CASE STUDY

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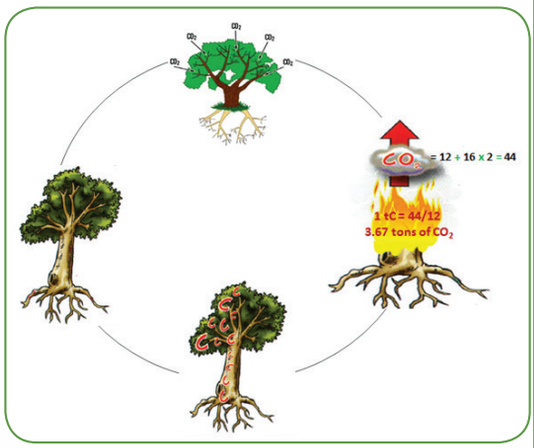
The Energy and Resources Institute



Mitigating Climate Change and Enhancing Income of Forest Dependent Communities through Carbon Finance Mechanism - A/R CDM Projects in Uttar Pradesh: A Case Study of Jhansi

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Background

The A/R CDM project of Jhansi has been a successfully registered with United Nations Framework Convention on Climate Change (UNFCCC). The carbon credits generated through the A/R CDM projects is an additional incentive to the forest fringe communities of Jhansi.

The major focus of the project is to improve livelihood, and empower local people who are dependent on forests by promoting sustainable forest management, including Joint Forest Management (JFM) plantation and community development, thereby, improving environment and alleviating poverty.

The Jhansi A/R CDM project sites represent eight village forests that are Khadaura, Kakarwai, Saraul, Kanaura, Parechha, Baraura, Raseena, and Manpur-Babina. These village forests predominantly have an agrarian economy having more than 80% of their population dependent on agriculture, livestock, and forests. The parcels of project lands selected for reforestation activities are in a state of severe degradation over the past many decades. The project sites have faced significant ecological degradation, run-off of fertile soil, and biodiversity loss. These sites are characterized by rocky undulating terrains, scanty water resources, and low fertile top soil cover. Further, the region experiences widespread open cast extraction and mining activities resulting in removal of top fertile soil and natural vegetative cover. These activities have severely affected the environment and this raises health hazard issues over a period of time at local level. Therefore, to restore these degraded lands the Joint Forest Management Committees (JFMCs) along with

forest department have established the proposed SSC A/R-CDM plan on these lands through a larger scheme titled, 'Uttar Pradesh Participatory Forest Management and Poverty Alleviation Project (UP PFMPAP)' funded by Japan International Cooperation Agency (JICA) as a loan to the Government of India.

The forest cover in the Jhansi Forest Division is far below the national threshold of 23.57% of the total geographic area of the country under the forest cover and tree cover. The forest type in the division is dry deciduous with open to medium canopy cover. The division falls under the semi-arid climatic zone and uncertain rainfall patterns. Most of the people within the selected village forest areas belong to the socially marginalized and economically weaker sections of the society. These communities are heavily dependent on forests and agriculture for sustaining their livelihood. During the summer season, the area experiences severe drought conditions due to shortage of water in the rivers and rivulets. Illicit felling, pollarding, and unsustainable harvesting practices are common during this period. Also, natural weeds, such as Lantana *(Lantana camara)*, Karonda (*Carissa spinarum*), and Vantulsi (*Ocimum basilicum*) adversely affect the growth of natural regeneration. Thus, restoring these forest areas is essentially required and is one of the major objectives of the forest department. Enhancement of forest canopy and rich humus on ground would certainly reduce the surface run-off and improve groundwater recharge. Reforestation of native tree species under this project would not only reduce the impact of drought, but also fulfil the much needed forest produce and its ecosystem services in the region.

The lands included in the project are those that belong to these JFMCs and which was non-forest (forest cover density of less than 15%) as on December 31, 1989, and also in January, 2012 (starting date of the project). The land belonging to these JFMCs that do

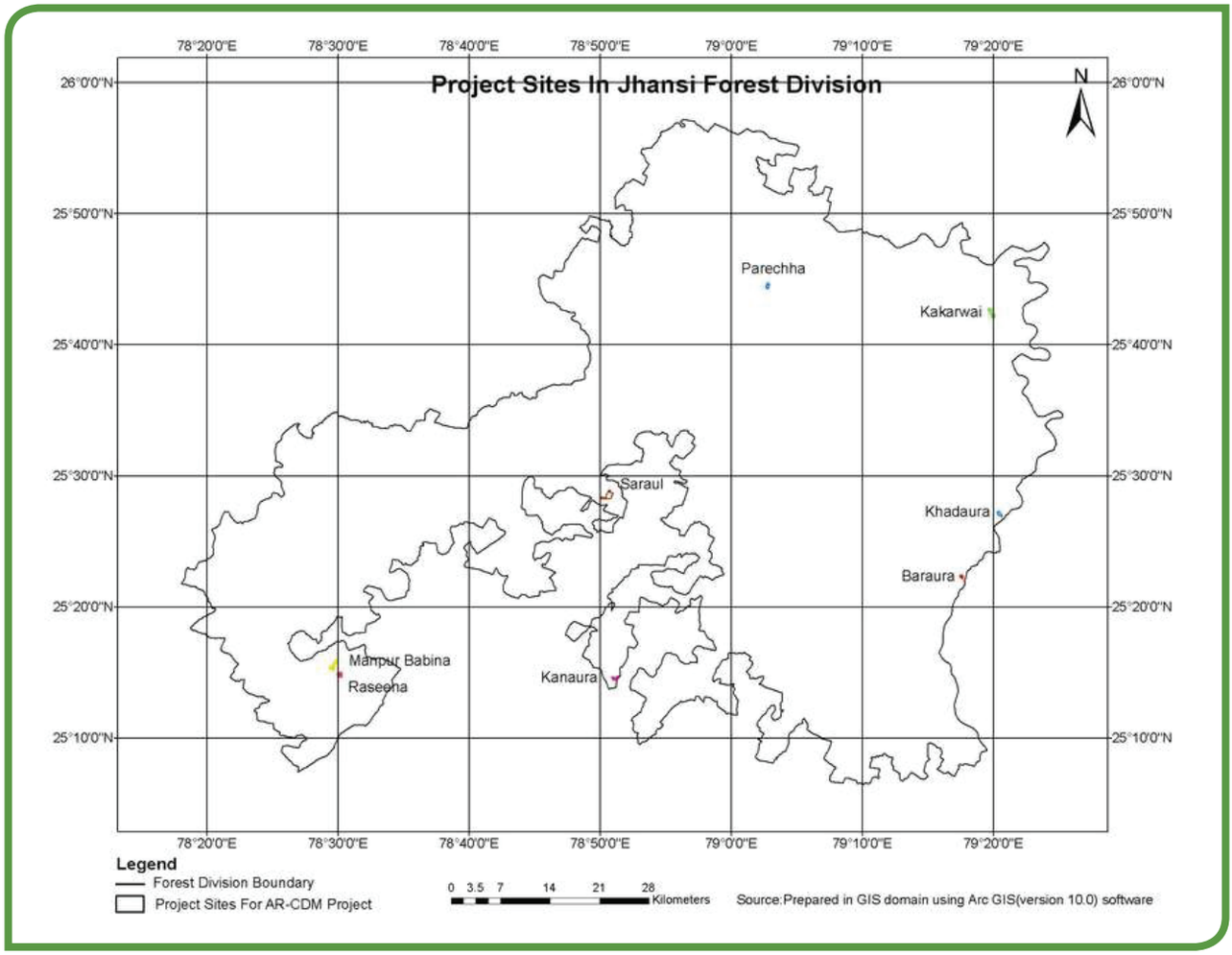


Figure 1 Forest Division Map of Jhansi

TABLE 1. DETAILS OF EACH DISCRETE PARCEL OF THE LAND IN ALL THE SELECTED JFMCs VILLAGE FOREST

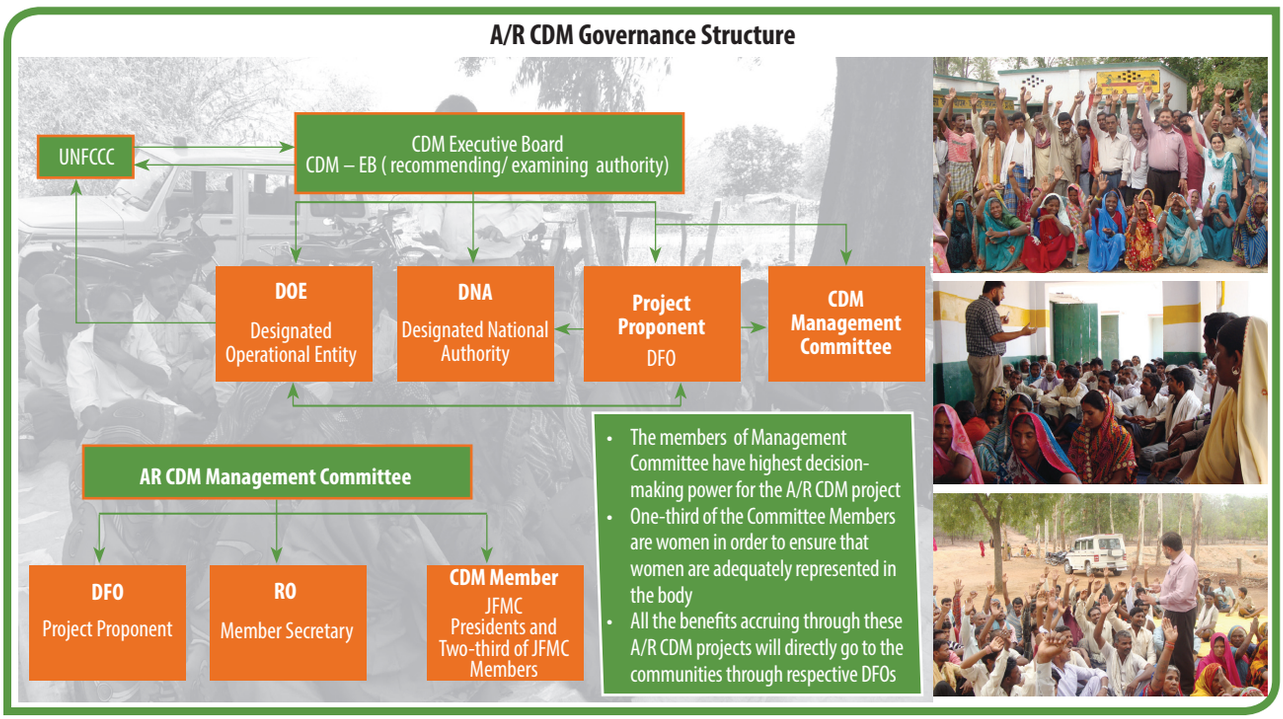
S. No.	JFMC Village	JFMC A/R CDM Code	Recorded village forest area (ha)	Area of each discrete patch (ha)	Total A/R CDM project area (ha)
1	Saraul	CH05101-2012	100.95	13.44	76.71
		CH05101-2014		63.27	
2	Kakarwai	BA03901-2012	100.00	44.24	44.24
3	Khadaura	GU04801-2012	173.59	23.01	23.01
4	Manpur-Babina	BA47801-2012	73.30	19.46	49.48
		BA47802-2012		18.33	
		BA47801-2013		7.77	
		BA47801-2014		3.92	
5	Raseena	BA04201-2014	88.70	24.89	24.89
6	Kanaura	MA04301-2014	70.98	6.3	18.51
		MA04302-2014		6.39	
		MA04303-2014		5.82	
7	Baraura	MA04401-2014	122.32	12.29	12.29
8	Parechha	MA04601-2012	132.10	19.74	19.74
9	Total		861.94	268.87	268.87

not fulfil the CDM land eligibility conditions or where reforestation activities have been carried out before January 2012 have not been included in this A/R CDM project. The project activities were implemented in the month of January, 2012. The plantation activities of the proposed project were planned in three different phases. The first phase of plantation was started in 2012, covering an area of 138.22 ha, the second phase of plantation was started in 2013, covering an area of 7.77 ha, and the third and final phase of plantation covering an area of 122.88 ha was completed in 2014, with a total of 268.87 ha area.

Each A/R CDM area was demarcated by the help of GPS and geo-coordinates maps of each discrete patch have been lead out which is indicated in Annexure -1.

Institutional Mechanism

A/R CDM Management Committee of Jhansi Forest Division has 14 members, of which 05 members are male and 06 members are female. The respective



DFO is the Chairperson and 02 RO are the Member Secretary of the Management Committee.

Project Cycle of Jhansi Forest Division

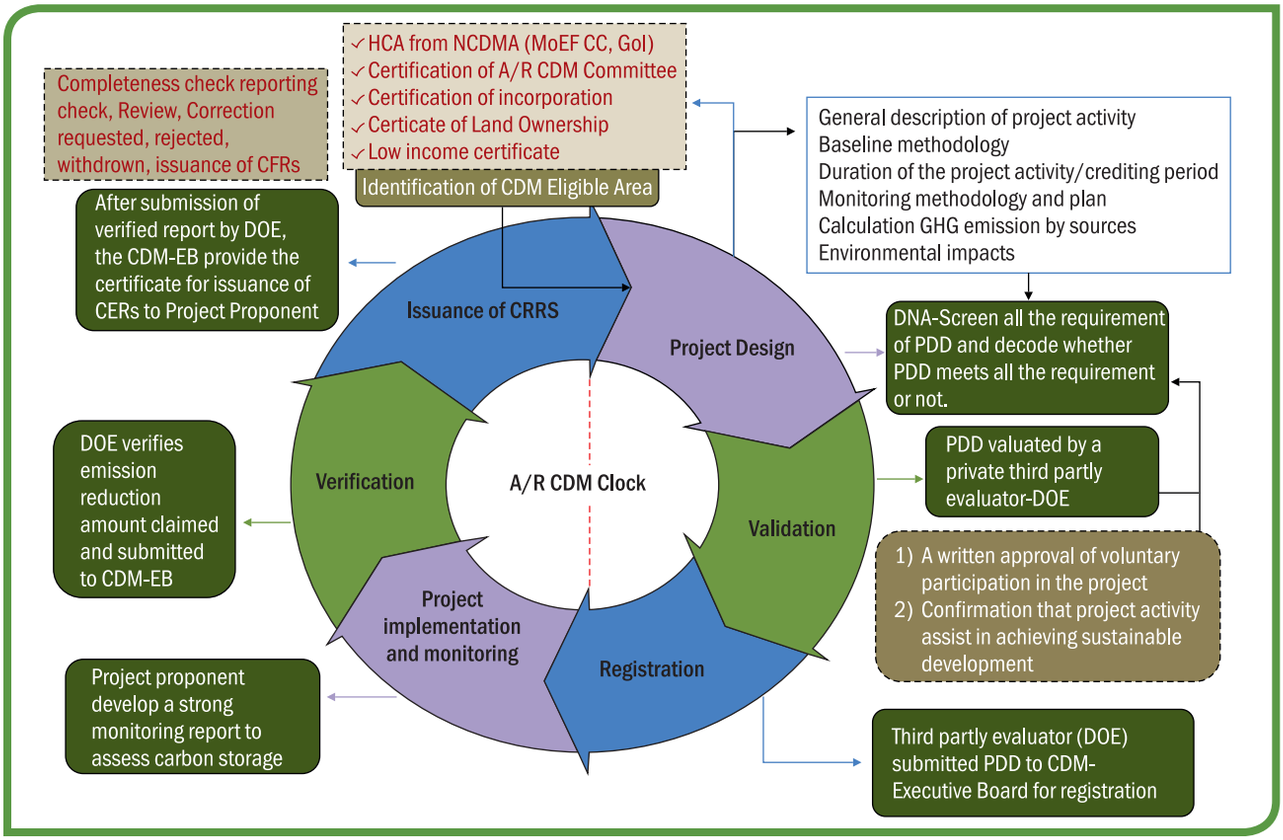
Validation of the Project Design Document (PDD) and Monitoring Report (MR) of Jhansi Forest Division is a tedious job because it requires long back and forth discussion, correction and answering of the queries raised by DOE in each and every step. Timely submission of PDD and MR is also a colossal task because if there are any delays in the process, it may cause redo of the entire process in PDD and MR as per the next version which is uploaded by UNFCCC time to time.

Jhansi A/R CDM projects passed various validation processes which are illustrated below:

Implementation

The project has taken several steps to ensure dissemination and adoption of processes introduced by way of various interventions. These steps started from village forest selection and community organizing followed by village forest area notification and signing of MoU between UPFD and JFMCs. Continuous

Validation Process



capacity development efforts are done that includes classroom trainings, exposure visits, and on-field guidance by project staff, NGOs, and consultants. Project design has provided scope to extend post plantations support for three years where thrust is given on non-wood forest produce (NWFP) species. In addition, income generation opportunities are being created for the forest-dependent families.

There are several challenges that need to be overcome to make the project of this nature a success. The key one is continuity of personnel who have been trained and oriented on the project and encouraging community to participate in planning and execution of works.

It is also a challenge to maintain and enhance quality of village forest area working together with community/JFMC and ensure benefit sharing under the provisions of UPJFM Rules 2002 and subsequent government orders/amendments.

Some other challenges are ensuring convergence, record maintenance, progress reporting, close follow-up, and M&E.

The crediting period start date of all projects is January 1, 2012, and the end date of crediting period is January 1, 2032, which can be further renewed for another 03 more rotation cycles.

The total number of projected certified emission reductions (CERs) for entire crediting period will be approx. 67,528 tCO_2e. On an average, around 3,376 tCERs will be generating annually in Jhansi forest division. Under first verification, a total of 5,464 amount of CERs has been issued for the period from January 1, 2012 to June 6, 2016. These CERs can be sold in compliance as well as voluntary markets in developing and developed countries.

As it is a government implemented project, the benefits of CERs are directly befitted to the local communities. The finances generated from the sale of tCERs would be transferred to the Village development fund which shall be utilized for sustainable forest management activities.

A total of 61,118 saplings, of 22 forestry tree species, were planted in the project which are *Acacia auriculiformis, A. catechu, A. nilotica, Aegle marmelos, Ailanthus excels, Albizia lebbeck, Annona squamosal, Azadirachta indica, Butea monosperma, Cassia siamea, Dalbergia sissoo, Embilica officinalis, Holoptelea integrifolia, Madhuca indica, Moringa olefeira, Pongamia pinnata, Prosopis juliflora, Tamarindus indica, Tectona grandis, Terminalia arjuna, Terminalia belerica, and Ziziphus mauritiana.*

Sale of First Carbon Credits through Plantations

- Uttar Pradesh Forest Department of Jhansi District has taken the lead by implementing the A/R CDM project.
- The state has been able to make the farmers realize the importance of clean development mechanism.
- The communities have decided to keep their CERs (5,464) on hold and will sale when they get the appropriate price.
- The current rate of carbon credit is around $5.1 in Voluntary Carbon Markets (Source: State of the Voluntary Carbon Markets 2017). However, price will be decided under voluntary carbon standards (VCS) as per prevailing rate of carbon which will be finalized by UPFD and village community jointly.
- The benefits will percolate down to farmers in 8 villages.
- The forestry plantations raised on 268.87 ha became eligible for the first cycle of carbon credits. The verification process for the first cycle was completed in June, 2016.
- The crediting period start date of all projects is January, 2012 and the end date of crediting period is January, 2032, which can be further renewed for another 03 rotation cycles till 2072.
- The project will make the villagers strategic sellers of carbon credits, in response to global demand for CERs.
- The CDM Project involves local communities in plantation activities on degraded common lands, degraded forestlands through planting of multipurpose species and implementing sustainable forest management practices.
- This combination has been able to provide multiple benefits to the poor farmers through meeting their needs of small timber, firewood, minor forest produce along with carbon credits (as cash incentive), besides providing gainful employment.

Summary of *ex ante* estimates of GHG removals by sink

Year	Baseline net GHG removals by sinks (tCO_2e)	Actual net GHG removals by sinks (tCO_2e)	Leakage ($t\ CO_2e$)	Net anthropogenic GHG removals by sinks (tCO_2e)	Cumulative net anthropogenic GHG removals by sinks (tCO_2e)
2012	1810	0	0	-1810.47	-1810
2013	0	1704.51	0	1704.51	-106
2014	0	1793.23	0	1793.23	1687
2015	0	3873.03	0	3873.03	5560
2016	0	3873.03	0	3873.03	9433
2017	0	3873.03	0	3873.03	13306
2018	0	3873.03	0	3873.03	17179
2019	0	3873.03	0	3873.03	21052
2020	0	3873.03	0	3873.03	24925
2021	0	3873.03	0	3873.03	28798
2022	0	3873.03	0	3873.03	32672
2023	0	3873.03	0	3873.03	36545
2024	0	3873.03	0	3873.03	40418
2025	0	3873.03	0	3873.03	44291
2026	0	3873.03	0	3873.03	48164
2027	0	3873.03	0	3873.03	52037
2028	0	3873.03	0	3873.03	55910
2029	0	3873.03	0	3873.03	59783
2030	0	3873.03	0	3873.03	63656
2031	0	3873.03	0	3873.03	67528
Total	1811	69,339	0	67,528	----
Total number of crediting years (January 2032)	20				
Annual average over the crediting period	91	3,466	0	3,376	--

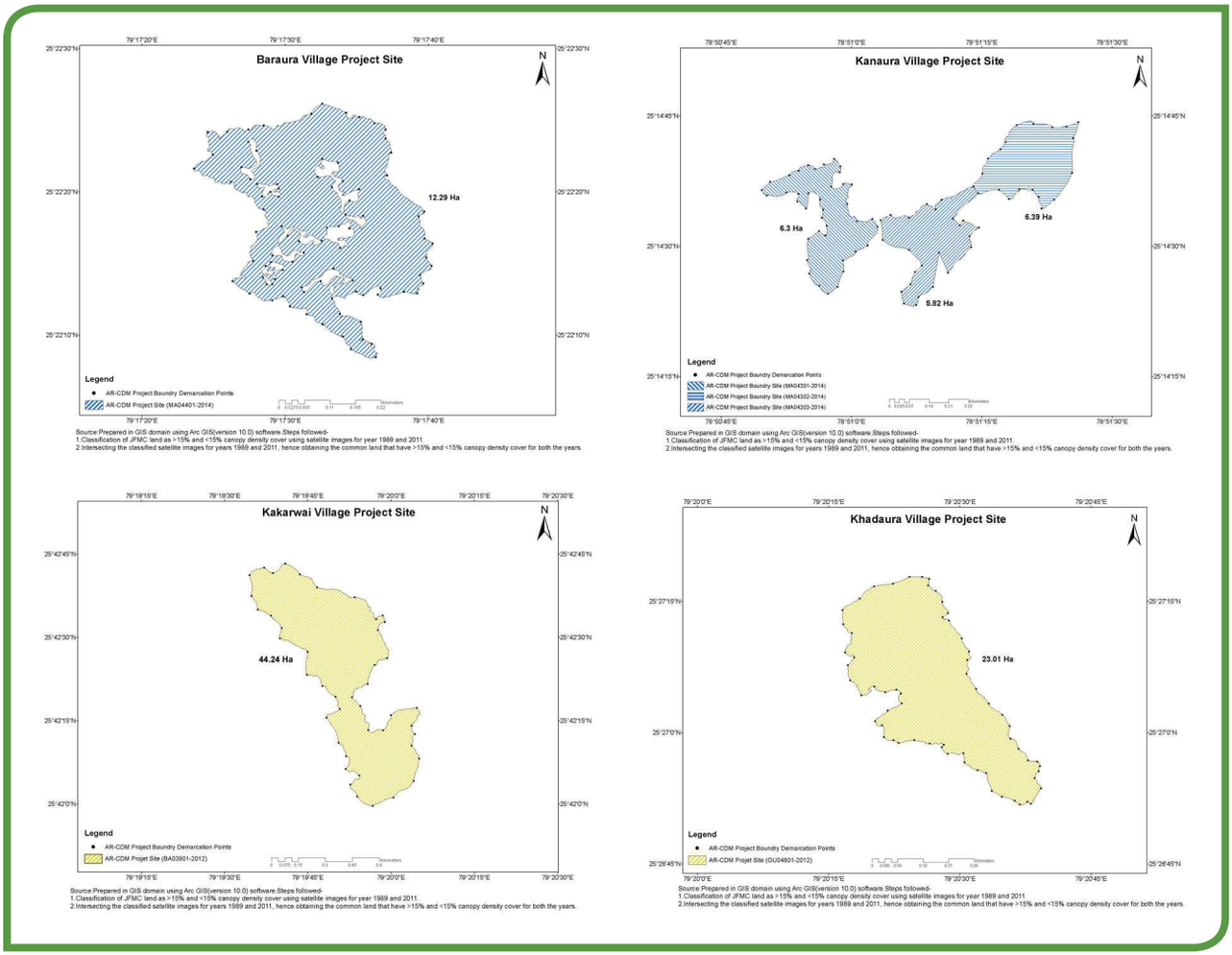
Benefits from A/R CDM Projects

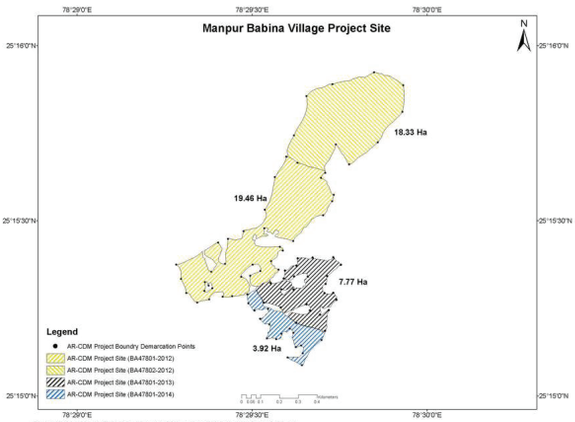
- Money generated from the sale of tCERs would be transferred to the Village Development Fund managed by the JFMCs federation and would be further utilized for sustainable forest management, including monitoring of the project.
- The project will benefit with respect to the sustainable forest management, carbon assessment, awareness regarding forest carbon financing mechanisms.
- Regular monitoring by the forestry experts would ensure success of the plantation.
- The project plantation activities would significantly improve water recharge capacities of these degraded lands, thereby increasing infiltration and reducing the run-off.
- The project plantations will discourage encroachment by adjacent communities looking for agricultural land. The plantation will also act as buffer zones to natural forests. By provision of alternative livelihoods, it will ease pressure on the natural forests.
- The project activities will conserve the biodiversity as 22 number of mixed and multiple tree species have been planted.
- The faunal biodiversity will increase due to presence of birds, soil macro- and micro-fauna,

and niche-based organisms inhabiting the areas due to increased protection from predators.

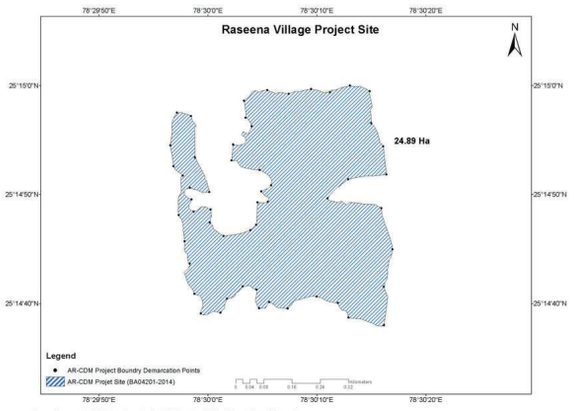
- Shade tolerant species will also thrive as under-storey vegetation.
- Restoration of the degraded silvi-pastoral areas will not only enhance the fuel and fodder supply for local people, but also improve the ecological and economic conditions of the local people. It would also improve ecosystem services through forest restoration.
- Protection in A/R CDM designated area will also suppress the germination and growth of invasive alien species, such as *Lantana camara* and *Parthenium* grass.
- The project envisages increase in production of NWFPs, that is, collecting *tendu patta*, *mahua* seed, *aonla* fruit, *jamun* fruit, *Arjun* seeds, and *chironjee* seed, resin, and others.
- There is scarcity of these resources in the A/R CDM project area. The reforestation activities of multiple species would revive NWFPs collection leading to generation of some additional income by processing these NWFPs and marketing them in the nearby market.

Annexure 1: Geo coordinates maps of A/R CDM area of Jhansi Forest Division





Source:Prepared in GIS domain using Arc GIS(version 10.0) software.Steps followed-
1.Classification of JFMC land as >15% and <15% canopy density cover using satellite images for year 1989 and 2011.
2.Intersecting the classified satellite images for years 1989 and 2011, hence obtaining the common land that have >15% and <15% canopy density cover for both the years.



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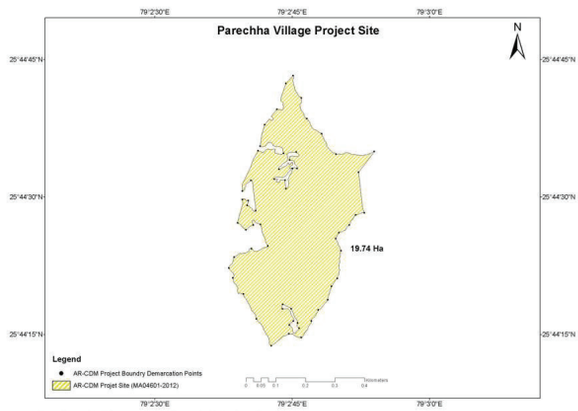

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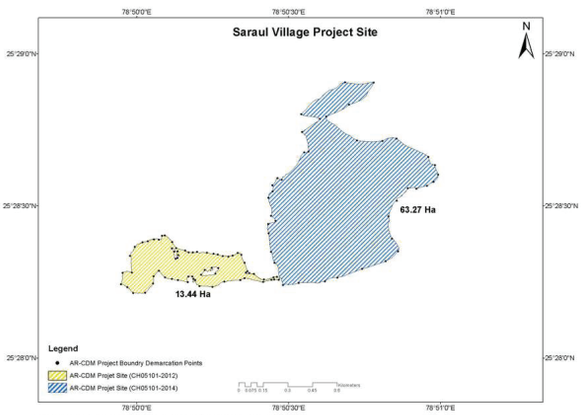

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