

**PROJECT DESIGN DOCUMENT FORM
FOR AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CCB-AR-PDD)**

**CLIMATE COMMUNITY AND BIODIVERSITY STANDARDS VERSION 1.0
PROJECT DESIGN DOCUMENT FORM FOR AFFORESTATION AND REFORESTATION
PROJECT ACTIVITIES (CCB-AR-PDD)**

Indian Farm Forestry Development Co-operative Limited (IFFDC) Wasteland Forestation Project



Plantations under Jaitpur Primary Farm Forestry Co-operative Society, Madhya Pradesh

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SECTION I. Basic data

This project activity is also proposed as CCX afforestation project.

Title of the proposed A/R CCB project activity:

**Indian Farm Forestry Development Co-operative Limited (IFFDC) Wasteland Forestation Project
Version No.: 1.0
Date: 04 May, 2009**

SECTION II. General Section

G1. Original Condition of Project Site

General Information

As per the agreement signed with India Canada Environment Facility (ICEF), Indian Farm Forestry Development Cooperatives (IFFCO) Limited has implemented the plantation project in the states of Uttar Pradesh, Madhya Pradesh and Rajasthan. The project activity has assisted farmers, especially women, to promote forestation on wastelands and marginally productive lands by organising Primary Farm Forestry Co-operatives (PFFCs) and thus making it a people's participative programme. The project has helped improving soil and water conservation and bring about ecological balance, and to generate consistent employment for the rural poor. The target group comprises of small and marginal farmers (men and women) owning less than two hectares and the landless whose percentage is above 90 percent.

The location of the project and basic physical parameters

Politically, India is divided into the following administrative hierarchy:

- I. State – India is a union of 28 States 7 Union Territories. States are governed by state governments.
- II. District- States are composed of many districts headed by district magistrates, also called collector.
- III. Tehsil- is a unit under district and is headed by Tehsildar
- IV. Blocks- blocks development units under Tehsil and are headed by BDO (Block Development Officer).A block may have several villages that are governed through local self government called Gram Panchayat (or village panchayat).

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The details of the districts covered by the project are as follows:

Table 1: Location of project sites

Sl No.	State	District	PFFCs	Total plantation sites	Area under plantation (Hectares)
1	Uttar Pradesh	Allahabad	1	1	135.00
		Kaushambhi	3	5	749.00
		Pratapgarh	9	22	1126.61
		Rae Bareli	6	12	935.50
		Unnao	1	2	186.00
		Sultanpur	9	14	1886.90
		Lucknow	1	3	140.00
2	Madhya Pradesh	Sagar	16	25	3245.00
		Tikamgarh	3	12	584.00
		Chhatarpur	3	3	387.00
3	Rajasthan	Udaipur	6	19	238.00
		Rajsamand	1	2	31.00
		Chittorgarh	6	12	199.00



Figure 1: Location of the states where the IFFDC Wasteland Forestation Project plantations are located

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Figure 2: Districts in Uttar Pradesh where IFFDC Wasteland Forestation Project plantations are located.

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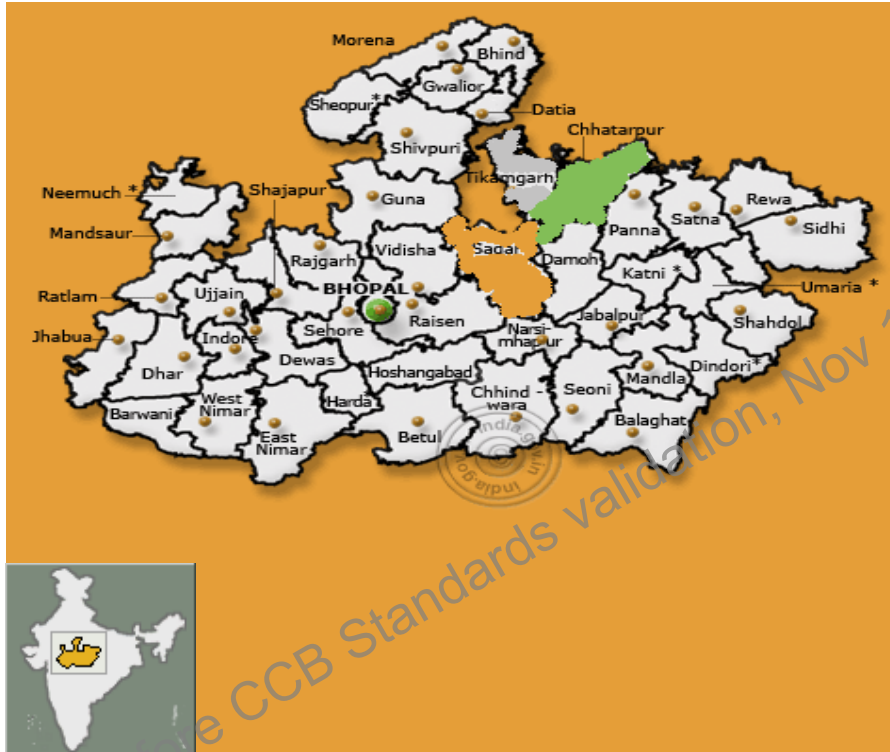


Figure 3 Districts in Madhya Pradesh where IFFDC Wasteland Forestation Project Plantations are located

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Figure 4 Districts in Rajasthan where IFFDC Wasteland Forestation Project plantations are located

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Physiographic Profile of Project Districts

The physiographic profile of the districts where the plantation project has been undertaken is as follows:

A. Uttar Pradesh

Table 2 Physiographic Profile of Project Regions (Districts) in Uttar Pradesh

Disrtict	Area (sqkm)	Topography	Soil Type ¹ (USDA)	Major Rivers	Major River Basin ²	Physiographic zone ³	Physiographic Unit ²
Allahabad	7261	Plain with slope towards south east; Located on Ganga-Yamuna divide	Ustochrepts Ustorthents Halaquepts, Natrustalfs	Ganga, Yamuna	Upper Ganga Basin	Northern Plain	Ganga Yamuna doab, Rohilkhand and Awadh Plain
Pratapgarh	3730	Plain with slope towards south east; Located on Ganga-Gomti divide	Ustochrepts Ustorthents Halaquepts, Natrustalfs	Ganga, Gomti	Upper Ganga Basin	Northern Plain	Ganga Yamuna doab, Rohilkhand and Awadh Plain
Kausambhi	2109	Plain with slope towards south east; Located on Ganga-Yamuna divide	Ustochrepts Ustorthents Halaquepts, Natrustalfs	Yamuna Ganga	Upper Ganga Basin and Yamuna Basin	Northern Plain	Ganga Yamuna doab, Rohilkhand and Awadh Plain
Lucknow	2528	Plain with slope towards south east. Located on the Ganga Ghagra Divide	Ustochrepts Ustifluvents Natrustalfs	Gomti	Upper Ganga Basin	Northern Plain	Rohilkhand and Awadh Plain
Rae Bareli	4609	Undulating Plain sloping from north-west to south-east	Ustochrepts Ustorthents Halaquepts, Natrustalfs	Ganga	Upper Ganga Basin	Northern Plain	Ganga Yamuna doab, Rohilkhand and Awadh

¹ Agro-Ecological Zones, their Soil Resource and Cropping Systems, K.S. Gajbhiye and C. Mandal, National Bureau of Soil Survey and Land Use Planning, Nagpur (agricoop.nic.in)

² cgwb.gov.in (Central Ground Water Board)

³ Forest Survey of India (<http://www.fsi.nic.in/sfr2003/Annexure-II.pdf>)

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							Plain
Sultanpur	4436	Undulating Plain sloping to north east towards Gomti valley interspersed with ravines along the rivers	Ustochrepts Ustifluvents Natrustalfs	Gomti	Upper Ganga Basin	Northern Plain	Rohilkhand and Awadh Plain
Unnao	4589	Undulating Plain sloping from north-west to south-east interspersed with ravines along the rivers	Ustochrepts Ustorthents Halaquepts, Natrustalfs	Ganga	Upper Ganga Basin	Northern Plain	Ganga Yamuna doab, Rohilkhand and Awadh Plain

B. Rajasthan

Table 3. Physiographic Profile of Project Regions (Districts) in Rajasthan

Disrtict	Area	Topography	Soil Type ⁴ (USDA)	Major Rivers	Major River Basin ⁵	Physiographic zone ⁶	Physiographic Unit ⁴
Chittorgarh	10856	Aravalli hills interspersed with deep river valleys	Ustochrepts Chromusterts Pellusterts	Chambal, Banas	Chambal Bain	Central Highlands	Madhya Bharat Plateau/ Western Malwa Plateau
Rajsamand	4550.93	Low ridges of Aravalli Range	Ustorthents Ustochrepts Fluventic Ustochrepts	Banas	Chambal Bain	Central Highlands	North Gujarat Plain (inclusion of Aravalli range and east Rajasthan Uplands)
Udaipur	14621	Low ridges of Aravalli Range forms watershed for a number of	Ustorthents Ustochrepts Fluventic Ustochrepts	Sabarmati, Som	Sabarmati and Chambal Basin	Central Highlands	North Gujarat Plain (inclusion of Aravalli range and east Rajasthan

⁴ Agro-Ecological Zones, their Soil Resource and Cropping Systems, K.S. Gajbhiye and C. Mandal, National Bureau of Soil Survey and Land Use Planning, Nagpur (agricoop.nic.in)

⁵ cgwb.gov.in (Central Ground Water Board)

⁶ Forest Survey of India (<http://www.fsi.nic.in/sfr2003/Annexure-II.pdf>)

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		seasonal rivers					Uplands)
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C. Madhya Pradesh

Table 4 Physiographic Profile of Project Regions (Districts) in Madhya Pradesh

Disrtict	Area	Topography	Soil Type ⁷ (USDA)	Major Rivers	Major River Basin ⁸	Physiographic zone ⁹	Physiographic Unit ⁷
Sagar	10252	Elevated plain broken by low Vindhyan hills	Ustochrepts Halaquepts Natrustalfs Haplustalfs Ochraqualfs Haplaquepts Ustorthents	Numerous small streams eg. Dhasan, Bina	Yamuna Basin	Central Highlands	Vindhyan Scarpland and Narmada Valley
Tikamgarh	5,048	Rolling plains of Buldelkhand plateau sloping towards north-east	Ustorthents Ustochrepts Chromusterts Haplustalfs Rhodustalfs	Betwa, Dhasan	Yamuna Basin	Central Highlands	Vindhyan Scarpland and Bundelkhand Plateau
Chhatarpur	8687	Rolling plains of Buldelkhand plateau sloping towards north-north-east and merging with gangetic plain	Ustorthents Ustochrepts Chromusterts Haplustalfs Rhodustalfs	Ken, Dhasan	Yamuna Basin	Central Highlands	Vindhyan Scarpland and Bundelkhand Plateau

The types and condition of vegetation at the project site

Forest Cover in the districts covered by the proposed project:

Most of the districts where the project has been undertaken do not have significant forest cover. The forest cover as assessed periodically by the Forest Survey of India is detailed below.

⁷ Agro-Ecological Zones, their Soil Resource and Cropping Systems, K.S. Gajbhiye and C. Mandal, National Bureau of Soil Survey and Land Use Planning, Nagpur (agricoop.nic.in)

⁸ cgwb.gov.in (Central Ground Water Board)

⁹ Forest Survey of India (<http://www.fsi.nic.in/sfr2003/Annexure-II.pdf>)

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Table 5 a Forest Cover Changes in the Project Districts

State	District	Forest Cover (sq km)						Percentage of land		
		Dense*			Open **			1991	1995	1999
		1991 ¹⁰	1995 ¹¹	1999 ¹²	1991	1995	1999			
Uttar Pradesh	Allahabad	17	17	15	35	34	37	0.72	0.7	0.7
	Pratapgarh	-	0	0	-	2	2	0	0.05	0.05
	Kausambhi	-	9	0	-	0	0	-	0.1	-
	Lucknow	2	7	7	15	22	24	0.67	1.15	1.22
	Rae Bareli	0	6	10	2	1	1	0.04	0.28	0.28
	Sultanpur	0	18	14	8	0	0	0.18	0.29	.33
	Unnao	0	34	2	0	0	0	0	0.3	0.3
Rajasthan	Chittorgarh	337	417	560	1191	1142	1037	14.07	14.36	18.9
	Rajsamand	-	-	-	-	68	-	-	-	-
	Udaipur [#]	1072	1414	1536	2096	2833	1718	18.33	18.79	27.3
Madhya Pradesh	Sagar	1552	1468	1183	803	876	1484	22.91	22.86	27.10
	Tikamgarh	76	68	51	187	182	183	5.21	4.95	7.15
	Chattarpur	1414	1353	846	200	258	716	18.58	18.54	18.62

* Above 40% crown cover

** less than 40% crown cover

includes Udaipur and Rajsamand Districts upto 1995

¹⁰ State of Forest Report, 1991, Forest Survey of India, Ministry of Environment and Forest, Government of India

¹¹ State of Forest Report, 1995, Forest Survey of India, Ministry of Environment and Forest, Government of India

¹² State of Forest Report, 1999, Forest Survey of India, Ministry of Environment and Forest, Government of India

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Table 5 b. Forest Cover Changes in Project Districts

State	District	Forest Cover (sq km)						Percentage of land		
		Dense*			Open **					
		2001 ¹³	2003 ¹⁴	2005 ¹⁵	2001	2003	2005	2001	2003	2005
Uttar Pradesh	Allahabad	143	28	28	18	69	69	3.13	1.89	2.37
	Pratapgarh	34	28	28	4	67	67	1.02	2.56	2.6
	Kausambhi	3	9	9	0	22	22	0.14	1.46	1.46
	Lucknow	115	115	115	14	183	183	5.10	11.79	11.79
	Rae Bareli	53	6	6	10	91	91	1.37	2.1	2.15
	Sultanpur	74	18	18	14	157	157	1.98	3.94	3.94
	Unnao	36	34	34	2	197	197	0.83	5.07	5.07
Rajasthan	Chittorgarh	602	581	576	1025	1094	1098	14.99	15.43	17.13
	Rajsamand	197	130	130	293	286	288	12.69	10.78	12.41
	Udaipur	1320	1379	1377	1609	1711	1717	21.83	23.03	26.92
Madhya Pradesh	Sagar	1292	1724	1708	1525	1198	1207	27.48	28.5	29.07
	Tikamgarh	127	101	96	227	224	208	7.01	6.44	6.83
	Chattarpur	971	844	863	723	862	834	19.5	19.64	20.34

* Above 40% crown cover

** 10-40% crown cover

*** Upto 10% crown cover

¹³ State of Forest Report,2001, Forest Survey of India, Ministry of Environment and Forest, Government of India

¹⁴ State of Forest Report,2003, Forest Survey of India, Ministry of Environment and Forest, Government of India

¹⁵ State of Forest Report,2005, Forest Survey of India, Ministry of Environment and Forest, Government of India

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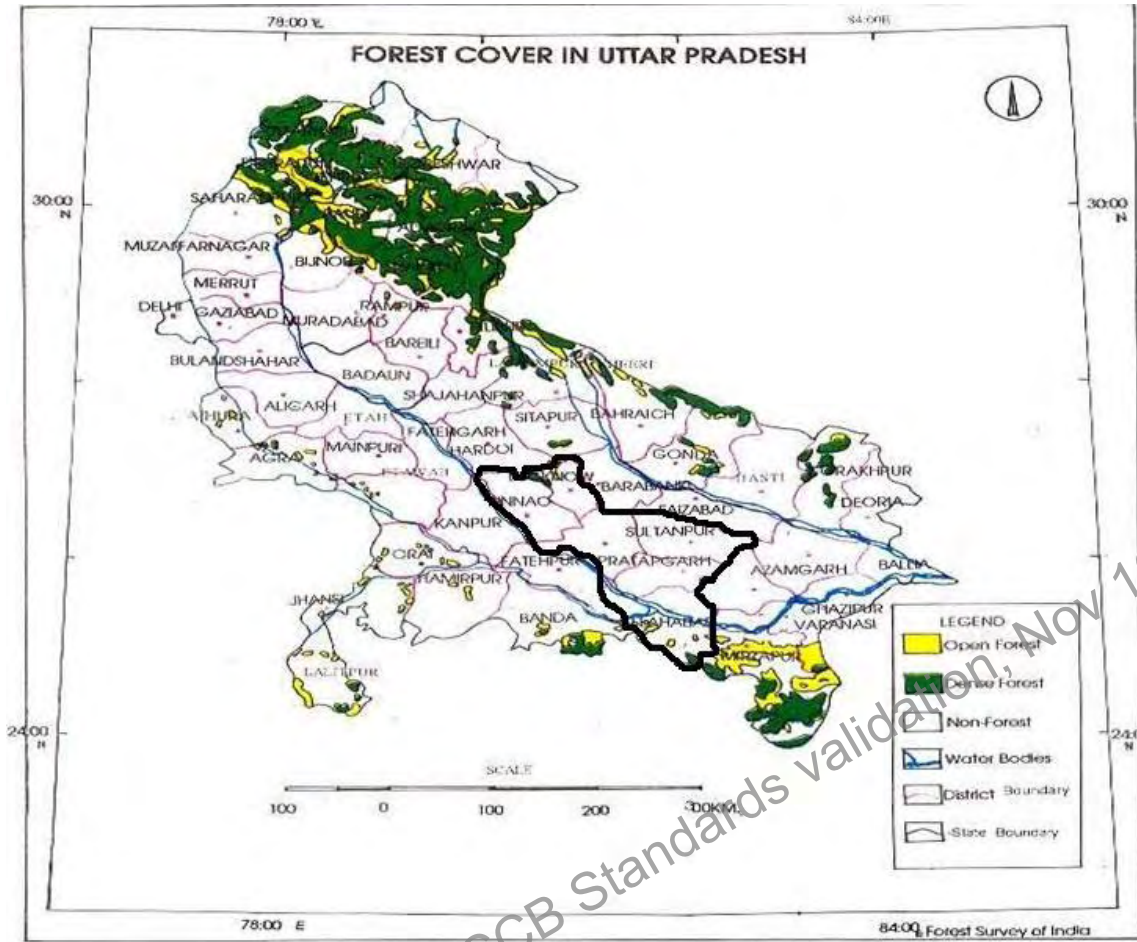


Figure 5. Forest Cover Map of Project Districts of Uttar Pradesh in 1995 (highlighted in black border) (State of Forest Report,1995,Forest Survey of India)

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Figure 6 Forest Cover Map of Project Districts of Uttar Pradesh in 2005 (highlighted in black border) (State of Forest Report,2005, Forest Survey of India)

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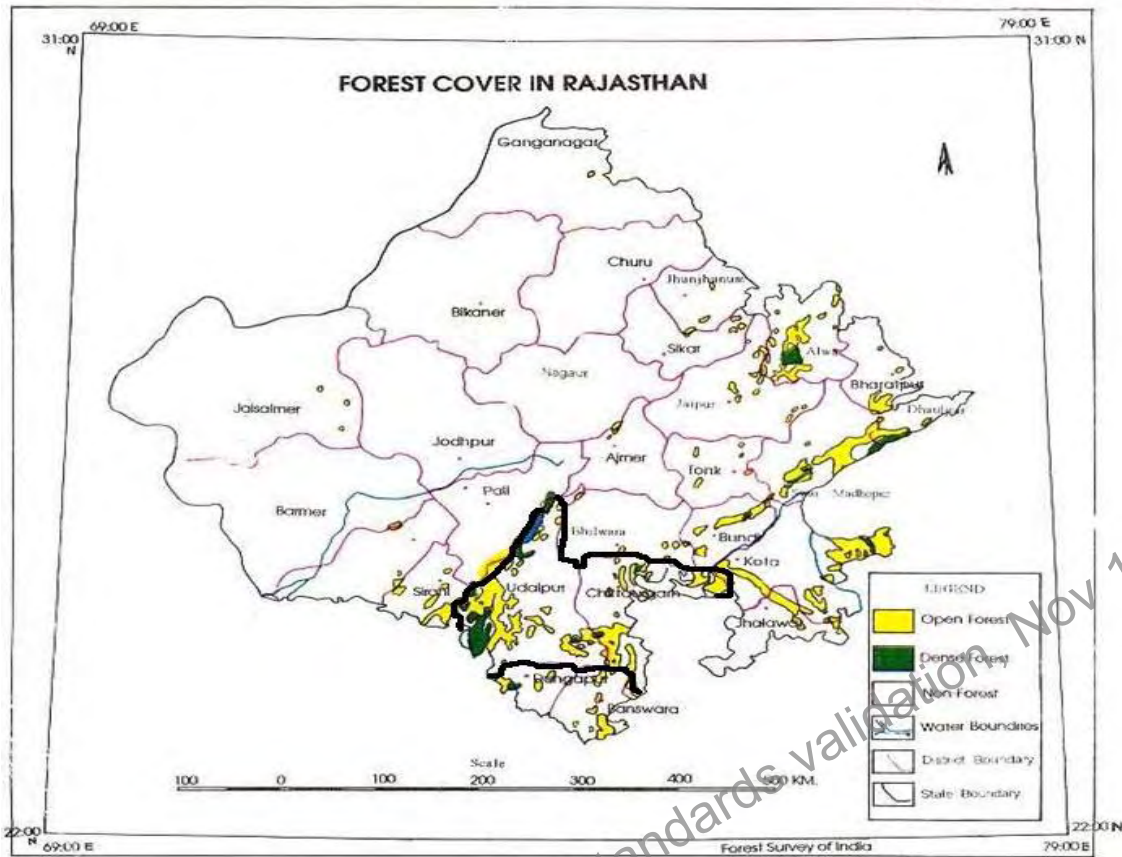


Figure 7 Forest Cover Map of Project Districts in Rajasthan in 1995 (Inter-state boundaries not highlighted) (State of Forest Report, 1995, Forest Survey of India)

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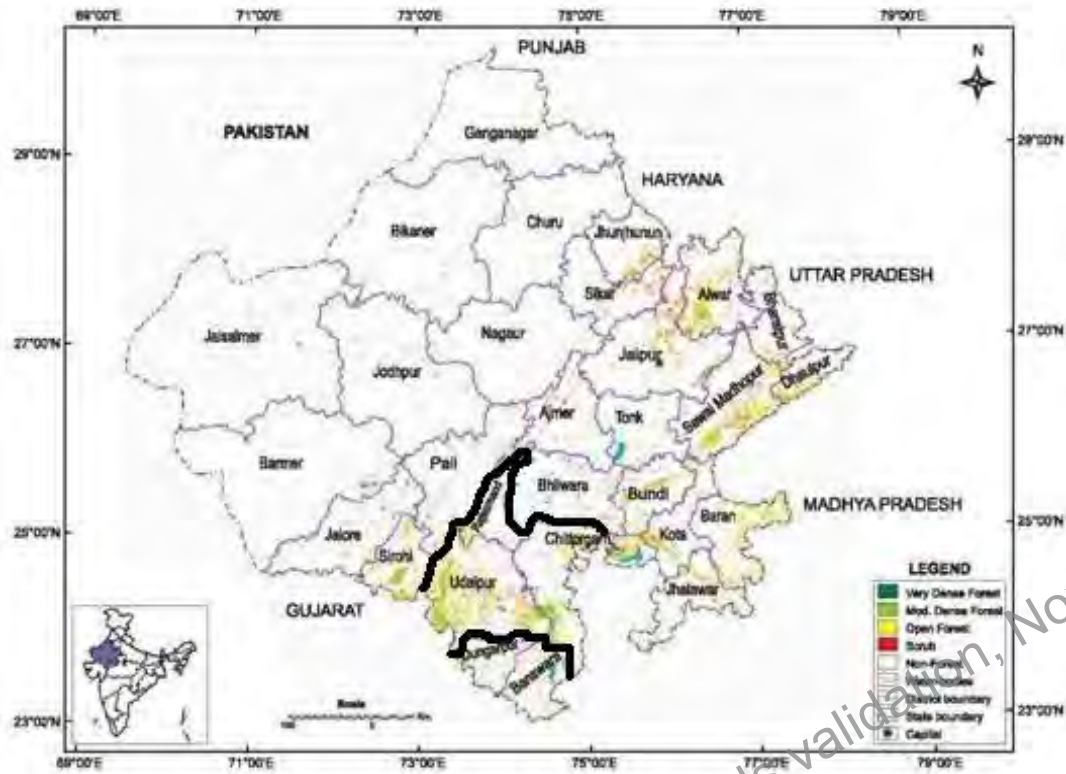


Figure 8 Forest Cover Map of Project Districts in Rajasthan in 2005 (Inter-state boundaries not highlighted) (State of Forest Report,2005, Forest Survey of India)

Project withdrawn before CCB Standards validation, Nov 16th, 2009

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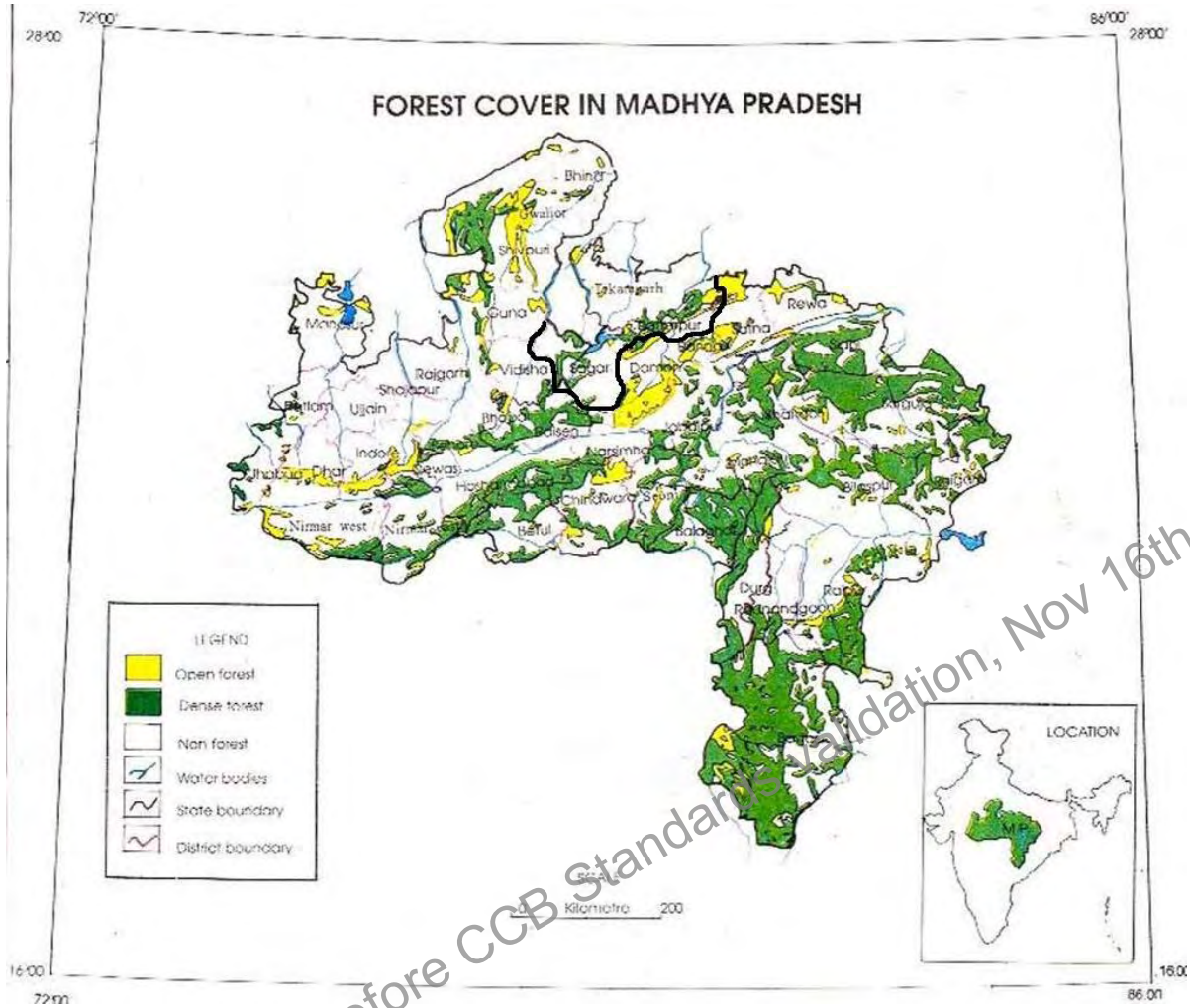


Figure 9 Forest Cover Map of Project Districts in Madhya Pradesh in 1995 (Inter-state borders not highlighted) (State of Forest Report,1995, Forest Survey of India)

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Figure 10 Forest Cover Map of Project Districts in Madhya Pradesh in 2005 (Inter-state borders not highlighted) (State of Forest Report,2005, Forest Survey of India)

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Vegetation Characteristics and types in the Project Zones:

The project districts are located in the arid and semi-arid region of the country which is reflected in the nature of natural vegetation of this region.

Table 6. Vegetation Characteristics in Project regions

S.N.	State	District	Principle Forest Types ¹⁶	Main Species
1	Uttar Pradesh	Allahabad	Northern dry mixed deciduous forest* (5B/C ₂) (Mainly edaphic and in various stages of degradation)	<i>Acacia leucophloea</i> , <i>Butea monosperma</i> and grass species like <i>Vetiveria</i> and <i>Imperata cylindrica</i>
2		Pratapgarh		
3		Kausambhi		
4		Lucknow		
5		Rae Bareli		
6		Sultanpur		
7		Unnao		
8	Rajasthan	Chittorgarh	Northern dry mixed deciduous forest (5B/C ₂)	<i>Anogeissus latifolia</i> , <i>Boswellia serrata</i> , <i>Sterculia urens</i> etc.
9		Rajsamand		
10		Udaipur		
11	Madhya Pradesh	Sagar	Southern Deciduous Dry Teak Forest (5A/C1b) and Southern Deciduous Very dry Teak Forest (5A/C1a)	<i>Tectona grandis</i> , <i>Boswellia serrata</i> , <i>Acacia catechu</i> etc.
12		Tikamgarh		
13		Chattarpur		

(*According to the classification of forest types by H.G. champion and S.K. Seth, there are 16 primary groups of forest types in India. Group 5 is Tropical Dry Deciduous Forest. Sub-Group 5A is Southern Tropical Dry Deciduous Forest and 5 B is Northern Tropical Dry Deciduous Forest. The Sub-groups are further divided on the basis of dominant species and general species consociations. Mixed Forests does not have any easily discernable dominant species. Deciduous forests in India generally shed their leaves during the dry season i.e. February to May. New leaves sprout at the onset of monsoon rains in June)

¹⁶ A revised survey of the forest types of India; H. G. Champion and S. K. Seth, Government of India, 1968.

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Climate Information

Climate Profile of Project Regions

The climate variables of the project regions are as follows:

Table 7. Climate Characteristics in the Project Regions

State	District	Area (sqkm)	Climate variables		Eco-Region Sub-Type ¹⁷	Agro-ecological zone type ¹⁷
			Mean Temperature	Avg. Annual Rainfall ¹⁷		
Uttar Pradesh	Allahabad	7261	24-25°C	700-900	hot semi-arid ecosystem	4.3 N8Dm4
	Kausambhi	2109				
	Pratapgarh	3730	24-25°C	700-900	hot semi-arid ecosystem	4.3 N8Dm4
	Lucknow	2528	24-26 °C	700-1000	Hot dry sub-humid ecosystem	9.2 N8Cd5
	Rae Bareli	4609	24-25°C	700-900	hot semi-arid ecosystem	4.3 N8Dm4
	Sultanpur	4436	24-26 °C	700-1000	Hot dry sub-humid ecosystem	9.2 N8Cd5
	Unnao	4589	24-25°C	700-900	hot semi-arid ecosystem	4.3 N8Dm4
Rajasthan	Chittorgarh	10856	24-25°C	800-1000	hot semi-arid ecosystem	5.2 I5Dm4
	Udaipur		25-27°C	500-850	hot semi-arid ecosystem	4.2 P14Dd3
	Rajsamand		25-27°C	500-850	hot semi-arid ecosystem	4.2 P14Dd3
Madhya Pradesh	Sagar	10252	25-26°C	1000-1200	Hot dry sub-humid ecosystem	10.1 I5Cd5
	Tikamgarh	5,048	25-26°C	1000-1200	Hot dry sub-humid ecosystem	10.3 I6Cd5
	Chhatarpur	8687	25-26°C	1000-1200	Hot dry sub-humid ecosystem	10.3 I6Cd5

Current carbon stocks at the project site

¹⁷ Agro-Ecological Zones, their Soil Resource and Cropping Systems, K.S. Gajbhiye and C. Mandal, National Bureau of Soil Survey and Land Use Planning, Nagpur (agricoop.nic.in)

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The pre-project net removals in the project sites has been quantified and detailed in the table below. The estimated net removals in the project sites in the absence of the project activity has also been estimated as below.

Table 8. Estimated Net Removals in the Project sites in absence of Project Activity

Year	Net Removals scenario	Rajasthan	Madhya Pradesh	Uttar Pradesh	Total
1995	Pre-Project	14.25	156.05	17.46	187.76
1996	Without Project Scenario	14.25	156.05	17.46	187.76
1997		14.25	156.05	17.46	187.76
1998		14.25	156.05	17.46	187.76
1999		14.25	156.05	17.46	187.76
2000		14.25	156.05	17.46	187.76
2001		14.25	156.05	17.46	187.76
2002		14.25	156.05	17.46	187.76
2003		14.25	156.05	17.46	187.76
2004		14.25	156.05	17.46	187.76
2005		14.25	156.05	17.46	187.76
2006		14.25	156.05	17.46	187.76
2007		14.25	156.05	17.46	187.76
2008		14.25	156.05	17.46	187.76
2009		14.25	156.05	17.46	187.76
2010		14.25	156.05	17.46	187.76

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Community Information

Description of communities located in and around the project area

The statistics regarding local communities in the project districts is detailed in Table 9 below:

Table 9. Description of Local communities in Project regions

S.N	State	District	Population	Sex ratio	Scheduled caste population	Scheduled Tribe Population	Literacy Rate (%)
1	Uttar Pradesh ¹⁸	Allahabad	4941510	882	21.60% ¹⁹	0.08%	62.89
2		Pratapgarh	2727156	983	22.04 ²⁰	0.01%	58.67
3		Kausambhi	1294937	894	-	-	48.18
4		Lucknow	3681416	827	21.90% ²¹	0.04%	69.39
5		Rae Bareli	2872204	949	29.83%	0.06%	55.09
6		Sultanpur	3190926	935	22.30% ²²	7.00%	56.90
7		Unnao	2700426	898	30.63% ²³	0.04%	55.72
8	Rajasthan	Chittorgarh	1803524 ²⁴	964	13.90%	21.53%	54.37
9		Rajsamand	987024	1001	12.41%	13.09%	55.65 ²⁵
10		Udaipur ²⁶	2632000	971	6.00%	47.80%	59.00
11	Madhya Pradesh ²⁷	Sagar	2,021,783	884	20.54%	9.72%	68.08
12		Tikamgarh	1,203,160	886	24.28%	4.32%	55.80
13		Chattarpur	1,474,633	869	23.26%	3.50%	53.44

¹⁸ <http://upgov.nic.in/>

¹⁹ <http://www.638387.org/allahabad/view.asp>

²⁰ <http://www.empowerpoor.com/districtdetail.asp?district=80>

²¹ http://nied.org/Dst_Lucknow.asp

²² <http://sultanpur.nic.in/tab1.htm>

²³ <http://www.empowerpoor.com/districtdetail.asp?district=84>

²⁴ http://sje.rajasthan.gov.in/About%20Deptt/About_districtpopu.htm

²⁵ <http://rajsamand.nic.in/glance.htm>

²⁶ <http://udaipur.nic.in/>

²⁷ www.empowerpoor.com

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Description of current land use and land tenure at the project site

The pre-project land use and land tenures in the project sites for different states are as follows:

- I. Uttar Pradesh: The land selected for plantation in Uttar Pradesh were mostly degraded, eroded gullied lands (belonging to individual farmers and local panchyat) near local streams and rivers covered with mostly isolated vegetation and privately owned marginal unused lands.
- II. Madhya Pradesh: The lands selected are mostly barren plain or undulating degraded lands devoid of any significant woody vegetation. Being barren and devoid of major vegetation cover, these areas were subjected to erosion and further degradations. These lands are owned by the revenue department of the government of Madhya Pradesh.
- III. Rajasthan: The lands within the project boundary are local government owned pastureland which has been in degraded condition in the pre-project period as reflected from PRA reports. The local people used to graze their livestock only occasionally as these lands were too degraded to support these livestock throughout the year.

Biodiversity Information

Description of current biodiversity in the project area and threats to that biodiversity:

The floral biodiversity of the project sites was assessed through root-stock analysis during PRAs and Baseline surveys conducted prior to the plantation activity. The tree species found in the project sites during baseline surveys were separately recorded for each PFFCS. The common species of plants found in the project areas are listed in the Table below.

Table 10. Common tree species found in plantation sites in pre-project period

S.N.	State	Plants	Common Name
1	Uttar Pradesh	<i>Terminalia arjuna</i>	Arjun
		<i>Acacia nilotica</i>	Desi Babool
		<i>Emblica officinalis</i>	Aonla
		<i>Psidium guajava</i>	Amrood
		<i>Albizia procera</i>	Kanji, siras
2	Rajasthan	<i>Acacia leucophloea</i>	Ronjh
		<i>Acacia nilotica</i>	Desibabool
		<i>Zizyphus xylopyra</i>	Ber
		<i>Azadirachta indica</i>	Neem xylopyra
		<i>Acacia catechu</i>	Khair

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		<i>Butea monosperma</i>	Plash, Dhak
3	Madhya Pradesh	<i>Acacia catechu</i>	Khair
		<i>Acacia nilotica</i>	Desibabool
		<i>Azadirachta indica</i>	Neem
		<i>Butea monosperma</i>	Plash, Dhak
		<i>Acacia leucophloea</i>	Ronjh
		<i>Dyospiros melanoxylon</i>	Tendu, bidipatta
		<i>Tectona grandis</i>	Teak, sagon
		<i>Zyziphus xylopyra</i>	Ber
		<i>Pongamia pinnata</i>	Karanj
		<i>Dalbergia sisoo</i>	Shisham
		<i>Writia tinctoria</i>	Dudhi

List of all IUCN Red List threatened species and species on nationally recognized list found within the project boundary

No threatened species of animals listed in IUCN Red List were found to inhabit the project sites.

G2. Baseline Projections

Description of the most likely land-use scenario in the absence of the Project activity

As per the applied accounting methodology AR-ACM001v2.0, the “Combined tool to identify the baseline scenario and demonstrate the additional in A/R CDM project activities” has been applied to identify the most probable baseline scenario.

STEP 0. Preliminary screening based on the starting date of the A/R project activity

The project start date is 1 April, 1995 and qualifies to earn early action credits as per CCX Rule Book.

STEP 1. Identification of alternative land use scenarios to the proposed A/R project activity

Stratum RJ 1:

Sub-step 1a: Identify credible alternative land use scenarios to the proposed project activity

A list of plausible alternative Land use scenarios for the project activity is given below:

1. Land reforested without carbon credit project
2. Land degradation as *status quo*

Outcome of Sub-step 1a:

Demonstration that under the plausible scenarios identified in Step 1a, the most plausible scenario is that the project areas would remain abandoned and degrading in absence of the project activity

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The lands within the project boundary are local government owned pastureland which has been in degraded condition in the pre-project period as reflected from PRA reports. The local people used to graze their livestock only occasionally as these lands were too degraded to support these livestock throughout the year.

State level Forestry Schemes

The state government of Rajasthan initiated several afforestation schemes (both externally aided and funded by state and central government) in various parts of the state. They have been listed below:

- i) Rural Fuelwood Plantation Scheme (Sixth 5-year Plan)
- ii) Afforestation and Pasture Development in I.G.N.P. (JBIC)(1992-2002)²⁸
- iii) Joint Forest Management Scheme (since 2001)
- iv) Aravalli Afforestation Project²⁹

The above are community based afforestation projects implemented with low degrees of success. Rural Fuelwood Plantation Scheme was implemented in Udaipur, Jaipur and Ajmer districts but the survival rate was very poor due to heavy grazing, lack of rainfall and poor site conditions³⁰. While the project sites of IFFDC in Rajasthan were outside the purview of Afforestation and Pasture Development in I.G.N.P. (JBIC) Scheme, JFM is restricted to degraded forest areas owned by the forest department only. The Aravalli Afforestation Project (AAP) was implemented as the same time period (and preceded IFFDC by a few years) and covered the project districts (Udaipur and Chittorgarh) of IFFDC, but the project areas of IFFDC were not covered by the project as the project was mainly concentrated in areas managed by Joint forest Management committees which include only forest department areas.

Apart from the above projects as discussed, there is no other scheme which covers the degraded community pasturelands as covered by IFFDC. Therefore, without the IFFDC A/R project activity the project area would not have been reforested, and with the project activity the goals of the on-going reforestation programs or policies were not reduced in Stratum RJ 1.

Sub-step 1b: Consistency of credible alternative land use scenarios with enforced mandatory applicable laws and regulations

There is *no* existing mandatory applicable law and regulation for any alternative land use in the project areas included for plantations.

²⁸ 203.179.38.26/english/operations/evaluation/jbic_archive/post/2004/pdf/2-41_full.pdf

²⁹ www.jica.go.jp/english/operations/evaluation/jbic_archive/post/2001/pdf/e_theme_07_smry_01.pdf

³⁰ Ram Prasad & P. Bhatnagar;(1995) Social Forestry Experiences Over A Decade,IBD, Dehradun, pp. 49-50

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Stratum MP 1:

Sub-step 1a: Identify credible alternative land use scenarios to the proposed project activity

A list of plausible alternative Land use scenarios for the project activity is given below:

1. Land reforested without carbon credit project
2. Land degradation as status quo

Outcome of Sub-step 1a:

Demonstration that under the plausible scenarios identified in Step 1a, the most plausible scenario is that the project areas would remain abandoned and degrading in absence of the project activity

This stratum consisted of barren plain or undulating degraded lands devoid of any significant woody vegetation. Being barren and devoid of major vegetation cover, these areas were subjected to erosion and further degradations. These lands are owned by the revenue department of the government of Madhya Pradesh. The Madhya Pradesh government has over the past decades taken up some projects to promote forest development activities in non-forest land.

- i) Social Forestry Scheme (late 1970's and 1980's)
- ii) Rural Fuelwood plantation Scheme
- iii) Tree Growers Co-operative Scheme (1990's)
- iv) Lok Vaniki (1999 onwards)

The Social Forestry Project was carried out with USAID and government funding since 1977-78³¹ and targeted vacant lands under panchayat and government ownership. But the extensive vacant government revenue lands provided to IFFDC were never brought under any plantations for various economic and administrative constraints like lack of co-ordination between different government departments, lack of community mobilization etc. Same was the case with Rural Fuelwood Plantation Scheme. The Tree Growers Co-operative Scheme was promoted by National Tree Growers' Co-operative Federation Limited, Anand and envisaged the rehabilitation of one lakh hectares of degraded forest areas through villages level Tree-Growers' Co-operative Societies (TGCS) under the auspices of MP State Forest Development Corporation. But the progress was impeded due to procedural constraint in acquiring degraded forest land and due inability to procure adequate funding, new areas were not brought under plantation and the project could not be sustained^{14,32}.

The Lok Vaniki Project was initiated in 1999 by MP forest Department for proper management and incentivizing maintenance of small forest patches in private land and also joint forest management of

³¹ Ram Prasad & P. Bhatnagar;(1995) Social Forestry Experiences Over A Decade,IBD, Dehradun, pp. 82-86

³² K. Balooni and K. Singh,(1994), Role of Nabard in Financing Social Forestry Programmes including Afforestation of Wasteland in India, Working Paper 56, IRMA, Anand, India

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degraded forests. But this scheme too hasn't concentrated on vacant revenue lands but on existing private forest patches and degraded forest lands³³.

Only under circumstances where no alternatives existed, the District Magistrate, who regulates the usage of revenue land at district level leased the land to IFFDC for wasteland development and environmental amelioration after carefully segregating wastelands and vacant lands. Therefore, without the IFFDC A/R project activity the project area would not have been reforested, and with the project activity the goals of the on-going reforestation programs or policies were not reduced.

Sub-step 1b: Consistency of credible alternative land use scenarios with enforced mandatory applicable laws and regulations

There is *no* existing mandatory applicable law and regulation for any alternative land use in the project areas included for plantations.

Stratum MP II:

Sub-step 1a: Identify credible alternative land use scenarios to the proposed project activity

A list of plausible alternative Land use scenarios for the project activity is given below:

1. Land reforested without carbon credit project
2. Land degradation as status quo

Outcome of Sub-step 1a:

Demonstration that under the plausible scenarios identified in Step 1a, the most plausible scenario is that the project areas would remain abandoned and degrading in absence of the project activity

This stratum consists of barren hilly degraded lands devoid of any significant woody vegetation. Being barren and devoid of major vegetation cover, these areas are subjected to erosion and further degradation. Hilly terrain also accelerates the process of degradation and makes stabilization measures of the land difficult in the absence of vegetation cover. These lands are owned by the revenue department of the government of Madhya Pradesh. Thus the policies determining the possibility of alternate land use are the same as described for Stratum MP I. From the review of policies as discussed earlier, without the IFFDC A/R project activity the project area would not have been reforested, and with the project activity the goals of the on-going reforestation programs or policies were not reduced.

Sub-step 1b: Consistency of credible alternative land use scenarios with enforced mandatory applicable laws and regulations

There is *no* existing mandatory applicable law and regulation for any alternative land use in the project areas included for plantations.

³³ <http://www.forest.mp.gov.in/lokvaniki.html>

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Stratum UP I:

Sub-step 1a: Identify credible alternative land use scenarios to the proposed project activity

A list of plausible alternative Land use scenarios for the project activity is given below:

1. Land reforested without carbon credit project
2. Land degradation as status quo

Outcome of Sub-step 1a:

Demonstration that under the plausible scenarios identified in Step 1a, the most plausible scenario is that the project areas would remain abandoned and degrading in absence of the project activity

This stratum consists of degraded, eroded gullied lands near local streams and rivers bearing isolated trees which are not adequate to check the continued erosion. In most of the gullied areas, the top layers of the soil have been washed away and there is no possibility of rejuvenation of the land without plantations and tree cover. These lands are mainly owned by individual farmers and local government bodies (*panchayats*). The principle project undertaken by Uttar Pradesh for such lands is Social Forestry project (1978-92) aided by the World Bank³⁴. Plantation through farm forestry and village community land constituted only 17% of the total plantations proposed under this scheme³⁵. But degraded lands of individual farmers were not brought under the project in any planned manner. The land areas acquired by IFFDC were mainly such individual and panchayat lands which had not been covered by the these projects. In the absence of other alternate projects for such land, without the IFFDC A/R project activity the project area would not have been reforested, and with the project activity the goals of the on-going reforestation programs or policies were not reduced.

Sub-step 1b: Consistency of credible alternative land use scenarios with enforced mandatory applicable laws and regulations

There is *no* existing mandatory applicable law and regulation for any alternative land use in the project areas included for plantations.

Stratum UP II:

Sub-step 1a: Identify credible alternative land use scenarios to the proposed project activity

A list of plausible alternative Land use scenarios for the project activity is given below:

1. Land reforested without carbon credit project
2. Land brought under agriculture
3. Land degradation as status quo

Outcome of Sub-step 1a:

³⁴ Ram Prasad & P. Bhatnagar;(1995) Social Forestry Experiences Over A Decade,IBD, Dehradun, pp. 101

³⁵ Ram Prasad & P. Bhatnagar;(1995) Social Forestry Experiences Over A Decade,IBD, Dehradun, pp. 39

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Demonstration that under the plausible scenarios identified in Step 1a, the most plausible scenario is that the project areas would remain abandoned and degrading in absence of the project activity

This stratum consists of fallow lands/degraded lands mostly owned by individual farmers left vacant for various constraints like lack of irrigation, lack of fertility etc. Unlike Stratum UP I, which consisted on eroded gullied land, the areas in stratum II are fallow and left unutilized by the marginal farmers. As evident from PRA reports, despite the presence of irrigation facilities in these villages, these lands could not be brought under irrigation for two reasons:

- i. Lack of capital with small and marginal farmers required to develop the required infrastructure for irrigating their fields.
- ii. Most of the marginal farmers are from socially backward classes and they are deprived of the irrigation facilities since the big landlords of higher castes corner most of the resources. Since water has to be brought to the fields from the canals through others' property, the smaller farmers are deprived of the facility as they are prevented from routing their irrigation channels through the lands of higher castes. This has prevented the small landholders from irrigating their lands and hence the lots remain fallow³⁶. This is aggravated by the fact that these plots are less productive and require more fertilizer application for farming. But this is not possible as the fields cannot be irrigated.

Sub-step 1b: Consistency of credible alternative land use scenarios with enforced mandatory applicable laws and regulations

There is no mandatory law/ regulation that would have required that the project activities be undertaken anyway.

Description of the identified baseline scenario (separately for each stratum)

The identified baseline scenarios for the different strata are as follows:

Stratum RJI:

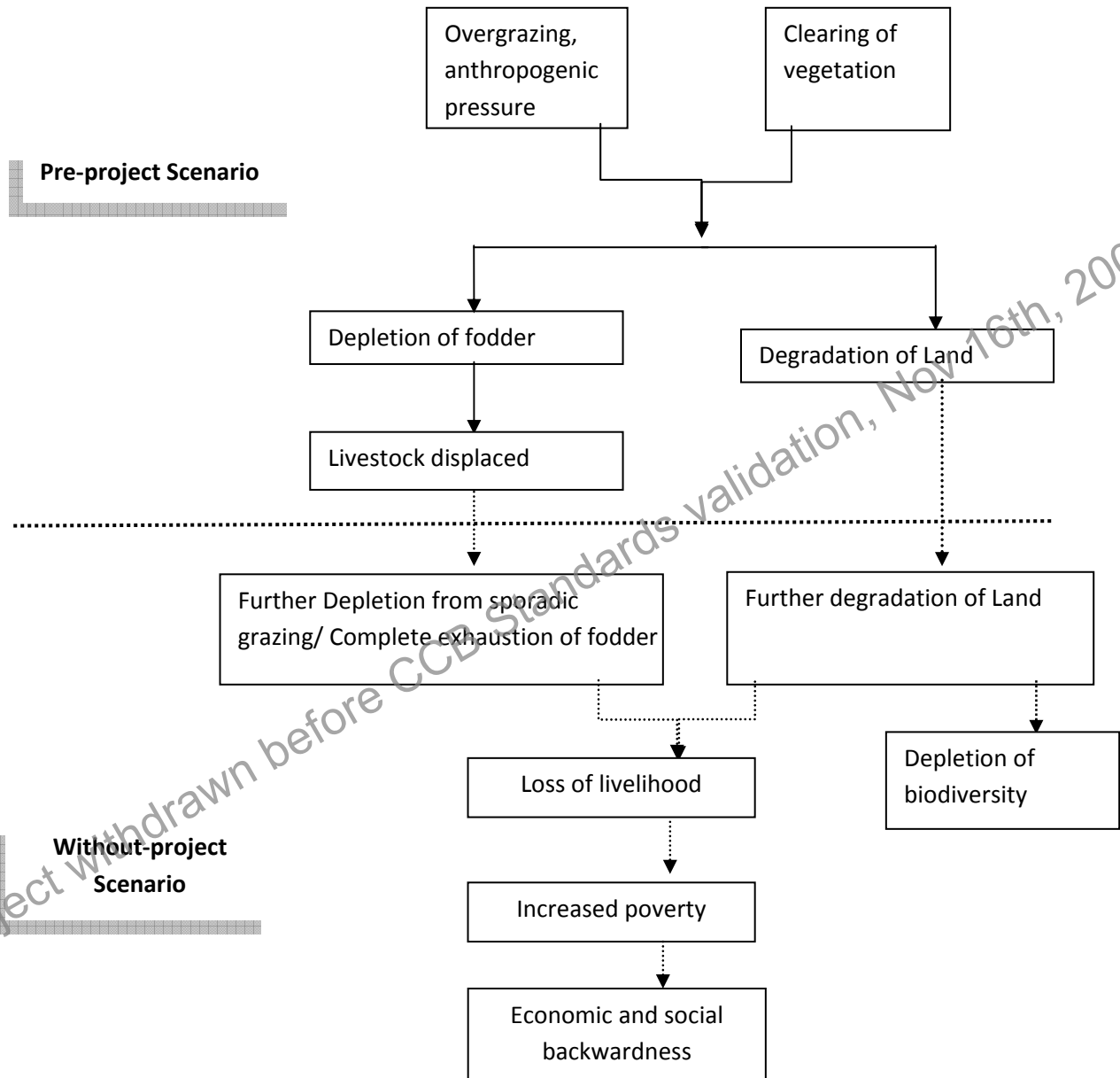
The baseline scenario for this stratum is degraded grasslands (ownership was with village level panchayats i.e. elected governing bodies) which would have continued to degrade in the absence of project activity. These lands were in the final stage of the cycle of land degradation which started with removal of tree cover, excess grazing stripping the land of all vegetation cover³⁷. During the rainy season

³⁶ PRA and interview with local communities

³⁷ PRA interviews in Rajasthan

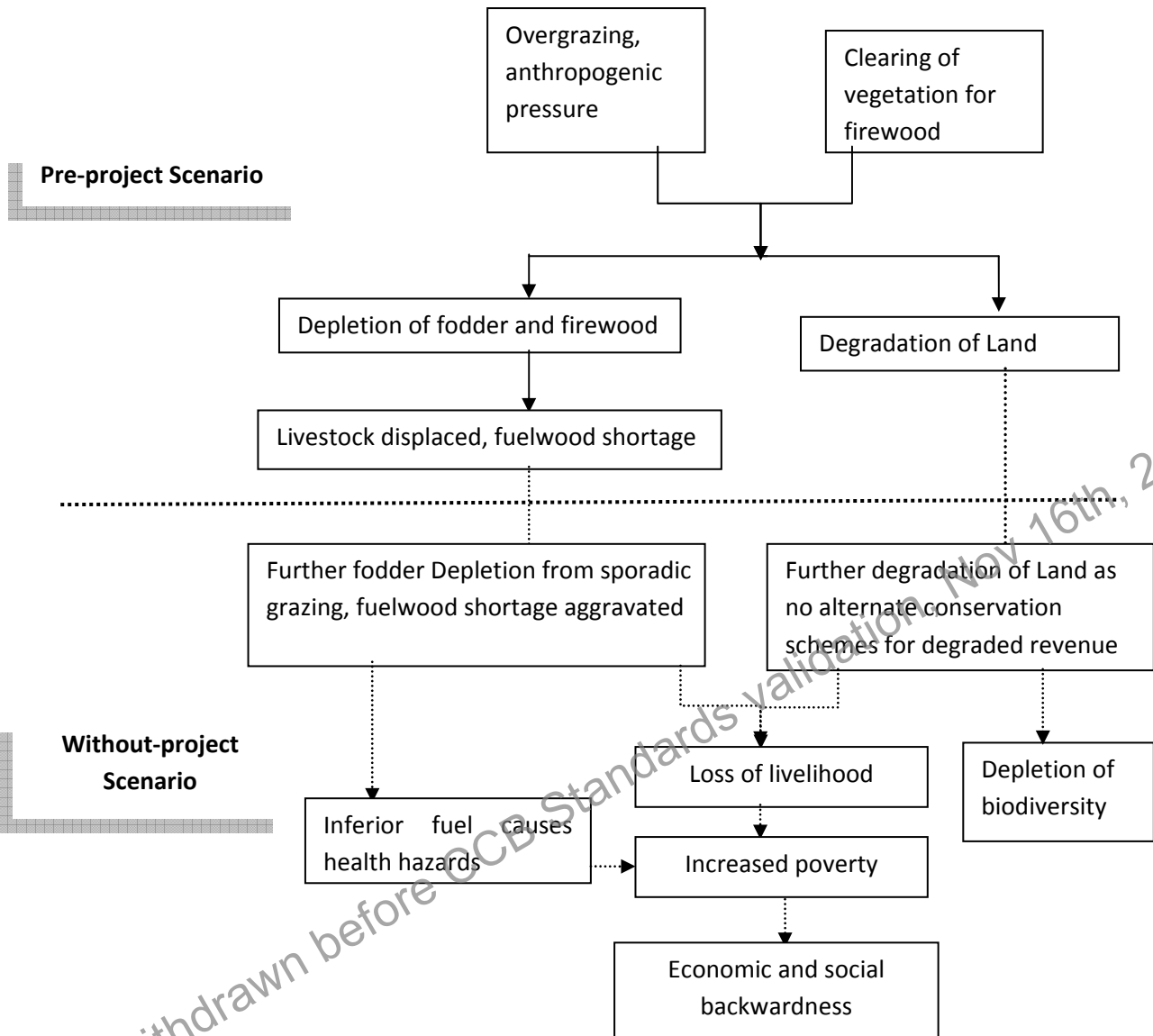
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(if at all), some ephemeral grasses would sprout, which would be immediately grazed by livestock. This would result in further degradation.



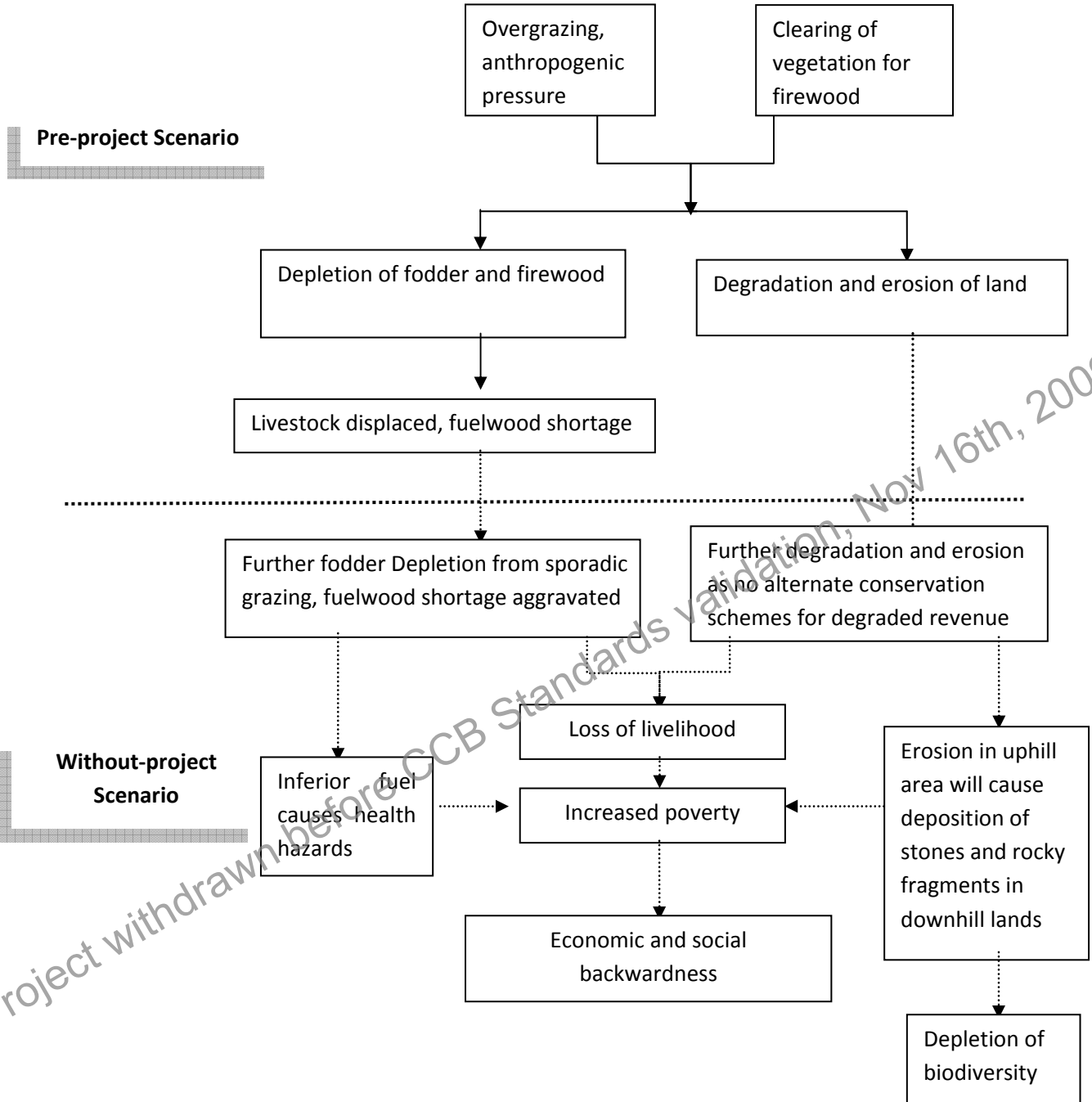
Stratum MP I: The baseline scenario for this stratum is barren plain or undulating degraded lands (ownership was with revenue department of government) which would have continued to degrade further in the absence of project activity. These lands were degraded with progressive removal of tree cover, excess grazing stripping the land of all vegetation cover and in the absence of any alternative government schemes for such land, were leased to IFFDC for rejuvenation of land and better environmental conditions.

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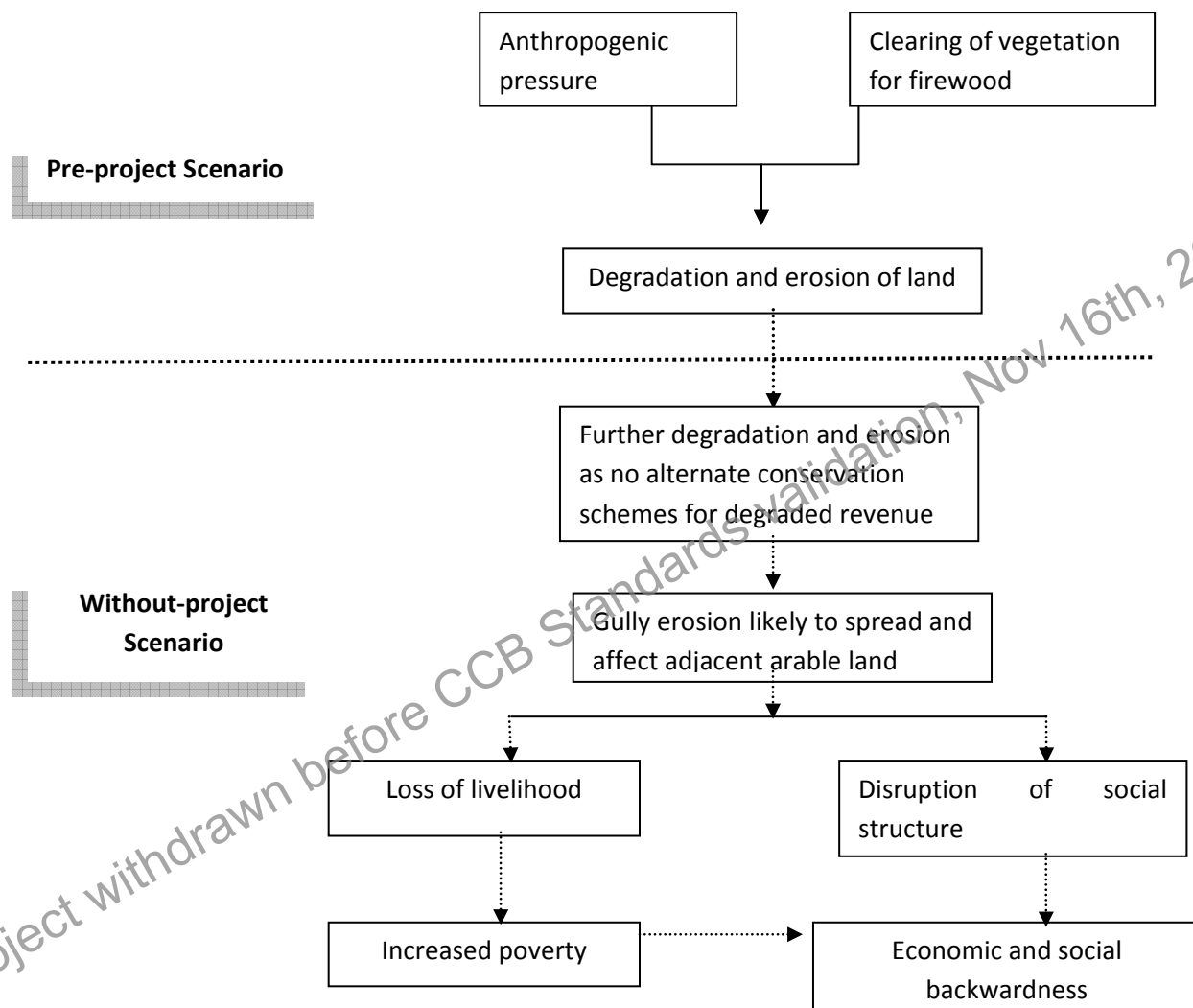
Stratum MP II: The baseline scenario for this stratum is barren hilly degraded lands (ownership was with revenue department of government) which would have continued to degrade further and in accelerated pace, principally due to the hilly terrain, in the absence of project activity. These lands were in the final stage of the cycle of land degradation which started with removal of tree cover, excess grazing stripping the land of all vegetation cover and in the absence of any alternative government schemes for such land, were leased to IFFDC for rejuvenation of land and better environmental conditions.

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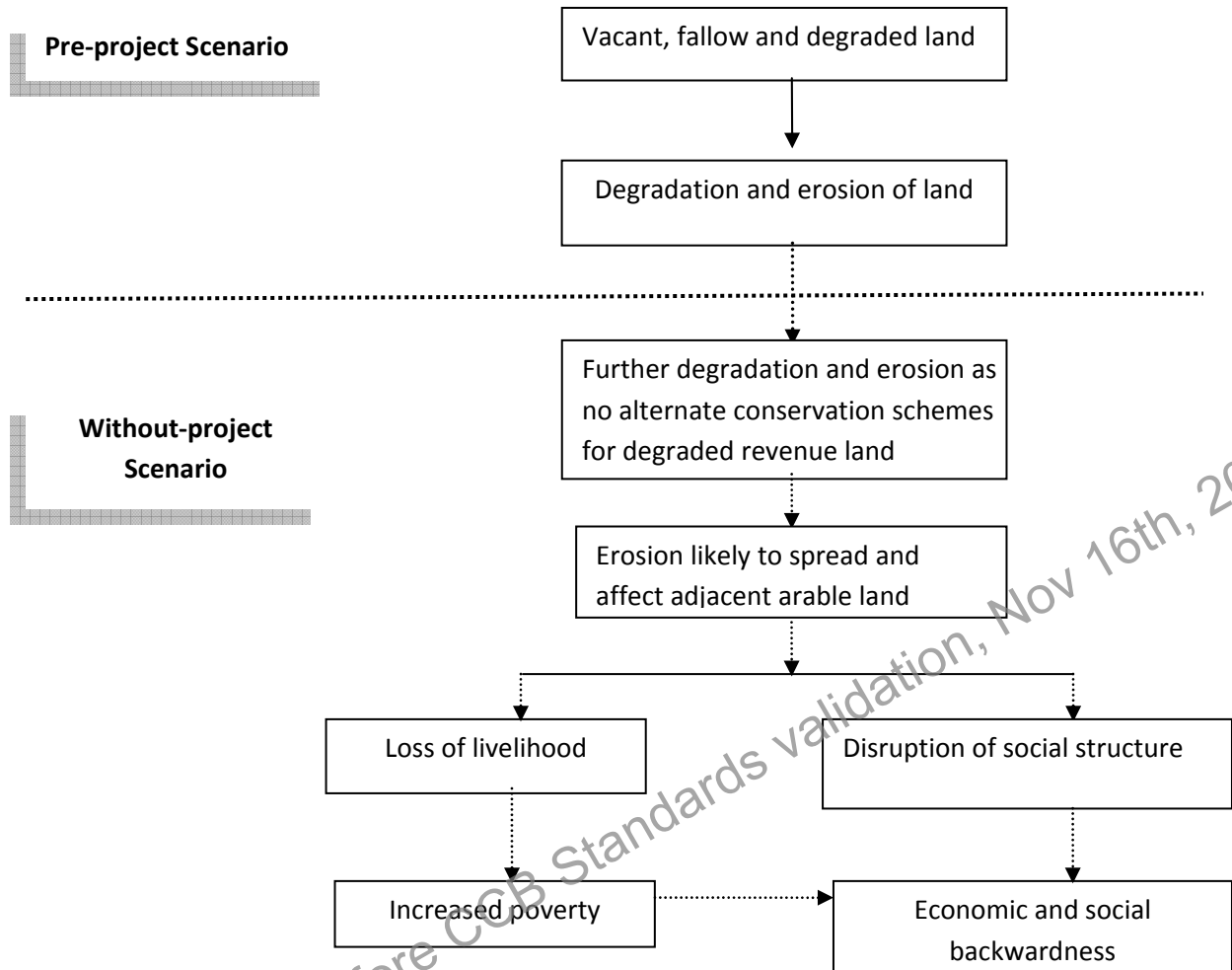
Stratum UP I: The baseline scenario for this stratum consists of degraded, eroded gullied lands (belonging to individual farmers and local *panchayat*) near local streams and rivers covered with mostly isolated vegetation. In the baseline scenario, this category of land is expected to erode further due to the absence of any vegetation cover that can effectively check this trend. With increasing erosion, these areas are expected to degrade and gullied lands transformed into deeper ravines³⁸.



Stratum UP II: The baseline scenario for this stratum consists of fallow, degraded and vacant land which have continued to be vacant and as a result, subjected to erosion and degrades further. Due to the deficiency of resources and technical know-how of land owners, these lands cannot be rehabilitated in the without project scenario.

³⁸ <http://www.cosis.net/abstracts/EGU05/00529/EGU05-J-00529.pdf>

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Project withdrawn before CCB Standards validation, Nov 16th, 2009

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Projection of future carbon stock changes in the absence of the project

The projection of future carbon stocks in the absence of the project in the different baseline strata are given below:

Table 11. Annual estimation of baseline carbon stock gains (in tonnes of CO₂ e) in Stratum RJ I

Year	Annual estimation of baseline carbon stock gains (in tonnes of CO₂ e/year)	Annual estimation of baseline carbon stock gains/ unit area (in tonnes of CO₂ e/ hectare/year)
1996	14.25	0.048
1997	14.25	0.048
1998	14.25	0.048
1999	14.25	0.048
2000	14.25	0.048
2001	14.25	0.048
2002	14.25	0.048
2003	14.25	0.048
2004	14.25	0.048
2005	14.25	0.048
2006	14.25	0.048
2007	14.25	0.048
2008	14.25	0.048
2009	14.25	0.048
2010	14.25	0.048
Total	213.81	---
Average	14.25	0.048

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Table 12 Annual estimation of baseline carbon stock gains (in tonnes of CO₂ e) in Stratum MP I

Year	Annual estimation of baseline carbon stock gains (in tonnes of CO₂ e/year)	Annual estimation of baseline carbon stock gains/ unit area (in tonnes of CO₂ e/ hectare/year)
1996	42.35	0.028
1997	42.35	0.028
1998	42.35	0.028
1999	42.35	0.028
2000	42.35	0.028
2001	42.35	0.028
2002	42.35	0.028
2003	42.35	0.028
2004	42.35	0.028
2005	42.35	0.028
2006	42.35	0.028
2007	42.35	0.028
2008	42.35	0.028
2009	42.35	0.028
2010	42.35	0.028
Total	635.25	---
Average	42.35	0.028

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Table 13. Annual estimation of baseline carbon stock gains (in tonnes of CO₂ e) in Stratum MP II

Year	Annual estimation of baseline carbon stock gains (in tonnes of CO₂ e/year)	Annual estimation of baseline carbon stock gains/ unit area (in tonnes of CO₂ e/ hectare/year)
1996	113.69	0.042
1997	113.69	0.042
1998	113.69	0.042
1999	113.69	0.042
2000	113.69	0.042
2001	113.69	0.042
2002	113.69	0.042
2003	113.69	0.042
2004	113.69	0.042
2005	113.69	0.042
2006	113.69	0.042
2007	113.69	0.042
2008	113.69	0.042
2009	113.69	0.042
2010	113.69	0.042
Total	1705.35	---
Average	113.69	0.042

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Table 14. Annual estimation of baseline carbon stock gains (in tonnes of CO₂ e) in Stratum UP I

Year	Annual estimation of baseline carbon stock gains (in tonnes of CO₂ e/year)	Annual estimation of baseline carbon stock gains/ unit area (in tonnes of CO₂ e/ hectare/year)
1996	13.15	0.003
1997	13.15	0.003
1998	13.15	0.003
1999	13.15	0.003
2000	13.15	0.003
2001	13.15	0.003
2002	13.15	0.003
2003	13.15	0.003
2004	13.15	0.003
2005	13.15	0.003
2006	13.15	0.003
2007	13.15	0.003
2008	13.15	0.003
2009	13.15	0.003
2010	13.15	0.003
Total	197.25	---
Average	13.15	0.003

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Table 15. Annual estimation of baseline carbon stock gains (in tonnes of CO₂ e) in Stratum UP II

Year	Annual estimation of baseline carbon stock gains (in tonnes of CO₂ e/year)	Annual estimation of baseline carbon stock gains/ unit area (in tonnes of CO₂ e/ hectare/year)
1996	4.3	0.004
1997	4.3	0.004
1998	4.3	0.004
1999	4.3	0.004
2000	4.3	0.004
2001	4.3	0.004
2002	4.3	0.004
2003	4.3	0.004
2004	4.3	0.004
2005	4.3	0.004
2006	4.3	0.004
2007	4.3	0.004
2008	4.3	0.004
2009	4.3	0.004
2010	4.3	0.004
Total	64.5	---
Average	4.3	0.004

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The persons/team responsible for determination of baseline are:

Table 16. Officials Responsible for determining Baseline

Name	Entity	Qualification	Contact (mail id)
Dr. K.G. Wankhede	IFFDC	PhD Agronomy	wankhedekg@iffco.nic.in
Dr. H.C. Gena	IFFDC	PhD Agriculture	harishgena@rediffmail.com
Dr. R.P.S. Yadav	IFFDC	PhD Agriculture	drpsyadav@rediffmail.com
S.C. Dixit	IFFDC	M.Sc. Agriculture	iffdcup11@rediffmail.com
Abhirup Sen	Consultant	M.Sc Forestry (Economics & Management)	abhirupsen@gmail.com
Lokesh Chandra Dube	Consultant	M. Sc. Environment Management M.Phil. Energy & Environment	lokesh.env@gmail.com

G3. Project Design & Goals

Description of the scope of the project and a summary of the major climate, community and biodiversity goals

Wastelands in India are a significant resource on which many rural people depend for food, fodder, and fuel wood. This project provides an opportunity for the rural poor to restore degraded lands and improve their living conditions. IFFDC has implemented the Project in the states of Uttar Pradesh, Madhya Pradesh & Rajasthan during the period from April 1, 1995 to March 31, 2002. The project has assisted farmers, especially women, to promote plantation on wastelands and marginally productive lands by organising primary farm forestry co-operatives and thus making it a people's participative programme. The project activities have helped in improving soil and water conservation and bring about ecological balance, and to generate consistent employment for the rural poor through an Integrated Farming Systems approach and thus help them in their socio-economic development. The target group comprises of small and marginal farmers (men and women) owning less than two hectares and the landless whose percentage is above 90 percent.

The project objectives are:

- ✓ To improve environment of the project area
- ✓ Develop national, state and village level co-operative institutions for promote farm forestry.
- ✓ Assist farmers, especially women, to promote plantations on wasteland and marginally productive lands through a participative program.

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- ✓ Help in soil and water conservation and bring about ecological balance.
- ✓ Generate consistent employment for the rural poor through an integrated farming system approach and thus help in their socio-economic development.

The project has five components:

I. Component 1: promoting and establishing national, state and village level farm forestry co-operatives

The national level IFFDC and three State Farm Forestry Co-operatives (SFFCs) or Project Executive Offices (PEOs) are to support the PFFCSs and assist them to become financially and organizationally viable. Support activities are to include developing a legal structure of laws and by laws, assisting in the marketing of farm forestry products and providing technical advice. Linkages with other organizations including NGOs are to be developed so that the project beneficiaries can benefit from their resource and skills.

II. Component 2: Integrated Farm Forestry for natural resource management and improving environment

PFFCSs members are to be assisted to develop skills to prepare lands use and integrated natural resource management (INRM) plans using participatory rural appraisal techniques. PFFCSs are also to be assisted and trained with forestry techniques.

III. Component 3: Training and Education – capacity building

Staff, local leaders and villagers are to be trained to plan and implement (INRM) activities and are to be made aware about gender and environmental issues through training programs and workshops.

IV. Component 4: Socio-economic and planning/ monitoring activities

This component has two aspects (a) subsidiary economic activities contributing to INRM and (b) planning and monitoring. Participatory methodologies for planning and monitoring and evaluation will be developed to ensure the project is oriented to the needs of the intended beneficiaries.

V. Component 5: Research and development

Research will be carried out to further knowledge in farm forestry and other natural resource conservation activities.

This is one of the few attempts made in India to bring management of common property natural resources under the cooperative sector.

Techniques for developing different kinds of wastelands like degraded grasslands, ravines and steep and rocky, has been developed with the assistance of research institutions and demonstrated on the ground. Innovative approaches such as developing medicinal plants or introducing poplar for farm forestry have proved to be successful.

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The efficiency in acquiring lands, formation of cooperatives and raising woodlots in a relatively short period of time points towards an effective project management apparatus. The efforts made by the communities in protecting the leased land from biotic interference and steps taken in controlling soil erosion and surface water runoff is paying yields resulting in natural regeneration of the existing rootstock.

An ecosystem based approach in which linkages of the land being addressed with all the land and natural resources available in a village is the hallmark of this intervention.

Likely risks to climate, community and biodiversity benefits during the project lifetime and their mitigation

Possible risks to climate, community and biodiversity benefits during the project lifetime have been identified and detailed in the Table 17. **A relative quantification of risks on the basis of the threat perceptions to the plantations in a scale of negligible to very high has been done and the same is summarized below:**

Table 17. Potential threats to plantations and mitigation measures

S.N.	Potential Threats	Extent of potential affliction	Mitigation measure	Likelihood of affliction after preventive measures
1	Drought conditions	All sites in Rajasthan	Extensive soil and water conservation measures.	medium
2	Water Erosion	Hilly sites in Madhya Pradesh and gullied and ravinous land in Uttar Pradesh	Water and soil conservation activities, planting of grass species	Low
3	Fire incidences	Dry weather may result in fire incidences. It should be restricted to individual sites	Fire lines were maintained during early stages of plantations and presently round the clock vigils are present to check any spread of fire	Low
3	Attack of insect pests	Should be restricted to individual sites, which vary in area between 10 ha and 250 ha	Mixed nature of plantations help as a biological barrier.	low

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4	Fungal infections	Should be restricted to individual sites, which vary in area between 10 ha and 250 ha	Mixed nature of plantations help as a biological barrier. Besides, infected trees will be removed in order to prevent spread of infection.	low
5	Illicit Felling	Varies depending on factors such as species planted on site, dispute within local community etc.	Round the clock guard is present at plantation sites. Besides, villagers have the right to collect fallen branches and twigs for their use. All disputes are taken care of within the PFFCS structure.	Low
6	Grazing	All plantation sites	Villagers are provided fodder free of cost in order to reduce incidence of grazing	low
7	Community disputes	All PFFCS areas	Disputes are settled through a dispute settlement mechanism devised democratically within the co-operative structure	low

Definition of local stakeholders

The various stakeholders of the project identified by IFFDC for the project are as follows:

- Local villagers (both men and women) who are members of primary Farm Forestry Co-operative Societies
- Local villagers not members of PFFCS but who have access to the resources generated by the plantation activities
- Local villagers who have given their land for plantation activities
- Local government entities i.e. panchayats

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Demonstration of transparency

All project documentation is publicly accessible at, or near, the project site and/or Project Proponents' local/regional/central offices; only financial and other information where confidentiality is needed is withheld. Local stakeholders have been informed how they can access the project documentation; and the key project documents have been made available in regional/national languages, where applicable.

G4. Management Capacity

Management team's experience

Profile of Indian Farm Forestry Development Co-operation

Indian Farm Forestry Development Co-operative Ltd. promoted by IFFCO was registered on 22nd October 1993 under the Multi-State Co-operative Societies Act, 1984. The promoter organisation (IFFCO) visualised it to become a model for large-scale adoption in the field of afforestation on wasteland and Rural development by promoting village level Primary Farm Forestry Co-operative Societies (PFFCS) for socio-economic development of the landless, marginal & small farmers, women in particular. IFFDC is presently working in whole of the Indian Union. More than 26000 ha. of wasteland comprising sodic, ravines, waterlogged and hilly areas have been converted into green forest through 145 village level PFFCS having a membership of 28,500 out of which 38% are landless and 51 % fall under marginal and small category. Special emphasis has been laid on women participation who constitute 30% of the total membership. IFFDC membership is open to Indian Farmer Fertilizers Co-operative Ltd. (IFFCO), National Co- operative Development Corporation (NCDC), Primary Farm Forestry Co-operative Societies (PFFCS), State Farm Forestry Co-operative Societies (SFFCS), Govt. of India, and any other co-operative institution or corporate body owned or controlled by the Govt. having an interest in the promotion of the Forestry Activities. As on March 31, 2005, 147 PFFCS Societies were members of IFFDC.

Experience of Indian Farmers Fertilizers Co-operative Limited (Promoter of IFFDC)

Indian Farmers Fertilizer Co-operative Limited (IFFCO) was registered on November 3, 1967 as a Multi-unit Co-operative Society. On the enactment of the Multistate Cooperative Societies act 1984 & 2002, the Society is deemed to be registered as a Multistate Cooperative Society. The Society is primarily engaged in production and distribution of fertilizers. The byelaws of the Society provide a broad frame work for the activities of IFFCO as a Cooperative Society. It is a unique venture in which the farmers of the country through their own Co-operative Societies created this new institution to safeguard their interests.

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The number of co-operative societies associated with IFFCO has risen from 57 in 1967 to 38, 155 in 2008³⁹.

The business model on which IFFCO is established is participatory in nature. The strength of co-operative movement emanates from its ability to empower people who are individually weak and often helpless. The spirit of co-operations encourages people to come together on the basis of equality to achieve their economic interests. Voluntary association of individuals is the important aspect of any co-operative endeavour. Equality is assured to all the individuals involved in an unselfish atmosphere. The goal is to achieve the common economic interests of the group of individuals who have come together for the purpose.

Prior experience of IFFCO in Forestry

IFFCO which is well known for its extension and development activities launched a Pilot Project on wasteland development in 1986-87. The objectives of the project were to improve degraded land, generate employment and provide fuel, fodder and timber to the community through afforestation activities. A total of 32 Primary Farm Forestry Co-operative Societies are the members of the Phase-I Project of which 17 are from UP, 10 from Rajasthan and 5 from MP. The total membership is 5,137 of which 4,640 are men and 497 are women. This Project has been in operation since 1986-87 in Sultanpur, Raibareli, Pratapgarh and Allahabad districts of UP; Udaipur in Rajasthan and Sagar in Madhya Pradesh. A total of 4623 ha. of wastelands has been transformed into forests in the three states (2,637 ha. in U.P. 1,850 ha. in Rajasthan and 136 ha. in MP) under the pilot project.

Management structure of IFFDC

The Board of Directors of IFFDC are nominees of Government of India and National Co-operative Development Corporation as per Multi state Cooperative Societies act, 2002, of whom one has specialisation in the field of Forestry/ Environment/ Rural Development, Four Directors from any of the Co-operative societies who contribute share capital worth Rs. One crore other than project equity/ project assistance already contributed/ committed by them to IFFDC. Chief Executive/Managing Director of IFFDC is nominated by IFFCO.

³⁹ <http://www.iffco.nic.in/applications/iffcowebr5.nsf/?Open>

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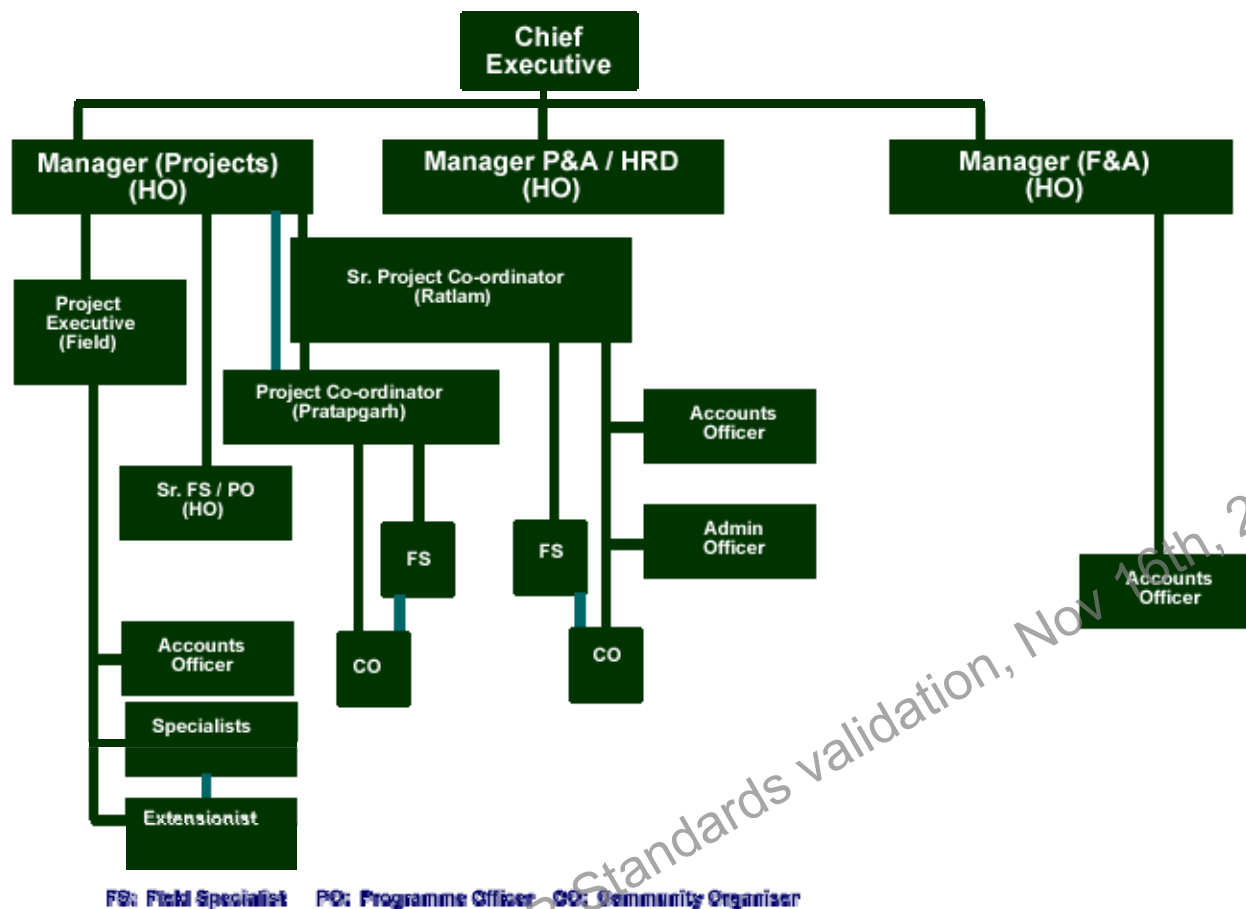


Figure 11: Management Structure of Indian Farm Forestry Development Corporation

Recognition of IFFDC efforts in afforestation activities

IFFDC as an organisation bagged the prestigious "Indira Priyadarshni Vrikshamitra Award 1999" and its five PFFCS (Sangwa & Rakhyawal in Rajasthan Katari & Madwa in U.P. & Karaiya in M.P.) of Phase-I have also received this Award conferred by the Ministry of Environment & Forests for the outstanding work in afforestation, environmental conservation & wasteland development.

IFFDC has been selected for "Environment Agriculture and Rural Development Award" by the panel of judges of the IMC Diamond Jubilee Endowment Trust Award, 2002.

Ragoli PFFCS, Sagar (M.P.) was conferred Environment conservation, Wasteland Development and Women Empowerment Award by the Government of Madhya Pradesh.

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Training and Capacity building of Staff

Projects that include a significant capacity-building (training, skill building, etc.) component A series of training programs have been organized for IFFDC Project staff. Training and education programs have been carefully planned on the basis of needs assessment of members and staff.

The training programs have been designed to bring the desired changes in the attitude, knowledge and skills of all the concerned at different levels of the project i.e. the IFFDC project staff, office bearers and the target groups (Photograph in Annexure II: Fig 19 and 20). Staff training was also given much importance as it was necessary to build up the capacity of IFFDC staff.

The main activities for capacity building are preparatory/ introductory meetings, co-operative secretary and member trainings, Staff meetings and gender sensitization and micro-planning workshops, exposure tours to the successful organizations, etc.

Key technical skills and responsibilities of Project management Team

Experienced technical as well as field workers are involved in the project. The following are the descriptions of skills and corresponding responsibilities of the members of Project Management Team.

Table 18. Qualifications and responsibilities of personnel at various levels of IFFDC involved in the project

Levels	Office location	Skill Levels of present officials	Responsibilities	Experience in IFFDC and IFFCO (parent organisation)	Steps taken to improve skill levels
Chief Executive	New Delhi (Head Office)	PhD in Agronomy and Masters in Business Administration	Overall supervision and management	27 years	Attending various conferences and refresher courses
Project Managers	State offices	Ranges from Masters to PhD in Agriculture, Horticulture and related subjects	Responsible for managing all IFFDC activities in respective states	Ranges from 20-22 years	Frequent conferences, training programs etc.
Field and extension	State offices	Masters and Bachelors in relevant	Interface between communities and IFFDC and	Ranges from 5-20 years	Training programs, exposure visits

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workers		subjects	managing day to day activities in the field		to other states and organisations
Members from local communities (including secretaries of PFFCS)	Individual PFFCSs	Diverse backgrounds	Responsible for sustainable working of PFFCS	varied	Training programs, exposure visits, interaction with counterparts etc.

Financial health of the IFFDC

IFFDC is a multistate co-operative and its financial performance is available for public review. The detailed audited financial results of IFFDC for the last three financial years have been included in Annexure III

G5. Land Tenure

Forestation activities undertaken by IFFDC has been primarily on wastelands which are owned either by the community through its local elected democratic representative bodies (panchayats) or are government revenue lands or are owned by local individual farmers. Land acquisition process was designed to be as transparent and according to the law of the land as possible in order to make the process acceptable to the local communities who are the main beneficiaries.

Process of Land acquisition

- i) **Local Community Land:** When the afforestation activities are undertaken on the community wastelands owned by the concerned village *panchayat*, a team of personnel including IFFDC project staff, state government officials, local community members, village elders etc. identified the available wastelands based on the secondary data. Then it was acquired in the name of proposed PFFCS through contract with the village *panchayat*. In order to rule out any future dispute, a number of public meetings and participatory rural appraisal exercises were held to intimate the local people about the benefits of the project and to acquaint about the needs and demands of the community.

Resolutions regarding providing land to IFFDC for afforestation activity for 20-30 years were passed by the *panchayat* in special meetings (Gram Sabha). A copy of the resolution was made available to the proposed PFFCS along with supporting documents, map etc. The proposed land for acquisition was properly surveyed so that it does not encroach on land not included in the agreement.

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- ii) **Acquisition of Government Revenue Land:** In Madhya Pradesh, wastelands under the category of government revenue lands were available. These lands were owned by the District Administration but were given to local village *panchayat* for community utilization. The process of acquisition of these lands was initiated by sending detailed project proposal about plantation program to the concerned village *panchayat* and identification of eligible wasteland with the help of government officials, community members etc. Resolutions regarding providing land to IFFDC for afforestation activity for 20-30 years were passed by the *panchayat* in special meetings (Gram Sabha). A copy of the resolution was made available to the proposed PFFCS along with supporting documents, map etc. The resolution taken by the village *panchayat* for afforestation was forwarded to the concerned district official (*Tehsildar*). Finally the approvals for implementation of the program were given by the District Collector, the top executive official of the district.
- iii) **Land acquisition from individual farmers:** When the afforestation activities are undertaken on wastelands owned by the private village persons, a team of personnel including IFFDC project staff, state government officials, local community members, village elders etc. identified the available wastelands based on local land records. Then after conducting PRA exercises and personal contacts with concerned farmers, the private wastelands of consenting farmers were acquired in the name of the proposed PFFCS through signing of a Memorandum of Understanding. Since the lands taken for plantation were wastelands, there was no question of relocation of any household or activity.

Describe potential “in-migration” of people from surrounding areas

The project involved members from surrounding villages only for the purpose of employment generation. Hence the project did not result in any in-migration of laborers. The project does not involve any large scale harvesting or similar forest related activities. Hence in-migration due to such activities is not possible.

G6. Legal Status

Legal Status of Primary Farm Forestry Co-operative Societies (PFFCS)

The PFFCS has been designed as the nodal village-level local body for implementing participatory afforestation works to rehabilitate wastelands, undertake community development activities and manage finances of the projects. The constitution of PFFCSs was done in a transparent and democratic manner so as to make it acceptable to all stakeholders. The process of PFFCS formation and registration is detailed below:

1. Awareness meetings, consultations with local community members by IFFDC project staff.
2. With the consent of the local community, the co-operative specialist of the project proceeds with the formation of PFFCS.

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3. The community is made aware in details about the laws governing co-operatives, the structure and objectives of PFFCS.
4. Application for registration, enrollment of members (by buying shares), constitution of executive committee and other formalities are completed with due presence of local community members.
5. The application and other documents are submitted to the concerned Deputy Registrar of Co-Operative Societies, who nominates an inspector to study the legality and reality of PFFCS through personal visits and interviews with involved persons.
6. The inspection report prepared by the nominated official is submitted to the Co-operative Department for necessary steps to register the PFFCS
7. The PFFCS is provided with the registration certificate.

Table 19. State wise details about PFFCS, Members and area planted

S.No.	State	PFFCS (No.)	Members (No.)		Area planted (ha.)
			Men	Women	
1	Uttar Pradesh	29	5236	3321	5299
2	Madhya Pradesh	21	1251	1160	4216
3	Rajasthan	13	2085	998	495
	Total	63	8572	5479	10010

100% of PFFCS under IFFDC Project have got legal validity by way of registration under respective State Co-operative Societies Acts.

As the plantations are designed to be established solely on wastelands which have been lying unutilized thus far, hence, the project did not require the relocation of people or of their activities important for the livelihoods and culture of the communities. On the other hand, socio-economic activities for the development of local communities were under taken along with the afforestation projects so as to improve the overall living standards of the people living around the project area.

The major disruptive activity that has threatened the survival of the plantations is grazing. As most of the project areas are drought-prone, fodder is a major constraint. The IFFDC has adopted a two-pronged strategy to address this problem.

1. Firstly, IFFDC has introduced legumes of high yielding fodder grasses and facilitated their plantation in community and private lands in the project villages so as to avert grazing pressure on the plantations.
2. Secondly, IFFDC has taken steps to ensure the involvement of whole village community irrespective of political and social backgrounds in order to enhance the trust of locals towards the project and inculcate a sense of belongingness towards the plantations. Some of the steps include involvement of at least one member (either male or female) of each

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family of the villages in the PFFCS, management sub-committees of all villages in the area of operation of PFFCS which work under the umbrella of PFFCS so as to manage any disputes and problems at the micro-level and awareness sessions among members of PFFCS about their rights and responsibilities.

Every separate plantation has been established with the consent of local community after detailed meetings and regular acquaintance sessions. Regular general meetings (held on the 26th of every month) as well as Executive Committee meetings of PFFCSs are held to keep abreast members about latest developments and increase participatory decision making capabilities of the members. As per the Multi States Co-operatives Act, each PFFCS and the member SHGs have shareholdings in IFFDC. This enables them to be a stakeholder in any economic benefit accrued from the IFFDC projects. Thus the project shareholders have a direct stake in the carbon revenues accrued from the project as any potential net profits from carbon benefits will be distributed among the shareholders as dividends.

There is a written agreement with each member of PFFCS for sharing of usufruct accrued from plantations with IFFDC (generally 50-50).

The project has been established in accordance with all existing relevant laws and has permission from appropriate entities.

G7. Adaptive Management for Sustainability

Management actions and monitoring programs

Sustainability has been considered a key issue since the inception of the IFFDC project. To achieve this goal, a revolving fund of two crores rupees has been provided to the societies for starting income generation activities, which will ensure perpetual income to the members. The modalities of the revolving fund were worked out through a three-day workshop on “**Development of Agro-Forestry Based Micro-Enterprises and Management of Revolving Fund**”, organized in Gurgaon in 1999 in which apart from IFFDC and ICEF officials, representatives from organizations like ATREE, EDI, ACORD etc. also participated. The amount is kept in fixed deposits bearing two joint signatories, one from IFFDC and other from PFFCS. A systematic procedure is followed for disbursement of loans from this fund. SHG members send their proposals through PFFCS to the IFFDC project office, which is then forwarded to the head office for final approval. At every level, the proposals are screened for their economic viability. Dairy and goat rearing are the most favored micro-enterprises. Till March, 2007, 2715 members have secured loans amounting to Rs 267.81 lakhs for developing different micro-enterprises.

Various economic activity like savings groups, nurseries raising groups and literacy groups have been established. Liaisons and linkages have been established with other organizations have also been established. Cultivation of improved fodder grasses like *Cenchrus ciliaris*, have been taken up as an income generation activity. Various micro-enterprises like dairy, piggery, goat rearing, poultry, agarbatti making, mushroom cultivation, vegetable cultivation etc. have been initiated. Micro-enterprises like sale of cattle feed and fertilizers have been undertaken at the PFFCS level. The aim of these activities is to make the PFFCS financially self-sufficient. The financial resources of PFFCS include voluntary contribution, share capital and income earned from micro-enterprise activities.

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Economic activities in the PFFCS

Uttar Pradesh

Table 20. Details of Economic activities in PFFCSs in Uttar Pradesh

PFFCS	PFFCS income	Shramdan (voluntary labor) (rupees)	SHG Groups	SHG Members	Savings	Revolving Fund (Rupees)		Types of Micro-enterprise
						Benefit	Loan disbursed	
Bachanpur	14633	77651	12	109	39450	14000	133000	Goatry, Dairy, Piggery
Bhadainya	73849	67923	7	62	85244	9946	194000	Goat raising, Dairy
Madwa	4500	95000	8	67	40049	22000	273000	General Store, book stall, Goat raising, Dairy, Piggery
Vinayakpur	10520	84089	11	72	49052	29000	167500	Goat raising, Dairy, Piggery
Harkhumau	700000	155000	9	165	95875	40300	336000	General Store, Goat raising, Dairy, Piggery
Uermau	57000	95722	9	97	51000	35000	215000	General Store, Goat raising, Dairy, Piggery, Cloth house
Haliyapur	2000	3110	4	30	22000	21000	210400	-
Kachnao	38845	103316	9	60	42900	5000	160000	General Store, Goat raising, Dairy, Piggery, Cloth house

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Khairahni	85494	73491	6	65	81670	64688	260000	PCO, General Store, book stall, Goat raising, Dairy, Piggery
Khajuro	13840	211664	13	118	46500	88463	412500	General Store, Goat raising, Dairy, Piggery, Fertiliser Sale
Kandranwa	17000	122000	10	115	1652.5	9004	248514	General Store, Goat raising, Dairy, Piggery, Fertiliser Sale
Malikmau	720813	1047650	4	41	87120	106178	560000	General Store, Goat raising, Dairy, Piggery, Fertiliser Sale
Pooranpur	79314	72245	4	48	11074	0	0	-
Sarai Bariya Khaida	71079	66795	5	56		2000	31000	Goat raising, Dairy
Poorabgaon	195541	104085	11	83	88115	36000	449000	General Store, Goat raising, Dairy, Piggery
Dabhiyar	87000	92265	11	89	34730	37628	388000	Goat raising, Dairy, Piggery
Bansi	110000	73746	5	47	50588	25000	134000	Aonla Product, Goat raising, Dairy, Piggery
Purebeerbal	4500	114918	11	102	118320	18000	214000	-
Chandapur	11291	62375	5	65	70036	11321	173000	-
Sarai Chivlaha	60210	80000	8	71	65700	27710	270000	Goat raising, Dairy

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Chaupai	74300	75000	15	128	48182	29675	401000	General Store, Goat raising, Dairy, Piggery
Medhawa	70625	109297	10	70	31683	25017	131000	General Store, Goat raising, Dairy, Piggery
Pithapur	24100	60979	6	44	46346	18231	110000	General Store, Goat raising, Dairy, Piggery, Fertiliser Sale
Mokchada	24750	49815	6	60	40897	8961	157000	Goat raising, Dairy
Tulapur	33609	30333	4	38	12374	0	-	
Chirla Bhagvatpur	5000	45000	10	97	1005000	13915	444000	Goat raising, Dairy
Mahegaon	1000	120408	6	59	40709	26624	274000	General Store, Goat raising, Dairy, Piggery
Kasainda	0	84717	5	47	35725	14825	181000	Goat raising, Dairy
Kumhrawan	59440	98023	23	230	245336	20995	191000	General Store, Goat raising, Dairy, Piggery, Fertiliser Sale
Barajhagarpur	12000	200000	9	95	157840	23607	181000	Goat raising, Dairy

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Madhya Pradesh

Table 21. Details of Economic Activities in PFFCSs in Madhya Pradesh

PFFCS	PFFCS income (Rs.)	Shramdan (voluntary labor)	SHG Groups	SHG Members	Savings	Revolving Fund		Types of Micro-enterprise
					Rs.	Benefit	Loan disbursed	
Guraiya	512070	130747	5	73	205890	28	308000	Agri. Purpose, Dairy, food grain shop, Poultry,
Udaipura	351928	211483	10	109	322572	36	345000	Dairy, Food Grain Shop, Vegetable Sale, General Store, Garment Shop
Ragoli	344510	111736	8	62	121632	22	190000	Agri. Purpose, Dairy, food grain shop, Pumpset, open well, Goat Rearing
Jaitpur	884771	134409	10	93	193345	19	197000	Agriculture Purpose, Dairy, General Store, Seed Shop, Food Grain Shop, Bricks Making
Berkotikalan	175032	100383	0	0	0	1	20000	Goat Rearing
Bijora	287013	78678	7	70	259954	17	166000	Air compressor, Garment shop, General Store, Vegetable cultivation, Vegetable Sale, Shoe Shop
Serkheda	100062	97267	0	0	0	14	145250	Dairy, Goat rearing
Berkotikhurd	221925	78474	4	33	53737	16	85000	Food Grains shop, Poultry, General Store, Vegetable Cultivation, Pumpset, shoe shop, poultry
Hilgan	104866	59960	11	104	143490	27	235000	agriculture purpose, bamboo goods, Bidi business, bidi making, bicycle shop, clay pot making, dairy, food grain shop
Khejra	176533	76234	0	0	0	24	229000	Bullock Cart, Bullock Purchase, seed shop, general store, thure purchase

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Dhura	231066	108850	0	0	0	4	35000	Hardware shop, agri, purpose
Berkhedhi	106765	155037	5	41	70087	9	61000	Dairy, Goat rearing, General store, Pumpset
Suna	113924	48595	0	0	0	15	153000	Agri. purpose, Dairy Goat-rearing, flour mill
Manegaon	71485	80877	0	0	0	7	55000	Bangle shop, Bullock cart, Garment shop, clay pot making, vegetable sale and culti
Dungariya	292830	83740	0	0	0	2	13000	Bricks Making, Furniture
Manjla	112207	91513	7	55	111096	9	80000	Food Grain Shop, General Store, Veg. Culti
Rajnagar	556111	67580	25	260	305169	99	660000	Music centre, Pan centre, juice centre, agri. purpose, spice mill, jewellery shop
Lalpur	198075	75939	10	114	134022	53	348000	Agricuture, bangle, bricks, flour mill, food grain shop, well repairing work shop, vegetable cultivation, vegetable sale
Jatkhra	303600	30878	12	139	446827	41	360000	Agriculture, Bamboo goods, cattle rearing, fertilizer sale, bangle, motor pump, poultry
Goma	65207	20245	0	0	0	10	82500	bamboo goods, bricks making, dairy, Food Grain shop, Piggery, vegetable cultivation
Ladwari	97418	68592	11	108	148495	8	63000	Agri purpose, Goat rearing, General Store, Pumpset, bullock cart
Jaswantnagar	323493	175802	14	109	329604	8	64000	Bullock Cart, Dairy, Flour Mill, Food grain shop, goat rearing
Mohangarh	336253	106239	8	97	119838	9	85000	Agri purpose, Garment Shop, Goat rearing, Fisheries, veg cultivation

Rajasthan

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Table 22. Details of Economic Activities in PFFCSs in Rajasthan

PFFCS	PFFCS income	Shramdan	SHG Groups	SHG Members	Savings Rs.	Revolving Fund		Micro-enterprise
						Benefit	Loan disbursed	
Changeri	168000	51528	2	20	21600	3	27000	
Badgaon	113440	63440	7	70	136350	50	265000	wheat mill, goat rearing
Nauwa	120319	60319						
Gadoali	166228	66228	11	128	322000	79	622000	wheat mill
Khimpur	0	27134						wheat mill
Intali	241604	73611	6	65	173570	33	265000	Co-op store
Lapsiya	373000	84195	3	35	77000	27	193000	Tea stall, fodder and seed selling
Hingoriya	61880	46408	3	38	55510	36	321000	
Langatch	57333	40925	3	64	35773	42	352000	
Raliya	60452	38621	2	21	3000	6	27500	
Maharaj ke Netawal	0	88919	0	0	0	0	0	
Rewaliya	0	36241	0	0	0	0	0	
Pawali	0	26621	3	30	45840	24	165000	

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The above economic activities have helped in improving the overall socio-economic conditions of the community. The revolving fund mechanism has helped strengthen the inter-relationship amongst PFFCSs, SHGs and members and create a deep sense of ownership, which will help in institutional sustainability. Income generation from SHGs has also helped in doing away with social evils like alcoholism and drug abuse.

Early commitment to the long-term sustainability of project benefits once initial project funding expires

The initial funding for the project was seven years whereas the project is designed for continuation for at least thirty years. Hence, funds for long-term sustainability of the project like payment through ecosystem services eg. Carbon credits and long-term sustainable activities like introduction of micro-credits (through revolving funds to promote micro-enterprises) are important aspects of the project. Since intermediate monetary income from timber sale through harvesting of timber is not likely to be generated from the project activity, hence intermediate income through sustainable micro-enterprise initiatives and carbon credits are critical to the success of the project. The details of micro-enterprise initiatives have been provided in Table 20-22.

G8. Knowledge Dissemination

Description of documentation of the relevant or applicable lessons learned

Research and Development activities of IFFDC in Forestry

Research and Development has played an important role in enhancing the knowledge base of the IFFDC staff as well as of the PFFCS members. The R&D efforts have improved the quality of work done in the field of farm forestry and given tested technologies for further application.

- i) The poplar planting program has been very successful in eastern Uttar Pradesh as an alternative income generation activity with identification of 5 superior clones in collaboration with Forest Research Institute, Dehradun. The program has proved a tremendous success and is yielding excellent returns to the societies. As a result of the success in U.P. the poplar program has also been replicated in Madhya Pradesh. The initial activities have yielded good results and has had a good impact on other farmers as many more nurseries are being set up which would result in manifold increase in the poplar cultivation in the area.
- ii) IFFDC has introduced legumes of the grass *Stylosanthus hamata* which has helped in natural regeneration of the grass, which is used for water and soil conservation.
- iii) IFFDC has undertaken provenance trials of different forestry species in collaboration with Forest Research Institute, Dehradun. Provenance trials of *Acacia nilotica*, *Prosopis cineraria*, *Azadirachta indica* and *Dalbergia sissoo* have helped in identifying superior clones of indigenous tree species, which will help in the efforts to increase biodiversity through afforestation with multiple species instead of ecologically damaging monocultures.
- iv) Keeping in mind the acute shortage of fodder in drought-prone Rajasthan, high yielding fodder grasses (*Cenchrus ciliaris*, *Stylosanthus hamata*) were introduced. In Madhya Pradesh, *Stylosanthus hamata* and *Panisetum pedicellatum* were tried and they have shown very

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encouraging results. Other high yield variety crops are also introduced in farmers' field of Madhya Pradesh and Rajasthan project areas.

Describe how they will disseminate this information in order to encourage replication of successful practices.

IFFDC has published several films, research papers and compilations to disseminate the knowledge accumulated throughout the project period. A list of such publications, films etc. is given below:

A. Films:

In Hindi

1. 'Abla Bani Sabla' (*The helpless now stand on their own feet*)
2. 'Aur Manzil Mil Gai...' (*The destination has arrived ..*)
3. 'Nai Ashaain Nai Dishain' (*New Hopes New Directions*)
4. 'Parivartan' (*Change*)
5. 'Safaltaon Ka Safar' (*The journey of success*)
6. Khushi (*Happiness*)

In English

1. New Horizons New Hopes
2. The Call

B. Important Papers presented/ published:

1. Monitoring the Livelihoods Platform: Reflections on the Operation of the Livelihoods Assets Status Tracking (LAST) Method from India and Malawi, Richard Bond; Prince Harvey Kapondamgaga, Bronco Mwenebanda, Raghuvendra P. S. Yadav, & Anees Rizvi
2. Primary Livelihood Development Co-operatives: A sustainable alternative to CBO federations; R.K. Dwivedi, Pradeep Yadav, I. Jafri & Keith Virgo
3. Simplified Micro Credit Accounting System; Vinod Lasod & N. Shiv Kumar
4. Mobilising local resources to overcome water shortages: A case study of Chillar village; Divya Kalia, G.P. Tewari, V. Duraisaminathan & Ian Tod
5. Small Millets for Sustaining Rural Livelihoods ; Prof. S.R. Maloo & Anees Rizvi
6. Community Land Mgt. for Livelihood improvement through afforestation by village level cooperatives (PFFCS) – An IFFDC Experience; H.C. Gena, Amandeep Singh & Dr. P.S. Marwaha
7. Common Land Management through Village level Cooperative-An Institutional arrangement for sustainability; Harish Gena & Ashwani Kumar (Seminar on "Degraded Forest for Productivity Enhancement and Carbon Sink Expansion" at Tropical Forest Research Institutes (TFRI) Jabalpur, Madhya Pradesh, India.

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8. Community participation through Cooperatives for Sustainable Development – Innovative approaches; P.S.Marwaha & Ashwani Kumar (Political Economic Journal of India, Centre for Indian Development Studies (CIDS), Chandigarh, India)
9. “Villages became University & Jankars became professors” IFFDC Jankar Model- An approach towards socio-economic development of rural area Jankar ; P.S.Marwaha & Ashwani Kumar (Political Economic Journal of India, Centre for Indian Development Studies (CIDS), Chandigarh, India)
10. IFFDC’s Wage labour support programme: Striving to create a culture of self help; P.S. Marwaha, RPS Yadav, Ashwani Kumar & Ajay Yadav (Political Economic Journal of India, Centre for Indian Development Studies (CIDS), Chandigarh, India))
11. Self Help Group – A Friend of Poor; Anju Gupta, Pramel Gupta, RPS Yadav & P.S. Marwaha
12. Participatory Livelihood Analysis, Dr. RPS Yadav & G.P. Tewari (International Institute of Rural Reconstruction)
13. IFFDC approaches in formation of Primary Cooperatives (Smarika Year 2004-05)
14. Waves of Change (IFFDC’s quarterly internal circulation)
15. Livelihood Asset Status Tracking: An Impact Monitoring Tool; R. Bond & N. Mukherjee, (Journal of International Development, 14, 2002, Wiley)

C. Leaflet/ Folders:

1. Vermi- Compost
2. Soil Testing
3. Seed Priming
4. Aonla – *Embllica officinalis* (Cultivation - Package & Practices)
8. Ber- *Zizyphus* sp. (Cultivation - Package & Practices)
9. Poplar (Cultivation - Package & Practices)

D. Livelihoods Letters:

1. Changing the Current
2. Settling the unsettled
3. Vending Information

E. Books Published

1. “Agro Forestry and Livelihood Promotion by Co-operatives” published by National Resource Centre for Agro Forestry, Jhansi, Indian Council of Agricultural Research, Krishi Bhawan, New Delhi, March 2005. (In English)
2. “Vaniki Prajatiyon ke Pramukh Keet va Rog Avam Prabhavi Niyantaran (Major pests of Forest tree species and their control) ” (In Hindi)

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III. Climate Section

CL1. Net Positive Climate Impacts

The project is dedicated for rehabilitation of degraded and marginal lands. IFFDC as an organisation and five of its promoted PFFCS have bagged the prestigious “Indira Priyadarshni Vrikshamitra Award” conferred by the Ministry of Environment & Forest, Govt. of India for their outstanding contribution in wasteland development & environment conservation. IFFDC has also won the “Environment, Agriculture and Rural Development Award” of Indian Merchants’ Chamber, Mumbai for its outstanding contribution to the cause of promoting the growth of rural economy. IFFDC has been awarded twice the “CERTIFICATE OF APPRECIATION” by TERI (The Energy and Resources Institute) under its Corporate Social Responsibility Award 2004/05 and 2006-07 for its efforts towards good corporate citizenship and sustainable initiatives. Ragoli PFFCS, Distt Sagar (MP) promoted by IFFDC has won an award for its outstanding contribution in the field of “Environment conservation, wasteland development and women empowerment” in March 2005. The award was conferred by Minister of Agriculture and Cooperation Govt of MP. IFFDC staff working at various levels in its ongoing projects and some Jankars (Para-professionals) developed by IFFDC have been also honoured on the eve of Republic/ Independence Day functions by Govt. of Rajasthan and MP for their dedicated services rendered to the rural community especially in the areas of Watershed development and poverty alleviation.

Table 23. Estimated amount of net anthropogenic GHG removals by sinks over the chosen crediting period

Project Year	Annual estimation of baseline carbon stock gains (in tonnes of CO ₂ e)	Annual estimated <i>ex-ante</i> carbon stock gains (in tonnes of CO ₂ e)	Annual estimated <i>ex-ante</i> net carbon stock gains (in tonnes of CO ₂ e)	Cumulative estimated <i>ex-ante</i> net carbon stock gains (in tonnes of CO ₂ e)	Annual estimated <i>ex-ante</i> net carbon stock gains/ hectare (in tonnes of CO ₂ e / ha)
	(a)	(b)	(b)-(a)		
1995	187.75	0	-187.75	-187.75	
1996	187.75	23637.63	23449.88	23165.85	9.59
1997	187.75	43099.66	42911.91	65981.48	9.27
1998	187.75	107873.75	107686.0	173667.48	14.44
1999	187.75	119462.81	119275.1	292942.55	13.88
2000	187.75	125742.63	125554.9	418497.43	13.60

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2001	187.75	125742.63	125554.9	544052.32	13.60
2002	187.75	128878.93	128691.2	672743.50	12.85
2003	187.75	128878.93	128691.2	801434.68	12.85
2004	187.75	128878.93	128691.2	930125.86	12.85
2005	187.75	132826.49	132638.7	1062764.61	13.25
2006	187.75	136507.59	136319.8	1199084.46	13.62
2007	187.75	138196.80	138009.1	1337093.51	13.79
2008	187.75	143090.63	142902.9	1479996.39	14.27
2009	187.75	143090.63	142902.9	1622899.28	14.27
2010	187.75	143090.63	142902.9	1765802.16	14.27
Total		1768806.10	1765802.16		
Average		117920.41	117732.66		

Non-CO₂ gases CH₄ and N₂O to the net change calculations

The emission of CH₄ is neglected as the project activity does not involve any planned management activity involving burning of biomass. In addition, *no slash and burn activity* was carried out for clearing of any vegetation during site preparation. Hence no emission source involving biomass burning exists either in ex-ante calculations or the ex-post scenarios of the project activity

The CDM Executive Board clarified in its 42nd meeting that accounting of GHG emissions in A/R CDM project activities from the following sources: (i) fertilizer application, (ii) removal of herbaceous vegetation, and (iii) transportation; may be considered as insignificant and hence can be neglected in A/R baseline and monitoring methodologies and tools.

But, as a conservative approach project proponents have calculated N₂O Emissions from fertilizer consumption. . However they have not been accounted for in the ex-ante estimations as the total volume is much less than the stipulated 15% level of the total net removals in the project scenario.

Net climate impact of the project

The project activity removes green house gas emissions by acting as sink of carbon dioxide and will pose a net positive impact on climate.

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CL2. Offsite Climate Impacts (“Leakage”)

Potential offsite decreases in carbon stocks (increases in emissions or decreases in sequestration) due to project activities

Under applicability conditions of the methodology used (AR-ACM001), the following types of leakage emissions are allowed:

- I. GHG emissions due to fossil fuel combustion in vehicles,
- II. GHG emissions due to activity displacement and
- III. GHG emissions due to increase in use of wood posts for fencing.

As per the EB 44 meeting report para 37, the Board agreed that the GHG emissions from the following sources related to A/R project activities, viz:

(a) Fossil fuel combustion in A/R CDM project activities;

(b) Collection of wood from non-renewable sources to be used for fencing of the project area are insignificant in A/R CDM project activities and may therefore be neglected in A/R baseline and monitoring methodologies. Hence point I and III are being neglected.

Decrease in sequestrations

As the project activity will not displace any activity outside the project boundary, offsite climate impacts are not expected to occur. The highly degraded lands included under the project activity would have provided very negligible amount of goods and services as in the absence of the project activity. The lands under the project activity had depleting resources as brought out by PRA reports. Only at some places there would have been insignificant grazing activities but the project activity will not lead to the shift of aforesaid pre-project activity outside the project boundary as the project proponents provide enough fuel and fodder to the local communities on regular basis without any cost. Thus the project is not susceptible to activity displacements and hence will not decrease pre-project carbon stocks outside the project activity.

Mitigation of negative offsite impacts resulting from project activities

The A/R CCB project activity will not result in any reduction of reforestation activities or increasing of deforestation activities outside of the project boundary. Under the baseline scenario, local farmers may have collected an insignificant amount fuel and fodder (mainly shrub and grass) from the project sites. Dead wood and some living branch biomass from the A/R CDM project activity can continue to be collected by local farmers as fuel wood without compromising the growth of trees established under the project. Thus, as the result of the project activities, local farmers will not have to collect additional fuelwood and fodder on lands outside the project boundary.

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Likely project-related unmitigated negative offsite climate impacts

The majority of villagers use shrubs, grasses and/or deadwood and branches as fuel wood for cooking and cremation purposes. Some farmers make use of biogas as an energy source and thus do not have need of accessibility to firewood from the forests. Local farmers will collect fuel wood within the project boundary without hindering the growth of trees established under the proposed A/R CCB project activity. The collection will be restricted to dead wood, branches and grasses growing between the trees. This is the mode of fuel collection in the existing lands as well. Thus, as the consequence of the proposed project activity, local farmers will not have to gather fuels from outside the project boundary.

Even though domestic animals were usually raised in the earlier periods in the project area, grazing activities will not need to be displaced to land outside the project boundary. This is due to the fact that project activity provides free of cost fuel-wood and fodder to the local people, as per requirement.

CL3. Climate Impact Monitoring

The monitoring of the project boundary under the proposed A/R CDM project activity is as per the provisions of AR-ACM0001 v2.0.

Data variable	Data unit	Measured (m), calculated (c) estimated (e) or default (d)⁴⁰	Recording frequency	Number of data points / Other measure of number of collected data	Comment
<i>GPS Coordinates</i>	<i>Numeric</i>	<i>M</i>	<i>Preceding verification</i>	<i>100%</i>	<i>The latitude and longitude of the land parcels falling in the project boundary are recorded. Any changes observed to the project boundary during the field surveys will be recorded and communicated to the DOE at the time of subsequent verification.</i>

Besides, information on following management practices will be recorded in each stratum:

1. Information on weeding
2. Information on slash and burning

⁴⁰ Please provide full reference to data source.

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3. Information on pest attack

Since thinning and harvesting are not allowed as per CCX rules applicable for this project, no such activity will be carried out for fifteen years from the date of approval of the project by CCX Committee on Forestry.

As per the applied methodology, the plantation management plan will be cross-checked to see whether the plantation has been done according to the plan.

Sampling design and stratification

Stratification:

As per the applied methodology, the stratification should be done on the basis of species and age class and possibly management. But in case of IFFDC project, the plantations comprises of miscellaneous species planted in non-discreet manner such that it is impossible to stratify plantation sites on the basis of species. Hence the plantation sites have been stratified on the basis of year of plantation. The stratification has been done as below:

Table 24. Stratification done for sampling purpose

Stratum	Year of Plantation	Species Composition	Area (ha)
1	1995	Miscellaneous	2411.12
2	1996	Miscellaneous	2154.68
3	1997	Miscellaneous	3184.91
4	1998	Miscellaneous	1123.00
5	1999	Miscellaneous	643.00
6	2001	Miscellaneous	358.20
7	2004	<i>Jatropha</i>	45.80
8	2005	<i>Jatropha</i>	21.00
9	2006	<i>Jatropha</i>	13.00
10	2007	<i>Jatropha</i>	56.50

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Sample size:

The sample plot size has been fixed at 1ha (100mx100m). The sampling intensity has been determined by using the methodological tool for calculation of the number of sample plots. The number of sample plots in each stratum is given below:

Table 25. Number of sample plots in each stratum

Stratum	Year of Plantation	Area (ha)	No. of Sample Plots
1	1995	2411.12	51
2	1996	2154.68	44
3	1997	3184.91	95
4	1998	1123.00	31
5	1999	643.00	9
6	2001	358.20	1
7	2004	45.80	1
8	2005	21.00	1
9	2006	15.00	1
10	2007	56.50	3

Monitoring of the baseline net GHG removals by sinks, if required by the selected approved methodology:

Monitoring of baseline net GHG removals by sinks is not required as per the applied methodology AR-ACM0001.

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Monitoring of the actual net GHG removals by sinks:

Selection of Project Related Carbon Pools

The following are the selected carbon pools as per the applied methodology AR-ACM001 version2.0:

Table 26. Carbon pools included for calculating net carbon sequestration

Carbon Pools	Selected (Yes or No)	Justification / Explanation of choice
Above-ground biomass	Yes	
Below-ground biomass	Yes	
Dead wood	No	The carbon stock in deadwood is excluded as carbon stocks in deadwood in the baseline scenario can be expected to decrease more or increase less, relative to the project scenario. Deadwood is mainly generated from tree vegetation; in the baseline there was insignificant tree vegetation compared to project scenario and hence it can be concluded that deadwood would be generated at a lower rate in the baseline scenario than in the project scenario and hence the carbon pool in deadwood can be conservatively neglected
Litter	No	The carbon stock in litter is excluded as carbon stocks in litter in the baseline scenario can be expected to decrease more or increase less, relative to the project scenario. Litter is mainly generated from tree vegetation; in the baseline there was insignificant tree vegetation compared to project scenario and hence it can be concluded that litter would be generated at a lower rate in the baseline scenario than in the project scenario and hence the carbon pool in litter can be conservatively neglected
Soil Organic Carbon	No	Soil Organic Carbon Pool was conservatively neglected as per the "Procedure to determine when accounting of the soil organic carbon pool may be conservatively neglected in CDM A/R project activities" (Version 01) (EB 33c Annex 1). The details of the different steps for determining the applicability of the procedure for conservatively neglecting Soil organic Carbon are as follows: <p style="text-align: center;">None of the sites included in the project area</p>

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		<p>consists of organic soils or wetland sites.</p> <p>2. The rate of loss of carbon stocks in mineral soils due to erosion within the project boundary shall not be permanently increased above baseline rates by the A/R project activity. This requirement shall be considered satisfied when conditions (i) to (iii) are met:</p> <p>i. There was no removal of existing vegetation as the sites were mostly wastelands. The isolated pre-existing trees were retained during the establishment of plantations.</p> <p>ii. The dimensions of the plantation pits are as follows:</p> <p>a) For forestry species, the pit size was 0.45 m³ and the spacing was kept at 3x3m.</p> <p>b) For fruit trees, the pit size was 0.6 m³ or .9 m³ and the spacing was kept at either 6x6m or 9x9m. Hence, the maximum area per hectare used for pit digging is 1100X.45X.45m² i.e. 222.75 m² which is about 2.2275% of the total land. This is less than the 10% stipulated by the procedure.</p> <p>iii. The pits were laid carefully along contours in hilly areas. Contour trenches and check dams in appropriate areas are an important component of the project aimed at soil and water conservation and checking erosion.</p> <p>3. No slash and burning activity is practiced inside plantation sites. Hence, fine litter remains on site.</p>
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Procedure

The changes in the carbon stocks of the mineral soil component of the soil organic carbon pool may be conservatively neglected in the A/R projects, during the calculation of net GHG removals by sinks, when the baseline carbon stock in mineral soils within the project boundary is either:

- In decline; or
- Is at steady-state or quasi-steady-state; or
- Is increasing at a rate less than or equal to the rate expected under the project activity.

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The above conditions are fulfilled as the project activity has been carried out on degraded /degrading grasslands and marginal fallows.

Selection of CO₂ and non CO₂ GHGs to be monitored

Table 27. Emissions sources included in the project boundary (as per AR-ACM001 v2.0)

Sources	Gas	Included /excluded	Justification/ Explanation of choice	Remarks
Combustion of fossil fuels	CO ₂	Included	Main gas of this source	As per EB 44 report, para 37 the Board agreed that the GHG emissions from the fossil fuel combustion in A/R project activities are insignificant in A/R project activities and may therefore be neglected in A/R baseline and monitoring methodologies.
	CH ₄	Excluded	Potential emissions are negligibly small	
	N ₂ O	Excluded	Potential emissions are negligibly small	
Burning of biomass	CO ₂	Excluded	However, carbon stock decreases due to burning are accounted as a carbon stock change	
	CH ₄	Included	Non-CO ₂ gas emitted from biomass burning*	
	N ₂ O	Excluded	Potential emissions are negligibly small	

*The emission of CH₄ is neglected as the project activity does not involve any planned management activity involving burning of biomass. In addition, *no slash and burn activity* was carried out for clearing of any vegetation during site preparation. Hence no emission source involving biomass burning exists either in ex-ante calculations or the ex-post scenarios of the project activity.

Data to be collected in order to monitor the verifiable changes in carbon stock in the carbon pools within the project boundary resulting from the proposed A/R project activity:

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Table 28. Data to be collected in order to monitor the verifiable changes in carbon stock within project boundary

Data variable	Data unit	Measured (m), calculated (c) estimated (e) or default(d)⁴¹	Recording frequency	Number of sample plots at which the data will be monitored	Comment
Stratum ID	Alpha-numeric	d	Annual	-	Each stratum is based on year of plantation
Sample size	Number	C	Annual	100%	Calculated for each stratum and sub-stratum
Sample Plot ID	Alpha numeric	-	Annual	100%	Identified and mapped for each stratum and sub-stratum
Plot location	Alpha numeric	M	Annual	100%	Numeric series ID has been assigned to each permanent sample plot.
Tree species	Name	-	Annual	100%	As mentioned in PDD
Age of plantation	Year	M	Annual	100% sampling plot	From the year of project plating.
No. of trees	Number	M	Annual	100% sampling plot	Trees are counted in the plots of each stratum.
Diameter at breastheight (DBH)	cm	M	Annual	Trees in sample Plots	Measurement of DBH as per at each monitoring event
Mean DBH	cm	C	Annual	Trees in sample plots	Calculated using the data on DBH
Tree height	m	M	Annual	100% sample plots	Measuring at each monitoring time per sampling

⁴¹ Please provide full reference to data source.

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					method
Mean tree height	m	C	Annual	100% of sampling plots	Calculated using the data on tree height
Merchantable volume	m ³ ha ⁻¹	C	Annual	100% sample plots	Using species-specific volume equations.
Wood density	t d.m. m ⁻³	d	Annual	100% sample plots	species specific values used
Biomass expansion factor	Dimensionless (ratio)	d	Annual	100% of sampling plots	IPCC default to be used
Carbon fraction	t C. t dm ⁻¹	d	Annual	100% sample plots	IPCC default to be used
Root-shoot ratio	Dimensionless (ratio)	d	Annual	100% of sampling plots	IPCC default to be used
Carbon stock in aboveground biomass of plots	t C ha ⁻¹	C	Annual	100% of sampling plots	
Carbon stock in belowground biomass of plots	t C ha ⁻¹	C	Annual	100% of sampling plots	
Mean Carbon stock in aboveground biomass per unit area per stratum	t C ha ⁻¹	C	Annual	100% of strata and sub-strata	
Mean Carbon	t C ha ⁻¹	C	Annual	100% of strata and	

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stock in belowground biomass per unit area per stratum				sub-strata	
Total carbon Stock change	t CO ₂ -e yr ⁻¹	C	Annual	100% project area	Summing up above ground and below ground carbon stock change for all strata, and tree species.

Data to be collected in order to monitor the GHG emissions by the sources, measured in units of CO₂ equivalent, that are increased as a result of the implementation of the proposed A/R CDM project activity within the project boundary:

As per the project design, none of the project activities will cause in an increase in GHG emissions by source. But the following variables will be monitored if and when they occur within the project boundary.

Table 29. Additional events to be recorded if and when they occur

Data variable	Data unit	Measured (m), calculated (c) estimated (e) or default (d)⁴²	Recording frequency	Number of sample plots at which the data will be monitored	Comment
Area of slash and burn	ha	m	annually	100%	Measurement for different strata using lengths and breadths
Mean biomass stock per unit area before	t d.m. ha-1	m	Annually	100%	Sampling survey for different strata before

⁴² Please provide full reference to data source.

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slash and burn					slash and burn
Proportion of biomass burnt	dimensionless	m	Annually	100%	Sampling survey after slash and burn
Biomass combustion efficiency	dimensionless	d	Before the start of the project	100%	Most recent IPCC default value to be used
Carbon fraction	t C.(t d.m.) ⁻¹	d	-	100%	Most recent IPCC default value to be used
Loss of above-ground biomass carbon due to slash and burn	t C yr ⁻¹	c	-	100%	Relevant IPCC Tool
N ₂ O emission from biomass burn	t CO ₂ -e yr ⁻¹	c	5 year	100%	Relevant IPCC Tool
CH ₄ emission from biomass burn	t CO ₂ -e yr ⁻¹	c	5 year	100%	Relevant IPCC Tool
Increase in Non-CO ₂ emission as a result of biomass burning in slash and burn	t CO ₂ -e yr ⁻¹	c	5 year	100%	Relevant IPCC Tool
Total increase in GHG emission	t CO ₂ -e yr ⁻¹	c	annually	100%	Relevant IPCC Tool

Leakage:

Not applicable as per the project requirements.

CL4. Adapting To Climate Change & Climate Variability

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Likely regional climate change and climate variability impacts

The project has been designed exclusively for wastelands and marginal lands. In Rajasthan, all the three project districts, viz. Udaipur, Chittorgarh and Rajsamand are drought-prone⁴³. Udaipur is one of the most chronically drought prone districts in India⁴⁴. In Madhya Pradesh, all three project districts, Sagar, Tikamgarh and Chhatarpur are all part of the severely drought prone Bundelkhand region of Central India^{45, 46}. In Uttar Pradesh, the plantations have been established in fallow lands where no activities had been possible due to lack of water and other resources.

Such adverse conditions not only take a toll on the survival of the plantations but also on the social fabric of the local populace. Livelihoods are affected due to the failure of farming activities. The vulnerable sections of the society, especially women, are adversely affected. The women are involved in household chores like bringing water, firewood, fodder etc. As these resources become scarce due to the drought conditions, women are affected the most as they have to toil even more to gather the resources. Hence IFFDC has not only had to devise appropriate measures for survival of the plantations, but also encourage and sustain livelihood development initiatives for the local communities. The different measures undertaken by IFFDC for this purpose are tabulated below.

Table 30. Measures to address the impacts of possible climate variability

Impact of Climate variability on-	Threat	Measures
Plantation	Drought	Water conservation structures to impound surface run-offs, mulching etc.
	Erosion of bare lands	Structures such as contour trenches, check dams etc.
Local Communities	Loss of livelihood	Livelihood generation activities promoted through revolving fund schemes (microfinance activities)
	Increase of burden on womenfolk	Promotion of women SHGs for self-sustaining income generation activities for women. SHGs for women also help create a financial security net for women and help in reducing possible exploitation by their male counterparts.

⁴³ United Nations Disaster Management Team (UNDMT), India

⁴⁴ Nagarajan R. 2003. Drought: assessment, monitoring, management, and resources conservation. New Delhi (India): Capital Publishing Company.

⁴⁵ http://www.downtoearth.org.in/full6.asp?foldername=20070615&filename=news&sec_id=50&sid=25

⁴⁶ <http://bundelkhand.in/portal/>

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CL5. Carbon Benefits Withheld from Regulatory Markets

The project is meant entirely for the voluntary market.

IV. Community Section

CM1. Net Positive Community Impacts

Appropriate methodologies used to estimate the net benefits to communities from project activity

PFFCS and SHGs etc. developed under the project are being maintained by IFFDC. In addition new plantation, capacity building of various stakeholders, development of micro enterprises and income generation activities are being facilitated by IFFDC for bringing sustainability of the PFFCS and improving the socio-economic conditions of the rural community.

The PFFCS are serving as nodal agencies for environment up gradation of the area and catering to fuel wood, fodder, medicinal and Non Timber Forest Produces (NTFPs) needs of the rural community. These PFFCS act as sustainable village level institution for sustainable environment conservation and employment generation. It also helps in mobilizing various outside resources to help for socio-economic development of the poor rural community for better livelihood. Various income generating activities and micro-enterprises have been accelerated at members as well as PFFCS level which shall lead towards self-sustainability and improvement of socio-economic status of the disadvantaged, downtrodden rural community. The community shall be benefited in term of improved environment, balanced ecology, social equality, strengthened inter-relationship and evils free society with deep sense of ownership on the project.

Education & health

While working with the tribal community, it was realised that the people are not very well aware about the health and hygiene related issues, for this they were losing many precious man-days along with an extra expenditure on medicines and health related problems.

IFFDC focused on community education and health related issues during the project implementation. To identify the health related issues, 149 Participatory Rural Appraisals were conducted. 824 literacy oriented groups were formed which propagated the health related measures among the rural community. 84 health check-up camps were organised in which 9932 (56% women) patients were provided curative medicines for enhancing the reproductive & health care knowledge 43 Gender Sensitization Workshops were conducted in which proper family planning measures were advocated among 1158 participants. 375, Preparatory Introductory meetings involving 24015 members and 293 cooperative member trainings involving 8,076 cooperative personals were conducted in which different health related issues were discussed at length to propagate the message of small family norms to improve the health standard of the community.

Improving environment due to the developing forests and various activities undertaken by IFFDC on community health resulted in a steep decline in the health related problems amongst the community.

The broad stratum of literates in the project area form about 35 percent of the total population but there was a marked difference in literacy rates of two sexes. Female literacy rate fall behind to the male literacy rate in all the PFFCS. Only negligible percentage of women was able to put signature

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and almost all the women were putting thumb impression at the time of PFFCS meetings & payments. It is widely accepted in the development arena that in addition to its inherent value, education for women has wide ramification on her future, social and economic progress, which decides her status in the society.

IFFDC recognized this fact from the beginning of the project and as a first step, women coordinators were appointed to make the illiterate members to read and write by organising literacy classes. More than 800 literacy groups were formed in these PFFCSs and about 9000 members were made literate. Further, this activity was linked with the district literacy programme of the respective states for long time sustainability.

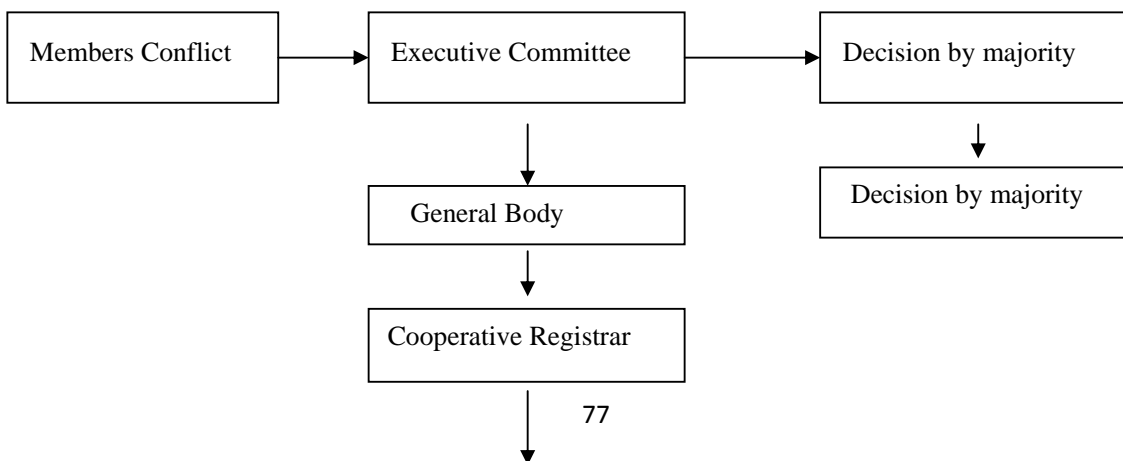
Most of the activities of afforestation like pit digging, soil & water conservation measures, nursery raising, CPT digging, sapling plantation, basin making, hoeing, weeding, irrigation, pruning, gap filling and watch & ward of the plantation had been undertaken manually by engaging the local rural community to generate wage employment to the community. About 28.84 lakhs workdays of employment were generated through afforestation activities, which included 13.06 lakhs (45.30%) workdays contributed by women.

Democratic framework of PFFCS and effective conflict resolution

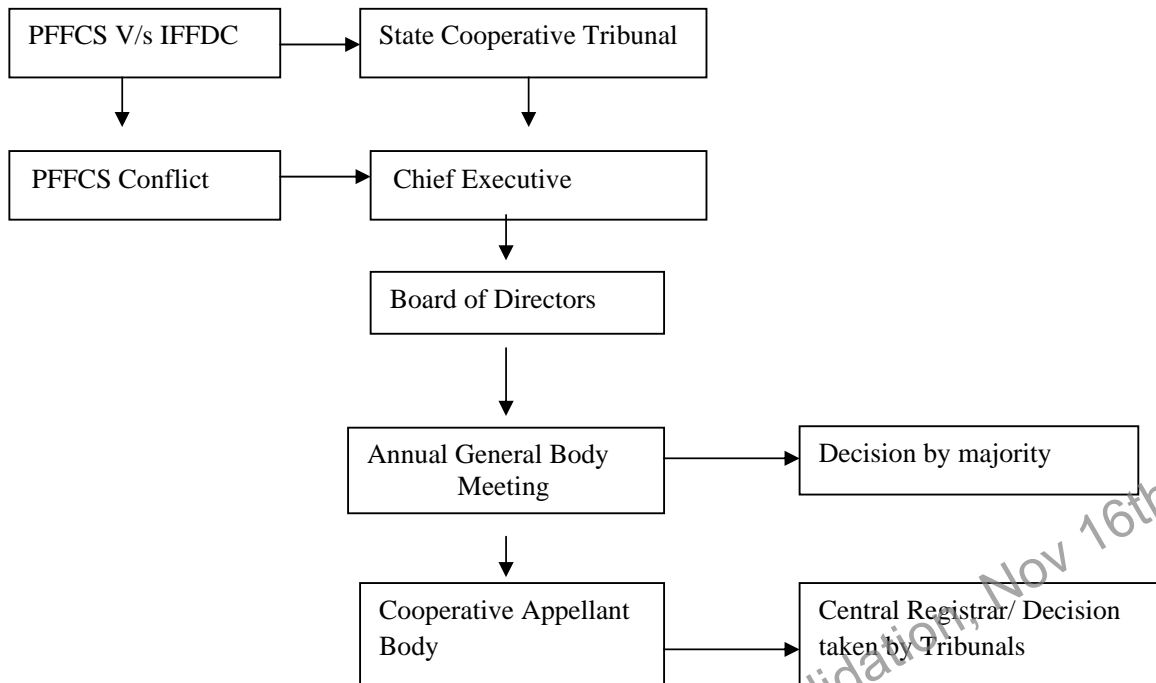
IFFDC has taken steps to ensure the involvement of whole village community irrespective of political and social backgrounds in order to enhance the trust of locals towards the project and inculcate a sense of belongingness towards the plantations. Some of the steps include involvement of at least one member (either male or female) of each family of the villages in the PFFCS, management sub-committees of all villages in the area of operation of PFFCS which work under the umbrella of PFFCS so as to manage any disputes and problems at the micro-level and awareness sessions among members of PFFCS about their rights and responsibilities.

Every separate plantation has been established with the consent of local community after detailed meetings and regular acquaintance sessions. Regular general meetings (held on the 26th of every month) as well as Executive Committee meetings of PFFCSs are held to keep abreast members about latest developments and increase participatory decision making capabilities of the members. As per the Multi States Co-operatives Act, each PFFCS and the member SHGs have shareholdings in IFFDC. This enables them to be a stakeholder in any economic benefit accrued from the IFFDC projects.

The institutional framework for conflict resolution in IFFDC is given below:



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The conflict resolution process is important for the sustainability of the PFFCS.

CM2. Offsite Community Impacts

No negative offsite community impact has been identified. No negative impacts were identified as per the PRA studies conducted by the project proponent.

CM3. Community Impact Monitoring

Initial plan for selection and monitoring of community variables

Annual monitoring of activities of all PFFCSs has been done so far since the inception of the project. Details regarding socio-economic background of all members, economic benefits accrued to the PFFCSs and their members, livelihood generation of the PFFCS members have been done. Percentage of income of PFFCS members involved in livelihood development projects *vis-à-vis* their total income will be assessed. Fodder and fuelwood availability in pre-project and project scenarios will be compared to assess the resource generation from the plantations.

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CM4. Capacity Building

Projects that include a significant capacity-building (training, skill building, *etc.*) component are more likely to sustain the positive outcomes generated by the project and have them replicated elsewhere. Hence IFFDC has taken a series of measures for enhancing capacity of different stakeholders to ensure sustainability of the project and undertake activities to strengthen its financial base. A series of training programs have been organized for IFFDC Project staff as well as local stakeholders. Training and education programs have been carefully planned on the basis of needs assessment of members and staff. During the project period, different training programs were organized in the priority fields listed below:

- I. Natural Resource Management
- II. Co-operative values and principles
- III. Leadership and motivation
- IV. Gender issues
- V. SHGs/Micro-credit and Micro-enterprise development

The training programs have been designed to bring the desired changes in the attitude, knowledge and skills of all the concerned at different levels of the project i.e. the IFFDC project staff, office bearers and the target groups. Special emphasis has been laid on women and other disadvantaged groups to increase their level of participation. Staff training was also given much importance as it was necessary to build up the capacity of IFFDC staff. The TOT (Training of Trainers) programs have helped greatly in facilitating the training of the PFFCS members.

The main activities for capacity building are preparatory/ introductory meetings, co-operative secretary and member trainings, Staff meetings and gender sensitization and micro-planning workshops, exposure tours to the successful organizations, PFFCS Annual General Meetings, Board Meetings, Monitoring and Evaluations etc.

318 participatory and introductory meetings were organized during 1995-2001 to orient the newly formed societies towards the concept of co-operatives and the project philosophy. The secretaries and the members have gained immensely from 188 training programs organized in the areas listed above. Keeping in mind the saying "Seeing is believing", exposure tours were organized to various places, where successful work has been done in the field of development. These have helped in motivating the people to achieve similar success in their own field.

The training programs have helped the PFFCS in Uttar Pradesh and Madhya Pradesh to carry out planning and implementation activities for natural resource management in this and subsequent projects. 90% of PFFCSs in Uttar Pradesh have been able to prepare and implement micro-plans on their own. By the training programs, linkages have been established with external agencies like Khadi Gram Udyog for this purpose. Such linkages will help in future projects, especially in their participatory planning and management and the development of sustainable community institutions.

Key persons of PFFCS have been taken on exposure visit to MYRADA (Mysore Resettlement and Development Agency), a pioneer non-governmental organization that has had extensive experience in incubating, developing and managing savings and credit programs in Southern India. The visiting

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persons were imparted experience in development, functioning, rules and regulation, conflict resolution mechanisms of SHGs and knowledge about micro-enterprises.

Special emphasis has been provided to gender equality. As part of this policy, several gender sensitization workshops have been organized

Training programs for PFFCSs members and IFFDC staff have continued after March 2002, through internal funding of IFFDC when ICEF Project funding ceased.

CM5. Best Practices in Community Involvement

Employment Generation

Before inception of project activity, the main source of income was from agriculture laboring, hazardous *bidī*⁴⁷ making works and other seasonal labor works. Due to lack of job opportunities many poor families used to move to urban areas in search of livelihood. Most of the activities like pit digging, soil and water conservation measures, nursery raising, cattle proof trench digging, sapling plantations, hoeing, weeding, gap filling and watch and ward of plantations had been undertaken manually by engaging local communities to generate extensive wage employments. Till date about 28.84 lakhs workdays of employment were generated through afforestation activities, which included 13.06 lakhs (45.30%) workdays contributed by women. More than 90% of the workdays have been availed by landless labors and marginal farmers. The jobs generated by IFFDC has also helped in overcoming some of the social evils like caste system as people now work side by side in project areas irrespective of their caste and creed.

Representation of weaker sections of society

During constitution of PFFCSs, stress has been given on the representation of economically weaker sections and socially backward communities. Out of the total members of PFFCS, about 38% are women. Out of the total members, 68.5% are landless workers or marginal farmers (less than 1 ha area). Socially backward classes, as identified by concerned governments constitute 74.17% of PFFCS members.

Workers' Rights

The PFFCS performs in a transparent and democratic manner and all government norms regarding wages and working hours are adhered to.

The workers are paid wages as fixed by the respective state government. As most laborers are hired from local community, they are well aware about their rights through frequent general meetings of IFFDC members.

There are no risks or health hazards involved or evaluated in the works in which the workers are engaged. The jobs undertaken in the plantations are not hazardous in nature and do not pose any substantial risk to worker safety.

⁴⁷ Local tobacco smoking product wrapped of *Diospyros melanoxylon* leaves

V. Biodiversity Section

B1. Net Positive Biodiversity Impacts

Methodologies used to estimate changes in biodiversity

The estimates in changes in biodiversity due to the project activity will be done visually and through experiences of local communities by following methods such as root stock analysis as done during PRA exercises.

Possible adverse effects of non-native species on the area's environment

No non-native species/invasive species will be used.

Identification of all IUCN Red List threatened species

All the project sites are degraded lands. There is no presence of any endangered species on the annexes to the IUCN Red Books, nor the presence of any rare and endangered species listed for key national/local protection.

List of all species to be used by the project

The detailed list has been provided in Table 34.

Mitigation of potential negative offsite biodiversity impacts

There are no negative offsite biodiversity impacts identified.

Impact on Flora

The project made extensive use of indigenous community knowledge through PRA surveys using participatory species inventoring and village root stock analysis techniques. The list of species found in the region which is used for fuelwood, fodder, fruits, medicinal values etc. were listed in a species ranking matrix in order of their usefulness. The species to be planted in the degraded lands and wastelands were chosen on the basis of such surveys.

Root stock analysis of the proposed plantation sites were done prior to the commencement of plantation activities and the number of trees of individual species were recorded. These trees were accounted for in the baseline scenario.

The main non-native species used in the plantations are *Leucaena leucocephala*, *Populus deltoidis*, *Acacia auriculiformis* and *Eucalyptus teretecornis*. While *Leucaena leucocephala* has been planted on demand by the villagers as it produces high quality fodder, the rest were planted for supplying fuelwood and timber in a short period of time.

No genetically modified organisms were used in the plantation activities.

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Impact on Fauna

The dense plantations constituted by native species provide habitat services to many wild animals, birds etc. Nilgai (*Boscephalus tragocamelus*) and *Sus scrofa* are frequently found to take shelter in these plantations. Sometimes leopards are also reported in some of the bigger plantation sites by the local villagers.

The plantations are a haven for different bird species due to the planting of huge number of fruit trees.

B2. Offsite Biodiversity Impacts

Identifying potential negative offsite biodiversity impacts

There is no conceivable circumstance where the project activity will have any offsite negative effects on biodiversity outside the project zone.

The use of non-native species will not limit the benefits to future biodiversity as their planting has been done in a diffused manner and constitutes a very small percentage of the planted trees.

B3. Biodiversity Impact Monitoring

Initial plan for selection of biodiversity variables to be monitored

The plantations sites are widely distributed over several states having about 150 sites covering an area of about 10000 hectares and are managed by the local communities. Hence, the proponent has proposed a community monitoring framework of biodiversity indicators with intermittent guidance and supervision of experts from local research institutions. The framework will include classification of biodiversity of plants in the plantations into various ecological use categories and rank the respective ecological use service provided by plantations. Thus biodiversity will be valued at species, process and habitat levels.

The components of biodiversity to be explicitly valued will be:

- Individual species: expressed as those useful for timber, fodder and fuel;
- Species richness: expressed as numbers of useful species, and increase in species richness;
- Ecosystem integrity: expressed as forest health and quality;
- Ecosystem function: expressed as effect on climate and soil erosion;

Annual transect walk will be organized preferably by involving school children to observe mammals and birds residing in the plantations. The list of birds and mammals will be used to identify the symbiotic relations between the species and the plantations. *eg.* Parakeets and babblers help in seed dispersal. While parakeets find residence in the higher canopies, the babblers reside in the bushes and ground vegetation established in the plantations.

The ecological services direct use (e.g. food, fuel, and fodder), indirect use (e.g. environmental services such as soil conservation), non-use or existence (e.g. spiritual) and option values (reserved in case of future need) and different stakeholders, or communities, attributing each type of value to each constituent of biodiversity.

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The goal of the biodiversity monitoring mechanism will be to establish community perception of the overall ecological services provided by the plantations. The biodiversity monitoring framework is expected to result in (a) contributing to community forest monitoring and indicators, (b) stimulating a learning process among forest users, and communicating between stakeholder groups.

The tabulation of species and their ecological use will be done as below:

Table 31. List of Animals and trees encountered during monitoring

Sl. No.		Species	Count
	Animal		
	Plants		

The kinds of value will be direct use values, followed by indirect use. For example diversity may be valued as 'diversity of use' as 'This is a diversity rich plantation it has many useful things in one place. Option values will be expressed only where rights are secure. Indirect use values such as ecosystem function and existence values were expressed only later in the process, and in the forest itself, 'Here is better because of the shade. It is more than a question of the useful-ness, here we have shade to sit in'. Existence values expressed across the socioeconomic range indicated appreciation of the 'greenery', peace provided by the forest, and the beauty of bird song.

The proposed biodiversity values framework. (In each cell different stakeholders may have different values and diversity for each individual species)

Table 32. Biodiversity Values Framework

	Direct use	Indirect use	Existence ⁴⁸	Option ⁴⁹
Species				
Ecosystems				
Processes				

The participatory nature of this type of monitoring is expected to lead to a convergence of interests and concerns among stakeholders. This is not to say that participation leads to consensus and improbable levels of mutuality. Transparency can (1) expose political interests and enhance democratic processes, (2) increase awareness of rights and therefore commitment to resource management, and (3) improve understanding amongst stakeholders so that they are able to work together more efficiently.

⁴⁸ existence value (eg. appreciation of beauty; intrinsic value)

⁴⁹ Option or bequest value (here including political value, or the realisation that it is of value because others want it)

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Besides biodiversity in plantation sites, annual community-based review of indicators of human disturbances near the plantation sites which may affect the biodiversity of the plantation sites will be conducted. The probable variables to be monitored will be as follows:

- Construction works in the vicinity of plantation sites.
- Increase in road density, vehicular traffic
- Encroachment of plantation land
- agricultural intensity
- rate of urbanization

The overall framework of monitoring will be as follows⁵⁰:

Table 33. Framework of Monitoring

Day	Activity	Description
1	Group discussion	Facilitators introduce the topic and participants discuss values around the guide questions
2	Resource map	Villagers and foresters prepare a map of the community forest and use this as the basis for planning the forest walk
3	Forest walks	The group plan a route to visit a range of sites intended to help them and the researchers discuss the different indicators eg. Density of plantation, natural regeneration, soil erosion, encroachment etc. which reveals positive or negative trends in biodiversity. The discussion during the walks focuses on species and habitats observed and on ecological processes
4	Feedback discussions	At the end of each day reflection meetings with participants, and later with forest guards, clarify and consolidate the findings of the day
35	Reflection and analysis	Further discussion with villagers draws out patterns and explanations from the results

The community monitoring will be held every year. The process and results will be reviewed by independent experts once every five years for every PFFCS.

B4. Native Species Use

The tree species for reforestation were selected after a rigorous discussion with local people and analysis of local conditions. The species composition of the plantations has been such that it reflects the biodiversity of the region. Only five of the species planted are exotic species (discussed in B1) and hence have no adverse effects on biodiversity. These species are already in use in the region where they are planted and are not reported to be invasive.

⁵⁰ Adopted from Adaptive Value Of Participatory Biodiversity Monitoring In Community Forestry, Nepal
AUTHORS: Anna Lawrence, Krishna Paudel , Richard Barnes and Yam Malla

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The fast growing species such as poplar and eucalyptus were used so as to provide easy means of firewood as the indigenous species growing in the wasteland conditions are all slow growing and yield is poor. Similarly *Leucaena leucocephala* was planted to provide good quality fodder in short period of time as is a fast growing species in adverse conditions.

The following species have been used in the A/R Project

Table 34. Species used in the Project

SI No.	Species	Type
1	<i>Acacia auriculiformis</i>	Originally exotic (from Australia) but now naturalized
2	<i>Acacia catechu</i>	Indigenous
3	<i>Acacia leucophloea</i>	Indigenous
4	<i>Acacia nilotica</i>	Indigenous
5	<i>Albizia lebbek</i>	Indigenous
6	<i>Albizia procera</i>	Indigenous
7	<i>Anogeissus latifolia</i>	Indigenous
8	<i>Azadirachta indica</i>	Indigenous
9	<i>Bombax ceiba</i>	Indigenous
10	<i>Buchanania latifolia</i>	Indigenous
11	<i>Butea monosperma</i>	Indigenous
12	<i>Cassia fistula</i>	Indigenous
13	<i>Dalbergia sisoo</i>	Indigenous
14	<i>Dendrocalamus strictus</i>	Indigenous
15	<i>Dyospiros melanoxylon</i>	Indigenous
16	<i>Emblica officinalis</i>	Indigenous
17	<i>Eucalyptus hybrid</i>	Exotic (from Australia)
18	<i>Gmelina arborea</i>	Indigenous
19	<i>Holoptelia integrifolia</i>	Indigenous
20	<i>Jatropha curcas</i>	Indigenous

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21	<i>Leucaena leucocephala</i>	Originally exotic but now naturalized
22	<i>Madhuca indica</i>	Indigenous
23	<i>Pongamia pinnata</i>	Indigenous
24	<i>Populus deltoidis</i>	exotic (From North America)
25	<i>Psidium guajava</i>	indigenous
26	<i>Tectona grandis</i>	indigenous
27	<i>Writia tinctoria</i>	Indigenous
28	<i>Zizyphus xylopyra</i>	Indigenous

Project withdrawn before CCB Standards validation, Nov 16th, 2009

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Table 35. Uses of Tree species planted by IFFDC

S L No.	Species	Utility					
		Timber	fuelwood	Food	Fodder	Medicinal Uses	Other Uses
1	<i>Acacia catechu</i>	Valuable timber used for house construction, agriculture implements and boats	Excellent fuelwood , calorific value of dry sapwood is 5142 cal, yields good quality charcoal		Leaves are used as fodder	Katha, extracted from heartwood is an astringent, anti-diarrhoea, applied on skin ulcers	Cutch, extracted from heartwood is used in dyeing of silk, pulp and paper. Bark is used for tanning
2	<i>Acacia leucophloea</i>	Use for making poles and agriculture implements	Used as fuelwood, calorific value of dry sapwood is 4900 cal		Pods, leaves and shoots are used as fodder	Used as an astringent, gum is used as a medicine	Leaves are used for tanning
3	<i>Acacia nilotica</i>	Timber is coarse and hard and used in structural purposes	Used as fuelwood, calorific value of dry sapwood is 4793 cal and yields high grade charcoal		Pods and leaves are used as fodder	Gum Arabic is used as astringent	Barks are used for tanning
4	<i>Albizia lebbek</i>	Timber is used for furniture, decorative work	It is also used as fuelwood in dry areas		Leaves are used as fodder	Bark is used as anti-inflammatory and anti-diarrhoeal and anti-haemorrhagic ⁵¹ purposes	Leaves are also used as manure Gum is used for

⁵¹ http://www.ecoheritage.cpreec.org/04_01_Sacred%20trees/28_04_01_sacred_trees_Indian%20Siris.htm

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							calico-printing
5	<i>Albizzia procera</i>	Valuable timber is used in construction and furniture making	Excellent charcoal is prepared from wood		Leaves are regarded as high quality fodder	The leaves are used for treating ulcers	The leaves are used as insecticides. Barks are used for tanning
6	<i>Anogeissus latifolia</i>	Timber is hard and used for making axles of carts (hence axlewood)	It is a very good firewood and yields good quality charcoal		Leaves are used as fodder	Barks produce anti-serum for snake bites ⁵²	Barks are used for tanning
7	<i>Azadirachta indica</i>	The timber is resistant to various pests and is used for storage			The leaves provide excellent fodder	The twigs are used as insect repellent and as chew sticks in the villages. The seeds yield margosa oil which is effective against skin diseases and as antiseptic.	The tree is held sacred by the Indians. The oil is used as insecticides, illuminant etc. Oil cake is used as fertilizer.
8	<i>Bombax ceiba</i>	It is used in furniture making, packaging, extremely durable in water, used as			Leaves are used as fodder	The bark exudes a gum used as an astringent and anti-diarroea ⁵³ , roots are used as astringent and	The floss from seeds are used for stuffing and insulation

⁵² <http://www.worldagroforestry.org/sea/Products/AFDbases/af/asp/SpeciesInfo.asp?SpID=1789>

⁵³ http://www.himalayahealthcare.com/herbfinder/h_bombax.htm

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		matchwood				anti-septic uses	
9	<i>Buchanania latifolia</i>	Used in match making and packaging	-	The fruits are eaten (<i>chironji</i>) ⁵⁴	Leaves are used as fodder		The gum is used in dyeing
10	<i>Butea monosperma</i>	-	It is use as fuelwood and charcoal making. The dry wood has a calorific value of 4925 cal		The leaves are high quality fodder	The powdered seeds is used as insecticide and anti-helminthic medicine Dried flowers are used as anti-diuretic ⁵⁵	Flowers are dried to produce a dye used in <i>Holi</i> festival Gum is used for tanning
11	<i>Cassia fistula</i>	Durable timber used as poles, agriculture instruments and structure	Excellent fuelwood and charcoal. The calorific value of dry wood is 5164 cal			The fruit pods are used as laxative and strong purgative. It also has anti-dysentery and anti-cancer property	Bark is used for tanning
12	<i>Dalbergia sisoo</i>	The timber is one of the finest in India and is used for furniture and construction	It is an excellent firewood and calorific value of dry sapwood is 4908 calories		Leaves are used as fodder	Dried leaves are used as insecticides. Powdered wood is used to treat leprosy ⁵⁶	The heartwood yields an oil used for lubrication
13	<i>Dendrocalamus</i>	Bamboo is termed	Bamboo yields high	The	Leaves are		

⁵⁴ http://botanical.com/site/column_poudhia/164_char.html

⁵⁵ http://www.ecoheritage.cpreec.org/04_01_Sacred%20trees/16_04_01_sacred_trees_flame%20of%20forest.htm

⁵⁶ <http://www.worldagroforestrycentre.org/sea/Products/AFDbases/AF/asp/SpeciesInfo.asp?SpID=645#Uses>

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	<i>strictus</i>	“poor man’s timber” for its usefulness. It is used for construction purposes.	quality charcoal.	rhizome is edible.	used as fodder		
14	<i>Dyospiros melanoxylon</i>		The timber can be used as fuelwood. The calorific value of sapwood is 4957 Kcal/kg	The fruits and seeds are edible	The leaves are used as fodder	The seeds are prescribed in India as a cure for mental disorders. Dried flowers are reportedly useful in urinary, skin and blood diseases. The bark is astringent ⁵⁷ .	The leaf is one of the most important NTFP in India. It is used for making <i>bidis</i> (indigenous cigars)
15	<i>Emblica officinalis</i>			The fruits are rich in Vitamin C and nutritious	The leaves are used as fodder	The fruit is extensively used as medicine in Indian medicine system (Ayurveda)	The fruits are used in shampoo and barks yield tannin.
16	<i>Gmelina arborea</i>	The timber is durable and used for furniture and construction. It yields high grade plywood.	The wood is used as firewood	The fruits are edible	The leaves are used as fodder	The roots are used to treat gout and also as laxative. The fruits are used to treat fever.	
17	<i>Jatropha</i>					The leaves are used to treat guinea-worm	The seeds yield oil which is used in

⁵⁷ <http://www.worldagroforestrycentre.org/sea/Products/AFDbases/AF/asp/SpeciesInfo.asp?SpID=690#Uses>

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	<i>curcas</i>					disease. The latex has anti-microbial property ⁵⁸	biodiesel
18	<i>Madhuca indica</i>	The timber is very hard and durable. It is used for construction purposes.	It is excellent firewood. The calorific value of sapwood is 4100 cal	The fruits coat and flowers are eaten	The leaves are used as fodder	<i>Madhuca indica</i> is termed one of the most “social” trees because of its utility. The tree is worshipped by tribals and protected by them. The bark and flowers are used as medicine.	The oil from fruit kernel is used for cooking and for burning lamps
19	<i>Pongamia pinnata</i>	The wood is used for construction	It is an useful fuel wood, the calorific value being 4839 cal		The foliage is used as fodder	The oil is used to treat rheumatism. Leaves have anti-microbial property. Roots are used for cleaning gums, teeth, and ulcers. Bark is used internally for bleeding piles. The oil is antiseptic. Powdered seeds are valued as a tonic and in bronchitis. Flowers are used for diabetes.	The leaves are used as manure. The seeds yield pongamia oil. oil cakes are used as fertilizer
20	<i>Tectona grandis</i>	Teak yields one of the best quality timbers in India. The	The wood also yields excellent charcoal		The leaves are used as	The bark has been used as an astringent and the	The leaves are used for thatching purpose.

⁵⁸ Wealth of India, Volume IV, 2003, NISCIR, Government of India

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		timber is durable and resistant to fungus. The timber is used in construction and furniture making			fodder	wood as a hair tonic.	
21	<i>Ziziphus xylopyra</i>	The timber is used locally for agricultural instruments	The wood is used for charcoal making				It is an important host of lac insect
22	<i>Writia tinctoria</i>	The wood is extensively used for carving.		The fruits and seeds are eaten	The leaves are used for fodder	The seeds are used as anthelmintic	The leaves and roots yields dye. The leaves are used as wrappers of <i>bidi</i> .
23	<i>Holoptelia integrifolia</i>	The timber is used for boxes and packing cases				The bark is used in rheumatism, for treating oedema, diabetes, leprosy and other skin diseases, dyspepsia, etc.	
24	<i>Psidium guajava</i>		Wood makes excellent firewood and charcoal	The fruits are edible and highly nutritious		All parts of the young fruit are astringent. Guava exhibits antibacterial action The dried ripe fruits are recommended as a remedy for dysentery, while the leaves and fruits are used as a cure for diarrhoea. Oil exhibit	

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						anti-inflammatory properties. A decoction of the leaves or bark is taken externally as a lotion for skin disease, wounds, and ulcers ⁵⁹ .	
25	<i>Eucalyptus</i>	It is also used for hardboard, fibreboard and particleboard. It is also used for poles, stakes, boxwoods, bridge timber etc.	It widely used for firewood and charcoal				The leaves yield Eucalyptus oil
26	<i>Populus deltoidis</i>	Timber is used for structural purposes and agriculture instruments.	Wood is used for fuel		The leaves are used as fodder		
27	<i>Leucaena leucocephala</i>		The species is fast growing and used as a good supply of fuelwood. The tree makes excellent charcoal with a heating value of 29mJ/kg and good recovery values (25-30%).		It is one the highest quality and most palatable fodder trees of the tropics, often being described as		Fibre values are similar to those of other tropical hardwoods, and it produces paper with good printability but low tearing and folding strength.

⁵⁹ <http://www.worldagroforestry.org/Sites/TreeDBS/aft/speciesPrinterFriendly.asp?Id=1375>

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					the 'alfalfa of the tropics' ⁶⁰ .		
28	<i>Acacia auriculiformis</i>	The wood makes attractive furniture and is suitable for construction work and carving. The young poles are also used as pulp.	The wood has a calorific value of 4700-4900 kcal/kg, which make it ideal for firewood and charcoal.				The bark yields tannin The spreading, densely-matted root system stabilizes eroding land making it suitable for stabilizing and revegetating mine spoils.

Project withdrawn before CCB Standards validation, Nov 16th, 2009

⁶⁰ <http://www.worldagroforestry.org/Sites/TreeDBS/aft/speciesPrinterFriendly.asp?Id=1069>

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IFFDC does not exploit any of the traditional uses depicted above for commercial purpose. The local populace has access to resources such as leaves, fruits and fallen branches to satisfy their demands for the uses listed above.

B5. Water & Soil Resource Enhancement

Identifying project activities that are likely to enhance water and soil resources

Undertaking soil and water conservation measures with a view of bringing about ecological balance in the project areas is one of the main goals of the project.

The project involves reforestation in wastelands and degraded lands devoid of any significant vegetation cover, prone to erosion. Hence soil and water conservation activity is a very important component of the project. The different soil conservation measures include both mechanical and biological measures like construction of check dams, gully plugging and other gabion structures for stabilizing of streams, contour bunding along slopes of bare hills, control of grazing, planting of grasses along slopes etc. The soil conservation measures not only included the plantation sites but also adjoining areas as provided by the administration and local communities, thus making the efforts effective and long-lasting. The area covered by soil and water conservation activities in various PFFCSs under the project is detailed in Table 36.

Table 36. Area covered under Water and Soil Conservation Activities⁶¹

Sl No.	State	District	PFFCS	Area covered (ha)
1	Uttar Pradesh	Sultanpur	Bhadainya	120
2			Madwa	172
3			Vinayakpur	149
4			Harkhumau	38
5			Urermou	203
6			Haliyapur	0
7			Kachnao	178
8		Rae Bareli	Khairahni	100
9			Khajuro	26
10			Kandrawan	85
11			Malikmau	35
12			Pooranpur	131
13			Sarai Bariya Khaida	111
14		Pratapgarh	Poorabgaon	120

⁶¹ IFFDC records

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15			Dabhiyar	158
16			Bansi	92
17			Purebeerbali	85
18			Sarai Chivlaha	130
19			Chaupai	110
20			Medhawa	153
21			Pithapur	90
22			Mokchada	0
23		Unnao	Barajhagarapur	0
24		Lucknow	Kumhrawan	300
25			Chirla Bhagvatpur	110
26		Kausambhi	Mahegaon	112
27			Kasainda	0
28		Allahabad	Tulapur	52
29			Sub-Total	2860
30			Changeri	20
31			Badgaon	118
32		Udaipur	Nauwa	32.3
33			Gadoali	126
34			Khimpur	25
35			Intali	85
36	Rajasthan	Rajsamand	Lapsiya	113
37			Hingariya	15
38			Langatch	111.65
39		Chittorgarh	Roliya	126
40			Maharaj ki Netawal	107.75
41			Riwaliya	57.5
42			Sub-Total	937.2
43			Guraiya	167
44			Berkhedi	163
45			Berkotikalan	177
46			Berkotikhurd	60
47			Bijora	93.5
48			Budhakhera	171
49	Madhya Pradesh	Sagar	Dhura	64
50			Dungariya	60
51			Hilgan	51
52			Jaitpur	217
53			Khejra	54
54			Magron	131
55			Manegaon	28

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56			Manjla	99
57			Padariya	161
58			Ragoli	125
59			Suna	47
60			Udaipura	293
61		Tikamgarh	Mohangarh	169
62			Ladwari	98
63		Chhatarpur	Rajnagar	70
64			Lalpur	176
65			Jatkhra	55
			Sub-Total	2729.5
			Total	6526.7

Ground water recharging: Better soil-moisture conservation techniques opted at the plantation sites are expected to result in rising levels of the water table in the nearby area(s) especially considering the barren wastelands which have been taken up for plantation purpose (Photographs 5-7:Annexure II).

The dense vegetation established as a result of the plantations act as a natural interceptor of rainfall and help in the increasing throughfall and stemfall, important factors in enhancing ground water recharge.

Afforestation of the watershed, contour trenching on the hill slopes, gulley plugging and stream bunding, contour bunding of farms, construction of underground impermeable bunds across stream beds and construction of percolation tanks for harnessing runoff water, will help in augmentation of ground water⁶². All these activities have a high degree of acceptance and participation by the rural community. Participatory planning, execution and maintenance stages of soil and water conservation programmes has definitely motivated the local community for active participation resulting in positive results.

⁶² Groundwater resources at risk in the basalts (Deccan traps) of western India, Limaye & Limaye, *Future Groundwater Resources at Risk* (Proceedings of the Helsinki Conference, June 1994). IAHS Publ.no. 222, 1994.

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Annex 1

**CONTACT INFORMATION ON PARTICIPANTS IN THE PROPOSED A/R CCB PROJECT
ACTIVITY**

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