Monitoring and Evaluation Report of Works Carried out During 2014-15 to 2016-17in the State Rajasthan

Comprehensive Report

Submitted to:

The Addl. PCCF (M&E)
O/o Principal Chief Conservator of Forests (HoFF)
Aranya Bhavan, Jhalana Dungari
Jaipur-302004, Rajasthan

Submitted by:

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The assignment of Conducting External Evaluation/Study of Plantations and Construction of Soil Water Conservation Structures and Building executed under CAMPA during 2014 -15 to 2016-17 in Rajasthan was awarded to AFC India Ltd.

At the very outset, we would like to thank the Principal Chief Conservator of Forests and Head of Forest Force (PCCF & HoFF) and Principal Chief Conservator of Forests, M&E for giving us the opportunity to undertake the assignment and for his timely guidance in bringing out this report. We would also like to thank the DCF (M&E), Jaipur for coordinating with circle and district level officials for the study.

We are extremely grateful to the DFOs at the Divisions level for their support and cooperation at field level without which the task could not have been accomplished.

We extend our heartfelt thanks to the Rangers, Foresters and Forest Guards for their kind support and co-operation in sharing information and facilitating field visit. In addition, we express our heartfelt thanks to all other Staff members for their inputs and support during the study.

We also convey our special thanks to the entire team who were associated directly or indirectly in the field assessment and data collection for their excellent support. Last but not least we are thankful to Dr Jeetram, CCF (retd) for his guidance and overall support in accomplishment of the study successfully.

Dr Narendra Baduni
Project Coordinator
AFC INDIA LTD.

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Executive Summary

E.1 State CAMPA

Ministry of Environment, Forests & Climate Change (MoEF&CC), Govt. of India (GoI) had issued guidelines on 2nd July 2009 for establishing State CAMPA (Compensatory Afforestation Fund Management and Planning Authority) in the States/UTs and putting in place a funding mechanism for enhancing forest and tree cover and conservation and management of wildlife by utilising funds received towards Compensatory Afforestation (CA) and Net Present Value (NPV), etc., currently available with the Adhoc CAMPA, GoI.

E.2 State CAMPA in Rajasthan

E.2.1 Establishment

The State CAMPA in Rajasthan was created in the year 2009 vide notification No. S.O. 279 dated November 12, 2009.

E.2.2 Aims and Objectives

The aims and objectives of Rajasthan State CAMPA are:

a. Conservation, protection, regeneration and management of existing natural forests.

b. Conservation, protection and management of wildlife and its habitat within and outside the protected areas including the consolidation of the protected areas.

c. Compensatory Afforestation.

d. Environmental services, which include (i) Provision of goods such as wood, non-timber forest products, fuel, fodder and water and provision of services such as grazing, tourism, wildlife protection and life support, (ii) Regulating services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes, (iii) Non-material benefits obtained from ecosystems, spirituals, recreational, aesthetic, inspirational, educational and symbiotic, and (iv) Supporting such other services necessary for the protection of ecosystem services, biodiversity, nutrient cycling and primary production.

e. Research, training and capacity building.

E.2.3 Implementation

In Rajasthan State CAMPA, several activities viz. (i) Compensatory Afforestation, (ii) Preservation & development of natural forests, (iii) Afforestation of degraded forest areas, (iv) Forest protection, (v) Management of wildlife, (vi) Capacity building, (vii) Research & development, (viii) Infrastructure development and (ix) Other allied activities have been taken up from 2010-11 till now.

During the years 2014-15 to 2016-17, the CAMPA Project was implemented in 225 Ranges of 51 Divisions of Forest, Wildlife and Research of Rajasthan State.

E.3 Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17. This evaluation/study was carried out by AFC Delhi during the year 2021-22.

The objectives of present Third Party Evaluation/Study were:

a. To evaluate the survival rate including growth of plants and their impact on vegetal cover.
b. To assess adherence to the procedures for construction, plantation and any other proceedings for asset creation in conformity with the guidelines and procedures laid down under the project or defined by the government.
c. To evaluate stock taking of various assets created under the project in terms of quantity and quality.
d. To check the documentation, record keeping and reports relating to assets created at Divisional level.
e. To assess the overall impact of the various activities of the project.

E.4 Methodology Used in Third Party Evaluation/ Study

E.4.1 Procurement of Secondary Data of Physical and Financial Targets

Secondary information pertaining to physical and financial targets allotted and achieved during the years 2014-15 to 2016-17 in Rajasthan State was obtained from the O/O Principal Chief Conservator of Forests (PCCF), Head of Forest Force (HoFF), Jaipur, Rajasthan and all the Divisional Forest Officers (DFOs) of CAMPA project and analyzed.

E.4.2 Selection of Sites

As per Annual Plans of Operations (APO) for the years 2014-15 to 2016-17 of Rajasthan CAMPA Project, the physical targets of plantations and construction activities were achieved on a number of sites located in its 225 Ranges of 51 CAMPA Project Divisions.

Out of these sites, 20% sites were selected by the O/O Principal Chief Conservator of Forests (PCCF), Head of Forest Force (HoFF), Jaipur, Rajasthan State by using stratified random sampling for the Present Third Party Evaluation/ Study

E.4.3 Procurement of Secondary Data of Selected Sites

The secondary data of the selected sites was obtained from the O/O concerned Divisional and Range Officers of Forest Department and analyzed.

E.4.4 Field Survey

E.4.4.1 Plantations

Detailed field survey of all the selected plantation sites was conducted and photographed by the AFC evaluation team during the year 2021-22.

At every selected plantation site:

- Panchnama was signed between the front line staff of Forest Department and the members of AFC evaluation team.
- KML file was prepared by walking on the boundary of planted area. The area of KML file was calculated and compared with plantation targets shown achieved in the APO.
- 100% counting of planted live and dead plants was carried out and calculation sheet was prepared. Lime was used to mark the counted plants. From this, species wise and overall survival % of every selected plantation site was determined.
- Girth at breast height (GBH) and height of randomly selected, species wise, representative planted live plants was measured. From this, species wise average height and GBH of planted live plants of every selected plantation site was determined.
- Sample plots of 0.1 ha were randomly laid for the counting of plants of natural regeneration of tree species. The species wise number of plants growing naturally in

each sample plot were counted and species wise average number of plants of natural regeneration per sample plot were calculated and extrapolated to per ha.

- Growth and survival of plants of seed sowing of every selected site was estimated in 4 categories (poor, good, very good and excellent). Further, spacing of plants is a very important cultural operation in seed sowing. Therefore, this operation was also evaluated.
- Contour Trenches constructed for rain water conservation, Check Dams constructed for soil conservation and the Stone Wall Fencing and Boundary Trench Fencing constructed for protection of plantations were measured and their roll played in the soil and moisture conservation along with their present condition were evaluated
- After completion of field survey, the area was re-surveyed to ensure that no work is left uncounted, unmeasured and unnoted.
- Observations made during the field survey were recorded in the Evaluation Format of Plantations and SMC Works.
- Documents such as plantation journal, estimation sheet/MB, KML file and plantation map, etc. were evaluated.
- Short meetings were held with the front line staff to know the constraints faced by them in the execution of project activities and their suggestions for improvement.
- Evaluators recorded their recommendations for the improvement of project activities.

E.4.4.2 Construction Activities

Every selected site of construction activities (Anicut II, Anicut III, 4Ft Wall, 6Ft Wall, Forest Guard Chowki, Office-cum-Residence, Rescue Centre, Boundary Pillars and Construction of Roads) was visited by the evaluation team during the year 2021-22. The construction activities were compared with the measurement book (MB), photographed and their GPS readings, present condition and utilization were recorded in the concerned Evaluation Format.

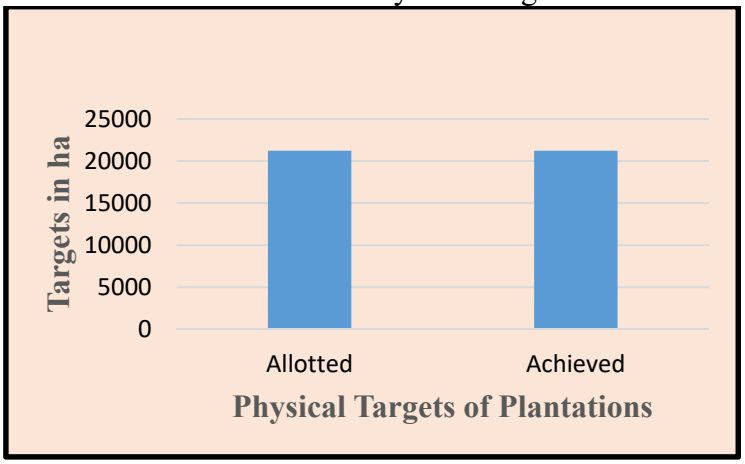
E.5 Results of Quantitative Evaluation

E.5.1 Physical Targets

a. Plantations

During the project period of 3 years (2014-15 to 2016- 17), physical target of 21216.765 ha plantation was achieved against the allotted physical target of 21216.765 ha plantations resulting in 100% achievement of plantation targets (figure-i).

Figure- i: Allotted and Achieved Physical Targets of Plantations (ha)

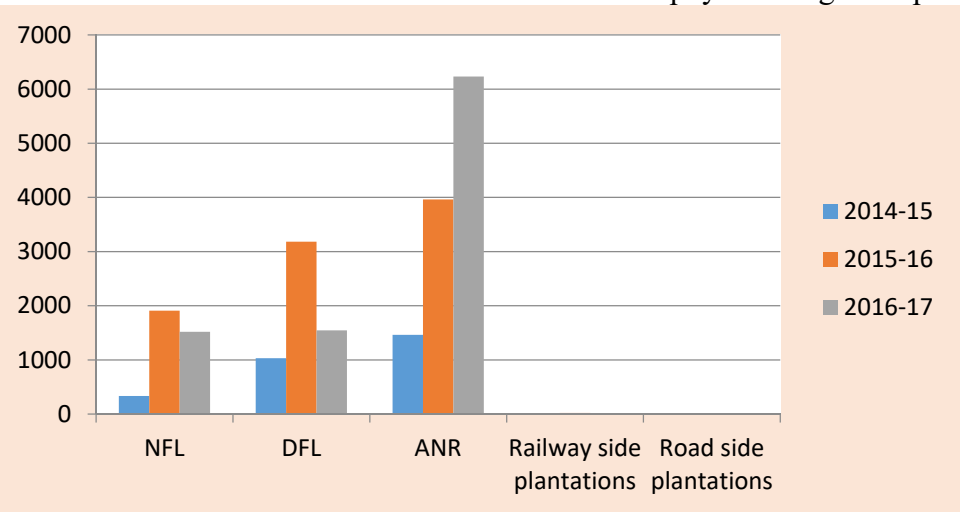


The year wise and model wise allotted and achieved physical targets of plantations (in ha) during the years 2014-15 to 2016-17 were as given in table-i and figure-ii.

Table-i: Year wise allotted and achieved physical targets of plantations

Year	Model of Plantations in ha					
	NFL	DFL	ANR	Railway side Plantations	Road side Plantations	Total
2014-15	335.000	1033.000	1462.000	0	0	2830.000
2015-16	1910.000	3182.000	3962.000	20.640	16.125	9090.765
2016-17	1518.000	1547.000	6231.000	0	0	9296.000
Total	**3763.000**	**5762.000**	**11655.000**	**20.640**	**16.125**	**21216.765**

Figure-ii: Year wise and model wise allotted and achieved physical targets of plantations



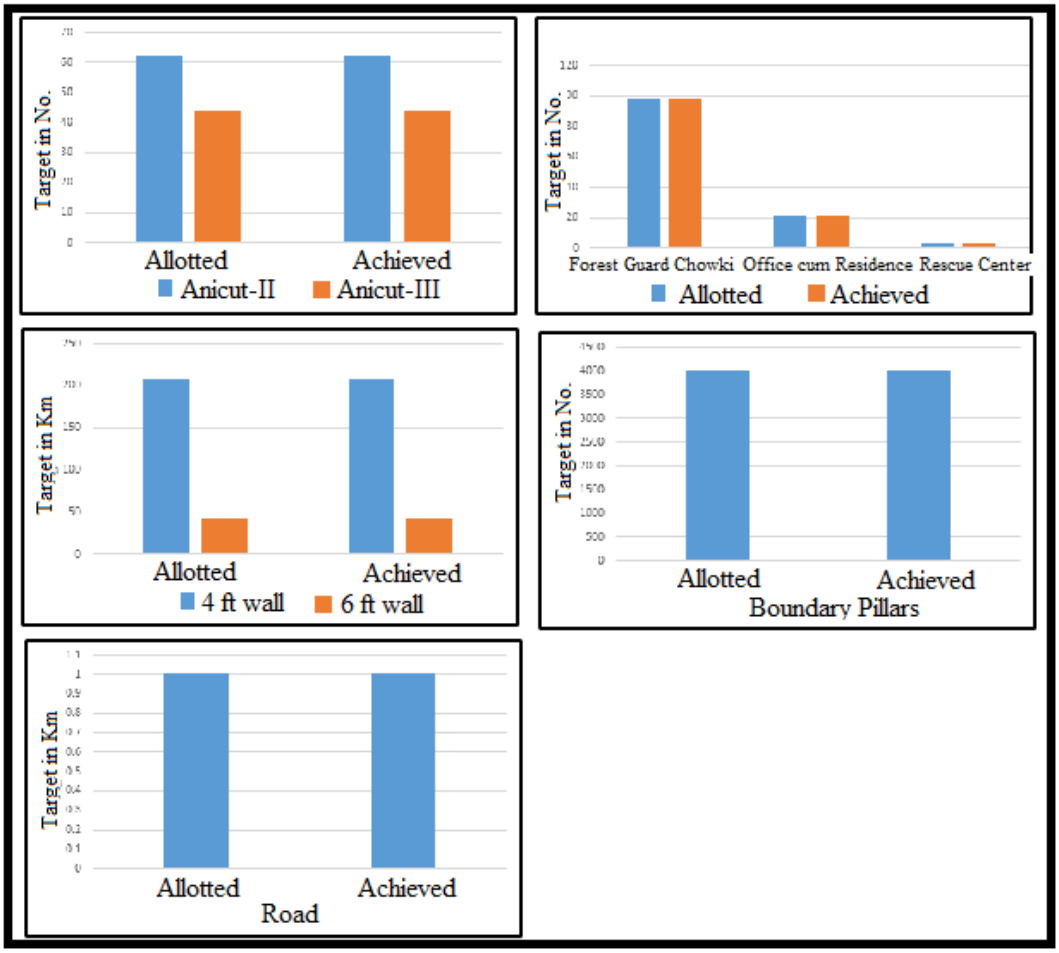
b. ***Construction Activities***

During the project period of 3 years (2014-15 to 2016- 17), 62 No. of Anicut II, 44 No. of Anicut III, 98 No. of Forest Guard Chowki, 21 No. of Office cu m Residence, 3 No. of Rescue Centre, 207.32 Km of 4Ft Wall, 41.84 Km of 6Ft Wall, 4005 No. of Boundary Pillars and 1 km road were constr ucted against the same No./Km allotted targets resulting in 100% achievement of these construction activities (table-ii and figure-iii).

Table-ii: Year wise allotted and achieved physical targets of Construction Activities

Year	Construction Activities								
	Anicut II (No.)	Anicut III (No.)	4Ft Wall (Km)	6Ft Wall (Km)	Forest Guard Chowki (No.)	Office cum Residence (No.)	Rescue Centre (No.)	Boundary Pillars (No.)	Construction of Roads (Km)
2014-15	31	22	139.00	0	40	3	0	0	0
2015-16	0	0	30.00	5.00	20	4	0	1700	0
2016-17	31	22	38.32	36.84	38	14	3	2305	1
Total	**62**	**44**	**207.32**	**41.84**	**98**	**21**	**3**	**4005**	**1**

Figure- iii: Allotted and Achieved Physical Targets of Construction Activities



E.5.2 Financial Targets

x. Plantations

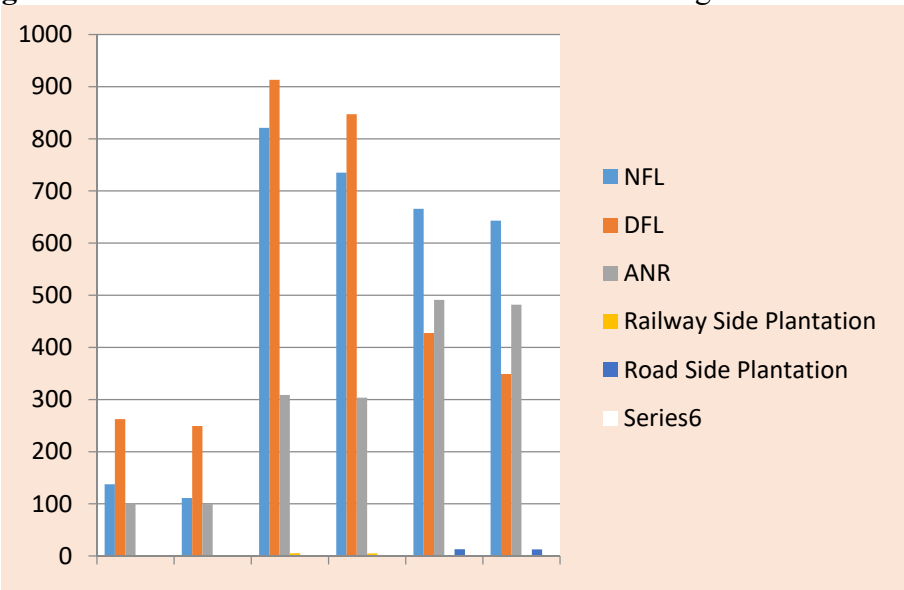
During the project period of 3 years (2014-15 to 2016- 17), an expenditure of Rs 3837.35 lakh was incurred on plantations against the allotted financial target of Rs. 4146.76 lakh resulting in 92.54% achievement of financial target of plantations (table-iii and figure-iv).

Table-iii: Year wise allotted and achieved financial targets of Plantations

Model of Plantation	Year wise Financial Targets of Plantations (Rs. in Lakhs)							
	2014-15		2015-16		2016-17		Total	
	Allotted	Achieved	Allotted	Achieved	Allotted	Achieved	Allotted	Achieved
NFL	137.55	111.13	821.01	735.00	665.74	642.98	1624.29	1489.12
DFL	262.37	249.36	913.24	847.04	427.61	348.93	1603.23	1445.33
ANR	101.13	99.54	308.80	303.60	491.02	481.99	900.95	885.13
Railway Side Plantation	0.00	0.00	5.21	5.13	0.00	0.00	5.21	5.13

Road Side Plantation	0.00	0.00	0.00	0.00	13.09	12.64	13.09	12.64
Total	**501.05**	**460.04**	**2048.26**	**1890.77**	**1597.46**	**1486.54**	**4146.76**	**3837.35**

Figure- iv: Year wise allotted and achieved financial targets of Plantations



y. Construction Activities

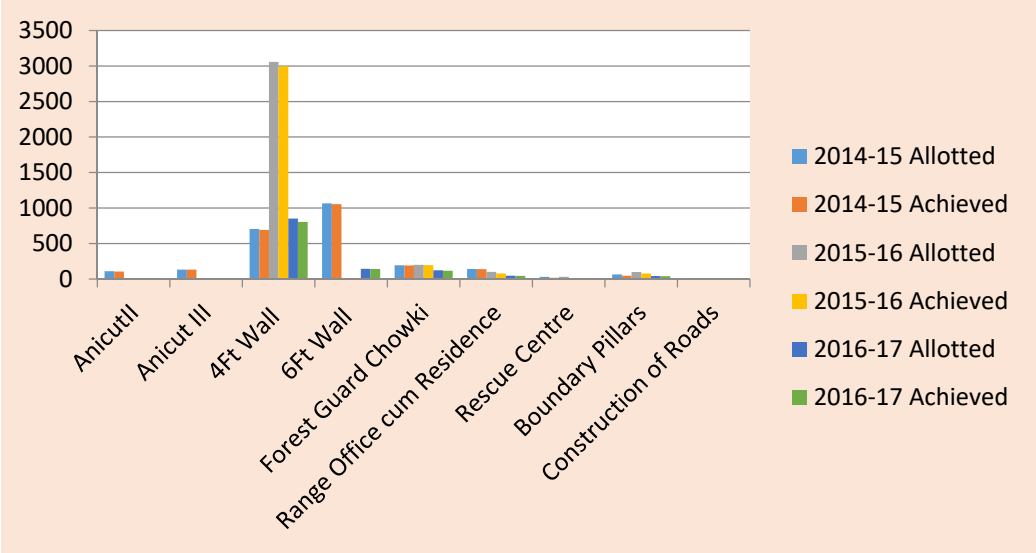
During the project period of 3 years (2014- 15 to 2016- 17), an expe nditure of Rs 6875.46 lakh was incurred on construction activities against the allotted fin ancial target of Rs. 7126.50 lakh resulting in 96.48 % achievement of financial target of construction activities (table-iv and figure-v).

Table-iv: Year wise financial targets of Construction Activities

Construction Activities	Financial targets of Construction Activities (Rs. in Lakh)							
	2014-15		2015-16		2016-17		Total	
	Allotted	Achieved	Allotted	Achieved	Allotted	Achieved	Allotted	Achieved
Anicut II	108.50	104.43	0.00	0.00	0.00	0.00	108.50	104.43
Anicut III	132.00	131.41	0.00	0.00	0.00	0.00	132.00	131.41
4Ft Wall	704.00	691.34	3058.00	2994.74	851.87	803.25	4613.87	4489.33
6Ft Wall	1066.06	1054.07	0.00	0.00	142.50	141.11	1208.56	1195.18
Forest Guard Chowki	191.98	190.99	200.00	195.98	123.91	115.62	515.89	502.59
Range Office cum Residence	140.00	138.85	100.00	77.99	46.33	44.66	286.33	261.50
Rescue Centre	30.00	17.68	30.00	10.87	0.00	0.00	60.00	28.55
Boundary Pillars	64.00	46.16	99.00	77.46	41.75	38.85	201.35	162.47

Construction of Roads	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	2436.54	2374.93	3487.00	3357.04	1206.36	1143.49	7126.50	6875.46

Figure- v: Year wise Financial Targets of Construction Activities



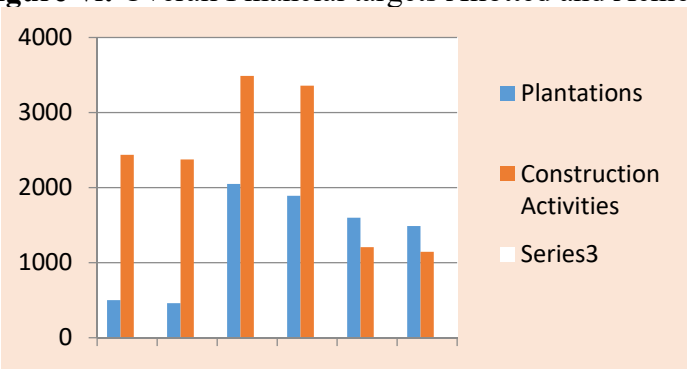
z. *Overall Financial Achievement*

Thus, during the project period of 3 years (2 014-15 to 2016- 17), an expenditure of Rs 10712.81 lakh was incurred on plantations an d construction activities against the allotted financial target of Rs. 11273.26 lakh resulting in 95.03% achievement of financial target (table-v and figure-vi).

Table-v: Overall Financial targets Allotted and Achieved

Overall Financial Achievement (Rs. in lakh)								
Project Activities	2014-15		2015-16		2016-17		Total	
	Allotted	Achieved	Allotted	Achieved	Allotted	Achieved	Allotted	Achieved
Plantations	501.05	460.04	2048.26	1890.77	1597.46	1486.54	4146.76	3837.35
Construction Activities	2436.54	2374.93	3487.00	3357.04	1206.36	1143.49	7126.50	6875.46
Total	**2937.59**	**2834.97**	**5535.26**	**5247.81**	**2803.82**	**2630.03**	**11273.26**	**10712.81**

Figure-vi: Overall Financial targets Allotted and Achieved



E.6 Results of Qualitative Evaluation

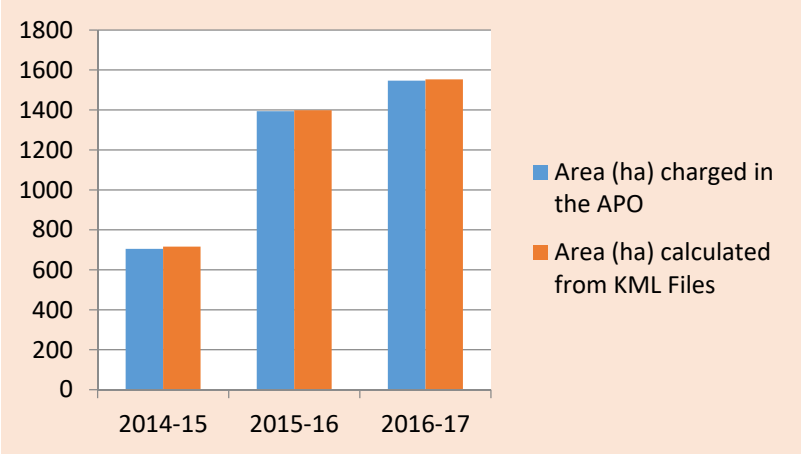
E.6.1 Comparison of Area of Plantations with KML files

Year wise plantation areas calculated in the field from the KML files and the areas charged in the APO were as given in table-vi and figure-vii.

Table-vi: Year wise plantation areas calculated in the field from the KML files and the areas charged in the APO

Year of Plantation	Area (ha) charged in the APO	Area (ha) calculated from KML Files	Excess area (ha) charged in the APO
2014-15	704.92	716.32	Nil
2015-16	1393.68	1398.82	Nil
2016-17	1546.54	1553.13	Nil
Total	**3645.14**	**3668.27**	Nil

Figure-vii: Year wise plantation areas calculated in the field from the KML files and charged in the APO



It is evident from table-vi and figure-vii that no excess area was charged in the APOs.

E.6.2 Ranking of Plantations and Construction Activities

85 sites of plantations of 74 Ranges of 39 Divisions and 93 sites of construction activities of 84 Ranges of 41 Divisions were selected by the O/O Principal Chief Conservator of Forests (PCCF), Head of Forest Force (HoFF), Jaipur, Rajasthan State by using stratified random sampling for the Present Third Party Evaluation/ Study.

All the selected sites of plantations and construction activities were evaluated by the evaluators of AFC Delhi during the year 2021-22 and the site wise results of evaluation were as given in table-vii.

Table-vii: Ranking of Plantations

	List of Plantations evaluated in the year 2014-15, 2015-16 & 2016-17						
1	**Name of Division** : **Ajmer**						
	Name of Range	**Name of Plantation**	**Model**	**Year of Plantation**	**Area**	**Survival percentage (%)**	**Rank**
	Pushkar	Daulatpura III	NFL	2015-16	10.1	49.6	5
	Kishangarh	Kshatipurti Natuti	NFl	2016-17	1.65	87.9	9
	Kishangarh	Tikhiya tukda	DFL	2015-16	28	79	8
2	**Name of Division : Alwar**						
	Laxmangarh	Dabarwas	NFL	2015-16	7.55	74.95	8
	Behror	Mainpur	DFL	2015-16	50	63.7	7
	Kishangarhwas	Chuhadpur	DFL	2016-17	50	62	7
	Alwar	Amritwas	DFL	2016-17	50	78.7	8
	Rajgarh	Jaitu ki Jo	ANR	2016-17	50	71.1	8
3	**Name of Division : Banswara**						
	Banswara	Kalakhet	NFL	2014-15	64	61.5	7
	Garhi	Rohal Panasi Malwasa	ANR	2016-17	60	62.9	7
4	**Name of Division : Baran**						
	Shahabad	Dudawar	DFL	2015-16	50	42.7	5
	Kishanganj	Vilasdam	ANR	2016-17	50	54.7	6
5	**Name of Division : Barmer**						
	Siwana	Nal-B	DFL	2015-16	20	53.3	7
6	**Name of Division : Bharatpur-T**						
	Kaman	Matiya Pahar - B	ANR	2015-16	65	45.2	5
	Bayana	Pathwari	ANR	2016-17	50	45.8	5
7	**Name of Division : Bhilwara**						
	Jahazpur	Sui	DFL	2014-15	50	67.1	7
	Mandalgarh	Danpura	NFL	2015-16	1.35	50.5	6
	Jahazpur	Titoda	DFL	2015-16	52	57.9	6
	Jahazpur	Kalia Dungar	ANR	2016-17	50	70.5	8
8	**Name of Division : Bundi**						
	Hindoli	Amratya -C	DFL	2015-16	50	75.7	8
	Nainwa	Devnarayan	ANR	2016-17	55	78.5	8

9	**Name of Division : Chhatargarh**						
	Dantor	3SLM	NFL	2014-15	2.75	70.7	8
10	**Name of Division : Chittorgarh-T**						
	Begun	Metha ki Dhani	DFL	2015-16	70	61.1	7
	Vijaypur	Chorbadli	ANR	2016-17	50	65.1	7
11	**Name of Division : Chittorgarh-WL**						
	Jakham	Karia Amba-B	ANR	2015-16	50	81.78	9
12	**Name of Division : Dausa**						
	Dausa	Khora khurd	ANR	2014-15	50	59.2	6
	Bandikui	Khund Jatali	DFL	2015-16	50	84.4	9
13	**Name of Division : Dholpur**						
	Bari	Sath ka kharra	DFL	2015-16	50	58.2	6
	Sarmathura	Dholimati -II	ANR	2016-17	50	60.6	7
14	**Name of Division : Dungarpur**						
	Bichhiwada	Sabli	ANR	2015-16	50	59.9	6
	Aspur	Bhadga	NFL	2014-15	2.55	65	7
15	**Name of Division : Jaipur-North**						
	Achrol	Achrol	ANR	2014-15	50	77.76	8
	Shahpur	Bera ki dhani-Bishangarh	NFL	2015-16	33.55	75.87	8
	Shahpur	Devan	ANR	2016-17	50	77.1	8
	Viratnagar	Berki	DFL	2015-16	50	59.41	6
16	**Name of Division : Jaipur-T**						
	Amer	Daulatpura	DFL	2014-15	48.16	71.83	8
17	**Name of Division : Jaipur-WL**						
	Raisar	Ghoret	ANR	2016-17	50	67.5	7
	Raisar	Kanikhor	ANR	2016-17	50	64.9	7
18	**Name of Division : Jaisalmer**						
	Jaisalmer	Mokla Parevar	NFL	2015-16	50	72	8
	Jaisalmer	Mokla Parevar	NFL	2016-17	50	71.56	8
	Jaisalmer	Mokla Parevar	NFL	2014-15	25	73.57	8
19	**Name of Division : Jaisalmer- Unit-II**						
	Unit-II	SDS 18RD JJW	NFL	2015-16	36	53.4	7
20	**Name of Division : Jalore**						
	Jasvantpura	Kolar	ANR	2016-17	50	70.6	8
21	**Name of Division : Jhalawar**						
	Aklera	Ametha-1	DFL	2014-15	50	61.6	6

	Manoharthana	Chamargarh Kotra	ANR	2015-16	50	79.5	8
	Khanpur	Golana -I	NFL	2016-17	40	78.4	8
22	**Name of Division : Jhunjhunu**						
	Udaipurwati	Goriya Dhanawat	DFL	2014-15	50	61	7
	Udaipurwati	Kishorpura	ANR	2014- 15	50	57	6
23	**Name of Division : Jodhpur**						
	Osian	Nadiyakalan	ANR	2016-17	50	59	6
24	**Name of Division : Karauli**						
	Gudachandraji	Gehroli-1	DFL	2015-16	50	60.5	6
	Sapotra	Narolidang	ANR	2016-17	50	63.8	7
25	**Name of Division : Karauli-RTR**						
	Karanpur	Gadigaon	ANR	2016-17	50	78.8	8
26	**Name of Division : Kota**						
	Ladpura	Dodhdevi-11	DFL	2014-15	50	68.9	7
	Mandana	Bhilot	ANR	2015-16	12	79.9	8
	Ladpura	Bowdikheda	NFL	2016-17	6.71	63.6	7
27	**Name of Division : Kota MNP**						
	Gagron	Raipura	NFL	2015-16	54.41	62.2	7
	Borawas	Sakatpura	DFL	2016-17	33.18	65.7	7
	Jawahar Sagar	Ambarani	ANR	2016-17	50	79.8	8
28	**Name of Division : Kota WL**						
	Bhensrodgarh	Katiramnagar	ANR	2014-15	50	69.5	7
29	**Name of Division : Pali**						
	Pali	Dari	ANR	2015-16	50	61.8	7
	Pali	Maniyari	ANR	2016-17	50	63.8	7
	Sendra	Pachanpura	DFL	2016-17	50	63	7
	Sojat	Devdugari	ANR	2016-17	50	63.2	7
30	**Name of Division : Pratapgarh**						
	Chhoti Sadri	Janjal	ANR	2016-17	50	78.9	8
31	**Name of Division : Rajsamand**						
	Kumbhalgarh	Tejo Ka gura	NFL	2015-16	19.16	68.1	7
	Desuri	Rupan Mata	ANR	2015-16	50	74.8	8
32	**Name of Division : Sariska Alwar**						
	Tehla	Talab	ANR	2016-17	50	85.3	9
33	**Name of Division : Sawai madhopur**						
	Boli	Dehlod-III	ANR	2014-15	50	50.9	6

34	**Name of Division : Sikar**						
	Neem ka Thana	Bhagega II	DFL	2014-15	50	61.6	7
	Sikar	Malkeda	NFL	2014-15	4.9	65.2	7
	Patan	Meena ka Nagal	ANR	2016-17	50	82.8	9
	Neem ka thana	Pritampuri	DFL	2014-15	50	67.2	7
35	**Name of Division : Sirohi**						
	Abu Road	Dhamsara (Village-Mung thala)	NFL	2015-16	1.735	59.3	6
	Sirohi	Kuakhera at Mirpur C.No. 9	DFL	2015-16	50	52.4	6
	Pindwara	Rupanmata at Rameshwar C.No . 18	ANR	2016-17	50	60.8	7
36	**Name of Division : Tonk**						
	Deoli	Devpura	DFL	2015-16	50	70.4	8
	Tonk	Kurasiya	DFL	2015-16	35	70.1	8
	Niwai	Choganya siras	ANR	2016-17	50	77.4	8
37	**Name of Division : Udaipur-North**						
	Gogunda	Patiya	DFL	2014-15	4.65	83.49	9
	Udaipur	Varda	NFL	2015-16	97.82	62	7
	Kotra	Subra subri-14	ANR	2015-16	50	71.7	8
	Sayra	Boramagra -B	ANR	2016-17	50	61.3	8
38	**Name of Division : Udaipur-T**						
	Kherwada	Pachapadla	NFL	2014-15	2.91	64	7
	Phalasiya	Balvi	ANR	2016-17	50	73.03	8
39	**Name of Division : Udaipur-WL**						
	Jaisamand	Janana odi	ANR	2015-16	50	88.5	9

(Excellent = 9, Very Good = 8, Good = 7, Average = 6 and Poor = 5)

It is evident from table-vii that:

a. Plantations

i. Total area of all the *selected and evaluated 85 sites of plantations of 74 Ranges of 39 Divisions was 3645.14 ha.*

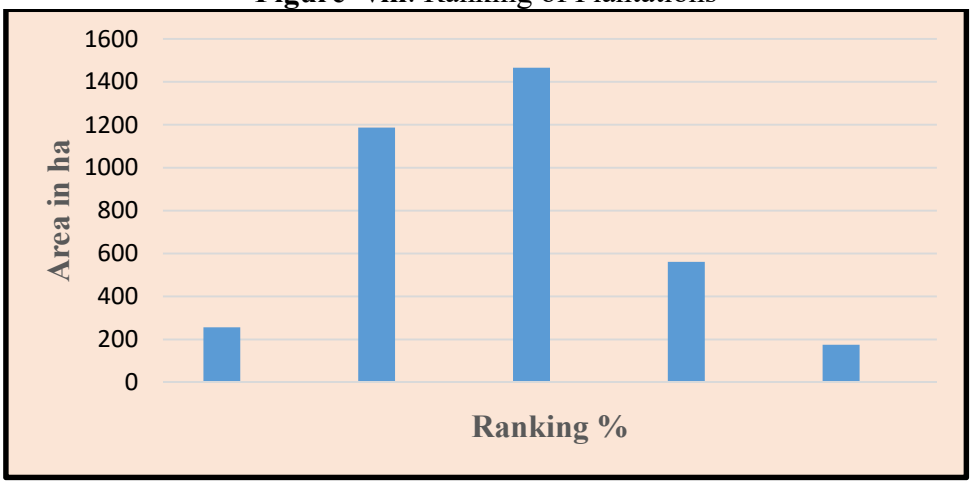
ii *The overall ranking of evaluated 3645.14 ha plantations was Good (7) with a survival percentage of 67.10%.*

iii. *The ranking was (figure-viii):*

- ***Excellent (9) of 256.30 ha plantations having survival % between 80 and 90%***
- ***Very Good (8) of 1187.01 ha plantation having survival % between 70 and 80%***

- ***Good (7) of 1465.64 ha plantation having survival % between 60 and 70%***
- ***Average (6) of 561.09 ha plantation having survival % between 50 and 60%***
- ***Poor (5) of 175.10 ha plantation having survival % between 40 and 50%***

Figure- viii: Ranking of Plantations



b. Construction Activities

Table-ix: Ranking of Construction Activities

	List of Structures evaluated in the year 2014-15, 2015-16 & 2016-17				
1	**Name of Division : Ajmer**				
	Name of Range	**Name of Structure**	**Site**	**Year of Construction**	**Rank**
	Ajmer	20 boundary pillars	Dumada	2016-17	7
	Ajmer	4 ft 500 m Stone wall	Mahua Bhid	2016-17	8
	Kishangarh	4 ft 4592m Stone wall	Sambharia harda	2015-16	8
	Pushkar	4 ft 350 m Stone wall	Kanas Banseli	2014-15	8
	Sarwad	Forest Guard Chowki	Sarwad	2014-15	8
2	**Name of Division : Alwar**				
	Rajgarh	Gwada Rampura	Forest Guard Chowki	2014-15	8
3	**Name of Division : Baran**				
	Chhipabarod	20 Boundary Pillars	Set Kolu	2014-15	6
	Kelwara	40 Boundary Pillars	Rajpura-A	2016-17	7
4	**Name of Division : Barmer**				
	Balotra	20 Boundary Pillars	Kitnod	2014-15	8
5	**Name of Division : Bharatpur-T**				
	Bayana	20 Boundary Pillar	Bayana Pahar -B Samraya	2014-15	6
	Deeg	4 Ft. wall-1000 m	Aau	2016-17	8

	Bharatpur	Range Office cum Residence	Bhutnath Nursery	2016-17	7
6	**Name of Division : Bharatpur-KNP**				
	Ghana	Anicut Type-III	D-Block of Ghana	2014-15	7
	_Bandhbaretha	20 Boundary Pillars	Ghuneni Saipur	2014-15	7
7	**Name of Division : Bhilwara**				
	Bhilwara	Hamirgarh	Forest Guard Chowki	2015-16	8
	Jahazpur	Paroli-1	4 ft 500 m Stone wall	2015-16	7
	Gangapur	Bharat Mataji	4 ft 500 m Stone wall	2015-16	7
	Bhilwara	Hamirgarh-111	4 ft 500 m Stone wall	2015-16	8
	Bhilwara	Sangner	4 ft 500 m Stone wall	2016-17	7
8	**Name of Division : Bikaner Stage-II**				
	Unit-III	Jaggasar	Forest Guard Chowki	2015-16	7
9	**Name of Division : Bikaner WL**				
	Johbid Gadhvala Conservation Reserve Forest	Kotri	Range office cum residence	2015-16	8
10	**Name of Division : Bundi**				
	Hindoli	Vijaygarh	10 Boundary Pillars	2014-15	7
	Dabi	Karaundi	40 Boundary Pillars	2016-17	6
11	**Name of Division : Chittorgarh-T**				
	Bengu	Bengu	Forest guard chowki	2016-17	8
12	**Name of Division : Chittorgarh-WL**				
	Jakham	Anoopura	Forest Guard Chowki	2014-15	8
	Dhariyavad	Aarampura	6 Ft. Wall- 800 m	2014-15	7
	Bassi	Bichor	Anicut- II	2015-16	7
13	**Name of Division : Churu**				
	Ratangarh	Ratangarh	Forest Guard Chowki	2015-16	8
	Sardarshahar	Sardarshahar	4 Ft. wall - 2000 m long	2015-16	7
14	**Name of Division : Dholpur**				
	Dholpur	Dholpur Nursery	Forest Guard Chowki	2014-15	8
	Kesarbagh	Kesar Bagh	Anicut-11	2015-16	6
	Sarmathura	Thane ka pura	4 Ft. wall -500 m	2016-17	7

15	**Name of Division : Sri Ganganagar**				
	Structures				
	Gharsana	3 STR	Forest Guard Chowki	2015-16	8
16	**Name of Division : Hanumangarh**				
	Hanumangarh	Pilibanga	Rescue Centre	2014-15	7
17	**Name of Division : Jaipur-North**				
	Viratnagar	Talwa Bhihajar	Forest Guard Chowki	2015-16	7
18	**Name of Division : Jaipur-T**				
	Dudu	Bhaislana Bhadwa	Forest Guard Chowki	2015-16	7
	Dudu	Kanchroda	Forest Guard Chowki	2014-15	8
	Name of Division : Jaipur-WL				
	Nahargarh	Barahgaon Bhatia	Forest Guard Chowki	2014-15	6
19	**Name of Division : Jaisalmer**				
	Jaisalmer	Chhayan	20 boundary pillars	2014-15	8
	Dabla	Kodiyasar	4ft, 500 m long Stone wall	2015-16	8
20	**Name of Division : Jhalawar**				
	Jhalawar	Mishroli	Forest Guard Chowki	2014-15	8
	Dug	Kalyanpura	20 Boundary Pillars	2014-15	8
	Khanpur	Golona	100 Boundary Pillars	2016-17	6
	Asnawar	Goverdhanpura	100 Boundary Pillars	2016-17	6
21	**Name of Division : Jhunjhunu**				
	Khetri	Chirani	20 boundary pillars	2014-15	7
22	**Name of Division : Karauli**				
	Gudachandraji	Talchida	Forest Guard Chowki	2014-15	6
	Sapotra	Durgashah Nursery	Range Office cum Residence	2014-15	7
	Masalpur	Banswadi-8	40 Boundary Pillar	2014-15	6
	Sapotra	Kila Sapotra	4 Ft. wall -500 m	2014-15	6
	Masalpur	Gubreda	4 Ft. wall - 491 m	2015-16	7
23	**Name of Division : Karauli-RTR**				
	Karanpur	Mahajpura	Forest Guard Chowki	2016-17	7
	Kailadevi	Bargama -II	6Ft. Wall- 200 m	2016-17	8
24	**Name of Division : Kota**				
	Itawa	Dungarli Girdharpura	20 Boundary Pillars	2014-15	5

25	**Name of Division : Kota MNP**				
	Darra	Darra	Forest Guard Chowki	2014-15	8
	Ranvtha	Ranvtha	Range office cum residence	2014-15	8
	Darra	Darra	Anicut -II	2015-16	7
	Kolipura	Adakhal Kolipura	Anicut -II	2015-16	7
	Borawas	Borawas	Anicut -II	2015-16	7
26	**Name of Division : Kota WL**				
	Jaitpur	Ramgarh	Forest Guard Chowki	2014-15	6
	Ramgarh	Churala	Anicut-11	2015-16	5
	Jaitpur	Tanwara ka Jhopra Wala Nala	Anicut-11	2015-16	5
	Ramgarh	Kalam Kuie Nala	Anicut-11	2015-16	5
27	**Name of Division : Mt Abu**				
	Abu Parwat	Behind Jal Hotel	Anicut type-III	2015-16	7
28	**Name of Division : Nagaur**				
	Kuchaman	Sawaipura Paldi	10 Boundary Pillars	2014-15	7
	Kuchaman	Kuchaman	4 Ft. wall -250 m long	2014-15	6
	Parbatsar	Manglana-A	4 Ft. wall -500 m long	2016-17	8
29	**Name of Division : Pali**				
	Marwar Junction	Kheda Kalyanpura	25 Boundary Pillars	2014-15	7
	Desuri	Ghanerao	4ft height, 800m long Stone wall	2015-16	8
30	**Name of Division : Pratapgarh**				
	Pratapgarh	Janagarh and Bangud	60 boundary pillars	2016-17	8
	Devgarh	Jhatla-B	10 boundary pillars	2014-15	8
31	**Name of Division : Rajsamand**				
	Sadri	Sadri	10 boundary pillars	2014-15	8
	Bijaguda	Bagadi	Anicut II-WHS	2014-15	7
	Nathadwara	Bandariya Magra Part-C	4 ft 500 m wall	2016-17	7
32	**Name of Division : Sariska Alwar**				
	Talvriksh	Badi chind Rampur	Forest Guard Chowki	2014-15	7
	Alwar Buffer	Bhurasidh	Range Office cum Residence	2014-15	8
	Akbarpur	Sarsla Jungle	Anicut-II	2015-16	5

33	**Name of Division : Sawai madhopur**				
	Gangapur city	Nananwas	Forest Guard Chowki	2016-17	7
34	**Name of Division : Sawai madhopur-RTR**				
	Baler	Jharna	Anicut type-II	2014-15	7
	Talda	Hiraman ka Sthan	Anicut-II	2014-15	7
	Kundera	Kundera	Wall of 6 ft height of 500 m long	2014-15	7
35	**Name of Division : Sikar**				
	Danta	Jinmata	20 Boundary Pillars	2014-15	7
36	**Name of Division : Sirohi**				
	Sirohi	Matarwata Van Khand	4 Ft. wall- 800 m	2015-16	8
37	**Name of Division : Tonk**				
	Tonk	Tonk	Range Office cum Residence	2014-15	8
	Deoli	Anwa Dehdu	10 Boundary Pillar	2014-15	7
	Tonk	Malji ki Dungri	4 Ft. wall -500 m stone wall	2014-15	7
	Uniyara	Banetha	4 Ft. wall -100 m stone wall	2015-16	8
	Deoli	Nursery Bharna	4 Ft. wall -500 m stone wall	2016-17	7
38	**Name of Division : Udaipur-North**				
	Udaipur	Paga- 80	20 Boundary Pillars	2014-15	8
	Sayra	Bisma	Forest Guard Chowki	2015-16	7
39	**Name of Division : Udaipur-T**				
	Palsad	Saru -C	20 Boundary Pillars	2014-15	6
40	**Name of Division : Udaipur-WL**				
	Panarwa	Maldaiya	Forest Guard Chowki	2014-15	7
	Mamer	Umaria	60 Boundary Pillars	2014-15	7
	Jaisamand	Jamuda-II	Anicut -II	2015-16	8

i. ***Out of total selected and evaluated 93 sites of construction activities of 84 Ranges of 40 Divisions, the Ranking was:***

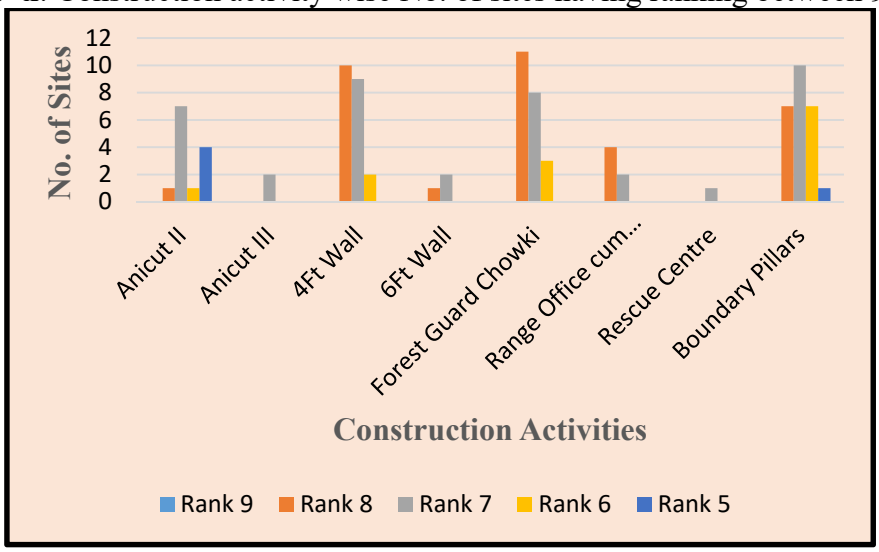
- ***Very Good (8) of 34 sites***
- ***Good (7) of 41 sites***
- ***Average (6) of 13 sites***
- ***Poor (5) 5 sites***

ii. The construction activity wise No. of sites having ranking between 9 an d 5 were as given in table-ix and figure- ix.

Table- x: Construction activity wise No. of sites having ranking between 9 and 5

Activity	No. of Sites with Ranks between 9 and 5					Total Sites
	9	**8**	**7**	**6**	**5**	
Anicut II	0	1	7	1	4	13
Anicut III	0	0	2	0	0	2
4Ft Wall	0	10	9	2	0	21
6Ft Wall	0	1	2	0	0	3
Forest Guard Chowki	0	11	8	3	0	22
Range Office cum Residence	0	4	2	0	0	6
Rescue Centre	0	0	1	0	0	1
Boundary Pillars	0	7	10	7	1	25
Total	0	34	41	13	5	93

Figure- x: Construction activity wise No. of sites having ranking between 9 and 5



E.6.3 Species wise Survival % and Height and Girth of Plants

Total 17 species (*Acacia catechu, Acacia leucopholea, Acacia nilotica, Acacia senegal, Acacia tortilis, Ailanthus excelsa, Azadirachta indica, Butea monosperma, Dalbergia sissoo, Dendrocalamus strictus, Emblica officinalis, Ficus racemosa, Holoptelea integrefolia, Pongamia pinnata, Tectona grandis, Wrightia tinctoria and Zizyphus mauritiana) were* planted in the CAMPA project.

Out of these 17 species, the survival and growth was very good of 9 species (*Acacia catechu, Acacia leucophloea, Acacia senegal, Acacia tortilis, Dalbergia sissoo, Dendrocalamus strictus, Holoptelea integrefolia, Tectona grandis and Zizyphus mauritiana)*

E.6.4 Status of Natural Regeneration

Plants of natural regeneration of *Butea monosperma* (Palash), *Azadirachta indica (*Neem), *Acacia leucophloea (*Ronj*), Acacia nilotica (*Desi babool*), Zizyphus mauritiana (*Ber), *Acacia senegal* (Kumtha) and *Acacia tortilis* (Totalis) were growing abundantly in areas of Aided Natural Regeneration (ANR) and Degraded Forest Land (DFL) plantations. Natural plants of these species varied from 83 to 192 per ha.

E.6.5 Status of Seed Sowing

Seedlings of seed sowing of *Acacia senegal* (Kumtha), *Acacia nilotica (*Desi babool*)*, *Acacia tortilis* (Totalis), *Acacia leucopholea (*Ronj*)*, *Azadirachta indica (*Neem) and *Zizyphus mauritiana (*Ber) were growing well on the dug up soil of trenches (contour trenches and trench fencing/boundary trenches) as well in the trenches. Spacing of seedlings of seed sowing should be done to enhance the growth of retained seedlings.

E.6.6 Status of Soil and Moisture Conservation (SMC) Works

Dimensions of Contour Trenches, Check Dams, Stone Wall Fencing and Boundary Trench Fencing were measured, compared with record and found almost correct. These SMC works have played their very good role in SMC and protection of plantations. The Boundary Trenches were found in good conditions, but some of the Check Dams and Stone Walls were found in broken condition and should be repaired.

E.6.7 Status of Record Keeping of Plantations and SMC Works

Year wise Plantation and SMC record produced by the frontline staff and checked by the evaluation team was almost appropriate (table-ix).

Table-xi: Year wise Plantation and SMC record produced by the frontline staff and checked by the evaluation team

Year	Total No. of plantation sites evaluated	No. of sites of which Plantation and SMC record produced by the frontline staff and checked by the evaluation team			
		Plantation Journal	Plantation Map	KML File	MB of SMC works
2014-15	20	17	12	9	19
2015-16	33	29	25	26	32
2016-17	32	27	29	27	32
Total	85	73	66	62	83

E.6.8 Status of Construction Activities: Status of construction activities was as given in table-xii.

Table-xii: Status of Construction Activities

Construction Activities	No. of sites	Present condition	Being utilized for the purpose of construction
Boundary Pillars	25	Good	Yes
Boundary wall	24	Good	Yes
Forest Guard Chowki	22	Good 5 Chowki need repair	Yes
Anicut	15	Good 7 Anicut need repair	Yes
Range Office cum Residence	6	Good	Yes
Rescue Centre	1	Good	Yes
Total	93	Good	Yes

E.6.9 Meeting with Stake Holders

The main issues emerged in the short meetings held with frontline staff of Forest Department at the evaluated plantation sites were as given below:

a. Constraints faced by the Front Line Staff in the implementation of CAMPA project activities

i. Hilly terrain
ii. No watering after planting
iii. No plantation watchers
iv. Huge biotic pressure
v. Less manpower/ staff

b. Suggestions of the Front Line Staff for improvement of CAMPA project activities

i. Provision of watering should be made
ii. Provision of plantation watchers should be made
iii. Adequate front line staff should be provided
iv. Vehicles should be provided to the front line staff

E.6.10 Recommendations of AFC Evaluators

Recommendations of AFC Evaluators for the improvement of project activities were as given below:

1. Rajasthan State CAMPA Project should be continued as it helped in:
    i. Improving the quality of Degraded Forest Lands (DFL),
    ii. Increasing the forest cover in the Non-Forest Lands (NFL),
    iii. Improving the habitat of wildlife, and
    iv. Improving the ecology of the areas.
2. Selection of plant species for planting should be site specific.
3. Proper alignment and spacing of plants should be maintained in all the models of plantation.
4. Spacing of seedlings of seed sowing should be done.
5. Damaged in-situ SMC structures (Stone walls and Check Dams) should be repaired.
6. Damaged Construction Activities (Anicuts and Forest Guard Chowkies) should be repaired.
7. Adequate provision should be made for watering to the plants.
8. Part time plantation watchers, at a fixed monthly payment, should be engaged at least up to 3rd year of plantations.
9. Adequate front line staff should be provided
10. Vehicles should be provided to the front line staff.
11. Forest area as well as Forest Cover is negligible in hot, arid and sandy Bikaner district of Rajasthan (Thar Desert) resulting in heavy soil erosion caused by wind storms during summer season.

    To increase the forest cover as well as to check the soil erosion in Bikaner district:

- The Mahajan Field Firing Range (located in Bikaner district) having 1,36,406 ha of barren govt. land should be taken up for afforestation.
- Wind breaks should be created by raising plantations along roads, canals and railway lines.

Chapter **A**

INTRODUCTION

A.1 State CAMPA

Ministry of Environment, Forests & Climate Change (MoEF&CC), Govt. of India (GoI) had issued guidelines on 2nd July 2009 for establishing State CAMPA (Compensatory Afforestation Fund Management and Planning Authority) in the States/UTs and putting in place a funding mechanism for enhancing forest and tree cover and conservation and management of wildlife by utilising funds received towards Compensatory Afforestation (CA) and Net Present Value (NPV), etc., currently available with the Adhoc CAMPA, GoI.

Compensatory Afforestation (CA) is the raising of plantation on alternate land to compensate the loss of forest area diverted for non-forestry purposes and Net Present Value (NPV) is the value of forest land diverted for non-forestry purposes.

A.2 State CAMPA in Rajasthan

A.2.1 Establishment

The State CAMPA in Rajasthan was created in the year 2009 vide notification No. S.O. 279 dated November 12, 2009.

A.2.2 Aims and Objectives

The aims and objectives of Rajasthan State CAMPA are:

a. Conservation, protection, regeneration and management of existing natural forests.

b. Conservation, protection and management of wildlife and its habitat within and outside the protected areas including the consolidation of the protected areas.

c. Compensatory Afforestation.

d. Environmental services, which include (i) Provision of goods such as wood, non-timber forest products, fuel, fodder and water and provision of services such as grazing, tourism, wildlife protection and life support, (ii) Regulating services such as climate regulation, disease control, flood moderation, detoxification, carbon sequestration and health of soils, air and water regimes, (iii) Non-material benefits obtained from ecosystems, spirituals, recreational, aesthetic, inspirational, educational and symbiotic, and (iv) Supporting such other services necessary for the protection of ecosystem services, biodiversity, nutrient cycling and primary production.

e. Research, training and capacity building.

A.2.3 Implementation

In Rajasthan State CAMPA, several activities viz. (i) Compensatory Afforestation, (ii) Preservation & development of natural forests, (iii) Afforestation of degraded forest areas, (iv) Forest protection, (v) Management of wildlife, (vi) Capacity building, (vii) Research & development, (viii) Infrastructure development and (ix) Other allied activities have been taken up from 2010-11 till now.

Major components of works carried outin Rajasthan State CAMPA Project were as given in table-1.

Table-1: Major components of works executed in Rajasthan State CAMPA Project

Sr. No.	Major Component	Brief Description
1	Afforestation	The following afforestation works are undertaken in Forest Divisions: a. Non-Forest Land (NFL) b. Degraded Forest Land (DFL) c. Assisted Natural Regeneration (ANR) d. Railway Side Plantation e. Road Side Plantation
2	Construction of Buildings	a. Forest Chowki b. Office cum Residence c. Rescue Centres
3	Soil & Moisture Conservation (SMC) Structures	a. Anicut type-II b. Anicut type-III
4	Construction of Boundary Walls	a. Construction of 4 feet high masonry wall in forest areas b. Construction of 6 feet high masonry wall in wildlife areas
5	Construction of Boundary Pillars	-
6	Construction of Roads	One road has been built in Dholpur Division

A.3 Present Third Party Evaluation/ Study

A.3.1 Introduction

Present Third Party Evaluation/ Study pertain to works carried out during the years 2014-15 to 2016-17 in Rajasthan State under the Rajasthan State CAMPA Project. This evaluation/study was carried out by AFC Delhi during the year 2021-22.

A.3.2 Objectives

The objectives of Third Party Evaluation/Study were:

a. To evaluate the survival rate including growth of plants and their impact on vegetal cover.

b. To assess adherence to the procedures for construction, plantation and any other proceedings for asset creation in conformity with the guidelines and procedures laid down under the project or defined by the government.

c. To evaluate stock taking of various assets created under the project in terms of quantity and quality.

d. To check the documentation, record keeping and reports relating to assets created at Divisional level.

e. To assess the overall impact of the various activities of the project.

A.3.3 Broad scope

The broad scope of Third Party Evaluation/Study includes, but not limited to:

a. Field verification and validation of plantations and quality of work done.

b. Field verification and validation of water conservation structurs and eco-restoration closures.

c. Field verification of various buildings/walls/assets constructed under the project.

d. Verification and comparison of related documents such as micro-plan, plantation journal, plantation card, design and estimate for soil & water conservation structures and construction of walls/buildings, store register and other necessary supporting documents in relation to the field situation and periodical progress reports submitted.

e. Assessment of the procedures/ norms of procurement, construction, plantation, payment and any other proceedings for asset creation in relation to the guidelines and procedures laid down under the project or defined by the government.

f. Suggested improvements.

g. Compliance of official circulars/orders by the implementing authorities.

A.3.4 Items/Activities assessed

The Items/Activities assessed in the Third Party Evaluation/Study were as given in table-2.

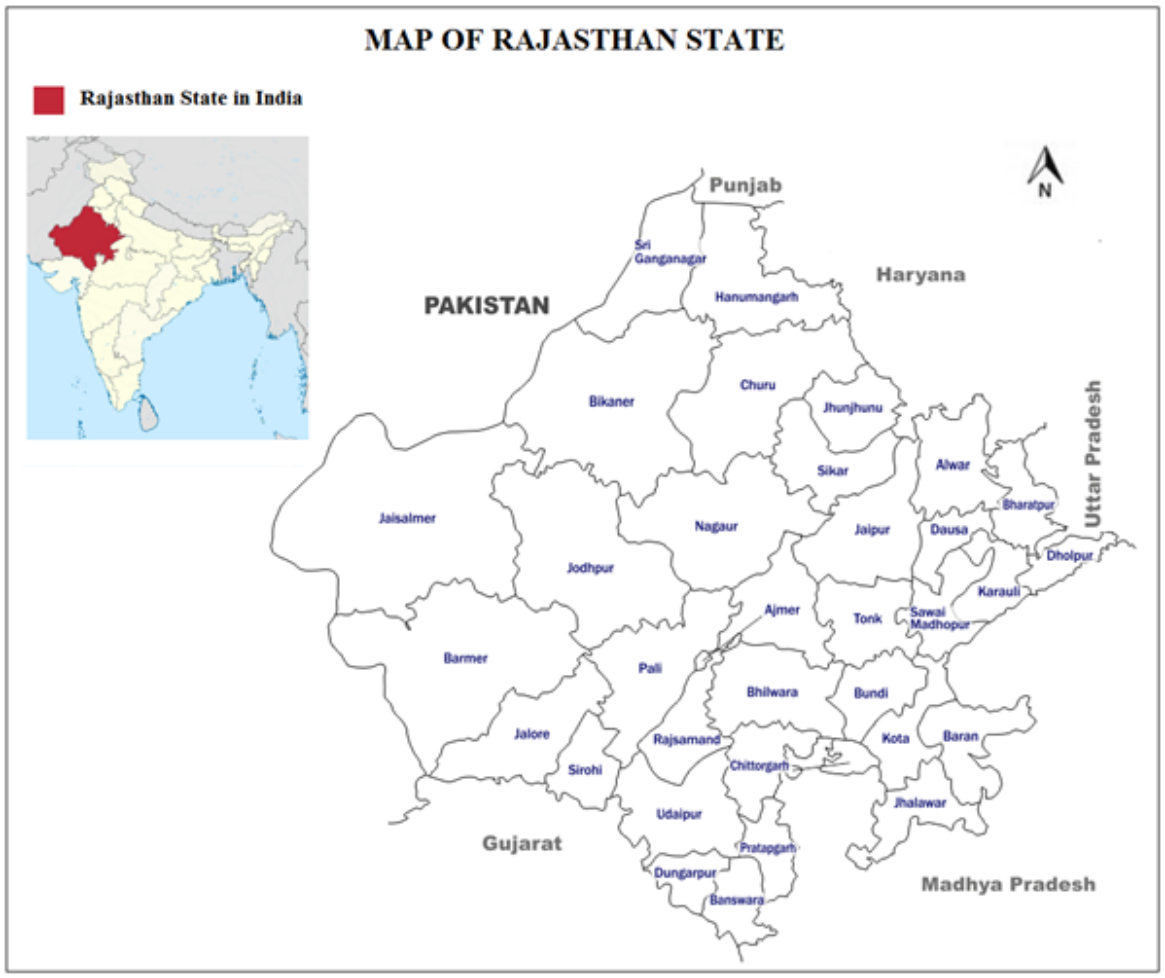
Table-2: Items/Activities to be assessed

Forestry related Activities	Construction related Activities	Record Keeping
• Survival rate of plantations under various Models including growth and impact of plantation • In-situ soil and water conservation works like CBD, Check dams, LB with gabions.	• SMC Structures (Anicut type-II & Anicut type-III) • Walls • Forest Chowkies • Office cum Residences • Rescue Centres • Roads • Boundary Pillars	• Micro-plans • Survey maps/ treatment maps • Plantation Journals • Estimates • Plantation cards • Transparency boards • VFPMC/ EDC's records • Various trainings, meetings, awareness camps, exchange visits, workshops, publicity etc. as mentioned in TOR.

A.4 Rajasthan State

a. Location

Rajasthan (Land of Kings) is the largest State in the Union of India. This State, with 3.42 lakh sq. km geographical area and 6.86 crores population (census 2011), is located in northwest India. It shares its western boundary with Pakistan and is bounded by the Indian States, viz. by Punjab State in the north, Haryana and Uttar Pradesh States in the northeast, Madhya Pradesh State in the southeast and south and Gujarat State in the south (Map of Rajasthan).



b. Administrative Divisions and Districts

For administrative purposes, Rajasthan State is divided into 7 Divisions. Each Division is divided into Districts resulting in 33 Districts in Rajasthan State (table-3). These Districts are further divided into Sub-Divisions consisting of Tehsils, Sub-Tehsils and Villages.

Table-3: Administrative Divisions and Districts in Rajasthan State

Sr. No.	Division	Districts
1	Ajmer	Ajmer, Bhilwara, Nagaur, Tonk
2	Bharatpur	Bharatpur, Dholpur, Karauli, Sawai Madhopur
3	Bikaner	Bikaner, Churu, Sri Ganganagar, Hanumangarh

4	Jaipur	Jaipur, Alwar, Dausa, Jhunjhunu, Sikar
5	Jodhpur	Jodhpur, Barmer, Jaisalmer, Jalore, Pali, Sirohi
6	Kota	Kota, Baran, Bundi, Jhalawar
7	Udaipur	Udaipur, Banswara, Chittorgarh, Dungarpur, Rajsamand, Pratapgarh

c. Topography

The physical variations in Rajasthan State are more than any other State of India. It has regions of rolling sand dunes in the west, lofty rocks of Aravalli Ranges in the middle and fertile plains in the east. The extensive topography of this State includes rolling sand dunes,rocky terrain, wetlands, barren tracts, land filled with thorny scrubs, river-drained plains, plateaus, ravines and wooded regions.

In a more broad way the topography of Rajasthan can be divided in the following regions- (i) the Aravalli or Hilly regions, (ii) the Thar and other arid regions, (iii) the Plateaus including Vindhaya and the Malwa, (iv) the Fertile plains including the Mewar, (v) the Forest Regions and (vi) the Waterbodies including Rivers and Salt Lakes.

The Thar Desert or the Great Indian Desert encompasses about 70% of total landmass of Rajasthan and hence this State is identified as the "Desert State of India". The Rajasthan desert which forms a major portion of the Thar Desert is the biggest desert in India and encompasses the districts of Jaisalmer, Barmer, Bikaner and Jodhpur.

Important rivers of State are Luni, Chambal, Banas, Banganga, Sabarmati, Mahi and West Banas, etc. The Luni river system that rises from the western slopes of Aravalli Ranges (near Ajmer) flows through the semi-arid transitional plains into the Rann of Kutch and Arabian Sea, while the Banas and other streams, rising from the eastern slopes of the Aravalli Ranges, join the Chambal. The rivers of the State are rainfed and identified by 14 major basins divided into 59 sub-basins.

d. Climate

Like its varying topography, Rajasthan has varying climate. The climate of the Rajasthan can be broadly classified into four distinct seasons, viz. (i) Pre-monsoon season, which is the hot season and extends from April to June, (ii) Monsoon season that occurs in the month of June in the eastern region and mid- July in the western arid regions, (iii) Post-monsoon season that commences from mid-September and continues till November and (iv) Winter season that extends from December to March, January being the coldest month of the year. The desert becomes very hot (50° C) during the summer and very cold (0° C) during winter. The average annual rainfall is less than 25 cm. Days are hot and the nights are cold. Sandy wind storms during summer and frost during winter are the usual phenomenon of the desert.

e. Soil

The soil of Rajasthan alters with its wide-ranging topography and the availability of water. The varied kind of soils available in Rajasthan are mostly sandy, saline, alkaline and chalky (calcareous). Clay, loamy, black lava soil and nitrogenous soils are also found.

f. Forests and Wildlife

The recorded forest area of Rajasthan State is 32,737 sq.km, which is 9.57% of its total geographical area. The reserved, protected and unclassed forests are 38.11%, 55.64% and 6.25% respectively. But the forest and tree cover in Rajasthan State is 24,838 sq.km, which is 7.26% of its geographical area (FSI, 2017).

Rajasthan is the abode of certain flora and fauna that are particularly endemic to arid regions and are specially adapted biologically to survive in the dry and waterless regions of the State. Owing to the varied topography one can find an assortment of flora and fauna and avifauna in Rajasthan.

The main tree species found in Rajasthan are *Acacia nilotica, A. tortilis, A. senegal, Prosopis cineraria, P. juliflora*, *Zizyphus mauritiana, Salvadora oleoides,Azadirachta indica,Butea monosperma andTectonagrandis,etc*.Numerous species of herbs and shrubs that have medicinal values are also found in this State.

The fauna of Rajasthan consists of 23 species of Lizards and 25 species of Serpents including the Spiny Tail Lizards and the Russel's Vipers.Other wildlife species include Antelopes, Indian Gazelles or Chinkaras, endangered Great Indian Bustard, Black Bucks, the Nilgai or the Bluebull, Wild Cats, Silver Foxes and so on. There are about 450 species of avifauna including various migratory birds. For the wildlife conservation, Rajasthan State is managing about 5 National Parks and 23 wildlife sanctuaries.

Chapter-B

QUANTITATIVE ANALYSIS

B.1 Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out during the years 2014-15 to 2016-17 in Rajasthan State under the Rajasthan State CAMPA Project. This evaluation/study was carried out by AFC Delhi during the year 2021-22.

B.2 Methodology Used

Secondary information pertaining to physical and financial targets allotted and achieved during the years 2014-15 to 2016-17in Rajasthan State was obtained from the O/O Principal Chief Conservator of Forests (PCCF), Head of Forest Force (HoFF), Jaipur, Rajasthan and all the Divisional Forest Officers (DFOs) of CAMPA project and analyzed.

B.3 CAMPA Project Divisions and Ranges

In Rajasthan State, during the years 2014-15 to 2016-17, the CAMPA Project was implemented in 225 Ranges of 51 Divisions of Forest, Wildlife and Research ***(Annexure-1).***

B.4 Physical Targets

B.4.1 Plantations

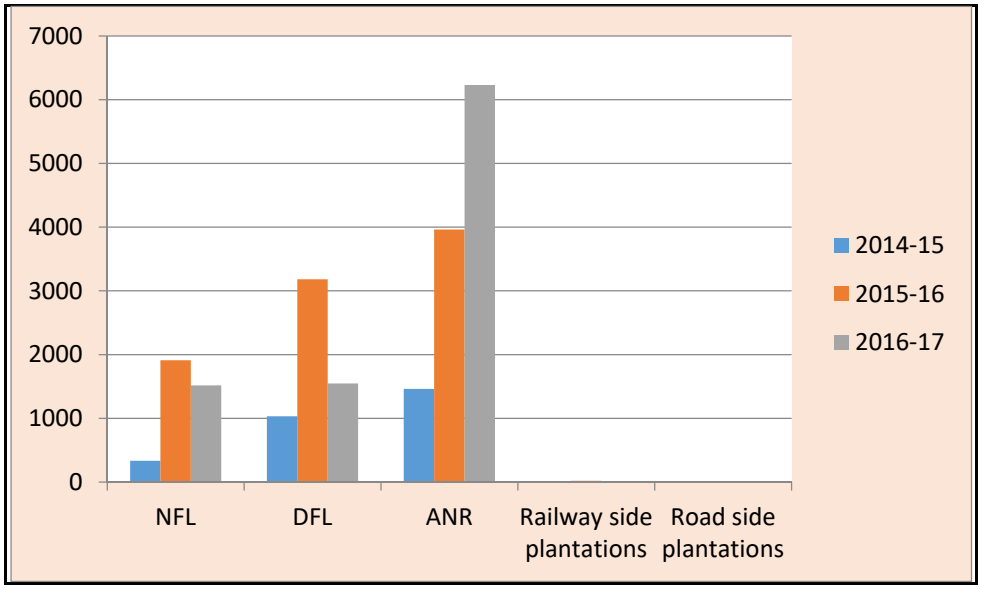
The Division wise and year wise allotted and achieved physical targets of plantations (in ha) during the years 2014-15 to 2016-17 under State CAMPA Project in different Divisions of Rajasthan State provided by the head office of PCCF, Jaipur.

Abstract of year wise allotted and achieved physical targets of plantations (in ha) during the years 2014-15 to 2016-17 under State CAMPA Project in Rajasthan State were as given in table-4 and figure-1.

Table-4: Year wise allotted and achieved physical targets of plantations in Rajasthan State

Year	Model of Plantations in ha					
	NFL	DFL	ANR	Railway side Plantations	Road side Plantations	Total
2014-15	335.000	1033.000	1462.000	0	0	2830.000
2015-16	1910.000	3182.000	3962.000	20.640	16.125	9090.765
2016-17	1518.000	1547.000	6231.000	0	0	9296.000
Total	**3763.000**	**5762.000**	**11655.000**	**20.640**	**16.125**	**21216.765**

Figure-1: Year wise allotted and achieved physical targets of plantations in Rajasthan State



It is evident from table-4and figure-1 that during the project period of 3 years (2014-15 to 2016- 17), physical target of 21216.765 ha plantation was ac hieved against the allotted target of 21216.765 ha resulting in 100% achievement of plantation targets.

B.4.2 Construction Activities

The Division wise and year wise allotted and achieved physical targets of Construction Activities (Soil and Moisture Conservation Works and other Construction Works)during the years 2014-15 to 2016-17 under State CAMPA Project in Rajasthan State provided by the head office of PCCF, Jaipur.

Abstract of year wise allotted and achieved physical targets of Construction Activities (Soil and Moisture Conservation Works and other Construction Works)during the years 2014-15 to 2016-17 under State CAMPA Project in Rajasthan State were as given in table-5.

Table-5: Year wise allotted and achieved physical targets of Construction Activities inRajasthan State

Year	Construction Activities								
	Anicut II (No.)	Anicut III (No.)	4Ft Wall (Km)	6Ft Wall (Km)	Forest Guard Chowki(No.)	Office cum Residence (No.)	Rescue Centre (No.)	Boundary Pillars (No.)	Construction of Roads (Km)
2014-15	31	22	139.00	0	40	3	0	0	0
2015-16	0	0	30.00	5.00	20	4	0	1700	0
2016-17	31	22	38.32	36.84	38	14	3	2305	1
Total	**62**	**44**	**207.32**	**41.84**	**98**	**21**	**3**	**4005**	**1**

It is evident from table-5 that during th e project period of 3 years (2014-15 to 2016- 17), physical target of 62 No. of Anicut II, 44 No. of Anicut III, 98 No. of Forest Guard Chowki, 21 No. of Office cum Residence, 3 No. of Rescue Centre, 4005 No. of Boundary

Pillars, 207.32 Km of 4 Ft Wall, 41.84 Km of 6 Ft Wall and 1 Km of road construction activities was achieved against their same allotted No./Km resulting in 100% achievement of construction activities.

B.5 Financial Targets

B.5.1 Plantations

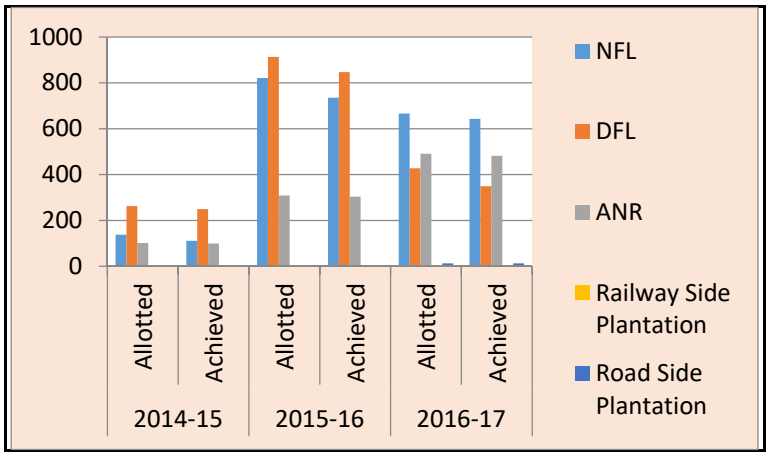
The Division wise and year wise allotted and achieved financial targets (Rs. in lakh) of plantations during the years 2014-15 to 2016-17 under State CAMPA Project in Rajasthan State provided by the head office of PCCF, Jaipur.

Abstract of year wise financial targets (Rs. in lakh)of plantations allotted and achieved during the years 2014-15 to 2016-17 under State CAMPA Project in Rajasthan State were as given in table-6 and figure-2.

Table-6: Year wise financial targets of Plantations allotted and achieved during 2014-15 to 2016-17 in Rajasthan State

Model of Plantation	Year wise Financial Targets of Plantations (Rs. in Lakhs)							
	2014-15		2015-16		2016-17		Total	
	Allotted	Achieved	Allotted	Achieved	Allotted	Achieved	Allotted	Achieved
NFL	137.55	111.13	821.01	735.00	665.74	642.98	1624.29	1489.12
DFL	262.37	249.36	913.24	847.04	427.61	348.93	1603.23	1445.33
ANR	101.13	99.54	308.80	303.60	491.02	481.99	900.95	885.13
Railway Side Plantation	0.00	0.00	5.21	5.13	0.00	0.00	5.21	5.13
Road Side Plantation	0.00	0.00	0.00	0.00	13.09	12.64	13.09	12.64
Total	**501.05**	**460.04**	**2048.26**	**1890.77**	**1597.46**	**1486.54**	**4146.76**	**3837.35**

Figure-2: Year wise financial targets of Plantations fixed and achieved during 2014-15 to 2016-17 in Rajasthan State



It is evident from table-6 and figure-2 that during the project period of 3 years (2014-15 to 2016- 17), an expenditure of Rs 3837.35 lakh was incurred on plantations against the allotted financial targ et of Rs. 4146.76 lakh resulting in 92.54 % achievement of financial target of plantations.

B.5.2 Construction Activities

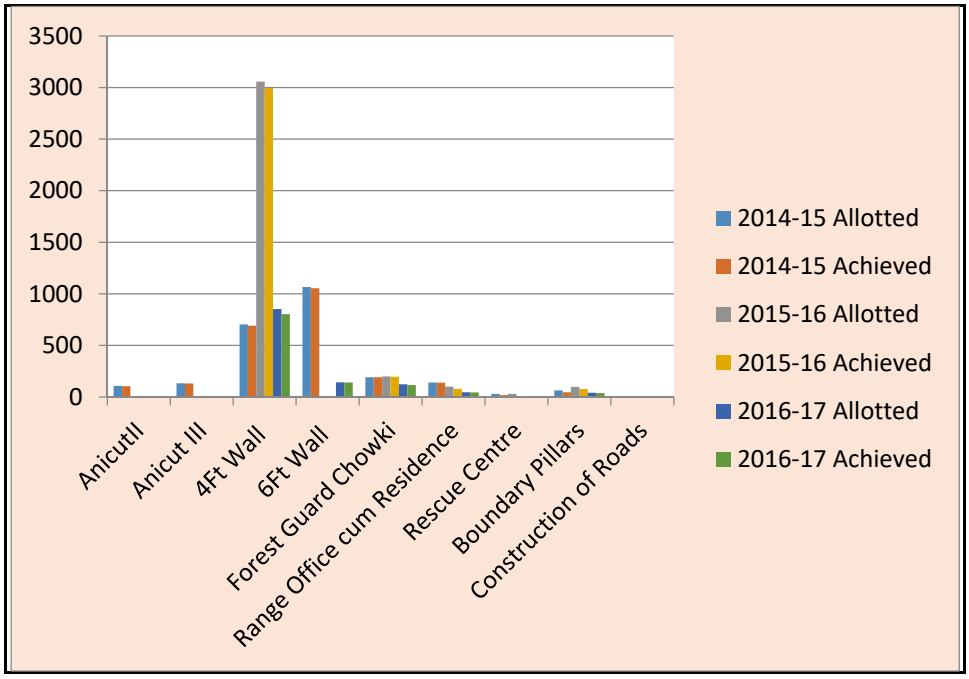
The Division wise and year wise financial targets (Rs. in lakh) of Construction Activities(Soil and Moisture Conservation Works and other Construction Works)allotted and achieved during the years 2014-15 to 2016-17 under State CAMPA Project in Rajasthan State provided by the head office of PCCF, Jaipur.

Abstract of year wise financial targets (Rs. in lakh) of Construction Activities(Soil and Moisture Conservation Works and other Construction Works) allotted and achieved during the years 2014-15 to 2016-17 under State CAMPA Project in Rajasthan State were as given in table-7 and figure-3.

Table-7: Year wise allotted and achieved financial targets of Construction Activities in Rajasthan State

Construction Activities	Financial targets of Construction Activities (Rs. in Lakh)							
	2014-15		2015-16		2016-17		Total	
	Allotted	Achieved	Allotted	Achieved	Allotted	Achieved	Allotted	Achieved
Anicut II	108.50	104.43	0.00	0.00	0.00	0.00	108.50	104.43
Anicut III	132.00	131.41	0.00	0.00	0.00	0.00	132.00	131.41
4Ft Wall	704.00	691.34	3058.00	2994.74	851.87	803.25	4613.87	4489.33
6Ft Wall	1066.06	1054.07	0.00	0.00	142.50	141.11	1208.56	1195.18
Forest Guard Chowki	191.98	190.99	200.00	195.98	123.91	115.62	515.89	502.59
Range Office cum Residence	140.00	138.85	100.00	77.99	46.33	44.66	286.33	261.50
Rescue Centre	30.00	17.68	30.00	10.87	0.00	0.00	60.00	28.55
Boundary Pillars	64.00	46.16	99.00	77.46	41.75	38.85	201.35	162.47
Construction of Roads	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**2436.54**	**2374.93**	**3487.00**	**3357.04**	**1206.36**	**1143.49**	**7126.50**	**6875.46**

Figure-3: Year wise allotted and achieved financial targets of Construction Activities in Rajasthan State



It is evident from table-6 and figure-3 that during the project period of 3 years (2014-15 to 2016- 17), an expenditure of Rs* 6875.46 *lakh was incurred on construction activities against the allotted financial target of Rs.* 7126.50 lakh resulting in 96.48% *achievement of financial target of construction activities.

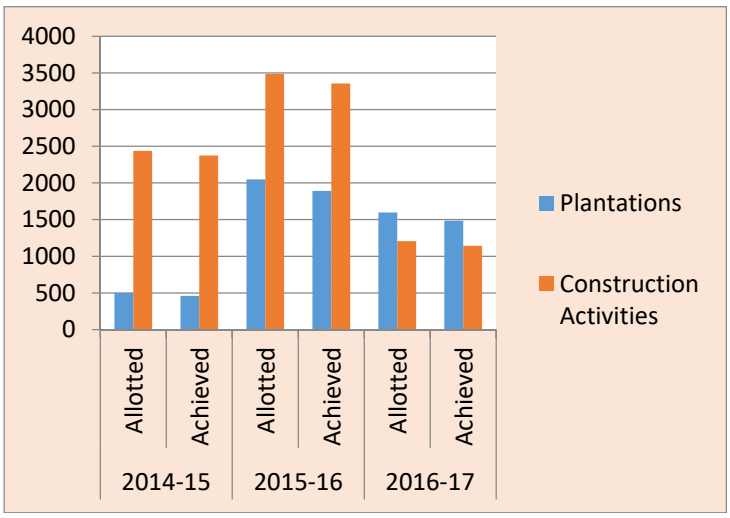
B.5.3 Overall Financial Achievement

Overall expenditure incurred on plantations and construction activities against the allotted financial targets during the years 2014-15 to 2016-17 under State CAMPA Project in Rajasthan State was as given in table-8 and figure-4.

Table-8: Overall Financial targets Allotted and Achievement in Rajasthan State

Overall Financial Achievement (Rs. in lakh)								
Project Activities	2014-15		2015-16		2016-17		Total	
	Allotted	Achieved	Allotted	Achieved	Allotted	Achieved	Allotted	Achieved
Plantations	501.05	460.04	2048.26	1890.77	1597.46	1486.54	4146.76	3837.35
Construction Activities	2436.54	2374.93	3487.00	3357.04	1206.36	1143.49	7126.50	6875.46
Total	**2937.59**	**2834.97**	**5535.26**	**5247.81**	**2803.82**	**2630.03**	**11273.26**	**10712.81**

Figure-4: Overall Financial targets Allotted and Achievement in Rajasthan State



It is evident from table-8 and figure-4 that during the project period of 3 years (2014-15 to 2016- 17), an expen diture of Rs* 10712.81 *lakh was incurred on plantations and construction activities against the a llotted financial target of Rs.* 11273.26 lakh resulting in 95.03% *achievement of financial target..

Chapter-C

QUALITATIVE ANALYSIS

C.1 Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out during the years 2014-15 to 2016-17 in Rajasthan State under the Rajasthan State CAMPA Project. This present evaluation/study was carried out by AFC Delhi during the year 2021-22.

C.2 Methodology Used

C.2.1 Selection of Sites

As per Annual Plans of Operations (APO) for the years 2014-15 to 2016-17 of Rajasthan CAMPA Project, the physical targets of plantations and construction activities were achieved on a number of sites located in its 225 Ranges of 51CAMPA Project Divisions.

Out of these sites, 20%sites were selected by the O/O Principal Chief Conservator of Forests (PCCF), Head of Forest Force (HoFF), Jaipur, Rajasthan State by using stratified random sampling for the Present Third Party Evaluation/ Study.

C.2.2 Procurement of Secondary Data of Selected Sites

The secondary data of the selected sites was obtained from the O/O concerned Divisional and Range Officers of Forest Department and analyzed.

C.2.3 Field Survey

C.2.3.1 Plantations

Detailed field survey of all the selected plantation sites was conducted by the AFC evaluation team. The process followed was as given below:

a. Instructions to Evaluation Team, frontline staff of forest department and the local labourers

At the gate of every selected plantation site, instructions were given (Photo-1) to the evaluation team, frontline staff of forest department and the local labourers on the following aspects:

Photo-1: Instructions given at the gate of plantation

i. Signing of Panchnama

ii. Measurement of planted area (Preparation of KML file).

iii. Counting of species wise planted live/dead plants.

iv. Measurement of height and girth of planted live plants.

v. Counting of plants of natural regeneration.

vi. Estimation of plants of seed sowing.

vii. Evaluation of SMC works.

viii. Re-survey of plantation site.

ix. Recording of field observations in Plantation Format

x. Checking of record keeping.

xi. Meeting with Stake Holders

xii. Recommendations of Evaluators

b. Signing of Panchnama

On reaching every selected plantation site, Panchnama was signed between the front line staff of Forest Department and the members of AFC evaluation team.

c. Measurement of Planted Area (Preparation of KML file)

KML file (photo-2) of every selected plantation site was prepared by walking on the boundary of planted area. The area of KML filewas calculated and compared with plantation targets shown achieved in the APO.

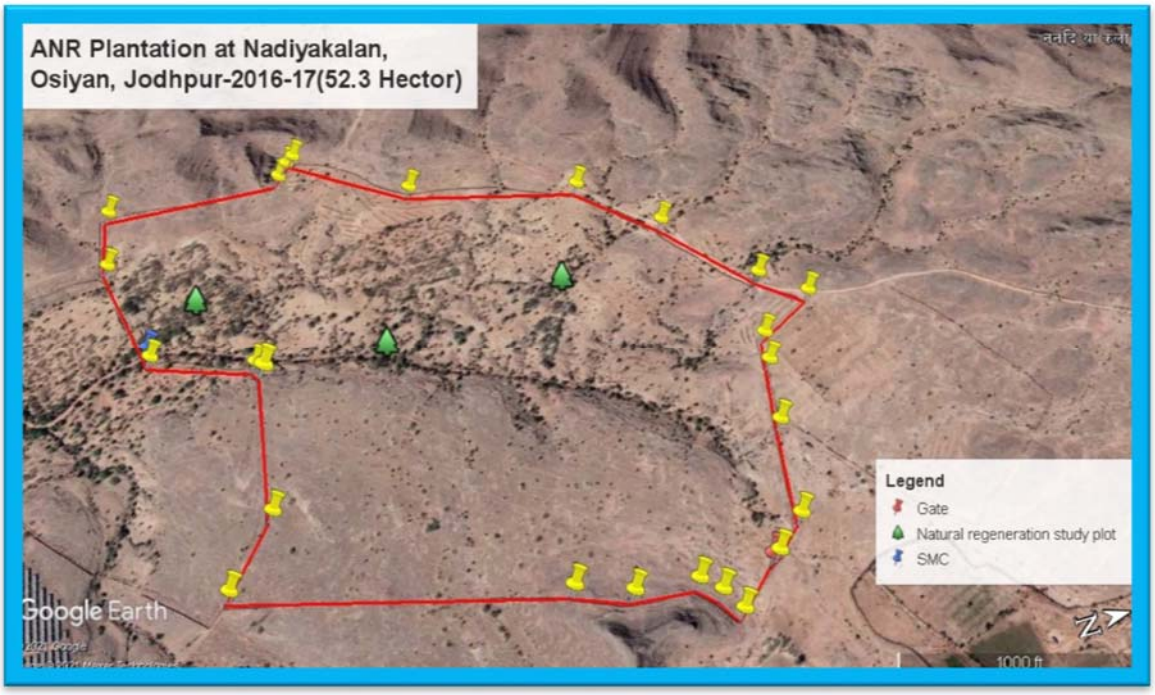


Photo-2: Sample KML File of Nadiyakalan Plantation Site, Osian, Jodhpur

d. Counting of Species wise Planted Live/Dead Plants

At every selected plantation site, 100% counting of planted live and dead plants was carried out (Photo-3a and 3b) and calculation sheet was prepared. Lime was used to mark

the counted plants.From this, species wise and overall survival % ofevery selected plantation site was determined.

Photo-3a: 100% counting of planted live and dead plants

Photo-3b: 100% counting of planted live and dead plants

e. Measurement of Height and Girth of Planted Live Plants

At every selected plantation site, the girth at breast height (GBH) and height of randomly selected, species wise, representative planted live plants was measured (Photo-4). From this, species wise average height and GBH of planted live plants of every selected plantation site was determined.

Photo-4: Measurement of height and GBH of planted live plants.

f. Counting of Plants of Natural Regeneration

At every selected plantation site, sample plots of 0.1 ha were randomly laid for the counting of plants of natural regeneration of tree species. The species wise number of plants growing naturally in each sample plot were counted and species wise average number of plants of natural regeneration per sample plot were calculated and extrapolated to per ha.

g. Estimation of Plants of Seed Sowing

Seeds of *Acacia senegal*, *Acacia tortilis* and *Zizyphus mauritiana,* etc. were sown on the dug up soil of trenches (contour trenches and trench fencing/boundary trenches) as well in the trenches (photo- 5). Growth and survival of plants of seed sowing of every selected site was estimated in 4 categories (poor, good, very good and excellent). Further, spacing of plants is a very important cultural operation in seed sowing. Therefore, this operation was also evaluated.

Photo- 5: Seedlings of seed sowing on boundary trench

h. Soil and Moisture Conservation (SMC) Works.

At every selcted plantation site, the Contour Trenches constructed for rain water conservation, Check Dams constructed for soil conservation and the Stone Wall Fencing and Boundary Trench Fencing constructed for protection of plantations were measured and their roll played in the soil and moisture conservation along withtheir present condition were evaluated(photo- 5 and 6).

Photo- 6: Measurement of Check Dam

i. Re-survey of Plantation Site

At every selcted plantation site, after completion of field survey, the area was re-surveyed to ensure that no work is left uncounted, unmeasured and unnoted.

j. Recording of Field Observations

At every selcted plantation site, the observations made during the field survey were recorded in the Evaluation Format of Plantations and SMC Works.

k. Record keeping

At every selcted plantation site, the documents such as plantation journal, estimation sheet/MB, KML file and plantation map, etc. were evaluated.

l. Meeting with Stake Holders

At every selcted plantation site, short meetings were held with the front line staff to know the constraints faced by them in the execution of project activities and their suggestions for improvement.

m. Recommendations of Evaluators

At every selcted plantation site, the evaluators recorded their recommendations for the improvement of project activities.

C.2.3.2. Construction Activities

Every selected site of construction activities (Anicut II, Anicut III, 4Ft Wall, 6Ft Wall, Forest Guard Chowki, Office-cum-Residence, Rescue Centre, Boundary Pillars and Construction of Roads) was visited by the evaluation team. The construction activities were compared with the measurement book (MB), photographed and their GPS readings, present condition and utilization were recorded in the concerned Evaluation Format.

As a sample, photographs of front view, side view and back view of Forest Guard Chowki constructed at Ratangarh of Churu Division were as given in photo-7a to 7c respectively and its GPS location was as given in photo-7d.

Photo-7a: Front view of Forest Guard Chowki at Ratangarh of Churu Division

Photo-7b: Side view of Forest Guard Chowki at Ratangarh of Churu Division

Photo-7c: Back view of Forest Guard Chowki at Ratangarh of Churu Division

Photo-7d: GPS location of Forest Guard Chowki at Ratangarh of Churu Division

Similarly, photographs of front view, measurement of height and measurement of length of 4 feet wall constructed at Sardarshahar of Churu Division were as given in photo-8a to 8c respectively and its GPS location was as given in photo-8d.

Photo-8a: Front view of 4 feet wall at Sardarshahar of Churu Division

Photo-8b: View of measurement of height of 4 feet wall at Sardarshahar of Churu Division

Photo-8c: View of measurement of length of 4 feet wall at Sardarshahar of Churu Division

Photo-8d: GPS location of 4 feet wall at Sardarshahar of Churu Division

C.2.4 Results of Qualitative Evaluation

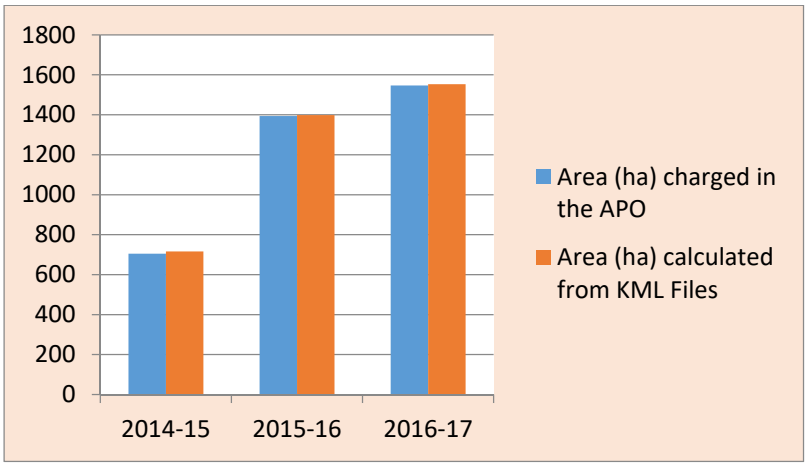
C.2.4.1Comparison of Area of Plantations with KML files

Year wise plantation areas calculated in the field from the KML files and the areas charged in the APO were as given in table-9 and figure-5.

Table-9: Year wise plantation areascalculated in the field from the KML files and the areas charged in the APO

Year of Plantation	Area (ha) charged in the APO	Area (ha) calculated from KML Files	Lessarea (ha)charged in the APO
2014-15	704.92	716.32	11.4
2015-16	1393.68	1398.82	5.14
2016-17	1546.54	1553.13	6.59
Total	**3645.14**	**3668.27**	**23.13**

Figure-5: Year wise plantation areas calculated in the field from the KML files and charged in the APO



It is evident from table-9 and figure-5 that no excess area was charged in the APOs.

C.2.4.2 Ranking of Plantations and Construction Activities

85 sites of plantations of 74 Ranges of 39 Divisions and 93 sites of construction activities of 84 Ranges of 41 Divisions were selected by the O/O Principal Chief Conservator of Forests (PCCF), Head of Forest Force (HoFF), Jaipur, Rajasthan State by using stratified random sampling for the Present Third Party Evaluation/ Study.

All the selected sites of plantations and construction activities were evaluated by the evaluators of AFC Delhi during the year 2021-22 and the site wise results of evaluation were as given in table-10.

Table-10: Ranking of Plantations and Construction Activities

(Excellent = 9, Very Good = 8, Good = 7, Average = 6 and Poor = 5)

Division	Plantations							Construction Activities				
	Range	Site	Model	Year	Area (ha)	Survival %	Rank	Range	Site	Structure	Year	Rank
Ajmer	Pushkar	Daulatpura III	NFL	2015 - 16	10.10	49.60	5	Pushkar	Kanas Banseli	4 ft 350 m Stone wall	2014 -15	8
	Kishangarh	Kshatipurti Natuti	NFl	2016 -17	1.65	87.90	9	Kishangarh	Sambhariah arda	4 ft 4592 m Stone wall	2015 -16	8
		Tikhiyatukda	DFL	2015 -16	28.00	79.00	8	Sarwad	Sarwad	Forest Guard Chowki	2014 -15	8
	-	-	-	-	-	-	-	Ajmer	Dumada	20 boundary pillars	2016 -17	7
	-	-	-	-	-	-	-		MahuaBhid	4 ft 500 m Stone wall	2016 -17	8
Alwar	Laxmangarh	Dabarwas	NFL	2015 -16	7.55	74.95	8	Rajgarh	GwadaRampura	Forest Guard Chowki	2014 -15	8
	Behror	Mainpur	DFL	2015 -16	50.00	63.70	7	-	-	-	-	-
	Kishangarhwas	Chuhadpur	DFL	2016 -17	50.00	62.00	7	-	-	-	-	-
	Alwar	Amritwas	DFL	2016 -17	50.00	78.70	8	-	-	-	-	-
	Rajgarh	Jaituki Jo	ANR	2016 -17	50.00	71.10	8	-	-	-	-	-
Banswara	Banswara	Kalakhet	NFL	2014 -15	64.00	61.50	7	-	-	-	-	-
	Garhi	RohalPanasiMalwasa	ANR	2016 -17	60.00	62.90	7	-	-	-	-	-
Baran	Shahabad	Dudawar	DFL	2015 -16	50.00	42.70	5	Chhipabarod	Set Kolu	20 Boundary Pillars	2014 -15	6
	Kishanganj	Vilasdam	ANR	2016 -17	50.00	54.70	6	Kelwara	Rajpura-A	40 Boundary Pillars	2016 -17	7
Barmer	Siwana	Nal-B	DFL	2015 -16	20.00	53.30	7	Balotra	Kitnod	20 Boundary Pillars	2014 -15	8
Bharatpur-T	Kaman	MatiyaPahar -B	ANR	2015 -16	65.00	45.20	5	Deeg	Aau	4 Ft. wall-1000 m	2016 -17	8
	Bayana	Pathwari	ANR	2016 -17	50.00	45.80	5	Bayana	BayanaPahar -B Samraya	20 Boundary Pillar	2014 -15	6
	-	-	-	-	-	-	-	Bharatpur	Bhutnath Nursery	Range Office cum Residence	2016 -17	7
Bharatpur-KNP	-	-	-	-	-	-	-	Ghana	D-Block of Ghana	Anicut Type-III	2014 -15	7
	-	-	-	-	-	-	-	Bandhbareth a	GhuneniSaipur	20 Boundary Pillars	2014 -15	7
Bhilwara	Jahazpur	Sui	DFL	2014 -15	50.00	67.10	7	Jahazpur	Paroli-1	4 ft 500 m Stone wall	2015 -16	7
		Titoda	DFL	2015 -16	52.00	57.90	6	Bhilwara	Hamirgarh	Forest Guard Chowki	2015 -16	8
		KaliaDungar	ANR	2016 -17	50.00	70.50	8	Gangapur	Bharat Mataji	4 ft 500 m Stone wall	2015 -16	7
	Mandalgarh	Danpura	NFL	2015 -16	1.35	50.50	6	Bhilwara	Hamirgarh-111	4 ft 500 m Stone wall	2015 -16	8
	-	-	-	-	-	-	-		Sangner	4 ft 500 m Stone wall	2016 -17	7
Bikaner Stage-II	-	-	-	-	-	-	-	Unit-III	Jaggasar	Forest Guard Chowki	2015 -16	7
Bikaner WL	-	-	-	-	-	-	-	JohbidGadhvala Conservation Reserve Forest	Kotri	Range office cum residence	2015 -16	8
Bundi	Hindoli	Amratya -C	DFL	2015 -16	50.00	75.70	8	Hindoli	Vijaygarh	10 Boundary Pillars	2014 -15	7
	Nainwa	Devnarayan	ANR	2016 -17	55.00	78.50	8	Dabi	Karaundi	40 Boundary Pillars	2016 -17	6
Chhatargarh	Dantor	3SLM	NFL	2014 -15	2.75	70.70	8	-	-	-	-	-
Chittorgarh-T	Begun	MethakiDhani	DFL	2015 -16	70.00	61.10	7	Bengu	Bengu	Forest guard chowki	2016 -17	8
	Vijaypur	Chorbadli	ANR	2016 -17	50.00	65.10	7	-	-	-	-	-
Chittorgarh-WL	Jakham	KariaAmba -B	ANR	2015 -16	50.00	81.78	9	Jakham	Anoopura	Forest Guard Chowki	2014 -15	8
	-	-	-	-	-	-	-	Dhariyavad	Aarampura	6 Ft. Wall-800 m	2014 -15	7
	-	-	-	-	-	-	-	Bassi	Bichor	Anicut- II	2015 -16	7

Churu	-	-	-	-	-	-	-	Ratangarh	Ratangarh	Forest Guard Chowki	2015-16	8
	-	-	-	-	-	-	-	Sardarshahar	Sardarshahar	4 Ft. wall - 2000 m long	2015-16	7
Dausa	Dausa	Khorakhurd	ANR	2014-15	50.00	59.20	6	-	-	-	-	-
	Bandikui	KhundJatali	DFL	2015-16	50.00	84.40	9	-	-	-	-	-
Dholpur	Bari	Sathkakharra	DFL	2015-16	50.00	58.20	6	Dholpur	Dholpur Nursery	Forest Guard Chowki	2014-15	8
	Sarmathura	Dholimati - II	ANR	2016-17	50.00	60.60	7	Sarmathura	Thane kapura	4 Ft. wall - 500 m	2016-17	7
	-	-	-	-	-	-	-	Kesarbagh	Kesar Bagh	Anicut-11	2015-16	6
Sri Ganganagar	-	-	-	-	-	-	-	Gharsana	3 STR	Forest Guard Chowki	2015-16	8
Hanumangarh	-	-	-	-	-	-	-	Hanumangarh	Pilibanga	Rescue Centre	2014-15	7
Dungarpur	Bichhiwada	Sabli	ANR	2015-16	50.00	59.90	6	-	-	-	-	-
	Aspur	Bhadga	NFL	2014-15	2.55	65.00	7	-	-	-	-	-
Jaipur-North	Achrol	Achrol	ANR	2014-15	50.00	77.76	8	-	-	-	-	-
	Shahpur	Berakidhani-Bishangarh	NFL	2015-16	33.55	75.87	8	-	-	-	-	-
		Devan	ANR	2016-17	50.00	77.10	8	-	-	-	-	-
	Viratnagar	Berki	DFL	2015-16	50.00	59.41	6	Viratnagar	TalwaBhihajar	Forest Guard Chowki	2015-16	7
Jaipur-T	Amer	Daulatpura	DFL	2014-15	48.16	71.83	8	Dudu	BhaislanaBhadwa	Forest Guard Chowki	2015-16	7
	-	-	-	-	-	-	-		Kanchroda	Forest Guard Chowki	2014-15	8
Jaipur-WL	Raisar	Ghoret	ANR	2016-17	50.00	67.50	7	Nahargarh	Barahgaon Bhatia	Forest Guard Chowki	2014-15	6
		Kanikhor	ANR	2016-17	50.00	64.90	7	-	-	-	-	-
Jaisalmer	Jaisalmer	MoklaPare var	NFL	2015-16	50.00	72.00	8	Jaisalmer	Chhayan	20 boundary pillars	2014-15	8
		MoklaPare var	NFL	2016-17	50.00	71.56	8	Dabla	Kodiyasar	4ft, 500 m long Stone wall	2015-16	8
		MoklaPare var	NFL	2014-15	25.00	73.57	8	-	-	-	-	-
Jaisalmer-Unit-II	Unit-II	SDS 18RD JJW	NFL	2015-16	36.00	53.40	7	-	-	-	-	-
Jalore	Jasvantpura	Kolar	ANR	2016-17	50.00	70.60	8	-	-	-	-	-
Jhalawar	Aklera	Ametha-1	DFL	2014-15	50.00	61.60	6	Jhalawar	Mishroli	Forest Guard Chowki	2014-15	8
	Manoharthana	ChamargarhKotra	ANR	2015-16	50.00	79.50	8	Dug	Kalyanpura	20 Boundary Pillars	2014-15	8
	Khanpur	Golana -I	NFL	2016-17	40.00	78.40	8	Khanpur	Golona	100 Boundary Pillars	2016-17	6
	-	-	-	-	-	-	-	Asnawar	Goverdhanpura	100 Boundary Pillars	2016-17	6
Jhunjhunu	Udaipurwati	GoriyaDhanawat	DFL	2014-15	50.00	61.00	7	Khetri	Chirani	20 boundary pillars	2014-15	7
		Kishorpura	ANR	2014 - 15	50.00	57.00	6	-	-	-	-	-
Jodhpur	Osian	Nadiyakalan	ANR	2016-17	50.00	59.00	6	-	-	-	-	-
Karauli	Gudachandraji	Gehroli-1	DFL	2015-16	50.00	60.50	6	Gudachandraji	Talchida	Forest Guard Chowki	2014-15	6
	Sapotra	Narolidang	ANR	2016-17	50.00	63.80	7	Sapotra	Durgashah Nursery	Range Office cum Residence	2014-15	7
	-	-	-	-	-	-	-	Masalpur	Banswadi-8	40 Boundary Pillar	2014-15	6
	-	-	-	-	-	-	-	Sapotra	KilaSapotra	4 Ft. wall - 500 m	2014-15	6
	-	-	-	-	-	-	-	Masalpur	Gubreda	4 Ft. wall - 491 m	2015-16	7
Karauli-RTR	Karanpur	Gadigaon	ANR	2016-17	50.00	78.80	8	Karanpur	Mahajpura	Forest Guard Chowki	2016-17	7
	-	-	-	-	-	-	-	Kailadevi	Bargama -II	6Ft. Wall-200 m	2016-17	8

Kota	Ladpura	Dodhdevi-11	DFL	2014-15	50.00	68.90	7	Itawa	DungarliGirdharpura	20 Boundary Pillars	2014-15	5
		Bowdikheda	NFL	2016-17	6.71	63.60	7	-	-	-	-	-
	Mandana	Bhilot	ANR	2015-16	12.00	79.90	8	-	-	-	-	-
Kota MNP	Gagron	Raipura	NFL	2015-16	54.41	62.20	7	Kolipura	AdakhalKolipura	Anicut -II	2015-16	7
	Borawas	Sakatpura	DFL	2016-17	33.18	65.70	7	Borawas	Borawas	Anicut -II	2015-16	7
	JawaharSagar	Ambarani	ANR	2016-17	50.00	79.80	8	Ranvtha	Ranvtha	Range office cum residence	2014-15	8
	-	-	-	-	-	-	-	Darra	Darra	Forest Guard Chowki	2014-15	8
	-	-	-	-	-	-	-		Darra	Anicut -II	2015-16	7
Kota WL	Bhensrodgarh	Katiramnagar	ANR	2014-15	50.00	69.50	7	Jaitpur	Ramgarh	Forest Guard Chowki	2014-15	6
	-	-	-	-	-	-	-		TanwarakaJhopraWala Nala	Anicut-11	2015-16	5
	-	-	-	-	-	-	-	Ramgarh	Churala	Anicut-11	2015-16	5
	-	-	-	-	-	-	-		KalamKuie Nala	Anicut-11	2015-16	5
Mt Abu	-	-	-	-	-	-	-	Abu Parwat	Behind Jal Hotel	Anicut type-III	2015-16	7
Nagaur	-	-	-	-	-	-	-	Kuchaman	SawaipuraPaldi	10 Boundary Pillars	2014-15	7
	-	-	-	-	-	-	-		Kuchaman	4 Ft. wall - 250 m long	2014-15	6
	-	-	-	-	-	-	-	Parbatsar	Manglana-A	4 Ft. wall - 500 m long	2016-17	8
Pali	Pali	Dari	ANR	2015-16	50.00	61.80	7	Marwar Junction	KhedaKalyanpura	25 Boundary Pillars	2014-15	7
		Maniyari	ANR	2016-17	50.00	63.80	7	Desuri	Ghanerao	4ft height, 800m long Stone wall	2015-16	8
	Sendra	Pachanpura	DFL	2016-17	50.00	63.00	7	-	-	-	-	-
	Sojat	Devdugari	ANR	2016-17	50.00	63.20	7	-	-	-	-	-
Pratapgarh	Chhoti Sadri	Janjal	ANR	2016-17	50.00	78.90	8	Pratapgarh	Janagarh and Bangud	60 boundary pillars	2016-17	8
	-	-	-	-	-	-	-	Devgarh	Jhatla-B	10 boundary pillars	2014-15	8
Rajsamand	Kumbhalgarh	TejoKagura	NFL	2015-16	19.16	68.10	7	Sadri	Sadri	10 boundary pillars	2014-15	8
	Desuri	Rupan Mata	ANR	2015-16	50.00	74.80	8	Bijaguda	Bagadi	Anicut II-WHS	2014-15	7
	-	-	-	-	-	-	-	Nathadwara	Bandariya Magra Part-C	4 ft 500 m wall	2016-17	7
Sariska Alwar	Tehla	Talab	ANR	2016-17	50.00	85.30	9	Talvriksh	Badichind Rampur	Forest Guard Chowki	2014-15	7
	-	-	-	-	-	-	-	Alwar Buffer	Bhurasidh	Range Office cum Residence	2014-15	8
	-	-	-	-	-	-	-	Akbarpur	Sarsla Jungle	Anicut-II	2015-16	5
Sawai madhopur	Boli	Dehlod-III	ANR	2014-15	50.00	50.90	6	Gangapur city	Nananwas	Forest Guard Chowki	2016-17	7
Sawai Madhopur-RTR	-	-	-	-	-	-	-	Baler	Jharna	Anicut type-II	2014-15	7
	-	-	-	-	-	-	-	Talda	Hiramanka Sthan	Anicut-II	2014-15	7
	-	-	-	-	-	-	-	Kundera	Kundera	Cemented wall of 6 ft height of 500 m long	2014-15	7
Sikar	Neem ka Thana	Bhagega II	DFL	2014-15	50.00	61.60	7	Danta	Jinmata	20 Boundary Pillars	2014-15	7
		Pritampuri	DFL	2014-15	50.00	67.20	7	-	-	-	-	-
	Sikar	Malkeda	NFL	2014-15	4.90	65.20	7	-	-	-	-	-
	Patan	Meenaka Nagal	ANR	2016-17	50.00	82.80	9	-	-	-	-	-
Sirohi	Abu Road	Dhamsara (Village-Mungthala)	NFL	2015-16	1.74	59.30	6	-	-	-	-	-

	Sirohi	Kuakhera at MirpurC.No. 9	DFL	2015-16	50.00	52.40	6	Sirohi	Matarwata Van Khand	4 Ft. wall-800 m	2015-16	8
	Pindwara	Rupanmata at Rameshwar C.No . 18	ANR	2016-17	50.00	60.80	7	-	-	-	-	-
Tonk	Deoli	Devpura	DFL	2015-16	50.00	70.40	8	Deoli	AnwaDehdu	10 Boundary Pillar	2014-15	7
		-	-	-	-	-	-		Nursery Bharna	4 Ft. wall - 500 m stone wall	2016-17	7
	Tonk	Kurasiya	DFL	2015-16	35.00	70.10	8	Tonk	Tonk	Range Office cum Residence	2014-15	8
		-	-	-	-	-	-		MaljikiDungri	4 Ft. wall - 500 m stone wall	2014-15	7
	Niwai	Choganyasiras	ANR	2016-17	50.00	77.40	8	Uniyara	Banetha	4 Ft. wall - 100 m stone wall	2015-16	8
Udaipur-North	Gogunda	Patiya	DFL	2014-15	4.65	83.49	9	-	-	-	-	-
	Udaipur	Varda	NFL	2015-16	97.82	62.00	7	Udaipur	Paga- 80	20 Boundary Pillars	2014-15	8
	Kotra	Subra subri-14	ANR	2015-16	50.00	71.70	8	-	-	-	-	-
	Sayra	Boramagra-B	ANR	2016-17	50.00	61.30	8	Sayra	Bisma	Forest Guard Chowki	2015-16	7
Udaipur-T	Kherwada	Pachapadla	NFL	2014-15	2.91	64.00	7	Palsad	Saru -C	20 Boundary Pillars	2014-15	6
	Phalasiya	Balvi	ANR	2016-17	50.00	73.03	8	-	-	-	-	-
Udaipur-WL	Jaisamand	JananaOdi	ANR	2015-16	50.00	88.50	9	Panarwa	Maldaiya	Forest Guard Chowki	2014-15	7
	-	-	-	-	-	-	-	Mamer	Umaria	60 Boundary Pillars	2014-15	7
	-	-	-	-	-	-	-	Jaisamand	Jamuda-II	Anicut -II	2015-16	8
Total					3645.14	-	-	-	-	-	-	-

It is evident from table-10 that:

a. Plantations

i. Total area of all the *selected and evaluated 85 sites of plan tations of 74 Ranges of 39 Divisions was 3645.14 ha.*

ii *The overall ranking of evaluated 3645.14 ha plantations was Good (7) with average survival percentage of 66.62%.*

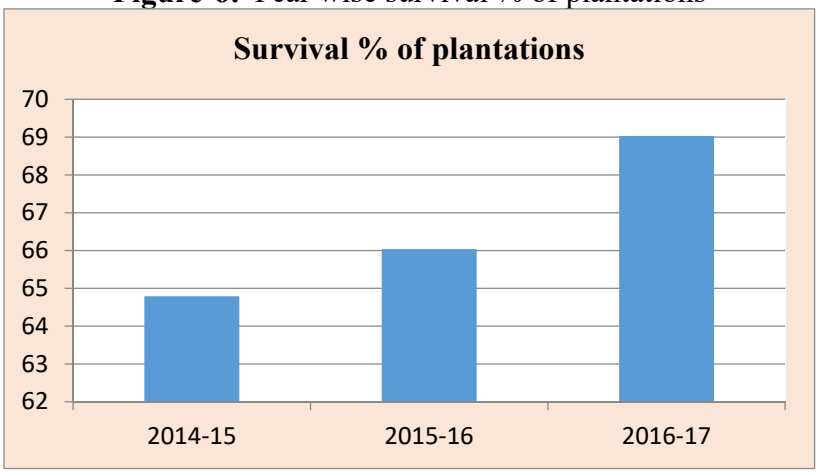
Site wise and species wise survival % of plants planted, weighted survival % of each plantation and year wise average survival % of plantations was as given in ***2a, 2b and 2c***.

Year wise survival % of plantations was as reproduced in table-11 and figure-6.

Table-11: Year wise survival % of plantations

Year of Plantation	Survival %	Rank
2014-15	64.79	7
2015-16	66.04	7
2016-17	69.03	7
Average	66.62	7

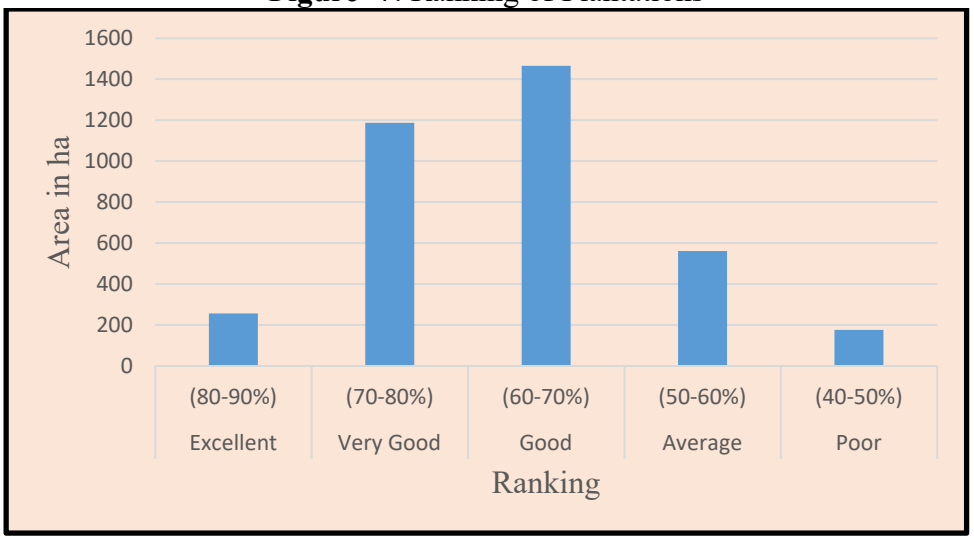
Figure-6: Year wise survival % of plantations



iii. **In terms of physical area, *the ranking of plantations (figure- 7) was:***

- ***Excellent (9) of 256.30 ha plantations having survival % between 80 and 90%***
- ***Very Good (8) of 1187.01 ha plantation having survival % between 70 and 80%***
- ***Good (7) of 1465.64 ha plantation having survival % between 60 and 70%***
- ***Average (6) of 561.09 ha plantation having survival % between 50 and 60%***
- ***Poor (5) of 175.10 ha plantation having survival % between 40 and 50%***

Figure- 7: Ranking of Plantations



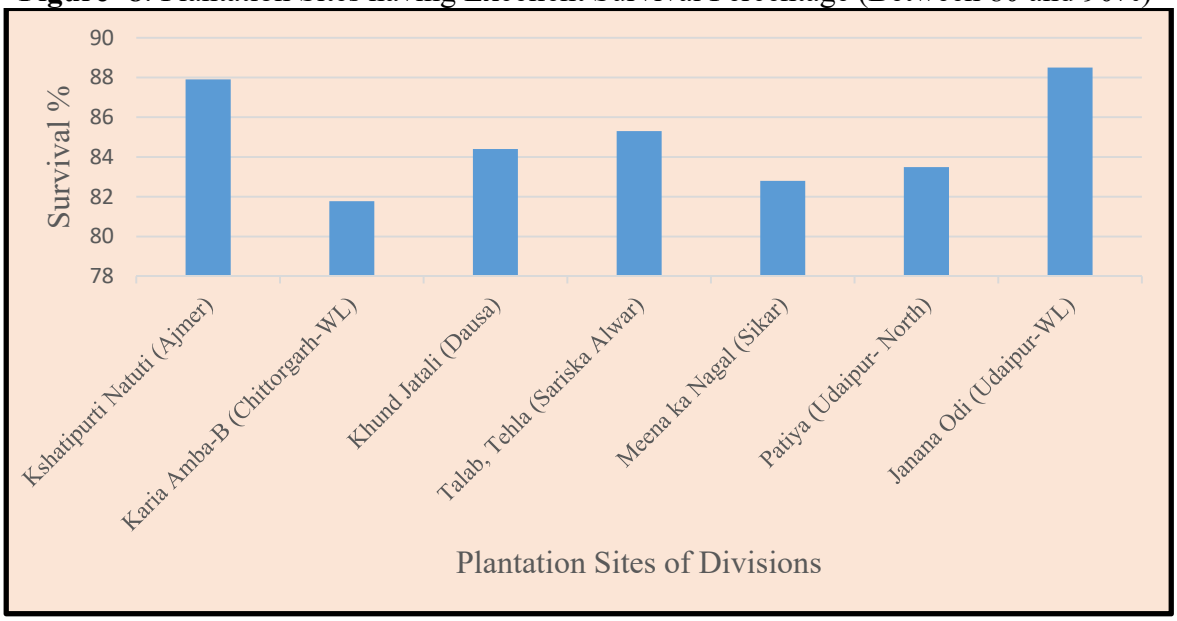
iv. ***The survival percentage was Excellent (between 80 and 90%) with 9 ranking of 256.30 ha plantation area of 7 sites of 7 Ranges of 7 Divisions (table-12 and figure-8).***

Table- 12: Plantation Sites having Survival Percentage between 80 and 90%

Sr. No.	Division	Range	Plantation sites	Model	Target achieved (ha)	Year of plantation	Survival %	Rank
1	Ajmer	Kishangarh	Kshatipurti	NFL	1.65	2016-17	87.90	9

			Natuti					
2	Chittorgarh-WL	Jakham	KariaAmba-B	ANR	50.00	2015-16	81.78	9
3	Dausa	Bandikui	KhundJatali	DFL	50.00	2015-16	84.40	9
4	Sariska Alwar	Tehla	Talab	ANR	50.00	2016-17	85.30	9
5	Sikar	Patan	Meenaka Nagal	ANR	50.00	2016-17	82.80	9
6	Udaipur-North	Gogunda	Patiya	DFL	4.65	2014-15	83.49	9
7	Udaipur-WL	Jaisamand	Janana Odi	ANR	50.00	2015-16	88.50	9
Total					256.30	-	-	-

Figure- 8: Plantation Sites having Excellent Survival Percentage (Between 80 and 90%)



v. ***The survival percentage was Very Good (Between 70 and 80%) with 8 ranking of 1187.01 ha plantation areas of 28 sites of 24 Ranges of 18 Divisions (table-13 and figure-9).***

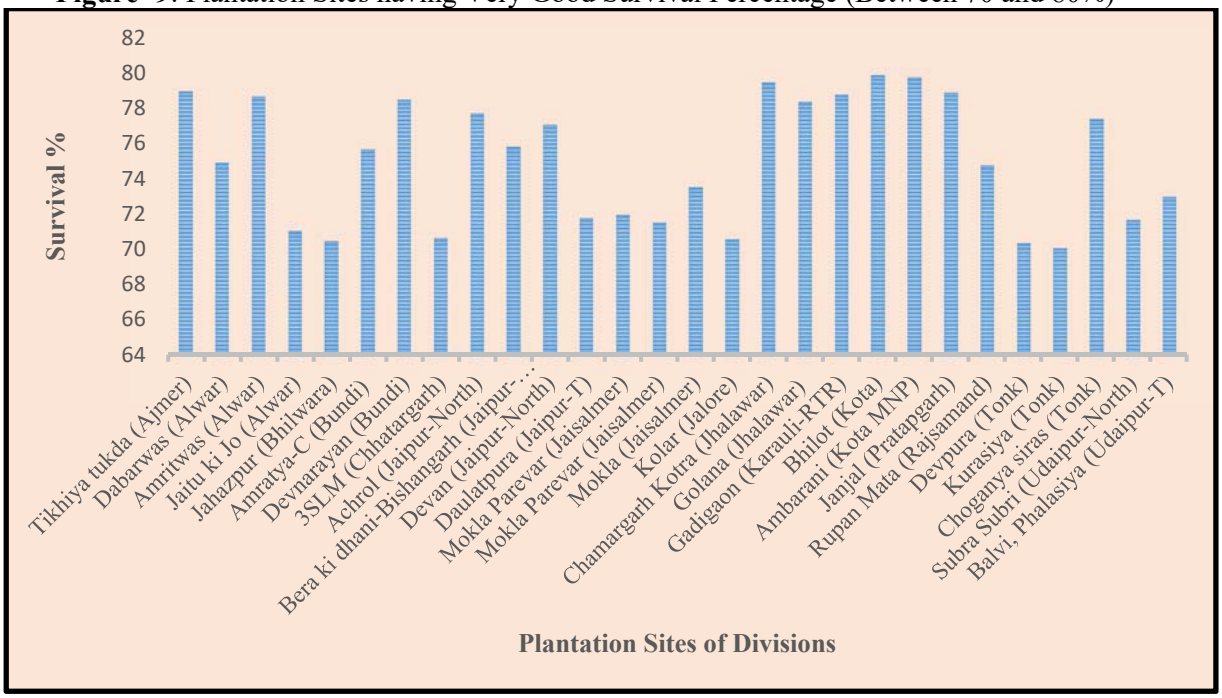
Table- 13: Plantation Sites having Survival Percentage between 70 and 80%

Sr. No.	Division	Range	Plantation sites	Model	Target achieved (ha)	Year	Survival %	Rank
1	Ajmer	Kishangarh	Tikhiyatukda	DFL	28.00	2015-16	79.00	8
2	Alwar	Laxmangarh	Dabarwas	NFL	7.55	2015-16	74.95	8

3	Alwar	Alwar	Amritwas	DFL	50.00	2016-17	78.70	8
4	Alwar	Rajgarh	Jaituki Jo	ANR	50.00	2016-17	71.10	8
5	Bhilwara	Jahazpur	KaliaDungar	ANR	50.00	2016-17	70.50	8
6	Bundi	Hindoli	Amratya-C	DFL	50.00	2015-16	75.70	8
7	Bundi	Nainwa	Devnarayan,	ANR	55.00	2016-17	78.50	8
8	Chhatargarh	Dantor	3SLM	NFL	2.75	2014-15	70.70	8
9	Jaipur-North	Achrol	Achrol	ANR	50.00	2014-15	77.76	8
10	Jaipur-North	Shahpur	Berakidhani-Bishangarh	NFL	33.55	2015-16	75.87	8
11	Jaipur-North	Shahpur	Devan	ANR	50.00	2016-17	77.10	8
12	Jaipur-T	Amer	Daulatpura	DFL	48.16	2014-15	71.83	8
13	Jaisalmer	Jaisalmer	MoklaParevar	NFL	50.00	2015-16	72.00	8
14	Jaisalmer	Jaisalmer	MoklaParevar	NFL	50.00	2016-17	71.56	8
15	Jaisalmer	Jaisalmer	Mokla	NFL	25.00	2014-15	73.57	8
16	Jalore	Jasvantpura	Kolar	ANR	50.00	2016-17	70.60	8
17	Jhalawar	Manoharthana	Chamargarh Kotra	ANR	50.00	2015-16	79.50	8
18	Jhalawar	Khanpur	Golana	NFL	40.00	2016-17	78.40	8
19	Karauli-RTR	Karanpur	Gadigaon,	ANR	50.00	2016-17	78.80	8
20	Kota	Mandana	Bhilot	ANR	12.00	2015-16	79.90	8
21	Kota MNP	Jawahar Sagar	Ambarani	ANR	50.00	2016-17	79.80	8
22	Pratapgarh	Chhoti Sadri	Janjal	ANR	50.00	2016-17	78.90	8

23	Rajsamand	Desuri	Rupan Mata	ANR	50.00	2015-16	74.80	8
24	Tonk	Deoli	Devpura	DFL	50.00	2015-16	70.40	8
25	Tonk	Tonk	Kurasiya	DFL	35.00	2015-16	70.10	8
26	Tonk	Niwai	Choganya siras	ANR	50.00	2016-17	77.40	8
27	Udaipur-North	Kotra	Subra Subri	ANR	50.00	2015-16	71.70	8
28	Udaipur-T	Phalasiya	Balvi	ANR	50.00	2016-17	73.03	8
Total					1187.01	-	-	-

Figure- 9: Plantation Sites having Very Good Survival Percentage (Between 70 and 80%)



vi. ***The survival percentage was Good (Between 60 and 70%) with 7 ranking of 1465.64 ha planted area of 32 sites of 29 Ranges of 19 Divisions (table-14 and figure- 10).***

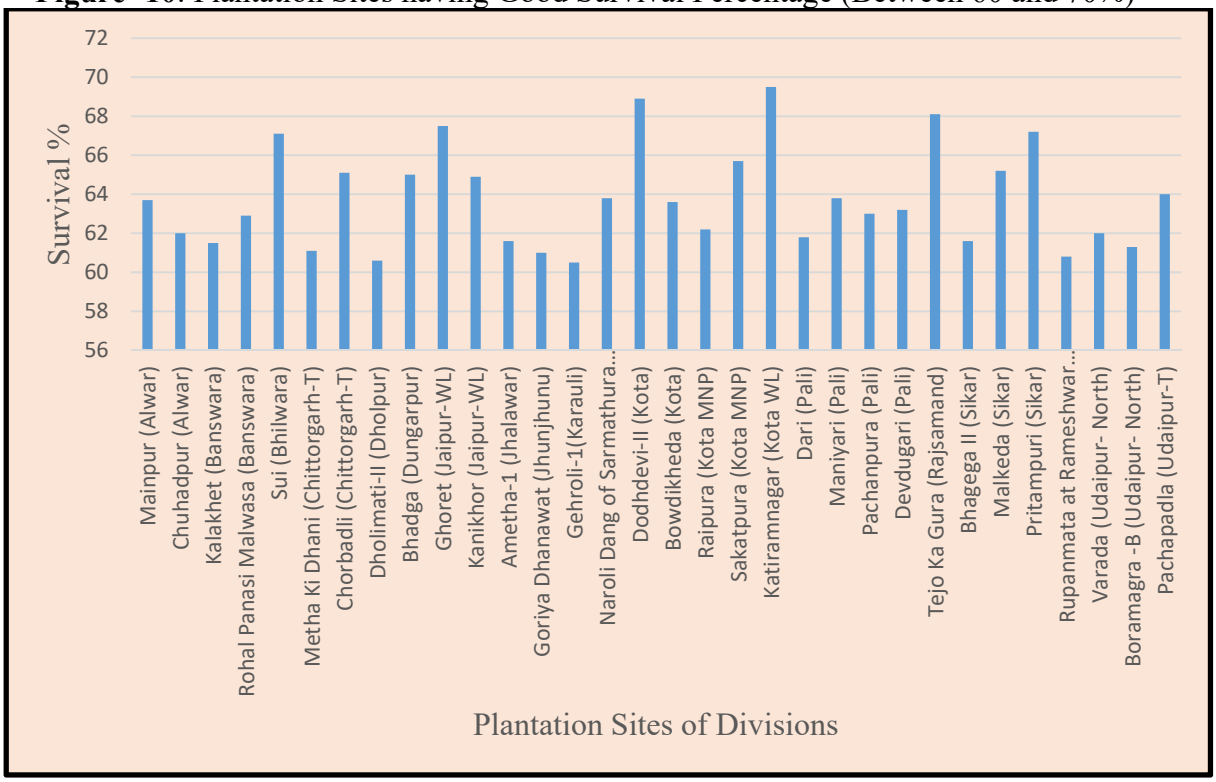
Table- 14: Plantation Sites having Survival Percentage between 60 and 70%

Sr. No.	Division	Range	Plantation sites	Model	Target achieved (ha)	Year	Survival %	Rank
1	Alwar	Behror	Mainpur	DFL	50.00	2015-16	63.70	7
2	Alwar	Kishangarhwas	Chuhadpur	DFL	50.00	2016-17	62.00	7

3	Banswara	Banswara	Kalakhet	NFL	64.00	2014-15	61.50	7
4	Banswara	Garhi	Rohal Panasi Malwasa	ANR	60.00	2016-17	62.90	7
5	Bhilwara	Jahazpur	Sui	DFL	50.00	2014-15	67.10	7
6	Chittorgarh -T	Begun	Metha Ki Dhani	DFL	70.00	2015-16	61.10	7
7	Chittorgarh -T	Vijaypur	Chorbadli	ANR	50.00	2016-17	65.10	7
8	Dholpur	Sarmathura	Dholimati-II	ANR	50.00	2016-17	60.60	7
9	Dungarpur	Aspur	Bhadga	NFL	2.55	2014-15	65.00	7
10	Jaipur-WL	Raisar	Ghoret	ANR	50.00	2016-17	67.50	7
11	Jaipur-WL	Raisar	Kanikhor	ANR	50.00	2016-17	64.90	7
12	Jhalawar	Aklera	Ametha-1	DFL	50.00	2014-15	61.60	7
13	Jhunjhunu	Udaipurwati	GoriyaDhanawat	DFL	50.00	2014-15	61.00	7
14	Karauli	Gudachandraji	Gehroli-1	DFL	50.00	2015-16	60.50	7
15	Karauli	Sapotra	Naroli Dang of Sarmathura	ANR	50.00	2016-17	63.80	7
16	Kota	Ladpura	Dodhdevi-II	DFL	50.00	2014-15	68.90	7
17	Kota	Ladpura	Bowdikheda	NFL	6.71	2016-17	63.60	7
18	Kota MNP	Gagron	Raipura	NFL	54.41	2015-16	62.20	7
19	Kota MNP	Borawas	Sakatpura	DFL	33.18	2016-17	65.70	7
20	Kota WL	Bhensrodgarh	Katiramnagar	ANR	50.00	2014-15	69.50	7
21	Pali	Pali	Dari	ANR	50.00	2015-16	61.80	7
22	Pali	Pali	Maniyari	ANR	50.00	2016-17	63.80	7
23	Pali	Sendra	Pachanpura	DFL	50.00	2016-17	63.00	7

24	Pali	Sojat	Devdugari	ANR	50.00	2016-17	63.20	7
25	Rajsamand	Kumbhalgarh	TejoKaGura	NFL	19.16	2015-16	68.10	7
26	Sikar	Neem ka Thana	Bhagega II	DFL	50.00	2014-15	61.60	7
27	Sikar	Sikar	Malkeda	NFL	4.90	2014-15	65.20	7
28	Sikar	Neem kathana	Pritampuri	DFL	50.00	2014-15	67.20	7
29	Sirohi	Pindwara	Rupanmata at RameshwarC. No. 18	ANR	50.00	2016-17	60.80	7
30	Udaipur-North	Udaipur	Varada	NFL	97.82	2015-16	62.00	7
31	Udaipur-North	Sayra	Boramagra -B	ANR	50.00	2016-17	61.30	7
32	Udaipur-T	Kherwada	Pachapadla	NFL	2.91	2014-15	64.00	7
Total					1465.64	-	-	-

Figure- 10: Plantation Sites having Good Survival Percentage (Between 60 and 70%)



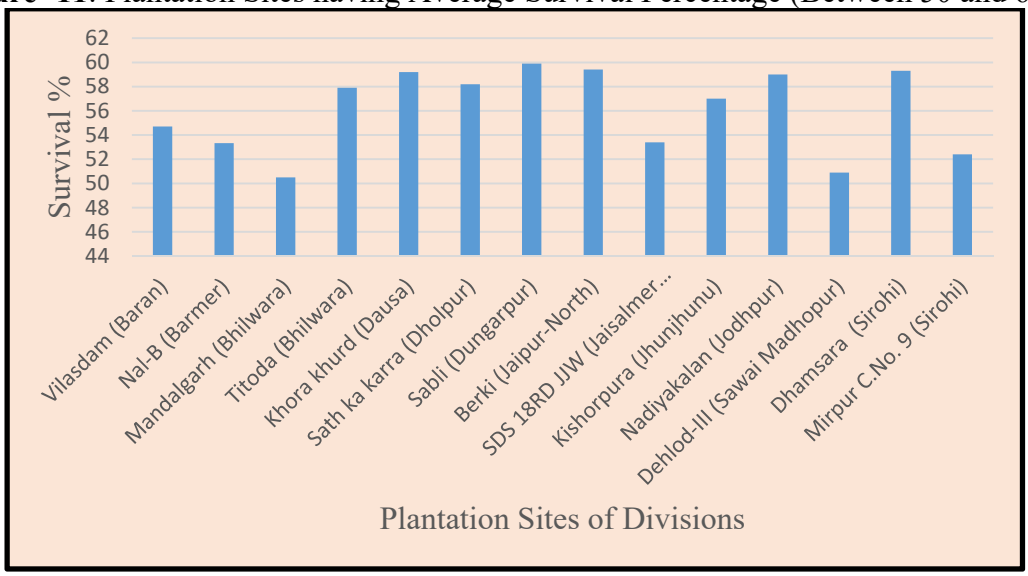
The good survival of plants is due to site specific plants planted, timely execution of work, good protection and watering of plants.

vii. ***The survival percentage was Average (B etween 50 and 60 %) with 6 ranking of 561.09 ha Planted area of 14 sites of 14 Ranges of 12 Divisions (table-15 an d figure-11).***

Table-15: Plantation Sites having Survival Percentage between 50 and 60%

Sr. No.	Division	Range	Site	Model	Target achieved (ha)	Year	Survival %	Rank
1	Baran	Kishanganj	Vilasdam	ANR	50.00	2016-17	54.70	6
2	Barmer	Siwana	Nal-B	DFL	20.00	2015-16	53.33	6
3	Bhilwara	Mandalgarh	Danpura	NFL	1.35	2015-16	50.50	6
	Bhilwara	Jahazpur	Titoda	DFL	52.00	2015-16	57.90	6
5	Dausa	Dausa	Khorakhur d	ANR	50.00	2014-15	59.20	6
6	Dholpur	Bari	Sathkakarr a	DFL	50.00	2015-16	58.20	6
7	Dungarpur	Bichhiwada	Sabli	ANR	50.00	2015-16	59.90	6
8	Jaipur-North	Viratnagar	Berki	DFL	50.00	2015-16	59.41	6
9	Jaisalmer Unit-II	Jaisalmer Unit-II	SDS 18RD JJW	NFL	36.00	2015-16	53.40	6
10	Jhunjhunu	Udaipurwati	Kishorpura	ANR	50.00	2014- 15	57.00	6
11	Jodhpur	Osian	Nadiyakala n	ANR	50.00	2016-17	59.00	6
12	Sawai Madhopur	Boli	Dehlod-III	ANR	50.00	2014-15	50.90	6
13	Sirohi	Abu Road	Dhamsara (Mungthala)	NFL	1.735	2015-16	59.30	6
14	Sirohi	Sirohi	Kuakhera at Mirpur C.No. 9	DFL	50.00	2015-16	52.40	6
Total					561.085	-	-	-

Figure- 11: Plantation Sites having Average Survival Percentage (Between 50 and 60%)



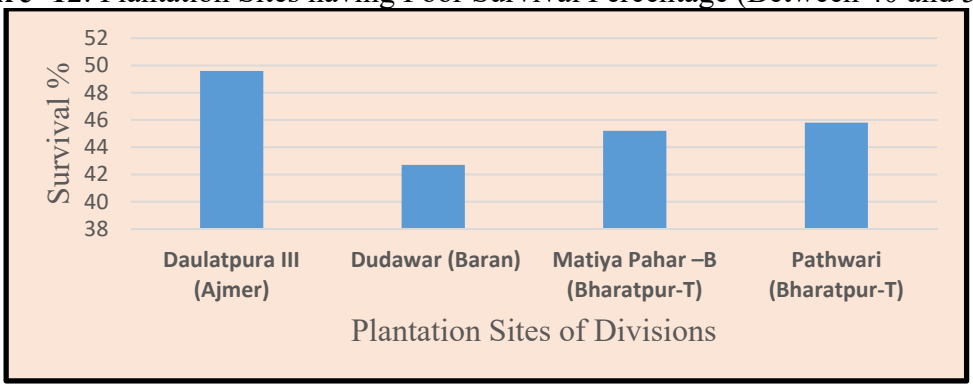
The average survival of plants is local biotic pressure and poor protection of the plantation area. Watering of plants has been found a major issue for survival and growth of the plants in these cases.

viii. ***The survival percentage was Poor (Between 40 and 50%) with 5 ranking of 175.10 ha planted area of 4 sites of 4 Ranges of 3 Divisions (table-16 and figure-12).***

Table- 16: Plantation Sites having Survival Percentage between 40 and 50%

Sr. No.	Division	Range	Plantation sites	Model	Target achieved (ha)	Year	Survival %	Rank
1	Ajmer	Pushkar	Daulatpura III	NFL	10.10	2015-16	49.60	5
2	Baran	Shahabad	Dudawar,	DFL	50.00	2015-16	42.70	5
3	Bharatpur-T	Kaman	MatiyaPahar -B	ANR	65.00	2015-16	45.20	5
4	Bharatpur-T	Bayana	Pathwari	ANR	50.00	2016-17	45.80	5
Total					175.10	-	-	-

Figure- 12: Plantation Sites having Poor Survival Percentage (Between 40 and 50%)



There are 4 sites where the survival percentage of plantation work is between 40 to 50%. The poor survival of plants is due to local biotic pressure and poor protection of the plantation area. Watering of plants has been found a major issue for survival and growth of the plants. As per the frontline staff statement, some areas were captured illegally by the local people where the plantation site has been developed against their willingness. So, extreme local biotic pressure causes low survival. Such poor category plantation site number is very low among total plantation sites.

b. Construction Activities

i. Out of total selected and evaluated 93 sites of construction activities of 84 Ranges of 40 Divisions, the Ranking was:

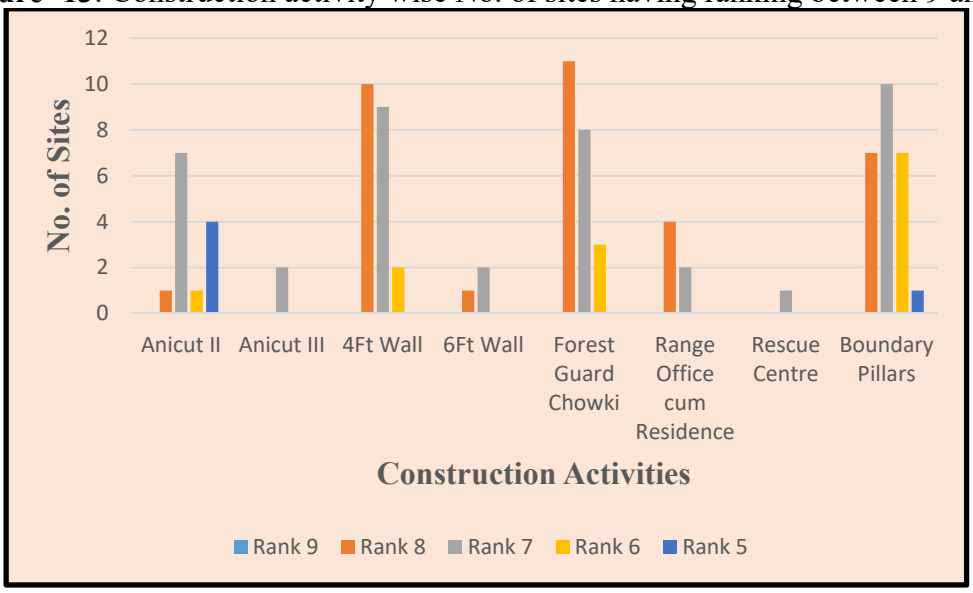
- ***Very Good (8) of 34 sites***
- ***Good (7) of 41 sites***
- ***Average (6) of 13 sites***
- ***Poor (5) 5 sites***

ii. The construction activity wise No. of sites having ranking between 9 and 5 were as given in table-17 and figure- 13.

Table- 17: Construction activity wise No. of sites having ranking between 9 and 5

Activity	No. of Sites with Ranks between 9 and 5					Total Sites
	9	**8**	**7**	**6**	**5**	
Anicut II	0	1	7	1	4	13
Anicut III	0	0	2	0	0	2
4Ft Wall	0	10	9	2	0	21
6Ft Wall	0	1	2	0	0	3
Forest Guard Chowki	0	11	8	3	0	22
Range Office cum Residence	0	4	2	0	0	6
Rescue Centre	0	0	1	0	0	1
Boundary Pillars	0	7	10	7	1	25
Total	**0**	**34**	**41**	**13**	**5**	**93**

Figure- 13: Construction activity wise No. of sites having ranking between 9 and 5



C.2.4.3 Specieswise Survival % and Height and Girth of Plants

Site wise, year wise and species wise Survival%, average Height and Girth at Breast Height (GBH) of major plants pecies and the year wise and species wise average Height and GBH of plants were as given in ***Annexure-2a,b,c***.

Year and species wise Survival %, average Height and GBH of major plant species were as reproduced in table-18.

Table-18: Year and Species wise, Survival%, Height and GBH of plants

Year	Species	Survival %	Average Height (m)	Average GBH (cm)
2014-15	*Acacia catechu* (Khair)	64.4	2.5	23.8
	Acacia leucopholea (Ronj)	63.9	3.4	23.1
	Acacia nilotica (Desibabool)	67.9	3.5	29.4
	Acacia senegal (Kumtha)	55.3	3.2	25.1
	Acacia tortilis (Totalis)	67.9	3.6	25.5
	Azadirachta indica (Neem)	54.1	3.2	21.9
	Butea monosperma (Palash)	68.9	2.9	26.0
	Dalbergia sissoo (Shisham)	67.5	3.9	29.0
	Dendrocalamus strictus (Baans)	49.2	5.3	-
	Emblica officinalis (Amla)	56.9	2.7	22.4
	Holopteleaintegrifolia (Churel)	57.0	2.9	18.5

	Tectona grandis (Sagwan)	68.4	3.4	19.0
	*Zizyphus mauritiana (*Ber)	59.2	2.4	17.5
2015-16	*Acacia catechu* (Khair)	72.7	3.1	26.7
	*Acacia leucopholea (*Ronj*)*	63.8	2.8	25.4
	*Acacia nilotica (*Desibabool*)*	62.9	3.3	26.1
	Acacia senegal (Kumtha)	58.7	3.4	24.4
	Acacia tortilis (Totalis)	69.5	3.4	24.9
	Ailanthus excelsa (Ardu)	56.7	3.1	29.1
	*Azadirachta indica (*Neem)	68.7	3.2	24.5
	Dalbergia sissoo (Shisham)	69.1	3.7	27.4
	*Dendrocalamus strictus (*Baans*)*	73.3	4.1	-
	*Emblica officinalis (*Amla*)*	59.1	2.7	21.5
	Ficus racemosa (Hawan)	68.9	2.9	23.0
	Holopteleaintegrifolia(Churel)	63.4	2.6	23.9
	Pongamia pinnata (Karanj)	70.8	2.6	23.3
	Wrightiatinctoria (Khirani)	62.3	2.2	27.0
	*Zizyphus mauritiana (*Ber)	67.5	2.3	18.7
2016-17	*Acacia catechu* (Khair)	72.2	3.4	29.4
	*Acacia leucopholea (*Ronj*)*	67.1	3.4	28.5
	*Acacia nilotica (*Desi babool*)*	69.6	3.6	27.9
	Acacia senegal (Kumtha)	71.7	3.5	25.7
	Acacia tortilis (Totalis)	64.7	3.7	27.1
	*Azadirachta indica (*Neem)	60.2	3.8	26.4
	Dalbergia sissoo (Shisham)	54.5	3.5	30.6
	*Dendrocalamus strictus (*Bans*)*	67.3	5.4	-
	*Emblica officinalis (*Amla*)*	56.2	2.5	20.1

	Holopteleaintegrifolia(Churel)	68.2	2.9	23.6
	Pongamia pinnata (Karanj)	59.6	2.6	18.6
	Tectona grandis (Sagwan)	77.6	4.5	26.3
	*Zizyphus mauritiana (*Ber)	74.1	2.3	17.5

It is evident from table-18 that total 17 species (*Acacia catechu, Acacia leucopholea, Acacia nilotica, Acacia senegal, Acacia tortilis, Ailanthus excelsa, Azadirachta indica, Butea monosperma, Dalbergia sissoo, Dendrocalamus strictus, Emblica officinalis, Ficus racemosa, Holoptelea integrefolia, Pongamia pinnata, Tectona grandis, Wrightia tinctoria and Zizyphus mauritiana)* were planted in the CAMPA project.

Out of these 17 species, the survival and growth was very good of 9 species (*Acacia catechu, Acacia leucophloea, Acacia senegal, Acacia tortilis, Dalbergia sissoo, Dendrocalamus strictus, Holoptelea integrefolia, Tectona grandis and Zizyphus mauritiana).*

C.2.4.4 Status of Natural Regeneration

Plants of natural regeneration were found growing abundantly in areas of Aided Natural Regeneration (ANR) and Degraded Forest Land (DFL) plantations (table-19).

Table-19: Species wise per ha plants of natural regeneration

Sr. No.	Species	Plants/ha of Natural Regeneration
1	*Acacia catechu* (Khair)	121
2	*Acacia leucopholea (*Ronj*)*	144
3	*Acacia nilotica (*Desibabool*)*	165
4	*Acacia senegal* (Kumtha)	157
5	*Acacia tortilis* (Totalis)	168
6	*Azadirachta indica (*Neem)	84
7	*Boswellia serrata*(Salar)	83
8	*Balanites sp. (*Hingot)	146
9	*Prosopis juliflora (*Khejri*)*	106
10	*Anogeissus latifolia* (Dhok)	115
11	*Holoptelea integrifolia* (Churel)	192
12	*Diospyrosmelanoxylon* (Tendu)	113

13	*Wrightia tinctoria* (Khirani)	90
14	*Zizyphus mauritiana (*Ber)	108
15	*Butea monosperma* (Palash)	93

C.2.4.5. Status of Seed Sowing

Seedlings of seed sowing of *Acacia senegal* (Kumtha), *Acacia nilotica (*Desibabool*)*, *Acacia tortilis* (Totalis), *Acacia leucopholea (*Ronj*)*, *Azadirachta indica (*Neem) and *Zizyphus mauritiana (*Ber)were growing well on the dug up soil of trenches (contour trenches and trench fencing/boundary trenches) as well in the trenches. Spacing of seedlings of seed sowing should be done to enhance the growth of retained seedlings.

There are five categories set out for seed sowing plants performance in the entire plantation site and is reproduced as percentage in table-20.

Table-20: Observation of survival and growth of seedlings of seed sowing

Status of seedlings of seed sowing in five categories at plantation site				
Excellent	Very Good	Good	Average	Poor
5.9%	23.8%	27.2%	11.9%	3.4%

C.2.4.6 . Status of Soil and Moisture Conservation (SMC) Works

Dimensions of Contour Trenches, Check Dams, Stone Wall Fencing and Boundary Trench Fencing were measured, compared with record and found almost correct. These SMC works have played their very good role in SMC and protection of plantations. The Boundary Trenches were found in good conditions, but some of the Check Dams and Stone Walls were found in broken condition in some cases and should be repaired.

C.2.4.7. Status of Record Keeping of Plantations and SMC Works

Year wise Plantation and SMC record produced by the frontline staff and checked by the evaluation team was almost appropriate (table-21).

Table-21: Year wise Plantation and SMC record produced by the frontline staff and checked by the evaluation team

Year	Total No. of plantation sites evaluated	No. of sites of which Plantation and SMC record produced by the frontline staff and checked by the evaluation team			
		Plantation Journal	Plantation Map	KML File	MB of SMC works
2014-15	20	17	12	9	19
2015-16	33	29	25	26	32
2016-17	32	27	29	27	32
Total	85	73	66	62	83

Sites of which Plantation Journals not produced were as given in table-22.

Table-22: Sites of which Plantation Journals were not produced

Year	Division	Range	Site	Area (ha)
2014-15	Kota	Ladpura	Dodhadevi-11	50.00
	Kota WL	Bhensrodgarh	Katiramnagar	50.00
	Udaipur-T	Kherwada	Pachapadla	2.91
2015-16	Ajmer	Kishangarh	TikhiyaTukda	28.00
	Jaisalmer-Unit-III	Unit-II	SDS 18RD JJW	36.00
	Jhalawar	Manoharthana	ChamargarhKotra	50.00
	Udaipur WL	Jaisamand	Jananaodi	50.00
2016-17	Baran	Kisanganj	Vilasdam	50.00
	Bundi	Nainwa	Devnarayan	55.00
	Jaipur-N	Shahpura	Devan	50.00
	Tonk	Niwai	Choganyasiras	50.00
	Kota MNP	Borawas	Sakatpura	33.18

Sites of which Plantation Maps not produced were as given in table-23.

Table-23: Sites of which Plantation Maps were not produced

Year	Division	Range	Site	Area (ha)
2014-15	Udaipur-T	Kherwada	Pachapadla	2.91
	Bhilwara	Jahazpur	Sui	50.00
	Kota	Ladpura	Dodhadevi-11	50.00
	Kota WL	Bhensrodgarh	Katiramnagar	50.00
	Sikar	Neem kathana	Bhagega II	50.00
	Sikar	Sikar	Malkheda	4.90
	Dungarpur	Aspur	Bhadga	65.00
	Banswara	Banswara	Kalakhet	64.00
2015-16	Pali	Pali	Dari	50.00

	Ajmer	Kishangarh	TikhiyaTukda	28.00
	Jaisalmer-Unit-III	Unit-II	SDS 18RD JJW	36.00
	Jhalawar	Manoharthana	ChamargarhKotra	50.00
	Udaipur WL	Jaisamand	Jananaodi	50.00
	Kota MNP	Gagron	Raipura	54.41
	Kota	Mandana	Bhilot in	12.00
	Rajsamand WL	Kumbhalgarh	TejoKagura	19.16
2016-17	Ajmer	Kishangarh	KshatipurtiNatuti	1.65
	Kota	Ladpura	Bowdikheda	6.71
	Kota MNP	Borawas	Sakatpura	33.18

Sites of which KML Files not produced were as given in table-24.

Table-24: Sites of which KML Files were not produced

Year	Division	Range	Site	Area (ha)
2014-15	Banswara	Banswara	Kalakhet	64.00
	Bhilwara	Jahazpur	Sui	50.00
	Dausa	Dausa	Khorakhurd	50.00
	Jaipur-N	Achrol	Achrol	50.00
	Jaisalmer	Jaisalmer	MoklaParevar	25.00
	Jhalawar	Aklera	Ametha-1	50.00
	Kota	Ladpura	Dodhdevi-11	50.00
	Sikar	Neem kathana	Pritampuri	50.00
	Udaipur-N	Gogunda	Patiya	4.65
	Udaipur-T	Kherwada	Pachapadla	2.91
	Sikar	Neem kathana	Bhagega II	50.00
2015-16	Alwar	Behror	Mainpur	50.00
	Barmer	Siwana	Nal-B	20.00

	Dausa	Bandikui	KhundJatali	50.00
	Jaisalmer-Unit-II	Unit-III	SDS 18RD JJW	36.00
	Rajsamand WL	Kumbhalgarh	TejoKagura	19.16
	Sirohi	Abu Road	Dhamsara (Village-Mungthala)	1.735
	Tonk	Tonk	Kurasiya	35.00
2016-17	Bharatpur	Bayana	Pathwari	50.00
	Bundi	Nainwa	Devnarayan	55.00
	Chittorgarh	Vijaypur	Chorbadli	50.00
	Dholpur	Sarmathura	Dholimati -II	50.00
	Kota MNP	JawaharSagar	Ambarani	50.00

Sites of which MB of SMC works not produced were as given in table-25.

Table-25: Sites of which MB of SMC works were not produced

Year	Division	Range	Site	Area (ha)
2014-15	Udaipur-T	Kherwada	Pachapadla	2.91
2015-16	Bharatpur-T	Kaman	MatiyaPahar-B	65.00

C.2.4.8 Status of Construction Activities

Status of construction activities was as given in table-26.

Table-26: Status of Construction Activities

Construction Activities	No. of sites	Present condition	Being utilized for the purpose of construction
Boundary Pillars	25	Good	Yes
Boundary wall	24	Good	Yes
Forest Guard Chowki	22	Good 5 Chowki need repair	Yes
Anicut	15	Good 7 Anicut need repair	Yes
Range Office cum Residence	6	Good	Yes

Rescue Centre	1	Good	Yes
Total	93	Good	Yes

Forest Guard Chowki and Anicut that need repair were as given in table-27

Table-27: Forest Guard Chowki and Anicut that need repair

Sr. No.	Forest Guard Chowki		Anicut	
	Division	Range	Division	Range
1	Jaipur-WL	Baragaon Bhatia , Nahargarh	Kota WL	Churala, Ramgarh
2	Kota WL	Ramgarh, Jaitpur	Kota WL	TanwarakaJhopraWala Nala, Jaitpur
3	Karauli	Talchida, Gudachandraji	Kota WL	KalamKuie Nala, Ramgarh
4	Jaipur-North	TalwaBhihajar, Viratnagar	Dholpur	Kesarbagh
5	Sawai Madhopur	Nananwas, Gangapur city	Sawai Madhopur-RTR	Baler
6			Sawai Madhopur-RTR	Talda
7			Kota MNP	Darra

C.2.4.9 Meeting with Stake Holders

The main issues emerged in the short meetings held with frontline staff of Forest Department at the evaluated plantation sites were as given below:

a. Constraints faced by the Front Line Staff in the implementation of CAMPA project activities

i. Hilly terrain

ii. No watering after planting

iii. No plantation watchers

iv. Huge biotic pressure

v. Less manpower/ staff

b. Suggestions of the Front Line Staff for improvement of CAMPA project activities

i. Provision of watering should be made

ii. Provision of plantation watchers should be made

iii. Adequate front line staff should be provided

iv. Vehicles should be provided to the front line staff

Chapter-D

Recommendations of the Evaluators

Recommendations of AFC Evaluators for the improvement of project activities were as given below:

1. Rajasthan State CAMPA Project should be continued as it helped in:
   i. Improving the quality of Degraded Forest Lands (DFL),
   ii. Increasing the forest cover in the Non-Forest Lands (NFL),
   iii. Improving the habitat of wildlife, and
   iv. Improving the ecology of the areas.
2. Selection of plant species for planting should be site specific.
3. Proper alignment and spacing of plants should be maintained in all the models of plantation.
4. Spacing of seedlings of seed sowing should be done.
5. Damaged in-situ SMC structures (Stone walls and Check Dams) should be repaired.
6. Damaged Construction Activities (Anicuts and Forest Guard Chowkies) should be repaired.
7. Adequate provision should be made for watering to the plants.
8. Part time plantation watchers, at a fixed monthly payment, should be engaged at least up to 3rd year of plantations.
9. Adequate front line staff should be provided
10. Vehicles should be provided to the front line staff.
11. Forest area as well as Forest Cover is negligible in hot, arid and sandy Bikaner district of Rajasthan (Thar Desert) resulting in heavy soil erosion caused by wind storms during summer season.

    To increase the forest cover as well as to check the soil erosion in Bikaner district:

    - The Mahajan Field Firing Range (located in Bikaner district) having 1,36,406 ha of barren govt. land should be taken up for afforestation.
    - Wind breaks should be created by raising plantations along roads, canals and railway lines.

General Recommendations

There are many factors that contribute to the success rate of a plantation in dry areas specifically where the plantation is totally depends on monsoon for providing water to the plants. Soil profile, rainfall, right choice of species, time bound implementation and effective protection measures are some the factors which necessarily improve the output of plantation work of an area.

- Firstly the choice of site should be right so that the plantation work can be carried out smoothly and the growth of plants should be good.
- Right choice of species to be planted on the site should be specific, so that the plants can survive there at high rate and acclimatize with the climate.
- Though the plantation is done in this case is totally depends on rain water, but support of watering should be provided after immediate plantation if rain is delayed. So that the survival rate increased during initiation stage.
- Watering in summer will enhance the growth of plants in the first year.
- The area is full of weeds which compete with the nutrition of healthy plants grown there. So weed removal should be done as and when required, so that the desired species grows well.
- Care should be taken to control the spread of invasive weeds in the plantation area.
- Regarding soil and moisture conservation measures adopted in the plantation site, cleaning of weeds and grasses from the trenches and ditch fencing should be done once in a year to avoid filling up of surface structures. This would enhance the conservation of rain water during monsoon and can stay for a longer period also.
- The total plantation area should be kept close and maintained for atleast 5 years for well growth of plants.
- For protection measures, a guard should be kept in the plantation site for atleast 3 years till the growth of the plants becomes good and to keep restriction of entrance of local people and livestock.
- In absence of effective protection, livestock are roaming freely and damage the plants. This reduces the growth of many plants.
- For successful plantation, involvement of local villagers or village forest protection and management committee (VFPMC) may play a very crucial role. Efforts should be made to make VFPMC at villages to take active part in plantation and protection activities.
- For boundary pillars, walls, forest guard chowki and stone wall- local people should know the purpose of making of it and periodical maintenance need to be done.

Annexure-1

Divisions and Ranges of CAMPA Project

Division		Range	
Sr. No.	Name of Division	No. of Ranges	Name of Ranges
1	Ajmer	5	Beawar, Kishangarh, Nasirabad, Pushkar, Sarwar
2	Bhilwara	5	Mandalgarh, Jahazpur, Bhilwara, Gangapur, Asind
3	Nagaur	2	Parbatsar, Kuchaman
4	Tonk	5	Deoli, Malpura, Newai, Tonk, Uniyara
5	Bharatpur	4	Bayana, Bharatpur, Deeg, Kaman
6	WL Bharatpur	2	Bandhbaretha, Ghana
7	Dholpur	4	Van Vihar, Badi, Dholpur, Sarmathura
8	Karauli	6	Gudachadraji, Hindaun, Karauli, Mandrayal, Masalpur, Sapotra
9	Sawai Madhopur	3	Bonli, Gangapur, Sawai Madhopur
10	Chambal Wildlife Sanctuary Sawai Madhopur	1	Keshoraipatan
11	DCF &Dy Field Director (First) RTR Sawai Madhopur	5	Indergarh, Phalodi, Khandar, Baler, Talda
12	DCF &Dy Field Director (Second) Tiger Project Sawai Madhopur Karauli	3	Nainiyaki, Kailadevi, Karanpur

13	Stage-II Bikaner	3	Bikaner, Unit (IV), Unit (III)
14	WL Bikaner	1	Johbid Gadhvala
15	Stage-I Chhatargarh	3	Beriyawali, Dantor, 61 RD KYD
16	Churu	4	Ratangarh, Sardarshahr, Sujangarh, Rajgarh
17	Sri Ganganagar	3	Sri Ganganagar, Ravla, Gharsana
18	Hanumangarh	2	Hanumangarh, Tibbi
19	Barmer	3	Barmer, Balotra, Siwana
20	Jaisalmer	2	Jaisalmer, Dabla
21	Stage-II Jaisalmer	1	Unit II
22	DNP Jaisalmer	3	Jaisalmer, Barmer, Pokran
23	Jalore	2	Jalore, Jaswantpura
24	Jodhpur	5	Mandor, Phalodi, Bilada, Bhopalgarh, Osian
25	Pali	7	Pali, Sumerpur, Sojat, Sendra, Marwar Junction, Bali, Desuri
26	Sirohi	3	Pindwara, Abu Road, Sirohi
27	WL Abu	2	Taleti, Abu Parwat
28	Jaipur	5	Amer, Phagi, Jaipur Territorial, Dudu, Bassi
29	Jaipur North	6	Achrol, Kotputli, Shahpura, Viratnagar, Paota, Chomu
30	WL Jaipur	3	Raisar, Jamwaramgarh, Nahargarh
31	Research Jaipur	1	Nainiyaki
32	Alwar	6	Alwar, Behror, Kishangarh bas, Laxmangarh, Rajgarh, Thanagaji
33	Sariska Tiger Reserve	6	Akabarpur, Alwar Buffer, Talvriksh, Tehla, Ajabgarh, Sariska
34	Dausa	5	Bandikui, Dausa, Lalshot, Mahua, Sikrai

35	Jhunjhunu	4	Khetri, Udaipurwati, Jhunjhunu, Nawalgarh
36	Sikar	6	Srimadhopur, Neem ka Thana, Patan, Sikar, Laxmangarh, Datan
37	Kota	6	Itawa, Kanwas, Ladpura, Mandana, Modak, Sultanpur
38	WL Kota	4	Bhensrodgarh, Jaitpura, Ramgarh, Shergarh
39	Mukundra National Park-Kota	6	Borawas, Darra, JawaharSagar, Ranvtha, Kolipura, Gagraun
40	Baran	8	Anta, Chabara, Chhipabarod, Kelwars, Kishanganj, Nahagarh, Shahbad, Shergarh
41	Bundi	4	Dabi, Hindoli, K Patan, Nainwa
42	Jhalawar	8	Aklera, Asnavar, Bakani, Dag, Jhalawar, Khanpur, Manohar Thana, Pidava
43	Udaipur North	7	Bhindar, Devla, Gogunda, Kotda, Kukawas, Sayra, Udaipur East
44	Udaipur	7	Kherwara, Ogna, Parsad, Phalasiya, Salumber, Sarada, Udaipur (W)
45	WL Udaipur	2	Panarwa, Jaisamand
46	Banswara	6	Banswara, Kushalgarh, Dungra, Ghatol, Gadhi, Bagidora
47	Chhitorgarh	8	Bengu, Borav, Chhitorgarh, Javda, Kapasan, Nimbaheda, Rawatbhata, Vijaypur
48	WL Chhitorgarh	5	Dhariyawad, Badi, Sadri, Jakham, Bassi
49	Dungarpur	5	Aspur, Bichchiwara, Dungarpur, Antri, Sagwara
50	Partapgarh	6	Bansi, ChhotiSaddi, Devgarh, Dhariyawad, Partapgarh, Pipal Khoont
51	Rajasamand	12	Rajasamand, Bheem, Nathdwara, Jorawar, BijaGuda, Sadri, Devgarh, Bokhara, Jhilwara, Desuri, Kumbhalgarh, Raoli

Annexure-2a

Site wise and species wise survival % of plants planted, weighted survival % of each species, height and GBH of plants in the year 2014-15

Plantation of 2014-15						
Banswara						
NFL-Kalakhet of Banswara range						
Species	**Total Plants planted**	**Live Plants**	**Dead Plants**	**Survival (%)**	**Average height of plants (m)**	**Average gbh (cm)**
Acacia catechu (Khair)	33000	19865	1315	60.1	2.2	27
*Dendrocalamus strictus (*Baans*)*	6500	4260	2240	65.5	3.6	-
*Emblica officinalis (*Amla*)*	8000	4866	3134	60.8	2.2	24
*Acacia leucopholea (*Ronj*)*	6000	3652	2348	60.8	2	20
Bauhinia racemesa (Kachnar)	3000	1684	1316	56.1	2.3	18
*Acacia nilotica (*Desi babool*)*	3000	1963	1037	65.4	1.8	20
*Zizyphus mauritiana (*Ber)	4000	2868	1132	71.7	1.8	18
*Azadirachta indica (*Neem)	1000	634	366	63.4	2.2	22
Ficus racemosa (Hawan)	2500	1419	1081	56.7	2.1	23
Dalbergia sissoo (Shisham)	1000	618	382	61.8	2	20
Tectona grandis (Sagwan)	700	465	235	66.4	1.8	18
Bombax ceiba (Semal)	700	429	271	61.2	2	20
Others	1000	638	362	63.8		
Total	**70400**	**43361**		**61.5**		
Bhilwara						
DFL-Sui in Jahazpur range						
*Acacia nilotica (*Desi babool*)*	18000	10406	7594	57.8	4.7	33.15
*Acacia leucopholea (*Ronj*)*	13000	8407	4593	64.66	3.9	20.05
Azadirachta indica (Neem)	700	131	569	18.74	1.7	4.9
Holoptelea integrifolia (Churel)	1000	431	569	43.1	2.3	13.85
*Zizyphus mauritiana (*Ber)	2300	603	1697	26.21	2.2	13.8
Total	**35000**	**19978**	15022	**57.08**		
NFL-Danpura in Mandalgarh range						
*Acacia nilotica (*Desi babool*)*	300	110	190	36.66	1.5	33
*Acacia leucopholea (*Ronj*)*	800	445	355	55.62	4.1	35
Total	**1100**	**555**	545	**50.50%**		
Chhatargarh						
NFL - 3SLM of Dantor range						
Acacia tortilis (Totalis)	2170	1844	326	84.97	2.4	16.95
Tecomella undulata (Rohida)	720	287	433	39.86	1432.5	10.4

Prosopis juliflora (Khejri)	120	8	112	6.66	1835	15.2
*Zizyphus mauritiana (*Ber)	15	0	15	0	-	-
Total	**3025**	**2139**	**886**	**70.70%**		
Dausa						
ANR-Khora Khurd of Dausa range						
*Acacia nilotica (*Desi babool*)*	500	262	238	52.4	2.8	19
*Acacia leucopholea (*Ronj*)*	5500	3235	2265	58.21	2.6	13
Acacia senegal (Kumtha)	1000	584	416	58.4	2.4	15
*Zizyphus mauritiana (*Ber)	500	260	240	52	1.5	9
Holoptelea integrifolia (Churel)	2000	1164	836	58.2	2	16
Azadirachta indica (Neem)	500	420	80	84	2.1	13
Total	**10000**	**5925**	**4075**	**59.25**		
Dungarpur						
NFL-Bhadga in Aspur range						
Azadirachta indica (Neem)	218	120	98	57.1		
Butea monosperma (Palash)	216	118	98	54.6		
*Zizyphus mauritiana (*Ber)	101	63	38	62.3		
*Acacia nilotica (*Desi babool*)*	207	109	98	52.6		
Dalbergia sissoo (Shisham)	206	188	18	91.2		
Acacia catechu (Khair)	407	309	98	75.9		
*Emblica officinalis (*Amla*)*	278	178	100	64.02		
*Acacia leucopholea (*Ronj*)*	214	118	96	55.1		
*Dendrocalamus strictus (*Baans*)*	64	15	49	23.4		
Sapindus sp. (Aritha)	206	59	147	28.6		
Jalkaranj	248	188	60	75.8		
Holoptelea integrifolia (Churel)	440	360	80	81.8		
Total	**2805**	**1825**		**65**		
Jaipur-North						
ANR-Achrol range						
Acacia tortilis (Totalis)	4500	4474	26	99.42	4.5	30
Acacia senegal (Kumtha)	2000	1983	17	99.15	4.5	30
Pongamia pinnata (Karanj)	50	-	50	--	--	--
Bauhinia variegata (Kachnar)	50	-	50	--	--	--
*Acacia leucopholea (*Ronj*)*	200	119	81	59.5	4	20
Dalbergia sissoo (Shisham)	1000	623	377	62.3	6	35
*Zizyphus mauritiana (*Ber)	200	68	132	34	3	15
Holoptelea integrifolia (Churel)	2000	509	1491	25.45	2.5	20
Total	**10000**	**7776**	2224	**77.76**		
Jaipur-T						
DFL-Daulatpura, Amer range						
Dalbergia sissoo (Shisham)	13000	9360	3640	72	7.7	18

Acacia tortilis (Totalis)	17500	12550	4950	71.7	6.7	13
*Acacia nilotica (*Desi babool*)*	2000	1440	560	72	7.9	17
*Acacia leucopholea (*Ronj*)*	1000	723	277	72.3	6.1	12
Others	500	352	148	70.4	5.2	9
Total	**34000**	**24425**	24425	**71.83**		
Jaisalmer						
NFL-Mokla Parevar in Jaisalmer range						
Acacia tortilis (Totalis)	10850	7894	2956	72.75	3	20
*Zizyphus mauritiana (*Ber)	1650	1109	541	67.21	2.8	10
Total	**12500**	**5003**	7497	**72**		
Jhalawar						
DFL-Ametha-1 in Aklera range						
Acacia catechu (Khair)	2000	1476	524	73.8	1.5	15.33
*Acacia leucopholea (*Ronj*)*	10000	8514	1486	85.14	1.7	20.33
*Acacia nilotica (*Desi babool*)*	500	482	18	96.4	1.6	13.5
Ficus religiosa (Pipal)	200	0	200	0	0	0
*Emblica officinalis (*Amla*)*	5000	2105	2896	42.1	1	12
Holoptelea integrifolia (Churel)	8000	2537	5463	31.71	110	13
*Zizyphus mauritiana (*Ber)	800	780	220	87.5	1.3	12.83
Dalbergia sissoo (Shisham)	5000	2526	2474	50.52	2	12
Pithecellobium dulce (Jangal Jalebi)	500	488	12	97.6	2.1	20.5
Other	3000	2653	347	88.43	110	12
Total	**35000**	**21561**	13439	**61.6**		
Jhunjhunu						
DFL-Goriya Dhanawat of Udaipurwati range						
*Acacia leucopholea (*Ronj*)*	700	340	360	48.57	3	15
Acacia senegal (Kumtha)	1400	878	522	62.71	2.5	20
Holoptelea integrifolia (Churel)	1500	1050	450	70	3.1	12
Acacia tortilis (Totalis)	31400	19082	12318	60.77	3.5	21
Total	**35000**	**21350**	**13350**	**61%**		
ANR-Kishorpura of Udaipurwati range						
Acacia tortilis (Totalis)	5000	1840	3160	36.8	3	18
*Acacia leucopholea (*Ronj*)*	1500	1320	180	88	2.8	21
Acacia senegal (Kumtha)	700	550	150	18.57	1.9	18
Albizia lebbeck (Siras)	500	310	190	62	2	12
*Ailanthus excelsa (*Ardu)	600	420	180	70	3.1	26
*Acacia nilotica (*Desi babool*)*	500	430	70	86	4	26
Ficus religosa (Bad/Pipal)	20	10	10	50	2.5	13

Cassia fistula (Amaltas)	100	80	20	80	1.9	14
Pongamia pinnata (Karanj)	640	430	210	67.18	2.9	19
*Zizyphus mauritiana (*Ber)	440	310	130	70.45	2.4	10
Total	**10,000**	**5,700**	**4,300**	**57%**		
Kota						
DFL-Dodhadevi-11 in Ladpura range						
Holoptelea integrifolia (Churel)	3700	2850	850	77.02	4.5	30
Pithecellobium dulce (Jangal Jalebi)	3500	1570	1930	44.85	4	30
Acacia catechu (Khair)	2100	1050	1050	50	4	27
*Zizyphus mauritiana (*Ber)	800	710	90	88.75	4.5	18
*Emblica officinalis (*Amla*)* (Aamla)	1500	800	700	53.33	4.5	29
*Acacia leucopholea (*Ronj*)*	12200	9780	2420	80.16	5	24
Azadirachta indica (Neem)	50	20	30	40	5	28
*Dendrocalamus strictus (*Baans)	400	100	300	25	6	--
Medla	500	250	250	50	5	26
*Terminalia arjuna (*Arjun)	200	100	100	50	5	23
*Syzygium cumini (*Jamun*)*	50	20	30	45	3	22
Total	**25000**	**17230**	7770	**68.9**		
Kota-WL						
ANR-Katiramnagar of Bhensrodgarh range						
*Acacia catechu (*Khair*)*	2500	1490	1010	59.6	2.6	25
*Dendrocalamus strictus (*Baans)	2500	2278	222	91.1	2.5	-
*Emblica officinalis (*Amla*)*	1000	350	650	35	1.5	15
Holoptelea integrifolia (Churel)	500	350	150	70	2.2	2.6
*Azadirachta indica (*Neem)	1500	1256	244	83.7	1.8	14
Commiphora sp. (Guggal)	500	208	292	41.6	-	-
*Terminalia bellerica (*Behada)	500	356	199	71.2	2.1	22
Pongamia pinnata (Karanj)	500	309	191	61.8	1.5	16
Others	500	358	142	71.6	-	-
Total	**10000**	**6955**		**69.5**		
Sawai Madhopur-T						
ANR-Dehlod-III of Boli range						
Acacia tortilis (Totalis)	6000	2809	3191	46.8	3.5	29
Acacia senegal (Kumtha)	1800	907	893	50	2.9	32
*Acacia leucopholea (*Ronj*)*	500	300	200	55	2.7	23
*Acacia nilotica (*Desi babool*)*	1000	608	392	60.8	3.2	28
Holoptelea integrifolia (Churel)	250	159	91	55	2.8	24
*Ailanthus excelsa (*Ardu)	100	63	37	63	2.7	29

Butea monosperma (Chila)	50	32	18	64	2.6	24
Acacia catechu (Khair)	300	220	80	73	3.1	28
Total	**10000**	**5098**		**50.9**		
Sikar						
DFL Bhagega II in Neem ka thana range						
*Zizyphus mauritiana (*Ber)		1160			2	13
*Acacia leucopholea (*Ronj*)*		2048			3.5	23
Acacia tortilis (Totalis)		13223			3.5	26
Dalbergia Sissoo (Shisham)		333			3.7	24
Tecomella undulata (Rohida)		104			4.5	25
Prosopis cineraria (Khejri)		511			2.5	20
Albizia lebbeck (Siras)		110			4	20
*Acacia nilotica (*Desi babool*)*		194			3.7	28
Acacia senegal (Kumtha)		324			3.9	28
Azadirachta indica (Neem)		228			4	30
Holoptelea integrifolia (Churel)		797			2.6	15
Mix		1236			-	-
Other		1315			-	-
Total	**35000**	**21533**		**61.5**		
NFL-Malkeda in Sikar range						
Acacia tortilis (Totalis)	3600	2536	1064	70	4.05	39
*Acacia nilotica (*Desi babool*)*	300	231	69	77	3.89	37.2
Zizyphus mauritiana (Ber)	500	354	146	70	3.15	32
Acacia senegal (Kumtha)	990	397	593	40	3.4	38
Total	**5390**	**3518**	1872	**65.26**		
DFL-Pritampuri in Neem ka thana range						
Acacia tortilis (Totalis)		12269			2.4	42
*Acacia leucopholea (*Ronj*)*		2757			2.4	45
Dalbergia Sissoo (Shisham)		321			2.3	65
Albizia lebbeck (Siras)		268			160	35
Tecomella undulata (Rohida)		120			163	25
Zizyphus mauritiana (Ber)		521			3	40
Prosopis cineraria (Khejri)		416			251	30
Azadirachta indica (Neem)		1441			4.3	29
Holoptelea integrifolia (Churel)		560			230	19
Acacia senegal (Kumtha)		1079			3.9	27
*Acacia nilotica (*Desi babool*)*		422			3.9	70
Mix		2281			-	-

Other		1092			-	-
Total	**35000**	**23547**		**67.2**	3759.99	1761.84
Udaipur-North						
DFL-Patiya in Gogunda range						
Dendrocalamus strictus (Baans)	900	761	139	84.55	7.2	-
*Emblica officinalis (*Amla*)*	300	260	40	86.66	4.4	32
Acacia catechu (Khair)	200	160	40	80	4.4	40
Ficus racemosa (Hawan)	100	82	18	82	4.5	33
*Bauhinia sp. (*Kachnar*)*	110	93	17	84.54	3.2	34
Azadirachta indica (Neem)	50	39	11	78	4.7	36
*Mangifera indica (*Mango*)*	100	82	18	82	3.9	32
*Madhuca longifolia (*Mahua*)*	100	76	24	76	4.2	38
Total	**1860**	**1553**	307	**83.49**		
Udaipur-T						
NFL- Pachapadla of Kherwada range						
Tectona grandis (Sagwan)	1200	847	353	70.58	5	20
Diospyros melanoxylon (Tendu)	300	155	145	51.66	2	22
*Butea monosperma (*Palash)	300	265	35	88.33	3.2	28
*Acacia leucopholea (*Ronj*)*	150	72	78	48	4.15	32
Acacia senegal (Kumtha)	200	116	84	58	3.1	18
Holoptelea integrifolia (Churel)	200	115	85	57.5	6.2	38
*Acacia nilotica (*Desi babool*)*	120	109	11	90.83	3.5	28
*Azadirachta indica (*Neem)	50	4	46	8	3	21
*Zizyphus mauritiana (*Ber*)*	200	160	40	80	2.2	19
*Dendrocalamus strictus (*Baans)	80	11	69	5.5	7.2	-
*Acacia catechu (*Khair)	288	125	163	43.4	2.5	28
Total	**3088**	**1979**		**64%**	**42.05**	

Annexure-2b

Site wise and species wise survival % of plants planted, weighted survival % of each species, height and GBH of plants in the year 2015-16

Plantation of 2015-16						
Ajmer						
NFL- Daulatpura in Pushkar range						
Species	**Total Plants planted**	**Live Plants**	**Dead Plants**	**Survival (%)**	**Average height of plants (m)**	**Average gbh (cm)**
Zizyphus mauritiana (Ber)	800	438	362	54.75	3.1	28
Acacia nilotica (Desi babool)	300	154	146	51.33	2.6	31
Acacia leucopholea (Ronj)	950	445	505	46.84	2.8	27
Acacia senegal (Kumtha)	950	453	497	47.68	3.9	43
Total	**3000**	**1490**	**1510**	**49.6**		
DFL-Tikhiya Tukda of Kishangarh range						
Acacia tortilis (Totalis)	9000	8356	644	92.84	2.5	5
Zizyphus mauritiana (Ber)	1000	444	556	44.4	2	4
Acacia senegal (Kumtha)	3300	2907	393	89.09	2.6	5
Acacia nilotica (Desi babool)	5000	3497	1503	69.94	2.4	4
Azadirachta indica (Neem)	100	15	85	15	1	2
Acacia leucopholea (Ronj)	1306	515	791	39.43	2.2	3
Total	**19706**	**15734**	3972	**79**		
Alwar						
NFL-Dabarwas in Laxmangarh range						
Acacia nilotica (Desi babool)	3000	2243	757	74.77	3.8	24
Acacia tortilis (Totalis)	588	389	199	66.16	3.2	26
Holoptelea integrifolia(Churel)	100	64	36	64	3.2	21
Acacia catechu (Khair)	1400	1133	267	80.93	3.6	27
Dalbergia Sissoo (Shisham)	200	134	66	67	3.4	24
Total	**5288**	**3963**	1325	**74.95**		
DFL-Mainpur in Kishangarhwas range						
Holoptelea integrifolia(Churel)	5000	2837	2163	56.7	4.6	38
Acacia leucopholea (Ronj)	5000	3474	1526	69.4	5.2	41
Acacia tortilis (Totalis)	7000	4831	2169	69	5.1	39
Ailanthus excelsa (Ardu)	2000	1279	721	63.9	2.7	19
Albizia lebbeck (Siras)	1000	445	555	44.6	4.7	36
Dalbergia Sissoo (Shisham)	1000	601	399	60.1	3.8	29

Prosopis cineraria (Khejari)	1000	553	447	55.3	4.5	35
*Ficus religiosa (*Pipal)*)*	1000	317	683	31.7	4.3	35
Zizyphus mauritiana (Ber)	2000	1183	817	59.1	3.2	32
Total	**25000**	**15521**	15306	**62**		
ANR-Jaitu ki Jo in Rajgarh range						
Acacia leucopholea (Ronj)	5000	3140	1860	62.8	2.6	27
Holoptelea integrifolia(Churel)	3000	2268	732	75.6	2.2	21
Acacia nilotica (Desi babool)	1000	838	162	83.8	2.3	23
Zizyphus mauritiana (Ber)	1000	864	136	86.4	1.8	19
Total	**10000**	**7110**	2890	**71.1**		
Baran						
DFL-Dudawar of Shahbad range						
Acacia leucopholea (Ronj)	9625	3856	5769	40.06	1	11
Zizyphus mauritiana (Ber)	4050	3114	936	76.8	0.7	9
Acacia nilotica (Desi babool)	18000	7384	10616	41.02	1.1	11
Holoptelea integrifolia(Churel)	3325	613	2712	18.43	1.1	8
Total	**35000**	**14967**		**42.7**		
Barmer						
DFL -Nal-B of Siwana range						
Acacia senegal (Kumtha)	4000	979	3021	24.47	3.6	15.87
Acacia tortilis (Totalis)	7600	5934	1666	78.08	2.5	11.45
Zizyphus mauritiana (Ber)	800	401	399	50.12	3.1	18.87
Prosopis cineraria (Khejri)	50	3	47	6	-	-
Tecomella undulata (Rohida)	500	83	417	16.6	2025	11.65
Azadirachta indica (Neem)	50	46	4	92	4.2	21.37
Cordia sinensis (Gundi)	1000	21	979	2.1	2000	12.5
Total	**14000**	**7467**	**6533**	**53.33%**		
Bharatpur-T						
ANR-Matiya Pahar-B of Kaman range						
Holoptelea integrifolia(Churel)	1000	468	532	46.8	2.2	20
Acacia nilotica (Desi babool)	3000	1324	1676	44.1	2.5	22
Acacia leucopholea (Ronj)	500	278	226	54.8	2.4	22
Acacia tortilis (Totalis)	3813	3813	4687	44.8	2.3	27
Total	**13000**	**5879**		**45.2**		
Bhilwara						
DFL-Titora in Jahazpur range						
Acacia nilotica (Desi babool)	24000	15499	8501	64.57	3	20
Acacia leucopholea (Ronj)	10000	4033	5967	40.33	1.5	15
Holoptelea integrifolia(Churel)	1000	880	120	88	1.4	18
Azadirachta indica (Neem)	20	19	1	95	3.5	21

Zizyphus mauritiana (Ber)	1328	612	716	46.08	1.2	32
Pongamia pinnata (Karanj)	52	51	1	98	1.1	24
Total	**36400**	**21094**	15306	**57.9**		
Bundi						
DFL-Amratya-C of Hindoli range						
Acacia catechu (Khair)	2000	1605	395	80.25	3.5	43
Holoptelea integrifolia(Churel)	4500	3371	1129	74.91	2.5	28
Zizyphus mauritiana (Ber)	1400	1255	145	89.64	3.1	30
Acacia nilotica (Desi babool)	7000	5316	1684	75.94	4.2	45
Acacia leucopholea (Ronj)	7500	5875	1625	78.3	2.8	28
Azadirachta indica (Neem)	2600	1520	1080	58.4	3.1	30
Total	**25000**	**18942**		**75.7**		
Chittorgarh-T						
DFL-Metha Ki Dhani of Bengu range						
Acacia catechu (Khair)	15000	9233	5767	61.5	3.2	33
Zizyphus mauritiana (Ber)	3000	2268	732	75.6	2.2	21
Emblica officinalis (Amla)	4000	2365	1635	59.1	2.3	23
Acacia leucopholea (Ronj)	9000	4860	4140	54	3.4	27
Azadirachta indica (Neem)	1000	735	265	73.5	2.7	23
Cassia fistula (Amaltas)	1000	568	432	56.8	1.7	18
Holoptelea integrifolia(Churel)	1000	735	265	73.5	2.9	22
Dendrocalamus strictus (Baans)	1000	640	360	64	3.3	-
Total	**35000**	**21404**		**61.10%**		
Chittorgarh-WL						
ANR-Karia Amba Bin Jakaham range						
Dendrocalamus strictus (Baans)	3000	2612	388	87.06	8	-
Emblica officinalis (Amla)	2200	1722	478	78.27	3.5	25
Acacia catechu (Khair)	2000	1664	336	83.02	4.3	30
Annona squamosa (Sitafal)	300	230	70	76.66	3.6	29
Sterculia urens (Kadaya)	200	114	86	57	3	26
Ailanthus excelsa (Ardu)	300	158	142	52	3.9	30
Zizyphus mauritiana (Ber)	2000	1678	322	83.09	3.3	20
Total	**10000**	**8178**	1822	**81.78**		
Dausa						
DFL_Khund Jatoli of Bandikui range						
Acacia tortilis (Totalis)	1000	8243	1757	82.43	5.5	36
Acacia nilotica (Desi babool)	12000	10320	1680	86	5.4	36
Acacia leucopholea (Ronj)	4000	3555	445	88.8	4.4	35
Dalbergia sissoo (Shisham)	3000	2630	370	87.66	4.7	34

Zizyphus mauritiana (Ber)	2500	1984	516	79.36	3.4	25
Prosopis cineraria (Khejri)	2500	2028	472	81.12	4.5	32
Others	1000	784	216	78.4	-	-
Total	**35000**	**29544**		**84.4**		
Dholpur						
DFL_Sath ka kharra of Badi range						
Acacia nilotica (Desi babool)	10000	6048	3952	60.4	3.5	32
Acacia leucopholea (Ronj)	8000	4426	3574	55.3	2.9	33
Acacia senegal (Kumtha)	10000	6041	3959	60.4	3.7	36
Zizyphus mauritiana (Ber)	2000	1124	876	56.2	2.6	22
Iuga dulcis (Jangal Jalebi)	3000	1572	1428	52.4	2.3	26
Pongamia pinnata (Karanj)	2000	1179	821	58.9	3.1	30
Total	**35000**	**20390**		**58.2**		
Dungarpur						
ANR- Sabli in Bichhiwada range						
Acacia leucopholea (Ronj)	1500	1421	79	94.73	1.8	41.5
Acacia catechu (Khair)	2200	1019	1181	46.31	1.4	22
Zizyphus mauritiana (Ber)	600	510	90	85	1.6	15
Emblica officinalis (Amla)	1200	515	685	42.91	120	13
*Dendrocalamus strictus (*Baans)	2300	1270	1030	55.21	3.1	-
Manilkara hexandra (Khirni)	1400	808	592	57.71	90	15
Ailanthus excelsa (Ardu)	200	84	116	42	1.5	30
Ficus racemosa (Hawan)	200	121	79	60.5	1.2	10
Annona squamosa (Sitafal)	400	242	158	60.5	97	15
Total	**10000**	**5990**		**59.9**		
Jaipur-North						
NFL-Bera ki dhani-Bishangarh in Shahpura range						
Acacia tortilis (Totalis)	18638	13976	4662	75	2.4	24
Acacia leucopholea (Ronj)	6961	5221	1740	75	1.5	18
Holoptelea integrifolia(Churel)	5545	4137	1408	74.6	1.5	25
Acacia nilotica (Desi babool)	5535	4492	1043	81	2.5	22
Total	**36679**	**27826**	8853	**75.87**		
DFL-Berki in Viratnagar range						
Acacia tortilis (Totalis)	23500	14335	9165	61	4.5	30
Acacia nilotica (Desi babool)	2300	1265	1035	55	4.5	30
Acacia leucopholea (Ronj)	300	180	120	60	3	29
Dalbergia sissoo (shisham)	2040	1224	816	60	6	35
Holoptelea integrifolia(Churel)	500	250	250	50	3	20
Azadirachta indica (Neem)	180	90	90	50	3	25

Zizyphus mauritiana (Ber)	5180	2849	2331	55	2.5	18
Pongamia pinnata (Karanj)	200	104	96	52	2.2	18
*Others (*Mix)	800	520	280	65	3	15
Total	**35000**	**20817**	14183	**59.41**		
Jaisalmer Stage-II						
NFL-SDS 18RD JJW, Unit-II range						
Acacia tortilis (Totalis)	-	9422	-	-	3.1	18.4
Acacia senegal (Kumtha)	-	101	-	-	2.9	18.25
Zizyphus mauritiana (Ber)	-	91	-	-	1.2	10.25
Total	**18000**	**9614**	**8386**	**53.41%**		
Jaisalmer						
NFL-Mokla Parevar in Jaisalmer range						
Acacia tortilis (Totalis)	14800	10825	3975	73.14	2.8	12
Tecomella undulata (Rohida)	2610	1862	748	75.17	270	9
Acacia senegal (Kumtha)	2090	1582	508	75.69	2.6	10
Zizyphus mauritiana (Ber)	3450	2430	1020	70.43	2.9	8
Salvadora persica (Jaal)	2050	1544	506	75.32	110	7
Total	**25000**	**18343**	6657	**73.37**		
Jhalawar						
ANR-Chamargarh Kotra in Manoharthana range						
Tectona grandis (Sagwan)	8000	6556	1444	81.9	3.6	32
Azadirachta indica (Neem)	1000	745	255	74.5	3.4	33
Pongamia pinnata (Karanj)	1000	650	350	65	3.3	28
Total	**10000**	**7951**	2049	**79.5**		
Karauli						
DFL-Gehroli-1 of Gudachandraji range						
Acacia leucopholea (Ronj)	7000	4272	3952	61.02	3.5	32
Holoptelea integrifolia(Churel)	10000	6098	3574	60.9	2.9	33
Acacia senegal (Kumtha)	8000	4804	3959	60.05	3.7	36
Acacia tortilis (Totalis)	10000	6030	1428	60.3	2.3	26
Total	**35000**	**21204**		**60.5**		
Kota						
ANR-Bhilot in Mandana range						
Acacia leucopholea (Ronj)	800	682	118	85.25	2.05	22
Acacia catechu (Khair)	500	352	148	70.4	1.9	24
Holoptelea integrifolia(Churel)	500	368	132	73.6	1.8	17
Zizyphus mauritiana (Ber)	400	362	38	90.5	0.9	11
*Butea monosperma (*Chhila)	200	154	46	77	1.4	14
Total	**2400**	**1918**		**79.9**		

Kota-MNP						
NFL-Raipura in Gagron range						
Acacia catechu (Khair)	8000	6008	1992	75.1	3.1	31
Zizyphus mauritiana (Ber)	5000	4500	500	90	2.2	21
Emblica officinalis (Amla)	2500	20	2480	0.8	2.3	20
Acacia nilotica (Desi babool)	8000	4090	3910	51.1	2.8	38
Total	**23500**	**14618**	8882	**62.2**		
Pali						
ANR- Dari in Pali range						
Acacia senegal (Kumtha)	3500	1652	1848	47.2	3.9	31
Zizyphus mauritiana (Ber)	2000	1412	588	70.6	2.6	20
Acacia nilotica (Desi babool)	2000	896	1104	44.8	4.3	33
Acacia leucopholea (Ronj)	1600	1380	220	86.2	3.9	30
Tecomella undulata (Rohida)	900	843	57	96.6	2.8	22
Total	**10000**	**6183**	3817	**61.8**		
Rajsamand						
NFL-Tejo Ka gura in Kumbhalgarh range						
*Dendrocalamus strictus (*Baans)	4000	2725	1275	68.12	3.5	10.15
Cordia dichotoma (Gundi)	1200	822	378	68.5	170	15
Zizyphus mauritiana (Ber)	5000	3406	1594	68.12	2.2	15
Emblica officinalis (Amla)	4000	2700	1300	67.5	4.2	15
Iuga dulcis (Jangal Jalebi)	2000	1365	635	68.25	215	20
Acacia catechu (Khair)	1000	682	318	68.2	3	10
Holoptelea integrifolia(Churel)	2000	1360	640	68	1.5	20
Acacia nilotica (Desi babool)	1000	670	330	67	3.5	10
Tamarindus indica (Imli)	300	210	90	70	140	15
Dalbergia paniculata (Parde)	300	225	75	75	1.8	10
Wrightia tinctoria (Khirani)	1200	827	373	68.91	1.2	
Total	**22000**	**14992**	2008	**68.1**		
ANR-Rupan Mata in Desuri range						
Acacia nilotica (Desi babool)	-	651	-	-	4	33
Acacia catechu (Khair)	-	431	-	-	3.1	28
Holoptelea integrifolia(Churel)	-	432	-	-	2.3	18
Azadirachta indica (Neem)	-	1188	-	-	4	32
Acacia leucopholea (Ronj)	-	649	-	-	3.4	27
Zizyphus mauritiana (Ber)	-	1300	-	-	1.9	16
Cassia fistula (Amaltash)	-	1735	-	-	2.7	20
Emblica officinalis (Amla)	-	584	-	-	1.9	18

Bamboosa tulda (Bans)	-	514	-	-		
Total	**10000**	**7484**	2516	**74.80%**		
Sirohi						
NFL-Dhamsara (Village- Mung thala) of Abu Road range						
Holoptelea integrifolia(Churel)	575	344	231	59.8	3.5	32
Ficus racemosa (Hawan)	25	12	13	48	4	26
Total	**600**	**356**		**59.3**		
DFL-Kuakhera at Mirpur C.No. 9 in Sirohi range						
Zizyphus mauritiana (Ber)	6000	2844	3156	47.6	2.2	12
Acacia nilotica (Desi babool)	7000	3968	3032	56.68	3.1	18
Acacia leucopholea (Ronj)	7000	3861	3139	55.15	3.3	14
Acacia senegal (Kumtha)	5000	2432	2568	48.64	3.2	16
Total	**25000**	**13105**		**52.4**		
Tonk						
DFL-Devpura in Deoli range						
Ailanthus excelsa (Ardu)	1800	1251	549	69.5	4.2	35
Acacia tortilis (Totalis)	24900	17929	6971	69.99	3.7	32
Holoptelea integrifolia (Churel)	3000	2150	850	71.66	3.6	32
Zizyphus mauritiana (Ber)	300	163	137	54.33	2.4	19
*Cassia sp. (*Cassiashyama)	100	72	28	72	2.2	20
Dalbergia sissoo (Shisham)	700	173	527	67.57	3.4	27
Pithecellobium dulce (Jangal Jalebi)	100	70	30	70	2.3	18
Emblica officinalis (Amla)	100	37	63	37	3.2	26
Acacia senegal (Kumtha)	9000	3007	5993	75.17	3.9	33
Total	**35000**	**24652**	10348	**70.4**		
DFL-Kurasiya in Tonk range						
Azadirachta indica (Neem)	500	221	279	62.3	3.8	42
Dalbergia sissoo (Shisham)	200	113	87	66.4	3.1	33
Ailanthus excelsa (Ardu)	200	117	83	55.5	2.9	29
*Butea monosperma (*Panchila)	1500	1329	171	60	3.1	26
Acacia nilotica (Desi babool)	500	389	111	62.2	4.1	37
Acacia tortilis (Totalis)	21500	14919	6581	62.3	4.5	38
Ficus benghalensis (Vad)	50	-	50	-	-	-
*Ficus religiosa (*Pipal)*)*	50	-	50	-	-	-
Total	**24500**	**17188**	7312	**70.1**		
Udaipur-North						
NFL-Varda in Udaipur range						

*Dendrocalamus strictus (*Baans)	8500	5320	3180	62.58	3	-
Pongamia pinnata (Karanj)	5000	2840	2160	56.8	2.1	19
Acacia catechu (Khair)	10500	6465	4035	61.57	2.8	25
Holoptelea integrifolia (Churel)	8500	4745	3755	55.82	2.9	28
Azadirachta indica (Neem)	1000	735	265	73.5	2.9	26
Emblica officinalis (Amla)	8000	5835	2165	72.93	2	22
*Wrightia tinctoria (*Khirani*)*	5000	3220	1780	64.4	2.3	23
Acacia leucopholea (Ronj)	8000	5213	2787	65.16	3	26
Ficus racemosa (Hawan)	1000	870	130	87	2.4	25
*Syzygium cumini (*Jamun)	6400	3460	2940	54.06	2.2	22
Zizyphus mauritiana (Ber)	6500	3719	2781	57.21	2.3	21
Others	74	38	36	51.35	-	-
Total	**68474**	**42460**	26014	**62**		
ANR-Subra subri 14 in Kotra range						
*Dendrocalamus strictus (*Baans)	3300	2930	370	88.78	4.5	-
Emblica officinalis (Amla)	600	491	109	81.83	3	34
Pongamia pinnata (Karanj)	590	442	148	74.91	2.9	26
Acacia catechu (Khair)	600	515	85	85.83	4.1	36
Zizyphus mauritiana (Ber)	600	208	392	34.66	2.8	25
Holoptelea integrifolia(Churel)	1200	796	404	66.33	3.5	30
Terminalia bellerica (Behada)	380	281	99	73.94	2.9	24
Tamarindus indica (Imli)	280	199	81	71.04	3.1	27
*Wrightia tinctoria (*Khirani*)*	1250	672	578	53.76	3.2	31
Ficus racemosa (Hawan)	600	342	258	57	4.1	38
Cassia fistula (Amaltash)	200	81	119	40.5	2.4	22
Albizia lebbeck (Kala Siras)	300	166	134	55.33	2.9	30
Ficus religiosa (Pipal)	10	4	6	40	3.8	34
Ailanthus excelsa (Ardu)	90	52	38	57.7	3.2	32
Total	**10000**	**7179**	2821	**71.7**		
Udaipur-WL						
ANR-Jananaodi in Jaisamand range						
Pongamia pinnata (Karanj)	50	40	10	90	3.5	18
Emblica officinalis (Amla)	1000	917	83	91.7	3.5	19
Azadirachta indica (Neem)	2000	1863	137	93.15	3.5	14
*Tamarindus indica (*Imli)	400	342	58	85.5	3.3	14
Aegle marmelos (Bilpatra*)*	500	328	172	65.6	3.4	11
*Dendrocalamus strictus (*Baans)	1000	876	124	87.6	3.7	-

Zizyphus mauritiana (Ber)	900	853	47	94.7	2.3	14
Ficus racemosa (Hawan)	800	739	61	92.3	2.8	16
*Terminaliia arjuna (*Arjun)	410	386	24	94.1	2.6	16
*Terminalia belerica (*Behada)	40	35	5	87.5	1.3	18
*Ficus glomerata (*Gular*)*	100	83	17	83	3.4	16
*Ficus religiosa (*Pipal*)*	400	342	58	85.5	3.4	16
*Prosopis cineraria (*Khejri*)*	400	312	88	78	2.4	14
Acacia catechu (Khair)	2000	1742	256	87.1	3.5	12
Total	**10000**	**8858**	1142	**88.5**		

Annexure-2c

Site wise and species wise survival % of plants planted, weighted survival % of each species, height and GBH of plants in the year 2016-17

Plantation of 2016-17						
Ajmer						
NFL- Kshatipurti Natuti in Kishangarh range						
Species	**Total Plants planted**	**Live Plants**	**Dead Plants**	**Survival (%)**	**Average height of plants (m)**	**Average gbh (cm)**
Acacia nilotica (Desi babool)	500	413	87	82.6	3.1	16.5
Acacia leucopholea(Ronj)	700	612	88	87.42	3	15.5
Acacia tortilis (Totalis)	300	291	9	97	3.6	19.7
Acacia senegal (Kumtha)	315	280	35	88.88	2.2	8.5
Total	**1815**	**1596**	219	**87.9**		
Alwar						
DFL-Chuhadpur in Tijara range						
Holoptelea integrifolia (Churel)	4500	2714	1786	60.31	3.2	30
Acacia tortilis (Totalis)	3000	1863	1137	62	3.6	35
Acacia nilotica (Desi babool)	1500	938	562	62.53	3.6	30
Acacia senegal (Kumtha)	3000	1983	1017	66.1	3.8	38
Dalbergia sissoo (Shisham)	1500	1014	486	67.6	2.9	40
Acacia leucopholea(Ronj)	1000	740	260	74	3.1	38
Azadirachta indica (Neem)	500	312	188	62.4	3	32
Total	**15000**	**9564**	5436	**63.7**		
DFL-Amritwas in Alwar range						
Acacia leucopholea(Ronj)	8000	6371	1629	79.6	3.9	36
Zizyphus mauritiana (Ber)	2000	1628	372	81.4	2.8	22
Holoptelea integrifolia (Churel)	2000	1533	467	76.6	3.2	32
Acacia nilotica (Desi babool)	1000	734	266	73.4	4.2	39
Azadirachta indica (Neem)	200	156	44	78	2.9	27
Acacia catechu (Khair)	1500	1287	213	85.8	3.7	33
Ailanthus excelsa (ardu)	300	106	194	35.3	3.1	23
Total	**15000**	**11815**		**78.7**		
Banswara						
ANR-Rohal Panasi Malwasa in Garhi range						
Emblica officinalis (Amla)	800	465	335	58	2.3	12

Terminalia bellirica (Behada)	400	270	130	67.5	4.2	24
Tectona grandis (Sagwan)	4000	2840	1160	71	5	22
Acacia catechu (Khair)	4500	2565	1935	57	3.3	18
Dendrocalamus strictus (Baans)	500	284	216	56.8	6	-
Ficus racemosa (Hawan)	480	316	164	65.8	4.3	24
Azadirachta indica (Neem)	120	82	38	68.3	3.2	18
Holoptelea integrifolia (Churel)	1000	614	386	61.04	2.4	10
Zizyphus mauritiana (Ber)	200	116	84	58	2.5	10
Total	**12000**	**7552**		**62.9**		
Baran						
Vilasdam in Kisanganj range						
Terminalia arjuna (Arjun)	1000	524	476	52.4	3.3	24
*Anthocephalus kadamba (*Kadamba)	1500	718	782	48.8	3.4	23
Dalbergia sissoo (Shisham)	1000	428	572	42.8	4.3	28
*Pongamia pinnata (*Karanj)	1500	730	770	48	3.6	23
Azadirachta indica (Neem)	500	273	227	54.6	4.6	32
*Syzygium cumini (*Jamun)	1000	614	386	61	2.1	17
Emblica officinalis (Amla)	1000	618	382	61.8	3.3	22
Holoptelea integrifolia (Churel)	500	412	88	82.4	4.2	26
Terminalia bellirica (Behada)	400	235	165	58.7	3.1	22
Bombax ceiba (Semal)	500	265	235	53	2.1	17
Acacia catechu (Khair)	500	273	227	54.6	3.3	26
Tectona grandis (Sagwan)	500	386	114	77.2	4.2	30
*Morus alba (*Shahtut*)*	100	0	100	0	-	-
Total	**10000**	**5478**		**54.7**		
Bharatpur-T						
ANR-Pathwari in Bayana range						
Acacia leucopholea(Ronj)	6500	2456	4044	37.7	2.1	20
Zizyphus mauritiana (Ber)	500	386	114	77.2	1.4	11
Acacia tortilis (Totalis)	2000	1088	912	54.4	2.3	19
Acacia nilotica (Desi babool)	1000	654	346	65.4	2.6	22
Total	**10000**	**4584**		**45.8**		
Bhilwara						
ANR-Kalia dungar in Jahazpur range						
Acacia nilotica (Desi babool)	6500	5152	1348	79.26	2.95	21.8
Acacia leucopholea(Ronj)	2000	1104	896	55.2	3.8	25.2
*Pongamia pinnata (*Karanj)	1000	645	355	64.5	3.4	12.5

Azadirachta indica (Neem)	100	20	80	20	4.9	40
Holoptelea integrifolia (Churel)	140	10	130	25	2.8	12.5
Butea monosperma (Palas)	150	46	104	30.66	4.7	38
Ficus bengalensis (bargad)	50	25	25	50	4.3	55
Zizyphus mauritiana (Ber)	160	25	35	34.37	1.9	2.8
Total	**10000**	**7057**	2943	**70.5**		
Bundi						
ANR-Devnarayan in Nainwa range						
Acacia nilotica (Desi babool)	9000	7059	1941	78.4	4.5	46
Acacia leucopholea(Ronj)	500	461	39	92.2	2.5	30
Holoptelea integrifolia (Churel)	500	449	21	89.8	3.3	28
Prosopis juliflora (Khejri)	500	289	211	57.8	4	45
Dalbergia sissoo (Shisham)	500	381	19	76.2	2.7	38
Total	**11000**	**8639**		**78.5**		
Chittorgarh-T						
ANR-Chorbadli in Vijaypur range						
Acacia catechu (Khair)	2017	15 67	450	77.6	3.2	23
Acacia leucopholea(Ronj)	1625	1137	488	69.9	2.9	28
Acacia nilotica (Desi babool)	970	630	340	64.9	2.7	24
Dendrocalamus strictus (Baans)	500	302	198	60.4	6	-
Emblica officinalis (Amla)	2113	1009	1104	47.7	1.4	17
Holoptelea integrifolia (Churel)	1025	644	381	62.8	2.7	21
*Cassia fistula (*Amaltas)	172	42	130	24.4	1.6	14
Zizyphus mauritiana (Ber)	1223	987	236	80.7	1.8	16
*Pongamia pinnata (*Karanj)	250	163	87	65.2	1.8	19
*Terminalia bellirica (*Behada*)*	105	29	76	27.6	2.1	20
Total	**10000**	**6510**		**65.1**		
Dholpur						
ANR-Dholimati-II in Sarmathura range						
Acacia nilotica (Desi babool)	8000	5232	2768	65.4	3	28
Acacia senegal (Kumtha)	2000	833	1167	41.6	2.5	43
Total	**10000**	**6065**		**60.6**		
Jaipur-North						
ANR-Devan in Shahpura range						
Acacia tortilis (Totalis)	5000	3248	1752	64.9	4.6	35
Acacia leucopholea(Ronj)	3000	2127	873	70.9	3	23
Dalbergia sissoo (Shisham)	500	418	82	83.6	5	27

Zizyphus mauritiana (Ber)	500	462	38	92.4	2.6	15
Acacia nilotica (Desi babool)	200	151	49	75.5	2.9	22
Holoptelea integrifolia (Churel)	800	705	95	88.1	1.1	30
Total	**10000**	**7111**	1593	**71.1**		
Jaipur-WL						
ANR-Ghoret of Raisar range						
Acacia nilotica (Desi babool)	3500	2334	1166	66.68	5.2	25
Acacia leucopholea(Ronj)	2000	1051	949	52.55	4.1	28
Acacia senegal (Kumtha)	1500	941	559	62.73	5.1	27
Acacia tortilis (Totalis)	1000	883	117	88.3	4.3	23
Holoptelea integrifolia (Churel)	1500	1200	300	80	3.8	21
Azadirachta indica (Neem)	500	341	159	68.2	4.5	18
Total	**10000**	**6750**	**3250**	**67.5**		
ANR-Kanikhor of Raisar range						
Acacia nilotica (Desi babool)	500	331	169	66.2	5.2	25
Acacia leucopholea(Ronj)	9000	5837	3163	64.85	4.1	28
Holoptelea integrifolia (Churel)	500	330	170	66	3.8	21
Total	**10000**	**6498**	**3502**	**64.9**		
Jaisalmer						
NFL-Mokla Parevar in Jaisalmer range						
Acacia tortilis (Totalis)	17500	12447	5053	71	3.8	22.5
Acacia senegal (Kumtha)	1050	793	257	75.52	2.1	12
Tecomella undulata (Rohida)	1640	1069	571	65.18	180	9
Zizyphus mauritiana (Ber)	4810	3581	1229	74.45	2.4	22
Total	**25000**	**17890**	7110	**71.56**		
Jalore						
ANR-Kolar of Jasvantpura range						
Acacia senegal (Kumtha)	6500	6030	470	92	5.3	20.6
Acacia leucopholea(Ronj)	2000	102	1898	5.1	4.7	32.8
Zizyphus mauritiana (Ber)	1000	860	140	86	2.8	19.2
*Cordia gharaf (*Gunda*)*	500	72	428	14.4	3100	27.3
Total	**10000**	**7064**	**2936**	**70.64**		
Jhalawar						
NFL-Golana-1 in Khanpur range						
Acacia nilotica (Desi babool)	44000	34534	9466	78.4	4.9	43
Total	**44000**	**34534**	9466	**78.4**		

Jodhpur						
ANR-Nadiyakalan of Osian range						
Acacia senegal (Kumtha)	2000	1618	382	80.9	2.8	21.25
Acacia tortilis (Totalis)	6000	3143	2857	5.23	4.1	29.3
Zizyphus mauritiana (Ber)	1000	829	171	82.9	2.6	18.7
Mixed plants	1000	310	690	31	225.75	19.75
Total	**10000**	**5900**	**4100**	**59%**		
Karauli						
ANR-Naroli Dang in Saptora range						
Acacia leucopholea(Ronj)	4000	2800	1200	70	4.3	36
Holoptelea integrifolia (Churel)	3000	1760	1240	58.6	3.8	39
Acacia nilotica (Desi babool)	1000	633	367	63.3	4.2	33
Acacia tortilis (Totalis)	2000	1188	812	59.4	4.3	38
Total	**10000**	**6381**		**63.8**		
RTR-Karauli						
ANR-Gadigaon of Karanpur range						
Acacia nilotica (Desi babool)	6000	5040	960	84	3.9	32
Butea monosperma (Chila)	1500	1288	212	85.5	5.4	40
Acacia leucopholea(Ronj)	400	108	391	27	3.3	31
Zizyphus mauritiana (Ber)	1500	1109	292	73.9	2.9	23
*Holoptelia integiifolia (*Churel*)*	500	304	196	60.8	3	32
Others	100	39	61	39	-	-
Total	**10000**	**7888**		**78.8**		
Kota						
NFL-Bowdikheda in Ladpura range						
Acacia catechu (Khair)	2646	1519	1127	57.4	3.5	28
Acacia leucopholea(Ronj)	2732	2200	532	80.5	3.9	32
Zizyphus mauritiana (Ber)	922	711	211	77.1	2.3	20
Pithecellobium dulce (Jangal Jalebi)	1100	278	822	25.2	2.7	22
Total	**7400**	**4728**	2672	**63.6**		
Kota-MNP						
DFL-Sakatpura in Borawas range						
Acacia catechu (Khair)	4250	3786	464	89	4.6	42
Zizyphus mauritiana (Ber)	3000	2080	920	69.3	3.3	28
Acacia leucopholea(Ronj)	1250	1009	241	80.7	4.1	36
Emblica officinalis (Amla)	5000	2800	2200	56	3.6	29
Holoptelea integrifolia (Churel)	3500	1508	1992	43	3.5	29
Total	**17000**	**11183**	5817	**65.70%**		

ANR-Ambarani in Jawahar Sagar range						
Zizyphus mauritiana (Ber)	2000	1756	244	87.8	3.4	48
Acacia leucopholea(Ronj)	7000	5208	1792	77.2	4.3	52
Acacia catechu (Khair)	1000	820	180	82	4.7	54
Total	**10000**	**7984**	2016	**79.8**		
Pali						
ANR-Maniyari-A in Pali range						
Acacia senegal (Kumtha)	6000	5695	305	94.9	4.5	32
Acacia nilotica (Desi babool)	2000	658	1342	32.9	4.1	34
Dalbergia sissoo (Shisham)	2000	34	1966	1.7	3	25
Total	**10000**	**6387**	3613	**63.8**		
DFL-Pachanpura in Sendra range						
Zizyphus mauritiana (Ber)	12500	6267	6233	50.1	2.6	15
Acacia leucopholea(Ronj)	10000	6570	3430	65.7	4	29
Acacia nilotica (Desi babool)	7500	4384	3116	58.4	4.2	32
Acacia catechu (Khair)	5000	4831	169	96.6	3.6	30
Total	**35000**	**22052**	12948	**63**		
ANR-Sojat in Devdungari range						
Acacia senegal (Kumtha)	3000	1295	1705	43.1	3.8	29.3
Acacia leucopholea(Ronj)	4000	3074	926	76.8	3.2	28
Zizyphus mauritiana (Ber)	1000	854	146	85.4	2.1	16
Acacia nilotica (Desi babool)	1000	524	476	52.4	3.9	31
Acacia catechu (Khair)	1000	574	426	57.4	3.7	28
Total	**10000**	**6321**	3679	**63.2**		
Pratapgarh						
ANR-Janjal of Chhoti Sadri range						
Acacia catechu (Khair)	1000	815	185	81.5	2.4	18.7
Emblica officinalis (Amla)	2000	1147	853	57.3	1.2	7.9
Dendrocalamus strictus (Baans)	500	479	21	95.8	5.7	-
Tectona grandis (Sagwan)	1000	847	153	84.7	4.3	26.9
Zizyphus mauritiana (Ber)	1800	1782	18	99	1.4	6
Acacia leucopholea(Ronj)	2200	1621	579	73.7	3.3	21.9
Holoptelea integrifolia (Churel)	1500	1199	301	79.9	1.65	15.8
Total	**10000**	**7890**	**2110**	**78.90%**		
Sariska Alwar						
ANR-Talab in Tehla range						
Acacia nilotica (Desi babool)	5100	4463	637	87.5	2.6	23
Acacia leucopholea(Ronj)	2300	1764	536	76.69	3.2	24

Acacia catechu (Khair)	300	234	66	78	2.3	25
Zizyphus mauritiana (Ber)	1200	974	226	81.16	1.2	16
Holoptelea integrifolia (Churel)	600	478	122	79.67	2	21
Cassia fistula (Amaltash)	500	265	235	53	2.3	24
Total	**10000**	**8178**	1822	**81.7**		
Sikar						
ANR-Meena Ka Nagal in Patan range						
Acacia leucopholea(Ronj)	6600	5346	1254	81	2.5	14
Acacia nilotica (Desi babool)	1500	1320	180	88	3.2	14
Zizyphus mauritiana (Ber)	1500	1290	210	86	2	8
Azadirachta indica (Neem)	200	160	40	80	3.2	12
Holoptelea integrifolia (churail)	200	164	36	82	2.2	10
Total	**10000**	**8280**	1720	**82.8**		
Sirohi						
ANR-Rupanmata at Rameshwar C.No . 18 in Pindwara range						
Zizyphus mauritiana (Ber)	2000	1268	732	63.4	1.4	12
Acacia catechu (Khair)	2500	1558	942	62.32	2.3	22
*Holoptelia integrifolia (*Churel)	1000	634	366	63.04	2.4	24
Acacia leucopholea(Ronj)	2000	1226	774	61.03	2.5	23
Acacia nilotica (Desi babool)	710	435	275	61.03	2.6	23
Dendrocalamus strictus (Baans)	1790	968	822	54.09	3.5	-
Total	**10000**	**6089**		**60.8**		
Tonk						
ANR-Choganya siras in Niwai range						
Acacia tortilis (Totalis)	6000	4800	1200	80	3.2	23
Acacia nilotica (Desi babool)	3000	2250	750	75	3	22
Acacia leucopholea(Ronj)	500	418	82	83.6	3.5	25
Prosopis juliflora (Khejri)	200	110	90	55	3.1	23
Zizyphus mauritiana (Ber)	200	105	95	52.5	1.9	15
Others	100	60	40	60	-	-
Total	**10000**	**7743**	2257	**77.4**		
Udaipur-North						
ANR-Boramagra B in Sayra range						
Dendrocalamus strictus (Baans)	3050	1891	1159	62	3.1	-
*Pongamia pinnata (*Karanj)	750	457	293	61	1.8	20
Acacia catechu (Khair)	3100	1984	1116	64	3.7	33
Emblica officinalis (Amla)	1150	632	518	55	2.8	23

Dalbergia sissoo (Shisham)	700	385	315	55	3.1	26
Zizyphus mauritiana (Ber)	1040	655	385	63	2.9	25
Tecomella undulata (Rohida)	210	126	84	60	2.3	17
Total	**10000**	**6130**	3870	**61.3**		
Udaipur-T						
ANR-Balvi in Phalasiya range						
Dendrocalamus strictus (Baans)	7500	5620	1880	74.94	8	-
Acacia catechu (Khair)	900	606	294	67.35	4	32
Emblica officinalis (Amla)	700	429	271	61.3	3.1	30
*Terminalia arjuna (*Arjun*)*	200	160	40	80	3.6	27
Albizia lebbeck (Siras)	200	185	15	92.5	2.9	28
*Syzygium cumini (*Jamun)	200	180	20	90	3.9	32
Azadirachta indica (Neem)	50	25	25	50	4	32
Pharri	250	98	152	39.2	3.2	29
Total	**10000**	**7303**		**73.03**		

Divisionwise Consolidated Reports

Ajmer (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Ajmer Forest Division. This Forest Division with 6 Forest Ranges namely Ajmer, Pushkar, Kishangarh, Beawar, Sarwar, and Nasirabad which has territorial jurisdiction over the entire Ajmer District.

Fig: Location of Ajmer district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Ajmer Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Physical Target Achieved
Pushkar	NFL Daulatpura III 10.10 Ha	2015-16	100%
Kishangarh	NFL Kshatipurti Natuti 1.65 Ha	2016-17	100%
Kishangarh	DFLTikhiya tukda 28 Ha	2015-16	100%

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Ajmer Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Ajmer	Dumada	2016-17	20 boundary pillars
Ajmer	Mahua Bhid	2016-17	4 ft 500 m Stone wall
Kishangarh	Sambharia harda	2015-16	4 ft 4592m Stone wall

Pushkar	Kanas Banseli	2014-15	4 ft 350 m Stone wall
Sarwad	Sarwad	2014-15	Forest Guard Chowki

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Daulatpura in Pushkar range** : The selected plantation has been carried out on 10.10 hec of land at Daulatpura in Pushkar range during the year 2015-16. The activities were done under the Non Forest Land (NFL) model. The GPS location of this selected site was N 26°.30333 and E 74°.299867. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour and stony hard layer.

Fig: Daulatpura NFL at Pushkar

3.1.2. Treatment plan before sowing: The area comprises of hilly, stony and hard surfaces where depending upon the availability of soil, digging has been made for plantation**.**

Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 3000 pits have been made for plantation in total 10.10 hec of land. After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Daulatabad, a forest department nursery of Pushkar range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 4. A total of 3000 numbers of seedlings were planted at the site. Seedlings of *Acacia nilotica* (desi babool), *Zizyphus mauritiana* (ber), *Acacia leucophoelea (*ronj), *Acacia senegal* (Kumatha) were planted.

A total of 3000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team. Technique of planting was trench cum pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 297 plants per hectare have been planted. So total number of plants planted was 3000 for 10.10 hectare of land.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants

has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. Plants such as ber, babool, ronj and kumtha have been found grown naturally in this site.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Zizyphus mauritiana (*Ber*)*	238	3.10	25
2	*Acacia nilotica* (Desi Babool)	177	2.80	33
3	*Acacia leucopholea* (Ronj)	207	2.90	29.2
4	*Acacia senegal* (Kumtha)	229	3.80	33

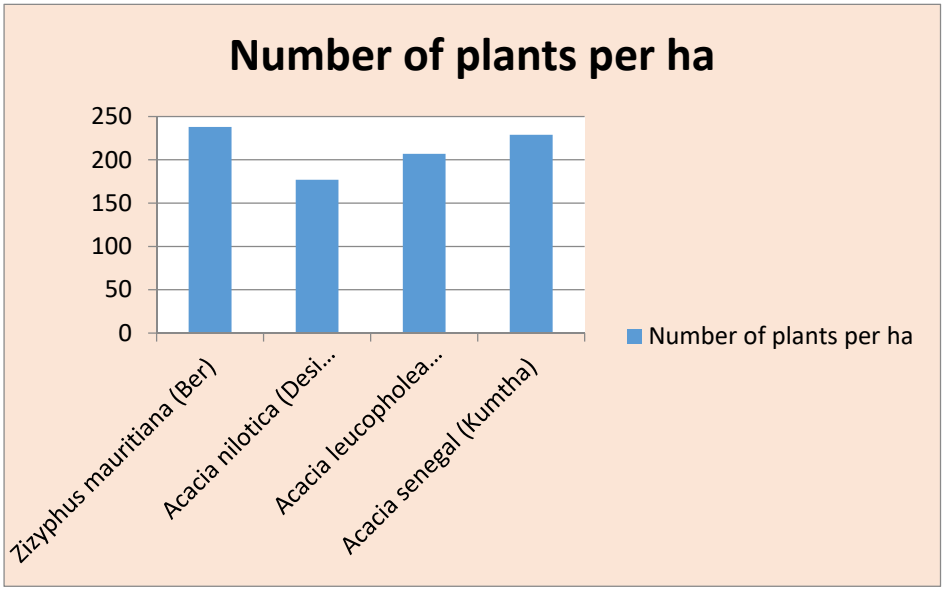


Fig: Graph showing number plants under natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of species like Ronj, Kumatha and Ber were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected NFL model plantation was **protected trench fencing with average top width of 0.75m, average depth of 0.45m and average bottom**

width of 0.40m. Grass has grown in trenches. Fencing has been partially effective in controlling the biotic pressures.

3.1.9. Soil and Water Conservation Measures: **There were 864.77RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3.5 m to 8.5 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation.

Fig: Measurement of contour trenches

3.1.10. Observations Recorded: Under this model, 297 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 49.6% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 3000 plants comprising of four species were planted in the 10.10 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Zizyphus mauritiana (Ber)	800	438	362	54.75	3.10	28
Acacia nilotica (Desi babool)	300	154	146	51.33	2.60	31
Acacia leucopholea (Ronj)	950	445	505	46.84	2.80	27
Acacia senegal (Kumatha)	950	453	497	47.68	3.90	43
Total	**3000**	**1490**	**1510**	**49.6**		

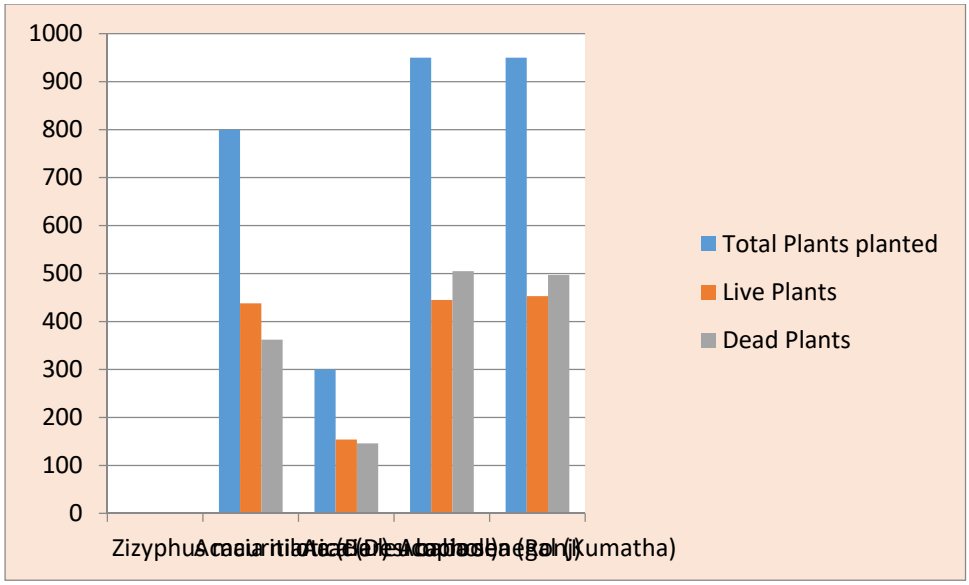


Fig: Graph showing survival of different plants

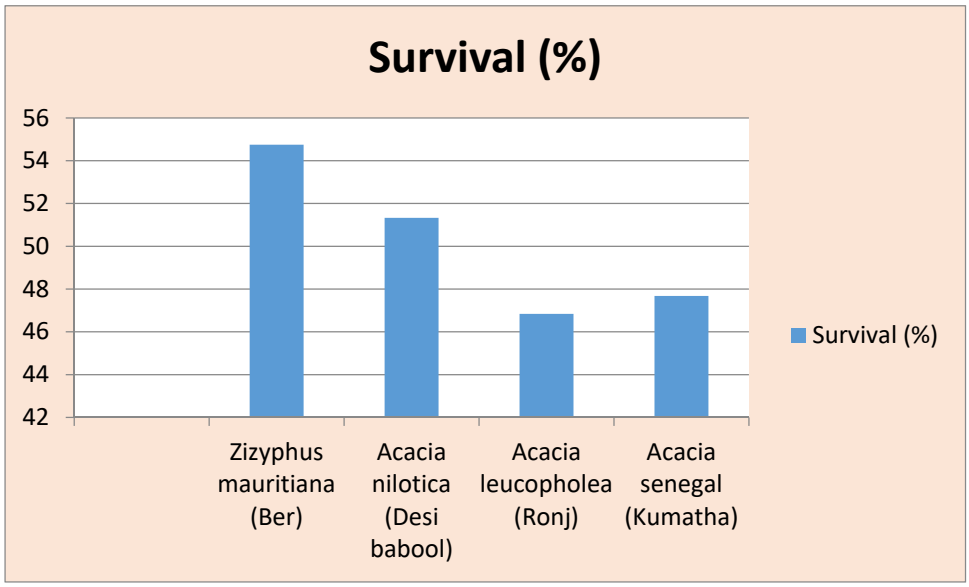


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ber plant was highest** followed by desi babool. **The survival percentage of ber was maximum which is 54.75 % and desi babool was 51.33%. All the plants planted in this site showed average survival rate.**

The reason for low survival of plants was watering. The plantation was dependent on rain mainly. Due to scanty rainfall, the growth and survival of plants got affected highly.

Fig: Putting of lime for counting of plants

3.1.11. GPS Location and KML file: The selected NFL model under CAMPA plantation site measured 10.1 hec plantation area as per kml file.

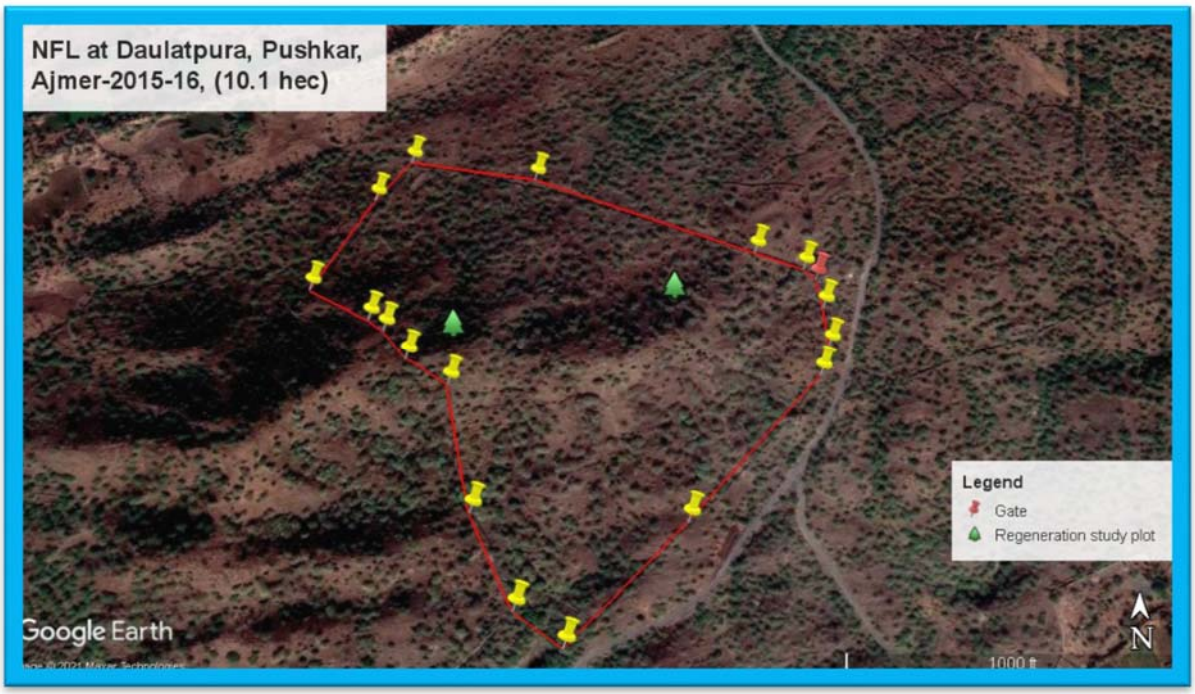


Fig: KML file of NFL at Daulatpura, Pushkar range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	15273.71	234689.48	291881.52	541844.71	20565	116723	213576	350864
2015-16	177245	45559	-	222804	163453	43171	11430	218054
2016-17	65349	-	31547	96896	65349	-	31513	96862
2017-18	41700	-	-	41700	41607	-	-	41607
2018-19	40365	-	9421	49786	40365	-	9421	49786
2019-20	31950	-	12147	44097	31950	-	12147	44097
2020-21	34080	-	14572	48652	34080	-	14572	48652

3.2.1. Site-2: **Kshatipurti Natuti in Kishangarh range:** The selected plantation has been carried out on 1.65 hec of land at Kshatipurti Natuti in Kishangarh range during the year 2015-16 and 2016-17. The activities were done under the Non Forest land (NFL) model. The GPS location of this selected site was N 26.78625 and E 74.740108. The site was a forest land and selected for 100% evaluation. The soil was brown in colour and stony hard layer. Type of land was hard stony and hilly.

3.2.2. Treatment plan before sowing: The area comprises of rocky, hilly and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 1815 pits have been made for plantation in total 1.65 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.2.3. Nursery Develo pment for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Kshatipurti Natuti, a forest department nursery of Kishangarh range. During monsoon these seedlings were planted.

Fig: Measurement of plants during field evaluation at Natuti, Kishangarh

3.2.4. Species Planted: The selected tree species under plantation were 4. A total of 1815 numbers of seedlings were planted at the site. Seedlings of *Acacia nilotica* (Desi babool), *Acacia leucophoelea (*Ronj), *Acacia senegal* (Kumtha) and *Acacia tortilis* (Totalis) were planted. The growth of plats was good.

A total of 1815 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. **No plantation journal was found by the team.**

Fig: NFL at Natuti, Kisangarh

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 1100 plants per hectare have been planted. So total number of plants planted was 1815 for 1.65 hectare of land. Type of plantation was block and technique of planting was pit. **The choice of**

species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found.

3.2.6. Natural Vegetation and Re generation: The area has been covered fully with vegetation due to this plantation. Grasses have grown in ditch trenches which should be controlled. Plants like ber totalis (*Acacia tortilis*), desi babool (*Acacia nilotica*), ronj (*Acacia leucopholea*), ber (*Zizyphus mauritiana*) and kumtha (*Acacia senegal*) have been found grown naturally, however, the growth was good.

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia tortilis* (Totalis)	352	2.8	21
2	*Acacia nilotica* (Desi Babool)	235	3.5	24
3	*Acacia leucopholea* (Ronj)	317	3.2	29
4	*Acacia senegal* (Kumtha)	308	3.5	28
5	*Zizyphus mauritiana* (Ber)	163	2.7	18

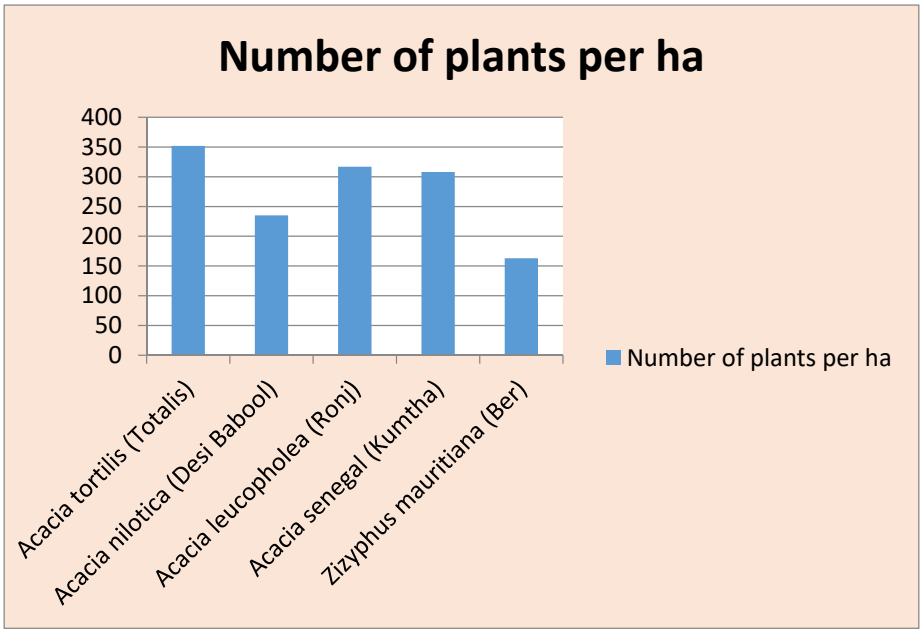


Fig: Graph showing number plants under natural regeneration

3.2.7. Regeneration through seeds sowing: Seeds of species *desi babool, ronj, tortilis, Kumatha* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.2.8. Protection Work: The selected NFL model plantation was **protected ditch/trench fencing with average top width of 0.90/0.60, average depth of 1.20/0.60 and average bottom width of 1.50/0.80. Present condition of fencing was good. Fencing has been partially effective in controlling the biotic pressures.**

Fig: Measurement of ditch fencing at Natuti, Kisangarh

3.2.9. Soil and Water C onservation Measures: **There were 273 RMT Ditch fencing in the form of water harvesting** structures present in the entire plantation area.

3.2.10. Observations R ecorded: Under this model, **1100 plants per hec** were planted during plantation. **Based on for as 100 percent counting, plants survival was 87.9% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 1815 plants comprising of four species were planted in the 1.65 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia nilotica (desi babool)	500	413	87	82.60	3.1	16.5
Acacia leucophoelea (ronj)	700	612	88	87.42	3	15.5
Acacia tortilis (totalis)	300	291	9	97.00	3.6	19.7
Acacia Senegal (kumtha)	315	280	35	88.88	2.2	8.5
Total	**1815**	**1596**	219	**87.9**		

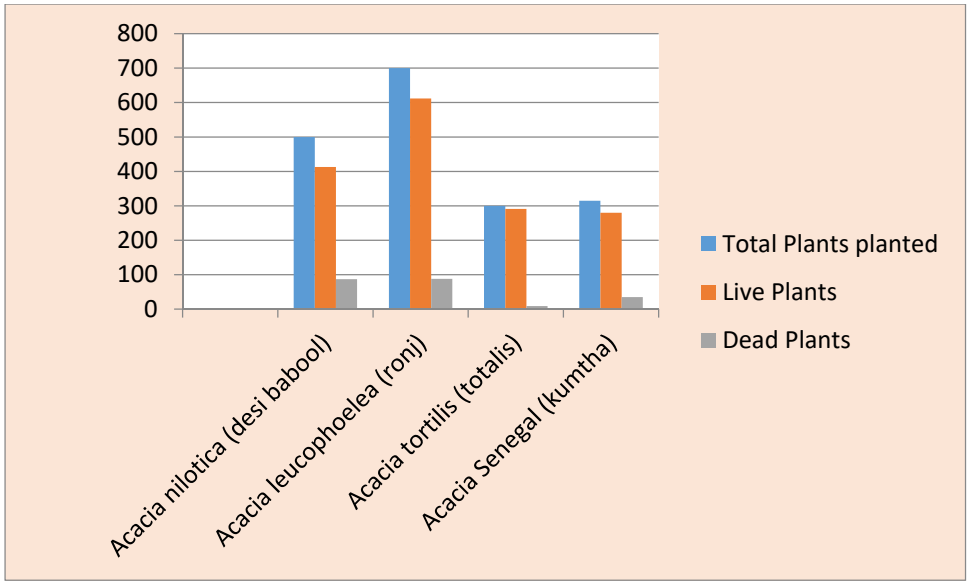


Fig: Graph showing survival of different plants

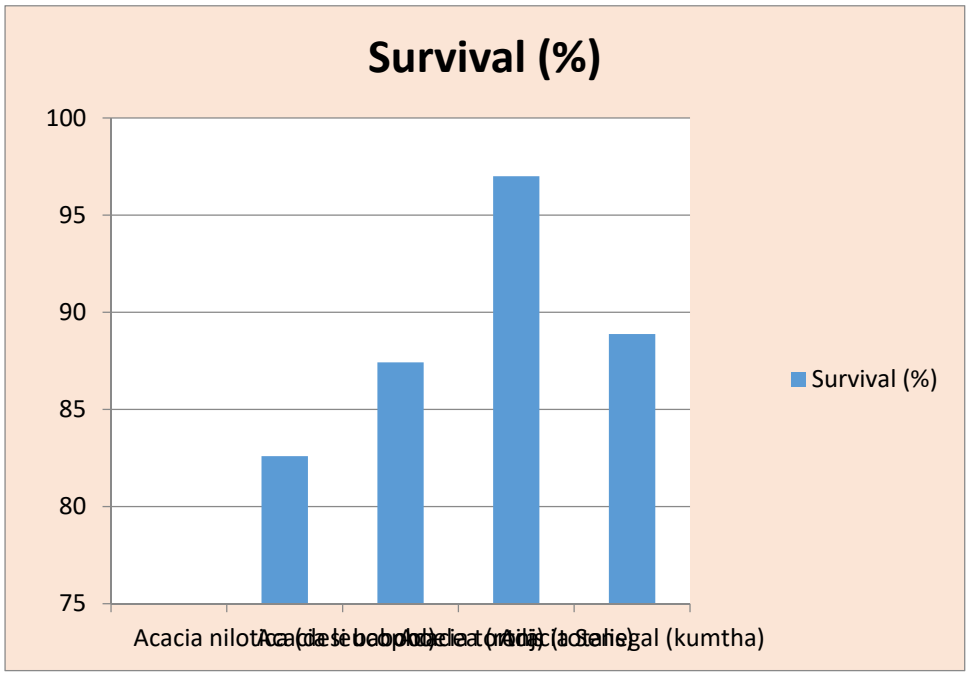


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of totalis plant was highest** followed by Kumtha. **The survival percentage of totalis was maximum which is 97 % and bans was 89%. All the plants planted in this site showed good survival rate.**

The reason for high survival of all plants was timely execution and watering of plants as well as protection of the area gives good survival. Cattle pressure is however, limitation faced by frontline staff.

3.2.11. GPS Location and KML file: The selected model under CAMPA plantation site measured 1.65 hec as per KML file.

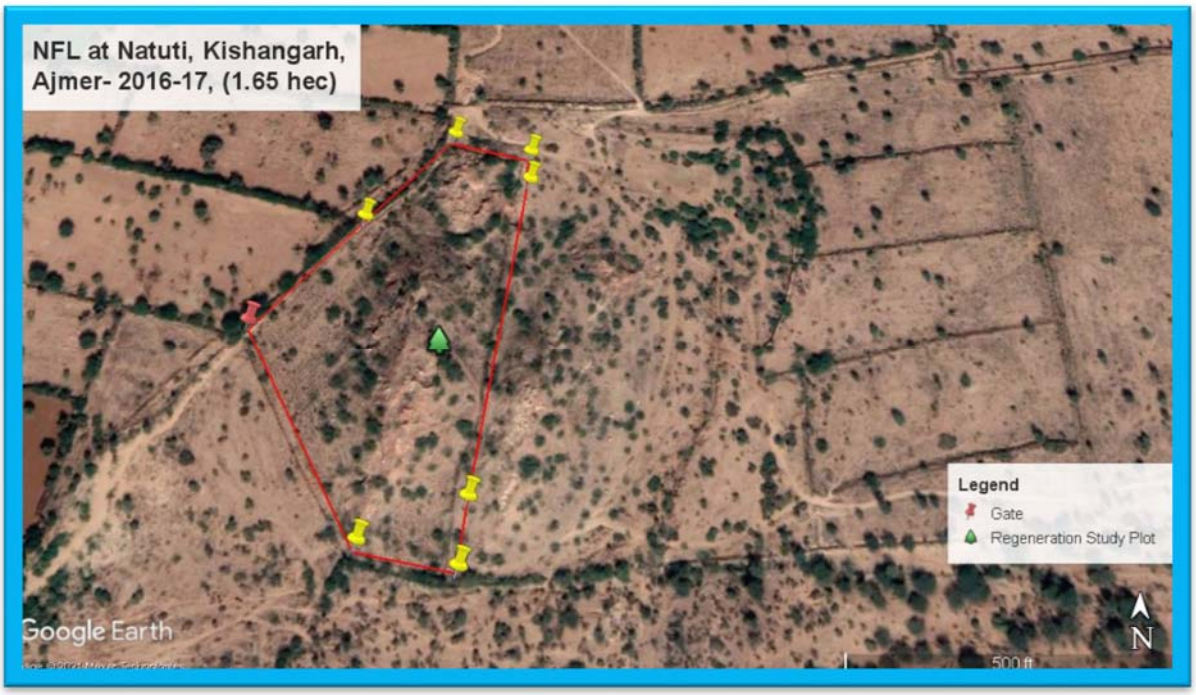


Fig: KML file of NFL at Natuti, Kisangarh range plantation area

C 3.2.18. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2016-17	-	-	-	119512	28259	58325	32928	119512
2017-18	-	-	-	22036	8069	13967	-	22036
2018-19	-	-	-	6755	875	-	5880	6755
2019-20	-	-	-	7135	-	-	7135	7135
2020-21	-	-	-	7943	-	-	7943	7943

3.3.1. Site-3: **Tikhiya Tukda of Kishangarh range**: The selected plantation has been carried out on 28 hec of land at Tikhiya Tukda in Kishangarh range during the year 2015-16. The activities were done under the DFL model.

The GPS location of this selected site was N 26.637092 and E 74.874769 The site was a forest land and selected for 100% evaluation. The soil was brown in colour and stony hard layer.

3.3.2. Treatment plan before sowing:
The area comprises of rocky, hilly and hard stony surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 19600 pits have been made for plantation in total 28 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: DFL at Tikhliya Tukda of Kishangarh range

3.3.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Tikhiya tukda, a forest department nursery of Kishangarh range. During monsoon these seedlings were planted.

3.3.4. Species Planted: The selected tree species under plantation were 6. A total of 19600 numbers of seedlings were planted at the site. Seedlings of *Acacia nilotica* (desi babool), *Acacia leucophoelea (*ronj), *Acacia senegal* (Kumatha), *Acacia tortilis* (totalis), *Zizyphus mauritiana* (ber) and *Azadirachta indica* (Neem) were planted.

Fig: Putting of lime on plants

A total of 19600 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have been planted. So total number of plants planted was 19600 for 28 hectare of land. Type of plantation was block. Pit technique of planting was used.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.3.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

Fig: Measurement of plants on field

3.3.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. The growth of plants is good. Plants like hingot (*Balanites* sp.), dhok (*Anogeissus* sp.), ronj (*Acacia leucopholea*), kakeda and gangan were found grown naturally.

Table-7: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (cm)	Average girth (gbh) cm
1	Hingot *(Balanites* sp.)	336	14	10
2	Dhok (*Anogeissus* sp.)	283	265	17
3	Ronj (*Acacia leucopholea)*	198	280	25
4	Kakeda	221	22	16
5	Gangan	256	33	16

3.3.7. Regeneration through seeds sowing: Seeds of species Species like desi babool, ronj, tortalis, Kumtha seeds have sown for natural regeneration. The growth of naturally seed sown plants was poor.

3.1.8. Protection Work: The selected NFL model plantation was **protected by ditch fencing of 1645 RMT and 264RMT of loose stone wall. The measurement of trench fencing with average top width of 0.75m, average depth of 0.45m and average bottom width of 0.40m. Grass has grown in trenches. Fencing has been partially effective in controlling the biotic pressures.**

3.1.9. Soil and Water Conservation Measures: **There were 8400 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3m to 7 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation. In addition, soil and water conservation measure in the form of earthen bund of size 270.09 m^3 has been found in the plantation area.

3.1.10. Observations Recorded: Under this DFL model, 700 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 79% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 19600 plants comprising of six species were planted in the 28 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-8: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
Acacia tortilis (totalis)	9000	8356	644	92.84	2.5	5
Zizyphus mauritiana (ber)	1000	444	556	44.40	2.0	4
Acacia senegal (kumtha)	3300	2907	393	89.09	2.6	5
Acacia nilotica (desi babool)	5000	3497	1503	69.94	2.4	4
Azadirachta indica (neem)	100	15	85	15	1.0	2
Acacia leucophoelea (ronj)	1306	515	791	39.43	2.20	3
Total	**19706**	**15734**	3972	**79**		

Fig: DFL at Tikhliya Tukda of Kishangarh

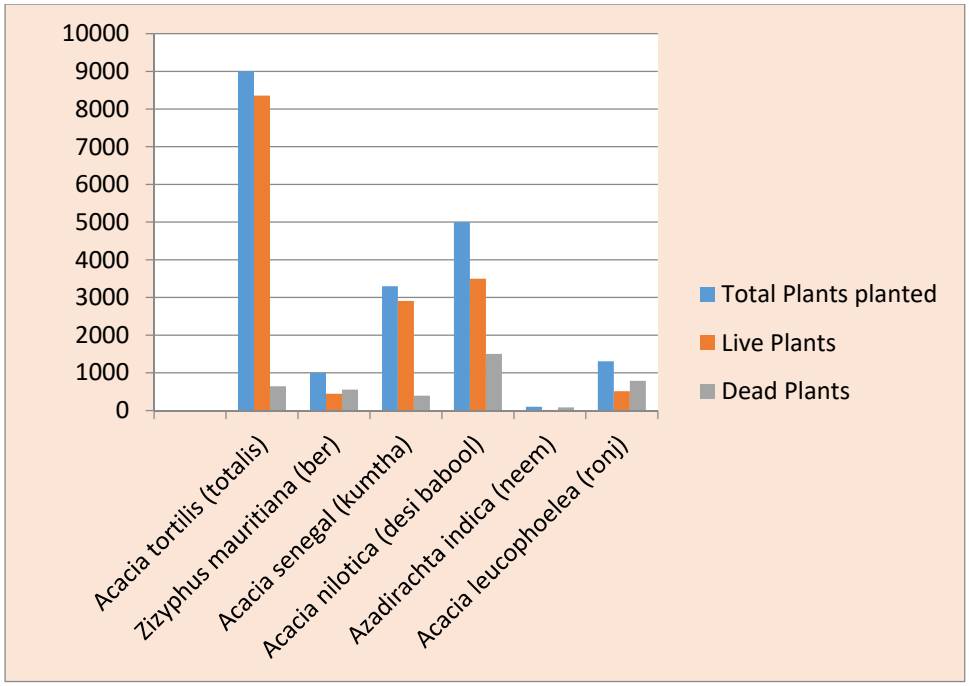


Fig: Graph showing survival of different plants

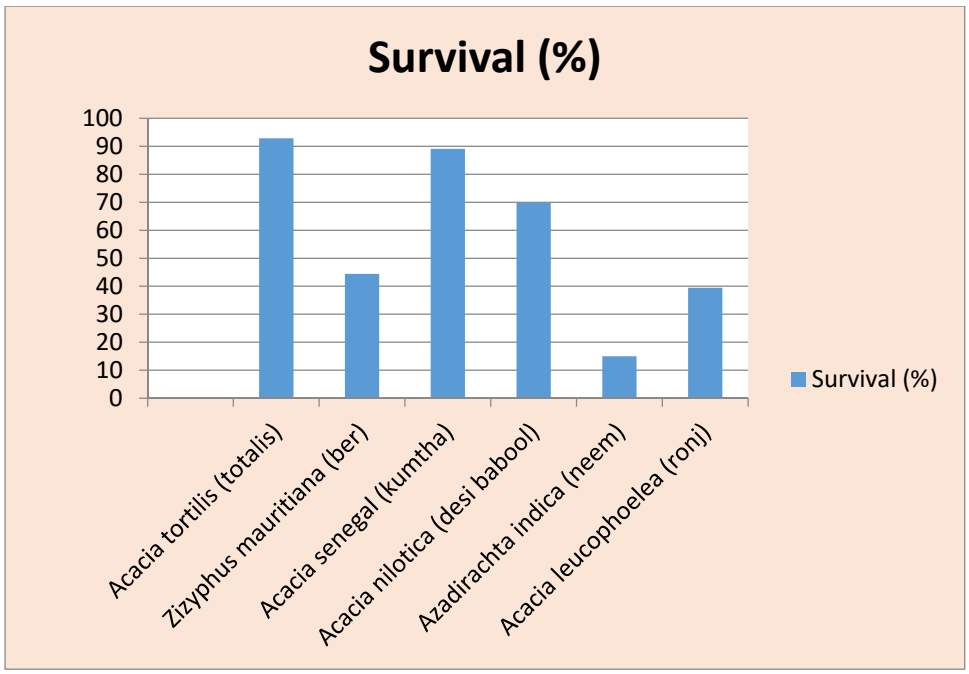


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of totalis plant was highest** followed by Kumtha. **The survival percentage of totalis was maximum which was 93% and Kumtha was 89%. Many plants planted in this site showed good survival rate, except a few like neem, which showed 15% survival only. Neem should be avoided in plantation in this area.**

The reason for high survival is timely implementation and plantation. However, hilly area, scanty rainfall was the reasons for plants who couldn't survive.

3.3.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 28 hec as per kml file map.

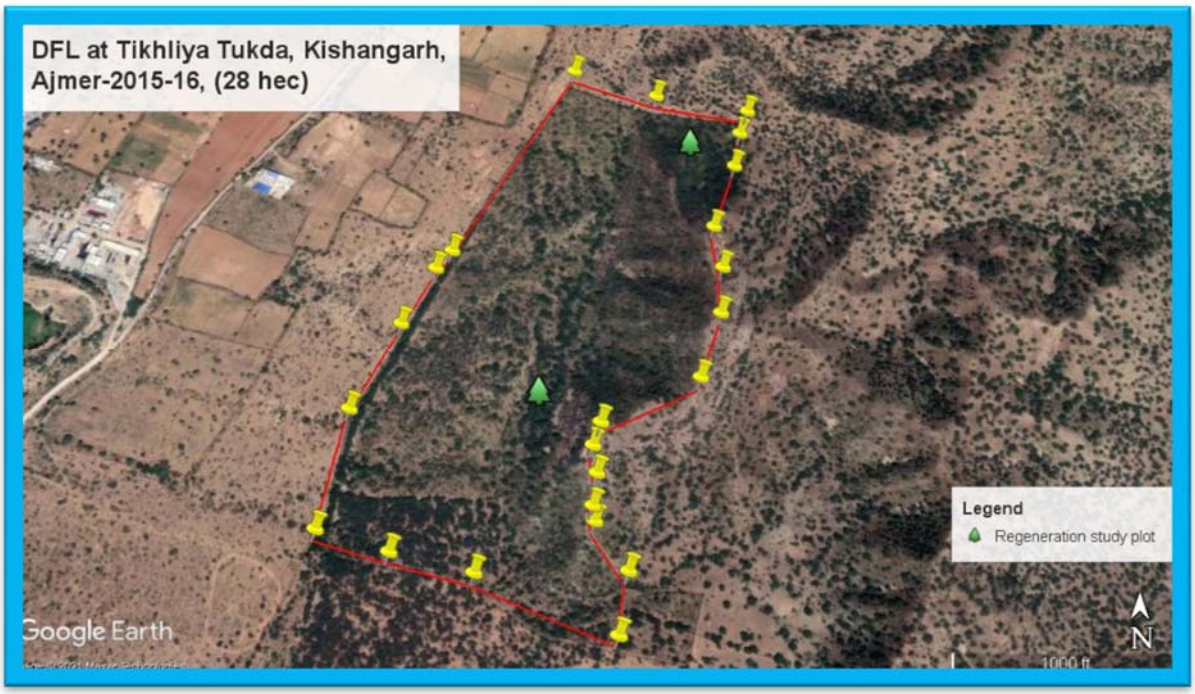


Fig: KML file of NFL at Natuti, Kisangarh range plantation area

3.3.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2015-16	-	-	-	1512324	499020	675742	337562	1512324
2016-17	-	-	-	251407	153939	61281	36187	251407
2017-18	-	-	-	123995	8369	60099	55527	123995
2018-19	-	-	-	123957	8750	61479	53729	123957
2019-20	-	-	-	130790	9000	58103	63687	130790

4. Results for construction sites

4.1. Site 1- Boundary pillars of Ajmer range

20 boundary pillars have been evaluated in the area of Dumada of Ajmer range. The size of the pillars was 0.45*0.45*0.90 m. These pillars were made during 2016-17 to demarcate forest boundary in that area. Total cost of 20 pillars is Rs.36000/-.

Fig: Boundary pillar of Ajmer

Fig: GIS mapping of all boundary pillars of Ajmer

Construction of all the pillars appeared good.

Site 2- Stone wall at Mahua Bhid, Ajmer

At Ajmer range, the stone wall has been evaluated at Mahua Bhid. The wall was constructed in the year 2016-17. The wall dimensions were 4 ft and 350m long. Construction work appeared to be good and useful. GP S location of this area was 26.502907 N and 74.639397 E. The construction work started in the year of 2016 after approval and completed in the 2017. The expenditure incurred for constructing this wall was 12,00,000 (as per mb).

Fig: GIS mapping of stone wall of Mahua Bid

Site 3- Sambharia Harda Stone wall at Kishangarh:

At Kishangarh range, the stone wall at Sambharia Harda has been evaluated. The wall was

Fig: Sambharia Harda stone wall and its GIS mapping

constructed in the year 2016-17. The wall dimensions were 4 ft and 4592m. Construction work appeared to be good and useful. GPS location of this area was 26.588563 N and 74.895117 E. The construction work started in the year of 2014 after approval and completed in the 2020.

Site 4- 4ft height Stone wall at Kanas beli, Pushkar

At Pushkar range, the stone wall in 4 ft 350m has been evaluated in Kanas Beli. The wall was constructed in the year 2014-15. Construction work appeared to be good and useful. GPS location of this area was 26.50307 N and 74.543582 E. The construction work started in the year of 2014 after approval and completed in the 2015. The expenditure incurred for constructing this wall was 724052 as per mb (its estimated cost was 770000).

Fig: Kanas Beli stone wall of Pushkar and its GIS mapping

Site 5- Forest Guard Chowki at Sarwad

At Sarwad range, one forest guard chowki has been constructed. The chowki was constructed in the year 2014-15. Construction work appeared to be very good and useful.

Fig: Forest Guard Chowki at Sarwad and It's GIS mapping

This chowki was constructed at the cost of Rs. 5 Lakh. GPS location of this area was Longitude- E 75°,13,'44" and Latitude-N 25°,45',52". The construction work started in the year of 2015 after approval and completed in the 2016. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Ajmer district.

Table-9: Quantitative assessment of plantation work created under CAMPA in Ajmer division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	NFL Daulatpura III 10.10 Ha	49.6	5
2	NFL Kshatipurti Natuti 1.65 Ha	87.9	9
3	DFL Tikhiya tukda 28 Ha	79	8

****<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)***

Evaluated construction work developed at selected site appeared good in condition and helped in demarcation of forest area.

Table-10: Quantitative assessment of constructions work created under CAMPA in Ajmer division

Sr. no.	Items	Name of the site	Rank of Item (Between 0 to 10)*
1	20 boundary pillars	Dumada	7
2	4 ft 500 m Stone wall	Mahua Bhid	8
3	4 ft 4592m Stone wall	Sambharia harda	8
4	4 ft 350 m Stone wall	Kanas Banseli	8
5	Forest Guard Chowki	Sarwad	8

****<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding***

Alwar (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Alwar Forest Division. This Forest Division with 6 Forest Ranges namely Alwar, Behror, Kishangarhwas, Laxmangarh, Rajgarh and Thanagaji, which has territorial jurisdiction over the entire Alwar District.

Fig : Location of Alwar district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Alwar Forest Division were as given in table-1.

Forest Range	Name of Site	Year of Plantation	Ha.	Model
Laxmangarh	Dabarwas	2015-16	7.55	NFL
Tijara	Chuhadpur	2015-16	50	DFL
Kishangarhwas	Mainpur	2016-17	50	DFL
Alwar	Amritwas	2016-17	50	DFL
Rajgarh	Jaitu ki Jo	2016-17	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Alwar Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Rajgarh	Gwada Rampura	2014-15	Forest Guard Chowki

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Dabarwas in Laxmangarh range:** The selected plantation has been carried out on 7.55 hec of land at Dabarwas in Laxmangarh range during the year 2015-16. The activities were done under the Non Forest Land (NFL) model. The GPS location of this selected site was N 28.04138and E 76.24343. The site was a forest land and selected for 100% evaluation. The soil was reddish brown in colour and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of clayey loam soil and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 5288 pits have been made for plantation in total 7.55 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.1.3. Nursery Development for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Dabarwas, a forest department nursery of Laxmangarh range. During monsoon these seedlings were planted.

Fig: NFL at Dabarwas, Laxmangarh

3.1.4. Species Planted: The selected tree species under plantation were 5. Seedlings of*Acacia nilotica (*Desi babool*), Acacia tortilis (*Tortilis), *Holoptelea integrifolia (*Churel*), Acacia catechu (*Khair) *and Dalbergia sissoo (*Shisham*)* were planted.

A total of 5288 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 1100 plants per hectare have been planted. So total number of plants planted was 5288 for 7.55 hectare of land.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

Fig: Counting of plants

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. Desi babool, hingota, ronj were the plants found grown naturally in this area. The growth of the plant was good.

3.1.7. Regeneration through seeds sowing: Seeds of species *ber, babool, ronj* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected NFL model plantation was **protected by ditch/trench fencing of 2880 RMT with average top width of 1m, average depth of 1.20m and average bottom width of 1.5m. Present condition of fencing was good.**

3.1.9. Soil and Water Conservation Measures: **There was 852.99 cum earthen dam and 3000 RMT contour trench in the form of water harvesting** structures present in the entire plantation area. These trenches are prepared for rainwater harvesting and soil conservation. Earthen dam filled up with soil due to high siltation.

3.1.10. Observations Recorded: Under this model, 1100 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 74.95% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 5288 plants comprising of five species were planted in the 7.55 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-3: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
*Acacia nilotica (*desi babool)	3000	2243	757	74.77	3.8	24
Acacia tortilis (tortilis)	588	389	199	66.16	3.2	26
Holoptelea integrifolia(Churel)	100	64	36	64	3.2	21
Acacia catechu (Khair).	1400	1133	267	80.93	3.6	27
Dalbergia Sissoo (Shisham)	200	134	66	67	3.4	24
Total	**5288**	**3963**	1325	**74.95**		

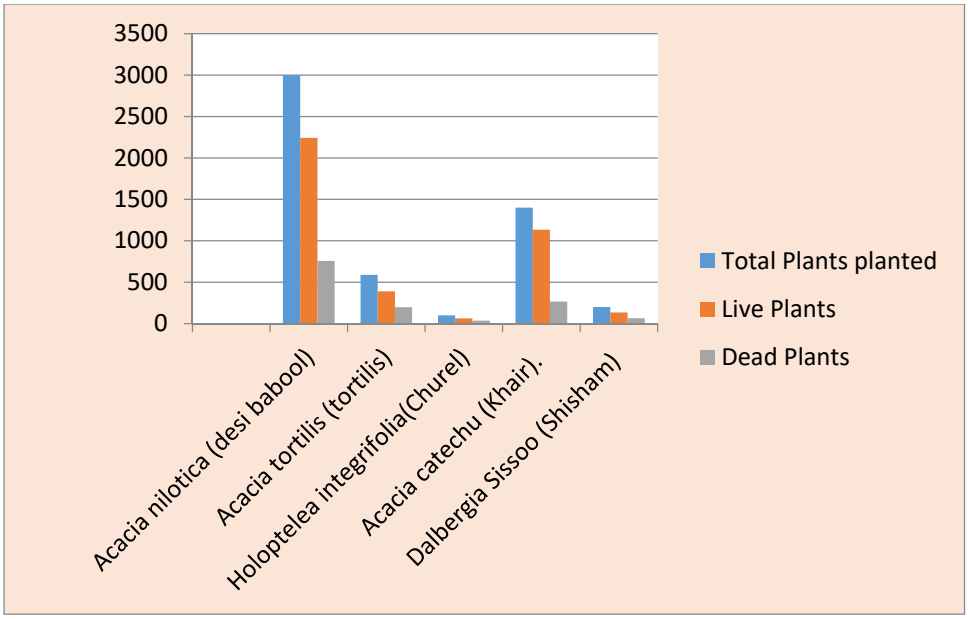


Fig: Graph showing survival of different plants

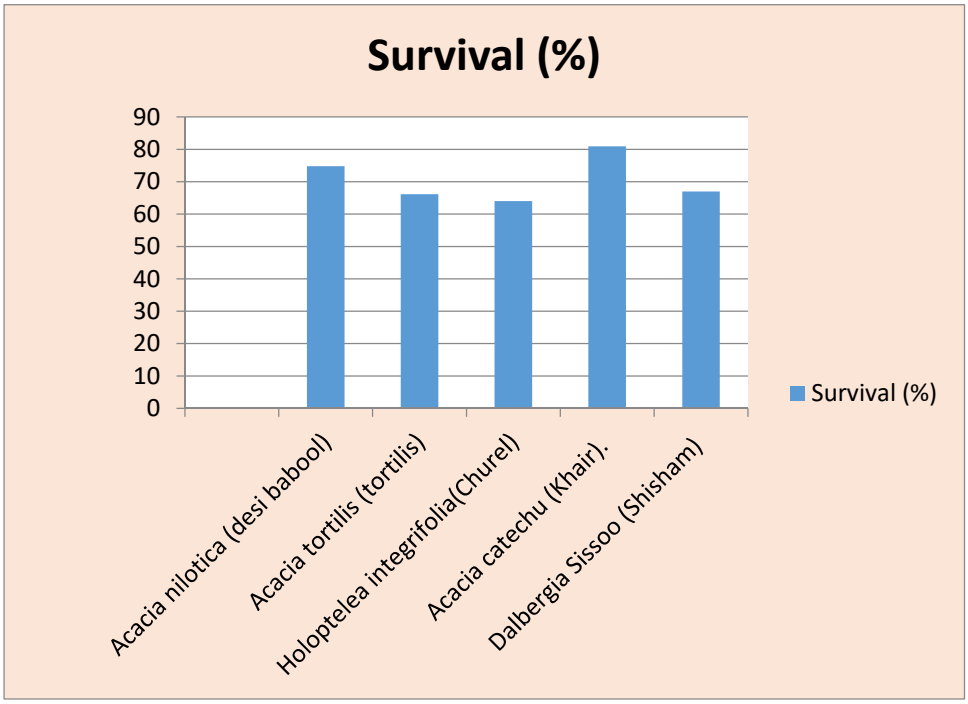


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Khair plant was highest** followed by desi babool. **The survival percentage of Khair was maximum which is 80.93%and desi babool was 74.77%. The reason for high survival was site specific plant selection and timely execution of work.**

3.1.11. GPS Location and KML file: The selected NFL model under CAMPA plantation site measured 7.55 hec as per kml map.

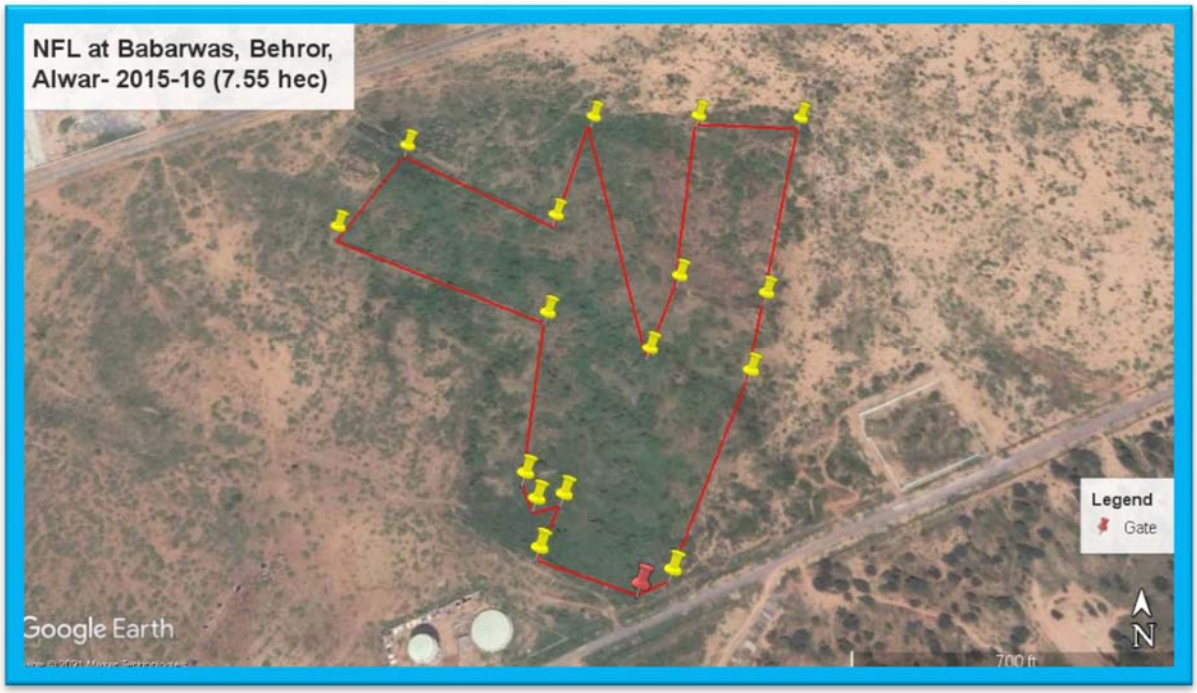


Fig: KML file of NFL at Dabarwas, Behror range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	106883	66030	71915	244829	106883	66030	71915	244829
2015-16	376818	-	-	376818	323034	-	-	323034
2016-17	94858	-	-	94858	83577	-	-	83577
2017-18	31182	-	-	31182	28743	-	-	28743
2018-19	30963	-	-	32963	32802	-	-	32802

3.2.1. Site-2: **Chuhadpur in Tijara range:** The selected plantation has been carried out on 50hec of land at Chuhadpur in Tijara range during the year 2016-17. The activities were done under the Degraded Forest Land (DFL) model. The GPS location of this selected site was N 28.73403 and E 76.575136.The site was a forest land and selected for 100% evaluation. The soil was clayey loam and stony hard layer.

3.2.2. Treatment plan before sowing: The area comprises of hilly, rocky and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 15000 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Chuhadpur, a forest department nursery of Tijara range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 7. Seedlings of *Holoptelea integrifolia (*churel*), Acacia tortilis (*tortilis*), Acacia nilotica (*desi babool*), Acacia Senegal* (kumatha*), Dalbergia sissoo (*shisham*), Acacia leucopholea (*ronj*), Azadirachta indica (*neem*)* were planted.

Fig: Counting of plants at Tijara range

A total of 15000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was evaluated by the team. Technique of planting was trench cum pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 300 plants per hectare have been planted. So total number of plants planted was 15000 for 50hectare of land. Map of planting site was prepared.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

Fig: Putting of lime for counting plants

3.2.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. Kumatha, Ber, Dhok, Salar, Chila, Juliflora were the plants found grown naturally in this area. The growth of the plant was good.

Table-4: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal*- Kumatha	93	3.4	31
2	*Zizyphus mauritiana*- Ber	99	2.5	21
3	*Anogeissus latifolia*- Dhok	53	3	26
4	*Boswellia serrata*- Salar	78	2.9	25
5	*Butea monosperma* - Chila	114	3.3	28
6	*Prosopis juliflora* -Juliflora	101	3.5	32

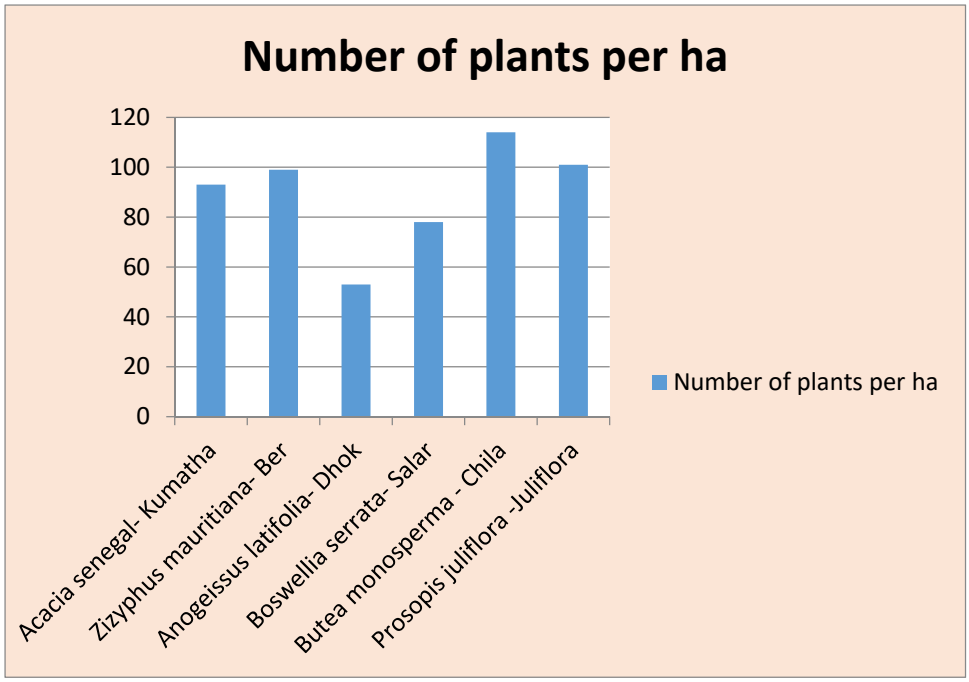


Fig: Graph showing number plants under natural regeneration

3.2.7. Regeneration through seeds sowing: Seeds of species *kumatha, ber, ronj*were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.2.8. Protection Work: The selected DFL model plantation was **protected by ditch/trench fencing of 2300 RMT and stone wall fencing of 1200 RMT with average top width of 0.80m, average depth of 1.20m and average bottom width of 1.50m. Present condition of fencing was good.**

3.2.9. Soil and Water Conservation Measures: **There was loose stone check dam of 800 cum, earthern dam of 1204.81 cum and 5000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. The size of the trenches varied from 3 to 9 m long and .45*.45m size. These were prepared for rainwater harvesting and soil conservation. Due to chekckdam, the extent of gullies were good.

3.2.10. Observations Recorded: Under this model, 300 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 63.7% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 15000 plants comprising of five species were planted in the 50hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-5: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Holoptelea integrifolia (Churel)	4500	2714	1786	60.31	3.2	30
Acacia tortilis (tortilis)	3000	1863	1137	62	3.6	35
*Acacia nilotica (*desi babool)	1500	938	562	62.53	3.6	30
Acacia Senegal (Kumatha)	3000	1983	1017	66.1	3.8	38
Dalbergia sissoo (Shisham)	1500	1014	486	67.6	2.9	40
Acacia leucopholea(Ronj)	1000	740	260	74	3.1	38
Azadirachta indica (Neem)	500	312	188	62.4	3	32
Total	**15000**	**9564**	5436	**63.7**		

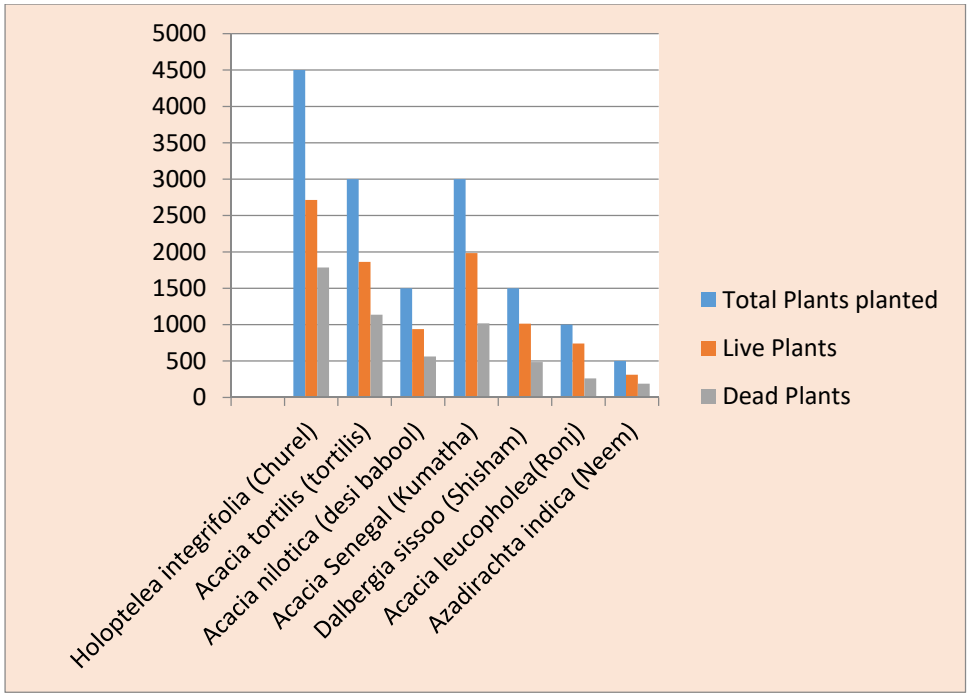


Fig: Graph showing survival of different plants

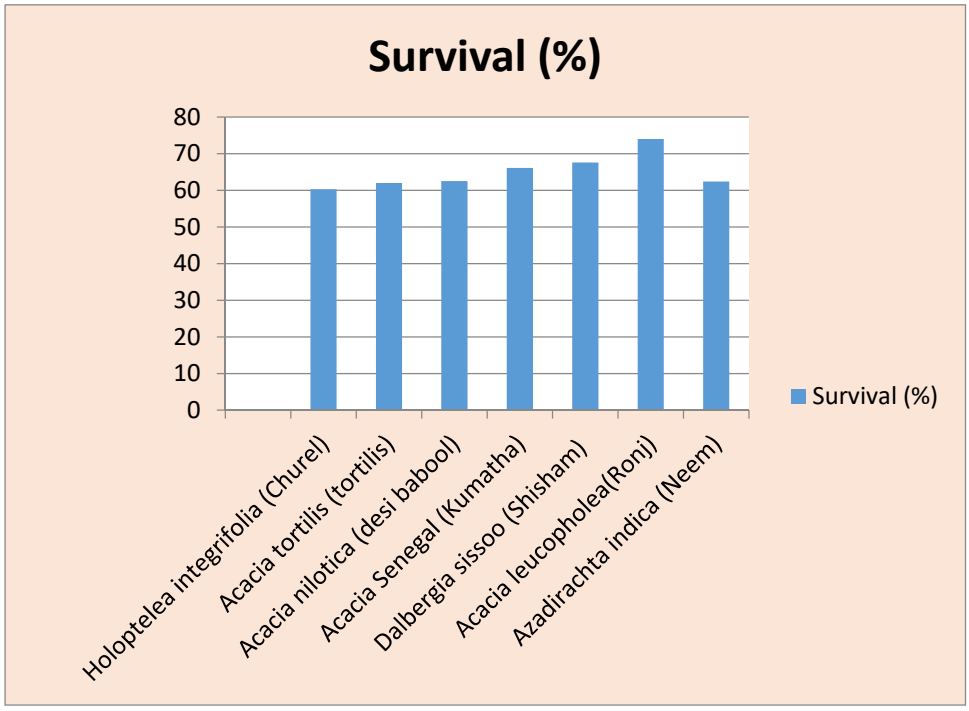


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ronj plant was highest** followed by Shisam. **The survival percentage of ronj was maximum which is 74% and Shisam was 67.6%.**

3.2.11.GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

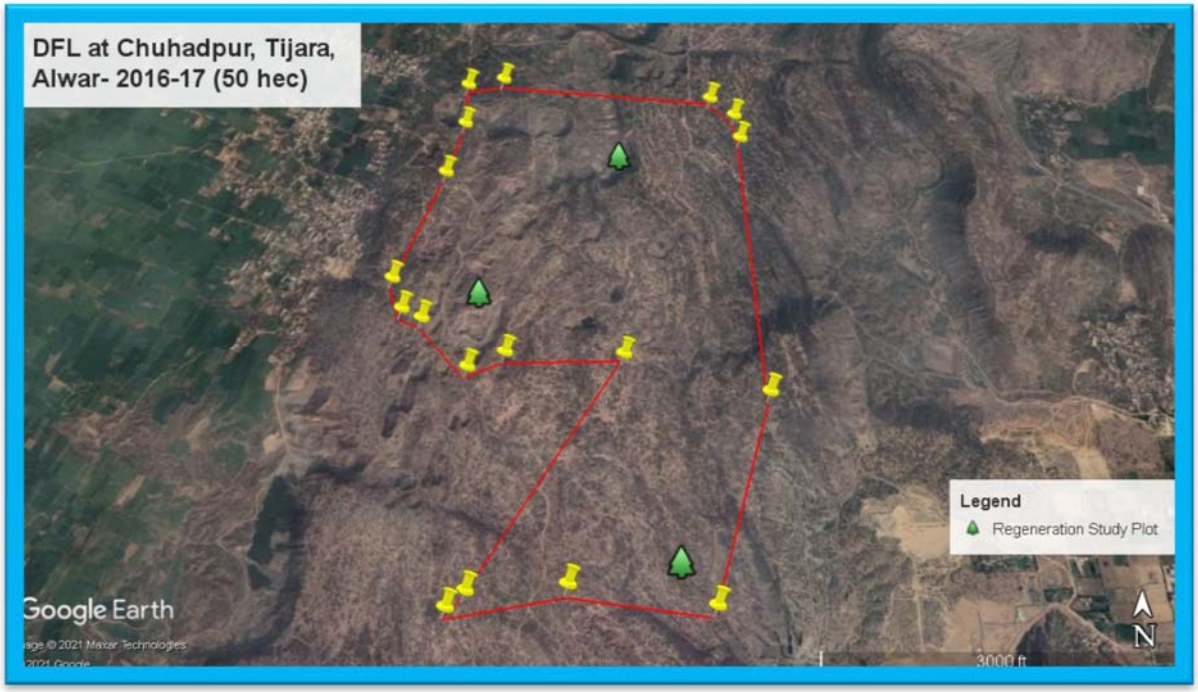


Fig: KML file of DFL at Chuhadpur, Tijara range plantation area

3.3.1. Site-3: **Mainpur in Kishangarhwas range:** The selected plantation has been carried out on 50 hec of land at Mainpur in Kishangarhwas range during the year 2015-16. The activities were done under the DFL model. The GPS location of this selected site was N 27.840981 and E 76.506594. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour and stony hard layer.

3.3.2. Treatment plan before sowing: The area comprises of rocky, hilly and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 25000 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.3.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Mainpur, a forest department nursery of Kishangarhwas range. During monsoon these seedlings were planted.

Fig: DFL at Mainpur, Kishangarhwas

3.3.4. Species P lanted: The selected tree species under plantation were 9. Seedlings of *Holoptelea integrifolia* (churail), *Acacia leucophoelea* (ronj), *Acacia tortilis* (tortilis), *Ailanthus excelsa (*ardu), *Albizia lebbeck* (siras), *Dalbergia sissoo* (Shisham),

Prosopis cineraria (khejari), *Ficus religiosa (*pipal), *Zizyphus mauritiana* (ber) were planted.

A total of 25000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there.

Fig: Measurement of contour trenches

Spacing between plants has not been adopted here and random plantation has been carried out in this site. As per the model, 500 plants per hectare have been planted. So total number of plants planted was 25000 for 50 hectare of land. Map of planting site was prepared. Type of plantation was block. Pit cum trench technique of planting was used.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.3.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found.

3.3.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Plants such as Ronj, Tortalis, Ber, Khejri have been found growing naturally in this area. The growth of plants was good.

Table-6: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia leucopholea*- Ronj	129	5.9	47
2	*Acacia tortiliis* -Tortalis	139	4.8	39
3	*Zizyphus mauritiana* - Ber	88	3.9	36
4	*Prosopis juliflora* - Khejri	112	4.6	38

3.3.7. Regeneration through seeds sowing: Seeds of species like Ber, Ronj, Tortilis have been sown for natural regeneration. The growth of seeds sowing plants was good.

3.3.8. Protection Work and SMC work: The selected DFL model plantation was **protected by trench fencing of 583RMT and stone wall fencing of 2030 RMT.**

Condition of ditch was good. Fencing has been partially effective in controlling the biotic pressures. Contour trenches of 10000 RMT and earthern bund of 1000 cum were there for soil and water conservation.

3.3.9. Observations Recorded: Under this model, 500 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 62% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 25000 plants comprising of nine species were planted in the 50hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-7: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Holoptelea integrifolia (Churail)	5000	2837	2163	56.7	4.6	38
Acacia leucophoelea (Ronj)	5000	3474	1526	69.4	5.2	41
Acacia tortilis (Tortilis)	7000	4831	2169	69	5.1	39
Ailanthus excelsa (Ardu)	2000	1279	721	63.9	2.7	19
Albizia lebbeck (Siras)	1000	445	555	44.6	4.7	36
Dalbergia Sissoo (Shisham)	1000	601	399	60.1	3.8	29
Prosopis cineraria (Khejari)	1000	553	447	55.3	4.5	35
*Ficus religiosa (*Pipal)*)*	1000	317	683	31.7	4.3	35
*Zizyphus mauritiana (*Ber)	2000	1183	817	59.1	3.2	32
Total	**25000**	**15521**	15306	**62**		

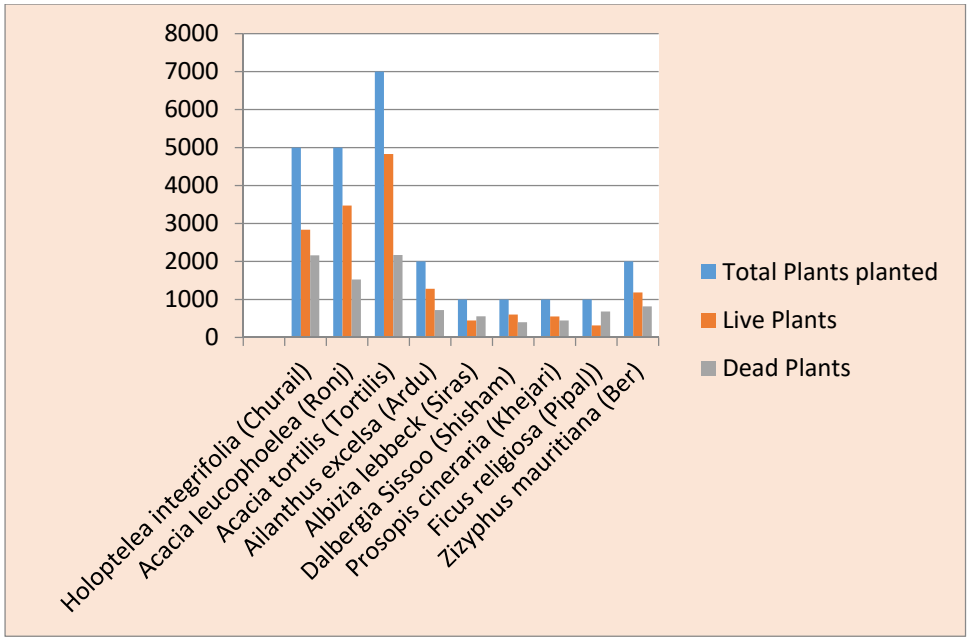


Fig: Graph showing survival of different plants

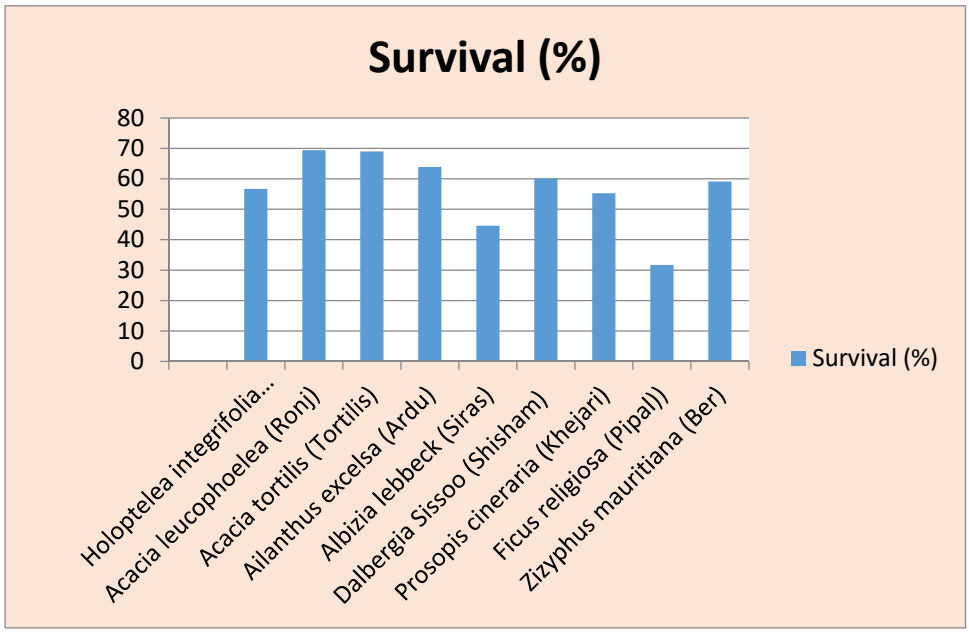


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Ronj plant was highest** followed by Tortilis. **The survival percentage of Ronj was maximum which was 69.4 % and Tortilis was 69%. Many plants planted in this site showed good survival rate.**

3.3.10. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

Fig: KML map of DFL at Mainpur, Kishangarhwas range plantation area

3.4.1. Site-4: **Amritwas in Alwar range:** The selected plantation has been carried out on 50hec of land at Amritwas in Alwar range during the year 2016-17. The activities were done under the Degraded Forest Land (DFL) model. The GPS location of this selected site was N 27.409 and E 76.3224. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour, clayey loam with stony hard layer.

3.4.2. Treatment plan before sowing: The area comprises of hilly, rocky and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 15000 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.4.3. Nursery Develo pment for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Amritwas, a forest department nursery of Alwar range. During monsoon these seedlings were planted.

Fig: Instruction given before evaluation on field

3.4.4. Species Planted: The selected tree species under plantation were 7. Seedlings of *Acacia leucophoelea* (ronj), *Zizyphus mauritiana* (ber), *Holoptelea integrifolia* (churail),

Acacia nilotica (desi babool), *Azadirachta indica* (neem), *Acacia catechu* (khair), *Ailanthus excelsa* (ardu*)* were planted.

A total of 15000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 300 plants per hectare have been planted. So total number of plants planted was 15000 for 50hectare of land. Map of planting site was prepared. Type of plantation was block. Trench cum Pit technique of planting was used.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.4.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

Fig: DFL at Amritwas, Alwar

3.4.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Plants such as Palash, Dhok, Khirani, Salar have been found grown naturally in this area. The growth of plants was good.

Table-8: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Butea monosperma*- Palash	129	8.3	46
2	*Anogeissus latifolia*- Dhok	67	5.1	37
3	*Wrightia tinctoria* - Khirani	73	4.2	33
4	*Boswellia serrata* - Salar	78	3.9	32

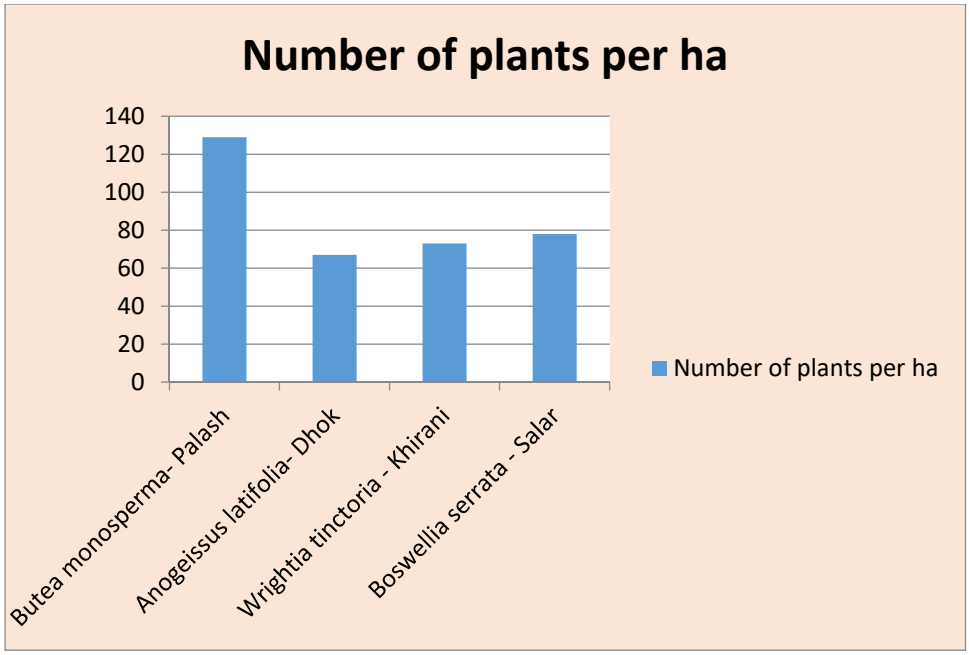


Fig: Graph showing number plants under natural regeneration

C.3.4.7. Regeneration through seeds sowing: Seeds of species like Ber, ronj, tortilis have sown for natural regeneration. The growth of plants was poor. Pruning of plants of seedlings planted, seeds sown and existing vegetation was done.

3.4.8. Protection Work: The selected DFL model plantation was **protected trench fencing of 1600 RMT and stone wall fencing of 1720 RMT with average top width of 1.20m, average depth of 1.15m and average bottom width of 0.80m and Fencing has been partially effective in controlling the biotic pressures.**

3.4.9. Soil and Water Conservation Measures: **There were 13000 RMT contour trenches and loose stone checkdam of 200 cum in the form of water harvesting** structures present in the entire plantation area. These trenches are prepared for rainwater harvesting and soil conservation.

Fig: Measurement of checkdam

C.3.4.10. Observations Recorded: Under this model, 300 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 78.7% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 15000 plants comprising of eight species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-9: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia leucophoelea (ronj)	8000	6371	1629	79.6	3.9	36
Zizyphus mauritiana (ber)	2000	1628	372	81.4	2.8	22
Holoptelea integrifolia (churail)	2000	1533	467	76.6	3.2	32
Acacia nilotica (desi babool)	1000	734	266	73.4	4.2	39
Azadirachta indica (neem)	200	156	44	78	2.9	27
Acacia catechu (khair)	1500	1287	213	85.8	3.7	33
Ailanthus excelsa (ardu)	300	106	194	35.3	3.1	23
Total	**15000**	**11815**		**78.7**		

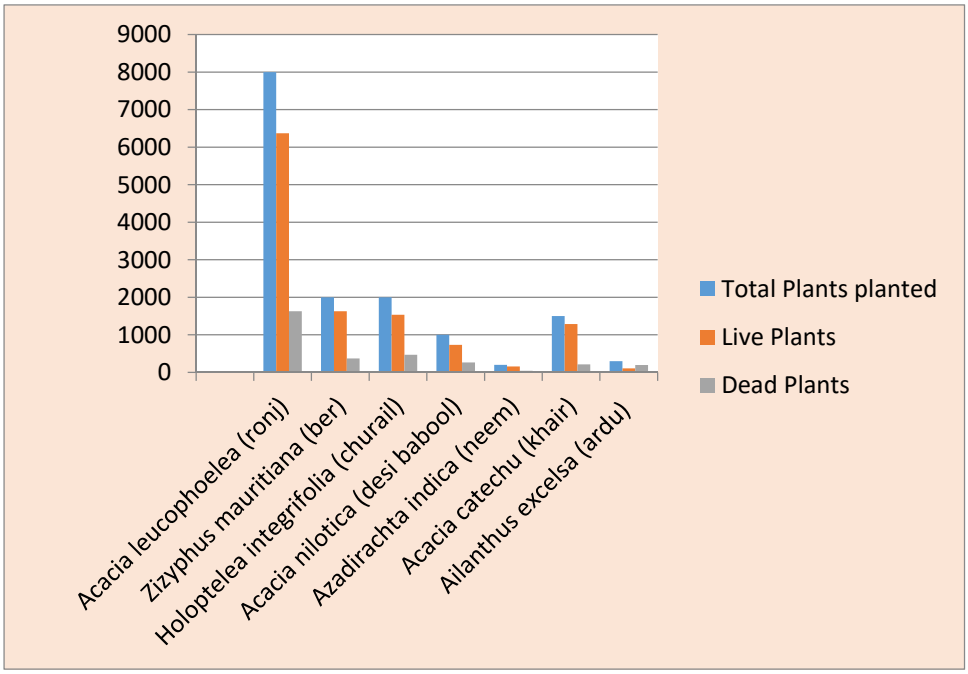


Fig: Graph showing survival of different plants

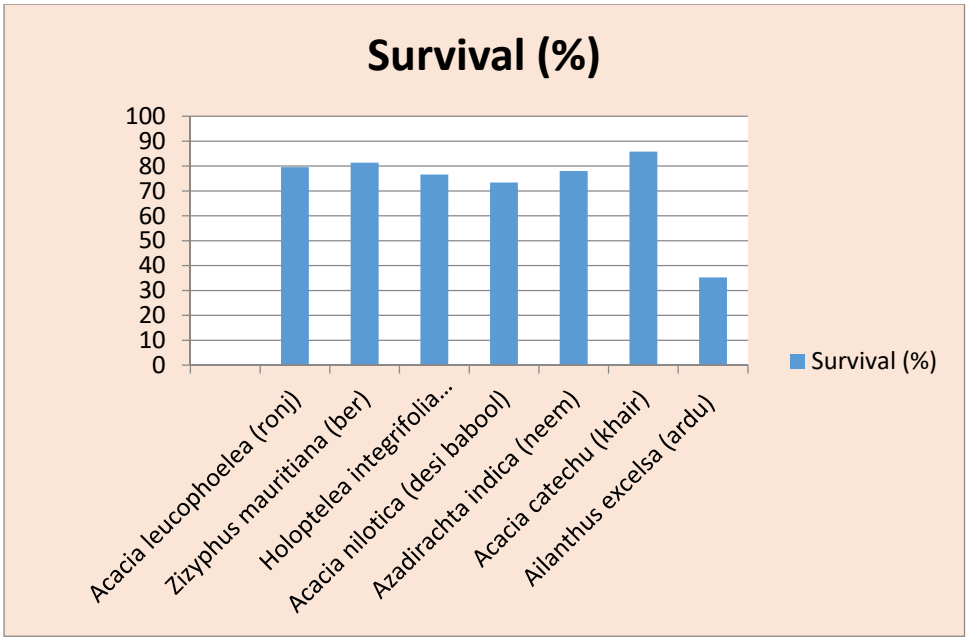


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of khair plant was highest** of 85.8% followed by neem of 78%. **Plants planted in this site showed good survival rate except ardu which showed lowest survival of 35.3%.**

3.4.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

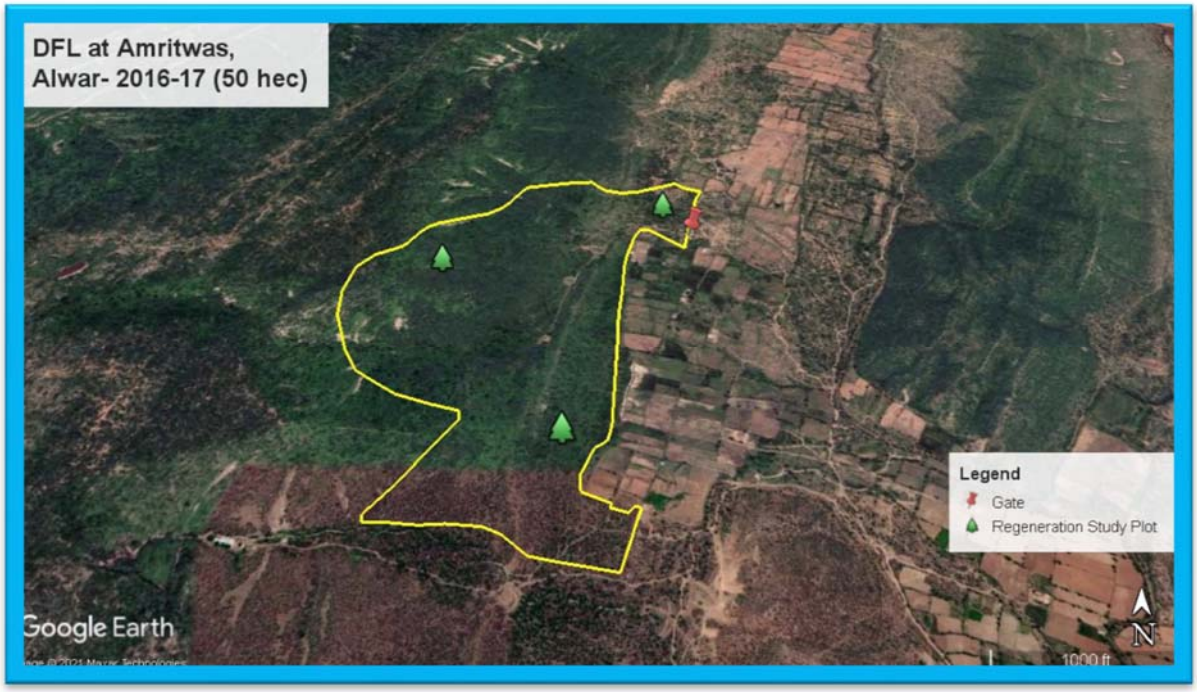


Fig: KML file of ANR at Amritwas, Alwar range plantation area

3.4.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2015-16	-	-	-	1501950	-	-	-	1501800
2016-17	-	-	-	1435000	-	-	-	8965210
2017-18	-	-	-	479450	-	-	-	325750
2018-19	-	-	-	25350	-	-	-	85135
2019-20	-	-	-	253350	-	-	-	142671
2020-21	-	-	-	258250	-	-	-	252134

3.5.1. Site-5: **Jaitu ki Jo in Rajgarh range:** The selected plantation has been carried out on 50 hec of land at Jaitu ki Jo in Rajgarh range during the year 2015-16. The activities were done under the Assisted Natural Regeneration (ANR) model. The GPS location of this selected site was N 27.211674 and E 76.623103. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour and stony hard layer.

3.5.2. Treatment plan before sowing: The area comprises of rocky, hillly and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50hec of land.**

Fig: ANR at Rajgarh

After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.5.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Jaitu ki Jo, a forest department nursery of Rajgarh range. During monsoon these seedlings were planted.

3.5.4. Species Planted: The selected tree species under plantation were 4. Seedlings of *Acacia leucophoelea* (ronj), *Holoptelea integrifolia* (churail), *Acacia nilotica* (desi babool) and Zizyphus *mauritiana* (ber) were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land. Map of planting site was prepared. Type of plantation was block. Pit cum trench technique of planting was used.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.5.5. Watering of plants:
Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found.

Fig: Field evaluation team

3.5.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Plants such as Dhok, Ronj, Ber, Desi babool have been found growing naturally in this area. The growth of plants was good.

Table-10: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Anogeissus latifolia* - Dhok	97	1.8	15
2	*Acacia leucohpolea*- Ronj	107	2.6	21
3	*Zizyphus mauritiana*- Ber	112	1.7	14
4	*Acacia nilotica* -Desi babool	93	2.9	23

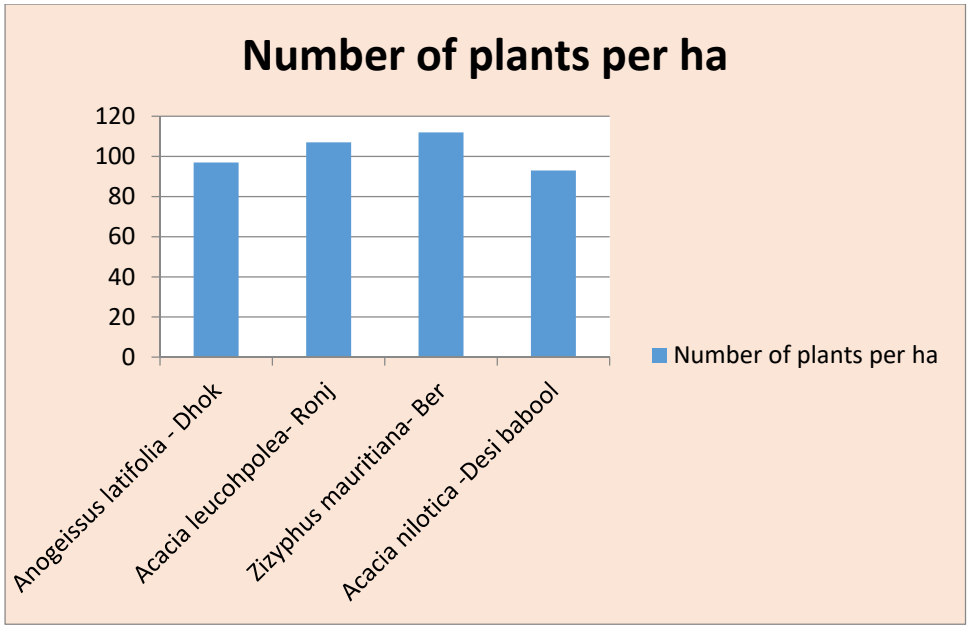


Fig: Graph showing number plants under natural regeneration

3.5.7. Regeneration through seeds sowing: Seeds of species like Ronj, Desi babool, ber have been sown for natural regeneration. The growth of seeds sowing plants was good.

3.5.8. Protection Work: The selected ANR model plantation was **protected by trench fencing of 3280 RMT and stone wall fencing of 200 RMT. Condition of ditch was good. Fencing has been partially effective in controlling the biotic pressures.**

3.4.9. Soil and Water Conservation Measures: **There were 10000 RMT contour trenches and loose stone checkdam of 500 cum in the form of water harvesting** structures present in the entire plantation area. These trenches are prepared for rainwater harvesting and soil conservation.

3.5.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 71.10% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of four species were planted in the 50hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-11: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia leucophoelea (ronj)	5000	3140	1860	62.8	2.6	27

Holoptelea integrifolia (churail)	3000	2268	732	75.6	2.2	21
Acacia nilotica (desi babool)	1000	838	162	83.8	2.3	23
Zizyphus mauritiana (ber)	1000	864	136	86.4	1.8	19
Total	**10000**	**7110**	2890	**71.10**		

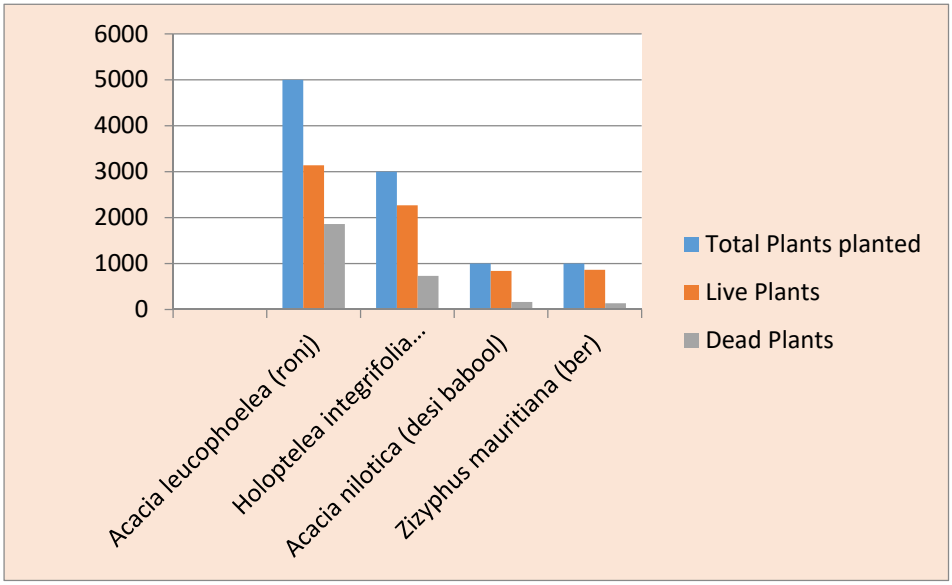


Fig: Graph showing survival of different plants

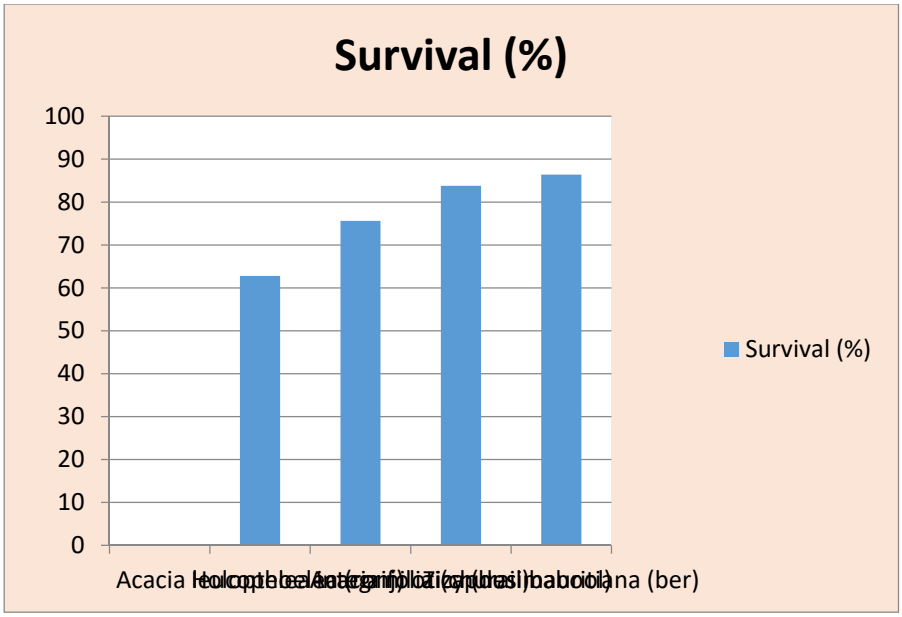


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Ber plant was highest** followed by desi babool. **The survival percentage of Ber was maximum which was 86.4 % and Neem was 83.8%. Many plants planted in this site showed good survival rate due to site specific plant selection and good protection.**

3.5.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per kml map.

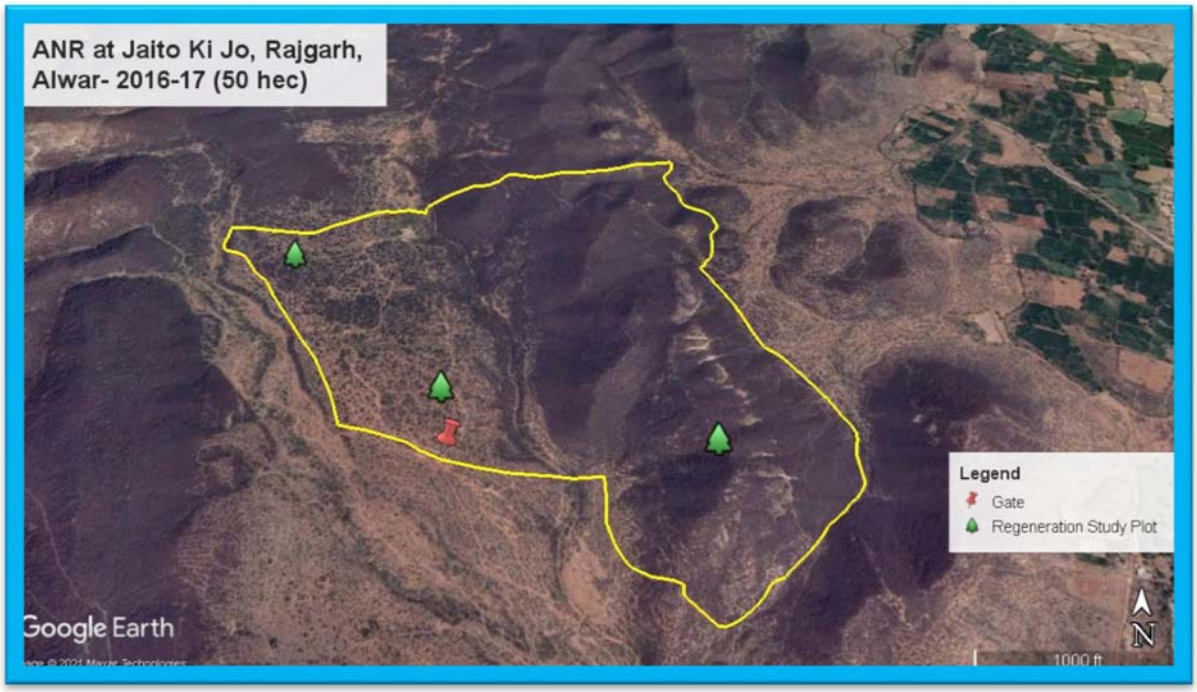


Fig1:KML map of ANR at Rajgarh range plantation area

3.5.12. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2015-16	-	-	-	1664200	-	-	-	1696753
2016-17	-	-	-	389700	-	-	-	388164
2017-18	-	-	-	162800	-	-	-	161589
2018-19	-	-	-	137000	-	-	-	86956
2019-20	-	-	-	92250	-	-	-	89038
Total	-	-	-	2395950	-	-	-	2422500

4. Results for construction sites

Site-1 Forest Guard Chowki at Gwada Rampura: At Gwada Rampura in Alwar range, one forest guard chowki has been constructed. The chowki was constructed in the year 2014-15. Construction work appeared to be very good and useful. This chowki was constructed at the cost of Rs. 5 lakh. GPS location of this area was Longitude- E 76.659421 and Latitude-N 27.148732. The construction work started in the year of 2014

after approval and completed in the 2015. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

Fig: Forest guard chowki at Jamdoli, Gwada Rampura and GIS mapping

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Alwar district.

Table-12: Quantitative assessment of plantation work created under CAMPA in Alwar division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	NFL Dabarwas7.55 Ha	74.95	8
2	DFL Mainpur50 Ha	63.7	7
3	DFL Chuhadpur50 Ha	62	7
4	DFL Amritwas 50 Ha	78.7	8
5	ANR Jaitu ki Jo 50 Ha	71.10	8

****<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)***

Table-13: Quantitative assessment of constructions work created under CAMPA in Alwar division

Sr. no.	Items	Name of the site	Rank of site (Between 0 to 10)*
1	Forest Guard Chowki	Gwada Rampura	8

****<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding***

Banswara (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Banswara Forest Division. This Forest Division with 6 Forest Ranges namely Banswara, Kushalgarh, Dungra, Ghatol, Garhi and Bagidora which has territorial jurisdiction over the entire Banswara District.

Fig: Location of Banswara district, Rajasthan

2. Selected Plantation Sites for Evaluation

The selected plantation sites of Banswara Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Ha.	Model
Banswara	Kalakhet	2014-15	64	NFL
Garhi	Rohal Panasi Malwasa	2016-17	60	ANR

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Kalakhet of Banswara range:** The selected plantation has been carried out on 64 hec of land at Kalakhet in Banswara during the year 2014-15. The activities were done under the Non Forest Land (NFL) model. The GPS location of this selected site was N 23,35,21.9 and E 74,40,59.0. The site was a forest land and selected for 100% evaluation. The soil was clayey loam and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 70400 pits have been**

made for plantation in total 64 hec of land. After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Kalakhet, a forest department nursery of Banswara range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 13. Seedlings of *Acacia catechu* (Khair), *Dendrocalamus strictus (*Baans*), Emblica officinalis (*Amla*), Acacia leucopholea (*Ronj*), Bauhinia racemesa* (Kachnar), *Acacia nilotica (*Desi babool*), Zizyphus mauritiana (*Ber), *Azadirachta indica (*Neem), *Ficus racemosa* (Hawan), *Dalbergia sissoo* (Shisham), *Tectona grandis* (Sagwan), *Bombax ceiba* (Semal) and Others were planted. Plantation journal was not received by the team; information was recorded in measurement book. The details species planted was not mentioned in the journal.

Fig: Measurement of plants on field

A total of 70400 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 1100 plants per hectare have been planted. So total number of plants planted was 70400 for 64 hectare of land. Map of planting site was prepared. **The choice of species under plantation appeared nearly proper**. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water.

3.1.6. Natural Vegetation and Rege neration: Due to this plantation, the vegetation cover has increased to some extent. Palash, adusa, ber were the plants found grown naturally in this area. The growth of the plant was good.

Table-2: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Butea monosperma*- Palash	64	2.7	22

2	*Ailanthus excelsa*- Adusa	73	3.1	29
3	*Zizyphus mauritiana* - Ber	73	2.2	17

3.1.7. Regeneration through seeds sowing: Seeds of species *kumatha, neem, khair, ratanjot* were sown. **The growth of seedlings from seeds was moderate.**

3.1.8. Protection Work: The selected NFL model plantation was **protected by stone wall fencing of 3229 RMT with average top width of 0.60m, average depth of 1.20m and average bottom width of 0.80m. Also the area was covered with 51200 RMT of trench fencing with average top width of 1.50, average depth of .90m and average bottom width of 01.20m. Present condition of both fencing was good and effective in controlling biotic pressure upto some extent.**

Fig: Putting lime for counting of plants

3.1.9. Soil and Water Conservation Measures: **There were 25600 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 4 m to 8 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation. Also there were 173.89 cum loose check dam in plantation area for controlling the flow of water during monsoon to check the gullies.

3.1.10. Observations Recorded: Under this model, 1100 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 61.5% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 70400 plants comprising of thirteen species were planted in the 64 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-3: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia catechu (Khair)	33000	19865	1315	60.1	2.2	27
*Dendrocalamus strictus (*Baans*)*	6500	4260	2240	65.5	3.6	-

Emblica officinalis (Amla)	8000	4866	3134	60.8	2.2	24
Acacia leucopholea (Ronj)	6000	3652	2348	60.8	2	20
Bauhinia racemesa (Kachnar)	3000	1684	1316	56.1	2.3	18
Acacia nilotica (Desi babool)	3000	1963	1037	65.4	1.8	20
Zizyphus mauritiana (Ber)	4000	2868	1132	71.7	1.8	18
Azadirachta indica (Neem)	1000	634	366	63.4	2.2	22
Ficus racemosa (Hawan)	2500	1419	1081	56.7	2.1	23
Dalbergia sissoo (Shisham)	1000	618	382	61.8	2	20
Tectona grandis (Sagwan)	700	465	235	66.4	1.8	18
Bombax ceiba (Semal)	700	429	271	61.2	2	20
Others	1000	638	362	63.8		
Total	**70400**	**43361**		**61.5**		

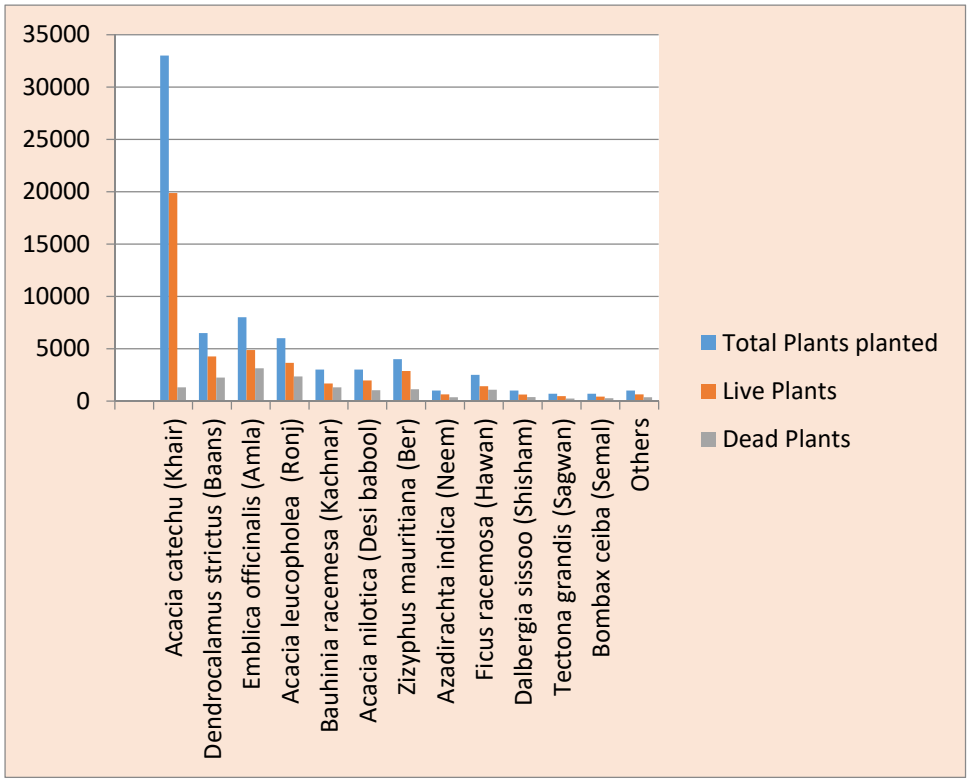


Fig: Graph showing survival of different plants

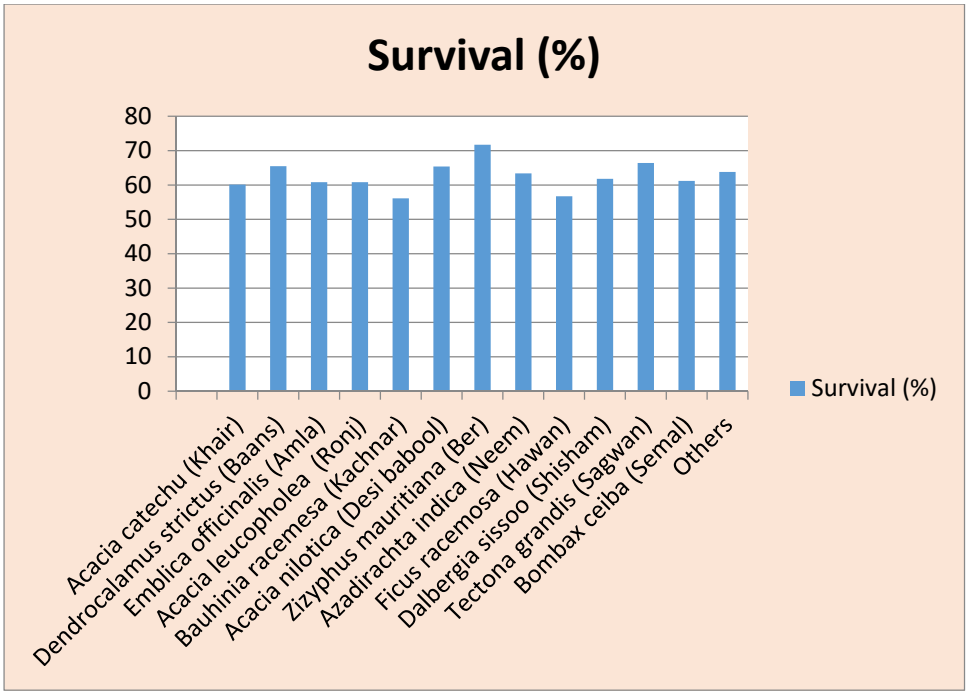


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ber was highest** of 71.7% followed by sagwan of 66.4%. **All the plants planted in this site showed good survival.**

Good protection and watering on time may improve the survival of plants.

3.1.12. GPS Location and KML file: The selected NFL model under CAMPA plantation site measured 64 hec as per kml map.

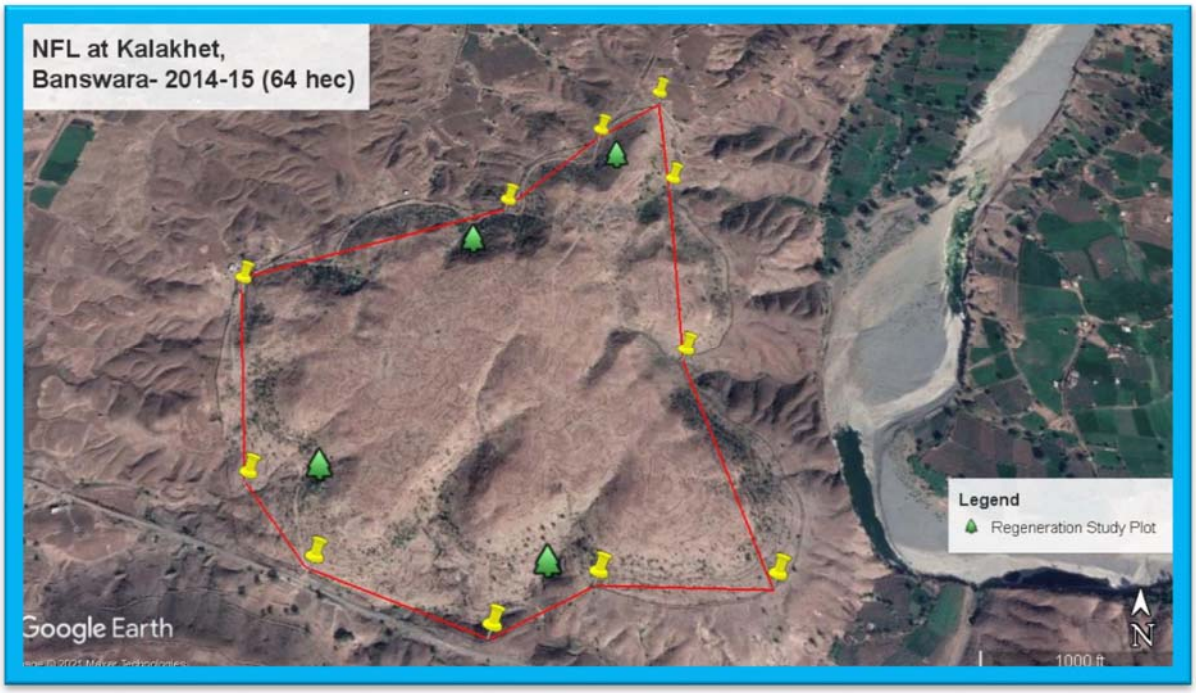


Fig: KML file of NFL at Kalakhet of Banswara range plantation area

3.1.13. **Budget and expenditure:** The total cost of plantation expenditure including plantation, soil and moisture conservation work and protection measures was Rs. 23,12,300/-.

3.2.1. Site-2: **Rohal Panasi Malwasa in Garhi range:** The selected plantation has been carried out on 60 hec of land at Rohal Panasi Malwasa in Garhi range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 23,30,11.6 and E 74,19,29.9. The site was a forest land and selected for 100% evaluation. The soil was blackish in colour and stony hard layer.

3.2.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 12000 pits have been made for plantation in total 60 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR plantation at Garhi

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Rohal Panasi Malwasa, a forest department nursery of Garhi range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 9. Seedlings of *Emblica officinalis* (Amla), *Terminalia bellirica* (Behada), *Tectona grandis* (Sagwan), *Acacia catechu* (Khair), *Dendrocalamus strictus* (Baans), *Ficus racemosa* (Hawan), *Azadiractha indica* Neem), *Holoptelia integrifolia (*Churel*) and Zizyphus mauritiana* (Ber) were planted.

A total of 12000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was not found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hec, so, 12000 plants in 50 hectare have been planted. Type of plantation was block and technique of planting was pit.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there.

Fig: Measurement of plants on field

The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.2.6. Natural Vegetation and Regeneration: The area has been covered partially with vegetation due to this plantation. The growth of plants was good. Grasses have grown in ditch trenches which should be controlled. Plants like neem, khair have been found grown naturally. The vegetation was sparsh.

Table-4: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Azadirachta indica*- Neem	154	5.5	24
2	*Acacia catechu*- Khair	73	4.3	28

3.2.7. Protection Work: The selected ANR model plantation was **protected by stone fencing of 4360 RMT with average top width was 0.90-0.60m, average depth was 1.20 to 1.30 m and average bottom width was 0.80-1.50m. It is partially effective in controlling the biotic pressure.**

3.2.8. Soil and Water C onservation Measures: **There was 12 loose stone checkdam of total volume of 210 cum present in the plantation area, due to which the extent of gullies was good. There were 21000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3m to 8 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation. There was 3000 RMT contour dike of size **0.45*0.45 m^2**.

Fig: Measurement of checkdam on field

3.2.9. Observations Recorded: Under this model, 12000 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 62.9% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 12000 plants comprising of nine species were planted in the 60 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-5: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Emblica officinalis (Amla)	800	465	335	58	2.3	12
Terminalia bellirica (Behada)	400	270	130	67.5	4.2	24
Tectona grandis (Sagwan)	4000	2840	1160	71	5	22
Acacia catechu (Khair)	4500	2565	1935	57	3.3	18
Dendrocalamus strictus (Baans)	500	284	216	56.8	6	-
Ficus racemosa (Hawan)	480	316	164	65.8	4.3	24
Azadiractha indica (Neem)	120	82	38	68.3	3.2	18
Holoptelia integrifolia (Churel)	1000	614	386	61.04	2.4	10
Zizyphus mauritiana (Ber)	200	116	84	58	2.5	10
Total	**12000**	**7552**		**62.9**		

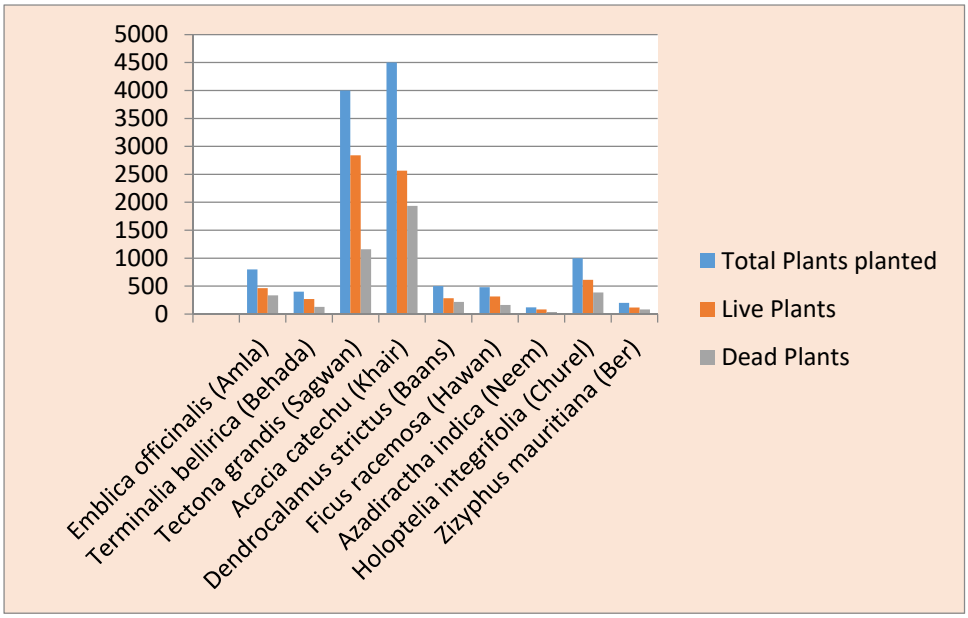


Fig: Graph showing survival of different plants

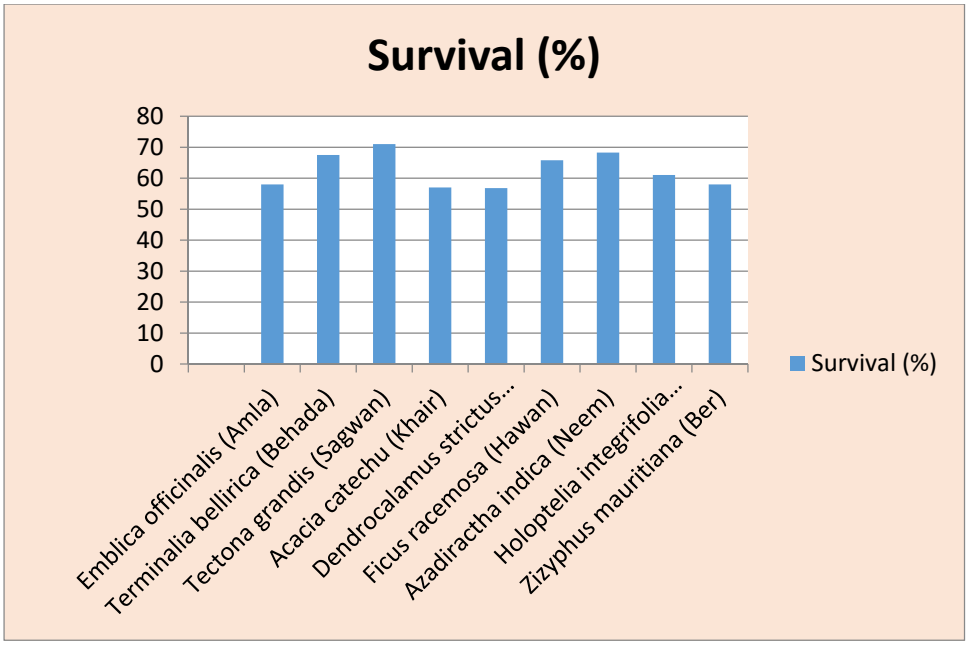


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of sagwan was highest** of 71% followed by neem of 68.3%. **All the plants planted in this site showed good survival.**

Good protection, site specific plants and watering on time may improve the survival of plants.

3.2.10. GPS Location and KML file: The selected model under CAMPA plantation site measured 60 hec as per kml map.

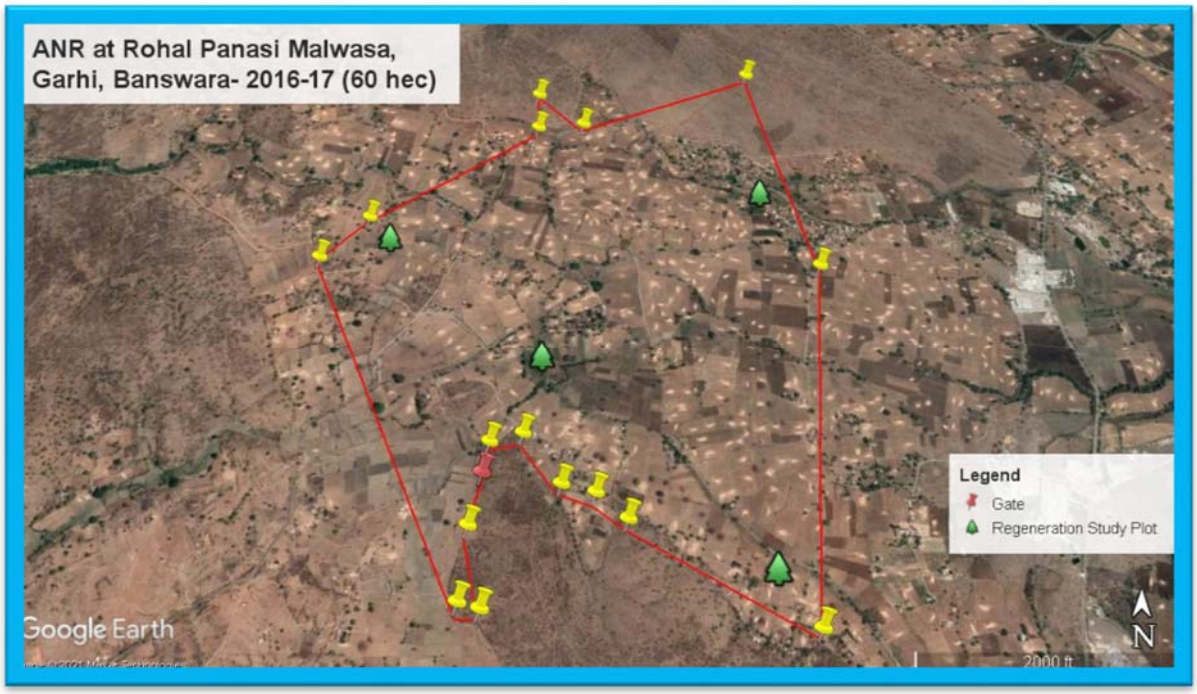


Fig: KML file of ANR at Rohal Panasi Malwasa, Garhi range plantation area

3.2.11. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	51923	1181778	630732	1864433	260770	985897	630732	1877395
2016-17	367730	53745	-	421475	271775	53745	-	325524
2017-18	-	-	-	-	97625	5956	139661	243242
2018-19	-	-	-	-	-	46967	-	46967
2019-20	-	-	-	-	-	46966	-	46966

4. Overall assessment: The overall impact of plantation activities appeared satisfactory in Banswara division

Table-6: Quantitative assessment of plantation work created under CAMPA in Banswara division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	NFL at Kalakhet, Banswara- 64 hec	61.5	7
2	ANR at Rohal Panasi Malwasa, Garhi-60 hec	62.9	7

****<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)***

Baran (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Baran Forest Division. This Forest Division with 8 Forest Ranges namely Anta, Chabara, Chhipabarod, Kelwara, Kisanganj, Nahargarh, Shahbad and Shergarh which has territorial jurisdiction over the entire Baran District.

Fig : Location of Baran district, Rajasthan

2. Selected Plantation Sites for Evaluation

The selected plantation sites of Baran Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Ha.	Model
Shahabad	Dudawar	2015-16	50	DFL
Kishanganj	Vilasdam	2016-17	50	ANR

2.1. Selected construction work sites for Evaluation

The selected construction work sites of Baran Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Chhipabarod	20 Boundary Pillars at Set Kolu	2014-15	100%
Kelwara	40 Boundary Pillars at Rajpura-A	2016-17	100%

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Dudawar of Shahbad range:** The selected plantation has been carried out on 50 hec of land at Dudawar in Shahbad during the year 2015-16. The activities were done under the Degraded Forest Land (DFL) model. The GPS location of this selected site was N 25,15,20.3 and E 77,13,39.5. The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer of hilly area.

3.1.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 35000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: DFL at Dudawar, Shahbad range

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Dudawar, a forest department nursery of Shahbad range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 4. Seedlings of *Acacia leucopholea (*Ronj), *Holoptelia integrifolia (*Churel*), Zizyphus mauritiana (*Ber), *and Acacia nilotica (*Desi Babool) were planted.

A total of 35000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 7**00 plants per hec have been planted, so total number of plants planted was 35000 for 50 hectare of land.**

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth and vegetation of survived plants was very poor.**

Fig: Putting of lime on plants

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water.

3.1.6. Natural Vegetation and Regeneration: Due to this plantation, the vegetation cover has increased to some extent. Hingota, ber were the plants found grown naturally in this area. The growth of the plant was poor. The vegetation cover was also low.

Fig: Counting of plants on field

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (ft)	Average girth (gbh) cm
1	*Balanites sp*- Hingota	73	2.7	3
2	*Zizyphus mauritiana*- Ber	47	3.2	4

3.1.7. Regeneration through seeds sowing: Seeds of species, *babool, ber,* were sown in and alongside of trenches. **The growth of seedlings from seeds was poor and low.**

3.1.8. Protection Work: The selected DFL model plantation was **protected by stone fencing of 4150 RMT with average top width of 1.50 m, average depth of 1.10 m and average bottom width of .90m. Present condition of fencing was good.**

3.1.9. Soil and Water Conservation Measures: **There were 15000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3 m to 9 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation. **The trenches have filled up with grasses. Also there were 14 loose stone check dam in 50 hec of land, which were damaged due to heavy rain. Contour dike of 2187 RMT was also built up.**

3.1.10. Observations Recorded: Under this model, 700 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 42.7% at the site.** Plant species girth breast height was also measured. The growth of planted plants was very poor. A total of 35000 plants comprising of four species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia leucopholea (Ronj)	9625	3856	5769	40.06	1	11

Zizyphus mauritiana (Ber)	4050	3114	936	76.8	.7	9
Acacia nilotica (Desi Babool)	18000	7384	10616	41.02	1.1	11
Holoptelia integrifolia (Churel)	3325	613	2712	18.43	1.1	8
Total	**35000**	**14967**		**42.7**		

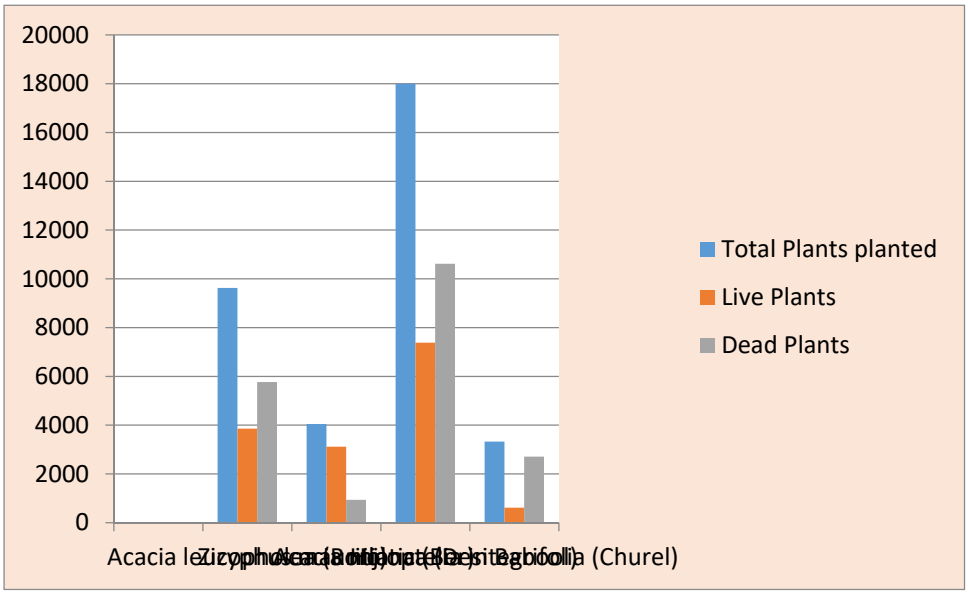


Fig: Graph showing survival of different plants

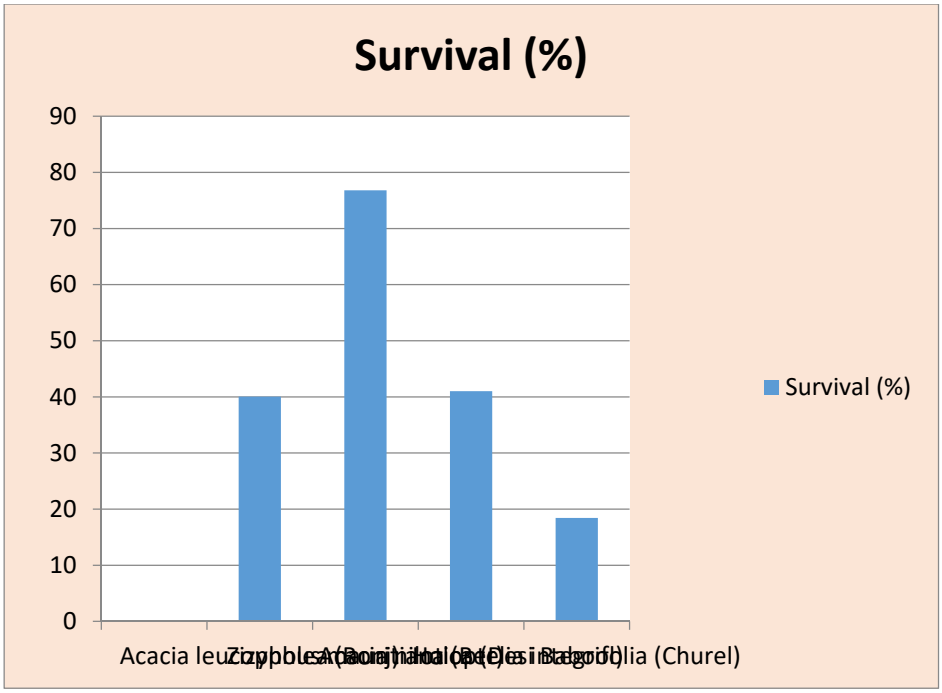


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ber was highest** of 76.8%. Plants such as babool and ronj showed lower survival of 41% and 40% respectively. **Churel showed lowest of 18.4% survival.**

Local biotic pressure was the main reason of low survival as per the statement of frontline staff.

3.1.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

Fig: KML file of DFL at Dudawar of Shahbad range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	503891	461725	41384	1379400	371154	621455	359640	1352249
2015-16	1180500	254500	-	1435000	1189338	99362	86971	1375671
2016-17	414485	-	37415	451900	338344	-	37415	375759
2017-18	179167	-	42183	221350	106881	67995	39994	214870
2018-19	133954	-	87396	221350	19899	-	-	19899
2019-20	126532	-	107018	233550	126096	-	107018	233114
2020-21	159809		98391	258200	151376		97660	249036

3.2.1. Site-2: **Vilasdam in Kisanganj range:** The selected plantation has been carried out on 55 hec of land at Vilasdam in Kisanganj range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 25,03,272 and E 76,49,138. The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer.

3.2.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR plantation at Vilasdam

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Vilasdam, a forest department nursery of Kisanganj range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 13. Seedlings of *Terminalia arjuna* (Arjun*), Anthocephalus kadamba (*Kadamba), *Dalbergia sissoo (*Shisham), *Azadirachta indica* (Neem), Syz*igium cumini (*Jamun),*Pongamiia pinnata* (Karanj), *Emblica officinalis* (Amla), *Holoptelia integrifolia* (Churel), *Terminalia bellirica* (Behada), *Bombax ceiba* (Semal), *Acacia catechu (*Khair*), Tectona grandis* (Sagwan) *and Morus alba (*Shahtut*)* were planted. **A total of 10000 numbers of seedlings were planted at the site.** Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was not found by the team.

Fig: Measurement of plants on field

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hec, so, 10000 plants in 50 hectare have been planted in this site. Type of plantation was block and technique of planting was pit.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants

has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.2.6. Natural Vegetation and Regeneration: The area has been covered partially with vegetation due to this plantation. The growth of plants was good. Grasses have grown in ditch trenches which should be controlled. Plants like chila, ronj, desi babool, ber have been found grown naturally. The vegetation was sparsh.

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Butea monosperma*- Chila	55	2.7	22
2	*Acacia nilotica*- Desi Babool	44	2.2	21
3	*Acacia leucopholea*- Ronj	39	2.3	19
4	*Zizyphus mauritiana*- Ber	63	1.6	14

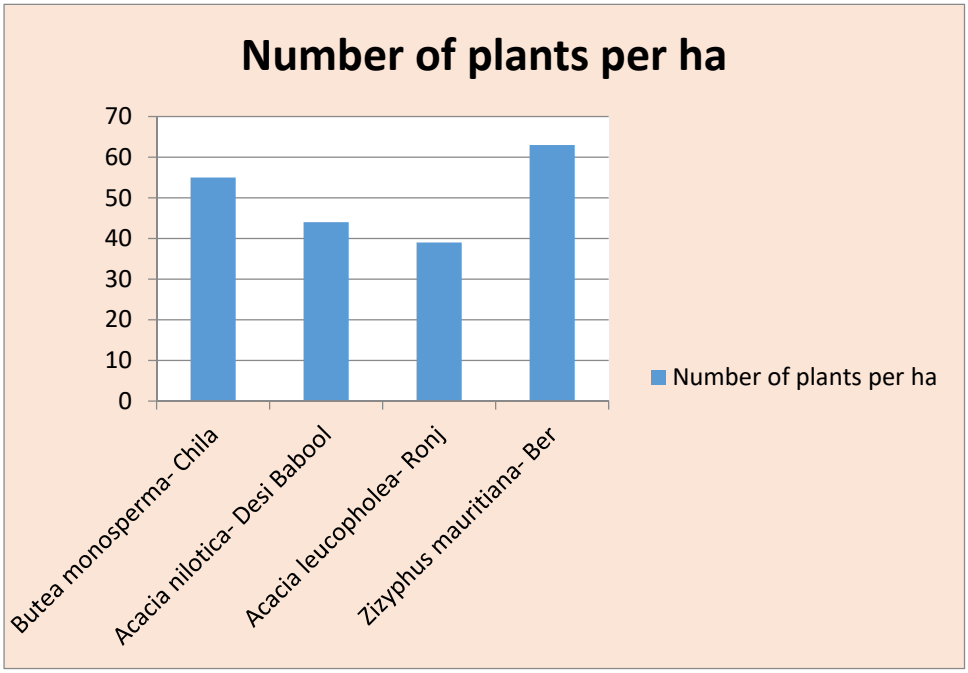


Fig: Number natural growing plants per hectare

3.1.7. Regeneration through seeds sowing: Seeds of Desi Babool, Ber species were sown on edges of contour trenches. **The growth of seedlings from seeds was good.**

3.2.8. Protection Work: The selected ANR model plantation was **protected by trench/ditch fencing of 325 RMT and stone wall fencing of 2420 RMT. Trench fencing average top width was 0.80, average depth was 1.20 m and average bottom width was 1.50m. The present condition of fencing was good but grasses have been grown in it. It was partially effective in controlling the biotic pressure.**

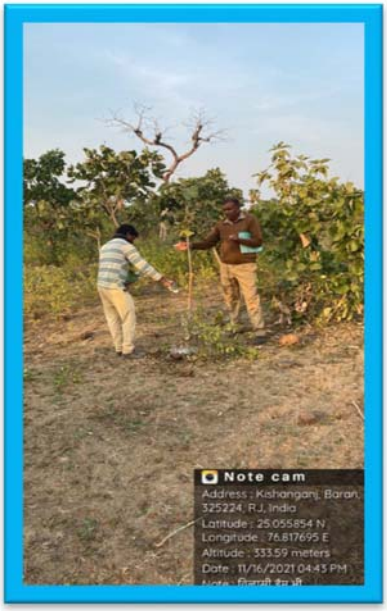


Fig: Putting of lime on plants

3.2.9. Soil and Water Conservation Measures: **There were 20000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3m to 9 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation.

3.2.10. Observations Recorded: Under this model, 10000 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 54.7% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of thirteen species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Terminalia arjuna (Arjun)	1000	524	476	52.4	3.3	24
Anthocephalus kadamba (Kadamba)	1500	718	782	48.8	3.4	23
Dalbergia sissoo (Shisham)	1000	428	572	42.8	4.3	28
Pongamia pinnata (Karanj)	1500	730	770	48	3.6	23
Azadirachta indica (Neem)	500	273	227	54.6	4.6	32
Sizygium cumini	1000	614	386	61	2.1	17

(Jamun)						
Emblica officinalis (Amla)	1000	618	382	61.8	3.3	22
Holoptelia integrifolia (Churel)	500	412	88	82.4	4.2	26
Terminalia bellirica (Behada)	400	235	165	58.7	3.1	22
Bombax ceiba (Semal)	500	265	235	53	2.1	17
Acacia catechu (Khair)	500	273	227	54.6	3.3	26
Tectona grandis (Sagwan)	500	386	114	77.2	4.2	30
Morus alba (Shahtut)	100	00	100	00	-	-
Total	**10000**	**5478**		**54.7**		

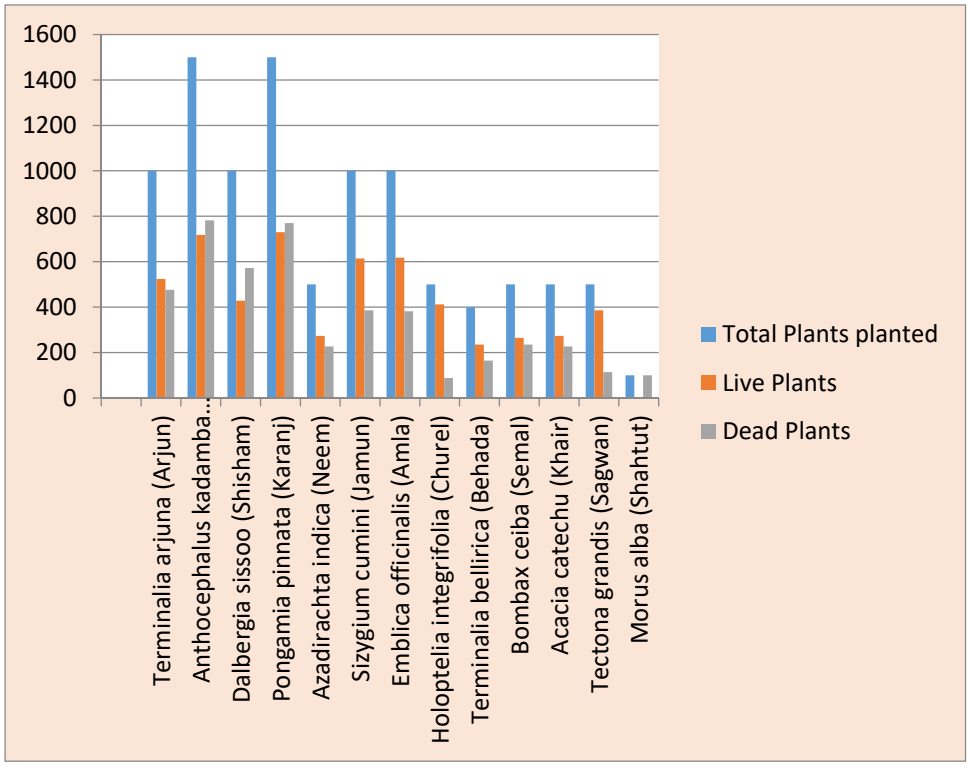


Fig: Graph showing survival of different plants

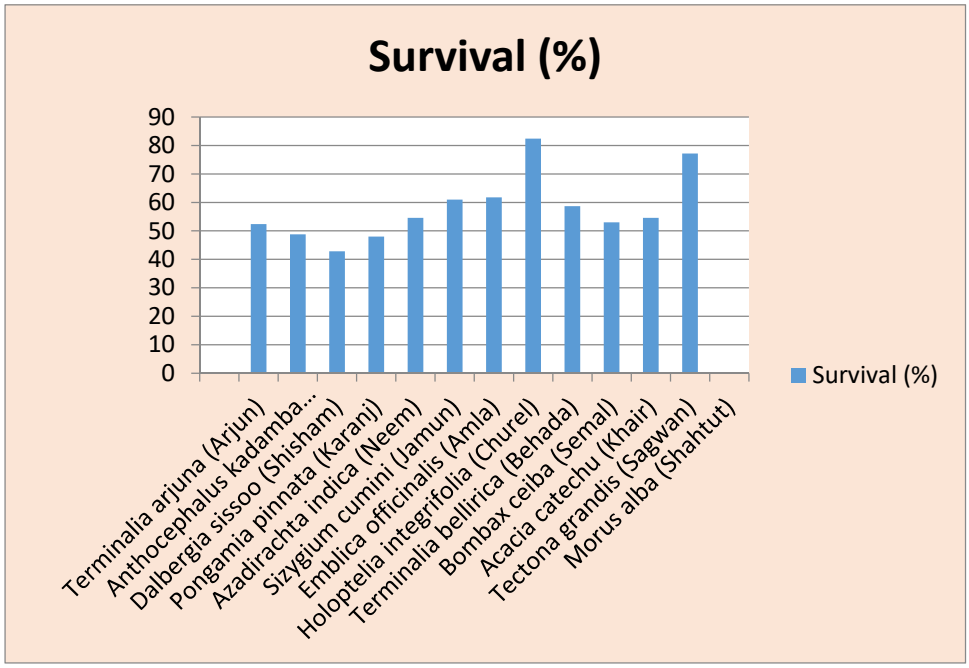


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of churel was highest** of 82.4%, followed by sagwan of 77.2%. **All the plants planted in this site showed moderate survival except shahtut which showed 0% survival rate.**

Site specific plants, good protection and timely execution of work may improve the survival of plants.

3.2.11. GPS Location and KML file: The selected model under CAMPA plantation site measured 50 hec as per kml map.

Fig: KML file of ANR at Vilasdam, Baran range plantation area

C 3.2.12. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	-	-	-	1164200	-	571566	652528	1224094
2016-17	-	-	-	389700	-	-	-	335545
2017-18	-	7877	-	162800	-	-	7877	153474
2018-19	-	23632	-	87000	-	-	23632	83329
2019-20		23851		92500			23851	87112

4. Field Survey of Construction Works Sites

Site-1: 20 Boundary Pillars at Set Kolu, Chhiapabarod:

20 boundary pillars have been evaluated in the area of Set Kolu of Chhipabarod range. The size of the pillars was 0.600*0.500m. These pillars were made during 2014-15 to demarcate forest boundary in that area. **9 pillars were found to be in good condition and 6 were damaged; remaining 5 were broken totally.** The cost of developing pillars was Rs.73704/- (estimated cost Rs.80000/-).

Fig: Boundary pillar of Chhipabarod

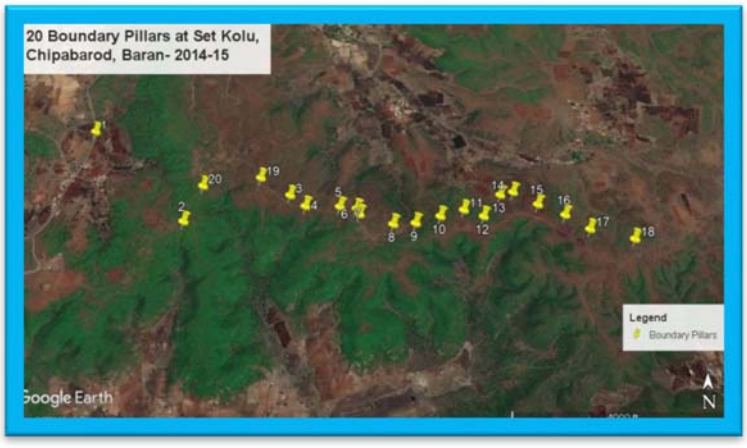


Fig: GIS mapping of all boundary pillars of Chhipabarod

Site- 2: 40 Boundary Pillars at Rajpura-A, Kelwara: 40 boundary pillars have been evaluated in the area of Rajpura-A of Kelwara range. The size of the pillars was 0.600*0.450 m. These pillars were made during 2016-17 to demarcate forest boundary in that area. The cost of developing one pillar was Rs.1895/-. During site visit**, 35 pillars have been found in good condition, 5 pillars were found damaged on the site**.

Fig: GIS mapping of all boundary pillars of Kelwara

5. Overall assessment: The overall impact of plantation activities appeared moderate to poor in Baran division.

Table-7: Quantitative assessment of plantation work created under CAMPA in Baran division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	DFL at Dudawar, Shahbad- 50 hec	42.7	5
2	ANR at Vilasdam, Kisanganj- 50 hec	54.7	6

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-8: Quantitative assessment of constructions work created under CAMPA in Baran division

Sr. no.	Ranges	Name of the site	Rank of site (Between 0 to 10)*
1	Chhipabarod	20 Boundary Pillars at Set Kolu	6
2	Kelwara	40 Boundary Pillars at Rajpura-A	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Barmer (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Barmer Forest Division. This Forest Division with 3 Forest Ranges namely Siwana, Balotra and Barmer has territorial jurisdiction over the entire Barmer District.

Fig: Location of Barmer district, Rajasthan

2. Selected plantation site for Evaluation

The DFL plantation of 20 ha Nal –B of Siwana range in the year 2015-16 and 20 boundary pillars at Kitnod of Balotra range of the year 2014-15 have been selected for evaluation.

Table-1: Selected plantation and construction sites for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved
Siwana	DFL plantation of 20 ha Nal-B	2015-16	100%
Balotra	20 boundary pillars at Kitnod	2014-15	100%

3. Results of Evaluation

3.1. Plantation Evaluation

3.1.1. Site-1: **DFL plantation of 20 ha Nal-B of Siwana range:** The selected plantation has been carried out on 20 hec of land at Nal-B of Siwana range during the year 2015-16. The plantation activities were done under the Degraded Forest Land (DFL) model. As per the model, 700 plants per hectare have been planted.

Fig: DFL at Nal-B of Siwana range

The GPS location of this selected site was 25°,36',35 N Latitude and 72°,18',36.5 E Longitude and at 300 m above msl. The site was a forest land and selected for 100% evaluation. The soil was brownish in colour and sandy, hard layer.

Fig: Instructions given before counting

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made.**

Total 14000 pits have been made for plantation in total 20 hec of land. After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.1.3. Nursery Development fo r Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Siwana, a forest department nursery of Siwana range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected 7 plants species under plantation were *Acacia senegal* (kumoth), *Zizyphus mauritiana* (Ber), *Acacia tortilis* (Totalis), *Prosopis cineraria* (Khejri), *Cordia sinensis* (Gundi), *Tecomella undulata* (Rohida) and *Azadirachta indica (Neem).* **A total of 14000 numbers of seedlings were planted at the site.** Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have been planted. So total number of plants planted was 14000 for 20 hectare of land.

Fig: Growth of plants taken at Nal-B, Siwana range

The choice of species under plantation appeared not proper. The plants selected for growing in this site were not specific and not grown naturally there. The choice of plants

has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of providing irrigation for plantation in this model of DFL.

3.1.6. Natural Vegetation and Regeneration: The area comes under forest land where the present existing tree species were *Acacia senegal (*kumoth*), Prosopis juliflora (*khejri*), Zizyphus mauritiana (*ber*)* and *Salvadora oleiodes* (jaal). **The growth of all types of existing plant species was found to be good. The natural regeneration process contributes to increase the vegetation coverage in that area.**

3.1.7. Regeneration through seeds sowing: Seeds of *Acacia senegal*, *Acacia tortilis* and *Zizyphus mauritiana* species were sown on the plantation site. The growth of the plants were good.

Fig: Water tank at plantation area

3.1.8. Protection Work: The area was protected by angle iron fencing. The protection provided by these fencing was good but now the area is opened to all.

3.1.9. Soil and Water Conservation Measu res: **There were no soil and water conservation measure has been taken place to conserve water. One small water tank has been made for watering the plants during plantation. The size of the tank was 70 cm height and 5.50 m width.**

3.1.10. Observations Recorded: Under this model, 700 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 53.33% at the site.** Plant species girth breast height was also measured. The growth of planted plants was moderate. A total of 14000 plants comprising of four species were planted in the 20 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-2: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
Acacia senegal (Kumoth)	4000	979	3021	24.47	3612.5	15.87
Acacia tortilis (Totalis)	7600	5934	1666	78.08	2587.5	11.45

Zizyphus mauritiana (Ber)	800	401	399	50.12	3112.5	18.87
Prosopis cineraria (Khejri)	50	03	47	6	-	-
Tecomella undulata (Rohida)	500	83	417	16.6	2025	11.65
Azadirachta indica (Neem)	50	46	4	92	4225	21.37
Cordia sinensis (Gundi)	1000	21	979	2.1	2000	12.5
Total	**14000**	**7467**	**6533**	**53.33%**		

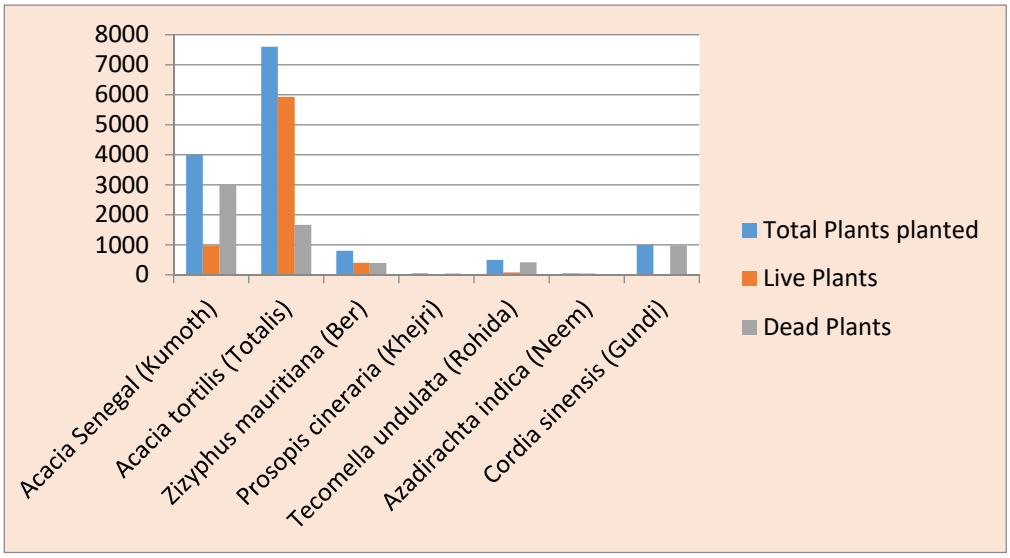


Fig: Graph showing survival of different plants

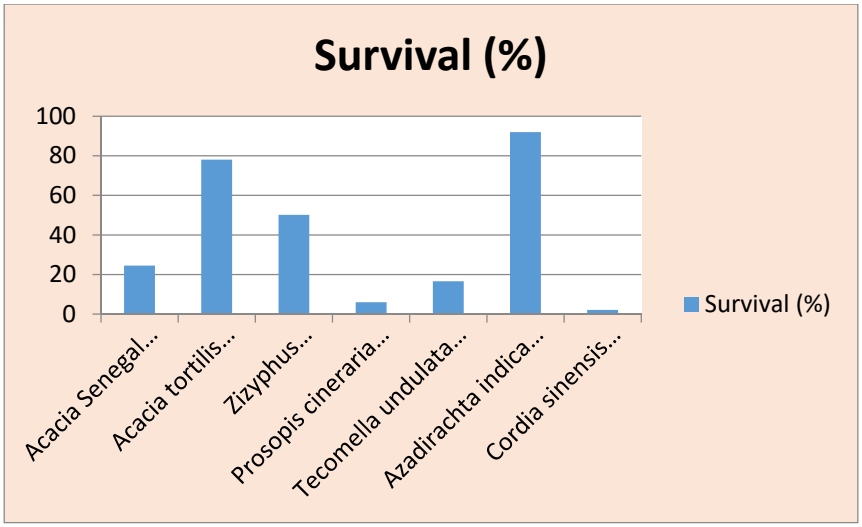


Fig: Graph showing survival percentage of different plants

From the above graph, it was shown that the **survival of neem plant was highest** followed by totalis. **The survival percentage of neem was maximum which was 92%. Plants such as totalis showed good survival rate of 78.08%. The lowest survival was gundi of 2.1% and khejri of 6%. Also the plant rohida showed low survival of 16.6%, which was not suitable for this region.**

The reason for high survival of neem and totalis was that both the species were fittest for this particular region. But gundi and khejri were not suitable for plantation at this particular region.

Another reason for low survival of plants in this particular region was the area was full of holes and burrows of rodents. These rodents might destroy the roots of the plants and thus causing the death of the plants.

Fig: Counting on field using lime for marking of plants

3.1.11. GPS Location and KML file: The selected DFL model at Nal-B of Siwana range under CAMPA plantation site measured slightly higher (20.13 hec, as per calculation through KML file) than reported plantation area (20 hec).

Fig: KML file of DFL at Nal-B, Siwana range plantation area

3.1.12. Budget and Expenditure

Year	Cost Estimate (Rs.)			Expenditure Incurred (Rs.)		
	Plantation	SMC Works	Fencing	Plantation	SMC Works	Fencing
2014-15	279000			278996		
2015-16	574000			562192		

2016-17	180904	115970
2017-18	88540	86498
2018-19	88540	87615
2019-20	93420	79950
2020-21	93420	89147
Total	**1397824**	**1300368**

4. Evaluation of construction activities

4.1: 20 Boundary Pillars at Kitnod of Balotra range:20 boundary pillars have been evaluated in the area of at Kitnod of Balotra range. The size of the pillars is 0.45*0.45*0.60 m. These pillars were made during 2014-15 to demarcate forest boundary in that area. Total expenditure of 20 pillars was Rs. 32,000/-.

The pillars were started making during the year 2014 after getting approval and completed the work on March of 2015. All the pillars were in good condition and only one was found damaged.

Fig: Boundary pillar at Kitnod

5. Overall assessment: The overall impact of plantation appeared satisfactory in Siwana range of Barmer division. The below mentioned ranking system has been given keeping the view of vegetation cover increased in this plantation site.

Table3: Quantitative assessment of plantation work created under CAMPA in Barmer division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	DFL plantation at Nal-B of Siwana range	53.33%	7

****<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)***

The boundary pillars were good in condition and fulfill the purpose of demarcation of forest area.

Table4: Quantitative assessment of constructions work created under CAMPA in Barmer division

Sr. no.	Items	Rank of Item (Between 0 to 10)*
1	20 Boundary Pillars at Kitnod of Balotra range	8

****<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding***

Bharatpur-KNP (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Bharatpur KNP Forest Division. This Forest Division with 2 Forest Ranges namely Ghana and Bandhbaretha has territorial jurisdiction over the entire Bharatpur district.

Fig: Location of Bharatpur district, Rajasthan

2. Selected construction work sites for Evaluation

Two sites such as one Anicut type-II at D- Block of Ghana range and another 20 Boundary Pillars at Ghuneni Saipur of Bandhbaretha range both in the year 2014-15 have been selected for evaluation.

Table-1: Selected construction sites for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved
Ghana	Anicut type-II at D- Block	2014-15	100%
Bandhbaretha	20 Boundary Pillars at Ghuneni Saipur	2014-15	100%

3. Field Survey of Construction Works Sites

3.1. Site-1: Anicut Type-III at Ghana range: At Ghana range of Bharatpur KNP division, one anicut type-III has been constructed at D-block during the year 2014-15. Quality of construction work appeared to be good and useful. This anicut was constructed at the cost of Rs. 3,49,459/- where as the estimated cost was Rs. 3.50 Lakh on record. GPS location of this area was Latitude- N 27°,16',9128" and Longitude-E 77°, 53',322''. At present this anicut was filled up with water and the water level was 1.5 m during field evaluation.

Basically this anicut was made to conserve rain water during monsoon, which was used for drinking purposes by local domestic as well as by the wild animals. Water conservation depends on rain only.

Once the whole area gets filled with water during monsoon, the water remains in this anicut for about a year. Because of rain water harvesting, the recharging of local water table takes place.

Fig: Anicut type-II at D-Block and GPS location mapping at Ghana range

3.2. Site-2: 20 Boundary Pillars at Ghuneni Saipur of Bandhbaretha range: 20 boundary pillars have been evaluated in the area of Ghuneni Saipur of Bandhbaretha range range. The size of the pillars was 0.45*0.45*0.60 m. These pillars were made during 2014-15 to demarcate forest boundary in that area. Total cost of 20 pillars was Rs. 31,908/-. The pillars were started making during the year 2014 after getting approval and completed the work on March 15 of 2015.

Most of the pillars were found in good conditions. 3 pillars were found damaged; reason was the pillars were damaged by the local people.

Fig: Visit of Pillars, marking with the numbers on pillars for easy counting

Fig: Damaged pillars found in field visit, Bandhbaretha

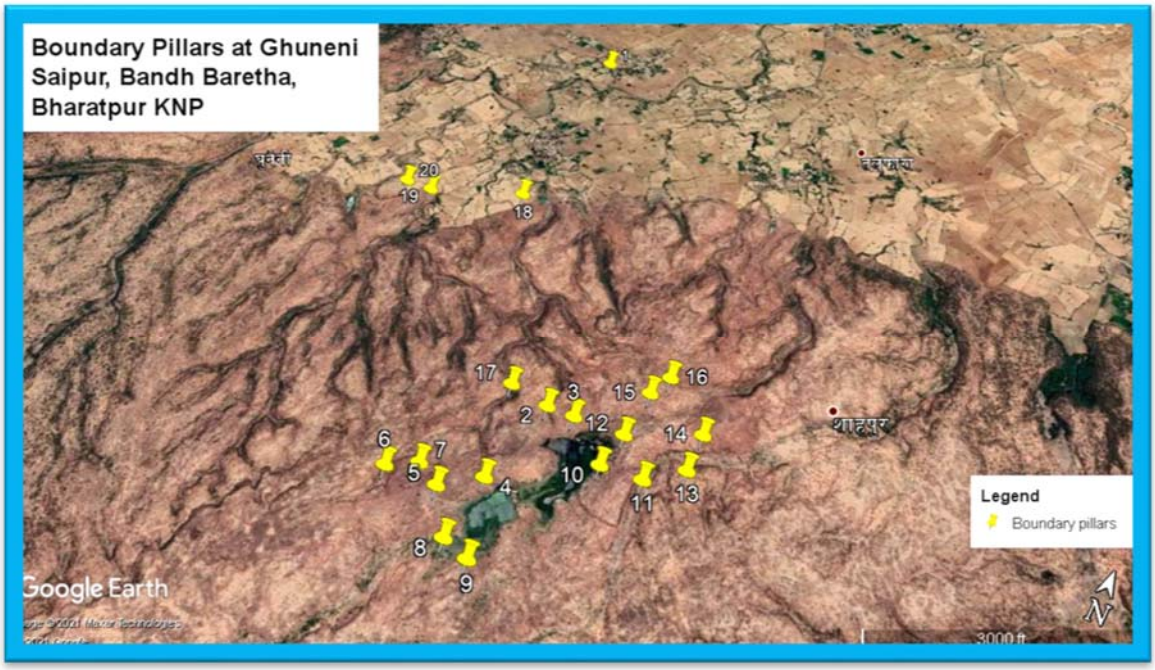


Fig: GPS location mapping of all 20 boundary pillars of of Ghuneni Saipur of Bandhbaretha range

4. Overall assessment: The overall impact of both the construction sites such as anicut-II and boundary pillars appeared satisfactory in Bharatpur KNP division. Permanent structure created was quite useful and utilized as required.

Table2: Quantitative assessment of constructions work created under CAMPA in Bharatpur KNP division

Sr. no.	Items	Rank of Item (Between 0 to 10)*
1	Anicut Type-III at D-Block of Ghana range	7
2	20 Boundary Pillars_at Ghuneni Saipur of Bandhbaretha range	7

****<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding***

Bharatpur (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Bharatpur-T Forest Division. This Forest Division with 4 Forest Ranges namely, Kaman, Bayana, Deeg and Bharatpur which has territorial jurisdiction over the entire Bharatpur District.

Fig: Location of Bharatpur district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Bharatpur-T Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Ha.	Model
Kaman	Matiya Pahar -B	2015-16	65	ANR
Bayana	Pathwari	2016-17	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Bharatpur-T Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Bayana	20 Boundary Pillar at Bayana Pahar -B Samraya	2014-15	100%
Deeg	4 Ft. wall-1000 m at Aau	2016-17	100%
Bharatpur	Range Office cum Residence at Bhutnath Nursery	2016-17	100%

3. Results and evaluation

3.1. Plantations Evaluation

C.3.1.1. Site-1: **Matiya Pahar-B in Kaman:** The selected plantation has been carried out on 65 hec of land at Matiya Pahar-B in Kaman during the year 2015-16. The activities were done under the ANR model. The GPS location of this selected site was N 27,35,788

and E 77,11,699. The site was a forest land and selected for 100% evaluation. The soil was clayey loam and stony hard layer of hilly area.

3.1.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 13000 pits have been made for plantation in total 65 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

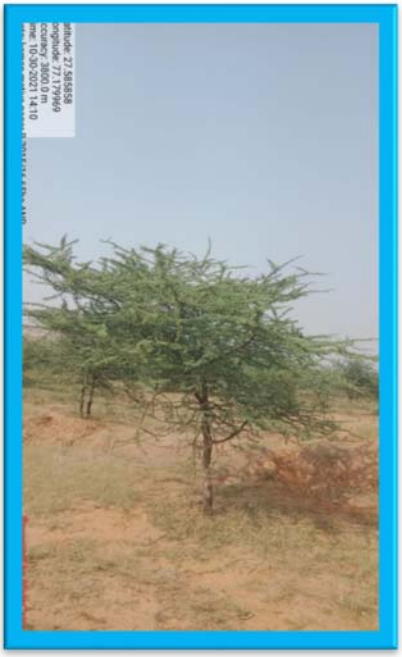


Fig: ANR at Matiya Pahar, Kaman

3.1.3. Nursery Develop ment for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Matiya Pahar, a forest department nursery of Kaman range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 4. Seedlings of *Holptelia integrifolia (*Churel*), Acacia nilotica (*Desi Babool*), Acacia leucopholea (*Ronj), *and Acaciia tortilis (*Totalis) were planted.

A total of 13000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 13000 for 65 hectare of land.

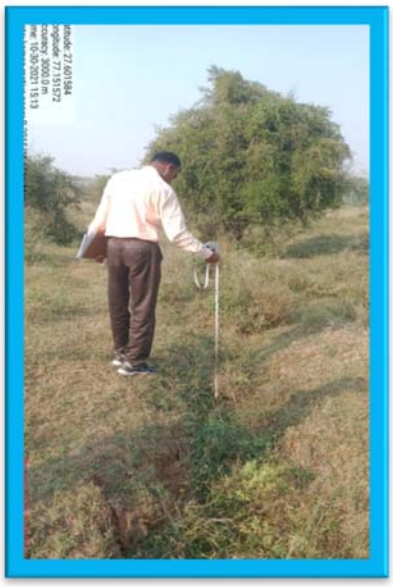


Fig: Measurement of trenches

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was poor.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water.

3.1.6. Natural Vegetation and Rege neration: Ronj, juliflora, ber, hingota were the plants found grown naturally in this area. The growth of the plant was poor and the vegetation was also less dense.

3.1.7. Regeneration through seeds sowing: Seeds of species *kumatha, ronj, totalis,* were sown in and alongside of trenches. **The growth of seedlings from seeds was low.**

3.1.8. Protection Work: The selected ANR model plantation was **protected by trench fencing of 2360 RMT with average top width of 0.50m, average depth of 1.20m and average bottom width of 0.90m. Also the area has 400 RMT of stone wall fencing. Present condition of both fencing was good and effective in controlling biotic pressure upto some extent.**

3.1.9. Soil and Water Conservation Measures: **There were 26000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3.5 m to 9 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation. **Also there was earthen check dam of 8330 cum present in 65 hec of plantation area.**

Fig: Counting of plants on field

3.1.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 45.2% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 13000 plants comprising of four species were planted in the 65 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-3: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Holoptelia integrifolia (Churel)	1000	468	532	46.8	2.2	20
Acacia nilotica (Desi Babool)	3000	1324	1676	44.1	2.5	22
Acacia leucopholea (Ronj)	500	278	226	54.8	2.4	22
Acacia tortilis (Totalis)	3813	3813	4687	44.8	2.3	27
Total	**13000**	**5879**		**45.2**		

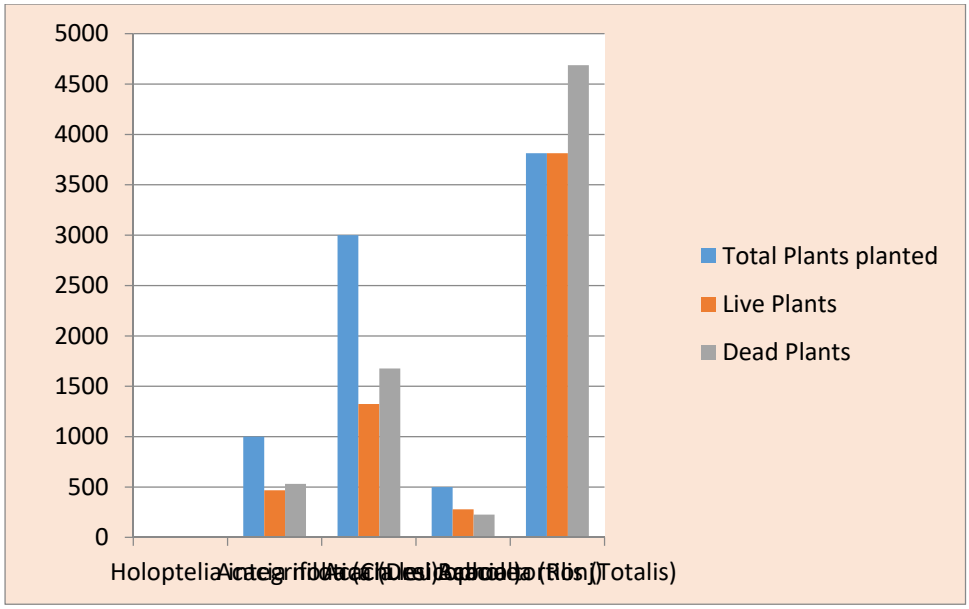


Fig: Graph showing survival of different plants

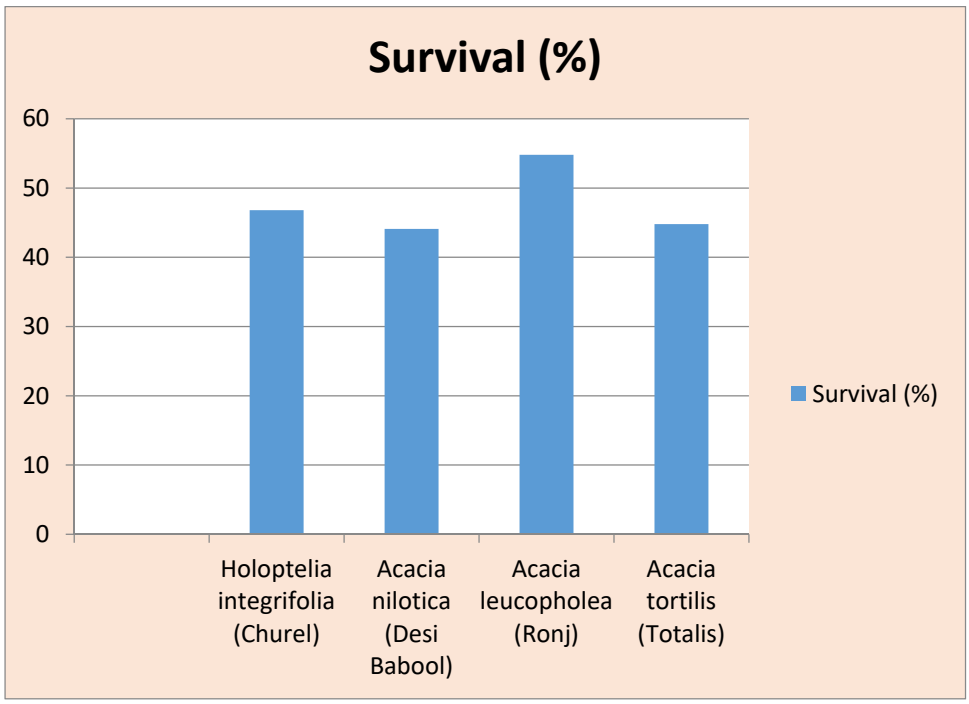


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ronj was highest** of 54.8%. **All the plants planted in this site showed below average survival.**

Good protection, site specific plants and watering on time may improve the survival of plants.

3.1.11.GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 65 hec as per kml map.

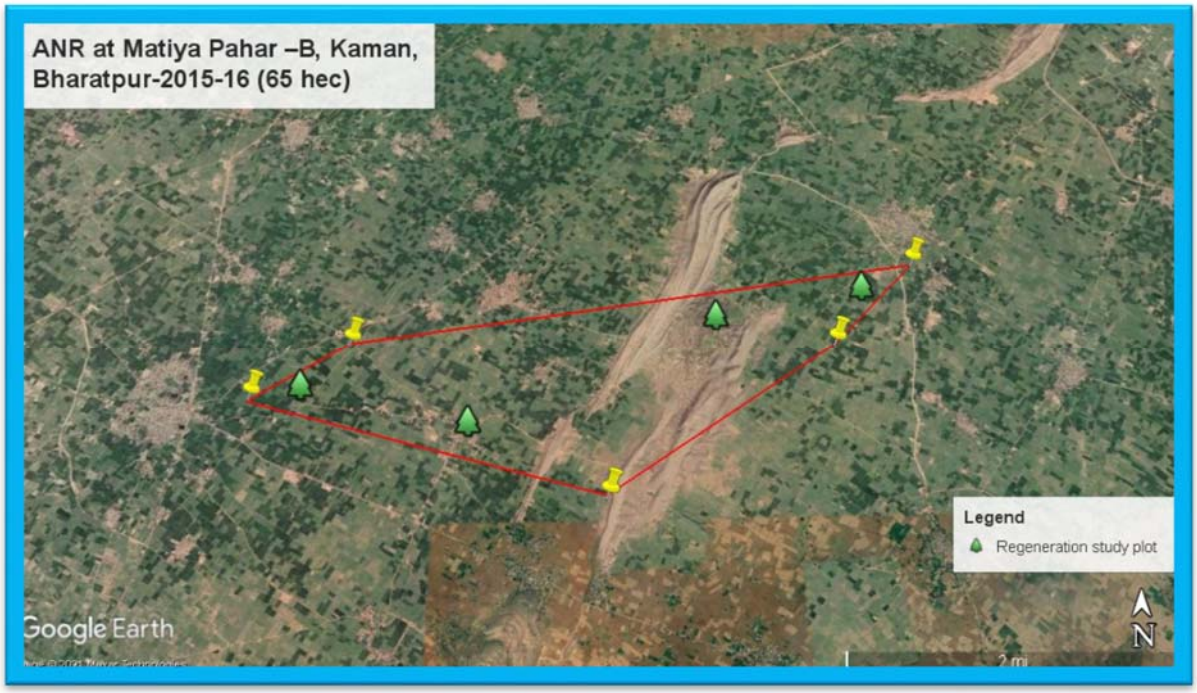


Fig: KML file of ANR at Matiya Pahar-B of Kaman range plantation area

3.2.1. Site-2: **Pathwari in Bayana range**: The selected plantation has been carried out on 50 hec of land at Pathwari in Bayana range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 26,58,46.7 and E 77,06,03.4. The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer.

3.2.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.**

After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR plantation at Pathwari

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Pathwari, a forest department nursery of Bayana range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 4. Seedlings of *Acacia leucopholea* (Ronj), *Zizyphus mauritiana (*Ber), *Acacia tortilis* (Totalis) and *Acacia nilotica (*Desi babool*)* were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was not found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 10000 plants in 50 hectare have been planted. Map of planting site was prepared. Type of plantation was block and technique of planting was pit.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was poor.**

Fig: Measurement of plants on field

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.2.6. Natural Vegetation and Regeneration: The area has been covered partially with vegetation due to this plantation. The growth of plants was poor. Grasses have grown in ditch trenches which should be controlled. Plants like ronj, kumtha, khair, dhok, ardu have been found grown naturally. The vegetation was sparsh and low densed.

3.1.7. Regeneration through seeds sowing: Seeds of Kumtha, Khair, Ronj species were sown on edges of contour trenches. **The growth of seedlings from seeds was poor.**

3.2.8. Protection Work: The selected ANR model plantation was **protected by trench/ditch fencing of 900 RMT and stone wall fencing of 2720 RMT. Stone fencing average top width was 0.80m, average depth was 1.00 m and average bottom width was 1.20m. It was partially effective in controlling the biotic pressure.**

Fig: Instructions given before counting of plants on field

3.2.9. Soil and Water Conservation Measures: **There were loose stone checkdam of total volume of 150 cum present in the plantation area. There were 9000 RMT**

contour trenches in the form of water harvesting structures present in the entire plantation area. **The size of the contour varied from 3.5m to 8 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation. Also **3200 RMT contour dike and 600 cum earthen checkdam** were developed in this plantation area.

3.2.10. Observations Recorded: Under this model, 10000 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 45.8% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of four species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia leucopholea (Ronj)	6500	2456	4044	37.7	2.1	20
Zizyphus mauritiana (Ber)	500	386	114	77.2	1.4	11
Acacia tortilis (Totalis)	2000	1088	912	54.4	2.3	19
Acacia nilotica (Desi babool)	1000	654	346	65.4	2.6	22
Total	**10000**	**4584**		**45.8**		

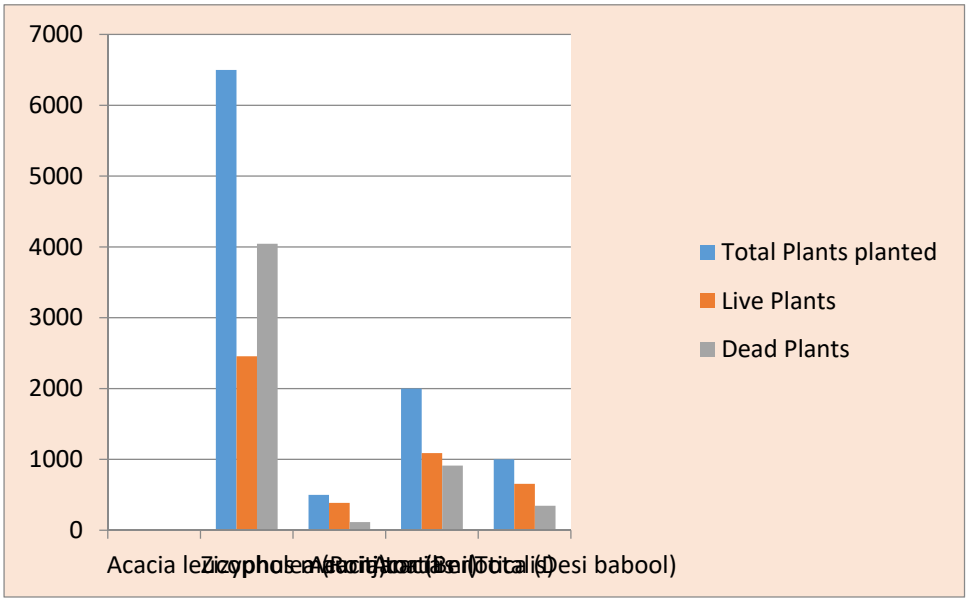


Fig: Graph showing survival of different plants

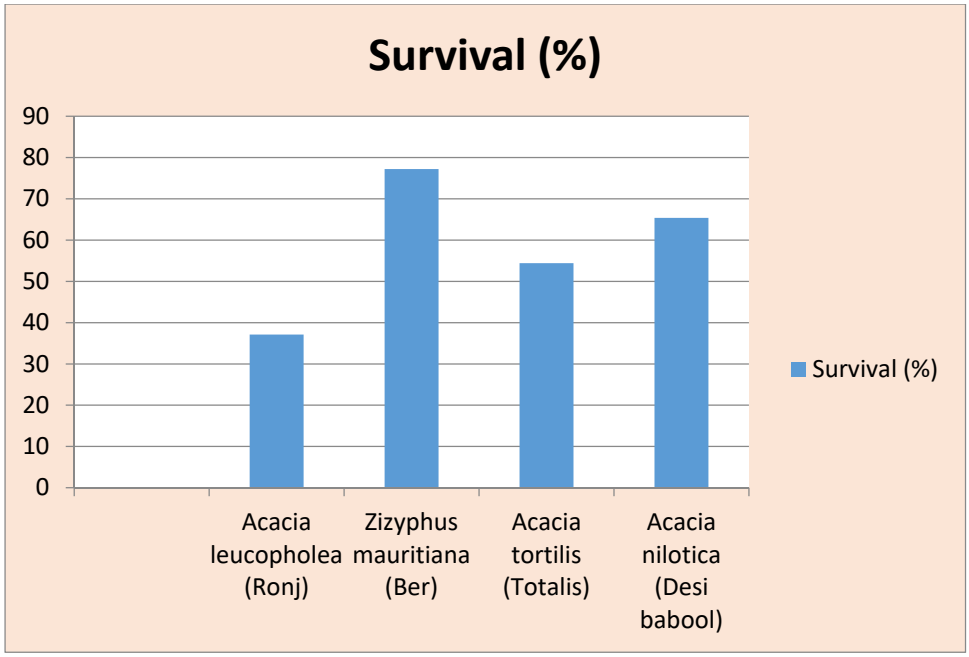


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ber was highest of 77.2%, followed by desi babool of 65.4%. Plants like ronj planted here in maximum number and showed lowest survival of 37.7%, due to which the total survival became poor.**

Good protection and watering may improve the survival of plants.

3.2.11. GPS Location and KML file: The selected model under CAMPA plantation site measured 50 hec as per kml map.

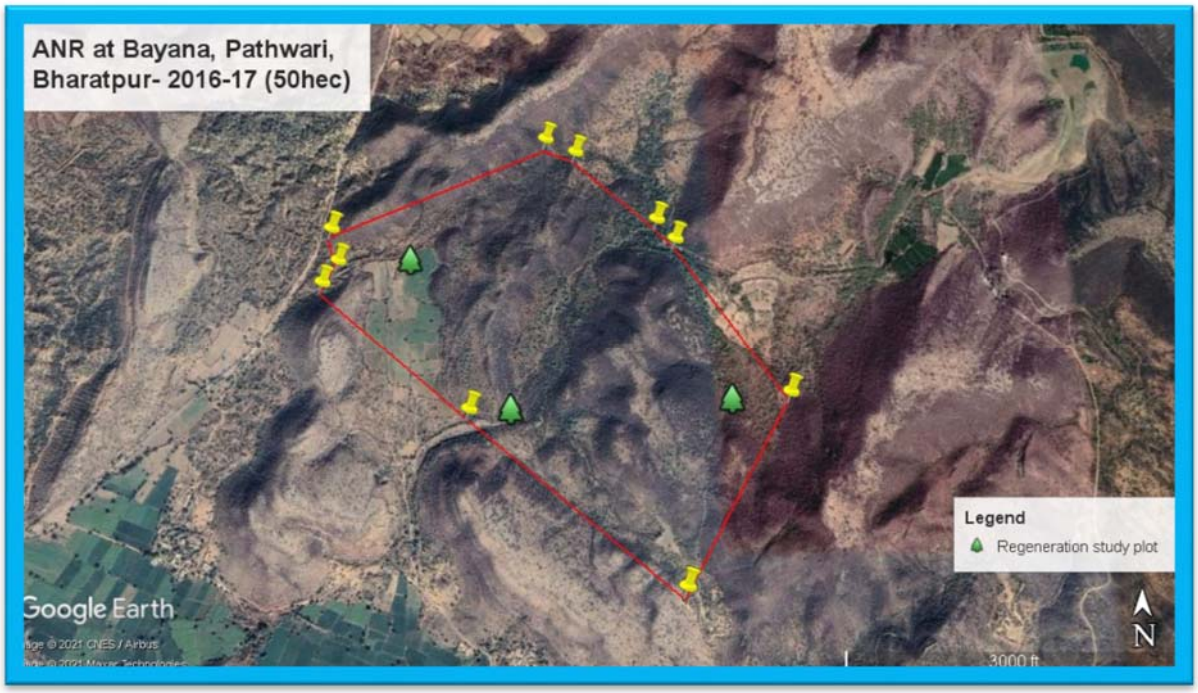


Fig: KML file of ANR at Pathwari, Bayana range plantation area

3.2.12. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	291708	478139	894353	1664200	300195	478000	884604	1662799
2016-17	389700	-	-	389700	3633357	-	-	363357
2017-18	154298	-	8502	162800	140583	-	8502	149085
2018-19	67650	-	19350	87000	62766	-	19350	82116
2019-20	-			92250	63424		24187	87611

4. Evaluation Construction Works Sites

<u>Site-1: 20 Forest Boundary Pillars at Bayana Pahar -B Samraya</u>: 20 boundary pillars have been evaluated in the area of Bayana Pahar -B Samraya of Bayana range. The size of the pillars was 0.450*0.600 m. These pillars were made during 2014-15 to demarcate forest boundary in that area. The cost of making these pillars was Rs.32000/-. **Construction of few pillars appeared damaged.**

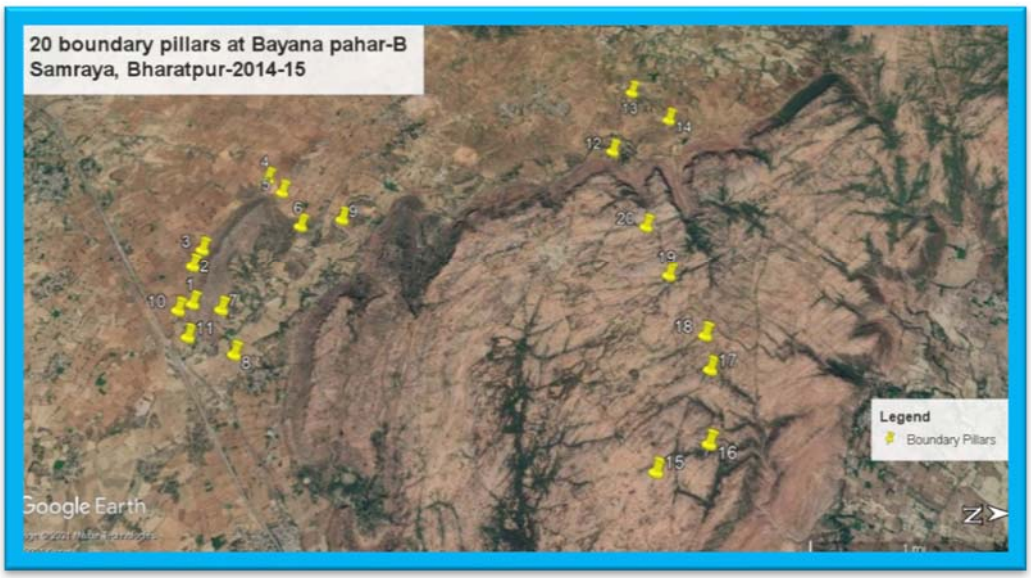


Fig: GIS mapping of all boundary pillars of Bayana

<u>Site- 2: 4 Ft. wall -1000 m stone wall at AAU of Deeg:</u> At AAU in Deeg range, the stone wall has been evaluated. The wall was constructed in the year 2016-17. The wall dimensions were 4 ft and 1000m length. Construction work appeared to be good and

useful. GPS location of this area was 27,421481 N and 77,342644 E. The construction work started in the year of 2016 after approval and completed in the 2017. The expenditure incurred for constructing this wall was Rs. 21,18,892/- (estimated cost was Rs. 26.40 Lakh). The wall was found in good condition.

Fig: Stone wall Deeg and GIS mapping

Site- 3: Range Office cum Residence at Bhutnath Nursery of Bharatpur:

At Bharatpur range, the Range Office cum Residence at Bhutnath Nursery has been evaluated. The building was constructed in the year 2016-1 7. Construction work appeared to be good and useful. GPS location of this area was 27.201623 N and 77.49611 E. The construction work started in the year of 2016 after approval and completed in the 2017. The cost of developing this building was Rs. 10 Lakh. After completion of building, the building was using by the department for official purpose as well as for staying purposes. Electricity and water facility were provided in this building.

Fig: Range office cum residence at Bhutnath Nursery and GIS mapping

4. Overall assessment: The overall impact of plantation activities appeared moderate to poor in Bharatpur-T division.

Table-5: Quantitative assessment of plantation work created under CAMPA in Bharatpur-T division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	ANR at Matiya Pahar-B, Kaman-65 hec	45.2	5
2	ANR at Pathwari, Bayana- 50 hec	45.8	5

****<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)***

Table-6: Quantitative assessment of constructions work created under CAMPA in Bharatpur-T division

Sr. no.	Ranges	Name of the site	Rank of site (Between 0 to 10)*
1	Bayana	20 boundary pillars of Bayana Pahar -B Samraya	6
2	Deeg	4 Ft. wall-1000 m at Aau	8
3	Bharatpur	Range Office cum Residence at Bhutnath Nursery	7

****<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding***

Bhilwara (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Bhilwara Forest Division. This Forest Division with 5 Forest Ranges namely Mandalgarh, Jahazpur, Bhilwara, Gangapur, and Asind, which has territorial jurisdiction over the entire Bhilwara District.

Fig: Location of Bhilwara district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Bhilwara Forest Division were as given in table-1.

Forest Range	Name of Site	Year of Plantation	Ha.	Model
Jahazpur	Sui	2014-15	50	DFL
Mandalgarh	Danpura	2015-16	1.35	NFL
Jahazpur	Titoda	2015-16	52	DFL
Jahazpur	Kalia Dungar	2016-17	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Bhilwara Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Bhilwara	Hamirgarh	2015-16	Forest Guard Chowki
Jahazpur	Paroli-1	2015-16	4 ft 500 m Stone wall
Gangapur	Bharat Mataji	2015-16	4 ft 500 m Stone wall
Bhilwara	Hamirgarh-111	2015-16	4 ft 500 m Stone wall
Bhilwara	Sangner	2016-17	4 ft 500 m Stone wall

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Sui in Jahazpur range**: The selected plantation has been carried out on 50hec of land at Sui in Jahazpur range during the year 2014-15. The activities were done under the Degraded Forest Land (DFL) model. The GPS location of this selected site was N 25.404635 and E 75.177817.The site was a forest land and selected for 100% evaluation. The soil was reddish brown in colour and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 35000 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: DFL at Sui, Jahazpur

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Sui, a forest department nursery of Jahazpur range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 5. Seedlings of *Acacia nilotica* (desi babool), *Zizyphus mauritiana* (ber), *Acacia leucophoelea (*ronj), *Holoptelea integrifolia* (Churel) and *Azadirachta indica* (Neem) were planted.

A total of 35000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have been planted. So total number of plants planted was 35000 for 50hectare of land.

Fig: Measurement of plants taking on field

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants

has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. Desi babool, hingota, ronj were the plants found grown naturally in this area. The growth of the plant was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia nilotica* (Desi Babool)	273	5.9m	39.5
2	*Acacia leucopholea* (Ronj)	192	6m	46
3	*Balanites sp.* (Hingota)	29	6.5 cm	5.5

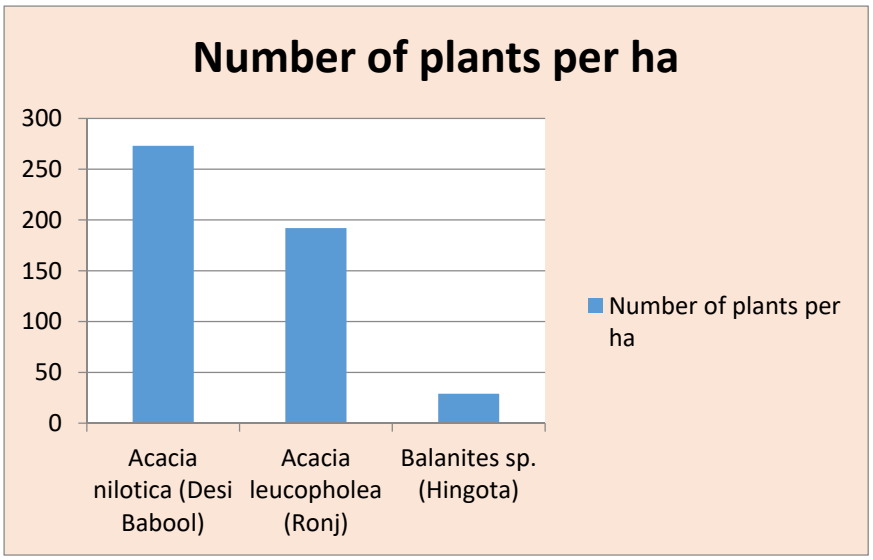


Fig: Graph showing number plants under natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of species *kumatha, desi babool, ronj and dhak* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected DFL model plantation was **protected by ditch/trench fencing of 3400 RMT with average top width of 1.50m, average depth of 1.20m and average bottom width of 0.90m. Present condition of fencing was good.**

3.1.9. Soil and Water Conservation Measures: **There were 14500 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 2.5 m to 8 m long with 0.45*0.35 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation.

3.1.10. Observations Recorded: Under this model, 700 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 57.08% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 35000 plants comprising of five species were planted in the 50hec plantation area.

Fig: Measurement of ditch fencing

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
*Acacia nilotica (*desi babool)	18000	10406	7594	57.8	4.7	33.15
Acacia leucopholea (Ronj)	13000	8407	4593	64.66	3.9	20.05
Azadirachta indica (Neem)	700	131	569	18.74	1.7	4.9
Holoptelea integrifolia (Churel)	1000	431	569	43.10	2.3	13.85
*Zizyphus mauritiana (*Ber)	2300	603	1697	26.21	2.2	13.80
Total	**35000**	**19978**	15022	**57.08**		

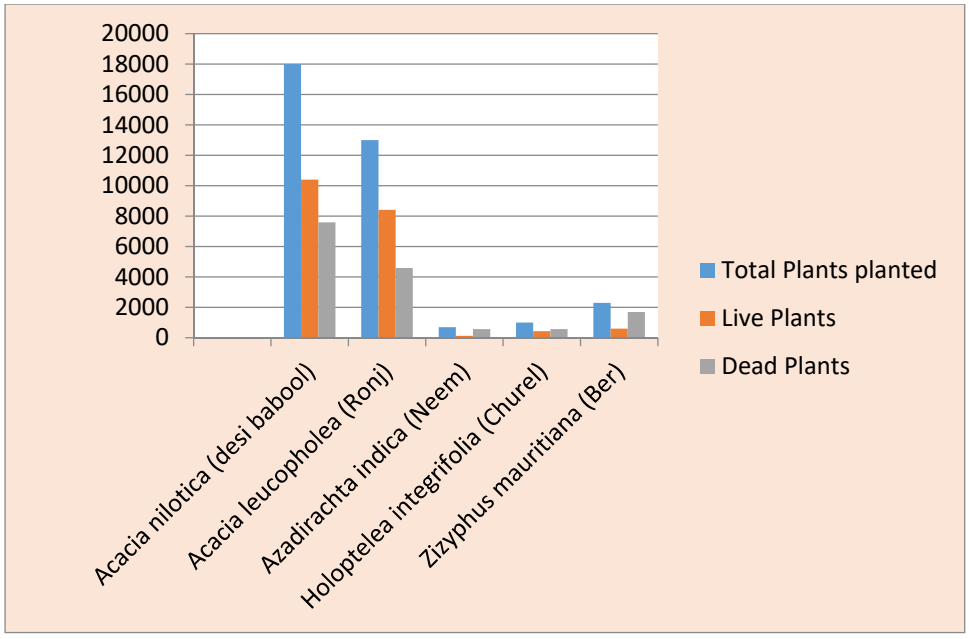


Fig: Graph showing survival of different plants

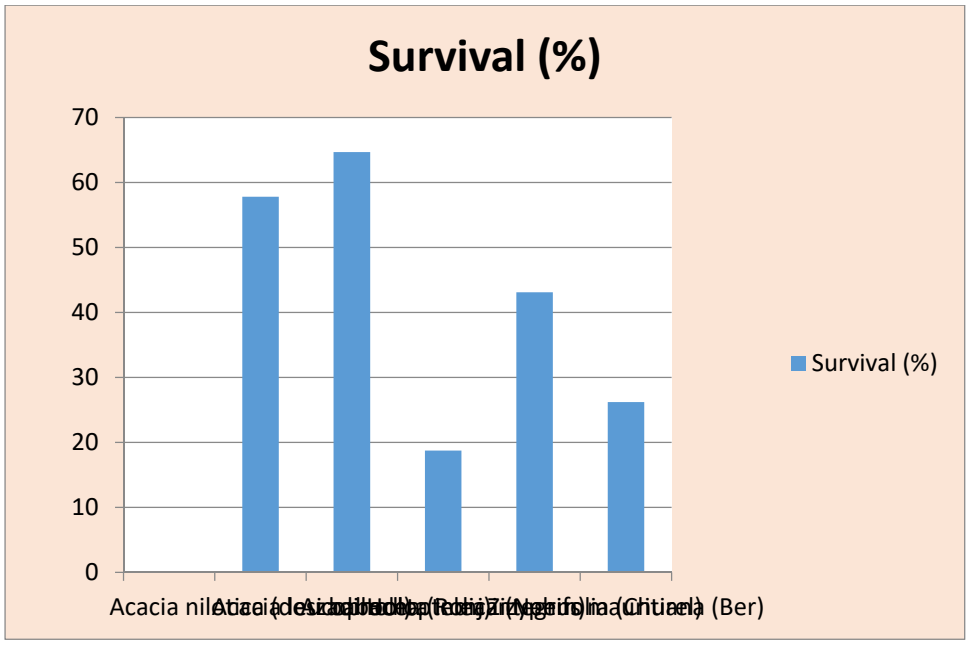


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ronj plant was highest** followed by desi babool. **The survival percentage of ronj was maximum of 64.66% and desi babool was 57.8%. Neem and ber showed low survival, which were not fittest for this region.**

3.1.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

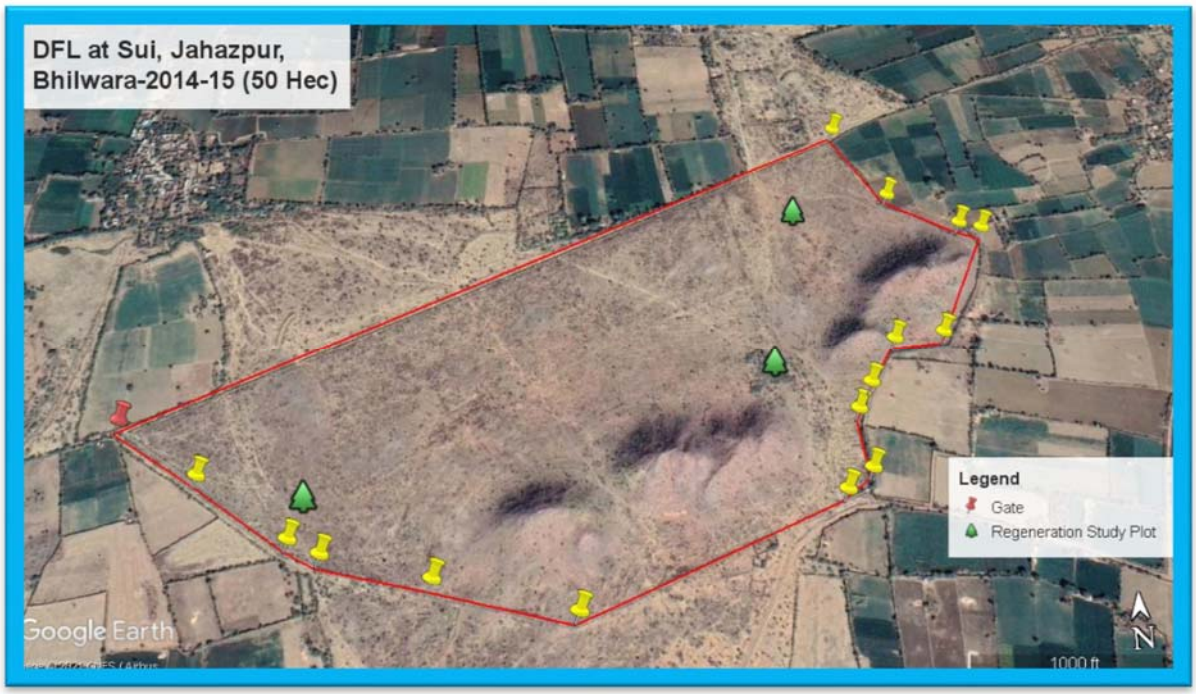


Fig: KML file of DFL at Sui, Jahazpur range plantation area

C.3.1.18. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2013-14	211477	458390	675258	1345125	211477	458390	675258	1345125
2014-15	1188737	-	46038	1234775	1188737	-	46038	1234775
2015-16	451900	-	-	451900	321590	-	130229	451819
2016-17	128223	-	80927	209150	110598	-	98525	209123
2017-18	131239	-	90111	221350	103877	-	117110	220987
2018-19	146356	-	74994	221350	137925	-	83425	221350
2019-20	142346	-	91204	233550	68424	-	165125	233549
2020-21	75988	-	182262	258250	75988	-	182262	258250
2021-22	75341	-	196309	271650	34617	-	196310	230927
Total	2551607	458390	1437103	4447100	2253233	458390	1694282	4405905

3.2.1. Site-2: **Danpura in Mandalgarh range** : The selected plantation has been carried out on 1.35hec of land at Danpura in Mandalgarh range during the year 2014-15. The activities were done under the NFL model. The GPS location of this selected site was N

25.335446 and E 75.2526178. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour and stony hard layer.

3.2.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 1100 pits have been made for plantation in total 1.35 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.2.3. Nursery Developmen t for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Danpura, a forest department nursery of Mandalgarh range. During monsoon these seedlings were planted.

Fig: NFL at Danpura, Mandalgarh

3.2.4. Species Planted: The selected tree species under plantation were 2. Seedlings of *Acacia nilotica* (desi babool) and *Acacia leucophoelea (*ronj) were planted.

A total of 1100 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was evaluated by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 1100 plants in 1.35 hectare have been planted. Map of planting site was prepared. Type of plantation was block and technique of planting was pit.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water.

3.2.6. Natural Vegetation and Re generation: The area has been covered fully with vegetation due to this plantation. The growth of plants was good. Grasses have grown in ditch trenches which should be controlled. Plants like desi babool, ronj, neem, dhok, churel have been found grown naturally.

3.2.7. Protection Work: The selected NFL model plantation was **protected by stone wall fencing of 203 RMT.**

3.2.8. Soil and Water Conservation Measures: **There was 24.66 cum of loose stone check dam in the form of water harvesting** structures present in the entire plantation area.

3.2.9. Observations Recorded: Under this model, 1100 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 50.5% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good.

Fig: Protection wall at NFL of Mandalgarh

A total of 1100 plants comprising of two species were planted in the 1.35hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-5: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia nilotica (desi babool)	300	110	190	36.66	1.5	33
Acacia leucophoelea (ronj)	800	445	355	55.62	4.10	35
Total	**1100**	**555**	545	**50.5%**		

From the above table, it is shown that the **survival of ronj plant was highest** followed by desi babool. **The survival percentage of Ronj was maximum which is 55.62% and desi babool was 36.66%. All the plants planted in this site showed average survival rate.**

The reason for low survival of all plants was scanty rainfall, cattle pressure and illegal mining.

3.2.10. GPS Location and KML file: The selected model under CAMPA plantation site measured 1.35 hec as per kml map.

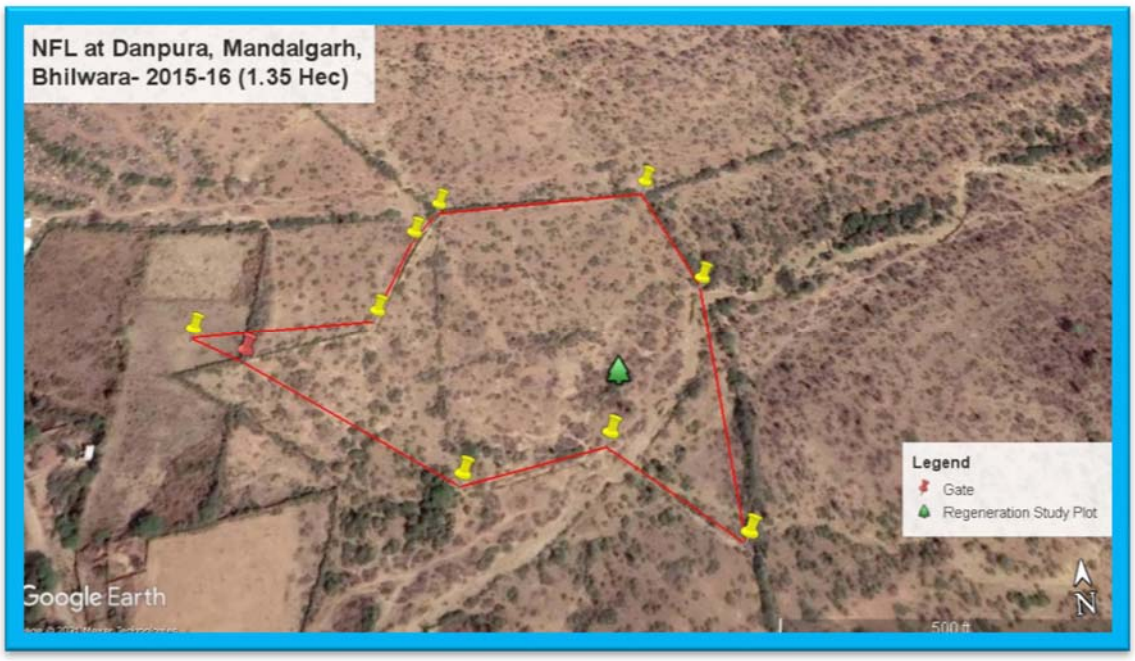


Fig: KML file of NFL at Danpura, Mandalgarh range plantation area

3.2.11. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-	42459	-	-	42459	42459
2015-16	-	-	-	59079	42581	5187	11311	59079
2016-17	-	-	-	16990	14838	-	2152	16990
2017-18	-	-	-	5477	-	-	5477	5477
2018-19	-	-	-	5501	-	-	5501	5501
2019-20	-	-	-	12419	-	-	12419	12419
Total								141925

3.3.1. Site-3: **Titora in Jahazpur range:** The selected plantation has been carried out on 52hec of land at Titora of Jahazpur range during the year 2015-16. The activities were done under the DFL model. The GPS location of this selected site was N 25.2522 and E 75.1410. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour and stony hard layer.

3.3.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 36400 pits have been made for plantation in total 52hec of land.** After applying of pesticides and manure in

the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.3.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Titora, a forest department nursery of Jahazpur range. During monsoon these seedlings were planted.

3.3.4. Species Planted: The selected tree species under plantation were 6. Seedlings of *Acacia nilotica* (desi babool), *Acacia leucophoelea (*ronj), *Zizyphus mauritiana* (ber), *Holoptelea integrifolia* (churail), *Pongamia pinnata* (karanj) and *Azadirachta indica* (neem) were planted.

Fig: DFL at Titoda, Jahazpur

A total of 36400 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area.

No plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have been planted. So total number of plants planted was 36400 for 52hectare of land. Type of plantation was block. Pit technique of planting was used.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.3.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found.

3.3.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Plants such as desi babool, churail, ber and neem have been found growing naturally in this area. The growth of plants was good.

Table-6: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia nilotica* (Desi babool)	298	8	34
2	*Holoptelia integrifolia*	204	3.5	27

	(Churail)			
3	*Zizyphus mauritiana* (Ber)	63	2	21
4	*Azadiracta indica* (Neem)	34	7	37

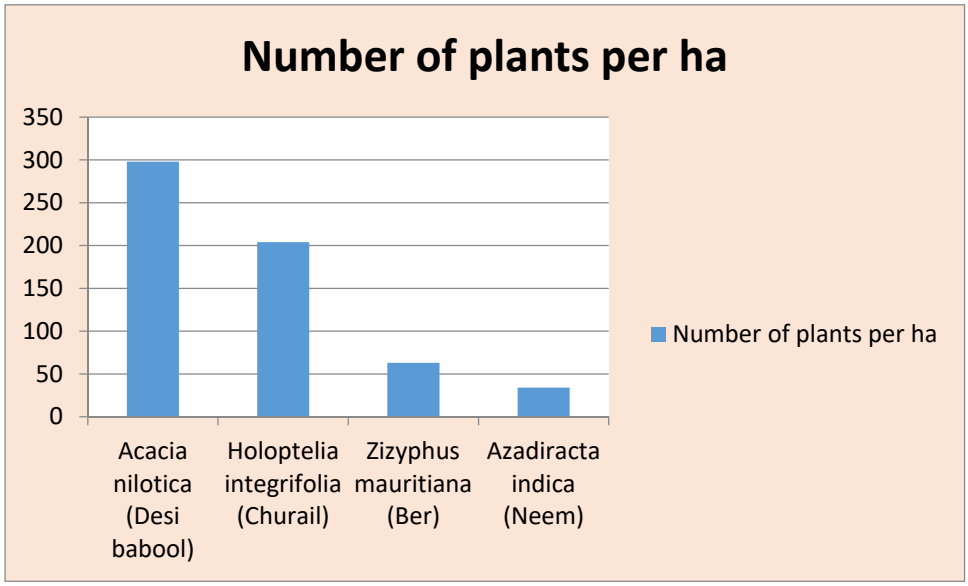


Fig: Graph showing number plants under natural regeneration

3.3.7. Regeneration through seeds sowing: Seeds of species like Kumtha, Ronj, Khair have been sown for natural regeneration. The growth of seeds sowing plants was good.

3.3.8. Protection Work: The selected NFL model plantation was **protected by loose stone wall fencing of 400 RMT and ditch fencing of 2263 cum. Condition of ditch was good. Fencing has been partially effective in controlling the biotic pressures.**

3.3.9. Observations Recorded: Under this model, 700 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 57.9% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 36400 plants comprising of six species were planted in the 52hec plantation area.

Fig: Measurement of plants on field

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-7: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
Acacia nilotica (desi babool)	24000	15499	8501	64.57	300	20
Acacia leucophoelea (ronj)	10000	4033	5967	40.33	150	15
Holoptelea integrifolia (churail)	1000	880	120	88.00	140	18
Azadirachta indica (neem)	20	19	1	95.00	350	21
Zizyphus mauritiana (ber)	1328	612	716	46.08	120	32
Pongamia pinnata (karanj)	52	51	1	98.00	110	24
Total	**36400**	**21094**	15306	**57.9**		

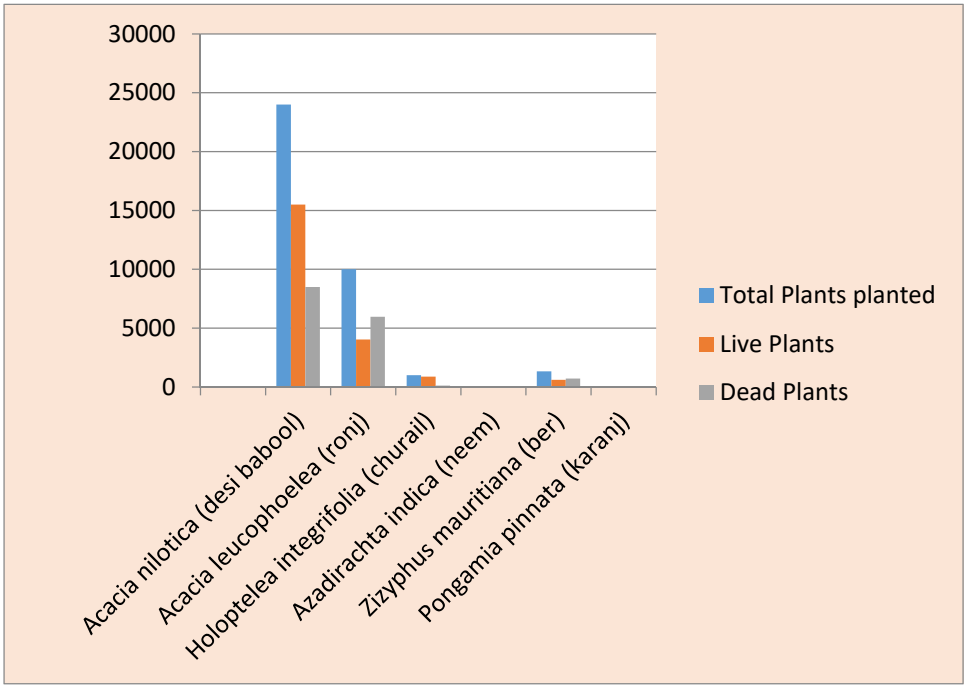


Fig: Graph showing survival of different plants

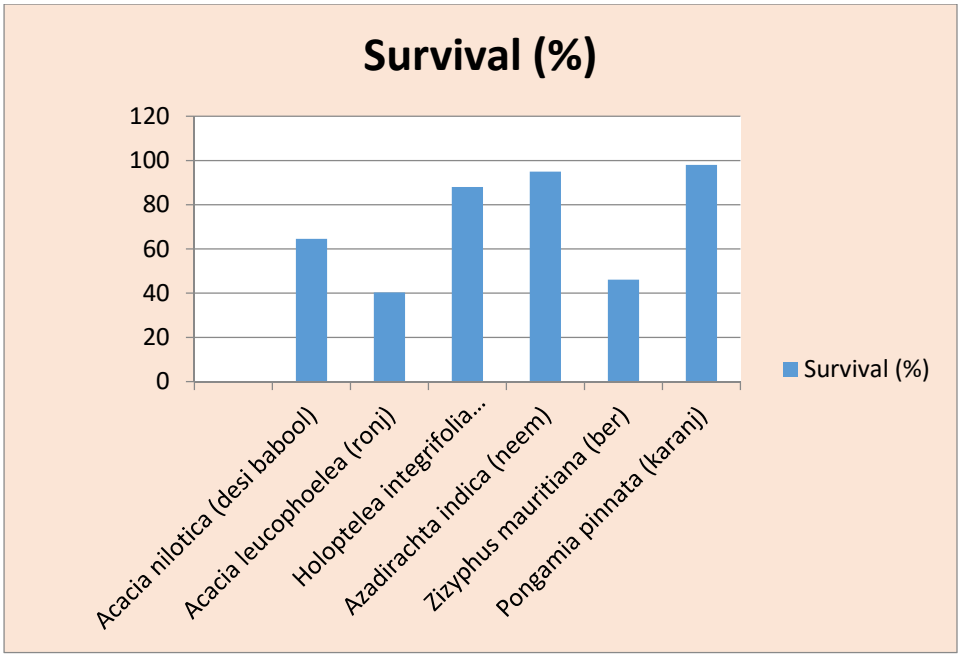


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Karanj plant was highest** followed by Neem. **The survival percentage of Karanj was maximum which was 98 % and Neem was 95%. Many plants planted in this site showed good survival rate.**

The reason for low survival was not hilly area, scanty rainfall and biotic pressure. Also site specific plants need to be planted for better survival of plants.

3.3.10.GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 52 hec as per kml map.

Fig: KML map of DFL at Titoda, Jahazpur range plantation area

3.3.11. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2014-15	424327	461753	536766	1422846	424327	461753	536766	1422846
2015-16	1492400	-	-	1492400	1196058	-	288042	1484100
2016-17	336879	-	133097	469976	302529	-	160372	462901
2017-18	83223	-	146981	230204	59775	-	170030	229805
2018-19	144983	-	85221	230204	139959	-	90245	230204
2019-20	117834	-	125058	242892	118159	-	124886	242845
2020-21	77738	-	190842	268580	77739	-	190841	268580
2021-22	75786	-	206740	282526	35062	-	206740	241802
Total	2753170	461753	1424705	4639628	2353608	461753	1767722	4583083

3.4.1. Site-4: **Kalia dungar in Jahazpur range:** The selected plantation has been carried out on 50hec of land at Kalia Dungar in Jahazpur range during the year 2016-17. The activities were done under the Assisted Natural Regeneration ((ANR) model. The GPS location of this selected site was N 25.401168 and E 75.663127. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour and stony hard layer.

Fig: ANR at Kalia Dungar, Jahazpur

3.4.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.4.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Kalia Dungar, a forest department nursery of Jahazpur range. During monsoon these seedlings were planted.

3.4.4. Species Planted: The selected tree species under plantation were 8. Seedlings of Acacia nilotica (desi babool), *Acacia leucophoelea (*ronj), *Holoptelea integrifolia* (Churail), *Pongamia Pinnata* (Karanj), *Zizyphus mauritiana* (ber), *Butea monosperma* (Palas), *Ficus bengalensis* (Bargad) and *Azadirachta indica* (Neem) were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50hectare of land. Map of planting site was prepared. Type of plantation was block. Pit technique of planting was used.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

Fig: ANR at Kalia Dungar, jahazpur

3.4.5. Watering of plants:
Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found.

Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.4.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Plants such as ronj, churel, dhak, ber and kumtha have been found grown naturally in this area. The growth of plants was good.

Table-8: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia leucophoelea (*ronj)	168	5	27
2	*Holoptelea integrifolia* (churail)	181	7	24
3	*Butea monosperma*(dhak)	103	4	15

4	*Zizyphus mauritiana* (ber)	107	1.5	1.9
5	*Acacia senegal* (kumtha)	122	2	12.3

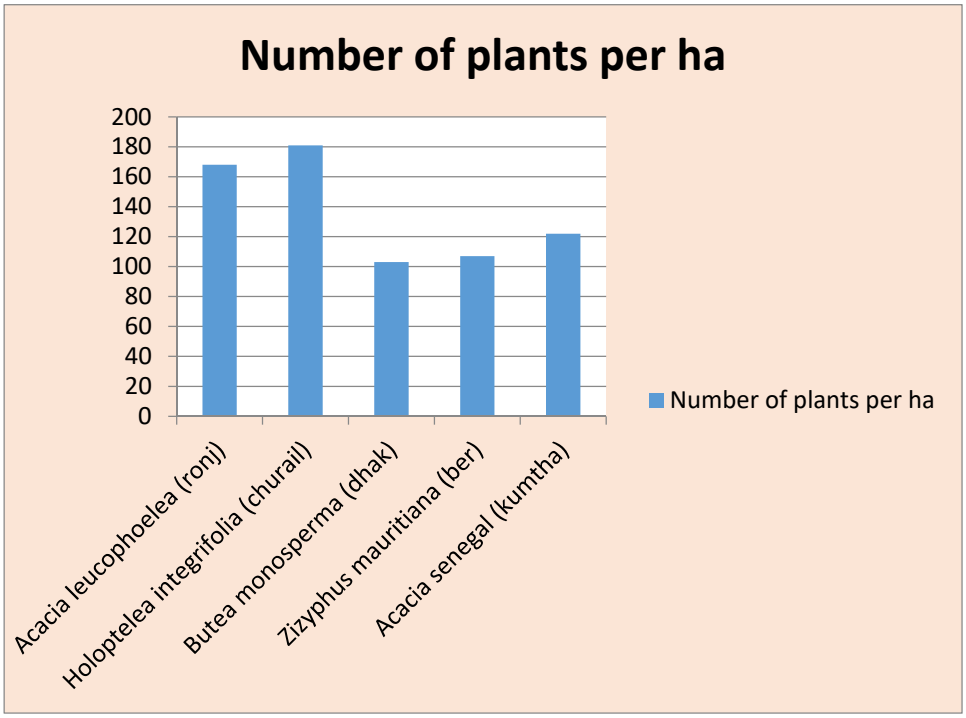


Fig: Graph showing number plants under natural regeneration

3.4.7. Regeneration through seeds sowing: Seeds of species like desi babool, ronj, khair, kumtha have sown for natural regeneration. The growth of plants was poor. Pruning of plants of seedlings planted, seeds sown and existing vegetation was done.

3.4.8. Protection Work: The selected ANR model plantation was **protected ditch fencing of 1829 RMT with average top width of 0.75m, average depth of 0.45m and average bottom width of 0.40m and loose stone wall of 884 RMT. Grass has grown in trenches. Fencing has been partially effective in controlling the biotic pressures.**

3.4.9. Soil and Water Conservation Measures: **There were 20000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3m to 8 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation.

Fig: Measurement of contour trenches on field

3.4.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 70.5% at the site.**

Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of eight species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-9: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia nilotica (desi babool)	6500	5152	1348	79.26	2.95	21.8
Acacia leucophoelea (ronj)	2000	1104	896	55.20	3.80	25.2
Pongamia pinnata (karanj)	1000	645	355	64.50	3.40	12.5
Azadirachta indica (neem)	100	20	80	20	4.90	40
Holoptelea integrifolia (churail)	140	10	130	25	2.80	12.5
Butea monosperma (palas)	150	46	104	30.66	4.70	38
Ficus bengalensis (bargad)	50	25	25	50	4.30	55
Zizyphus mauritiana (ber)	160	25	35	34.37	1.90	2.80
Total	**10000**	**7057**	2943	**70.5**		

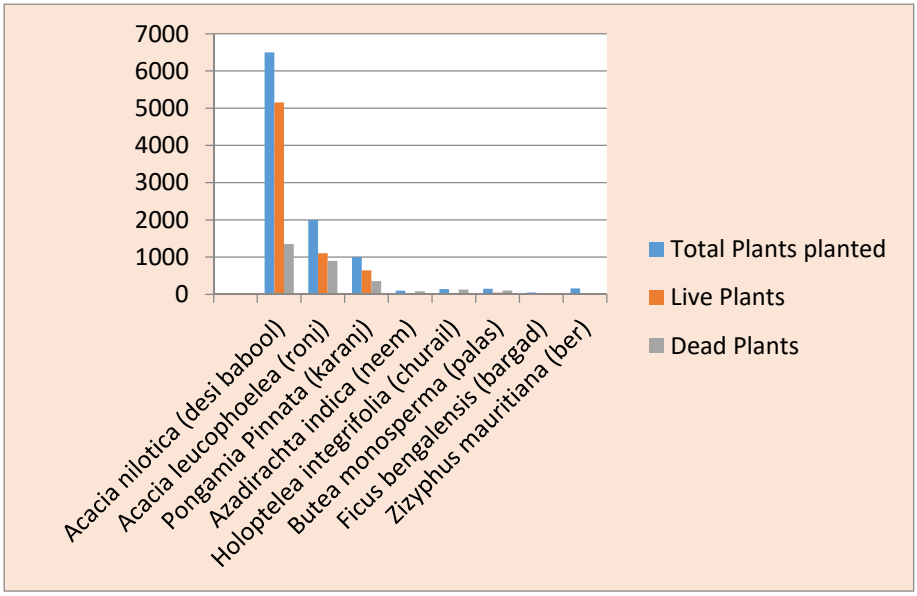


Fig: Graph showing survival of different plants

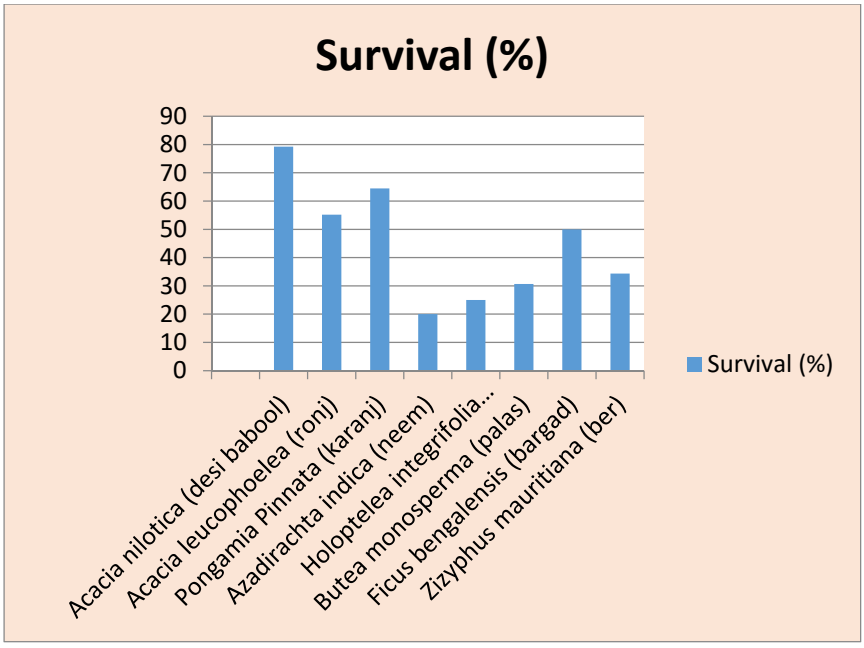


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of desi babool plant was highest** followed by Karanja. **The survival percentage of desi babool was maximum which was 79.26% and Karanj was 64.50%. Plants planted in this site showed average survival rate.**

The reason for low survival is hilly area and scanty rainfall.

3.4.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per km map.

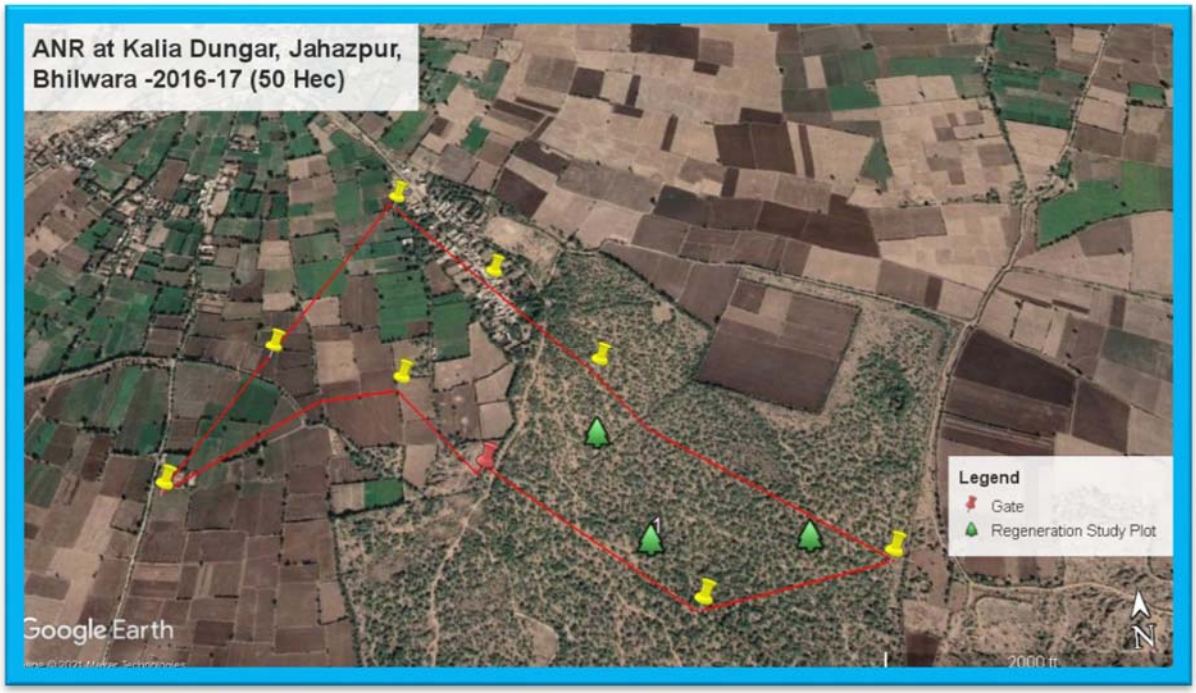


Fig: KML file of ANR at Kalia Dungar, Jahazpur range plantation area

3.4.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2015-16	225336.57	659190	779673.44	1664200	225588	700905	732517	1659010
2016-17	389700	-	-	389700	337420	-	26719	364139
2017-18	151766	-	11034	162800	148610	-	13788	162398
2018-19	76834	-	10166	87000	74575	-	12425	87000
2019-20	66486	-	25764	92250	63474	-	28746	92220
Total	910122.57	659190	826637.44	2395950	849667	700905	814195	2364767

4. Evaluation of Construction Works Sites

Site-1 Forest Guard Chowki at Hamirgarh:

At Hamirgarh in Bhilwara range, one forest guard chowki has been constructed. The chowki was constructed in the year 2015-16. Construction work appeared to be very good and useful. This chowki was constructed at the cost of Rs. 5207541. GPS location of this area was Longitude- E 74°,39,'33.3216" and Latitude-N 25°,13',46.9632". The construction work started in the year of 2015 after approval and completed in the 2016. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

Fig: GIS mapping of Hamirgarh Chowki

Site 2- Stone wall at Paroli-1 in Jahazpur range

At Paroli-1 in Jahazpur range, the stone wall has been evaluated. The wall was constructed in the year 2015-16. The wall dimensions were 4 ft and 500m length. Construction work appeared to be

good and useful. GPS location of this area was 25.350125 N and 74.656668E. The construction work started in the year of 2016 after approval and completed in the 2017. The expenditure incurred for constructing this wall was Rs. 11,00,000 (as per mb).

Fig: Paroli-1 wall in Jahazpur range and GIS mapping

Site 3- Stone wall at Bharat Mataji in Gangapur range

At at Bharat Mataji in Gangapur range, the stone wall has been evaluated. The wall was constructed in the year 2015-16. The wall dimensions were 4 ft and 500m length. Construction wo rk appeared to be good and useful. GPS location of this area was 25.8478248 N and 74.1728896E.

The construction work started in the year of 2016 after approval and completed in the 2017. The expenditure incurred for constructing this wall was Rs. 1059780 (as per mb).

Fig: Wall at Gangapur

Site 4- Stone wall at Hamirgarh-III in Bhilwara range: At Hamirgarh in Bhilwara range, the stone wall has been evaluated. The wall was constructed in the year 2015-16. The wall dimensions were 4 ft and 500m length. Construction work appeared to be good and useful. GPS location of this area was 25.517198 N and 75.076263E.

The construction work started in the year of 2015 after approval and completed in the 2016. The expenditure incurred for constructing this wall was Rs. 520754 (as per mb).


Fig: Stone wall at Hamirgarh and GIS mapping

Site 5- Stone wall at Sangner in Bhilwara range

At Sangner in Bhilwara range, the stone wall has been evaluated. The wall was constructed in the year 2015-16. The wall dimensions were 4 ft and 500m length. Construction work appeared to be good and useful. GPS location of this area was 25.350115 N and 74.656671E. The construction work started in the year of 2016 after approval and completed in the 2017. The expenditure incurred for constructing this wall was Rs. 1017561 (as per mb).

Fig: Wall measurement, Sangner and GIS mapping

5**. Overall assessment:** The overall impact of plantation activities appeared satisfactory in Bhilwara district.

Table-10: Quantitative assessment of plantation work created under CAMPA in Bhilwara division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	DFL Sui 50 Ha	67.1	7
2	NFL Mandalgarh 1.35 Ha	50.5	6
3	DFL Titoda 52 Ha	57.9	6
4	ANR Jahazpur 50 Ha	70.5	8

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-11: Quantitative assessment of constructions work created under CAMPA in Bhilwara division

Sr. no.	Items	Name of the site	Rank of site (Between 0 to 10)*
1	Forest Guard Chowki	Hamirgarh	8
2	4 ft 500 m Stone wall	Paroli-1	7
3	4 ft 500 m Stone wall	Bharat Mataji	7
4	4 ft 500 m Stone wall	Hamirgarh	8
5	4 ft 500 m Stone wall	Sangner	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Bikaner Stage-II (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Bikaner Stage-II Forest Division. This Forest Division with 3 Forest Ranges namely Bikaner, Unit-III and Unit-IV has territorial jurisdiction over the entire Bikaner District.

Fig : Location of Bikaner district, Rajasthan

2. Selected construction work sites for Evaluation

The forest guard chowki developed at Jaggasar of Unit-III range in the year 2015-16 has been selected for evaluation.

Table-1: Selected forest guard chowki site for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved
Unit-III	Forest Guard Chowki at Jaggasar	2015-16	100%

3. Evaluation of Construction Works Sites

Site: Forest Guard Chowki at Jaggasar: At Jaggasar of Unit-III range, one forest guard chowki has been constructed. The chowki was constructed in the year 2015-16. Construction work appeared to be good and useful. This chowki was constructed at the cost of Rs. 5 Lakh. GPS location of this area was Longitude- E 72°,26,'24.43" and Latitude-N 28°,18',38.52". The construction work started in the year of 2015 after approval and completed in the 2016. After completion of building, the chowki has been using by the department for official purpose. Electricity and water facility were provided in this building.

Fig : Front view of forest guard chowki

Fig : Back view of forest guard chowki

Fig : GPS location mapping of Forest Guard Chowki at Jaggasar of Unit-III range

4. Overall assessment: The overall impact of forest guard chowki appeared satisfactory in Bikaner Stage-II division of Bikaner district. Permanent structure created is quite useful and utilized as required.

Table2: Quantitative assessment of constructions work created under CAMPA in Bikaner Stage-II division

Sr. no.	Site	Rank of Site (Between 0 to 10)*
1	Forest Guard Chowki at Jaggasar of Unit-III range	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Bikaner-WL (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Bikaner Wild Life Forest Division. This division has one range under its territory, Johbid Gadhvala.

Fig: Location of Bikaner district, Rajasthan

2. Selected construction work sites for Evaluation

The range office cum residence developed at Kotri of Johbid Gadhvala Conservation Reserve Forest in the year 2015-16 has been given for evaluation.

Table-1: Selected Range office cum residence site for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved
Johbid Gadhvala Conservation Reserve Forest	Range office cum residence developed at Kotri	2015-16	100%

3. Evaluation of Construction Works Sites

Site: At Kotri of Johbid Gadhvala Conservation Reserve Forest, one range office cum residence has been constructed. The building was constructed in the year 2015-16. Construction work appeared to be very good and useful. The estimated cost as per record for the construction of this building is 10 Lakh of rupees, where as the expenditure incurred for developing this range office cum residence is 9.99845 Lakh. GPS location of this area was Longitude- E 73°24'1.89" and Latitude-N 27°56'35.20". The construction work started in the year of 2015 after approval and completed in the 2016. After completion of the building has been using by the department for official as well as for residential purpose. Electricity and water facility were provided in this building.

Fig : Side view of forest guard chowki

Fig: Back view of forest guard chowki

Fig: GPS location mapping of Range Office cum Residence at Kotri of Johbid Gadhvala Conservation Reserve Forest

4. Overall assessment: The overall impact of range office cum residence at Kotri of Johbid Gadhvala Conservation Reserve Forest appeared very good in Bikaner Wildlife forest division of Bikaner district. Permanent structure created was quite useful and utilized as required.

Table2: Quantitative assessment of constructions work created under CAMPA in Bikaner Wildlife division

Sr. no.	Site	Rank of Site (Between 0 to 10)*
1	Range office cum residence at Kotri of Johbid Gadhvala Conservation Reserve Forest	8

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Bundi (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Bundi Forest Division. This Forest Division with 4 Forest Ranges namely Dabhi, Hindoli, K Patan and Nainwa which has territorial jurisdiction over the entire Bundi District.

Fig : Location of Bundi district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Bundi Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Ha.	Model
Hindoli	2015-16	Amratya -C	50	DFL
Nainwa	2016-17	Devnarayan	55	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Bundi Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Hindoli	10 Boundary Pillars at Vijaygarh	2014-15	100%
Dabi	40 Boundary Pillars at Karaundi	2016-17	100%

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Amratya-C of Hindoli range** : The selected plantation has been carried out on 50 hec of land at Amratya-C in Hindoli during the year 2015-16. The activities were done under the Degraded Forest Land (DFL) model. The GPS location of this selected site was N 25,36,24 and E 75,31,31. The site was a forest land and selected for 100% evaluation. The soil was clayey loam and stony hard layer of hilly area.

3.1.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 25000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: DFL at Hindoli range

3.1.3. Nursery Development for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Amratya, a forest department nursery of Hindoli range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 6. Seedlings of *Acacia catechu (*Khair*), Acacia leucopholea (*Ronj), *Holoptelia integrifolia (*Churel*), Zizyphus mauritiana (*Ber*), Azadirachta indica (*Neem*) and Acaciia nilotica (*Desi Babool) were planted.

A total of 25000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have to be planted. **But in this site, 500 plants per hec have been planted, so total number of plants planted was 25000 for 50 hectare of land.**

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

Fig: Measurement of plants

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water.

3.1.6. Natural Vegetation and Rege neration: Dhok, ronj, kumtha, khair were the plants found grown naturally in this area. The growth of the plant was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal*- Kumtha	57	3.8	32
2	*Anogeissus latifoliia*- Dhok	153	3	25
3	*Acacia leucopholea* - Ronj	117	3.5	26
4	*Acacia catechu*- Khair	44	3	19

3.1.7. Regeneration through seeds sowing: Seeds of species *kumatha, ronj, khair, babool, neem,* were sown in and alongside of trenches. **The growth of seedlings from seeds was low.**

3.1.8. Protection Work: The selected DFL model plantation was **protected by trench fencing of 3380 RMT with average top width of 0.90m, average depth of 1.20m and average bottom width of 1.50m. Present condition of fencing was good and effective in controlling biotic pressure upto some extent.**

3.1.9. Soil and Water Conservation Measures:
There were 15080 RMT contour trenches in the form of water harvesting structures present in the entire plantation area. **The size of the contour varied from 3.5 m to 9 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation.

Fig: Counting of plants on field

3.1.10. Observations Recorded: Under this model, 25000 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 75.7% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 25000 plants comprising of six species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia catechu (Khair)	2000	1605	395	80.25	3.5	43
Holoptelia integrifolia (Churel)	4500	3371	1129	74.91	2.5	28

Zizyphus mauritiana (Ber)	1400	1255	145	89.64	3.1	30
Acacia nilotica (Desi Babool)	7000	5316	1684	75.94	4.2	45
Acacia leucopholea (Ronj)	7500	5875	1625	78.3	2.8	28
Azadirachta indica (Neem)	2600	1520	1080	58.4	3.1	30
Total	**25000**	**18942**		**75.7**		

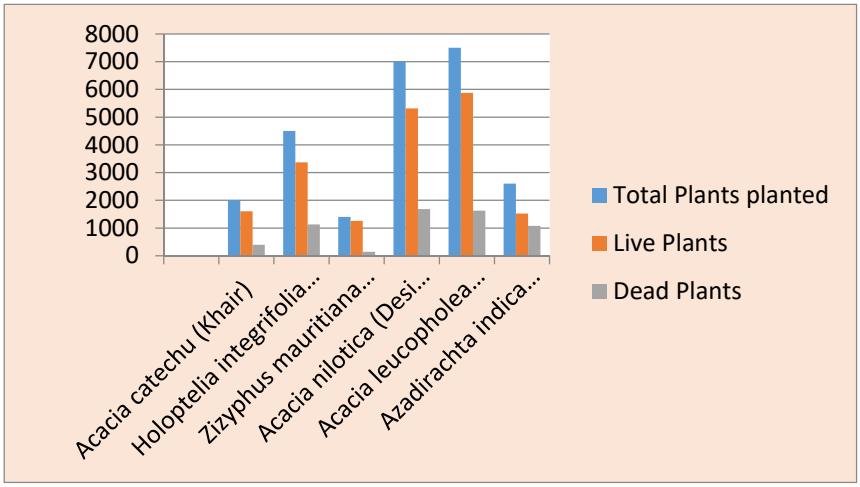


Fig: Graph showing survival of different plants

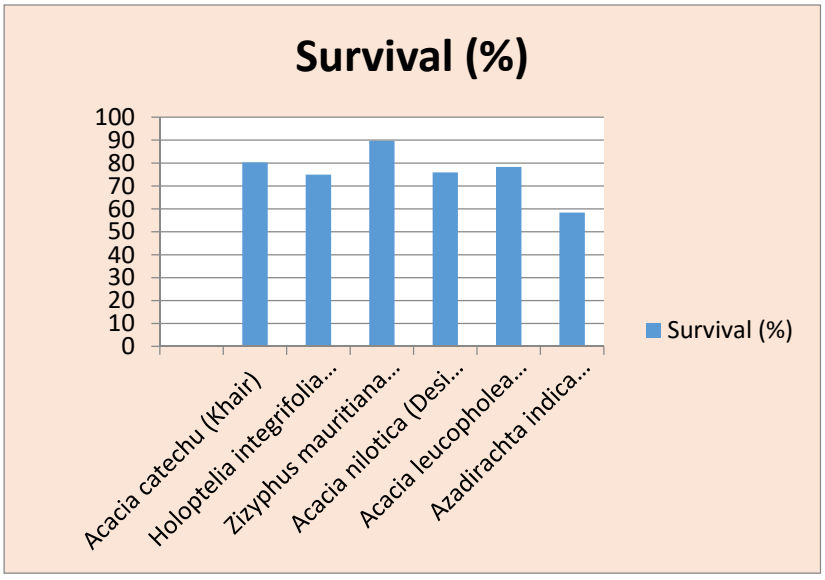


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ber was highest** of 89.64%, followed by khair of 80.25%. **All the plants planted in this site showed good survival**

except neem which showed 58% survival rate. Good protection and timely execution of work contributed to the good survival of plants.

3.1.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

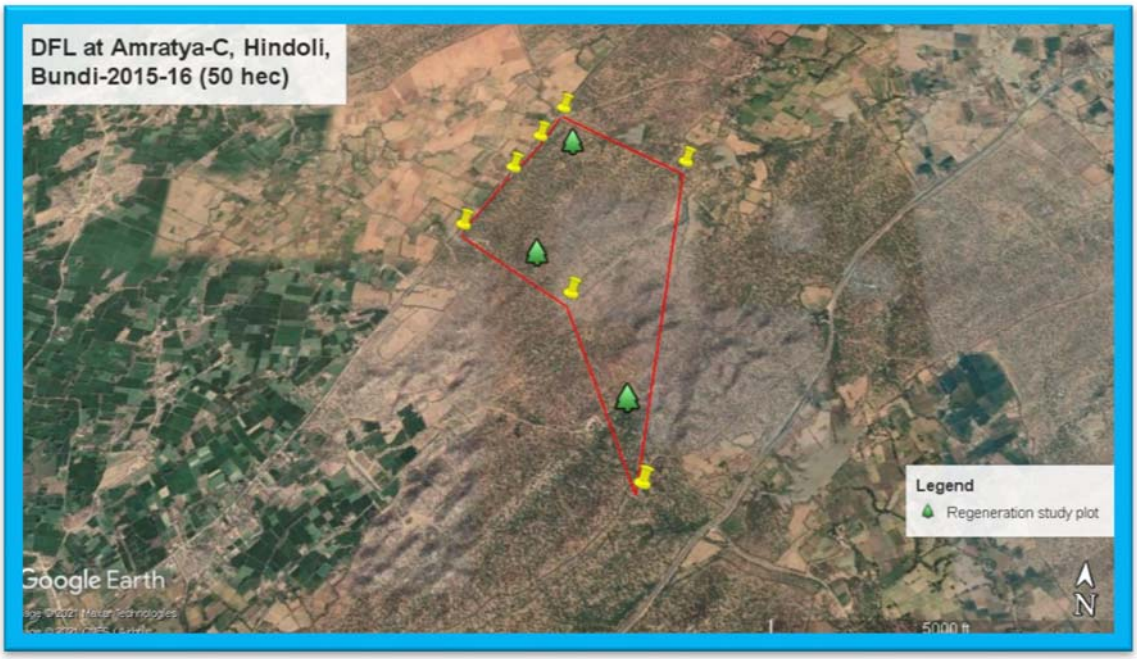


Fig: KML file of DFL at Amratya-C of Hindoli range plantation area

3.1.12. **Budget and expenditure**

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-	1270268	-	-	-	1270268
2015-16	-	-	-	1001036	-	-	-	1001036
2016-17	-	-	-	454172	-	-	-	454172
2017-18	-	-	-	151159	-	-	-	151159
2018-19	-	-	-	183866	-	-	-	183866
2019-20	-	-	-	459973	-	-	-	459973

3.2.1. Site-2: **Devnarayan in Nainwa range** : The selected plantation has been carried out on 55 hec of land at Devnarayan in Nainwa range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 25,42,22

and E 75,41,15. The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer.

3.2.2. Treatment plan before sowing: The area comprises of sandy loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 11000 pits have been made for plantation in total 55 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR plantation at Devnarayan, Nainwa

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Devnarayan, a forest department nursery of Nainwa range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 5. Seedlings of *Acacia leucopholea* (Ronj), *Holoptelia iintegrifolia* (Churel), *Acacia nilotica (*Desi babool*), Dalbergia sissoo (*Shisham) *and Prosopis juliflora (*Khejri*)* were planted.

A total of 11000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was not found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hec, so, 11000 plants in 55 hectare have been planted in this site. Type of plantation was block and technique of planting was pit. **The choice of species under plantation appeared proper**. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

Fig: Measurement of trenches on field

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this

area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.2.6. Natural Vegetation and Regeneration: The area has been covered with vegetation due to this plantation. The growth of plants was good. Grasses have grown in ditch trenches which should be controlled. Plants like dhok, ronj, desi babool, totalis have been found grown naturally.

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Anogeissus latifoliia*- Dhok	53	3.4	44
2	*Acacia nilotica*- Desi Baool	37	3.9	28
3	*Acacia leucopholea*- Ronj	37	4.1	32
4	*Acacia tortilis*- Totalis	13	3.8	35

3.1.7. Regeneration through seeds sowing: Seeds of Kumtha, Khair, Desi Babool, Neem species were sown on edges of contour trenches. **The growth of seedlings from seeds was good.**

3.2.8. Protection Work: The selected ANR model plantation was **protected by trench/ditch fencing of 3400 RMT and stone wall fencing of 53.15 RMT. Trench fencing average top width was 0.90, average depth was 1.20 m and average bottom width was 1.50m. The present condition of fencing was good but grasses have been grown in it. It was partially effective in controlling the biotic pressure.**

3.2.9. Soil and Water C onservation Measures: **There were 4 loose stone checkdam of total volume of 83.37 cum present in the plantation area. There were 22000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 5m to 10 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation.

Fig: Counting of plants on field

3.2.10. Observations Recorded: Under this model, 11000 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 78.5% at the site.** Plant species girth breast height was also measured. The growth of planted plants was

good. A total of 11000 plants comprising of five species were planted in the 55 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia nilotica (Desi babool)	9000	7059	1941	78.4	4.5	46
Acacia leucopholea (Ronj)	500	461	39	92.2	2.5	30
Holoptelia integrifolia (Chruel)	500	449	21	89.8	3.3	28
Prosopis juliflora (Khejri)	500	289	211	57.8	4	45
Dalbergia sissoo (Shisham)	500	381	19	76.2	2.7	38
Total	**11000**	**8639**		**78.5**		

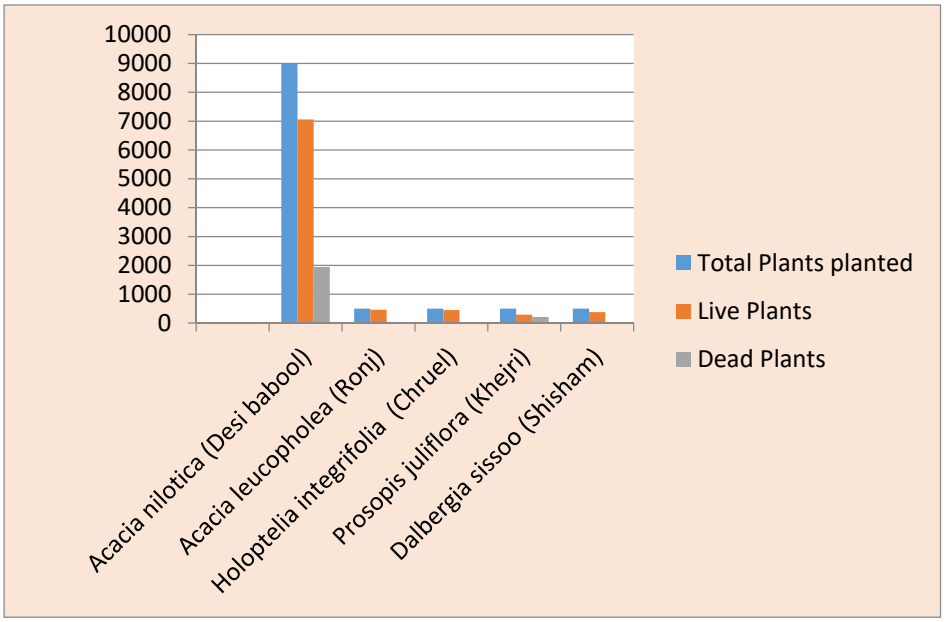


Fig: Graph showing survival of different plants

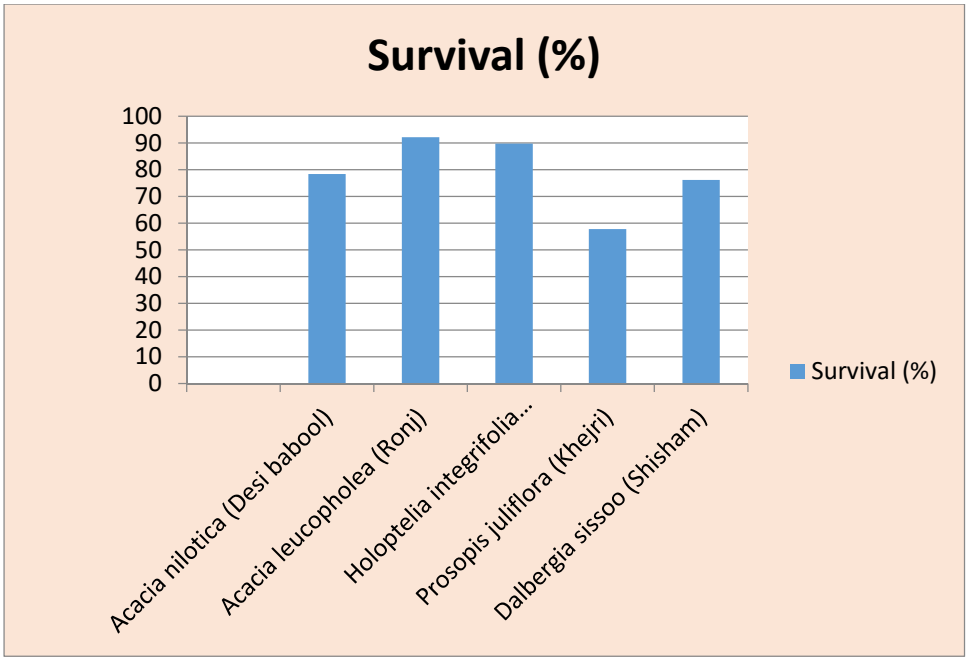


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ronj was highest** of 92.2%, followed by churel of 89.8%. **All the plants planted in this site showed good survival except khejri which showed 57.8% survival rate.**

Site specific plants, good protection and timely execution of work contributed to the good survival of plants.

3.2.11. GPS Location and KML file: The selected model under CAMPA plantation site measured 55 hec as per kml map.

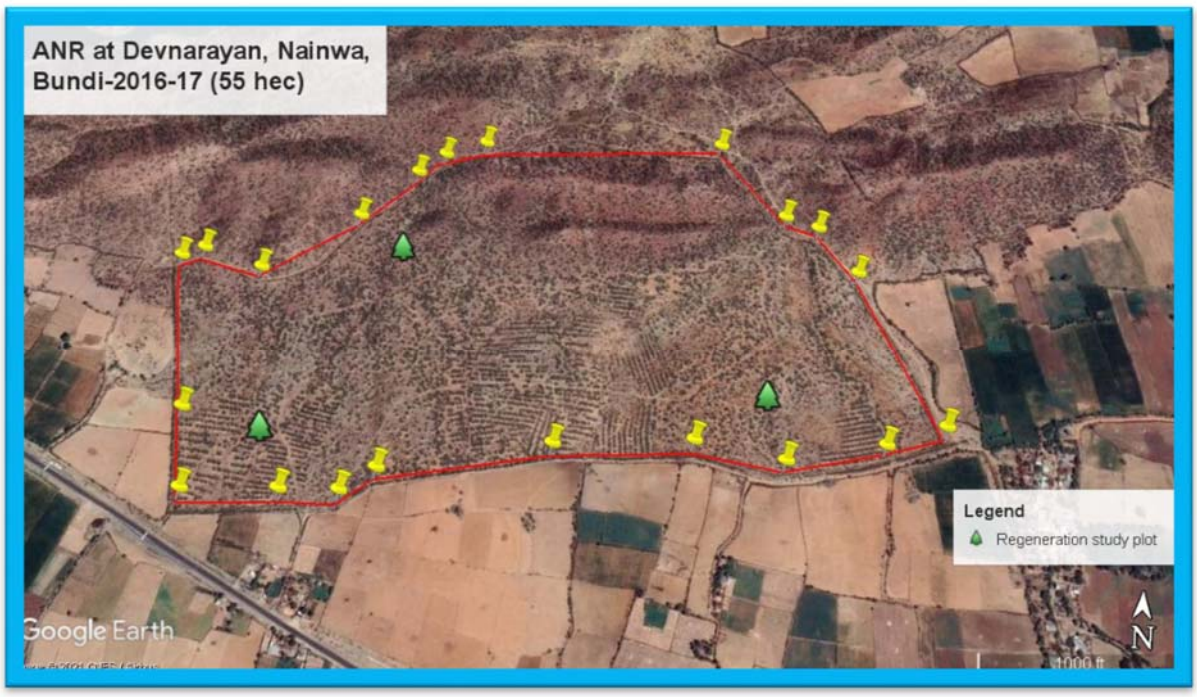


Fig: KML file of ANR at Devnarayan, Nainwa range plantation area

3.2.12. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	-	-	-	1821123	-	-	-	1821123
2016-17	-	-	-	384746	-	-	-	384746
2017-18	-	-	-	157400	-	-	-	157400
2018-19	-	-	-	95400	-	-	-	95400
2019-20				93089				93089

4. Evaluation of Construction Works Sites

Site-1: 10 Boundary Pillars at Vijaygarh, Hindoli: 10 boundary pillars have been evaluated in the area of Viijaygarh of Hindoli range. The size of the pillars was 0.60*0.40*0.90 m. These pillars were made during 2014-15 to demarcate forest boundary in that area. **Construction of all pillars appeared good.** The cost of developing one pillar was Rs.2284/-.

Fig: Marking of pillars done by the survey team for counting

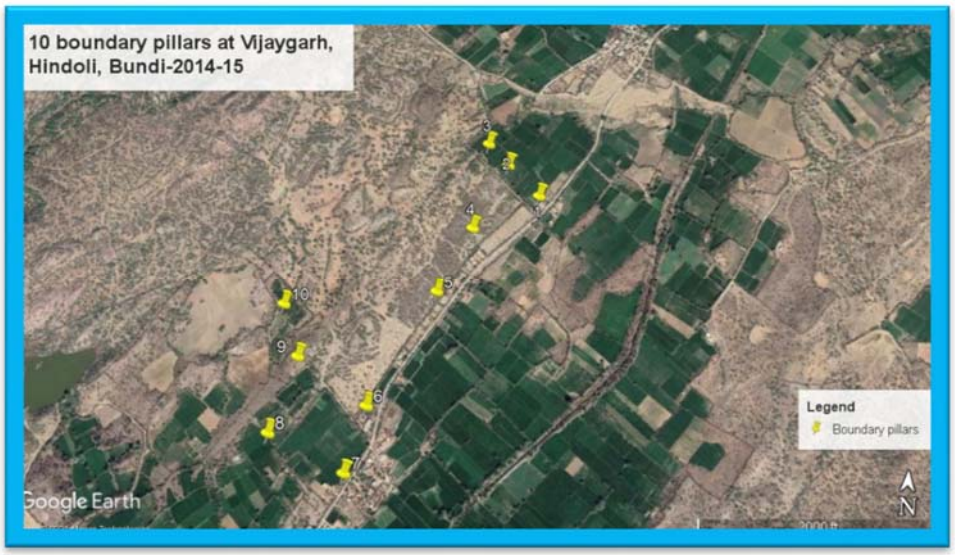


Fig: GIS mapping of all pillars of Hindoli range

<u>Site- 2: 40 Boundary Pillars at Karaundi, Dabi:</u> Boundary pillars have been evaluated in the area of Karaundi of Dabi range. The size of the pillars was 0.600*0.900 m. These pillars were made during 2016-17 to demarcate forest boundary in that area. The cost of developing all pillar was Rs.71897/-. During site visit**, 24 pillars have been found in good condition, 11 pillars were found damaged and 5 pillars have not been found on the site**.

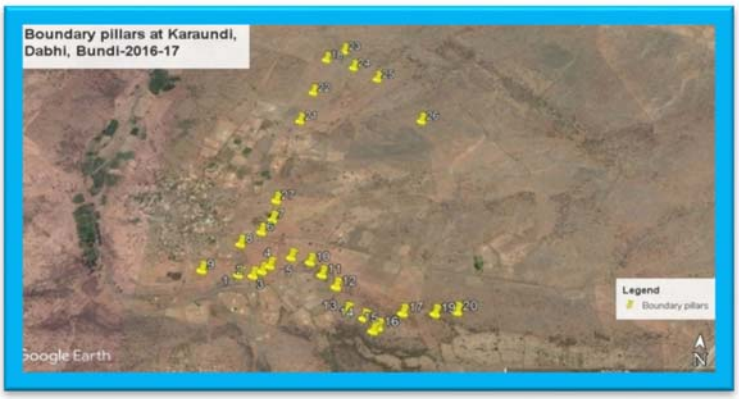


Fig: GIS mapping all pillars of Dabi range

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Bundi district.

Table-7: Quantitative assessment of plantation work created under CAMPA in Bundi division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	DFL at Amratya-C, Hindoli-50hec	75.7%	8
2	ANR at Devnarayan, Nainwa-55 hec	78.5%	8

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-8: Quantitative assessment of constructions work created under CAMPA in Bundi division

Sr. no.	Ranges	Name of the site	Rank of site (Between 0 to 10)*
1	Hindoli	10 Boundary Pillars at Vijaygarh	7
2	Dabi	40 Boundary Pillars at Karaundi	6

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Chattargarh-Bikaner (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in IGNP Stage-I-Chattargarh Forest Division of Bikaner district. This Forest Division with 3 Forest Ranges namely Beriyawali, Dantor and 61Rd KYD which has territorial jurisdiction under Bikaner district.

Fig: Location of Bikaner district, Rajasthan

2. Selected plantation site for Evaluation

The NFL plantation of 2.75 ha at 3SLM of Dantor range in the year 2014-15 has been selected for evaluation.

Table-1: Selected plantation site for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved
Dantor	NFL plantation of 2.75 ha at 3SLM	2014-15	100%

3. Evaluation of Plantation

3.1. Site: The selected plantation has been carried out on 2.75hec of land at 3SLM of Dantor range during the year 2014-15. The plantation activities were done under the Non Forest Land (NFL) model. As per the model, 1100 plants per hectare have been planted. The GPS location of this selected site was 28°,43',9292 N Latitude and 72°,24',5082 E Longitude and at 3148.46 m above msl. The site was a forest land and selected for 100% evaluation.

3.2. Treatment plan before sowing: The area comprises of sandy soil surfaces where digging has been made for plantation in blockwise**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 3025 pits have been made for plantation in total 2.75 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out. Along with the pits, contour trenches were also prepared in advance in the whole plantation area to conserve rain water for providing water to the plants after plantation works completed.

Fig: NFL at 3SLM of Dantor range

3.3. Nursery Develop ment for P lantation: The seeds of naturally occurring plants available in that area has been collected and seedlings were raised in the nearby ORD nursery, a forest department nursery of Dantor range. During monsoon these seedlings were planted.

Fig: Lime was putting for counting of plants

3.4. Species Planted: **The selected 4 tree species under plantation were *Prosopis juliflora* (khejri), *Zizyphus mauritiana* (Ber), *Acacia tortilis* (Totalis) and *Tecomella undulata* (rohida). A total of 3025 numbers of seedlings were planted at the site.** Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area.

Spacing between plants has not been adopted here. As per the model, 1100 plants per hectare have been planted. So total number of plants planted was 3025 for 2.75 hectare of land.

The choice of species under plantation appears nearly proper. The plants selected for growing in this site were nearly specific and already grown naturally there. These plants does not require much water as the all plants are thorny trees and can be grown easily on this hard, rocky surface areas. The choice of plants has been made so that the plants can grow well and survive for longer period. **The growth of planted plants was poor.**

3.5. Watering of plants: As per the NFL model, there was a provision of watering the plants. So just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. Watering of plants has been carried out whenever required.

3.6. Natural Vegetation and Regeneration: Naturally growing plants were seen in very low quantity, only sevan grass has been found in that area. Though the area comes under desert area, because of scanty rainfall**, the regeneration of naturally growing plants were almost nil.**

3.7. Regeneration through seeds sowing: Seeds of *Prosopis juliflora* (khejri) and *sevan grass* were sown. **The growth of seed sowing plants was poor. The reason for that low growth was mainly sandy soil and hot climate with scanty rainfall.**

Fig: Barbed wire fencing with RCC polls at plantation site

3.8. Protection Work: **The area was protected by barbed wire fencing of 5600 RMT having 165 RCC polls.** The protection provided by these fencing was good.

3.9. Soil and Water Conservation Measures: No loose stone checkdam or contour trenches of soil and moisture conservation work have been found in the plantation area.

3.10. Observations Recorded: Under this model, 1100 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 70.7% at the site.**

Fig: Growth measurement, NFL, Dantor

Plant species girth breast height was also measured. The growth of planted plants was poor. A total of 3025 plants comprising of four species were planted in the 2.75 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-2: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
Acacia tortilis	2170	1844	326	84.97	2405	16.95

(Totalis)						
Tecomella undulata (Rohida)	720	287	433	39.86	1432.5	10.4
Prosopis juliflora (Khejri)	120	8	112	6.66	1835	15.2
Zizyphus mauritiana (Ber)	15	00	15	00	-	-
Total	**3025**	**2139**	**886**	**70.7%**		

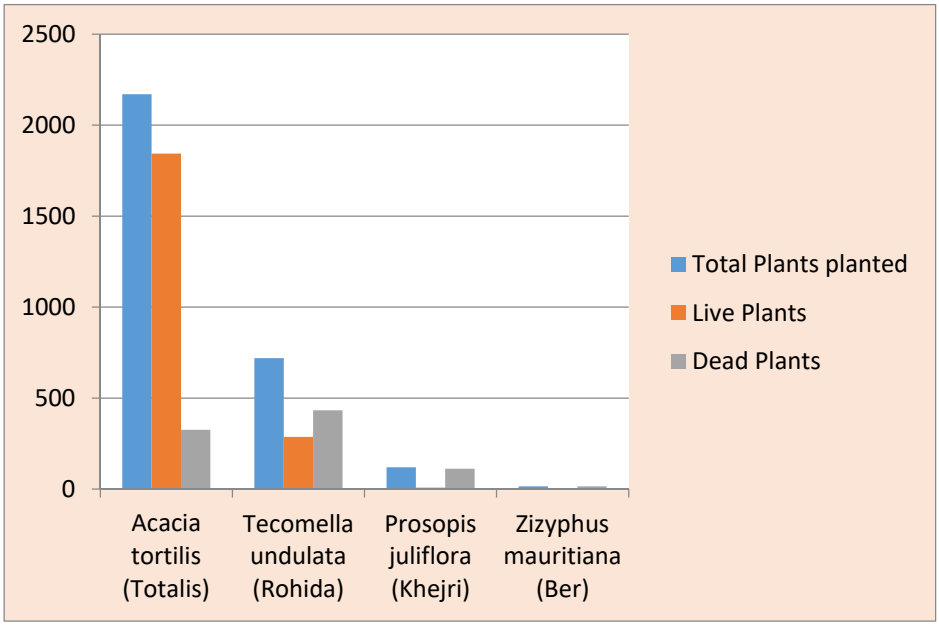


Fig: Graph showing survival of different plants

From the above graph, it is shown that the **survival of totalis plant was highest** followed by rohida. **The survival percentage of totalis was maximum which is 84.97 % and the lowest was for ber which is 0%. Plants such as khejri also showed low percentage of survival of 6.66%. But the highest number of plants planted in this site was totalis.**

The reason for high survival of totalis was that the species was endemic on that area and has fittest for this particular region. Similarly rohida also showed good survival rate, which was also a fittest plant in that region.

3.10. GPS Location and KML file: The selected NFL model at 3SLM of Dantor range under CAMPA plantation site measured slightly higher (3.03 hec, as per calculation through KML file) than reported plantation area (2.75hec).

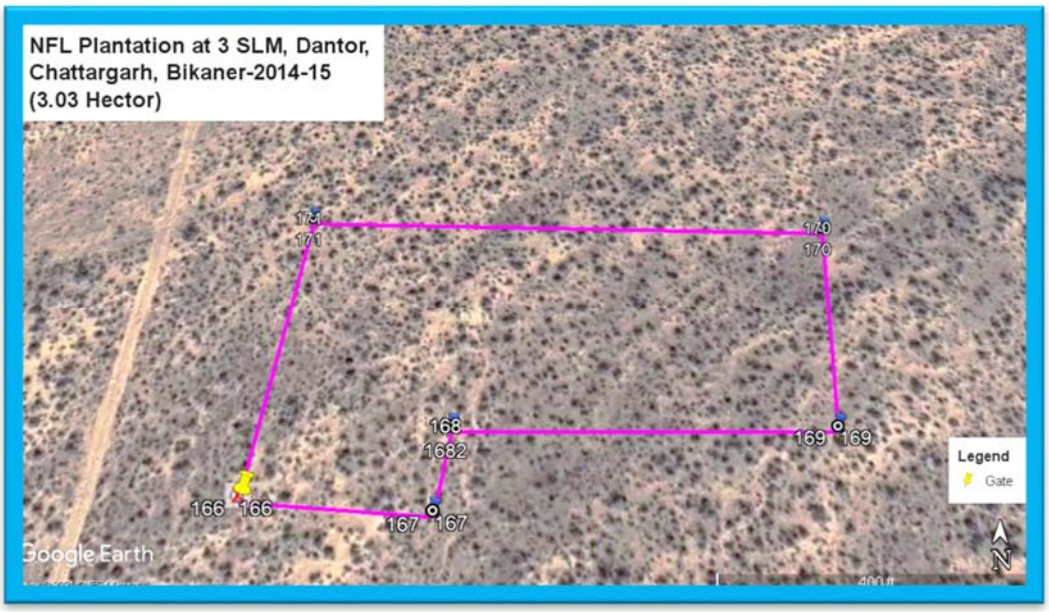


Fig: KML file of NFL at 3SLM, Dantor range plantation area

3.11. Budget and Expenditure

Year	Cost Estimate (Rs.)			Expenditure Incurred (Rs.)			
	Plantation	SMC Works	Fencing	Plantation	SMC Works	Fencing	Total
2013-14	-	-	-	38630	3808	28511	70949
2014-15	-	-	-	85685	-	-	85685
2015-16	-	-	-	10574	-	-	10574
2016-17	-	-	-	-	-	-	-
2017-18	-	-	-	10251	-	-	10251
2018-19	-	-	-	11076	-	-	11076
2019-20	-	-	-	13206	-	-	13206
Total				169422	3808	28511	**201741**

4. Overall assessment: The overall impact of plantation appears satisfactory in Dantor range of IGNP Stage-I-Chattargarh forest division. Quantitative assessment of plantation work created under CAMPA in IGNP Stage-I-Chattargarh forest division

Sr. no.	**Site**	**Survival percentage**	**Rank of Site (Between 0 to 10)***
1	NFL plantation at 3SLM of Dantor range	70.7%	8

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Chittorgarh-WL (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Chittorgarh WL Forest Division. This Forest Division with 4 Forest Ranges namely Dhariyabad, Jakham, Badi Sadri and Bassi.

Fig : Location of Chittorgarh district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of ChitorgarhWL Forest Division were as given in table-1.

Forest Range	Name of Site	Year of Plantation	Ha.	Model
Jakham	Karia Amba-B	2015-16	50	ANR

2.2. Selected construction work sites for Evaluation

Theselected construction work sites of ChitorgarhWL Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Jakham	Anoopura	2014-15	Forest Guard Chowki
Dhariyavad	Aarampura	2014-15	6 Ft. Wall- 800 m
Bassi	Bichor	2015-16	Anicut- II

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: The selected plantation has been carried out on 50hec of land at Karia Amba B in Jakaham range during the year 2015-16. The activities were done under the Assisted Natural Regeneration (ANR) model. The GPS location of this selected site was N 24.1320and E 74.3135.The site was a forest land and selected for 100% evaluation. The soil was yellowish brown in colour and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

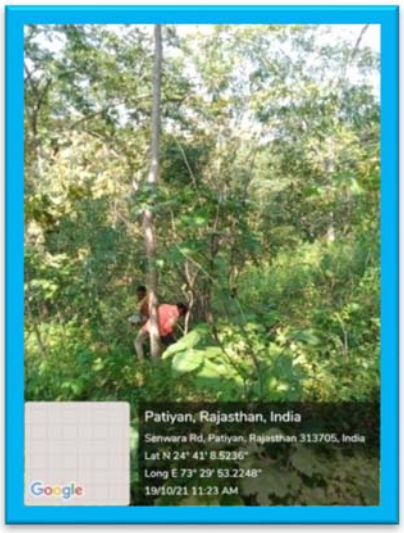


Fig: ANR at Karia Amba-B, Jakham

3.1.3. Nursery Development for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Karia Amba B, a forest department nursery of Jakaham range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 7. Seedlings of *Dendrocalamus Strictus* (Baas), *Emblica officinalis* (Amla), *Acacia catechu* (Khair), *Annona squamosa* (Sitafal), *Sterculia urens* (Kadaya), *Ailanthus excelsa* (Adusa), *Zizyphus mauritiana* (Ber) were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team. Technique of planting was trench cum pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50hectare of land. Map of planting site was prepared.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

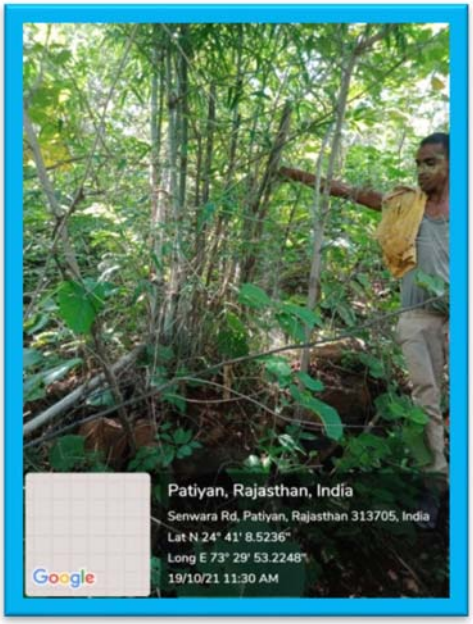


Fig: Putting of lime for counting of plants

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Rege neration: Due to this plantation, the vegetation cover has increased to some extent. Jangli ber, Timru, Godal, Sagwan, Dhok, Gugal, Arjun, Sandad, Bilpatra, were the plants found grown naturally in this area. The growth of the plant was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	Zizyphus sp.- Jangali Ber	156	2.9	20
2	*Diospyros melanoxylon*- Timru	159	4.2	28
3	*Tectona grandis* -Sagwan	161	4.8	38
4	*Anogeissus sp*.- Dhok	154	3.5	30
5	*Commiphora wightii*- Guggal	31	2.1	11
6	*Terminalia arjuna*- Arjun	72	4	27
7	*Aegle marmelos*- Bilpatra	91	3.4	35

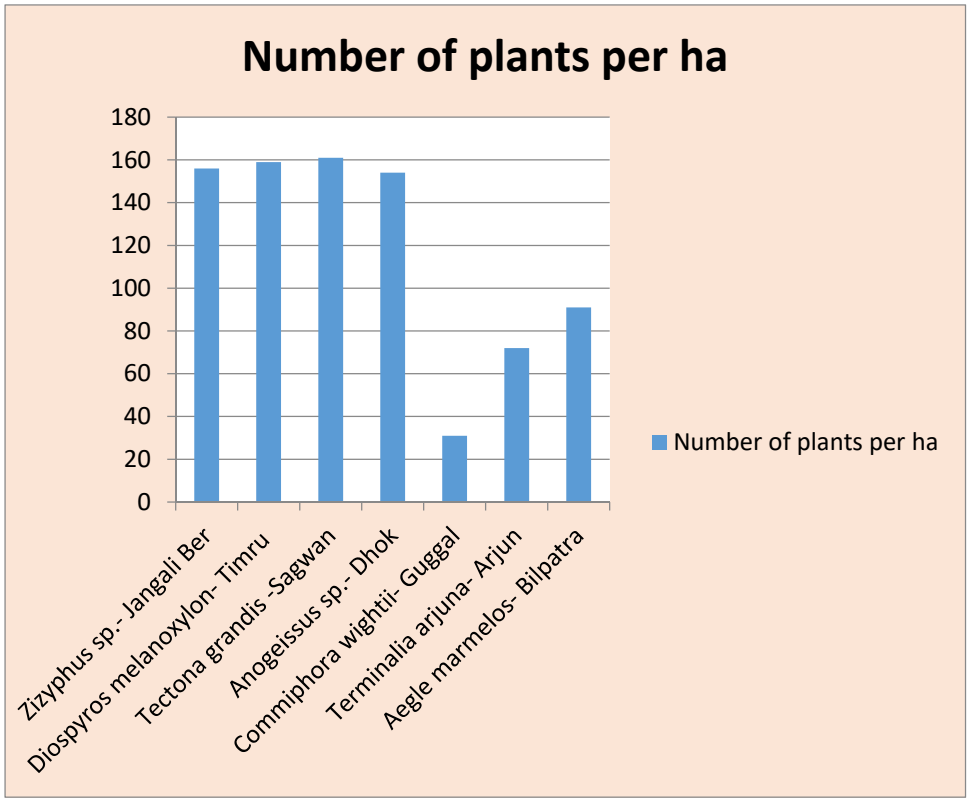


Fig: Graph showing number plants under natural regeneration

3.1.7. Regeneration th rough seeds sowing: Seeds of species like Ber and Khair were sown in as well as along the trenches. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected ANR model plantation was **protected by trench fencing of 2222 RMT. Present condition of fencing was good.**

3.1.9. Soil and Water Conservation Measures: **There were 20000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 2.5 m to 8 m long with 0.45*0.35 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation.

3.1.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 81.78% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of seven species were planted in the 50hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Dendrocalamus Strictus (Baas)	3000	2612	388	87.06	8	-
Emblica officinalis (Amla)	2200	1722	478	78.27	3.5	25
Acacia catechu (Khair)	2000	1664	336	83.02	4.3	30
Annona squamosa (Sitafal)	300	230	70	76.66	3.6	29
Sterculia urens (Kadaya)	200	114	86	57.00	3	26
Ailanthus excelsa (Adusa)	300	158	142	52.00	3.9	30
*Zizyphus mauritiana (*Ber)	2000	1678	322	83.09	3.3	20
Total	**10000**	**8178**	1822	**81.78**		

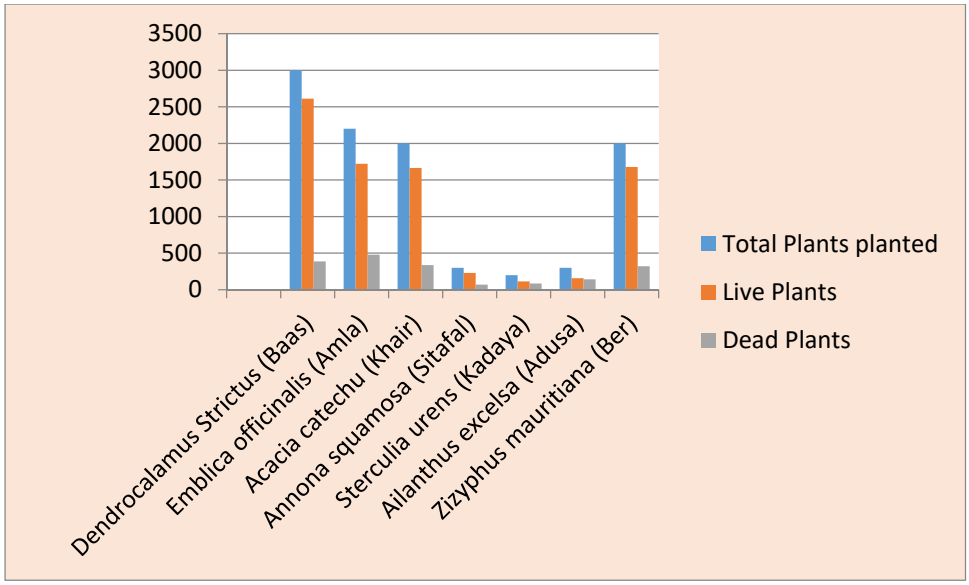


Fig: Graph showing survival of different plants

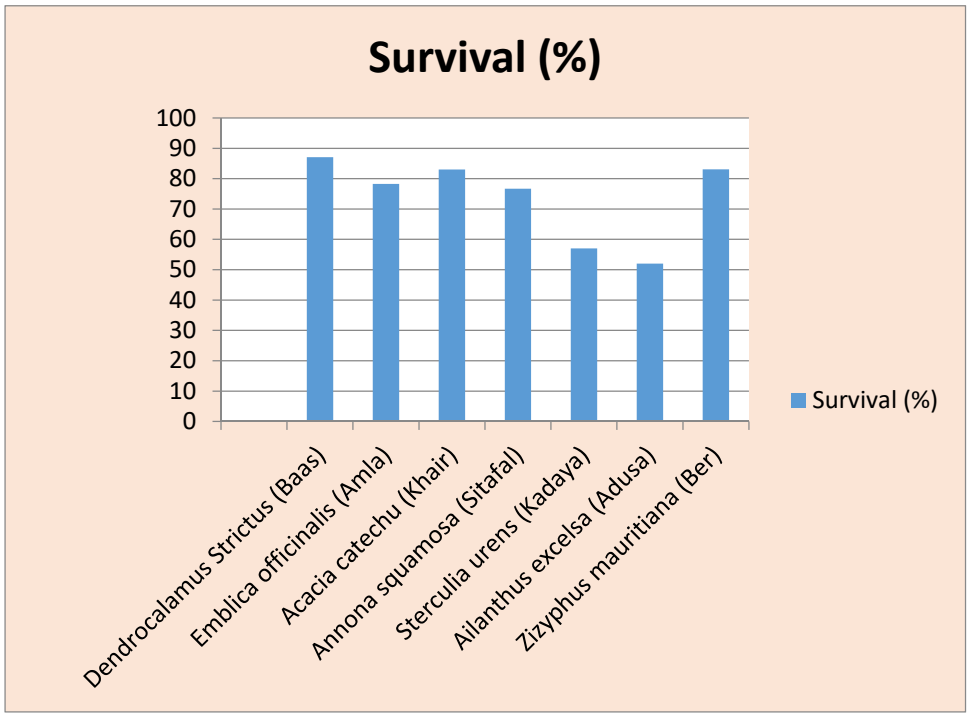


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of bamboo plant was highest** followed by ber. **The survival percentage of bamboo was maximum of 8 7.06%and ber was 83.09%. All other plants showed good survival except Kadaya and Adusa showed relatively low survival, which were not fittest for this region. Good rainfall and timely execution of work were reasons for good survival.**

3.1.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

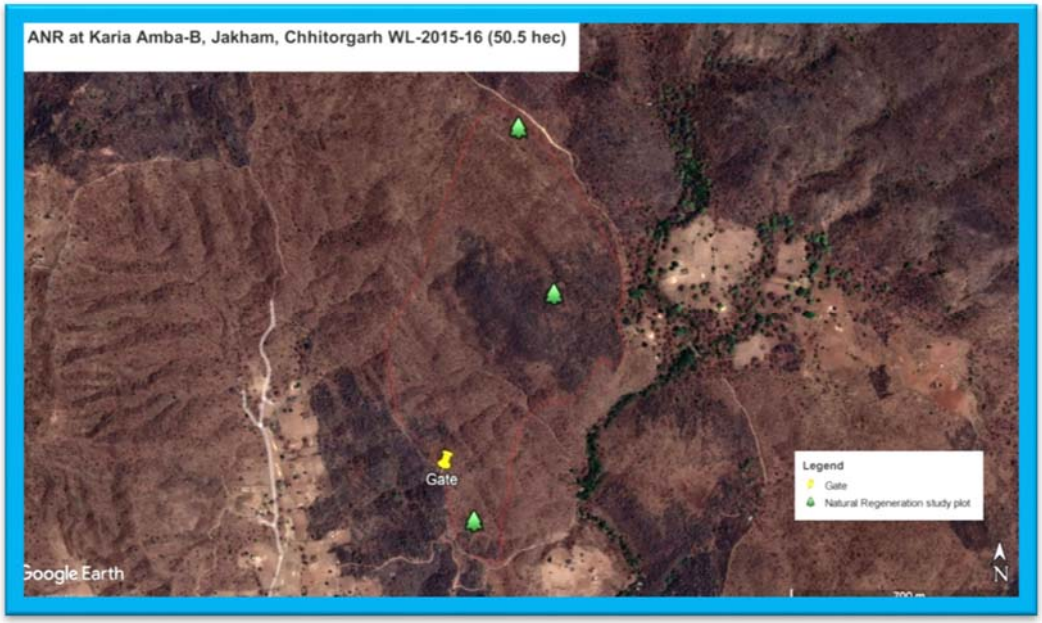


Fig: KML file of ANR at Karia Amba-B, Jakham range plantation area

4. Evaluation of Construction Works Sites

Site-1 : Forest Guard Chowki at Anoopura of Jakham range: At Annoppura in Jakham range, one forest guard chowki has been constructed. The chowki was constructed in the year 2014-15. Construction work appeared to be very good and useful. This chowki was constructed at the cost of Rs. 4.99 Lakh (estimated cost Rs. 5 Lakh). GPS location of this area was Longitude- E 74.48358308 and Latitude-N 25.1512292. The construction work started in the year of 2014 after approval and

Fig: Forest guard chowki at Anoopura, Jakham anfd GIS mapping

completed in the 2015. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

Site -2: Stone wall at Aarampura in Dhariyavad range: At Aarampura in Dhariyavad range, the stone wall has been evaluated. The wall was constructed in the year 2014-15. The wall dimensions were 6 ft and 800m length. Construction work appeared to be good and useful. GPS location of this area was

24.17152484 N and 74.24474264E. The construction work started in the year of 2014 after approval and completed in the 2015. The expenditure incurred for constructing this wall was Rs. 25.65 Lakh (as per mb).

Fig: GIS mapping of stone wall at Aarampura

Site-3: Anicut- II at Bichor of Bassi range: At Bichor in Bassi range, anicut has been constructed. The anicut was constructed in the year 2015-16. Construction work appeared to be good and useful. This anicut-11 was constructed at the cost of Rs. 3.50 Lakh. GPS location of this area was Longitude- E 74.5936186 and Latitude-N 25.3321012. The construction work started in the year of 2015 after approval and completed in the 2016. During site visit this anicut was filled up with water upto 2ft. The water remains in it till December month. Water normally used for drinking purpose by the domestic as well as wild animals of local area.

Fig: Anicut-II at Bassiand GIS mapping

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Chitorgarh WL district.

Table-5: Quantitative assessment of plantation work created under CAMPA in Chitorgarh WL division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	ANR at Karia Amba-B 50 Ha	81.78	9

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-6: Quantitative assessment of constructions work created under CAMPA in Chitorgarh WL division

Sr. no.	Items	Name of the site	Rank of site (Between 0 to 10)*
1	Forest Guard Chowki	Anoopura	8
2	6 Ft. Wall- 800 m	Aarampura	7
3	Anicut- 11	Bichor	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Chittorgarh (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Chittorgarh-T Forest Division. This Forest Division with 8 Forest Ranges namely Bengu, Borav, Chittorgarh, Javda, Kapasan, Nimbaheda, Rawatbhata and Vijaypur.

Fig : Location of Chittorgarh

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Chittorgarh-T Forest Division were as given in table-1.

Table-1: Selected plantation site for evaluation

Forest Range	Name of Site	Year	Ha.	Model
Begun	2015-16	Metha ki Dhani	70	DFL
Vijaypur	2016-17	Chorbadli	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction sites of Chittorgarh-T Forest Division were as given in table-2.

Table-2: Selected construction sites for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Bengu	Forest guard chowki	2016-17	100%

3. Results and evaluation

3.1 Plantations Evaluation

3.1.1. Site-1: **Metha Ki Dhani of Bengu range:** The selected plantation has been carried out on 70 hec of land Metha Ki Dhani in Bengu range during the year 2015-16. The activities were done under the DFL model. The GPS location of this selected site was N

24,54,250 and E 74,59,709. The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of clayey loam, hilly and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 35000 pits have been made for plantation in total 70 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: DFL at Metha Ki Dhani, Bengu

3.1.3. Nursery Development for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Metha Ki Dhani, a forest department nursery of in Bengu range. During monsoon these seedlings were planted.

Fig: Plant measurement process on field

3.1.4. Species Planted: The selected tree species under plantation were 8. Seedlings of *Acacia catechu (*Khair), *Zizyphus mauritiana (*Ber*),Emblica officinalis* (Amla), *Acacia leucopholea* (Ronj), *Azadirachta indica (*Neem *), Cassia fistula* (Amaltas*), Holoptelia integrifolia (*Churel) and *Dendrocalamus strictus (*Baans) were planted.

A total of 35000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Technique of planting was trench cum pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the DFL model, 700 plants per hectare have to be planted, but here 500 plants per hec have been planted. So total number of plants planted was 35000 for 70 hectare of land.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this

site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was very good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Rege neration: Due to this plantation, the vegetation cover has increased to some extent. Khair, ber, neem, khirni, dhok, tendu were the plants found grown naturally in this area.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia catechu*- Khair	88	3.3	37
2	*Zizyphus mauritiana*- Ber	88	2.6	23
3	*Azadirachta indica*-Neem	63	3.1	32
4	*Wrightia tinctoria*- Khirni	107	2.4	23
5	*Anogeissus latifolia* -Dhok	59	2.9	27
6	*Diospyros melanoxylon*-Tendu	88	3.5	30

3.1.7. Regeneration through seeds sowing: Seeds of species like *Ronj, Ratanjot, khair and ber* were sown in as well as along the trenches. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected DFL model plantation was **protected by trench fencing of 500 RMT and stone fencing of 3850 RMT with average top width of 1.5m, average depth of 3m and average bottom width of 1.9 m. Present condition of fencing was good.**

Fig: Measurement of contour trenches

3.1.9. Soil and Water Conservation Measures: **There were 27500 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3m to 9 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation.

3.1.10. Observations Recorded: Under this model, 500 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 61.1% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 35000 plants comprising of eight species were planted in the 70 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
*Acacia catechu (*Khair)	15000	9233	5767	61.5	3.2	33
*Zizyphus mauritiana (*Ber*)*	3000	2268	732	75.6	2.2	21
Emblica officinalis (Amla)	4000	2365	1635	59.1	2.3	23
Acacia leucopholea (Ronj)	9000	4860	4140	54	3.4	27
*Azadirachta indica (*Neem *)*	1000	735	265	73.5	2.7	23
Cassia fistula (Amaltas*)*	1000	568	432	56.8	1.7	18
*Holoptelia integrifolia (*Churel)	1000	735	265	73.5	2.9	22
*Dendrocalamus strictus (*Baans)	1000	640	360	64	3.3	-
Total	**35000**	**21404**		**61.1%**		

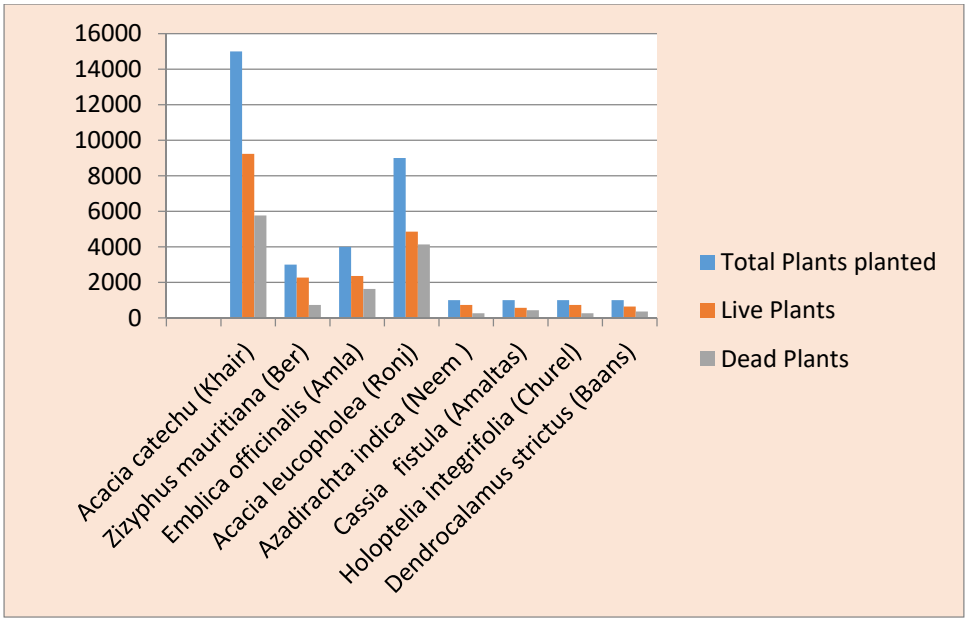


Fig: Graph showing survival of different plants

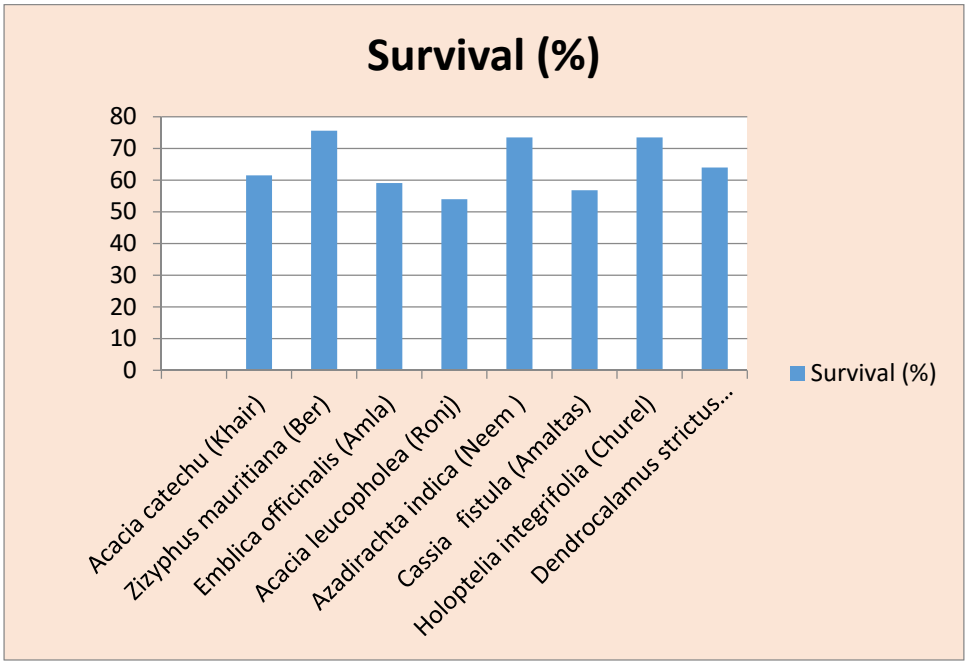


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ber plant was highest of 75.6%** followed by churel and neem both of 73.5%. **All the plants planted here showed good survival.**

3.1.11.GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 70 hec as per kml map.

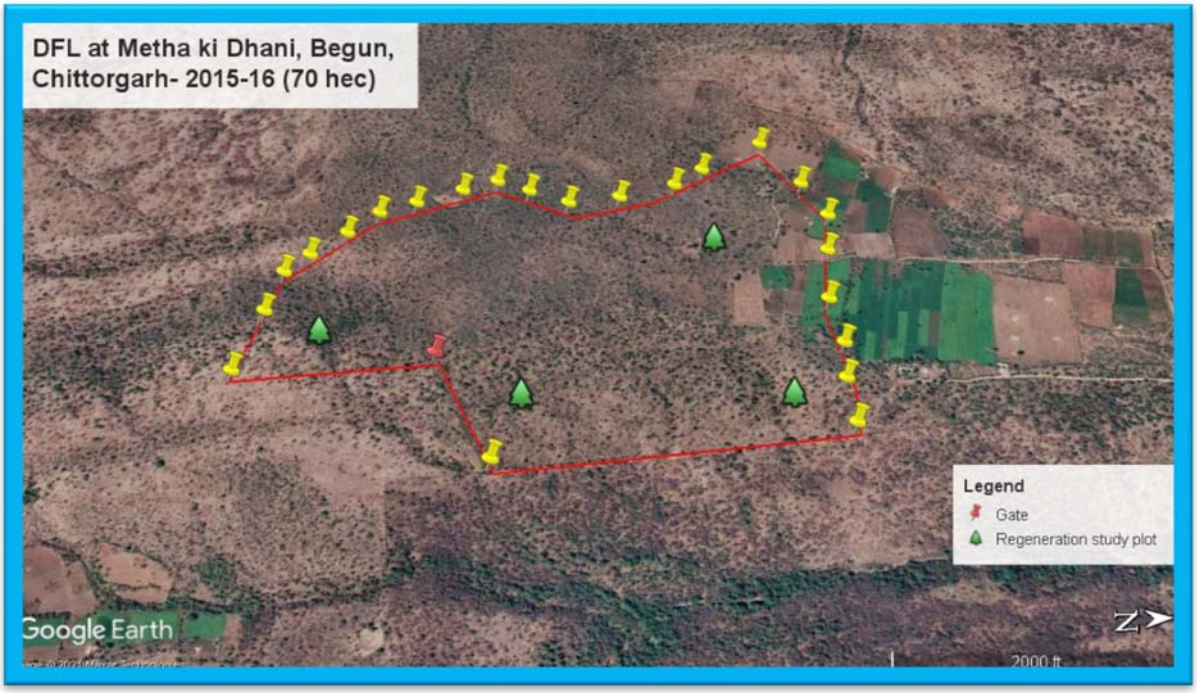


Fig: KML file of DFL at Metha Ki Dhani, Bengu range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-	1931300	-	-	-	1885998
2015-16	-	-	-	1395700	-	-	-	1394725
2016-17	-	-	-	566800	-	-	-	479709
2017-18	-	-	-	309900	-	-	-	172343
2018-19	-	-	-	309900	-	-	-	195781
2019-20				327000				277433
2020-21				361600				114409

3.2.1. Site-2: **Chorbadli in Vijaypur range:** The selected plantation has been carried out on 50 hec of land at Chorbadli in Vijaypur range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 24,45,447 and E 74,54,734. The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer.

3.2.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in

the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.2.3. Nursery Development for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Chorbadli, a forest department nursery of Vijaypur range. During monsoon these seedlings were planted.

Fig: ANR plantation at Chorbadli, Vijaypur

3.2.4. Species Planted: The selected tree species under plantation were 10. Seedlings of *Acacia catechu* (Khair), *Acacia leucopholea* (Ronj), *Acacia nilotica* (Desi babool), *Dendrocalamus strictus* (Baans), *Emblica officinalis* (Amla), *Holoptelia integrifolia (*Churel), *Cassia fistula (*Amaltas), *Zizyphus mauritiana* (Ber), Pongamia pinnata *(Karanj) and Terminalia bellirica (*Behada*)* were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 10000 plants in 50 hectare have been planted. Type of plantation was block and technique of planting was pit.

Fig: Measurement of contour trenches

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.2.6. Natural Vegetation and Regeneration: The area has been covered partially with vegetation due to this plantation. The growth of plants was good. Grasses have grown in ditch trenches which should be controlled. Plants like dhok, tendu and ronj have been found grown naturally.

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Anogeissus pendula*- Dhok	70	2.7	24
2	*Diospyros melanoxylon*-Tendu	92	2.9	28
3	*Acacia leucopholea*- Ronj	74	3.1	27

3.1.7. Regeneration through seeds sowing: Seeds of Ronj, Khair, Kumtha species were sown on edges of contour trenches. **The growth of seedlings from seeds was good.**

C.3.2.8. Protection Work: The selected ANR model plantation was **protected by stone wall fencing of 2200 RMT. Stone fencing average top width was 0.60m, average depth was 1.20 m and average bottom width was 0.80m. Also there was 250 RMT of ditch fencing having average top width was 1.50m, average depth was 1.20 m and average bottom width was 0.90m. The present condition of both fencing was good and partially effective in controlling the biotic pressure.**

Fig: Measurement of plants on field

3.2.9. Soil and Water C onservation Measures: **There were 6 loose stone checkdam of total volume of 118.94 cum present in the plantation area. There were 10500 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3m to 8 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation. Along with these, **earthen bund of 202 cum was also present** as soil and moisture conservation measure.

Fig: Monitoring team on field evaluation

3.2.10. Observations Recorded: Under this model, 10000 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 65.1% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of ten species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia catechu (Khair)	2017	15 67	450	77.6	3.2	23
Acacia leucopholea (Ronj)	1625	1137	488	69.9	2.9	28
Acacia nilotica (Desi babool)	970	630	340	64.9	2.7	24
Dendrocalamus strictus (Baans)	500	302	198	60.4	6	-
Emblica officinalis (Amla)	2113	1009	1104	47.7	1.4	17
*Holoptelia integrifolia (*Churel)	1025	644	381	62.8	2.7	21
*Cassia fistula (*Amaltas)	172	42	130	24.4	1.6	14
Zizyphus mauritiana (Ber)	1223	987	236	80.7	1.8	16
Pongamia pinnata (Karanj)	250	163	87	65.2	1.8	19
*Terminalia bellirica (*Behada*)*	105	29	76	27.6	2.1	20
Total	**10000**	**6510**		**65.1**		

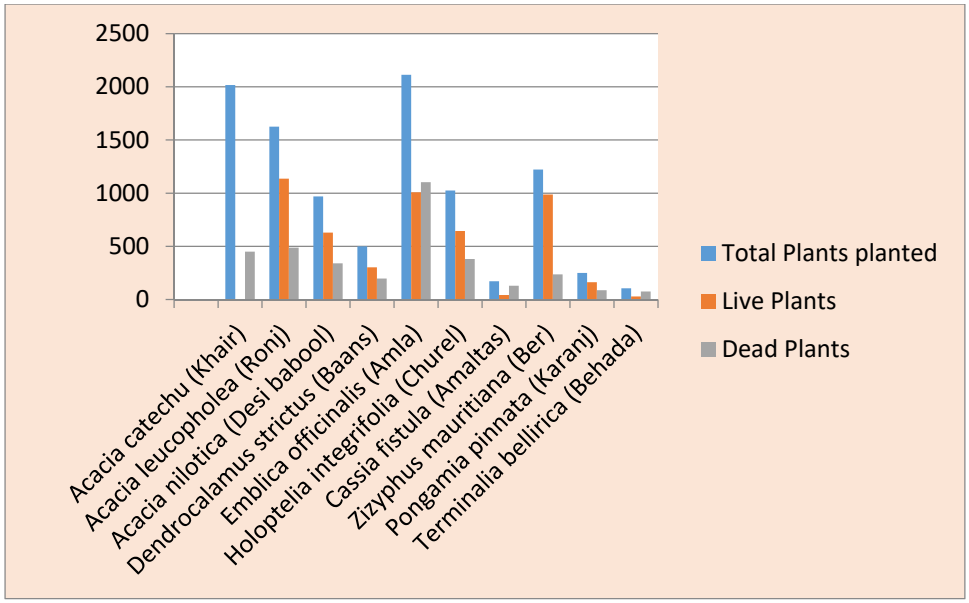


Fig: Graph showing survival of different plants

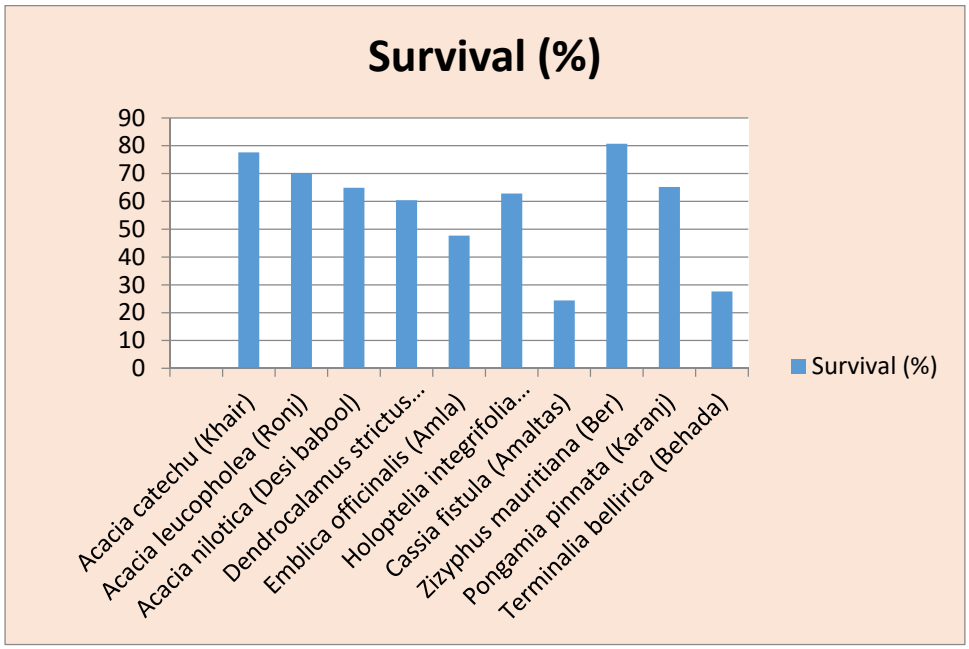


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ber was highest** of 80.7% followed by khair of 77.6%. **All the plants planted in this site showed good survival except amaltas and behada having lowest survival of 24.4% and 27.6%, not fitted for this area.**

Good protection and watering on time may improve the survival of plants.

3.2.11. GPS Location and KML file: The selected model under CAMPA plantation site measured 50 hec as per kml map.

Fig: KML file of ANR at Chorbadli, Vijaypur range plantation area

3.2.12. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	-	-	-	-	-	-	-	1646295
2016-17	-	-	-	-	-	-	-	382193
2017-18	-	-	-	-	-	-	-	151727
2018-19	-	-	-	-	-	-	-	80543
2019-20	-	-	-	-	-	-	-	92120

4. Evaluation of Construction Works

Site-1: Forest Guard Chowki at Begun range: At Bengu range, one forest guard chowki was constructed. The site was constructed in the year 2016-17. GPS location of this area was Longitude- E 75.0,33.7428 and Latitude-N 24.59,53.0808. The construction work started in the year of 2016 after approval and completed in the 2017. The cost of construction was Rs. 4,82,000/- (estimated cost was Rs. 5.50 Lakh). The construction of chowki was very good in condition. After completion of building, the chowki was now using by the department for official purpose. Electricity and water facility were provided in this building.

Fig: GIS mapping of forest guard chowki at Begun

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Chittorgarh-T division.

Table-7: Quantitative assessment of plantation work created under CAMPA in Chittorgarh-T division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	DFL at Metha Ki Dhani, Bengu-70 ha	61.1	7
2	ANR at Chorbadli, Vijaypur-50 ha	65.1	7

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-8: Quantitative assessment of constructions work created under CAMPA in Chittorgarh-T division

Sr. no.	Name of the site	Range	Rank of site (Between 0 to 10)*
1	Forest guard chowki at Begun	Begun	8

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Churu (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Churu Forest Division. This Forest Division with 4 Forest Ranges namely Rajgarh, Ratangarh, Sujangarh, and Sardsahar has territorial jurisdiction over the entire Churu District.

Fig: Location of Churu district, Rajasthan

2. Selected construction work sites for Evaluation

Two sites such as one forest guard chowki at Ratangarh range and 4 Ft. wall - 2000 m long at Sardarshahar range; both built during the year 2015-16 have been selected for evaluation.

Table-1: Selected construction sites for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved
Ratangarh	Forest Guard Chowki at Ratangarh	2015-16	100%
Sardarshahar	4 Ft. wall - 2000 m long at Sardarshahar	2015-16	100%

3. Evaluation of Construction Works Sites

3.1. Site-1: Forest Guard Chowki at Ratangarh: At Ratangarh range, one forest guard chowki has been constructed. The chowki was constructed in the year 2015-16. Construction work appeared to be good and useful. This chowki was constructed at the cost of Rs. 5 Lakh. GPS location of this area was Latitude-N 28°,07',1443" and Longitude-E 74°, 59',667" .The construction work started in the year of 2015 after approval and completed in the 2016. After completion of building, the chowki has been using by the department for official purpose. Electricity and water facility are provided in this building.

Fig: Forest Guard Chowki at Ratangarh

Fig: Back view of forest guard chowki

Fig: GPS mapping of Forest Guard Chowki at Ratangarh

3. 2. Site-2: 4ft wall, 2000 m long at Sardarshahar: At Sardarshahar range, 2000 m long wall of 4 ft height has been evaluated. The wall was constructed in the year 2015-16. Construction work appeared to be good and useful. GPS location of this area was Latitude-N 28°,48',3598" and Longitude-E 74°, 48',535" . The construction work started in the year of 2015 after approval and completed in the 2016. The expenditure incurred for constructing this wall was 7,43,042/- (as per mb). The cemented wall was constructed to demarcate the forest area. At few places the wall has developed crack in it.

Fig: Wall at Sardarshahar

Fig: Measurement of length of Wall taking during field evaluation

Fig: Measurement of height of Wall during field evaluation

Fig: GPS location mapping of Wall at Sardarshahar range

4. Overall assessment: The overall impact of both the construction sites such as forest guard chowki and cemented wall appeared satisfactory in Churu division. Permanent structure created was quite useful and utilized as required.

Table2: Quantitative assessment of constructions work created under CAMPA in Churu division

Sr. no.	Site	Rank of Site (Between 0 to 10)*
1	Forest Guard Chowki at Ratangarh	8
2	2000 m long wall, 4 ft ht at Sardarshahar	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Dausa (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2016 in Dausa Forest Division. This Forest Division with 5 Forest Ranges namely Bandikui, Dausa, Lalshot, Mahua and Sikrai, which has territorial jurisdiction over the entire Dausa district.

Fig : Location of Dausa district, Rajasthan

2. Selected Plantation Sites for Evaluation

The selected plantation sites of Dausa Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Ha
Dausa	ANR at Khora khurd	2014-15	50
Bandikui	DFL at Khund Jatali	2015-16	50

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Khora Khurd of Dausa range:** The selected plantation has been carried out on 50 hac of land at Khora Khurd village of Dausa range during the year 2014-15. The activities were done under the Assisted Natural Regeneration (ANR) model. The GPS location of this selected site was 27°,02',19.0''N Latitude and 76°,23',57.1''E Longitude. The site was a forest land and selected for 100% evaluation. The soil was hard stony layer. The area belongs to Hilly area.

Fig: ANR at Khora Khurd, Dausa

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10,000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and

manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Khora Khurd, a forest department nursery of Dausa range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 6. Seedlings of *Acacia nilotica* (Desi babul), *Acacia lecopholea* (Ronj), *Acacia senegal* (Kumtha), *Zizyphus mauritiana (*Ber*), Holoptelea integrifolia* (Churel), *Azadirachta indica* (Neem) were planted. **A total of 10,000 numbers of seedlings were planted at the site.** Seedlings of above plants were planted. Seedlings were planted block wise according to the availability of space in the plantation area.

Spacing between plants has not been adopted here and random plantation has been carried out in this site. As per the model, 200 plants per hectare have been planted. So total number of plants planted was 1000 for 50 hectare of land.

Fig: Measurement of plants on field

The choice of species under plantation appeared proper. The plants selected for growing in this site were specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was moderate.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Regeneration: The area comes under reserved forest where the present existing tree species were Dhok, Babool, Neem and Churel. **The growth of all types of existing plant species was found to be moderate.**

Table-2: Species wise number of plants (per ha) in natural regeneration and the growth measurement.

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Anogeissus latifolia* (Dhok)	67	3	15
2	*Acacia nilotica (*Desi Babool*)*	63	3.1	16
3	*Azadirachta indica* (Neem)	72	2.5	18
4	*Holoptelia integrifolia (*Churel)	70	2.9	19

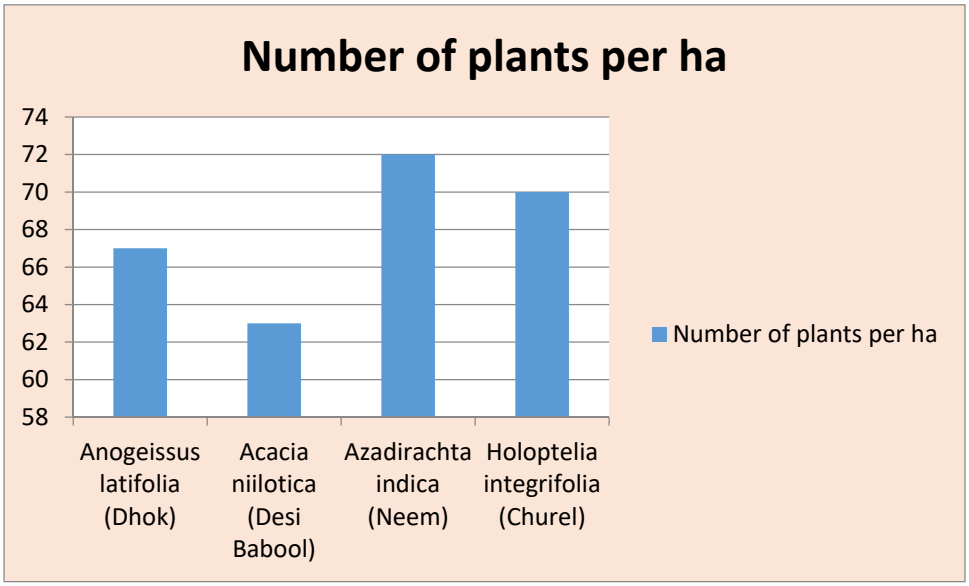


Fig: Graph showing number plants of natural regeneration

3.1.7. Regeneration th rough seeds sowing: Seeds of Kumtha, Neem And Ber species were sown on edges of contour trenches. **The growth of seedlings from seeds were poor.**

3.1.8. Protection Work: The selected ANR model plantation was **protected by ditch fencing of 1475 RMT and stone wall of 1572 RMT with average top width of 1.60m, average depth of 2.3 m and average bottom width of 1.90m. Present condition of fencing was good. Fencing has been effective in controlling biotic pressure up to some extent.**

3.1.9: Soil and Water Conservation Measures: **There were 16100 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of contour varied from 3.5 m to 7 m long with 0.45 x 0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation. Along with it there were 18 loose stone check dams in 50 hec of plantation site.

3.1.10: Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 59.25% at the site.** Plant species girth breast height was also measured. The growth of planted plants was not good. A total of 10000 plants comprising of six species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-3: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia nilotica (Desi Babul)	500	262	238	52.40	2.8	19
Acacia leucophloea	5500	3235	2265	58.21	2.6	13

(Ronj)						
Acacia senegal (Kumtha)	1000	584	416	58.40	2.4	15
Zizyphus mauritiana (Ber)	500	260	240	52	1.5	9
Holoptelea integrifolia (Churel)	2000	1164	836	58.2	2	16
Azadirachta indica (Neem)	500	420	80	84	2.1	13
Total	**10000**	**5925**	**4075**	**59.25**		

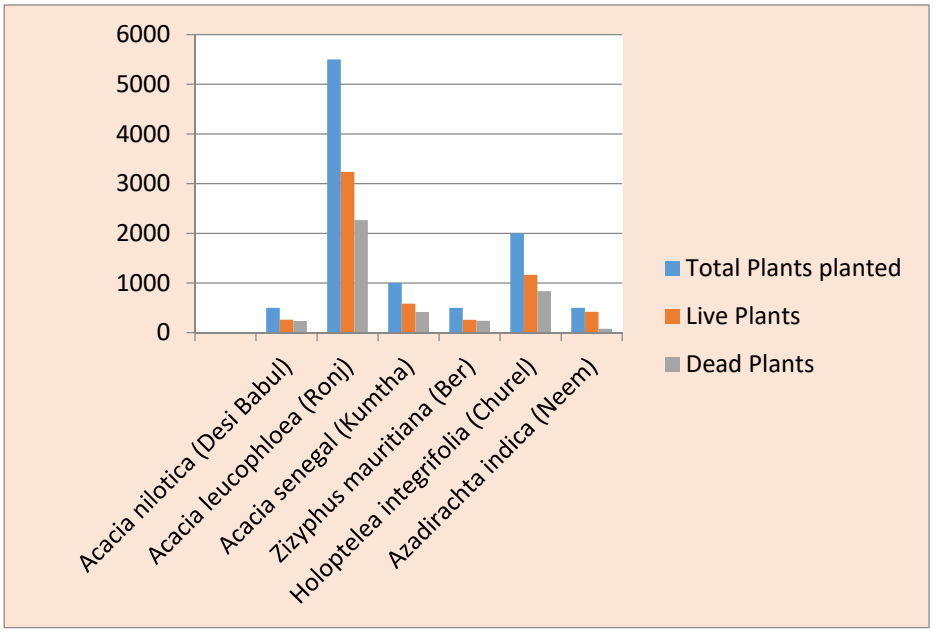


Fig: Graph showing survival of different plants

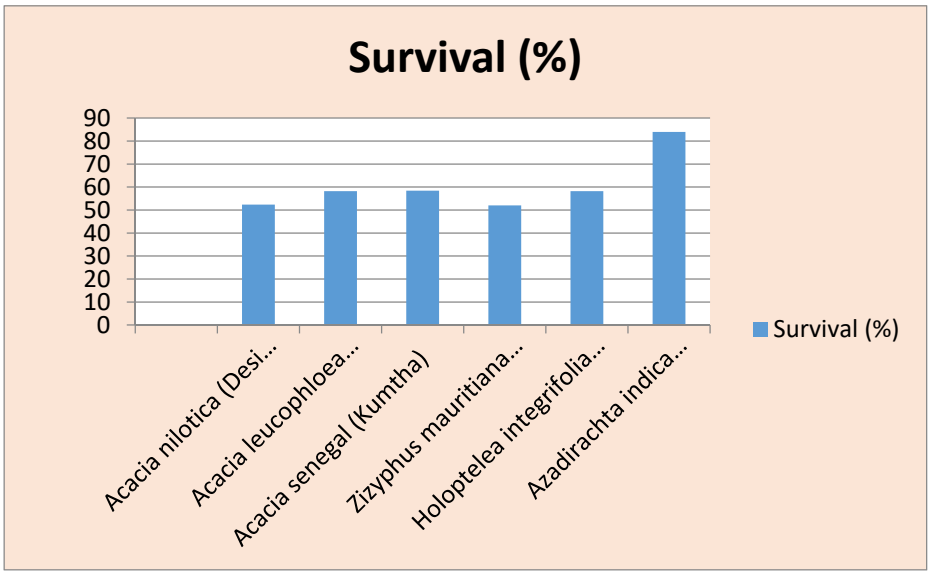


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of neem plant was highest** followed by Ronj. **The survival percentage of neem was maximum of 80% and ronj was 58.8%. All the plants planted in this site showed average survival rate.**

The reason of average survival was low rainfall and biotic pressure.

3.1.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site 50 hec as per kml map.

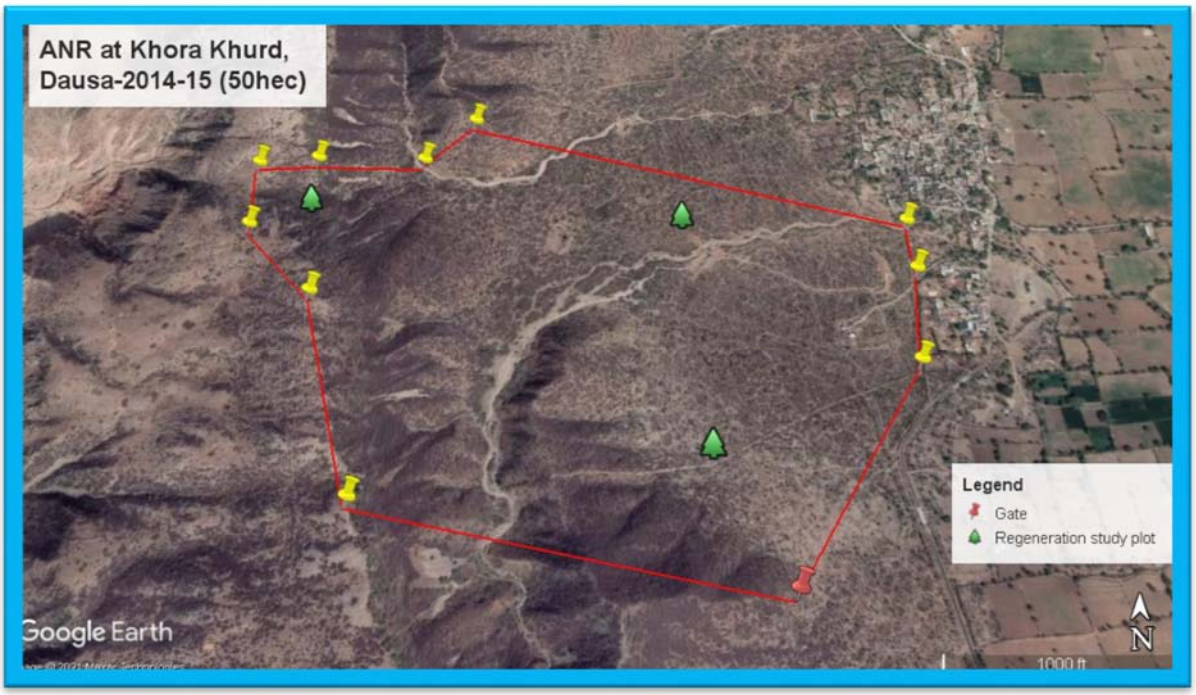


Fig: KML map of ANR plantation at Khora Khurd, Dausa range

3.1.12 Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-	-	-	-	-	328434
2015-16	-	-	-	-	-	-	-	148993
2016-17	-	-	-	-	-	-	-	82138
2017-18	-	-	-	-	-	-	-	84480
Total								644045

3.2.1. Site-2: **Khund Jatoli of Bandikui range** : The selected plantation has been carried out on 50 hac of land at Khund jatoli village of Bandikui range during the year 2015-2016. The activities were done under the DFL model. The GPS location of this selected site was 27°,03’43.2’’N Latitude and 76°26’45.2’’E Longitude. The site was a forest land and selected for 100% evaluation. The soil was Clay loam with hard stony layer. The area belongs to hilly area.

3.2.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 35000 pits have been made for plantation in total 50 hac of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: Instructions given before counting of plants on field

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Khund Jatoli, a forest department nursery of Bandikui range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 7. Seedlings of *Acacia tortilis* (Totalis), *Acacia nilotica* (Desi Babul), *Acacia lecopholea* (Ronj), *Dalbergia sissoo* (Shisham), *Zizyphus mauritiana* (Ber), *Prosopis cineraria* (Khejri) and *others* were planted. **A total of 35,000 numbers of seedlings were planted at the site.** Seedlings of above plants were planted. Seedlings were planted block wise according to the availability of space in the plantation area. Seedlings were planted in block. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have been planted. So total number of plants planted was 35,000 for 50 hectare of land.

Fig: DFL at Khund Jatoli, Bandikui

The choice of species under plantation appeared proper. The plants selected for growing in this site were specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was very good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trenches made adjacent to the planting area were the means of providing water which conserve rain water.

3.2.6. Natural Vegetation and Regeneration: The area comes under reserved forest where the present existing tree species were *Zizyphus mauritiana* (ber), *Acacia senegal* (kumtha), *Acacia tortilis* (totalis) and *Acacia catechu* (khair). **The growth of all types of existing plant species was found to be good.** Thor and lapla grass have been in abundant.

Table-4: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1.	*Acacia senegal* (kumtha)	69	5	36
2.	*Zizyphus mauritiana* (ber)	72	3.2	28
3.	*Acacia tortilis* (totalis)	93	5.4	37
4	*Acacia catechu* (khair)	64	4.3	34

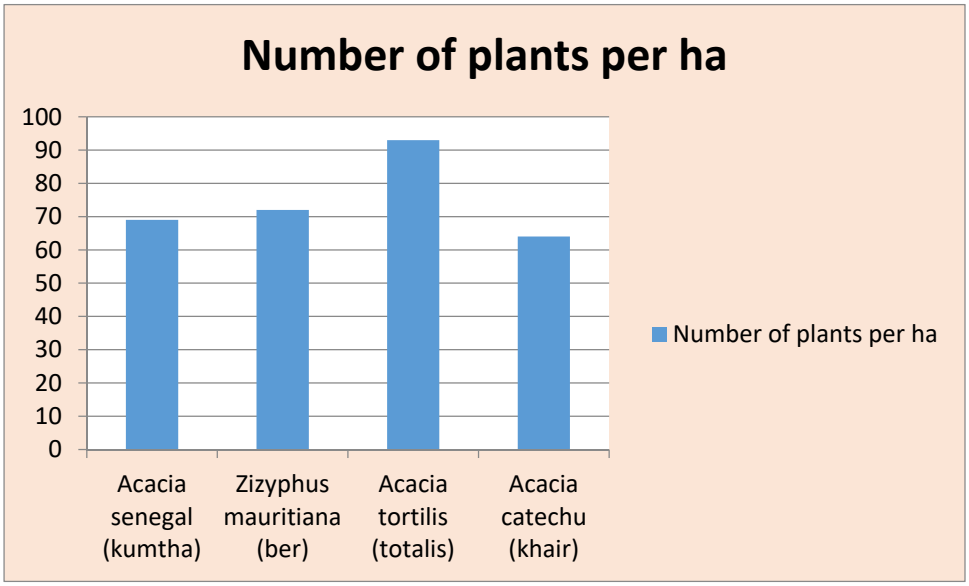


Fig: Graph showing number plants of natural regeneration

3.2.7. Regeneration through seeds sowing: Seeds of ber, khair and kumtha species were sown on edges of contour trenches. **The growth of seedlings from seeds were good.**

3.2.8. Protection Work: The selected DFL model under CAMPA plantation was **protected by trench fencing of 3500 RMT having average top width 1.5 m, depth 1.2 m and bottom width of .90m. Trench fencing was found in good condition and effective in controlling biotic pressure upto some extent.**

3.2.9: Soil and Water Conservation Measures: **There were 13000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of contour varied from 3 m to 8 m long with 0.45 x 0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation. Along with contour trenches there were 13 loose stone check dams in 50 hec of plantation site.

Fig: Measurement of contour trenches

The total area of loose stone check dam was 3925.62 cum. Because of the check dam the extent of civilization of gullies was found to be good.

3.2.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 84.4% at the site.** Plant species girth breast height was also measured. The growth of planted plants was very good. A total of 35000 plants comprising of four species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-5: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia tortilis (Totalis)	1000	8243	1757	82.43	5.5	36
Acacia nilotica (Desi Babul)	12000	10320	1680	86	5.4	36
Acacia lecopholea (Ronj)	4000	3555	445	88.8	4.4	35
Dalbergia sissoo (Shisham)	3000	2630	370	87.66	4.7	34
Zizyphus mauritiana (Ber)	2500	1984	516	79.36	3.4	25
Prosopis cineraria (Khejri)	2500	2028	472	81.12	4.5	32
Others	1000	784	216	78.4	-	-
Total	**35000**	**29544**		**84.4**		

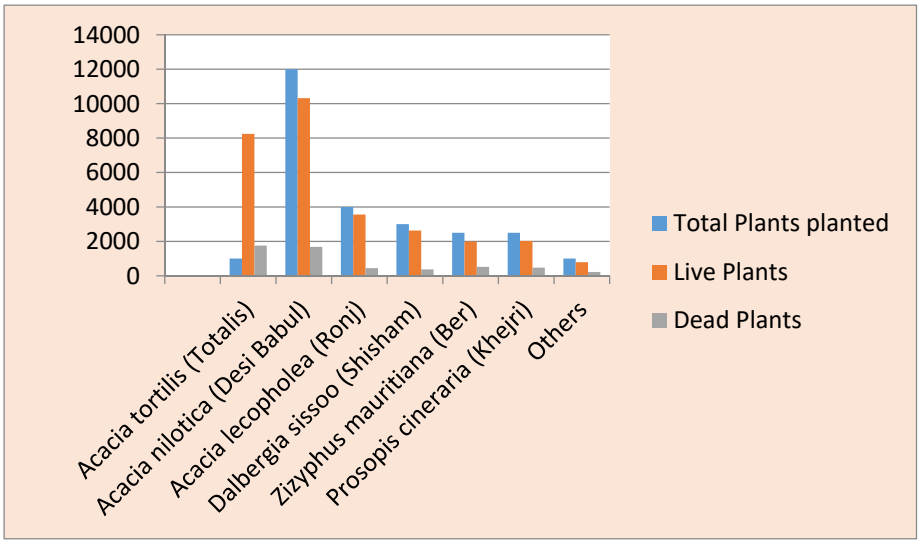


Fig: Graph showing survival percentage of different plants

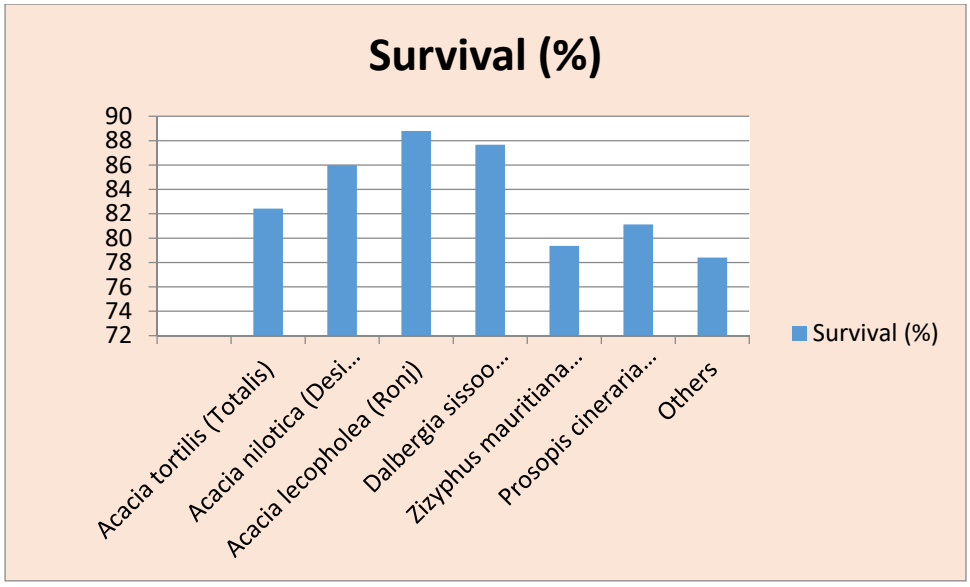


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ronj plant was highest** followed by shisham. **The survival percentage of ronj was maximum of 88.8 % and shisham was 87.6%. All the plants in this site showed very good survival. The reason behind the high survival was timely execution of work, watering and good protection shared by the frontline staff.**

Fig: DFL at Khund Jatoli, Bandikui

3.2.11. GPS Location and KML file: The selected DFLs model under CAMPA plantation site measured 50 hec as per kml map.

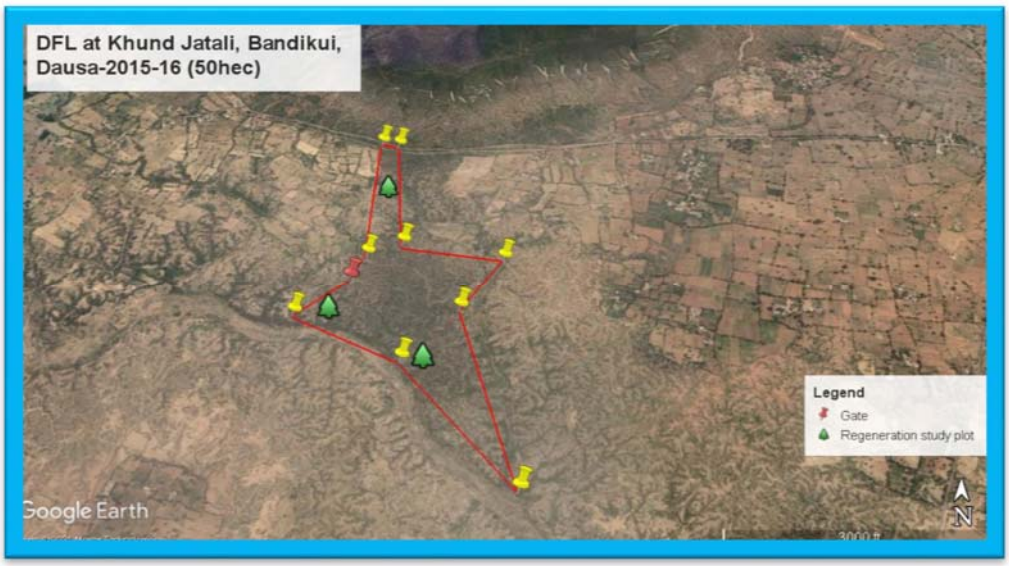


Fig- KML file of DFL plantation at Khund Jatoli, Bandikui range

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-	137900	-	-	-	1255357
2015-16	-	-	-	1435000	-	-	-	1285000
2016-17	-	-	-	451900	-	-	-	451852
2017-18	-	-	-	221350	-	-	-	220261
2018-19	-	-	-	221350	-	-	-	221266
2019-20	-	-	-	233550	-	-	-	232812
2020-21	-	-	-	258250	-	-	-	257373
2021-22	-	-	-	271650	-	-	-	

4. Overall assessment: The overall impact of plantation activities appeared satisfactory in Dausa division.

Table-6: Quantitative assessment of plantation work created under CAMPA in Dausa division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	ANR at Khora khurd	59.2	6
2	DFL at Khund Jatali	84.4	9

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Dholpur (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Dholpur Forest Division. This Forest Division with 4 Forest Ranges namely Van Vihar, Badi, Sarmathura and Dholpur which has territorial jurisdiction over the entire Dholpur District.

Figure: Location of Dholpur district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Dholpur Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Ha.	Model
Bari	2015-16	Sath ka kharra	50	DFL
Sarmathura	2016-17	Dholimati -II	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Dholpur Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Dholpur	Forest Guard Chowki at Dholpur Nursery	2014-15	100%
Kesarbagh	Anicut-11 at Kesar Bagh	2015-16	100%
Sarmathura	4 Ft. wall -500 m at Thane ka pura	2016-17	100%

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Sath ka kharra of Badi range:** The selected plantation has been carried out on 50 hec of land at Sath ka kharra in Badi during the year 2015-16. The activities were done under the Degraded Forest Land (DFL) model. The GPS location of this selected site was N 26.742340 and E 77.45871. The site was a forest land and selected for 100% evaluation. The soil was clayey loam and stony hard layer.

3.1.2. Treatment plan before sowing:
The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 35000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: DFL at Badi range

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Sath Ka Karra, a forest department nursery of Badi range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 6. Seedlings of *Zizyphus mauritiana (*Ber), *Iuga dulicis (*Jangal Jalebi*), Acacia senegal (*Kumtha*), Acacia leucopholea (*Ronj*), Acacia nilotica (*Desi babool*), Pongamia piinnata (*Karanj) were planted.

Fig: Counting of plants on field

A total of 35000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have been planted. So total number of plants planted was 35000 for 50 hectare of land.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

Fig: Measurement of trenches

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water.

3.1.6. Natural Vegetation and Rege neration: Due to this plantation, the vegetation cover has increased to some extent. Babool, kumtha, birbira were the plants found grown naturally in this area. The growth of the plant was good. The vegetation was sparsh.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal*- Kumath	33	4.3	20
2	*Acacia nilotica*- Babool	57	3.3	22
3	Birbira	33	3	21

3.1.7. Regeneration through seeds sowing: Seeds of species *kumatha, ronj, khair,* were sown. **The growth of seedlings from seeds was low.**

3.1.8. Protection Work: The selected DFL model plantation was **protected by stone wall fencing of 123.84 RMT with average top width of 0.60m, average depth of 1.20m and average bottom width of 0.90m. Also the area was covered with 3360 RMT of trench fencing. Present condition of fencing was good and effective in controlling biotic pressure upto some extent.**

3.1.9. Soil and Water Conservation Measures: **There were 15000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3.5 m to 8 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation.

Fig: Instructions before field work

3.1.10. Observations Recorded: Under this model, 35000 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 58.2% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 35000 plants comprising of six species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia nilotica (Desi babool)	10000	6048	3952	60.4	3.5	32
Acacia leucopholea (Ronj)	8000	4426	3574	55.3	2.9	33
Acacia senegal (Kumtha)	10000	6041	3959	60.4	3.7	36
Zizyphus mauritiana (Ber)	2000	1124	876	56.2	2.6	22
Iuga dulcis (Jangal Jalebi)	3000	1572	1428	52.4	2.3	26
Pongamia pinnata (Karanj)	2000	1179	821	58.9	3.1	30
Total	**35000**	**20390**		**58.2**		

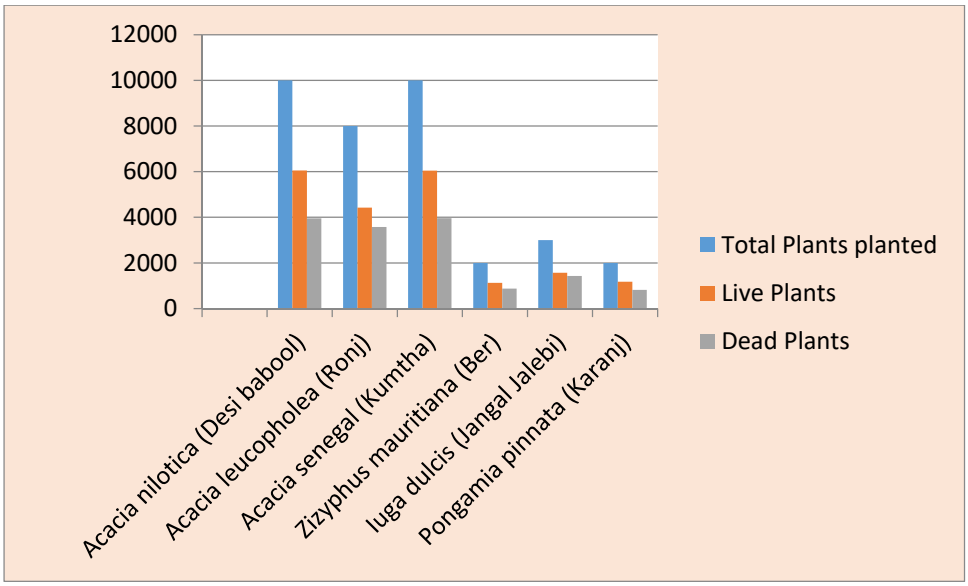


Fig: Graph showing survival of different plants

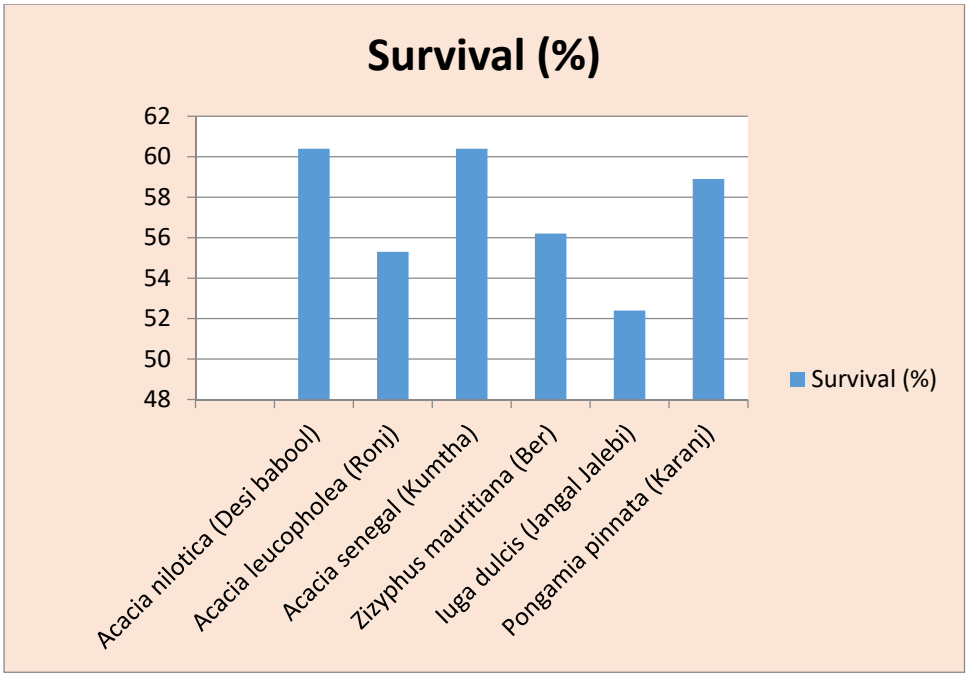


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of desi babool and kumtha were highest** of 60.4% both , followed by karanj of 58.9%. **All the plants planted in this site showed good survival.**

Good protection and watering on time may improve the survival of plants.

3.1.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

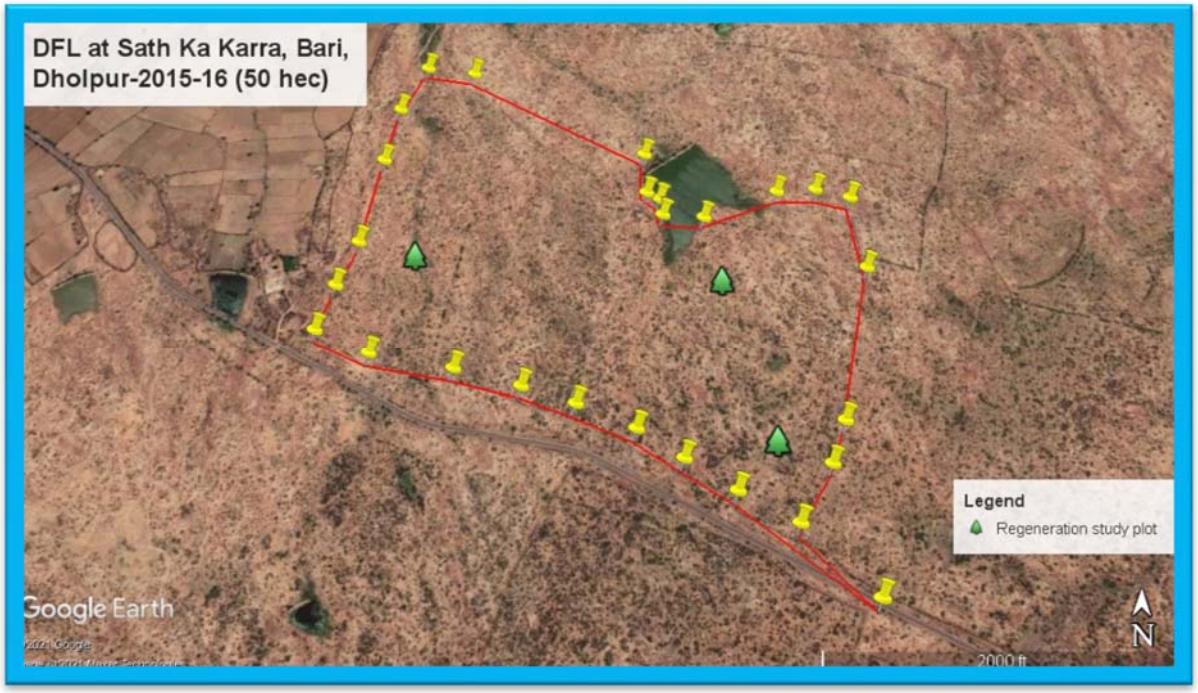


Fig: KML file of DFL at Sath ka karra of Badi range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-	-	-	-	-	1228445
2015-16	-	-	-	-	-	-	-	146303
2016-17	-	-	-	-	-	-	-	1107464
2017-18	-	-	-	-	-	-	-	481309
2018-19	-	-	-	-	-	-	-	241095
2019-20	-	-	-	-	-	-	-	242350
2020-21	-	-	-	-	-	-	-	427485

3.2.1. Site-2: **Dholiimati-II in Sarmathura range** : The selected plantation has been carried out on 50 hec of land at Dholimati-II in Sarmathura range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 26.470441 and E 77.477076. The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer.

3.2.2. Treatment plan before sowin g: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR plantation at Sarmathura range

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Dholimati, a forest department nursery of Sarmathura range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 2. Seedlings of *Acacia nilotica (*Desi babool*) and Acacia senegal (*Kumtha*)* were planted. **A total of 10000 numbers of seedlings were planted at the site.** Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 10000 plants in

50 hectare have been planted. Type of plantation was block and technique of planting was pit. **The choice of species under plantation appeared proper**. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

Fig: Loose stone checkdam at Sarmathura range

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

Fig: Counting and measurement of plants on field

3.2.6. Natural Vegetation and Regeneration: The area has been covered partially with vegetation due to this plantation. The growth of plants was poor. Grasses have grown in ditch trenches which should be controlled. Plants like desi babool, kumtha, churel have been found grown naturally. The vegetation was sparsh.

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal*- Kumath	126	2.8	30
2	*Holoptelia integrifolia* (Churel)	76	1.5	22
3	*Acacia leucopholea*- Ronj	73	2	30

3.2.7. Protection Work: The selected ANR model plantation was **protected by trench/ditch fencing of 3215 RMT. Trench average top width was 0.90-0.60m, average depth was 1.20 to 1.30 m and average bottom width was 0.80-1.50m. The present condition of fencing is good but grasses have been grown in it. It is partially effective in controlling the biotic pressure.**

3.2.8. Soil and Water Conservation Measures: **There was loose stone checkdam of total volume of 3000 cum present in the plantation area, due to which the extent of gullies**

was good. There were 10000 RMT contour trenches in the form of water harvesting structures present in the entire plantation area. **The size of the contour varied from 3m to 8 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation.

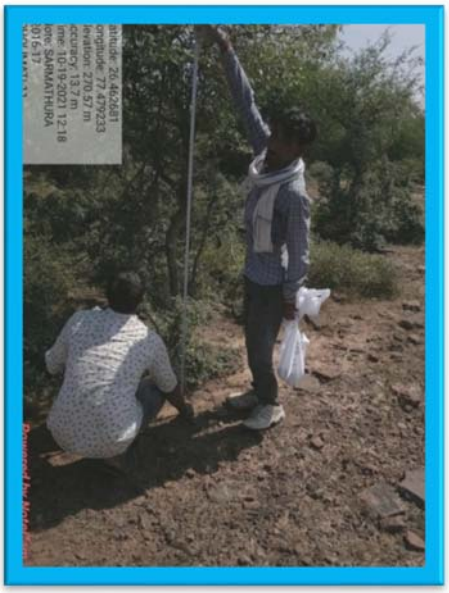


Fig: Measurement of plants on field

3.2.9. Observations Recorded: Under this model, 10000 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 60.6% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of two species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia nilotica (Desi babool)	8000	5232	2768	65.4	3	28
Acacia senegal (Kumtha)	2000	833	1167	41.6	2.5	43
Total	**10000**	**6065**		**60.6**		

From the above table, it is shown that desi babool plants showed highest survival of 65.4%.

Good protection and watering on time may improve the survival of plants.

3.2.11. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	-	-	-	-	-	-	-	1873882
2016-17	-	-	-	-	-	-	-	126290
2017-18	-	-	-	-	-	-	-	107211

2018-19	-	-	-	-	-	-	-	123200

3.2.12. GPS Location and KML file: The selected model under CAMPA plantation site measured 50 hec as per kml map.

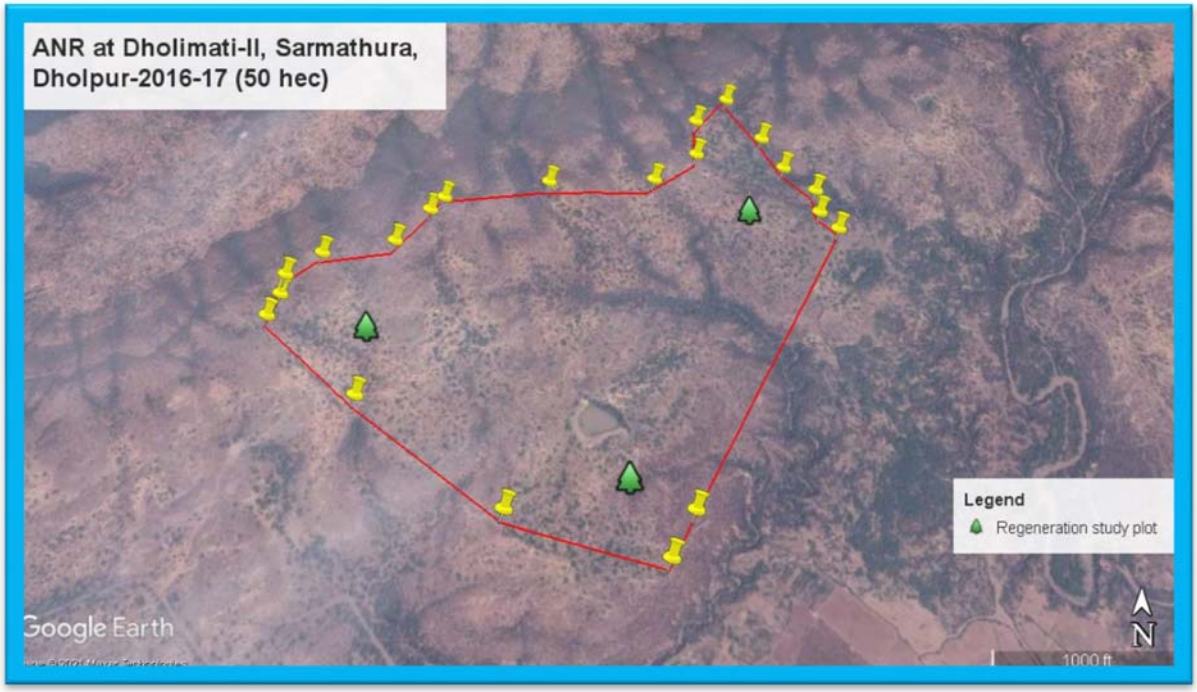


Fig: KML file of ANR at Dholiimati-II, Sarmathura range plantation area

4. Evaluation of Construction Works

Site-1: Forest Guard Chowki at Dholpur nursery: At Dholpur range, one forest guard chowki was constructed. The site was constructed in the year 2014-15.

Fig: Forest guard chowki and GIS mapping

GPS location of this area was Longitude- E 77.885756 and Latitude-N 26.702358. The construction work started in the year of 2014 after approval and completed in the 2015. The construction of chowki was good in condition. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

Site- 2: Anicut II at Kesarbagh range: At Kesarbag range, the anicut- II has been evaluated. The anicut was constructed in the year 2015-16. Construction work appeared to be good and useful. GPS location of this area was 26.679586 N and 77.836143 E. The construction work started in the year of 2015 after approval and completed in the 2016. During site visit, the anicut was filled up with rain water of upto 2 m height. The water normally used for drinking purposes by the animals.

Fig: Anicut-II at Kesarbagh and GIS mapping

Site- 3: 4 Ft. wall -500 m stone wall at Thane ka pura of Sarmathura range: At Thane ka pura in Sarmathura range, the stone wall has been evaluated. The wall was constructed in the year 2016-17. The wall dimensions were 4 ft and 500m length. Construction work appeared to be good and useful. GPS location of this area was 26,29,35.6 N and 77,28,00 .5 E. The construction work started in the year of 2016 after approval and completed in the 2017. The expenditure incurred for constructing this wall was Rs. 11,88,299 (estimate was Rs.12 lakh).

The wall was found in good condition. Only at few places, it was damaged.

Fig: Stone wall Sarmathura and GIS mapping

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Dholpur district.

Table-7: Quantitative assessment of plantation work created under CAMPA in Dhoplur division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	DFL Sath ka karra, Badi, 50 hec	58.2	6
2	ANR at Dholimati-II, Sarmathura, 50 hec	60.6	7

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-8: Quantitative assessment of constructions work created under CAMPA in Dholpur division

Sr. no.	Items	Name of the site	Rank of site (Between 0 to 10)*
1	Forest Guard Chowki	Dholpur	8
2	Anicut –II	Kesarbagh	6
3	4 ft 500 m wall	Sarmathura	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Dungarpur (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Dungarpur Forest Division. This Forest Division with 5 Forest Ranges namely Aspur, Bichhiwada, Dungarpur, Antri and Sagwara, which has territorial jurisdiction over the entire Dungarpur District.

Fig : Location of Dungarpur district, Rajasthan

2. Selected Plantation Sites for Evaluation

The selected plantation sites of Dungarpur Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Ha.	Model
Bichhiwada	Sabli	2015-16	50	ANR
Aspur	Bhadga	2014-15	2.55	NFL

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Sabli in Bichhiwada range:** The selected plantation has been carried out on 50hec of land at Sabli in Bichhiwada range during the year 2015-16. The activities were done under the ANR model. The GPS location of this selected site was N 23,87,1554 and E 73,583001.The site was a forest land and selected for 100% evaluation. The soil was reddish brown in colour and stony hard layer.

Fig: ANR plantation at Sabli, Bichhiwada range

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in

the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Sabli, a forest department nursery of Bichhiwada range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 9. Seedlings of *Acacia leucophoelea (*ronj), *Acacia catechu* (Khair), *Zizyphus mauritiana* (ber), *Emblica officinalis* (Amla), *Dendrocalamus strictus* (Baans), *Manilkara hexandra* (Khirni), *Ailanthus excelsa* (Adusa), *Ficus racemosa* (Hawan) and *Annona squoamosa* (Sitaphal) were planted.

Fig: Measurement of plants on field

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50hectare of land.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was moderate.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

Fig: Counting of plants taking place

3.1.6. Natural Vegetation and Rege neration: Due to this plantation, the vegetation cover has increased to some extent. Ronj, khirni, churel, dhak, desi babool were the plants found grown naturally in this area. The growth of the plant was good.

Table-2: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia nilotica* (Desi Babool)	212	9.6	69
2	*Acacia leucopholea* (Ronj)	303	7.5	48
3	*Holoptelia integrifolia* (Churel)	127	6	32
4	*Anogeissus latifolia* (Dhak)	252	5.2	75
5	*Manilkara hexandra* (Khirni)	107	8.1	48

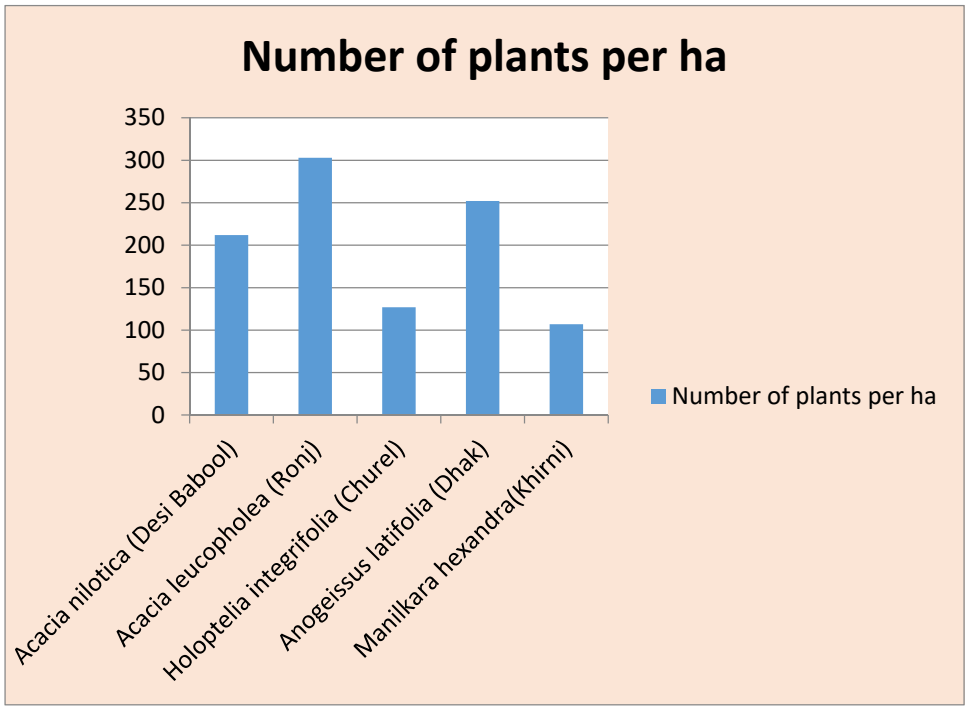


Fig: Graph showing number plants under natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of species *khair, ber, ronj and dhak* were sown in as well as along the trenches. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected ANR model plantation was **protected by stone wall fencing of 3220 RMT. Present condition of fencing was good.**

3.1.9. Soil and Water Conservation Measures: **There were 20000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 2.5 m to 8 m long with 0.45*0.35 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation. Along with it, loose stone checkdam were also made as water conservation measure. There were **46 loose stone checkdam in 50 hec of land having 646.046 cum volume in total**.

3.1.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 59.9% at the site.** Plant species girth breast height was also measured. The growth of planted plants was moderate. A total of 10000 plants comprising of five species were planted in the 50hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-3: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
*Acacia leucophoelea (*ronj)	1500	1421	79	94.73	180	41.5
Acacia catechu (Khair)	2200	1019	1181	46.31	141	22
Zizyphus mauritiana (ber)	600	510	90	85	161	15
Emblica officinalis (Amla)	1200	515	685	42.91	120	13
Dendrocalamus strictus (Baans)	2300	1270	1030	55.21	310	-
Manilkara hexandra (Khirni)	1400	808	592	57.71	90	15
Ailanthus excelsa (Adusa)	200	84	116	42	153	30
Ficus racemosa (Hawan)	200	121	79	60.5	120	10
Annona squoamosa (Sitaphal)	400	242	158	60.5	97	15
Total	**10000**	**5990**		**59.9**		

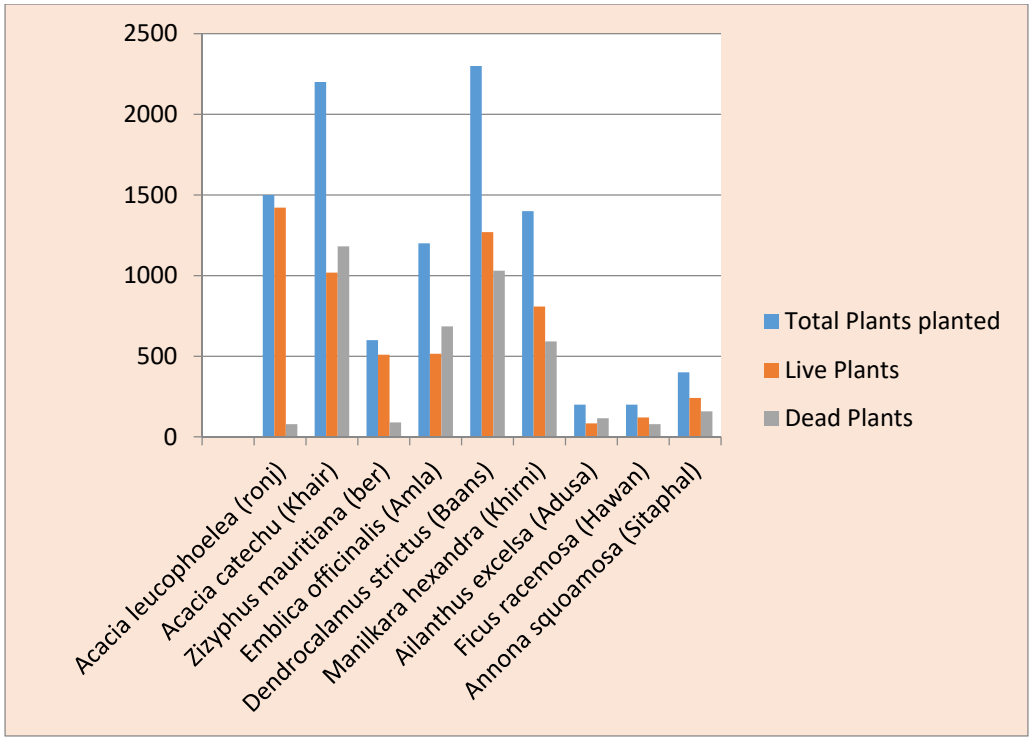


Fig: Graph showing survival of different plants

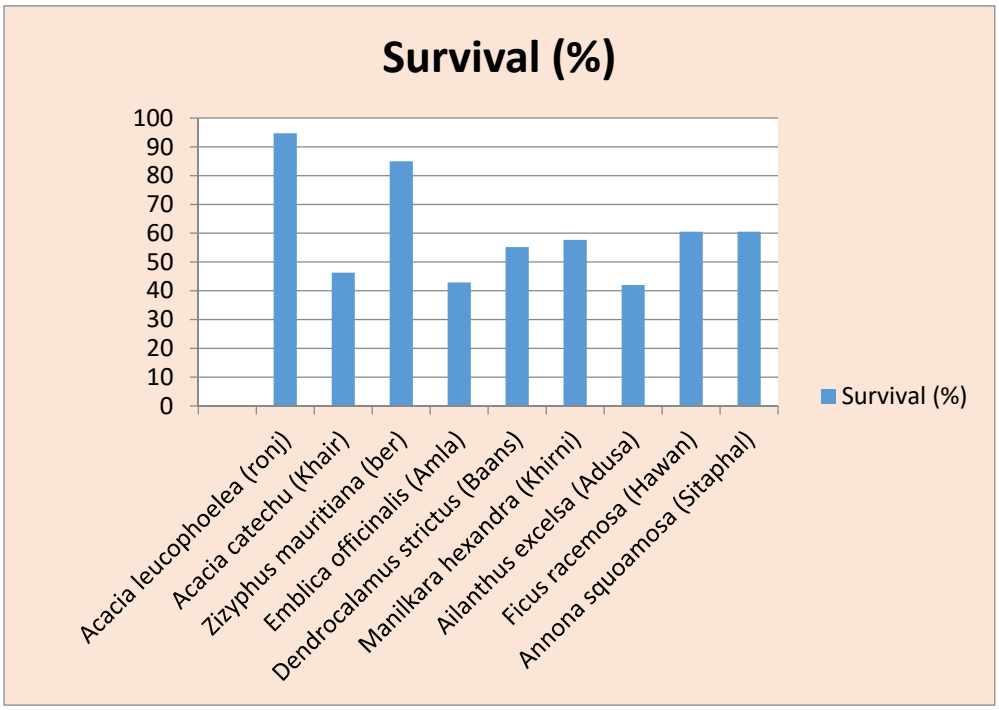


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ronj plant was highest** followed by ber. **The survival percentage of ronj was maximum of 94.73% and ber was 85%. All the plants showed good survival.**

3.1.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per kml map.

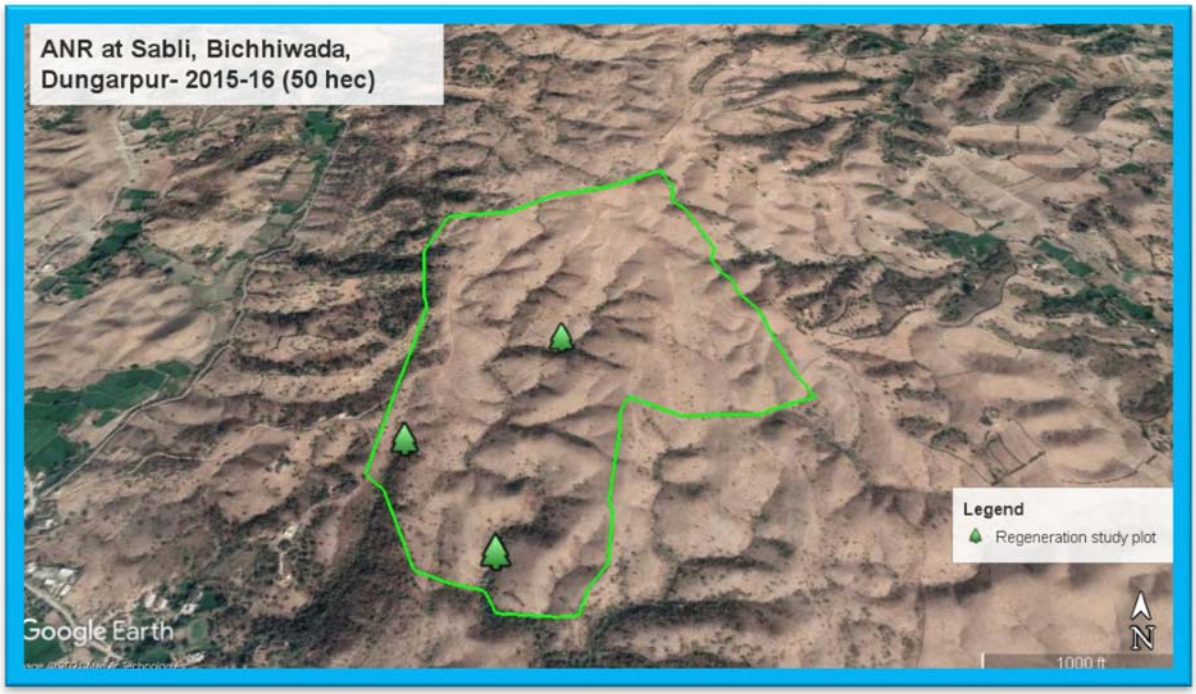


Fig: KML file of ANR at Sabli, Bichhiwada range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15				1467500	752614		558332	1310946
2015-16				386850	379762			379762
2016-17					153490			153490
2017-18					85008			85008
2018-19					86556			86556

3.2.1. Site-2: **Bhadga in Aspur range** : The selected plantation has been carried out on 2.55 hec of land at Bhadga in Aspur range during the year 2014-15. The activities were done under the NFL model. The GPS location of this selected site was N 23.869881 and E 74.193574. The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer.

Fig: NFL at Aspur, Dungarpur

3.2.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 2805 pits have been made for plantation in total 2.55 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Bhadga, a forest department nursery of Aspur range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 12. Seedlings of *Azadirachta indica* (Neem), *Butea monosperma* (Palash), *Zizyphus mauritiana* (Ber), *Acacia nilotica* (Desi babool), *Dalbergia sissoo* (Shisham), *Acacia catechu* (Khair), *Emblica officinalis* (Amla), *Acacia leucophoelea (*Ronj), *Dendrocalamus strictus* (Baans), *Sapindus sp.* (Aritha), Jalkaranj and *Holpotelia integrifolia* (Churel) were planted.

A total of 2805 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was evaluated by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 2805 plants in 2.55 hectare have been planted. Map of planting site was prepared. Type of plantation was block and technique of planting was pit.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period.

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water.

Fig: Measurement of stone wall on field

3.2.6. Natural Vegetation and Re generation: The area has been covered fully with vegetation due to this plantation. The growth of plants was good. Grasses have grown in ditch trenches which should be controlled. Plants like khair, ber, sagwan, kumtha, hingot and lapla grass have been found grown naturally.

3.2.7. Protection Work: The selected NFL model plantation was **protected by stone wall fencing of 547 RMT.**

3.2.8. Soil and Water Conservation Measures: **There were 1020 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area.

3.2.9. Observations Recorded: Under this model, 1100 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 65 % at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 1100 plants comprising of two species were planted in the 2.55 hec plantation area.

Measurement of plants has not been because the plants were small. As per the frontline staff's word, during 2020-21, due to high temperature, all the plants in this site got burnt. Fresh plantation was carried out during the monsoon, so the height of plants was low.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)
Azadirachta indica (Neem)	218	120	98	57.1
Butea monosperma (Palash)	216	118	98	54.6
Zizyphus mauritiana (Ber)	101	63	38	62.3
Acacia nilotica (Desi babool)	207	109	98	52.6
Dalbergia sissoo (Shisham)	206	188	18	91.2
Acacia catechu (Khair)	407	309	98	75.9
Emblica officinalis (Amla)	278	178	100	64.02
*Acacia leucophoelea (*Ronj)	214	118	96	55.1
Dendrocalamus strictus (Baans)	64	15	49	23.4
Sapindus sp. (Aritha)	206	59	147	28.6
Jalkaranj	248	188	60	75.8
Holpotelia integrifolia (Churel)	440	360	80	81.8
Total	**2805**	**1825**		**65**

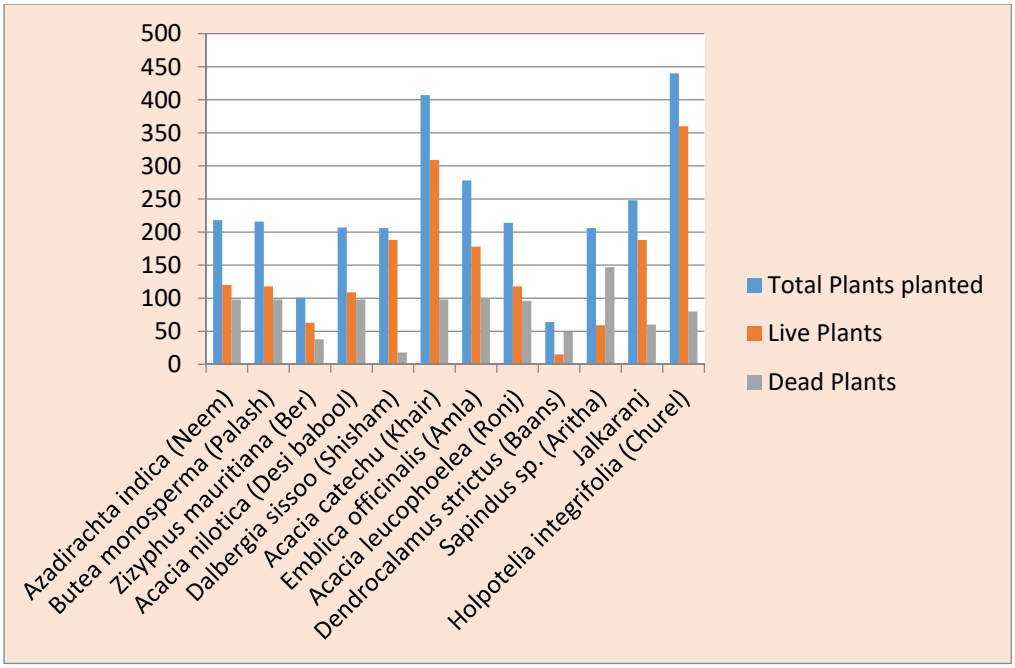


Fig: Graph showing survival of different plants

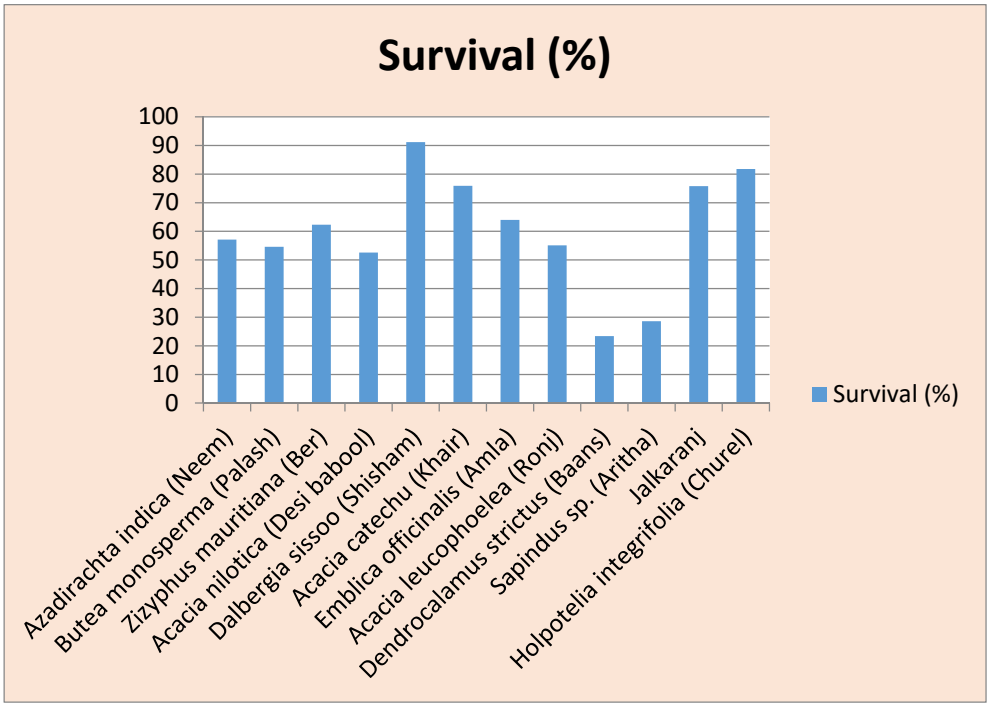


Fig: Graph showing survival percentage of different plants

From the above table, it is shown that the **survival of shisham plant was highest** followed by khair. **The survival percentage of shisham was maximum of 91.26% and khair was 75.9%. All the plants planted in this site showed average survival rate except baans and aritha plants lowest survival and not fitted for planting in this area.**

3.2.11. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-					93263
2015-16	-	-	-	32038				21691
2016-17	-	-	-					9828
2017-18	-	-	-					10510
2018-19	-	-	-	10532				10500
2019-20	-	-	-	11133				10500
2020-21								11850

3.2.12. GPS Location and KML file: The selected model under CAMPA plantation site measured 2.55 hec as per kml map.

Fig: KML file of NFL at Bhadgo, Aspur range plantation area

4. Overall assessment: The overall impact of plantation activities appeared satisfactory in Dungarpur district.

Table-5: Quantitative assessment of plantation work created under CAMPA in Dungarpur division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	ANR at Sabli, Bichhiwada, 50 ha	59.9	6
2	NFL at Bhadga, Aspur, 2.55 hec	65	7

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Sri Ganganagar (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Sri Ganganagar Forest Division. This Forest Division with 3 Forest Ranges namely Sri Ganganagar, Ravla and Gharsana has territorial jurisdiction over the entire Sri Ganganagar District.

Fig: Location of Sri Ganganagar district, Rajasthan

2. Selected construction work sites for Evaluation

The forest guard chowki developed at 3 STR of Gharsana range in the year 2015-16 has been selected for evaluation.

Table-1: Selected forest guard chowki site for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved
Gharsana	Forest Guard Chowki at 3 STR	2015-16	100%

3. Evaluation of Construction Works Sites

3.1 Forest Guard Chowki at 3 STR of Gharsana range: At 3 STR of Gharsana range, one forest guard chowki has been constructed. The chowki was constructed in the year 2015-16. Construction work appeared to be very good and useful. This chowki was constructed at the cost of Rs. 5 Lakh. GPS location of this area was Longitude- E 73°,07,'2448" and Latitude-N 29°,01',8482". The construction work started in the year of 2015 after approval and completed in the 2016. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

Fig: Forest Guard Chowki at 3 STR

Fig: Side view of forest guard chowki

Fig: Back view of forest guard chowki, Gharsana

Fig : GPS location mapping of Forest Guard Chowki at 3 STR

4. Overall assessment: The overall impact of forest guard chowki appeared very good in Sri Ganganagar division of Bikaner district. Permanent structure created was quite useful and utilized as required.

Table-2: Quantitative assessment of constructions work created under CAMPA in Sri Ganganagar division

Sr. no.	**Site**	**Rank of Site (Between 0 to 10)***
1	Forest Guard Chowki at 3 STR of Gharsana range	8

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Hanumangarh (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Hanumangarh Forest Division. This Forest Division with 2 Forest Ranges namely Hanumangarh and Tibbi has territorial jurisdiction over the entire Hanumangarh District.

Fig: Location of Hanumangarh district, Rajasthan

2. Selected construction work sites for Evaluation

The Rescue Centre at Pilibanga of Hanumangarh range in the year 2014-15 has been selected for evaluation.

Table-1: Selected Rescue Centre site for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved
Hanumangarh	Rescue Centre at Pilibanga	2014-15	100%

3. Evaluation of Construction Works Sites

3.1. Rescue Centre at Pilibanga of Hanumangarh range: At Pilibanga of Hanumangarh range, one rescue centre has been constructed during the year 2014-15. Construction work appeared to be good and useful. This rescue centre was constructed at the cost of Rs. 599071/-, where as the estimated cost was 6 Lakh on record. GPS location of this area was Longitude- E 74°,06,'9161" and Latitude-N 29°,48',4388". The construction work started in the year of 2014 after approval and completed in the 2015. Electricity and water facility were provided in this centre

Basically this centre developed for to rescue wild animals which were injured or trapped. Injured

animals have been given treatment in this centre. After recovering from the injury, the rescued animals usually freed to the nearby forest. Animals such as deer, nilgai, chinkara etc. used to rescue here.

Fig : Front view of rescue centre

Fig : Side view of recsue centre, Pilibanga

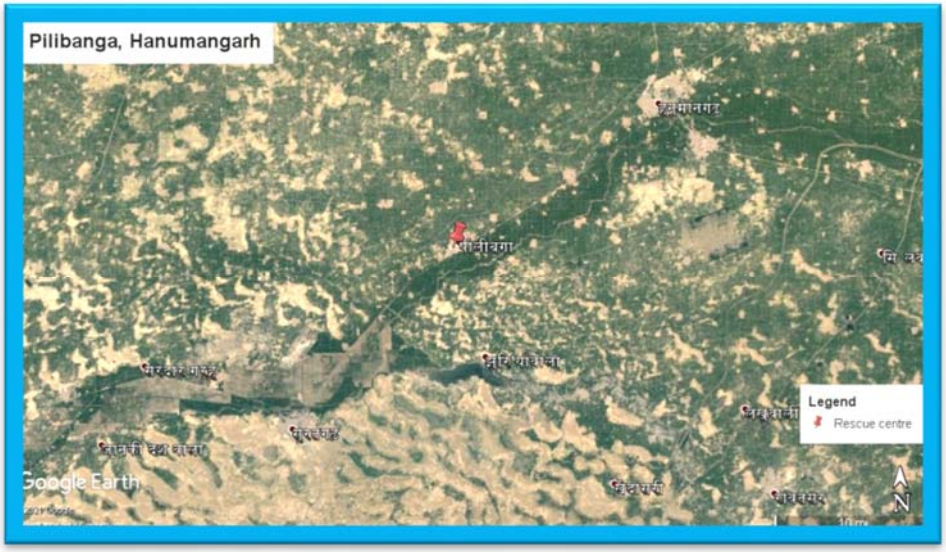


Fig: GPS location mapping of Forest Guard Chowki at 3 STR

4. Overall assessment: The overall impact of forest guard chowki appeared satisfactory in Hanumangarh division. Permanent structure created is quite useful and utilized as required.

Table-2: Quantitative assessment of constructions work created under CAMPA in Hanumangarh division

Sr. no.	Site	Rank of Site (Between 0 to 10)*
1	Rescue Centre at Pilibanga of Hanumangarh range	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Jaipur-North (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Jaipur-North Forest Division. This Forest Division with 6 Forest Ranges namely Achrol, Kotputli, Shahpura, Viratnagar, Paota and Chomu.

Fig: Location of Jaipur district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Jaipur (N) Forest Division were as given in table-1.

Forest Range	Name of Site	Year of Plantation	Ha.	Model
Achrol	Achrol	2014-15	50	ANR
Shahpur	Bera ki dhani-Bishangarh	2015-16	33.55	NFL
Shahpur	Devan	2016-17	50	ANR
Viratnagar	Berki	2015-16	50	DFL

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Jaipur (N)Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Viratnagar	Talwa Bhihajar	2015-16	Forest Guard Chowki

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Achrol range** : The selected plantation has been carried out on 50 hec of land at Achrol in Achrol range during the year 2014-15. The activities were done under the Assisted Natural Regeneration (ANR) model. The GPS location of this selected site was N 27.135602 and E 75.947012. The site was a forest land and selected for 100% evaluation. The soil was brown in colour and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR plantation at Achrol, Jaipur-N

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Achrol, a forest department nursery of Achrol range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 8. Seedlings of *Acacia senegal* (kumtha), *Acacia leucophoelea (*ronj), *Zizyphus mauritiana* (ber), *Dalbergia Sissoo* (shisham), *Acacia tortilis* (totalis), *Holoptelea integrifolia* (churail), *Bauhinia variegata* (kachnar) and *Pongamia pinnata* (karanj) were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was very good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

Fig: Measurement of plants on field

3.1.6. Natural Vegetation and Rege neration: Due to this plantation, the vegetation cover has increased to some extent. Naturally growing plants were dhok, chila, khirnii, churel, neem, gurjan. The growth of plants was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Anogeissus latifolia*-Dhok	213	3.30	27.30
2	*Butea monosperma*-Chola	64	4.30	28.30
3	*Writhia tinctoria*-Khirni	11	3	18
4	*Holpotelia integrifolia*-Churail	93	4	31
5	*Azadiractha indica*-Neem	82	4.6	32.6
6	Gurjan	63	1.9	11.3

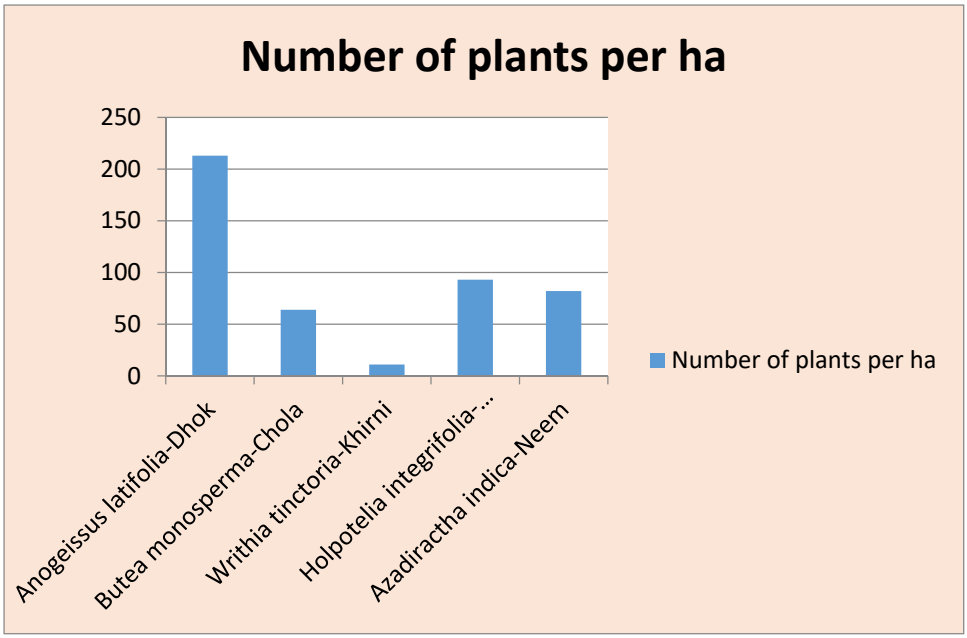


Figure: Species wise number of plants (per ha) in natural regeneration

3.1.7. Regeneration th rough seeds sowing: Seeds of species *shisham, bharad, neem, kumtha, tortilis, ber* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected ANR model plantation was **protected by ditch fencing of 2319 RMT with average top width of 0.90m, average depth of 1.20m and average bottom width of 1.50m. Also the area was protected by stone wall fencing of 1163 RMT and barbed wire fencing of 205 RMT. Present condition of fencing was good. Fencing has been partially effective in controlling the biotic pressures.**

3.1.9. Soil and Water Conservation Measures: **There are 20000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3m to 7 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation. 13 loose stone check dam and one earthen bound were present. The volume of loose stone check dam was 1366.52 cum and the earthen bund was 2107.23 cum. The extent of gullies is good due to the check dam.

Fig: Measurement of ditch fencing

3.1.10. Observations R ecorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 77.76% at the site.** Plant species girth breast height was also measured. A total of 10000 plants comprising of eight species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Fig: Evaluation team at field of Achrol

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia tortilis (Totalis)	4500	4474	26	99.42	4.50	30
Acacia senegal (Kumatha)	2000	1983	17	99.15	4.50	30
Pongamia pinnata (Karanja)	50	-	50	--	--	--
Bauhinia variegata (Kachnar)	50	-	50	--	--	--
Acacia leucophoelea (Ronj)	200	119	81	59.50	4.00	20

Dalbergia sissoo (Shisham)	1000	623	377	62.30	6.00	35
Zizyphus mauritiana (Ber)	200	68	132	34.00	3.00	15
Holoptelea integrifolia (Churail)	2000	509	1491	25.45	2.50	20
Total	**10000**	**7776**	2224	**77.76**		

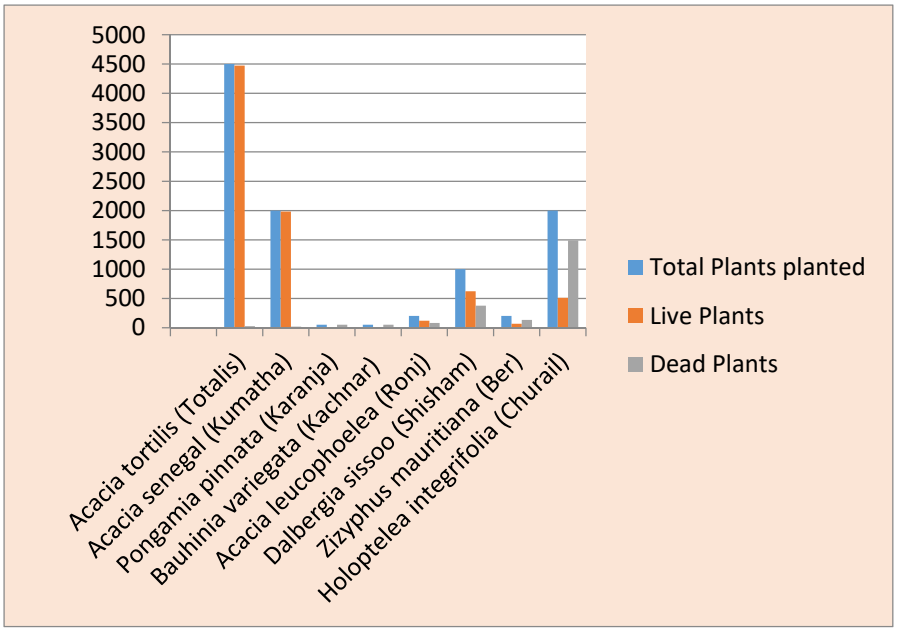


Fig: Graph showing survival of different plants

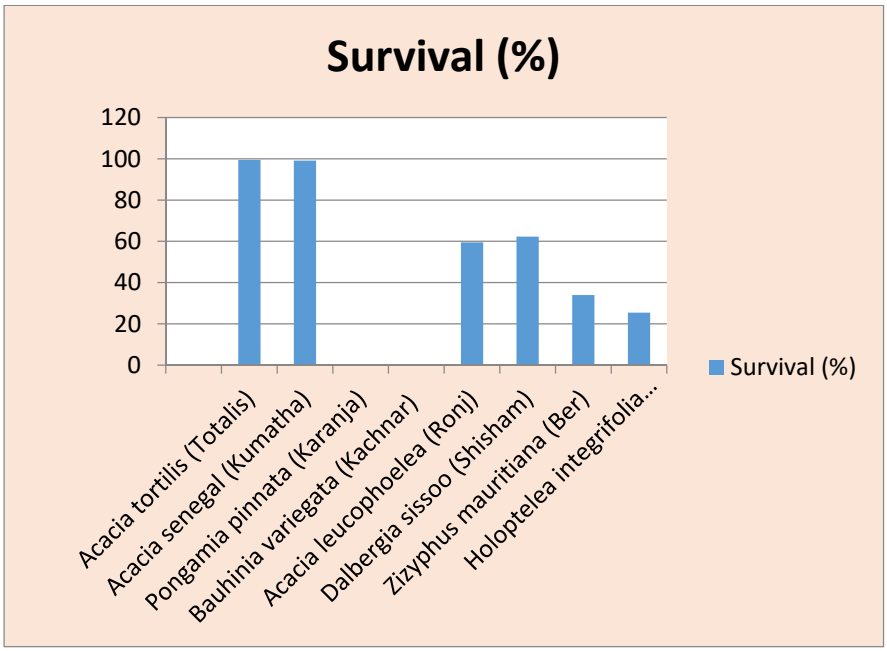


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of totalis plant was highest** followed by kumtha. **The survival percentage of totalis was maximum which was 99.42 % and kumatha was 99.15%. Plants like karanj and kachnar showed zero survival and not fitted for plantation in this area.**

The reason for good survival of plants was watering on time, timely execution and good protection despite the hilly area.

3.1.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site 50 hec as per kml map.

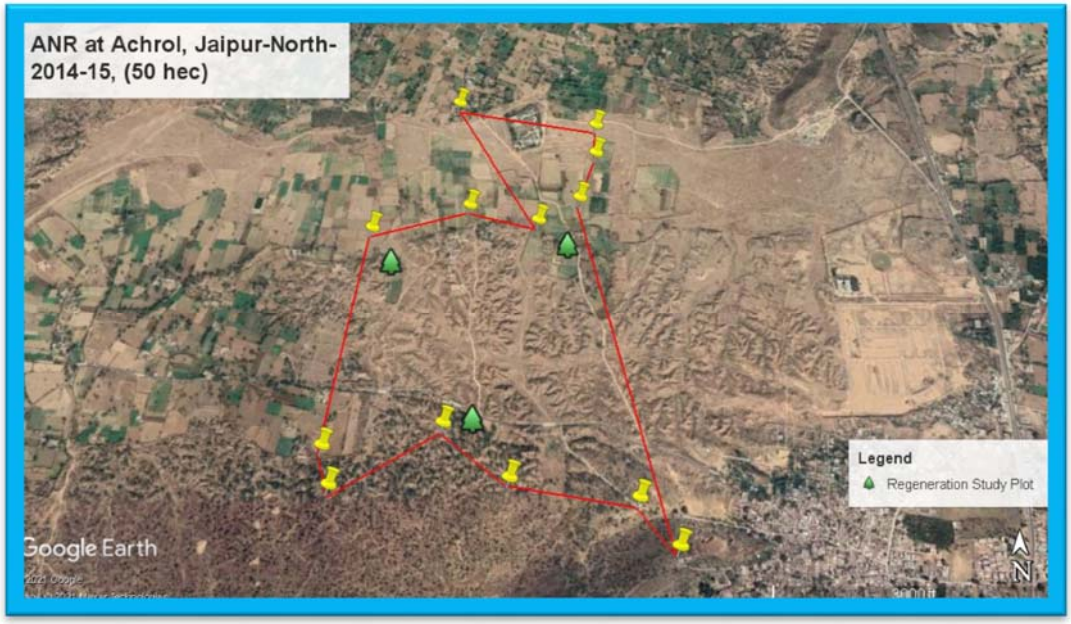


Fig: KML map of ANR at Achrol range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2013-14	-	-	-	1467500	140099	827940	493766	1461805
2014-15	-	-	-	346000	345867	-	-	345867
2015-16	-	-	-	152850	116265	3500	33036	152801
2016-17	-	-	-	82000	72131	-	9881	82012
2017-18	-	-	-	87000	78082	-	8808	86890

.3.2.1. Site-2: **Bera ki dhani-Bishangarh in Shahpura range:** The selected plantation has been carried out on 33.55 hec of land at Bera ki dhani-Bishangarh in Shahpura range during the year 2015-16. The activities were done under the NFL model. The GPS location of this selected site was N 27.18076 and E 75.541911 The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour and stony hard layer. Type of land was hard stony and hilly.

3.2.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 36679 pits have been made for plantation in total 33.55 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: NFL plantation at Bera ki dhani-Bisangarh

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Bera ki dhani, Bishangarh, a forest department nursery of Shahapura range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 4. Seedlings of *Acacia tortilis* (totalis), *Acacia nilotica* (desi babool), *Acacia leucophoelea (*ronj) and *Holoptelea integrifolia* (churail) were planted.

A total of 36679 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 1100 plants per hectare have been planted. So total number of plants planted was 36679 for 33.55 hectare of land. Type of plantation was block and technique of planting was pit.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

Fig: Field evaluation team at Bera ki dhani plantation

3.2.6. Natural Vegetation and Re generation: The area has been covered fully with vegetation due to this plantation. The growth of plants was good. Naturally growing plants were dhok, chila, khirni, churel, ronj. Pruning of plants of seedlings planted, seeds sown and existing vegetation was done.

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Anogeissus latifolia*-Dhok	203	3.30	27.30
2	*Butea monosperma*-Chola	64	4.30	28.30
3	*Writhia tinctoria*-Khirni	11	3.00	18
4	*Holpotelia integrifolia*-Churail	59	2.5	16
5	*Acacia leucopholea* -Ronj	113	2.7	14.3

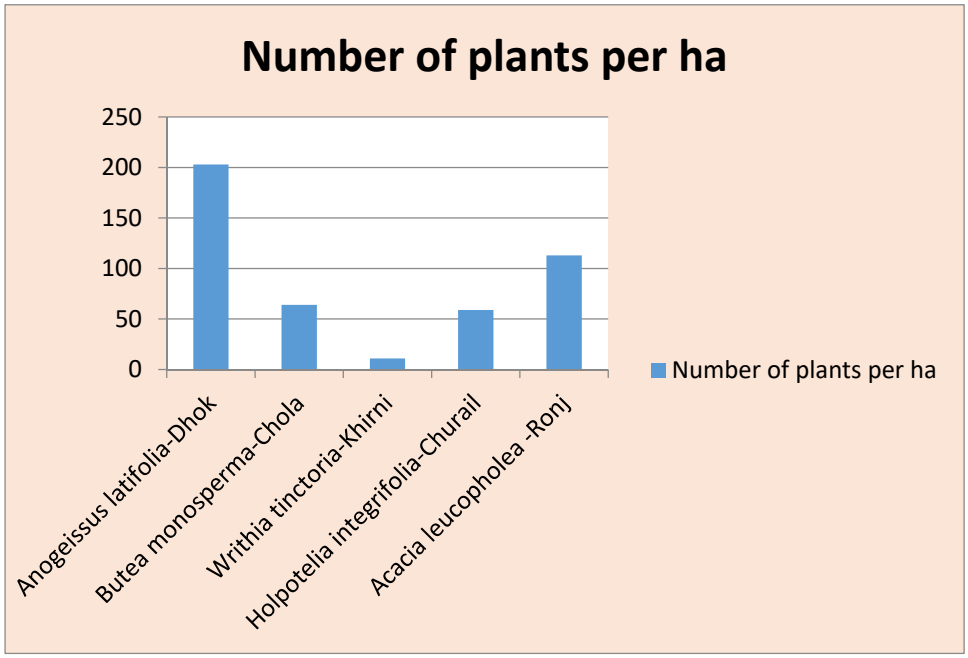


Fig: Species wise number of plants (per ha) in natural regeneration

3.2.7. Regeneration through seeds sowing: Seeds of species k*umtha, ber, ronj, neem and totalis* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.2.8. Protection Work: The selected NFL model plantation was **protected by ditch fencing of 32.65 RMT with average top width of 0.90, average depth of 1.20and average bottom width of 1.50m. Present condition of fencing was good. Fencing has been partially effective in controlling the biotic pressures.**

3.2.9. Soil and Water Conservation Measures: **There are 13346 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. These trenches were prepared for rainwater harvesting and soil conservation. Along with the trenches **sand check dam of 250 cum and one earthen bound of 167 cum were also present.**

3.2.10. Observations Recorded: Under this model, 1100 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 75.87% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 36679 plants comprising of four species were planted in the 33.55 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Fig: Measurement of ditch fencing

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia tortilis (totalis)	18638	13976	4662	75	2.4	24
Acacia leucophoelea (ronj)	6961	5221	1740	75	1.5	18
Holoptelea integrifolia (Churail)	5545	4137	1408	74.60	1.5	25
Acacia nilotica (desi babool)	5535	4492	1043	81	2.5	22
Total	**36679**	**27826**	8853	**75.87**		

Fig: Graph showing survival of different plants

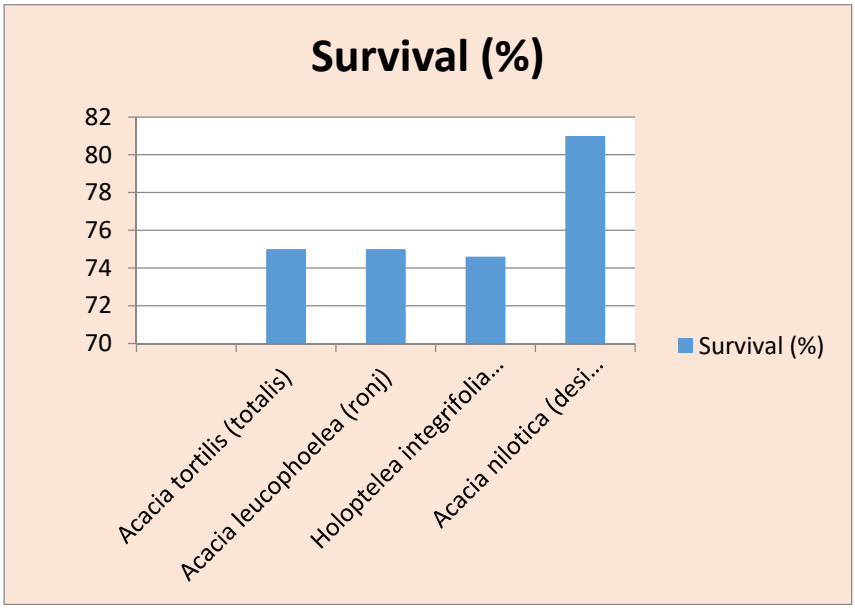


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of desi babool was highest followed by totalis, ronj and churail plants. The survival percentage of desi babool was maximum which is 81 % and for all other plants was 75%. All the plants planted in this site showed good survival rate.The reason for high survival of all plants was site specific species plantation and good protection.**

3.2.11. Budget and expenditure

	Cost estimate (Rs.in Lakh)				Expenditure (Rs. In Lakh)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	-	-	-	-	15.126	-	-	-

2016-17	-	-	-	-	4.19	-	-	-
2017-18	-	-	-	-	1.37	-	-	-
2018-19	-	-	-	-	1.43	-	-	-
2019-20	-	-	-	-	1.45	-	-	-
2020-21	-	-	-	-	1.60	-	-	-

3.2.11. GPS Location and KML file: The selected model under CAMPA plantation site measured 33.55 hec as per kml map.

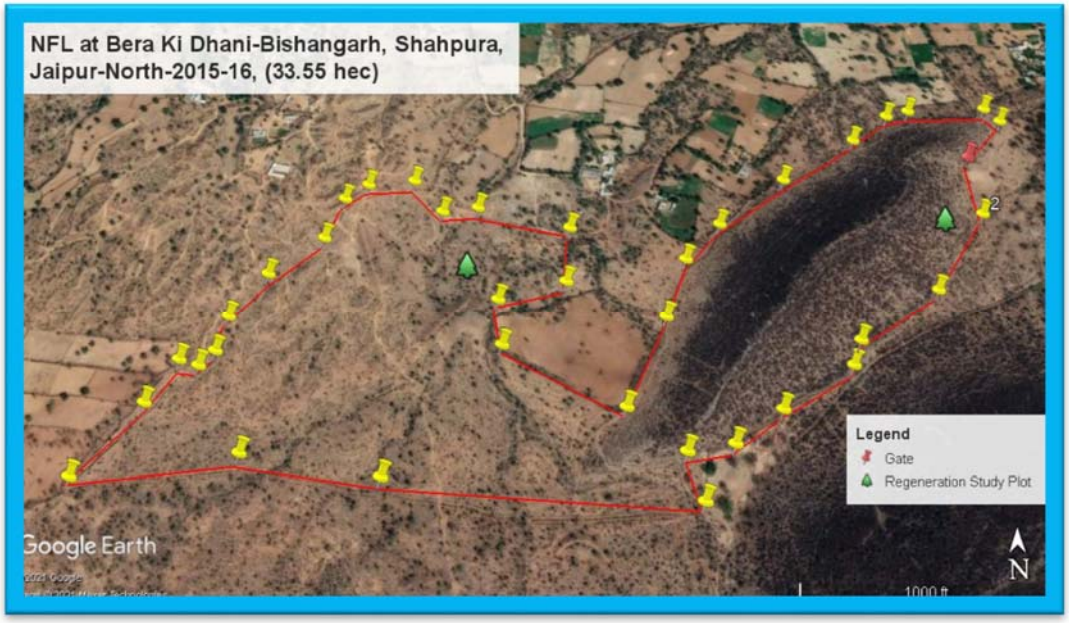


Fig: KML map of NFL at Bera ki dhani, Shahpura range plantation area

3.3.1. Site-3: **Devan in Shahpura range** : The selected plantation has been carried out on 50 hec of land at Devan in Shahpura range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 27.22409 and E 75.01469. The site was a forest land and selected for 100% evaluation. The soil was sandy loam and stony hard layer.

Fig: ANR plantation at Devan, Shahpura

3.3.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.**

After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.3.3. Nursery Developmen t for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Devan, a forest department nursery of Shahpura range. During monsoon these seedlings were planted.

3.3.4. Species Planted: The selected tree species under plantation were 6. Seedlings of *Acacia nilotica* (desi babool), *Acacia leucophoelea (*ronj), *Acacia tortilis* (totalis), *Zizyphus mauritiana* (ber) *Dalbergia sissoo* (shisham) and *Holoptelea integrifolia* (churail) were planted. **A total of 10000 numbers of seedlings were planted at the site.** Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land. Type of plantation was block. Pit technique of planting was used. **The choice of species under plantation appeared proper**. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.3.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.3.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Naturally growing plants were dhok, chila, khirnii, churel, neem, gurjan. The growth of plants was good.

Table-7: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Anogeissus latifolia*-Dhok	213	3.40	28.30
2	*Butea monosperma*-Chola	66	4.40	29.40
3	*Writhia tinctoria*-Khirni	27	2.1	11.3
4	*Holpotelia integrifolia*-Churail	73	3.5	23.6
5	*Azadiractha indica*-Neem	71	3.7	33
6	Gurjan	92	1.6	11

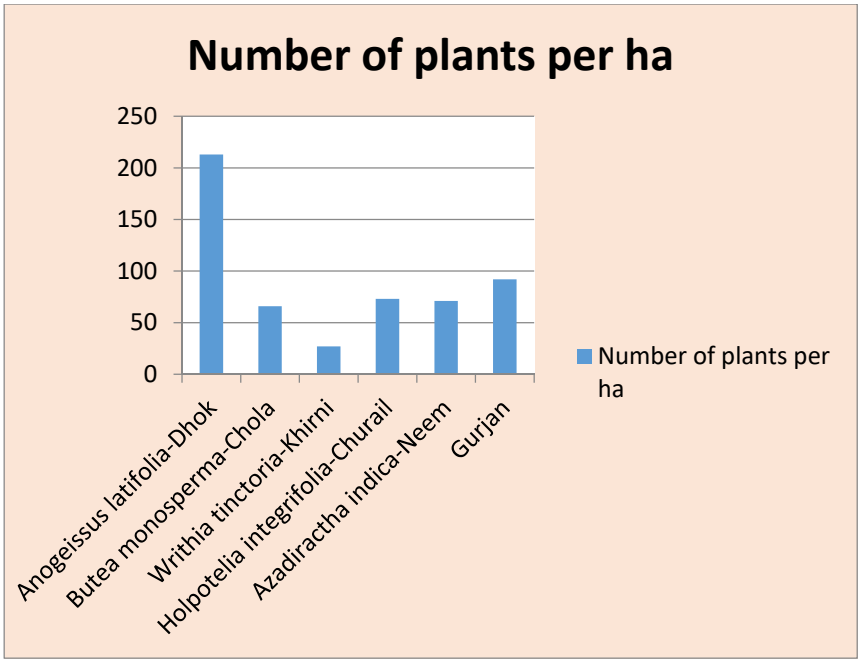


Fig: Species wise number of plants (per ha) in natural regeneration

3.3.7. Regeneration through seeds sowing: Seeds of species like desi babool, ronj, tortalis, kumtha have sown for natural regeneration. The growth of plants was good.

3.1.8. Protection Work: The selected ANR model plantation was **protected by ditch fencing of 2870 RMT with average top width of 1.50m, average depth of 1.20m and average bottom width of 0.90m. Fencing has been partially effective in controlling the biotic pressures.**

3.1.9. Soil and Water Conservation Measures: **There are 20008 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3m to 7 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation. In addition, soil and water conservation measure in the form of loose stone check dam has been found in this area. **Total 10 checkdam have been built of volume 142.76cum** (as per mb). The earthen bund prepared during plantation time has been filled up with soil due to high siltation.

Fig: Putting of lime on plants

3.1.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 71.1% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of four species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-8: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia tortilis (totalis)	5000	3248	1752	64.9	4.6	35
Acacia leucophoelea (ronj)	3000	2127	873	70.9	3	23
Dalbergia sissoo (shisham)	500	418	82	83.6	5.00	27
Zizyphus mauritiana (ber)	500	462	38	92.4	2.60	15
Acacia nilotica (desi babool)	200	151	49	75.5	2.90	22
Holoptelea integrifolia (churail)	800	705	95	88.1	1.10	30
Total	**10000**	**7111**	1593	**71.1**		

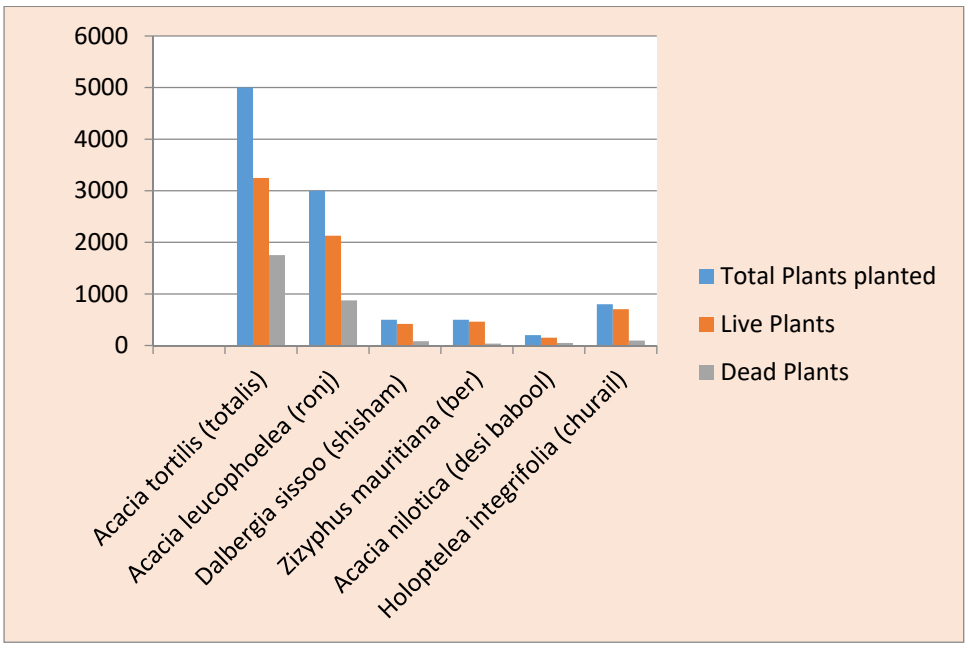


Fig: Graph showing survival of different plants

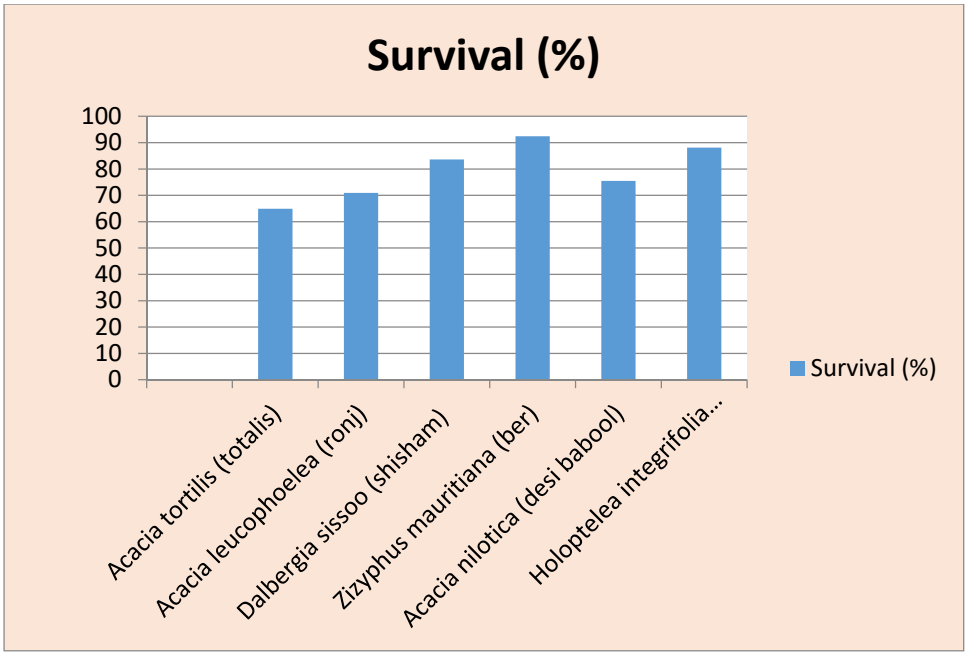


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ber plant was highest** followed by churel. **The survival percentage of ber was maximum which was 92.4% and churel was 88.1%. All plants planted in this site showed good survival rate.**

The reason for high survival was watering on time, timely execution and good protection.

3.3.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per kml map.

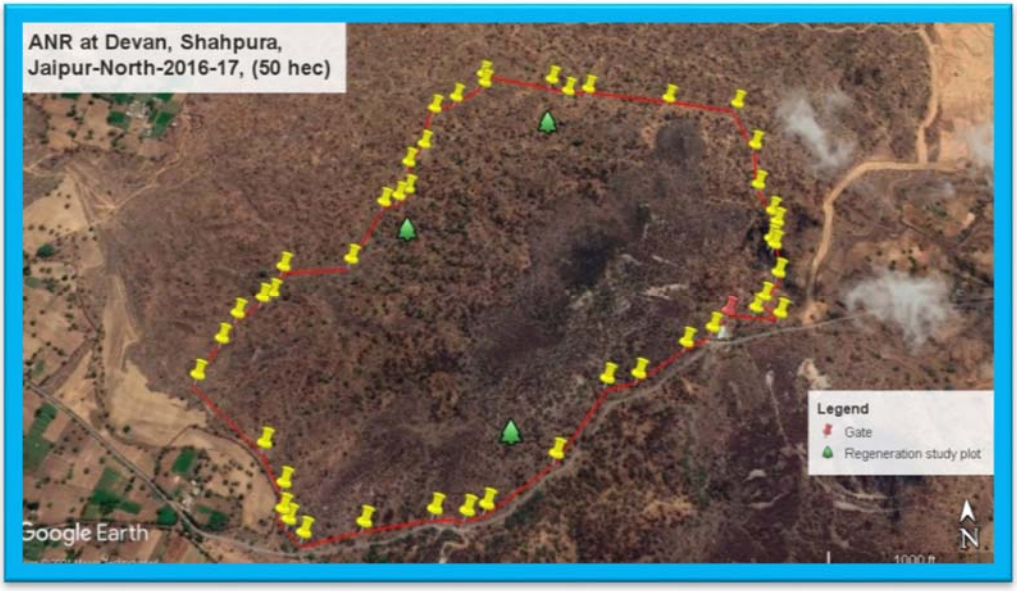


Fig: KML file of DFL at Sui, Jahazpur range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.in Lakh)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	-	-	-	-	-	-	-	16.56
2016-17	-	-	-	-	-	-	-	3.88
2017-18	-	-	-	-	-	-	-	1.44
2018-19	-	-	-	-	-	-	-	0.86
2019-20	-	-	-	-	-	-	-	0.92

3.4.1. Site-4: **Berki in Viratnagar range** : The selected plantation has been carried out on 50 hec of land at Berki in Viratnagar range during the year 2015-16. The activities were done under the DFL model. The GPS location of this selected site was N 27.17340 and E 76.06369. The site was a forest land and selected for 100% evaluation. The soil was clayey loam and stony hard layer.

3.4.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 35000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.4.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Berki, a forest department nursery of Viratnagar range. During monsoon these seedlings were planted.

Fig: DFL plantaion at Berki, Viratnagar

3.4.4. Species Planted: The selected tree species under plantation were 9. Seedlings of *Acacia nilotica* (desi babool), *Acacia leucophoelea (*ronj), *Pongamia pinnata* karanj), *Acacia tortilis* (totalis), *Zizyphus mauritiana* (ber), *Holoptelea integrifolia* (papad/churel), *Dalbergia sissoo* (shisham), *Azadirachta indica* (neem) and others (mix) were planted.

A total of 35000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare

have been planted. So total number of plants planted was 35000 for 50 hectare of land. Type of plantation was block. Pit technique of planting was used.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.4.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

Fig: Plants counting process on field

3.4.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Plants such as dhok, chila, ronj, kakeda, salar, neem and churel have been found grown naturally in this plantation area. The growth of plants was good.

Table-9: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Anogeissus latifolia*-Dhok	207	3.30	27.30
2	*Butea monosperma*- Chila	63	5.30	28.30
3	*Acacia leucopholea*- Ronj	14	3.30	27
4	Kakeda	42	3.30	18
5	*Boswellia sp.*- Salar	53	3	20
6	*Azadirachta indica*- Neem	63	4	27
7	*Holoptelia integrifolia*- Churel	59	2	12

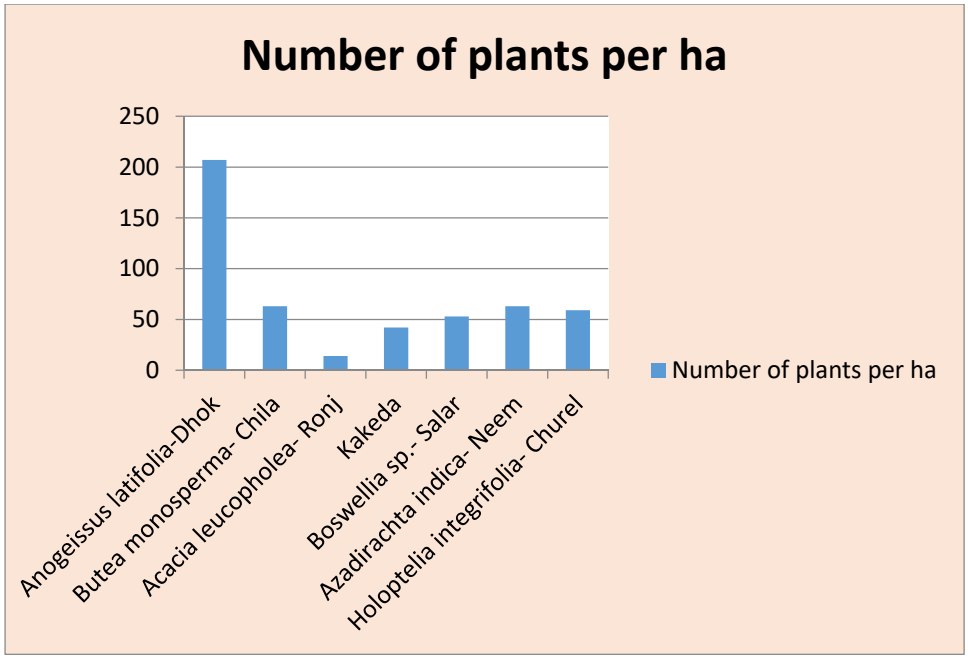


Fig: Species wise number of plants (per ha) in natural regeneration

3.4.7. Regeneration through seeds sowing: Species like desi babool, neem, totalis, kumtha seeds have sown for natural regeneration. The growth of naturally grown plants is good. Pruning of plants of seedlings planted, seeds sown and existing vegetation was done.

3.4.8. Protection Work: The selected DFL model plantation was **protected by stone wal fencing of 1250 RMT and ditch fencing of 2500 RMT with average top width of 0.90m, average depth of 1.20m and average bottom width of 1.50m. Present condition was good. Fencing has been partially effective in controlling the biotic pressures.**

3.4.9. Soil and Water Conservation Measures: **There are 12500 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 2m to 7 m long with 0.45*4.5 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation. In addition, soil and water conservation measure in the form of earthen bund of size 1537m^S has been found in the plantation area. **Also there were 35 loose stone check dam of volume 360 cum in 50 hec of plantation area.** The size of check dam varied from 6.5*3.1*.8 to 10.5*2.5*.9 cum. The extent of stabilization of gullies were good upto certain extent.

Fig: Measurement of protection stone wall

3.4.10. Observations Recorded: Under this model, 700 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 59.41% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good.

A total of 35000 plants comprising of nine species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species.

The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-10: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
Acacia tortilis (totalis)	23500	14335	9165	61	4.50	30
Acacia nilotica (desi babool)	2300	1265	1035	55	4.50	30
Acacia leucophoelea (ronj)	300	180	120	60	3.00	29
Dalbergia sissoo (shisham)	2040	1224	816	60	6.00	35
Holoptelea integrifolia (papad/churel)	500	250	250	50	3.00	20
Azadirachta indica (neem)	180	90	90	50	3.00	25
Zizyphus mauritiana (ber)	5180	2849	2331	55	2.50	18
Pongamia pinnata (karanj)	200	104	96	52	2.20	18
*Others (*Mix)	800	520	280	65	3.00	15
Total	**35000**	**20817**	14183	**59.41**		

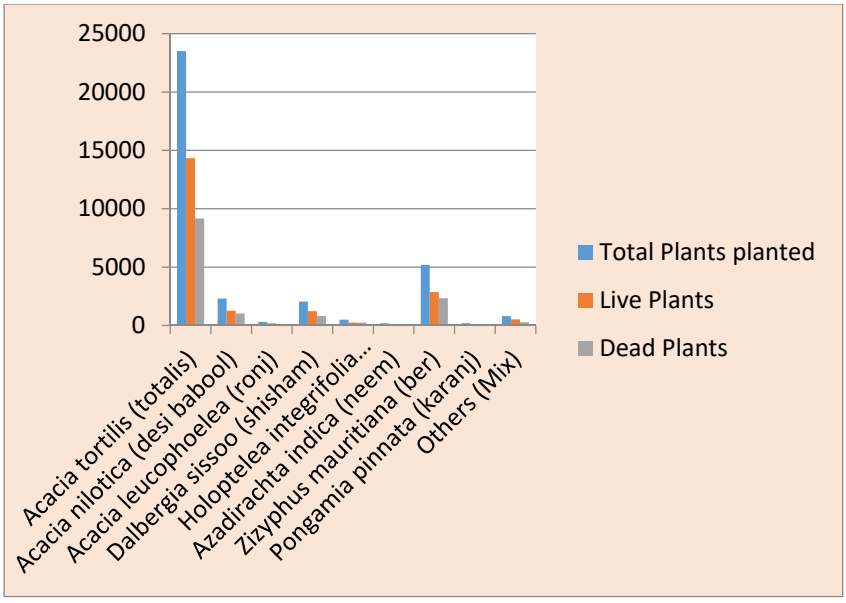


Fig: Graph showing survival of different plants

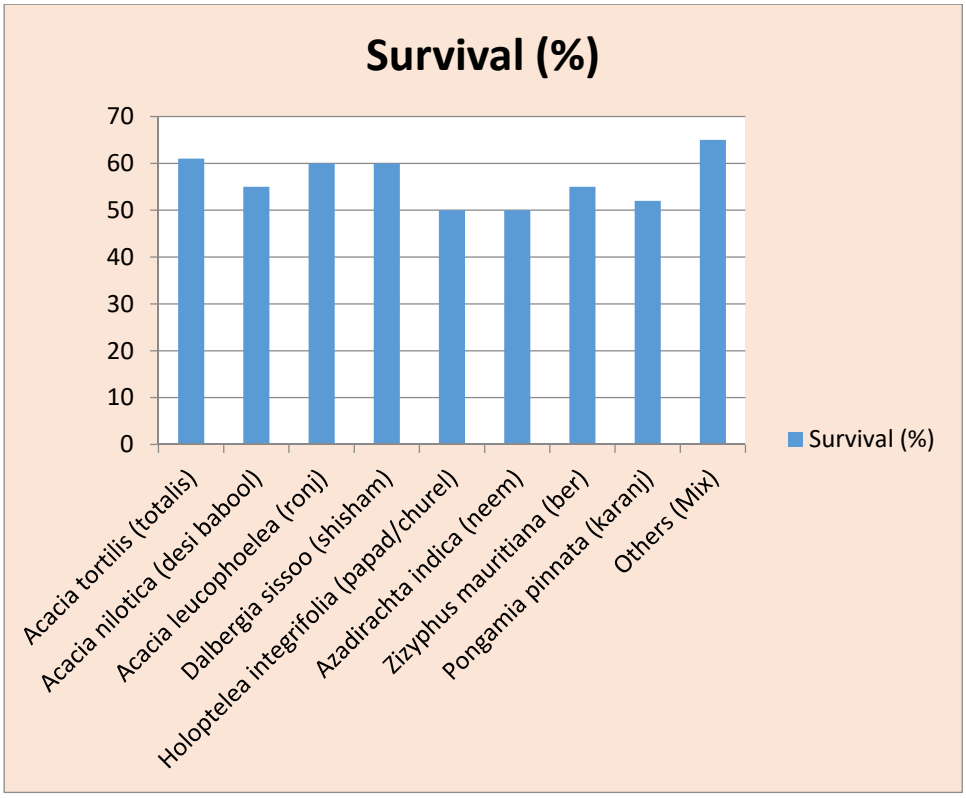


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of totalis, ronj and shisham plants were good about 61% of all. All plants planted in this site showed moderate survival rate.**

Hilly area, scanty rainfall and low watering contribute to low survival of plants in this area. Due to hilly area, transportation of materials and keeping protection was difficult.

3.4.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

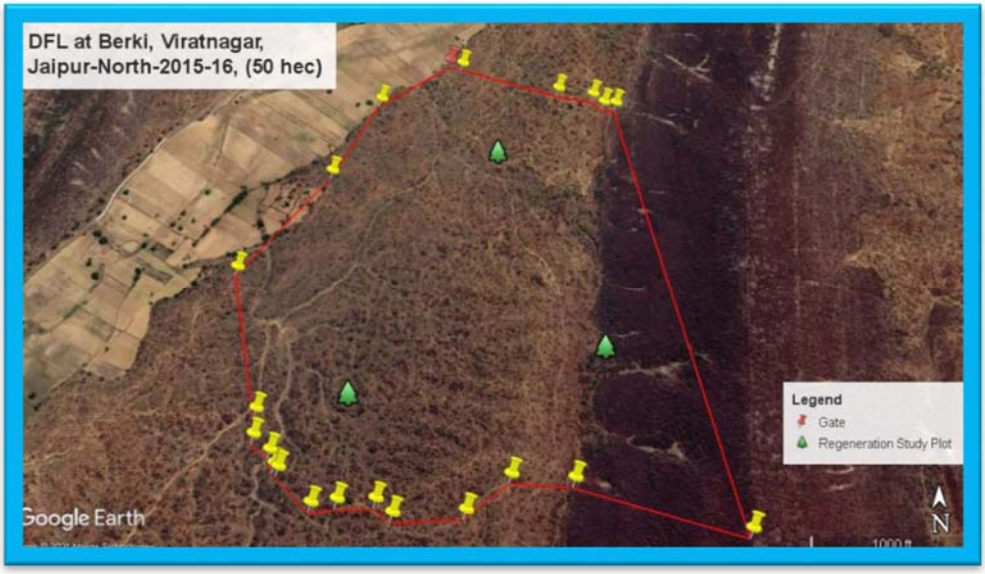


Fig: KML file of DFL at Berki, Viratnagar range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-	-	125669	703873	504755	1334297
2015-16	-	-	-	-	1477672	185100	-	1662772
2016-17	-	-	-	-	169617	42699	-	212316
2017-18	-	-	-	-	221290	-	-	221290
Total	-	-	-	-	-	-	-	**3430675**

4. Evaluation for construction site

4.1. Site 1: Forest Guard Chowki at Talwa Bhihajar in Viratnagar range: At Viratnagar range, one forest guard chowki has been constructed at Talwa Bhihajar. The chowki was constructed in the year 2015-16. Construction work appeared to be good and useful. This chowki was constructed at the cost of Rs. 5 Lakh. GPS location of this area was Longitude- E 76°,14,'67" and Latitude-N 27°,35',11 ". The construction work started in the year of 2015 after approval and completed in the 2016. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building. Building need maintenance.

Fig: Forest guard chowki at Viratnagar

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Jaipur (N) division.

Table-11: Quantitative assessment of plantation work created under CAMPA in Jaipur (N) division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	ANR Achrol 50 Ha	77.76	8
2	NFL Bera ki dhani-Bishangarh 33.55 Ha	75.87	8
3	ANR Devan 50 Ha	77.1	8
4	DFL Berki 25 Ha	59.41	6

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-12: Quantitative assessment of constructions work created under CAMPA in Jaipur (N) division

Sr. no.	Items	Name of the site	Rank of Item (Between 0 to 10)*
1	Forest guard chowki	Talwa Bhihajar in Viratnagar range	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Jaipur (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Jaipur-T Forest Division. This Forest Division with 5 Forest Ranges namely Amer, Dudu, Jaipur territorial, Phagi and Bassi.

Fig: Location of Jaipur district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Jaipur (T) Forest Division were as given in table-1.

Forest Range	Name of Site	Year of Plantation	Ha.	Model
Amer	Daulatpura	2014-15	48.16	DFL

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Jaipur (T) Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Dudu	Bhaislana Bhadwa	2015-16	Forest Guard Chowki
Dudu	Kanchroda	2014-15	Forest Guard Chowki

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Daulatpura, Amer range** : The selected plantation has been carried out on 48.16 hec of land at Daulatpura katra in Amer range during the year 2014-15. The activities were done under the Degraded Forest Land (DFL) model. The GPS location of this selected site was N 27, 02,42.3 and E 75,50,07.0. The site was a forest land and selected for 100% evaluation. The soil was clayey loam and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 34000 pits have been made for plantation in total 48.16 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: DFL plantation at Daulatpura, Amer

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Daulatpura, a forest department nursery of Amer range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 5. Seedlings of *Dalbergia Sissoo* (shisham), *Acacia tortilis* (totalis), *Acacia nilotica (d*esi babool*), Acacia leucopholea* (ronj) and others were planted.

A total of 34000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have been planted. So total number of plants planted was 34000 for 48.16 hectare of land. Map of planting site was prepared.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was very good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

Fig: Putting lime on plants for marking of counting of plants

3.1.6. Natural Vegetation and Rege neration: Due to this plantation, the vegetation cover has increased to some extent. Naturally growing plants were dhok, kumtha, churel, totalis, neem, kakeda. The growth of plants was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Anogeissus pendula*-Dhok	73	525	21.5
2	*Acacia senegal*- Kumtha	125	538	24
3	*Acacia tortilis*- Totalis	146	604	23
4	*Holpotelia integrifolia*-Churel	127	721	25
5	*Azadiractha indica*-Neem	146	601	23
6	Kakeda	177	355	21

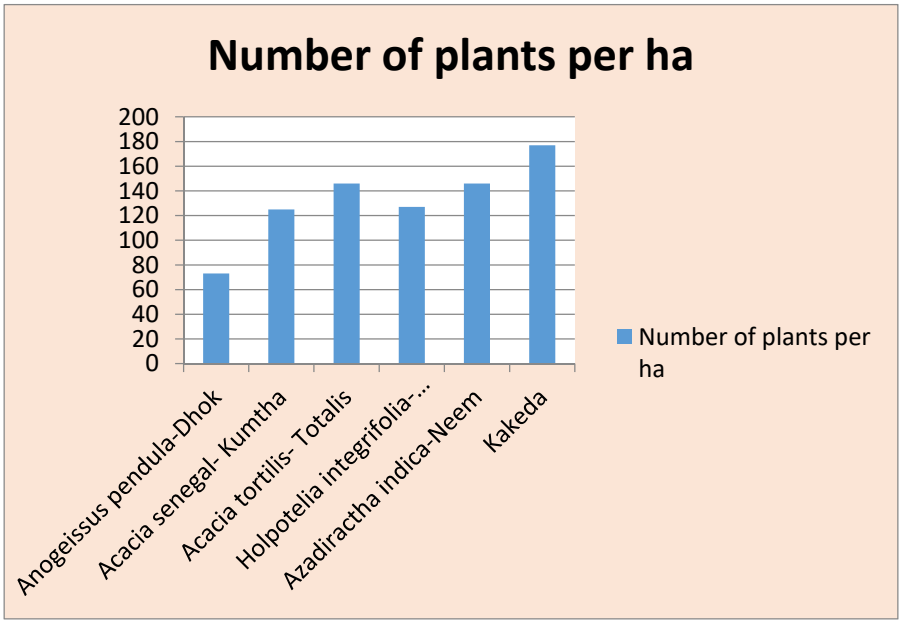


Fig: Species wise number of plants (per ha) in natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of species *ronj,churel, kumtha, tortilis, etc.* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected DFL model plantation was **protected by ditch fencing of 3704 RMT with average top width of 0.90m, average depth of 1.20m and average bottom width of 1.50m. Present condition of fencing was good. Fencing has been partially effective in controlling the biotic pressures.**

3.1.9. Soil and Water Conservation Measures: **There were 14448 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3m to 7 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation. 86 loose earthen bund (check dam) of volume 1799.92 cum were present.

3.1.10. Observations Recorded: Under this model, 700 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 71.83% at the site.** Plant species girth breast height was also measured. A total of 34000 plants comprising of eight species were planted in the 48.16 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Fig: Measurement of plants on field

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Dalbergia sissoo (Shisham)	13000	9360	3640	72	7.7	18
Acacia tortilis (Totalis)	17500	12550	4950	71.7	6.7	13
*Acacia nilotica (*Desi babool)	2000	1440	560	72	7.9	17
Acacia leucophoelea (Ronj)	1000	723	277	72.3	6.1	12
Others	500	352	148	70.4	5.2	9
Total	**34000**	**24425**	24425	**71.83**		

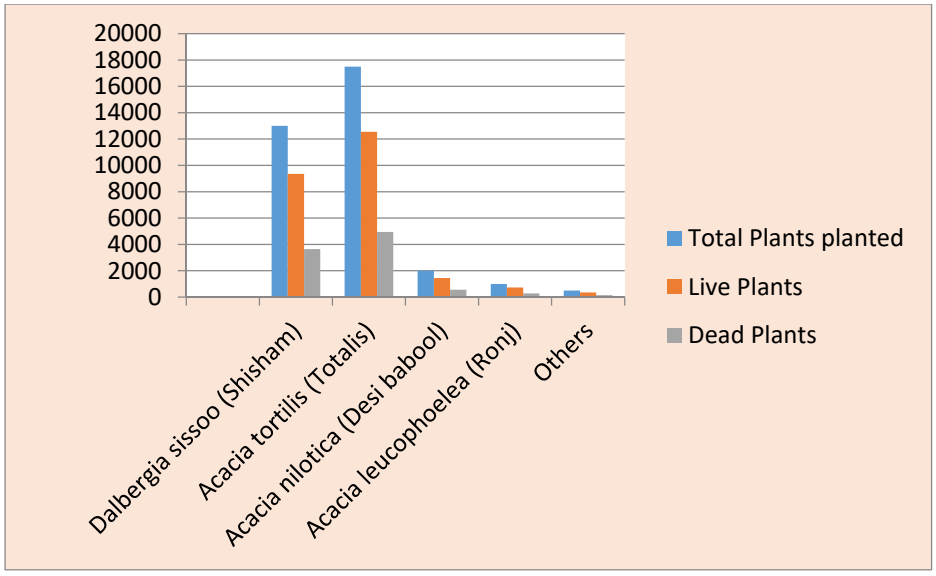


Fig: Graph showing survival of different plants

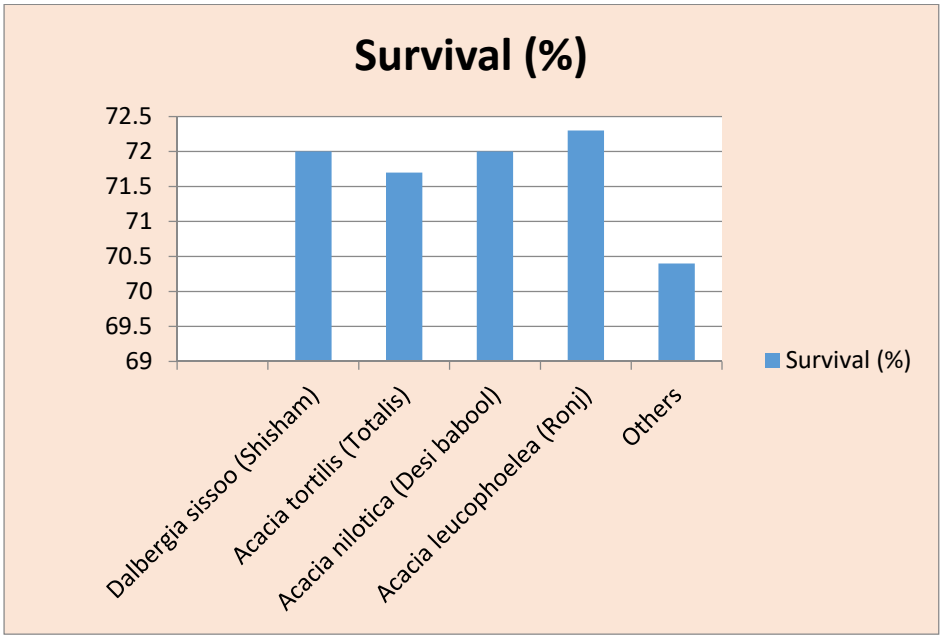


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ronj plant was highest** followed by desi babool and shisham. **The survival percentage of ronj was maximum of 72.3 % and both desi babool and shisham was 72%. All the plants showed good survival.**

The reason for good survival of plants was watering on time, timely execution and good protection despite the hilly area.

Fig: Field evaluation team

3.1.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site 50 hec as per kml map.

Fig: KML map of DFL plantation at Daulatpura, Amer range

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2013-14	-	-	-					1280598
2014-15	-	-	-					1211140
2015-16	-	-	-					424699
2016-17	-	-	-					200956
2017-18	-	-	-					248241
2018-19								212971
2019-20								199664
2020-21								244232

4. Evaluation for construction site

C.4.1. Site 1: <u>Forest Guard Chowki at Bhaislana Bhadwa in Dudu range</u>

At Dudu range, one forest guard chowki has been constructed at Bhaislan a Bhadwa. The chowki was constructed in the year 2015-16. Construction work appeared to be good and useful. This chowki was constructed at the cost of Rs. 4,50,855/- (instead of estimated 5 Lakh).

Fig: Bhaislana Bhadwa forest guard chowki

GPS location of this area was Longitude- E 75°,27,'728" and Latitude-N 27°,05',7019". The construction work started in the year of 2015 after approval and completed in the 2016. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

4.2. Site 2: <u>Forest Guard Chowki at Kanchroda in Dudu range</u>

At Dudu range, one forest guard chowki has been constructed at Bhaislana Bhadwa. The chowki was constructed in the year 2014-15. Construction work appeared to be good and useful. This chowki was constructed at the cost of Rs. 4,96,233/- (instead of estimated 5 Lakh). GPS location of this area was Longitude- E 75.261332 and Latitude-N 26.890353.

Fig: Kanchroda forest guard chowki

The construction work started in the year of 2014 after approval and completed in the 2015. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

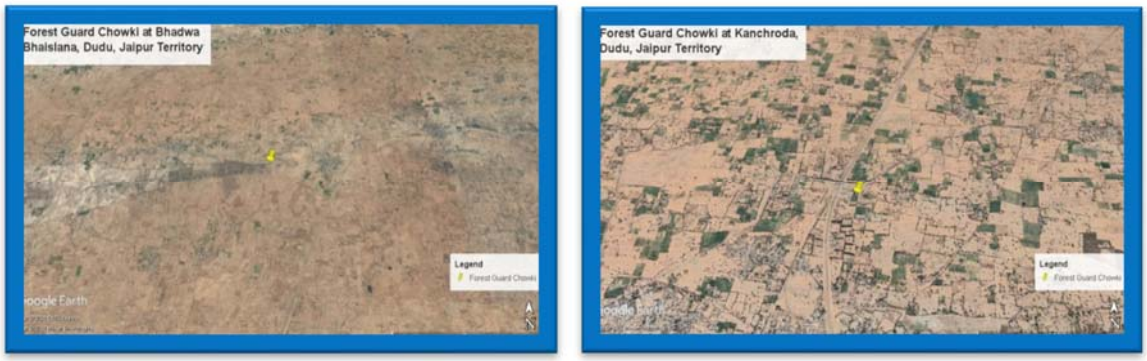


Fig: GIS mapping of Bhaislana Bhadwa and Kanchroda forest guard chowki

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Jaipur (T) division.

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	DFL at Daulatpura, Amer	71.83	8

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Sr. no.	Items	Name of the site	Rank of Item (Between 0 to 10)*
1	Forest guard chowki	Bhaislana Bhadwa, Dudu	7
2	Forest guard chowki	Kanchroda, Dudu	8

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Jaipur-WL (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2016 in Jaipur WL Forest Division. This Forest Division with 3 Forest Ranges namely Raiser, Nahargarh and Jamwaramgarh.

Fig: Location of Jaipur district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Jaipur WL Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Physical Target Achieved
Raisar	ANR Ghoret of Raisar of 50 ha	2016-17	100%
Raisar	ANR at Kanikhor of Raisar of 50 ha	2016-17	100%

2.2. Selected construction work sites for Evaluation

The selected construction work site of Jaipur WL Forest Division was as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Nahargarh	Forest Guard Chowki at Barahgaon Bhatia	2014-15	100%

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Ghoret of Raisar range:** The selected plantation has been carried out on 50 hac of land at Ghoret village of Raisar range during the year 2016. The activities were done under the Assisted Natural Regeneration (ANR) model. The GPS location of this selected site was 27°,04',08.4''N Latitude and 76°,05',46.7''E Longitude. The site was a forest land and selected for 100% evaluation. The soil was hard stony layer. The area belongs to Hilly area.

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10,000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.1.3. Nursery D evelopment for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Ghoret, a forest department nursery of Jaipur WL range. During monsoon these seedlings were planted.

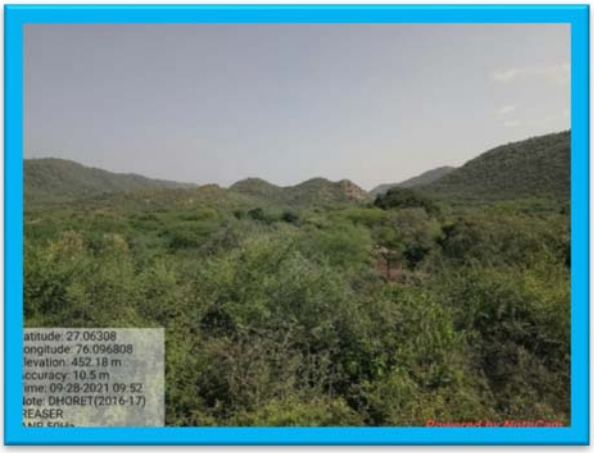


Fig: ANR plantation at Dhorate, Raisar

3.1.4. Species Planted: The selected tree species under plantation were 6. Seedlings of *Acacia nilotica* (Desi babul), *Acacia lecopholea* (Ronj), *Acacia senegal* (Kumtha), *Acacia tortilis* (Totalis), *Holoptelea integrifolia* (Churel), *Azadirachta indica* (Neem) were planted. **A total of 10,000 numbers of seedlings were planted at the site.** Seedlings of above plants were planted. Seedlings were planted block wise according to the availability of space in the plantation area.

Seedlings were planted in block. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 1000 for 50 hectare of land.

The choice of species under plantation appeared proper. The plants selected for growing in this site were specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

Fig: Measurement of plants on field

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Regeneration: The area comes under reserved forest where the present existing tree species were Dhok, Salar, Ronj, Gurjan and Kumtha. **The growth of all types of existing plant species was found to be good.**

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement.

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Anogeissus latifolia* (Dhok)	177	4	27
2	*Boswellia serrata* (Salar)	114	7	29
3	*Acacia leucophloea* (Ronj)	93	4.16	15
4	*Dipterocarpus sp* (Gurjan)	65	6	12
5	*Acacia senegal* (Kumtha)	93	5	18

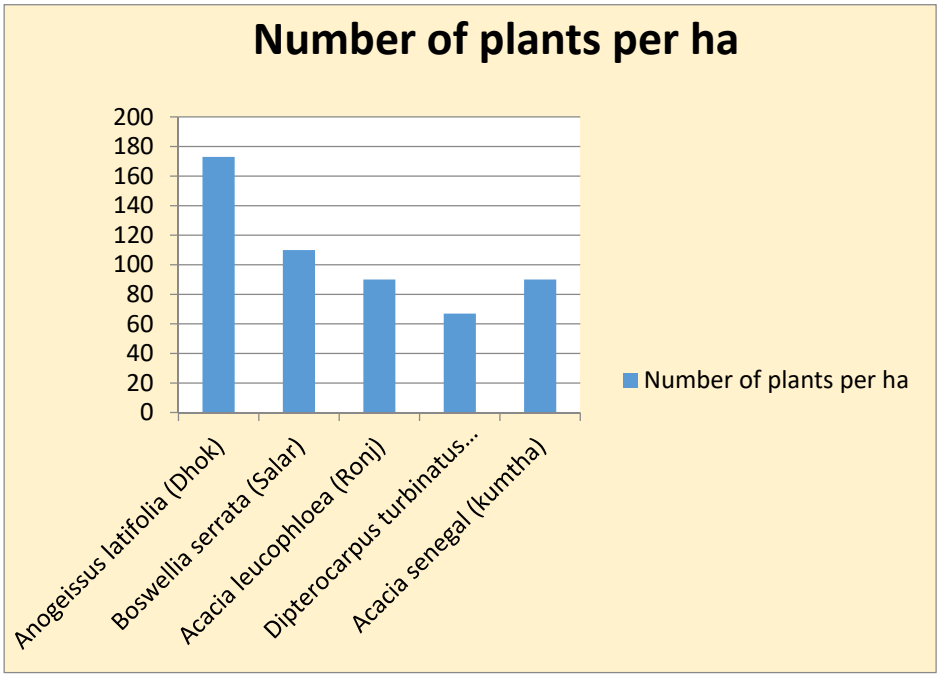


Fig: Graph showing number plants of natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of Kumtha, Ronj, Babool and Khejri species were sown on edges of contour trenches. **The growth of seedlings from seeds were poor.**

3.1.8. Protection Work: The selected ANR model under CAMPA plantation was **protected by loose stone wall fencing of 2025 RMT and also by ditch fencing surrounding of 1320 RMT. Condition of loose stone wall and trench were found to be good and effective.**

Fig: Measurement of ditch fencing

3.1.9: Soil and Water Conservation Measures: **There were 13000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of contour varied from 3.5 m to 6.9 m long with 0.45 x 0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation. Along with contour trenches there were 18 loose stone check dams in 50 hec of plantation site. **The total area of loose stone check dam was 100.74 cum. Because of the check dam the extent of civilization of gullies was found to be good. Also 79.95 cum earthen bund was present in the plantation area for water conservation measure.**

3.1.10: Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 67.5% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of six species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Fig: Putting of lime on plants for counting process

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia nilotica (Desi Babul)	3500	2334	1166	66.68	5.2	25
Acacia leucophloea (Ronj)	2000	1051	949	52.55	4.1	28
Acacia senegal (Kumtha)	1500	941	559	62.73	5.1	27
Acacia tortilis (Totalis)	1000	883	117	88.30	4.3	23
Holoptelea integrifolia (Churel)	1500	1200	300	80.00	3.8	21
Azadirachta indica (Neem)	500	341	159	68.20	4.5	18
Total	**10000**	**6750**	**3250**	**67.50**		

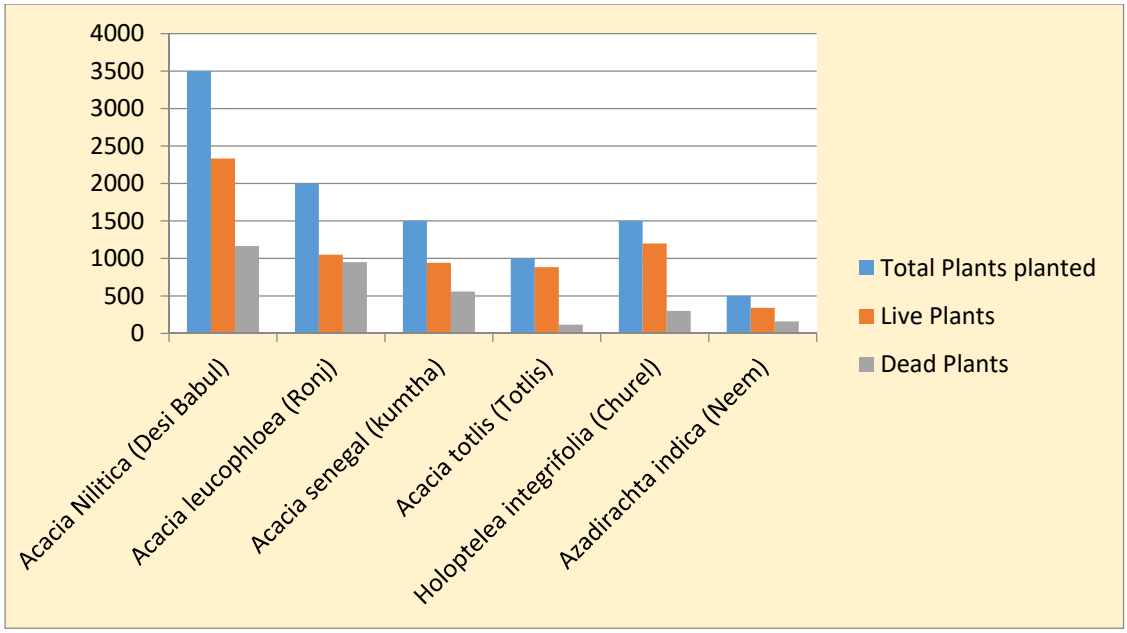


Fig: Graph showing survival of different plants

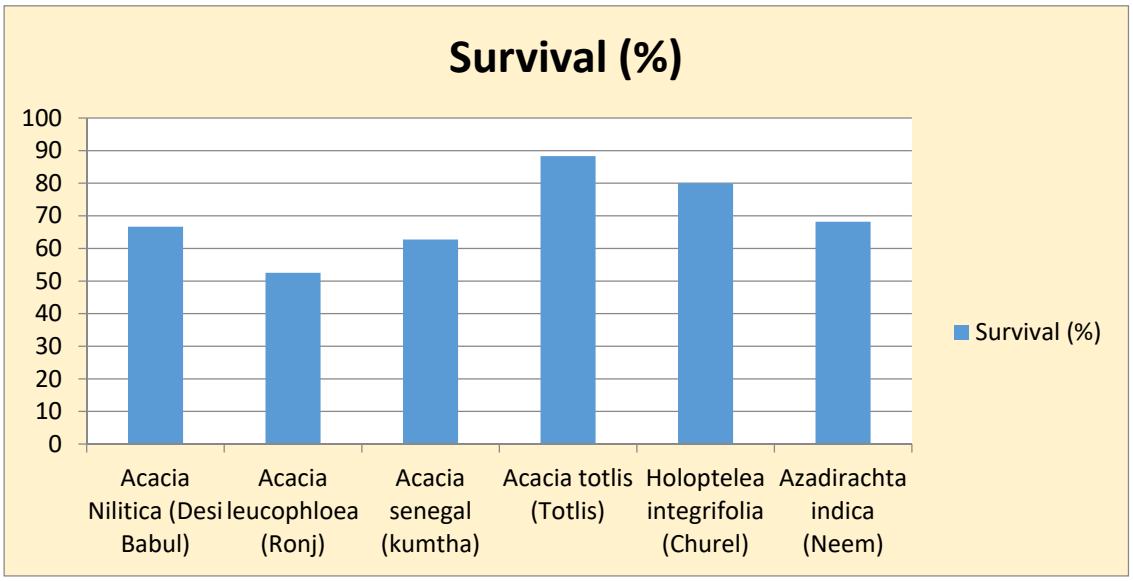


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Totalis plant was highest** followed by Churel. **The survival percentage of Totalis was maximum of 88.3 % and Churel was 80%. All the plants planted in this site showed good survival rate.**

3.1.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site 50 hec as per kml map.

Fig: KML map of ANR plantation at Ghoret, Raisar range

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC work**	**Fencing**	**Total**
2015-16	-	-	-	-	-	-	-	16,53,529
2016-17	-	-	-	-	-	-	-	3,81,191
2017-18	-	-	-	-	-	-	-	1,62,796
2018-19	-	-	-	-	-	-	-	81,604
2019-20	-	-	-	-	-	-	-	89,239

3.2.1. Site-2: The selected plantation has been carried out on 50 hac of land at Kanikhor village of Raisar range during the year 2016. The activities were done under the Assisted Natural Regeneration (ANR) model. The GPS location of this selected site was 27°,06'30.5''N Latitude and 76°09'21.6''E Longitude. The site was a forest land and selected for 100% evaluation. The soil was Clay loam with hard stony layer. The area belongs to hilly area.

3.2.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hac of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Kanikhor, a forest department nursery of Jaipur WL range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 3. Seedlings of *Acacia nilotica* (Desi Babul), *Acacia lecopholea* (Ronj) and *Holoptelea integrifolia* (Churel), were planted. **A total of 10,000 numbers of seedlings were planted at the site.** Seedlings of above plants were planted. Seedlings were planted block wise according to the availability of space in the plantation area. Seedlings were planted in block. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10,000 for 50 hectare of land.

Fig: ANR plantation at Kanikhor, Raiser

The choice of species under plantation appeared proper. The plants selected for growing in this site were specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of providing irrigation for plantation in this model of ANR.

3.2.6. Natural Vegetation and Regeneration: The area comes under reserved forest where the present existing tree species were *Acacia lecopholea* (ronj), *Acacia senegal* (kumtha) and *Anogeissus pendula* (dhonk). **The growth of all types of existing plant species was found to be good.**

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1.	*Anogeissus pendula* (Dhonk)	170	5.2	25
2.	*Acacia leocophlea (Ronj)*	121	4.1	28
3.	*Acacia senegal* (Kumtha)	127	3.8	21

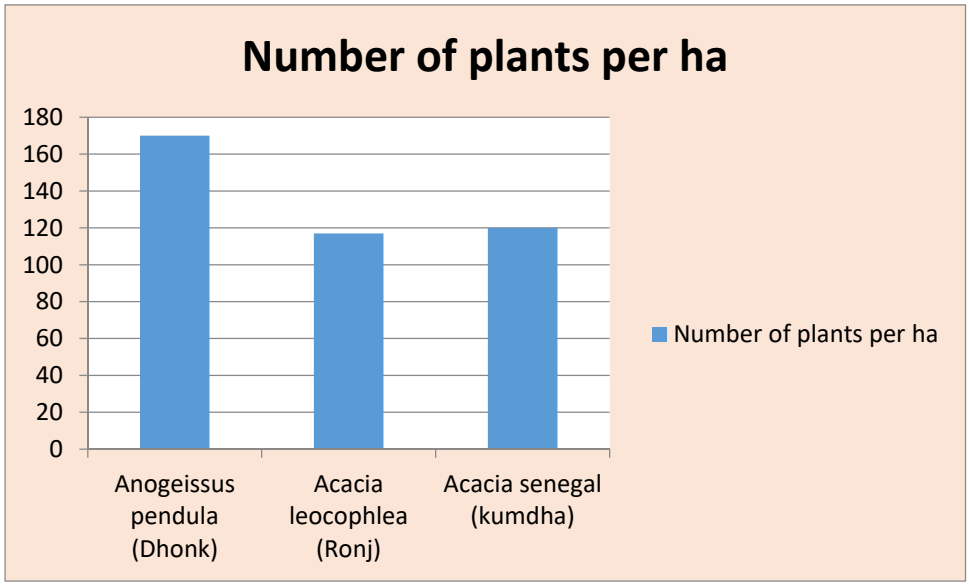


Fig: Graph showing number plants of natural regeneration

3.2.7. Regeneration through seeds sowing: Seeds of Desi babul, Ronj, Neem, and Churel species were sown on edges of contour trenches. **The growth of seedlings from seeds were good.**

3.2.8. Protection Work: The selected ANR model under CAMPA plantation was **protected by loose stone wall fencing of 2150 RMT and also by ditch fencing 1330 RMT. Ditch fencing as well as the loose stone wall was in good condition.**

3.2.9. Soil and Water Conservation Measures: **There were 10000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area.

Fig: Measurement of stone checkdam

The size of contour varied from 3 m to 8 m long with 0.45 x 0.45 m^2 in width and depth. These trenches were prepared for rainwater harvesting and soil conservation. Along with contour trenches there were 76 loose stone check dams in 50 hec of plantation site. **The total area of loose stone check dam was 428 cum. Because of the check dam the extent of civilization of gullies was found to be good.**

3.2.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 64.9% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of four species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants	Average gbh (cm)
Acacia nilotica (Desi babul)	500	331	169	66.20	5.2	25
Acacia lecopholea (Ronj)	9000	5837	3163	64.85	4.1	28
Holoptelea integrifolia (Churel)	500	330	170	66.00	3.8	21
Total	**10000**	**6498**	**3502**	**64.9**		

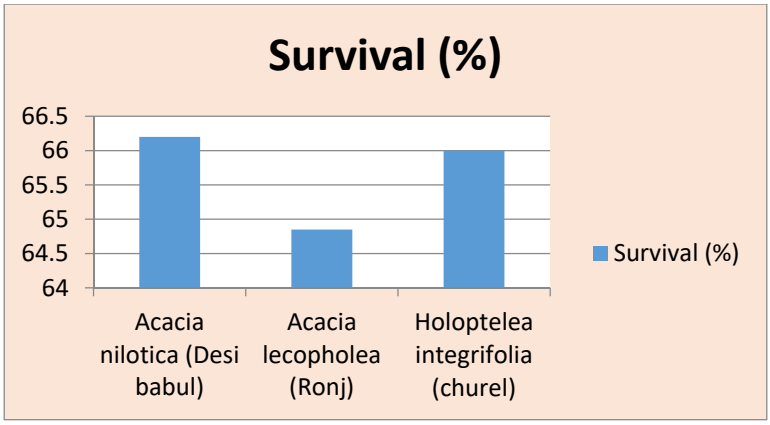


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Desi babul plant was highest** followed by Churel. **The survival percentage of Desi babul was maximum of 66.20 % and churel was 66%.**

Fig: Measurement of plants on field

3.2.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per kml map.

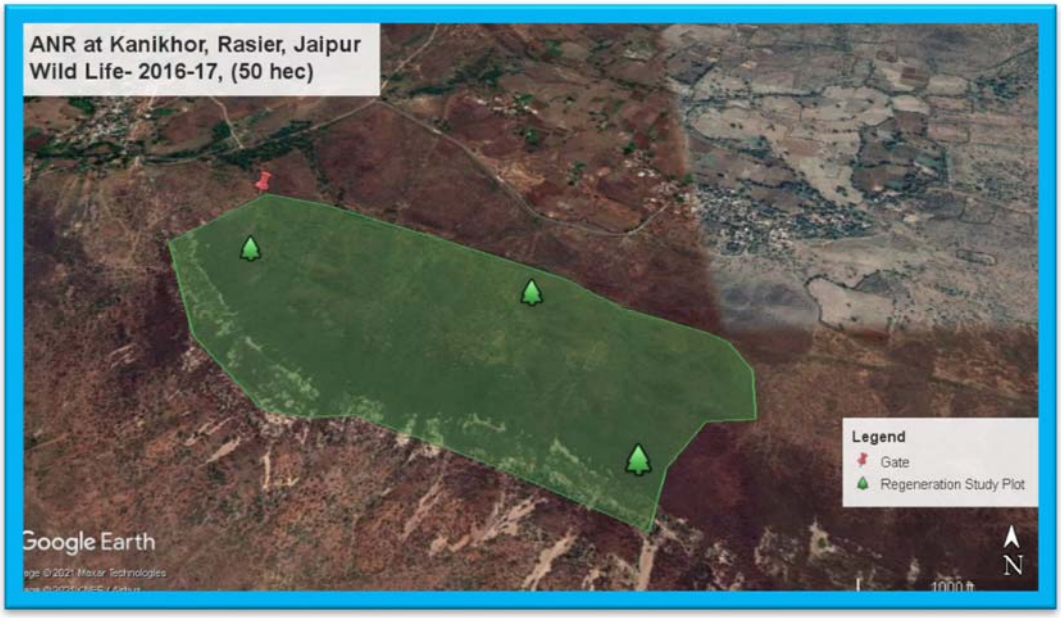


Fig: KML file of ANR plantation at Kanikhor, Raisar

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	-	-	-					1655754
2016-17	-	-	-					389393
2017-18	-	-	-					162793
2018-19								81604
2019-20								88373

4. Evaluation of Construction Works Sites

Site 1: <u>Forest Guard Chowki at Baragaon Bhatia in Nahargarh range:</u> At Nahargarh range, one forest guard chowki has been constructed at Baragaon Bhatia. The chowki was constructed in the year 2014-15. This chowki was constructed at the cost of Rs. 4,85,983/- (instead of estimated 5 Lakh). GPS location of this area was Longitude- E 75°,10,'10.59" and Latitude-N 27°,01',52.71". The construction work started in the year of 2014 after approval and completed in the 2015. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building. The condition of the chowki was not good and structural crack has developed at many places of the building. Repair and maintenance need to be done.

Fig: GIS mapping of forest guard chowki at Nahargarh

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Jaipur -WL division.

Table-7: Quantitative assessment of plantation work created under CAMPA in Jaipur-WL division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	ANR at Ghoret, Raisar 50 Ha	67.5	7

2	ANR at Kanikhor, Raisar 50 ha	64.9	7

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-8: Quantitative assessment of constructions work created under CAMPA in Jaipur-WL division

Sr. no.	**Items**	**Name of the site**	**Rank of Item (Between 0 to 10)***
1	Forest guard chowki	Baragaon Bhatia, Nahargarh range	6

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Jaisalmer (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Jaisalmer Forest Division. This Forest Division with 2 Forest Ranges namely Jaisalmer and Dabla.

Fig: Location of Jaisalmer district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Jaisalmer Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Physical Target Achieved
Jaisalmer	NFL Mokla Parevar 50 Ha	2015-16	100%
Jaisalmer	NFL Mokla Parevar 50 Ha	2016-17	100%
Jaisalmer	NFL Mokla Parevar 25 Ha	2014-15	100%

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Jaisalmer Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Jaisalmer	Chhayan	2014-15	20 boundary pillars
Dabla	Kodiyasar	2015-16	Stone wall

3. Results and evaluation

3.1. Plantations Evaluation at

C.3.1.1. Site-1: **Mokla Parevar in Jaisalmer range (2015-16):** The selected plantation has been carried out on 50 hec of land at Mokla Parevar in Jaisalmer range (2015-16). The selected plantation has been carried out on during the year 2015-16. The activities were

done under the NFL model. The GPS location of this selected site was N 27.114407 and E 70.464222. The site was a forest land and selected for 100% evaluation. The soil was sandy having low moisture holding capacity.

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Total 25000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: Mokla plantation entry gate

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Mokla Parevar, a forest department nursery of Jaisalmer range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 5. Seedlings of *Zizyphus mauritiana* (ber), Acacia senegal (kumtha), *Acacia tortilis* (totalis), *Tecomella undulata* (rohida) and *Salvadora persica* (jaal) were planted.

Per hec 500 plants have been planted (whereas as per the guideline of NFL, 1100 plants per hec should be planted). A total of 25000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise and in a block one type of species has been planted. Plantation journal was found by the team.

Fig: Plants measurement

4*5 m spacing adopted for plantation in block.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was poor.**

3.1.5. Watering of plants: A fter the plantation, water was provided to the seedlings once for its growing and anchoring in the ground.

3.1.6. **Species present in Natural Vegetation and Regeneration**: Sevan grass found grown naturally here only. Sevan grass slips were planted with tree species- result of seven grass was in better condition.

3.1.7. Regeneration through seeds sowing: Sevan grass regeneration was more effective. It grows in every rainy season, every year. The growth was satisfactory.

3.1.8. Protection Work: The selected NFL model plantation was **protected through stone wall fencing of 840 RMT with average width of 40cm, and height 1.80m. Also the area was covered with 500 RMT of barbed wire fencing. The condition of fencing was good and can control the biotic pressure in good measure.**

3.1.9. Observations Recorded: Under this model, 500 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 73.37% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 25000 plants comprising of five species were planted in the 50 hec plantation area.

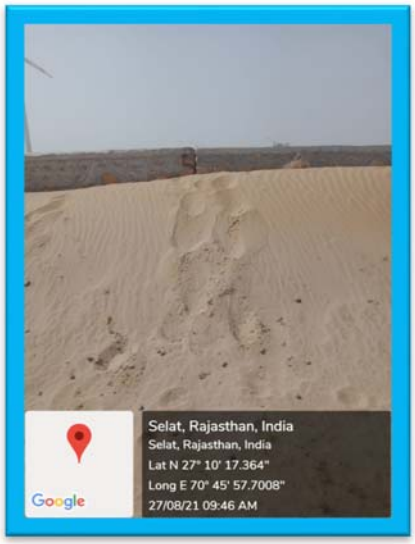


Fig: Protection wall at Mokla

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-3: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
Acacia tortilis (Totalis)	14800	10825	3975	73.14	285	12
Tecomella undulata (Rohida)	2610	1862	748	75.17	270	9
Acacia senegal (Kumtha)	2090	1582	508	75.69	265	10
Zizyphus mauritiana (Ber)	3450	2430	1020	70.43	290	8
Salvadora persica (Jaal)	2050	1544	506	75.32	110	7
Total	**25000**	**18343**	6657	**73.37**		

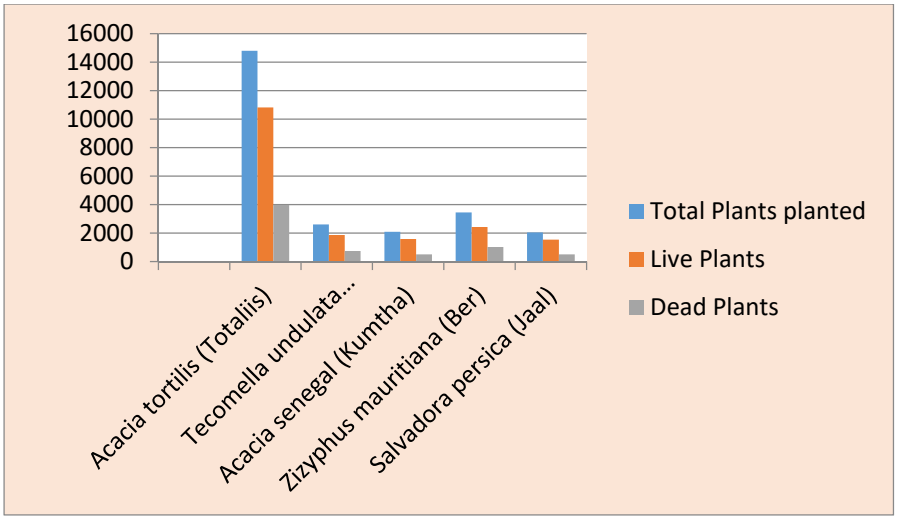


Fig: Graph showing survival of different plants

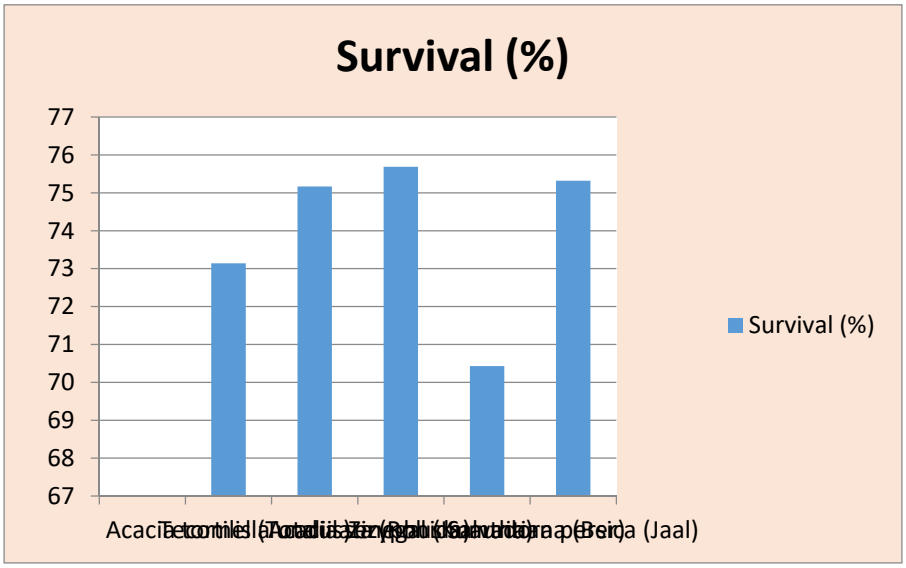


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Kumtha plant was highest** followed by Jaal. **The survival percentage of Kumatha was maximum of 75.69 % and Jaal was 75.32%. All the plants planted in this site showed good survival rate.**

The reason for high survival of all plants was continuous security and maintenance provided to plants.

3.1.10. GPS Location and KML file: The selected NFL model under CAMPA plantation site measured slightly higher (50.2 hec, as per calculation through KML file) than reported plantation area (50 hec).

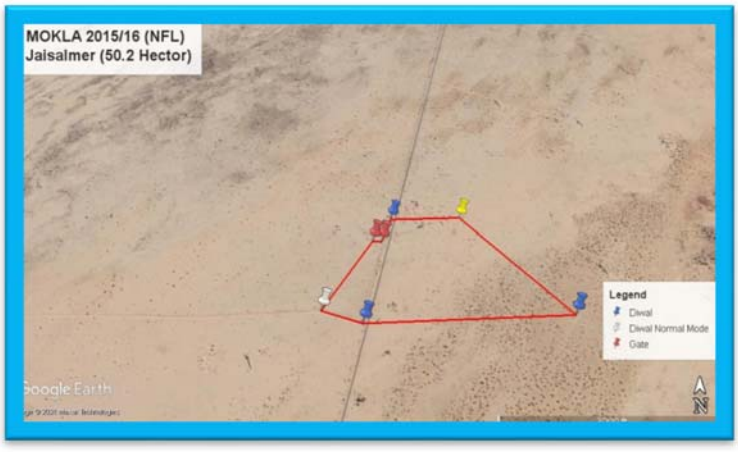


Fig: KML map of NFL at Mokla, Jaisalmer

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2014-15	-	-	-	-	-	-	519980	519980
2015-16	-	-	-	-	1488856	337296	-	2026152
2016-17	-	-	-	-	620105	-	-	620105
2017-18	-	-	-	-	207401	-	-	207401
2018-19	-	-	-	-	196663	-	-	186663
2019-20	-	-	-	-	218324	-	-	218324
Total	-	-	-	-	-	-	-	3808635

3.2.1. Site-2: **Mokla Parevar in Jaisalmer range (2016-17):** The selected plantation has been carried out on 50 hec of land at Mokla Parevar in Jaisalmer range (2016-17). The selected plantation has been carried out on during the year 2016-17. The activities were done under the NFL model. The GPS location of this selected site was N 27.13295 and E 70.45206. The site was a forest land and selected for 100% evaluation. The soil was sandy having low water holding capacity.

3.2.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Total 25000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: NFL at Mokla (2016-17)

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Mokla Parewar, a forest department nursery of Jaisalmer range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 4. Seedlings of *Acacia tortilis* (Totalis), *Acacia senegal* (Kumtha), *Tecomella undulata* (Rohida) and *Zizyphus mauritiana* (Ber) were planted.

Per hec 500 plants have been planted (whereas as per the guideline of NFL, 1100 plants per hec should be planted). A total of 25000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise and

in a block one type of species has been planted. Plantation journal was found by the team. **4*5 m spacing adopted for plantation in block.**

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was poor.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found.

Fig: NFL at Mokla plantation

3.2.6. Natural Vegetation and Regeneration: Natural bushes, ker, saniya were developed by protection. Sevan grass slips were planted with tree species.

3.2.7. Regeneration through seeds sowing: Sevan grass regeneration results were better.

3.2.8. Protection Work: The selected NFL model plantation was **protected through stone wall fencing of 420 m, having height of 1.8 m. The condition of fencing was good and upto some extent control biotic pressure.**

Fig: Measurement of plants on field

3.2.9. Observations R ecorded: Under this model, 500 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 71.56% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 25000 plants comprising of four species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
Acacia tortilis (Totalis)	17500	12447	5053	71	385	22.5

Acacia senegal (Kumtha)	1050	793	257	75.52	215	12
Tecomella undulata (Rohida)	1640	1069	571	65.18	180	9
Zizyphus mauritiana (Ber)	4810	3581	1229	74.45	245	22
Total	**25000**	**17890**	7110	**71.56**		

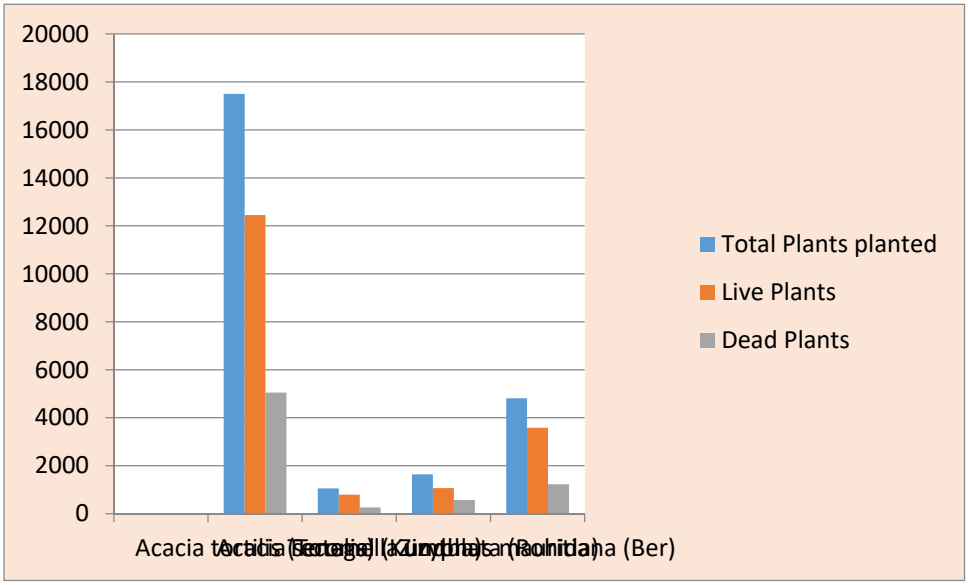


Fig: Graph showing survival of different plants

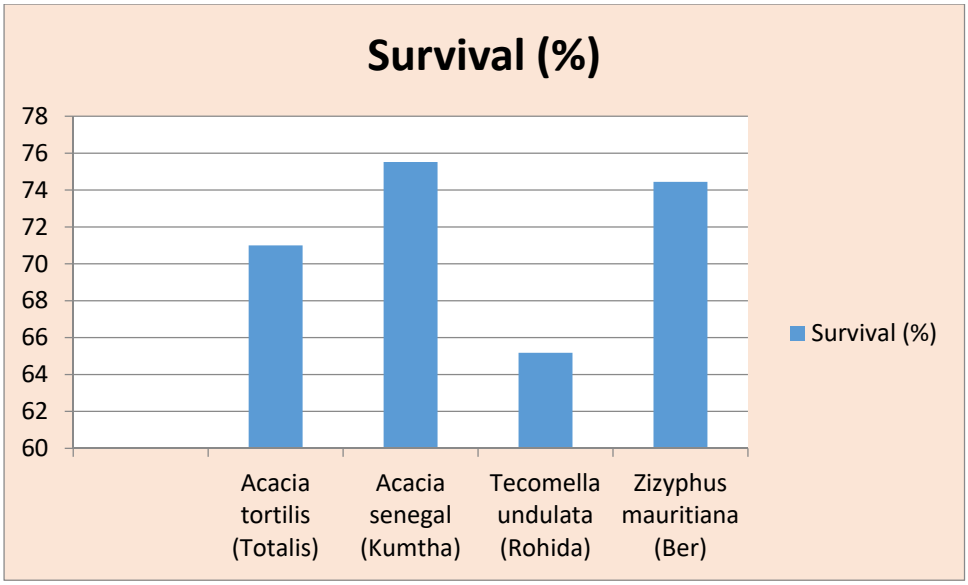


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Kumtha plant was highest** followed by Ber. **The survival percentage of kumtha was maximum of 75.52 % and ber was 74.45%. All the plants planted in this site showed good survival rate.**

The reason for high survival of all plants was good maintenance provided to plants.

3.2.11. GPS Location and KML file: The selected NFL model under CAMPA plantation site measured slightly higher (51.5 hec, as per calculation through KML file) than reported plantation area (50 hec).

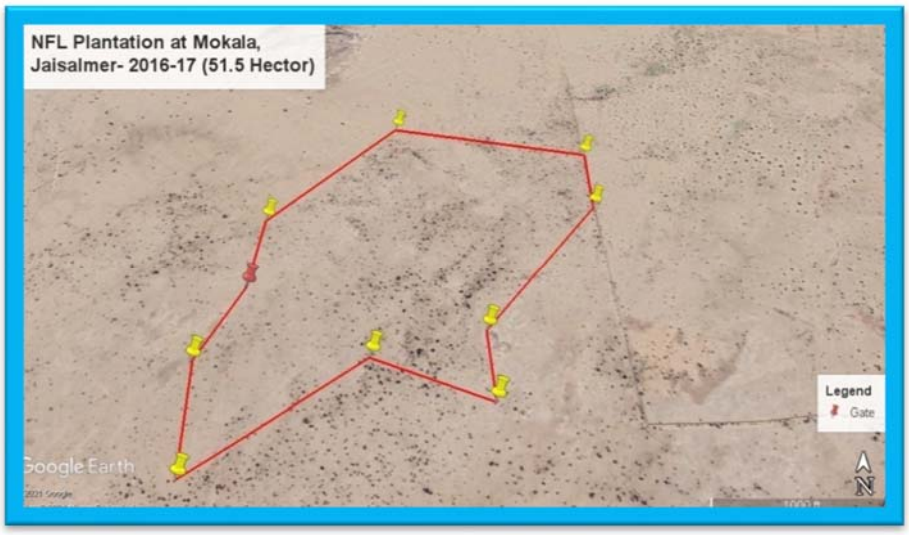


Fig: KML map of NFL plantation at Mokla, Jaisalmer

3.2.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2015-16	-	-	-	-	-	-	973577	973577
2016-17	-	-	-	-	-	1574692	590632	2165690
2017-18	-	-	-	-	-	746180	-	746180
2018-19	-	-	-	-	-	205538	-	205538
2019-20	-	-	-	-	-	214830	-	214830
Total	-	-	-	-	-	-	-	4269995

3.3.1. Site-3: **Mokla-7 Parevar in Jaisalmer range (2014-15):** The selected plantation has been carried out on 25 hec of land at Mokla Parevar in Jaisalmer range (2014-15). The selected plantation has been carried out on during the year 2014-15. The activities were done under the NFL model. The GPS location of this selected site was N 27.113523 and E 70.43118. The site was a forest land and selected for 100% evaluation. The soil was sandy having less water holding capacity.

3.3.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Total 12500 pits have been made for plantation in total 25 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.3.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Mokla Parewar, a forest department nursery of Jaisalmer range. During monsoon these seedlings were planted.

3.3.4. Species Planted: The selected tree species under plantation were 2. Seedlings of *Acacia tortilis* (totalis) and *Zizyphus mauritiana* (ber) were planted.

Per hec 500 plants have been planted (whereas as per the guideline of NFL, 1100 plants per hec should be planted). A total of 12500 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise and in a block one type of species has been planted. Plantation journal was found by the team. **4*5 m spacing adopted for plantation in block.**

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was poor.** *Fig: NFL at Mokla-7*

Fig: Field evaluation work

3.3.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found.

3.3.6. Regeneration th rough seeds sowing: Sevan grass regenerated during monsoon. Satisfactory natural regeneration of grasses only.

3.1.7. Protection Work: The selected NFL model plantation was **protected by barbed wire fencing of 3183 RMT having 212 RCC pole. Fencing has been partially effective in controlling the biotic pressures.**

3.1.8. Observations Recorded: Under this model, 500 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 72% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 12500 plants comprising of four species were planted in the 25 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-5: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
Acacia tortilis (totalis)	10850	7894	2956	72.75	300	20
Zizyphus mauritiana (ber)	1650	1109	541	67.21	280	10
Total	**12500**	**5003**	7497	**72**		

From the above table, it is shown that the **survival of tortilis plant was highest** followed by ber. **The survival percentage of tortilis was maximum of 72.75 % and ber was 67.21%. The reason for high survival is timely watering and good protection.**

Fig: Monitoring team on field

3.3.9. GPS Location an d KML file: The selected NFL model under CAMPA plantation site measured 25 hec as per kml map.

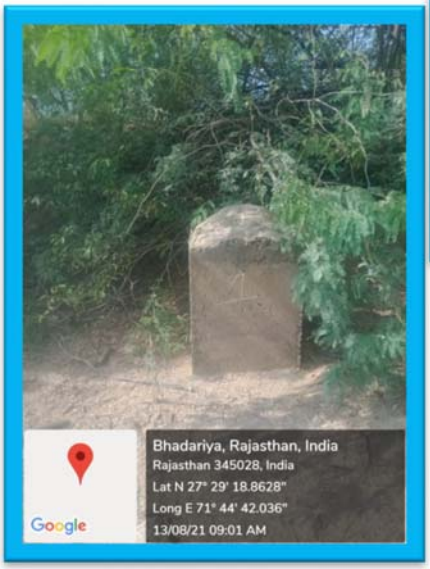
Fig: KML file of NFL plantation at Mokla-7, Jaisalmer

3.3.10. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2013-14	-	-	-	-	161458	298558	215249	673365
2014-15	-	-	-	-	762875	-	-	762975
2015-16	-	-	-	-	276312	-	-	276312
2016-17	-	-	-	-	94750	-	-	94750
2017-18	-	-	-	-	102786	-	-	102786
2018-19	-	-	-	-	101703	-	-	101703
2019-20	-	-	-	-	93688	-	-	93688
Total	-	-	-	-	1593672	-	-	2107573

4. Evaluation of Construction Works

4.1. <u>Site 1- Chhayan Boundary pillars:</u> Site of 20 Boundary Pillars at Chhayan constructed/fixed was visited, surveyed, measured, GPS co-ordinates recorded of all the pillars. These pillars have been made during 2014-15 to demarcate the forest area. The cost of making these 20 pillars was Rs. 32000/- (1600/- per pillar)



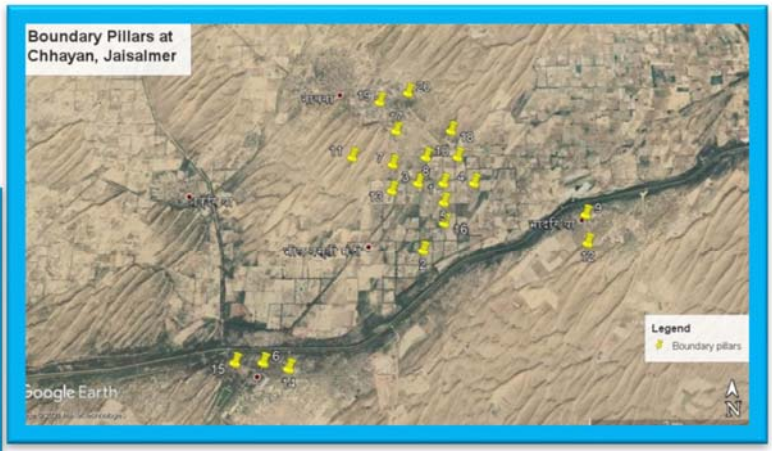


Fig: Chhayan boundary pillars and GIS mapping of all pillars

4.2. <u>Site 2- Stone wall at Kodiyasar in Dabla range:</u> At Dabla range, the stone wall has been evaluated at Kodiyasar. The wall was constructed in the year 2015-16. The wall dimensions were 4 ft height and 500 m long. Construction work appeared to be good and useful. GPS location of this area was 26.30484812 N and 71.165133 E. The construction work started in the year of 2015 after approval and completed in the 2016.

Fig: GIS mapping of Kodiyasar wall, Dabla, Jaisalmer

Fig: Measurement taking of stone wall at Kodiyasar, Dabla range

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Jaisalmer division.

Table-6: Quantitative assessment of plantation work created under CAMPA in Jaisalmer division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	NFL Mokla Parevar 50 Ha	72	8
2	NFL Mokla Parevar 50 Ha	71.56	8
3	NFL Mokla-7 25 Ha	73.57	8

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-7: Quantitative assessment of constructions work created under CAMPA in Jaisalmer division

Sr. no.	Items	Name of the site	Rank of Item (Between 0 to 10)*
1	20 boundary pillars	Chhayan	8
2	Stone wall	Kodiyasar	8

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Jaisalmer-Unit-III (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Jaisalmer Stage-II Forest Division. This Forest Division with one Forest Range named Unit-II.

Fig: Location of Jaisalmer district, Rajasthan

2. Selected plantation site for Evaluation

The NFL plantation of 36 ha at SDS 18RD JJW of Unit-II range of the year-2015-16 has been selected for evaluation.

Table-1: Selected plantation site for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved
Unit-II	NFL plantation of 36 ha at SDS 18RD JJW	2015-16	100%

3. Selected Plantation Sites for Evaluation

The name of plantation site was NFL at SDS 18RD JJW of Unit-II range. The land was a forest land. The area comes under sandy soil area where the plantation work has been carried out. The model of this plantation was Non Forest Land (NFL). Area suitable species has been planted to increase the vegetative coverage. Digging was made in block and plantation carried out blockwise.

As per the model, 500 plants per hectare have been planted. So in this site total 18000 seedlings were planted in 36 hec of land.

Fig: Instruction is given on field before counting starts

3.1.1. Site: The selected plantation evaluation has been carried out on NFL plantation of 36 ha at SDS 18RD JJW

2015-16. The plantation activities are done under the Non Forest Land (NFL) model. As per the model, 500 plants per hectare have been planted (**as per the NFL guideline, 1100 plants has to be planted per hec., but here 500 plants have been planted per hec.**).

Fig: NFL, SDS 18RD JJW, Unit-II

The GPS location of this selected site was 27°,37',7494 N Latitude and 71°,15',9654 E Longitude and at 164.54 m above msl. The site was a forest land and selected for 100% evaluation. The soil is sandy and brownish.

3.1.2. Treatment plan before sowing: The area comprises of plain and sandy surfaces where digging has been made at 5*4 m spacing for plantation**. Pits of size 0.30*0.30*0.40 cm^3 have been made. Total 18000 pits have been made for plantation in total 36 hec of land in block.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of forest department.

3.1.4. Species P lanted: The selected 3 species under plantation were *Acacia senegal* (kumoth), *Zizyphus mauritiana* (Ber) and *Acacia tortilis* (Totalis). A total of 18000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise having spacing 5*4m in the plantation area.

Fig: Growth of plants taking place, NFL, SDS 18RD JJW

As per the model, 500 plants per hectare have been planted. So total number of plants planted was 18000 for 36 hectare of land.

The choice of species under plantation appears nearly proper. The plants selected for growing in this site were nearly specific and already grown naturally there. These plants does not require much water as the all plants are thorny trees and can be grown easily on this hard, rocky surface areas. The choice of plants has been made so that the plants can grow well and survive for longer period. **The growth of planted plants was poor.**

Fig: Sandy soil area of plantation site with grasses

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. One water tank of size 21*21*3m^3 has been made on the plantation area for providing water to the plants. But the water was not sufficient for providing water to all plants.

3.1.6. Natural Vegetation and Regeneration: The area has only grasses which generally grow during the monsoon period. Grasses like *Aristida, Pennisetum, Chloris* have been found.

3.1.7. Protection Work: The area was protected by V-ditch fencing of 14000 RMT. The area was protected by the angel iron along with wire.

3.1.8. Soil and Water Conservation Measures: There was no structure related to soil and moisture conservation measures found on the plantation site.

3.1.9. Observations Recorded: Under this model, 500 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 53.41% at the site.** Plant species girth breast height was also measured. The growth of planted plants was moderate. A total of 18000 plants comprising of four species were planted in the 36 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

About number of species planted in this plantation area, no information have been found in the plantation documents. The above mentioned 3 species have been planted in total 18000 in this 36 hec of land. Survival rate has been calculated on the total number of plants planted as there was no information provided to the team regarding the number of species planted during plantation programme.

Table-2: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
Acacia tortilis (Totalis)	-	9422	-	-	3162.5	18.4
Acacia senegal (Kumoth)	-	101	-	-	2912.5	18.25
Zizyphus mauritiana (Ber)	-	91	-	-	1287.5	10.25
Total	**18000**	**9614**	**8386**	**53.41%**		

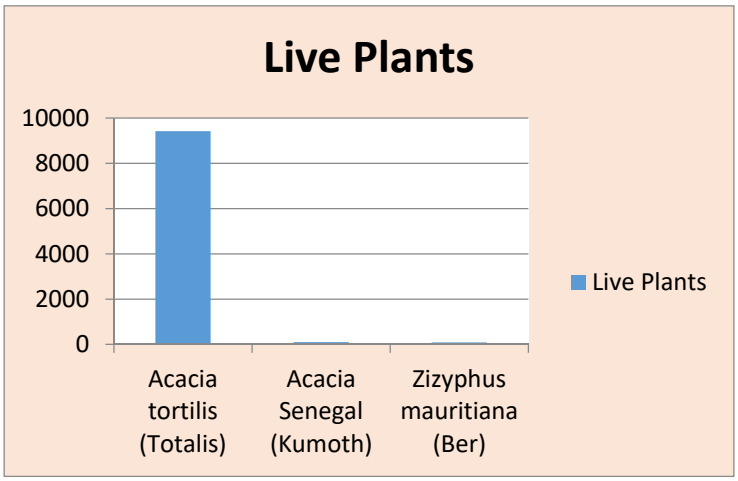


Fig: Graph showing survival of different plants

From the above graph, it is shown that the **survival of totalis plant is highest**. The reason for high survival totalis is that the species is endemic on that area and is fittest for this particular region.

3.1.10. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured slightly higher (37 hec, as per calculation through KML file) than reported plantation area (36 hec).

Fig-6:KML file of NFL plantation of 36 ha at SDS 18RD JJW, Unit-II range

3.1.11. Budget and expenditure:

Year	Cost Estimate (Rs.)				Expenditure Incurred (Rs.)			
	Plantation	SMC Works	Fencing	Total	Plantation	SMC Works	Fencing	Total
2014-15				1157800				-
2015-16				1130616				1635032
2016-17				452304				446632
2017-18				148680				28803
2018-19				148680				-
2019-20				157170				-
2020-21				-				145689
Total				**3195250**				**2256156**

4. Overall assessment: The overall impact of plantation appeared satisfactory in Unit-II range of Jaisalmer Stage-II division. The below mentioned ranking system has been given keeping the view of vegetation cover increased in this plantation site.

Table-3: Quantitative assessment of plantation work created under CAMPA in Jaisalmer Stage-II division

Sr. no.	**Site**	**Survival percentage**	**Rank of Site (Between 0 to 10)***
1	NFL plantation of 36 ha at SDS 18RD JJW	53.4	7

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Jalore (Rajasthan)

1. Present Third Party Evaluation/ Study

Present third party evaluation/ study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Jalore Forest Division. This Forest Division with 4 Forest Ranges Jalore, Raniwara, Bhinmal and Jasvantpura have territorial jurisdiction over the entire Jalore District.

Fig: Location of Jalore district, Rajasthan

2. Selected Plantation Sites for Evaluation

Table-1: Selected Plantation site for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved
Jasvantpura	ANR at Kolar, 50 Hec	2016-17	100%

3.1 Plantations Evaluation (100%)

3.1.1. Site: The selected plantation has been carried out on 50 hec of land at Kolar village of Jasvantpura range during the year 2016-17. The activities were done under the Assisted Natural Regeneration (ANR) model. As per the model, 200 plants per hectare have been planted. The GPS location of this selected site was 24°,59',458 N Latitude and 72°,29',910 E Longitude and at 217.6 m above msl. The site was a forest land and selected for 100% evaluation. The soil is brownish in colour and hard stony layer.

3.1.2. Treatment plan before sowing: The area comprises of hilly, slope and rocky surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during

monsoon, the plantation works carried out. Along with the pits, contour trench were also prepared in advance in the whole plantation area to conserve rain water for providing water to the plants after plantation works completed.

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and seedlings were raised in the nearby nursery Ramseen, a forest department nursery of Jasvantpura. During monsoon these seedlings were planted.

Fig:ANR, Kolar, Jasvantpura Plantation

3.1.4. Species Planted: The selected tree species under plantation are *Acacia senegal* (kumoth), *Zizyphus mauritiana* (Ber), *Acacia leucopholea* (Ronj) and *Cordia gharaf* (gunda) .

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land.

Fig: Instruction is given on field before counting starts

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and already grown naturally. These plants does not require much water as the all plants are thorny trees and can be grown easily on this hard, rocky surface areas. The choice of plants has been made so that the plants can grow well and survive for longer period. **The growth of the plants planted in this site was good.**

3.1.5. Watering of plants: The plantation works carried out here were totally based on rain water. There is no provision of providing irrigation for plantation in this model of ANR. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Regeneration: The area comes under forest land where the present existing plant species were *Acacia senegal, Acacia leucophoelea, Acacia tortilis, Euphorbia nerifolia* and *Zizyphus mauritiana* . **The growth of all types of existing plant**

species was found to be good. The natural regeneration process contributes to increase the vegetation coverage in that area.

Fig: Contour trench at plantation area

Table-2: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (cm)	Average girth (gbh) cm
1	*Acacia tortilis* (totalis)	196	4580	24.3
2	*Acacia senegal* (kumoth)	133	4175	22.9
3	*Zizyphus mauritiana* (ber)	94	1937.5	12.3
4	*Acacia leucophoelea* (ronj)	123	4480	22.8
5	*Euphorbia nerifolia*	83	1225	7

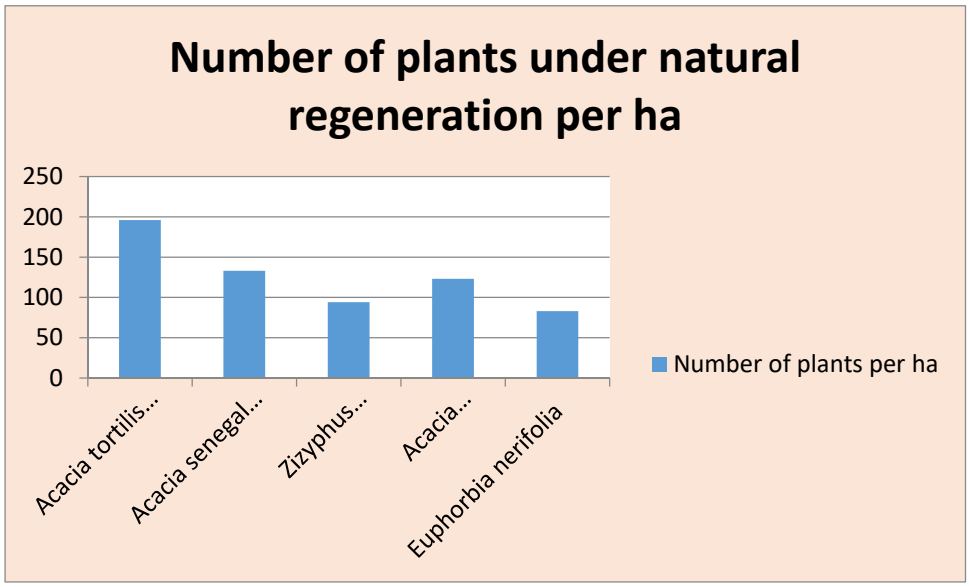


Fig: Graph showing number plants under natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of *Acacia senegal*, *Acacia leucophoelea* and *Zizyphus mauritiana* species were sown in as well as along the trenches and on the bund of ditch fencing. The plants on the edges of ditch fencing showed very good growth.

3.1.8. Protection Work: **The area was protected by loose stone wall fencing of 1000 RMT (the area which was less than the area mentioned on record, 1250 RMT) and also by trench fencing surrounding of 1500 RMT (the area was bigger than the area mentioned on record, which was 1200 RMT).** The protection provided by these fencing was good but now the area was opened to all and villagers were allowed to enter in this site along with their livestock. Trench fencing was in good condition but grasses have grown in the ditch which competes with the water conserve during monsoon.

3.1.9. Soil and Water Conservation Measures: **There were 10755 RMT contour trenches in the form of water harvesting structures** present in the entire plantation area adjacent to the pits. **The size of the contour varied from 4m to 8 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation. During monsoon, these trenches become full of water and stayed for 2-3 months, which provide water to the plants. In addition to these trenches, there were soil and water conservation measure in the form of **earthen bund of size 180*3.5*6 m^3 , the total area was 3780 m^3 (bigger in size than the actual on record which was 1510 RMT) has been found in the plantation area**, the GPS location of this bund was 24°,98',64 N Latitude and 72°,50',16 E Longitude and at 197.5 m above msl.

Fig: Earthen bund (Nadi) at plantation area

The earthen bund locally called *Nadi* was also effective in conserving rain water during monsoon. As per the locals voice, the water remains for 3-4 months in this nadi which was used for drinking by animals as well as for providing water to the plants.

Apart from the above trench and earthen bund, several small loose stone check dams have been made on the hills where the water flow comes from the top of hills. These check dams were used to control the flow of water from hill top and restrict the motion of flow. So that the small plants were not wash away due to heavy water flow and also restrict the soil erosion. **Around 64 check dams were prepared in this region of total 50 hec of land which comprises of total 1100 m^3 area.** The size of loose stone check dam varied depending upon the space

Fig: Measurement of plants taking on field

available on the channel of water flows from the hill top. The average size recorded for rocky check dam was 8 m length, 2m top width and 2,5 m height. The structure of these loose stone check dam was good and fulfill the purpose of which it was constructed.

3.1.10. Observations Recorded: Under this model, 200 plants per hec was planted during plantation. **Based on for as 100 percent counting, plants survival is 70.64% at the site.** Plant species girth breast height was also measured. **The growth of plant was good.** A total of 10000 plants comprising of four species are planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-3: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
Acacia senegal (Kumoth)	6500	6030	470	92	5300	20.6
Acacia leucopholea (Ronj)	2000	102	1898	5.1	4700	32.8
Zizyphus mauritiana (Ber)	1000	860	140	86	2800	19.2
*Cordia gharaf (*Gunda*)*	500	72	428	14.4	3100	27.3
Total	**10000**	**7064**	**2936**	**70.64**		

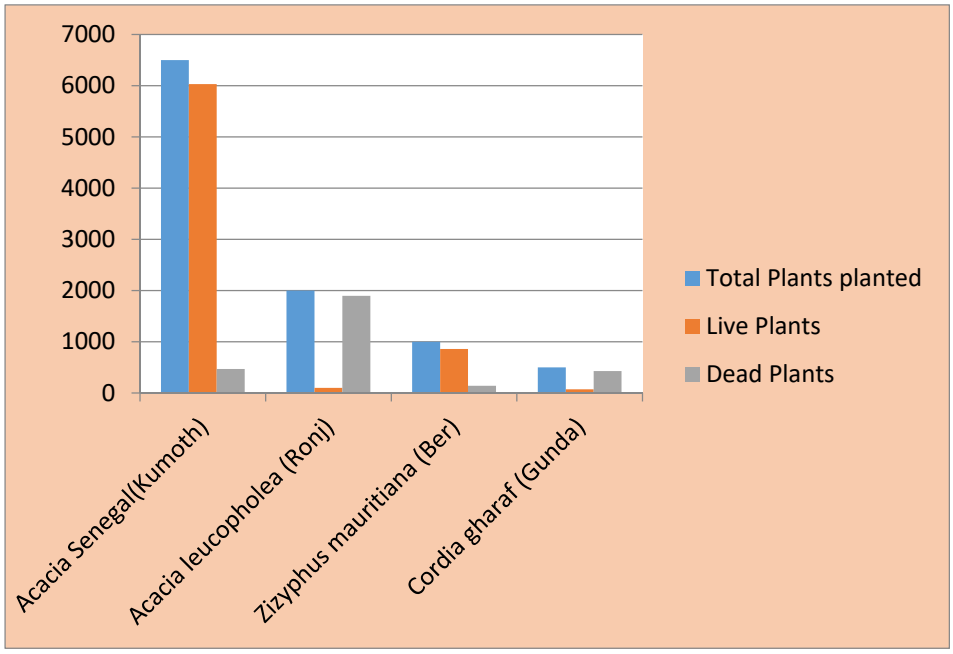


Fig: Graph showing survival of different plants

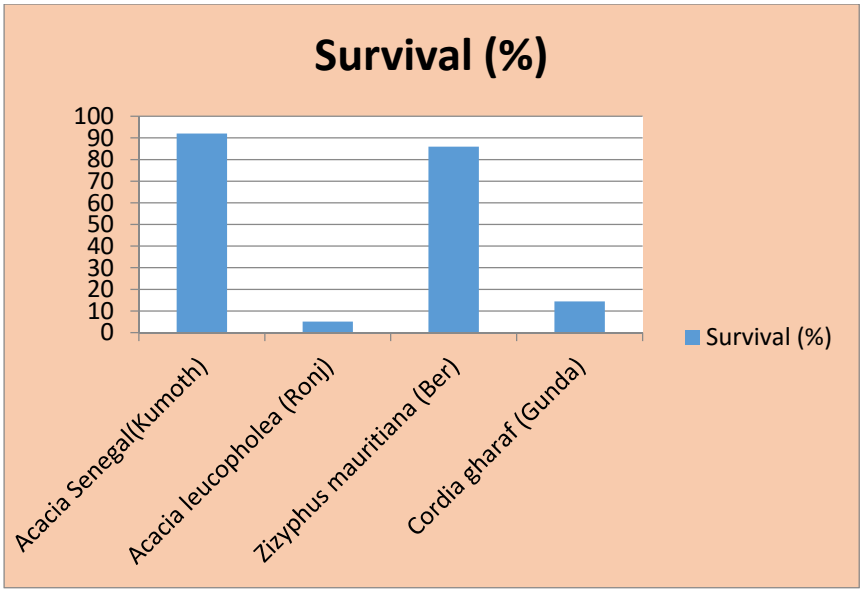


Fig: Graph showing survival percentage of different plants

From the above graph, it has been shown that the **survival of kumoth plant was highest** followed by ber. The **survival of ronj plant showed lowest number**. **The survival percentage of kumoth was maximum which was 92% and lowest was ronj, 5.1%. Plants such as ber showed survival rate of 86% and gunda was 14.4%.**

The reason for high survival of kumoth was that the species was endemic on that area and was fittest for this particular region. Similarly ber also showed good survival rate, which was also a fittest plant in that region. Whereas for the ronj, the survival rate was lowest because the plant was not endemic on that region and might not be suitable for its growing. Similarly the plant gunda, survival rate was poor; this plant also was not suitable for growing in this region.

3.1.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured slightly higher (50 hec, as per calculation through KML file) than reported plantation area (50 hec).

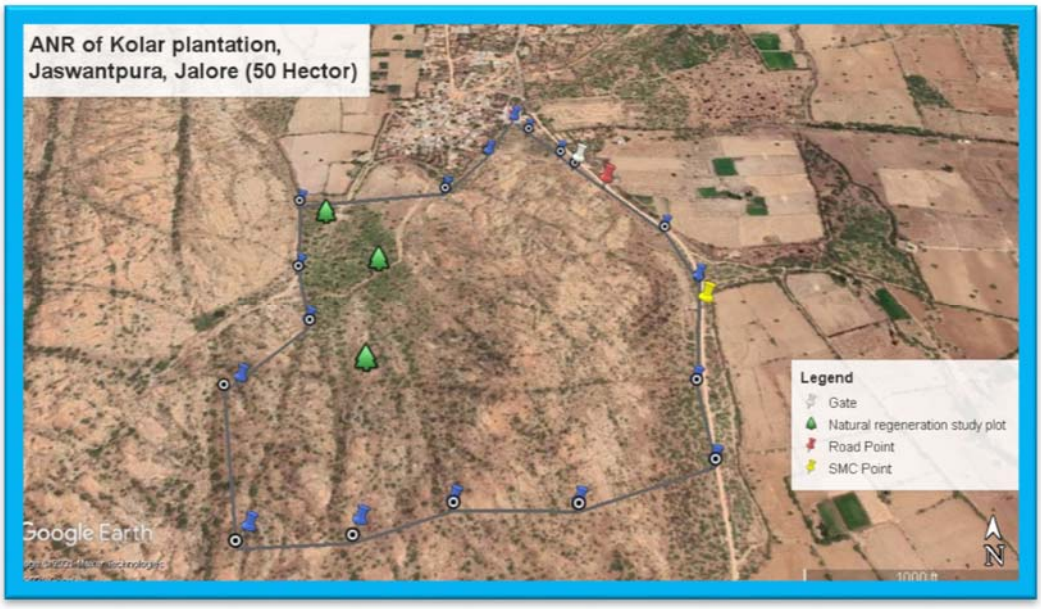


Fig: KML file of ANR at Kolar, Jasvantoura plantation area

3.1.12. Budget and expenditure:

Year	Cost Estimate (Rs.)				Expenditure Incurred (Rs.)			
	Plantation	SMC Works	Fencing	Total	Plantation	SMC Works	Fencing	Total
2015-16	374648	695392	592560	1662600	464346	661923	516234	1642503
2016-17	389700	-	-	389700	335148	-	-	335148
2017-18	162800	-	-	162800	162800	-	-	162800
2018-19	87000	-	-	87000	86985	-	-	86985
2019-20	92250	-	-	92250	85980	-	-	85980
Total				**2394350**				**2313416**

4. Overall assessment: The overall impact of plantation appeared satisfactory in Jalore division of Jalore district. The below mentioned ranking system has been given keeping the view of vegetation cover increased in this plantation site.

Table-4: Quantitative assessment of plantation work created under CAMPA in Jalore division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	ANR plantation at Kolar of Jasvantpura range	70.64%	8

****<5: poor (below 40%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)***

Jhalawar (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Jhalawar Forest Division. This Forest Division with 8 Forest Ranges namely Aklera, Asnawar, Bakani, Dag, Jhalawar, Khanpur, Pidava and Manoharthana, which has territorial jurisdiction over the entire Jhalawar District.

Fig : Location of Jhalawar district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Jhalawar Forest Division were as given in table-1.

Forest Range	Name of Site	Year of Plantation	Ha.	Model
Aklera	Ametha-1	2014-15	50	DFL
Manoharthana	Chamargarh Kotra	2015-16	50	ANR
Khanpur	Golana -I	2016-17	40	NFL

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Jhalawar Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Jhalawar	Mishroli	2014-15	Forest Guard Chowki
Dug	Kalyanpura	2014-15	20 Boundary Pillars
Khanpur	Golona	2016-17	100 Boundary Pillars
Asnawar	Goverdhanpura	2016-17	100 Boundary Pillars

3. Results and evaluation

3.1. Plantations Evaluation

C.3.1.1. Site-1: **Ametha-1 in Aklera range** : The selected plantation has been carried out on 50hec of land at Ametha-1 in Aklera range during the year 2014-15. The activities were

done under the Degraded Forest Land (DFL) model. The GPS location of this selected site was N 24.416901and E 76.414476.The site was a forest land and selected for 100% evaluation. The soil was reddish brown in colour and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 35000 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: DFL at Aklera range

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Ametha-1, a forest department nursery of Aklera range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 10. Seedlings of *Acacia catechu* (Khair), *Acacia leucopholea* (Ronj), *Acacia nilotica* (desi babool), Paras Pipal (*Ficus religiosa*), *Emblica officinalis* (Aamla), *Holoptelea integrifolia* (Churel), *Zizyphus mauritiana* (Ber), *Dalbergia sissoo* (Shisham), *Pithecellobium dulce* (Jangal Jalebi) and Other were planted.

A total of 35000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have been planted. So total number of plants planted was 35000 for 50hectare of land.Map of planting site was prepared.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground.

Fig: Putting lime on plants for counting

The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. Ronj, Neem, Ber, Palash, Liptis were the plants found grown naturally in this area. The growth of the plant was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia leucopholea*- Ronj	267	4	40
2	*Azadiarchta indica*- Neem	223	4.5	43
3	*Zizyphus mauritiana* - Ber	194	2	18
4	*Butea monosperma* - Palash	424	6.5	73
5	*Acacia catechu*- Khair	117	1.5	20

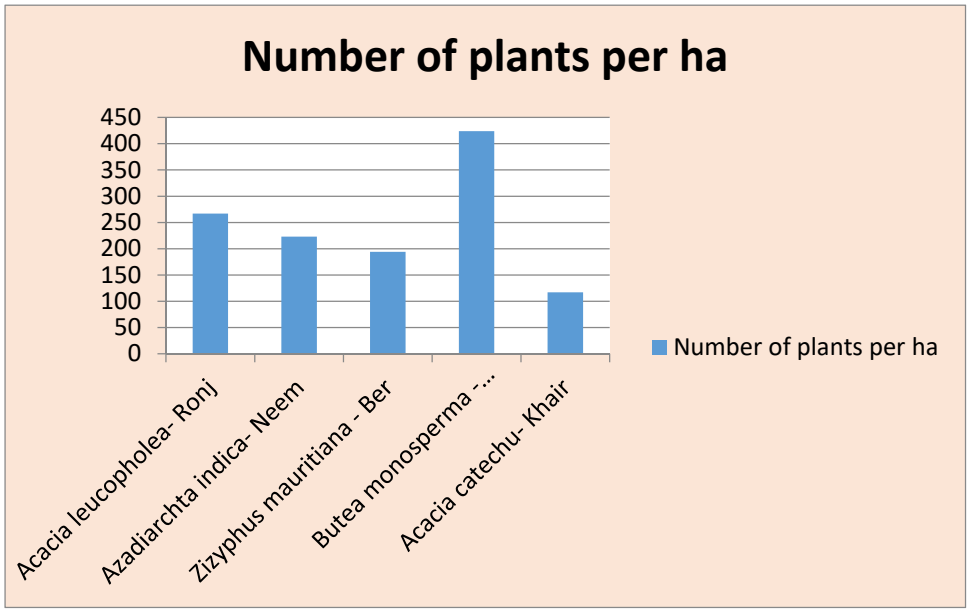


Fig: Graph showing number plants under natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of species *kumatha, ber, ronj and Khair* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected DFL model plantation was **protected by trench fencing of 3540 RMT with average top width of 1.20m, average depth of 1.50m and average bottom width of 1.90m. Present condition of fencing was good.**

3.1.9. Soil and Water Conservation Measures: **There were 16500 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area.

3.1.10. Observations Recorded: Under this model, 700 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 61.6% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 35000 plants comprising of ten species were planted in the 50hec plantation area.

Fig: Protection wall

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
Acacia catechu (Khair)	2000	1476	524	73.80	150	15.33
Acacia leucopholea (Ronj)	10000	8514	1486	85.14	176.6	20.33
*Acacia nilotica (D*esi babool)	500	482	18	96.4	163.3	13.5
Ficus religiosa (Pipal)	200	0	200	0	0	0
Emblica officinalis (Aamla)	5000	2105	2896	42.1	100	12
Holoptelea integrifolia (Churel)	8000	2537	5463	31.71	110	13
*Zizyphus mauritiana (*Ber)	800	780	220	87.5	130	12.83
Dalbergia sissoo (Shisham)	5000	2526	2474	50.52	200	12

Pithecellobium dulce (Jangal Jalebi)	500	488	12	97.60	216.6	20.5
Other	3000	2653	347	88.43	110	12
Total	**35000**	**21561**	13439	**61.6**		

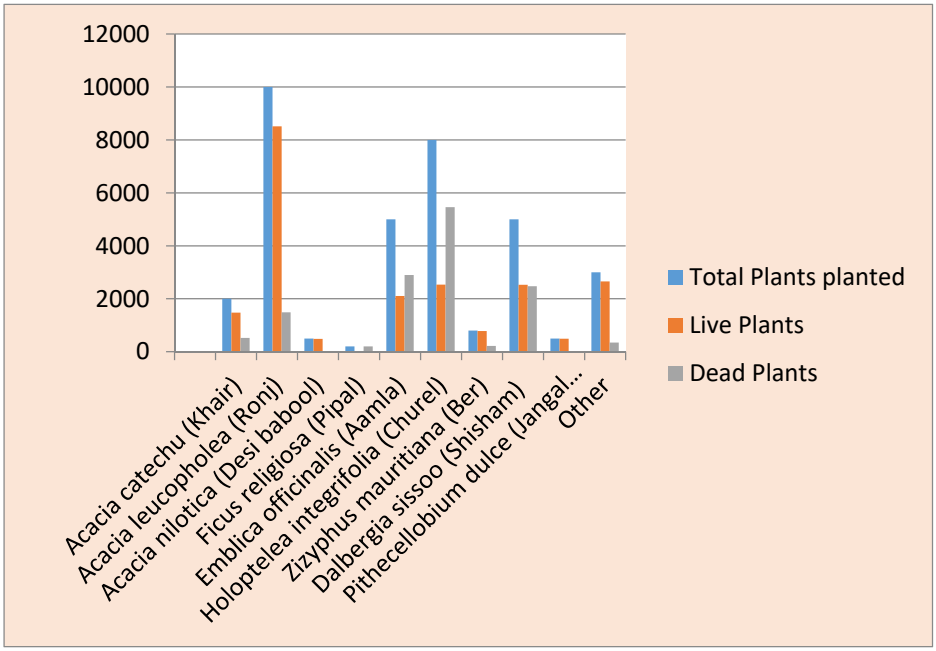


Fig: Graph showing survival of different plants

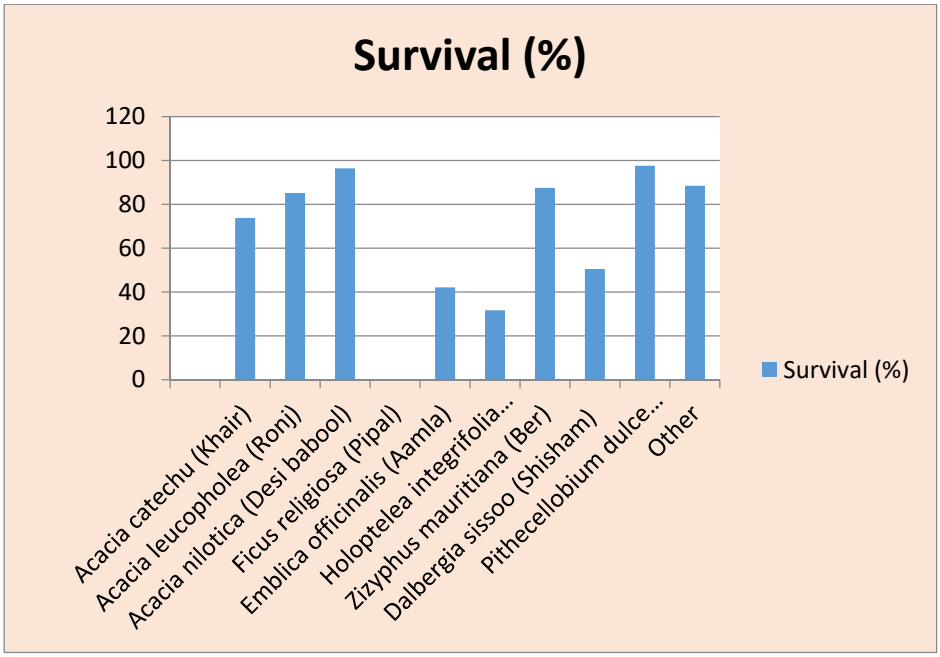


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Jangal jalebi plant was highest** followed by desi babool. **The survival percentage of Jangal jalebi was maximum which is 97.60%and desi babool was 96.4%.**

3.1.11.GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

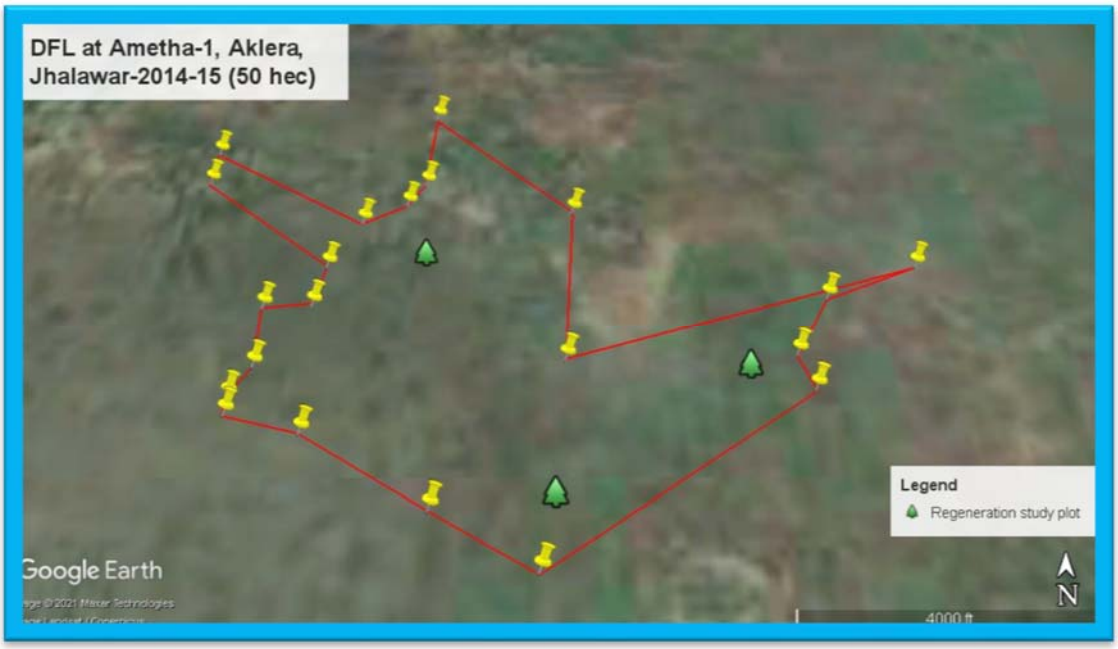


Fig: KML file of DFL at Ametha-1, Aklera range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2013-14	-	-	-	-	-	-	-	1272083
2014-15	-	-	-	-	-	-	-	1097494
2015-16	-	-	-	-	-	-	-	258528
2016-17	-	-	-	-	-	-	-	204392
2017-18	-	-	-	-	-	-	-	156776
2018-19	-	-	-	-	-	-	-	252150
2019-20	-	-	-	-	-	-	-	183754
2020-21	-	-	-	-	-	-	-	216977
Total	-	-	-	-	-	-	-	3642154

3.2.1. Site-2: **Chamargarh Kotra in Manoharthana range:** The selected plantation has been carried out on 50hec of land at Chamargarh Kotra in Manoharthana range during the year 2015-16. The activities were done under the Assisted Natural Regeneration (ANR) model. The GPS location of this selected site was N 24.329463 and E 76.78786. The site was a forest land and selected for 100% evaluation. The soil was reddish brown in colour, clayey loam with stony hard layer.

3.2.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR at Manoharthana range

3.2.3. Nursery Development for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Chamargarh Kotra, a forest department nursery of Manoharthana range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 3. Seedlings of *Tectona grandis (Sagwan), Azadirachta indica (Neem), Pongamia Pinnata (Karanja)* were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50hectare of land.

Fig: Measurement of plants

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.2.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. Chhola were the plants found grown naturally in this area. The growth of the plant was good.

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Butea monosperma*- Chila	93	3.8	40

3.2.7. Regeneration through seeds sowing: Seeds of species *kumatha, ber, ronj and khair* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.2.8. Protection Work: The selected ANR model plantation was **protected by trench fencing of 3750 RMT with average top width of 1.20m, average depth of 1.50m and average bottom width of 0.90m. Present condition of fencing was good.**

3.2.9. Soil and Water Conservation Measures: **There was 10000 RMT of contour trenches made in the form of water harvesting** structures present in the entire plantation area. The size of trenches was 3-9 m long with .45*.45m size. These trenches were made to harvest rain water.

3.2.10. Observations Recorded: Under this model, 500 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 79.5% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of three species were planted in the 50hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Tectona grandis (Sagwan)	8000	6556	1444	81.9	3.6	32
Azadirachta indica (Neem)	1000	745	255	74.5	3.4	33
Pongamia Pinnata (Karanja)	1000	650	350	65	3.3	28
Total	**10000**	**7951**	2049	**79.5**		

From the above table, it is shown that the **survival of sagwan plant was highest** followed by Sagwan. **The survival percentage of Sagwan was maximum of 81.9%. All the**

plants showed good survival. Good protection and site specific plants showed good result of survival.

3.2.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per kl map.

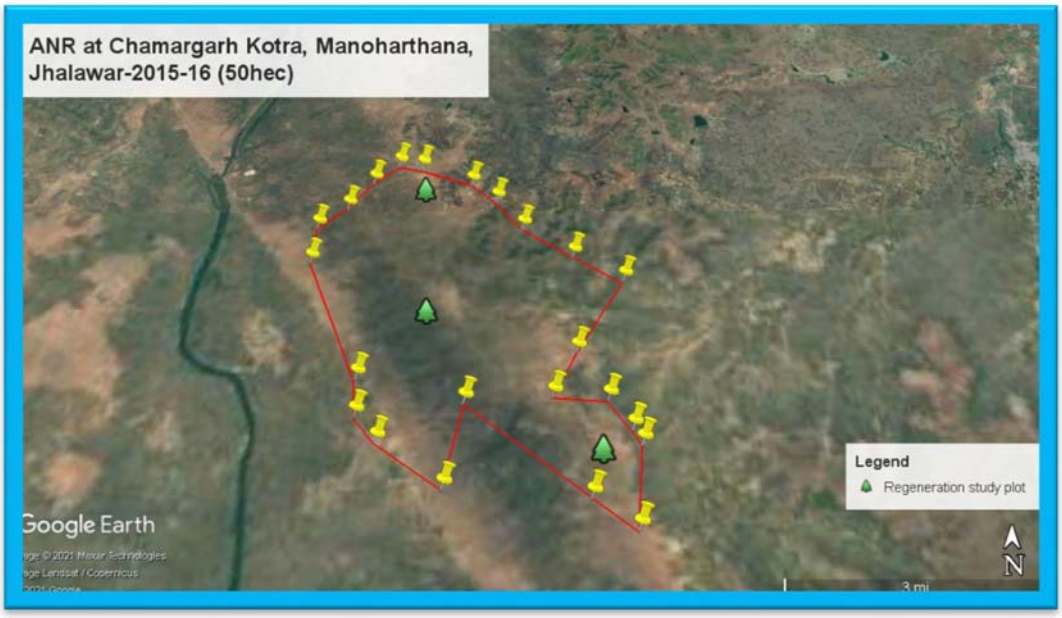


Fig: KML file of ANR at Manoharthan range plantation area

3.2.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2013-14	-	-	-	1836544	-	1836544	-	-
2014-15	-	-	-	345914	-	345914	-	-
2015-16	-	-	-	115914	-	115914	-	-
2016-17	-	-	-	104512	-	104512	-	-
2017-18	-	-	-	96645	-	96645	-	-

3.3.1. Site-3: **Golana-1 in Khanpur range** : The selected plantation has been carried out on 40 hec of land at Golana-1 in Khanpur range during the year 2016-17. The activities were done under the Non-Forest Land (NFL) model. The GPS location of this selected site was N 24.683388 and E 76.783458. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour and stony hard layer.

3.3.2. Treatment plan before sowing: The area comprises of sandy, rocky and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 44000 pits have been made for plantation in total 40hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: NFL at Golana, Khnapur range

3.3.3. Nursery Development for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Golana-1, a forest department nursery of Khanpur range. During monsoon these seedlings were planted.

3.3.4. Species Planted: The selected tree species under plantation was 1. Seedlings of *Acacia nilotica* (desi babool) were planted.

A total of 44000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 1100 plants per hectare have been planted. So total number of plants planted was 44000 for 40 hectare of land. Type of plantation was block. Pit technique of planting was used.

Fig: Measurement of plants

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.3.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found.

3.3.6. Natural Vegetation and Regeneration: Lapla grasses grown abundantly.

3.3.7. Protection Work: The selected NFL model plantation was **protected by Ditch fencing of 6000 RMT. Average top width was 0.60m, depth was 0.90m and average bottom width was 1.20m. Condition of ditch was good. Fencing has been partially effective in controlling the biotic pressures.**

3.2.8. Soil and Water Conservation Measures: **There was 12000 RMT of contour trenches made in the form of water harvesting** structures present in the entire plantation area. The size of trenches was 3-9 m long with .45*.45m size. These trenches were made to harvest rain water. **Earthen bund of 899.5cum was also present for water harvesting and soil conservation, which was filled up with soil.**

3.3.9. Observations Recorded: Under this model, 1100 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 78.4% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 44000 plants comprising of one species were planted in the 40hec plantation area.

Fig: Putting lime on plants

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-7: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia nilotica (desi babool)	44000	34534	9466	78.4	4.9	43
Total	**44000**	**34534**	9466	**78.4**		

The reason for good survival was site specific selection.

3.3.11.GPS Location and KML file: The selected NFL model under CAMPA plantation site measured 40 hec as per kml map.

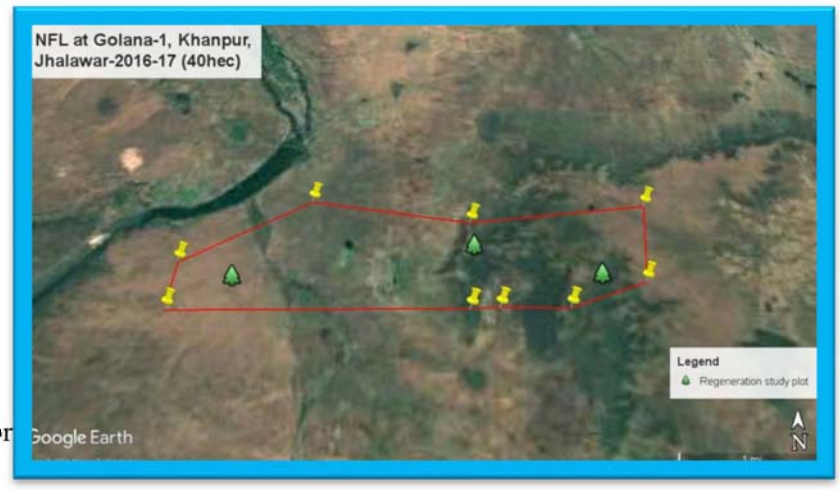


Fig:KML map of NFL at Golana, Khanpur range plantation area

3.3.12. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2016-17	-	-	-	-	-	-	-	1337055
2017-18	-	-	-	-	-	-	-	1715698
2018-19	-	-	-	-	-	-	-	494065
2019-20	-	-	-	-	-	-	-	185516
2020-21	-	-	-	-	-	-	-	152315

4. Evaluation of Construction Works Sites

Site-1: Forest Guard Chowki at Mishroli: At Mishroli in Jhalawar range, one forest guard chowki has been constructed. The chowki was constructed in the year 2014-15. Construction work appeared to be very good and useful. This chowki was constructed at the cost of Rs. 478772/-. GPS location of this area was Longitude- E 75.834677 and Latitude-N 24.285582. The construction work started in the year of 2014 after approval and completed in the 2015.

Fig:Forest guard chowki at Mishroli and GIS mapping

After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

Site-2: 20 Boundary Pillars at Kalyanpura:

At Kalyanpura in Dug range, 20 boundary pillars site has been constructed. The site was constructed in the year 2014-15. Construction work appeared to be very good and useful. All the pillars found in good condition. This site was constructed at the cost of Rs. 35463/-. The construction work started in the year of 2014 after approval and completed in the 2015.

Fig: Boundary pillar at Kalyanpura

Site-3: 100 Boundary Pillars at Golona: At Golona in Khanapur range, 100 Boundary Pillars site has been constructed. Size of pillars 0.600*0.450. The site was constructed in the year 2016-17. This site was constructed at the cost of Rs. 1.80 Lakhs. The construction work started in the year of 2016 after approval and completed in the 2017. 56 pillars were found in good condition and 18 were in damaged conditions. 26 pillars were not found on the site. Most of the pillars were in good condition.

Fig: Boundary pillar at Golona

Site-4: 100 Boundary Pillars at Goverdhanpura: At Goverdhanpura in Asanawar range, 100 Boundary Pillars site has been constructed. The site was constructed in the year 2016-17. Size of boundary pillars was 0.600 * 0.450 m. This site was constructed at the cost of Rs. 1.80 Lakhs. The construction work started in the year of 2016 after approval and completed in the 2017. 53 pillars have been found on the site and remaining 47 were not found. Most of the pllairs were in good condition.

Fig: Boundary pillar at Goverdhanpura

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Jhalawar district. Quantitative assessment of plantation work in Jhalawar division:

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	DFL Ametha-1 50 Ha	61.6	6
2	ANRChamargarhKotra 50 Ha	79.5	8
3	NFL Golana -I40 Ha	78.4	8

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Quantitative assessment of constructions work created of CAMPA in Jhalawar division:

Sr. no.	Items	Name of the site	Rank of site (Between 0 to 10)*
1	Forest Guard Chowki	Mishroli	8
2	20 Boundary Pillars	Kalyanpura	8
3	100 Boundary Pillars	Golona	6
4	100 Boundary Pillars	Goverdhanpura	6

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Jhunjhunu (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Jhunjhunu Forest Division. This Forest Division with 4 Forest Ranges namely Khetri, Udaipurwati, Jhunjhunu and Nahalgarh which has territorial jurisdiction over the entire Jhunjhunu District.

Fig: Location of Jhunjhunu district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Jhunjhunu Forest Division are as given in table-1.

Forest Range	Name of Site	Year	Physical Target Achieved
Udaipurwati	DFL Goriya Dhanawat of Udaipurwati plantation of 50 ha	2014-15	100%
Udaipurwati	ANR at Kishorpura plantation of 50 ha	2014- 15	100%

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Jhunjhunu Forest Division are as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Khetri	Chirani	2014-15	20 boundary pillars

3. Results of Evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Goriya Dhanawat of Udaipurwati range:** The selected plantation has been carried out on 50 hac of land at Goriya Dhanawat village of Udaipurwati range during the year 2014-15. The activities were done under the Degraded Forest Land (DFL) model.

The GPS location of this selected site was 27°,45',40.25''N Latitude and 75°,30',48.55''E Longitude and at 512.03 m above msl. The site was a forest land and selected for 100% evaluation. The soil was Clay loam with hard stony layer. The area belongs to Hilly area.

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 35000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: DFL Goriya Dhanawat Plantation

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Goriya Dhanawat, a forest department nursery of Udaipurwati range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 4. A total of 35000 numbers of seedlings were planted at the site. Seedlings of *Acacia lecopholea* (Ronj), *Acacia senegal* (Kumtha), *Holoptelea integrifolia* (Churel), *Acacia tortilis* (Totalis) were planted. **A total of 35000 numbers of seedlings were planted at the site.** Seedlings of above plants were planted. Seedlings were planted block wise according to the availability of space in the plantation area.

Fig: Putting of lime - counting of plants

Seedlings were planted in block. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have been planted. So total number of plants planted was 35000 for 50 hectare of land.

The choice of species under plantation appeared proper. The plants selected for growing in this site were specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of providing irrigation for

plantation in this model of DFL. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Regeneration: The area comes under reserved forest where the present existing tree species were *Acacia senegal* (Kumtha), *Acacia tortilis* (Totalis), *Zizyphus mauritiana* (Ber). The major grass was *Sevan*. **The growth of all types of existing plant species was found to be good.**

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal* (Kumtha)	343	6	30
2	*Acacia tortilis* (Totalis)	467	8	31
3	*Zizyphus mauritiana* (Ber)	250	3	22

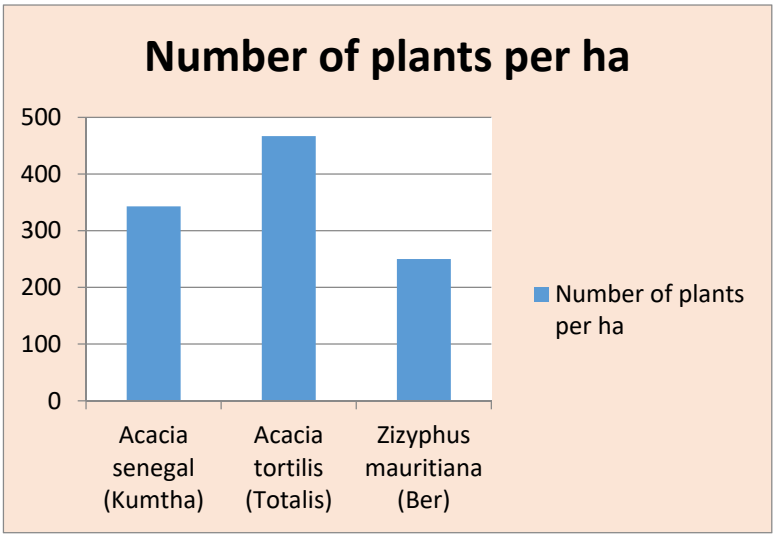


Fig: Graph showing number plants of natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of Kumtha, Ronj, and Ber species were sown on edges of contour trenches. **The growth of seedlings from seeds was poor.**

3.1.8. Protection Work: The selected DFL model under CAMPA plantation was **protected by loose stone wall fencing of 1283.50 RMT and also by trench fencing surrounding of 780 RMT. Trench fencing as well as the loose stone wall was in good condition. The plantation site was also protected by barbed wire fencing of 1500 RMT. Condition of loose stone wall, trench and barbed wire fencing were found to be good and effective.**

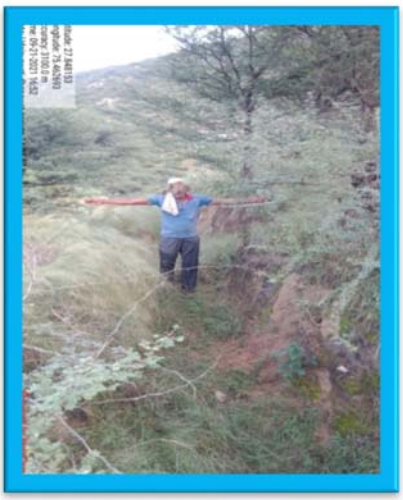


Fig: Measurement of Trench fencing

3.1.9. Soil and Water Conservation Measures: **There were 1500 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3 m to 9 m long with 0.45 x 0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation. Along with contour trenches there were 34 loose stone check dams in 50 hec of plantation site. **The total area of loose stone check dam was 466.316 cum. Because of the check dam the extent of civilization of gullies was found to be good.**

3.1.10. Observations Recorded: Under this model, 700 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 61% at the site.** A total of 35000 plants comprising of four species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia lecopholea (Ronj)	700	340	360	48.57	3	15
Acacia senegal (Kumtha)	1400	878	522	62.71	2.5	20
Holoptelea integrifola (Churel)	1500	1050	450	70.00	3.10	12
Acacia tortilis (Totalis)	31400	19082	12318	60.77	3.5	21
Total	**35000**	**21350**	**13350**	**61%**		

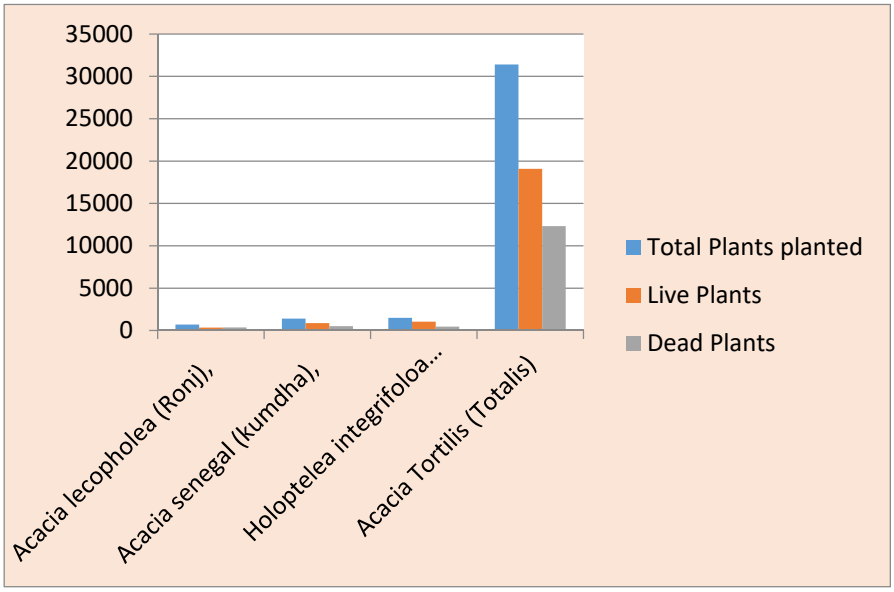


Fig: Graph showing survival of different plants

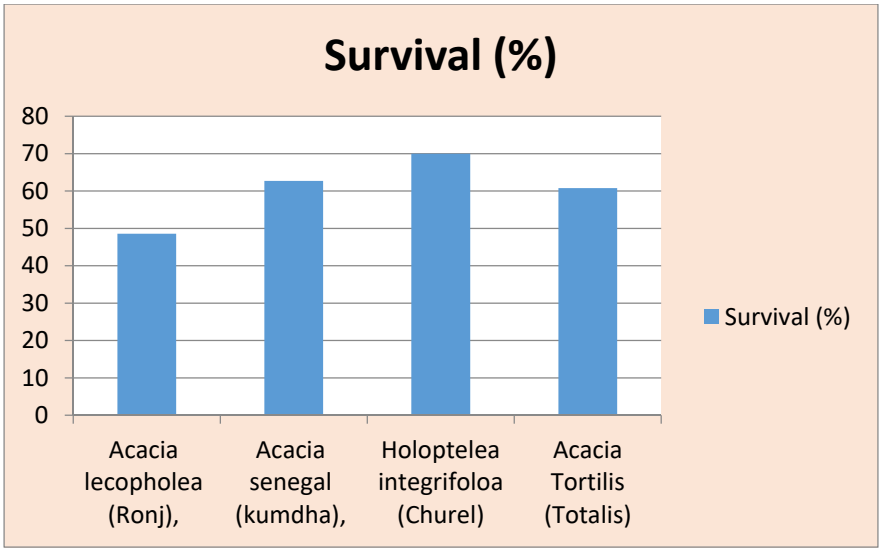


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Churel plant was highest** followed by Kumtha. **The survival percentage of Churel was maximum which was 70 % and kumtha was 62.71%. All the plants planted in this site showed good survival rate.**

3.1.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site of Udaipurwati Goriya Dhanawat measured 50 hec as per kml map.

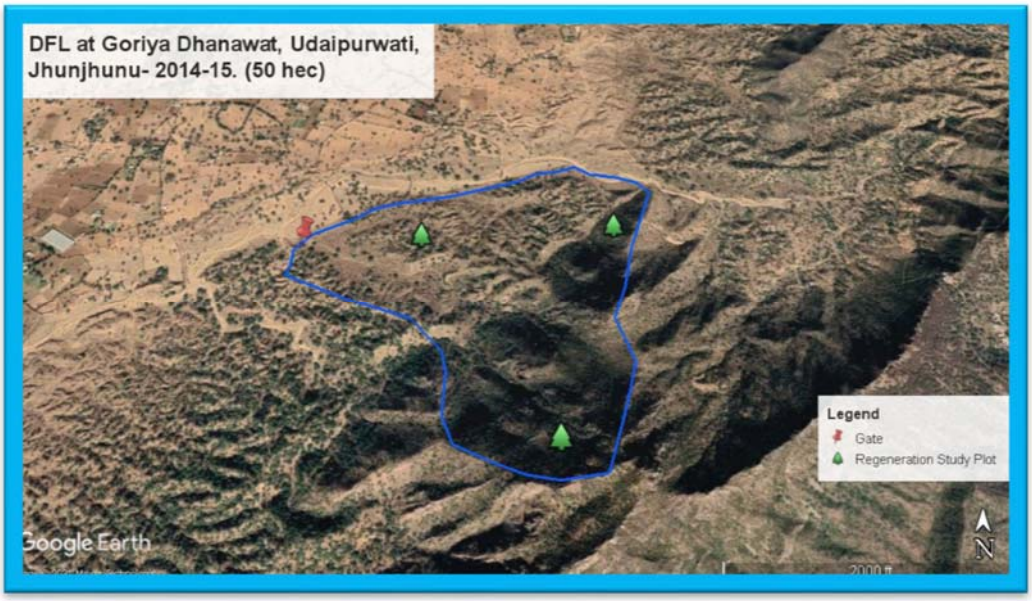


Fig: KML file of ANR at Goriya Dhanawat, Udaipurwati plantation area

C.3.1.15. Budget and expenditure:

Year	Cost Estimate (Rs.)				Expenditure Incurred (Rs.)			
	Plantation	SMC Works	Fencing	Total	Plantation	SMC Works	Fencing	Total
2013-14	-	-	-	-		353020	823713	1176733
2014-15	-	-	-	-	893145	58951	238024	1190120

2015-16	-	-	-	-	280149	36072	135523	451744
2016-17	-	-	-	-		146143	62632	2087775
2017-18						138205	83145	221350
Total								**5127722**

3.2.1. Site-2: **Kishorpura of Udaipurwati range:** The selected plantation has been carried out on 50 hac of land at Kishorpura village of Udaipurwati range during the year 2014-15. The activities were done under the Assisted Natural Regeneration (ANR) model.

The GPS location of this selected site was 27°,52',21.56''N Latitude and 75°,36',36.18''E Longitude and at 467.75 m above msl. The site was a forest land and selected for 100% evaluation. The soil was clay loam with hard stony layer. The area belongs to hilly area.

3.2.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Kishorpura, a forest department nursery of Udaipurwati range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 10. A total of 10,000 numbers of seedlings were planted at the site. Seedlings of *Acacia lecopholea* (Ronj), *Acacia senegal* (Kumtha), *Acacia nilotica* (Desi babool), *Acacia tortilis* (Totalis), *Ablizia lebbeck* (Siras), *Ailanthus sp* (Aradu), *Ficus religiosa* (Badh/papal), *Cassia fistula* (Amaltas), *Pongamia pinnata* (Karanj) and *Zizyphus mauritiana* (Ber) were planted. **A total of 10,000 numbers of seedlings were planted at the site.** Seedlings of above plants were planted in block wise according to the availability of space in the plantation area.

Fig: ANR, Kishorpura Vegetation

Spacing between plants has not been adopted here and random plantation has been carried out in this site. As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10,000 for 50 hectare of land.

The choice of species under plantation appeared proper. The plants selected for growing in this site were specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of providing irrigation for plantation in this model of ANR.

Fig: Measurement of plants on field

3.2.6. Natural Vegetation and Regeneration: The area comes under reserved forest where the present existing tree species were *Acacia leucopholea* (Ronj), *Acacia nilotica* (Desi babul), *Acacia senegal* (Kumtha), *Acacia tortilis* (Totalis), *Acacia nilotica* (Desi babul). The major grass was *Sevan*. **The growth of all types of existing plant species was found to be good.**

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia tortilis* (Totalis)	373	9.00	31
2	*Acacia leucopholea* (Ronj)	330	7.00	28
3	*Acacia senegal* (Kumtha)	307	8.00	24
4.	*Acacia nilotica* (Desi babul)	300	9.00	31

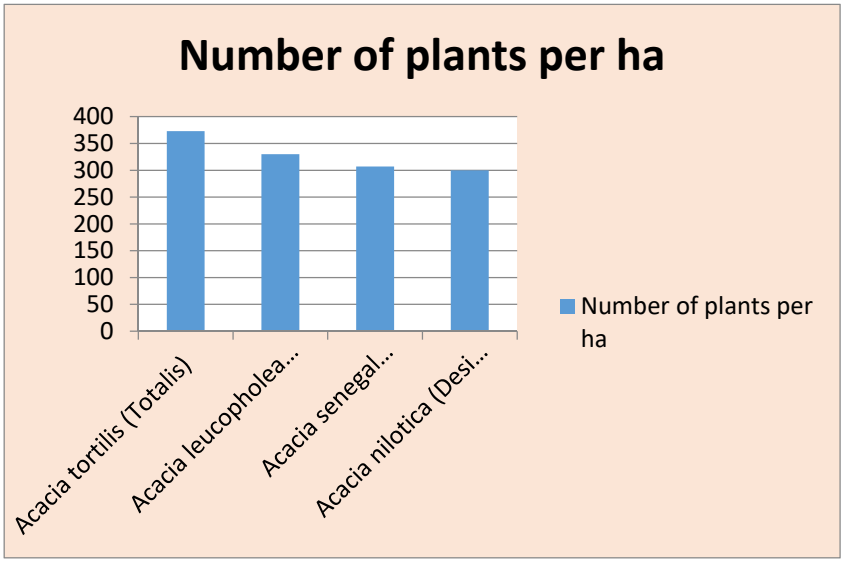


Fig: Graph showing number plants of natural regeneration

3.2.7. Regeneration through seeds sowing: Seeds of Kumtha, Ronj, and Ber species were sown on edges of contour trenches. **The growth of seedlings from seeds were good.**

3.2.8. Protection Work: The selected ANR model under CAMPA plantation was **protected by loose stone wall fencing of 1510 RMT and also by trench fencing surrounding of 55 RMT. Trench fencing as well as the loose stone wall were in good condition. The plantation site was also protected by barbed wire fencing of 1305 RMT. Condition of loose stone wall, trench and barbed wire fencing were found to be good and effective.**

3.2.9. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 57% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. 10 different plant species have been planted here comprising of 10000 seedlings.

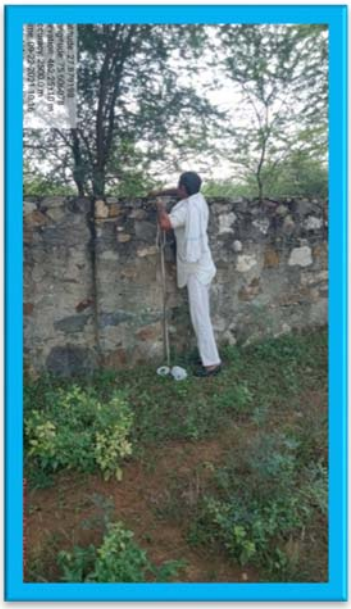


Fig: Measurement of protection stone wall at plantation area

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia tortilis (Totalis)	5000	1840	3160	36.80	3.00	18
Acacia lecopholea (Roni)	1500	1320	180	88.00	2.80	21
Acacia senegal (Kumtha)	700	550	150	18.57	1.90	18
Albezia lebbeck (Siras)	500	310	190	62.00	2.00	12
Ailanthus sp. (Aradu)	600	420	180	70.00	3.10	26
Acacia nilotica (Desi babul)	500	430	70	86.00	4.00	26
Ficus religosa (Bad/Pipal)	20	10	10	50.00	2.50	13
Cassia fistula (Amaltas)	100	80	20	80.00	1.90	14

Pongamia pinnata (Karanj)	640	430	210	67.18	2.9	19
Zizyphus mauritiana (ber)	440	310	130	70.45	2.40	10
Total	**10,000**	**5,700**	**4,300**	**57%**		

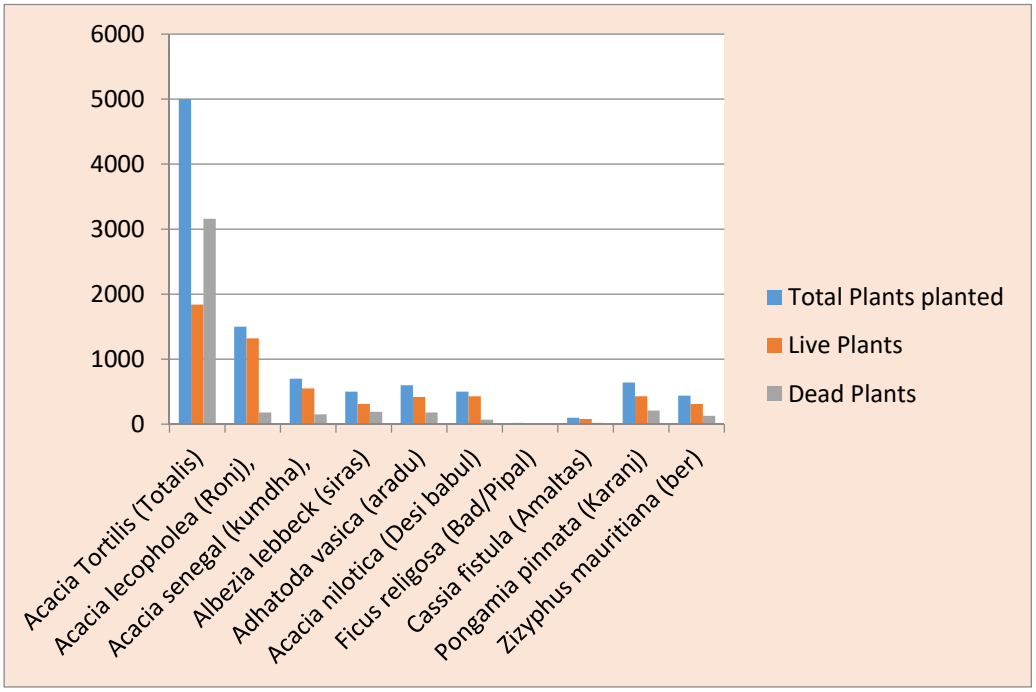


Fig: Graph showing survival of different plants

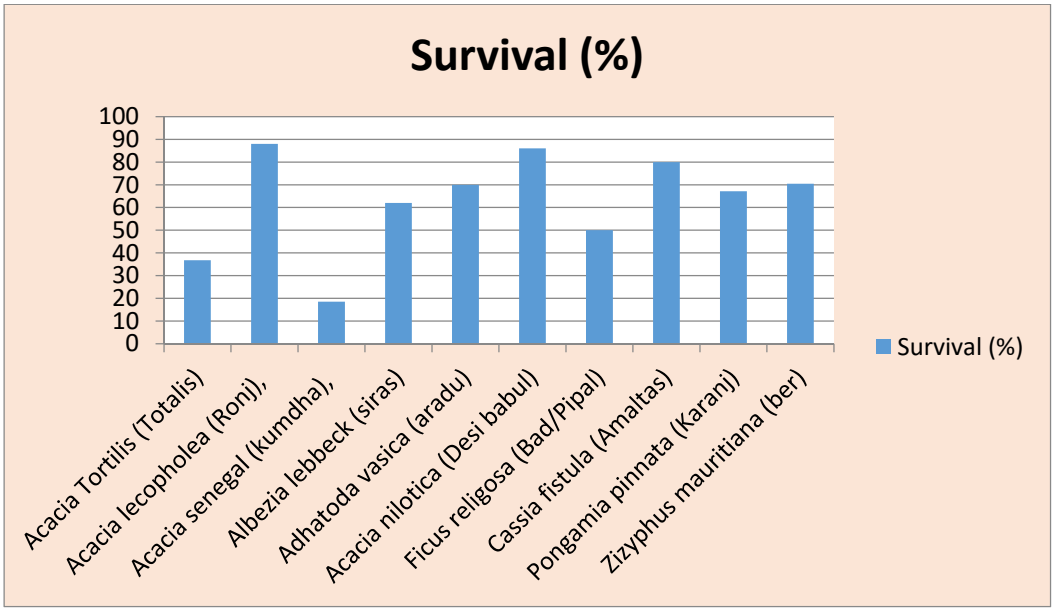


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Ronj plant was highest** followed by desi babul. **The survival percentage of Ronj was maximum which was 88 % and desi babul was 86%. All the plants such as karanj, ber, amaltas, siras planted in this site showed good survival rate. Totalis showed poor survival.**

3.2.10. GPS Location and KML file: The selected ANR model under CAMPA plantation site at Udaipurwati Kishorpura measured 50 hec as per kml map.

Fig: KML file of ANR at Kishorpura, Udaipurwati plantation area

3.2.11. Budget and expenditure:

Year	Cost Estimate (Rs.)				Expenditure Incurred (Rs.)			
	Plantation	SMC Works	Fencing	Total	Plantation	SMC Works	Fencing	Total
2014-15	-	-	-	-	170362	340147	510509	1021018
2015-16	-	-	-	-	226627		151084	377711
2016-17	-	-	-	-	44990	33198	73859	151547
2017-18						58862	28137	86999
2018-19						54842	32140	86982
Total								**1724257**

4. Evaluation of construction

Site-1: Forest Boundary Pillars, Khetri / Chirani of Jhunjhunu: 20 boundary pillars have been evaluated in the area of Khetri / Chirani of Khetri range . The size of the pillars was 0.45*0.45*0.60 m. These pillars were made during 2014-15 to demarcate forest boundary in that area. **Most of the pillars were found in good conditions.** Few were damaged by the local people.

Fig: Numbering done on pillars for counting

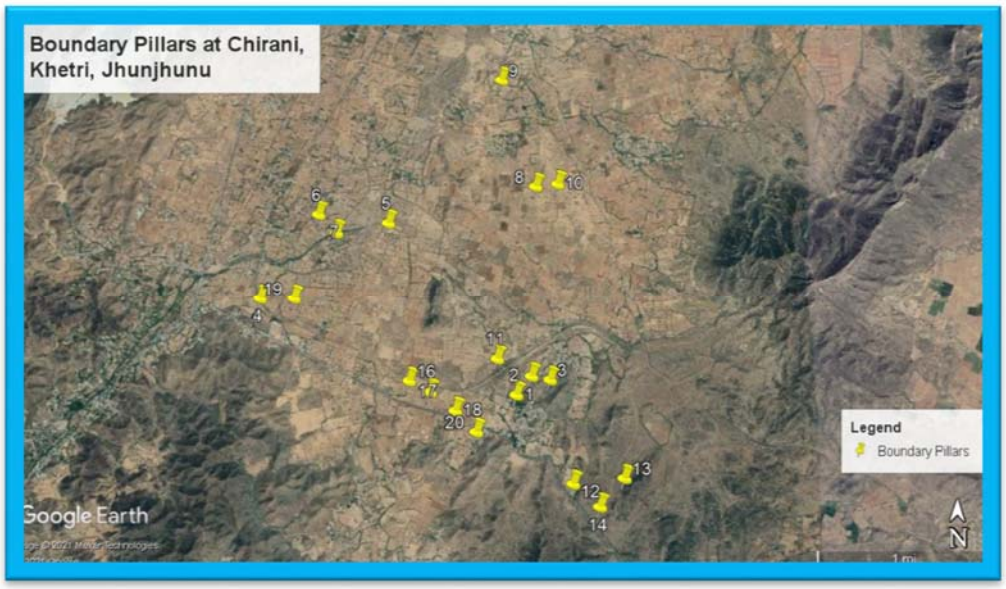


Fig: GPS location mapping of all 20 boundary pillars of Khetri/Chirani of Jhunjhunu

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Jhunjhunu district.

Table-7: Quantitative assessment of plantation work created under CAMPA in Jhunjhunu division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
Udaipurwati	DFL Goriya Dhanawat of Udaipurwati plantation of 50 ha	61	7
Udaipurwati	ANR at Kishorpura plantation of 50 ha	57	6

****<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)***

Evaluated construction work in terms of boundary pillars developed at selected site appeared good in condition and helped in demarcation of forest area.

Table-8: Quantitative assessment of constructions work created under CAMPA in Jhunjhunu division

Sr. no.	Items	Rank of Item (Between 0 to 10)*
1	20 Boundary Pillars at Chirani of Khetri range	7

****<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding***

Jodhpur (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Jodhpur Forest Division. This Forest Division with 5 Forest Ranges namely Mandor, Phalodi, Bilada, Bhopalgarh and Osian has territorial jurisdiction over the entire Jodhpur District.

Fig: Location of Jodhpur district, Rajasthan

2. Selected plantation site for Evaluation

The ANR plantation of 50 ha at Nadiyakalan of Osian range in the year 2016-17 has been selected for evaluation.

Table-1: Selected plantation site for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved
Osian	ANR plantation of 50 ha at Nadiyakalan	2016-17	100%

3. Evaluation of Plantation

3.1.1. Site: The selected plantation has been carried out on 50 hec of land at Nadiyakalan village of Osian range during the year 2016-17. The plantation activities were done under the Assisted Natural Regeneration (ANR) model. As per the model, 200 plants per hectare have been planted. The GPS location of this selected site was 26°,43',25 N Latitude and 73°,10',45 E Longitude and at 300 m above msl. The site was a forest land and selected for 100% evaluation. The soil was brownish in colour and hard stony layer.

3.1.2. Treatment plan before sowing: The area comprises of hilly, slope and rocky surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out. Along with the pits, contour trenches were also

prepared in advance in the whole plantation area to conserve rain water for providing water to the plants after plantation works completed.

Fig: Instruction is given on field before counting starts

3.1.3. Nursery Development for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Nadiyakalan, a forest department nursery of Osian. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected **4 tree species under plantation were *Acacia senegal* (kumoth), *Zizyphus mauritiana* (Ber), *Acacia tortilis* (Totalis) and *Mixed plants* (as per the plantation journal). A total of 10000 numbers of seedlings were planted at the site.** Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Seedlings were planted in mixed system along with the naturally growing plants already available there. Spacing between plants has not been adopted here and random plantation has been carried out in this site. As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land.

Fig: Growth measurement of plants taking place

The choice of species under plantation appears nearly proper. The plants selected for growing in this site were nearly specific and already grown naturally there. These plants does not require much water as the all plants are thorny trees and can be grown easily on this hard, rocky surface areas. The choice of plants has been made so that the plants can grow well and survive for longer period. **The growth of planted plants was moderate.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There is no provision of providing irrigation for plantation in this model of ANR. Contour trench made adjacent to the pits in this area are the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Regeneration: The area comes under forest land where the present existing tree species were *Acacia senegal (kumoth), Acacia tortilis (Totalis), Zizyphus mauritiana (ber)* and barbudiya grass. The growth of all types of existing plant species was found to be good. **The natural regeneration process contributes to increase the vegetation coverage in that area.**

Fig: Contour trench at plantation area

Table-2: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) m
1	*Acacia tortilis (Totalis)*	171	4.3	.22
2	*Acacia senegal (kumoth)*	132	3.5	.21
3	*Zizyphus mauritiana (ber)*	123	2.4	.13

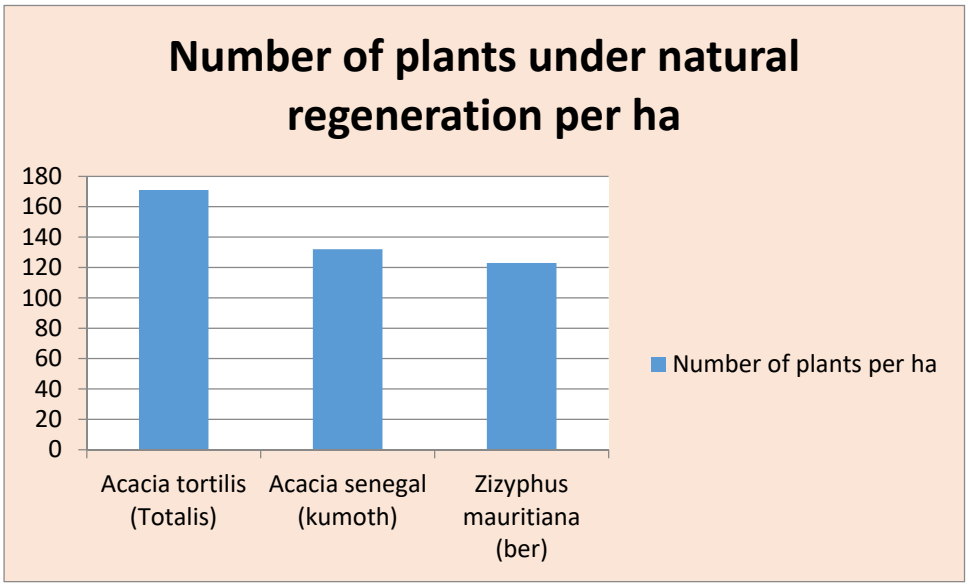


Fig: Graph showing plants under natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of *Acacia senegal*, *Acacia tortilis* and *Zizyphus mauritiana* species were sown in as well as along the trenches and on the bund of ditch fencing. The plants on the edges of ditch fencing showed poor growth.

3.1.8. Protection Work: **The area was protected by loose stone wall fencing of 2800 RMT and also by trench fencing surrounding of 502 RMT (the area was bigger than**

the area mentioned on record, which was 500 RMT). The protection provided by these fencing was good but now the area is opened to all and villagers are allowed to enter in this site along with their livestock. Trench fencing was in good condition but grasses have grown in the ditch which competes with the water conserve during monsoon.

3.1.9. Soil and Water Conservation Measures: **There were 20000 RMT contour trenches in the form of water harvesting structures** present in the entire plantation area adjacent to the pits. **The size of the contour varied from 3m to 7 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation. During monsoon, these trenches become full of water and stay for 2-3 months, which provide water to the plants. In addition to these trenches, soil and water conservation measure in the form of several small rock check dams have been made on the hills where the water flow comes from the top of hills. These check dams were used to control the flow of water from hill top and restrict the motion of flow. So that the small plants were not wash away due to heavy water flow and also restrict the soil erosion.

Fig: Measurement of checkdam at plantation site

Around 27 check dams were prepared in this region of to tal 50 hec of land which comprises of total 500.61 m^3 area. The size of rock check dam varied depending upon the space available on the channel of water flows from the hill top. The average size recorded for rocky check dam was 14.26 m length, 3.7m width and 0.57 m depth. The structure of rocky check dam was good and was useful for the purpose of which it was constructed.

3.1.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 59% at the site.** Plant species girth breast height was also measured. The growth of planted plants was moderate. A total of 10000 plants comprising of four species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-3: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
Acacia Senegal (Kumoth)	2000	1618	382	80.9	282.0	21.25
Acacia tortilis	6000	3143	2857	52.3	406.25	29.3

(Totalis)						
Zizyphus mauritiana (Ber)	1000	829	171	82.9	264.25	18.7
Mixed plants	1000	310	690	31.0	225.75	19.75
Total	**10000**	**5900**	**4100**	**59%**		

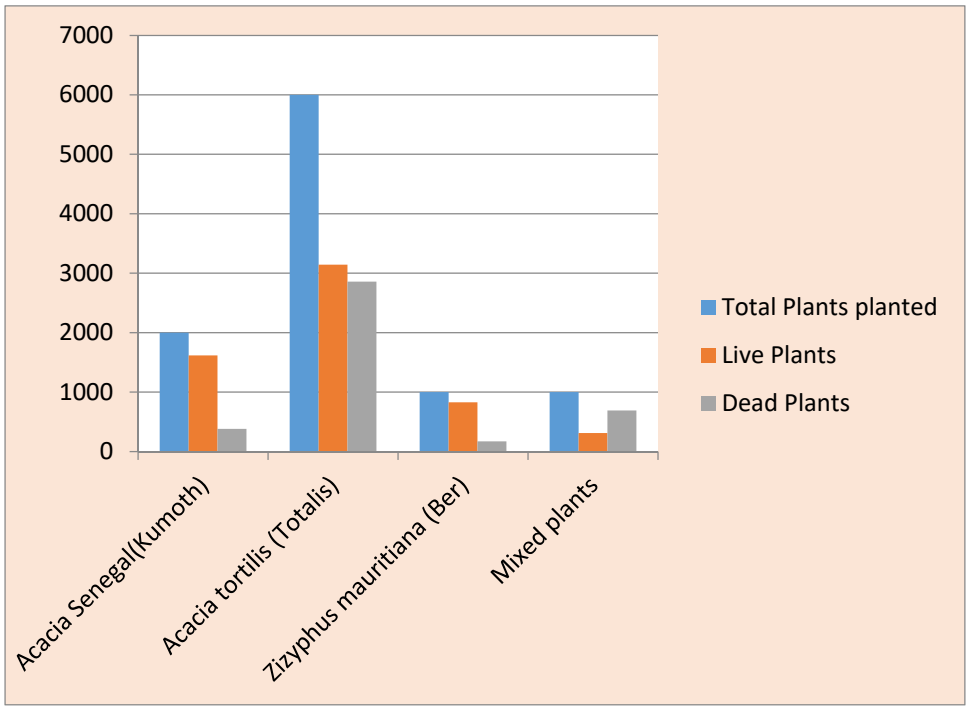


Fig: Graph showing survival of different plants

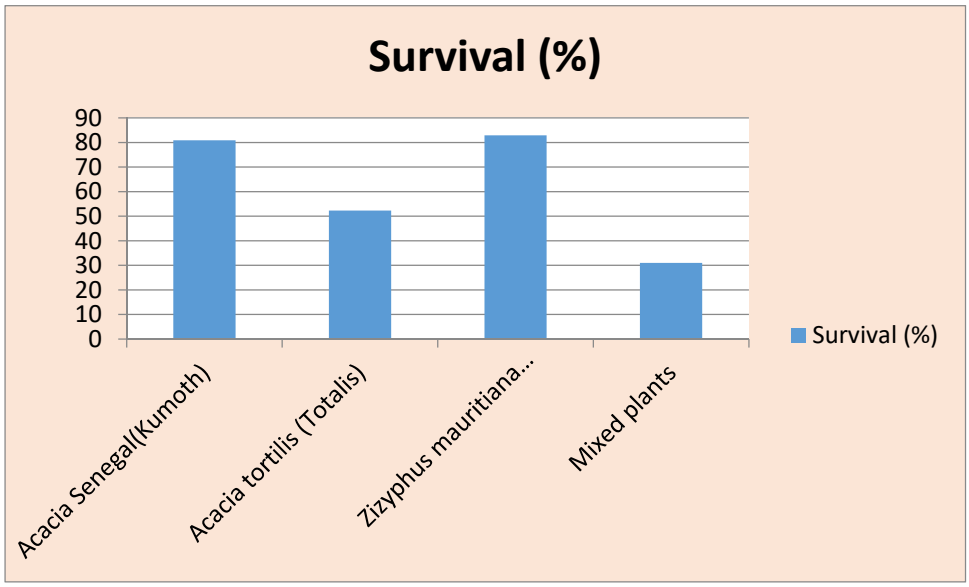


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ber plant was highest** followed by kumoth. **The survival percentage of ber was maximum which is 82.9 %. Plants such as kumoth showed good survival rate of 80.9%.**

The reason for high survival of ber and kumoth was that the species was endemic on that area and was fittest for this particular region. Similarly totalis also showed good survival rate, which was also a fittest plant in that region.

Fig: Measurement of plants taking on field

3.1.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured slightly higher (52.3 hec, as per calculation through KML file) than reported plantation area (50 hec).

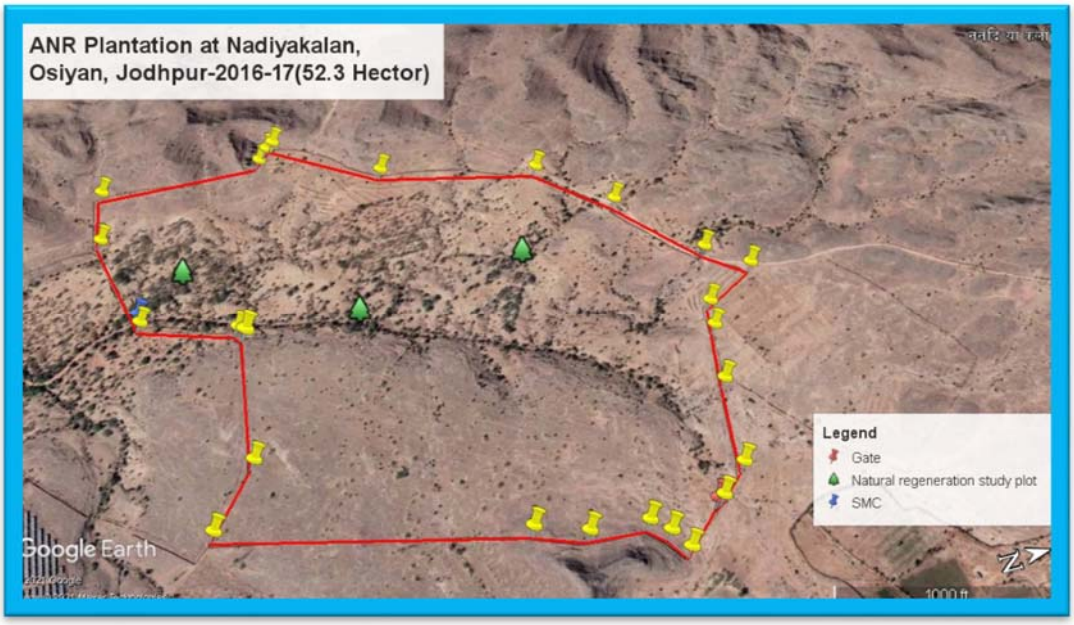


Fig: KML file of ANR at Nadiyakalan of Osian range plantation area

3.1.11. Budget and Expenditure:

Year	Cost Estimate (Rs.)				Expenditure Incurred (Rs.)			
	Plantation	SMC Works	Fencing	Total	Plantation	SMC Works	Fencing	Total
2015-16	416602	52215	725383	1664200	254877	678422	625625	1558924
2016-17	389726	-	-	389726	366555	-	23142	389697
2017-	126672	-	36128	162800	126510	-	36128	162638

18								
2018-19	77616	-	9384	87000	64742	-	17245	81987
2019-20	92250	-	-	92250	58149	-	18179	76328
Total	1102866	52215	770895	2395976	870833	678422	720319	2269574

4. Overall assessment: The overall impact of plantation appears satisfactory in Osian range of Jodhpur division. The below mentioned ranking system has been given keeping the view of vegetation cover increased in this plantation site.

Table-4: Quantitative assessment of plantation work created under CAMPA in Jodhpur division

Sr. no.	**Site**	**Survival percentage**	**Rank of Site (Between 0 to 10)***
1	ANR plantation at Nadiyakalan of Osian range	59%	7

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Karauli (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Karauli Forest Division. This Forest Division with 6 Forest Ranges namely Karauli, Gudachandraji, Hindaun, Mandrayal, Masalpur and Sapotra which has territorial jurisdiction over the entire Karauli District.

Fig : Location of Karauli district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Karauli Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Ha.	Model
Gudachandraji	2015-16	Gehroli-1	50	DFL
Sapotra	2016-17	Narolidang	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Karauli Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Gudachandraji	Forest Guard Chowki at Talchida	2014-15	100%
Sapotra	Range Office cum Residence at Durgashah Nursery	2014-15	100%
Masalpur	40 Boundary Pillar at Banswadi-8	2014-15	100%
Sapotra	4 Ft. wall -500 m at Kila Sapotra	2014-15	100%
Masalpur	4 Ft. wall - 491 m at Gubreda	2015-16	100%

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Gehroli-1 of Gudachandraji range:** The selected plantation has been carried out on 50 hec of land at Gehroli-1 in Gudachandraji during the year 2015-16. The activities were done under the Degraded Forest Land (DFL) model. The GPS location of this selected site was N 26.938603and E 76.794781. The site was a forest land and selected for 100% evaluation. The soil was clayey loam and stony hard layer of hilly area.

3.1.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 35000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: DFL at Gudachandraji

3.1.3. Nursery Development for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Gehroli-1, a forest department nursery of Gudachandraji range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 4. Seedlings of *Acacia senegal (*Kumtha*), Acacia leucopholea (*Ronj), *Holptelia iintegriifolia (*Churel*) and Acaciia tortilis (*Totalis) were planted.

A total of 35000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have been planted. So total number of plants planted was 35000 for 50 hectare of land.

Fig: Measurement of Plants

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water.

3.1.6. Natural Vegetation and Rege neration: Due to this plantation, the vegetation cover has increased to some extent. Aretha, kumtha, gabai were the plants found grown naturally in this area. The growth of the plant was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal*- Kumath	133	3.3	42
2	*Sapindus sp.*- Aretha	41	3	28
3	Gabai	44	4.3	28

3.1.7. Regeneration through seeds sowing: Seeds of species *kumatha, ronj, totalis,* were sown in and alongside of trenches. **The growth of seedlings from seeds was low.**

3.1.8. Protection Work: The selected DFL model plantation was **protected by trench fencing of 3390 RMT with average top width of 0.50m, average depth of 1.20m and average bottom width of 0.90m. Present condition of fencing was good and effective in controlling biotic pressure upto some extent.**

3.1.9. Soil and Water Conservation Measures: **There were 15000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 5.6 m to 10 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation. **Also there was loose stone check dam of 2340.28 cum present in 50 hec of plantation area.**

3.1.10. Observations Recorded: Under this model, 35000 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 60.5% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 35000 plants comprising of four species were planted in the 50 hec plantation area.

Fig: Counting of plants on field

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia leucopholea (Ronj)	7000	4272	3952	61.02	3.5	32
Holoptelia	10000	6098	3574	60.9	2.9	33

integrifolia (Churel)						
Acacia senegal (Kumtha)	8000	4804	3959	60.05	3.7	36
Acacia tortilis (Totalis)	10000	6030	1428	60.3	2.3	26
Total	**35000**	**21204**		**60.5**		

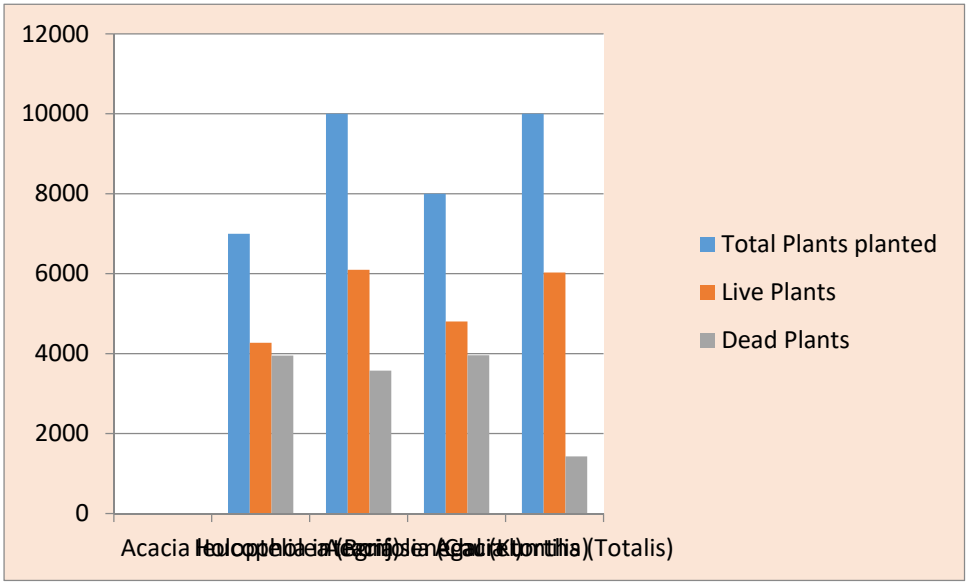


Fig: Graph showing survival of different plants

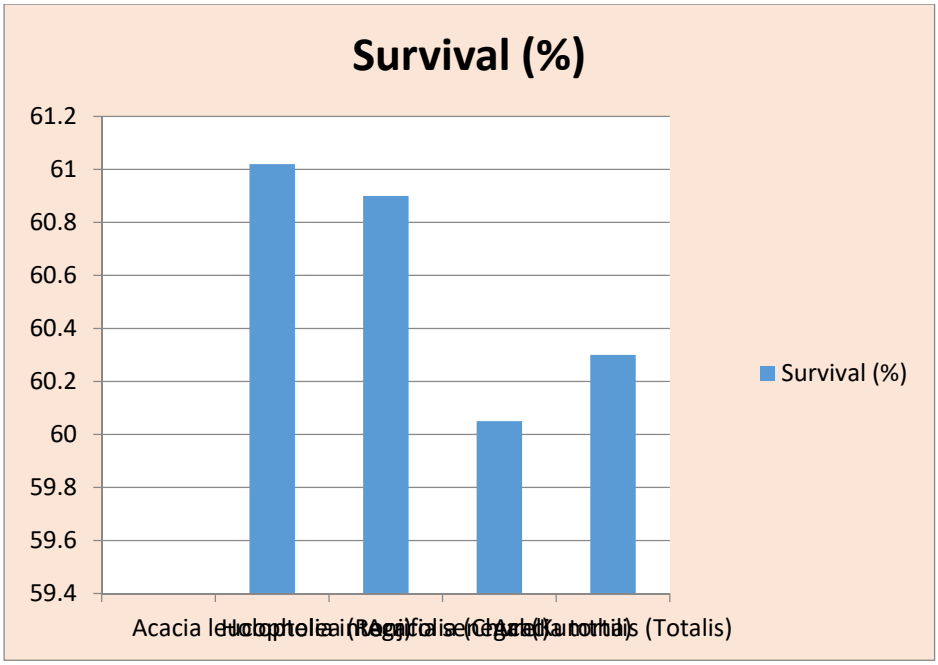


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ronj was highest** of 61.02%, followed by others of 60% on an average. **All the plants planted in this site showed good survival.** Good protection and watering on time may improve the survival of plants.

3.1.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

Fig: KML file of DFL at Gehroli-1 of Gudachandraji range plantation area

C.3.1.12. **Budget and expenditure**

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	-	-	-	-	-	-	-	143500
2016-17	-	-	-	-	-	-	-	4519
2017-18	-	-	-	-	-	-	-	221350
2018-19	-	-	-	-	-	-	-	221350
2019-20	-	-	-	-	-	-	-	233550
2020-21	-	-	-	-	-	-	-	258250

3.2.1. Site-2: **Naroli Dang in Saptora range:** The selected plantation has been carried out on 50 hec of land at Naroli Dang in Sapotra range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 26.334847 and E 76.647548. The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer.

3.2.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Naroli, a forest department nursery of Sapotra range. During monsoon these seedlings were planted.

Fig: ANR plantation at Sapotra range

3.2.4. Species Planted: The selected tree species under plantation were 4. Seedlings of *Acacia leucopholea* (Ronj), *Holoptelia iintegrifolia* (Churel), *Acacia nilotica (*Desi babool*) and Acacia senegal (*Kumtha*)* were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was not found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 10000 plants in 50 hectare have been planted. Type of plantation was block and technique of planting was pit. **The choice of species under plantation appeared proper**. The plants selected for growing in this site were nearly specific and grown naturally there. **The growth of survived plants was good.**

Fig: Putting lime on plants

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.2.6. Natural Vegetation and Regeneration: The area has been covered partially with vegetation due to this plantation. The growth of plants was good. Grasses have grown in ditch trenches which should be controlled. Plants like dhok, ronj, desi babool, totalis have been found grown naturally. The vegetation was sparsh.

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Anogeissus latifoliia*- Dhok	53	3.4	44

2	*Acacia nilotica*- Desi Baool	37	3.9	28
3	*Acacia leucopholea*- Ronj	37	4.1	32
4	*Acacia tortilis*- Totalis	13	3.8	35

3.1.7. Regeneration through seeds sowing: Seeds of Kumtha, Khair, Desi Babool, Churel species were sown on edges of contour trenches. **The growth of seedlings from seeds was good.**

Fig: Measurement of checkdam

3.2.8. Protection Work: The selected ANR model plantation was **protected by trench/ditch fencing of 2090 RMT and stone wall fencing of 1250 RMT. Stone fencing average top width was 0.60-0.80m, average depth was 1.20 m and average bottom width was 0.90-1.50m. The present condition of fencing is good but grasses have been grown in it. It was partially effective in controlling the biotic pressure.**

3.2.9. Soil and Water Conservation Measures: **There were 56 loose stone checkdam of total volume of 631.87 cum present in the plantation area, due to which the extent of gullies was good. There were 20000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 5m to 11 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation.

Fig: Counting process on field

3.2.10. Observations Recorded: Under this model, 10000 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 63.8% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of four species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia leucopholea (Ronj)	4000	2800	1200	70	4.3	36
Holoptelia integrifolia (Chruel)	3000	1760	1240	58.6	3.8	39
Acacia nilotica (Desi babool)	1000	633	367	63.3	4.2	33
Acacia tortilis (Totalis)	2000	1188	812	59.4	4.3	38
Total	**10000**	**6381**		**63.8**		

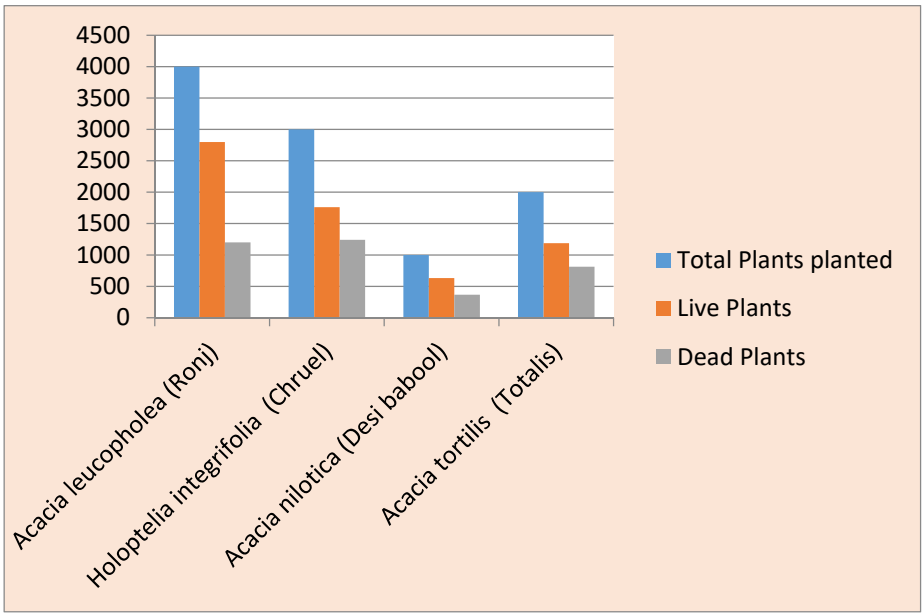


Fig: Graph showing survival of different plants

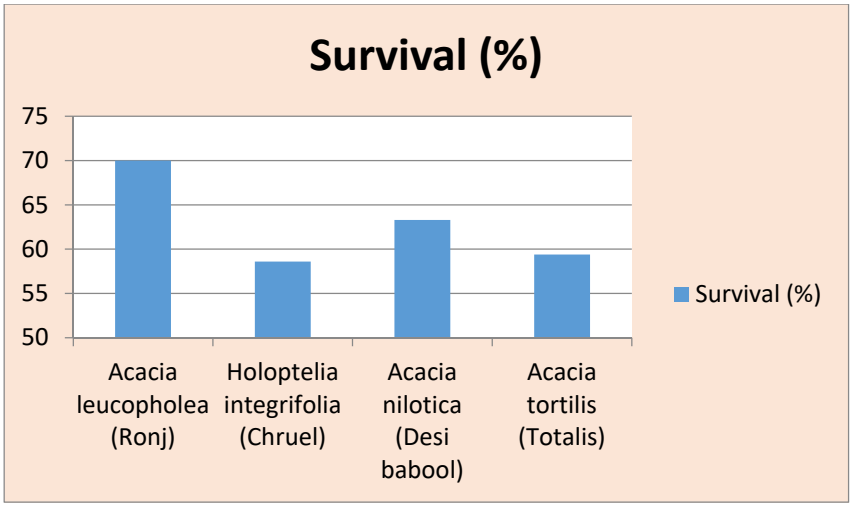


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ronj was highest** of 70%, followed by desi babool of 63.3%. **All the plants planted in this site showed good survival.**

Good protection and watering may improve the survival of plants.

3.2.11. GPS Location and KML file: The selected model under CAMPA plantation site measured 50 hec as per kml map.

Fig: KML file of ANR at Naroli Dang, Sapotra range plantation area

3.2.12. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	-	-	-	-	-	-	-	1030492
2016-17	-	-	-	-	-	-	-	155745

2017-18	-	-	-	-	-	-	-	637515
2018-19	-	-	-	-	-	-	-	83782
2019-20								88624

4. Evaluation of Construction Works

Site-1: Forest Guard Chowki at Talchida of Gudachandraji: At Gudachandraji range, one forest guard chowki was constructed. The site was constructed in the year 2014-15. GPS location of this area was Longitude- E 76.701587 and Latitude-N 26.850285. The cost incurred for construction was Rs. 5 lakh. The construction work started in the year of 2014 after approval and completed in the 2015.

Fig: Forest guard chowki at Gudachandrajii and GIS mapping

The construction of chowki appeared to be good but need maintenance as many places, dampness have developed on the building. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

Site- 2: Range Office cum Residence at Durgashah Nursery of Sapotra: At Sapotra range, the Range Office cum Residence at Durgashah Nursery has been evaluated. The building was constructed in the year 2014-15. Construction work appeared to be good and useful. GPS location of this area was 26.18,08.1 N and 76.44,28.4 E. The construction work started in the year of 2014 after approval and completed in the 2015. The cost of developing this building was Rs. 8,82,805/- (estimated cost was Rs. 10 Lakh). After completion of building, the building was using by the department for official purpose as well as for staying purposes. Electricity and water facility were provided in this building.

Fig: Range Office cum Residence at Sapotra and GIS mapping

Site- 3: 40 Forest Boundary Pillars at Banswadi-8 of Masalpur: 10 boundary pillars out of 40 have been evaluated in the area of Banswadi-8 of Masalpur range. The size of the pillars was 0.45*0.45*0.90 m. These pillars were made during 2014-15 to demarcate forest boundary in that area. **Construction of few pillars appeared damaged.** The GPS location of pillars was N 26.73718 and E 77.246747. **Remaining 30 pillars have not been found on field.**

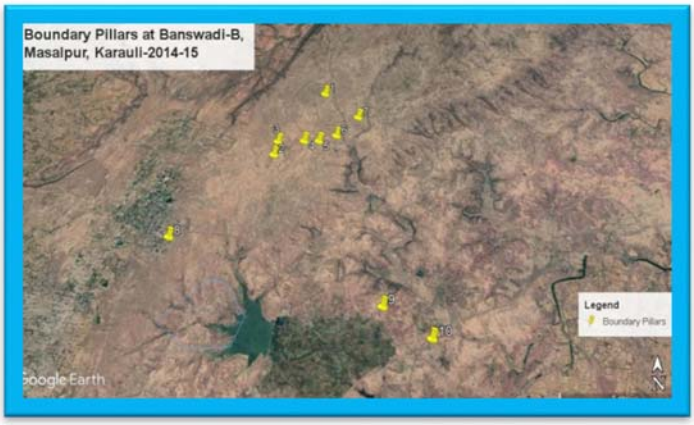


Fig: Boundary pillar at Masalpur

Fig: GIS mapping of 10 pillars at Masalpur

Site- 4: 4 Ft. wall -500 m stone wall at Kila Sapotra of Saptora range: At Kila Sapotra in Sapotra range, the stone wall has been evaluated. The wall was constructed in the year 2014-15. The wall dimensions were 4 ft and 500m length. Construction work appeared to be good and useful. GPS location of this area was 26,17,0.001 N and 76,47,93.5 E. The construction work started in the year of 2014 after approval and completed in the 2015. The expenditure incurred for constructing this wall was Rs10,99,987/-. The wall was found in good condition. Only at few places, it was damaged.

Fig: Stone wall at Sapotra and GIS mapping

Site- 5: 4 Ft. wall -491 m stone wall at Gubreda of Masalpur range: At Gubreda in Masalpur range, the stone wall has been evaluated. The wall was constructed in the year 2015-16. The wall dimensions were 4 ft and 491m length. Construction work appeared to be good and useful. GPS location of this area was 26,569005 N and 77,241021 E. The construction work started in the year of 2015 after approval and completed in the 2016. The expenditure incurred for constructing this wall was Rs. 5,52,923/- (estimate was Rs.11 lakh). The wall was found in good condition. Only at few places, it was damaged.

Fig: Stone wall at Masalpur and GIS mapping

4. Overall assessment: The overall impact of plantation activities appeared satisfactory in Karauli district.

Table-7: Quantitative assessment of plantation work in Karauli division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	DFL at Gehroli-1, Gudachandraji, 50 hec	60.5	6
2	ANR at Naroli Dang of Sarmathura- 50 hec	63.8	7

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-8: Quantitative assessment of constructions work created in Karauli division

Sr. no.	Ranges	Name of the site	Rank of site (Between 0 to 10)*
1	Gudachandraji	Forest Guard Chowki at Talchida	6
2	Sapotra	Range Office cum Residence at Durgashah Nursery	7
3	Masalpur	40 Boundary Pillar at Banswadi-8	6
4	Sapotra	4 Ft. wall -500 m at Kila Sapotra	6
5	Masalpur	4 Ft. wall - 491 m at Gubreda	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Karauli-RTR (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in RTR-Karauli Forest Division. This Forest Division with 3 Forest Ranges namely Kailadevi, Karanpur and Nainiyaki.

Fig : Location of Karauli district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of RTR-Karauli Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Ha.	Model
Nainiyaki*	2014-15	Bharrapura	50	ANR
Karanpur	2016-17	Gadigaon	50	ANR

*** Plantation site at Nainiyaki has not been found on site visit as there was no such plantation done in this range shared by the frontline staff. The official letter of this issue has been attached herewith with this report.**

2.2. Selected construction work sites for Evaluation

The selected construction work sites of RTR-Karauli Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Karanpur	Forest Guard Chowki at Mahajpura	2016-17	100%
Kailadevi	6Ft. Wall- 200 m at Bargama - II	2016-17	100%

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Gadigaon of Karanpur range**: The selected plantation has been carried out on 50 hec of land at Gadigaon in Karanpur range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 26, 12,45.3

and E 76,59,43.8. The site was a forest land and selected for 100% evaluation. The soil was clayey loam and stony hard layer of hilly area.

3.1.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR at Gadigaon, Karanpur

3.1.3. Nursery Development for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Gadigaon, a forest department nursery of Karanpur range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 6. Seedlings of *Acacia nilotica* (Desi Babool), *Butea monosperma* (Chila), *Acacia leucopholea (*Ronj), *Zizyphus mauritiana* (Ber), *Holoptelia integrifolia (*Churel*)* and Others were planted.

Fig: Counting of plants on field

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water.

3.1.6. Natural Vegetation and Rege neration: Due to this plantation, the vegetation cover has increased. Desi babool, chila and ronj were the plants found grown naturally in this area. The growth of the plant was good. The area has good coverage.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia nilotica*- Desi babool	137	2.5	37
2	*Butea monosperma*- Chila	83	3.9	42
3	*Acacia leucopholea*- Ronj	67	2.8	35

3.1.7. Regeneration through seeds sowing: Seeds of species *ronj, ber* were sown in and alongside of trenches. **The growth of seedlings from seeds was good.**

Fig: Putting lime on plants for counting

3.1.8. Protection Work: The selected ANR model plantation was **protected by trench fencing of 3126 RMT with average top width of 0.50m, average depth of 1.20m and average bottom width of 0.90m; and also with 2560 RMT loose stone wall. Present condition of both fencing was good and effective in controlling biotic pressure upto some extent.**

3.1.9. Soil and Water Conservation Measures: **There were 18000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 5 m to 8 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation. **Also there was loose stone check dam of 200 cum and earthen check dam of 1500 cum present in 50 hec of plantation area as water conservation measures.**

Fig: Measurement of plants

3.1.10. Observations Recorded: Under this model, 10000 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 78.8% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of six species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia nilotica (Desi Babool)	6000	5040	960	84	3.9	32
Butea monosperma (Chila)	1500	1288	212	85.5	5.4	40
*Acacia leucopholea (*Ronj)	400	108	391	27	3.3	31
Zizyphus mauritiana (Ber)	1500	1109	292	73.9	2.9	23
*Holoptelia integiifolia (*Churel*)*	500	304	196	60.8	3	32
Others	100	39	61	39	-	-
Total	**10000**	**7888**		**78.8**		

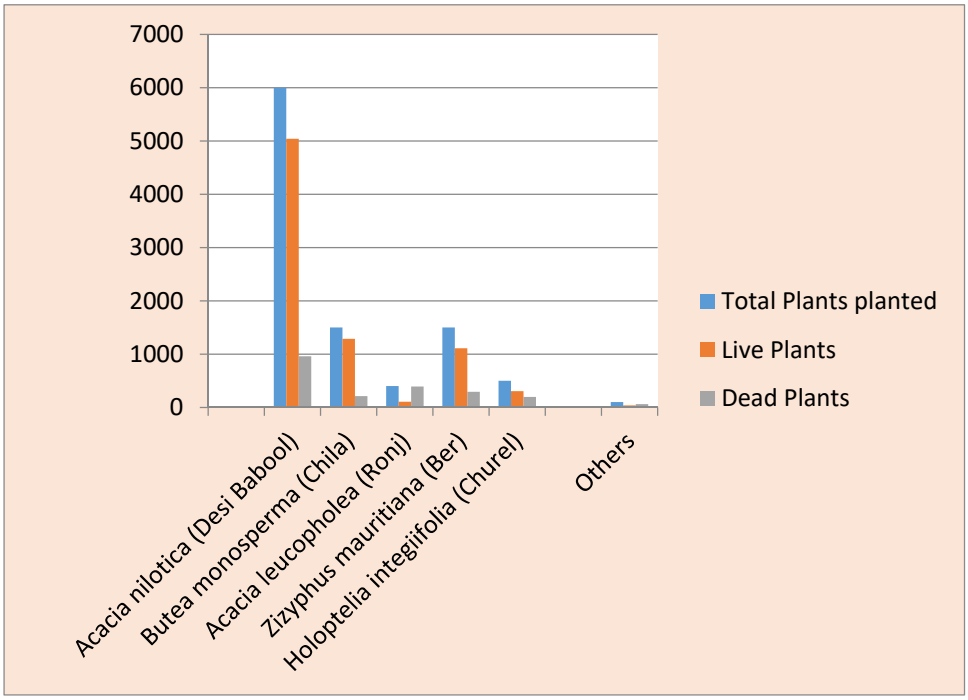


Fig: Graph showing survival of different plants

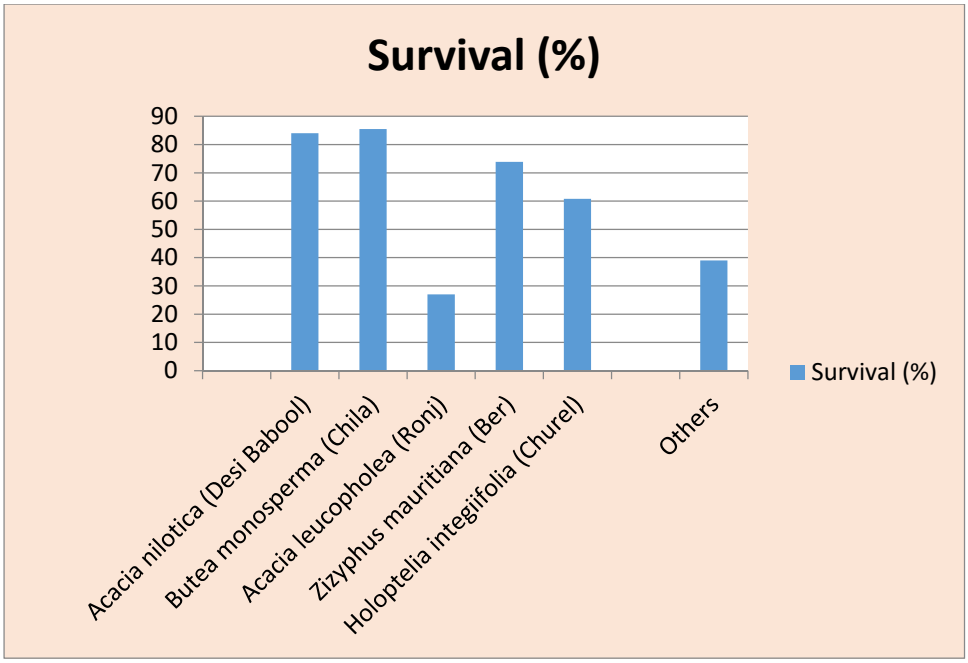


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of chila was highest** of 85.5%, followed by desi babool of 84%. **All the plants planted in this site showed good survival except ronj, which shoed lowest survival of 27%.**

Site specific species plantation, good protection and watering on time contributed to the good survival of plants.

3.1.11.GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per kml map.

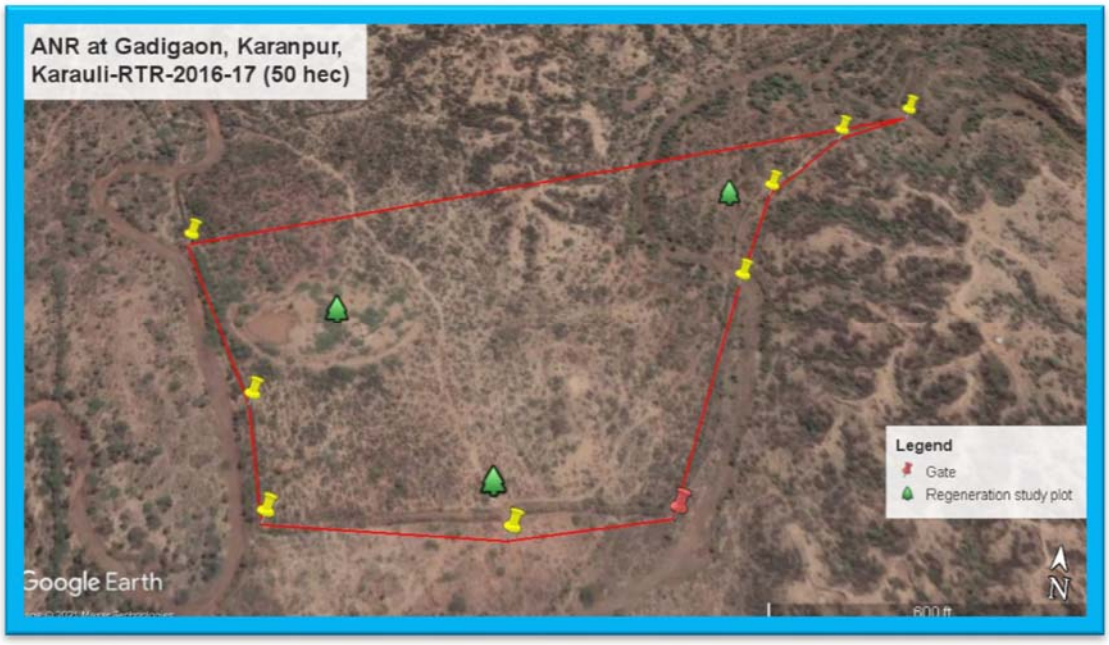


Fig: KML file of ANR at Gadigaon of Karanpur range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	-	-	-	-	-	-	-	1586582
2016-17	-	-	-	-	-	-	-	380277
2017-18	-	-	-	-	-	-	-	162029
2018-19	-	-	-	-	-	-	-	133712

4. Evaluation of Construction Works

Site-1: Forest Guard Chowki at Mahajpura of Karanpur: At Mahajpura of Karanpur range, one forest guard chowki was constructed. The site was constructed in the year 2016-17. GPS location of this area was Longitude- E 76,52,22 and Latitude-N 26,5,19. The cost incurred for construction was Rs.5,49,824/-. The construction work started in the year of 2016 after approval and completed in the 2017. The construction of chowki appeared to be good and useful. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

Fig: Forest guard chowki of Karanpur and GIS mapping

Site- 2: 6 Ft. wall -200 m stone wall at Bargama-II of Kailadevi range: At Bargama-II in Kailadevi range, the stone wall has been evaluated. The wall was constructed in the year 2016-17. The wall dimensions were 6 ft and 200m length. Construction work appeared to be good and useful. GPS location of this area was 26,18,49.64 N and 76,52,39.86 E. The construction work started in the year of 2016 after approval and completed in the 2017. The expenditure incurred for constructing this wall was Rs. 1408405/- (estimated cost was 14.25 Lakh) for 500 m long wall, here the team has evaluated 200 m long wall out of 500m. The wall was found in good condition.

Fig: Stone wall at Kailadevi and GIS mapping

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in RTR- Karauli district.

Table-5: Quantitative assessment of plantation work created under CAMPA in RTR-Karauli division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	ANR at Gadigaon, Karanpur, 50 hec	78.8	8

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-6: Quantitative assessment of constructions work created under CAMPA in RTR-Karauli division

Sr. no.	Ranges	Name of the site	Rank of site (Between 0 to 10)*
1	Karanpur	Forest Guard Chowki at Mahajpura	7
2	Kailadevi	6Ft. Wall- 200 m at Bargama - II	8

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Kota-MNP (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Kota MNP Forest Division. This Forest Division with 6 Forest Ranges namely Borawas, Darra, Jawaharsagar, Ranvtha, Kolipura and Gagraun.

Fig: Location of Kota district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of MNP Kota Forest Division were as given in table-1.

Forest Range	Name of Site	Year of Plantation	Ha.	Model
Gagron	Raipura	2015-16	54.41	NFL
Borawas	Sakatpura	2016-17	33.18	DFL
Jawahar Sagar	Ambarani	2016-17	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of MNP Kota Forest Division were given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Darra	Darra	2014-15	Forest Guard Chowki
Ranvtha	Ranvtha	2014-15	Range office cum residence
Darra	Darra	2015-16	Anicut -II
Kolipura	Adakhal Kolipura	2015-16	Anicut -II
Borawas	Borawas	2015-16	Anicut -II

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Raipura in Gagron range:** The selected plantation has been carried out on 54.41 hec of land at Raipura in Gagron range during the year 2015-16. The activities were

done under the Non forest land (NFL) model. The GPS location of this selected site was N 24.405997and E 76.111110.The site was a forest land and selected for 100% evaluation. The soil was reddish brown in colour and stony hard layer.

3.1.2. Treatment plan before sowin g: The area comprises of clayey loam soil and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 23500 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: NFL at Rajpura, Gagron

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Rajpura, a forest department nursery of Gagron range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 4. Seedlings of *Acacia nilotica* (desi babool), *Zizyphus mauritiana* (ber), *Acacia catechu* (khair) *and Emblica officinalis* (amla) were planted.

A total of 23500 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team. Technique of planting was trench cum pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have to be planted. Here total number of plants planted was 23500 for 54.41hectare of land.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground.The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

Fig: Measurement of checkdam

3.1.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. Dhok, ronj were the plants found grown naturally in this area. The growth of the plant was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Anogeissus latifolia*- Dhok	36	3.9m	42
2	*Acacia leucopholea*- Ronj	32	2.8m	34

3.1.7. Regeneration through seeds sowing: Seeds of species *kumatha, ronj* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected NFL model plantation was **protected by ditch/trench fencing of 234 RMT and stone wall of 1400 RMT with average top width of 0.60m, average depth of 0.20m and average bottom width of 0.80m. Present condition of fencing was good.**

3.1.9. Soil and Water Conservation Measures: **There was 11 checkdam in the form of water harvesting** structures present in the entire plantation area. **The size of the dam was 318.74 cum.** These are prepared for rainwater harvesting and soil conservation.

Fig: Plant counting process

3.1.10. Observations Recorded: Under this model, 23500 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 62.2% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 23500 plants comprising of four species were planted in the 54.41 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia catechu (Khair)	8000	6008	1992	75.1	3.1	31

*Zizyphus mauritiana (*Ber)	5000	4500	500	90	2.2	21
Emblica officinalis (Aamla)	2500	20	2480	0.8	2.3	20
*Acacia nilotica (*Desi babool)	8000	4090	3910	51.1	2.8	38
Total	**23500**	**14618**	8882	**62.2**		

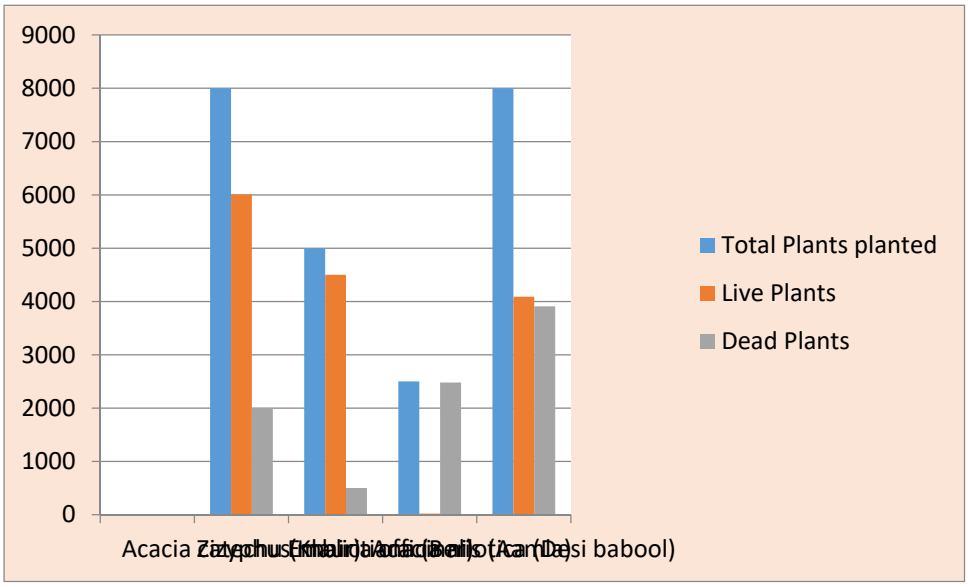


Fig: Graph showing survival of different plants

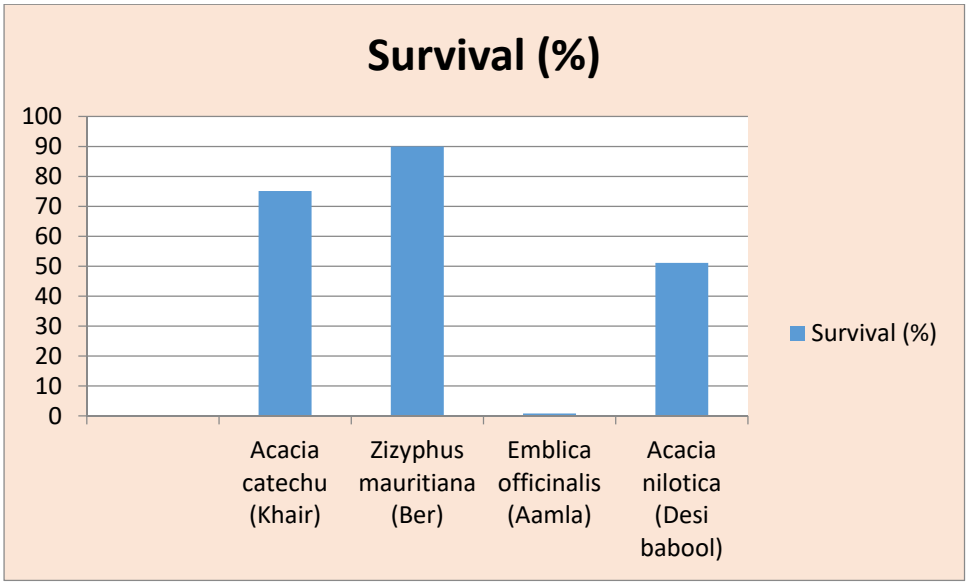


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ber plant was highest** followed by khair. **The survival percentage of ber was maximum which is 90%and khair was 75.1%. Aamla showed lowest survival, which were not fittest for this region for plantation.**

3.1.11.GPS Location and KML file: The selected NFL model under CAMPA plantation site measured 54.41 hec as per kml map.

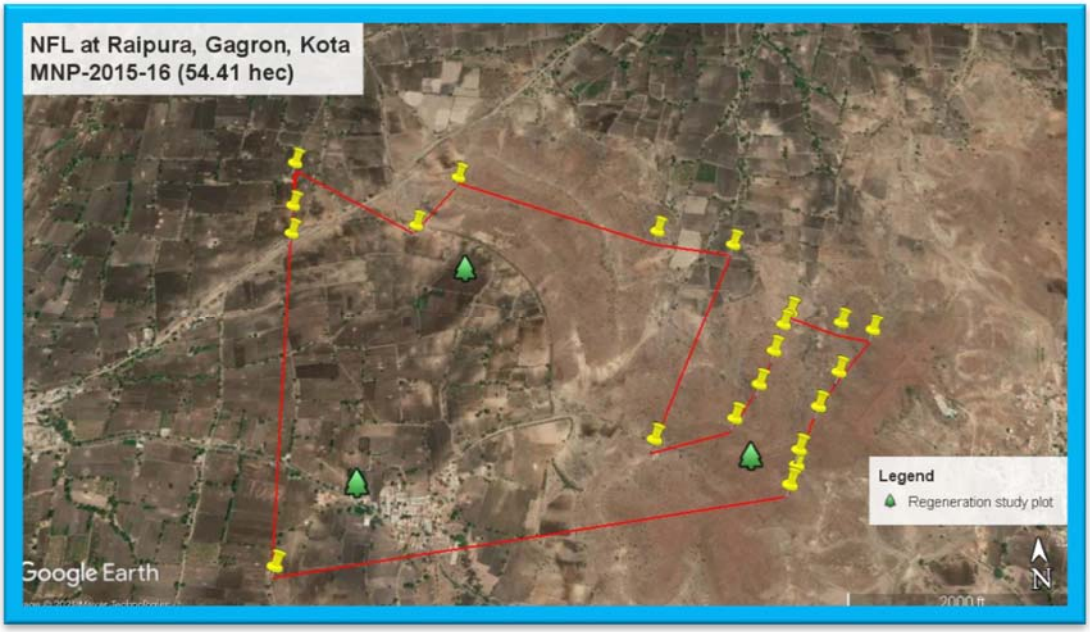


Fig: KML file of NFL at Rajpura, Gagron range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-	-	-	-	-	1764433
2015-16	-	-	-	-	-	-	-	181325
2016-17	-	-	-	-	-	-	-	531079
2017-18	-	-	-	-	-	-	-	32160
2018-19	-	-	-	-	-	-	-	213199
2019-20	-	-	-	-	-	-	-	192484
2020-21	-	-	-	-	-	-	-	139684.92

3.2.1. Site-2: **Sakatpura in Borawas range:** The selected plantation has been carried out on 33.18 hec of land at Sakatpura in Borawas range during the year 2016-17. The activities were done under the Degraded Forest Land (DFL) model. The GPS location of this selected site was N 25.3343 and E 72.2778. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour, clayey loam with stony hard layer.

3.2.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 17000 pits have been**

made for plantation in total 33.18hec of land. After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Sakatpura, a forest department nursery of Borawas range. During monsoon these seedlings were planted.

Fig: DFL at Sakatpura, Borawas

3.2.4. Species Planted: The selected tree species under plantation were 5. Seedlings of *Acacia catechu* (Khair), *Zizyphus mauritiana* (Ber), *Emblica officinalis* (Aamla), *Holoptelea integrifolia* (Churail) and *Acacia leucophoelea (*Ronj) were planted.

A total of 17000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No Plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 17000 plants in 33.18 hectare have been planted. Type of plantation was block and technique of planting was pit.

Fig: Measurement of plants

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground.The plantation works carried out here are totally based on rain water.

3.2.6. Natural Vegetation and Re generation: The area has been covered fully with vegetation due to this plantation. The growth of plants was good. Grasses have grown in ditch trenches which should be controlled. Plants like ber, ronj, have been found grown naturally.

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Zizyphus mauritiana* (Ber)	33	4.6m	32
2	*Acacia leucopholea* (Ronj)	47	5.5m	38

3.2.7. Regeneration through seeds sowing: Seeds of species like Ronj, Kumatha have been sown for natural regeneration. The growth of seeds sowing plants was good.

3.2.8. Protection Work: The selected DFL model plantation was **protected by stone wall fencing of 2800 RMT. Average top width of fencing was 0.60m, average depth was 0.80m and average bottom width was 1.20m. Also there was 14200 RMT ditch fencing.**

3.2.9. Observations Recorded: Under this model, 17000 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 65.7% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 17000 plants comprising of two species were planted in the 33.18 hec plantation area.

Fig: Stone wall at plantation area

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia catechu (Khair)	4250	3786	464	89	4.6	42
Zizyphus mauritiana (ber)	3000	2080	920	69.3	3.3	28
Acacia leucophoelea (Ronj)	1250	1009	241	80.7	4.1	36
Emblica officinalis (Aamla)	5000	2800	2200	56	3.6	29

Holoptelea integrifolia (Churail)	3500	1508	1992	43	3.5	29
Total	**17000**	**11183**	5817	**65.7%**		

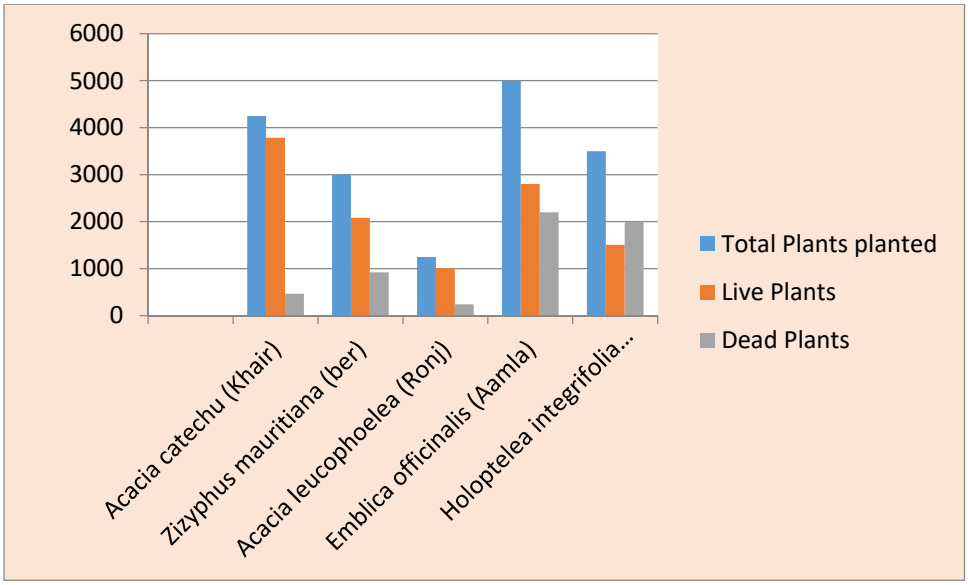


Fig: Graph showing survival of different plants

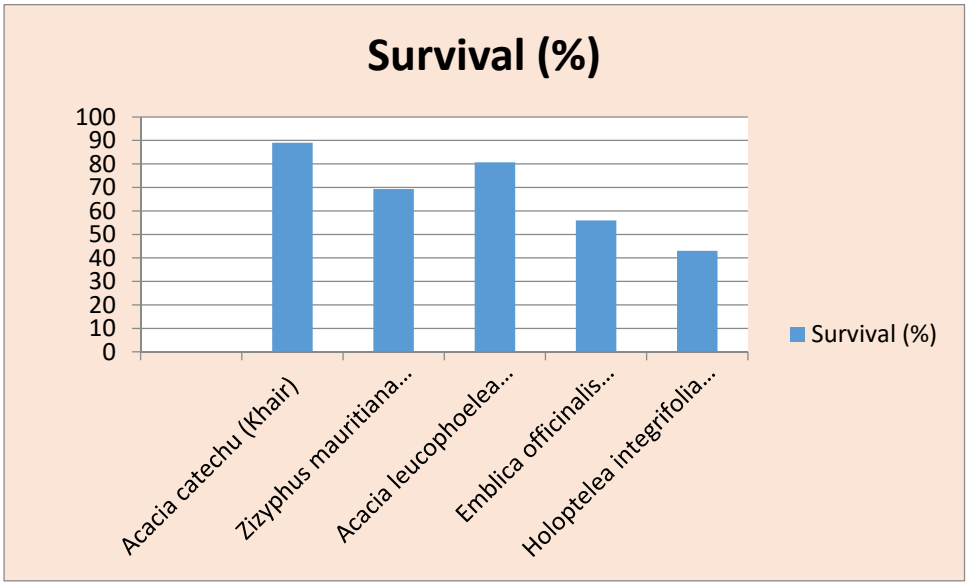


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Khair plant was highest** followed by Ronj. **The survival percentage of Khair was maximum which was 89% and Ronj was 80.7%. All the plants planted in this site showed good survival rate.**

3.2.11. GPS Location and KML file: The selected model under CAMPA plantation site measured 33.18 hec as per kml map.

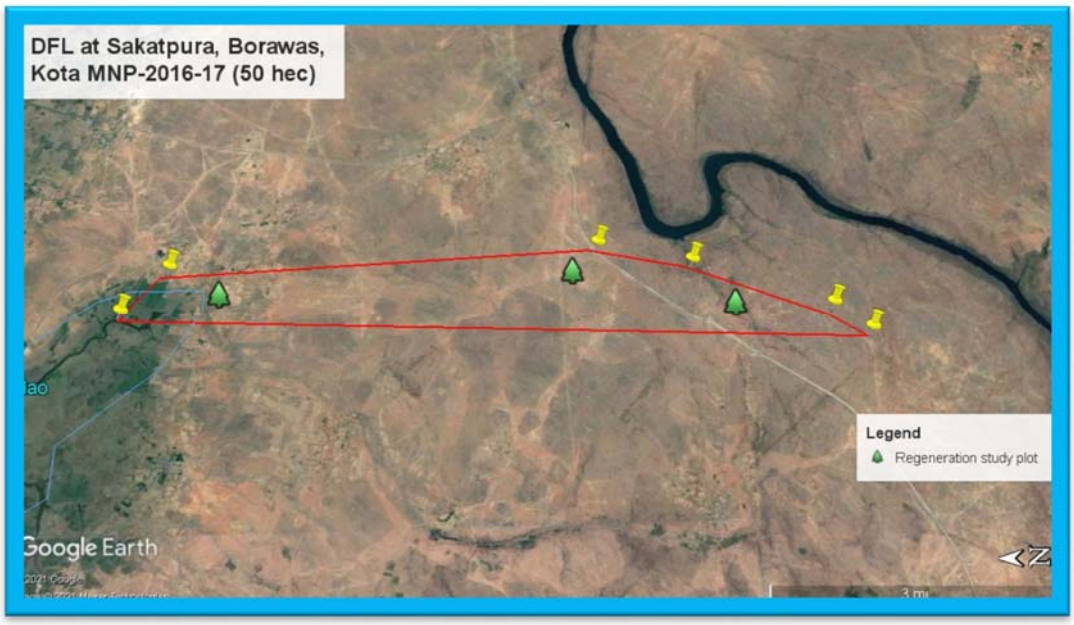


Fig: KML file of DFL at Sakatpura, Borawas range plantation area

3.2.12. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	-	-	-	-	-	-	-	905274
2016-17	-	-	-	-	-	-	-	724476
2017-18	-	-	-	-	-	-	-	269518
2018-19	-	-	-	-	-	-	-	337027
2019-20	-	-	-	-	-	-	-	4522
2020-21	-	-	-	-	-	-	-	80537

3.3.1. Site-3: **Ambarani in Jawahar Sagar range:** The selected plantation has been carried out on 50 hec of land at Ambarani in Jawahar Sagar range during the year 2016-17. The activities were done under the Assisted Natural Regeneration (ANR) model. The GPS location of this selected site was N 25.06917 and E 75.421764. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour and stony hard layer.

3.3.2. Treatment plan before sowing: The area comprises of hilly, rocky and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the

seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.3.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Ambarani, a forest department nursery of Jawahar Sagar range. During monsoon these seedlings were planted.

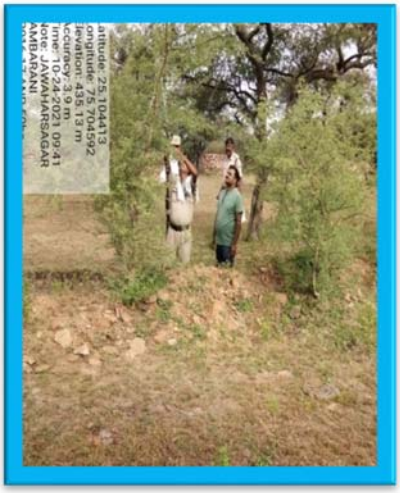


Fig: Measurement of plants

3.3.4. Species Planted: The selected tree species under plantation were 3. Seedlings of *Acacia leucophoelea (*ronj), *Acacia catechu* (Khair), *Zizyphus mauritiana* (ber), were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land. Type of plantation was block. Pit technique of planting was used.

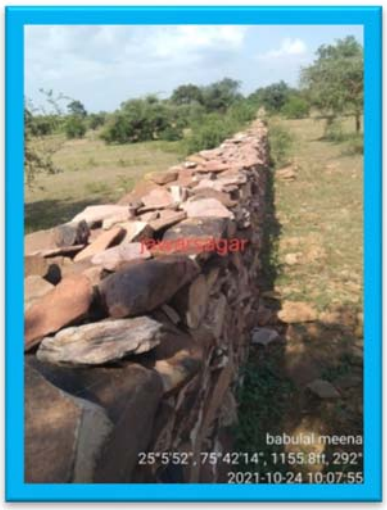


Fig: Stone wall for protection

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

C.3.3.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found.

3.3.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Plants such as Dhonk, Tendu, ber have been found growing naturally in this area. The growth of plants was good.

Table-7: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Anogeissus latifolia*- Dhonk	27	3.90	25.30

2	*Diospyros melanoxylon*-Tendu	38	4.50	28
3	*Zizyphus mauritiana* -Ber	63	2.5	27

3.3.7. Regeneration through seeds sowing: Seeds of species like Ronj, Khair have been sown for natural regeneration. The growth of seeds sowing plants was good.

3.3.8. Protection Work: The selected ANR model plantation was **protected by ditch fencing of 20000 RMT and stone wall fencing of 30000 cum. Fencing average top width was 0.6m, depth was 1.2m and average bottom width was 0.8m. Condition of ditch was good. Fencing has been partially effective in controlling the biotic pressures.**

3.3.9. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 79.8% at the site.** Plant species girth breast height was also measured. The growth of planted plants was very good. A total of 10000 plants comprising of three species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Fig: Measurement of checkdam

Table-8: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Zizyphus mauritiana (Ber)	2000	1756	244	87.8	3.4	48
Acacia leucophoelea (Ronj)	7000	5208	1792	77.2	4.3	52
Acacia catechu (Khair)	1000	820	180	82.0	4.7	54
Total	**10000**	**7984**	2016	**79.8**		

From the above graph, it is shown that the **survival of Ber plant was highest** followed by Khair. **The survival percentage of Ber was maximum which was 87.8% and Khair was 82%. All plants planted in this site showed good survival rate due to site specific plants selection.**

C.3.3.14.GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per kml map.

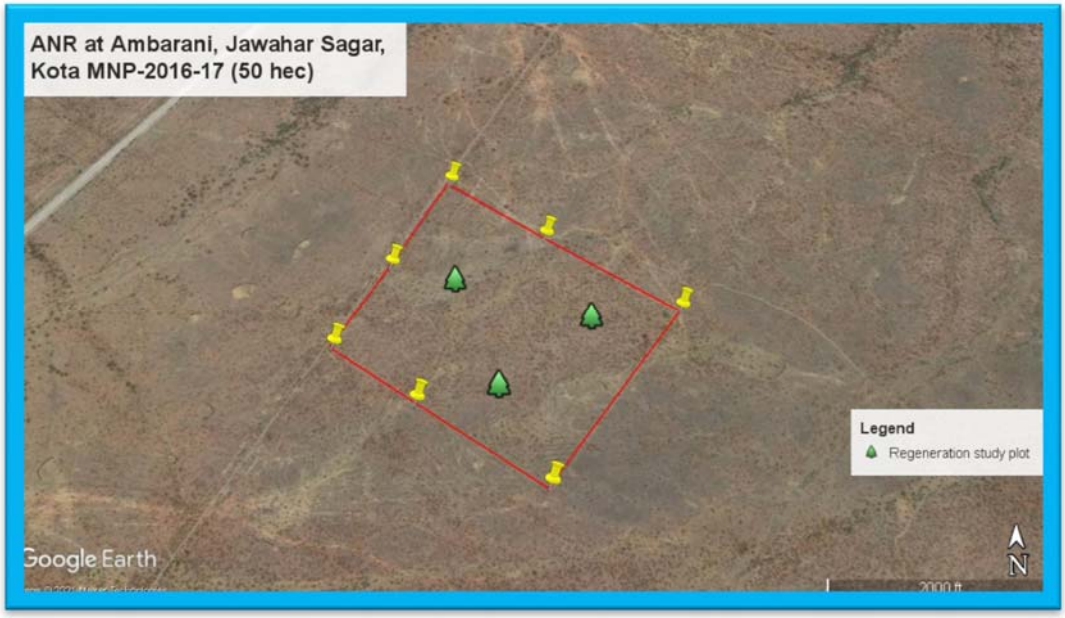


Fig: KML map of ANR at Borkui-III, Jawaharsagar range plantation area

3.3.12. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2016-17	-	-	-	-	-	-	-	1918429
2017-18	-	-	-	-	-	-	-	233273
2018-19	-	-	-	-	-	-	-	92954
2019-20	-	-	-	-	-	-	-	89025
2020-21	-	-	-	-	-	-	-	15123

4. Evaluation of Construction Works Sites

Site-1: Forest Guard Chowki at Darra: At Darra, one forest guard chowki has been constructed. The chowki was constructed in the year 2014-15. Construction work appeared to be very good and useful. This chowki was constructed at the cost of Rs. 495648/-. GPS location of this area was Longitude- E 76.169268 and Latitude-N 24.788718. The construction work started in the year of 2014 after approval and completed in the 2015. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

Fig: Forest guard chowki at Darra and GIS mapping

Site-2: Range Office cum Residence at Ranvtha: At Ranvtha range, one Range Office cum Residence has been constructed. The site was constructed in the year 2014-15. Construction work appeared to be very good and useful. This site was construc ted at the cost of Rs. 999916/- (estimated cost was Rs.10 lakh). GPS location of this area was Longitude- E 75.5522 and Latitude-N 24.5211. The construction work started in the year of 2014 after approval and completed in the 2015. After completion of building, the site was using by the department for official purpose. Electricity and water facility were provided in this building.

Fig: Range office at Ranvtha and GIS mapping

Site-3: Anicut-II at Darra:

At Darra in Darra range, anicut 11 has been constructed. The site was constructed in the year 2015-16. Construction work appeared to be good and useful. This site was constructed at the cost of Rs. 345064/-. GPS location of this area was Longitude- E 76.157459 and Latitude-N 24.769842. The construction work started in the year of 2014 after approval and completed in the 2015. This is used for drinking of wild animals. During site visit, the anicut was filled up with water upto 1.5m.

Fig: Anicut-II at Darra

Fig: GIS map of Anicut-II at Darra

Site-4: Anicut -II at Adakhal Kolipura: At Adakhal Kolipura in Kolipura range, anicut II has been constructed. The site was constructed in the year 2015-16. Construction work appeared to be good and useful. This site was constructed at the cost of Rs. 599980. GPS location of this area was Longitude- E 75.4059 and Latitude-N 24.5834. The construction work started in the year of 2015after approval and completed in the 2016. The water is used for drinking of wild animals. During site visit, the anicut was filled up with water upto 1.5m.

Fig: Anicut-II at Adakhal kolipura and GIS map

Site-5: Anicut-II at Seiger Borawas: At Seiger Borawas, anicut II has been constructed. The site was constructed in the year 2015-16. Construction work appeared to be good and useful. GPS location of this area was Longitude- E 75.4040 and Latitude-N 24.5827. The construction work started in the year of 2015 after approval and completed in the 2016. This is used for drinking of wild animals. During site visit, the anicut was filled up with water upto 1m.

Fig: Anicut-II of Seiger Borawas and GIS map

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in MNP Kota district.

Table-9: Quantitative assessment of plantation work created under CAMPA in MNP Kota division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	NFL at Raipura 54.41 Ha	62.2	7
2	DFL at Sakatpura 33.18 Ha	65.7	7
3	ANR at Ambarani 50 Ha	79.8	8

****<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)***

Table-10: Quantitative assessment of constructions work created under CAMPA in Kota MNP division

Sr. no.	Items	Name of the site	Rank of site (Between 0 to 10)*
1	Forest Guard Chowki	Darra	8
2	Range office cum residence	Ranvtha	8
3	Anicut 11	Darra	7
4	Anicut 11	Adakhal Kolipura	7
5	Anicut 11	Borawas	7

****<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding***

Kota (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Kota Forest Division. This Forest Division with 6 Forest Ranges namely Itawa, Kanwas, Ladpura, Mandana, Modak and Sultanpur, which has territorial jurisdiction over the entire Kota District.

Fig: Location of Kota district, Rajasthan

2.1 Selected Plantation Sites for Evaluation

The selected plantation sites of Kota Forest Division were as given in table-1.

Forest Range	Name of Site	Year of Plantation	Ha.	Model
Ladpura	Dodhdevi-11	2014-15	50	DFL
Mandana	Bhilot	2015-16	12	ANR
Ladpura	Bowdikheda	2016-17	6.71	NFL

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Kota Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Itawa	Dungarli Girdharpura	2014-15	20 Boundary Pillars

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Dodhadevi-11 in Ladpura range:** The selected plantation has been carried out on 50hec of land at Dodhadevi-11 in Ladpura range during the year 2014-15. The activities were done under the Degraded Forest Land (DFL) model. The GPS location of this selected site was N 25.0434and E 75.53593. The site was a forest land and selected for 100% evaluation. The soil was reddish brown in colour and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of clayey loam soil and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 25000 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in

the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.1.3. Nursery Develo pment for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Dodhadevi-11, a forest department nursery of Ladpura range. During monsoon these seedlings were planted.

Fig: DFL at Dodhdevi-II of Ladpura range

3.1.4. Species Planted: The selected tree species under plantation were 11. Seedlings of *Holoptelea integrifolia* (Churel), *Pithecellobium dulce* (Jangal Jalebi), *Acacia catechu* (Khair), *Zizyphus mauritiana* (Ber), *Emblica officinalis* (Aamla), *Acacia leucopholea* (Ronj), *Azadirachta indica* (Neem), *Dendrocalamus strictus* (Bans), Medla, *Terminalia arjuna* (Arjun), *Syzygium cumini* (Jamun) were planted.

A total of 25000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 500 plants per hectare have been planted. So total number of plants planted was 25000 for 50hectare of land.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground.The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

Fig: Measurement of treanches

3.1.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. *Acacia leucopholea* (Ronj),

Dhonk were the plants found grown naturally in this area. The growth of the plant was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
2	*Acacia leucopholea* (Ronj)	69	4	32
3	*Anogeissu latifolia (*Dhonk)	23	5	28

3.1.7. Regeneration through seeds sowing: Seeds of species *kumatha, Khair, ronj* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected DFL model plantation was **protected by stone wall fencing of 3040 RMT with average top width of 1.00m, average depth of 1.20m and average bottom width of 1.50m. Present condition of fencing was good and partially effective in controlling in biotic pressure.**

Fig: Evaluation team on field

3.1.9. Soil and Water Conservation Measures: **There were 176.378 cum 9 loose stone checkdam and 15000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area**.** These are prepared for rainwater harvesting and soil conservation. The size of trenches were .45*.45m and length varied from 4-10m.

3.1.10. Observations Recorded: Under this model, 500 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 68.9% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 25000 plants comprising of five species were planted in the 50hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Holoptelea integrifolia (Churel)	3700	2850	850	77.02	4.50	30

Pithecellobium dulce (Jangal Jalebi)	3500	1570	1930	44.85	4	30
Acacia catechu (Khair)	2100	1050	1050	50	4	27
*Zizyphus mauritiana (*Ber)	800	710	90	88.75	4.5	18
Emblica officinalis (Aamla)	1500	800	700	53.33	4.5	29
Acacia leucopholea (Ronj)	12200	9780	2420	80.16	5	24
Azadirachta indica (Neem)	50	20	30	40	5	28
*Dendrocalamus strictus (*Baans)	400	100	300	25	6	--
Medla	500	250	250	50	5	26
*Terminalia arjuna (*Arjun)	200	100	100	50	5	23
*Syzygium cumini (*Jamun*)*	50	20	30	45	3	22
Total	**25000**	**17230**	7770	**68.9**		

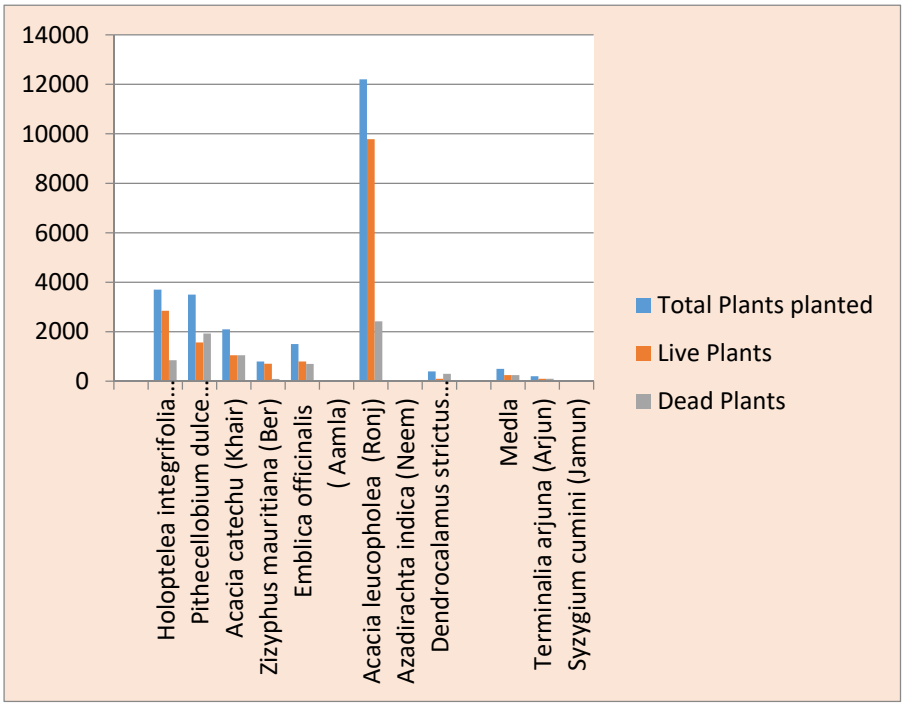


Fig: Graph showing survival of different plants

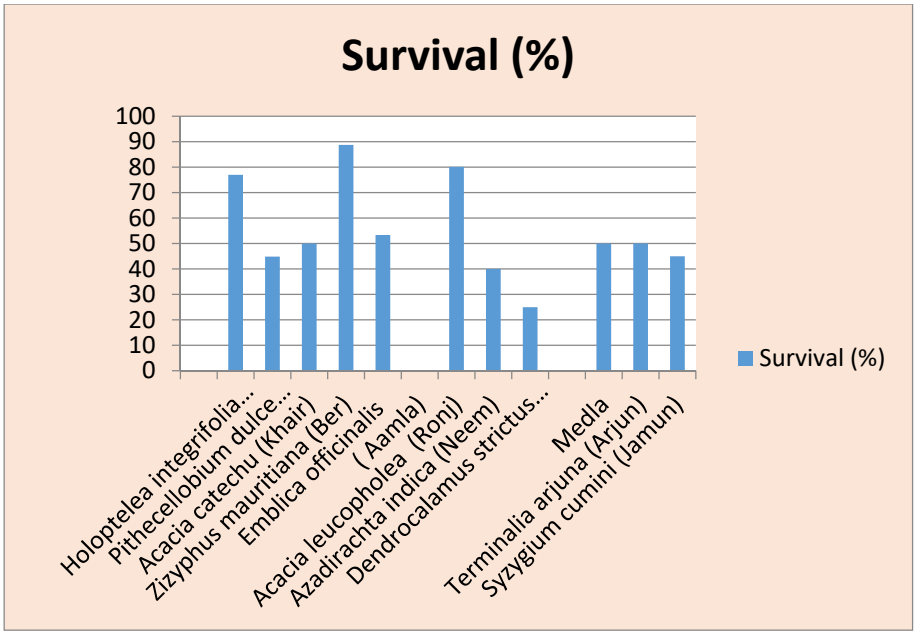


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ber plant was highest** followed by ronj. **The survival percentage of ber was maximum which is 88.75% and ronj was 80.16%.**

3.1.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

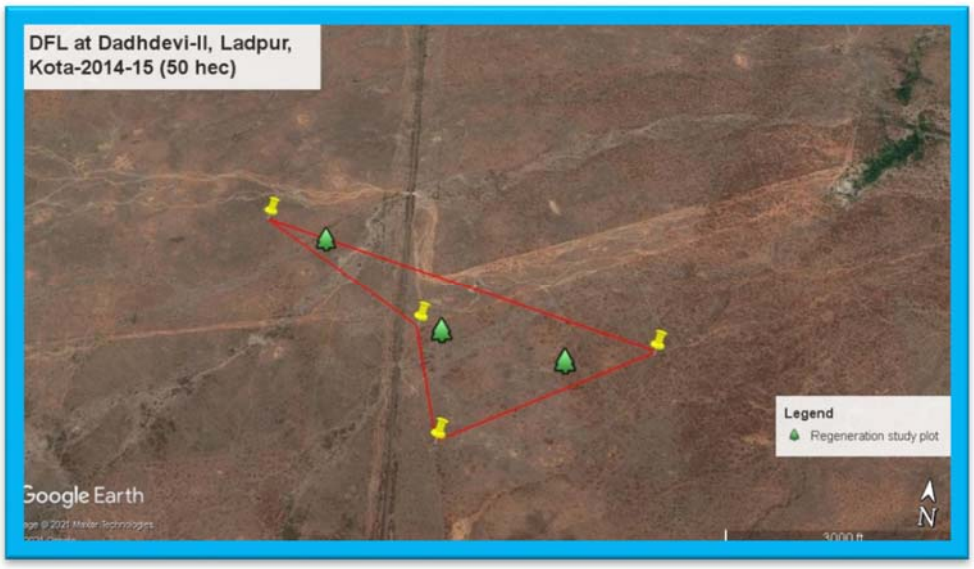


Fig: KML file of DFL at Dodhdevi-II, Ladpura range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2013-14	-	-	-	1380000	-	-	-	1379939

2014-15	-	-	-	1043120	-	-	-	1043120
2015-16	-	-	-	451900	-	-	-	451863
2016-17	-	-	-	209150	-	-	-	209148
2017-18	-	-	-	221300	-	-	-	217055
2018-19	-	-	-	221300	-	-	-	206520
2019-20	-	-	-	233550	-	-	-	228012
2020-21	-	-	-	258250	-	-	-	207513

C.3.2.1. Site-2: **Bhilot in Mandana range:** The selected plantation has been carried out on 12hec of land at Bhilot in Mandana range during the year 2015-16. The activities were done under the Assisted Natural Regeneration (ANR) model. The GPS location of this selected site was N 24.5456 and E 75.5819.The site was a forest land and selected for 100% evaluation. The soil was reddish brown in colour, clayey loam with stony hard layer.

Fig: ANR at Bhilot, Mandanana

3.2.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 2400 pits have been made for plantation in total 12hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Bhilot, a forest department nursery of Mandana range. During monsoon these seedlings were planted.

Fig: Putting lime on plants for counting

3.2.4. Species Planted: The selected tree species under plantation were 5. Seedlings of *Acacia leucopholea* (Ronj*), Acacia catechu (*Khair), *Holoptelea integrifolia (*Churel*), Zizyphus mauritiana (*Ber*), Butea monosperma (*Chila*)* were planted.

A total of 2400 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 2400 for 12hectare of land.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

Fig: Measurement of trenches

3.2.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. Desi babool, hingota, ronj were the plants found grown naturally in this area. The growth of the plant was good.

3.2.7. Regeneration through seeds sowing: Seeds of species *kumatha, ronj* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.2.8. Protection Work: The selected DFL model plantation was **protected by ditch/trench fencing of 4000 RMT and stone wall fencing of 300 RMT with average top width of 0.80m or 0.60m, average depth of 1.20m and average bottom width of 1.50m or 0.90m. Present condition of fencing was good. It helps in handling biotic pressure.**

3.2.9. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 79.9% at the site.** Plant species girth breast height was also measured. The growth of planted plants was moderate. A total of 2400 plants comprising of five species were planted in the 50hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-5: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia leucopholea (Ronj)	800	682	118	85.25	2.05	22
Acacia catechu (Khair)	500	352	148	70.4	1.95	24
Holoptelea integrifolia (Churel)	500	368	132	73.6	1.80	17
*Zizyphus mauritiana (*Ber)	400	362	38	90.5	.90	11
*Butea monosperma (*Chhila)	200	154	46	77.0	1.40	14
Total	**2400**	**1918**		**79.9**		

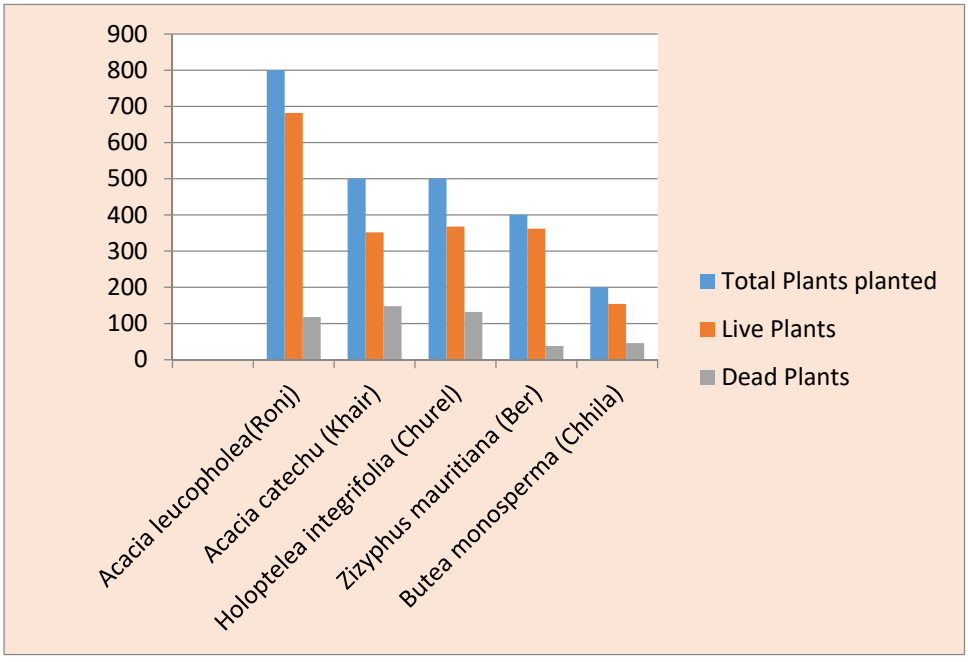


Fig: Graph showing survival of different plants

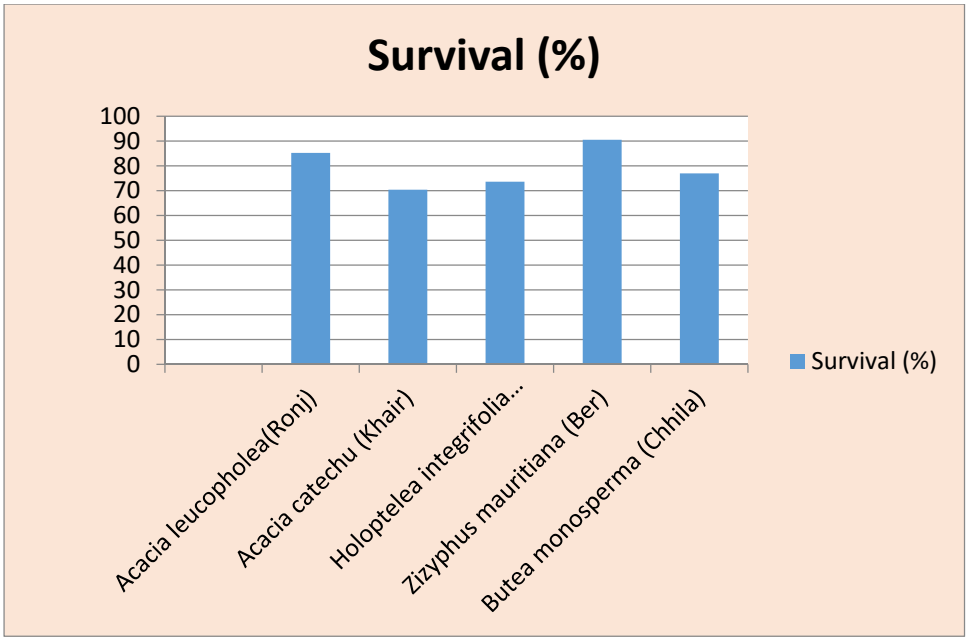


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Ber plant was highest** followed by Ronj. **The survival percentage of ber was 90.5% and ronj was 85.25%. All the plants showed good survival.**

Site specific plants and good protection resulted in good survival.

3.2.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 12 hec as per kml map.

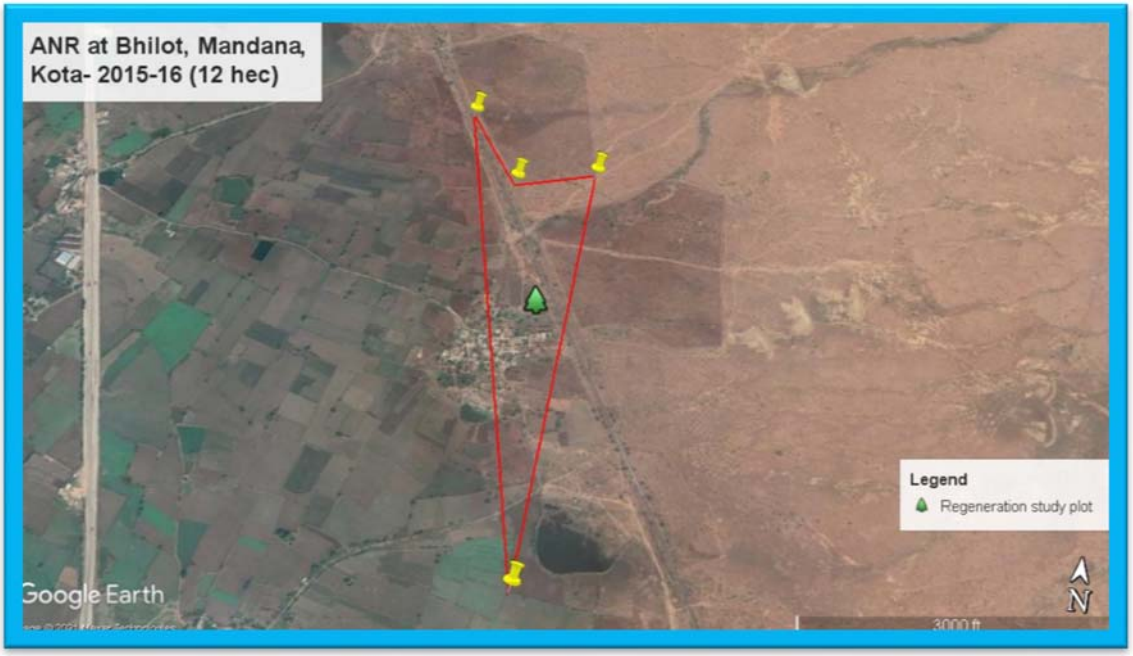


Fig: KML file of ANR at Bhilot, Mandana range plantation area

3.2.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-	320952	-	-	-	-
2015-16	-	-	-	7759	-	-	-	-
2016-17	-	-	-	8822	-	-	-	-
2017-18	-	-	-	20063	-	-	-	-

3.3.1. Site-3: **Bowdikheda in Ladpura range:** The selected plantation has been carried out on 6.71 Ha of land at Bowdikheda in Ladpura range during the year 2016-17. The activities were done under the Non Forest Land (NFL) model. The GPS location of this selected site was N 24.992586 and E 75.837179. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour and stony hard layer.

3.3.2. Treatment plan before sowin g: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 7400 pits have been made for plantation in total 6.71hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: NFL at Bowdikheda, Ladpura

3.3.3. Nursery Developmen t for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Bowdikheda, a forest department nursery of Ladpura range. During monsoon these seedlings were planted.

3.3.4. Species Planted: The selected tree species under plantation were 4. Seedlings of *Acacia catechu* (khair), *Acacia leucophoelea* (ronj), *Zizyphus mauritiana* (ber), *Pithecellobium dulce* (jangal jalebi) were planted.

Fig: Measurement of trenches

A total of 7400 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, total number of plants planted was 7400 for 6.71hectare of land. Type of plantation was block. Pit technique of planting was used.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.3.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found.

Fig: Protection stone wall

3.3.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Plants such as desi babool, churail, ber and neem have been found growing naturally in this area. The growth of plants was good.

3.3.7. Regeneration through seeds sowing: Seeds of species like Kumtha, Ronj, Khair have been sown for natural regeneration. The growth of seeds sowing plants was good.

3.3.8. Protection Work: The selected NFL model plantation was **protected by loose stone wall fencing of 1017 RMT. With average top width of 1.20m, average depth of 1.20m and average bottom width of 1.50 or 0.90m. Condition of ditch was good. Fencing has been effective in controlling the biotic pressures. Also the area has barbed wire fencing of 5370 RMT.**

3.3.9. Observations Recorded: Under this model, 7400 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 63.6% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 7400 plants comprising of four species were planted in the 6.71hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia catechu (Khair)	2646	1519	1127	57.4	3.5	28
Acacia leucophoelea	2732	2200	532	80.5	3.9	32

(Ronj)						
Zizyphus mauritiana (Ber)	922	711	211	77.1	2.3	20
Pithecellobium dulce (Jangal Jalebi)	1100	278	822	25.2	2.7	22
Total	**7400**	**4728**	2672	**63.6**		

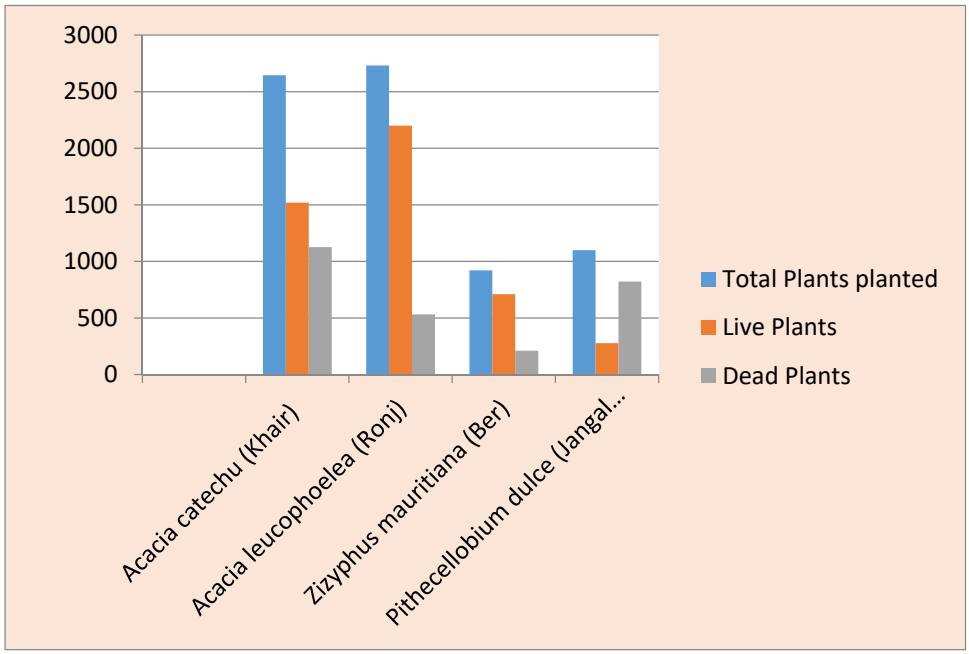


Fig: Graph showing survival of different plants

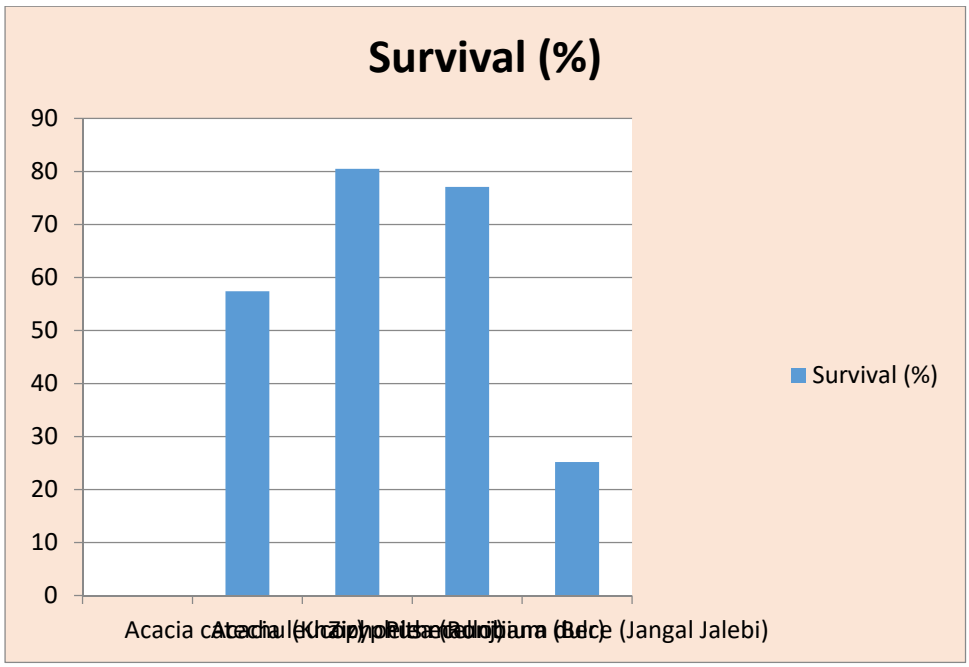


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Ronj plant was highest** followed by Ber. **The survival percentage of Ronj was maximum which was 80.5 % and Ber was 77.1%. Many plants planted in this site showed average survival rate.**

3.3.11. GPS Location and KML file: The selected NFL model under CAMPA plantation site measured 6.71 hec as per kml map.

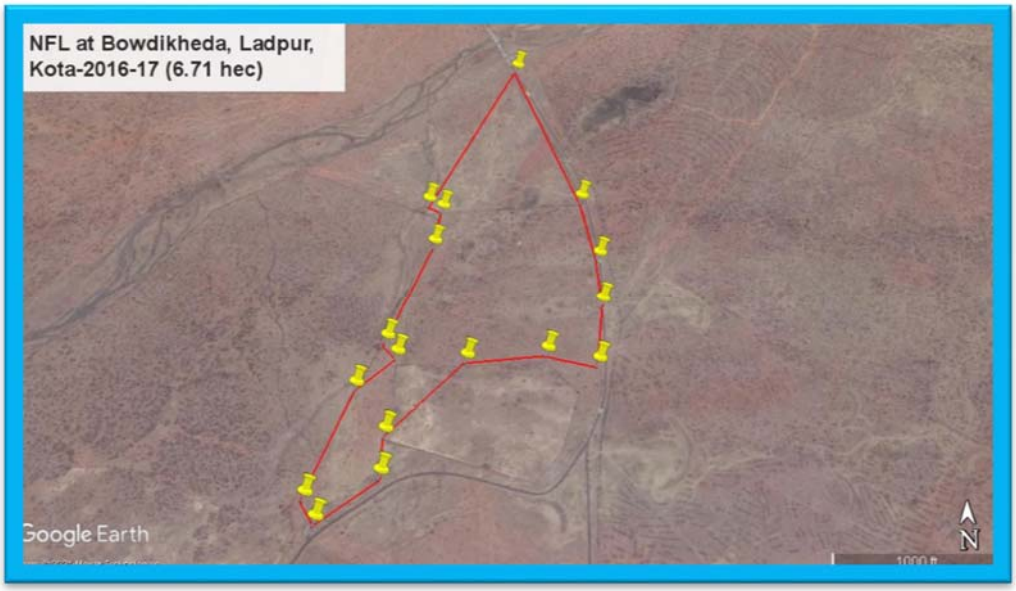


Fig: KML map of NFL at Bowdikheda, Ladpura range plantation area

4. Evaluation of Construction Works Sites

<u>Site-1 : 20 Boundary Pillars at Dungarli Girdharpura of Itawa range:</u> At Dungarli Girdharpura in Itawa range, 20 boundary pillars site has been constructed. The site was constructed in the year 2014-15. 6 pillars have been found on the site, remaining 14 were not found. This site was constructed at the cost of Rs. 77990. The construction work started in the year of 2014 after approval and completed in the 2015. Most of the pillars were in damaged conditions.

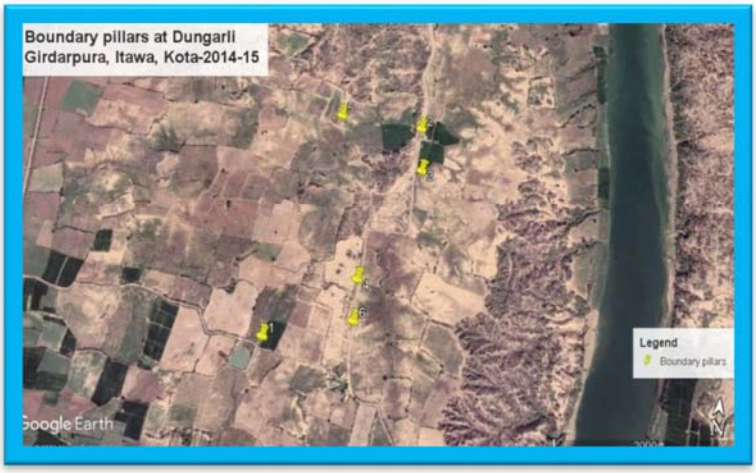


Fig: Boundary pillar of Itawa range and GIS mapping of pillars

C.4. Overall assessment: The overall impact of plantation activities appeared satisfactory in Kota district.

Table-7: Quantitative assessment of plantation work created under CAMPA in Kota division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	DFL Dodhdevi-1150 Ha	68.9	7
2	ANR Bhilot 12 Ha	79.9	8
3	NFL Bowdikheda 6.71 Ha	63.6	7

****<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)***

Table-8: Quantitative assessment of constructions work created under CAMPA in Kota division

Sr. no.	Items	Name of the site	Rank of site (Between 0 to 10)*
1	20 Boundary Pillars	Dungarli Girdharpura	5

****<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding***

Kota-WL (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Kota WL Forest Division. This Forest Division with 4 Forest Ranges namely Bhensrodgarh, Jaitpur, Ramgarh and Shergarh.

Fig: Location of Kota district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Kota WL Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Ha.	Model
Bhensrodgarh	2014-15	Katiramnagar	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Kota WL Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Jaitpur	Forest Guard Chowki at Ramgarh	2014-15	100%
Ramgarh	Anicut-11 at Churala	2015-16	100%
Jaitpur	Anicut-11 at Tanwara ka Jhopra Wala Nala	2015-16	100%
Ramgarh	Anicut-11 at Kalam Kuie Nala	2015-16	100%

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Katiramnagar of Bhensrodgarh range:** The selected plantation has been carried out on 50 hec of land at Katiramnagar in Bhensrodgarh during the year 2014-15. The activities were done under the ANR model. The GPS location of this selected site was N 24,49,20 and E 75,30,24. The site was a forest land and selected for 100% evaluation. The soil was clayey loam and stony hard layer of hilly area.

3.1.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR at Katiramnagar

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Katiramnagar, a forest department nursery of Bhensrodgarh range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 9. Seedlings of *Acacia catechu (*Khair*), Dendrocalamus strictus (*Baans), *Emblica officinalis (*Amla), *Holptelia integriifolia (*Churel*), Azadirachta indica (*Neem), *Commiphora sp.* (Guggal), *Terminalia bellerica (*Behada), *Pongamia pinnata (*Karanj) and *others* were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was moderate.**

Fig: Plants counting process

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water.

3.1.6. Natural Vegetation and Rege neration: Due to this plantation, the vegetation cover has increased to some extent. Aretha, kumtha, gabai were the plants found grown naturally in this area. The growth of the plant was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal*- Kumath	133	3.3	42
2	*Sapindus sp.*- Aretha	41	3	28
3	Gabai	44	4.3	28

3.1.7. Regeneration through seeds sowing: Seeds of species *khair, neem, ronj* were sown in and alongside of trenches. **The growth of seedlings from seeds was low.**

3.1.8. Protection Work: The selected ANR model plantation was **protected by loose stone wall fencing of 3225 RMT with average top width of 0.90m, average depth of 1.20m and average bottom width of 0.60m. Present condition of fencing was good and effective in controlling biotic pressure upto some extent.**

3.1.9. Soil and Water Conservation Measures: **There were 9900 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 5 m to 9 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation. **Also there was loose stone check dam of 130 cum present in 50 hec of plantation area.**

Fig: Plants measurement process

3.1.10. Observations Recorded: Under this model, 10000 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 69.5% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of nine species were planted in the 50 hec plantation area. **The number of species planted was not mentioned in plantation journal as there was no journal received by the team.** Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia catechu (Khair)	2500	1490	1010	59.6	2.6	25

Dendrocalamus strictus (Baans)	2500	2278	222	91.1	2.5	-
Emblica officinalis (Amla)	1000	350	650	35	1.5	15
Holoptelia integriifolia (Churel)	500	350	150	70	2.2	2.6
Azadirachta indica (Neem)	1500	1256	244	83.7	1.8	14
Commiphora sp. (Guggal)	500	208	292	41.6	-	-
Terminalia bellerica (Behada)	500	356	199	71.2	2.1	22
Pongamia pinnata (Karanj)	500	309	191	61.8	1.5	16
Others	500	358	142	71.6	-	-
Total	**10000**	**6955**		**69.5**		

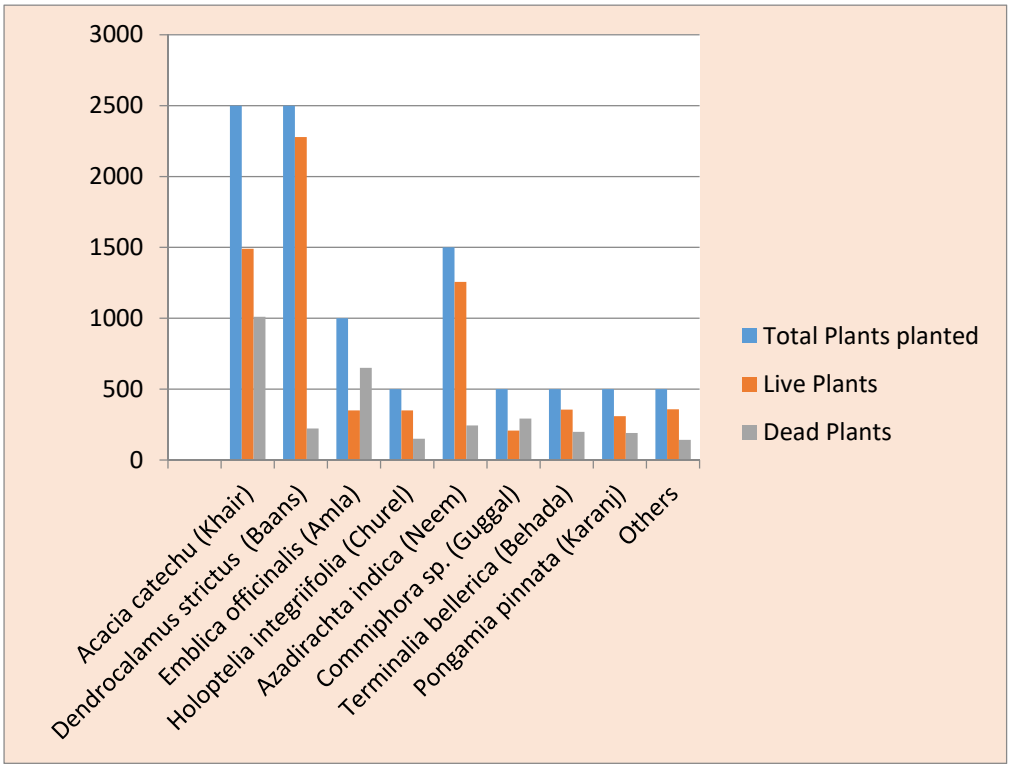


Fig-: Graph showing survival of different plants

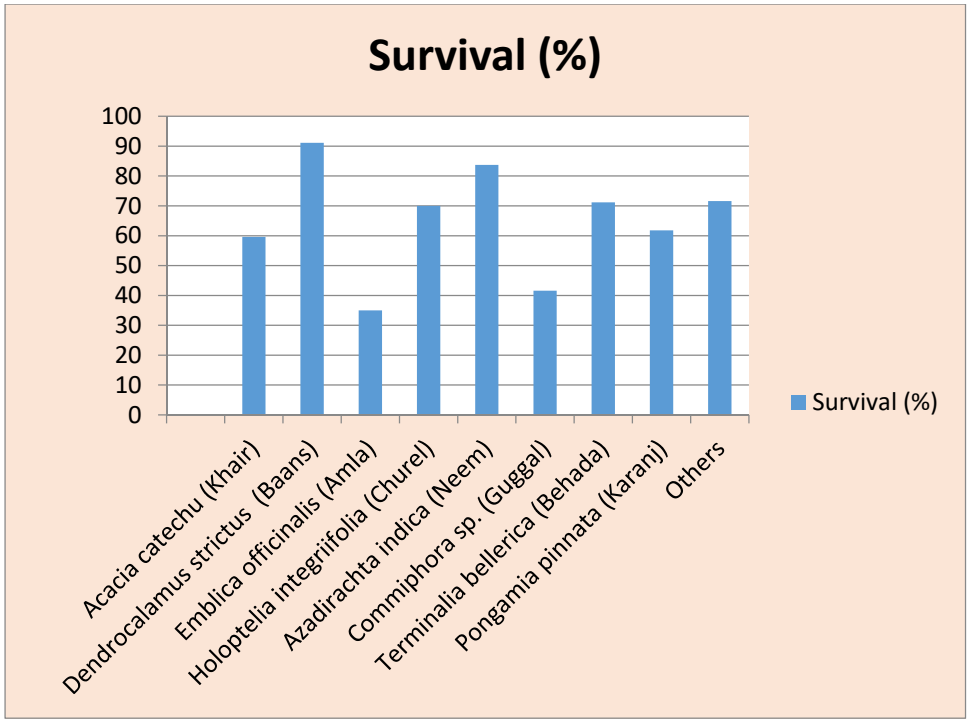


Fig-: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of baans was highest** of 91.1%, followed by neem of 83.7%.. **All the plants planted in this site showed good survival except amla, which showed 59.6 %.**

Good protection and watering on time contributed to good survival of plants.

3.1.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per kml map.

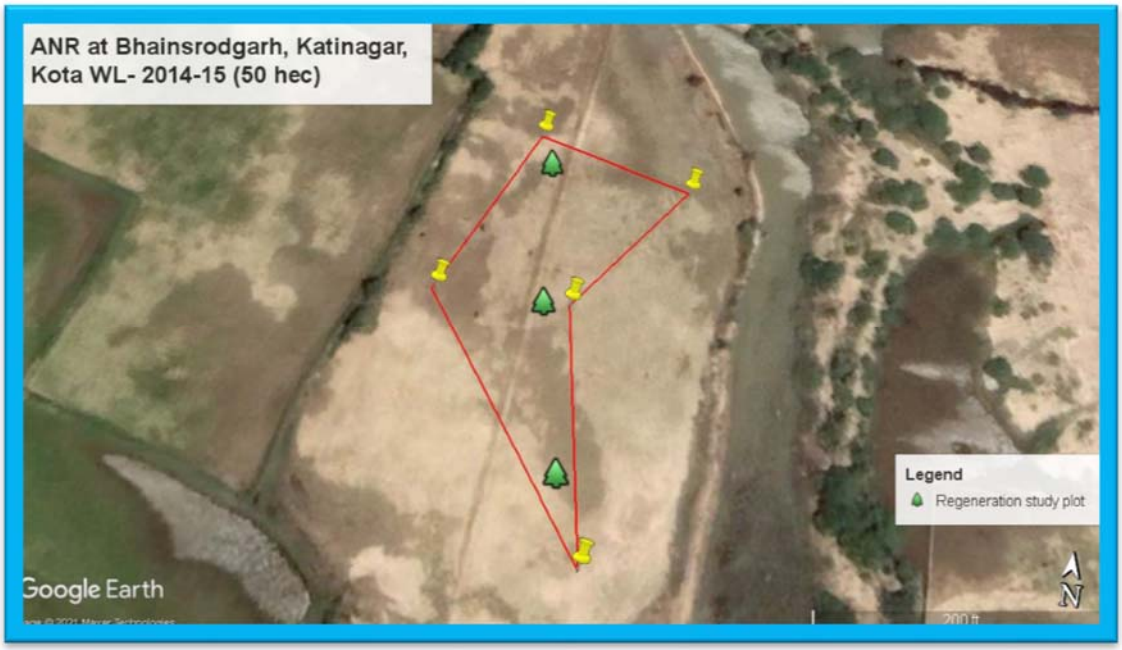


Fig: KML file of ANR at Katiramnagar of Bhensrodgarh range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2013-14	-	-	-	-	-	-	-	1464992
2014-15	-	-	-	-	-	-	-	342228
2015-16	-	-	-	-	-	-	-	153450
2016-17	-	-	-	-	-	-	-	172696
2017-18	-	-	-	-	-	-	-	84842

4. Evaluation of Construction Works Sites

Site-1: Forest Guard Chowki at Ramgarh of Jaitpur: At Ramgarh of Jaitpur range, one forest guard chowki was constructed. The site was constructed in the year 2014-15. GPS location of this area was Longitude- E 75.53,19.4 and Latitude-N 25,34,35.6. The cost incurred for construction was Rs.4,62,818/- (estimated cost was Rs. 5 lakh). The construction work started in the year of 2014 after approval and completed in the 2015. The construction of chowki appeared to good but need maintenance. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

Fig: Forest gurad chowki at Jaitpur and GIS mapping

Site- 2: Anicut-II at Churala, Ramgarh:

Second site of which was Anicut type II constructed/fixed at Churala of Ramgarh range was visited, the GPS location was N 25.557305 and E 75.744082. The cost incurred for construction was Rs. 5,95,690/- (estimated cost was Rs. 6 lakh). The construction work started in the year of 2014 after approval and completed in the 2015.

Fig: Anicut-II at Ramgarh and GIS mapping

Site- 3: Anicut-II at Tanwara ka Jhopra Wala Nala, Jaitpur:

Third site of which was Anicut type II constructed/fixed at Tanwara ka Jhopra Wala Nala of Jaitpur range was visited, the GPS location was N 25.604828 and E 75.903486. The cost incurred for construction was Rs. 3,24,493/- (estimated cost was Rs. 3.5 lakh). The construction work started in the year of 2014 after approval and completed in the 2015.

Fig: Anicut-II at Jaitpur

Site- 4: Anicut-II at Kalam Kuie Nala, Ramgarh:

Fourth site of which was Anicut type II constructed/fixed at Kalam Kuie Nala of Ramgarh range was visited, surveyed, the cost incurred for construction was Rs. 3,49,989/- (estimated cost was Rs. 3.5 lakh). The construction work started in the year of 2014 after approval and completed in the 2015.

Fig: Anicut-II at Ramgarh

Evaluation of all three Anicut-II of Jaitpur and Ramgarh ranges:

Basically all these anicut were made to conserve rain water during monsoon, which was used for drinking purposes by local domestic as well as by the wild animals. The water level of these anicut was upto 1-2 m when filled up with water during monsoon. Once the

whole area gets filled with water during monsoon, the water remains in this anicut for about a year.

During site visit all these above 3 anicut-II were found in damaged condition. Severe cracks have developed in all three. All these anicuts need repair and maintenance in urgent.

Due to scarcity of rainfall, during site visit there was no water in these anicut. Water conservation depends on rain only.

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Kota WL district.

Table-5: Quantitative assessment of plantation work created under CAMPA in Kota WL division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	ANR at Katiramnagar, Bhensrodgarh, 50 hec	69.5	7

****<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)***

Table-6: Quantitative assessment of constructions work created under CAMPA in Kota WL division

Sr. no.	Ranges	Name of the site	Rank of site (Between 0 to 10)*
1	Jaitpur	Forest Guard Chowki at Ramgarh	6
2	Ramgarh	Anicut-II at Churala	5
3	Jaitpur	Anicut-II at Tanwara ka Jhopra Wala Nala	5
4	Ramgarh	Anicut-II at Kalam Kuie Nala	5

****<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding***

Mount Abu (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Mount Abu Wildlife Forest Division. This Forest Division with 2 Forest Ranges namely Abu Parwat and Taleti has territorial jurisdiction over the entire Mount Abu Wildlife division.

Fig: Location of Mount Abu in Rajasthan

2. Selected construction work sites for Evaluation

The Anicut type-III at behind Jal Hotel of Abu Parwat range in the year 2015-16 has been selected for evaluation.

Table-1: Selected Anicut-III site for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved
Abu Parwat	Anicut type-III at behind Jal Hotel	2015-16	100%

3. Anicut Type-III Evaluation: Behind Jal Hotel of Abu Parwat range of Mount Abu Wildlife division, one anicut type-III has been constructed during the year 2015-16. Quality of construction work appeared to be good and useful. This anicut was constructed at the cost of Rs. 5 Lakh. GPS location of this area was Longitude- E 72°,73,'9138" and Latitude-N24°,58',9903". The construction work completed in the month of September in the year of 2015 after approval. The area of this anicut type-III was 220m*30m*1.5m as per measurement book.

Basically this anicut was made to conserve rain water during monsoon, which was used for drinking purposes by local domestic as well as by the wild animals. But due to scarcity of rainfall, at present there was no water in this anicut. Water conservation depends on rain only. Once the whole area gets filled with water during monsoon, the water remains in this anicut for about a year. Because of rain water harvesting, the recharging of local water table takes place.

Fig: Front view of anicut-III

Fig: Side view of anicut-III

Fig: GIS mapping of anicut, Abu Parwat

3. Overall assessment: The overall impact of anicut type-III appears satisfactory in Mount Abu Wildlife division of Sirohi district. Permanent structure created is quite useful and utilized as required.

Table-2: Quantitative assessment of constructions work created under CAMPA in Mount Abu Wildlife division

Sr. no.	Site	Rank of Site (Between 0 to 10)*
1	Anicut Type-III at Behind Jal Hotel of Abu Parwat range	7

****<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding***

Nagaur (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Nagaur Forest Division. This Forest Division with 2 Forest Ranges namely Kuchaman and Parbatsar has territorial jurisdiction over the entire Nagaur district.

Fig: Location of Nagaur district, Rajasthan

2. Selected construction work sites for Evaluation

Three sites have been selected for evaluation.

Table-1: Selected construction sites for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved
Kuchaman	10 Boundary Pillars at Sawaipura Paldi	2014-15	100%
Kuchaman	4 Ft. wall -250 m long at Kuchaman	2014-15	100%
Parbatsar	4 Ft. wall -500 m long at Manglana-A	2016-17	100%

3. Result of Evaluation

3.1 Site-1: 10 Boundary Pillars at Sawaipura Paldi of Kuchaman range: 10 boundary pillars have been evaluated in the area of at Sawaipura Paldi of Kuchaman range. The size of the pillars is 0.45*0.45*0.60 m. These pillars were made during 2014-15 to demarcate forest boundary in that area. Total expenditure of 10 pillars was Rs. 48,000/-. The pillars were started making during the year 2014 after getting approval and completed the work on March of 2015.

All the pillars were found in good conditions except one.

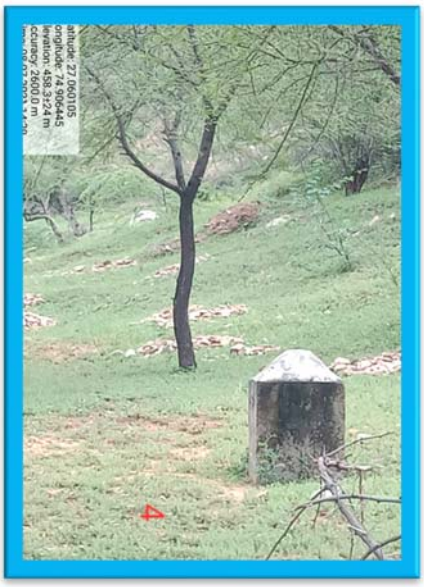


Fig: Visit of Pillars, marking with the numbers on pillars for easy counting

Fig: A good boundary pillar

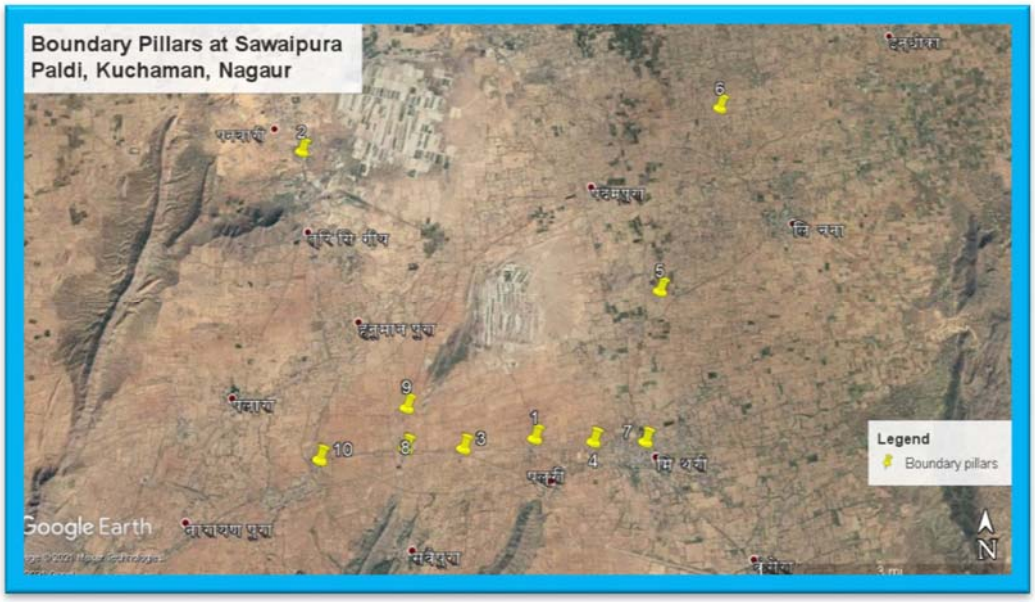


Fig: GPS location mapping of all 10 boundary pillars at Sawaipura Paldi

3.2. Site-2: 4 Ft. wall -250 m long at Kuchaman: At Kuchaman range, 250 m long wall of 4 ft height has been evaluated. The wall was constructed in the year 2014-15. Construction work appears to be good and useful. GPS location of this area was Latitude- N 27°,12',2305" and Longitude-E 74°, 82',83" . The construction work started in the year of 2015 after approval and completed in the month of March, 2016. The expenditure incurred in making this wall was Rs. 5,50,000/-.

Fig: Measurement of length of Wall taking during field evaluation

The stone wall was constructed to demarcate the forest area. At few places the wall has been damaged and broken partly.

Fig: Damaged parts found of wall in field visit

Fig: Measurement of height of Wall during field evaluation

Fig: GPS location mapping of Wall at Kuchaman range

3.3. Site-3: 500m long, 4ft ht wall of Parbatsar: At Parbatsar range, 500 m long wall of 4 ft height at Manglana-A has been evaluated. The wall was constructed in the year 2016-17. Construction work appeared to be very good and useful. GPS location of this area was Latitude- N 27°,04',4148" and Longitude-E 74°, 74',4863" . The construction work started in the year of 2016 after approval and completed in the month of March, 2017. The expenditure incurred in making this wall was Rs. 11,99,960/- whereas the cost estimated on record was Rs. 12,00,000/-. The stone wall was constructed to demarcate the forest area. The condition of the wall was very good and no damage has been found anywhere.

Fig: Wall at Parbatsar

Fig: Measurement of Wall taking during field evaluation

Fig: GPS location mapping of Wall at Parbatsar

4. Overall assessment: The overall impact of all the construction sites such as boundary pillars and wall appeared satisfactory in Nagaur forest division. Permanent structure created is quite useful and utilized as required.

Table2: Quantitative assessment of constructions work created under CAMPA in Nagaur forest division

Sr. no.	Site	Rank of Site (Between 0 to 10)*
1	10 Boundary Pillars at Sawaipura paldi of Kuchaman range	7
2	4 Ft. wall -250 m long at Kuchaman	6
3	4 Ft. wall -500 m long at Parbatsar	8

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Pali (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Pali Forest Division. This Forest Division with 7 Forest Ranges namely Pali, Sumerpur, Sojat, Sendra, Marwar Junction, Desuri and Bali which has territorial jurisdiction over the entire Pali District.

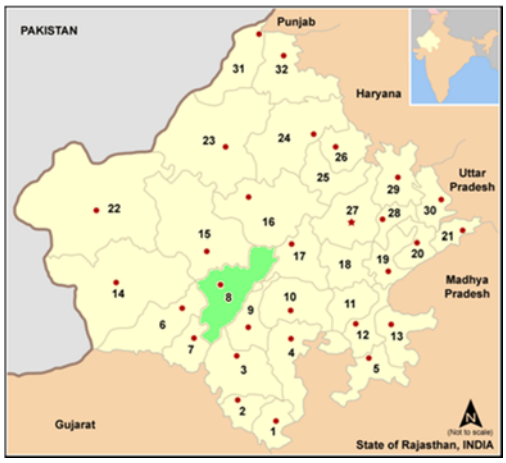


Fig : Location of Pali district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Pali Forest Division were as given in table-1.

Forest Range	Name of Site	Year of Plantation	Ha.	Model
Pali	Dari	2015-16	50	ANR
Pali	Maniyari	2016-17	50	ANR
Sendra	Pachanpura	2016-17	50	DFL
Sojat	Devdugari	2016-17	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Pali Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Marwar Junction	Kheda Kalyanpura	2014-15	25 Boundary Pillars
Desuri	Ghanerao	2015-16	4ft height, 800m long Stone wall

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Dari in Pali range**: The selected plantation has been carried out on 50 hec of land at Dari in Pali range during the year 2015-16. The activities were done under the

ANR model. The GPS location of this selected site was N 25.36385and E 73.04422.The site was a forest land and selected for 100% evaluation. The soil was brown in colour, rocky and stony hard layer.

Fig: ANR at Dari, Pali range

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Dari, a forest department nursery of Pali range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 5. Seedlings of *Acacia nilotica* (desi babool), *Zizyphus mauritiana* (ber), *Acacia leucophoelea (*ronj), *Acacia senegal* (kumtha) and *Tecomella undulata* (rohida) were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted in mix method according to the availability of space in the plantation area. Plantation journal was found by the team. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants.

Fig: Protection stone wall at Dari plantation

During monsoon, these trenches conserve rain water and used by the plants for growing. ***3.1.6. Natural Vegetation and Regeneration:*** The vegetation cover has increased to some extent. Kumtha, ronj, totalis, ber and thor have been found grown naturally in this plantation area.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal*-Kumtha	159	3.7	31
2	*Acacia leucophoelea* -Ronj	128	3.2	21
3	*Acacia tortilis*- Totalis	143	2	29
4	*Zizyphus mauritiana* -Ber	64	2.9	15

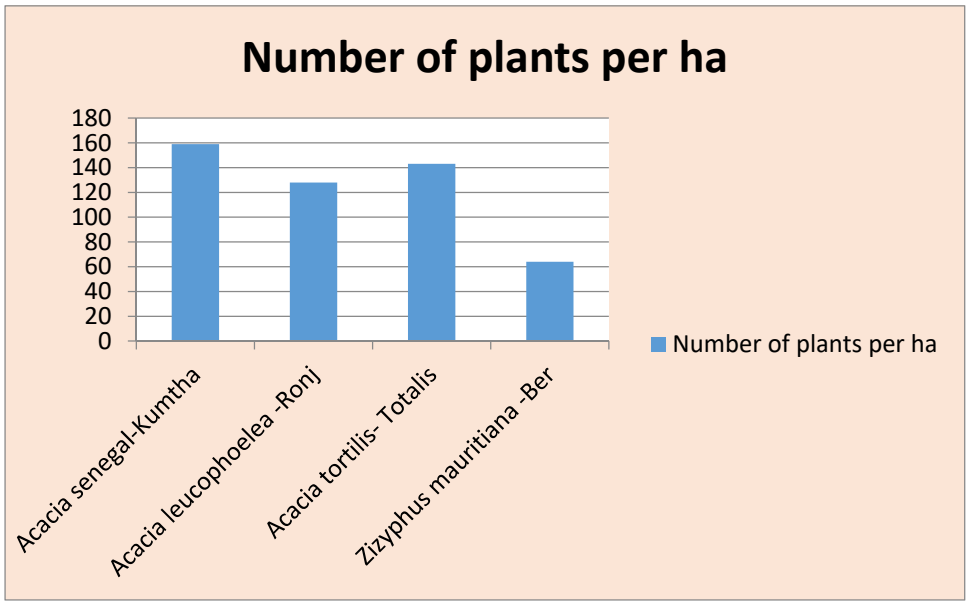


Fig: Species wise number of plants (per ha) in natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of species *kumtha, ronj and totalis* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected ANR model plantation was **protected with stone fencing of 795 RMT with average top width of 4m, average depth of 3.5m and average bottom width of 3m. Present condition of wall fencing was found to be partially broken.**

Fig: Earthen bund at Dari ANR

3.1.9. Soil and Water Conservation Measures: **There were 17000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3m to 8 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation. Earthen bund of size 5*3*43cum prepared during plantation has been filled up with soil partially.

3.1.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 61.8% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of five species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia senegal (Kumtha)	3500	1652	1848	47.2	3.9	31
Zizyphus mauritiana (Ber)	2000	1412	588	70.6	2.6	20
Acacia nilotica (desi babool)	2000	896	1104	44.8	4.3	33
Acacia leucopholea (Ronj)	1600	1380	220	86.2	3.9	30
Tecomella undulata (Rohida)	900	843	57	96.6	2.8	22
Total	**10000**	**6183**	3817	**61.8**		

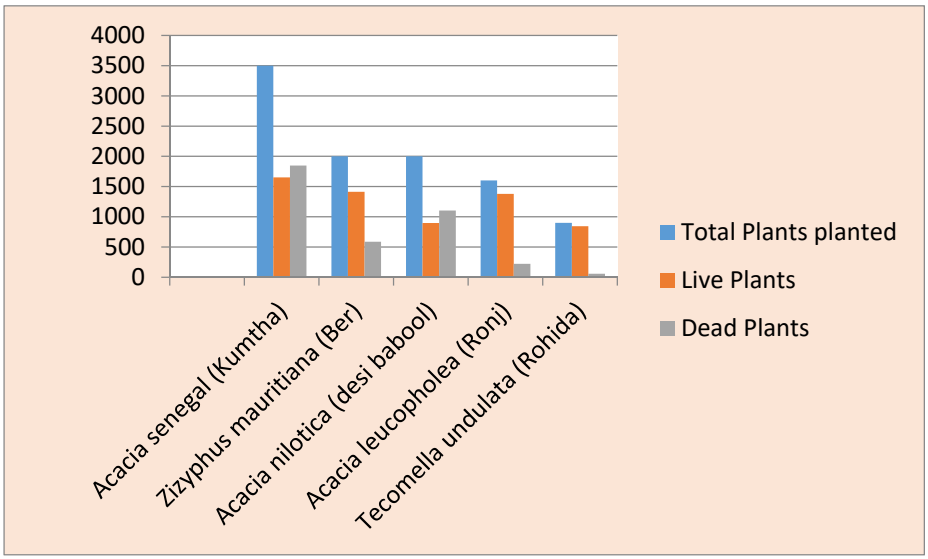


Fig: Graph showing survival of different plants

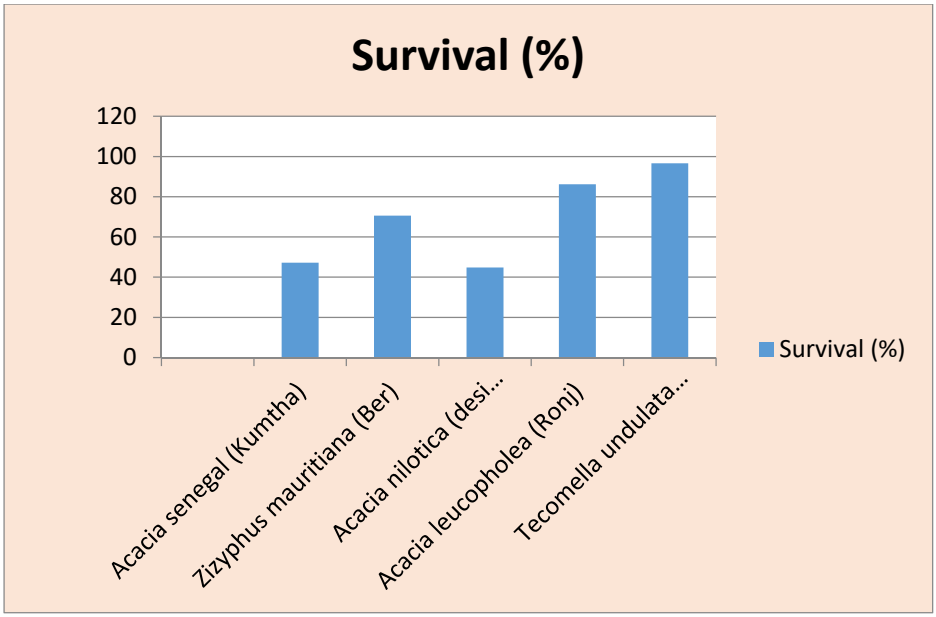


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Rohida plant was highest** followed by Ronj. **The survival percentage of Rohida was maximum which was 96.6% and Ronj was 86.2%. All the plants planted in this site showed good survival rate**

The reason for good survival of plants was watering during plantation and good protection.

Fig: Instruction given on field

3.1.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured slightly higher (53.4 hec, as per calculation through KML file) than reported plantation area (50 hec).

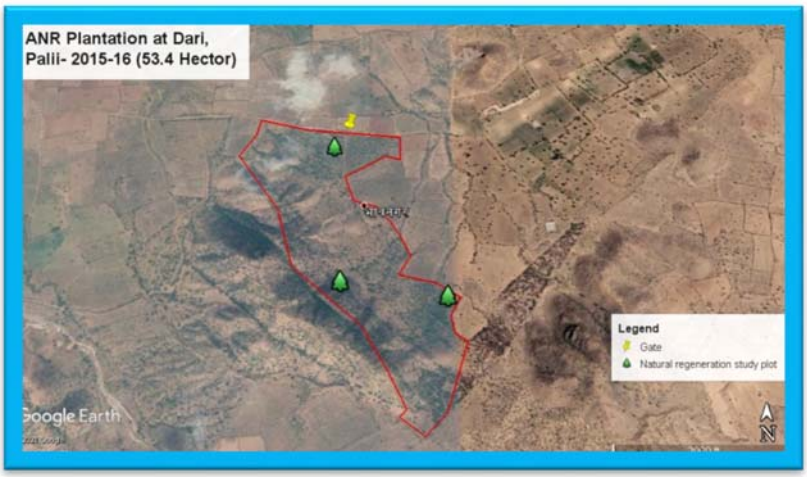


Fig: KML file of ANR at Dari, Pali range plantation area

3.2.1. Site-2: **Maniyari-A in Pali range** : The selected plantation has been carried out on 50 hec of land at Maniyari in Pali range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 25.37945 and E 73.08076. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour and stony hard layer.

3.2.2. Treatment plan before sowing:
The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR plantation at Maniyari-A, Pali

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Maniyari, a forest department nursery of Pali range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 3. Seedlings of *Acacia nilotica* (desi babool), *Acacia senegal* (Kumtha) and *Dalbergia Sissoo* (shisham) were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 10000 plants in 50 hectare have been planted. Type of plantation was block and technique of planting was pit.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.2.6. Natural Vegetation and Re generation: The area has been covered fully with vegetation due to this plantation. The growth of plants was good. Grasses have grown in ditch trenches which should be controlled. Plants like ronj, kumtha have been found grown naturally. Pruning of plants of seedlings planted, seeds sown and existing vegetation was done.

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal*- Kumtha	143	3	27
2	*Acacia leucopholea*- Ronj	169	3.2	26

3.2.7. Regeneration through seeds sowing: Seeds of species *Totalis* and *Kumtha* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.2.8. Protection Work: The selected ANR model plantation was **protected by ditch fencing of 2550 RMT with average top width 1.50, depth 1.20 and bottom width 0.90. Grasses has grown in it, which need to be cleaned.**

3.2.9. Soil and Water Conservation Measures: **There were 20000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 4 to 11ft long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation.

Fig: Loose stone checkdam at Maniyari plantation area

Along with it, **there were 68 loose stone check dam in 50 hec of plantation site for controlling water flow from hill top during monsoon. The total volume of check dam was 483** cum as per mb.

3.2.10. Observations Recorded: Under this model, 10000 plants (200 per Ha) were planted during plantation. **Based on for as 100 percent counting, plants survival was 63.8% at the site.** Plant species girth breast height was

also measured. The growth of planted plants was good. A total of 10000 plants comprising of three species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia senegal (Kumatha)	6000	5695	305	94.9	4.5	32
Acacia nilotica (Desi babool)	2000	658	1342	32.9	4.1	34
Dalbergia sissoo (Shisham)	2000	34	1966	1.7	3	25
Total	**10000**	**6387**	3613	**63.8**		

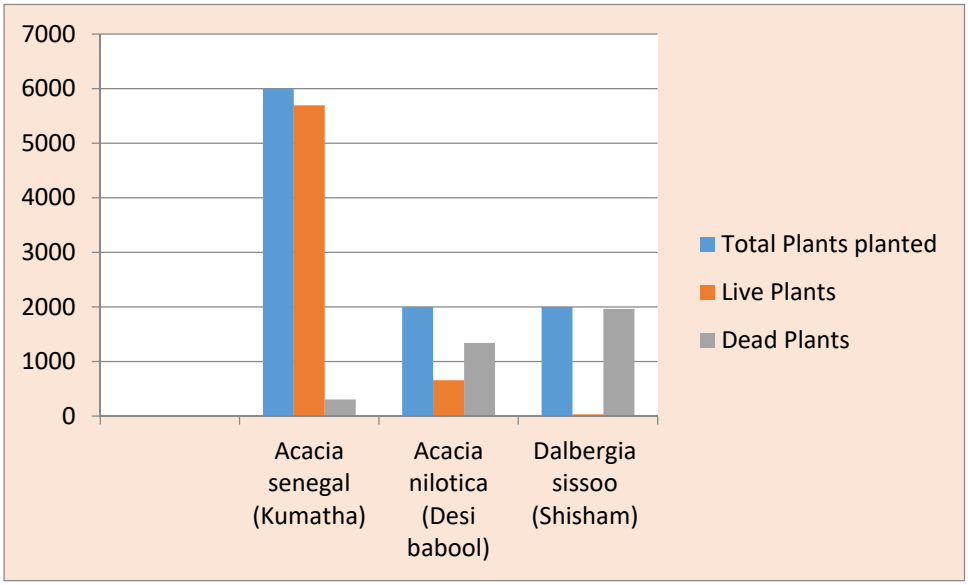


Fig: Graph showing survival of different plants

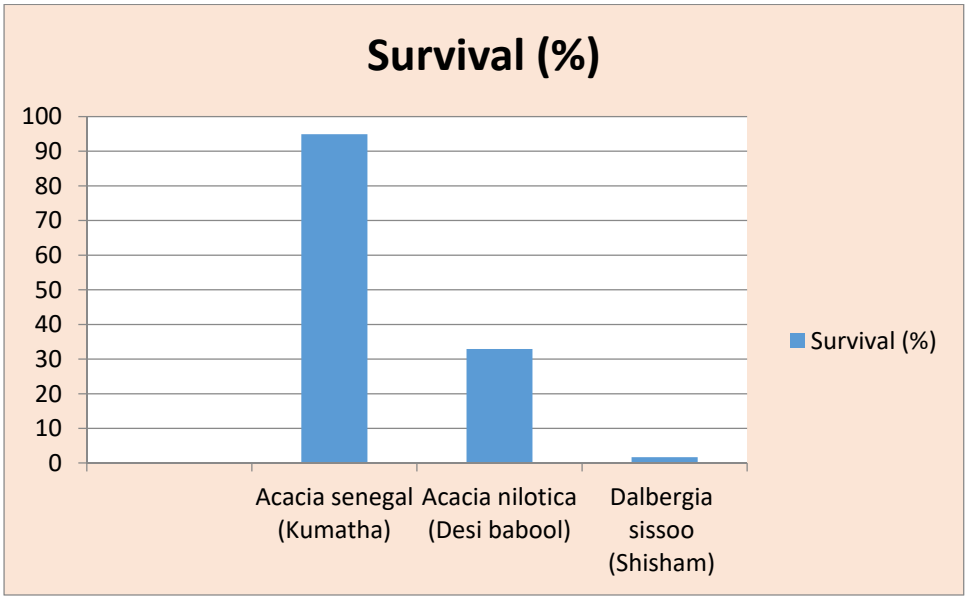


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Kumtha plant was highest** and **survival percentage was 94.9%. Desi babool showed low survival of 32.9%. Shisham showed least survival and not fittest for growing in this region.**

The reason for average survival of plants was scanty rainfall.

3.2.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured slightly higher (52.2 hec, as per calculation through KML file) than reported plantation area (50 hec).

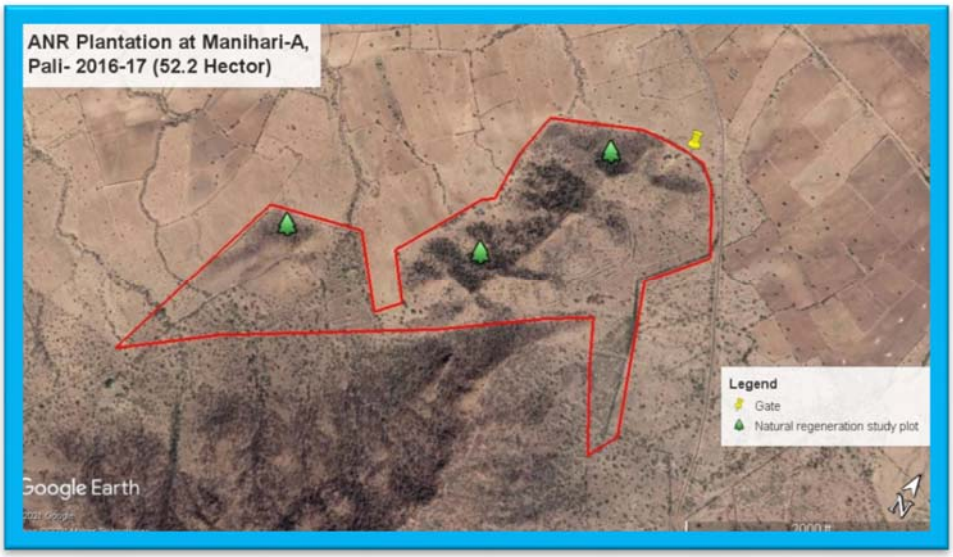


Fig: KML file of ANR at Maniyari-A, Pali range plantation area

3.3.1. Site-3: **Pachanpura in Sendra range:** The selected plantation has been carried out on 50 hec of land at Pachanpura in Sendra range during the year 2016-17. The activities were done under the DFL model. The GPS location of this selected site was N 25.963223 and E 74.091495. The site was a forest land and selected for 100% evaluation. The soil was brown in colour and stony hard layer.

Fig: DFL plantation at Pachanpura, Sendra range

3.3.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 35000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.3.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Pachanpura, a forest department nursery of Sendra range. During monsoon these seedlings were planted.

3.3.4. Species Planted: The selected tree species under plantation were 4. Seedlings of *Acacia nilotica* (desi babool), *Acacia leucophoelea (*ronj), *Zizyphus mauritiana* (ber), *Acacia catechu* (khair) were planted.

A total of 35000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted in mixed plantation according to the availability of space in the plantation area.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have been planted. So total number of plants planted was 35000 for 50 hectare of land. Type of plantation was block. Pit technique of planting was used.

Fig: Vegetation cover at Pachanpura DFL

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.3.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.3.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Kumtha, ronj, totalis and salar were found in this region grown naturally and the growth of plants was good.

Table-7: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal*- Kumtha	109	4.4	33
2	*Acacia tortilis*- Totalis	153	3.7	30
3	*Acacia leucopholea*- Ronj	144	3.5	33
4	*Boswellia serrata*- Salar	101	4.3	36

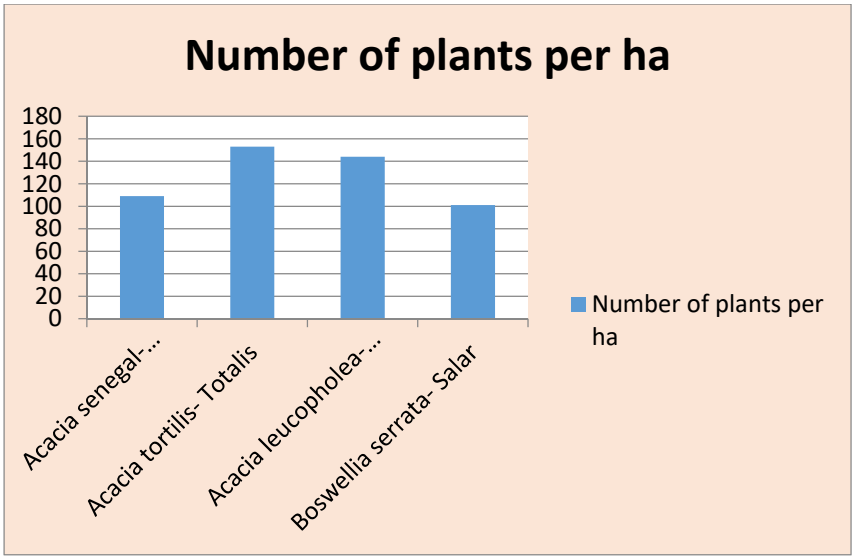


Fig: Species wise number of plants (per ha) in natural regeneration

3.3.7. Regeneration through seeds sowing: Seeds of species like kumtha , ronj, totalis seeds have sown for natural regeneration. The growth of seeds sowing plants was good. Pruning of plants of seedlings planted, seeds sown and existing vegetation was done.

3.3.8. Protection Work: The selected DFL model plantation was **protected by 1200 RMT stone wall fencing. Average top width was 1.5m, average depth was 0.7m and average bottom width was 1.2m. Fencing has been partially broken and partially effective in controlling the biotic pressures.**

Fig: Measurement taking on field of checkdam

3.3.9. Soil and Water C onservation Measures: **There were 250 cum loose stone check dam and contour trenches of 20000 RMT in the form of water harvesting** structures present in the entire plantation area. **The size of the contour trenches varied from 3m to 8.5 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation. **Check dam siltation was 2-3ft.**

3.3.10. Observations Recorded: Under this model, 700 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 63% at the site.** Plant species girth breast height was also measured. A total of 35000 plants comprising of six species were planted in the 50 hec plantation area. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-8: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Zizyphus mauritiana	12500	6267	6233	50.1	2.6	15

(ber)						
Acacia leucophoelea (ronj)	10000	6570	3430	65.7	4	29
Acacia nilotica (desi babool)	7500	4384	3116	58.4	4.2	32
Acacia catechu (khair)	5000	4831	169	96.6	3.6	30
Total	**35000**	**22052**	12948	**63**		

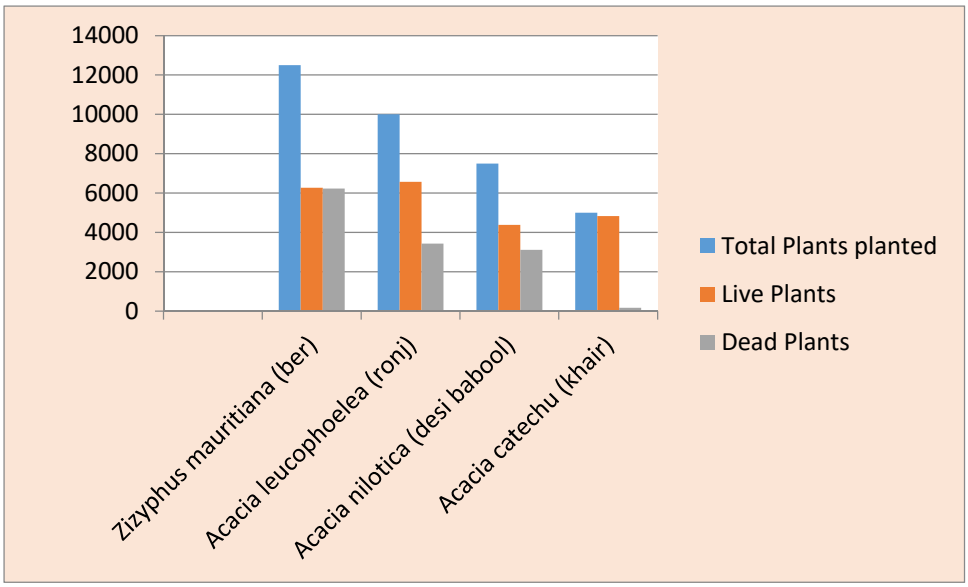


Fig: Graph showing survival of different plants

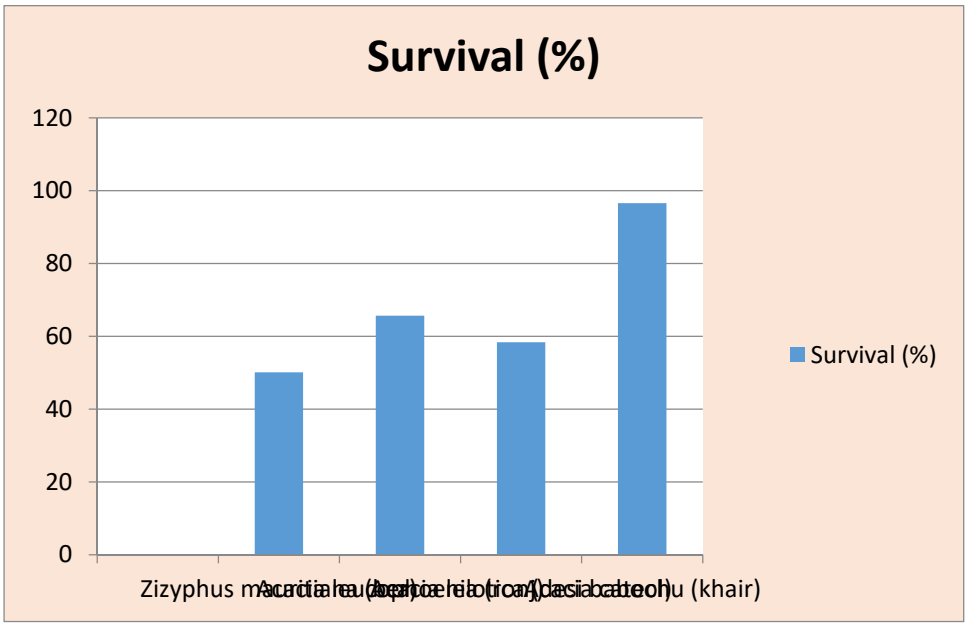


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Khair plant was highest** followed by Ronj. **The survival percentage of Khair was maximum of 96.6% and Ronj was 65.7%. Many plants planted in this site showed good survival rate.**

3.3.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured slightly higher (50.44 hec, as per calculation through KML file) than reported plantation area (50 hec).

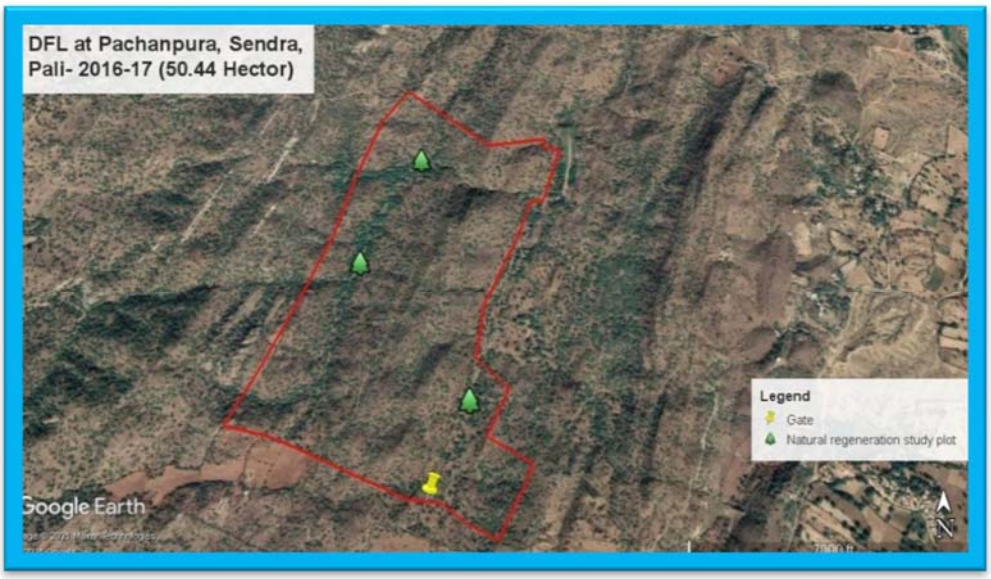


Fig: KML file of DFL at Pachanpura, Sendra range plantation area

3.3.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2015-16	650000	487105	420345	1557450	603300	377200	370900	1351400
2016-17	1435000	-	-	1435000	1390200	-	-	1390200
2017-18	479450	-	-	479450	460500	-	-	460500
2018-19	221350	-	-	221350	217000	-	-	217000
2019-20	233500	-	-	233500	213900	-	-	213900
2020-21	258250	-	-	258250	257835	-	-	257835

3.4.1. Site-4: **Sojat in Devdungari range:** The selected plantation has been carried out on 50 hec of land at Sojat in Devdungari range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 25.56580 and E 73.54945. The site was a forest land and selected for 100% evaluation. The soil was brown in colour and stony hard layer.

3.4.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.4.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Sojat, a forest department nursery of Devdugari range. During monsoon these seedlings were planted.

3.4.4. Species Planted: The selected tree species under plantation were 5. A total of 10000 numbers of seedlings were planted at the site. Seedlings of Acacia nilotica (desi babool), *Acacia leucophoelea (*ronj), *Zizyphus mauritiana* (ber), *Acacia catechu* (khair) and *Acacia senegal* (kumtha) were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted in mixed plantation according to the availability of space in the plantation area. Plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land. Map of planting site was prepared. Type of plantation was block. Pit trenching technique of planting was used.

Fig: ANR plantation at Sojat, Devdungri range

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.4.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.4.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Plants such as kumtha, ronj, and babool were found in this region grown naturally and the growth of plants was good.

Table-9: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal*-Kumtha	136	3.7	34
2	*Zizyphus mauritiana*- Ber	127	2.5	17
3	*Acacia niilotica*- Babool	141	4	36

3.4.7. Regeneration through seeds sowing: Seeds of species like desi babool, ber, kumtha have sown in and along side of trenches.. The growth of plants was good though.

3.4.8. Protection Work: The selected ANR model plantation was **protected by ditch fencing of 2830 RMT. The condition of fencing was good.**

Fig: Putting of lime on plants

3.4.9. Soil and Water Conservation Measures: **There were 20000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 12 to 15ft long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation. Weeds have grown in trenches which need to be cleared.

3.4.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 63.2% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of five species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-10: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia senegal (Kumtha)	3000	1295	1705	43.1	3.8	29.3
Acacia leucophoelea (Ronj)	4000	3074	926	76.8	3.2	28

Zizyphus mauritiana (Ber)	1000	854	146	85.4	2.1	16
Acacia nilotica (Desi babool)	1000	524	476	52.4	3.9	31
Acacia catechu (Khair)	1000	574	426	57.4	3.7	28
Total	**10000**	**6321**	3679	**63.2**		

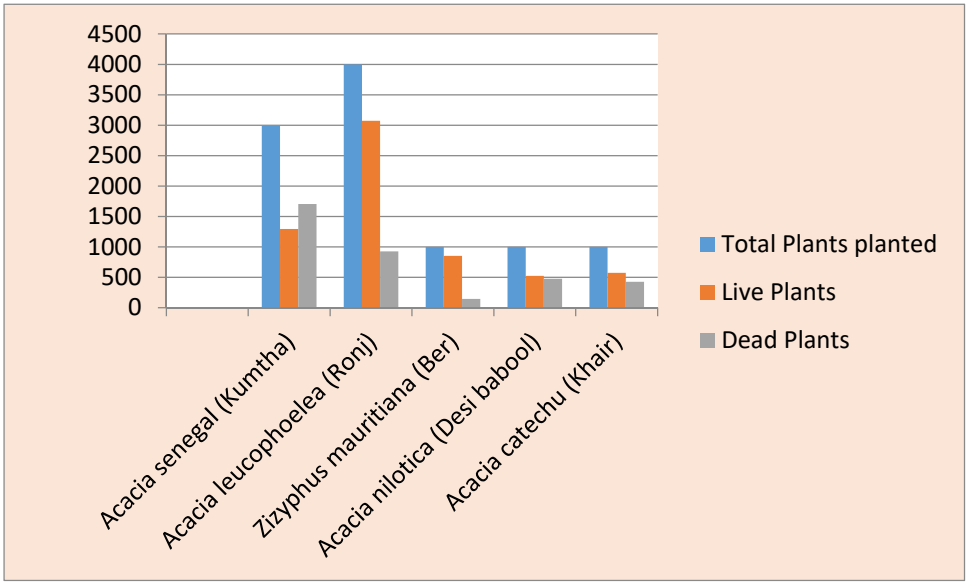


Fig: Graph showing survival of different plants

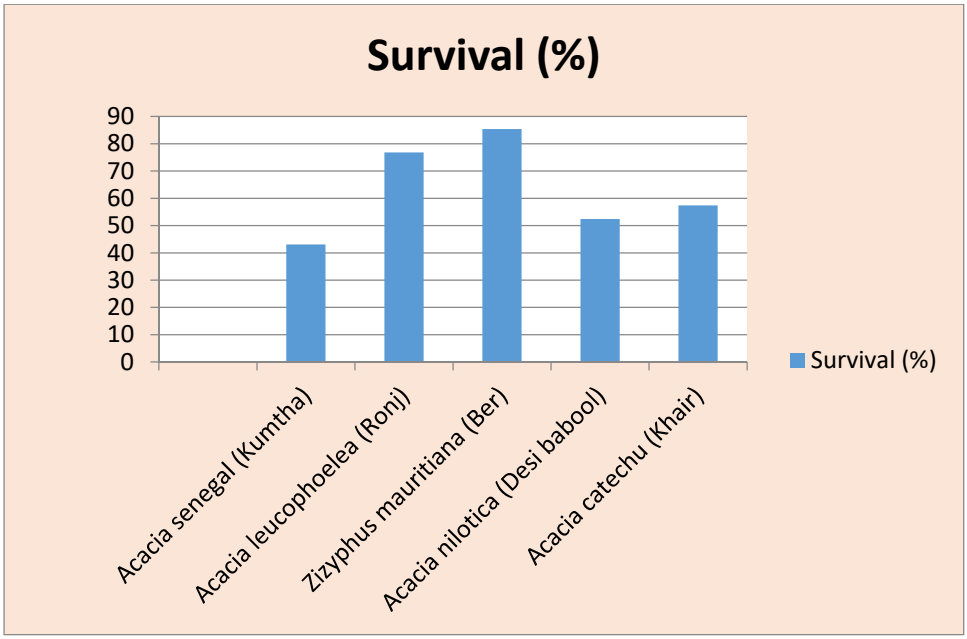


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Ber plant was highest** followed by Ronj. **The survival percentage of Ber was maximum of 85.4% and Ronj was 76.8%. Plants planted in this site showed good survival rate.**

3.4.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured slightly higher (52.49 hec, as per calculation through KML file) than reported plantation area (50 hec).

Fig: KML file of ANR at Devdungri, Sojat range plantation area

3.4.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2015-16	-	-	-	1629780	-	-	-	-
2016-17	-	-	-	345096	-	-	-	-
2017-18	-	-	-	157317	-	-	-	-
2018-19	-	-	-	85623	-	-	-	-
2019-20	-	-	-	86539	-	-	-	-

4. Evaluation of Construction Works Sites

4.1. Site-1: 25 Boundary pillars at Marwar Junction

25 boundary pillars have been evaluated in the area of Kheda Kalyanpura in Marwar Junction range of Pali division. The size of the pillars was 0.45*0.45*0.60 m. These pillars were made during 2014-15 to demarcate forest boundary in that area. Total cost of 25 pillars is Rs. 25000/-. **23 pillars were found in good conditions and 2 pillars not found.**

Fig: Boundary pillars at Marwar junction nd GIS mapping of all pillars

4.2. Site 2- Stone wall at Ghenarao in Desuri range

At Ghenarao in Desuri range, the stone wall has been evaluated. The wall was constructed in the year 2015-16. The wall dimensions were 4 ft and 800m long. Construction work appeared to be good and useful. GPS location of this area was 25.1435N and 75.2956 E. The construction work started in the year of 2016 after approval and completed in the 2017. The expenditure incurred for constructing this wall was 17.60 Lakh (as per mb).

Fig: Stone wall at Ghanerao, Desuri and GIS mapping

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Pali district.

Table-11: Quantitative assessment of plantation work created under CAMPA in Pali division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	ANR Dari, Pali 50 Ha	61.8	7
2	ANR Maniyari, Pali 50 Ha	63.8	7
3	DFL Pachanpura, Sendra 50 Ha	63	7

4	ANR Devdugari, Sojat 50 Ha	63.2	7

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-12: Quantitative assessment of constructions work created under CAMPA in Pali division

Sr. no.	Items	Name of the site	Rank of Item (Between 0 to 10)*
1	25 boundary pillars	Marwar Junction	7
2	Stone wall	Desuri Ghanerao	8

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Pratapgarh (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Pratapgarh Forest Division. This Forest Division with 6 Forest Ranges namely Pratapgarh, Chhoti Sadri, Dhariyawad, Arnod, Devgarh and Peepalkhoont has territorial jurisdiction over the entire Pratapgarh District.

Fig: Location of Pratapgarh district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Pratapgarh Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Physical Target Achieved
Chhoti Sadri	ANR plantation of 50 ha at Janjal	2016-17	100%

2.2. Selected construction work sites for Evaluation

The selected construction sites of Pratapgarh Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Pratapgarh	Janagarh and Bangud	2016-17	60 boundary pillars
Devgarh	Jhatla-B	2014-15	10 boundary pillars

3. Results of Evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Janjal of Choti Sadri range:** The selected plantation has been carried out on 50 hec of land at Janjal village of Chhoti Sadri range during the year 2016-17. The activities were done under the Assisted Natural Regeneration (ANR) model.

The GPS location of this selected site was 24°,23',24'' N Latitude and 74°,35',36'' E Longitude and at 431 m above msl. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprised of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR, Janjal, Chhoti Sadri

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Janjal, a forest department nursery of Choti Sadri range. During monsoon these seedlings were planted.

Fig:ANR, Janjal, Chhoti Sadri Natural vegetation

3.1.4. Species Planted: The selected tree species under plantation were 7. A total of 10000 numbers of seedlings were planted at the site. Seedlings of *Acacia catechu* (desi khair), *Emblica officinalis* (amla), Holoptelia integrifolia (churel), *Bamboosa tulda* (bans), *Tectona grandis* (sagwan), *Zizyphus mauritiana* (ber) and *Acacia leucophoelea* (ronj) were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land.

The choice of species under plantation appeared proper. The plants selected for growing in this site were specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of providing irrigation for plantation in this model of ANR. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Regeneration: The area comes under reserved forest where the present existing tree species were *Butea monosperma, Diospyros melanoxylon, Azadirachta indica, Acacia leucophoelea*. Among shrubs, there were *Lantana camara, Jatropha curcas, Carrissa carandas* were found in plenty numbers. The major grass was *Aristida funiculata*. **The growth of all types of existing plant species was found to be good.**

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia leucophoelea* (ronj)	302	4.9	24.3
2	*Azadirachta indica* (neem)	211	5.2	20.8
3	*Zizyphus mauritiana* (ber)	133	2.0	12.6
4	*Butea monosperma* (khakhra)	262	5.4	24.2
5	*Diospyros melanoxylon* (tendu)	175	5.4	26.1
6	*Jatropha curcas*	248	-	-
7	*Carrisa caradas* (karonda)	110	1.8	8.7

The *Lantana camara* which was considered as invasive weed, has been found in this site abundantly. This weed should be controlled from spreading as it compete with other plant species and reduce the growth of other plants species.

Fig: Trench fencing surrounding the plantation area

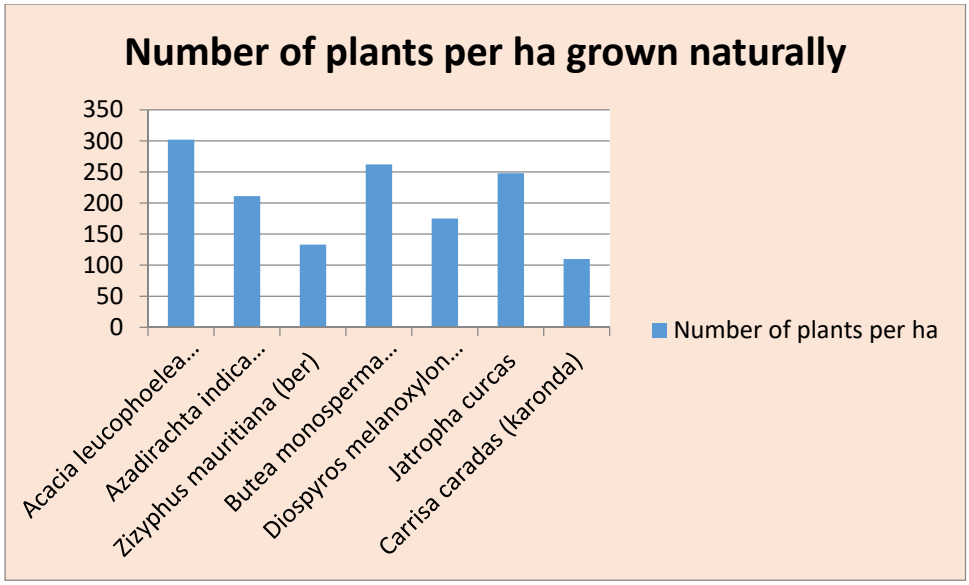


Fig: Graph showing number plants of natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of *Jatropha curcas*, Date palm, Stylo grass, *Azadirachta indica*, *Acacia senegal*, *Acacia leucophoelea* species were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected ANR model under CAMPA plantation was **protected by loose stone wall fencing of 1400 RMT and also by trench fencing surrounding of 1300 RMT. Trench fencing as well as the loose stone wall were found in good condition.**

Fig: Stone wall at plantation area for protection

3.1.9. Soil and Water Conservation Measures: **There are 20000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3m to 7 m long with 0.45*0.45 m^2 in width and depth.**

These trenches are prepared for rainwater harvesting and soil conservation. In addition, soil and water conservation measure in the form of earthen bund of size 252m^S has been found in the plantation area, the GPS location of this bund is 24°,23',39 N Latitude and 74°,35',38 E Longitude.

3.1.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 78.9% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of four species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia catechu (Desi Khair)	1000	815	185	81.5	2.4	18.7
Emblica officinalis (Amla)	2000	1147	853	57.3	1.2	7.9
Bamboosa tulda (Bans)	500	479	21	95.8	5.7	-
Tectona grandis (Sagwan)	1000	847	153	84.7	4.3	26.9
Zizyphus mauritiana (Ber)	1800	1782	18	99	1.4	6
Acacia leucopholea (Ronj)	2200	1621	579	73.7	3.3	21.9
Holoptelia integrifolia (Churel)	1500	1199	301	79.9	1.6	15.8
Total	**10000**	**7890**	**2110**	**78.9%**		

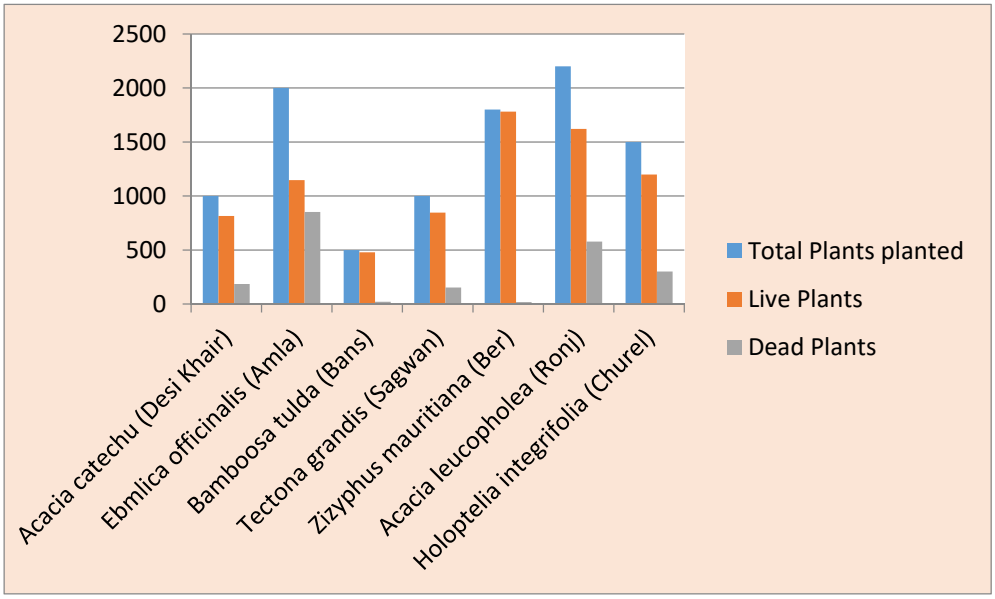


Fig: Graph showing survival of different plants

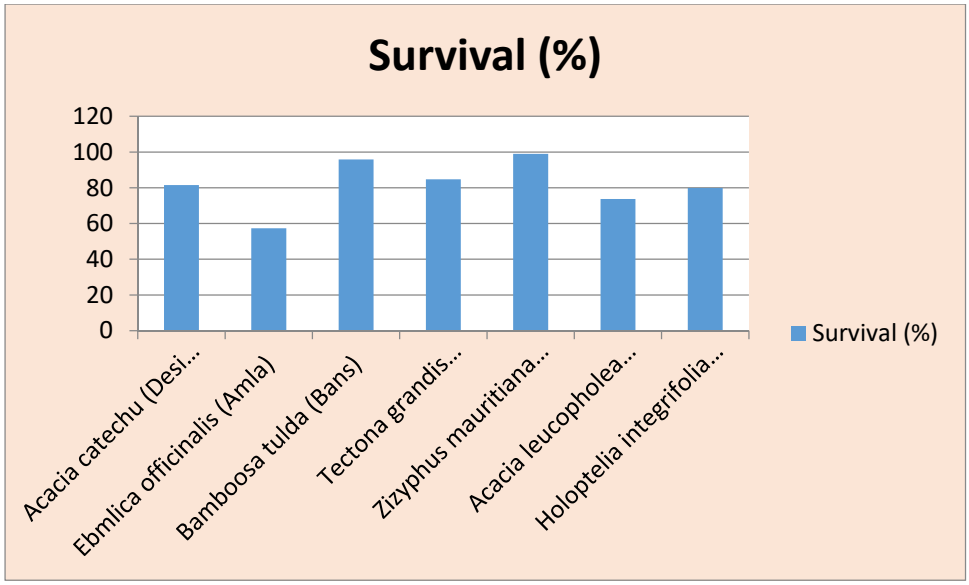


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ber plant was highest** followed by bans. **The survival percentage of ber was maximum which is 99 % and bans was 95.8%. All the plants planted in this site showed good survival rate.**

The reason for high survival of all plants was that the species was endemic on that area and was fittest for this particular region. The choice of site specific plants was also the reason of good survival. Simultaneously the timely execution of plantation, protection and watering of the plants has contributed the higher survival.

3.1.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured slightly higher (51.1 hec, as per calculation through KML file) than reported plantation area (50 hec).

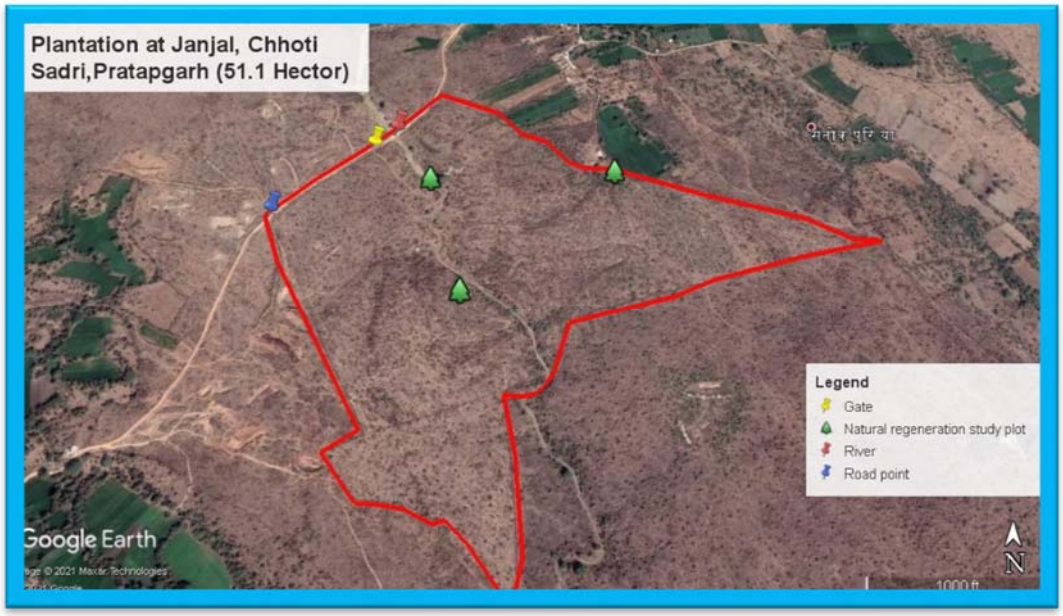


Fig: KML file of ANR at Janjal, Chhoti Sadri plantation area

3.1.11. Budget and expenditure

Year	Cost Estimate (Rs.)				Expenditure Incurred (Rs.)			
	Plantation	SMC Works	Fencing	Total	Plantation	SMC Works	Fencing	Total
2016-17	-	-	-	-	452034	751565	649315	1852914
2017-18	-	-	-	-	21900	-	-	21900
	-	-	-	-	-	-	-	-
Total					473934			**1874814**

4. Construction Sites Evaluation:

4.1. Site-1: Forest Boundary Pillars, Janagarh/Bangad, Pratapgarh: 60 boundary pillars have been evaluated in the area of Janagarh and Bangad of Pratapgarh range. The size of the pillars was 0.45*0.45*0.60 m. These pillars were made during 2016-17 to demarcate forest boundary in that area. Total cost of 60 pillars was Rs. 1,08,000/-. **Most of the pillars were found in good conditions.** Few are damaged by the local people.

Fig-Numbering done on pillars for counting

Fig: GPS location mapping of all 60 boundary pillars of Janagarh/Bangad, Pratapgarh

4.2. Site-2: Forest Boundary Pillars, Jhatla-B, Devgarh: 10 boundary pillars have been evaluated in the area of Jhatla-B of Devgarh range. The size of the pillars was 0.45*0.45*0.90 m. These pillars were made during 2014-15 to demarcate forest boundary in that area. Total cost of 10 pillars was Rs.16000/-. **Construction of all the pillars appeared good.**

Fig: Devgarh Pillars visit and GPS location mapping of all 10 boundary pillars

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Pratapgarh district.

Table-5: Quantitative assessment of plantation work created under CAMPA in Pratapgarh division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	ANR plantation at Janjal of Choti Sadri range	78.9%	8

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-6: Quantitative assessment of constructions work created under CAMPA in Pratapgarh division

Sr. no.	Items	Rank of Item (Between 0 to 10)*
1	60 Boundary Pillars at Janagarh/Bangud of Pratapgarh range	8
2	10 Boundary Pillars at Jhatla-B of Devgarh	8

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Rajsamand (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Rajsamand WL Forest Division. This Forest Division with 12 Forest Ranges namely Rajsamand, Bheem, Kumbhalgarh, Desuri, Bijaguda, Nathdwara, Jorawar, Sadri, Devgarh, Bokara, Jhilwara and Raoli, which has territorial jurisdiction over the entire Rajsamand District.

Fig : Location of Rajsamand district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of WL Rajsamand Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Ha.	Model
Kumbhalgarh	Tejo Ka gura	2015-16	19.16	NFL
Desuri	Rupan Mata	2015-16	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of WL Rajsamand Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Sadri	Sadri	2014-15	10 boundary pillars
Bijaguda	Bagadi	2014-15	Anicut II
Nathadwara	Bandariya Magra Part-C	2016-17	4 ft 500 m wall

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Tejo Ka gura in Kumbhalgarh range:** The selected plantation has been carried out on 19.16 hec of land at Tejo Ka gura in Kumbhalgarh during the year 2015-16. The activities were done under the Non Forest Land (NFL) model. The GPS location of

this selected site was N 25.20060and E 73.44365.The site was a forest land and selected for 100% evaluation. The soil was reddish brown in colour and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 22000 pits have been made for plantation in total 19.16 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: NFL at Kumbhalgarh

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Tejo Ka gura, a forest department nursery of Kumbhalgarh range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 11. Seedlings of *Dendrocalamus strictus (*Bamboo), *Cordia dichotoma (*Gundi*), Zizyphus mauritiana (*Ber), *Emblica officinalis (*Amla*), Iuga dulicis (*Jangal Jalebi*), Acacia catechu (*Khair*), Holoptelea integrifolia (*Churel*), Acacia nilotica (*Desi babool*), Tamarindus indica (*Imli*), Dalbergia paniculata* (Parde*), Wrightia tinctoria (*Khirani) were planted.

A total of 22000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 1150 plants per hectare have been planted. So total number of plants planted was 22000 for 19.16 hectare of land.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

Fig: Measurement of stone wall

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water.

3.1.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. Kumath, Ghabda, Salar, Khakhra, Neem were the plants found grown naturally in this area. The growth of the plant was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal*- Kumath	52	7	25
2	*Anogeissus latifolia*- Ghabda	61	7	26
3	*Boswellia serrata*- Salar	9	8	16
4	*Butea monosperma*- Khakhra	9	12	32
5	*Azadirachta indica*- Neem	72	10	46

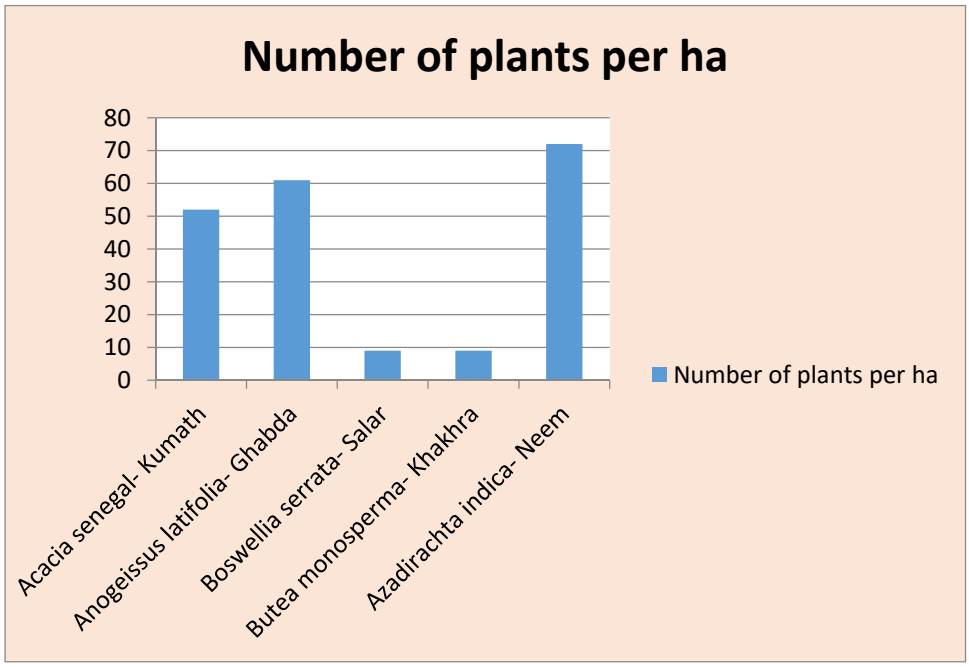


Fig: Graph showing number plants under natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of species *kumatha, desi babool, ronj, khair, churel and ber* were sown. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected NFL model plantation was **protected by stone wall fencing of 2030 RMT with average top width of 0.60m, average depth of 1.20m and average bottom width of 0.80m. Also the area was covered with 8000 RMT of barbed wire fencing. Present condition of fencing was good and effective in controlling biotic pressure upto some extent.**

C.3.1.9. Observations Recorded: Under this model, 1150 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 68.1% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 22000 plants comprising of eleven species were planted in the 19.16hec plantation area. **The species planted on the site provided by the concerned range as there was no plantation journal received by the survey team during evaluation.**

Fig: Counting of plants on field

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
Dendrocalamus strictus (Bamboo)	4000	2725	1275	68.12	350	10.15
Cordia dichotoma (Gundi)	1200	822	378	68.50	170	15
*Zizyphus mauritiana (*Ber)	5000	3406	1594	68.12	220	15
Emblica officinalis (Amla)	4000	2700	1300	67.50	420	15
Iuga dulcis (Jangal Jalebi)	2000	1365	635	68.25	215	20
Acacia catechu(Khair)	1000	682	318	68.20	300	10
Holoptelea integrifolia (Churel)	2000	1360	640	68.00	150	20
Acacia nilotica (Desi babool)	1000	670	330	67.00	350	10
Tamarindus indica (Imli)	300	210	90	70.00	140	15
Dalbergia paniculata (Parde)	300	225	75	75.00	180	10

Wrightia tinctoria (Khirani)	1200	827	373	68.91	120	
Total	**22000**	**14992**	2008	**68.1**		

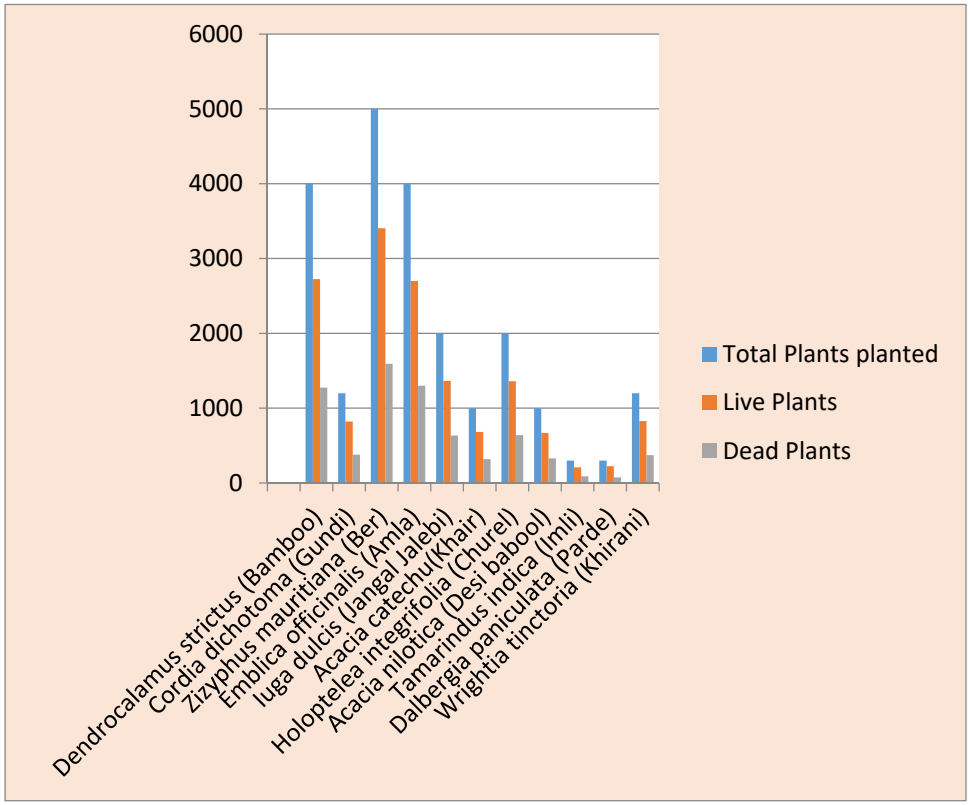


Fig: Graph showing survival of different plants

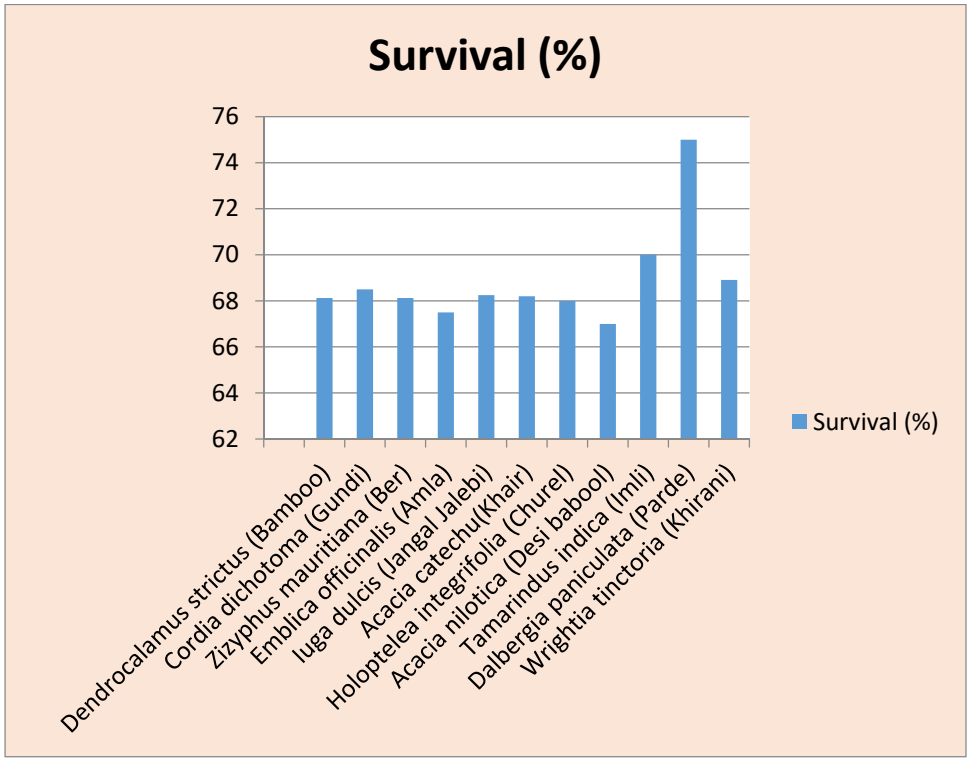


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of parde plant was highest** followed by Imli. **The survival percentage of parde was maximum of 75% and imli was 70%. All the plants planted in this site showed good survival.**

3.1.11. GPS Location and KML file: The selected NFL model under CAMPA plantation site measured 19.16 hec as per kml map.

Fig: KML file of NFL at Kumbhalgarh range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	158563	127457	347980	634000	156556	127457	349982	633995
2015-16	690787	91623	57590	840000	691593	91623	57589	840805
2016-17	229448	-	11312	240760	229249	-	11311	240560
2017-18	64695	-	14436	79131	71969	-	15195	87164

3.2.1. Site-2: **Rupan Mata in Desuri range:** The selected plantation has been carried out on 50hec of land at Rupan Mata in Desuri range during the year 2015-16. The activities were done under the ANR model. The GPS location of this selected site was N 25.15119 and E 73.34583. The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer.

3.2.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made.**

Fig: ANR plantation at Desuri

Total 10000pits have been made for plantation in total 50 hec of land. After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Rupan Mata, a forest department nursery of Desuri range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 9. Seedlings of *Acacia nilotica (*Desi babool*), Acacia catechu (*Khair), *Holoptelea integrifolia (C*hurail*), Azadirachta indica (*Neem*), Acacia leucophoelea (*Ronj*), Zizyphus mauritiana (*Ber*), Cassia fistula (A*maltash*), Emblica officinalis (*Aamla*) and Bambusa tulda (*Bans*)* were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was not found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 10000 plants in 50hectare have been planted. Type of plantation was block and technique of planting was pit. **The choice of species under plantation appeared proper**. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

Fig: Measurement of plants on field

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.2.6. Natural Vegetation and Re generation: The area has been covered fully with vegetation due to this plantation. The growth of plants was good. Grasses have grown in ditch trenches which should be controlled. Plants like desi babool, ronj, neem, dhok, churel have been found grown naturally.

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal*- Kumath	266	8	34

2	Komai	212	3.5	27
3	*Anogeissus latifolia*- Ghabri	63	2	21
5	*Azadirachta indica*- Neem	31	7	37

3.2.7. Protection Work: The selected ANR model plantation was **protected by trench fencing of 872 RMT and stone wall 2348 RMT. Trench average top width was 0.90-0.60m, average depth was 1.20 to 1.30 m and average bottom width was 0.80-1.50m. The present condition of fencing is good but stone wall is partially broken. It is partially effective in controlling the biotic pressure.**

3.2.8. Soil and Water Conservation Measures: **There was 13 loose stone checkdam of total volume of 132.22 cum present in the plantation area. There were 20004 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3m to 8 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation. Also one earthen bund was present of 87.99 cum volume. Grasses and weeds have grown in trenches which need to be cleaned.

Fig: Measurement of checkdam on field

3.2.9. Observations Recorded: Under this model, 10000 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 74.8% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of nine species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia nilotica (Desi babool)	-	651	-	-	4	33
Acacia catechu (Khair)	-	431	-	-	3.1	28
Holoptelea integrifolia	-	432	-	-	2.3	18

(Churail)						
Azadirachta indica (Neem)	-	1188	-	-	4	32
Acacia leucophoelea (Ronj)	-	649	-	-	3.4	27
Zizyphus mauritiana (Ber)	-	1300	-	-	1.9	16
Cassia fistula (Amaltash)	-	1735	-	-	2.7	20
Emblica officinalis (Aamla)	-	584	-	-	1.9	18
Bamboosa tulda (Bans)	-	514	-	-		
Total	**10000**	**7484**	2516	**74.8%**		

The reason for good survival of all plants was timely execution, watering, during plantation, good protection.

3.2.10. GPS Location and KML file: The selected model under CAMPA plantation site measured 50 hec as per kml map.

Fig: KML file of ANR at Rupan Mata, Desuri range plantation area

3.2.12. Budget and expenditure:

	Cost estimate (Rs.)				**Expenditure (Rs.)**			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-	1464094	147831	69825	618048	1464094
2015-16	-	-	-	389700	378695	10414	-	389109

2016-17	-	-	-	153450	142589	-	10716	153305
2017-18	-	-	-	87000	65126	-	20261	85387
2018-19	-	-	-	87000	71063	-	15834	86897

4. Evaluation of Construction Works

Site-1: 10 Boundary Pillars at Sadri: At Sadri in Sadri range, 10 Boundary Pillars were constructed. The site was constructed in the year 2014-15. All the pillars found in good condition. The cost of constructing all the pillars at Rs. 16000/-.

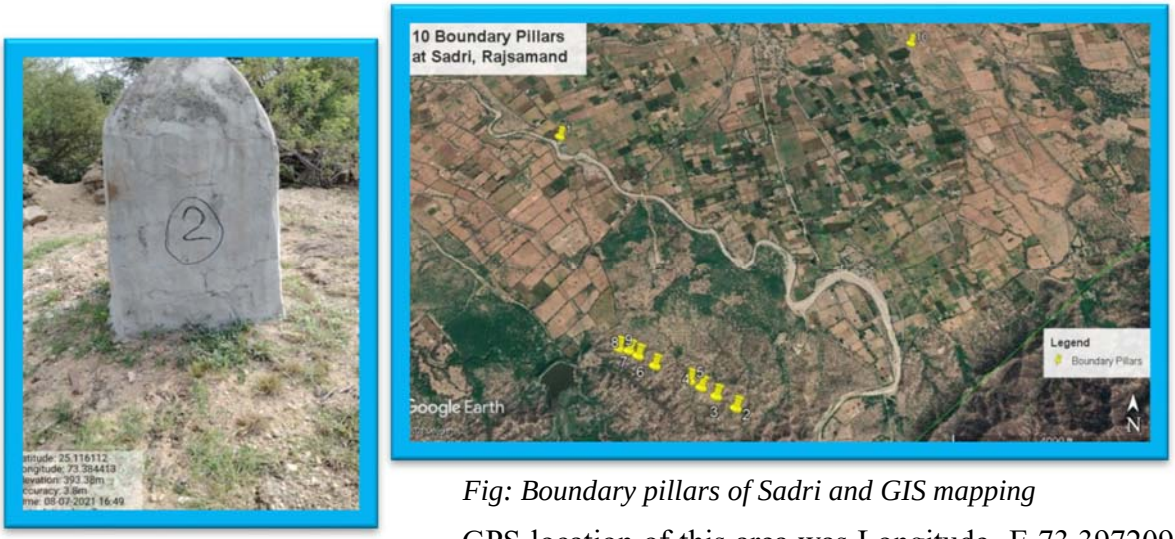


Fig: Boundary pillars of Sadri and GIS mapping

GPS location of this area was Longitude- E 73.397209 and Latitude-N 25.142138. The construction work started in the year of 2014 after approval and completed in the 2015.

Site- 2: Anicut II at Bagadi in Bijaguda range: At Bagadi in Bijaguda range, the anicut-II has been evaluated, **which was basically a water harvesting system, not a proper anicut.** The anicut was constructed in the year 2014-15. Construction work appeared to be good and useful. GPS location of this area was 25.891183 N and 74.078527E. The construction work started in the year of 2014 after approval and completed in the 2015.

Fig: Anicut-II at Bijaguda and GIS mapping

The expenditure incurred for constructing this WHS was Rs. 318000/- (as per mb). The capacity of this water harvesting system was 2 Lakh litre of water. During site visit, there

was 1.5 lakh of water present in the WHS. The water normally used for drinking purposes by the animals.

Site- 3: Stone wall at Bandariya Magra Part C in Nathdwara range: At Bandariya Magra Part C in Nathdwara range, the stone wall has been evaluated. The wall was constructed in the year 2016-17. The wall dimensions were 4 ft and 500m length. Construction work appeared to be good and useful. GPS location of this area was 24.928884 N and 73.835400 E. The construction work started in the year of 2016 after approval and completed in the 2017. The expenditure incurred for constructing this wall was Rs. 12 lakh (as per mb). The wall was found in good condition. Only at few places, it was damaged.

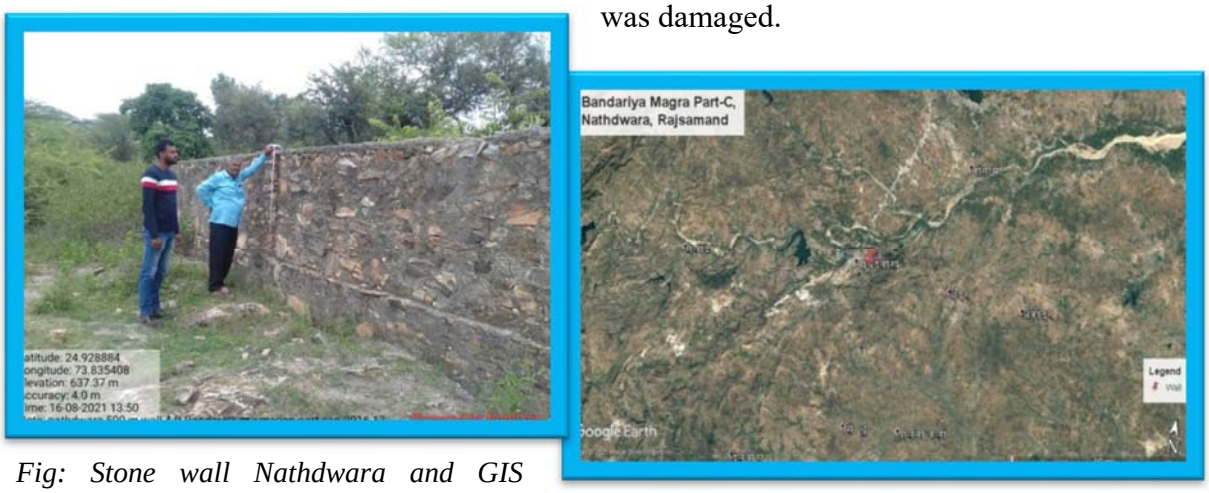


Fig: Stone wall Nathdwara and GIS mapping

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in WL Rajsamand district.

Table-7: Quantitative assessment of plantation work

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	NFL Tejo Ka Gura 19.16 Ha	68.1	7
2	ANR at Rupan Mata, Desuri 50 Ha	74.8	8

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-8: Quantitative assessment of constructions work

Sr. no.	Items	Name of the site	Rank of site (Between 0 to 10)*
1	10 boundary pillars	Sadri	8
2	Anicut –II (WHS)	Bagadi	7
3	4 ft 500 m wall	Bandariya Magra Part-C	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Sariska Alwar (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Sariska Alwar Forest Division. This Forest Division with 6 Forest Ranges namely Akbarpur, Alwar Buffer, Sariska, Tehla, Talvriksh and Ajabgarh.

Fig : Location of Alwar district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Sariska, Alwar Forest Division were as given in table-1.

Forest Range	Name of Site	Year of Plantation	Ha.	Model
Tehla	Talab	2016-17	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Sariska, Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Talvriksh	Badi chind Rampur	2014-15	Forest Guard Chowki
Alwar Buffer	Bhurasidh	2014-15	Range Office cum Residence
Akbarpur	Sarsla Jungle	2015-16	Anicut-II

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Talab in Tehla range:** The selected plantation has been carried out on 50hec of land at Talab in Tehla range during the year 2016-17. The activities were done under the Assisted Natural Regeneration (ANR) model. The GPS location of this selected site was N 27.13090 and E 76.28357. The site was a forest land and selected for 100% evaluation. The soil was brown in colour and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.1.3. Nursery Development for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Talab, a forest department nursery of Tehla range. During monsoon these seedlings were planted. ***3.1.4. Species Planted:*** The selected tree species under plantation were 6. Seedlings of*Acacia nilotica* (Desi babool)*, Acacia leucopholea*(Ronj)*, Acacia catechu* (Khair). *Zizyphus mauritiana* (Ber), *Holoptelea integrifolia* (Churel), *Cassia fistula* (Amaltash) were planted.

Fig: ANR at Talab, Tehla

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team. Technique of planting was trench cum pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there.

Fig: Counting of plants on field

Spacing between plants has not been adopted here and random plantation has been carried out in this site. As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50hectare of land. Map of planting site was prepared.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Rege neration: Due to this plantation, the vegetation cover has increased to some extent. Salar, Dhok, Ronz, Khair, Ber were the plants found grown naturally in this area. The growth of the plant was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Boswellia serrata* (Salar)	94	2.7	25
2	*Anogeissus latifolia* (Dhonk)	166	3.2	27
3	*Acacia leucopholea* (Ronj)	127	2.8	26
4	*Acacia catechu* (Khair)	129	2.9	27
5	*Zizyphus mauritiana*(ber)	107	1.9	16

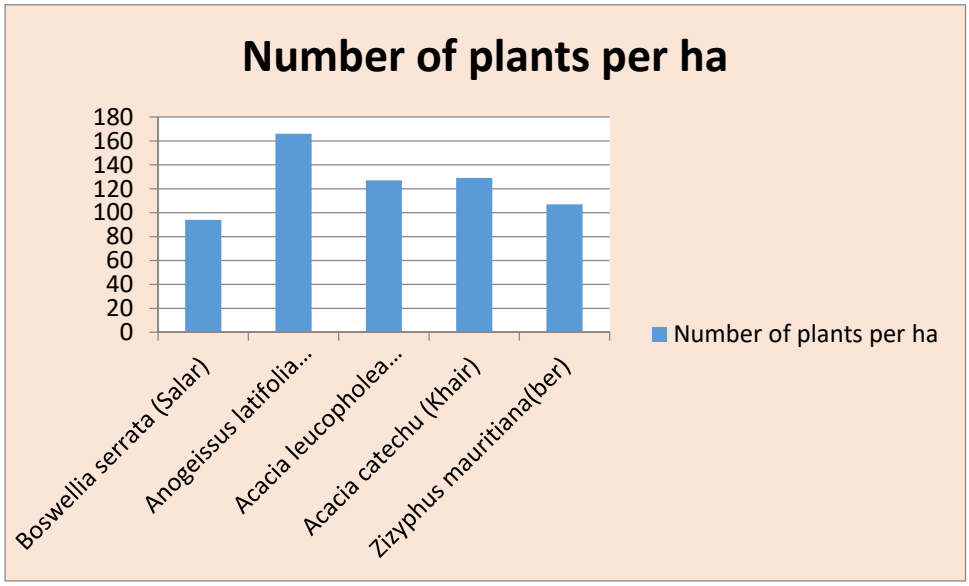


Fig: Graph showing number plants under natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of species *khair, ber, ronj* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected ANR model plantation was **protected by ditch fencing of 1950 RMT and stone wall of 700 RMT with average top width of 1.60m,**

Fig: Stone wall at Plantation area

average depth of 2.3 m and average bottom width of 1.90m. Present condition of fencing was good. Fencing has been effective in controlling biotic pressure up to some extent.

3.1.9. Soil and Water Conservation Measures: **There were 730 cum loose stone checkdam in the form of water harvesting** structures present in the entire plantation area. Also there were **18000 RMT contour trenches** adjacent to the planting. **The size of the contour varied from 3 m to 7 m long with 0.45*0.45 m^2 in width and depth.** These were prepared for rainwater harvesting and soil conservation.

3.1.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 81.7% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of six species were planted in the 50hec plantation area.

Fig: ANR at Talab, Tehla

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
*Acacia nilotica (*Desi babool)	5100	4463	637	87.5	2.6	23
Acacia leucopholea (Ronj)	2300	1764	536	76.69	3.2	24
Acacia catechu (Khair)	300	234	66	78	2.3	25
*Zizyphus mauritiana (*Ber)	1200	974	226	81.16	1.2	16
Holoptelea integrifolia (Churel)	600	478	122	79.67	2.0	21
Cassia fistula (Amaltash)	500	265	235	53	2.3	24
Total	**10000**	**8178**	1822	**81.7**		

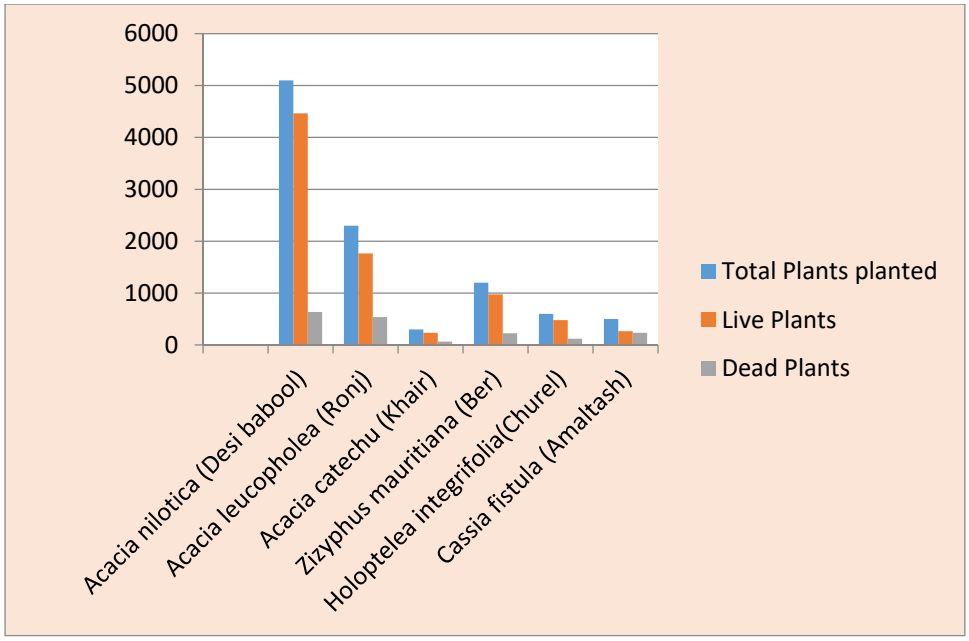


Fig: Graph showing survival of different plants

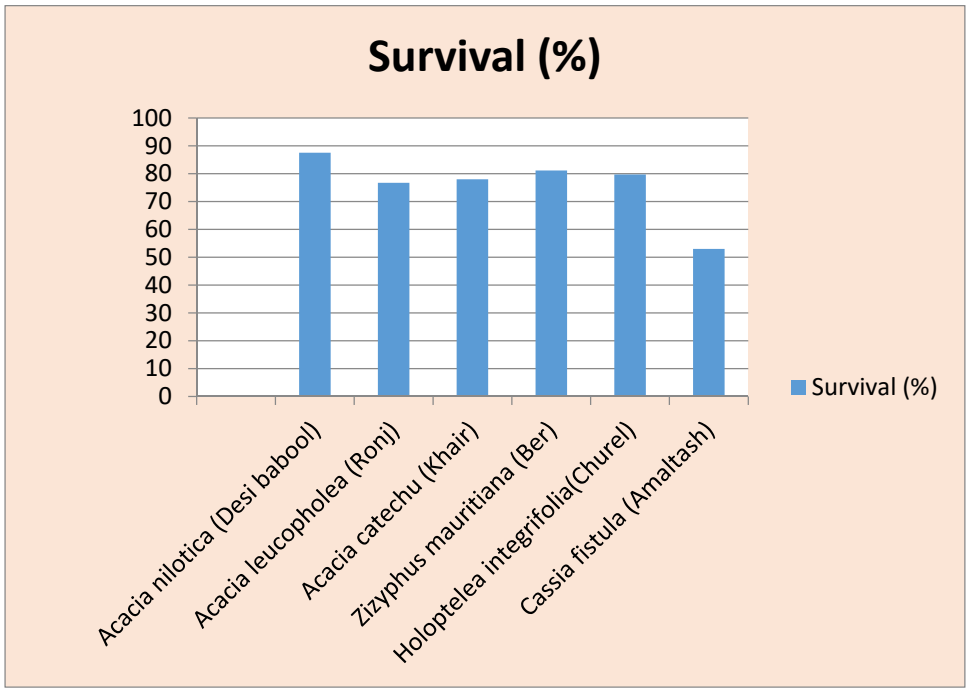


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of desi babool plant was highest** followed by ber. **The survival percentage of desi babool was maximum of 87.5%and ber was 81.6%. All the plants showed good survival.**

Right choice of species, good protection and timely execution resulted into good survival.

3.1.11.GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per kml map.

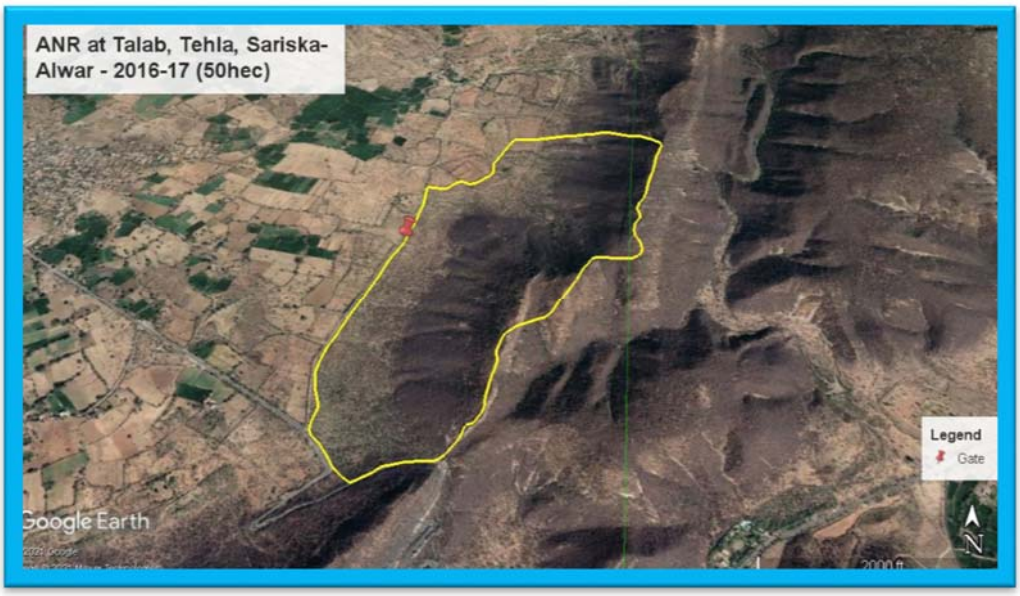


Fig:

KML file of DFL at Talab, Tehla range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16								1609560
2016-17								358704
2017-18								139648
2018-19								83054
2019-20								88302

4. Evaluation of Construction Works Sites

Site-1: Forest Guard Chowki at Badi chind Rampur, Talvriksh range:

At Badi chind Rampur in Talvriksh range, one forest guard chowki has been constructed. The chowki was constructed in the year 2014-15. Construction work appeared to be good and useful. This chowki was constructed at the cost of Rs. 490658/- (estimate Rs. 5 Lakh). GPS location of this area was Longitude- E 76.256 and Latitude-N 27.3536. The construction work started in the year of 2014 after approval and completed in the 2015. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

Fig: Forest Guard Chowki at Talvriksh and GIS mapping

Site-2: Range Office cum Residence at Bhurasidh of Alwar Buffer range: At Bhurasidh in Alwar Buffer range, one Range Office cum Residence has been constructed. The chowki was constructed in the year 2014-15. Construction work appeared to be very good and useful. This office was constructed at the cost of Rs. 923433/- Estimated cost Rs. 10 Lakh). GPS location of this area was Longitude- E 76.3529 and Latitude-N 27.2247. The construction work started in the year of 2014 after approval and completed in the 2015.

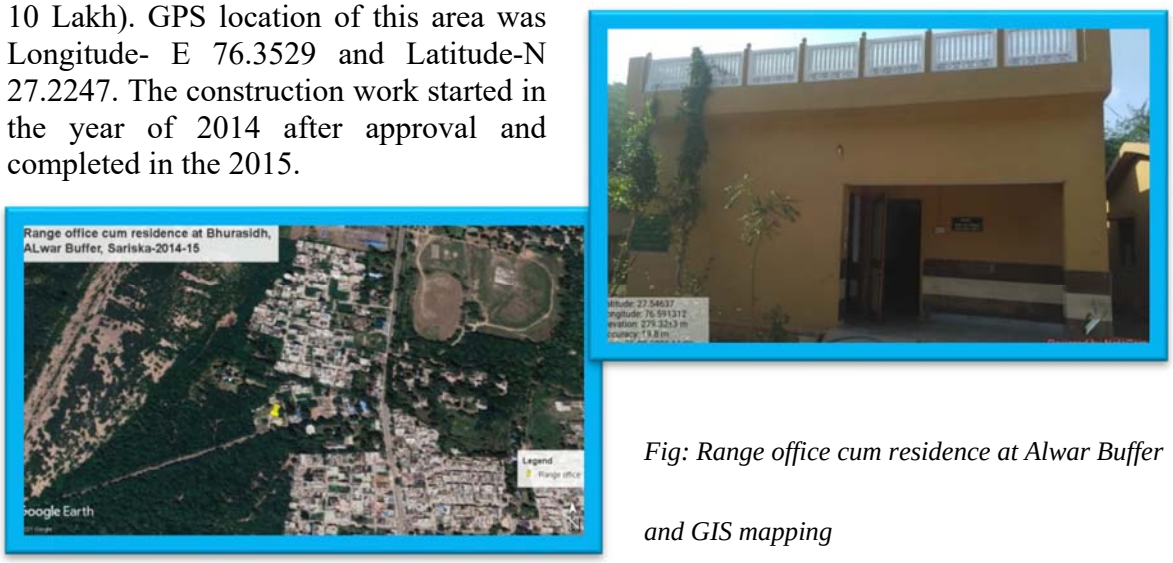


Fig: Range office cum residence at Alwar Buffer and GIS mapping

At present the building is used by the department for residential as well as for office work purposes.

Site-3: Anicut-II at Sarsla Jungle, Akbarpur range:

At Sarsla Jungle in Akbarpur range, anicut-II has been constructed. The anicut was constructed in the year 2015-16. This anicut was constructed at the cost of Rs. 334746/- (estimated cost Rs. 3,5 Lakh). GPS location of this area was Longitude- E 76.28355 and Latitude-N 27.31333. The construction work started in the year of 2015 after approval and completed in the 2016. At present the construction of anicut was found to be damaged at several places. At one place, 15 m has been broken, which need to be repaired.

Fig: Anicut-II at Akbarpur and GIS mapping

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Sariska Alwar district.

Table-5: Quantitative assessment of plantation work created under CAMPA in Sariska Alwar division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	ANR Talab, Tehla 50 Ha	85.3	9

****<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)***

Table-6: Quantitative assessment of constructions work created under CAMPA in Sariska Alwar division

Sr. no.	Items	Name of the site	Rank of site (Between 0 to 10)*
1	Forest Guard Chowki	Badi chind Rampur	7
2	Range Office cum Residence	Bhurasidh	8
3	Anicut-11	Sarsla Jungle	5

****<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding***

Sawai Madhopur (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Sawai Madhopur Forest Division. This Forest Division with 3 Forest Ranges namely Boli, Gangapur and Sawai Madhopur which has territorial jurisdiction over the entire Sawai Madhopur District.

Fig: Location of Sawai Madhopur district, Rajasthan

2. Selected Plantation Sites for Evaluation

The selected plantation sites of Sawai Madhopur Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Ha.	Model
Boli	2014-15	Dehlod-III	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Sawai Madhopur Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Gangapur city	Forest Guard Chowki at Nananwas	2016-17	100%

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Dehlod-III of Boli range:** The selected plantation has been carried out on 50 hec of land at Dehlod-III in Boli during the year 2014-15. The activities were done under the ANR model. The GPS location of this selected site was N 26,12,46 and E 76,21,47. The site was a forest land and selected for 100% evaluation. The soil was clayey loam and stony hard layer of hilly area.

3.1.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in

the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR at Boli range

3.1.3. Nursery Developmen t for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Dehlod, a forest department nursery of Boli range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 8. Seedlings of *Acacia senegal (*Kumtha*), Acacia leucopholea (*Ronj), *Holptelia integrifolia (*Churel*) and Acacia tortilis (*Totalis), *Acacia nilotica* (Desi Babool), *Ailanthus excelsa* (Ardu), *Butea monosperma* (Chila) and *Acacia catechu* (Khair) were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Technique of planting was pit.

Fig: Measurement of plants

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.**

As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water.

3.1.6. Natural Vegetation and Rege neration: Due to this plantation, the vegetation cover has increased to some extent. Pilu and Khair were the plants found grown naturally in this area. The growth of the plant was good. The vegetation was sparsh and less concentrated.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia catechu*- Khair	16	3.2	31
2	*Savaldora sp.*- Pilu	23	4.5	42

3.1.7. Regeneration through seeds sowing: Seeds of species *kumatha, khair, desi babool* were sown in and alongside of trenches. **The growth of seedlings from seeds was low.**

3.1.8. Protection Work: The selected ANR model plantation was **protected by trench fencing of 830 RMT with average top width of 0.60m, average depth of .90m and average bottom width of 1.20m. Present condition of fencing was good and effective in controlling biotic pressure upto some extent.**

3.1.9. Soil and Water Conservation Measures: **There were 10000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 2.5 m to 7.5 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation.

3.1.10. Observations Recorded: Under this model, 10000 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 50.9% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of eight species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia tortilis (Totalis)	6000	2809	3191	46.8	3.5	29
Acacia senegal (Kumtha)	1800	907	893	50	2.9	32
Acacia leucopholea (Ronj)	500	300	200	55	2.7	23
Acacia nilotica (Desi Babool)	1000	608	392	60.8	3.2	28
Holoptelia integrifolia (Churel)	250	159	91	55	2.8	24
Ailanthus excelsa (Ardu)	100	63	37	63	2.7	29

Butea monosperma (Chila)	50	32	18	64	2.6	24
Acacia catechu (Khair)	300	220	80	73	3.1	28
Total	**10000**	**5098**		**50.9**		

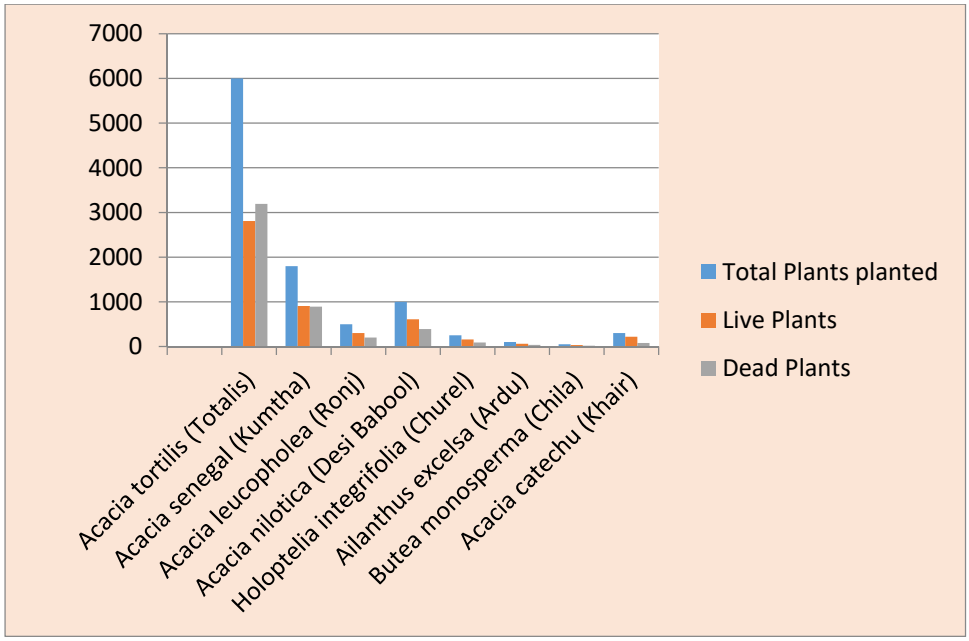


Fig: Graph showing survival of different plants

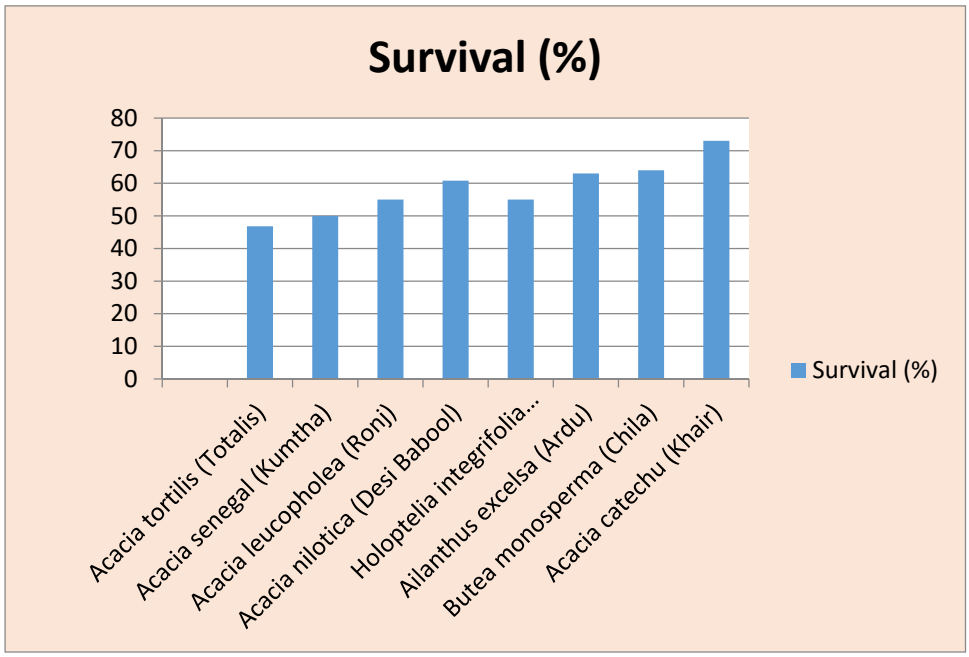


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of khair was highest** of 73%, followed by chila of 64%. **Lowest survival was for totalis plant of 46.8%.**

Good protection and watering on time may improve the survival of plants.

3.1.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per kml map.

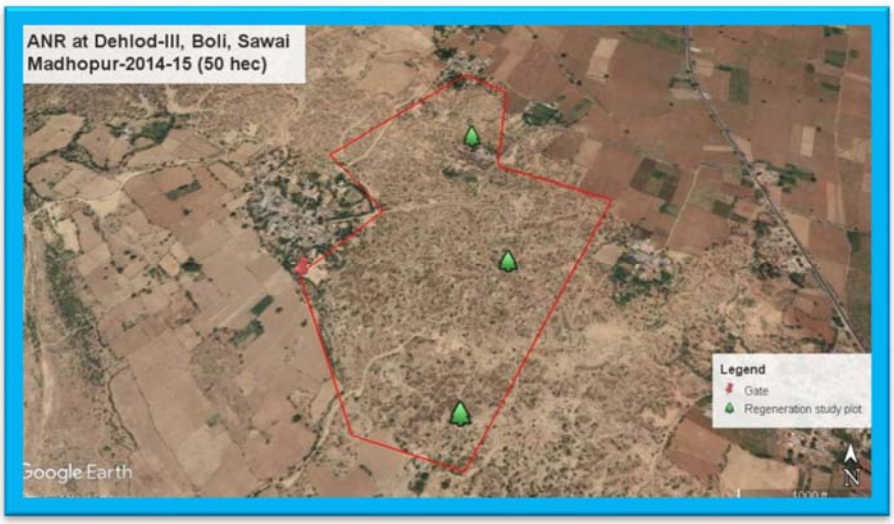


Fig: KML file of ANR at Dehlod-III of Boli range plantation area

3.1.12. **Budget and expenditure**

	Cost estimate (Rs.)				**Expenditure (Rs.)**			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC work**	**Fencing**	**Total**
2013-14	-	-	-	-	-	-	-	946599
2014-15	-	-	-	-	-	-	-	509152
2015-16	-	-	-	-	-	-	-	304406
2016-17	-	-	-	-	-	-	-	34534
2017-18	-	-	-	-	-	-	-	68081
Total	-	-	-	-	-	-	-	**1862772**

4. Evaluation of Construction Works

<u>Site-1: Forest Guard Chowki at Nananwas of Gangapur city:</u> At Gangapur city, one forest guard chowki was constructed. The site was constructed in the year 2016-17. GPS location of this area was Longitude- E 76.550651 and Latitude-N 26.330049. The cost incurred for construction was Rs. 5,50798/- (estimated cost was Rs. 5.5 lakh). The construction work started in the year of 2016 after approval and completed in the 2017. The construction of chowki appeared to be good and useful. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building. Building need maintenance.

Fig: Forest guard chowki at Gangapur city and GIS mapping

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Sawai Madhopur district.

Table-5: Quantitative assessment of plantation work created under CAMPA in Sawai Madhopur division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	ANR at Dehlod-III, Boli, 50 hec	50.9	6

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-6: Quantitative assessment of constructions work created under CAMPA in Sawai Madhopur division

Sr. no.	Ranges	Name of the site	Rank of site (Between 0 to 10)*
1	Gangapur city	Forest Guard Chowki at Nananwas	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Sawai Madhopur-RTR (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in RTR- Sawai Madhopur Forest Division. This Forest Division with 5 Forest Ranges namely Baler, Talda, Kundera, Phalodi and Indergarh.

Fig: Location of Sawai Madhopur district, Rajasthan

2. Selected construction work sites for Evaluation

The three construction sites selected for evaluation given below.

Table-1: Selected construction sites for evaluation

Forest Range	Name of Site	Year	Physical Target Achieved
Baler	Anicut type-II at Jharna	2014-15	100%
Talda	Anicut-II at Hiraman ka Sthan	2014-15	100%
Kundera	Cemented wall of 6 ft height of 500 m long	2014-15	100%

3. Evaluation of Construction Works Sites

3.1 Site-1: Anicut Type-II at Baler range: At Jharna of Baler range of RTR-Sawai Madhopur forest division, one anicut type-II has been constructed during the year 2014-15. Quality of construction work appears to be good and useful, but at one place, around 10ft of anicut was found to be damaged, which was covered with stone to protect further damage. This anicut was constructed at the cost of Rs. 3.5 Lakh. GPS location of this area was Longitude- E 76°,78,'4171" and Latitude-N26°,08',9531". The construction work completed in the month of March in the year of 2015 after approval. Present water level at this anicut was 2 m during field evaluation.

Basically this anicut was made to conserve rain water during monsoon, which was used for drinking purposes by local domestic as well as by the wild animals. Water conservation depends on rain only. Once the whole area gets filled with water during

monsoon, the water remains in this anicut upto the month of March and April of next year. Because of rain water harvesting, the recharging of local water table takes place. During the evaluation period on field, the anicut was filled with water.

Fig: Front view of anicut-II filled with water

Fig: Damaged part of anicut-II , Baler

Fig: GPS location mapping of Anicut-II at Baler range

3.2. Site-2: Anicut Type-II at Talda range: At Hiraman ka Sthan of Talda range of RTR-Sawai Madhopur forest division, one anicut type-II has been constructed during the year 2014-15. During field evaluation, **at many places this anicut-II has been found damaged.** This anicut was constructed at the cost of Rs. 6 Lakh. GPS location of this area was Longitude- E 76°,33,'29" and Latitude-N26°,8',30". The construction work completed in the month of March in the year of 2015 after approval. Present water level at this anicut was 1 m during field evaluation.

Basically this anicut was made to conserve rain water during monsoon, which was used for drinking purposes by local domestic as well as by the wild animals.

Fig: Anicut type-II at Talda range

Water conservation depends on rain only. Once the whole area gets filled with water during monsoon, the water remains in this anicut upto October month. Because of rain water harvesting, the recharging of local water table takes place. During the evaluation period on field, the anicut was filled with water. Few places was damaged which need to be repaired.

Fig: Damaged part of anicut-II, Talda

Fig: GPS location mapping of Anicut-II at Talda range

3.3. Site-3: 500m long, 6ft ht wall of Kundera: At Kundera range, 500 m long wall of 6 ft height has been evaluated. The wall was constructed in the year 2014-15. Construction work appears to be good and useful. GPS location of this area was Latitude- N 26°,05',950" and Longitude-E 76°, 29',551" . The construction work started in the year of 2014 after approval and completed in the month of March, 2015. The expenditure incurred in making this wall was Rs. 12,33,691/- whereas the cost estimated on record was Rs. 14,25,000/-. The stone wall was constructed to demarcate the forest area. The condition of remaining parts of the wall was good.

Fig: Wall at Kundera

15m of this wall has been found damaged near the lake, the damage was caused by heavy rain. Repair need to be done on this part to stop further damage of the wall.

Fig: Measurement of length and height of Wall

Fig: Damaged part of wall, Kundera

Fig: GPS location mapping of Wall at Kundera range

4. Overall assessment: The overall impact of anicut type-II and wall appeared satisfactory in RTR-Sawai Madhopur forest division. Permanent structure created was quite useful and utilized as required.

Table2: Quantitative assessment of constructions work created under CAMPA in RTR-Sawai Madhopur division

Sr. no.	Site	Rank of Site (Between 0 to 10)*
1	Anicut type-II at Jharna of Baler range	7
2	Anicut type-II at Hiraman ka Sthan of Talda range	7
3	Cemented wall of 6 ft height of 500 m long of Kundera range	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Sikar (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Sikar Forest Division. This Forest Division with 6 Forest Ranges namely Srimadhopur, Neem ka thana, Patan, Sikar, Laxmangarh and Danta, which has territorial jurisdiction over the entire Sikar district.

Fig: Location of Sikar district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Sikar Forest Division were as given in table-1.

Forest Range	Name of Site	Year of Plantation	Ha.	Model
Neem ka Thana	DFL Bhagega II	2014-15	50	DFL
Sikar	NFL Malkeda	2014-15	4.9	NFL
Patan	Meena ka Nagal	2016-17	50	ANR
Neem ka thana	DFL Pritampuri	2014-15	50	DFL

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Sikar Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Danta	Jinmata	2014-15	20 Boundary Pillars

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **DFL Bhagega II in Neem ka thana range** : The selected plantation has been carried out on 50 hec of land at Bhagega II in Neem ka thana range during the year 2014-15. The activities were done under the DFL model. The GPS location of this selected site was N 27.392380 and E 75.44642.The site was a forest land and selected for 100% evaluation. The soil was sandy loam and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 35000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.1.3. Nursery Development for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Bhagega, a forest department nursery of Neem ka thana range. During monsoon these seedlings were planted.

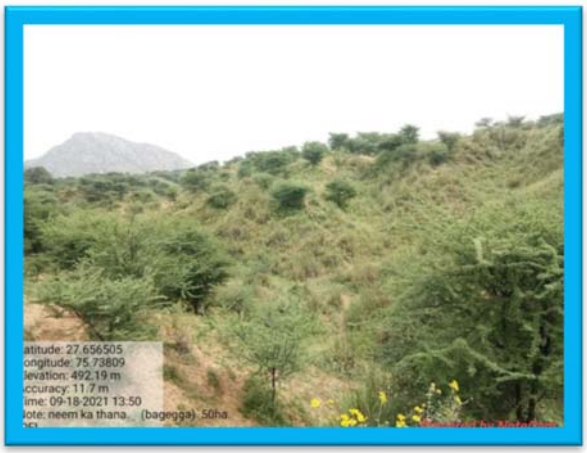


Fig: DFL at Bhagega, Neem ka Thana

3.1.4. Species Planted: The selected tree species under plantation were 13. Seedlings of Acacia nilotica (desi babool), *Zizyphus mauritiana* (ber), *Tecomella undulata* (Rohida), *Acacia tortilis* (totalis), *Dalbergia Sissoo* (shisham), *Acacia leucophoelea (*ronj), *Holoptelea integrifolia* (churail), *Azadirachta indica* (neem), *Prosopis cineraria* (\khejri), *Albizia lebbeck* (siras), *Acacia Senegal* (kumtha), mix varieties and others were planted.

A total of 35000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have been planted. So total number of plants planted was 35000 for 50 hectare of land.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

Fig: Measurement of plants on field

3.1.6. Natural Vegetation and Regeneration: It was a degraded forest land and due to this plantation, the vegetation cover has increased to some extent. Plants such as kumtha, ber, ronj and kakeda have been found grown naturally in this area.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (ft)	Average girth (gbh) inch
1	*Acacia senegal*-Kumtha	153	10	20
2	*Zizyphus mauritiana*- Ber	97	9	17.5
3	*Acacia leucopholea*- Ronj	151	7.5	12.7
4	Kakeda	59	3.5	5.5

3.1.7. Regeneration through seeds sowing: Seeds of species k*umatha, ronj* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected DFL model plantation was **protected by ditch fencing of 2900 RMT with average top width of 1.50m, average depth of 1.20m and average bottom width of 0.90m. Also the area was protected with barbed wire fencing of 400 RMT. Present condition of fencing was good. Upto some extent it can control the biotic pressure.**

Fig: Measurement of ditch fencing

3.1.9. Soil and Water Conservation Measures: **There were 15000 RMT contour trenches made adjacent to the** planted area for conserving rain water and providing water to the plants. The size of the contour varied from 4m to 8 m long with 0.45*0.35 m^2 in width and depth. Also there were **123 earthen checkdam in the form of water harvesting** structures present in the entire plantation area**.** The volume of checkdam was 6226.082 cum.

3.1.10. Observations Recorded: Under this model, 700 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 61.5% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 35000 plants comprising of five species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Live Plants	Average height of plants (m)	Average gbh (cm)
Zizyphus mauritiana (Ber)	1160	2	13
Acacia leucopholea (Ronj)	2048	3.5	23
Acacia tortilis (Totalis)	13223	3.5	26
Dalbergia Sissoo (Shisham)	333	3.7	24
Tecomella undulata (Rohida)	104	4.5	25
Prosopis cineraria (Khejri)	511	2.5	20
Albizia lebbeck (Siras)	110	4	20
Acacia nilotica (Desi babool)	194	3.7	28
Acacia Senegal (Kumtha)	324	3.9	28
Azadirachta indica (Neem)	228	4	30
Holoptelea integrifolia (Churail)	797	2.6	15
Mix	1236	-	-
Other	1315	-	-
Total	**21533**		

The above number of plants planted provided by the concerned range as there was no plantation journal received by the survey team.

3.1.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

Figure: KML map of DFL plantation at Bhagega of Neem ka Thana range, Sikar

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2014-15	-	-	-	1379500	-	-	-	1153007
2015-16	-	-	-	1435000	-	-	-	1417280
2016-17	-	-	-	451900	-	-	-	451908
2017-18	-	-	-	221350	-	-	-	221337
2018-19	-	-	-	221350	-	-	-	220131
2019-20	-	-	-	233550	-	-	-	233483
2020-21	-	-	-	258250	-	-	-	258247
2021-22	-	-	-	271650	-	-	-	105995

3.2.1. Site-2: **Malkeda in Sikar range** : The selected plantation has been carried out on 4.90 hec of land at Malkeda in Sikar range during the year 2014-15. The activities were done under the NFL model. The GPS location of this selected site was N 27.3338 and E 75.1220. The site was a forest land and selected for 100% evaluation. The soil was sandy loam.

3.2.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 5390 pits have been made for plantation in total 4.9 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: Instruction given on field evaluation

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Malkeda, a forest department nursery of Sikar range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 4. Seedlings of *Acacia nilotica* (desi babool), *Acacia senegal* (kumatha), *Zizyphus mauritiana* (ber), *Acacia tortilis* (totalis) were planted.

A total of 5390 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 5390 plants in 4.9 hectare have been planted. Map of planting site was prepared. Type of plantation was block and technique of planting was pit.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water.

3.2.6. Observations Recorded: Under this model, 5390 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 65.26% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 5390 plants comprising of four species were planted in the 4.90 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-5: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia tortilis (totalis)	3600	2536	1064	70	4.05	39
Acacia nilotica (desi babool)	300	231	69	77	3.89	37.2
Zizyphus mauritiana (ber)	500	354	146	70	3.15	32
Acacia senegal (kumtha)	990	397	593	40	3.4	38
Total	**5390**	**3518**	1872	**65.26**		

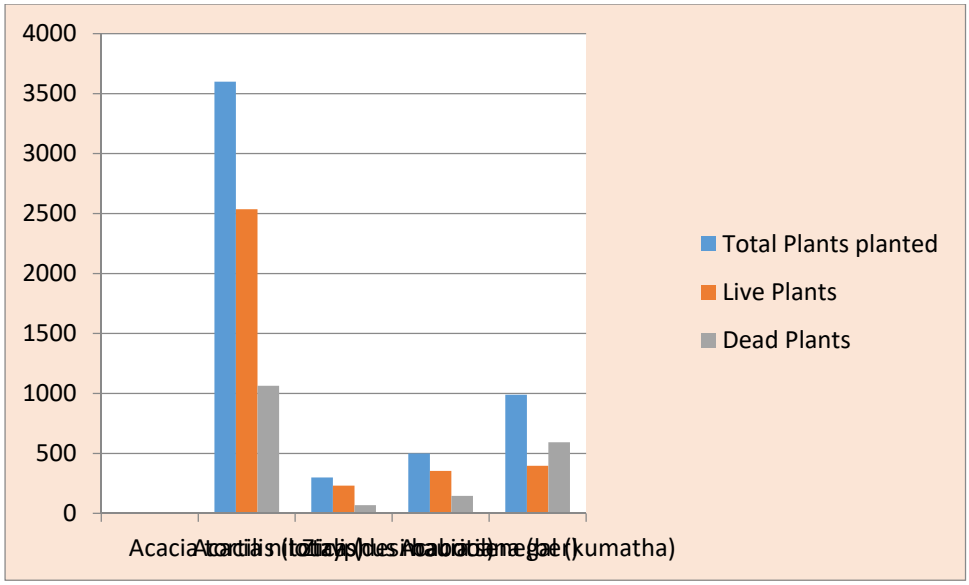


Fig: Graph showing survival of different plants

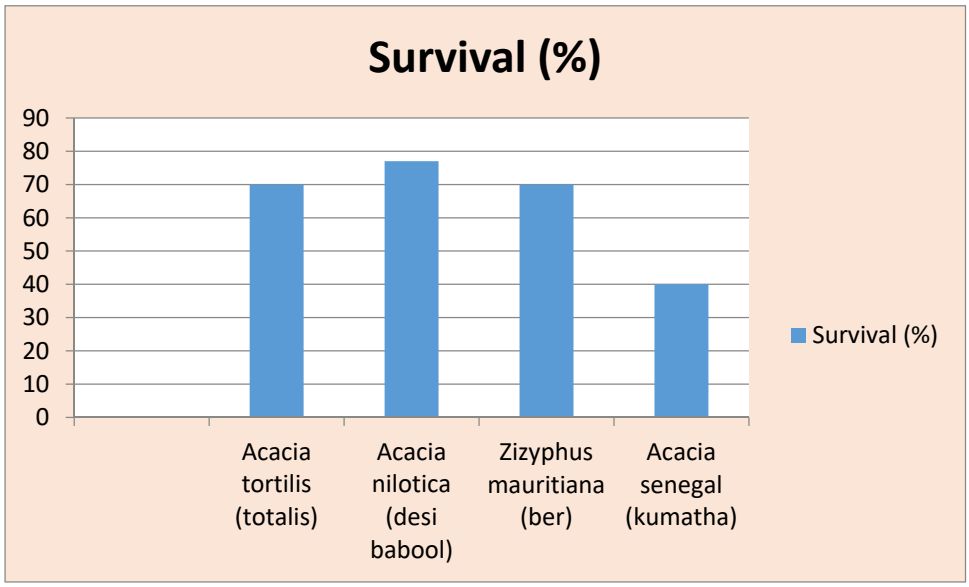


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of desi babool plant was highest** followed by tortilis and ronj. **The survival percentage of desi babool was maximum which is 77% and other two was 70% each. All the plants planted in this site showed good survival rate.**

The reason for moderate survival of all plants was scanty rainfall, cattle pressure etc.

3.2.11. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2014-15	-	-	-	-	-	-	6355	6355

2015-16	-	-	-	-	203284	-	-	203284
2016-17	-	-	-	-	39373	-	22199	16572
2017-18	-	-	-	-	4706	-	15534	20240
2018-19	-	-	-	-	9933	-	-	9933
2019-20	-	-	-	-	5006	-	16327	21333
2020-21	-	-	-	-	2907	-	16893	19800
Total	-	-	-	-	265209	-	77308	342517

3.2.12. GPS Location and KML file: The selected model under CAMPA plantation site measured 4.9 hec as per kml map.

Figure: KML map of NFL plantation at Malkheda, Sikar

3.3.1. Site-3: **Meena Ka Nagal in Patan range** : The selected plantation has been carried out on 50 hec of land at Meena ka Nagal in Patan range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 24.500308 and E 78.014695. The site was a forest land and selected for 100% evaluation. The soil was brown in colour and stony hard layer.

3.3.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR plantation at Meena ka Nagal, Patan

3.3.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Meena Ka Nagal, a forest department nursery of Patan range. During monsoon these seedlings were planted.

3.3.4. Species Planted: The selected tree species under plantation were 5. A total of 10000 numbers of seedlings were planted at the site. Seedlings of *Acacia nilotica* (desi babool), *Acacia leucophoelea (*ronj), *Zizyphus mauritiana* (ber), *Holoptelea integrifolia* (churail) and *Azadirachta indica* (neem) were planted.

Fig: Measurement of plants on field

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted mixed system in block wise according to the availability of space in the plantation area. No plantation journal was evaluated by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land. Type of plantation was mixed. Pit technique of planting was used.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.3.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.3.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Plants like guggal, gangeran, khair have been found grown naturally in this area. The growth of plants was good.

Table-6: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	Gangeran	76	2.5	12
2	*Acacia catechu*- Khair	43	2.25	8
3	*Commiphora sp.* -Guggal	43	2	10

3.3.7. Regeneration through seeds sowing: Seeds of species like Kumtha and Khair have been sown on edges of contour trenches.. The growth of seeds sowing plants was good. Pruning of plants of seedlings planted, seeds sown and existing vegetation was done.

3.3.8. Protection Work: The selected ANR model plantation was **protected by stone wall fencing of 50 RMT and ditch fencing of 3250 RMT. Also there was 600 RMT of barbed wire fencing as protection measure. Condition of fencingwas good.**

3.3.9. Soil and Water Conservation Measures: **There are 600 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3m to 7 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation.

3.3.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 82.8% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of six species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-7: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia leucophoelea (ronj)	6600	5346	1254	81	2.5	14
Acacia nilotica (desi babool)	1500	1320	180	88	3.2	14
Zizyphus mauritiana (ber)	1500	1290	210	86	2	8
Azadirachta indica (neem)	200	160	40	80	3.2	12
Holoptelea integrifolia (churail)	200	164	36	82	2.2	10
Total	**10000**	**8280**	1720	**82.8**		

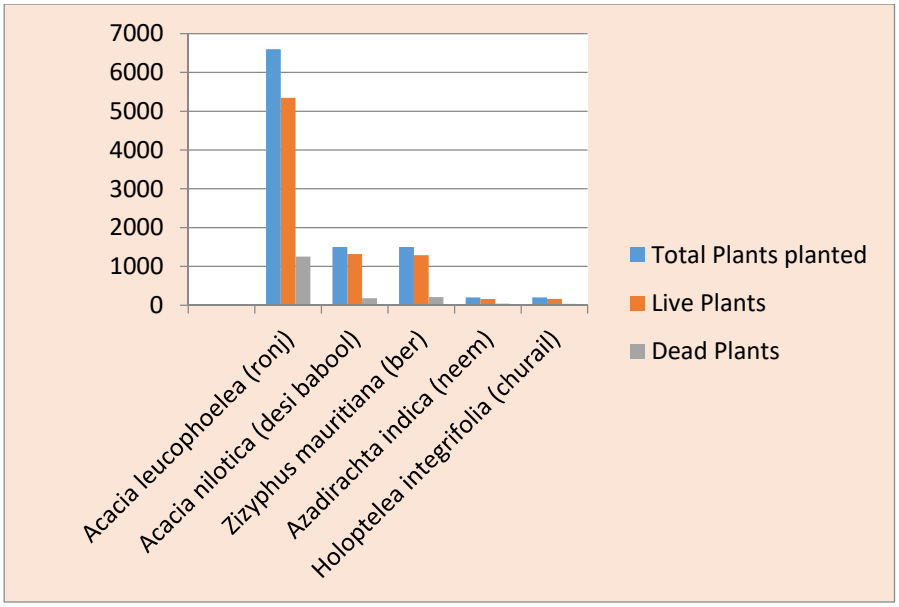


Fig: Graph showing survival of different plants

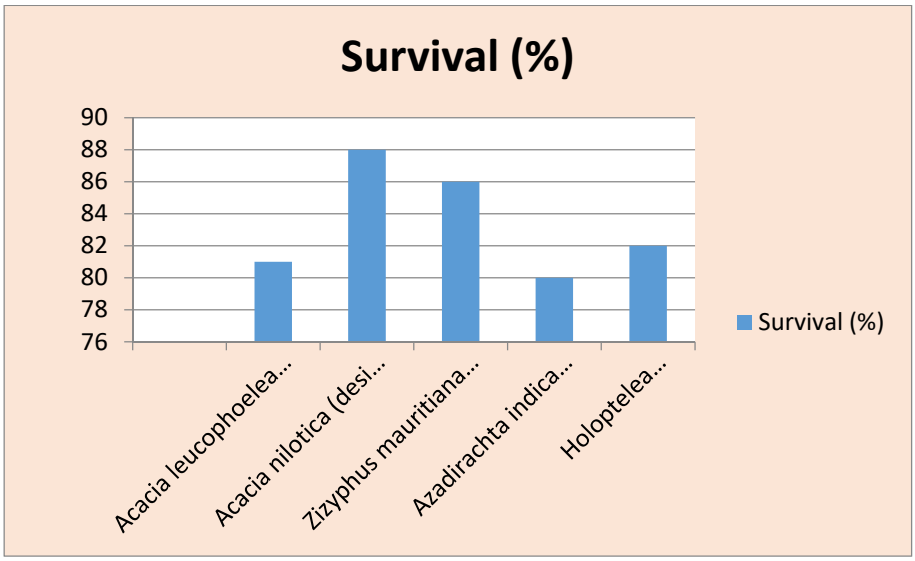


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of desi babool plant was highest** followed by Ber. **The survival percentage of desi babool was maximum of 88 % and ber was 86%. All plants planted in this site showed good survival rate.**

The reason for high survival was right choice of plants and timely execution of plantation.

3.3.11. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2015-16	-	-	-	1573073	-	-	-	-

2016-17	-	-	-	389265	-	-	-	-
2017-18	-	-	-	160717	-	-	-	-
2018-19	-	-	-	86876	-	-	-	-
2019-20	-	-	-	92217	-	-	-	-

3.3.12. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per kml map.

Figure: KML map of ANR plantation of Meena Ka Nagal, , Patan, Sikar

3.4.1. Site-4: **Pritampuri in Neem ka thana range:** The selected plantation has been carried out on 50 hec of land at Pritampuri in Neem ka thana range during the year 2014-15. The activities were done under the DFL model. The GPS location of this selected site was N 27.351099 and E 75.47084. The site was a forest land and selected for 100% evaluation. The soil was sandy loam and stony hard layer.

3.4.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 35000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: DFL at Pritampuri, Neem ka thana

3.4.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and

seedlings were raised in the nearby nursery of Pritampuri, a forest department nursery of Neem ka thana range. During monsoon these seedlings were planted.

3.4.4. Species Planted: The selected tree species under plantation were 13. A total of 35000 numbers of seedlings were planted at the site. Seedlings of *Acacia nilotica* (desi babool), *Zizyphus mauritiana* (ber), *Tecomella undulata* (rohida), *Acacia tortilis* (totalis), *Dalbergia Sissoo* (shisham), *Acacia leucophoelea (*ronj), *Holoptelea integrifolia* (churail), *Azadirachta indica* (neem), *Prosopis cineraria* (khejri), *Albizia lebbeck* (siras) *Acacia Senegal* (kumtha), mix varieties and others were planted.

A total of 35000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have been planted. So total number of plants planted was 35000 for 50 hectare of land. Map of planting site was prepared. Type of plantation was block. Pit technique of planting was used.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.4.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.4.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Plants such as kumtha, ber, totaliis and ronj found grown naturally in this area. Also dhaman grass found grown abundantly in this region. The growth of plants was good.

Table-8: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (cm)	Average girth (gbh) cm
1	*Acacia senegal*- Kumtha	143	200	85
2	*Zizyphus mauritiana*- Ber	187	360	78
3	*Acacia tortilis*- Totalis	332	200	48
4	*Acaia leucopholea*- Ronj	129	350	45

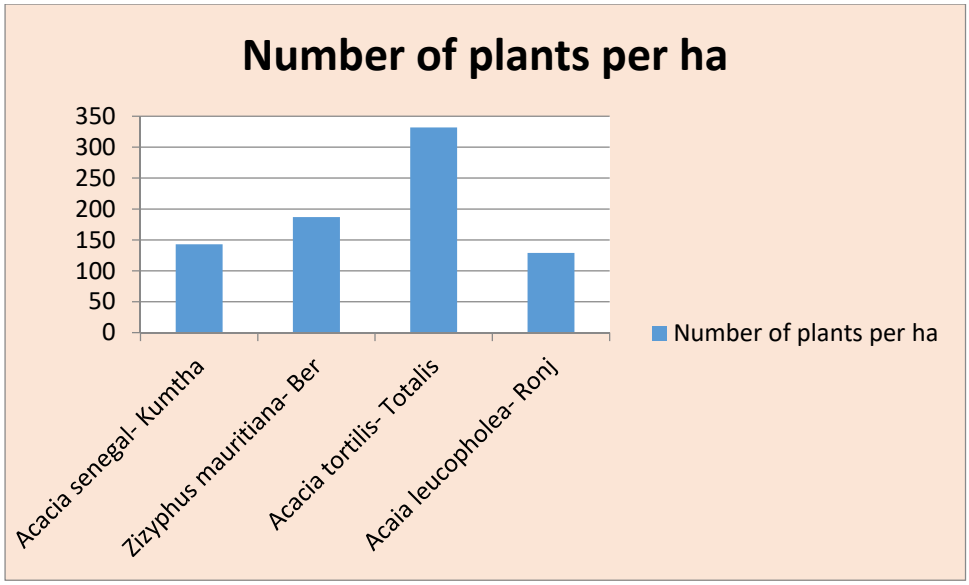


Figure: Species wise number of plants (per ha) in natural regeneration

3.4.7. Regeneration through seeds sowing: Seeds of species like ronj, khair, kumtha seeds have sown for natural regeneration. The growth of plants was good.

3.4.8. Protection Work: The selected DFL model plantation was **protected through ditch fencing of 1920 RMT with average top width of 1.50m, average depth of 1.20m and average bottom width of 0.90m. Also the area has been protected by barbed wire fencing of 210 RMT and stone wall of 450 RMT. Present condition of fencing was good. Fencing has been partially effective in controlling the biotic pressures.**

3.4.9. Soil and Water Conservation Measures: **There were loose stone check dam of 189 cum and earthen bund of 6278cum in the form of water harvesting** structures present in the entire plantation area. Also there was **1700 RMT contour trenches** made adjacent to the planting for water conservation measure. The size of the contour varied from 3m to 7 m long with 0.45*0.45 m^2 in width and depth.

3.4.10. Observations Recorded: Under this model, 700 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 67.2% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 35000 plants comprising of 13 species were planted in the 50 hec plantation area. The species planted have been given by the range office; no information was received from the journal, as there was no plantation journal received for evaluation by the team.

Fig: Measurement of plants on field

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-9: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (cm)	Average gbh (cm)
Acacia tortilis (Totalis		12269			240	42
Acacia leucopholea (Ronj)		2757			240	45
Dalbergia Sissoo (Shisham)		321			230	65
Albizia lebbeck (Siras)		268			160	35
Tecomella undulata (Rohida)		120			163	25
Zizyphus mauritiana (Ber)		521			300	40
Prosopis cineraria (Khejari)		416			251	30
Azadirachta indica (Neem)		1441			430	29
Holoptelea integrifolia (Churail)		560			230	19
Acacia senegal (Kumatha)		1079			390	27
Acacia nilotica (Desi babool)		422			390	70
Mix		2281			-	-
Other		1092			-	-
Total	**35000**	**23547**		**67.2**		

3.4.11. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2014-15	-	-	-	1375500	-	-	-	127148
2015-16	-	-	-	1435000	-	-	-	1387231
2016-17	-	-	-	451900	-	-	-	451892
2017-18	-	-	-	221350	-	-	-	221339

2018-19	-	-	-	221350	-	-	-	220831
2019-20	-	-	-	233550	-	-	-	233430
2020-21	-	-	-	251250	-	-	-	258242
2021-22	-	-	-	271650	-	-	-	75985

3.4.12. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

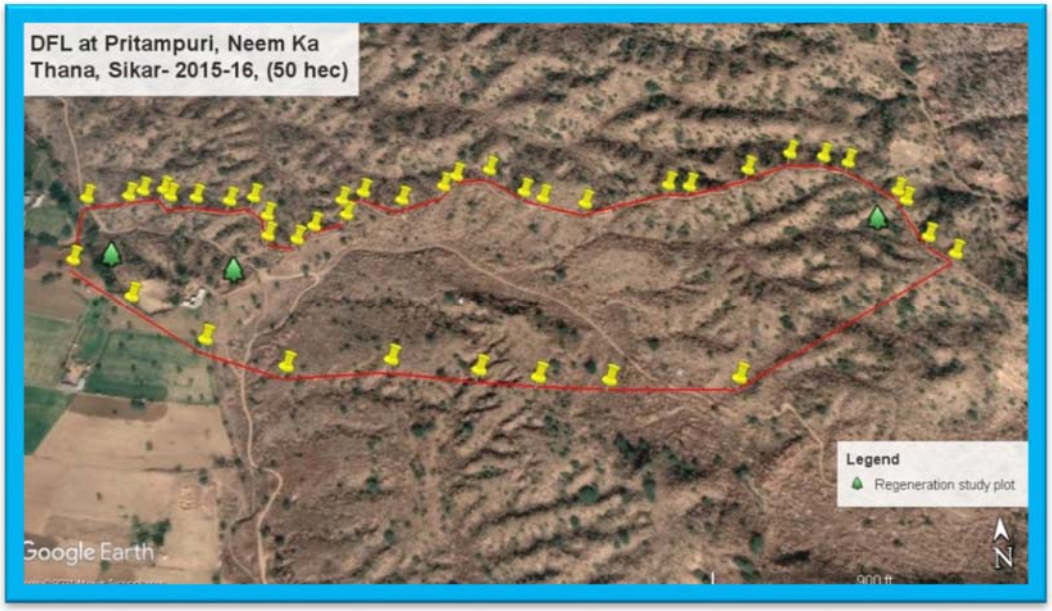


Fig: KML file of DFL plantation at Pritampuri, Neem Ka Thana, Sikar

4. Evaluation of Construction Works

<u>Site-1: 17 Boundary Pillars at Jinamata in Danta</u>

17 boundary pillars (out of 20) have been evaluated in the area of Jinamata in Danta range of Sikar division**. 3 pillars have not been found on site, local people have damaged these pillars.** The size of the pillars was 0.45*0.45*0.60 m. These pillars were made during 2014-15 to demarcate forest boundary in that area. Total cost of 17 pillars is Rs. 38000/-. **Most of the pillars are found in good conditions.**

Fig: Boundary pillars at Jinmata, Danta and GIS mapping of all pillars

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Sikar district.

Table-10: Quantitative assessment of plantation work created under CAMPA in Sikar division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	DFL Bhagega II50 Ha	61.6	7
2	NFL Malkeda 4.9 Ha	65.2	7
3	ANR Meena ka Nagal 50 Ha	82.8	9
4	DFL Pritampuri 50 Ha	67.2	7

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-11: Quantitative assessment of constructions work created under CAMPA in Sikar division

Sr. no.	Items	Name of the site	Rank of Item (Between 0 to 10)*
1	17 Boundary Pillars	Jinmata in Danta Range	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Sirohi (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Sirohi Forest Division. This Forest Division with 3 Forest Ranges namely, Sirohi, Pindwara and Abu Road which has territorial jurisdiction over the entire Sirohi District.

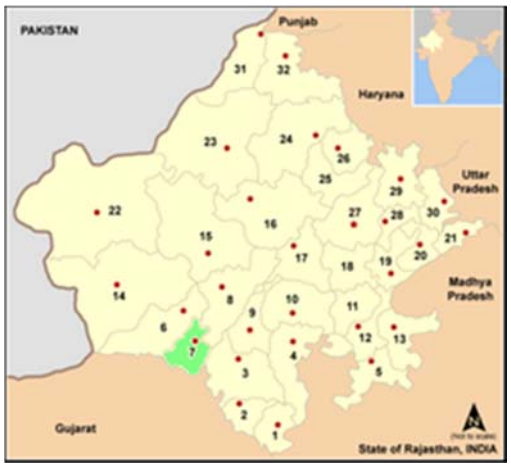


Fig: Location of Sirohi district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Sirohi Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Ha.	Model
Abu Road	Dhamsara (Village- Mung thala)	2015-16	1.735	NFL
Sirohi	Kuakhera at Mirpur C.No. 9	2015-16	50	DFL
Pindwara	Rupanmata at Rameshwar C.No . 18	2016-17	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Sirohi Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Sirohi	4 Ft. wa ll- 800 m at Matarwata Van Khand	2015-16	100%

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Dhamsara (Village- Mung thala) of Abu Road range:** The selected plantation has been carried out on 1.735 hec of land at Dhamsara in Abu Road during the year 2015-16. The activities were done under the NFL model. The GPS location of this selected site was N 24.50815 and E 72.697359. The site was a forest land and selected for 100% evaluation. The soil was clayey loam and stony hard layer of hilly area.

3.1.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 600 pits have been made for plantation in total 1.735 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: NFL at Dhamsara, Abu Road

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Mungthala, a forest department nursery of Abu Road range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 2. Seedlings of *Holoptelia integrifolia (*Churel*)* and *Ficus racemosa (*Hawan) were planted.

A total of 600 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.**

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

Fig: Lime putting on plants for marking

C.3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water.

3.1.6. Natural Vegetation and Regeneration: Palash, ber, khair were the plants found grown naturally in this area. The growth of the plant was good and the vegetation was also densed.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Butea monosperma* - Palash	144	5.3	43
2	*Zizyphus mauritiana* - Ber	77	3.5	32
4	*Acacia catechu*- Khair	66	4	38

3.1.7. Regeneration through seeds sowing: Seeds of species *kumatha, ronj, totaliskhair, ber, churel* were sown in and alongside of trenches. **The growth of seedlings from seeds was low.**

3.1.8. Protection Work: The selected NFL model plantation was **protected by stone wall fencing of 415 RMT with average top width of 0.50m, average depth of 1.20m and average bottom width of 0.90m. Present condition of fencing was good and effective in controlling biotic pressure upto some extent.**

3.1.9. Soil and Water Conservation Measures: **There were 601 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3 m to 7 m long with 0.45*0.45 m^2 in width and depth.** These trenches are prepared for rainwater harvesting and soil conservation. **Also there was loose stone check dam of 22 cum present in 1.735 hec of plantation area.**

3.1.10. Observations Recorded: Under this model, 600 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 59.3% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 600 plants comprising of two species were planted in the 1.735 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Holoptelia integrifolia (Churel)	575	344	231	59.8	3.5	32
Ficus racemosa (Hawan)	25	12	13	48	4	26
Total	**600**	**356**		**59.3**		

From the above table, it is shown that the **survival of churel was highest** of 59.8% followed by hawan of 48%.

Good protection, site specific plants and watering on time may improve the survival of plants.

3.1.11. GPS Location and KML file: The selected NFL model under CAMPA plantation site measured 1.735 hec as per kml map.

Fig: KML file of NFL at Dhamsara of Abu Road range plantation area

3.2.12. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-		-	1438.64	43309.07	57696.4
2015-16	-	-	-	76065	-	23469.79	43523.56	66993.3
2016-17	-	-	-	21851	-	4668.4	3074	77424
2017-18	-	-	-	721	-	1322.45	2822.25	4144.7
2018-19	-	-	-	7158	-	2994	2596	5590
2019-20	-	-	-	7566	-	4080	1196	5276
2020-21	-	-	-	8358	-	-	-	-

3.2.1. Site-2: **Kuakhera at Mirpur C.No. 9 in Sirohi range:** The selected plantation has been carried out on 50 hec of land at Kuakhera at Mirpur C.No. 9 in Sirohi range during the year 2015-16. The activities were done under the DFL model. The GPS location of this selected site was N 24,46,128 and E 72,48,158. The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer.

3.2.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 25000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in

the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Kuakhera a forest department nursery of Sirohi range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 4. Seedlings of *Acacia leucopholea* (Ronj), *Zizyphus mauritiana (*Ber), *Acacia senegal* (Kumtha) and *Acacia nilotica (*Desi babool*)* were planted.

A total of 25000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area.

Fig: DFL plantation at Kuakhera

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hec need to be planted but here 500 plants per hec have been planted. So, total 25000 plants in 50 hectare have been planted. Type of plantation was block and technique of planting was pit.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was moderate.**

Fig: Field evaluation team

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.2.6. Natural Vegetation and Regeneration: The area has been covered partially with vegetation due to this plantation. The growth of plants was poor. Grasses have grown in ditch trenches which should be controlled. Plants like dhok, kumtha, lapla grass have been found grown naturally. The vegetation was sparsh.

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal* - Kumtha	142	3.2	24
2	*Anogeissus latifolia* - Dhok	112	2.7	18

3.2.7. Regeneration through seeds sowing: Seeds of Kumtha, Ber, Babool species were sown on edges of contour trenches. **The growth of seedlings from seeds was moderate.**

3.2.8. Protection Work: The selected DFL model plantation was **protected by trench/ditch fencing of 3580 RMT and stone wall fencing of 410 RMT. Trench fencing average top width was 0.80m, average depth was 0.60 m and average bottom width was 1.20m. The condition of both fencing was good. It was partially effective in controlling the biotic pressure.**

3.2.9. Soil and Water Conservation Measures: **There were loose stone checkdam of total volume of 290cum present in the plantation area. There were 15000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3.5m to 8 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation.

3.2.10. Observations Recorded: Under this model, 25000 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 52.4% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 25000 plants comprising of four species were planted in the 50 hec plantation area. Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Zizyphus mauritiana (Ber)	6000	2844	3156	47.6	2.2	12
Acacia nilotica (Desi babool)	7000	3968	3032	56.68	3.1	18
Acacia leucopholea (Ronj)	7000	3861	3139	55.15	3.3	14
Acacia senegal (Kumtha)	5000	2432	2568	48.64	3.2	16
Total	**25000**	**13105**		**52.4**		

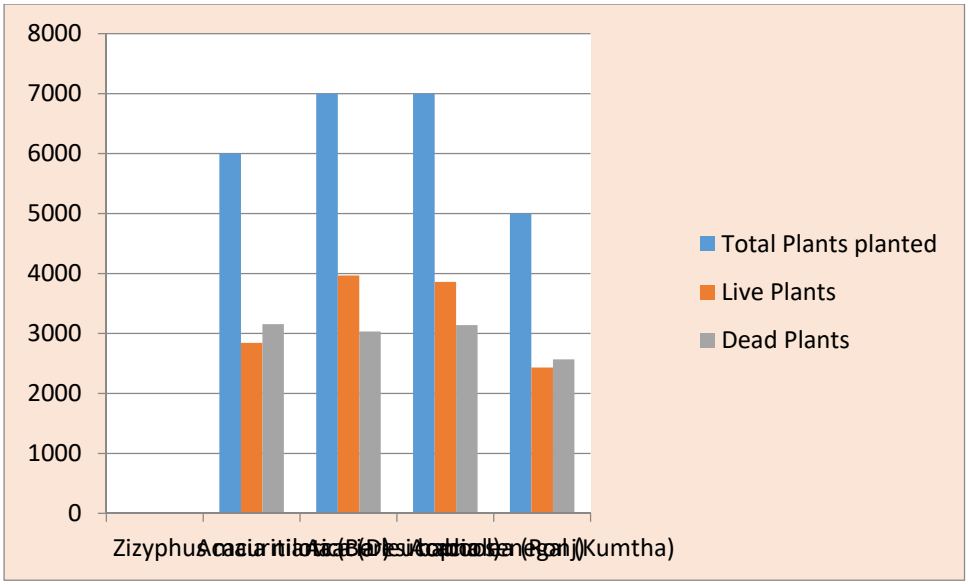


Fig: Graph showing survival of different plants

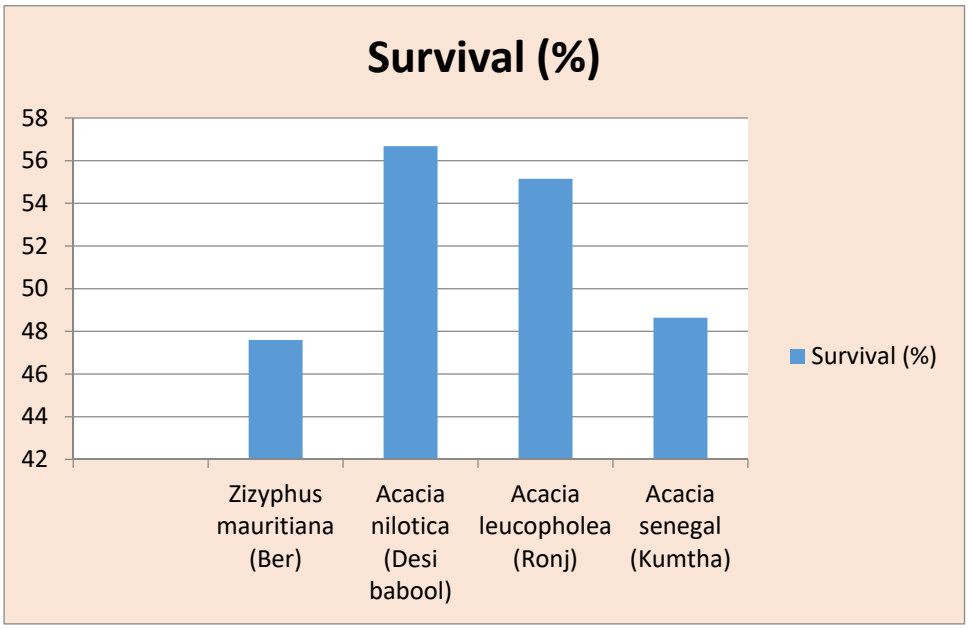


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of desi babool was highest of 56.6%, followed by ronj of 55.1%. All other plants showed average survival.**

Good protection and watering may improve the survival of plants.

3.2.11. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	362942	604053.2	-	-	362942	604053.28	
2015-16	-	32582.62	-	-	-	32582.62	-	

2016-17	-	-	88848	-	-	-	88848	
2017-18	-	-	103716	-	-	-	103716	
2018-19	-	-	107736	-	-	-	107736	
2019-20	-	-	117237.4	-	-	-	117237.4	
2020-21	-	-	106287	-	-	-	106287	
2021-22	-	-	127575	-	-	-	127575	

3.2.12. GPS Location and KML file: The selected model under CAMPA plantation site measured 50 hec as per kml map.

Fig: KML file of DFL at Kuakhera, Sirohi range plantation area

3.3.1. Site-3: **Rupanmata at Rameshwar C.No . 18 in Pindwara range:** The selected plantation has been carried out on 50 hec of land Rupanmata at Rameshwar C.No . 18 in Pindwara range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 24,44,52.6 and E 73,04,31.4. The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer.

3.3.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted.

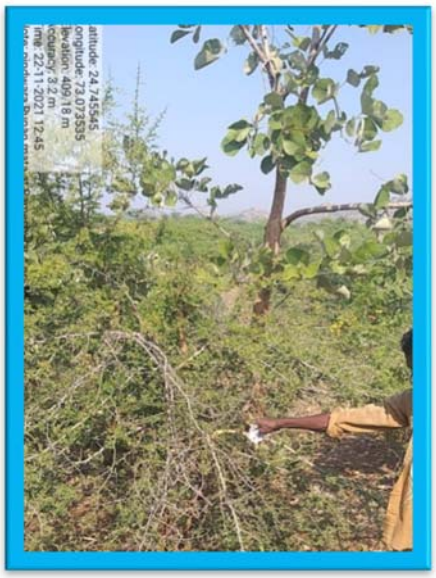


Fig: ANR plantation at Pindwara

First year the pits were made and second year during monsoon, the plantation works carried out.

3.3.3. Nursery Developmen t for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Rupanmata, a forest department nursery of Pindwara range. During monsoon these seedlings were planted.

3.3.4. Species Planted: The selected tree species under plantation were 6. Seedlings of *Zizyphus mauritiana (*Ber), *Acacia catechu* (Khair), *Holoptelia integrifolia (*Churel), *Acacia leucopholea* (Ronj), *Acacia nilotica (*Desi babool*)* and *Dendrocalamus strictus* (Baans) were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hec need to be planted, so, total 10000 plants in 50 hectare have been planted. Type of plantation was block and technique of planting was pit.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was moderate.**

3.3.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.3.6. Natural Vegetation and Regeneration: The area has been covered partially with vegetation due to this plantation. The growth of plants was good. Grasses have grown in ditch trenches which should be controlled. Plants like dhok, kumtha, palash, amla have been found grown naturally.

Table-7: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia senegal* - Kumtha	67	3.3	30
2	*Anogeissus latifolia* - Dhok	125	3.6	32
3	*Butea monosperma* - Palash	33	3.6	37
4	*Emblica officinalis*- Amla	93	2.7	23

3.3.7. Regeneration through seeds sowing: Seeds of Kumtha, Ber, Ronj species were sown on edges of contour trenches. **The growth of seedlings from seeds was moderate.**

3.3.8. Protection Work: The selected ANR model plantation was **protected by stone wall fencing of 1699 RMT having average top width was 0.80m, average depth was 0.60 m and average bottom width was 1.20m. The condition of fencing was good. It was partially effective in controlling the biotic pressure.**

3.3.9. Soil and Water Conservation Measures: **There were loose stone checkdam of total volume of 800 cum present in the plantation area. There were 15000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area.

Fig: Counting of plants

The size of the contour varied from 3m to 9 m long with 0.45*0.45 m^2 in width and depth. These trenches were prepared for rainwater harvesting and soil conservation.

3.3.10. Observations Recorded: Under this model, 10000 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 60.8% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of six species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-8: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
*Zizyphus mauritiana (*Ber)	2000	1268	732	63.4	1.4	12
Acacia catechu (Khair)	2500	1558	942	62.32	2.3	22
*Holoptelia integrifolia (*Churel)	1000	634	366	63.04	2.4	24
Acacia leucopholea (Ronj)	2000	1226	774	61.03	2.5	23
Acacia nilotica	710	435	275	61.03	2.6	23

(Desi babool)						
Dendrocalamus strictus (Baans)	1790	968	822	54.09	3.5	-
Total	**10000**	**6089**		**60.8**		

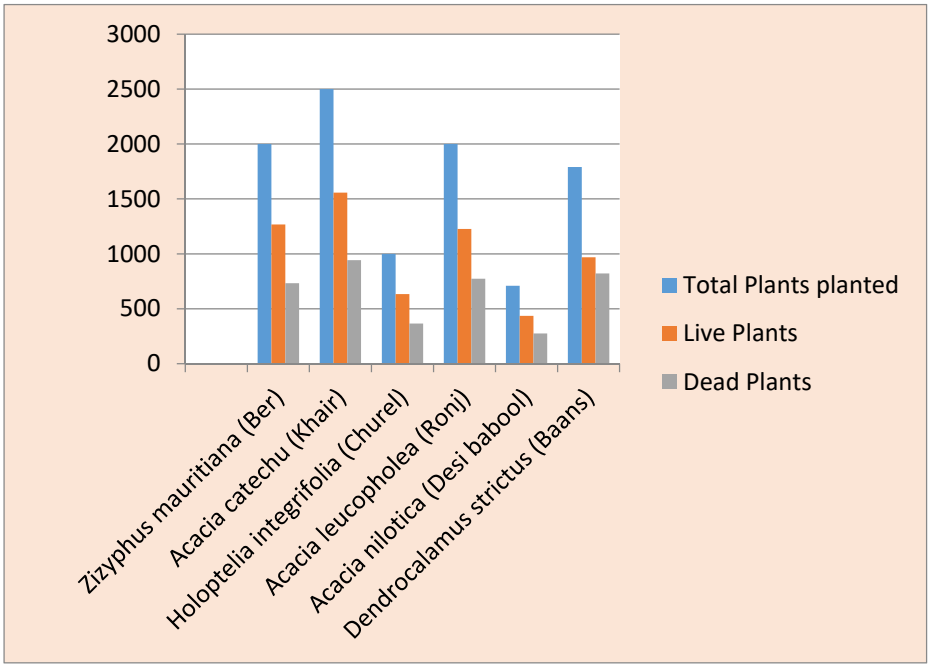


Fig: Graph showing survival of different plants

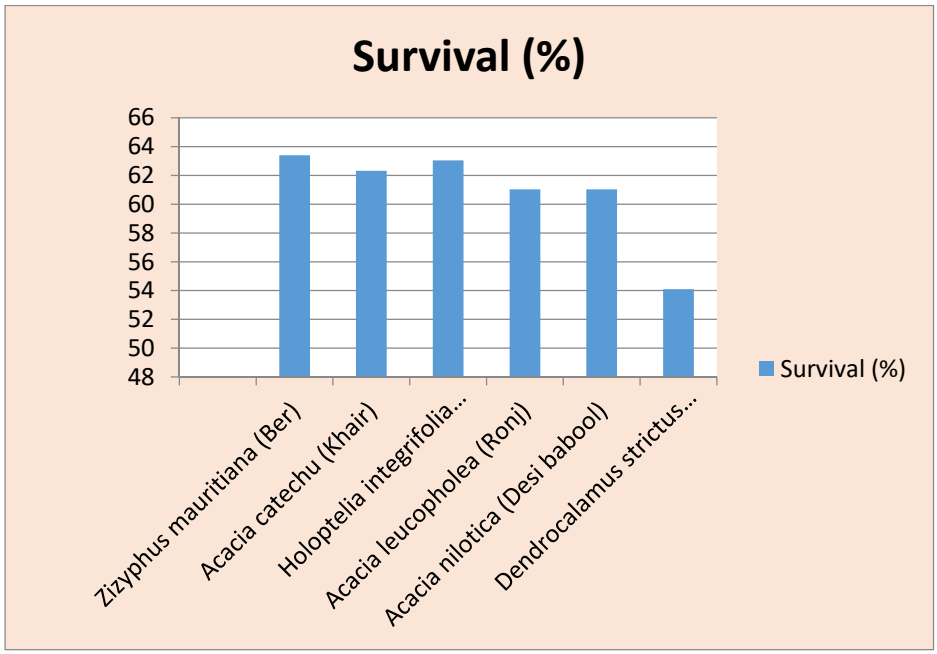


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of churel and ber was highest of 63.4%, followed by khair of 61%. All other plants showed good survival except baans, which showed average survival of 54%.**

Good protection, site specific plants and watering may improve the survival of plants.

3.3.11. GPS Location and KML file: The selected model under CAMPA plantation site measured 50 hec as per kml map.

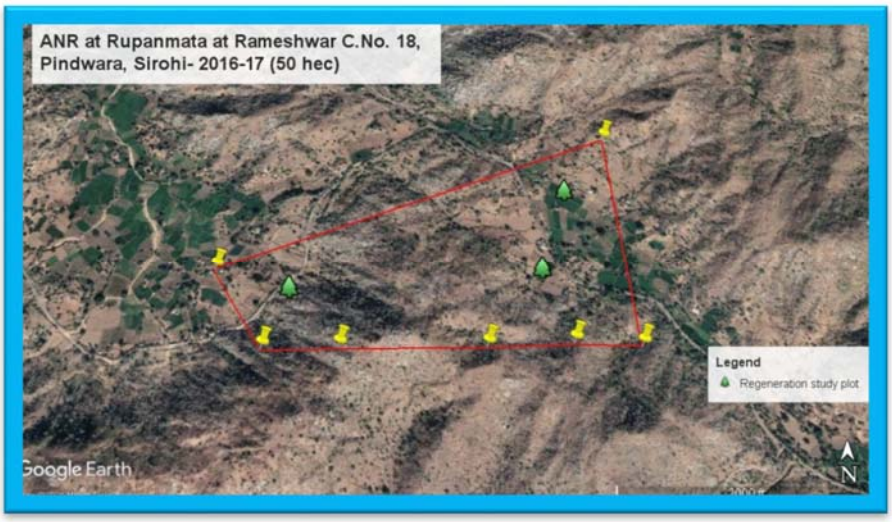


Fig: KML file of ANR at Rupanmata, Pindwara range plantation area

3.3.12. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	278873	722824	655097	1656794	209429	572804	655074	1437307
2016-17	278547	92633	-	371180	259366	92421	-	351787
2017-18	-	-	-	-	122919	-	-	122919
2018-19	-	-	-	-	65835	-	12261	78096
2019-20	-	-	-	-	71144	-	11928	83072
Total					**728693**	**665225**	**679263**	**2073181**

4. Evaluation of Construction Works

Site- 1: 4 Ft. wall -800 m stone wall at Matarwata Van Khand of Sirohi: At Matarwata Van Khand in Sirohi range, the stone wall has been evaluated. The wall was constructed in the year 2015-16. . The wall dimensions were 4 ft and 800m length. Construction work appeared to be good and useful. GPS location of this area was 24,54,06 N and 72,52,06 E. The construction work started in the year of 2015 after approval and completed in the 2016. The expenditure incurred for constructing this wall was Rs. 17.60 Lakh. The wall was found in good condition.

Fig: Stone wall Sirohi and GIS mapping

5. Overall assessment: The overall impact of plantation activities appeared moderate to poor in Sirohi division.

Table-9: Quantitative assessment of plantation work created under CAMPA in Sirohi division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	NFL-Dhamsara (Village- Mung thala), Abu Road	59.3	6
2	DFL- Kuakhera at Mirpur C.No. 9, Sirohi	52.4	6
3	ANR- Rupanmata at Rameshwar C.No . 18, Pindwara	60.8	7

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-10: Quantitative assessment of constructions work created under CAMPA in Sirohi division

Sr. no.	Ranges	Name of the site	Rank of site (Between 0 to 10)*
1	Sirohi	4 Ft. wall- 800 m at Matarwata Van Khand	8

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Tonk (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Tonk Forest Division. This Forest Division with 5 Forest Ranges namely Deoli, Niwai, Malpura, Tonk and Uniyara, which has territorial jurisdiction over the entire Tonk District.

Fig : Location of Tonk district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Tonk Forest Division were as given in table-1.

Forest Range	Name of Site	Year of Plantation	Ha.	Model
Deoli	Devpura	2015-16	50	DFL
Tonk	Kurasiya	2015-16	35	DFL
Niwai	Choganya siras	2016-17	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Tonk Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Tonk	Tonk	2014-15	Range Office cum Residence
Deoli	Anwa Dehdu	2014-15	10 Boundary Pillar
Tonk	Malji ki Dungri	2014-15	4 Ft. wall -500 m stone wall
Uniyara	Banetha	2015-16	4 Ft. wall -100 m stone wall
Deoli	Nursery Bharna	2016-17	4 Ft. wall -500 m stone wall

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Devpura in Deoli range:** The selected plantation has been carried out on 50hec of land at Devpura in Deoli range during the year 2015-16. The activities were done

under the Degraded Forest Land (DFL) model. The GPS location of this selected site was N 25.5826 and E 75.3639. The site was a forest land and selected for 100% evaluation. The soil was reddish brown in colour and stony hard layer.

Fig: DFL at Deoli range

3.1.2. Treatment plan before sowing:
The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 35000 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Devpura, a forest department nursery of Deoli range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 9. Seedlings of Ailanthus *excelsa* (Ardu), *Acacia tortilis* (tortilis), *Holoptelea integrifolia* (Churel), *Zizyphus mauritiana* (Ber), *Cassia sp.* (Cssiashayama), *Dalbergia sissoo* (Shisham) ,*Pithecellobium dulce* (Jangal Jalebi), *Emblica officinalis* (Aamla), *Acacia senegal* (Kumatha) were planted.

A total of 35000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 700 plants per hectare have been planted. So total number of plants planted was 35000 for 50hectare of land. Map of planting site was prepared.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

Fig: Plant counting on field

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. *Holoptelea integrifolia* (Churail), *Dalbergia sissoo* (Shisham), *Acacia tortilis* (tortilis), *Azadirachta indica* (Neem), *Ailanthus excelsa (*Ardu) were the plants found grown naturally in this area. The growth of the plant was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Holoptelea integrifolia* (Churail)	187	2.75	24
2	*Dalbergia sissoo* (Shisham)	73	5.5	39
3	*Acacia tortilis* (Tortilis)	85	4.5	40
4	*Azadirachta indica* (Neem)	57	16.66	32
5	*Ailanthus excelsa* (Ardu)	49	16.66	38.33

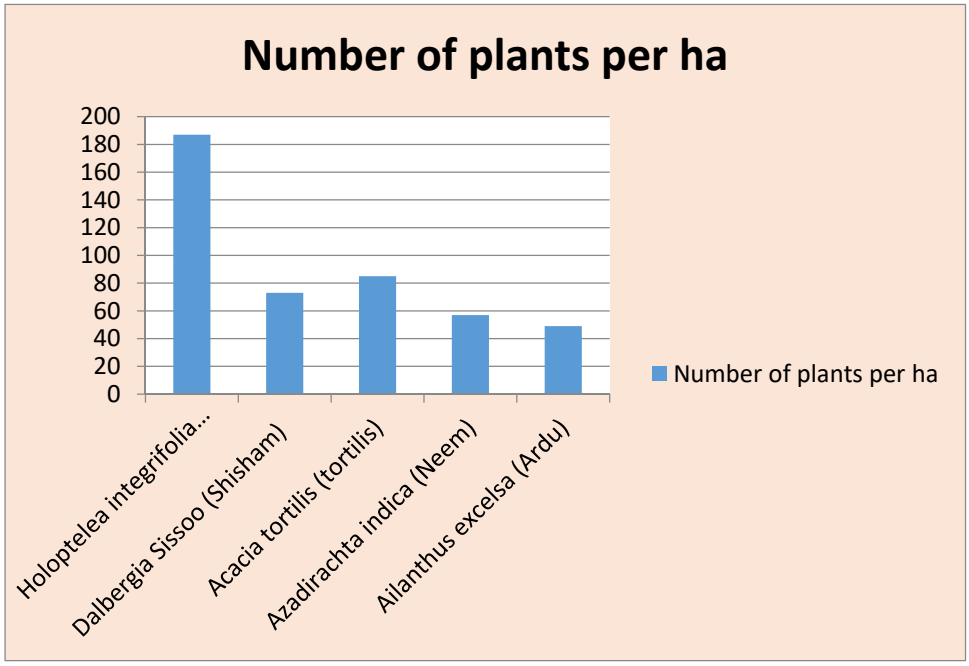


Fig: Graph showing number plants under natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of tortilis, ber, neem were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected DFL model plantation was **protected by ditch/trench fencing of 4150 RMT with average top width of 0.95m, average depth of 0.95mand average bottom width of 0.90m. Present condition of fencing was good and effective in handling biotic pressures.**

3.1.9. Soil and Water C onservation Measures: **There was 14000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area**.** These trenches are prepared for rainwater harvesting and soil conservation.

Fig: Measurement of plants

3.1.10. Observations Recorded: Under this model, 700 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 70.4% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 35000 plants comprising of five species were planted in the 50hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Ailanthus excelsa (Ardu)	1800	1251	549	69.5	4.2.	35
Acacia tortilis (tortilis)	24900	17929	6971	69.99	3.7	32
Holoptelea integrifolia (Churel)	3000	2150	850	71.66	3.6	32
*Zizyphus mauritiana (*Ber)	300	163	137	54.33	2.4	19
*Cassia sp. (*Cassiashyama)	100	72	28	72.00	2.2	20
Dalbergia sissoo (Shisham)	700	173	527	67.57	3.4	27
Pithecellobium dulce (Jangal Jalebi)	100	70	30	70.00	2.3	18
Emblica officinalis(Aamla)	100	37	63	37.00	3.2	26

Acacia senegal (Kumatha)	9000	3007	5993	75.17	3.9	33
Total	**35000**	**24652**	10348	**70.4**		

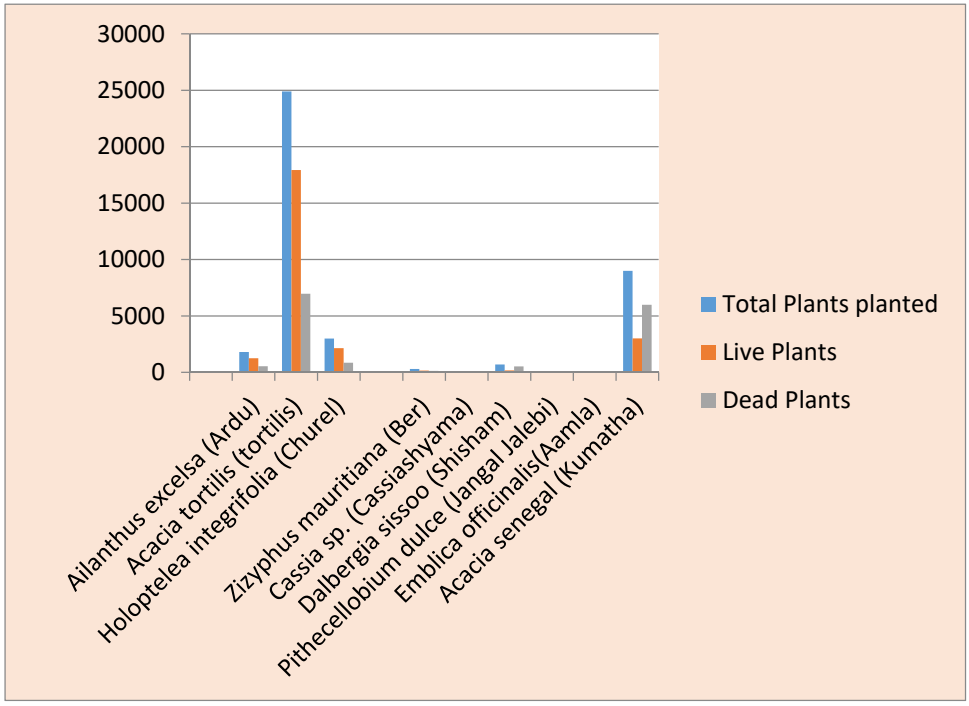


Fig: Graph showing survival of different plants

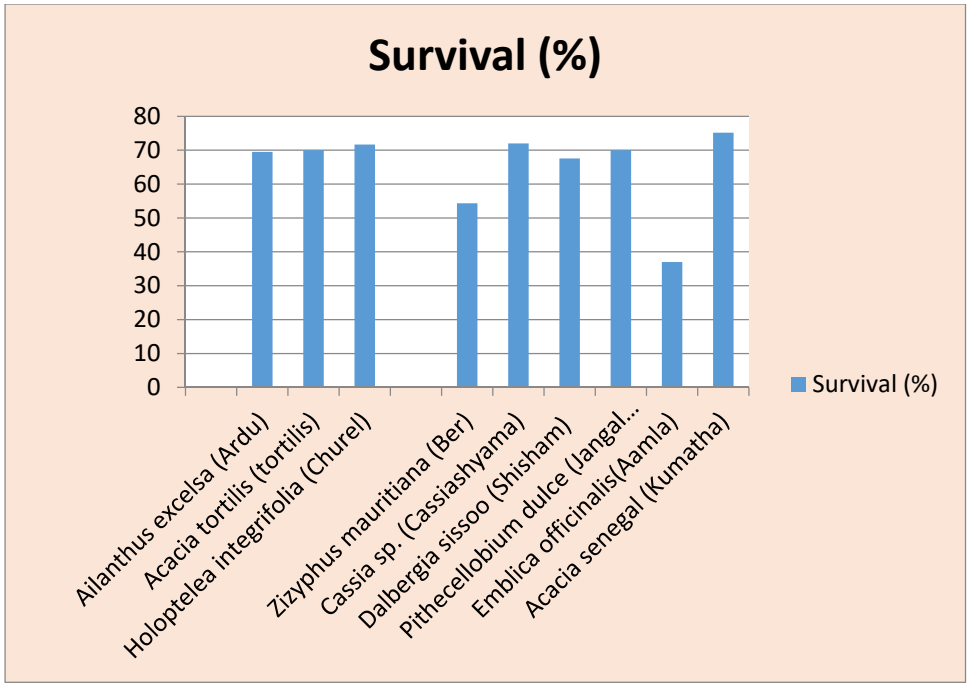


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Kumatha plant was highest** followed by Cassia. **The survival percentage of Kumatha was maximum which was 75.17% and Cassia was 72.00%.**

3.1.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

Fig: KML file of DFL at Devpura, Deoli range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	-	-	-	-	-	-	-	2170195
2016-17	-	-	-	-	-	-	-	448957
2017-18	-	-	-	-	-	-	-	207628
2018-19	-	-	-	-	-	-	-	221397
2019-20	-	-	-	-	-	-	-	231602
2020-21	-	-	-	-	-	-	-	229149

3.2.1. Site-2: **Kurasiya in Tonk range** The selected plantation has been carried out on 35 hec of land at Kurasiya in Tonk range during the year 2015-16. The activities were done under the Degraded Forest Land (DFL) model. The GPS location of this selected site was N 25.5328 and E 75.8041.The site was a forest land and selected for 100% evaluation. The soil was reddish brown in colour, clayey loam with stony hard layer.

Fig: DFL at Kurasiya, Tonk

3.2.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 24500 pits have been made for plantation in total 35 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.2.3. Nursery Developmen t for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Kurasiya, a forest department nursery of Tonk range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 8. Seedlings of *Azadirachta indica (Neem), Dalbergia Sissoo (Shisham), Ailanthus excelsa (Ardu), Butea monosperma (*Panchila), *Acacia nilotica* (Desi babool*), Acacia tortilis (*tortilis), *Ficus benghalensis (*Vad), *Ficus religiosa (*Pipal) were planted.

A total of 24500 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team. Technique of planting was pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, total number of plants planted was 24500 for 35hectare of land. Map of planting site was prepared.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.2.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. Prosopis cineraria (Khejari), Zizyphus mauritiana (Ber), Acacia catechu (Khair) were the plants found grown naturally in this area. The growth of the plant was good.

Table-5: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Prosopis cineraria* (Khejari)	119	3.50	23
2	*Zizyphus mauritiana*(Ber)	67	1.6	16

3	*Acacia catechu* (Khair)	89	1.8	30

3.2.7. Regeneration through seeds sowing: Seeds of species *ber, khair, neem, desi babool, and tortilis* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.2.8. Protection Work: The selected DFL model plantation was **protected by ditch/trench fencing of 3789 RMT with average top width of 0.90m, average depth of 1.20m and average bottom width of 1.50m. Present condition of fencing was good and partially effective in controlling biotic pressures**

3.2.9. Soil and Water Conservation Measures: **There was earthern checkdam of 2256.30 cum and contour trenches of 16000 RMT in the form of water harvesting** structures present in the entire plantation area. These trenches are prepared for rainwater harvesting and soil conservation.

Fig: Measurement of plants

3.2.10. Observations Recorded: Under this model, 24500 were planted during plantation. **Based on for as 100 percent counting, plants survival was 70.1% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 24500 plants comprising of eight species were planted in the 35hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-6: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Azadirachta indica (Neem)	500	221	279	62.3	3.8	42
Dalbergia sissoo (Shisham)	200	113	87	66.4	3.1	33
Ailanthus excelsa (Ardu)	200	117	83	55.5	2.9	29
*Butea monosperma (*Panchila)	1500	1329	171	60	3.1	26
Acacia nilotica (Desi babool)	500	389	111	62.2	4.1	37
Acacia tortilis (Tortilis)	21500	14919	6581	62.3	4.5	38
Ficus benghalensis	50	-	50	-	-	-

(Vad)						
Ficus religiosa (Pipal)	50	-	50	-	-	-
Total	**24500**	**17188**	7312	**70.1**		

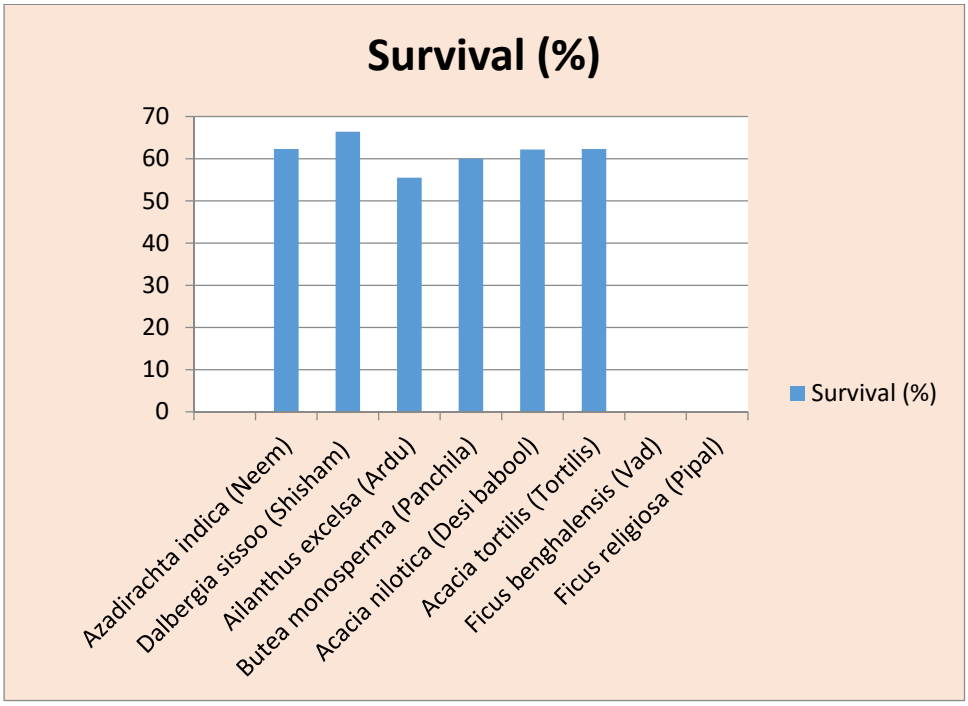


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Shisham plant was highest** followed by Neem and tortilis. **The survival percentage of Shisham was maximum which was 66.4% and Neem and tortilis was 62.3%.**

3.2.15.GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 35 hec as per kml map.

Fig:KML file of DFL at Kurasiya, Tonk range plantation area

3.2.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC work**	**Fencing**	**Total**
2014-15	-	-	-	-	-	-	-	964865
2015-16	-	-	-	-	-	-	-	1004499
2016-17	-	-	-	-	-	-	-	316299
2017-18	-	-	-	-	-	-	-	152712
2018-19	-	-	-	-	-	-	-	154938
2019-20	-	-	-	-	-	-	-	163382
2020-21	-	-	-	-	-	-	-	174145
Total	-	-	-	-	-	-	-	2930840

3.3.1. Site-3: **Choganya siras in Niwai range:** The selected plantation has been carried out on 50 hec of land at Choganya siras in Niwai range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 26.1627 and E 76.0004. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour and stony hard layer.

3.3.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR at Niwai range

3.3.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Choganya, a forest department nursery of Niwai range. During monsoon these seedlings were planted.

3.3.4. Species Planted: The selected tree species under plantation were 6. Seedlings of *Acacia tortilis* (tortilis), Acacia *nilotica* (desi babool), *Acacia leucophoelea* (ronj), *Prosopis cineraria* (khejari), Zizyphus *mauritiana* (ber) and Others were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land. Type of plantation was block. Pit technique of planting was used.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.3.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found.

3.3.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Plants such as Khair and Jaal have been found growing naturally in this area. The growth of plants was good.

Table-7: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia catechu* (Khair)	33	2.9	20
2	*Salvadora persica* (Jaal)	39	2.3	16

3.3.7. Regeneration th rough seeds sowing: Seeds of species like ber, desi babool and khejri have been sown for natural regeneration. The growth of seeds sowing plants was good.

3.3.8. Protection Work and SMC work: The selected ANR model plantation was **protected trench fencing of 3890 RMT. Average top width was 1.0m, average depth was 1.2m and average bottom width was 1.5m. Condition of ditch was good. Fencing has been partially effective in controlling the biotic pressures.**

There was earthern checkdam of 4678 cum which was filled up with soil. Also there were contour trenches of 18000 RMT in the form of water harvesting structures present in the entire plantation area. These trenches are prepared for rainwater harvesting and soil conservation. The size of trenches was .45*.45m and length varied from 3-9 m. There was 1580 cum of loose stone checkdam in 50 hec of plantation area.

3.3.9. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 77.4% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of six species were planted in the 50hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-8: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Acacia tortilis (tortilis)	6000	4800	1200	80	3.2	23
Acacia nilotica (desi babool)	3000	2250	750	75	3	22
Acacia leucophoelea (ronj)	500	418	82	83.6	3.5	25
Prosopis cineraria (khejari)	200	110	90	55	3.1	23
Zizyphus mauritiana (ber)	200	105	95	52.5	1.9	15
Others	100	60	40	60	-	-
Total	**10000**	**7743**	2257	**77.4**		

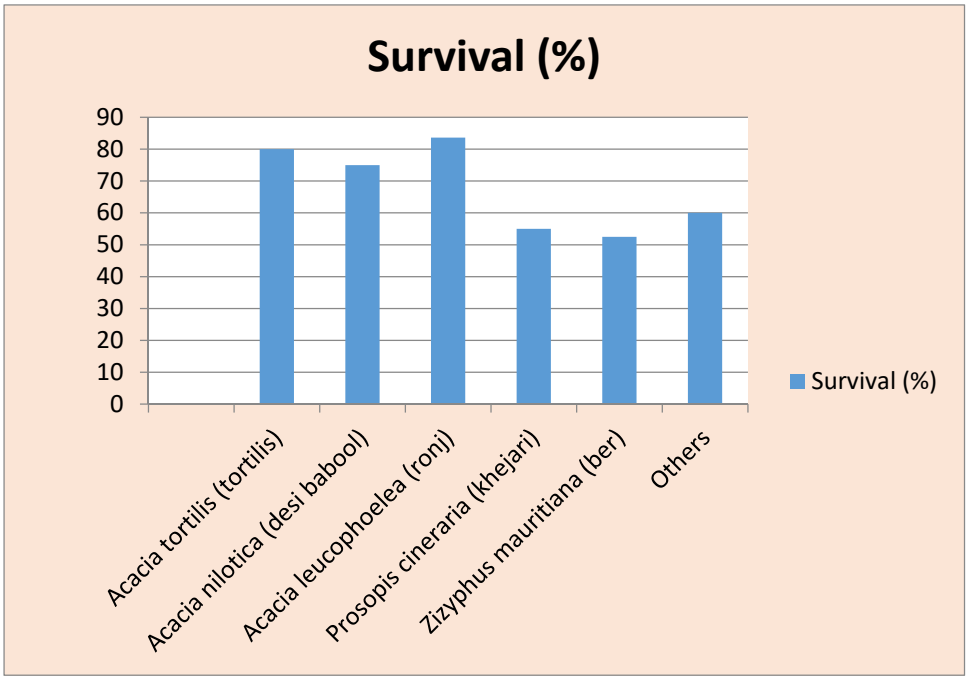


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Ronj plant was highest** followed by Tortilis. **The survival percentage of Ronj was maximum which was 83.6 % and Tortilis was 80%. Many plants planted in this site showed good survival rate.**

The reason for good survival was site specific selection and good protection.

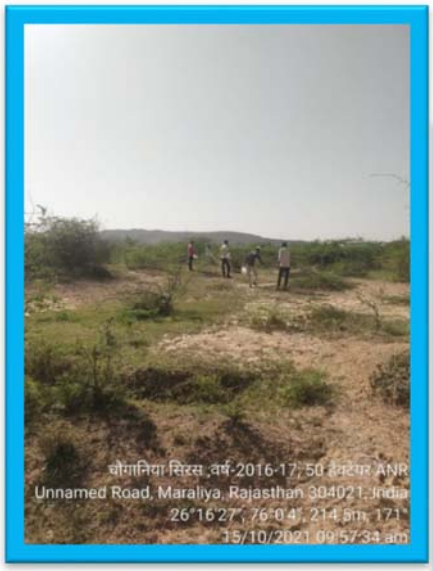


Fig: Measurement of trenches

3.3.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per kml map.

Fig: KML map of ANR at Choganiyasiras, Niwai range plantation area

3.3.12. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2015-16	-	-	-	-	-	-	-	1572357
2016-17	-	-	-	-	-	-	-	383501
2017-18	-	-	-	-	-	-	-	125224
2018-19	-	-	-	-	-	-	-	81044
2019-20	-	-	-	-	-	-	-	89219

4. Evaluation of Construction Works

Site-1 : Range Office cum Residence at Tonk: At Tonk range, one Range office cum residence has been constructed.

Fig: GIS mapping of range office, Tonk

The Range office cum residence was constructed in the year 2014-15. Construction work appeared to be very good and useful. This site was constructed at the cost of Rs. 7.20 lakhs. GPS location of this area was Longitude- E 75.790248 and Latitude-N 26.154106. The construction work started in the year of 2014 after approval and completed in the 2015.

Site 2- 10 Boundary Pillars at Anwa Dehdu in Deoli range: At Anwa Dehdu in Deoli range, all the boundary pillars have been evaluated. The pillars were constructed in the year 2014-15. The pillar dimensions were 0.600*0.500. Construction work appeared to be good and useful for all the pillars.

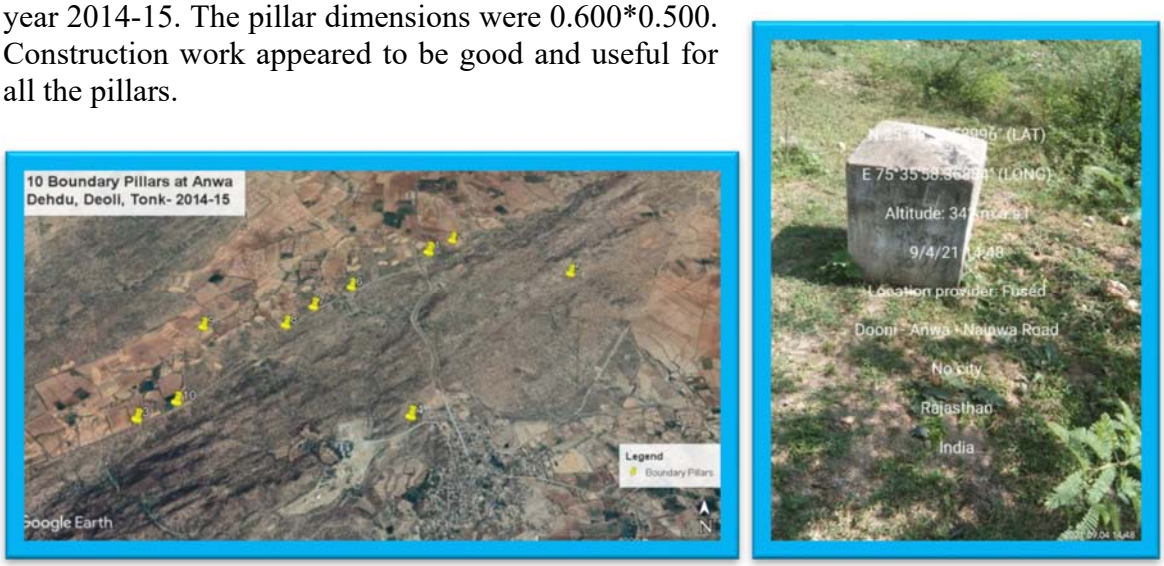


Fig: GIS mapping of all boundary pillars

The construction work started in the year of 2014 after approval and in the 2015. The expenditure incurred for constructing this wall was Rs. 80000 (as per mb.

Site 3- Stone wall at Malji ki Dungri in Tonk range: At Malji ki Dungri in Tonk range, the stone wall has been evaluated. The wall was constructed in the year 2014-15. The wall dimensions were 4 ft and 500m length. Construction work appeared to be good and useful. GPS location of this area was 26.188504 N and 75.809374E.

Fig: GIS mapping of wall Malji ki Dungri

The construction work started in the year of 2014 after approval and completed in the 2015. The expenditure incurred for constructing this wall was Rs. 1038178 (as per mb).

Site 4- Stone wall at Banetha in Uniyara range: At Banetha in Uniyara range, the stone wall has been evaluated. The wall was constructed in the year 2014-15. The wall dimensions were 4 ft and 100m length. Construction work appeared to be good and useful. GPS location of this area was 26.075239 N and 75.989562 E. The construction work started in the year of 2014 after approval and completed in the 2015. The expenditure incurred for constructing this wall was Rs. 165023 (as per mb).

Fig: GIS mapping of wall, Banetha

Site 5- Stone wall at Nursery Bharna in Deoli range: At Nursery Bharna in Deoli range, the stone wall has been evaluated. The wall was constructed in the year 2016-17. The wall dimensions were 4 ft and 500m length. Construction work appeared to be good and useful. GPS location of this area was 25.96544 N and 75.659775 E. The construction work started in the year of 2016 after approval and completed in the 2017. The expenditure incurred for constructing this wall was Rs. 1443358 (as per mb).

Fig: GIS mapping of wall, Nursery Bharna in Deoli

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Tonk district.

Table-9: Quantitative assessment of plantation work created under CAMPA in Tonk division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	DFL Devpura 50 Ha	70.4	8

2	DFL Kurasiya35 Ha	70.1	8
3	ANR Choganya siras50 Ha	77.4	8

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-10: Quantitative assessment of constructions work created under CAMPA in Tonk division

Sr. no.	**Items**	**Name of the site**	**Rank of site (Between 0 to 10)***
1	Range Office cum Residence	Tonk	8
2	10 Boundary Pillar	Anwa Dehdu	7
3	4 Ft. wall -500 m stone wall	Malji ki Dungri	7
4	4 Ft. wall -100 m stone wall	Banetha	8
5	4 Ft. wall -500 m stone wall	Nursery Bharna	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Udaipur-North (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Udaipur North Forest Division. This Forest Division with 7 Forest Ranges namely Bhindar, Gogunda, Devla, Kotda, Kukawas, Sayra and Udaipur(E), which has territorial jurisdiction over the entire Udaipur District.

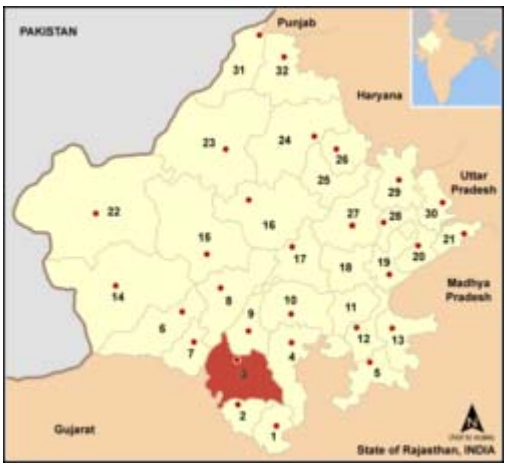


Fig : Location of Udaipur district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Udaipur North Forest Division were as given in table-1.

Forest Range	Name of Site	Year of Plantation	Ha.	Model
Gogunda	Patiya	2014-15	4.65	DFL
Udaipur	Varda	2015-16	97.82	NFL
Kotra	Subra subri-14	2015-16	50	ANR
Sayra	Boramagra -B	2016-17	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of Udaipur North Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Udaipur	Paga- 80	2014-15	20 Boundary Pillars
Sayra	Bisma	2015-16	Forest Guard Chowki

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Patiya in Gogunda range:** The selected plantation has been carried out on 4.65hec of land at Patiya in Gogunda range during the year 2014-15. The activities were done under the Degraded Forest Land (DFL) model. The GPS location of this selected site

was N 24.41759 and E 73.29276.The site was a forest land and selected for 100% evaluation. The soil was reddish brown in colour and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of hilly, rocky and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 1860 pits have been made for plantation in total 4.65hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: DFL at Gogunda

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Patiya, a forest department nursery of Gogunda range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 8. Seedlings of *Dendrocalamus strictus* (Baans*), Emblica officinalis (*Aamla), *Acacia catechu (K*hair*), Ficus racemosa (*Havan*), Bauhinia sp. (*Kachnar*), Azadirachta indica (*Neem*), Mangifera indica (*Mango*), Madhuca longifolia (*Mahua*)* were planted.

A total of 1860 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team. Technique of planting was trench cum pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 400 plants per hectare have been planted. So total number of plants planted was 1860 for 4.65 hectare of land. Map of planting site was prepared.

Fig: Loose stone checkdam measurement

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means

of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. *Acacia leucopholea* (Ronj), *Emblica officinalis* (Aamla), *Prosopis cineraria* (Khejari), Salar, *Holoptelea integrifolia* (Churail) were the plants found grown naturally in this area. The growth of the plant was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia leucopholea* (Ronj)	22	3.5	27
2	*Emblica officinalis* (Aamla)	49	2.7	23
3	*Prosopis cineraria* (Khejari)	42	1.9	21
4	*Boswellia serrata (*Salar)	33	2.2	24
5	*Holoptelea integrifolia* (Churail)	42	2.1	23

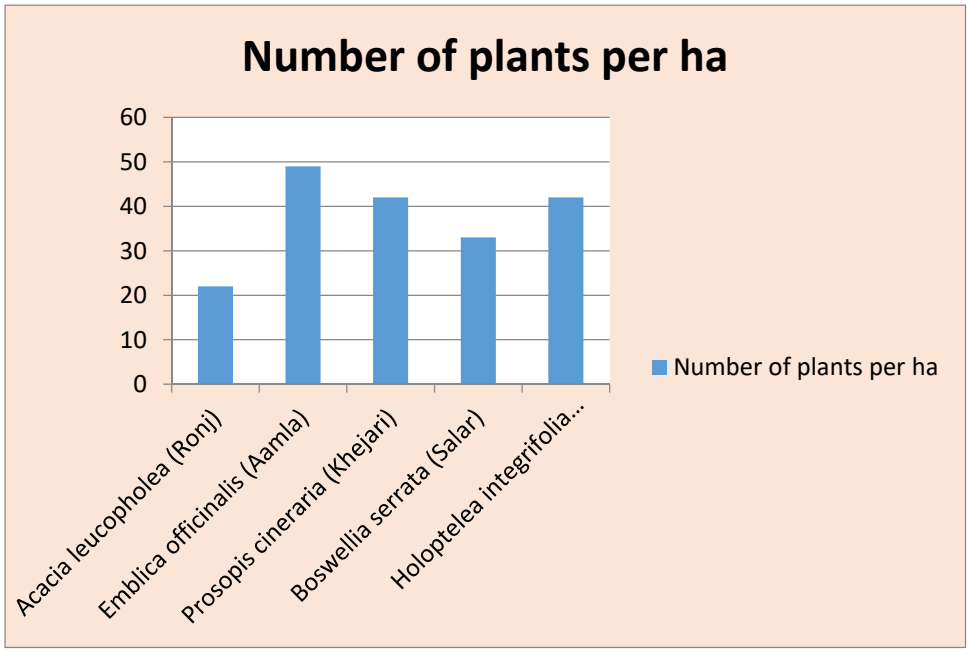


Fig: Graph showing number plants under natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of species *khirni, ronj, churel and dhak* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected DFL model plantation was **protected by ditch/trench fencing of 500 RMT with average top width of 0.84m, average depth of 1.20m and average bottom width of 0.80m. Present condition of fencing was good. It was effective in controlling the biotic pressure to some extent.**

3.1.9. Soil and Water C onservation Measures: **There were 28 loose stone check dams of 188.73 cum total in the form of water harvesting** structures present in the entire plantation area. **Contour trenches of 1860 RMT were present.** These trenches are prepared for rainwater harvesting and soil conservation.

3.1.10. Observations Recorded: Under this model, 400 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 83.49% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 1860 plants comprising of eight species were planted in the 4.65hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Dendrocalamus strictus (Baans)	900	761	139	84.55	7.2	-
Emblica officinalis (Aamla)	300	260	40	86.66	4.4	32
Acacia catechu (Khair)	200	160	40	80.00	4.4	40
Ficus racemosa (Havan)	100	82	18	82.00	4.5	33
Bauhinia sp. (Kachnar)	110	93	17	84.54	3.2	34
Azadirachta indica (Neem)	50	39	11	78.00	4.7	36
Mangifera indica (Mango)	100	82	18	82.00	3.9	32
Madhuca longifolia (Mahua)	100	76	24	76.00	4.2	38
Total	**1860**	**1553**	307	**83.49**		

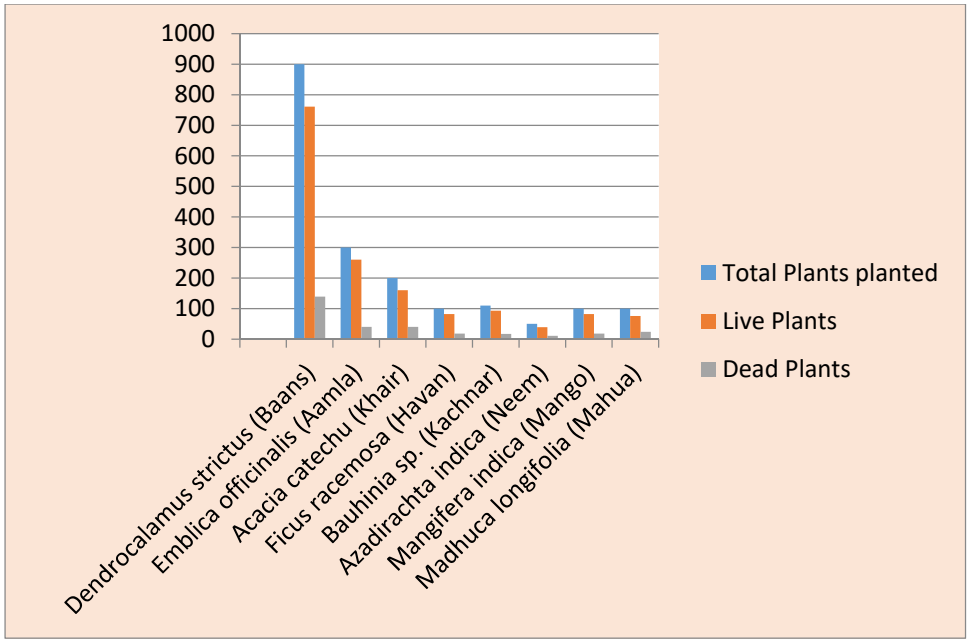


Fig: Graph showing survival of different plants

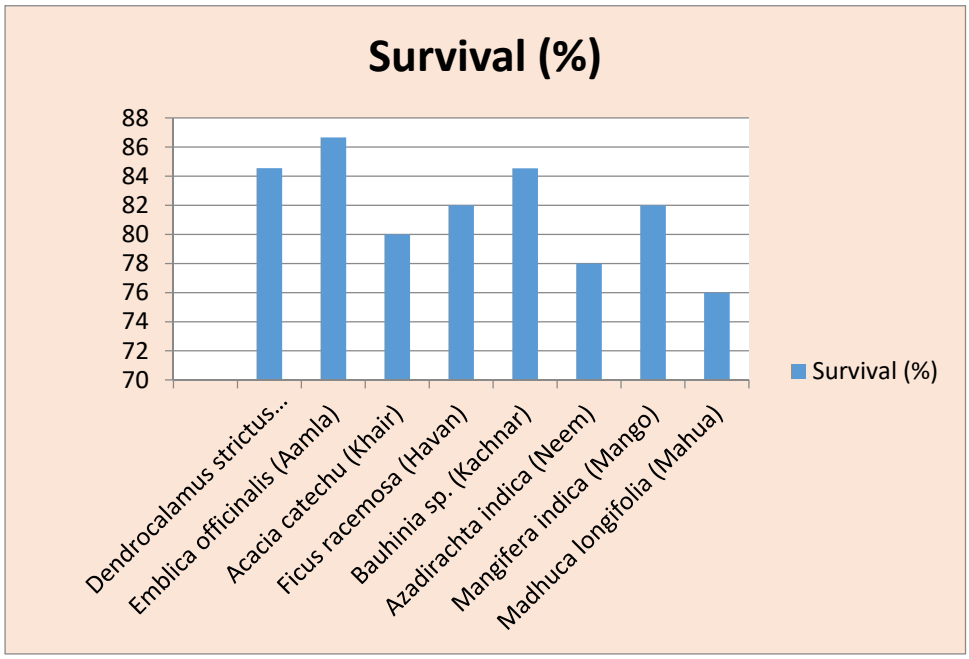


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Aamla plant was highest** followed by Bans. **The survival percentage of aamla was maximum which was 86.66% and Bans was 84.55%. Site specific plants and watering resulted into good survival of plants.**

3.1.11. GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 4.65 hec as per kml map.

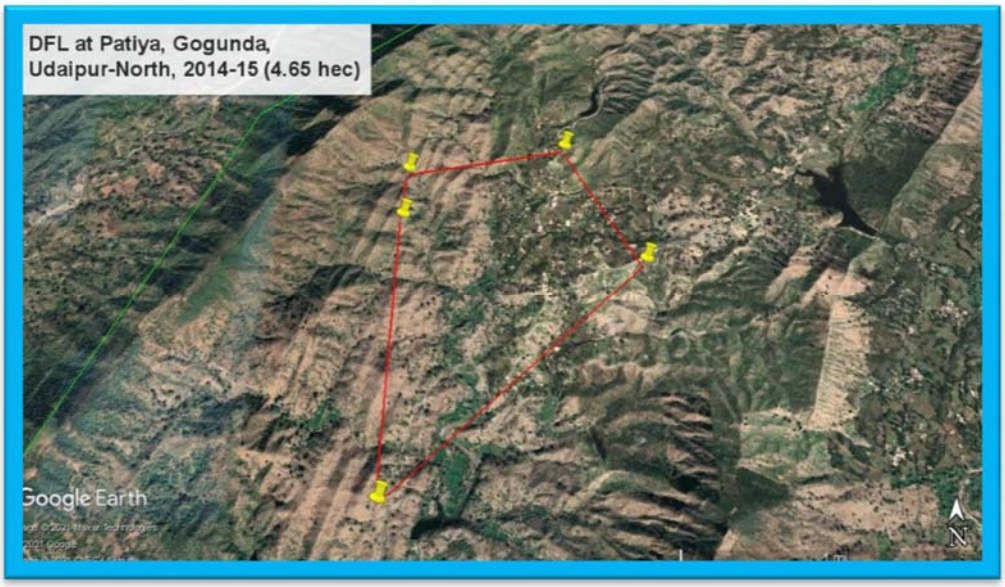


Fig: KML file of DFL at Patiya, Gogunda range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-	-	-	-	-	230483
2015-16	-	-	-	-	-	-	-	41956
2016-17	-	-	-	-	-	-	-	19395
2017-18	-	-	-	-	-	-	-	40631
2018-19	-	-	-	-	-	-	-	12942
2019-20	-	-	-	-	-	-	-	7306
2020-21	-	-	-	-	-	-	-	23672
2021-22	-	-	-	-	-	-	-	7224
Total	-	-	-	-	-	-	-	383609

3.2.1. Site-2: **Varda in Udaipur range** : The selected plantation has been carried out on 97.82 hec of land at Varda in Udaipur range during the year 2015-16. The activities were done under the Non Forest Land (NFL) model. The GPS location of this selected site was N 24.38561 and E 73.35405.The site was a forest land and selected for 100% evaluation. The soil was clayey loam and stony hard layer.

3.2.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 68474 pits have been made for plantation in total 97.82 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.2.3. Nursery Developmen t for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Varda, a forest department nursery of Udaipur range. During monsoon these seedlings were planted.

Fig: NFL at Varda

3.2.4. Species Planted: The selected tree species under plantation were 12. Seedlings of *Dendrocalamus strictus (*Bans*), Pongamia piinnata (*Kangi), *Acacia catechu (*Khair), *Holoptelea integrifolia (*Churel*), Azadirachta indica (N*eem*), Emblica officinalis (*Aamla), *Wrightia tinctoria (*Khirani*), Acacia leucopholea (*Ronj), *Ficus racemosa (*Havan*), Syzygium cumini (*Jamun), *Zizyphus mauritiana (*Ber*) and Others* were planted.

A total of 68474 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team. Technique of planting was trench cum pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 500 plants per hectare have been planted. So total number of plants planted was 68474 for 97.82 hectare of land. Map of planting site was prepared.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.2.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. Ronj, palash, khirni, churel, kumtha grown naturally here.

3.2.7. Regeneration through seeds sowing: Seeds of species *kumatha, ronj and dhak* were sown in as well as along the trenches and on the bund of ditch fencing. **The growth of seedlings from seeds was good.**

3.2.8. Protection Work: The selected NFL model plantation was **protected by trench fencing of 3000 RMT and stone wall fencing of 4750 RMT with average top width of 0.90 m, average depth of 1.20m and average bottom width of 1.00m. Present condition of fencing was good. It is partially effective in controlling biotic pressure.**

Fig: Measurement of checkdam

3.2.9. Soil and Water Conservation Measures: **There was 71 loose stone checkdam of 830 cum and contour trenches 39128 RMT in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 3-7 m long, size .45*.45m.** These trenches are prepared for rainwater harvesting and soil conservation.

3.2.10. Observations Recorded: Under this model, 500 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 62% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 68474 plants comprising of 12 species were planted in the 97.82hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-5: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
*Dendrocalamus strictus (*Bans*)*	8500	5320	3180	62.58	3	-
*Pongamia piinnata (*Kangi)	5000	2840	2160	56.8	2.1	19
Acacia catechu (Khair)	10500	6465	4035	61.57	2.8	25
Holoptelea integrifolia (Churel)	8500	4745	3755	55.82	2.9	28
Azadirachta indica (Neem)	1000	735	265	73.5	2.9	26
Emblica officinalis (Aamla)	8000	5835	2165	72.93	2	22
*Wrightia tinctoria (*Khirani*)*	5000	3220	1780	64.4	2.3	23

Acacia leucopholea(Ronj)	8000	5213	2787	65.16	3	26
Ficus racemosa (Havan)	1000	870	130	87	2.4	25
Syzygium cumini (Jamun)	6400	3460	2940	54.06	2.2	22
Zizyphus mauritiana (Ber)	6500	3719	2781	57.21	2.3	21
Others	74	38	36	51.35	-	-
Total	**68474**	**42460**	26014	**62**		

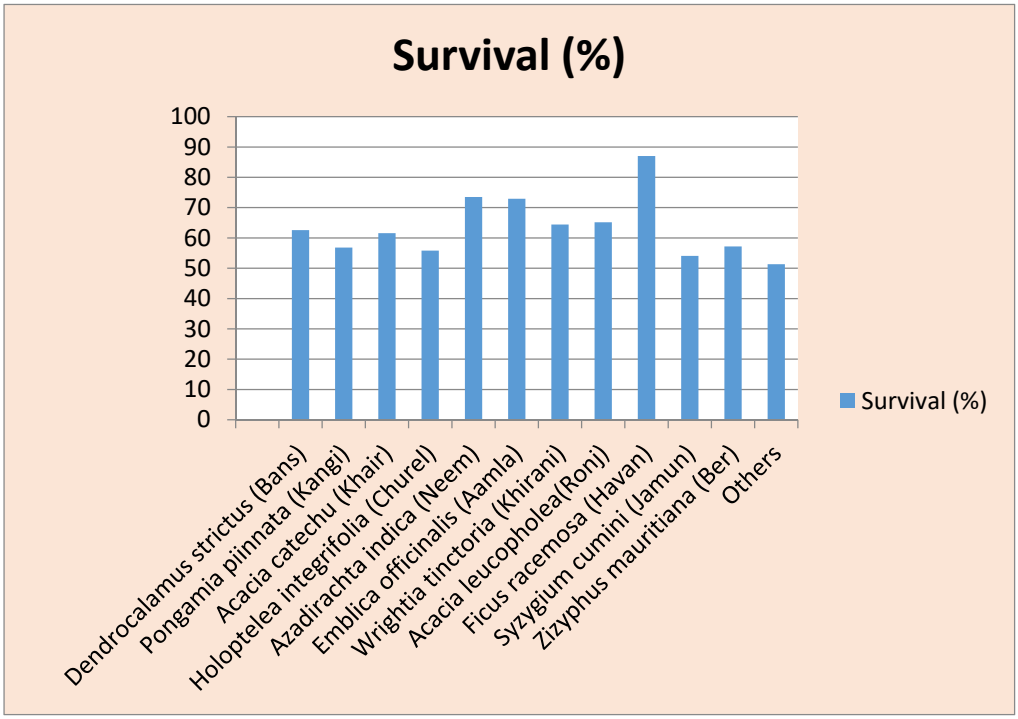


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of havan plant was highest** followed by neem. **The survival percentage of havan was maximum of 87% and neem was 73.5%. All the plants showed average survival.**

Fig: Counting of plants

3.2.11.GPS Location and KML file: The selected NFL model under CAMPA plantation site measured 97.82 hec as per kml map.

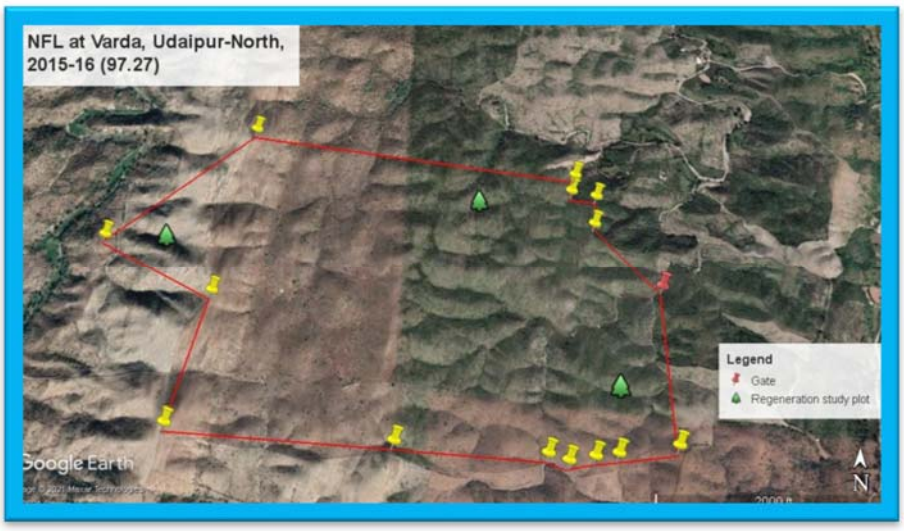


Fig: KML file of NFL at Varda, Udaipur-E range plantation area

3.2.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC work**	**Fencing**	**Total**
2014-15	-	-	-	2700941	-	-	-	2662980
2015-16	-	-	-	4288624	-	-	-	4035951
2016-17	-	-	-	-	-	-	-	1228930
2017-18	-	-	-	-	-	-	-	383367
2018-19	-	-	-	-	-	-	-	403847
2019-20	-	-	-	-	-	-	-	426986
2020-21	-	-	-	-	-	-	-	470920

3.3.1. Site-3: **Subra subri 14 in Kotra range** : The selected plantation has been carried out on 50 hec of land at Subra subri 14 in Kotra range during the year 2015-16. The activities were done under the Assisted Natural Regeneration (ANR) model. The GPS location of this selected site was N 24.426101 and E 73.176143. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour, clayey loam with stony hard layer.

3.3.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in

the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

3.3.3. Nursery Development for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Subra subri 14, a forest department nursery of Kotra range. During monsoon these seedlings were planted.

Fig: ANR at Kotra range

3.3.4. Species Planted: The selected tree species under plantation were 14. Seedlings of *Dendrocalamus strictus (*Bans*), Emblica officinalis (A*amla*), Pongamia pinnata (*karanj), *Acacia catechu (*Khair), *Zizyphus mauritiana (ber), Holoptelea integrifolia (churail), Terminalia Bellerica(Behada), Tamarindus indica (I*mli*), Wrightia tinctoria (*Khirani*), Ficus racemosa (*Hawan*), Cassia fistula (Am*altash*), Albizia lebbeck (*Kala Siras*) and Ficus religiosa (*Pipal*), Ailanthus excelsa (A*dusa*)* were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50 hectare of land. Map of planting site was prepared. Type of plantation was block. Trench cum Pit technique of planting was used.

Fig: Measurement of fencing

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.3.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground.The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found.

3.3.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Plants such as Tendu, Dhok, Dhak, Churail, Ronj have been found growing naturally in this area.The growth of plants was good.

Table-6: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Diospyros melanoxylon*- Tendu	110	4.7	40
2	*Anoseissus latifolia*- Dhok	89	3.9	35
3	*Butea monosperma* -Dhak	127	4.2	37
4	*Holopteliia integrifolia*- Churail	53	3.6	32
5	*Acacia leucopholea* - Ronj	83	4.2	37

3.3.7. Regeneration th rough seeds sowing: Seeds of species like ratanjot, khirni, ronj, havan have been sown for natural regeneration. The growth of seeds sowing plants was good.

3.3.8. Protection Work and SMC work: The selected ANR model plantation was **protected by stone wall fencing of 3200 RMT. Average top width was 0.84m, average depth was 1.20m and average bottom width was 0.80m. Condition of ditch was good. Fencing has been partially effective in controlling the biotic pressures.**

There were contour trench of 13000 RMT was present for soil and water conservation. Also 77 loose stone checkdam were present of total area 1065.69 cum.

3.3.9. Observations Recorded: Under this model, 500 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 71.7% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of fourteen species were planted in the 50hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-7: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
*Dendrocalamus strictus (*Bans*)*	3300	2930	370	88.78	4.5	-
Emblica officinalis (Aamla)	600	491	109	81.83	3	34
Pongamia pinnata (karanj)	590	442	148	74.91	2.9	26

Acacia catechu (Khair)	600	515	85	85.83	4.1	36
Zizyphus mauritiana(ber)	600	208	392	34.66	2.8	25
Holoptelea integrifolia (churail)	1200	796	404	66.33	3.5	30
Terminalia bellerica (Behada)	380	281	99	73.94	2.9	24
Tamarindus indica (Imli)	280	199	81	71.04	3.1	27
Wrightia tinctoria (Khirani)	1250	672	578	53.76	3.2	31
Ficus racemosa (Hawan)	600	342	258	57	4.1	38
Cassia fistula (Amaltash)	200	81	119	40.5	2.4	22
Albizia lebbeck (Kala Siras)	300	166	134	55.33	2.9	30
Ficus religiosa (Pipal)	10	4	6	40	3.8	34
*Ailanthus excelsa (*Adusa)	90	52	38	57.7	3.2	32
Total	**10000**	**7179**	2821	**71.7**		

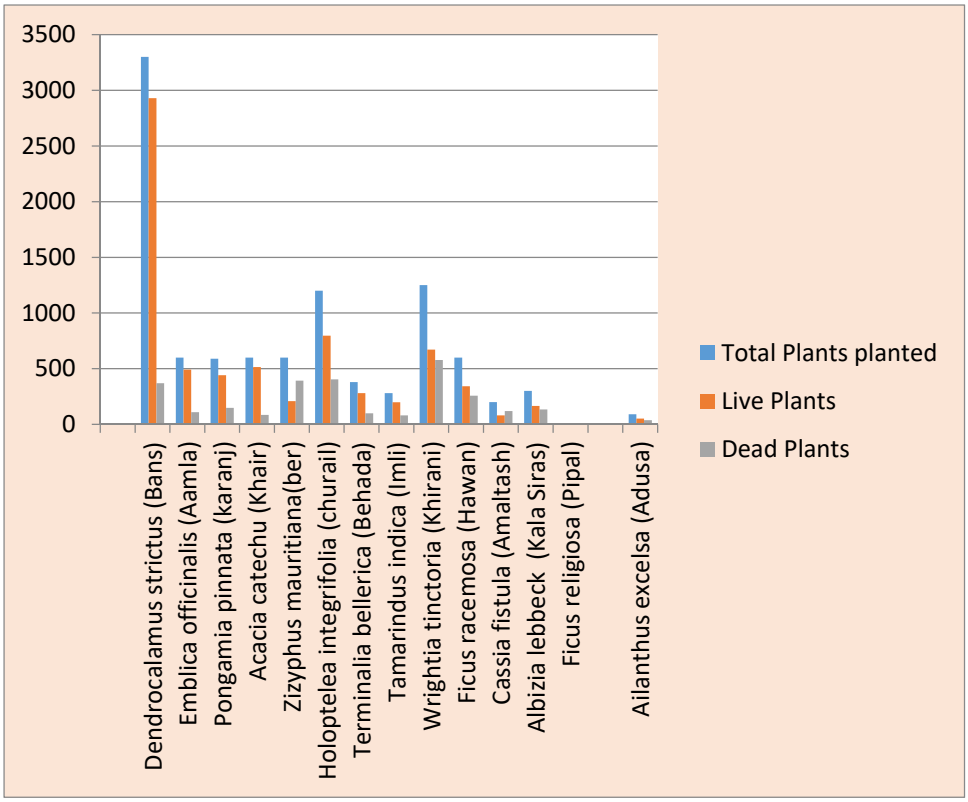


Fig: Graph showing survival of different plants

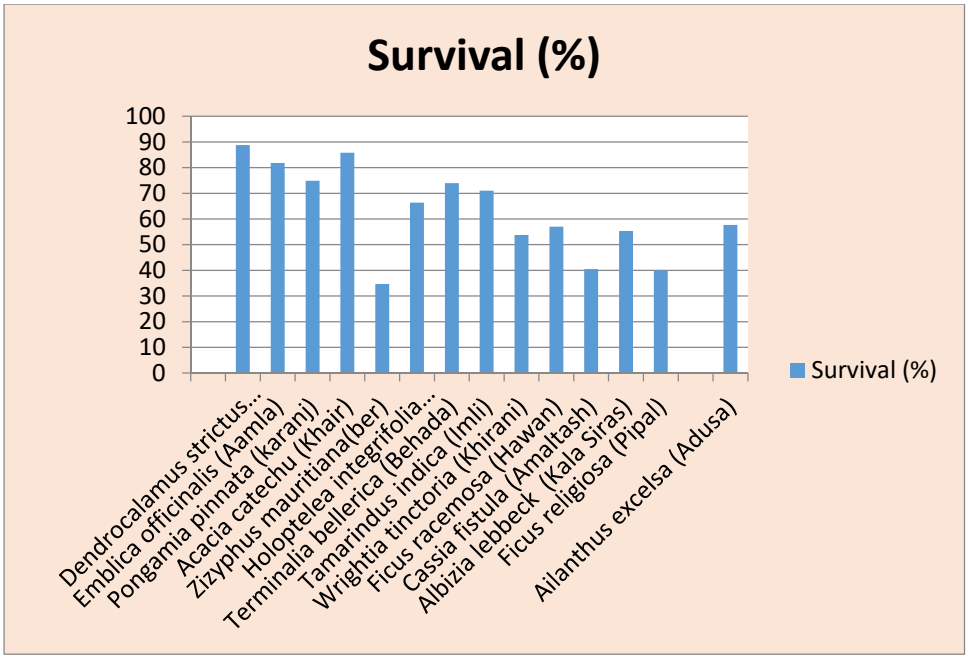


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Baans was highest** followed by khair. **The survival percentage of bans was maximum which was 88.7% and khair was 85.8%. Many plants planted in this site showed good survival rate.**

3.3.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per kml map.

Fig: KML map of DFL at Subra-subri of Kotda range plantation area

3.3.12. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2014-15	-	-	-	-	-	-	-	1430641

2015-16	-	-	-	-	363750	-	-	363750
2016-17	-	-	-	-	144934	-	-	144934
2017-18	-	-	-	-	86944	-	-	86944
2018-19	-	-	-	-	84403	-	-	84403
Total	-	-	-	-	-	-	-	-2110672

3.4.1. Site-4: **Boramagra B in Sayra range:** The selected plantation has been carried out on 50hec of land at Boramagra B in Sayra range during the year 2016-17. The activities were done under the Assisted Natural Regeneration ((ANR) model. The GPS location of this selected site was N 24.55199 and E 73.26031. The site was a forest land and selected for 100% evaluation. The soil was brown to reddish in colour and stony hard layer.

Fig: ANR at Sayra range

3.4.2. Treatment plan before sowing: The area comprises of hilly, rocky and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: Measurement of contour trenches

3.4.3. Nursery Development for Plantation: The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Boramagra B, a forest department nursery of Sayra range. During monsoon these seedlings were planted.

3.4.4. Species Planted: The selected tree species under plantation were 7. Seedlings of *Dendrocalamus strictus (*Bans), *Pongamia pinnata (*Kanji), *Acacia catechu* (Khair). *Emblica officinalis* (Aamla), *Dalbergia sissoo* (Shisham), *Zizyphus mauritiana* (ber) and *Tecomella undulata* (Rohida) were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50hectare of land. Map of planting site was prepared. Type of plantation was block. Pit technique of planting was used.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.4.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.4.6. Natural Vegetation and Regeneration: The vegetation cover has increased to some extent. Plants such as Sitafal, Agori, Acacia leucophoelea (ronj) have been found grown naturally in this area. The growth of plants was good.

Table-8: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	Sitafal	27	3	29
2	Agori	63	1.2	12
3	*Acacia leucophoelea (*ronj)	55	4.1	30

3.4.7. Regeneration th rough seeds sowing: Seeds of species like Khirni, Khair, Ronj, Havan have sown for natural regeneration. The growth of plants was poor. Pruning of plants of seedlings planted, seeds sown and existing vegetation was done.

3.4.8. Protection Work: The selected ANR model plantation was **protected stone wall fencing of 3497 RMT with average top width of 0.84m, average depth of 1.20m and average bottom width of 0.80m. Fencing has been partially effective in controlling the biotic pressures.**

3.4.9. Soil and Water Conservation Measures: **There were 19963 RMT contour trenches and 69 loose stone check dam of 695 cum in the form of water harvesting** structures present in the entire plantation area. These trenches were prepared for rainwater harvesting and soil conservation.

3.4.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 61.30% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of eight species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-9: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
*Dendrocalamus strictus (*Bans)	3050	1891	1159	62	3.1	-
*Pongamia pinnata (*Kanji)	750	457	293	61	1.8	20
Acacia catechu (Khair)	3100	1984	1116	64	3.7	33
Emblica officinalis(Aamla)	1150	632	518	55	2.8	23
Dalbergia Sissoo (Shisham)	700	385	315	55	3.1	26
Zizyphus mauritiana (ber)	1040	655	385	63	2.9	25
Tecomella undulata (Rohida)	210	126	84	60	2.3	17
Total	**10000**	**6130**	3870	**61.30**		

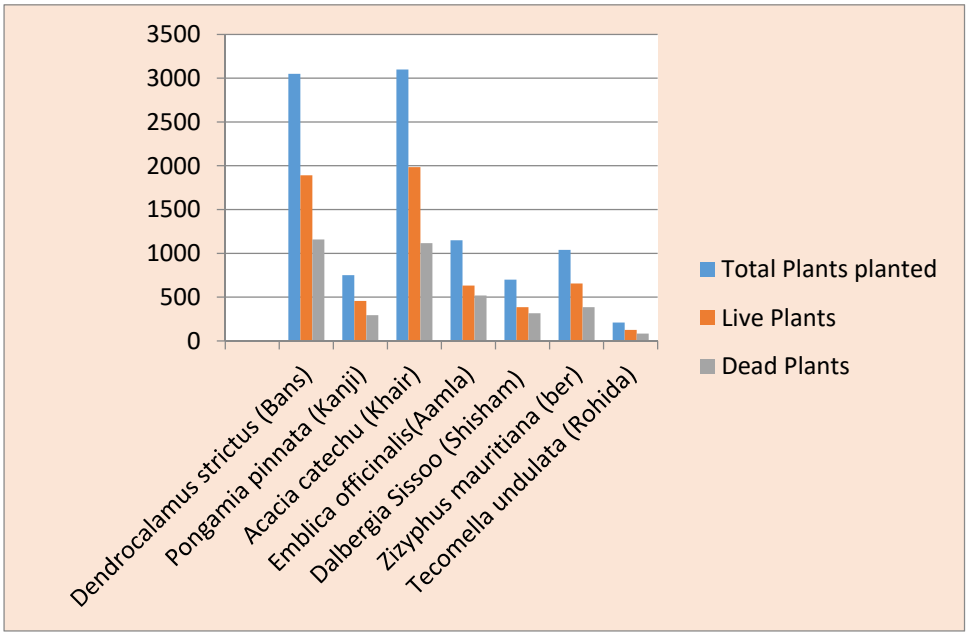


Fig: Graph showing survival of different plants

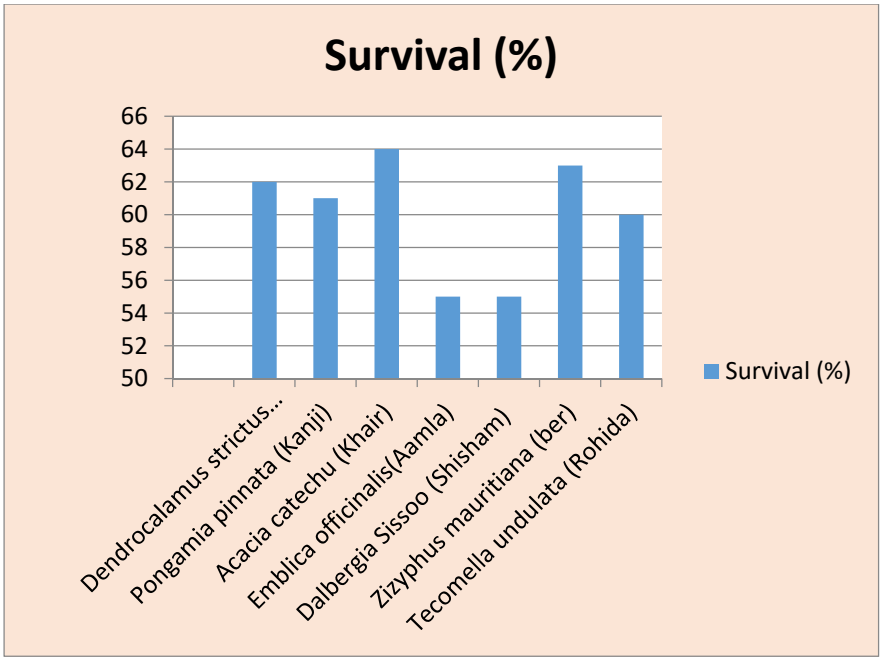


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of Khair plant was highest** followed by Ber. **The survival percentage of Khair was maximum which was 64% and Ber was 63%. Plants planted in this site showed average survival rate. The reason for low survival was pest attack and cattle pressure.**

3.4.11. GPS Location and KML file: The selected ANR model under CAMPA plantation site measured 50 hec as per kml map.

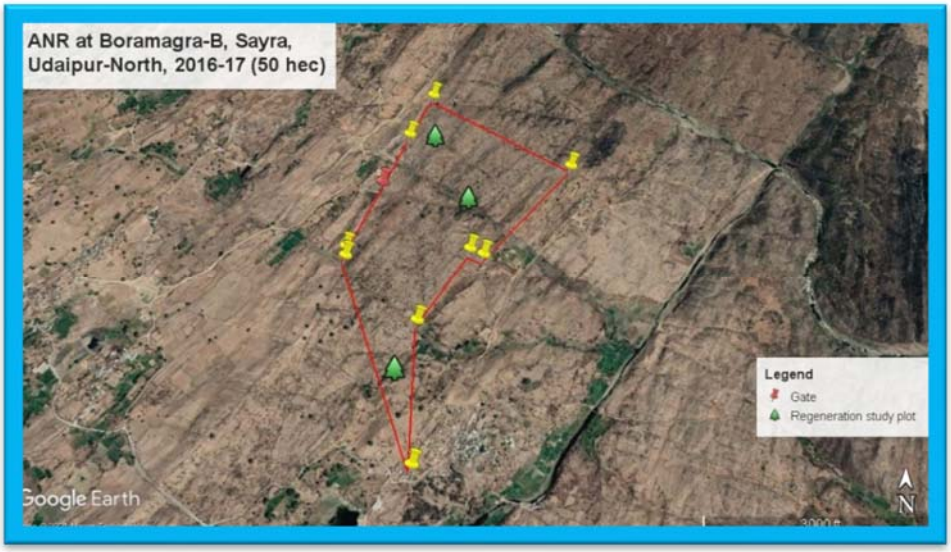


Fig: KML file of ANR at Boramogra, Sayra range plantation area

3.4.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	Plantation	SMC works	Fencing	Total	Plantation	SMC works	Fencing	Total
2015-16	-	-	-	-	-	-	-	1649976

2016-17	-	-	-	-	-	-	-	386356
2017-18	-	-	-	-	-	-	-	162605
2018-19	-	-	-	-	-	-	-	86884
2019-20	-	-	-	-	-	-	-	92243
Total	-	-	-	-	-	-	-	2378064

4. Evaluation of Construction Works Sites

Site-1 : 20 Boundary Pillars at Paga-80: At Paga-80 in Udaipur range, Site of 20 Boundary Pillars has been constructed. The site was constructed in the year 2014-15. Construction work appeared to be very good and useful. Site was constructed at the cost of Rs. 32000. The construction work started in the year of 2014 after approval and completed in the 2015.

Fig: GIS mapping of all pillars of Paga-80

Site-2: Forest Guard Chowki at Bisma, Sayra: At Bisma in Sayra range, one forest guard chowki has been constructed. The chowki was constructed in the year 2015-16. Construction work appeared to be very good and useful. This chowki was constructed at the cost of Rs. 5 lakh. GPS location of this area was Longitude- E 63.2417802 and Latitude- N 24.54330624.The construction work started in the year of 2015 after approval and completed in the 2016. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building.

Fig: Forest Guard Chowki at Bisma, Sayra

5. Overall assessment:

The overall impact of plantation activities appeared satisfactory in Udaipur North district.

Table-10: Quantitative assessment of plantation work created under CAMPA in Udaipur North division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	DFL Patiya4.65 Ha	83.49	9
2	NFL Varada 97.82 Ha	62	7
3	ANR Subra subri-1450 Ha	71.7	8
4	ANR Boramagra -B 50 Ha	61.30	8

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-11: Quantitative assessment of constructions work created under CAMPA in Udaipur North division

Sr. no.	Items	Name of the site	Rank of site (Between 0 to 10)*
1	20 Boundary Pillars	Paga- 80	8
2	Forest Guard Chowki	Bisma	7

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Udaipur- WL (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Udaipur-WL Forest Division. This Forest Division with 2 Forest Ranges namely Panarwa and Jaisamand.

Fig: Location of Udaipur district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of WL Udaipur Forest Division were as given in table-1.

Forest Range	Name of Site	Year of Plantation	Ha.	Model
Jaisamand	Janana odi	2015-16	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction work sites of WL Udaipur Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Panarwa	Maldaiya	2014-15	Forest Guard Chowki
Mamer	Umaria	2014-15	60 Boundary Pillars
Jaisamand	Jamuda-II	2015-16	Anicut -II

3. Results and evaluation

3.1. Plantations Evaluation

C.3.1.1. Site-1: **Jananaodi in Jaisamand range:** The selected plantation has been carried out on 50hec of land Jananaodi in Jaisamand range during the year 2015-16. The activities were done under the Assisted Natural Regeneration (ANR) model. The GPS location of this selected site was N 24.140108and E 73.582610.The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of sandy, plain and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: ANR at Jananodi,Jaisamand

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Janana odi, a forest department nursery of in Jaisamand range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 14. Seedlings of *Mangifera indica* (Aam)*,Emblica officinalis (*Amla*), Azadirachta indica (*Neem*), Tamarindus indica (*Imli), *Aegle marmelos* (Bilpatra*), Dendrocalamus strictus (*Baas*), Zizyphus mauritiana (*Ber*), Ficus racemosa (*Havan*), Terminaliia arjuna (*Arjun), *Termiinalia belerica (*Behada), *Ficus glomerata (*Gular*), Ficus religiosa (*Pipal*), Prosopis cineraria (*Khejri*), Acacia catechu (*Khair) were planted.

Fig: Monitoring team on field evaluation

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team. Technique of planting was trench cum pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 200 plants per hectare have been planted. So total number of plants planted was 10000 for 50hectare of land.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means

of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. Khair, Churail, Khirani, Ber, Dhak and Ardu were the plants found grown naturally in this area. The growth of the plant was good.

Table-3: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Acacia catechu*- Khair	107	3.3	25
2	*Holoptelia integrifolia*- Churail	57	2.9	28
3	*Wrightia tinctoria*- Khirani	83	2.6	21
4	*Zizyphus mauritiana*- Ber	129	2.4	17
5	*Anogeissus latifolia*- Dhak	132	3.2	24
6	*Ailanthus excelsa*- Ardu	56	3.5	27

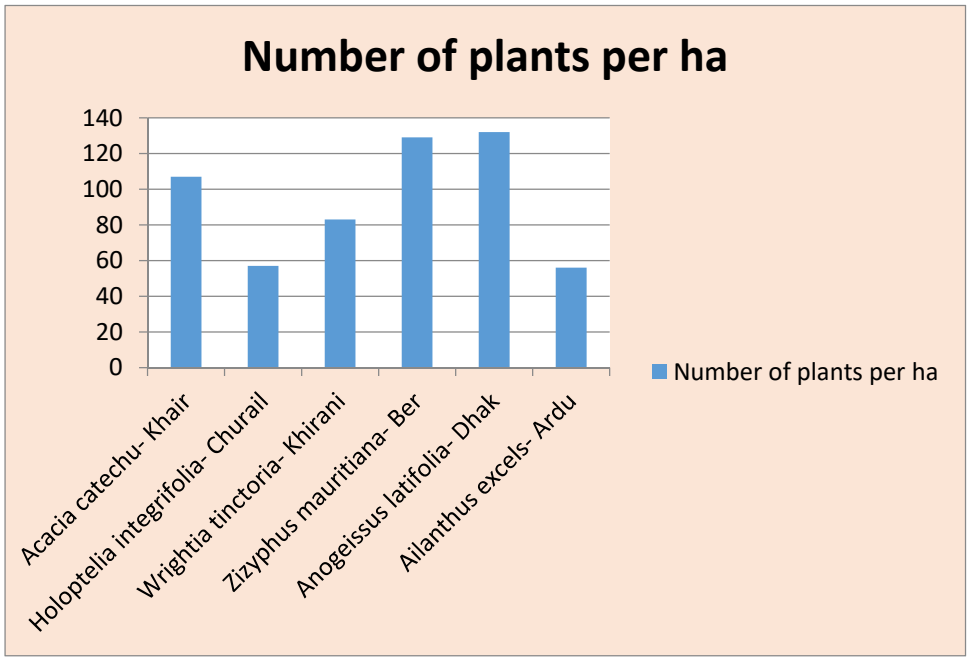


Fig: Graph showing number plants under natural regeneration

3.1.7. Regeneration through seeds sowing: Seeds of species like *Khejdi, Khair and Jangal Jalebi* were sown in as well as along the trenches. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected ANR model plantation was **protected by stone wall fencing of 575 RMT with average top width of 0.84m, average depth of 1.20m and average bottom width of 0.80m. Present condition of fencing was good.**

3.1.9. Soil and Water Conservation Measures: **There were 20000 RMT contour trenches and 55 loose stone check dam of 607.50 cum volume in the form of water harvesting** structures present in the entire plantation area. These were prepared for rainwater harvesting and soil conservation.

Fig: Measurement of contour trenches

3.1.10. Observations Recorded: Under this model, 200 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 88.5% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of fourteen species were planted in the 50hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-4: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Mangifera indica (Aam)	50	40	10	90	3.5	18
Emblica officinalis (Amla)	1000	917	83	91.7	3.5	19
Azadirachta indica (Neem)	2000	1863	137	93.15	3.5	14
*Tamarindus indica (*Imli)	400	342	58	85.5	3.3	14
Aegle marmelos (Bilpatra*)*	500	328	172	65.6	3.4	11
*Dendrocalamus strictus (*Baas*)*	1000	876	124	87.6	3.7	-
*Zizyphus mauritiana (*Ber)	900	853	47	94.7	2.3	14

Ficus racemosa (Havan)	800	739	61	92.3	2.8	16
Terminaliia arjuna (Arjun)	410	386	24	94.1	2.6	16
Terminalia belerica (Behada)	40	35	5	87.5	1.3	18
Ficus glomerata (Gular)	100	83	17	83	3.4	16
Ficus religiosa (Pipal)	400	342	58	85.5	3.4	16
Prosopis cineraria (Khejri)	400	312	88	78	2.4	14
Acacia catechu (Khair)	2000	1742	256	87.1	3.5	12
Total	**10000**	**8858**	1142	**88.5**		

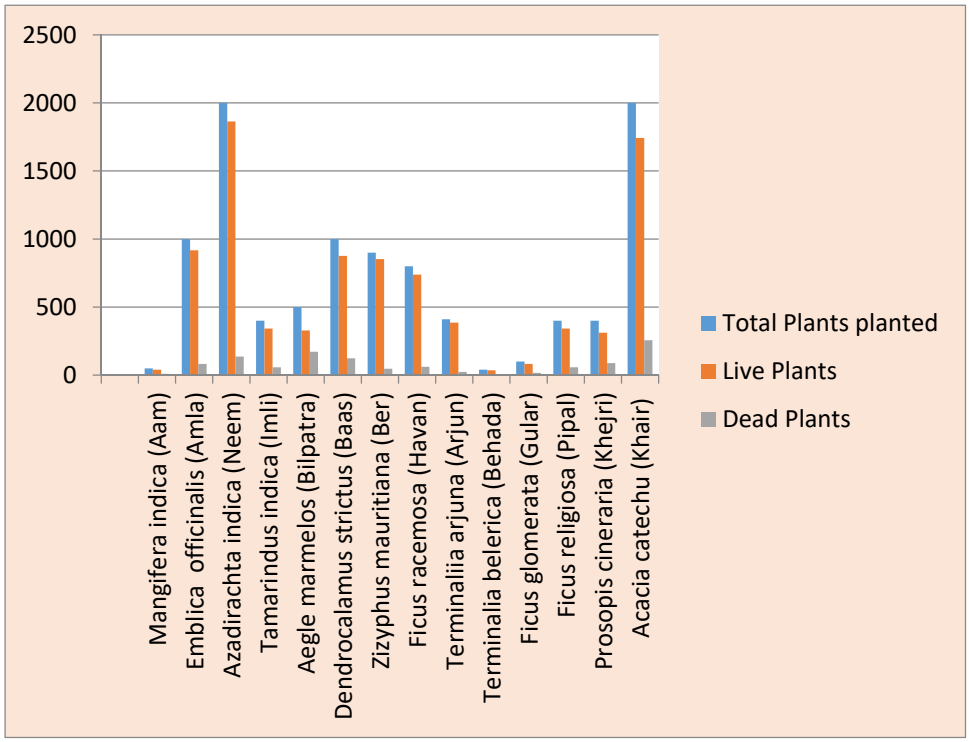


Fig: Graph showing survival of different plants

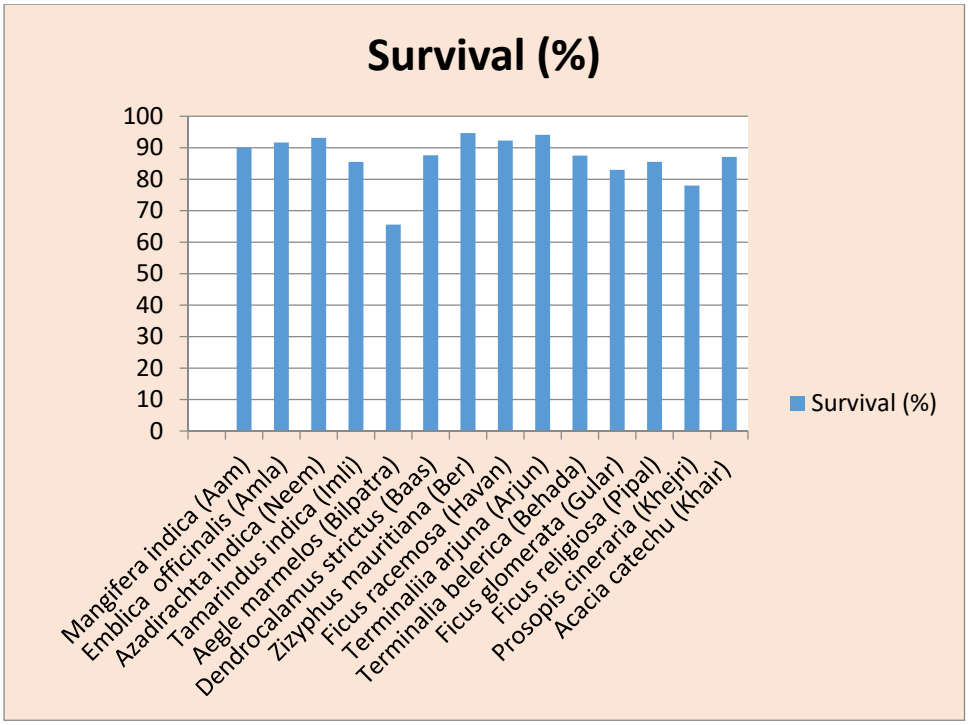


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of ber plant was highest** followed by Arjun. **The survival percentage of Ber was maximum of 94.7% and Arjun was 94.1%. Cattle pressure and wild life pressure were reasons for survival challenges of plants. But overall survival was good. All the plants showed good survival in this site.**

Fig: Plant counting process on field

3.1.11.GPS Location and KML file: The selected DFL model under CAMPA plantation site measured 50 hec as per kml map.

Fig: KML file of ANR at Janana odi, Jaisamand range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-	-		-	-	1532434
2015-16	-	-	-	-	391120	-	-	391120
2016-17	-	-	-	-	153128	-	-	153128
2017-18	-	-	-	-	86989	-	-	86989
2018-19	-	-	-	-	85937	-	-	85937
Total								2249608

4. Evaluation of Construction Works

Site-1 : Forest Guard Chowki at Maldaiya: At Maldaiya in Panarwa range, one forest guard chowki has been constructed. The chowki was constructed in the year 2014-15. Construction work appeared useful. This chowki was constructed at the cost of Rs. 5 lakh.

GPS location of this area was Longitude-E 73.26224412 and Latitude-N 23.5942276. The construction work started in the year of 2014 after approval and completed in the 2015. After completion of building, the chowki was using by the department for official purpose. Electricity and water facility were provided in this building. The building need maintenance as it has developed structural cracks at several places.

Fig: GIS mapping of Forest Guard Chowki at Maladiya, Panarwa

Site-2: 60 Boundary Pillars at Umaria:

At Umaria in Mamer range, 60 Boundary Pillars have been constructed. The pillars was constructed in the year 2014-15. This site was constructed at the cost of Rs. 1.60 lakh. The construction work started in the year of 2014 after approval and completed in the 2015. Most of the pillars have been found in good condition, few were damaged by the local people.

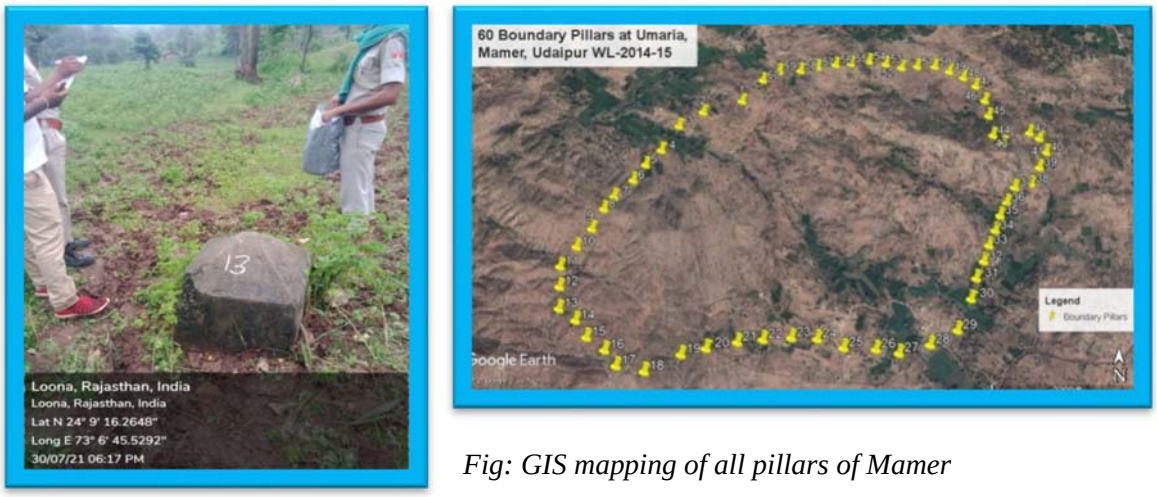


Fig: GIS mapping of all pillars of Mamer

Site-3: Anicut -II at Jamuda-II, Jaisamand: At Jamua-II in Jaisamand range, anicut-II has been constructed. The site was constructed in the year 2015-16. Quality of construction work appeared to be good and useful. This anicut was constructed at the cost of Rs. 6 Lakh. GPS location of this area was Longitude- E 73°,54,'32.3172" and Latitude-N 24°,15',25.542".

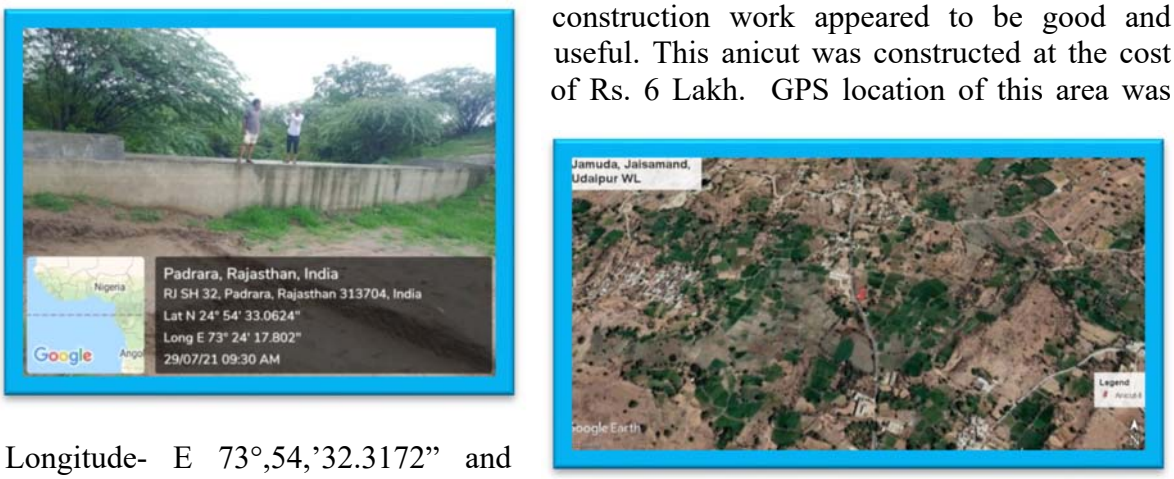


Fig: GIS mapping of Anicut-II at Jamuda, Jaisamand

Basically this anicut was made to conserve rain water during monsoon, which was used for drinking purposes by local domestic as well as by the wild animals. But due to scarcity of rainfall, at present there was no water in this anicut. Water conservation depends on rain only. Once the whole area gets filled with water during monsoon, the water remains in this anicut for about a year. Because of rain water harvesting, the recharging of local water table takes place.

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Udaipur-WL district.

Table-5: Quantitative assessment of plantation work created under CAMPA in Udaipur-WL division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	ANR Janana Odi 50 Ha	88.5	9

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-6: Quantitative assessment of constructions work created under CAMPA in Udaipur- WL division

Sr. no.	Items	Name of the site	Rank of site (Between 0 to 10)*
1	Forest Guard Chowki	Maldaiya	7
2	60 Boundary Pillars	Umaria	7
3	Anicut -II	Jamuda-II	8

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding

Udaipur-T (Rajasthan)

1. Present Third Party Evaluation/ Study

Present Third Party Evaluation/ Study pertain to works carried out under Rajasthan State CAMPA Project during the years 2014-15 to 2016-17 in Udaipur-T Forest Division. This Forest Division with 7 Forest Ranges namely Kherwada, Ogna, Phalasiya, Palsad, Salumber, Sarada and Udaipur(W).

Fig: Location of Udaipur district, Rajasthan

2.1. Selected Plantation Sites for Evaluation

The selected plantation sites of Udaipur-T Forest Division were as given in table-1.

Forest Range	Name of Site	Year	Ha.	Model
Kherwada	Pachapadla	2014-15	2.91	NFL
Phalasiya	Balvi	2016-17	50	ANR

2.2. Selected construction work sites for Evaluation

The selected construction sites of Udaipur-T Forest Division were as given in table-2.

Forest Range	Name of Site	Year	Physical Target Achieved (100%)
Palsad	20 Boundary Pillars at Saru -C	2014-15	100%

3. Results and evaluation

3.1. Plantations Evaluation

3.1.1. Site-1: **Pachapadla of Kherwada range:** The selected plantation has been carried out on 2.91 hec of land Pachapadla in Kherwada range during the year 2014-15. The activities were done under the NFL model. The GPS location of this selected site was N 24,07,02 and E 7,30,59.The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer.

3.1.2. Treatment plan before sowing: The area comprises of sandy, hilly and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 3088 pits have been made for plantation in total 2.91 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: NFL at Kherwada range

3.1.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Pachapadla, a forest department nursery of in Kherwada range. During monsoon these seedlings were planted.

3.1.4. Species Planted: The selected tree species under plantation were 11. Seedlings of *Tectona grandis* (Sagwan), *Diospyros melanoxylon* (Tendu), *Butea monosperma (*Palash), *Acacia leucopholea* (Ronj), *Acacia senegal* (Kumtha*), Holoptelia integrifolia (*Churel), *Acacia nilotica (*Babool), *Azadirachta indica (*Neem), *Zizyphus mauritiana (*Ber*), Dendrocalamus strictus (*Baas) and *Acacia catechu (*Khair) were planted.

Fig: Plants counting on field

A total of 3088 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. No plantation journal was found by the team. Technique of planting was trench cum pit.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the NFL model, 1100 plants per hectare have to be planted, but here 1061 plants per hec have been planted. So total number of plants planted was 3088 for 2.91 hectare of land.

The choice of species under plantation appeared nearly proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was very good.**

3.1.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. There was no provision of water harvesting structure found. Contour trench made adjacent to the pits in this area were the only means

of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.1.6. Natural Vegetation and Regeneration: Initially it was a barren land and due to this plantation, the vegetation cover has increased to some extent. Khair, Churail, Khirani, Ber, Dhak and Palash were the plants found grown naturally in this area. Lapla grass found abundantly.

3.1.7. Regeneration through seeds sowing: Seeds of species like *Kumtha, khair and ber* were sown in as well as along the trenches. **The growth of seedlings from seeds was good.**

3.1.8. Protection Work: The selected NFL model plantation was **protected by trench fencing of 1080 RMT with average top width of 0.84m, average depth of 1.20m and average bottom width of 0.80m. Present condition of fencing was good.**

3.1.9. Observations Recorded: Under this model, 1061 plants per hec were planted during plantation. **Based on for as 100 percent counting, plants survival was 64% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 3088 plants comprising of eleven species were planted in the 2.91hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-3: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Tectona grandis (Sagwan)	1200	847	353	70.58	5	20
Diospyros melanoxylon (Tendu)	300	155	145	51.66	2	22
*Butea monosperma (*Palash)	300	265	35	88.33	3.2	28
Acacia leucopholea (Ronj)	150	72	78	48	4.15	32
Acacia senegal (Kumtha*)*	200	116	84	58	3.1	18
*Holoptelia integrifolia (*Churel)	200	115	85	57.5	6.2	38
*Acacia nilotica (*Babool)	120	109	11	90.83	3.5	28

*Azadirachta indica (*Neem)	50	4	46	8	3	21
*Zizyphus mauritiana (*Ber*)*	200	160	40	80	2.2	19
*Dendrocalamus strictus (*Baas)	80	11	69	5.5	7.2	-
*Acacia catechu (*Khair)	288	125	163	43.4	2.5	28
Total	**3088**	**1979**		**64%**		

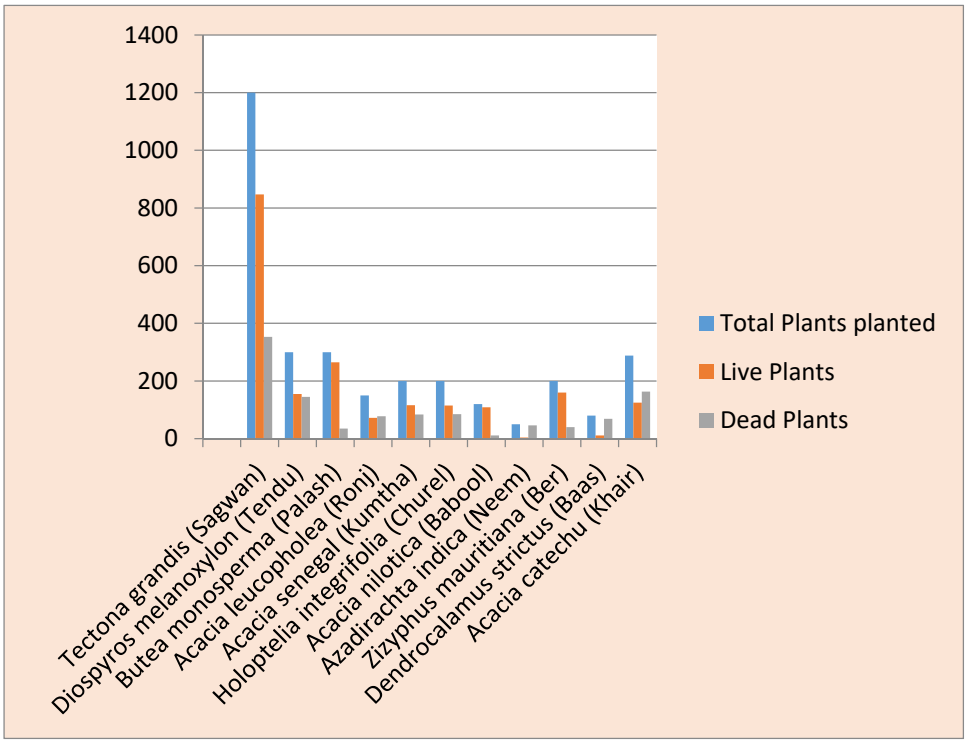


Fig: Graph showing survival of different plants

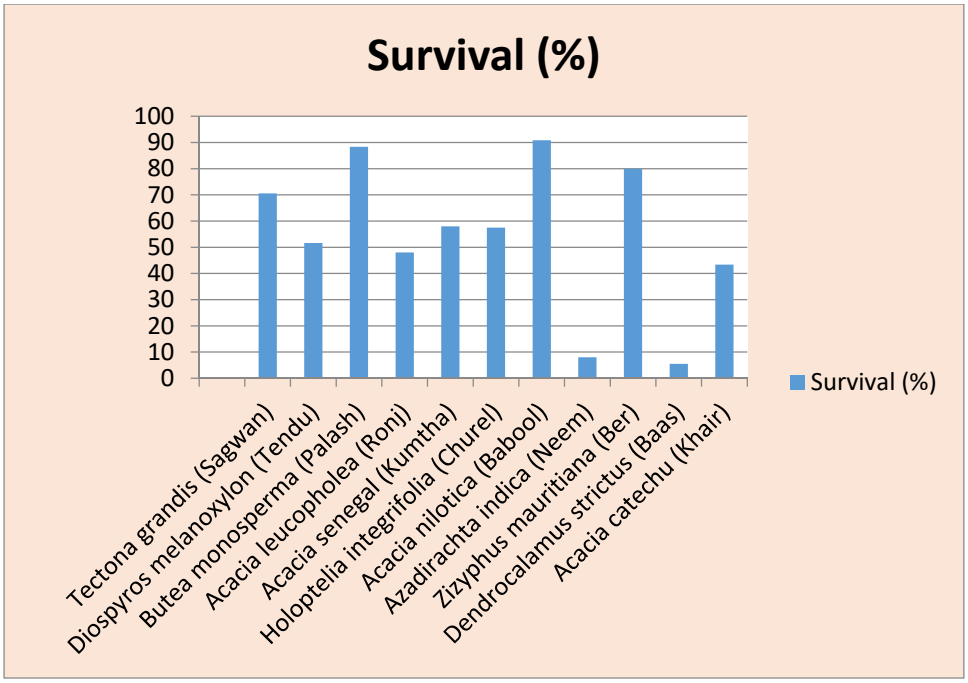


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of babool plant was highest of 90.8%** followed by palash of 88.3%. **The survival percentage of ber and sagwan were also good of 80% and 70.5% respectively. Neem and baans showed lowest survival of 8% and 5.5%, which were not fitted for this area.**

Cattle pressure and wild life pressure were reasons for survival challenges of plants. But overall survival was good. All the plants showed good survival in this site.

3.1.11. GPS Location and KML file: The selected NFL model under CAMPA plantation site measured 2.91 hec as per kml map.

Fig: KML file of NFL at Pachapadla, Kherwada range plantation area

3.1.12. Budget and expenditure

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2014-15	-	-	-	-	-	-	-	-
2015-16	-	-	-	-	-	-	-	-
2016-17	-	-	-	-	-	-	-	-
2017-18	-	-	-	-	-	-	-	-
2018-19	-	-	-	-	-	-	-	-
Total								113200

3.2.1. Site-2: **Balvi in Phalasiya range:** The selected plantation has been carried out on 50 hec of land at Balvi in Phalasiya range during the year 2016-17. The activities were done under the ANR model. The GPS location of this selected site was N 24,14,301 and E 73,28,264. The site was a forest land and selected for 100% evaluation. The soil was reddish in colour and stony hard layer.

Fig: ANR plantation at Phalasiya

3.2.2. Treatment plan before sowing: The area comprises of clayey loam and hard surfaces where depending upon the availability of soil, digging has been made for plantation**. Pits of size 0.45*0.45*0.45 cm^3 have been made. Total 10000 pits have been made for plantation in total 50 hec of land.** After applying of pesticides and manure in the pit, the seedlings were planted. First year the pits were made and second year during monsoon, the plantation works carried out.

Fig: Evaluation team

3.2.3. Nursery Develo pment for Plantation : The seeds of naturally occurring plants available in that area has been collected and also purchased from the nearby market and seedlings were raised in the nearby nursery of Balvi, a forest department nursery of Phalasiya range. During monsoon these seedlings were planted.

3.2.4. Species Planted: The selected tree species under plantation were 8. Seedlings of *Dendrocalamus strictus* (Baans), *Acacia catechu* (Khair), *Emblica officinalis* (Amla), *Terminalia arjuna (*Arjun*), Albizia lebbeck* (Siras), *Syzygium cumini (*Jamun), *Azadirachta indica* (Neem) and Pharri were planted.

A total of 10000 numbers of seedlings were planted at the site. Seedlings of above plants were planted. Seedlings were planted blockwise according to the availability of space in the plantation area. Plantation journal was not found by the team.

Seedlings were planted in mixed system along with the naturally growing plants already available there. **Spacing between plants has not been adopted here and random plantation has been carried out in this site.** As per the model, 10000 plants in 50 hectare have been planted. Type of plantation was block and technique of planting was pit.

The choice of species under plantation appeared proper. The plants selected for growing in this site were nearly specific and grown naturally there. The choice of plants has to be made so that the plants can grow well and survive for longer period. **The growth of survived plants was very good.**

3.2.5. Watering of plants: Only just after the plantation, water was provided to the seedlings once for its growing and anchoring in the ground. The plantation works carried out here are totally based on rain water. Contour trench made adjacent to the pits in this area were the only means of providing water to the plants. During monsoon, these trenches conserve rain water and used by the plants for growing.

3.2.6. Natural Vegetation and Regeneration: The area has been covered partially with vegetation due to this plantation. The growth of plants was good. Grasses have grown in ditch trenches which should be controlled. Plants like churel, ber, karamda and ronj have been found grown naturally.

Table-4: Species wise number of plants (per ha) in natural regeneration and the growth measurement

Sr. No.	Name of Species	Number of plants per ha	Average height (m)	Average girth (gbh) cm
1	*Holoptelia integrifolia*- Churel	59	3.9	34
2	*Zizyphus mauritiana*- Ber	127	2.7	23
3	*Carissa caranda*- Karamda	118	1.6	14
4	*Acacia leucopholea*- Ronj	132	4.2	33

3.1.7. Regeneration through seeds sowing: Seeds of Ronj, Khair, Ber, Neem, Ratanjot species were sown on edges of contour trenches. **The growth of seedlings from seeds was good.**

3.2.8. Protection Work: The selected ANR model plantation was **protected by stone wall fencing of 3700 RMT. Stone fencing average top width was 0.84m, average depth was 1.20 m and average bottom width was 0.80m. The present condition of fencing was good and partially effective in controlling the biotic pressure.**

3.2.9. Soil and Water Conservation Measures: **There were loose stone checkdam of total volume of 1024.76 cum present in the plantation area, due to which the extent of gullies was good. There were 20000 RMT contour trenches in the form of water harvesting** structures present in the entire plantation area. **The size of the contour varied from 4m to 8 m long with 0.45*0.45 m^2 in width and depth.** These trenches were prepared for rainwater harvesting and soil conservation.

Fig: Measurement of checkdam on field

3.2.10. Observations Recorded: Under this model, 10000 plants were planted during plantation. **Based on for as 100 percent counting, plants survival was 73.03% at the site.** Plant species girth breast height was also measured. The growth of planted plants was good. A total of 10000 plants comprising of eight species were planted in the 50 hec plantation area.

Measurement of plants has been taken on randomly selected plants of every species. The measurement has been conducted at various places of the plantation area to get proper average measurement.

Table-5: Species wise number of plants planted, the survival and the growth measurement

Species	Total Plants planted	Live Plants	Dead Plants	Survival (%)	Average height of plants (m)	Average gbh (cm)
Dendrocalamus strictus (Baans)	7500	5620	1880	74.94	8	-
Acacia catechu (Khair)	900	606	294	67.35	4	32
Emblica officinalis (Amla)	700	429	271	61.3	3.1	30
Terminalia arjuna (Arjun)	200	160	40	80	3.6	27
Albizia lebbeck (Siras)	200	185	15	92.5	2.9	28
Syzygium cumini (Jamun)	200	180	20	90	3.9	32
Azadirachta indica	50	25	25	50	4	32

(Neem)						
Pharri	250	98	152	39.2	3.2	29
Total	**10000**	**7303**		**73.03**		

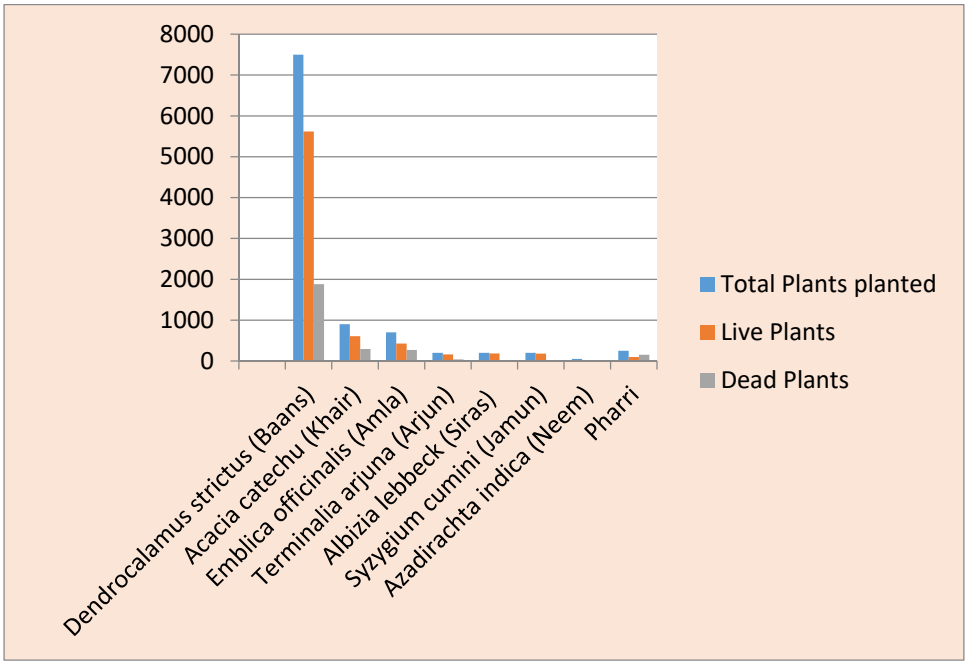


Fig: Graph showing survival of different plants

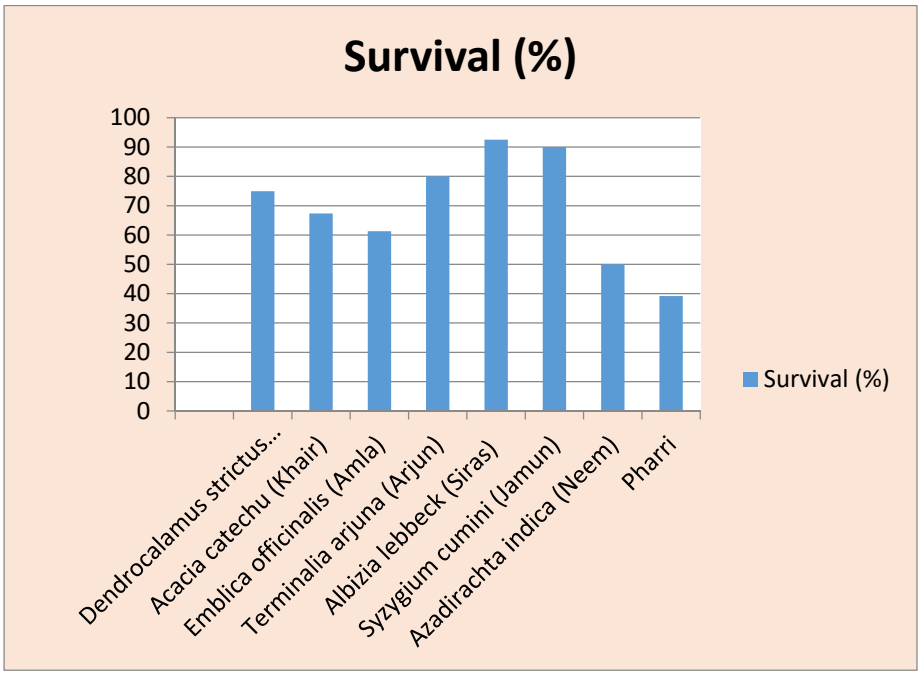


Fig: Graph showing survival percentage of different plants

From the above graph, it is shown that the **survival of siras and jamun were highest** of 92.5% and 90%, followed by arjun of 80%. **All the plants planted in this site showed good survival except neem, which showed lowest survival of 39.2% and not fitted for**

this area. Site specific plants, good protection and watering on time contributed to good survival of plants.

3.2.11. GPS Location and KML file: The selected model under CAMPA plantation site measured 50 hec as per kml map.

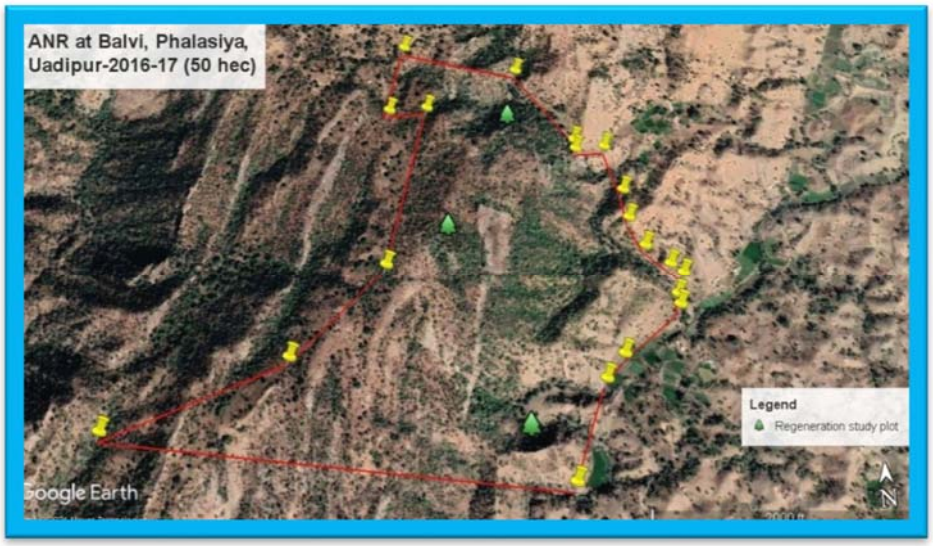


Fig: KML file of ANR at Balvi, Phalasiya range plantation area

3.2.12. Budget and expenditure:

	Cost estimate (Rs.)				Expenditure (Rs.)			
Year	**Plantation**	**SMC works**	**Fencing**	**Total**	**Plantation**	**SMC works**	**Fencing**	**Total**
2015-16	-	-	-	1664200	101799	877403	684998	1664200
2016-17	-	-	-	389700	389700	-	-	389700
2017-18	162800	-	-	162800	162800	-	-	162800
2018-19	87000	-	-	87000	86945	-	-	86945
2019-20	92250	-	-	92250	92207	-	-	92207

4. Evaluation of Construction Works Sites

<u>Site-1 : 20 Boundary Pillars at Saru –C, Palsad range:</u> At Saru-C in Palsad range, 20 Boundary Pillars have been constructed. The pillars was

Fig: GIS mapping of all pillars of Palsad

constructed in the year 2014-15. The construction work started in the year of 2014 after approval and completed in the 2015. Most of the pillars have been found in good condition, few were damaged by the local people.

5. Overall assessment: The overall impact of plantation activities appeared satisfactory in Udaipur-T division.

Table-6: Quantitative assessment of plantation work created under CAMPA in Udaipur- T division

Sr. no.	Site	Survival percentage	Rank of Site (Between 0 to 10)*
1	NFL at Pachapadla, Kherwada-2.91 ha	64	7
2	ANR at Balvi, Phalasiya-50 ha	73.03	8

<5: poor (below 50%), 6-7: good (50-69%), 8: very good (70-79%), 9 and above: excellent (above 80%)

Table-7: Quantitative assessment of constructions work created under CAMPA in Udaipur-T division

Sr. no.	Name of the site	Range	Rank of site (Between 0 to 10)*
1	20 Boundary Pillars at Saru - C	Palsad	6

<5: poor, 6: moderate, 7: good, 8: very good, 9: excellent, 10: outstanding


Bansi, Rajasthan, India
Boundary pillar, Jaisapurh, Bharatpur