सत्यमेव जयते

PROJECT FOR DEVELOPMENT OF WATER CATCHMENT THROUGH GREENING OF RAJASTHAN UNDER RIDF- XVIII

(PHASE-I)
2012-13 to 2016-17
FOREST DEPARTMENT
RAJASTHAN

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CHAPTER - I

INTRODUCTION

Rajasthan is the largest state in the country. It lies between 23° 30' and 30°11' north latitudes and 69°29' and 78°17' east longitudes. The geographical area of the state is 34.22 million ha. which is 10.41% of country's geographical area. There is marked difference in the physiographic features of the state. The Aravallis, one of the oldest mountain systems, divides the state into two unequal parts. The Aravallis cover over 30% of the state. A vast expanse of arid and semi-arid tract lies in the west of the Aravallis. The Vindhyan hill system, another important hill range in the south-east of the state, drains into Chambal and Banas rivers. Ravine formation is a very serious problem in the fragile sedimentary tracts of these rivers.

PHYSIOGRAPHY

The physiography of Rajasthan is the product of long years of erosional and depositional processes. The present landforms and drainage systems have been greatly influenced and determined by the geological formations and structures. Four major physiographic regions can be identified within the state as described below:-

THE WESTERN DESERT

This region is characterised by arid landscape, barren hills, rocky structural plains, other sandy plains with alluvium layers underneath, sandy hummocks and low sand streaks, sand dunes of various kinds and interdunal plains. Most of the western sandy

plain is covered with a thick mantle of aeolin sand, visible in the form of shifting and permanent sandy dunes.

ARAVALLI HILLS

This constitutes the most dominant hilly area of Rajasthan. The ranges run diagonally across the state in the south-west to north-east direction starting from Gujarat and ending in Delhi, covering a distance of about 690 Kms. Within Rajasthan, the ranges run from Khedbrahma in the south-west to Khetri in the north-east for a length of about 550 Kms. Apart from the hills, other major landforms within this region are the rocky uplands, shallow to moderately deep colluvial plains and narrow alluvial plains at few locations.

THE EASTERN PLAINS

It covers most parts of Alwar, Bharatpur, Jaipur, Dholpur, Tonk, Sawaimadhopur, Bundi and Kota districts. The eastern plains have rich alluvial soils drained by seasonal rivers.

THE SOUTH-EASTERN PLATEAU

Southern and south eastern Rajasthan is mostly a plateau. The Hadoti plateau having intrusions of black volcanic rocks and the Vindhyan extensions covering most parts of Jhalawar, Baran and Kota districts. The Malwa plateau also extends into the southern parts of Chittorgarh and Banswara districts.

GEOLOGY AND SOILS

GEOLOGY

Rajasthan is endowed with continuous geological sequences of rocks from the oldest Archaean Metamorphites, represented by

Bhilwara Super Group to subrecent alluvium and wind blown sand. The western and north western parts of the state are covered by vast blanket of unconsolidated deposits including the blown sand of the Thar desert. The remaining area exposes wide variety of hard rocks which includes various types of metamorphic schists, quartzites, marbles and gneiss of Pre-Cambrian age with associated acid and basic intrusive rocks. The sedimentaries include the rocks of Aravalli Super Group, Delhi Super Group, upper Pre-Cambrian, Vindhyan Super Group and of Cambrian to Jurassic, Cretaceous and Tertiary periods. The south eastern extremity of the state is occupied by a pile of basaltic flows of Deccan Traps of Cretaceous period.

SOILS

The soils of Rajasthan are complex, highly variable, reflecting a variety of parent materials, physiographic land features, range of distribution of rainfall and its effects, etc. However, broadly the soils can be put in five major groups, based on the basic fabric of soils, i.e., soil texture which governs its many other properties. They are, (1) Sandy soils or light soils, (2) sandy loam or light medium soils, (3) loam or medium soils, (4) clay-loam to clay or heavy soils and (5) skeletal soils or shallow rocky and hilly soils. As such, these different soils create different types of habitats for plant growth, and therefore, the tree choice and afforestation patterns on such kind of soils vary greatly. Soils are thus, variable in their soil-water-plant relationship, conservation needs and production potentials.

CLIMATE

The climate of Rajasthan varies from semi-arid to arid. Hyperthermic conditions prevail in the whole of the state. The mercury touches 49°C at some of the places during summer and drops below freezing point during winter. The rainfall pattern of the state is very erratic. Though, the average annual rainfall ranges between 200-400 mm, the annual rainfall received is as low as 150 mm in the extreme arid zones and as high as 1000 mm in the south-eastern part of the state. Most of the rainfall (60-80%) is received with the south-west monsoon in the period from July to September. The average number of rainy days vary from 6 to 42 depending on the aridity of the area.

Scanty and unevenly distributed rainfall, very few rainy days and extremes of very high and very low temperatures are the main causes of aridity in the state. Under such conditions, vegetative growth is very poor and can mainly support Xerophytic and bushy vegetation only.

DEMOGRAPHIC FEATURES

HUMAN POPULATION

The total population of the State is 68.62 million (Census, 2011), which constitutes 5.67% of the country's population. The distribution of population in various regions is closely related to a number of factors, viz., climatic conditions, soil fertility, availability and development of means of transport and communication, growth of trade and other secondary and tertiary activities.

Dispersal of population closely follows the pattern of annual rainfall regime which exhibits a consistent decreasing trend from east, south-east to west and north-west. It is only in the central parts of Rajasthan, that the area and population are proportionate. Human population density is 165 persons per sq. km., which is maximum in Bharatpur where there are 414 persons per square kilometre and minimum in Jaisalmer district where there are only 13 persons per square kilometre.

LIVESTOCK POPULATION

Rajasthan is rich in animal wealth. It has the distinction of having second largest population of cattle, sheep and camels of different breeds in the country, which is 49.14 million (Livestock Census, 2003). The livestock constitutes an important component of state's economy, particularly in its western parts, where nearly two third of the population is engaged in Animal Husbandry and allied activities. Livestock rearing is an important occupation of farmers to augment farm income. The ratio of live stock to human population is 1:1.149 whereas this ratio is 1:2.12 for the country. This shows the acute pressure of live stock on natural resources as well as on forests.

LAND USE

The various parts of the state present a variety of land use patterns which exhibit, to a large extent, the availability of soil and water resources in the area and the human endeavours to harness them. Based on the availability of different types of land and their potential, site specific strategy plan as per the local factors. The land use pattern of the State is given below:

TABLE 1.1
LAND USE PATTERN

S. No.	Land Use	Area (in sq.km..)	Percentage
1	Total geographical area	342239	
2	Reporting area for land utilization	342239	100.00
3	Forests	32701	9.56
4	Not available for cultivation	17257	5.04
5	Permanent pastures and other grazing lands	11942	3.49
6	Wastelands not under cultivation	4420	1.29
7	Culturable wasteland	68985	20.16
8	Fallow lands	42077	12.29
9	Net area sown	164857	48.17
	Total	342239	100

6. FOREST AREA AND FOREST COVER

AREA BY FOREST TYPE

The forests of Rajasthan are basically of five types spread unequally in northern, southern, eastern and south-eastern parts. The state has teak forests which is northern most limit of teak zone in India. The forests are mostly edapho-climatic climax forests. Area by forest types is given in table 1.2

TABLE- 1.2
AREA BY FOREST TYPE

S.N	TYPE	FOREST AREA (Sq.km.)	% OF TOTAL FOREST AREA
i	Dry teak forests.	2247.87	6.87
ii	Subsidiary edaphic type of dry tropical Anogeissus pendula forests.	19027.75	58.19
iii	Northern tropical dry deciduous mixed forests.	9292.86	28.42
iv	Tropical thorn forests.	2006.23	6.14
v	Sub-tropical evergreen forests.	126.64	0.38
TOTAL		**32701.35**	**100**

AREA BY LEGAL STATUS

Besides the above five basic classifications, the forests of Rajasthan have also been classified on the basis of their legal status which is given as under:

TABLE- 1.3

AREA BY LEGAL STATUS

S.NO.	LEGAL STATUS	AREA (in sq.km.)	PERCENTAGE
I.	Reserved forest	12213.85	37.35
II.	Protected forest	17712.94	54.17
III.	Unclassed Forest	2774.56	8.48
TOTAL		**32701.35**	**100**

It is clear from the above data that nearly 37 % forest cover is under reserved category but less than one third i.e. nearly 11 % has good forest cover. Similarly over 50% area under protected category is also under tremendous biotic pressure. Unclassed

forest mainly lies in desert districts as well as in IGNP area where plantations have been raised mainly on public wastelands.

AREA BY DENSITY CLASSES

The total forest area of the State is 32701.35 sq.km., but very dense forest is only 72 sq.km.. The actual forest cover by crown density classes, as per State of the Forest Report, 2009, by Forest Survey of India is given below:-

TABLE- 1.4
AREA BY DENSITY CLASSES

S.No.	Density Class	Area (in Sq. Km.)	% of Forest area
1	Very Dense Forests- Canopy density 70% and above	72	0.22
2	Moderately Dense Forests- Canopy density between 40-70%	4450	13.61
3	Open Forests- Canopy density between 10% - 40%	11514	35.21
4	Scrub- Degraded Forest lands-Canopy density less than 10%	16665.35	50.96
	Total	32701.35	100%

Thus, it is evident from the data above that only about 14% of the forest area is having good forest cover, 35% of the forest areas are open with 10-40% canopy density and almost 51% of the forest areas are either in scrub form or degraded to heavily degraded form.

DISTRICT WISE FOREST AREA AND FOREST COVER

The district wise details of the forest area and forest cover are detailed in Table 1.5:

TABLE- 1.5
DISTRICT WISE FOREST AREA AND FOREST COVER
(Area in Sq. Km.)

District	Geographic Area	Forest Area	Very dense forest	Mod. dense forest	Open forest	Total	Degraded Forest Area
Ajmer	8481	613.10	0	39	237	276	337.10
Alwar	8380	1784.95	59	336	812	1207	577.95
Banswara	5037	1236.67	0	83	292	375	861.67
Baran	6992	2239.62	0	149	940	1089	1149.62
Barmer	28387	627.22	0	3	166	169	458.22
Bharatpur	5066	434.94	0	34	202	236	198.94
Bhilwara	10455	778.76	0	33	189	222	556.76
Bikaner	27244	1249.06	0	28	169	197	1052.06
Bundi	5550	1566.78	0	146	307	453	1113.78
Chittorgarh*	10856	3227.23	0	597	1092	1689	1538.23
Churu	16830	71.22	0	5	84	89	00
Dhaulpur	3033	638.45	0	82	337	419	219.45
Dungarpur	3770	692.73	0	44	208	252	440.73
Ganga Nagar*	20634	872.9	0	31	146	177	695.90
Jaipur*	14069	1228.29	13	114	504	631	597.29
Jaisalmer	38401	581.29	0	47	115	162	419.29
Jalore	10640	452.60	0	13	195	208	244.60
Jhalawar	6219	1349.79	0	83	313	396	953.79
Jhunjhunun	5928	405.36	0	24	169	193	212.36
Jodhpur	22850	243.03	0	3	90	93	150.03
Kota	5443	1310.82	0	155	460	615	695.82
Nagaur	17718	240.93	0	11	108	119	121.93
Pali	12387	963.58	0	214	444	658	305.58
Rajsamand	3860	396.58	0	131	291	422	00
Sawai Madhopur*	10528	2739.78	0	260	1039	1299	1440.78
Sikar	7732	639.35	0	32	160	192	447.35
Sirohi	5136	1638.65	0	300	617	917	721.65
Tonk	7194	335.98	0	33	133	166	169.98
Udaipur	13419	4141.69	0	1420	1695	3115	1026.69
Total	**3,42,239**	**32701.35**	**72**	**4450**	**11514**	**16036**	**16665.35**

- *Boundaries of four new districts (Dausa, Hanumangarh, Karauli & Pratapgarh) not available. The data are given jointly with that of the parent districts.
- Very Dense Forests- Lands with forest cover having a canopy density of 70% and above.
- Moderately Dense Forests- Lands with forest cover having a canopy density between 40-70%.
- Open Forests- Land with forest cover having a canopy density between 10-40%.
- Scrub- Degraded forest lands having canopy density less than 10%.

As per the State Forest Policy, 2010, 20% of the Geographical Area i.e. 68448 sq.km. should be under Forest Tree Cover. So there is a vast gap of approximately 45000 Sq. Km. area to be brought under FTC.

CHAPTER – II

PROJECT AREA

The project envisages to cover 17 of total 33 districts of the State. Most of the forest area, which is going to be treated under the project will come from the open, scrub and degraded forests. Since, the total forest area of the State is only 9.56% of the geographical area, to reach the goal of 20% of the geographical area under forest/tree cover as envisaged by the State Forest Policy, 2010.

14 districts namely Banswara, Barmer, Bhilwara, Bikanar, Churu, Dungarpur, Jaisalmer, Jalore, Jaipur, Jodhpur, Nagaur, Pali, Jhunjhunu and Sikar, which have been proposed under RFBP Phase II have not been included in this project. Since only one Tehsil namely Abu Road of Sirohi district has been included in RFBP Phase II the remaining area of Sirohi district excluding Abu Road Tehsil has been proposed to be included in this project. There will be no duplicity in execution of this project with the ongoing schemes of the department. Hanumangarh & Sriganganagar districts have not been included in the project under RIDF-XVIII.

The area to be treated under the project can be categorized as follows:-

1. Open and degraded forest areas **and non forest areas lying on their periphery** of Aravali and Vindhayan Hills and Eastern Parts of the State includes- Alwar, Bharatpur, Dausa, Dholpur, Karauli, Swai Madhopur, Tonk , Ajmer, Bundi, Baran, Kota, Jhalawar, Chittorgarh, Pratapgarh,

- To mitigate the climate change impacts and also to enhance the carbon-sink and carbon-pools.

For achieving, the abovementioned objectives afforestation in the degraded forest area would be undertaken which would finally lead to its conversion into green reservoir for water retention. The villages located within two km of the fringe of the forest area would be receiving outlets and the water would be available for irrigating the agriculture land.

Rajasamand, Sirohi (excluding Abu Road Tehsil) and Udaipur,

PROJECT OBJECTIVES

The main objectives of this project are:

- To restore the ecological status of the Aravallis and Vindhyas by intensive reforestation and *in situ* soil and moisture conservation to maintain the soil-moisture regime.
- To enhance agricultural productivity in rainfed non forest areas on the fringes of the forest lands to reduce the resource dependency of the villagers on the forest lands and also create alternate livelihoods for them.
- To protect the infrastructures like agricultural fields, human settlements from drifting sand.
- To conserve the gene-pool and improve the biodiversity of flora and fauna.
- To augment the availability of fuel-wood, fodder and minor forest products in the State.
- To generate employment opportunities to the rural/tribal population, thus improving their socio-economic condition.
- To elicit peoples participation for institutionalization of Joint Forest Management (JFM).
- To achieve the goal of 20% of the geographical area under vegetal cover within reasonable time frame as envisaged by the State Forest Policy, 2010.

CHAPTER III

PROJECT STRATEGIES

It is essential to undertake appropriate strategies for conservation, management and sustainable development of the forests to bring them to an optimum level of productivity and expand forest cover outside the traditional forest boundaries to achieve the policy goal of having 20% area under proper forest cover. This will ensure the forest biomass based needs of the local communities and others.

MICROPLANNING

Involvement of local community in the forestry programmes is desirable to make these programmes a success. Generally afforestation activities are opposed by the local villagers due to the closure of areas, restrictions imposed on the grazing and their easy access to the forest areas for fuel-wood, fodder besides other daily use products.

To mobilize and to overcome the hardships faced by the local community, the concept of Entry Point Activities and other promotional activities was thought of as a remedy. By Entry Point Activities some community Assets are created and maintained by communities themselves. The main objective of Entry Point Activities and other promotional activities is to elicit willing participation of the communities in JFM and also to win the trust and confidence of the people. In the Entry Point Activities, the developmental activities are decided and maintained by the community as a whole.

Microplanning has proved a very effective tool to secure community participation in the forestry development activities. Thus, right from the beginning need based and site specific

microplans will be prepared through Participatory Rural Appraisal (PRA) and their needs will be assessed and Entry Point Activities will be decided by the community itself

In order to effectively tackle the problems of lands of different nature, site specific strategies are to be adopted. In the tactical and operational part of the programme, needs and aspirations of the state and country in general and the local people in specific must be catered to. For this purpose, detailed microplanning exercises will be carried out. Different treatments are proposed to be given to different categories of land.

DEVELOPMENT STRATEGY

The project activities are proposed to be implemented on cluster basis as clear watersheds cannot be physically delineated on the ground. Keeping in mind the current trends of watershed approach towards land development and management, degraded lands will be treated by taking up 'cluster of sites within a watershed'. The advantage of the watershed approach is that soil and moisture conservation results in maximising productivity of the treated uplands as well as the agricultural lands in the downstream. The cluster approach will ensure maximum usufruct flow to the beneficiaries and maximum positive environmental repercussions leading to sustainable management of land resources.

MANAGEMENT STRATEGY:

MANAGEMENT OF FORESTS AND PLANTATIONS THROUGH JOINT FOREST MANAGEMENT

The forest management and conservation efforts in the past have not been commensurate with the ever increasing needs of growing population resulting in degradation of forest resources at an accelerated pace. The sustainability of essential ecological processes and life support systems have been at stake. This has adversely affected the livelihood security of the poor people living in and around forests and protected areas. As it stands today the Joint Forest Management involves the participatory management of forests by the Government agencies and the user groups (forest dependent communities) so as to optimise the returns, minimise conflicts and linking the forestry development with over all development - the ultimate aim being an ideal condition where the users acquire the technical and managerial capability to sustain the system. In pursuance of National Forest Policy,1988 Govt. of Rajasthan issued circulars on 26 March 1991 and 15th April 1991. Based on experience of about 8-9 years, subsequently these circulars were amended on 17th October 2000. As per recent circular Gram Sabha constitutes the general body of Village Forest Protection Committee. Women sub-committee is to be constituted and atleast one key official in executive committee has to be a woman.

Participatory approach has been considered crucial for achieving sustainability of the governmental programmes /projects on account of efficiency, effectiveness, self reliance, increased coverage and sustainability. Participation implies a greater chance

that resources available to development will be used more efficiently ensuring better output.

ACTIVITIES UNDER JFM

The emphasis will be given on following activities under JFM:

AREA SPECIFIC PLANNING

A need based and area specific microplans shall be prepared taking a village/phala as an unit of development. This will convince the people at the microplanning stage itself about the benefits likely to accrue to them from the proposed measures. The views and consent regarding the pattern of closure, period of closure, choice of species and introduction of the system of "cut and carry" grass and fodder during the closed period, shall be obtained at the inception of the project. In every village, or a group of villages, a Village Forest Protection / Management Committee shall be formed and registered representing all the households as per resolution of the State Government. Need assessment and its prioritisation will be done through PRA exercise. Draft microplans will be discussed in VFPMC meetings and should be finalised after incorporating suggestions, if any, from VFPMC members, Consultants/NGOs etc.The Final Microplan shall be approved by the concerned Divisional Forest Officer. A MOU will be signed between Forest Deptt. and VFPMC before implementation of microplans.

During the microplanning exercise, besides gathering base level data, efforts will be made to explain the worth of the activities proposed and make the villagers aware of the benefits by organising village workshops in the form of evening gatherings

(Choupals) or if necessary such gatherings will be organised at the time of microplanning exercise. These are important forums for information exchange. Through the village workshops important traditional knowledge will be documented for further use.

INVOLVEMENT OF WOMEN

Women in rural areas are most dependent on forest lands from where they gather most of the forest produce both for subsistence and sale, therefore, participation of women for forest management is of immense significance. Women are not only the victims of the environmental crisis but also have emerged as the managers of the crisis. Women, unless involved from the very beginning, are not going to benefit from projects aimed at eco-regeneration. Involving women in the selection of tree species and method of harvesting, utilising their knowledge of uses of different tree species and ensuring that they are provided with the type of forestry products they need would sustain their interest in forestry. Expanding employment opportunities for women in forest based industries, providing incentives like extending health services, e.g., opening primary health centres or holding medical diagnostic camps, providing child care facilities, labour saving technologies and water supplies in their villages will be of great help. We have to allow flexibility in including such activities in taking up forestry programmes. This would facilitate better management of project assets.

ATTENTION TO THE POOR

Vulnerable groups will be identified and helped by giving them employment in the forestry works in order to enable low income rural families to participate.

TRAINING

The JFM calls for a shift from traditional policing role of the forestry staff to that of working in close partnership with the village communities. This requires significant change in orientation of the staff to adopt a new role- from that of an implementers to a facilitator, from that of a prosecutor to a partner. It can be achieved through organising the in-service training programmes for the various level officers and subordinate field staff. The training programmes/ courses must include in their curriculum the JFM, micro-planning and related subjects.

So far training has been focused mainly on the staff and officers of the department. The next comes the need for the training of the members of VFPMCs., NGOs, farmers, village leaders, panch, sarpanch and other departmental officers.

COMMUNICATION AND EXTENSION

Forest conservation programme can not succeed without the willing support and co-operation of the people. It is essential, therefore, to inculcate in the people, the direct interest in forests, their development and conservation to make them conscious of the value of trees, wildlife and nature in general. This can be achieved through the involvement of educational institutions right from the primary stage. Short term extension courses and lectures should be organised in order to educate the villagers. For this purpose it is essential that suitable programmes are propagated through mass-media, audio-visual aids, cinema, drama, songs, exhibitions, melas, puppet shows, folders, pamphlets and posters, etc.

PARTICIPATORY EVALUATION

In order to organise JFM successfully a system of participatory evaluation shall be carried out regularly. This would not only help in ensuring proper feedback to the forest department but at the same time facilitate in understanding the degree of community participation.

CHAPTER IV

TECHNICAL STRATEGIES

Since different categories of forests, common lands, revenue waste lands etc will be taken up for afforestation/reforestation activities, it is emphasized that the site selection should be very judicious and based on type of forest density class, type of soil and type of activity to be taken up.

A. PRINCIPAL ACTIVITIES

SITE SELECTION

For efficient and successful implementation of the project it is essential that sites should be selected based on certain criterion followed by their prioritisation. There ought to be a general criterion of site selection which will be followed for all types of activities in the project. Whereas in case of different activities criterion for site selection will be different.

GENERAL CRITERION

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The general criterion for site selection for all afforestation activities in the project will be as follows :

- Selection of sites will be done keeping in mind the cluster approach. It will ensure proper supervision and will require less staff. On the other hand there will be optimum accrual of benefits to the local communities which in turn will improve their economic conditions.
- Remote areas will get precedence over easily accessible areas because most of the people living in remote area of the project are mainly Schedule Castes, Schedule Tribes or backward classes and most of them are below the poverty

line. The developmental activities which will be undertaken in the area will improve their socio-economic condition.

SPECIFIC CRITERIA

Based on aforesaid general criterion which will be common for all components of project, the specific criteria for site selection for each project component will be as follows:

REHABILITATION OF DEGRADED FORESTS - I

- Crown density should be between 0% - 10%.
- Lesser availability of root stock
- There should be scope for planting 400-500 plants per Ha.

REHABILITATION OF DEGRADED FORESTS - II

- Crown density should be between 10% - 40%.
- There should be scope for planting 200-300 plants per Ha.

ASSISTED NATURAL REGENERATION

- Crown. density should be above 40%
- Availability of sufficient root stock.
- There should be scope for planting about 150-200 plants per Ha.

SOIL AND WATER CONSERVATION STRUCTURES:

- Soil and water Conservation Structures will be constructed strategically to enhance water resource augmentation and top soil moisture regime to enhance the growth of plants in the project area. The structures shall be constructed as per the technical criterion as per the soil conservation principles at per the site conditions. of the according to suitability of sites and their requirement in the areas.
- The structures will primarily be constructed in wildlife and forest areas .

- To reduce the dependency of local people on the forest areas, such structures will also be taken up in non-forest areas . This will go a long way in protection of forest produce in its adjacent areas while providing impetus to peoples' participation in the area and improving the overall socio-economic condition of the community.

CONVERGENCE THROUGH MNREGA

- Areas near/inside cities, near habitations, which are susceptible to encroachment, will be protected by means of pucca stone wall fencing.
- Isolated blocks may be taken in entirety

TECHNICAL MODELS

The activities to be undertaken under different models are clearly spelt out in the model cost estimates of the respective models. These models are only for guidance and site treatment may vary as per site requirement. Any item which is not required on any site due to technical reasons may be excluded while implementation and provided amount will be surrendered. Any deviation from model will be permitted only after approval of next higher authority. The sites will be chosen according to the specific requirements of the respective models. The activities which are presently being executed will be strictly followed in the following sequential order.

- Proper selection of site
- Formation of Village Forest Protection and Management Committee.
- Preparation of Microplan of the village.

- Survey of the area.
- Preparation treatment plan and cost estimate of site.
- Execution of the work
- Periodic monitoring of growth and survival of plants

During execution following things will be observed:

- Involvement of local people
- Preference to indigenous species according to site/model suitability and local requirement.
- Maintenance of plantations according to silvicultural practices in such a manner that maximum benefit accrues to the local communities

Based on the above principles different models have been explained below.

PHYSICAL AND FINANCIAL PHASING OF PLANTATION & OTHER ACTIVITIES UNDER DIFFERENT MODELS

REHABILITATION OF DEGRADED FORESTS –I

Under this category the forest area having crown density between 0 to 10%will be treated, 48000 hectares of such degraded lands will be taken up for rehabilitation operations during the project period. The areas will be fenced either by random rubble stone wall or by trench cum mound fencing. Along the fence lines, seeds/cuttings of suitable species will be sown/planted so that it acts as a live hedge. Degraded root stock in the existing crop would be cut back. 350 to 400 pits of $(45\ cm)^3$ will be dug in the area at proper spacing on contours depending on the site

requirement. In addition to this 400 running metre of contour trenches/V-ditch of size 45 cm x 45 cm cross section will be dug at proper places. For proper moisture conservation in the area adequate measures like construction of loose stone check dams with vegetative support, construction of crib dams, retaining walls/outlets etc. will be taken up at proper places so that rain water is conserved "in situ". With the onset of rainy season, sowings of grass/tree species seeds would be done on the ridges of V-ditches and in inter-pit spaces. In northern districts where ever sandy deposits occur, intensive ' munja' planting will be done. Plants of suitable indigenous species would be planted in the pits. Seeds of suitable tree/shrubs would be sown on contour trenches. Local villagers will be engaged as labourers for implementation of the works. Subsidiary silvicultural operations will be taken up from time to time as per requirement. In all 48000 Ha. area will be treated under this activity and this will require Rs. 23387 lacs over the project period. The phasing of physical and financial targets has been given in table below.

Table- 4.1

Physical and Financial Phasing- REHABILITATION OF DEGRADED FORESTS- I

Activity	Unit Cost	YEARWISE PHYSICAL TARGETS					
	In Rs	1	2	3	4	5	Total
Advance action	27,372	20,000	10,000	10,000	8,000		48,000
Planting	16,303		20,000	10,000	10,000	8,000	48,000
Maintenance 1	4,256			20,000	10,000	10,000	40,000
Maintenance 2	1,441				20,000	10,000	30,000
Maintenance 3	1,441					20,000	20,000
FINANCIAL REQUIREMENT (Rs. In Lacs)							
		5474	**5998**	**5219**	**4534**	**2162**	**23387**

REHABILITATION OF DEGRADED FORESTS - II

Under this category the forest area having crown density between 10 to 40% will be treated. The areas will be fenced either by random rubble stone wall or by trench cum mound fencing. Along the fence lines, seeds/cuttings of suitable species will be sown /planted so that it acts as a live hedge. Degraded root stock in the existing crop would be cut back. 200 to 400 pits of $(45\ cm)^3$ will be dug in the area at proper spacing on contours depending on the site requirement. In addition to this 400 running metre of contour trenches/V-ditch of size 45 cm x 45 cm cross section will be dug at proper places. For proper moisture conservation in the area adequate measures like construction of loose stone check dams with vegetative support, construction of crib dams, retaining walls/outlets etc. will be taken up at proper places so that rain water is conserved "in situ". With the onset of rainy season, sowings of grass/tree species seeds would be done on the ridges of V-ditches and in inter-pit spaces. Sowing/planting of medicinal plants will be done on the ridges of V-ditches and some of the contour trenches. Plants of suitable indigenous species would be planted in the pits. Seeds of suitable tree/shrubs would be sown on contour trenches. Subsidiary silvicultural operations will be taken up from time to time as per requirement. The phasing of physical and financial targets has been given in Table 4.2

Table- 4.2

Physical and Financial Phasing- REHABILITATION OF DEGRADED FORESTS- II

Activity	Unit Cost	YEARWISE PHYSICAL TARGETS					
	In Rs	1	2	3	4	5	Total
Advance action	26,845	20,000	15,000	15,000	10,000		60,000
Planting	8,995		20,000	15,000	15,000	10,000	60,000
Maintenance 1	2,546			20,000	15,000	15,000	50,000
Maintenance 2	1,436				20,000	15,000	35,000
Maintenance 3	1,436					20,000	20,000
FINANCIAL REQUIREMENT (Rs. In Lacs)							
		5369	**5826**	**5885**	**4703**	**1784**	**23567**

ASSISTED NATURAL REGENERATION

Forest areas having crown density above 40% will be treated under this category. The areas will be fenced either by random rubble stone wall or by trench cum mound fencing. Along the fence lines, seeds/cuttings of suitable species will be sown/ planted so that it acts as a live hedge. Degraded root stock in the existing crop will be subjected to cut back operations. About 150-200 pits of $(45\ cm)^3$ will be dug (per ha.) in the blank areas at proper spacing on contours. In addition to this 400 running meter of contour trenches/V-ditch of size 45 cm x 45 cm cross section will be dug at proper places. For proper moisture conservation in the area, adequate measures like construction of loose stone check dams with vegetative support, etc. will be taken up at proper places so that rain water is conserved "in situ". With the on set of rainy season, sowings of grass seeds would be done on the ridges of V-ditches and in inter pit spaces. Sowing/planting of medicinal plants will be done on the ridges of V-ditches and some of contour trenches. Plants of suitable indigenous species would

be planted in the pits. Seeds of suitable tree/shrubs would be sown on contour trenches. Subsidiary silvicultural operations will be taken up from time to time as per requirement.

The phasing of physical and financial targets has been given below:

TABLE- 4.3

PHYISCAL AND FINANCIAL PHASING: ASSISTED NATURAL REGENERATION (ANR)

Activity	Unit Cost	YEARWISE PHYSICAL TARGETS (Ha.)					
	In Rs	1	2	3	4	5	Total
Advance Action	13,174	12,500	12,500	12,500	12,500		50,000
Planting	6,136		12,500	12,500	12,500	12,500	50,000
Maintenance 1	2,946			12,500	12,500	12,500	37,500
Maintenance 2	1,618				12,500	12,500	25,000
Maintenance 3	1,618					12,500	12,500
FINANCIAL REQUIREMENT (Rs. In Lacs)							
		1647	**2414**	**2782**	**2984**	**1540**	**11367**

PANCHAYAT LAND PLANTATION

In each village, wastelands are available under the control of Panchayats. These areas are fit for growing fuel, small timber and fodder for the community. These lands are variable in extent and only a part of each village can be brought under afforestation at a time. The size of each plantation may vary from 10 to 20 hectares. 1,000 hectares of such lands in project area would be taken up for plantation during the project period. Works in buffer areas of various National Parks and Wildlife sanctuaries will be taken up on priority. 800 plants of fuel wood and fruit plants would be planted in pits of $(45\ cm)^3$. 300 running metres of contour trenches/V-ditches will also be dug up at proper places. On the mound of which, as also that of trench fence, sowings of fuel wood species would be done. Fodder grasses will be raised in between the tree lines. The indigenous species providing fuel wood and

fodder will be planted in this category of plantations. All intermediary yields from grasses, fruits, pods, lops and tops would accrue to the Village Forest Protection and Management Committees. The fuel wood and small timber from the areas will be available to local community on preference. In all 1000 Ha. area will be treated under this activity and this will require Rs. 644 lacs over the project period. The phasing of Physical and Financial targets is as under:

TABLE-4.4

PHYISCAL AND FINANCIAL PHASING: PANCHAYAT LAND PLANTATION

Activity	Unit Cost	YEARWISE PHYSICAL TARGETS (Ha.)					
	In Rs	1	2	3	4	5	Total
Advance Action	37,900	250	250	250	250		1,000
Planting	21,138		250	250	250	250	1,000
Maintenance 1	5,912			250	250	250	750
Maintenance 2	1,188				250	250	500
Maintenance 3	1,188					250	250
FINANCIAL REQUIREMENT (Rs. In Lacs)							
		95	**148**	**162**	**165**	**74**	**644**

FARM FORESTRY

A sizeable area of marginal and sub-marginal land is available with farmers, which provides little or no agricultural returns. With proper extension and technical assistance, these lands can be brought under tree cover. Trees can also be planted on the farm boundaries, farm bunds, home steads, around wells and along water channels. The yield from these trees would be available to the farmer for meeting his own requirements of fuel wood, small timber, fodder and fruits as well as also for selling in the market. The choice of species to be raised under the programme will

depend on the needs and priorities of the local people as will be determined by a detailed microplanning exercise.

During the project period, it is proposed to distribute 20 million seedlings of suitable species to private individuals in the project area for planting on their farm lands and homesteads. The plants will not be subsidised under the project. The plants will be sold at cost to all the beneficiaries and income from plants will be kept in separate bank account for use in next year for plant raising for distribution. Only one time provision for plant raising has been made in the project and in subsequent years provision for incremental cost has been made under the project. The details are given in Table below:

In order to facilitate the large scale distribution of seedlings, two related activities are proposed. Firstly creating of 30 new nurseries and 40 existing nurseries in the State will be upgraded so as to augment their current capacities of plant raising. Development activities in existing nurseries will include improved water supply facilities, seed storage and treatment facilities, mist chambers in selected nurseries etc. All these activities clubbed together will require funds to the tune of Rs. 1894.58 lacs. The details are given in the Tables 4.5 to 4.7

Table – 4.5

PHYSICAL AND FINANCIAL PHASING -SEEDLING DISTRIBUTION

Activity								
Component	Unit Cost (Rs. Per Plant)		Project Year (Financial Year) In Lacs)					
			1	2	3	4	5	Total
Plant Raising	Per Plant	515325	50	50	50	50	0	200
Plant Maintenance	Per Plant	115712		50	50	50	50	200
	FINANCIAL REQUIREMENT (Rs. In Lacs)							
			257.6625	315.519	315.5185	315.5185	57.856	**1262.074**

Table – 4.6

PHYSICAL AND FINANCIAL PHASING -CREATION OF NEW NURSERIES

Activity								
		Unit Cost	Project Year (Financial Year) (IN NOS.)					
		(Rs)	1	2	3	4	5	Total
Creation of New Nurseries	Year 1	825000	10	10	10			30
	Year 2	550000		10	10	10		30
		FINANCIAL REQUIREMENT (Rs. In Lacs)						
			82.5	137.5	137.5	55	0	**412.5**

Table – 4.7

PHYSICAL AND FINANCIAL PHASING -DEVELOPMENT OF EXISTING NURSERIES

Activity		Unit Cost	YEARWISE PHYSICAL TARGETS (Unit No.)					
		Per Site	1	2	3	4	5	Total
Development of Existing Nursries	Year1	330000	10	10	10	10		40
	Year2	220000		10	10	10	10	40
FINANCIAL REQUIREMENT (Rs. In Lacs)								
			33	**55**	**55**	**55**	**22**	**220**

SOIL AND WATER CONSERVATION MEASURES

The engineering practices for in-situ soil and moisture conservation have been selected keeping in mind the following objectives; -

- The major objective of this project is to make available moisture for optimal plant growth and also provide drinking water to the Wild Animals through-out the year especially during summer when other natural sources of water get dried
- Reduction of runoff from the catchments to reduce peak flow in to the main nalla thus minimizing the risk of flood in lower reaches.
- Prevention of soil erosion, land degradation and enhancing productivity and landuse capability.
- To preserve the Flora and Fauna of the project area
- To recharge ground water in the project area as well as in the peripheral areas and near by villages
- To create awareness among the people about the need of preserving wild life and forests.

The strategy to conserve in-situ soil and moisture will be the; Adoption of watershed approach to harvest maximum run-off; Emphasis on sustainability of structures ; Higher thrust for construction of strategically located structures along drainage lines to retard velocity of runoff, to arrest silt and to impound maximum runoff in the area itself; and High priority to Drop type masonry structures to get immediate results and to surpass excess run-off safely. The soil and water conservation measures are proposed as follows:

1. Forest lands :

   Upper reaches: Masonry checkdams, loose boulder with gabion will be constructed in the upper reaches of the drainage lines for gulley control and checking the velocity of run-off and reducing silt flow with run-off.

Lower reaches: Percolation Tanks, Water harvesting structures, Anicut type II and III will be constructed in the lower reaches to stabilize the nallahs and impound water for water resource augmentation.

2. Non Forest lands (Waste and agriculture lands):
   In the areas , peripheral to the forest lands upto 500 meters, contour bunding is proposed for increasing the time of concentration of run-off for in-situ moisture conservation for enhancing agricultural productivity. About 125 meters contour bunding will be constructed per hectare. Field outlets will be provided at suitable places for removal of excess water with non erosive velocity. In addition, structures in upper and lower reaches will be constructed as in the forest land.

An abstract of works proposed is given in Table 4.8

Table 4.8

S. NO	TYPE OF WORK	PHYSICAL TARGET(HA/NOS)	FINANCIAL IN LACS
1	Contour bunding with outlets	150000	9750.00
2	Check Dams	3400	629.00
3	Farm Pond	1300	422.50
4	Loose boulder with gabion	780	425.10
5	Percolation Tank	780	1177.80
6	Water harvesting structure	700	2114.00
7	Anicut type II	525	3412.50
8	Anicut III	300	2550.00
	Total		20480.90

The total requirement of funds will be about Rs. 204.81crore.

CONVERGENCE THROUGH MNREGA

Forest areas susceptible to encroachment and habitat destruction and subjected to heavy biotic pressure shall be provided adequate effective protection by erecting pucca masonry stone wall on the vulnerable side. Pucca stone wall will be constructed only on notified outer boundaries of the forest blocks/ protected areas by the way of convergence through MNREGA. The entire expenditure on the Pucca Fencing of Vulnerable Areas would be met from MNREGA. No pucca wall will be constructed on inner boundaries. Wall will be about 2 meter high with the square base of 60 cm wide with height of 30 cm. The thickness of the wall will be 45 cm and height of the wall above the base will be 1.55 meters. There will be 10 cms thick coping on the top of the walls. There will be pillars of 75 cm square base having 30 cm height at interval of every 2.25 meter. Seed sowing and suitable soil and moisture conservation measures will be done in the area. In subsequent years re-seeding will be done to insure greening of these areas.

The phasing of physical and financial targets is as under:

Table - 4.9

					Years					
				Unit Cost	1	2	3	4	5	Total (Rs. in Lacs)
1	**Construction of Pucca Fencing of Vulnerable Forest and Wild Life Area(through MNREGA)**	2,500	HA							
				368000	500	500	500	500	500	9200.00
				2650		500	500	500	500	53.00
				2550			500	500	500	38.25
	TOTAL			**373200**						**9291.25**

CHAPTER V

JFM CONSOLIDATION

A. INFRASTRUCTURE DEVELOPMENT

Most of the villages in the remote forest areas particularly in tribal region of the project are quite underdeveloped with regards to infrastructural facilities. Lowest forest functionaries i.e., Forest Guards, who are working in the area have a close understanding of the local people and their problems, being the only Government representative available in such areas people approach them for most of their problems. Gradual depletion of natural resources in such areas creates much more problems downstream in the watersheds. The investment of funds from District Rural Development Agency and other sources is miniscule in such areas. Therefore, for proper development of the area and to subvert environmental crisis in long run it is essential to undertake infrastructure development in remote forest villages of the project as per the needs of the local people. To create better appreciation of community for infrastructure development activities,up to 10% of the cost will be taken as voluntary contribution from people in form of cash, kind or voluntary labour.

The microplanning exercises which have been carried out in earlier afforestation activities have clearly indicated that in the interior areas besides forestry related problems, there are many more problems pertaining to the societal needs. These problems generally have much more priority than the forestry related problems. If these problems remain untouched, people's attitude remains neutral towards forestry activities and it becomes very difficult to seek their active co-operation. If few of these problems are solved then seeking peoples active participation for forest

conservation and development becomes very easy. Implementation of infrastructure development activities in the project area particularly tribal areas will also improve the quality of life in such areas.

Most of the committees in these villages are active because of the welfare activities which are undertaken in the village and these act as an easy entry point of the forest officials in the villages and there is a good rapport between the forest officials and the villagers.

This component entails larger percentage of material component, therefore, this component would be financed 100% through RIDF-XVIII. The details of various activities and their financial outlay is as under:

Table 5.1

PHYSICAL & FINANCIAL PHASING OFJOINT FOREST MANAGEMENT ACTIVITIES

S.NO.	TYPE OF WORK	TOTAL TARGET	UNIT	UNIT COST	PHYSICAL TARGETS					Rs. In Lacs
				YEARS ->	1	2	3	4	5	
1	IGA and Strengthening/ Creation of SHGs/VFPMCs	850	No	100000	250	200	150	150	100	850.00
2	Preparation of Micro-plans	850	No	10000	250	200	150	150	100	85.00
3	VFPMCs Meetings	850	No	2000	250	200	150	150	100	17.00
4	Honararium to NGOs	LS	No	10000	17	17	17	17	17	8.50
5	Awareness camps	850	No	5000	250	200	150	150	100	42.50
FINANCIAL REQUIREMENT (Rs. In Lacs)					294.20	235.70	177.20	177.20	118.70	1003.00

B. CAPACITY BUILDING

For consolidation of JFM, it is essential that the income of village community members is augmented by undertaking income generating activities after formulation of Self Help Groups (SHGs). Success of income generating activities will depend a lot on skill levels of members of the group undertaking the particular activity.

Income generating activity may include tailoring, weaving, knitting, NTFP processing, spice making and rope making etc. Training will be arranged under the project for developing the skills of village community keeping in view local practices.

This component entails larger percentage of material component, therefore, this component would be financed 100% through RIDF-XVIII.

Based on the studies of microplans of VFPMCs, various development activities which are required to be undertaken in the villages are categorised below :

A. Drinking water

- Hand pumps
- Digging of wells
- Deepening of wells
- Tubewells
- Drinking water tanks
- Village ponds
- Anicuts

B. Animal Husbandry

- Cattle breed improvement
- Cattle troughs

C. Roads

- Construction of approach roads

D. Community works

- Yatri sheds
- Chaupals
- Chabutara

- Culverts

E. Income generating activities

- Skill Upgradation
- Tailoring training
- Mid wife training
- weaving/knitting
- NTFP processing
- Lift Irrigation etc.

F. Non conventional energy sources and fuel saving devices

- Improved chulhas
- Improved crematoria

G. Education Programmes

- Balwadis
- Adult education

H. Other activities

- Based on the individual microplans and interaction with the villagers the identified welfare activities will be taken up in the respective villages.

Table 5.2

PHYSICAL & FINANCIAL PHASING OF CAPACITY BUILDING

S.NO.	TYPE OF WORK	TOTAL TARGET	UNIT	UNIT COST	PHYSICAL TARGETS					Rs. In Lacs
				YEARS ->	1	2	3	4	5	
1	Training of VFPMC Members / VLW / FG / CG	850	LS	10000	250	200	150	150	100	85.00
2	Training of NGO /Pub. Rep./ /RO/ ACF at FTI	10	LS	50000	4	3	2	1	0	5.00
3	Training of DCF & Above (At FTI)	5	LS	100000	2	1	1	1	0	5.00
FINANCIAL REQUIREMENT (Rs. In Lacs)					29.00	22.50	17.00	16.50	10.00	95.00

CHAPTER VI

COMMUNICATION AND EXTENSION

Forestry Extension has been one of the serious weaknesses of the State Forest Department. It is, therefore, very essential to have a proper extension network at the regional levels so as to promote forestry development in the project area. For this purpose the following specific activities shall be undertaken :

AWARENESS RAISING

Awareness raising is extremely pertinent in relation to Forestry development in a country like India. Extension units set up as above will have the following responsibilities :

- **Proper documentation** : It will be the responsibility of the Extension units to prepare, develop and disseminate publications, pamphlets, posters and any other relevant publicity material.
- **Organising film shows, exhibitions, Chaupals, Puppet shows.** : The extension units will organise film/ video shows, puppet shows, chaupals exhibitions, music, dances, songs & bhajans which familiarize and generates awakening about the importance of forest, plants, trees, birds and wildlife etc. Slogans writing on walls etc., hording boards and painting etc., will also be done, both for rural and urban populace. Extension services will be extended to schools and educational institutions as well.
- **Experience sharing workshops & Exchange visits** : In order to ensure bi-directional feedback, the Extension units will be responsible for organising exchange programmes and workshops for all categories of Forestry Personnel,

Extension workers, VFPMC members, Eco-Development Committee members, Local Self Government representatives etc. In the normal course, exchange visits will be followed by a workshop where sharing of field experience and cross fertilisation of ideas will take place.

- **Use of mass media** : The importance and capabilities of mass media as a tool for extension is acknowledged. So as to allow maximum publicity TV programmes, radio talks, Press releases, etc., will be handled by these units.
- **Organisation of Environmental** : Awareness camps will be taken up by extension wings in various institutions of the project area in order to educate children and students. In these camps various participatory and competitive activities like quizes, essay writing, paintings, posters, etc., will be be organised.
- **Sensitisation of Politicians, Public servants, Media personnel etc.** : The need to sensitise Politicians, Public Servants and media persons to the needs, requirements and performance of the State Forest Department is of paramount importance. They need to know, appreciate and, when necessary, critically analyse the forestry activities. For this purpose the extension units will be cultivating this very vital target audience by preparing reading material, references, training and will also organise field visits from time to time so that interaction among field functionaries, locals, other departmental staff would take place and first hand knowledge of the methodology adopted would also be available.

Proposals for allocation of funds for communication, extension and research activities for given in table below:

Table- 6.1

PHYSICAL & FINANCIAL PHASING OF COMMUNICATION & EXTENSION

S.NO.	TYPE OF WORK	TOTAL TARGET	UNIT	UNIT COST	PHYSICAL TARGETS					Rs. In Lacs
				YEARS ->	1	2	3	4	5	
1	Exchange Visits / Study Tours	170	Nos.	10000.00	34	34	34	34	34	17.00
2	Workshops and Seminars	34	Nos.	25000.00	7	7	7	7	6	8.50
3	Publicity Equipments		LS							25.00
4	General Publicity and Documentation		LS							125.00
FINANCIAL REQUIREMENT (Rs. In Lacs)					35.15	35.15	35.15	35.15	34.90	175.50

CHAPTER-VII

MONITORING AND EVALUATION :

PRESENT SET UP

The monitoring and evaluation system that exists in the Forest Department mainly focuses on the performance monitoring and evaluation of the various departmental activities. Presently, at the division level besides regular monitoring of physical and financial targets, the survival percentage of plantations are assessed on the basis of either total enumeration or sample plot enumeration. Internal arrangements have been made to carry out enumeration in a particular range by the staff of other range so as to overcome personal bias. Sample checks are done by ACF/DCF. Similarly at the Regional CCF level, the Conservator of Forests are supposed to get sample checking in a division done by the staff of other division. At the project level there is a planning and monitoring unit under the control of CCF which carries out enumeration in various project divisions which are randomly selected by the CCF. This Planning and Monitoring Cell is headed by a DCF rank officer.

At the state headquarters, Chief Conservator of Forests (Concurrent Evaluation) is the nodal officer working under the APCCF (Monitoring & Evaluation), who is directly under the control of PCCF. Sample checks are carried out at various regions for different projects/programmes. Sometimes, at the State Government level, the Evaluation Department conducts sample checks of ongoing programmes and furnishes the findings to the department. Government of India, through government and non-

government agencies get the centrally sponsored programme evaluated.

INDICATORS OF MONITORING AND EVALUATION

In order to undertake systematic monitoring and evaluation of forestry development programmes to achieve policy and developmental goals for short, medium and long term perspective it is essential to have a proper system and structure in the form of Management Information System (MIS). The progress indicators in the form of quantifiably measurable parameters of monitoring and evaluation are listed below :

MONITORING INDICATORS

In view of the basic purpose of monitoring the progress indicators would be monitored for all the development programmes with a view to know the success.

A - QUANTITATIVE INDICATORS

The information about the following progress indicators will be collected regularly through the system of regular flow of information from the implementing agencies;-

Monitoring of actual achievements, vis-à-vis, planned/projected physical and financial targets in terms of numbers, area coverage, scheduled date of completion as per implementation schedule, actual vis-à-vis, planned budget with cost variation analysis.

B - QUALITATIVE INDICATORS

Performance monitoring as against the norms and standards. This should also include details about the species, growth achieved, extent of natural regeneration induced, improvements in soil and

moisture regimes, hydrogeology and such other parameters which are conspicuously visible to the onlookers.

C - BROAD PROGRESS INDICATORS

- Seedlings / plantations
- Number of seedlings raised in the nursery; Division and Range wise and species wise.
- Number of seedlings distributed; Agency wise and beneficiary wise.
- Number of seedlings planted; Division and Range wise and species wise.
- Number of seedlings survived; Division and Range wise and species wise as well as agency wise and beneficiary wise.
- Area coverage; Category wise and agency wise.
- Employment provided to the villagers.
- Benefits accrued to the villagers.
- Awareness raising
- Number of staff/farmers/beneficiaries trained including percentage of women.
- Number of men/women attending VFPMC/ Eco-development/ Watershed Development Committee meetings.

The various indicators for monitoring are proposed in the logical framework of the project

D - PERIODICITY OF REPORTING

The periodicity of reporting these parameters will vary from monthly, quarterly to yearly basis depending upon the nature of indicators whether, quantitative or qualitative. This will be through the system of internal monitoring.

EVALUATION INDICATORS

Evaluation is generally done at the end of the project. However, participatory evaluation is concurrently done right from the inception of the project as described above. This is necessary to evaluate the project objectives alongwith the beneficiary community to ensure their active involvement from the very beginning. The evaluation including participatory evaluation necessarily should, inter-alia, incorporate the following process indicators:

- Project objectives.
- Measurable progress indicators, both Qualitative and Quantitative.
- Time schedule of various activities.
- Beneficiary response on the usefulness, objectivity, validity and sustainability of the project.
- Social and economic and environmental parameters to be decided by the multidisciplinary evaluation group.

METHODOLOGY

All the developmental activities will be effectively monitored and evaluated as per the circular issued by the PCCF.. The salient features of the circular are as follows:

- The area will be divided in small plots based on either the natural features of the work site or by distinct marking in the area. The size of the plots may vary from 2-5 ha.
- A modified plantation card will be maintained for every site showing the sketch map of the site as well as the details of plotwise activities undertaken in the area.

- The plantation card will be maintained in three copies which will be available at site, range and division headquarters.
- DCF Planning and Monitoring at project level will evaluate as per norms, randomly selected divisions every year. This team will evaluate randomly selected works in each division. One work will be completely evaluated and remaining works will be partially, equivalent to 10% of the area, evaluated. In case certain major deviations are found then those works will also be completely evaluated.
- DCF Planning and Monitoring at PCCF level will evaluate randomly selected divisions every year on the same lines. This team will also evaluate old plantations which have been carried out by the division. In case of 1-2 year old plantations 5% of randomly selected works, 3-4 year old plantations 2.5% of randomly selected works will be completely evaluated by this team.
- External agencies appointed by PCCF will carry out evaluation in 10% of the project divisions after three years, on the above lines.

PERIODICITY OF EVALUATION

The evaluation will be carried out throughout the project cycle by various internal and external agencies as mentioned above. The periodicity of the evaluation will be decided by the project implementing authority. However, it should be at least during the mid-course of the project and at the end of the project-post project evaluation. The phasing physical and financial activities are as under:

Table - 7.1

PHYSICAL & FINANCIAL PHASING OF MONITORING & EVALAUTION

S.NO.	TYPE OF WORK	TOTAL TARGET	UNIT	UNIT COST	PHYSICAL TARGETS					Rs. In Lacs
				YEARS ->	1	2	3	4	5	
1	(i) Mid-term Evaluation /study		LS	0	0	0	0	0	0	20.00
	(ii) Post - Project Evaluation / Study		LS	0	0	0	0	0	0	20.00
2	Reports and Publications		LS	0	0	0	0	0	0	23.00
C	**Regular Monitoring and Eevaluation works**		LS	0	0	0	0	0	0	55.00
FINANCIAL REQUIREMENT (Rs. In Lacs)					3.00	14.00	34.00	21.00	46.00	118.00

CHAPTER - VIII

ISSUES AND STRATEGIES

Rajasthan has marked difference in physiographic features. The Aravallis, one of the oldest mountain systems, divides the state in two unequal parts. Over 30% of the State is covered by Aravallis and a vast expanse of arid and semi-arid tract lie in the west of Aravallis. Hyperthermic conditions prevail in whole of the State and rainfall pattern is very erratic. Under such adverse conditions, vegetative growth is very poor and can mainly support xerophytic and bushy vegetation. Only small area in the south west has some forests. In this backdrop, the State faces a challenge of greening it within a reasonable time frame.

Meagre financial resources and low priority accorded to the forestry sector in the earlier plan periods led to limited achievements in the forestry sector.

There is acute shortage of forest products. State depends upon neighbouring states to fulfill the needs of fuelwood and fodder. Thousands of cattle from the State migrate to neighbouring states in summer for grazing. There is urgent need of producing sufficient fodder and fuelwood in an integrated plan to fulfill the requirements of the people. The total forest area of the State is 32701.35 sq.km. which is 9.56% of the geographical area, and Forest and Tree Cover in the state is only 7.11 % of the Geographical area. Hence there is a vast gap of 45000 Sq. Kms. to be brought under Forest and Tree Cover to reach the 20% target as per State Forest Policy, 2010. It is only possible to reach the 20% mark by setting apart the waste lands, pastures and fallow

lands for plantations and permanent pastures and also the agro-forestry is given special emphasis. The development of pastures is imperative as they are the permanent source of fodder in the fodder-deficient State.

The policy to increase the forest/tree cover is essential for the sustainability and mitigating the climate change and global warming and hence for the human survival.

Keeping in mind the prevailing hyperthermic conditions, erratic rainfall, recurrent droughts and fast depleting ground water, climate change, it is envisaged that to counter the above mentioned challenges and also to bridge the demand-supply gap of fuelwood and fodder, the total available degraded forest areas and other common lands be planted within next 5 years. From Financial Year 2012-13 to 2016-17, 1.59 lac ha. planting will be undertaken in different models. Hence, this project document is prepared with the objective to achieve the goal of 20% Forest and Tree Cover (FTC) within the reasonable time frame.

FOREST LAND USE CLASSIFICATION AND AVAILABILITY

Out of the 3,42,239 Sq.Km. geographical area of the state, the total recorded forest area is 32701.35 Sq.Km., out of which 11,514 Sq.Km. is open forest, 4,450 Sq.Km. is moderately dense forest and only 72 sq. km. area is having very dense forests. The total degraded forest area including the scrub forests is 16665.35 sq.km., which has canopy cover from 0 to 10%. However, Open forest area is also degraded as its canopy cover ranges from 10% to 40%.

Other than forest areas, the following category of land is available for setting apart for afforestation:-

Waste lands: 68985 Sq. Km.

Waste lands not under cultivation- 4420Sq.Km.

Fallow lands- 42077 Sq. Km.

Permanent Pastures & Other Grazing Lands-11942 Sq. Km.

Not available for cultivation- 17257 Sq. Km.

Total Available Waste lands: 144681 Sq.Km.

To reach the 20% target additional land requirement for afforestation/reforestation is- 45000 Sq. Km.

ASSUMPTION

The total open forest area in the State as per FSI's State of the Forest Report, 2009 is 11514 sq.km. Out of this area almost 50% of the area is either in sanctuaries or National Parks where no further treatment is possible. Apart from that, plantations taken up in last 5 to 6 years are necessarily not reflected in the satellite imageries because canopy development starts in later stage of tree growth. Hence, it is presumed that out of the 11514 sq.km. open forests, only 50% area i.e.5750 sq.km. area is available for enrichment plantations under Aided Natural Regeneration Model.

The total degraded forest area having less than 10% crown density is 16665.35 sq. km. and is in very degraded form. It is presumed that out of total degraded forest area, nearly 50% of area, which is roughly 8000 sq.km. has depleted rootstock and 25% area roughly 4000 sq.km. is with skeletal soil. Besides that remaining 25% area of 4665 sq.km. is either totally barren or in precipitous slopes, with exposed rock surfaces without any soil cover, hence this area is excluded from the proposed action plan.

In 8000 sq. km. of area treatment is needed by planting of 500 saplings/ha under ***Rehabilitation of Degraded Forest –I (RDF-1) Model.***

In 4000 sq. km. of degraded forests with skeletal soils will be effectively fenced by loose stone /pucca wall to enhance the productivity and also to initiate succession process in the area again. Treatment of these areas is proposed under NREGS. These areas will be taken up in Phase-II & onwards. These areas are not included in the Phase-I.

ACTION PROGRAMME

Thus 3 categories of degraded forest areas are available for intensive treatment for enhancing their productivity. These are-

1. Category- A (With natural rootstock) – Treatment of these areas through Participatory Forestry

2. Category- B (With depleted rootstock) – Treatment of these areas through Participatory Forestry

3. Category- C (With skeletal soil cover)- These areas will be treated departmentally without JFM approach.

In case of Category- A and Category B forest land, with natural root stock, the rehabilitation of such land would be brought about through Joint Forest Management (JFM) approach by involving the local communities, living in the fringe areas of the forests, wildlife sanctuaries and National Parks, while in the Category-C areas, it would be done departmentally without JFM approach. These works will be undertaken in NREGS.

TREATMENT

I- Forest Land-

Separate strategies will be adopted for treating the different categories of forest land, which need to be brought under forest cover. These are –

1. Treatment of Category-A Areas (Open Forest Areas With Natural Rootstock)-

Roughly 5750 sq. km. area is available for treatment in this category. Thus, these areas are suitable for management under the JFM programme. Such areas will be treated by applying ***Aided Natural Regeneration (ANR) Model*** *(Annexure- 3).* Emphasis will be given on indigenous species with intensive soil moisture conservation measures.

2. Treatment of Category B areas (Degraded Areas with depleted rootstock)-

Roughly 8000 sq.km. area is available in this category. The partially degraded areas with depleted rootstock, require very careful and scientific treatment through technology based plantations of fuelwood, fodder and timber species with substantial investment and technological inputs. Such areas will be treated by applying ***Rehabilitation of Degraded Forest- I & II (RDF-I & II) Models (Annexure-1& 2)*** through JFM approach. In this area, in contrast to category- A areas where 200 plants/ha. are planted; here 500 plants/ha. will be planted, besides intensive soil moisture conservation measures.

3. Treatment of Category- C areas (With skeletal soils)-

Such areas are heavily degraded and under heavy biotic pressure. These areas are either treeless or with few scattered trees and with skeletal soils. Approximately 4000 sq.km. area falls under this category. Such areas will be fenced by loose stone/pucca wall fencing and will be treated by planting/sowing the *Acacia Senegal* and other suitable hardy plant species of primary colonizer nature. These works will be undertaken departmentally in NREGS in Phase –II & onwards. The rest of the 4665 Sq. Km. area, which is totally barren, is excluded from the Action Plan.

CHAPTER IX

FINANCIAL REQUIREMENT

FUNDS REQUIRED –

It is not possible to calculate exact investment requirement for the next 5 years because of inflationary trends and increase in wage rates. However, for greening of 159000 hectares of degraded forest lands and pucca fencing of vulnerable forest area through MNREGA an amount of *Rs. **988.56*** crores will be required. The amount is subject to revision with the increase in wage rates and material cost from time to time. The details of the physical and financial targets as been given in Annexure 1.

FUNDING SOURCES-

It is apparent that to treat the available degraded forest land and other common lands, a huge staggering sum of amount will be required. At present there is no definite assurance of fund availability other than MNREGA. But from the past experience it is seen that planting related activities being highly time bound programme labour unavailability in time would jeopardise the entire effort. Since, MNREGA is a demand driven programme, during actual need of labour for planting, sufficient number of labour do not turn out, because in rural areas at that time agricultural activities remain in peak.

Looking to the large demand of funds and requirement of manpower, the entire operation of treating maximum area of the degraded forests of the state, within 5 years has been proposed assuming that funds will be available from MNREGA, and RIDF-

XVIII, in continuity for the proposed project period of 5 years. In this backdrop, for next five years i.e. 2012-13 to 2016-17, a modest target for treatment of **159000 ha.** of degraded forests and other common lands has been planned, requirement of funds is stated in separate annexures. However, as per availability of funds from other sources, more area can be treated for which the Forest Department will make special efforts.

Looking to the experience of coming five years, treatment operations of degraded forest land and other common lands of the State can be up scaled or downscaled and exact requirement of funds can be predicted at the beginning of 5 years slab. Therefore price escalation @2% per annum and physical contingency of 5% have been added to the project cost

CONVERGENCE THROUGH MNREGA

It is proposed that out of the total funds required for the implementation of the project under RIDF-XVIII, the cost of Pucca Fencing of vulnerable areas has been proposed to be met from MNREGA. Whereas other activities of the project would be implemented from the funds made available by NABARD under RIDF-XVIII. After the completion of five years or after the project period the maintenance of the plantations raised under this project would be done through MNREGA.

CHAPTER X

PROJECT BENEFITS

The project will generate both the tangible and intangible benefits in the form of goods and services to the society. The major tangible benefits will be in the form of fuel wood, dry fallen wood, timber, small timber, fodder, grasses and other Non Timber Forest Products. The intangible benefits will by way of soil and moisture conservation, improvement in the ground water regime, moderating the extremes of temperatures, reducing desertification resulting into enhanced productivity of the land and improvement in general environmental conditions.

BASIS OF ESTIMATION

It is quite difficult to make accurate estimation of the output from the various project components for various types of site conditions, as the authentic data are not available. However, the projections have been based on the data collected from some sites during the working of forests and man made plantations. Output of various forest products for different project components for

Estimation of the output from environmental plantations, soil & moisture activities and pucca fencing of vulnerable areas have not been done because the intangible benefits of these components are much more if they are maintained and conserved.

Table- 10.1

PROJECT BENEFITS (Per Ha)

		AREA (Ha)	TIMBER (cum)	SMALL TIMBER (cum)	GRASS (QUINTALS)	DRY /FALLEN WOOD (Qt.)	MFP (Kg)	FRUITS (Kg.)	FUELWOOD (QUINTALS)	
	RATE PER UNIT---->		7000	6000	200	300	25	20	300	300
	HARVESTING YEAR		25th	25th	2nd to 25th	12th to 25th	6th to 25th	10th to 25th	12th	25th
1	REHABILITATION OF DEGRADED FORESTS - I	48,000								
	PLANTED TREES		10	30	7.5	20	100	100	100	400
	NATURAL TREES		0	0	0	0	0	0	0	0
	TOTAL QUANTITY		10	30	180	280	2000	1600	100	400
	TOTAL AMOUNT (Rs.)		70000	180000	36000	84000	50000	32000	30000	120000
							0	0	0	0
2	REHABILITATION OF DEGRADED FORESTS - II	60,000								
	PLANTED TREES		5	20	5	10	50	50	25	300
	NATURAL TREES		5	10	2.5	10	50	50	25	100
	TOTAL QUANTITY		10	30	180	280	2000	1600	50	400
	TOTAL AMOUNT (Rs.)		70000	180000	36000	84000	50000	32000	15000	120000
3	ASSISTED NATURAL REGENERATION	50,000								
	PLANTED TREES		8	20	5	10	100	100	50	350
	NATURAL TREES		22	20	0	0	0	0	10	150
	TOTAL QUANTITY		30	40	120	140	2000	1600	60	500
	TOTAL AMOUNT (Rs.)		210000	240000	24000	42000	50000	32000	18000	150000
4	FARM FORESTRY (PER 1000 TREES)	300								
	PLANTED TREES		20	40	0	30	0	400	150	450
	TOTAL QUANTITY		20	40	0	420	0	400	150	450
	TOTAL AMOUNT (Rs.)		140000	240000	0	126000	0	8000	45000	135000

TOTAL OUTPUT

Based on the above tables the total output of various forest products from the project has been worked out in the table below:.

TABLE - 10.2

TOTAL PRODUCTION OF VARIOUS FOREST PRODUCTS DURING THE PROJECT PERIOD

		AREA	TIMBER	SMALL TIMBER	GRASS	DRY /FALLEN WOOD	MFP	FRUITS	FUEL-WOOD
		Ha	million cum	million cum	million tonnes	million tonnes	million tonnes	million tonnes	million tonnes
	RATE PER UNIT (PER HA) --->>		10000	8000	300	250	50	40	300
1	REHABILITATION OF DEGRADED FORESTS-I	48,000							
	TOTAL QTY.		0.48	1.44	0.864	1.344	0.096	0.0768	2.4
2	REHABILITATION OF DEGRADED FORESTS II	60,000							
	TOTAL QTY.		0.6	1.8	1.08	1.68	0.12	0.096	2.7
3	ASSISTED NATURAL REGENERATION	50,000							
	TOTAL QTY.		1.5	2	0.6	0.7	0.1	0.08	2.8
4	FARM FORESTRY	1,000							
	TOTAL QTY.		0.02	0.04	0	0.042	0	0.0004	0.06
5	**PANCHAYATI LAND PLANTATION**	1,000							
	TOTAL QTY.		0.03	0.15	0.07	0.0105	0.02	0.0001	0.03
	TOTAL QUANTITY		**2.63**	**5.43**	**2.61**	**3.78**	**0.34**	**0.25**	**7.99**
	TOTAL AMOUNT(Rs.in million)		**26300**	**43440**	**784.2**	**944.125**	**16.8**	**10.132**	**2397**
	GRAND TOTAL (Rs. In millions)	**73892.257**							

EMPLOYMENT GENERATION

The details of mandays to be generated due to implementation of the project are given in the table – 10.3 It will be seen from the table that about 55 million mandays are expected to be generated due to project implementation over 5 years period.

TABLE – 10.3

ANNUAL MANDAYS TO BE GENERATED IN THE PROJECT

		Year					
S.No.	Type of Work	1	2	3	4	5	Total
1	RDF -I	35.18	38.49	33.66	29.15	13.90	150.38
2	RDF-II	35.06	37.31	37.87	30.08	11.15	151.47
3	ANR	10.74	15.66	18.07	19.37	9.93	73.76
4	PANCHAYAT LAND PLANTATION	0.61	0.94	1.04	1.06	0.47	4.13
5	SEEDLING DISTRIBUTION	1.18	1.51	1.51	1.51	0.33	6.03
6	CREATION OF NEW NURSERIES	0.24	0.41	0.41	0.16	0.00	1.22
7	DEVELOPMENT OF OLD NURSERIES	0.12	0.16	0.16	0.16	0.04	0.65
8	SOIL & MOISTURE CONSERVATION STRUCTURES	39.41	27.81	23.77	18.95	15.46	125.39
9	CONVERGENCE THROUGH MNREGA	6.65	6.71	6.77	6.77	6.77	33.68
	Total	129.20	129.01	123.27	107.21	58.05	546.73

CONCLUSION

It has been estimated that by implementing the Project for Greening of Rajasthan under RIDF-XVIII the state, the department would not only fulfill the objective of increasing the vegetal coverage in the state but also fulfill the basic need of timber, small timber, fuel wood, fodder, non timber forest produce and fruits of local people especially the weaker sections of the society like women and tribals. In addition the moisture regime of the area will improve because of soil & moisture conservation activities leading to improvement of the economic condition of the pupil residing in the area by the way of increased agriculture production, production of fruits, small timber and fuelwood. In financial terms the total benefit from the project over a period of 25 years will be to the tune of Rs**. 7390** crores, besides creation of about 55 million mandays from various project activities.