MAHOGANY PLANTATION IN INDIA

Document Prepared by MITCON Consultancy & Engineering Services Limited

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The project "**Mahogany Planation in India"** is a grouped afforestation activity in form of agrisilvicultural system that intends to satisfy multiple Sustainable Development Goals through project activity ("Project or Project Activity"). The project is implemented on multiple scattered small land parcels within the 65 districts (defined by Government of India, as on 28 June 2019, Project Start date and shall include split/bifurcation, regrouping, renaming as may be carried out by Government of India from time to time, detailed in Annexure[9]) across the States of Maharashtra, Madhya Pradesh, Karnataka, Gujarat and Telangana, in India ("Project Area"). Plantation under this Project is carried out by the multiple farmers by planting Mahogany (*Swietenia macrophylla*[1], hereinafter referred to as "Mahogany") trees on their privately owned agriculture land in the Project Area. The Project Proponent (PP), Mahogani Vishwa Agro Private Limited (100% subsidiary of MITCON Nature Based Solutions Limited, which in turn is Joint Venture Company of MITCON Consultancy & Engineering Services Limited[2]), legal holding structure is detailed in Appendix [8]. The PP and is responsible for the implementation of the Project Activity in coordination with the farmers and other relevant stakeholders. In pre-project scenario, the agricultural lands owned by farmers are used for traditional farming and shall be used for Project Activity with continuation of traditional farming. The intent of PP is to create a stable sustainable income source for the farmer who is solely dependent on traditional subsistence driven farming.

Currently, the farmer is carrying out subsistence driven farming dependent on the single stream of income from the traditional crops which is affected by multiple uncertainties such as weather conditions during crop cycle (90-120 Days), input price fluctuations, market forces after harvesting. The Project Activity intends to address and minimize the impacts of the factors enumerated above by creating stable sustainable stream of income besides traditional farming.

Swietenia macrophylla in agrisilviculture system offers following advantages:

[1] Detailed Taxonomy in the Annexure 1

[2] www.mitconindia.com

a. Wide Ecological Range[3]: It has been found on alluvial soils, volcanic soils, heavy clays, lateritic soils and soil derived from limestone, granite and other sedimentary, igneous or metamorphic rock formations.

b. Conversion to agroforestry enhances carbon sequestration, habitat for soil biological activity and erosion resistance functions in croplands (https://doi.org/10.1038/s43247-023-00680-1)

c. Naturalization: The inception of *Swietenia macrophylla* in India was dated back in the year 1872, at Royal Botanical Garden, Kolkata, West Bengal. Since then, it has been introduced in the forest in many parts of the country.

d. Resistance to Wind Speed[4]: *Swietenia macrophylla* is reported to have resistance to high wind speed and recommended for garden and avenue plantation.

e. Reduces Atmospheric Warming[5]: A seven-member team from the Indian Institute of Science Education and Research (IISER), Mohali, discovered in a first-of-its-kind study that the big-leaf mahogany tree (*Swietenia macrophylla*), known for its high-quality timber, emits significant amounts of the compound dimethyl sulphide (DMS), which aids cloud formation and cooling of the earth's surface, influencing regional air quality and climate.

f. Medicinally Important Plant which exhibits antimicrobial, anti-inflammatory, antioxidant effects, antimutagenic, anticancer, antitumor and antidiabetic activities (https://doi.org/10.3390/molecules180910465)

g. Wood Quality and Yield: Mahogany offers wood quality suitable for high end, long life applications such as ship building, furniture, musical instruments and buildings.

The Project Activity is implemented through multiple consultation and engagements between PP and the relevant stakeholders including but not limited to farmer, local governance bodies and administrations. The stakeholders involved in the Project Activity are mutually bound by legal framework in compliance with all the local and national laws and regulations.

The proposed Project covers multiple scattered small landholdings privately owned by various farmers aggregating to 15,000 hectares' land across the Project Area.

[3] https://www.sciencedirect.com/science/article/abs/pii/S1433831904700669 : The ecology, silviculture and biogeography of mahogany (Swietenia macrophylla): a critical review of the evidence

[4] https://www.sciencedirect.com/science/article/abs/pii/S1433831904700669 : The ecology, silviculture and biogeography of mahogany (*Swietenia macrophylla*): a critical review of the evidence

[5] IISER Study - https://doi.org/10.5194/acp-2019-489

During the years 2019 and 2020 (First Project Activity Instance) plantation was completed at 315 scattered land parcels aggregating to 165.41 hectares under Project Area.

PP intends to complete the plantation activity in 15,000 hectares by the year 2024, which shall create direct positive impact on livelihoods of more than 25,000 farmer families, i.e. 100,000 individuals and indirect positive impacts on large number of individuals involved in Project Activity.

The Project Activity is designed in compliance with the methodology AR-ACM0003 Version.2.0, developed under the Clean Development Mechanism for large-scale afforestation and reforestation of lands except wetlands, being used under the Verified Carbon Standard (VCS), to generate GHG emission removal.

Based on ex-ante estimates of the Above and Below Ground Biomass (details provided in the Ex-ante Emission Reduction Sheet), the First Project Activity Instance of Area of 165.41 ha is expected to sequester 230,982 tonnes of $CO_{2\text{-}eq}$ over 30 years, capped to Long-term Average of 94,413 tonnes of CO_{2eq} equivalent to 19 tonnes per hectare per year of plantation over 30 years.

Correspondingly, on completion of the proposed Project Activity of 15,000 ha across 65 districts in five states, the Project is expected to create a carbon sink of 470,392 tonnes of CO_{2eq} per year over 30 years of crediting period.

Based on the Non-Permanence Risk Assessment of this project, 12% buffer credits are to be deposited in the AFOLU pooled buffer account.

1.2 Sectoral Scope and Project Type

The Project is based on the Agrisilvicultural system, a form of Agroforestry, hence falls under the VCS Sectoral Scope 14, Agriculture, forestry and other land use (AFOLU) and categorizes under Afforestation, Reforestation, and Revegetation (ARR) project type. The Project is a Grouped Project and plans to have multiple Project Activity instances.

Sectoral Scope	Sector 14: AFOLU
AFOLU Project Category	☒ Afforestation, Reforestation and Revegetation (ARR) ☐ Agricultural Land Management (ALM) ☐ Improved Forest Management (IFM) ☐ Reduced Emissions from Deforestation and Degradation (REDD) ☐ Avoided Conversion of Grasslands and Shrub lands (ACoGS) ☐ Wetlands Restoration and Conservation (WRC)
Activity Type	Agroforestry
Grouped	Yes, this Project is a Grouped Project. Project involves single Project Activity with multiple Project Activity Instances

1.3 Project Eligibility

Eligible AFOLU Projects as mentioned in the Appendix 1 of VCS Standard Version 4.4, the Project Activity and First Project Activity Instance falls under the "Afforestation, Reforestation and Revegetation" (ARR) category. Objective of the Project is to increase the Forest cover through Agrisilvicultural system of Mahogany plantation in the existing land parcels. Eligibility of the project is justified as indicated below:

Table 1: Eligibility Criteria

Eligibility conditions	Justification
a) Eligible ARR activities are those that increase carbon sequestration and/or reduce GHG emissions by establishing, increasing or restoring vegetative cover (forest or non-forest) through the planting, sowing or human-assisted natural regeneration of woody vegetation	The Project involves plantation of Mahogany in multiple scattered small land parcels within the Project Area, thereby increasing the vegetation cover (forest), which leads to carbon sequestration through above and below ground biomass. The above description of the Project complies with rules set under Appendix 1 of VCS Standard Version 4.4 which categorizes the Project Activity under the Afforestation, Reforestation and Revegetation (ARR) category.
b) Eligible ARR projects may include timber harvesting in their management plan.	The Mahogany trees planted may be harvested after the plant age of 15 years or more. Harvesting and Replantation is a part of the Contractual Agreement between the farmer and PP. The PP management plan delineates strata and year wise harvesting and replantation.
c) The project area shall not be cleared of native ecosystems within the 10 year period prior to the project start date	To ensure that there were no native ecosystems within the 10 years' period prior to the plantation, the following evidences/documents form part of eligibility to include land parcels of each farmer. I. Last 10 years' satellite images form the part of each Farmer Eligibility for inclusion in Project Activity (List of Few Farmers are enclosed in Appendix "6")

	II. Land Title/Rights Document for each land parcels which categorize the land use type (sample of Land Title is enclosed in Appendix "7")

1.4 Project Design

The Project is designed to include multiple scattered small land parcels owned by the Farmers across the Project Area of the Project Activity. The Project is a Grouped Project as defined under the VCS (VCS Standard 4.4).

Eligibility Criteria

The Group Project Activity uses the UNFCCC Afforestation/Reforestation CDM methodology AR-ACM0003 Ver. 2.0 – "Methodology for Afforestation and reforestation of land except wetlands" under sectoral scope 14 –Agriculture, Forestry and Other Land Uses (AFOLU). Participation in the Grouped Project should fulfil the following eligibility criteria of the AR-ACM0003 methodology. The conditions are as follows:

(a) The land subject to the project activity does not fall in wetland category

The land parcels included in the Project Activity and First Project Activity Instance are farm lands privately owned by multiple farmers who are undertaking traditional crop farming and does not fall under the wetland area defined by the Government bodies, particularly (i) Wetlands Portal of India[6], accorded by the Ministry of Environment, Forest and Climate change, Government of India; and (ii) ENVIS Centre on Wildlife & Protected Areas[7], sponsored by Ministry of Environment, Forests & Climate Change, Government of India. The same is additionally evidence by land title/right document which details about the land use type.

PP under its due diligence approach for the areas under rice cultivation has specifically considered only those areas where rice is cultivated under aerobic rice cultivation system. The aerobic rice cultivation system is the method of cultivation, where the rice crop is established by direct seeding (dry or water-soaked seed) in non-puddle field and un-flooded field condition. Rice cultivation through puddle or flooding techniques are excluded during on-boarding of farmers as per SOP. The aerobic rice cultivation being carried out in non-puddle/un-flooded field is not considered as wetland as defined under Ramsar Convention on Wetlands[8].

[6] https://indianwetlands.in/wetlands-overview/interactive-wetland-map-of-india

[7] http://www.wiienvis.nic.in/Database/ramsar_wetland_sites_8224.aspx

[8] https://www.ramsar.org/sites/default/files/documents/library/info2007-01-e.pdf

It may be noted that the first Project Activity Instance of 165.41 ha does not include any land parcel having rice cultivation pre or post Project Activity.

(b) Soil disturbance attributable to the project activity does not cover more than 10 per cent of area in each of the following types of land, when these lands are included within the project boundary:

(i) Land containing organic soils;

(ii) Land which, in the baseline, is subjected to land-use and management practices and receives inputs listed in appendices 1 and 2 to this methodology

The Project Activity and First Project Activity Instance involves cropland which falls under the clause (b)(ii) of the applicability criteria of AR-ACM0003 methodology.

The Project Activity and First Project Activity Instance involves the digging of pits for the plantation of Mahogany seedlings in which the soil disturbance is not more than 10% of area, below calculations establishes the fact:

Table 2: Calculation of Soil Disturbance

Sample Project Area	1 hectare
Pit Size	1.5 ft. x 1.5 ft. (Length x Width) or 2.25 Sq.ft.
Number of Plantation	Maximum 1,111 seedlings
Total Area of Pits	1,111 x 2.25 Sq. ft. or 2,500 Sq. ft. or 0.02 hectare
Percentage of Soil Disturbance	2.30%

Post harvesting of the Mahogany, the replantation activity would entail similar soil disturbance of 2.30% as it envisages the natural decomposition of harvested stumps without any Soil Disturbance.

In addition to above requirement the PP has added following eligibility criteria for the inclusion of the new Project Activity Instances:

(i) Plantation of Mahogany (*Swietenia macrophylla)* trees and pre-project land use must be fallow or barren or crop land or agri-allied activities. Plantation may be carried out as Block or Boundary plantation

(ii) Agrisilviculutral system, part of Agroforestry

(iii) Land parcels shall be in 65 districts (defined by Government of India, as on 28 June 2019, Project Start date and shall include split/bifurcation, regrouping, renaming as may be carried out by Government of India from time to time) across the State of Maharashtra, Karnataka, Telangana, Gujarat and Madhya Pradesh, in India

(iv) Land – Privately owned lands with clear possession and access to the land and does not form part of Government declared protected areas

a) Eligibility criteria for Grouped Projects:

Description	Evaluation
A delineation of the geographic area(s) within which all project activity instances shall occur	As mentioned in section 1.4, the delineation of the geographical areas has been carried out to include 65 districts (defined by Government of India, as on 28 June 2019, Project Start date and shall include split/bifurcation, regrouping, renaming as may be carried out by Government of India from time to time) across five states. This forms eligibility criteria for farmer to be included in the grouped Project Activity.
One or more determinations of the baseline for the project activity in accordance with the requirements of the methodology applied to the project	The land parcel(s) to be included under the Project Activity: • must not cleared of any native forests prior 10 years from the Project Start Date, • must not be a wetland, • must be a crop land • must have less than 10% soil organic disturbance. The above is ensured for each farmer before inclusion in the grouped Project Activity through SOPs and Contractual Agreement.
One or more demonstrations of additionality for the project activity in accordance with the requirements of the methodology applied to the project	The land parcel(s) must demonstrate the additionality explained in section 3.5 herein.
One or more sets of eligibility criteria for the inclusion of new project activity instances at subsequent verification events	In addition to eligibility criteria set in section 1.4, land parcel(s) to be included under the Project Activity: • must be a crop land or fallow land or agri-allied activities; • must be in 65 districts (defined by Government of India, as on 28 June 2019, Project Start date and shall include split/bifurcation, regrouping, renaming as may be carried out by Government of India from time to time) across the State of Maharashtra, Karnataka, Telangana, Gujarat and Madhya Pradesh, in India • must practice in Agrisilviculutral system, part of Agroforestry

	• must be privately owned lands with clear possession and access to the land and does not form part of Government declared protected areas The above is ensured for each farmer before inclusion in the grouped Project Activity through SOPs and Contractual Agreement.
A description of the central GHG information system and controls associated with the project and its monitoring	PP has an Operation division wherein the GHG information system, controls and monitoring is governed associated with the project and its monitoring. Whole time Director (Operations), Measurement, Reporting and Verification (MRV) Team, AFLOU expert and Agronomist shall be responsible for the above as detailed in section 6.3 and section 1.11 herein

b) Eligibility criteria for New Project Activity Instance

Description	Evaluation
Meet the applicability conditions set out in the methodology applied to the project	Each land parcel to be included in the new Project Activity Instance shall meet all the applicability conditions set out in CDM AR-ACM0003 methodology. The same is ensured through SOP and Contractual Agreement
Use the technologies or measures specified in the project description	Each land parcel to be included in the new Project Activity Instance must practise farming in Agrisilvicultural system, a part of agroforestry
Apply the technologies or measures in the same manner as specified in the project Description	Each land parcel to be included in the new Project Activity Instance must practise farming in Agrisilvicultural system, detailed in section 1.11 and 1.4 herein
Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area	Each land parcel must to be included in the new Project Activity Instance comply with the baseline scenario determined in the project description for the specified Project Activity and geographic area (kml file is shared with VVB separately), explained in section 1.11 and 1.12 herein
Have characteristics with respect to additionality that are consistent with the initial	Each land parcel must to be included in the new Project Activity Instance, must include the

instances for the specified project activity and geographic area	characteristics with respect to additionality demonstrated under section 3.5 and section 1.13, for the initial instances of the Project Activity and geographic area (kml file is shared with VVB separately)

c) Eligibility criteria for Inclusion of New Project Activity Instances

Description	Evaluation
Occur within one of the designated geographic areas specified in the project description	Each land parcel to be included in the new Project Activity instances must fall under 65 districts (defined by Government of India, as on 28 June 2019, Project Start date and shall include split/bifurcation, regrouping, renaming as may be carried out by Government of India from time to time) across the State of Maharashtra, Karnataka, Telangana, Gujarat and Madhya Pradesh, in India
Conform with at least one complete set of eligibility criteria for the inclusion of new project activity instances. Partial conformance with multiple sets of eligibility criteria is insufficient	Each land parcel to be included under the new Project Activity instances: • must be a crop land or fallow land or agri-allied activities; • must be in 65 districts (defined by Government of India, as on 28 June 2019, Project Start date and shall include split/bifurcation, regrouping, renaming as may be carried out by Government of India from time to time) across the State of Maharashtra, Karnataka, Telangana, Gujarat and Madhya Pradesh, in India • must practice in Agrisilviculutral system, part of Agroforestry • must be privately owned lands with clear possession and access to the land and does not form part of Government declared protected areas
Be included in the monitoring report with sufficient technical, financial, geographic, and other relevant information to demonstrate conformance with the applicable set of eligibility	Relevant information to demonstrate conformance with the applicable set of eligibility criteria is provided under section 1.1, 1.11,1.12

criteria and enable evidence gathering by the validation/verification body	of Joint PD MR and section 1.2 of Non Permanence Risk Report.
Be included in an updated project description, with updated project location information (as set out in Section 3.11 of VCS Standard), which shall be validated at the time of verification against the applicable set of eligibility criteria	Each land parcel to be included under new Project Activity instance must fall under 65 districts (defined by Government of India, as on 28 June 2019, Project Start date and shall include split/bifurcation, regrouping, renaming as may be carried out by Government of India from time to time) across the State of Maharashtra, Karnataka, Telangana, Gujarat and Madhya Pradesh, in India
Have evidence of project ownership, in respect of each project activity instance, held by the project proponent from the respective start date of each project activity instance	Contractual Agreement between PP and Farmer evidences the project ownership held by project proponent from start date of each Project Activity instance
Have a start date that is the same as or later than the grouped project start date.	Each land parcel to be included under the new Project Activity instance must have start date or plantation date later than Grouped Project start date
Be eligible for crediting from the start date of the project activity instance through to the end of the project crediting period	Each land parcel to be included in the new Project Activity instance will be eligible for crediting from the start date of respective Project Activity instance till the end of the project crediting period
Only eligible for crediting from the start of the verification period in which they were added to the grouped project.	Each land parcel to be included in the new Project Activity instance will be eligible for crediting from the start date of verification period of new Project Activity instance in which they were added in the Grouped Project.
Not be or have been enrolled in another VCS project.	Each land parcel to be included in the new Project Activity instance must not be enrolled in another VCS project. This is ensured through Contractual Agreement and specific legal declaration by the land parcel owners/farmer.
Adhere to the clustering and capacity limit requirements for multiple project activity instances set out in 3.6.8 - 3.6.9 of VCS Standard v4.4 3.6.8: The project proponent shall include in a singular project all project activity instances	Each land parcel to be included in the new Project Activity instance must comply with requirements set out in AR ACM0003 Methodology. The same is ensured through Contractual Agreement and SOP.

within ten kilometers of another instance of the same project activity and with the same project Proponent 3.6.9: Where a capacity limit applies to a project activity included in the project, no project activity instance shall exceed such limit. Further, no single cluster of project activity instances shall exceed the capacity limit, determined as follows: 1) Each project activity instance that exceeds one percent of the capacity limit shall be identified. 2) Such instances shall be divided into clusters, whereby each cluster is comprised any system of such instances such that each instance is within one kilometer of at least one other instance in the cluster. Instances that are not within one kilometer of any other instance shall not be assigned to clusters. 3) None of the clusters shall exceed the capacity limit and no further project activity instances shall be added to the project that would cause any of the clusters to exceed the capacity limit.	

1.5 Project Proponent

Organization name	Mahogani Vishwa Agro Private Limited
Contact person	Bhagatsing Manohar Shelke
Title	Managing Director
Address	Manjri Greens, Phase-II. Twin bungalow, RH 13, Solapur- Pune Hwy, Manjri Bk, Pune Maharashtra 412307
Telephone	+91-9175757696
Email	mahoganivishvaagro@gmail.com bhagatsingshelke@mitconnbs.com

1.6 Other Entities Involved in the Project

Organization name	MITCON Consultancy & Engineering Services Limited
Role in the project	Co-implementer
Contact person	Mr. Dhawal Marghade
Title	Assistant Vice President
Address	1st Floor, Kubera Chambers, Shivajinagar, Pune, Maharashtra 411021
Telephone	+91 8605728840
Email	dhawal.marghade@mitconindia.com

1.7 Ownership

Project Management – Project Activity management rights are owned by PP through Contractual Agreement with multiple scattered small land owners. Project Management practices are detailed under Section 1.11 of this document.

Land- Land parcels under Project Activity and First Project Activity Instance are owned by multiple farmers and farmers have entered into contractual agreement with PP for carrying out Project Activity.

Carbon Credit- The farmers have vested rights to carbon credits with PP through contractual agreement. The PP is authorized to undertake activities in respect of carbon credits such as validation, issuance and sale. The PP shall distribute the carbon credit sale proceeds to the farmers in accordance with contractual agreement.

Rights of produce including fruit, trimmings, seeds and wood log ("Produce") generated from Project Activity and First Project Activity Instance– Ownership of Produce is with farmers for their respective land parcels

1.8 Project Start Date

The first plantation date is 28 June, 2019 at Nagpur, Maharashtra and hence considered as Project Start Date.

1.9 Project Crediting Period

Project crediting period Start date: 28 June 2019

Project crediting end date: 27 June 2049

Project crediting period: 28 June 2019 to 27 June 2049

Total number of crediting years: 30 Years (Renewable)

The crediting period is for 30 years from the Project Start Date. The emission reductions have been demonstrated for 30 years in line with the current contract period. However, PP shall apply for renewal of crediting period post 30 years and amend the terms of contract simultaneously.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	
Large project	✓

Year	Estimated GHG emission reductions or removals (tCO_2e)
28 June 2019	-15
2020	328
2021	2,872
2022	6,142
2023	9,402
2024	12,101
2025	12,628
2026	15,230
2027	17,925
2028	20,688
2029	23,495
2030	26,341
2031	29,388
2032	32,501

2033	35,666
2034	14,300
2035	-2,68,022
2036	2,872
2037	6,142
2038	9,402
2039	12,101
2040	12,628
2041	15,230
2042	17,925
2043	20,688
2044	23,495
2045	26,341
2046	29,388
2047	32,501
2048	35,666
27 June 2049	-4,367
Total estimated ERs	230,982
Total number of crediting years	30
Average annual ERs	7,699

1.11 Description of the Project Activity

The proposed Project Activity involves the plantation of the Mahogany trees on the multiple scattered small croplands privately owned by the farmer/farmer groups. This project is an agrisilvicultural system, an agroforestry initiative on non-forest land with the plantation of *Swietenia macrophylla* species. The

objective is to plant on multiple scattered small landholdings owned by various farmers aggregating to 15,000 hectares' land across the Project Area by 31 December 2024. PP intends to complete the Project by the year 2024, which shall create direct positive impact on livelihoods of more than 25,000 farmer families, i.e. 100,000 individuals and indirect positive impacts on large number of individuals involved in various project and allied activities. PP may extend the completion of 15,000 hectare's plantation to accommodate delays on the account of any unforeseen circumstances.

The First Project Activity Instance covers 165.41 ha of land parcels, completed plantation between 28 June, 2019 and 31 December, 2020, involving 315 farmers in 21 districts across Maharashtra, Karnataka and Telangana states in India. Over 30-year period First Project Activity Instance is expected to sequester 230,982 tonnes of $CO_{2\text{-}eq}$ over 30 years, capped to Long-term Average of 94,413 tonnes of CO_{2eq} equivalent to 19 tonnes per hectare per year of plantation over 30 years.

Project is not located in a boundary that is covered by jurisdictional REDD+ program.

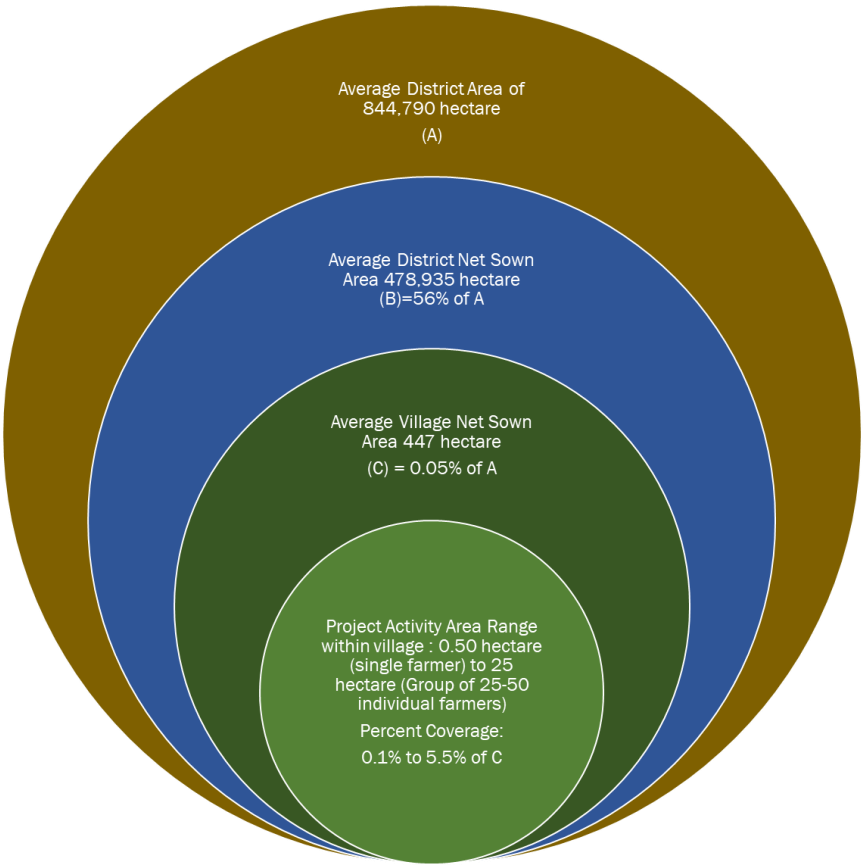
State	Area (%)	State wise Area (ha)	Year Wise Area Plantation (ha)[9]							Net Sown Area (000'ha)[10]	Coverage of Plantation (%)
			2019	2020	2021	2022	2023	2024	Total Area (ha)		
MH	70	10,500	12	152	1,260	1,470	4,200	3,454	10,500	16,815	0.062%
MP	15	2,250	-	-	270	315	900	740	2,250	15,205	0.015%
KA	10	1,500	-	0.4	180	210	600	493	1,500	10,664	0.014%
GJ	2.5	375	-	-	45	53	150	123	375	9,390	0.004%
TL	2.5	375	-	0.8	45	53	150	123	375	4,660	0.008%
Total	**100**	**15,000**	**12**	**153**	**1,800**	**2,100**	**6,000**	**4,920**	**15,000**	**56,734**	**0.026%**

MH- Maharashtra, MP- Madhya Pradesh, KA- Karnataka, GJ- Gujarat, TL- Telangana

The Project Activity covers 65 districts (defined by Government of India, as on 28 June 2019, Project Start date and shall include split/bifurcation, regrouping, renaming as may be carried out by Government of India from time to time) in five States in India. Weighted average area of district is 844,790 hectares having average net sown area of 478,935 hectares, spread over average of 1,058 villages. Illustrative representation of the Project Activity within typical district is as under:

[9] Plantation is spread over multiple scattered small land parcels of about less than 1ha each

[10] https://www.rbi.org.in/Scripts/PublicationsView.aspx?id=21443



State-wise Project Activity Area in comparison with District area is show in below table:

Maharashtra (28 Districts)*	Total	Project Activity
Average District Area (ha)	9,61,786	354
Average District Net Sown Area (ha)	5,61,314	354
Average Village Net Sown Area (ha)	451	0.290

Madhya Pradesh (15 Districts)*	Total	Project Activity
Average District Area (ha)	6,42,840	148
Average District Net Sown Area (ha)	2,99,378	148
Average Village Net Sown Area (ha)	297	0.205

Karnataka (6 Districts)*	Total	Project Activity
Average District Area (ha)	9,52,700	219
Average District Net Sown Area (ha)	6,06,356	219
Average Village Net Sown Area (ha)	720	0.275

Gujarat (11 Districts)*	Total	Project Activity
Average District Area (ha)	4,05,000	34

Average District Net Sown Area (ha)	1,88,702	34
Average Village Net Sown Area (ha)	318	0.064

Telangana (5 Districts)*	Total	Project Activity
Average District Area (ha)	4,81,700	74
Average District Net Sown Area (ha)	1,98,955	74
Average Village Net Sown Area (ha)	308	0.119

*Detailed representation with sources are attached in annexure "2"

Project Management includes the following:

a. Stakeholder Awareness Programs/Campaigns – Project Activity starts with stakeholder awareness sessions through multiple forums such as (i) Invitation to the Farmers and relevant stakeholders for conducting local stakeholder consultation; (ii) Agriculture Trade Forums and Exhibitions[11]; (iii) Meeting with Farmers through Block Development Officer (Local Government Officer); (iv) Campaign for Farmers Groups on Social Media Platforms; (v) Advertisements on Websites and Print Media.

   Each of the stakeholder awareness session is followed by one to one Consultation with interested farmers in which PP apprises about the aspects of the Project Activity. Awareness activity includes demonstrative presentations, distribution of leaflets, visit to sample sites and interactions with farmers, video content on social media, explaining various aspects of *Swietenia macrophylla* to the Farmer groups in line with ongoing impacts of climate change, sustained income through contribution of sequestration of Greenhouse Gas Emissions while improving their livelihoods and the ecology of their surroundings and also addresses the issues faced by the farmers in the traditional farming through Project Activity.

b. Pre-Plantation Activities –

   I. Admission of the Farmer – Inclusion of Farmer in the Project Activity is completed after satisfying the mandatory applicability and eligibility conditions, as in Section 1.3 Project Eligibility of this document and the following:

   - Land Title Deed to verify the land use
   - Records related to the vegetation cover in the past 10 - 15 years
   - GIS mapping of the land for the past 10 - 15 years

Further to above conditions, the PP also carries out assessment on soil suitability and water adequacy.

[11] Annexure 3 Evidence of Participation by Project Proponent in Trade Forums and Exhibitions

II. Documentation - An agreement is signed between the PP and farmer/farmer groups for the cultivation, inclusion of the land parcels with plantation as Grouped Project and sharing of revenues through net sale proceeds generated through life cycle of Mahogany Trees. Following stakeholders are involved in the project with responsibilities:

Farmer - Plant the Mahogany Trees, cultivating and sharing the revenues as per the Terms and Condition in the Contractual Agreement.

Project Proponent - Provide Mahogany Seedlings with appropriate training and guidance for cultivation throughout the duration of the contract agreement of 30 years or more.

Co-implementer – Provide Project Management Support for Implementation of the Project Activity

III. Sourcing of Mahogany Seedlings: Mahogany seedlings in line with the PP's SOPs are sourced from the technically qualified nurseries. Nursery owner provides requisite infrastructure (Land and Labour) while PP provides input quality parameters in respect of seeds, fertilization and pest control at the nursery premises. Technical Representatives of PP are present at the Nursery site to carry out the requisite Quality Checks for selection of the sourced Mahogany seedlings. The selection of seedlings from the Nurseries are based on the physical inspection and satisfying the criteria of Quality Checks (QC) procedure set by PP such as height, collar diameter, number of leaf stage and visual indicators for the disease/pest infestation. Following the completion of the QC procedure, the seedlings are dispatched to the designated Hardening Centre setup by PP. PP representative is present during the transportation of Mahogany Seedlings to ensure that the seedlings arrive without any adverse quality impact at the Hardening Centre.

IV. Hardening Centre

- Hardening Centre ensures acclimatization of seedlings sourced from the nurseries. Acclimatization is an important part of the process that allows seedlings to reduce mortality rate of the seedlings when they are planted in the farm lands.
- PP ensures hardening of seedlings through Four Hardening centres at various locations namely one each in Ahmednagar, Aurangabad, Nanded and Pune in the State of Maharashtra. The first hardening centre was contracted at Kalas, Pune, Maharashtra, in March, 2019 and the first seedlings arrived in April, 2019. The first batch of seedlings post requisite hardening was released for the plantation in June, 2019 at Lohgaon, Aurangabad, Maharashtra. The PP has entered into Agreements for each of the Hardening Centres, with respective land owners/farmers for providing infrastructure in terms of minimum 20,000 Sq. ft. of land with adequate water availability and man-power to implement SOPs provided by PP for Hardening Centre Management. At a given point, the total hardening capacity contracted by PP aggregates to 1.5 million seedlings. The PP may increase number of hardening centre in future to optimize the logistics.

V. Hardening Centre Management:

- Bed Preparation: Bed preparation involves creation of sterilized beds for storage of seedlings arrived from nurseries. Sterilization involves Solarisation and application insecticides/pesticides.
- Bio-fertilizers are used for the enhancement of the seedlings growth, watering at regular frequency is ensured.
- During the acclimatization, seedlings are rotated to the adjacent beds to avoid deep root growth
- FIFO (First In First Out) for inventory control of the seedlings with minimum residence time at Hardening Centres being 30 days.
- Quality parameters for the release of the seedlings to the farm land for Plantation includes height in meter, collar diameter in centimetre, number of leaf pairs and visual indicators for the disease/pest infestation.
- Buffer seedling stock is provided by PP to the farmer to accommodate the quality issues arising from the transportation and plantation activities.

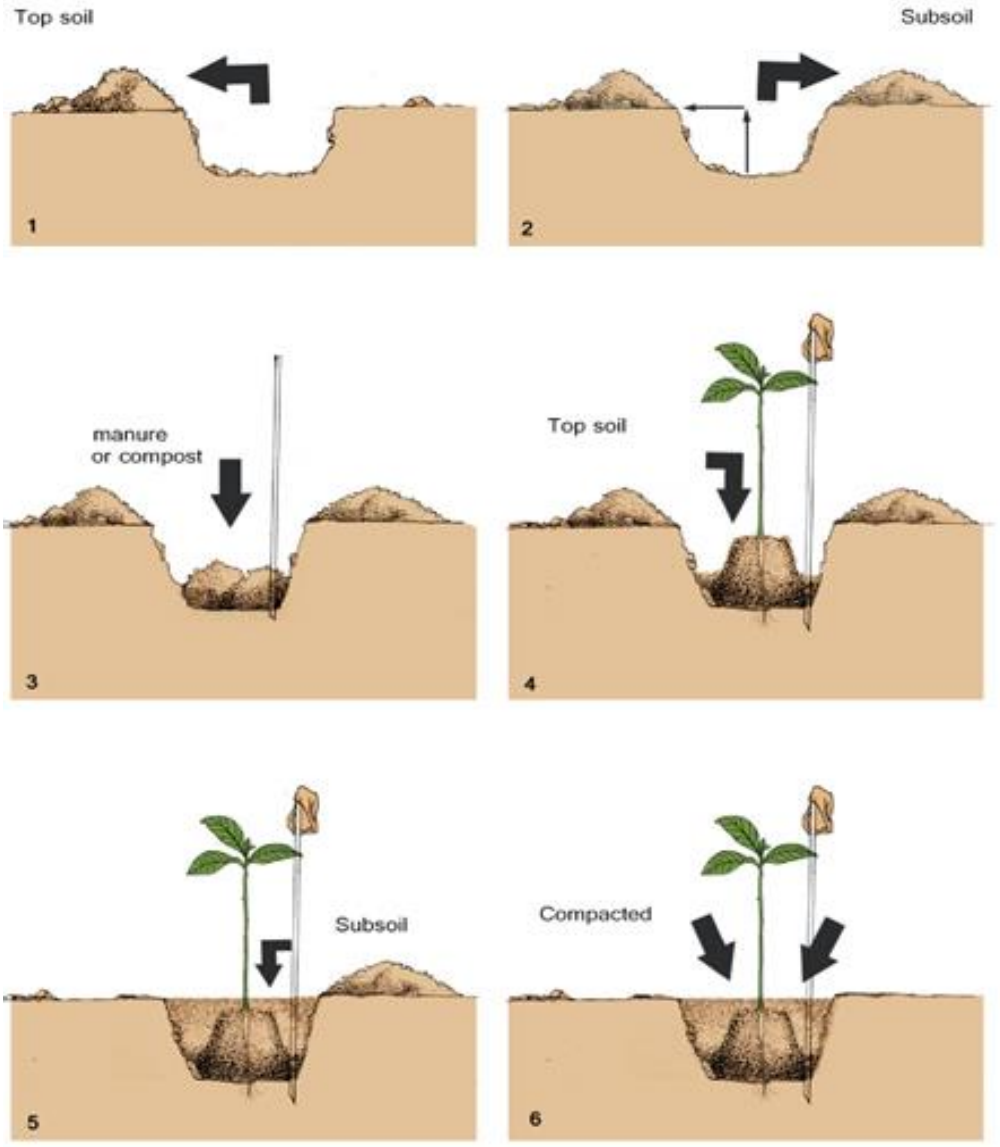
c. Plantation Activities – The plantation of the Mahogany constitutes the following activities:

I. Site/Land Preparation for Block Plantation: The land is prepared in a such a manner that ensures the minimum disturbance of soil. The plot is marked in such a way to accommodate 1,111 seedlings per hectare or equivalent proportioned thereof which also ensures sufficient access for carrying out intercropping. Pits of appropriate sizes preferably of 1.5' x 1.5' are dug manually in presence of PP representative.

II. Site/Land Preparation for Boundary Plantation: For single row boundary plantation 3-meter-wide land strips is marked along the boundary as such effective area for boundary plantation is 1,164 sq. mtr. accommodating 132 seedlings. For double row or multiple boundary plantation, the area and seedlings will increase proportionately. Pits of appropriate sizes preferably of 1.5' x 1.5' are dug manually in presence of PP representative.

III. Plantation: The seedlings are planted in the pits dug during the land preparation process along with vermicompost, neem (Azadirachta indica) cake and watered thereafter.

A pictorial representation on step by step process on the plantation of the Mahogany in a farm land:



The below figure represents the plantation of Mahogany in one of the Project Area with traditional farming of regular crops in between the Mahogany Trees. Few of the examples of intercropping of cotton and millets with Mahogany are shown below:

d. The PP also facilitates admission of farmers who have voluntarily chosen to carry out the plantation activities without PPs direct involvement. In such cases, PP assesses that the plantation is carried out in accordance with PPs SOPs. PP also carries out necessary diligence as required for eligibility and applicability in section 1.3. The plantation management and activities thereafter shall be carried out by PP in the same manner as that of the farmers who opts for plantation through PP.

e. Plantation Management –

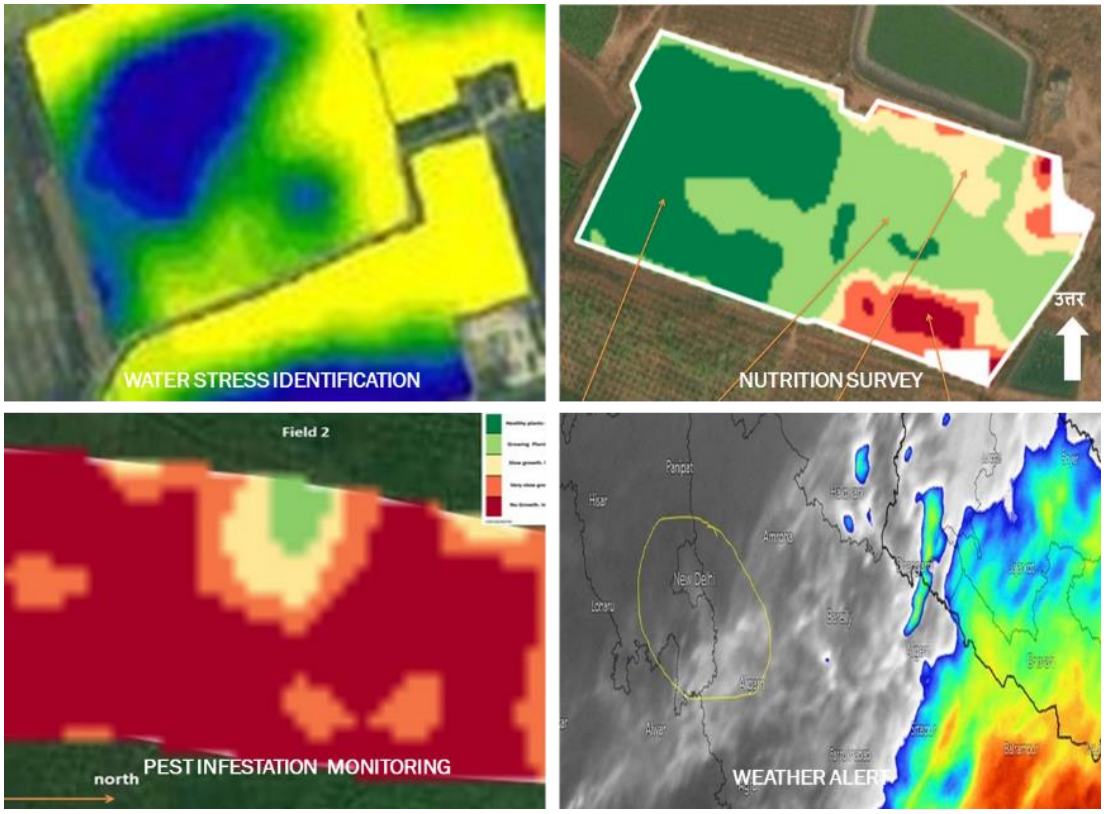
I. Monitoring: PP appointed Agronomists with extensive subject knowledge visits each plantation site monthly for the first year and quarterly thereafter for quality inspection and growth monitoring. PP has appointed and place Agronomist in such a manner that an Agronomist is available within a range of 100 km radius for any plantation site. The PP provides detailed mechanism to address the queries from the farmers during the life-cycle of Plantation. Following methodology is adapted:

- Company website/app is being used for raising and addressing the queries/complaints.
- A typical call centre receives the call and ensures closure of complaint
- Complaint log book is regularly checked and updated by agronomist visiting the farmer once in a quarter or as per the requirement

II. AI-based Precision Farming - With the target area of Project Activity being at a very large scale at scattered multiple small land parcels, PP is exploring Satellite Monitoring of the Mahogany Trees, Land Use and intends to implement it in the near future. The PP has conducted AI based Precision Farming using satellite monitoring for few sample land parcels. The areas identified for digitised monitoring are:

- Water Stress Area Identification up to 2 meters below ground

- Nutrition Survey
- NPK Distribution Analysis
- Canopy Study
- Predictive Pest infestation alert
- Predictive Fire Alert



III. Intercrops: The PP shall be providing inputs in respect of most suitable intercrops that are symbiotic with the plantation. Further PP is facilitating to develop symbiotic high value intercrops alternatives apt for various stages of plantation growth. PP is conducting studies on more than 100 land parcels which involve impact of Mahogany plantation on soil health, qualitative and quantitative impact on intercrops.

IV. Pest and Disease Control: The success of initial pest and disease control is of utmost importance for the final outcome of the Plantation. One of the pest threat identified for the plantation of Mahogany is the seedling shoot borer known as Hypsipyla. The two most important Hypsipyla species are Hypsipyla grandella, which occurs in the Neotropics, and Hypsipyla robusta, which occurs throughout tropical Africa, Asia, and the Pacific region, including Australia.

For nursery and small agroforestry scenario, pest and disease are monitorable and manageable. The PP has formulated a robust plan through Pest Management comprising of biological control, chemical control and silvicultural control[12] measures to reduce shoot borer invasion. PP communicates SOPs to farmers for implementation of Pest Management Strategies to reduce the impact of pests and disease and the same has been mandated to farmers through contractual agreement. PP monitors implementation of Pest Management SOPs on quarterly basis through its agronomist. Salient features of Integrated Pest Management are as under:

i. Chemical Control:

- Organic manure with Neem (Azadirachta indica) cake is applied to each pit before plantation of seedlings followed by Neem-Ark spray, dashparni ark (combination of Neem leaves, Jatropa leaves, Papaya, Heart-leaved moonseed leaves, Custard apple leaves, Karanja leaves, Castor leaves, Nerium leaves, Aak leaves, Green chili paste, Garlic paste, Cow dung, Cow urine)
- Application of Bordeaux paste, a combination of copper sulphate, lime and water, on stems.
- Application of bio-fertilizers, according to growth stage of seedlings and the soil characteristics.

ii. Biological Control:

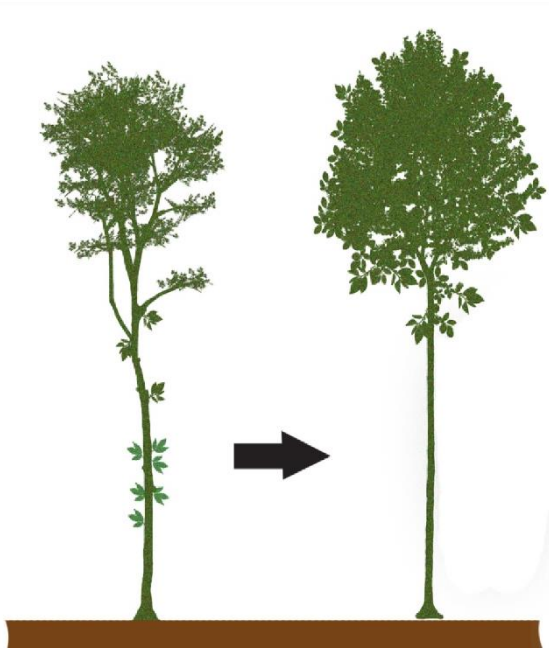
- Selection of Seeds from healthy and disease free Mahogany trees at the seeding stage.
- Quality Control checks to reject the infected or infection prone or seedlings at Hardening centre to ensure plantation of healthy seedlings on project land parcels.
- Companion Crops in Intercropping: This reduces the chance of pests or diseases and acts as biological control agents.

iii. Silvicultural Control

- Removal of branches13 grown around the trunk is carried out as per SOP. Pruning is done using special tools: pruners, secateurs and pruning saws. Small, young twigs are pruned with a sharp sickle or machete. Below figure represents the height set for the pruning of the branches of a tree:

[12] Reference: Managing Mahogany Plantations in the Tropics, published by CSIR-FORIG, Kumasi, Ghana

[13] https://www.sciencedirect.com/science/article/abs/pii/S0378112700005314 The effectiveness of pruning in mitigating *Hypsipyla grandella* attack on young mahogany (*Swietenia macrophylla* King) trees



- Controlled Weeding: During the initial years, frequent circle weeding on a 2/3-month cycle is performed around the seedling to prevent pest attacks. Regular process or activities of intercropping serves as effective tool for pest control.

V. Fire Risk Mitigation Plan: Farmer receives training and awareness from PP towards fire hazard. PP has addressed the fire risk by developing Standard Operating Procedures (SOPs) for the prevention of fire outbreaks, in which all stakeholders are involved. These SOPs serve as a guiding principles to be followed in reducing/mitigating the fire risks for farmers. Few of the following guidelines are as under:

- Sustainable disposal of dead litters, leaves, and other crop residues either by Composting or through proper burial in the ground
- Flammable material such as fuel (for operation of various farm equipment), herbicides, grain dust, jute/plastic bags for storing grain and any other farm produce, animal fodder, hay and straw are kept in isolated place away from plantation area.
- Maintaining biomass free land patch from adjacent land parcels.
- Water pumps and other electrical implements should have moisture/dust proof ON/OFF switches and covers for motors.
- No use of any electrical tool when the weather is windy or near the dry grass region
- Avoidance of plantation in the area below electrical line.

f. Harvesting/Replantation Plan

- Harvesting- PP has prepared Integrated Harvesting cum Replantation Plan in line with the Project schedule along with SOPs for implementing the same. Farmers may harvest in consultation with PP considering the quality with respect to circumference in inches, density in kg/m^3 and colour of the harvested wood. The first harvesting may begin after the completion of minimum 15 years from the date of plantation and the same is enforced through contractual agreement. Below is the tentative harvesting/replantation plan:

Integrated Harvesting cum Replantation Plan			
Plantation Year	**Strata**	**Area (Ha)**	**Harvesting/Replantation Year**
2019	Strata 1	12	2034
2020	Strata 2	153	2035
2021	Strata 3	1,800	2036
2022	Strata 4	2,100	2037
2023	Strata 5	6,000	2038
2024	Strata 6	4,934	2039

PP encourages the farmer to delay/avoid the Harvesting by explaining the incremental value from increased biomass and produce which sufficiently compensates such delayed Harvesting. The farmer agrees to continue the plantation after 30 years or more through contractual agreement provided such continuance covers opportunity cost of land through non-timber produce and Carbon Credits with renewal of crediting period.

Further, PP in association with an Agriculture based Autonomus Organization under the Department of Agricultural Research and Education (DARE), Ministry of Agriculture and Farmers Welfare, Government of India through an MoU has devised intercropping plan considering the tree canopy, soil and climatic conditions with 20 different traditional crops that are practiced in the Project Area prior to the Project Activity. Research paper and journal literature from *Handa et al*[14]*., Jahan et al*.[15] and *Chavan et al.*[16] were considered for selection of intercrops over period of 15 years. The details have been shared with VVB. Below table summarizes the effect of revenue from non-timber produce and carbon credits over 15 years:

[14] Handa, A. K., Dev, I., Rizvi, R. H., Kumar, N., Ram, A., Kumar, D., ... & Rizvi, J. (2019). Successful Agroforestry Models for Different Agro-Ecological Regions in India.

[15] Jahan, M., Sikdar, S.K., Islam, M.T., Alam, Z. and Wadud, M.A., Winter leafy vegetables cultivation in association with six years old Swietenia macrophylla tree.

[16] Chavan, S.B. and Dhillon, R.S., 2019. Doubling farmers' income through Populus deltoides-based agroforestry systems in northwestern India. Current Science, 117(2), pp.219-226.

Intercrop Model	Pre-Project Activity Yearly Revenue (INR/ha)** [Assuming No Change to Cropping Pattern]	Project Activity Yearly Revenue without considering VCU Revenue (INR/ha)**	% Incremental Revenue
Model-1	45,396	58,864	23%
Model-2	59,006	68,160	13%
Model-3	69,709	77,477	10%
Model-4	57,576	72,475	21%
Average	**57,922**	**69,244**	**17%**

**Kindly note that the revenue per hectare do not consider market price fluctuations and yield fluctuations due to monsoon.

As depicted above revenue from Project Activity scenario sufficiently covers the opportunity cost of land after implementation of Project Activity through cropping pattern and non-timber agroforestry produce. Thus ensuring continuation of plantation by the farmer in absence of VCUs revenue.

Further, to ensure continuation of plantation by the farmer beyond LTA, PP shall disburse the revenue from VCUs sale to the farmers over a period of 30 years' subject to various audits including but not limited to MRV during the entire crediting period.

- Replantation: PP developed SOPs that included the replanting of Swietenia macrophylla species after harvesting matured trees completing minimum 15 years. The replanting will take place in the same land parcels with the same spacing, accommodating 1,111 trees per hectare or equivalent proportioned thereof. The seedlings will be planted using the same planting procedure as described in section 1.11 above, which was used during the initial plantation in the same land parcel.

  The planted area must be replanted after harvesting to ensure continuous GHG sequestration and productivity.

  A comprehensive replanting plan is detailed below that outlines the steps and resources necessary for successful replantation after harvest. It includes the following components:

  a. Site Preparation:

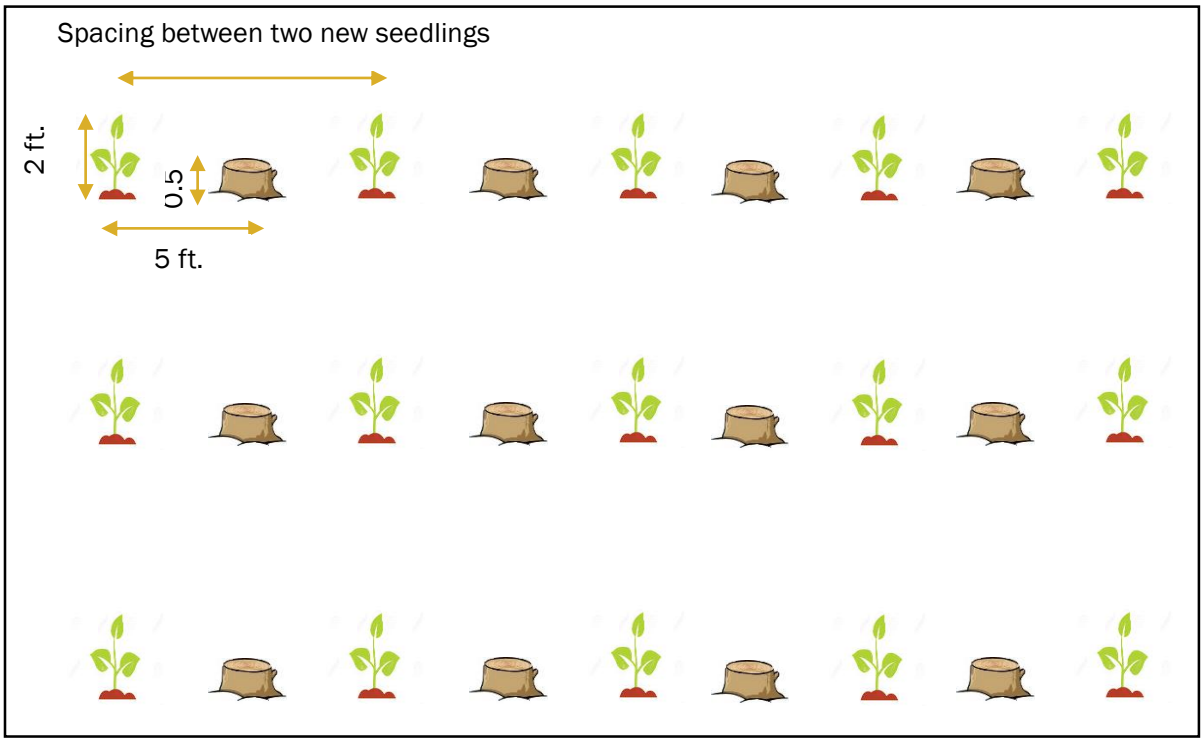
  During site preparation, previously harvested mahogany tree stumps are left in place for decomposition. Removal of coppiced growth in harvested stumps:

  - Removal of side bark for avoiding lateral growth of trunk/stumps.
  - Applying a decomposer to the soil around a tree trunk or stump can hasten the decay of old root systems and produce soil humus, both of which are beneficial to newly planted seedlings.

  b. Planting Design:

Determining the proper seedling spacing and planting pattern (in accordance with SOPs), taking into account factors such as the ideal tree density, growth rate, and form. All over the land parcel, a pattern is established by planting new seedlings between rows of already harvested trees. Explained in below diagram;

Replantation Structure



1.12 Project Location

As per the VCS Standard version 4.4, the description of the project location is as under:

c. Name of the Project Area - The First Project Activity Instance and Project Activity instances are spread over multiple scattered small land parcels in 65 districts (defined by Government of India, as on 28 June 2019, Project Start date and shall include split/bifurcation, regrouping, renaming as may be carried out by Government of India from time to time) across the five states of India (i) Maharashtra, (ii) Gujarat, (iii) Madhya Pradesh, (iv) Karnataka, (v) Telangana

The project location and set of geodetic coordinates of the first project instance are submitted as a separate KML file.

d. Map of the Grouped Project zone

The First Project Activity Instance covers Maharashtra, Karnataka and Telangana States.

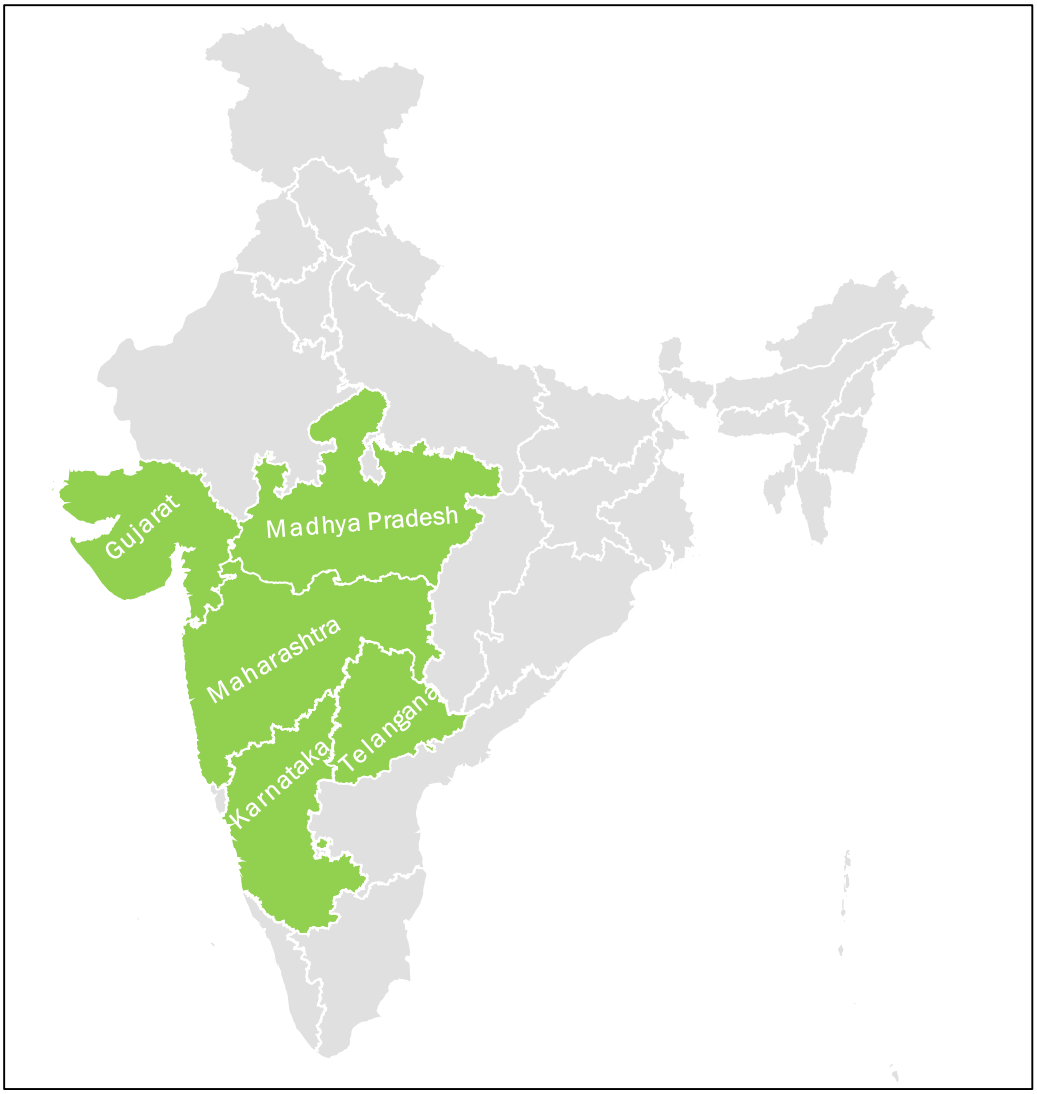


Figure 1 Map of the Project with States Maharashtra, Madhya Pradesh, Karnataka, Gujarat, Telangana

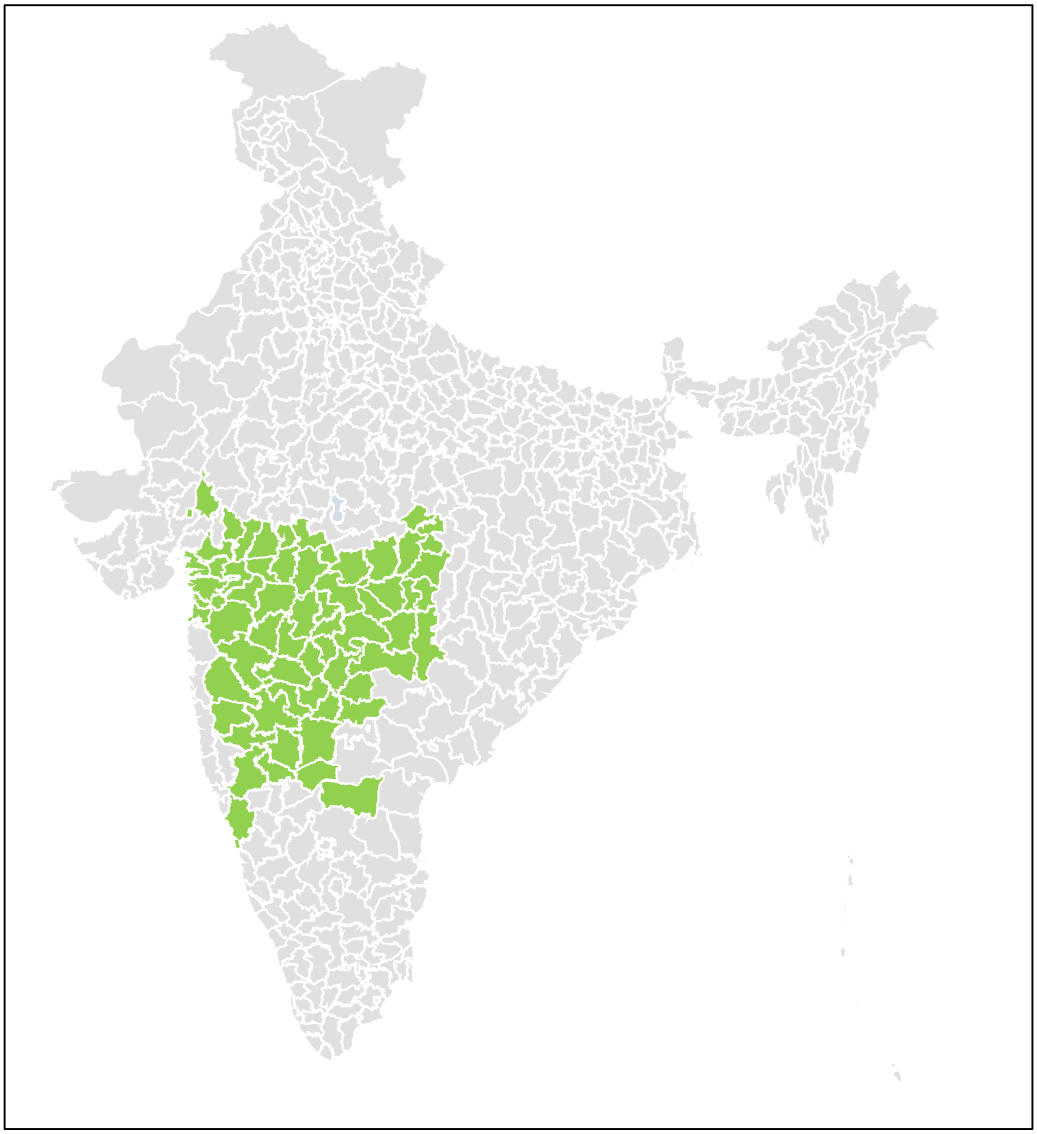
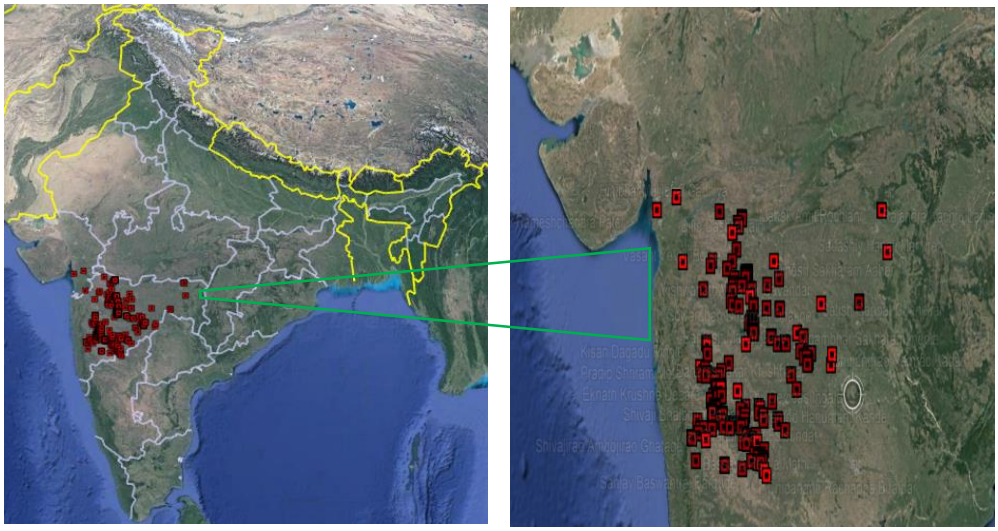


Figure 2 Districts considered under Project Activity and First Project Activity Instance

e. KML file of all parcels included the 1st PAI is submitted to the DOE separately.



The first project instance will include 165.41 hectares of land parcels in 21 different districts predominantly in Maharashtra, followed by Telangana and Karnataka.

Following are the districts involved in the First Project Activity Instance:

Maharashtra State

1. Ahmednagar
2. Aurangabad
3. Beed
4. Bhandara
5. Buldhana
6. Dhule
7. Hingoli
8. Jalgaon
9. Jalna
10. Latur
11. Nagpur
12. Nanded
13. Nashik
14. Osmanabad
15. Parbhani
16. Pune
17. Sangali
18. Satara
19. Solapur

Karnataka State

20. Bijapur

Telangana State

21. Nirmal

1.13 Conditions Prior to Project Initiation

Baseline scenario is the same as the conditions existing prior to the project initiation (see Section 3.4, Baseline Scenario).

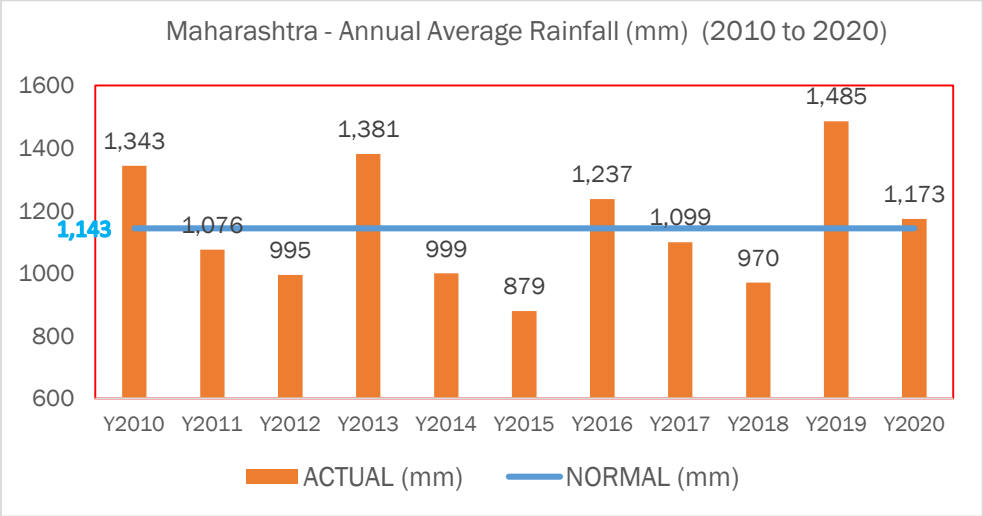
1. Climate

a. Maharashtra:

The figure below suggests the State of Maharashtra mainly comes under the climatic type Tropical Savanna, hot, seasonally dry, usually winter. However, some central region has climatic type: Dry, Semi-arid, Hot Tropical and coastal belt and adjoining Ghats come under tropical rainy monsoon with short dry season.

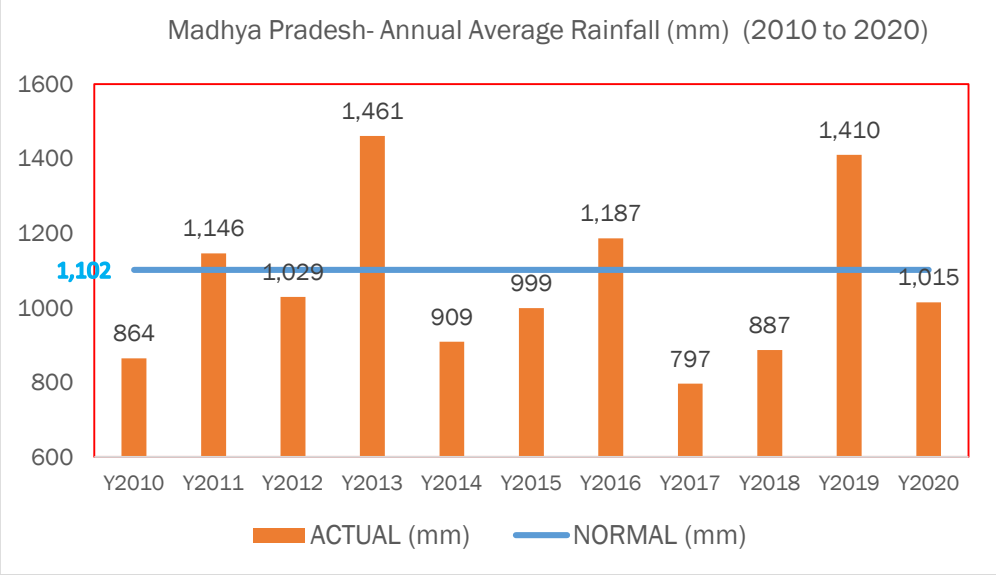
The state of Maharashtra, located in western India, has a tropical climate with distinct dry and rainy seasons. The temperature in the Indian state of Maharashtra varies depending on the region and season. The coastal regions, such as Mumbai, have a tropical climate and temperatures typically range from around 25-32°C during the day and 20-25°C at night. Inland areas, such as the Vidarbha region, have a more arid climate and temperatures can be quite high, with daytime temperatures reaching up to 40 °C or more during the summer months of April to June. The winter months of December to February, are relatively cooler and the temperature can go down to around 10-15 °C. Overall the Temperature throughout the year varies between the range of 17 to 40 °C.

The Rainy season sees rainfall that starts normally in the first week of June. The average annual rainfall in the State of Maharashtra for the past decade is shown below:



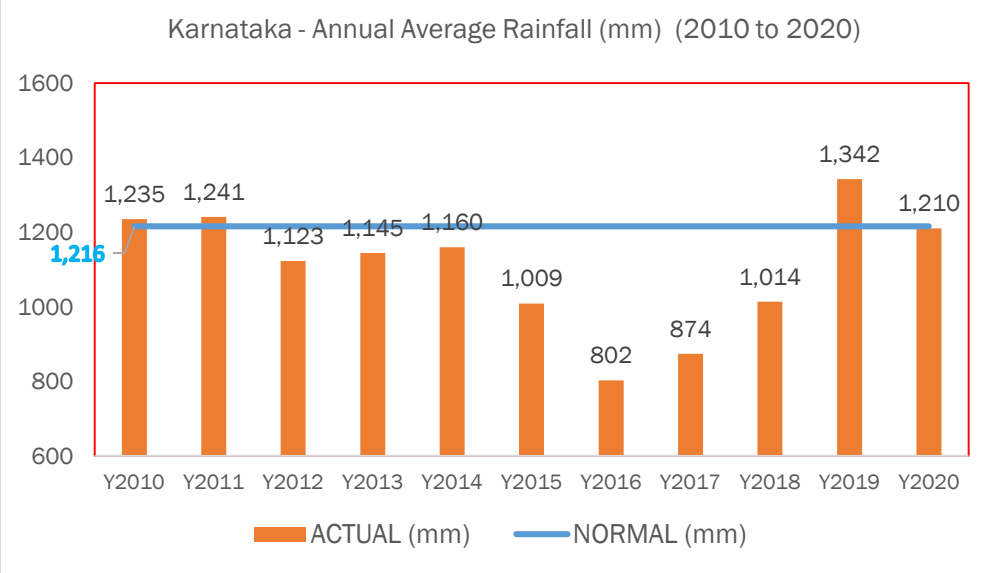
b. Madhya Pradesh:

Madhya Pradesh has three distinct seasons: winter (December to February), summer (March to May), and the rainy season (June to October). The average minimum temperature in winter is 10°C, though it can drop as low as 1°C and rise as high as 25°C. Summer temperatures range from a low of 22°C to a high of 38°C, though it can get very hot with temperatures reaching 48°C. The State's annual average rainfall is 1102 mm, with the heaviest rains falling in the south-east and decreasing towards the north-west. The average annual rainfall in the State of Madhya Pradesh for the past decade is shown below graph:



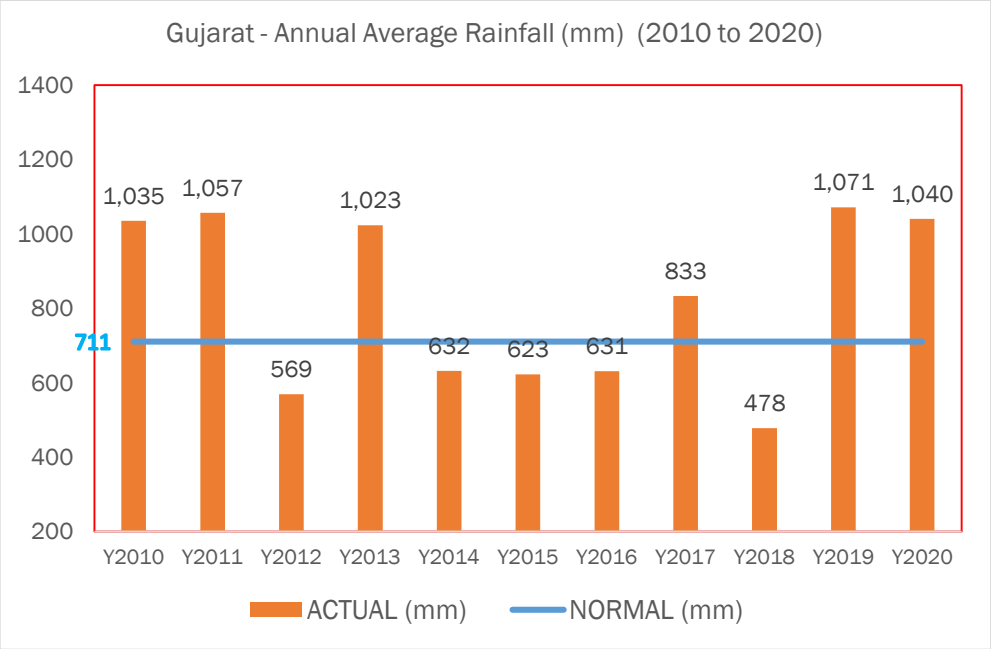
c. Karnataka:

The climate of Karnataka is subtropical, with winter (January and February), summer (March through May), southwest monsoon (June through September), and post-monsoon (October through December) seasons. Maximum daily temperatures in winter reach below 30°C, whereas in the summer months' temperatures rise about 40°C. Average Annual Rainfall in the North Karnataka region is 731 mm, Coastal region has around 3,456 mm and Southern region has 1,126 mm. The average annual rainfall in the State of Karnataka for the past decade is shown below graph:



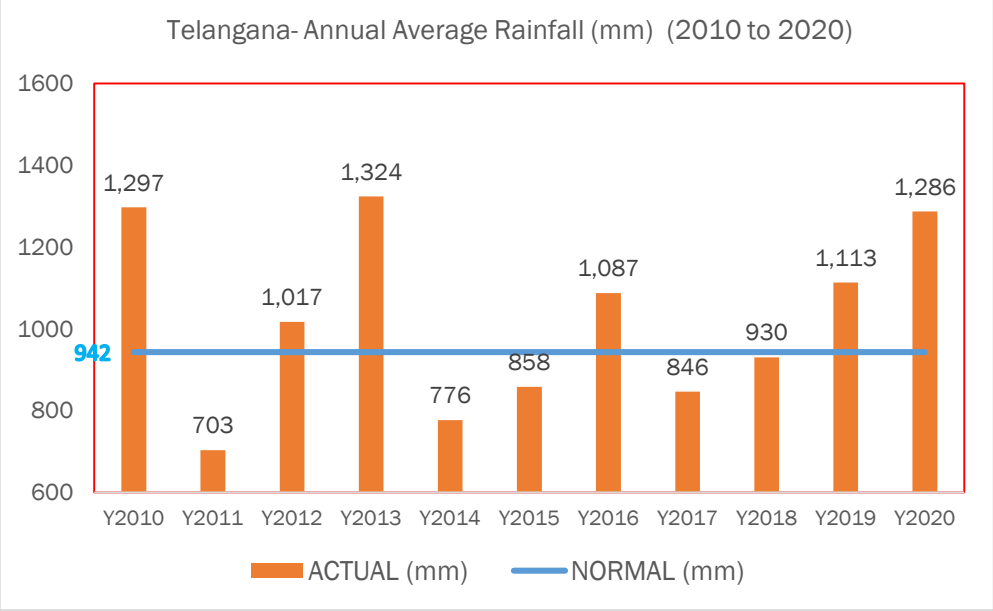
d. Gujarat:

The state has a subtropical climate with sub-humid climate in southern Gujarat (south of the Narmada River), moderately humid climate in central Gujarat (between the Narmada and Sabarmati rivers), humid and sultry climate in the coastal region (south facing coastal region of Saurashtra), dry climate in central Gujarat (north of Ahmedabad and part of central Saurashtra), and arid and semi-arid climate in north Gujarat and Kutch. The average temperature varies across the State. The summer temperature varies between 25^{0}C and 45^{0}C while the winter temperature ranges between 15^{0}C and 35^{0}C degrees.
The average annual rainfall over the State varies widely from 300 mm in the Western half of Kutch to 2,100 mm in the Southern part of Valsad district and the Dangs. The Project Activity lies in districts with annual average rainfall of more than 1,000 mm. The average annual rainfall in the State of Gujarat for the past decade is shown below graph:



e. Telangana:

Telangana state is located in a semi-arid region with a predominantly hot and dry climate. Summer begins in March, and the highest temperatures are recorded in May, with an average temperature of 42° C. The Southwest Monsoon season begins in June and lasts until September. According to the Telangana government's agricultural department, the state is divided into four subzones: North Telangana Zone, Southern Telangana Zone, High Altitude Zone, and Tribal Zone. The state's normal annual rainfall is 939 mm, with the Southwest monsoon (June-September) contributing 80% (749 mm), the Northeast monsoon (October-December) contributing 13% (120 mm), winter contributing 1% (12 mm), and summer contributing 6% (58 mm). The average annual rainfall in the State of Telangana for the past decade is shown below graph:



2. Hydrology Profile

a. Maharashtra:

There are several major river basins in the state of Maharashtra, India, which include:

- Godavari River Basin: The Godavari River, also known as the Ganges of the South, originates in the Western Ghats in the state of Maharashtra and flows eastward through the states of Maharashtra, Andhra Pradesh, and Telangana before emptying into the Bay of Bengal. The Godavari River Basin is the largest river basin in Maharashtra and covers an area of around 312,812 square kilometers.
- Krishna River Basin: The Krishna River, also known as the Kistna, originates in the Western Ghats in the state of Maharashtra and flows eastward through the states of Maharashtra, Karnataka, Telangana and Andhra Pradesh before emptying into the Bay of Bengal. The Krishna River Basin covers an area of around 258,948 square kilometers.
- Tapi River Basin: The Tapi River, also known as the Tapti, originates in the Satpura Range of the Central Indian state Madhya Pradesh, and flows westward through the states of Maharashtra, Gujarat before emptying into the Arabian Sea. The Tapi River Basin covers an area of around 65,145 square kilometers.
- Bhima River Basin: The Bhima River is one of the tributaries of the Krishna River, it originates in the Western Ghats in the state of Maharashtra, and flows eastward through the states of Maharashtra, Karnataka, Telangana and Andhra Pradesh before emptying into the Bay of Bengal. The Bhima River Basin covers an area of around 58,252 square kilometers.
- Wainganga River Basin: The Wainganga River is one of the tributaries of the Godavari River, it originates in the Satpura Range of the Central Indian state

b. Madhya Pradesh:

Madhya Pradesh is a state in central India. It is drained by several major rivers, including the Narmada, Tapti, Chambal, and Sone rivers.

The Narmada River is the longest river in the state and is considered to be one of the most sacred rivers in India. It originates in the state of Maharashtra and flows through Madhya Pradesh before flowing into the Gulf of Khambhat in Gujarat.

The Tapti River also originates in Maharashtra and flows through Madhya Pradesh before emptying into the Arabian Sea. The Chambal River is an important tributary of the Yamuna River and is known for its deep, clear water and the rugged terrain through which it flows. The Sone River is a tributary of the Ganges River and flows through the eastern part of the state. Overall, Madhya Pradesh is rich in water resources and several major rivers flow through the state, which play a vital role in the economic development of the state as well as support the water needs of the people of the state.

c. Karnataka:

The hydrology of Karnataka, a state in southern India, is characterized by several major rivers, including the Cauvery, the Tungabhadra, and the Krishna. The Cauvery River, also known as the Dakshina Ganga, is the most important river in the state and is considered the life-line of the state. It originates in the Western Ghats and flows through the state, emptying into the Bay of

Bengal. The Tungabhadra River is another major river in the state, which is formed by the joining of two rivers, Tunga, and Bhadra. It flows through the states of Karnataka and Andhra Pradesh before emptying into the Krishna River. The Krishna River flows along the western boundary of the state before entering Andhra Pradesh and then it flows into the Bay of Bengal. These rivers provide irrigation and drinking water for the people of Karnataka and also support a variety of agricultural activities in the state, such as the cultivation of rice, sugarcane, and cotton. These rivers also generate hydroelectric power and support the industries. Like Telangana, these rivers also depend on monsoons and prone to floods and droughts. Several dams have been built over these rivers, to conserve and utilize the water resources. Groundwater is another important source of water in the state. It is mainly exploited through dug wells, bore wells, and lift irrigation schemes. The state of Karnataka has good aquifers and the groundwater is mainly used for irrigation, domestic and industrial purposes.

d. Gujarat:

Gujarat is a state located in western India, on the Arabian Sea coast. The state is drained by several major rivers, including the Narmada, Tapti, Sabarmati, and Mahi rivers. The Narmada River is considered to be one of the most sacred rivers in India. It originates in the state of Madhya Pradesh, flows through Gujarat before flowing into the Gulf of Khambhat in the Arabian Sea.

The Tapti River originates in the Satpura Range in Madhya Pradesh and flows through Gujarat before emptying into the Arabian Sea. The Sabarmati River is a tributary of the Gulf of Khambhat, which originate in the Aravalli Range in Rajasthan and flows through Gujarat. The Mahi River is a tributary of the Arabian Sea, which originates in Madhya Pradesh and flows through Gujarat. Gujarat is a dry state with low annual rainfall and high variability in temporal and spatial distribution. Despite its dry climate, Gujarat has a well-developed irrigation system, with many dams, canals, and other infrastructure built to store and distribute water.

The Sardar Sarovar Dam on the Narmada River is one of the largest dams in the world and provides irrigation and drinking water to large areas of the state. Overall, Gujarat has limited water resources, but through efficient water management, it has been able to meet the water needs of its growing population and support its agricultural and industrial sectors.

e. Telangana:

The hydrology of Telangana, a state in southern India, is characterized by several major rivers, including the Godavari, the Krishna, and the Bhima. The Godavari River, also known as the Ganges of the South, is the longest river in the state and one of the longest in the country. It originates in Maharashtra and flows through Telangana before emptying into the Bay of Bengal. The Krishna River also originates in Maharashtra and flows through Telangana before emptying into the Bay of Bengal. The Bhima River is a tributary of the Krishna River and also flows through Telangana. These rivers provide irrigation and drinking water for the people of Telangana and also support a variety of agricultural activities in the state, such as the cultivation of rice, cotton, and sugarcane. These Rivers are mainly dependent on monsoons, which brings heavy rainfall during the monsoon season. It leads to floods and soil erosion in several areas during the monsoons. Also, during the summers, these rivers are prone to droughts. Several dams have been built over these rivers, to conserve and utilize the water resources. Groundwater is another

important source of water in Telangana. It is mainly exploited through dug wells, bore wells, and lift irrigation schemes. Over-exploitation and rapid urbanization are leading to a decline in the groundwater level in the state.

State wise groundwater availability is as under:

Resource	Value (billion cubic meters)				
	Maharashtra	Madhya Pradesh	Karnataka	Gujarat	Telangana
Annual Groundwater Draft (Total)	16.63	18.97	10.63	13.3	8.01
Annual Replenish able Groundwater Resources	32.01	36.16	18.16	26.81	16.63
Net Groundwater Availability	30.25	33.38	16.4	24.91	15.03
Groundwater Availability for Future Irrigation	14.2	15.25	7.08	12.52	7.14
Stage of Groundwater Development (%)	54.99	56.82	64.58	53.39	53.32

3. Topographic Profile

a. Maharashtra: The state is located between latitudes 15°35' N and 22°02' N and longitudes 72°36' E and 80°54' E. It is located in the country's western and central regions. The state's dominant physical feature is its plateau character, which is separated from the Konkan coastline by the Western Ghats mountain range, which runs parallel to the coast from north to south. The Krishna and its tributary Bhima, the Godavari and its main tributaries Manjara and Wardha-Wainganga, and the Tapi and its tributary Purna are the state's main rivers. The state of Maharashtra is divided into five geographical regions. The Konkan region is located on the western coast of India, between the Western Ghats and the sea. Khandesh is the north region lying in the valley of the Tapti, Purna river.

b. Madhya Pradesh: The state is located in the geographic heart of India in between the latitude of 21.6°N–26.30°N and longitude of 74°9'E–82°48'E. The state straddles the Narmada River, which runs east and west between the Vindhya and Satpura ranges; these ranges and the Narmada are the traditional boundaries between the north and south of India. The highest point in Madhya Pradesh is Dhupgarh, with an elevation of 1,350 m (4,429 ft).

c. Karnataka: The state is located on a tableland where the Western and Eastern Ghat ranges meet to form the Nilgiri hill complex. The state of Karnataka is roughly bounded by latitudes of 11.5°N and 18.5°N, and longitudes of 74°E and 78.5°E. The state is approximately 750 kilometres long from north to south and 400 kilometres long from east to west. Only the narrow coastal belt facing the Arabian Sea has plain land with an elevation of less than 300 metres above mean sea level. There are numerous high peaks with elevations greater than 1,500 metres in both the Western and Eastern Ghat systems.

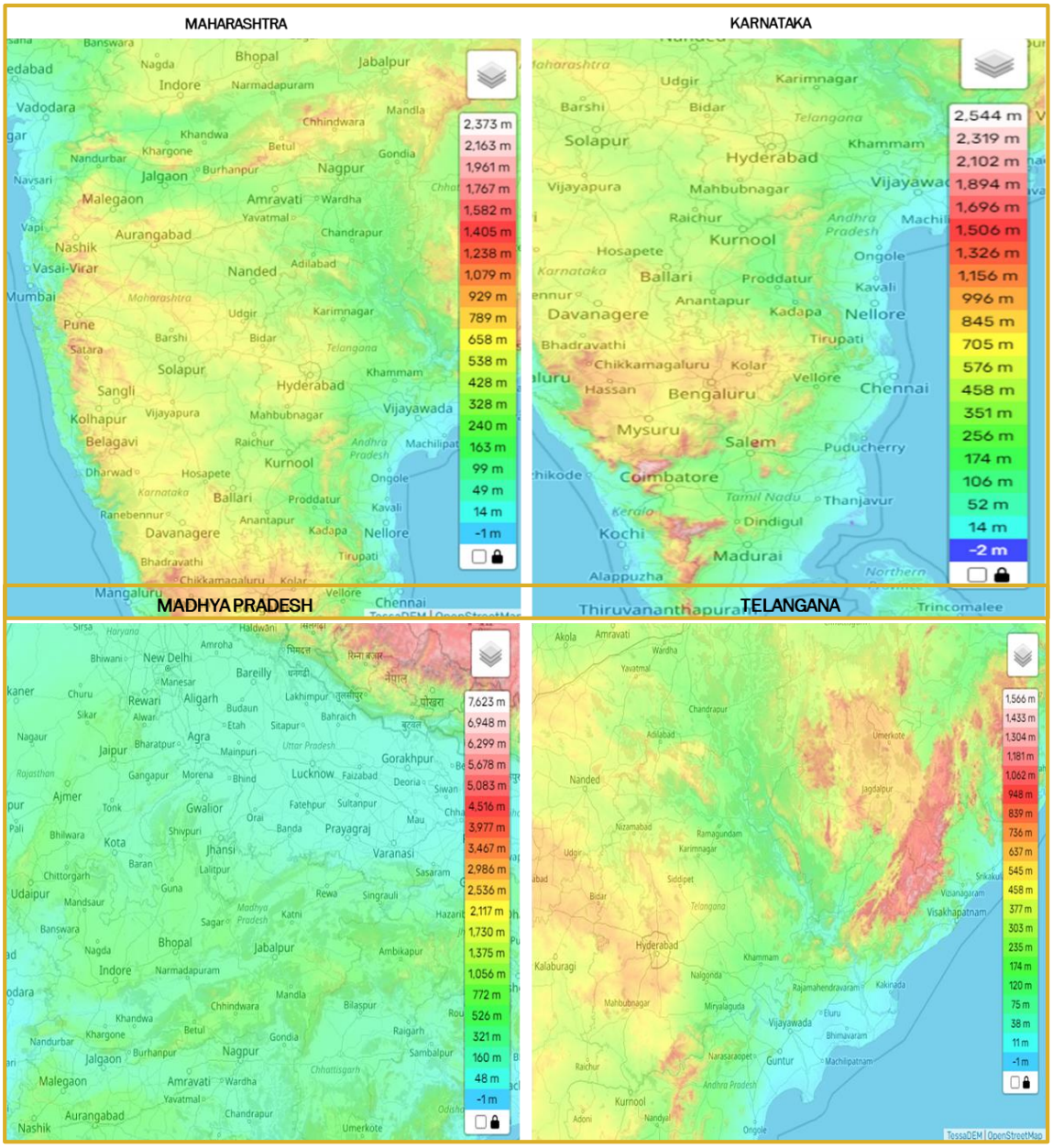
d. Gujarat: The State of Gujarat lies on the western coast of India between 20°6' N and 24° 42' N and 68° 10' E to 74° 28'E. The length of Gujarat from north to south is approximately 590 km and width from east to west is approximately 500 km. Hilly tracts form a major divide in the State and most of the rivers originate from the hills in the east and flow towards the south and southwest except the Narmada and Tapi (interstate rivers). The Highland of Kutch

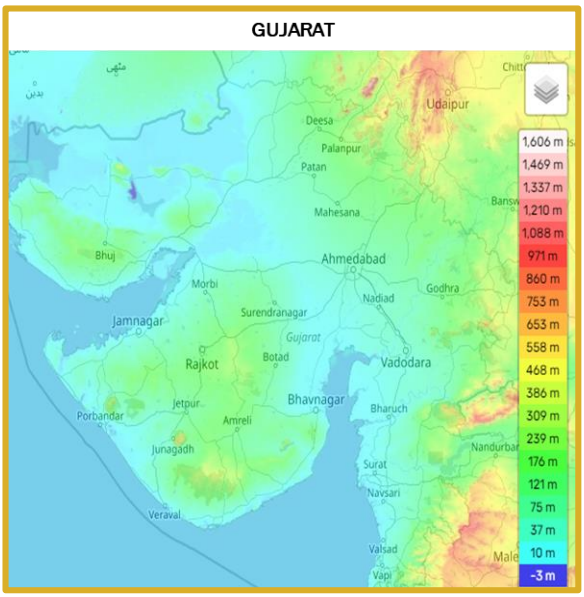
(Saurashtra) with an elevation of about 150 to 500 mtr comprises of sedimentary and volcanic rocks.

e. Telangana: The state lies between NL 15° 48' and 19° 54'and EL 77° 12' and 81° 50'. the State comprises 33 districts covering an area of 1,12,077 sq. km (44,273 sq. mi). Telangana state is occupied by western pediplains except a fringe of Eastern Ghats in the northeastern part of Khammam district. The pediplains depict rolling topography with flat to undulating tracts.

The project area is distributed at an Average Mean Sea Level of >600 meter across the five states. The following figure indicates the average mean sea level of the project area locations.

Source: https://en-gb.topographic-map.com/map/





4. Soil Profile

a. Maharashtra:

There are five types of soil in the state: Black soil, Laterite soil, Red soil, Alluvial soil, and Clay soil. More than 80% of Maharashtra is made up of Black soil, which can be found in the Godavari and Bhima-Krishna river basins. This soil is ideal for growing cotton. This soil also supports the cultivation of sorghum, pigeon pea, millet, wheat, sugarcane, and other crops. The various texture of soil includes: Clay, Loamy clay, sandy clay, silty clay, sandy clay loam, silt loam, silt, sandy loam, rocky, loamy sand and sand. Moderately low productive to Highly productive soil found all over Maharashtra region with 20.35% (2020-23) average volumetric Soil moisture[17].

b. Madhya Pradesh:

The state has five major type of soil; Black soil, Red and Yellow soil, Alluvial soil, Mixed soil, Kachari soil. Black soil covers 47% of the total area of the state, whereas the Red and Yellow soil covers 37% of the total area of the state. The various texture of soil includes: Clay, Loamy clay, sandy clay, silty clay, sandy clay loam, silt loam, silt, sandy loam, rocky, loamy sand and sand. Moderately low productive to Highly productive soil found all over Madhya Pradesh region with 22.47% (2020-23) average volumetric Soil moisture.

c. Karnataka:

The state has six types of soil found in various regions. These are Red soils, Lateritic soils, Black soils, Alluvio-Colluvial soils, Forest soils, and Coastal soils. The red soil is predominant in the eastern tract of the state, a large variety of crops such as paddy, jowar, ragi and cotton are grown. Lateritic soil occurs in the western parts of the of the state, favorable for tea, coffee, rubber and

[17] https://indiawris.gov.in/wris/#/soilMoisture

coconut plantations. The various texture of soil includes: Clay, Loamy clay, sandy clay, silty clay, sandy clay loam, silt loam, silt, sandy loam, rocky, loamy sand and sand. Moderately low productive to Highly productive soil found all over Karnataka region with 22.95% (2020-23) average volumetric Soil moisture.

d. Gujarat:

The state is endowed with a wide range of macro and microclimates, physiography, landforms, geology and vegetation that have an influence on the genesis of soil. The soil type in Gujarat can be broadly classified into nine groups[18], black soil, mixed red and black soils, residual sandy soils, alluvial soils, saline/alkali soil, lateritic soil, hilly soil, desert soil and forest soil. The various texture of soil includes: Clay, Loamy clay, sandy clay, silty clay, sandy clay loam, silt loam, silt, sandy loam, rocky, loamy sand and sand. Moderately low productive to Highly productive soil found all over Gujarat region with 16.62% (2020-23) average volumetric Soil moisture.

e. Telangana:

The state has a diverse range of soils, including red soil, lateritic soils, and black cotton soils. Red soils with loamy subsoils cover 60% of the state, including the entire Nalgonda district and a large portion of Mahabubnagar, Waranagal, Karimnagar, and Nizamabad districts. Black cotton soil is common in the districts of Adilabad and Nizamabad. Laterite soil occurs in western part of Ranga Reddy and Medak districts. The various texture of soil includes: Clay, Loamy clay, sandy clay, silty clay, sandy clay loam, silt loam, silt, sandy loam, rocky, loamy sand and sand. Moderately low productive to Highly productive soil found all over Telangana region with 20.39% (2020-23) average volumetric Soil moisture. (Source: Ground water year book 2020-2021, issued by Central Ground Water Board (CGWB)[19], Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation · Government of India)

5. Vegetation

The states of Maharashtra, Karnataka, Telangana, Gujarat, and Madhya Pradesh in India are all home to a diverse range of vegetation types.

a. Maharashtra: The state is home to a wide variety of vegetation types, including Tropical forests in the Western Ghats, Dry deciduous forests in the Central regions, and Mangrove forests along the coast. Some of the major plant species found in Maharashtra include teak, bamboo, and various species of *Acacia*, as well as medicinal plants such as ayurvedic herbs.

b. Madhya Pradesh: The state is known for its diverse range of vegetation types, which include Tropical and Subtropical moist deciduous forests, Dry deciduous forests and grasslands. Some of the major plant species found in Madhya Pradesh include teak, bamboo, Sal and various species of acacia, as well as medicinal plants such as ayurvedic herbs.

c. Karnataka: The state is home to a diverse range of vegetation, including Tropical and Subtropical forests in the Western Ghats, Dry deciduous forests in the eastern regions, and grasslands and scrublands in the Northern and Central regions. Some of the major plant

[18] https://slbcgujarat.in/state-profile/agriculture/#:~:text=The%20soils%20of%20Gujarat%20can,desert%20soils%20and%20forest%20soils

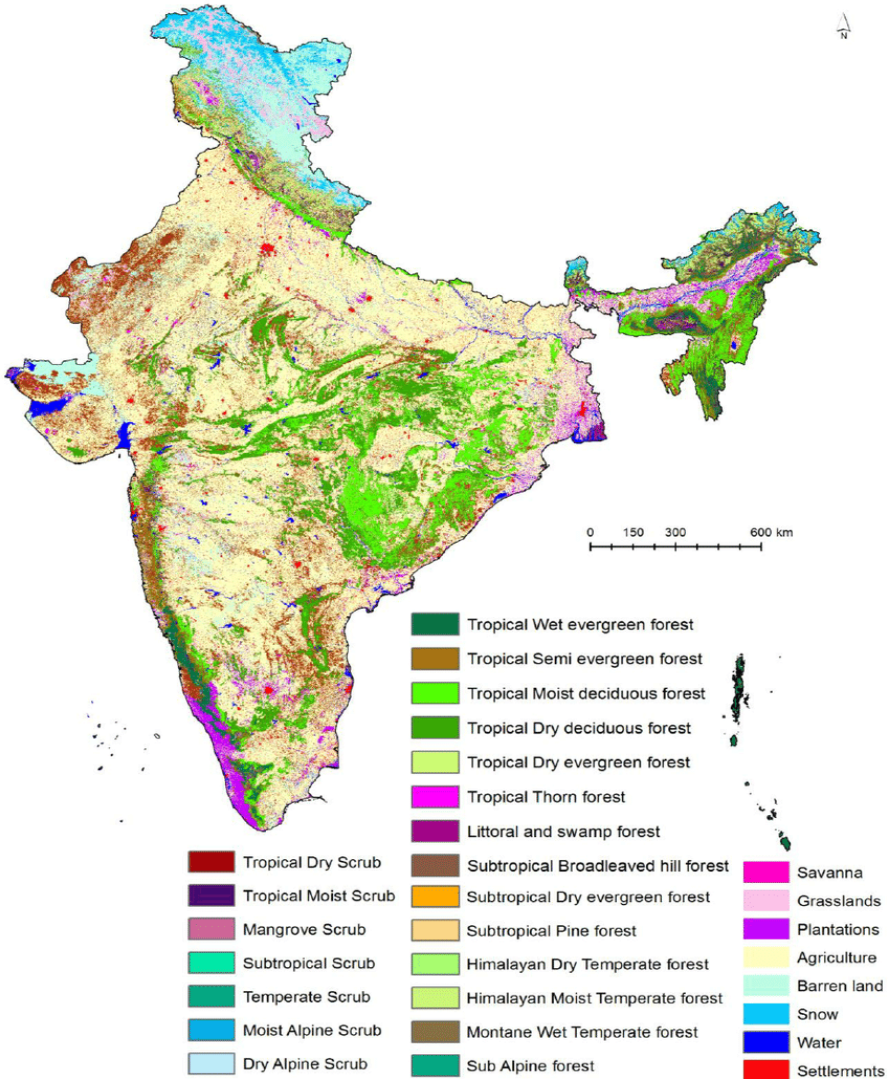
[19] http://cgwb.gov.in/Regions/SR/Reports/GWYB%20Telangana%202020-2021.pdf

species found in Karnataka include teak, sandalwood, and bamboo, as well as medicinal plants such as ayurvedic herbs.

d. Gujarat: The state is known for its diverse range of vegetation types, which include Tropical dry deciduous forests, Thorn forests, and mangrove forests along the coast. Some of the major plant species found in Gujarat include teak, bamboo, and various species of *Acacia*, as well as medicinal plants such as ayurvedic herbs.

e. Telangana: The state is known for its diverse range of vegetation types, which include Tropical Forests, Dry deciduous forests, and grasslands. Some of the major plant species found in Telangana include *Anogeissus*, *Terminalia*, *Pterocarpus*, *Dalbergia* and Bamboo.

Below figure shows the types of vegetation cover in the Project Area:



(Map source: Quantification and monitoring of long term forest cover changes and carbon stocks in South Asia: National Carbon Project, ISRO)

6. Ecosystem:

a. Maharashtra:

Maharashtra is a state in western India, known for its diverse geography and rich biodiversity. The state encompasses a range of ecosystems, including coastal, hill and mountain, and forest.

- Coastal Ecosystem: The Konkan coast of Maharashtra is known for its rich mangrove forests and biodiversity. These forests provide crucial ecosystem services such as coastal protection and support for fishing communities.
- Hill and Mountain Ecosystems: Western Ghats, which runs through Maharashtra, is a biodiversity hotspot and UNESCO World Heritage Site. The region is home to a wide variety of flora and fauna, including rare and endemic species.
- Forest Ecosystems: Maharashtra's forests are home to a wide variety of plant and animal species, and they provide important ecosystem services such as carbon sequestration and water regulation. Forests in the state include the tropical moist deciduous forests of the Western Ghats and the dry deciduous forests of the Deccan plateau.

In addition to these ecosystems, Maharashtra also has some of the richest agricultural lands and freshwater ecosystems in India.

b. Madhya Pradesh:

Madhya Pradesh is a state located in central India, and it has a diverse range of ecosystems. Some of the notable ecosystems found in the state include:

- Satpura Range: The Satpura Range is a mountain range that runs through the state and is home to a wide variety of flora and fauna, including many endemic species. The area is known for its dense forests, waterfalls, and scenic beauty.
- Central Indian Highlands: The state falls in the central highlands of India, and it's characterized by rocky terrain and dry deciduous forests. It's also known for its rich wildlife, including tigers, leopards, and a variety of deer species.
- Chambal River: The Chambal River and its tributaries run through the state and support a rich biodiversity. The river is known for its crocodiles and gharials and several species of fish and plants.
- Panna National Park: It's located in the state, and it's known for its rich variety of flora and fauna. The park is home to tigers, leopards, and a variety of deer and antelope species, as well as many species of birds and reptiles.

Agro-ecosystem: Madhya Pradesh has diverse Agriculture activities and that's where we can find agro-ecosystems.

c. Karnataka:

Karnataka is a state located in the southern region of India, and it has a diverse range of ecosystems. Some of the notable ecosystems found in the state include:

- Western Ghats: The Western Ghats mountain range runs along the western border of Karnataka and is a UNESCO World Heritage Site. The area is home to a wide variety of flora and fauna, including many endemic species.

- Coastal Ecosystem: The state has a long coastline on the Arabian Sea, and the coastal ecosystem is characterized by mangrove forests, sandy beaches, and a rich diversity of marine life.
- Deccan Plateau: The Deccan Plateau covers a large portion of Karnataka and has a dry, tropical climate. The area is characterized by scrub forests, grasslands, and rocky outcrops.
- River Ecosystems: The state has several major rivers like Cauvery, Kabini, Krishna, Tungabhadra, these rivers are home to several species of fish, aquatic plants, and other organisms that are adapted to the riverine environment.
- Agro-ecosystem: The state has diverse Agriculture activities and that's where we can find agro-ecosystems.

d. Gujarat:

Gujarat is a state in western India known for its diverse ecosystems. The state has a wide range of habitats, including deserts, grasslands, wetlands, and coastal regions. Some of the notable ecosystems in Gujarat include:

- The Rann of Kutch, a large salt marsh located in the western part of the state. This region is known for its seasonal salt flats, which attract a wide variety of migratory birds.
- The Gulf of Kutch, located on the coast of Gujarat, is a large estuary and mangrove ecosystem. The Gulf is home to a wide variety of fish, crustaceans, and mollusks, as well as several species of threatened marine mammals, such as the dugong and the Indian grey dolphin.
- The Gir Forest National Park and Sanctuary is a protected area located in the Saurashtra region of Gujarat. The park is home to the last remaining wild population of Asiatic lions, as well as other wildlife such as leopards, sloth bears, and Indian antelopes.
- The Shoolpaneshwar Wildlife Sanctuary, is another protected area located in the state of Gujarat. The snctuary is home to a wide variety of plant and animal species, including leopards, Indian bison, and several species of deer.
- The Marine National Park, Gulf of Kutch, is the first marine national park of India and is located on the coast of Gujarat, in the Gulf of Kutch. With 42 islands and a diverse range of marine life and coral reefs, it provides a habitat for a wide range of species, including the Indian saltwater crocodile, the giant mud skipper, and the colorful coral reefs.
- The Girnar & Purneshwar wildlife sanctuary, covers the wide range of fauna and flora of the region with special focus on bird watching & rock climbing experience.

e. Telangana:

The ecosystem of Telangana, a state in southern India, are diverse and include tropical dry forests, tropical thorn forests, and mangroves, as well as wetlands and grasslands.

- The state is home to many species of plants and animals, including the threatened blackbuck antelope, the Indian rock python, and the Indian peafowl. Telangana is also home to several important bird sanctuaries and national parks, including the Kawal Wildlife Sanctuary and the Kinnerasani Wildlife Sanctuary.

- The Godavari and Krishna rivers, which flow through the state, support a variety of aquatic life, including fish and crocodiles. Additionally, the state has significant area under cultivation of Rice, Jowar, Maize, Turmeric, Pulses and Oilseeds.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The Project Activity and First Project Activity Instance involving Plantation of Mahogany Seedlings on privately owned cropland by the individual farmers and harvesting of the Produce is in compliance with all the extant rules, regulations, guidelines and laws stipulated by State and Central Government of India.

It should be noted that the Project Activity and First Project Activity Instance is encouraged and promoted by State and Central Governments through various policy guidelines. Few of them are cited below:

India has a "National Agroforestry Policy"[20] in the year 2014. The policy underlines the environmental contribution of agroforestry by preventing deforestation, and promoting carbon storage, biodiversity conservation, and soil and water conservation. Agroforestry provides employment to rural as well as urban people through production, industrial processing and value addition of the tree products.

State	Policy/Schemes	Objectives
National	Sub-Mission on Agroforestry[21] (2016-17)	To encourage tree plantation on farm land along with crops/ cropping system to help the farmers get additional income and make their farming systems more climate resilient and adaptive. The scheme is being implemented in 20 States viz. Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, M.P., Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, U.P., Mizoram, Meghalaya, Nagaland and 2 UTs viz. J&K and Ladakh.
Maharashtra	Maharashtra State Forest Policy[22]- 2008	Increasing substantially the tree cover on all available public, community and private lands through social forestry and agro

[20] https://agricoop.nic.in/sites/default/files/National%20Agroforestry%20Policy%202014.pdf

[21] https://pib.gov.in/PressReleasePage.aspx?PRID=1705520

[22] http://www.fdcm.nic.in/PDF/Maharashtra_State_Forest_Policy-2008.pdf

		forestry with the involvement of people and especially those who are landless, from weaker sections and women.
Madhya Pradesh	Madhya Pradesh State Forest Policy (2005)[23]	Expanding forest tree-covered area to make it one-third of the geographical area. Ensuring stability of the environment and ecological balance by developing government forests and private areas under forest cover through sustainable management of forests. To earmark 10 per cent of the forest area under intensive management for production of timber in order to reduce the gap between its demand and supply
Karnataka	Krishi Aranye Protsaha Yojane (KAPY) [24]	To increase the forest cover of the state, Karnataka Forest Department launched a scheme called as 'Krishi Aranya Protsaha Yojane' (KAPY) from 2011-12 by involving farmers and general public.
Telangana	Telangana Haritha Haram[25]	Telangana Haritha Haram a flagship programme of the Telangana Government envisages to increase the present 24% tree cover in the State to 33% of the total geographical area of the State.

In addition to above, various regulatory[26] support are being introduced by the States to provide Non-Monetary Regulation Incentive towards Felling of the trees in an agroforestry system, such as relaxation of restriction on harvest and transit of agroforestry products/timber growing in private lands by Maharashtra State, relaxation of restriction on felling and transit of forest products by Karnataka State. This is to promote the agroforestry and increase the Tree outside Cover (ToF) supporting livelihood of poor and vulnerable groups.

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

[23] https://mpforest.gov.in/ecotourism/pdf/forestpolicy.pdf

[24] https://aranya.gov.in/aranyacms/(S(op10gjszg3cmuro4juj33xh4))/English/IndividualScheme.aspx?HkxuiBwcRAlH/nwkzKruPQ ==

[25] http://harithaharam.telangana.gov.in/

[26] https://files.wri.org/d8/s3fs-public/2022-03/roadmap-scaling-trees-outside-forests-india.pdf?VersionId=6dR4jQJT.TF_70rCP7EQ00jhznFyxAVc

The project is neither registered nor seeking registration under any other GHG program. The Project Activity and First Project Activity Instance is newly proposed and seeking registration under VERRA VCS mechanism.

1.15.2 Projects Rejected by Other GHG Programs

The project has not been rejected by any other GHG program. The Project Activity and First Project Activity Instance is newly proposed and seeking registration under VERRA VCS mechanism.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

The project host country is Republic of India and is a developing nation. Net GHG emission reductions or removals generated by the Project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits.

1.16.2 Other Forms of Environmental Credit

The Project Activity and First Project Activity Instance is not being used to create any other environmental credits.

1.16.3 Supply Chain (Scope 3) Emissions

Scope -3 Supply Chain Constituents

To maintain environmental integrity, GHG emission reductions/removals, PP has ensured the following:

1. PP has identified the seedlings supplier as a potential supply chain partner under Scope-3, involved in the Project Activity and First Project Activity Instance and a declaration obtained from the seedling supplier, for not claiming any Environmental Attributes is appended in the annexure- 4.

2. PP has identified the Produce consumers as potential Scope 3 claimants and the same has been addressed through Contractual Agreement between PP and the Farmer, so as to ensure that the Produce Consumers do not claim any environmental attributes for the purchase of the Produce from the Project Activity and First Project Activity Instance.

1.17 Sustainable Development Contributions

1.17.1 Sustainable Development Contributions Activity Description

The project activity contributes to the sustainable development in multiple. Specifically, the project activity and First Project Activity Instance aims at the following sustainable development goals (SDGs) proposed by United Nations Development Programme (UNDP):

Goal 1: No Poverty – "End poverty in all its forms everywhere". As per the clause 1.1 of Goal 1 of UN SDG[27], By 2030, Eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day.

Under the Project Activity and First Project Activity Instance, the local unskilled labourer required for seeding at nurseries, hardening center activities, support for digging pits during plantation, weeding, pruning, fertigation, application of bio-fertilizers, seed collection thereby improving livelihood to rural poor and economicaly vulnerable individuals.

Goal 2: Zero Hunger - "End hunger, achieve food security and improved nutrition, and promote sustainable agriculture". As per the clause 2.3 of Goal 2 of UN SDG[28], doubling the agricultural productivity and incomes of small-scale food producers is one of the main sub-goals of Goal 2 of SDGs.

The Project Activity and First Project Activity Instance includes farmers with small land holding (average less than 0.5 hectare in first Project Instance), whose current source of income is from subsistence driven marginal farming activities which gets affected due to change in climate conditions. The Project Activity and First Project Activity Instance is expected to generate additional stable sustainable source of income from carbon credits and Produce.

Goal 3: Good Health and Well-being – "Ensure healthy lives and promote well-being for all at all ages". As per the clause 3.9, By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination and indicator 3.9.1, Mortality rate attributed to household and ambient air pollution.

The Project Activity and First Project Activity Instance positively contributes to the following:

i. Sequestration the Carbon Dioxide gas by photosynthesis which enhances the microclimate thereby improving the air quality and human well-being.

ii. Mahogany emits significant amounts of the compound dimethyl sulphide (DMS), influencing regional air quality and climate

iii. Improve soil quality by effusion of essential nutrients from sub-soil layers to surface layers

iv. Arresting Soil Erosion thereby reducing Suspended Particulate Matters (SPM) in air

Goal 5: Gender Equality - "Achieve gender equality and empower all women and girls". Clause 5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws. Undertake reforms to give women equal rights to economic resources,

[27] https://sdg.humanrights.dk/en/goals-and-targets

[28] https://www.un.org/sustainabledevelopment/hunger/

as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws.

The first Project Activity Instance includes 59 women small land holders having full right of ownership of income generated through regular farming, Produce and carbon credits thereby ensuring progress towards gender equality, empowering all rights to women.

Goal 8: Decent Work and Economic Growth – "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all". Clause 8.3, Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services and Clause 8.4, Improve progressively, through 2030, global resource efficiency in consumption and production and endeavor to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead.

The Project Activity and First Project Activity Instance involves the creation of employment and enhancement of work profile of the local skilled and un-skilled resources. Work profile includes the implementation of managed Agro-forestry programmes through digital monitoring of processes which gives diverse exposure of ISO systems, SDGs advanced silviculture practices, bio-based fertilization and pest management, scientific data collection and analysis. Web-based tools and social media for improving farmer communication. Following skill/knowledge enhancement activities were undertaken for first Project Activity Instance and the same shall be continued for future Project Activity Instances:

i. ISO (International Organization for Standardization) training on 9001:2015
ii. SDG awareness programs
iii. Awareness programs on enhancing knowledge on Climate Change including carbon credit system
iv. Training on improved Silviculture practice by Forestry Experts
v. Precision farming through AI based tools

Goal 12: Responsible Production and Consumption – "Ensure sustainable consumption and production patterns. Clause 12.5, By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

The Project Activity includes the procurement of seedlings from the selected nursery uses recycled Low Density Polyethylene (LDPE) for preparation of the polybags containing seedlings. Post plantation of seedlings, polybags are further collected from land parcels and given to the recyclers/processors. For first Project Activity Instance we have collected more than 1,80,000 LDPE polybags equivalent to approximately 1 ton of Plastic. The same shall be continued for future Project Activity Instances.

Goal 13: Climate action - "Take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy" – Under the project activity and First Project Activity Instance, private lands are being planted with Mahogany Trees. Through the process of

carbon sequestration, the Mahogany trees will be able to capture Carbon Dioxide, a major Greenhouse Gas (GHGs) from the atmosphere. Therefore, the project activity and First Project Activity Instance will be able to contribute to the climate change mitigation.

Goal 15: Life on Land – ""Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss". According to clause 15.2[29] of United Nations SDGs promoting the implementation of sustainable management of all types of forests, halting deforestation, restoring degraded forests, and substantially increasing afforestation and reforestation is one of the sub-goals under Goal 15. Under the Project Activity and First Project Activity Instance, forest cover of the states will be increased through plantation of Mahogany Trees.

1.17.2 Sustainable Development Contributions Activity Monitoring

[29] https://www.un.org/sustainabledevelopment/biodiversity/

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	1.1	1.1.1 Proportion of population below the international poverty line	Implemented activities to decrease	The first project activity instance has generated 15 seasonal employments at Nursery, 28 seasonal employments at Hardening Center and more than 500 daily wage labor based on manual work load with daily earning of US$ 1.50 per day averaged for entire year.	Overall cumulative employment generated during project life time through Nursery, Hardening Center and Plantation Activities is expected to create 40,000 seasonal employment with an opportunity to earn about US$ 1.50 per day averaged for entire year
2)	2.3	2.3.2 Average income of small-scale food producers, by sex and indigenous status	Implemented activities to increase	Under the First Project Activity Instance, total 315 farmers (1,300 individuals as farmer family members) have been admitted in the project activity who will able to generate additional income from carbon credits and Produce.	The entire Project Activity Instances is expected to included 25,000 (100,000 individuals as farmer family members) famers who can generate additional source of income from carbon credits and Produce.

3)	3.9	3.9.1 Mortality rate attributed to household and ambient air pollution	Implemented activities to decrease	First Project Activity Instance includes plantation of more than 1,83,000 trees resulting in improved soil and air quality parameters by sequestering more than 4,280 tons of CO2 contributing to creating clean environment.	The total Project Activity is expected to plant more than 16,000,000 trees which shall sequester more than 4,00,000 tons of CO_{2eq} annually over the project life time, contributing to clean environment.
4)	5.a	5.a.1 (a) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and b) share of women among owners or rights-bearers of agricultural land, by type of tenure	Implemented activities to increase	The first Project Activity Instance includes 56 women small land holders having full right of ownership of income generated through regular farming, Farm Produce and carbon credits. Further 120 women are expected to be employed as seasonal daily wage labor for Seed collection, picking of dead litters, weeding.	The entire Project Activity Area expected to include more than 5,000 women small land holders having full right of ownership of income generated through regular farming, Produce and carbon credits. Further 10,000 women are expected to be employed as seasonal daily wage labor for Seed collection, picking of dead litters, weeding over the Project life cycle.

6)	8.3	8.3.1 Proportion of informal employment in total employment, by sector and sex	Implemented activities to increase	The first Project Activity Instance has imparted training to 10 individuals on ISO 9001:2015, SDG awareness training to 20 individuals, Climate Change Awareness programs to more than 500 individuals and relevant stakeholders, Training on Mahogany silviculture practice to 315 farmers and PPs representatives	For the entire Project Activity Instance, it is expected to train 30 individuals on ISO 9001:2015, SDG awareness training to 100 individuals, Climate Change Awareness programs to more than 30,000 individuals and relevant stakeholders, Training on Mahogany silviculture practice to 25,000 farmers and PPs representatives
	8.4	8.4.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP	Implemented activities to decrease	The first Project Activity Instance shall result in decrease in import of approximately 4 million cubic feet of timber by the end of year 2035.	The entire Project Activity Instance shall result in decrease in import of approximately 300 million cubic feet of timber by the end of year 2041, resulting in improving the Domestic timber consumption per GDP.
7)	12.5	12.5.1 National recycling rate, tons of material recycled	Implemented activities to decrease	The first Project Activity Instance has used 2,00,000 Polybags made from recycled LDPE and further PP has collected and handed over 1,80,000 LDPE polybags equivalent to 1 tons of plastic to the recyclers/processors	The entire Project Activity Instance is expected to use 1,80,00,000 Polybags made from recycled LDPE and the same shall be collected by PP and handing over to the recyclers/processors, equivalent to 75 tons of Plastic, over Project life cycle.

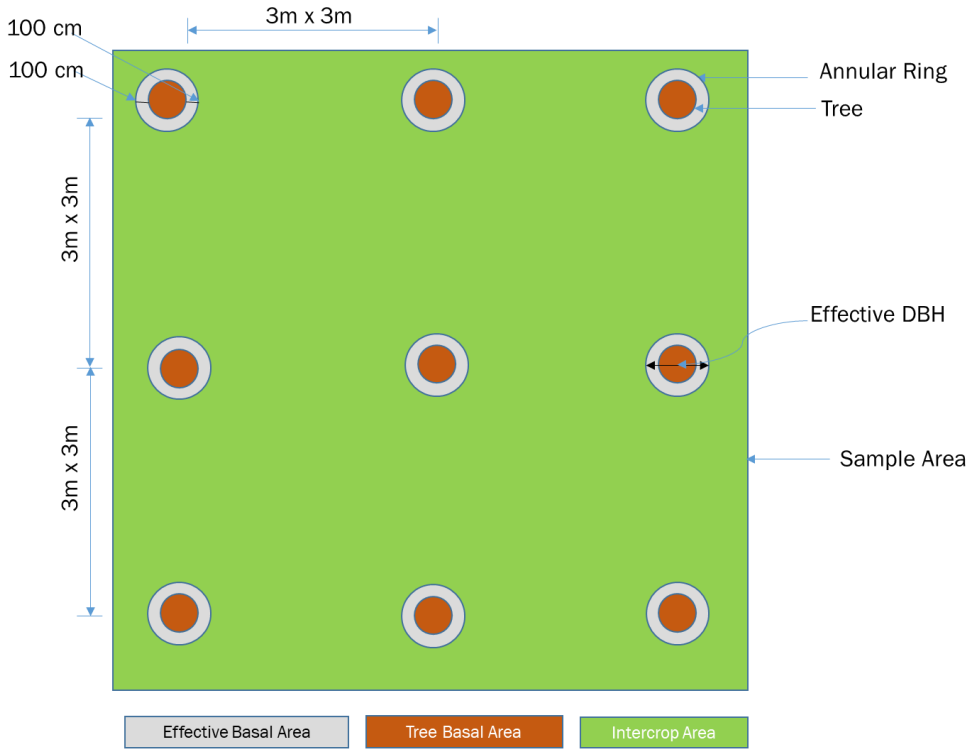
8)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase	By planting 165.41 hectares of lands, Project Activity has removed 4,280 tonnes of carbon dioxide from the atmosphere during the monitoring period.	The entire Project Activity will sequester 4,00,000 tons of CO_{2eq} annually from the atmosphere over the Project life-time

1.18 Additional Information Relevant to the Project

Leakage Management

PP has estimated the leakage emission for the First Project Activity Instance of 165.41 hectares considering the annular ring width from the tree basal area. Annular ring with width of 100cm around the basal area of tree has been considered to be prone to resource competition, hence the PP has not considered the annular ring width for cultivation of Intercrop. This practice of cultivation ensures smoother intercultural operations. As such area of agriculture displaced by the Project Activity is limited to the basal area of planted tree in addition to annular ring with width of 100cm around the basal area of tree. Below figure demonstrates the effective basal area and intercrop area.

Below figure demonstrates the effective basal area and intercrop area:



Below table indicates the estimated area for displaced agriculture activities:

Year	DBH (cm)	Annular Ring Width (cm)	Effective DBH(cm)	Stratum 1 Displaced Area (ha)	Stratum 2 Displaced Area (ha)
1	2.80	200	203	4.29	53.63
2	5.40	200	205	4.40	55.01
3	7.80	200	208	4.51	56.30
4	10.00	200	210	4.60	57.50

5	12.00	200	212	4.69	58.60
6	13.80	200	214	4.77	59.60
7	15.60	200	216	4.85	60.61
8	17.40	200	217	4.93	61.62
9	19.20	200	219	5.02	62.65
10	21.00	200	221	5.10	63.68
11	22.80	200	223	5.18	64.72
12	24.60	200	225	5.27	65.77
13	26.40	200	226	5.35	66.83
14	28.20	200	228	5.44	67.90
15	30.00	200	230	5.52	68.98

The leakage emission has been estimated for displaced agriculture activities in section 5.3.
In addition, PP has devised intercropping plan which elaborates the crops to be undertaken as the *Swietenia macrophylla* plantation ages till 15 years considering various factors such as soil properties, climatic conditions, methods of cultivation and tree canopy. Four Intercrop models have been developed considering the tree canopy, soil and climatic conditions with 20 different traditional crops that are practiced in the Project Area prior to the Project Activity. This model have been devised in association with an Agriculture based Autonomus Organization under the Department of Agricultural Research and Education (DARE), Ministry of Agriculture and Farmers Welfare, Government of India through an MoU. Intercropping plan and MoU is separately submitted to VVB.

Commercially Sensitive Information

There is no commercially sensitive information.

Further Information

There is no further information.

2 SAFEGUARDS

2.1 No Net Harm

PP has identified the following potential negative environmental and socio-economic impacts and measures to mitigate:

Project Activity and First Project Activity Instance with Potential Negative impact	Impact area	Explanation	Mitigation measures	Monitoring of mitigation measures
Environmental				
Use of LDPE Polybags	Soil, water, flora and fauna	Consumption and improper disposal leading to higher plastic consumption and contamination of soil, water and threat to flora and fauna	i. Use of polybags made from recycled LDPE granules ii. Proper disposal of used polybags after plantation by collecting and transporting to recycler/processor	i. Monitor implementation of SOP on Quarterly basis ii. Monitoring of Polybag material balance
Transportation of Seedlings and Produce	Soil, water, flora and fauna	Use of heavy vehicles for transportation of seedlings from Nursery to Hardening Centre	i. Avoiding one-way/single journey use of heavy vehicles by strictly procuring heavy vehicle which otherwise would have returned empty thereby converting one-way journey to two-way journey ii. Optimizing supply order quantity and route plan management for reduced requirement of transport vehicles	i. Monitor procurement SOP of heavy vehicles for transport of seedlings ii. Fixing of minimum supply order quantity of seedlings and monitor SOP for: a. supply of seedlings from hardening centre to cropland b. design shortest route map

Project Activity and First Project Activity Instance with Potential Negative impact	Impact area	Explanation	Mitigation measures	Monitoring of mitigation measures
Use of fertilizers/ herbicides	Soil, water, flora and fauna	Use of fertilizers and herbicides may affect land parcels	i. Stipulate quantities and frequency for use of fertilizers and herbicides ii. Use of AI based precision farming tools to reduce overall consumption of fertilizers/herbicides iii. Maximise bio-based fertilizers/herbicides such as, vermicompost, neem (Azadirachta indica) cake, Dashparni ark or variations thereof, Jeevamrut	i. Monitor SOPs for fertilizer applications ii. Weekly monitoring of land parcels iii. Monitor SOPs for Pest and Disease Management
Socio-economical				
Field Work	Health and Safety	Use of herbicide/fertilizer equipment	Use of protective gears during use of herbicides/fertilizer application	Monitor SOPs for fertilizer applications
Land procurement	Economic	Acquisition of land for hardening centre and storage of	Procurement of land is done by way of lease, instead of acquisition and	Contractual Agreements for hardening centre and ensuring

Project Activity and First Project Activity Instance with Potential Negative impact	Impact area	Explanation	Mitigation measures	Monitoring of mitigation measures
		Produce may affect farmers livelihood	farmer family manages operation of hardening centre thereby keeping ownership of land with farmers simultaneously generating income. The same method shall be adopted for procurement of land for storage facility of Produce	same agreements for storage facility of Produce in future
Transportation of seedlings and Produce	Health and Safety	i.Use of unfit heavy vehicles ii.Use of light vehicles without safety precautions	i. Procurement SOP to stipulate mandatory requirement for Vehicle Fitness Certificate, issued by Government of India and PUC (Pollution Under Control certificate issued by Government of India) ii. Human Resource (HR) SOP, stipulating compulsory use of protective gear while riding light vehicle	i. Monitoring of SOPs for requirement Vehicle for transportation ii. Monitoring of HR SOP for Employee

PP's Parent company, MITCON Consultancy & Engineering Services Limited (MITCON) is empaneled as Category A- EIA (Environment Impact Assessment) organization. MITCON also has NABL (National Accreditation Board for Testing and Calibration Laboratories) accredited laboratory for testing of air, water, soil and food having ISO IEC 17025:2017 and ISO 45001:2018 certification.

MITCON has requisite expertise and competence in environment and social sector projects. MITCON has successfully carried out skill upgradation of more than 2 million individuals over past 2 decades across India. Skill upgradation programs aimed at increasing employability of unemployed youth and creating micro and small entrepreneurs.

Impact of Agroforestry or Alley Cropping System

Alley cropping is the agricultural practice of planting in rows, or alleys, of trees in fields of crops. According to a new study by an international, multidisciplinary research team led by the University of Gottingen, this type of land use rapidly leads to significant ecosystem improvements in farmland. The positive impacts of Agroforestry or Alley cropping system are as under:

- Conversion of croplands to alley-cropping agroforestry did not affect crop yield per cropped area.
- Crop quality partly improved for cropland agroforestry as shown by greater wheat (Triticum aestivum) crude starch and canola (Brassica napus) crude protein contents as well as greater canola 1000-grain weight compared to open cropland.
- Abundances of phyto-pathogenic fungi in crops were not affected following conversion to agroforestry.
- Indicators of carbon sequestration, soil nutrient cycling, habitat for soil biological activity, soil GHG abatement, water regulation, and erosion resistance
    - The large net primary production of trees strongly contributed to the increase in carbon sequestration following agroforestry establishment in cropland.
    - Soil organic Carbon (SOC) stocks did not differ between agroforestry and open cropland
    - Conversion of open cropland to agroforestry improved the soil biological habitat as shown by greater earthworm biomass, soil bacterial and fungal population sizes.
    - The tree rows greatly reduced wind speed and number of days with wind erosion risk compared to open cropland, which resulted in a substantial increase in wind erosion resistance.

In summary, conversion to agroforestry enhanced carbon sequestration, habitat for soil biological activity and erosion resistance functions. Implementation of agroforestry did not lead to a decrease in any of the measured indicators of ecosystem functions.

2.2 Local Stakeholder Consultation

Process

The PP has the adopted the following process engaging local stakeholders:

a. Meeting location is selected from the Project Area based on PP's internal assessment in respect of soil type, water adequacy, cropping patterns, farming practices, climate conditions and hydrogeology.

b. An initial level engagement is held with the local government officer such as gram Sarpanch (Elected head of Village) or gram sevak (Government Employee), explaining the Project details and benefits of Plantation to the local village farmers having small land holdings.

c. As a result of successful initial engagement an invitation letter is sent to gram Sarpanch (Elected head of Village) or Gramsevak (Government Employee) for conducting the local stakeholder consultation/meetings, 15 days prior to the proposed date of meeting.

d. Meeting invitation letter is sent in local language to Sarpanch or Gramsevak who in turn communicates to the farmers and advises them to attend the meeting.

e. Invitation letter consist following details:

i. Date and Venue of meeting

ii. Briefing on subject" Plantation of Mahogany"

iii. Agenda:

- Introduction of the project
- Project details including Eligibility and applicability criteria, Permanence (Regeneration after harvesting, fire risk mitigation, pest and disease management)
- About VCS and CDM mechanism
- Benefits from the Plantation project (Environment, Social and Economic)
- Grievance Mechanism for stakeholders
- Carbon Stock Assessment methods

- Yearly/Biennial monitoring process for Sustainable development
- Feedback/Questions from Stakeholders
- Question and Answer session

iv. Contact Details

f. Meetings are conducted on date and time at venue mentioned in the invitation letter. PP representative having subject matter expertise conducts the meeting in local language, detailing the above agenda. Details of few meetings are shown in below table

Sr. No.	Districts	Date of local stakeholder meeting conducted	Name of Sarpanch or Gramsevak
1.	Pune	07 January 2019	Samiksha Madan Kurumkar
2.	Ahmednagar	19 January 2019	Joshana Devidas Hiade
3.	Bijapur (Vijayapur)	15 March 2019	Sangugouda Biradar
4.	Osmanabad	11 October 2019	Biru dev Narayan Sontakke
5.	Jalgaon	13 January 2020	Dnyaneshwar Mahadu Tambe
6.	Satara	07 August 2020	Deepali Anil Salunkhe
7.	Aurangabad	10 August 2020 and 14 October 2020	Laxmibai Sonaji Raut
8.	Sangali	04 October 2020	Maruti Jamdar
9.	Solapur	15 November 2020	Priyanka Ramesh Asabe
10.	Yavatmal	18 December 2020	Sachin Chavhan
11.	Nashik	04 January 2021	Joyti Nitin Bhalerav
12.	Parbhani	24 January 2021	Mahananda Nagnath Latpate
13.	Nanded	25 January 2021	Ganesh Datta Rathod

g. Outcomes

PP follows the following process to record the outcomes of meeting held with local stakeholders:

i. PP representative documents details of proceedings

ii. Outcome evaluation through questionnaire by PP

iii. One to One interactions by PP representative post completion of meeting for addressing specific queries and documenting the same.

iv. Stakeholder response team further connects with the attendees post meeting to assess the assimilation of the meeting content

v. On-going communications with the stakeholders is handled by remote and local stakeholder response team. Currently the team consists of 9 members in remote response team and 150 members in local response team.

vi. Inputs received during and after local stakeholder consultation meeting are duly incorporated in process for conducting meeting, content inputs are addressed in agenda of subsequent meetings, and other inputs relating with plantation cropping form part of relevant SOPs of the PP.

Following are few comments received from local stakeholder meeting members indicating assimilation of outcomes:

- Farmers are proud to be part of a climate change mitigation program
- Farmers are thankful for this help as they feel it would provide a better long-term viability as compared to the regular agricultural outputs.
- The producers also declared they were very interested by the possibility of developing projects of carbon sequestration. The project will help them access this new market and revenue for their efforts to mitigate climate change.

h. Below are few of the inputs/requests received from local stakeholders which were taken into account by incorporating the same in processes governed by Standard Procedure:

- Will a real efficient monitoring process be implemented? (they've heard of or known other projects led by other entities that did not include follow up in the long run)
- Will the farmers receive trainings about agroforestry and forestry practices?
- How will the farmers fight against the pests?
- How will the carbon credits be claimed and how much revenue the farmers would receive?
- By when would the farmers receive the money from carbon credits?
- What will be the requirements from individual farmers to claim carbon credits?
- Report on how due account was taken of any comments received

i. PP has and will communicate about the project design, its implementation, monitoring outcomes, risks, costs, benefits, local regulations and process of VCS validation through following means:

- Impact of Climate Change and mitigation through sequestration of GHG emission thereby creating sustainable income source through agroforestry practices.
- Presentation detailing the entire process of VCS project validation, verification, issuance and the importance of site visit conducted by Validation/Verification Body and requested for cooperation during the VVB site visits.
- Brochure/factsheet containing the above aspects in local language such as Marathi in Maharashtra in addition to English
- Infomercials, containing above aspects of the project with risk and cost benefit analysis associated with Carbon Credit and Produce market condition
- Agriculture Trade Forums and Exhibitions
- Meeting with Farmers through Block Development Officer (Local Government Officer)
- Campaign for Farmers Groups on Social Media Platforms
- Advertisements on Websites and Print Media.
- Visit to sample project land parcels for creating awareness about the Project Activities for local government offices and farmers, as a follow up to stakeholder meeting.
- Explained through one to one meetings about the prevailing laws and regulations pertaining of felling of tree and local/national labor laws.

Photographs of the individual locations are described below.

Location: Pune-Hadapsar (Sagar Inn Hotel) Date-25/2/2019

Location-Aurangabad(Netaji Mangal Karyalay)
Date-18/5/2019

Location-Aurangabad(Panchayat Samiti Kannad)
Date-07/07/2019

Location-Solapur(Mohol Gram panchayat)
Date-02/09/2019

Location-Nanded (Marata Seva Sangh Karyalay)
Date-09/02/2020

Location-Ahmednagar(Srigonda-Madhevadgoan)
Date-20/3/2020

Location-Pune-Indapur(Kalamb)
Date-20/4/2020

Location-Pune-Hadapsar(Hotel Magestick)
Farmer Tranning Program
Date-01/7/2020

Location-Aurangabad-Paithan(Gajanan Mangal Karyalay)
Date-28/9/2020

Location-Dhule(Village-Chunchale)
Date-26/8/2020

2.3 Environmental Impact

The Project Activity and First Project Activity Instance being agroforestry on multiple scattered small land parcels privately owned by farmers does not create requirement for carrying out environmental impact assessments as per the Ministry of Environment, Forest and Climate Change, Government of India, notification number S.O. 1533 (E), dated September 14, 2006 and latest amendment vide notification number S.O. 3250 (E) dated July 20, 2022.

2.4 Public Comments

The project was available for public comment at VCS webpage https://registry.verra.org/app/projectDetail/VCS/2479 from May 20, 2021 to June 19, 2021.

During the above period, there were no public comment received for the project. However, few comments were received outside the comment period. The comments are as under with responses:

Comment 1:

i. Mr Bhagatsingh Shelke is the director & channel partner of Cropcity Agrovet Pvt Ltd, Kolhapur.

ii. Mr Shelke has started a new company named as 'Mahogany Vishwa Agro Pvt Ltd' and through this company, he concealed all old agreements of Farmers. Mr Shelke has breached the terms & conditions of Cropcity Agrovet Pvt Ltd & deceivingly made all new agreements of Mahogany Contract Farming under company 'Mahogany Vishwa' by keeping both Farmers & Cropcity Agrovet unknowing. The Cropcity Agrovet pvt ltd has claimed the case against Mr Bhagtsingh Shelke under IPC section 420, 406 with strong evidence.

PP Response:

i. August 01, 2020, Mr. Bhagatsing Shelke appointed as Additional Director (pending approval by shareholders) in Cropcity Agrovet Pvt Ltd (CAPL). October 22, 2020, vide Board Resolution, CAPL revoked appointment of Mr. Bhagatsing Shelke as Additional Director, in furtherance of resignation by Mr. Bhagatsing Shelke on October 21, 2020. Relevant documents from Ministry of Corporate Affairs, Government of India, have been submitted to the VVB.

ii. The complaint dated 31 May 2021, filed by Mr. Kundal Patil, Director, CAPL with Judicial Magistrate F.C. Kale (Kherivade), with claims as detailed above has been DISMISSED vide Honorable Magistrate order as under:

Hon. V.V. Khulape, Judicial Magistrate, F.C. Kale (Kherivade)

Order - MHK020000175-2021 in Cr. M.A.No. 32-2021 (Exh.1)

1. The complaint is dismissed under section 203 of the code of criminal procedure.

2. Proceeding is closed.

The above order copy is submitted to the VVB.

All the Contractual documents entered into by Mahogany Vishwa Agro Pvt Ltd (MVAPL) have representation and warranty from farmers that they have not entered into any arrangement with any third party in relation to the Mahogany Plants, Produce and/or Carbon credits. Further MVAPL has obtained Affidavit (In India, Affidavit is a written statement sworn before a person having authority to administer an oath) from each farmer confirming there is no other agreement signed concerning their plot/plants with any person/institution/company. A few Affidavits have been submitted to the VVB.

There is no breach of any agreement by PP or its Directors. The claims made above are false and baseless

Comment 2:
The Cropcity Agrovet pvt ltd has claimed the case against Mr Bhagtsingh Shelke AND MVAPL under IPC section 420, 406 with strong evidence. MR. KUNDAN PATIL 9325794597; patilkundan.com@gmail.com Attached all document and evidence

PP Response:
The complaint dated 31 May 2021, filed by Mr. Kundal Patil, Director, CAPL with Judicial Magistrate F.C. Kale (Kherivade), with claims as detailed above has been DISMISSED vide Honorable Magistrate order as under:

Hon. V.V. Khulape, Judicial Magistrate, F.C. Kale (Kherivade)
Order - MHK020000175-2021 in Cr. M.A.No. 32-2021 (Exh.1)
1. The complaint is dismissed under section 203 of the code of criminal procedure.
2. Proceeding is closed.

The above order copy is submitted to the VVB.

There is no breach of any agreement by PP or its Directors. The claims made above are false and baseless.

It may be noted that on July 27, 2021, as a response to application filed by Mr. Kundan Patil, MVAPL sent Notice to CAPL for invocation of Arbitration Process in respect of dues owed by CAPL to MVAPL under the Channel Partner Agreement.

On September 09, 2021, MVAPL filed Arbitration Petition at Bombay High Court, ARPST/17072/2021, for appointment of Arbitrator and venue at Pune, Maharashtra
Screenshot of the Honorable Bombay Court Website is submitted to the VVB.

Comment 3:
Mr Bhagatsingh Shelke has breached terms & conditions of Cropcity Agrovet & deceivingly made all new agreements of Mahogany Contract Farming under 'Mahogany Vishwa' & concealed all old agreements by keeping everyone unknowing. We have claimed case against Mr Shelke under section 420, 406 with strong evidences which we can submit. Please share email ID.

PP Response:

The above mentioned case refer to, the complaint dated 31 May 2021, filed by Mr. Kundal Patil, Director, CAPL with Judicial Magistrate F.C. Kale (Kherivade), with claims as detailed above has been DISMISSED vide Honorable Magistrate order as under:

Hon. V.V. Khulape, Judicial Magistrate, F.C. Kale (Kherivade)

Order - MHK020000175-2021 in Cr. M.A.No. 32-2021 (Exh.1)

1. The complaint is dismissed under section 203 of the code of criminal procedure.

2. Proceeding is closed.

The above order copy is submitted to the VVB.

All the Contractual documents entered into by MVAPL have representation and warranty from farmers that they have not entered into any arrangement with any third party in relation to the Mahogany Plants, Produce and/or Carbon credits. Further MVAPL has obtained Affidavit (In India, Affidavit is a written statement sworn before a person having authority to administer an oath) from each farmer confirming there is no other agreement signed concerning their plot/plants with any person/institution/company. A few Affidavits have been submitted to the VVB.

There is no breach of any agreement by PP or its Directors. The claims made above are false and baseless.

Comment 4:

I am Mr Kundan Patil, Managing Director of Cropcity Agrovet Pvt Ltd, Kolhapur, Maharashtra State, Country India. Email Id : patilkundan.com@gmail.com Contact No. 9325794597 Mr Bhagatsingh Shelke is director & channel partner of Cropcity, has started new company named 'Mahogany Vishwa Agro Pvt Ltd'

PP Response:

The comment with respect to the Director is addressed above. In respect of channel partner agreement, it may be noted that MVAPL has terminated the Channel Partner Agreement with CAPL vide email dated October 21, 2020 and the same was revoked by CAPL vide Board Resolution dated October 22, 2020.

Further, it may be noted that:

a) Mahogani Vishwa Agro Private Limited was incorporated on January 25, 2019, which confirms that MVAPL was not New Company, as claimed in the above comment. MVAPL had launched the project and completed 71 plantations before execution of Channel Partner Agreement with CAPL. The supporting documents is shared with VVB.

b) Channel Partner arrangement had no restrictive clauses or exclusivity in respective of Mahogany Plantation. The supporting documents is shared with VVB.

Comment 5:
Hi,. Jdhe. Rjfb.

PP Response:

The above comment is irrelevant.

Comment 6:

Water scarcity is a biggest risk in this project and farmers are poor (page22). How this risk is mitigated? Project is planning to provide water to all farmers i.e., 15000 ha. Pete, Climate change enthusiastic Independent researcher

PP response:

Swietenia macrophylla, also known as the big-leaf mahogany, it is a large deciduous tree species. The species is considered to be drought-tolerant or also tolerating dry conditions in open forest (Mejía *et al*. 2008[30]) and can survive in a range of soil types, but it prefers well-drained soils with a high organic matter content.

According to a study published in the "Center for International Forestry Research" (Krishnawati *et al*. 2011[31]), *Swietenia macrophylla* is able to tolerate relatively low soil water potentials, and can survive in areas with low rainfall and prolonged dry seasons. The study also found that the species has a deep root system that allows it to access water deep in the soil and to survive in conditions of water stress. *Seldon et al. (2021)*[32] conducted analysis of "Water requirements for growth and survival of *Swietenia macrophylla* juvenile tree in relation to water production capacity of dew condensers". They found that all *Swietenia macrophylla* juvenile trees survived at RET (Relative Evapotranspiration) values of 0.5 and higher, but only 60 percent survived at RET = 0.25 and all died at RET = 0.125. This means that the minimum RET value required for survival of *Swietenia macrophylla* occurred somewhere between 0.25 and 0.5 (approximately in the range between 0.07 and 0.14 L/tree/day). *Swietenia macrophylla* required between 0.07

[30] Mejía, E., Buitrón, X., Peña-Claros, M., & Grogan, J. (2008, November). Big-leaf mahogany (Swietenia macrophylla) in Peru, Bolivia and Brazil.

[31] Krisnawati, H., Kallio, M. H., & Kanninen, M. (2011). Swietenia macrophylla King: ecology, silviculture and productivity. CIFOR.

[32] Seldon, J., Snyder, V. A., Harmsen, E., & Van Bloem, S. J. (2021). Water requirements for growth and survival of Swietenia macrophylla and Tabebuia heterophylla juvenile trees in relation to water production capacity of dew condensers 1, 2.

and 0.14 L/tree/day for complete survival. This shows *Swietenia macrophylla* is a drought tolerance species, which must be taken into account in formulating reforestation/afforestation strategies

Below table shows the comparison of water intake potential of regular/tradition crops and *Swietenia macrophylla*:

S.No.	Name of Crops	Total Growing Period (Minimum days)[33]	Crop Water need (mm/Total Growing period)[34]	Crop Water Requirement (Liter per day per hectare	Water intake for 15 years (kilo Liter)
1	Rice	90	450	50,000	67,500
2	Cotton	180	700	38,889	1,05,000
3	Sugarcane	270	1500	55,556	2,25,000
4	Soybean	135	450	33,333	67,500
5	Wheat	120	450	37,500	67,500

Water Requirement by *Swietenia macrophylla*[35]					
Year	Litres Tree^{-1} .Day^{-1}	Litres Day^{-1}. ha^{-1}	Litres Month^{-1}. ha^{-1}	Litres Yr^{-1}.ha^{-1}	Kilo Litres ha^{-1}
1	0.14	156	4,666	37,330	37
2	0.28	311	9,332	74,659	75
3	0.42	467	13,999	1,11,989	112
4	0.56	622	18,665	1,49,318	149
5	0.7	778	23,331	1,86,648	187
6	0.84	933	27,997	2,23,978	224
7	0.98	1,089	32,663	2,61,307	261
8	1.12	1,244	37,330	2,98,637	299
9	1.26	1,400	41,996	3,35,966	336
10	1.4	1,555	46,662	3,73,296	373
11	1.54	1,711	51,328	4,10,626	411
12	1.68	1,866	55,994	4,47,955	448
13	1.82	2,022	60,661	4,85,285	485
14	1.96	2,178	65,327	5,22,614	523
15	2.1	2,333	69,993	5,59,944	560
Total	**16.8**	**18664.8**	**559944**	**44,79,552**	**4,480**

[33] Section 2.2.2, Table 4, https://www.fao.org/3/s2022e/s2022e02.htm

[34] Section 2.4, Table 5, https://www.fao.org/3/s2022e/s2022e02.htm

[35] Seldon, J., Snyder, V. A., Harmsen, E., & Van Bloem, S. J. (2021). Water requirements for growth and survival of Swietenia macrophylla and Tabebuia heterophylla juvenile trees in relation to water production capacity of dew condensers 1, 2.

Crops	Water Requirement in multiplication of requirement by *Swietenia macrophylla*
Rice	15
Cotton	23
Sugarcane	50
Soya	15
Wheat	15

From the above tables it shows that *Swietenia macrophylla* requires less water compared to the regular or traditional crops sown by the farmers in their land parcels per hectare.

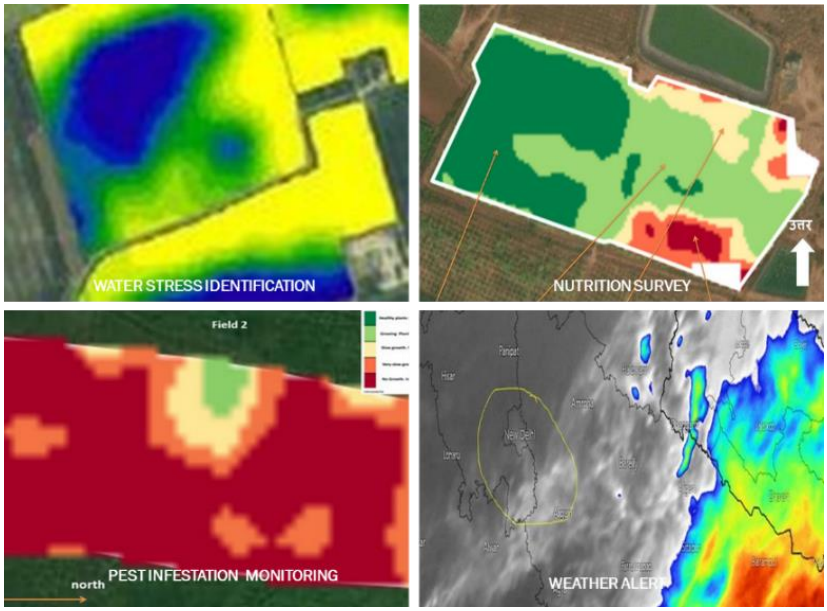
Comment 7:

The role of Remote sensing is not clear. PD lacks which satellite data is used, what's analysis were carried out. The technical details of the data are missing. Pete, Climate change enthusiastic Independent researcher

PP Response:

PP is exploring Satellite based AI Precision Farming and Monitoring of the Mahogany Trees, Land Use and intends to implement it in the near future. The PP has conducted AI based Precision Farming using satellite monitoring for few sample land parcels. This tool has delivered 25-30% lower water, NPK and pesticide consumption for other projects. The areas identified for digitised monitoring are:

- Water Stress Area Identification up to 2 meters below ground
- Nutrition Survey
- NPK Distribution Analysis
- Canopy Study
- Predictive Pest infestation alert
- Predictive Fire Alert



Comment 8:

PD says farmers joined this program due to scarcity of water and could not grow crops. These areas are experiencing scanty precipitation (Page 22). To grow trees farmers need water ?. To prevent fire farmers are trained/tought to maintain moisture by project requires lot of water. This is contradictory. Pete, Climate change enthusiastic Independent researcher

PP Response:

The word “scarcity of water” referred to the fluctuation in the water availability and the same has been corrected in the Joint PD and MR.

As mentioned in above that Plantation in Project Activity requires less water compared to traditional crops.

PPs representatives provides Farmer training and awareness towards fire hazard. PP has addressed the fire risk by developing Standard Operating Procedures (SOPs) for the prevention of fire outbreaks, in which all stakeholders are involved. These SOPs serve as a guiding principles to be followed in reducing/mitigating the fire risks for farmers. Few of the following guidelines are as under:

- Sustainable disposal of dead litters, leaves, and other crop residues either by Composting or through proper burial in the ground

- Flammable material such as fuel (for operation of various farm equipment), herbicides, grain dust, jute/plastic bags for storing grain and any other farm produce, animal fodder, hay and straw are kept in isolated place away from the land parcels.
- Maintaining biomass free land patch from adjacent land parcels.
- Water pumps should have moisture/dust proof ON/OFF switches and covers for motors.
- No use of any electrical tool when the weather is windy or near the dry grass region
- Avoidance of plantation in the area below electrical line.

Comment 9:

Geodetic polygons that delineate the geographic area of each AFOLU project activity, provided in a KML file. Pete, Climate change enthusiastic Independent researcher

PP Response:

Geodetic Polygons of 1st Project Activity Instance is attached as separate KML file and is shared with the VVB.

The screenshot of KML file containing all the land parcels included in 1st Project Activity Instance is shown in Section 1.12 of Joint PD MR.

Comment 10:

Geodetic polygons that delineate the geographic area of each AFOLU project activity, provided in a KML file. Pete, Climate change enthusiastic Independent researcher

PP Response:

Geodetic Polygons of 1st Project Activity Instance is attached as separate KML file and is shared with the VVB.

The screenshot of KML file containing all the land parcels included in 1st Project Activity Instance is shown in Section 1.12 of Joint PD MR.

Comment 11:

In this project i have Observed the locations which you added in this project with serial numbers 4,5,6,10,11,12,13,15,47,48,54,55,61,62,75,78,79,99,153,301,445,467 are same used in this Project id 2346 as it is same this searial numbers 80,14,50,67,84,78,32,145,133,132,135,140,141,111,137,136,142,59,131,144,73 respectively.

PP Response:

We have carried out further investigation and have retained farmers wherein unambiguous and clear evidences are available. As a result, we have revised the farmer list and submitted to the DOE. The Famer list of VCS 2479, contains 20 farmers aggregating to 12.48 hectares of land parcels. These areas do feature in VCS 2346, however these areas have been included in VCS 2346 without consent of the farmers. These farmers had entered into exclusive agreements with VCS 2479 and had purchased the seedlings through PP of VCS 2479 and had followed all the Plantation SOPs and guidelines provided by the PP of VCS 2479. The same has been confirmed by PP of VCS 2346 vide email dated March 09, 2023 specifically requesting VERRA to exclude these farmers from VCS 2346. The copy of the same as shared by farmer with us was submitted to VVB.

Comment 12:

I found in this project you have copied most of data from project id 2346 Ramesh Patil AFPF welfare Assosiation INDIA rameshpatilbabu@gmail.com

PP Response:

Since the Project Activity, Geographic data, Plantation Species, is similar, the factual data may be similar. Hence some information in PDD may look similar.

However, no information has been copied from VCS 2346.

2.5 AFOLU-Specific Safeguards

Local Stakeholder Identification process and results:

1) The process(es) used to identify local stakeholders likely impacted by the project and a list of such stakeholders

As detailed in section 1.11 herein above, the Project Activity is spread over 65 districts (defined by Government of India, as on 28 June 2019, Project Start date and shall include split/bifurcation, regrouping, renaming as may be carried out by Government of India from time to time) across five states in India with average statistics of each district is as under:

Weighted Average	Total	Project Activity
Average District Area (ha)	844,790	262
Average District Net Sown Area (ha)	478,935	262
Average Village Net Sown Area (ha)	447	0.251

As seed from above, each district is an area of 844,790 hectares, equivalent to circle with 52 km radius.

Project Activity is undertaken on 0.055% of the average district net sown area and ranges from 0.1% to 5.5% of the average village net sown area.

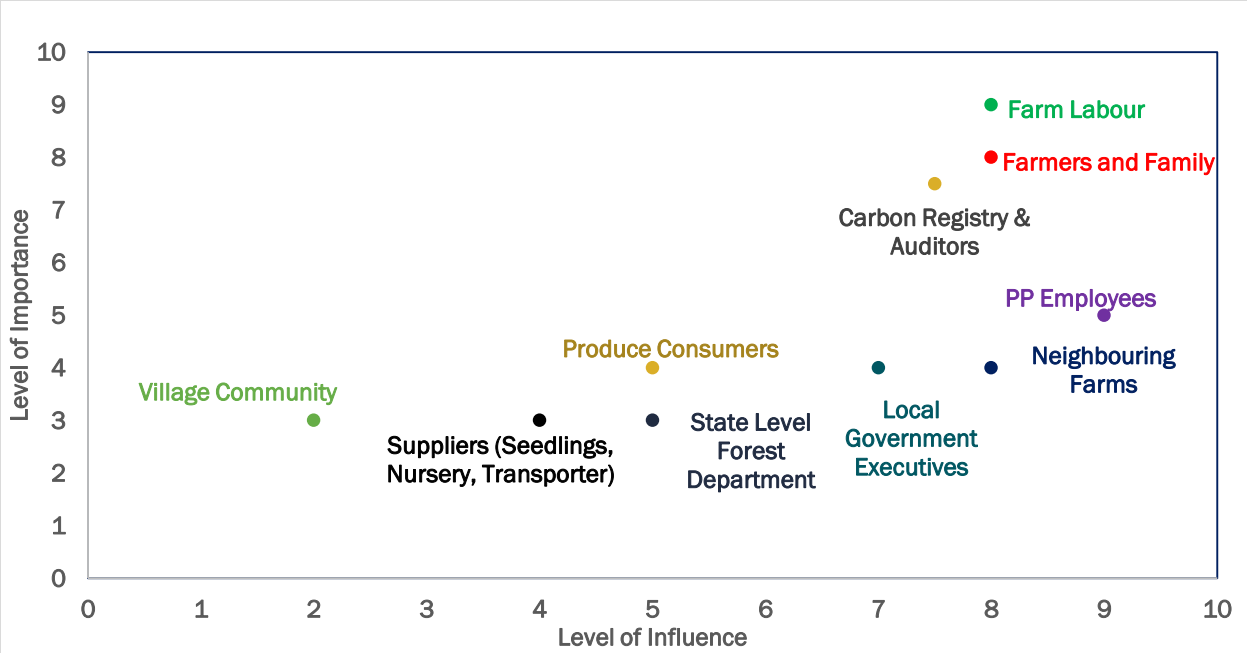
As such, impact of Project Activity on stakeholder outside the boundary of Project Activity is insignificant and negligible on account of the following:

- Acquisition of Land is not involved
- Community access to various resources such as water bodies, forest covers, or any other social infrastructure is unhindered
- No displacement of agriculture activities since it is an agrisilviculture practised on insignificant area of the district
- No dislocation of labour market
- No impact on local ecosystem, since the Project Activity covers insignificant area of the district
- Project Activity is taken by small farmers in disaggregated manner, hence no need of creation of large infrastructure and mobilization of resources (Labour, Land, Capital) thereof

The PP has followed the process for identification of stakeholders and their importance/influence for the Project Activity as under:

- Development of list of all parties within and outside the Project Area with likelihood of impact from the Project Activity
- Conduct discussions with identified stakeholders, specific attention paid to reduce socio-political, socio-economical, educational, mobility, barriers in articulation of concerns by various stakeholders
- Discussions with PPs Social, Legal and Governance expert to ensure concern/issues of vulnerable and disadvantage groups such as farm labour or any other stakeholder having challenges in communicating/articulating their views.

The PP has thus identified and mapped the relevant stakeholders with level of importance and influence as under:



2) Identification of any legal or customary tenure/access rights to territories and resources, including collective and/or conflicting rights, held by local stakeholders;

- Land owners and their legal or customary tenure / access to territories and resources can be identified by proper verification of land-holding documents. This may involve checks of land record documents like 7/12 extracts (in MH), and other similar documents in other states, with relevant government agencies like land record (revenue) department, forest department, etc.

- Legal customary tenure/access rights to resources- The PP has adequate and sufficient rights through legally binding contracts in respect of following resources
    - Seedling Procurement
    - Hardening Centre
    - Transporters
    - PP Man-power
    - PP Office Space

    All contractual agreement entered into by PP are in compliance with local laws and regulations and follow principle of good faith, reasonableness, efficacy, fair dealing, and at all times, endeavour to preserve the spirit and intent of the agreement by behaving consistently, cooperatively and providing necessary information in a timely and transparent manner.

    The Project Activity is spread over 25,000 distinct land parcels across, 65 districts (defined by Government of India, as on 28 June 2019, Project Start date and shall include

split/bifurcation, regrouping, renaming as may be carried out by Government of India from time to time), in five States of India. Such distribution acts as a natural hedge and reduces risk associated with territory or resources.

- Any collective and/or conflicting rights against the legal rights to land parcels is identified through internal legal team before admission of farmer in the Project Activity. PPs internal Legal team scrutinizes the land record documents as under:

  - Details and particulars as to location, measurements, area of the property. Also confirmed by local representative of PP.
  - Owner of the property whether it is individual, company, trust, or other legal person. Assess how the legal personality of the owner will impact on the title of the property.
  - Nature of the right of the Owner, if it is absolute in terms of enjoyment, possession and disposal or not.
  - Any charge or dues or lien on the property.
  - Check whether property is subject to mortgage.
  - Any kind of encumbrances upon the property for example unpaid tax mortgages, unpaid loans etc.
  - Any third party interest on the property.
  - Any ongoing litigation or if it is in the process of acquisition.

3) A description of the social, economic and cultural diversity within local stakeholder groups and the differences and interactions between the stakeholder groups;

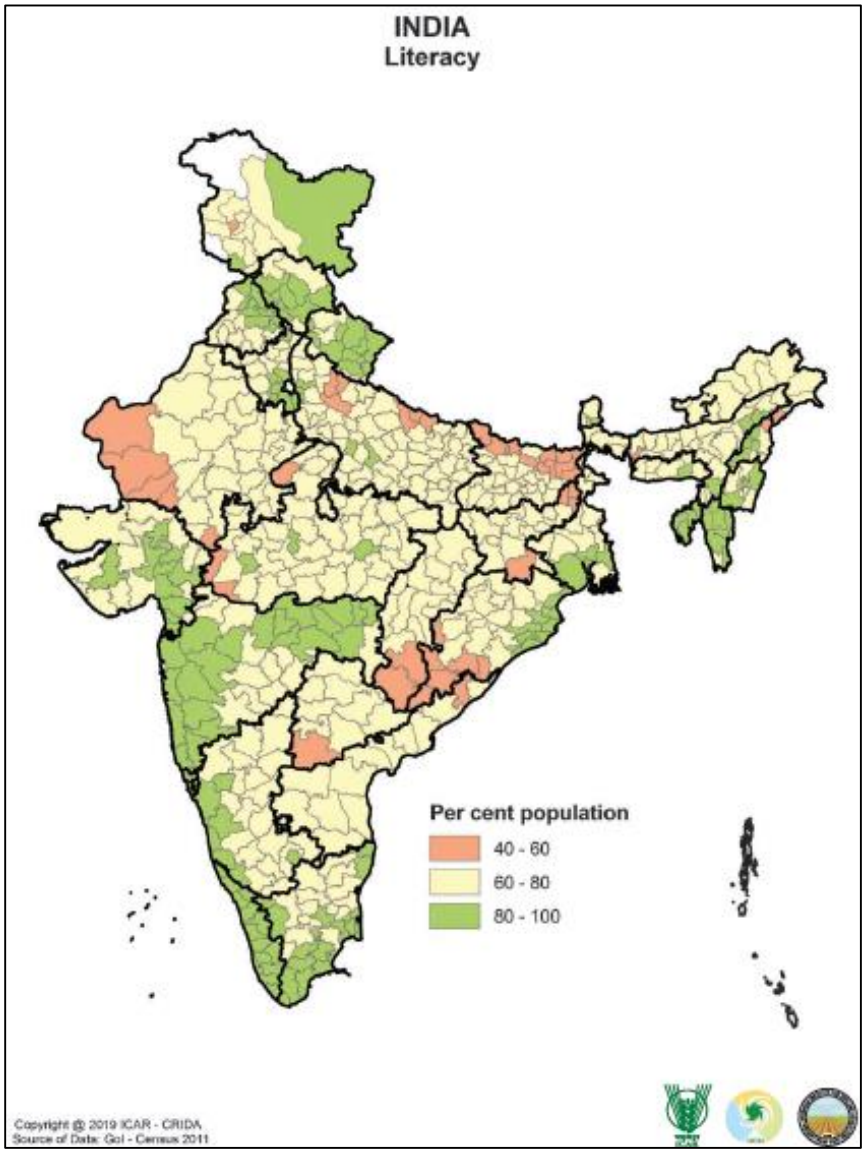
Like many large tropical countries, India is characterized by a complex mosaic of distinct agro-ecosystems, differentiated by their climatic, soil, geological, vegetational, and other natural features. A recent classification by the National Bureau of Soil Survey and Land Use Planning distinguishes 20 broad agro-ecological zones, separated by natural features and crop growing periods. Each of these agro-ecological zones is in turn comprised of myriad micro-habitats.

Over generations, Indian farmers have continuously adapted and modified the rich genetic material available to them from nature.

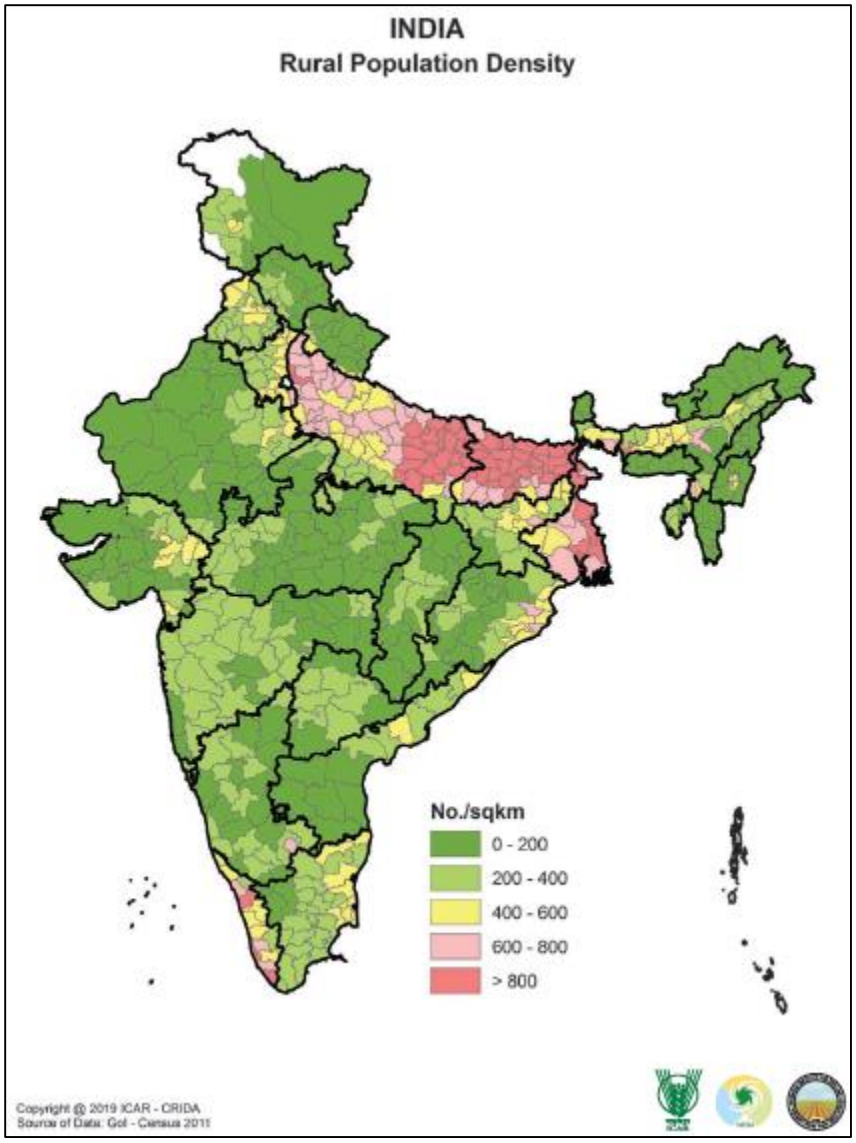
Social Diversity:

Social factors affect farming in a number of ways. The type of farming practiced, be it shifting cultivation, subsistence farming, extensive cereal cultivation or mixed farming, etc., is always related to regional social structure. Social factors can also affect the type of crops that are grown. The following factors contribute to social diversity amongst the stakeholder

- Education: Farmers need to stay aware of latest developments in farm practices and an array of other skills that improves agricultural operations. Literacy level of rural household in the Project Activity area is more than 60% of the population as shown under:



- Population growth**:** As the world's population increases the need for land for agriculture grows: land to grow crops and land for pasture. Typically, in the Indian context, large land holdings tend to be reduced into smaller and smaller land parcels with each generation of farmer families. Below figure indicates homogenous population density in the Project Activity area:



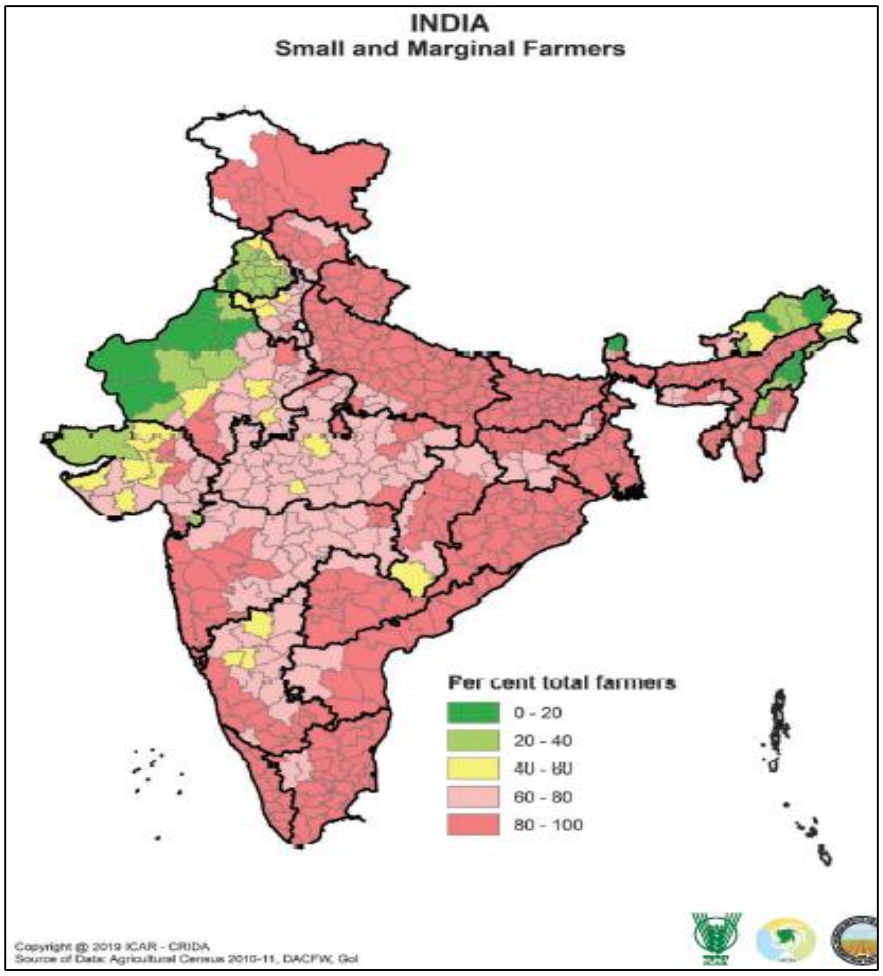
- Political Factors: Political factors also play a vital role in agricultural development and the social diversity in various farmer groups. The significant population under Project Area is agriculture dependent, hence political groups are pro-farmers and pro-agriculture.
- Government policy: Government policies will have a direct or indirect effect on the prevalent agricultural system. Farmer groups have to keep adapting to various reforms and changes in government policies from time to time. These reforms and policies affect different farmer groups differently. All the states involved in the Project Activity have pro agro forestry policies stressing on increasing the tree outside forest area.

Economic Diversity:

Land holding, ownership, mechanization, cropping pattern and allied infrastructure contribute to the economic diversity of the stakeholders:

- Nature of land ownership: Generally, two types of land-holdings are prevalent across different farming communities in India: Private (belonging to an individual, family, private company or cooperative) / Collective (belonging to a community, tribe, municipality, state, etc.). The Project Activity involves only privately owned land parcels.

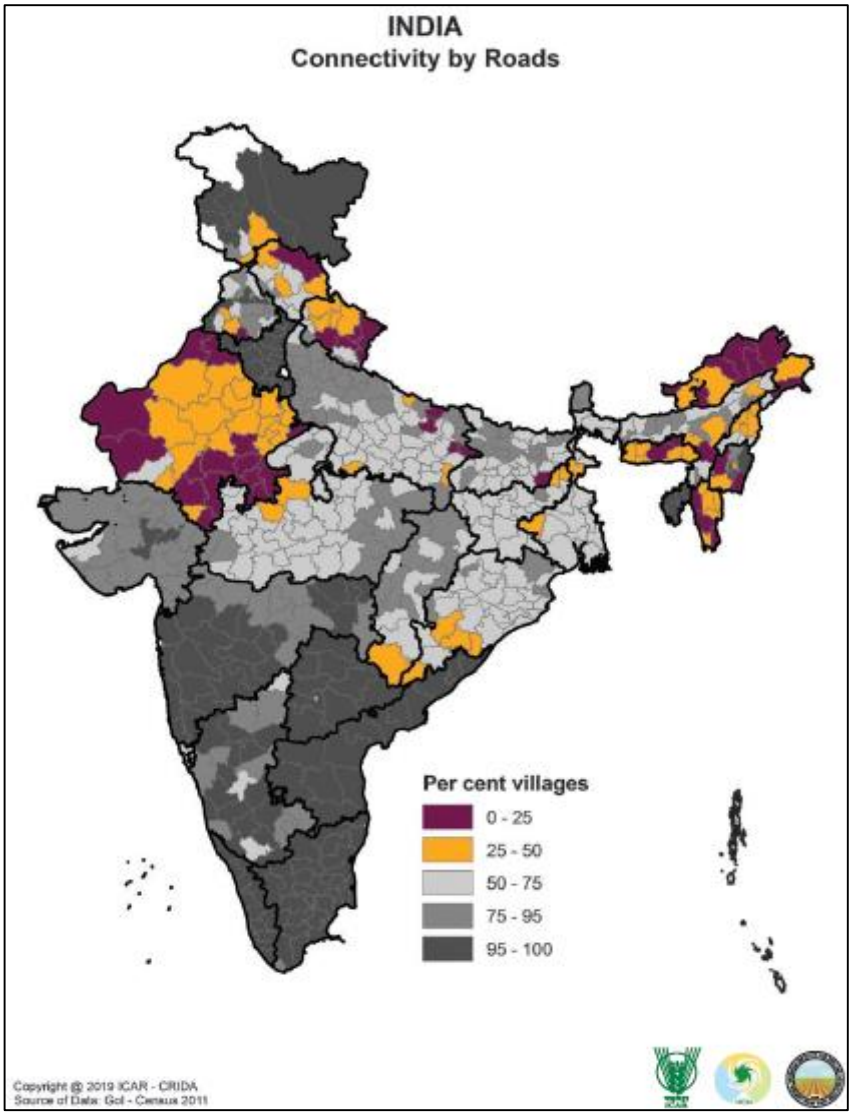
- Size of land holding: Efficiency of agricultural operation and its economic benefits depend on the size of landholding of the farmers. The size of landholding decides the degree of economic risk that a farmer may be able to bear. Households in India are broadly classified into different categories as <0.5 Ha., 0.5 – 1 Ha., 1-2 Ha., 2-5 Ha., 5-10 Ha. and >10 Ha. The Project Activity includes farmers with small land holding (average less than 0.5 hectare in first Project Instance), whose current source of income is from marginal farming activities which gets affected due to change in climate conditions. The Project Activities is expected to generate additional stable sustainable source of income from carbon credits and Produce. Below map depicts the homogenous composition of small and marginal farmers (above 60% of total farmers) in the Project Activity Area

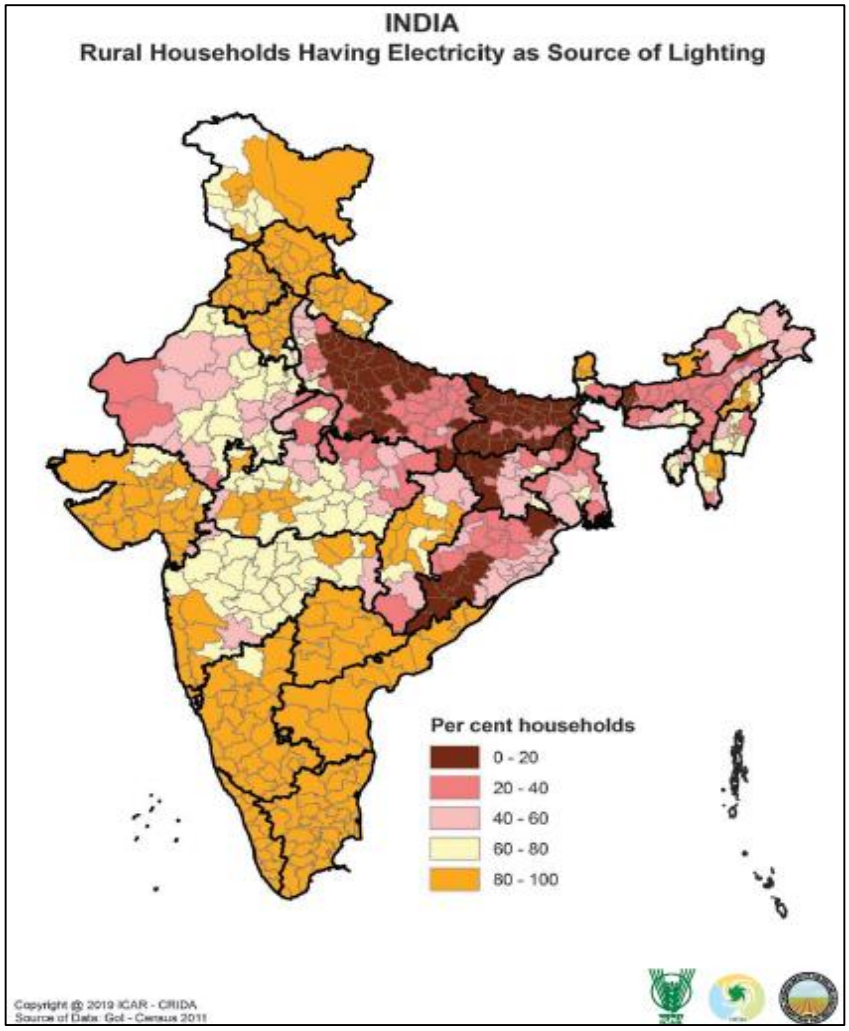


- Mechanization: Mechanization or access to it, is also an important factor that causes economic diversity in various farming groups of India. The technological changes including the use of modern hand tools, animals drawn implements, tractors, thrashers and more economic patterns of farm management play a vital role in the selection of crops grown and decision-making at the farm level. These changes help in improving the crop yields and thus the economic status of farmers. The Project Activity entails low level of mechanization during plantation and cultivation phase. Mechanization required for the harvesting of the Produce is being facilitated by the PP.

- Supply of Labour: The availability of labour, its quantity and quality at the periods of demand have great influence on the agricultural land use and decision making process of the farmer, ultimately affecting economic status. Since the Project Activity is an agrisilvicutlure system wherein farmer is carrying out plantation along with its traditional crops. As such there is no incremental requirement of labour for the Project Activity.

- Infrastructure**:** Access to transport, Electricity and communication facilities is an important factor in determining location of farm types. Efficient Infrastructure ensures market accessibility for farm produce and thus impacts the socio-economic status of the farmer. Project Activity is being carried out in the five states wherein the infrastructure (Road and Electricity) is in upper quartile of the country. The following maps depicts the status of Road and Electricity network in the Project Area:


INDIA
Connectivity by Roads
Per cent villages
0 - 25
25 - 50
50 - 75
75 - 95
95 - 100
Copyright @ 2019 ICAR - CRIDA
Source of Data: GoI - Census 2011



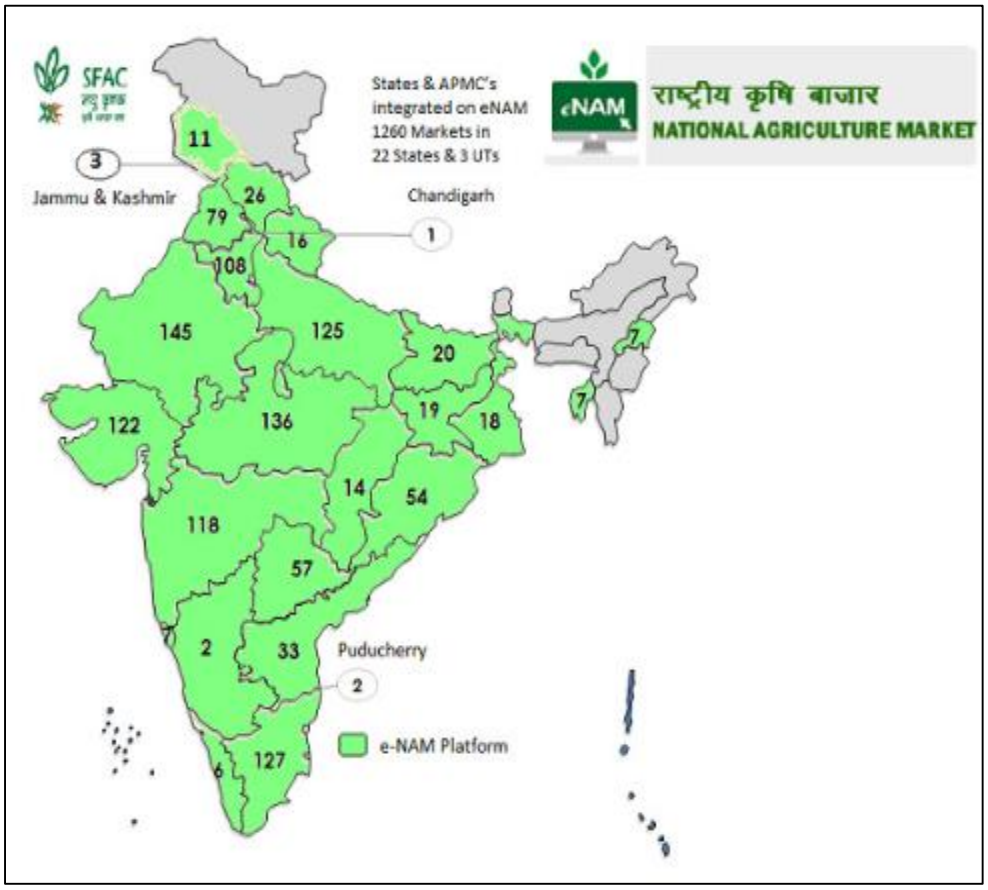
- Market (Demand of Agricultural Crops): Market places are the fundamental focal points of socio-economic life. Marketing is one of the stimulating factors for the development of agriculture. Commercial crops (or "Cash Crops") can be produced if good marketing and transport facilities are available to the farmers. PP shall be facilitating the market linkages for the sale of Produce from the Project Activity.

  The total number of Agricultural Produce Market Committee (APMC), for the purpose of regulation of marketing of notified agricultural produce and livestock in physical, electronic or other such mode, in the Project Activity states are as under:

S.No.	States	No. of APMCs (Principle Market Yard)	No. of APMCs (Sub-Market Yard)	Total APMCs
1	Maharashtra	306	596	902
2	Madhya Pradesh	257	288	545
3	Karnataka	162	351	513

4	Gujarat	224	176	400
5	Telangana	150	110	260

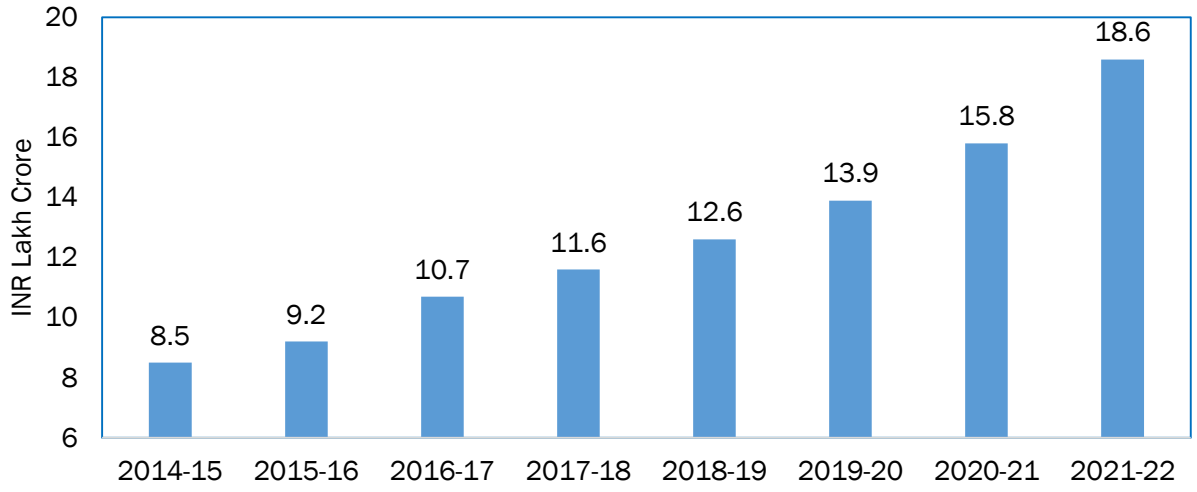
In addition to above, Ministry of Agriculture and Farmers Welfare, Government of India, is operating e-National Agriculture Market (e-NAM) is a Pan-India electronic trading portal which networks the existing APMC mandis to create a unified national market for agricultural commodities. Currently there are 1260 eNAM, out of which total of 435 eNAM falls under the Project Activity area.



- **Agricultural Loans and Insurance:** Agriculture finance and agricultural insurance are strategically important for eradicating extreme poverty and boosting shared prosperity. To ensure that the farmers pay a minimal interest rate to the banks, the Government of India has introduced the Interest Subvention Scheme (ISS), now renamed Modified Interest Subvention Scheme (MISS), to provide short-term credit to farmers at subsidised interest rates.

As of 30 December, 2022, banks issued Kisan Credit Cards (KCC) to 3.89 crore eligible farmers with a KCC limit of ₹ 4,51,672 crore.

Below graph[36] indicates the continued increase in Institutional credit to agriculture sectors:



Below table[37] depicts the Agriculture credit issued by the Commercial Banks of India in the past 5 years in the states falling under the Project Area:

Agriculture Credit (INR Mn.)					
States	**2018**	**2019**	**2020**	**2021**	**2022**
Maharashtra	9,27,000	12,84,320	9,62,500	10,29,000	11,15,470
Madhya Pradesh	6,59,000	7,18,560	7,33,200	8,15,060	9,20,380
Karnataka	10,09,000	10,13,100	10,39,720	12,11,960	13,72,410
Gujarat	5,71,000	6,09,440	6,33,490	7,07,230	7,41,340
Telangana	5,90,000	7,05,940	6,73,210	7,96,890	10,06,450

Cultural Diversity:

The cultural description[38] of the states in Project Activity Area are as under depicting multiple similarities among the five states:

States	Food	Dress	Language	Festivals	Performing Arts (Music)
Maharashtra	Vada Pav, Puran Poli	Men-Dhoti Women-Saree	Marathi, Hindi	Ganesh Chaturthi, Diwali	Natya sangee and Folk Music

[36] https://www.indiabudget.gov.in/economicsurvey/doc/echapter.pdf

[37] https://m.rbi.org.in/Scripts/AnnualPublications.aspx?head=Handbook%20of%20Statistics%20on%20Indian%20States

[38] https://ncert.nic.in/pdf/publication/otherpublications/Unity_cultural.pdf

Madhya Pradesh	Poha,Bhutte ki kees	Men-Dhoti and Safa Women-Lehenga and Choli	Hindi	Mahashivratri, Diwali	Kalgiturra and Folk music
Karnataka	Rice, Coffee	Men-Dhoti Women-Saree	Kannada, Hindi	Ugadi, Diwali	Carnatic and folk music
Gujarat	Gujarati Platter, Dhokla, Rice	Men - chorno and kediyu Women -chaniyo and choli.	Gujarati, Hindi	Navratri, Diwali	Classical and folk music
Telangana	Biryani	Men - Lungi Women -Saree	Telugu, Hindi	Ugadi, Diwali	Carnatic and Folk music

4) Any significant changes in the makeup of local stakeholders over time;

The Project Activity being intergenerational activity, stakeholder makeup is likely to change on account of urbanization, technology penetration, climate change, and education. The PP shall continually monitor and inculcate these changes in its operating procedures, organizational makeup, communication strategies, in consultation with social sector expert, subject expert, to suit sensitivities of changed stakeholders makeup. PP expects the following changes to the makeup of the local stakeholders over the time:

Stakeholders	2019-2025	Import-ance Level(%)	2035-2040	Import-ance Level(%)	2050 Onwards	Import-ance Level(%)
Farmers	A. Subsistence Driven Traditional Cropping B. Low Educational Levels C. Low Gender Equality (Lower Women Participation in farming activities) D. Economically Disadvantaged E. No or Low Mechanization F. Demographic Pressure on Land Fragmentation	55%	A. Improved Farming Methods B. Improved Educational Levels of 2nd Generation C. Improve Gender Equality (Higher Women Participation in farming activities) D. Economically Better of E. Improved Mechanization F. Stabilized Land Fragmentation	50%	A. Precision Farming/Drone Application B. Knowledge of Carbon/Sustainability Market C. Achieving Gender Equality D. Economically Sustainable and Stable E. Low/No Land Fragmentation	60%
Labour	A. Low Rural Employment Opportunities B. Low/No Access to Formal Education	10%	A. Higher Rural Employment Opportunities with Improved wages B. Increased Access to Formal Education	5%	A. Improved Standards of Living B. Access to higher Education	5%
Neighbour	A. Subsistence Driven Traditional Cropping B. Low Educational Levels	5%	A. Improved Farming Methods B. Improved Educational Levels of 2nd Generation	2%	A. Improved Farming Methods B. Access to higher Education	2.5%
Village Community	A. Lower Access to Quality Social Infrastructure (Education, Healthcare, Power) B. Lower Access to Mobility and Communication	5%	A. Improved Access to Quality Social Infrastructure (Education, Healthcare, Power) B. Improved Access to Mobility and Communication	2%	A. Improved Access to Quality Social Infrastructure (Education, Healthcare, Power) B. Increased Access to Decarbonized Mobility and Communication	2.5%

Stakeholders	2019-2025	Import-ance Level(%)	2035-2040	Import-ance Level(%)	2050 Onwards	Import-ance Level(%)
	C. Migration due to Urbanization		C. Decreased Migration due to Urbanization		C. Low/No Migration due to Urbanization	
PP employees	A. Professionally Qualified B. Lower Access to AI based Monitoring tools	10%	A. Professionally Qualified B. Access to AI based Monitoring tools	6%	A. Advanced Expertise B. AI based Monitoring	10%
Suppliers (Seedlings, Fertilizers, Pesticides, Seeds)	A. Fulfil necessary and sufficient requirements for Supply of goods and services B. Lack of Quality Logistics Ecosystem	10%	A. Certified Quality Management System Driven Supply of goods and services B. Improved Quality Logistics Ecosystem	10%	A. Certified Quality Management System Driven Supply of goods and services B. Decarbonized Logistics Ecosystem	10%
Local Government	A. Lack exposure to quality governance frameworks	5%	Improved governance frameworks	5%	Improved governance frameworks	5%
Produce Consumers	Not Applicable	0%	Development of Ecosystem	10%	Developed Ecosystem	3%
Processing Industry	Not Applicable	0%	Development of Processing Industry and Supply chain	10%	Developed Processing Industry and Supply chain	2%

5) The expected changes in well-being and other stakeholder characteristics under the baseline scenario, including changes to ecosystem services identified as important to local stakeholders

The implementation of the Project Activity expects the improvement of well-being, economic growth and productive employment opportunities from the baseline scenario elaborated below:

Good Health and Well Being

- Implementation of Project Activity enhances the microclimate thereby improving the air quality and human well-being. Mahogany emits significant amounts of the DMS, improving regional air quality and climate
- Improve soil quality by effusion of essential nutrients from sub-soil layers to surface layers. Arresting Soil Erosion thereby reducing Suspended Particulate Matters (SPM) in air.

Economic Growth and Productive Employment

- The Project Activity involves the creation of employment and enhancement of work profile of the local skilled and un-skilled resources.

- Work profile includes the implementation of QMS based Agro-forestry programmes through digital monitoring of processes which gives diverse exposure of ISO systems, SDGs advanced silviculture practices, bio-based fertilization and pest management, scientific data collection and analysis. Web-based tools and social media for improving farmer communication

6) The location of communities, local stakeholders and areas outside the project area that are predicted to be impacted by the project; and

Project Activity is undertaken on 0.055% of the average district net sown area and ranges from 0.1% to 5.5% of the average village net sown area.

As such, impact of Project Activity on stakeholder outside the boundary of Project Activity is insignificant and negligible on account of the following:

- Acquisition of Land is not involved
- Community access to various resources such as water bodies, forest covers, or any other social infrastructure is unhindered
- No displacement of agriculture activities since it is an agrisilviculture practised on insignificant area of the district
- No dislocation of labour market
- No impact on local ecosystem, since the Project Activity covers insignificant area of the district
- Project Activity is taken by small farmers in disaggregated manner, hence no need of creation of large infrastructure and mobilization of resources (Labour, Land, Capital) thereof

However, PP through its Stakeholder Response Team and local representatives engages with the local communities, government officers, neighboring farmers outside the Project Area.

7) The location of territories and resources which local stakeholders own or to which they have customary access

The identified local stakeholders to which they own or have customary access are tabulated below:

Stakeholder	Territories	Resources
Farmers	Privately Owned Land Parcels	Water Wells, Drip Irrigation, Market Access for Fertilizers, Manure, seeds, Plantation and cultivation Tools within 50 km radius. Availability of Manual Labour required for plantation and cultivation activities.

Stakeholder	Territories	Resources
		Access to Local Government Institutions for Loan and related activities within 5 to 50 km (Village to District Level)
Labour	Farm Land as wage labour	Transport medium to reach Farm land Parcel. Protective gear for conducting various activities, provided by farmer. Social Infrastructure in nearby village/block/district level within 5 to 50 km
Neighbours	Privately Owned land with shared boundary of the Project Area	Common Access to land parcels and if any, canal linkage water resources
Village Community	Common Social Infrastructure	Common Access to Social Infrastructure, Roads, Waters, Power, Education, healthcare
PP employees	PP Office Space	Office space, Commuting for Project Activity purpose, social infrastructure for families
Suppliers (Seedlings/ Hardening Centre/Trans porters)	Lands owned or leased by respective suppliers	Common Access to land parcels. Vehicles and labour required for transportation of seedlings
Local Government Executives	Local Government Administrative Setups	Common Access to Social Infrastructure, Roads, Waters, Power, Education, healthcare
Produce Consumers	Lands owned or leased by Consumers	Common Access to land parcels. Vehicles and labour required for transportation of Produce

Risks to local stakeholder resources due to project implementation and its mitigation:

Local stakeholder resources identified are tabulated in the below table:

Stakeholder Resources	Risk	Mitigation
Land (Nursery/Hardening Centre/Land Parcels)	No Risk - Since, there is contractual agreements with Nursery and Hardening centre, no risk to resources is identified due to implementation of Project Activity	Not Applicable
Water wells, Drip Irrigation	No Risk - Annually Swietenia macrophylla required around average of 1.12 Litres per day per tree for 15 years. This requirement of water can	Not Applicable

Stakeholder Resources	Risk	Mitigation
	be easily accommodated by the farmer and hence shall not burden water wells or drip irrigation.	
Organic Manure, Fertilizers, Pesticides	No/Low Risk - Since the farmers shall be applying organic fertilizers, there stands a low or minimal risk associated with the purchasing cost and health	PP shall be creating a linkage with Bio-fertilizer manufacturers to procure directly at low cost for the farmers to eliminate the risk. Use of protective gears during use of herbicides/fertilizer application
Vehicle for Transportation	Low Risk - Major stakeholder involves who utilizes vehicle due to implementation are the Seedlings transporter and PP employee	PP shall be monitoring the SOPs created for not utilising the transportation vehicles which are declared unfit and mandate the transporter to use safety precautions. HR SOP is in place to monitor the PPs employee commute to office and return
Social Infrastructure (Education, Healthcare, Water, Power)	No risk – There shall be no impact on social infrastructure due to the implementation of the project Activity	Not Applicable

Risks to local stakeholder resources due to project implementation and how the project will mitigate such risks, including the plans to ensure the project will not impact local stakeholder's property rights without the free, prior and informed consent.

The Project Activity does not involve any resources belonging to the local stakeholders other than land parcel privately owned by the farmer who is participating in the project for carrying out plantation in agricsilviculture system

In addition to the above risks identified for local stakeholder resources with mitigation, following measures are taken to ensure there is be no impact on local stakeholder property rights:

- Project Activity Land Parcel: All the Project Activity land parcels are privately owned by the farmers and Project Activity does not create any right in respect of the said land parcel. Further, before admission of any land parcel privately owned by the farmer, PP undertakes various processes of

engagement (as detailed in Section 1.11 in this document) with the farmer to ensure free and informed participation of the farmer.

- Hardening Centre: Procurement of land is done by way of lease, instead of acquisition and farmer family manages operation of hardening centre thereby keeping ownership of land with farmers simultaneously generating income. The same method shall be adopted for procurement of land for storage facility of Produce. Contractual Agreements for hardening centre and ensuring same agreements for storage facility of Produce in future. Before finalization of any arrangement with hardening centre, PP undertakes various processes of engagement with the owners to ensure free and informed participation.

Processes to ensure ongoing communication and consultation with local stakeholders, including a grievance redress procedure to resolve any conflicts which may arise between the project proponent and local stakeholders.

PP has formed a stakeholder response team comprising of the Forest, Environment, Legal, Governance, Regulatory Expert, Farmers Representative, Carbon Expert, approved by the Board of Directors of the PP to ensure transparent, impartial and culturally appropriate communication with stakeholders. Stakeholder Response Team presents its findings in respect of governance, regulatory changes, edapho-climatic analysis, analysis of local stakeholder meetings to the management on regular basis. The committee also recommends the changes required to be made to Operating Procedures for efficient implementation of the Project.

The grievance mechanism includes the following:

- Multiple avenues for stakeholders to submit grievances, which includes submissions in person, by Grievance Register available with each participatory farmer as checked by PP team on regular basis, phone, text message, social media platforms, mail, e-mail or via a website;
- A repository of grievances is maintained as a database in head office of the PP;

Key features of the grievance mechanism are as follows:

- Transparency about the grievance procedure, governing structure, and decision makers;
- The grievance mechanism is expected to address concerns promptly and effectively, in a transparent manner that is culturally appropriate and readily accessible to all project-affected parties, at no cost and without retribution.
- The PP will inform the project-affected parties about the grievance process in the course of its community engagement activities, and will make publicly available a record documenting the responses to all grievances received; and

- Handling of grievances will be done in a culturally appropriate manner and be discreet, objective, sensitive, and responsive to the needs and concerns of the project-affected parties. The mechanism will also allow for anonymous complaints to be raised and addressed.
- The grievance mechanism sets out indicative time frames for acknowledgment, interim responses, and, where possible, final resolution of grievances.
- All grievances to be treated confidentially, impartially, objectively, and in a timely manner.
- Users of a grievance mechanism may not be subject to retaliation, abuse, or any kind of discrimination.
- The PP has qualified staff to implement and monitor stakeholder engagement activities and, if necessary, supplements the staff with external expert assistance

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

The CDM consolidated methodology AR ACM0003[39]: Afforestation and reforestation of lands except wetlands Version 02.0 is applied.

- Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project activities (Version 1.0)
- Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity (Version 4.0)
- Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities (Version 3.1)
- Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities (Version 4.2)
- Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity (Version 2.0)
- Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities (Version 1.1.0)

[39] https://cdm.unfccc.int/methodologies/DB/C9QS5G3CS8FW04MYYXDFOQDPXWM4OE

3.2 Applicability of Methodology

Applicability Criteria AR-ACM0003	Evaluation
a) The land subject to the project activity does not fall into the wetland category.	The area in which the Project Activity and First Project Activity Instance is situated is not classified as a wetland.
(b) Soil disturbance attributable to the project activity does not cover more than 10 per cent of area[2] in each of the following: types of land, when these lands are included within the project boundary	Soil disturbance attributable to the project will in no case cover more than 10% of the total surface.
(i) Land containing organic soils (ii) Land which, in the baseline, is subjected to land-use and management practices and receives inputs listed in appendices 2 and 3 to this	The land on which the plantation has been established does not contain organic soils. The soils of the initial project instances and the grouped project area were classified according to the procedures of the Intergovernmental Panel on Climate Change (IPCC) utilizing soil maps, vector files and maps, soil classification. Any of the selected areas will undergo, under baseline conditions, land use or management practices described in appendices 2 and 3.
The project activity applying this methodology shall also comply with the applicability conditions of the tools contained within the methodology and applied by the project activity.	The Project Activity and First Project Activity Instance applied to this methodology is also complied with tools as mentioned in section 3.1.

Applicability Criteria for tools under AR ACM0003 methodology

Tool	Applicability Conditions	Evaluation
Combined tool to identify the baseline scenario and demonstrate	Forestation of the land within the proposed project boundary performed with or without being registered as the A/R CDM project	Refer section 1.14 herein, which enumerates that the Project Activity and First Project Activity Instance is in compliance with all local laws

additionality in A/R CDM project activities (version 1.0)	activity shall not lead to violation of any applicable law even if the law is not enforced.	and regulations and does not lead to violation of any applicable law, even if the law is not enforced. In fact the Project Activity and First Project Activity Instance being agroforestry is promoted by various national and state policy as detailed in section 1.14 herein above
	This tool is not applicable to small - scale afforestation and reforestation project activities	The First Project Activity Instance being part of the Project Activity is a large scale Project as the Project Activity leads to sequestration of more than 16,000 tons of CO_2 per year as per the CDM Methodology Booklet[40]
Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity (Version 04.0.0)	The tool is applicable to all occurrence of fire within the project boundary	As mentioned in section 5.2 herein, the farmers involved in the Project Activity and First Project Activity Instance is not using burning of biomass or fire for site or land preparation.
	Non-CO2 GHG emissions resulting from any occurrence of fire within the project boundary shall be accounted for each incidence of fire which affects an area greater than the minimum threshold area reported by the host Party for the purpose of defining forest, provided that the accumulated area affected by such fires in a given year is ≥5% of the project area.	As mentioned in section 5.2 herein, the Project Activity and First Project Activity Instance is not: i. using fire for site preparation ii. using fire to clear the land of harvest residue prior to replanting of the land iii. subjected to fire risk, as detailed in Non-Permanence Risk Report
Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities (Version 03.1)	No Internal Applicability Conditions	The PP has not considered the change in carbon stocks in dead wood and litter. Hence not applicable.

[40] https://cdm.unfccc.int/methodologies/documentation/meth_booklet.pdf

Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities (Version 04.2)	No Internal Applicability Conditions	PP has used the tool for estimation of carbon stocks for the Trees.
Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity (Version 02.0)	This tool is not applicable if the displacement of agricultural activities is expected to cause, directly or indirectly, any drainage of wetlands or peat lands	The Project Activity does not lead to any displacement of agricultural activities, hence not applicable.
Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities (Version 01.1.0)	This tool is applicable when the areas of land, the baseline scenario, and the project activity meet the following conditions: (a) The areas of land to which this tool is applied: (i) Do not fall into wetland1 category; or (ii) Do not contain organic soils as defined in ìAnnex A: glossaryî of the IPCC GPG LULUCF 2003; (iii) Are not subject to any of the land management practices and application of inputs as listed in the Tables 1 and 2; (b) The A/R CDM project activity meets the following conditions: (i) Litter remains on site and is not removed in the A/R CDM project activity; and (ii) Soil disturbance attributable to the A/R CDM project activity, if any, is: • In accordance with appropriate soil conservation practices, e.g.	PP has not considered the change in carbon stock due to soil organic carbon in the Project Activity and First Project Activity Instance. Hence not applicable.

	follows the land contours; • Limited to soil disturbance for site preparation before planting and such disturbance is not repeated in less than twenty years.	

3.3 Project Boundary

The proposed Project Activity involves multiple scattered small parcels of land spread across five states of India mentioned in section 1.12. Total proposed coverage of the Project Activity is 15,000 hectares of land, expected to involve 30,000 farmers.

The first Project Activity Instance covers 165.41 hectares of land parcels involving 315 farmers across 21 districts in Maharashtra, Karnataka and Telangana states in India. The KML file is attached separately.

Source		Gas	Included?	Justification/Explanation
Baseline	Above Ground Biomass	CO_2	Yes	CO_2 emissions from removal of preexisting vegetation are conservatively considered
		CH_4	No	Pre-existing vegetation is not slashed nor burned
		N_2O	No	Pre-existing vegetation is not slashed nor burned
		Other	-	
	Below Ground Biomass	CO_2	Yes	CO_2 emissions from removal of preexisting vegetation are conservatively considered
		CH_4	No	Pre-existing vegetation is not slashed nor burned
		N_2O	No	Pre-existing vegetation is not slashed nor burned
		Other	-	
Project	Above Ground Biomass	CO_2	Yes	This is the major carbon pool of the Project Activity and First Project Activity Instance
		CH_4	No	Biomass in project scenario is not slashed nor burned

Source	Gas	Included?	Justification/Explanation
	N_2O	No	Biomass in project scenario is not slashed nor burned
	Other	-	
Below Ground Biomass	CO_2	Yes	This is the major carbon pool of the Project Activity and First Project Activity Instance
	CH_4	No	Biomass in project scenario is not slashed nor burned
	N_2O	No	Biomass in project scenario is not slashed nor burned
	Other	-	

3.4 Baseline Scenario

The eligibility requirement for land parcels to be part of the Grouped Activity is as under:

- No native forest for the past 10 years prior to the plantation date
- No wetland
- Land must be used either for cropping, or should be barren, fallow

The First Project Activity Instance covers 165.41 hectares of small land parcels in 21 districts across three states (Maharashtra-MH; Karnataka-KA; Telangana-TL) in India.

Project Activity is targeted at 15,000 hectares of multiple scattered small land parcels across five states (Maharashtra-MH; Madhya Pradesh-MP; Karnataka-KA; Gujarat-GJ;Telangana-TL) in India. The tentative area across five states is as under:

State	Area (%)	State wise Area (ha)	Major Crops[41]	Net Sown Area (000'ha)[42]	Coverage of Plantation (%)
MH	70	10,500	Sugarcane, Food Grains	16,815	0.062%
MP	15	2,250	Wheat, Food Grains, Pulses	15,205	0.015%
KA	10	1,500	Rice, Sugarcane	10,664	0.014%

[41] https://rbi.org.in/Scripts/PublicationsView.aspx?id=21120

[42] https://www.rbi.org.in/Scripts/PublicationsView.aspx?id=21443

GJ	2.5	375	Cotton, Sugarcane, Food grains	9,390	0.004%
TL	2.5	375	Cotton, Food grains, Rice	4,660	0.008%
Total	**100**	**15,000**		**56,734**	**0.026%**

The land parcel involved in the Project Activity and First Project Activity Instance undertake Mahogany Plantation along with the following activities:

- Traditional cropping such as cultivation of rice, wheat, paddy, maize, cotton, sugarcane, soyabean, cotton, and vegetables. These activities are seasonal having 90-180 days cycle wherein biomass oscillates between a minimum and a maximum value every 90-180 days. Hence, as per AR-Tool 14 for Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities, version 4.2, clause 5. 12(f), the carbon stock and change in carbon stock is accounted as zero.
- Cultivation of fruits such as citrus, pomegranate, guava, custard apple. In such cases, carbon inventory includes solely the Mahogany plants and no other biomass from cultivation of fruits are considered. Hence, as per AR-Tool 14 for Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities, version 4.2, clause 5.11 (c), the carbon stock and change in carbon stock is accounted as zero

3.5 Additionality

The Project Activity and the First Project Activity Instance involving Plantation of Mahogany Seedlings on privately owned cropland by the individual farmers and harvesting of the Produce is in compliance with all the extant rules, regulations, guidelines and laws stipulated by State and Central Government of India. The Project Boundary performed with or without being registered as the A/R CDM project activity shall not lead to violation of any applicable law even if the law is not enforced.

Further, it may be noted that, farmers are voluntarily opting to participate in the Grouped Project Activity involving the Plantation activity and there is no mandate from Government authority.

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

If project participants claim that the afforestation or reforestation CDM project activity has a starting date after 31 December 1999 but before the date of its registration, then the project participants shall:

• Provide evidence that the starting date of the A/R CDM project activity was after 31 December 1999

The PP as a legal entity was incorporated in January 25, 2019. Incorporation certificate of PP, issued by Ministry of Corporate Affairs, Government of India, is enclosed in Annexure "5". The first plantation date is June 28, 2018 and is considered as Project Start Date.

Each land parcel is included in the Grouped Project Activity after collecting following evidences to confirm meeting all the applicability and eligibility criteria:

- Last 10 years' satellite images form the part of each Farmer Eligibility for inclusion in Project Activity and First Project Activity Instance
- Land Title/Rights Document for each land parcels which categorize the land use type and evidenced of cropping activity before plantation.

• Provide evidence that the incentive from the planned sale of CERs was seriously considered in the decision to proceed with the project activity. This evidence shall be based on (preferably official, legal and/or other corporate) documentation that was available to third parties at, or prior to, the start of the project activity.

During the local stakeholder consultation process, details of generating carbon credits through Verified Carbon Standard (VCS) using Clean Development Mechanism (CDM) was one of the key point in Agenda. The farmers were apprised about the carbon credit and economic benefits thereof. Also, PP communication with stakeholders through One to One Consultation, demonstrative presentations, distribution of leaflets and social media prominently contains economic benefits of carbon credits available to farmers as a result of participating in Plantation Project. As such carbon credits form important aspects of farmer decision making to include plantation in his traditional cropping framework for additional sustainable revenue stream.
Also, the agreement between PP and Farmer details process of carbon credits and revenue thereof for farmers. Therefore, the incentive from the planned sale of VCUs was seriously considered by the farmer in the decision to proceed with the Project Activity.

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

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

The following alternatives to the project activity will be evaluated:

- Land Use Scenario A - Continuation of the pre-project land use:

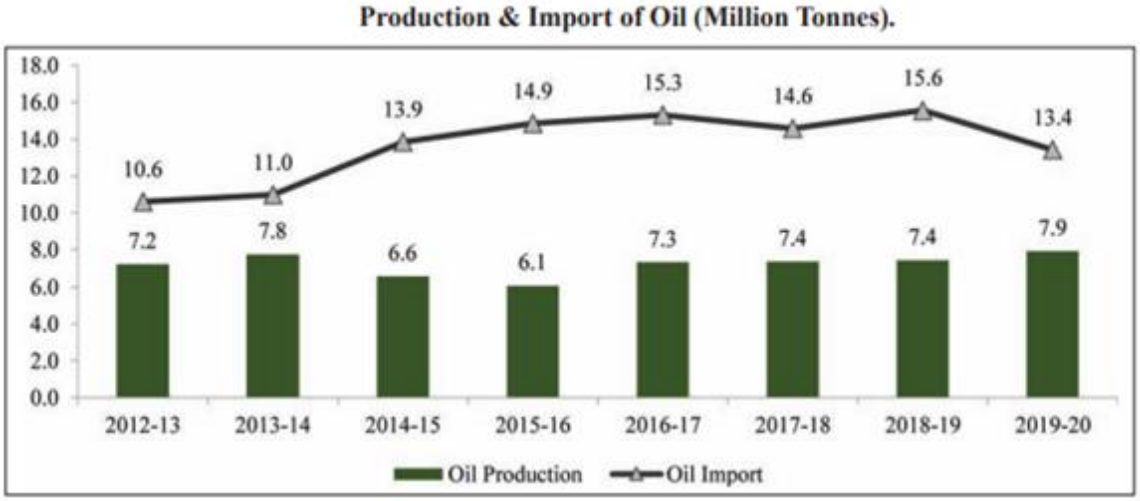
- The Project Activity that involves multiple scattered small land parcels privately owned by farmers are most likely to continue with existing /historical land use of traditional cropping. The nature of crop will be governed by prevalent support prices or other incentives announced by Government of India, crops undertaken in the vicinity of farm land, and crop economics in a particular season.
- The above land use scenario being carried out historically complies with all mandatory applicable legal and regulatory requirements
- [43]Major crop-wise State data of crop pattern with net sown area for the period from 2012-13 to 2018-19, except Madhya Pradesh (2012-13 to 2020-21):

Area in Thousand Hectares								Food Grain (% of Gross Sown Area)	Overall Production (% of Gross Sown Area)
States	Gross sown Area	Food Grains	Oil Seeds	Cotton	Sugar-cane	Fruits	Vege-tables		
Maharashtra	22,630	11,090	4,200	4,158	941	972	658	49%	97%
Madhya Pradesh	25,369	15,590	7,292	587	96	306	826	61%	97%
Karnataka	12,228	7,429	1,262	634	431	407	457	61%	87%
Gujarat	12,677	3,622	2,677	2,597	174	400	615	29%	80%
Telangana	5,717	2,926	471	1,736	37	261	163	51%	98%

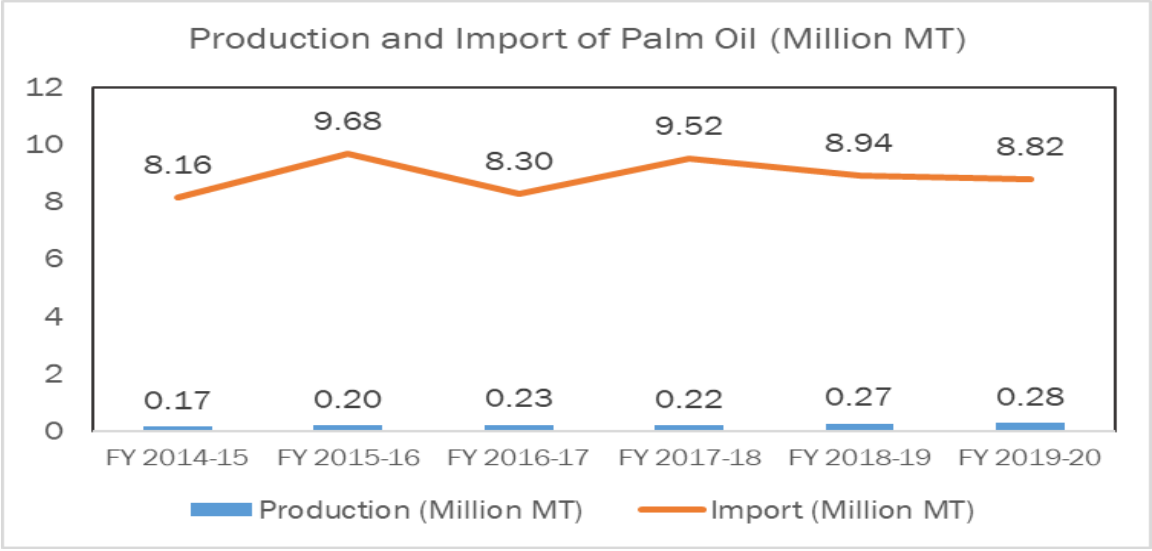
- Land Use Scenario B - Afforestation of the land with Palm Oil Plantation without being registered as the A/R CDM project activity

43 https://rbi.org.in/Scripts/AnnualPublications.aspx?head=Handbook%20of%20Statistics%20on%20Indian%20Economy

Plantation of Palm oil trees within the Project Boundary has been identified as an alternative land use scenario for the Project Area. As per the Economic Survey[44], 2021-22, released by Government of India, from FY 2012-13 to FY 2019-20, Oil import by India stood at an average of 13.6 million MT and production at 7.2 million MT.



The average Palm Oil production from FY 2014-15 to FY 2019-20 was 0.23 Million MT and import was 8.90 Million MT. It shows that there is a large scope for import substitution by promoting domestic production/cultivation of the Palm.



On November 30, 2017, Government of India launched the National Mission on Edible Oils - Oil Palm (NMEO-OP) with the aim to augment the availability of edible oil in the country by harnessing area expansion, increasing crude palm oil production for reduction of import burden.

[44] https://www.indiabudget.gov.in/economicsurvey/doc/echapter.pdf

The Reassessment Committee of Indian Council of Agricultural Research (ICAR) and Indian Institute of Oil Palm Research (IIOPR) 2020 has assessed around 2.84 million hectares' potential for oil palm cultivation for 22 states in India. Out of 2.84 million hectares assessed, 0.85 million hectares lies in the Project Area. The state wise details of the same is shown below:

State	Potential Area (million ha)	No. of Districts
Maharashtra	0.16	28
Madhya Pradesh	0.12	29
Karnataka	0.07	15
Gujarat	0.06	14
Telangana	0.44	27
Total	**0.85**	**113**

- Land Use Scenario C - Afforestation of the land with in Agroforestry system without being registered as the A/R CDM project activity

Agroforestry is a land use system, which integrates trees, shrubs on a farm land. Agroforestry can also be defined as a dynamic, ecologically based, natural resource management system that, through the integration of trees on farms and in the agricultural landscape, diversifies and sustains production for increased social, economic and environmental benefits for land users at all levels. The current Project Area falls in such an ecological range which suits the cultivation of commercial trees. Agroforestry includes systems such as Agrisilviculture, Agrihorticulture, Tree on field boundary or bunds, Silvo-pastoral, Home gardens and Trees on community/common lands.

In 2014, Ministry of Agriculture, Government of India, has launched National Agroforestry Policy, which recognizes agroforestry as an alternative to meet the target of tree cover to 33 per cent from the present level of less than 25 per cent, by Government of India, envisaged in the National Forest Policy 1988.

As per the Forest Survey of India (FSI), total forest and tree cover (Tree Outside Forest) in the year 2015 and 2021 is shown in below table:

Cover	Year 2015 Million Sq.km. / (%)	Year 2021 Million Sq.km. / (%)
Total Geographic Area India	3.287 / 100%	3.287 / 100%
Forest Cover	701,673 / 21.34%	713,789 / 21.71%
Tree Cover	92,572 / 2.82%	95,748 / 2.91%

From the above, it is evident that the forest and tree cover has increased by 0.37% and 0.09%, this becomes a credible alternative land use option.

The basic objectives of National Agroforestry Policy are to:

- Encourage and expand tree plantation in complementarity and integrated manner with crops and livestock to improve productivity, employment, income and livelihoods of rural households, especially the small holder farmers.
- Protect and stabilize ecosystems, and promote resilient cropping and farming systems to minimize the risk during extreme climatic events.
- Meet the raw material requirements of wood based industries and reduce import of wood and wood products to save foreign exchange.
- Supplement the availability of agroforestry products (AFPs), such as the fuel-wood, fodder, non-timber forest produce and small timber of the rural and tribal populations, thereby reducing the pressure on existing forests.
- Complement achieving the target of increasing forest/tree cover to promote ecological stability, especially in the vulnerable regions.
- Develop capacity and strengthen research in agroforestry and create a massive people's movement for achieving these objectives and to minimize pressure on existing forests.

- If applicable, forestation of at least a part of the land within the project boundary of the proposed A/R CDM project at a rate resulting from:
  - Legal requirements; or
  - Extrapolation of observed forestation activities in the geographical area with similar socio-economic and ecological conditions to the proposed A/R CDM project activity occurring in a period since 31 December 1989 as selected by the PPs.

The Project Area do not form of any part of the land under forestation, resulting from legal requirement and the rate of forestation activities in the geographical area with similar socio-economic and ecological conditions to the proposed project activity and First Project Activity Instance is very low, almost nil. Hence, this scenario is not applicable.

Outcome of Sub-step 1a: Below is the list of credible alternative land use scenarios that would have occurred on the land within the project boundary of the A/R CDM project activity

- Land Use Scenario A - Continuation of the pre-project land use
- Land Use Scenario B - Afforestation of the land with Palm Oil Plantation without being registered as the A/R CDM project activity

- Land Use Scenario C - Afforestation of the land with commercial tree plantations in agroforestry system without being registered as the A/R CDM project activity

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

Current laws and/or regulations allow all the alternative land use scenario. Therefore, the identified alternatives are entirely in compliance with applicable legal and regulatory requirements, currently and in the foreseeable future.

The following are the list of such laws:

1. The Indian Forest Act, 1927

2. The Wildlife (Protection) Act, 1972

3. Water (Prevention and Control of Pollution) Act, 1974 with Rules

4. Forest (Conservation) Act, 1980

5. Environmental (Protection) Act, 1986

6. Noise Pollution (regulation and Control) Rules, 2000

All the above policies are taken into consideration while evaluating the alternatives to the Project Activity and First Project Activity Instance and the following alternatives listed are in compliance with the applicable laws and regulations.

Identified Alternative Scenarios	Permitted/Not Permitted
Land Use Scenario A - Continuation of the pre-project land use	Permitted
Land Use Scenario B - Afforestation of the land with Palm Oil Plantation without being registered as the A/R CDM project activity	Permitted
Land Use Scenario C - Afforestation of the land with commercial tree plantations in agroforestry system without being registered as the A/R CDM project activity	Permitted

Outcome of Sub-step 1b: Below is the list of plausible alternative land use scenarios to the A/R CDM project activity that are in compliance with mandatory legislation and regulations taking into account their enforcement in the region or country and EB decisions on national and/or sectoral policies and regulations.

- Land Use Scenario A - Continuation of the pre-project land use
- Land Use Scenario B - Afforestation of the land with Palm Oil Plantation without being registered as the A/R CDM project activity
- Land Use Scenario C - Afforestation of the land with commercial tree plantations in agroforestry system without being registered as the A/R CDM project activity

STEP 2. Barrier analysis

Sub-step 2a. Identification of barriers that would prevent the implementation of at least one alternative land use scenarios.

The proposed project activity and First Project Activity Instance faces a number of investments, technological, infrastructural, institutional and social barriers to its implementation described as below:

a. Barriers due to Social condition:

i. Demographic pressure on the land

With the increasing population, the size of landholdings has been declining due to land fragmentation. The landless and marginal farmers account for more than 80% of rural households. Agriculture is unable to sustain these households. Below table shows the operational holding of the land parcels per household for the year 2018-19[45].

States	No. of Operational Holdings	Average Area Per Operational Holding (ha)	Average Area Operated Per Holding (ha)
Maharashtra	75,92,100	1.406	1.298
Madhya Pradesh	75,37,700	1.359	1.268
Karnataka	44,23,300	1.355	1.269
Gujarat	41,35,800	0.984	0.945
Telangana	27,54,600	1.542	1.455
All India	10,19,81,700	0.913	0.833

Fragmented and scattered holdings (as is the case of most of the marginal and small farms in India) do not allow efficient utilization of farm resources and technology adoption by the farmers, and as a result challenge economic productivity. Moreover, this also hinders the diversification process, which is considered a key in adding to the income of farmers.

45 https://www.im4change.org/docs/Situation%20Assessment%20of%20Agricultural%20Households%20and%20Land%20and%20Livestock%20Holdings%20of%20Households%20in%20Rural%20India%202019.pdf

States	% Distribution of Agriculture Households							
	Size Class of Land Possessed (Hectare) as of 2018-19							
	<0.01	0.01-0.40	0.04-1.00	1.01-2.00	2.01-4.00	4.01-10.00	10.00+	Total (%)
Maharashtra	1.4	12.3	36.4	27.9	15.9	5.5	0.6	100
Madhya Pradesh	1.4	12.6	40.5	26.6	12.8	5.6	0.5	100
Karnataka	1.2	12.8	37.9	25.9	16.4	5.2	0.6	100
Gujarat	1.1	33.1	32.7	17.6	11.3	3.9	0.4	100
Telangana	0	11.4	30.8	30.8	20.2	6.3	0.4	100
All India	0.6	34.2	35.6	17.7	8.6	2.8	0.5	100

ii. Lack of skilled and/or properly trained labor force

The literacy rate in the agriculture households falling under the Project Area is mainly categorized into 3 areas; a) Among 7 years and above, b) Among 15 years and above, and c) 15 Years and above with formal agriculture training.

It is evident from the table[46] given below that average percentage with secondary level education and above for the Project Area is around 33% and percentage of persons above 15 years who have attended the formal training in agriculture is only 0.58%. This shows the lack of skill towards practicing of agriculture activities in the Project Area.

States	Literacy Rate (among 7 years and above			% of Person of age 15 year and above with highest level of education secondary and above			% of Persons age 15 years and above who have attended formal training in agriculture		
	Male	Female	Average	Male	Female	Average	Male	Female	Average
Maharashtra	87.9	72.3	80.4	50.5	33.5	42.3	1.3	0.3	0.8
Madhya Pradesh	78.7	57.6	68.7	28.8	14.1	21.9	0.8	0.1	0.4
Karnataka	81.4	67.3	74.6	44.8	33.3	39	2	0.1	1.1
Gujarat	83.2	63.4	73.5	38.6	22.3	30.6	0.5	0.1	0.3
Telangana	69.4	53	61.2	41.3	27.1	34.2	0.5	0.2	0.3
All India	81.9	65	73.6	40.4	27	33.8	1.1	0.3	0.7

iii. Lack of organization of local communities.

There is a need for aggregation for farmers in order to get benefit from:

- Economies of scale

46 https://www.im4change.org/docs/Situation%20Assessment%20of%20Agricultural%20Households%20and%20Land%20and%20Livestock%20Holdings%20of%20Households%20in%20Rural%20India%202019.pdf

- Development of Common Facilities Centre such as training centre, quality control lab, soil testing lab
- Development of upstream/downstream ecosystems

Both Palm Oil plantation and Agroforestry Project need significant investments in creating upstream and downstream ecosystem.

Upstream ecosystem involves preparation of seedlings, procurement of seedlings from nurseries or creation of nurseries, transportation, procurement of fertilizers, pesticides.

Downstream ecosystem involves collection of fruits, seeds, harvesting of wood logs, processing centres, market access, infrastructure for storage of perishable goods.

iv. Access to technical advice/knowledge

The percentage of agricultural households[47] accessing technical advices from various sources during the two halves of the agricultural year July 2018 – June 2019 and corresponding estimates for Project Area is given below:

States	Percentage Agri Households That Accessed Technical Advice		Percentage Of Agricultural Households Adopted The Advice Among Those Who Accessed Technical Advice	
	Jul18-Dec18	Jan19-Jun19	Jul18-Dec18	Jan19-Jun19
Maharashtra	64.1	46.6	93.3	92.1
Madhya Pradesh	45.4	48.5	78.5	83.7
Karnataka	47.7	46.2	77.8	79.3
Gujarat	41.5	45.2	87	86.6
Telangana	63.0	48.0	95.3	97.4

As seen from the above table, percentage of technical advice accessed by farmers is 45 to 65% and adoption thereof ranges from 75-95%.

Technical advice available to farmer is largely contributed by Progressive farmers, input dealers, and radio/TV/Electronic media.

v. Urbanization

The urban share of India Population was 20% and is expected to cross 40% by the year 2040. As such availability of farm labor availability is reducing and increasing cost thereof.

[47] https://www.im4change.org/docs/Situation%20Assessment%20of%20Agricultural%20Households%20and%20Land%20and%20Livestock%20Holdings%20of%20Households%20in%20Rural%20India%202019.pdf

b. Technology Barriers:

i. Dearth of quality planting material - While availability of traditional crops/seeds has improved, availability of planting material for Palm Oil, Mahogany and other species, such as seeds, seedlings, palm oil cloning, improved varieties, are generally of poor quality and not available commonly. It is estimated that only about 10% of planting material is of high quality, the rest without any guarantee for quality standards. This issue mainly relates to the production, handling, distribution and planting & supervision of high quality planting material.

ii. Lack of Processing Industry – The development of agroforestry or palm oil plantation in the Project Area, is not possible without the establishment of processing industries of the farm produce. Lack of processing industry and the longer gestation period involved in these plantations, is a significant barrier in farmer decision making process.

iii. Weak market access for agroforestry produce: The marketing infrastructure (market yard, processing Industry), including "price discovery" mechanisms for agroforestry produce in general are unavailable in the country except in few states which have either developed exclusive marketing infrastructure for agroforestry produce or have dovetailed with the regulated agriculture commodity marketing systems. As a result, it is largely a buyer's market and the middlemen get the major share in profit.

c. Barriers relating to markets, transport and storage

Farmers involved in the Project Activity are residing and have their farm lands are in remote areas which has poor road connectivity and distance to storage yard/processing unit put major barrier in transportation of the produce. In the scenario, where Project is registered with involvement of PP, the PP has ensured the development of forward and backward linkages essential for the Project Activities.

d. Investment barrier

i. Access to credit is difficult and level of indebtedness; in large number of agriculture households is high. The same is shown below indicating the average amount (INR) of outstanding loan per agricultural household and percentage of indebted agricultural households in the Project Area:

States	Survey (July 2018 - December 2018)[48]	
	Average Amount of Loan Outstanding Per Household (INR)	% of Indebted Agriculture Households
Maharashtra	82,085	54.0

[48] Page No. 170 of 4264, https://mospi.gov.in/sites/default/files/publication_reports/Report_587m_0.pdf

Madhya Pradesh	74,420	48.4
Karnataka	1,26,240	67.6
Gujarat	56,568	42.5
Telangana	1,52,113	91.7

ii. High upfront investment: The plantation of Mahogany requires significant upfront investment which includes seedlings cost, labor cost, organic manures, fertilizers, drip against a longer gestation period particularly with no visibility of sale of farm produce and revenue from environmental attribute. Hence, this forms an investment barrier for the farmer.

A survey was conducted between July 2018 and June 2019, by National Statistical Office (NSO) monthly gross income and expenses for farmers and the same has been shown below:

The below table indicates the average monthly expenses and monthly receipts for farmers:

States	**July 2018-June 2019[49]**	
	Average Monthly Paid out Expenses (INR/ha)	**Average Monthly Receipts (INR/ha)**
Maharashtra	3,500	8,483
Madhya Pradesh	3,038	7,506
Karnataka	3,219	10,276
Gujarat	2,417	7,143
Telangana	6,543	11,551

Outcome of Step 2a: List of barriers that may prevent one or more land use scenarios identified in the Step 1b

- Barriers due to Social Condition
- Technology Barriers
- Barriers relating to markets, transport and storage
- Investment barrier

Sub-step – 2b Elimination of land use scenarios that are prevented by the identified barriers

The following table shows the summary of barriers hindering land-use option scenarios:

Alternative Land Use Scenario	**Barriers Limiting the Scenario**
A - Continuation of the pre-project land use	-
B - Afforestation of the land with Palm Oil Plantation without being registered as the A/R CDM project activity	○ **Barriers due to Social Condition** ✓ Demographic pressure on the land

[49] Page No. 164 of 4264, https://mospi.gov.in/sites/default/files/publication_reports/Report_587m_0.pdf

	✓ Lack of skilled and/or properly trained labor force ✓ Lack of organization of local communities ✓ Access to technical advice/knowledge ✓ Urbanization ○ **Technology Barriers** ✓ Dearth of quality planting material ✓ Lack of Processing Industry ✓ Weak market access for agroforestry produce ○ **Barriers relating to markets, transport and storage** ○ **Investment barrier** ✓ Access to credit is difficult and level of indebtedness ✓ High upfront investment
C - Afforestation of the land with commercial tree plantations in agroforestry system without being registered as the A/R CDM project activity	○ **Barriers due to Social Condition** ✓ Demographic pressure on the land ✓ Lack of skilled and/or properly trained labor force ✓ Lack of organization of local communities ✓ Access to technical advice/knowledge ✓ Urbanization ○ **Technology Barriers** ✓ Dearth of quality planting material ✓ Lack of Processing Industry ✓ Weak market access for agroforestry produce

	○ **Barriers relating to markets, transport and storage** ○ **Investment barrier** ✓ Access to credit is difficult and level of indebtedness ✓ High upfront investment

In February 2014, Government of India, approved National Agroforestry Policy 2014, to deal with problems faced by agroforestry sector, including adverse policies, weak markets and a dearth of institutional finance.

In the past, major policy initiatives, including the National Forest Policy 1988, the National Agriculture Policy 2000, Planning Commission Task Force on Greening India 2001, National Bamboo Mission 2002, National Policy on Farmers, 2007 and Green India Mission 2010, emphasize the role of agroforestry for efficient nutrient cycling, organic matter addition for sustainable agriculture and for improving vegetation cover.

Objectives

- Encourage and expand tree plantation in complementarity and integrated manner with crops and livestock to improve productivity, employment, income and livelihoods of rural households, especially the small holder farmers.

- Protect and stabilize ecosystems, and promote resilient cropping and farming systems to minimize the risk during extreme climatic events.

- Meet the raw material requirements of wood based industries and reduce import of wood and wood products to save foreign exchange.

- Supplement the availability of agroforestry products (AFPs), such as the fuel-wood, fodder, non-timber forest produce and small timber of the rural and tribal populations, thereby reducing the pressure on existing forests.

- Complement achieving the target of increasing forest/tree cover to promote ecological stability, especially in the vulnerable regions.

- Develop capacity and strengthen research in agroforestry and create a massive people's movement for achieving these objectives and to minimize pressure on existing forests.

Strategy

- Establishment of Institutional Setup at National level to promote Agroforestry

An institutional mechanism, such as a Mission or Board is to be established for implementing the agroforestry policy. It will provide the platform for the multi-stakeholders to jointly plan and identify the priorities and strategies, for inter-ministerial coordination, programmatic convergence, financial resources mobilization and leveraging, capacity building facilitation, and technical and management support.

The Ministry of Agriculture has the mandate for agroforestry. Agroforestry Mission / Board will be located in the Department of Agriculture and Cooperation (DAC) in the Ministry of Agriculture (MoA).

The actual implementation may involve convergence and dovetailing with a number of programmes.

Agroforestry research and development (R&D), including capacity development and pilot studies / testing and action research should be the responsibility of the ICAR

In the proposed institutional arrangement, the current stakes of the key ministries are to be respected and utilized.

- Simple regulatory mechanism

There is a need to create simple mechanisms / procedures to regulate the harvesting and transit of agroforestry produce within the State, as well as in various States forming an ecological region. There is also the need to simplify procedures, with permissions extended on automatic route as well as approval mode through a transparent system within a given time schedule. There are regulations imposed by multiple agencies of State governments (viz. Department of Forest, land revenue, other local bodies) on harvesting and transit which have negative implications on the growth of agroforestry. All these restricting regulations need to be identified and aligned with the proposed simplified mechanism.

- Development of a sound database & information system
- Investing in research, extension and capacity building and related services
- Improving famers' access to quality planting material
- Providing institutional credit and insurance cover for agroforestry
- Facilitating increased participation of industries dealing with agroforestry produce
- Strengthening farmer access to markets for tree products.
- Incentives to farmers for adopting agroforestry
- Promoting sustainable agroforestry for renewable biomass based energy

As detailed herein above implementation of the NAF Policy requires involvement of various central ministries, state ministries, central and state department and other institution (National Level Institution for Agro-forestry as envisaged above is yet to be set-up).

The strategy includes Institutional credit and insurance cover for agroforestry and Incentives to farmers for adopting agroforestry. The institutional credit is available for traditional crops through Kisan Credit Card and Crop Loan Schemes (to meet short term credit requirement for cultivation of crops, investment credit requirement for agriculture and allied activities like pump set, dairy and animals, post harvesting expenses, working capital for maintaining farm asset and allied activities) and the same is not applicable to Agroforestry plantation. As also, crop insurance under Pradhan Mantri Bima Fasal Yojana (PMBFY) which is not applicable to Agroforestry plantation.

As such there is no subsidy or alternate finance available to the farmers for agroforestry.

The above barriers have been substantiated in sub-step 2a. Considering the barriers listed above, Land use scenario B, Afforestation of the land with Palm Oil Plantation and Land use scenario C, Afforestation of the land with commercial tree plantations in agroforestry system, are excluded from further consideration.

Outcome of Sub-step 2b: Land use scenario A – Continuation of Pre-Project Land Use is the alternative land use scenario not prevented by any barrier.

Sub-step 2c: Determination of baseline scenario

This sub-step consists of applying the decision tree from the tool. As demonstrated above, forestation without being registered as an A/R VCS project activity is not included in the list of land use scenarios that are not prevented by any barrier and the list contains only one land use scenario. As such step 3 of Investment Analysis is not needed.

Therefore, according to the decision tree of sub-step 2c of the combined tool, it is concluded that Land Use Scenario A, Continuation of pre-project land use, is the baseline scenario and Step 4: "Common practice test" is the next step in the analysis.

STEP 4. Common practice analysis

i. Analysis of the extent to which forestation activity has diffused[50] in the geographical area of the proposed Project Activity is shown below:

Diffusion of forestation for the year 2015 in the Project Area:

States	Geographical Area (Sq. Km)	2015		Diffusion Percentage	
		Forest Cover (Sq.km)	Tree Cover (Sq.km)	Forest Cover	Tree Cover
Maharashtra	3,07,713	50,628	9,558	16.5%	3.1%
Madhya Pradesh	3,08,252	77,462	7,773	25.1%	2.5%
Karnataka	1,91,791	36,421	5,552	19.0%	2.9%

[50] https://fsi.nic.in/forest-report-2015 and https://fsi.nic.in/forest-report-2021

Gujarat	1,96,244	14,660	7,914	7.5%	4.0%
Telangana	1,12,077	21,591	2,549	19.3%	2.3%

Diffusion of forestation for the year 2021 in the Project Area:

States	Geographical Area (Sq. Km)	2021		Diffusion Percentage	
		Forest Cover (Sq.km)	Tree Cover (Sq.km)	Forest Cover	Tree Cover
Maharashtra	3,07,713	50,798	12,108	16.5%	3.9%
Madhya Pradesh	3,08,252	77,493	8,054	25.1%	2.6%
Karnataka	1,91,791	38,730	7,494	20.2%	3.9%
Gujarat	1,96,244	14,926	5,489	7.6%	2.8%
Telangana	1,12,077	21,214	2,848	18.9%	2.5%

The National Agroforestry Policy (2014) envisaged the significant contribution to afforestation target set under National Forest Policy and had launched various objectives as detailed above in sub-steps to facilitate the growth of agroforestry in India. However, diffusion of agroforestry is minimal which is evident from the above data. The reason for such low diffusion is attributable to various barriers detailed in sub-step 2a.

ii. An analysis to which extent similar forestation activities to the one proposed as the Project Activity have been implemented previously or are currently underway. Similar forestation activities are defined as that which are of similar scale, take place in a comparable environment, inter alia, with respect to the regulatory framework and are undertaken in the relevant geographical area, subject to further guidance by the underlying methodology

"Mahogany Plantation in India" being developed by PP comprises of Plantation of *Swietenia macrophylla* in multiple scattered small land parcels across 65 districts (defined by Government of India, as on 28 June 2019, Project Start date and shall include split/bifurcation, regrouping, renaming as may be carried out by Government of India from time to time) in Maharashtra, Madhya Pradesh, Karnataka, Gujarat and Telangana states of India, with planting density of 1,111 trees per hectare or equivalent proportioned thereof, subject to eligibility and applicability conditions set out in AR-ACM0003 CDM methodology.

As can be seen from publicly available document[51], there is one similar small scale project covering about 129 hectares across Maharashtra and Karnataka states.

As defined in A/R Methodological tool "Combined tool to identify the baseline scenario and demonstrate additionality in A/R CDM project under Step 4 Common Practice Analysis, clause 33, the above identified project do not fall under the similar forestation activities. Since, the

[51] https://registry.verra.org/app/projectDetail/VCS/2346

scale of project is 0.86% of the Project Area under our Project Activity. Further, plantation of Mahogany in Agrisilvic

Outcome of Step-4: Since, the Step-4 Common Practice Analysis is not satisfied. The proposed Project Activity and First Project Activity Instance being part of the Project Activity is not the baseline scenario and hence, it is additional.

3.6 Methodology Deviations

There is no deviation to Applied AR-ACM0003 Methodology.

4 IMPLEMENTATION STATUS

4.1 Implementation Status of the Project Activity

The total coverage of the Project Activity, Mahogany Plantation in India, is 15,000 hectares of multiple small scattered land parcels across 65 districts (defined by Government of India, as on 28 June 2019, Project Start date and shall include split/bifurcation, regrouping, renaming as may be carried out by Government of India from time to time) in five states of India, Maharashtra, Madhya Pradesh, Karnataka, Telangana and Gujarat.

The first Project Activity instance involves plantation on 165.41 hectares of multiple small scattered land parcels in four states of India, Maharashtra, Karnataka, Gujarat and Telangana consisting 315 farmers. These plantations have been carried out in year 2019 and 2020.

During the current monitoring period, plantations have not seen any event which have impacted the intended GHG removals. PP with his effective management of the plantation has observed sincere growth expected from the *Swietenia macrophylla*, which has wide range of ecological adaptability.

There is insignificant displacement of agricultural activities and hence leakage is accounted as zero.

Non-Permanence Risk factors and mitigation thereof are elaborated in separate document provided.

Below are few images of the land parcel involved in the first instance of the Project Activity:

- Pandharinath Raosaheb Thore

- Anand Ganpat Devkate

- Sarjerao Ramrao Gavhane

5 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

Following the requirements of section 5.4 of the methodology, the project uses the following equations to calculate the net GHG removal under the baseline scenario.

$$\Delta C_{BSL,t} = \Delta C_{TREE_BSL,t} + \Delta C_{SHRUB_BSL,t} + \Delta C_{DW_BSL,t} + \Delta C_{LI_BSL,t}$$

Where:

$\Delta C_{BSL,t}$ = Baseline net GHG removals by sinks in year t; t CO_{2e}

$\Delta C_{TREE_BSL,t}$ = Change in carbon stock in baseline tree biomass within the project boundary in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_{2e}

$\Delta C_{SHRUB_BSL,t}$ = Change in carbon stock in baseline shrub biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R project activities", t CO_{2e}

$\Delta C_{DW,t}$ = Change in carbon stock in baseline dead wood biomass within the project boundary, in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R project activities", t CO_{2e}

$\Delta C_{LI,t}$ = Change in carbon stock in baseline litter biomass within the project in year t, as estimated of carbon stocks and change in dead wood and litter in A/R CDM project activities", t CO_{2e}

The baseline emissions estimation is carried out using the A/R Methodological AR-TOOL 14 "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities Version 04.2".

According to the AR-TOOL 14, carbon stock in trees in the baseline can be accounted as zero if all of the following conditions are met:

a. The pre-project trees are neither harvested, nor cleared, nor removed throughout the crediting period of the project activity;

   - Prior to the start of the Project Activity and First Project Activity Instance in multiple small land parcels, the land parcels were used for cultivation of crops such as soya bean, cotton, sugarcane, wheat, rice, fruits, vegetables and other food grains. These activities have been a part of traditional farming for many years. Hence, there were no-pre-project trees in the Project Area.

b. The pre-project trees do not suffer mortality because of competition from trees planted in the project, or damage because of implementation of the project activity, at any time during the crediting period of the project activity;

   - As mentioned herein above, there were no pre-project trees in the Project Area and in the First Project Activity Instance.

c. The pre-project trees are not inventoried along with the project trees in monitoring of carbon stocks but their continued existence, consistent with the baseline scenario, is monitored throughout the crediting period of the project activity

   - As indicated above there are no pre-project trees in the Project Area and in the First Project Activity Instance.

   - However simultaneous with the Project Activity, i.e. plantation of *Swietenia macrophylla,* a few of the land parcels have undertaken cultivation of fruits (citrus, pomegranate, guava, custard apple) as intercrop. In such cases, carbon inventory includes solely the Mahogany plants and no other biomass from cultivation of fruits are considered.

$\Delta C_{TREE_BSL,t}$

Since, all the above conditions for estimation of carbon stock in trees in the baseline are met, change in carbon stock in baseline tree biomass within the project boundary in year t, $\Delta C_{TREE_BSL,t}$ is considered zero.

$\Delta C_{SHRUB_BSL,t}$

The land parcels involved in the Project Activity and First Project Activity Instance is subjected to periodic cycle of clearing-regrwowing of traditional crops due to which biomass oscillates between a minimum and a maximum value every 90-180 days. Hence, according to the AR-TOOL 14, clause 5. 12(f), change in carbon stock in shrubs, $\Delta C_{SHRUB_BSL,t}$ in the baseline is accounted as zero.

$\Delta C_{DW_BSL,t}$ and $\Delta C_{LI_BSL,t}$

The Project Activity and First Project Activity Instance is Plantation of Mahogany in Agrisilviculture system in the land parcels, which involves the cultivation of Mahogany trees along with farming of crops (e.g. soyabean, cotton, rice, wheat, other food grains, etc.) with harvesting cycle oscillating between minimum 90 to maximum 180 days every year. Hence, the change in dead wood biomass $\Delta C_{DW_BSL,t}$ and change in litter biomass $\Delta C_{LI_BSL,t}$ are considered as zero.

Therefore, Baseline net GHG removals by sinks, $\Delta C_{BSL,t}$ is zero.

$$\Delta C_{BSL,t} = 0$$

As the baseline emissions were assumed to be zero, no calculations were undertaken. However, if new activity instances are to be included, and baseline emissions are found, the equations of section 5.1 will be applied to calculate the carbon increase in the baseline scenario.

5.2 Project Emissions

As per the AR-ACM0003 methodology, GHG emissions resulting from removal of herbaceous vegetation, combustion of fossil fuel, fertilizer application, use of wood, decomposition of litter and fine roots of N-fixing trees, construction of access roads within the project boundary, and transportation attributable to the Project Activity and First Project Activity Instance shall be considered insignificant and therefore accounted as zero.

The actual net GHG removals by sinks shall be calculated as follows:

$$\Delta C_{ACTUAL,t} = \Delta C_{p,t} - GHGE_{,t}$$

Where

$\Delta C_{ACTUAL,t}$ = Net current GHG removal by reservoirs in year t; tCO_{2e}

$\Delta C_{p,t}$ = Change in the carbon stocks in project, occurring in the selected carbon pools, in year t; t CO_{2-e}

$GHGE_{,t}$ = Increase in non-CO2 GHG emissions within the project boundary as a result of the implementation of the A/R CDM project activity, in year t, as estimated in the tool "Estimation of non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity"; t CO_{2-e}

Following the methodology and the "tool for non-CO2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity (v04.0.0)" under $GHGE_{,t}$ only the non-CO2gases N2O and NH4need to be quantified.

The Project Activity and First Project Activity Instance is not:

i. using fire for site preparation

ii. using fire to clear the land of harvest residue prior to replanting of the land

iii. subjected to fire risk, as detailed in Non-Permanence Risk Report

Therefore, $GHGE_{,t}$ is zero.

Change in the carbon stocks in project, occurring in the selected carbon pools in year t shall be calculated as follows:

$$\Delta C_{p,t} = \Delta C_{TREE_PROJ,t} + \Delta C_{SHRUB\ PROJ,t} + \Delta C_{DW_PROJ,t} + \Delta C_{LI_PROJ,t} + \Delta SOC_{AL,t}$$

Where:

$\Delta C_{TREE_PROJ,t}$ = Change in carbon stock in tree biomass in project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_{2-e}

$\Delta C_{SHRUB\ PROJ,t}$ = Change in carbon stock in shrub biomass in project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities"; t CO_{2-e}

$\Delta C_{DW_PROJ,t}$ = Change in carbon stock in dead wood in project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO_{2-e}

$\Delta C_{LI_PROJ,t}$ = Change in carbon stock in litter in project in year t, as estimated in the tool "Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities"; t CO_{2-e}

$\Delta SOC_{AL,t}$ = Change in carbon stock in SOC in project, in year t, in areas of land meeting the applicability conditions of the tool "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities", as estimated in the same tool; t CO_{2-e}

No shrubs were found during the baseline measurements. Therefore, the estimations of changes in existing vegetation are only associated with the carbon stock in the tree biomass

In the First Project Activity Instance and Project Activity, the relevant carbon pools are Above ground biomass and Below ground biomass. Hence, change in shrub biomass, deadwood and litter biomass are considered as zero.

Therefore, $\Delta C_{p,t} = \Delta C_{TREE_PROJ,t}$

Ex-ante estimation of change in carbon stock in tree biomass ($\Delta C_{TREE_PROJ,t}$)

The change in tree biomass shall be calculated by estimating the biomass at the beginning and end of each verification period. The tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" is used to determine changes in tree carbon stock.

The ex-ante carbon stock estimation of *Swietenia macrophylla* uses the following equation:

$C_{Tree} = \frac{44}{12} \times CF_{Tree} \times B_{Tree}$

Where;

C_{Tree} = Carbon stock in trees in the tree biomass estimation strata; t CO_{2e}

CF_{Tree} = Carbon fraction of tree biomass; t C (t d.m.)$^{-1}$. A default value of 0.50[52] is used.

B_{Tree} = Tree biomass in the tree biomass estimation strata; t d.m

For estimation of Tree biomass, the following equation is used:

B_{Tree} = [Above Ground Biomass (AGB) + Below Ground Biomass (BGB)] x Area

B_{Tree} = exp (-2.302+0.894 Ln(D^2H)[53] x (1+ Root to Shoot Ratio) x Area

[52] https://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/GPG_LULUCF_FULL.pdf

[53] Allometric Equation source - https://doi.org/10.4236/ojf.2020.101012

B_{Tree} = exp (-2.302+0.894 Ln(D^2H) x (1+ R_j) x A_i

Where;

exp = Exponential

DBH = Diameter at Breast Height in metre, measured at 1.3 meter above ground level

H = Height in meter

R_j = Root to Shoot ratio for tree species j; default value of 0.27 as per IPCC table 3A.1.8 for tropical dry forest (See page 215 of the report[54]);

Area = Plantation Area; A_i

DBH = Diameter at Breast Height in metre, measured at 1.3 meter above ground level

H = Height in meter

The following allometric equation used in calculation of Above Ground Biomass (AGB):

Ln (TAGB) = - 2.302 + 0.894 Ln (D^2H)

TAGB = exp(-2.302+0.894 Ln(D^2H)

TAGB= Total Above Ground Biomass

D=Diameter at Breast Height (in cm)

H=Height (in meters)

The above allometric equation is derived from Bangladesh, a neighbouring country with similar conditions to the Project Area. The allometric equation is derived for *Swietenia macrophylla* by Mahmood Hossain *et.al* (2020) with R^2 value of 0.974[55].

PP has also referred other scientific literatures on *Swietenia macrophylla* such as (i) "Carbon Sequestration by Large Leaf Mahogany (Swietenia macrophylla King.) Plantation in Mount Makiling Forest Reserve, Philippines: A Decade After"[56], by Elenita L.R. *et.al* (2019) conducted

[54] Table 3A.1.8 Tropical Dry Forest (Mean=0.27): https://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/GPG_LULUCF_FULL.pdf

[55] Source-https://doi.org/10.4236/ojf.2020.101012

[56] Racelis, E., Racelis, D., & Luna, A. (2019). Carbon sequestration by large leaf mahogany (Swietenia macrophylla King.) plantation in Mount Makiling forest reserve, Philippines: a decade after. Journal of Environmental Science and Management, 22(1).

study on monitoring carbon accumulation and sequestration potential of Large Leaf Mahogany *(Swietenia macrophylla King)* aimed at assessing the sequestration rate of the plantation after a 10-year period. This study showed that the plantation has sequestration rate of 81 Mg ha^{-1} yr^{-1} or 81 tCO_{2eq} ha^{-1} yr^{-1} ; (ii) "Vegetation structure, aboveground biomass, and carbon storage of wono¸ a local forest management in Gunungkidul, Yogyakarta, Indonesia, across three geomorphological zones"[57], by Tohirin *et.al* (2021), conducted study on various species including *Swietenia macrophylla* in Indonesia. The study showed the sequestration of Carbon Sequestration of 398 tCO_{2eq} ha^{-1} for density 613 stems ha^{-1}.

Both the above literature has conducted study on *Swietenia macrophylla* in a similar climatic conditions to India since both Philippines and Indonesia belongs to the southeast asia region and have tropical climates with similar soil types suitable to agriculture such as Alluvial Soil in India and Philippines and Andosols in Indonesia.

On a conservative approach, PP has considered allomteric equation of Bangladesh which has similar edaphic-climatic conditions to India and has comparatively lower sequestration rate compared to the above two literatures.

Edaphic-climate comparison[58] of Bangladesh and India:

S. No.	Parameters	Units	Bangladesh	India
1	Climate	Zone	Subtropics to Tropics	Subtropics to Tropics
2	Daytime maximum temperature	°C	29.90	31.70
3	Daily low temperature	°C	20.80	21.10
4	Humidity	%	75	66
5	Precipitation	mm	2,745	1,639
6	Hours of Sunshine	hours	2,044	2,227
7	Soil pH	Unit less	5.5-8.3	6.5–7.5
8	Major Crops	Unit less	Rice, wheat, Pulses, Paddy, Maize, Potato	Rice, Wheat, Sugarcane, Pulses, Paddy

From the above table it is evident that area under the Project Activity, First Project Activity Instance and the reference project area have similar edaphic-climatic conditions which suffice the requirements for ex-ante estimation as per Para 1 (6.c) of tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" Version 04.2 and

[57] Tohirin, T., Suryanto, P., & Sadono, R. (2021). Vegetation structure, aboveground biomass, and carbon storage of wono a local forest management in Gunungkidul, Yogyakarta, Indonesia, across three geomorphological zones. *Biodiversitas Journal of Biological Diversity*, *22*(8).

[58] https://www.worlddata.info/climate-comparison.php?r1=bangladesh&r2=india

ex-post estimation as per para 5(c) of tool "Demonstrating appropriateness of volume equations for estimation of aboveground tree biomass in A/R CDM project activities" Version 01.0.1.

According to Appendix 1 (Methods of plot biomass measurement) of the tool, the plot biomass value will be determined as follows:

$$b_{TREE,p,i} = \frac{B_{TREE,p,i}}{A_{PLOT,i}}$$

$$B_{TREE,p,i} = \sum_{j} B_{TREE,j,p,i}$$

$$B_{TREE,j,p,i} = \sum_{l} B_{TREE,l,j,p,i}$$

Where:

$b_{TREEp,i}$ = Tree biomass per hectare in sample plot p of stratum i; t.d.m. ha^{-1}

$B_{TREE\ p,i}$ = Tree biomass in sample plot p of stratum i; t.d.m.

$A_{PLOT,\ i}$ = Size of sample plot in stratum i; ha

$B_{TREE\ j,p,i}$ = Biomass of trees of species j in sample plot p of stratum i; t.d.m.

$B_{TREE\ l,j,p,i}$ = Biomass of tree l of species j in sample plot p of stratum i; t.d.m.

Justification for Selection of Reference/input Values:

- DBH – The DBH value is derived from the research project coordinated by Centre for International Forestry Research (CIFOR), funded by the Gesellschaft für Internationale Zusammenarbeit (GIZ). The said project gathered information on *Swietenia macrophylla King* with a focus on Indonesian sites at Java and Nusa Tenggara. The Mean Annual Increment (MAI) for DBH in centimetres per year is arrived at from the chart given in the research project for mean DBH in cm versus age of the Mahogany. The MAI values for DBH for 100 years is given below:

Tree Age (years)	MAI DBH (cm $year^{-1}$)
0-1	2.8
2	2.6
3	2.4
4	2.2
5	2

6	1.8
7	1.8
8	1.8
9	1.8
10	1.8
11	1.8
12	1.8
13	1.8
14	1.8
15	1.8
16	1.4
17	1.4
18	1.4
19	1.4
20	1.4

- Height - The height value is derived from the research project coordinated by Centre for International Forestry Research (CIFOR), funded by the Gesellschaft für Internationale Zusammenarbeit (GIZ). The said project gathered information on Swietenia macrophylla King with a focus on Indonesian sites at Java and Nusa Tenggara. The Mean Annual Increment (MAI) for height in metres per year is arrived at from the chart given in the research project for mean Height in meters versus age of the Mahogany. The MAI values for height for 100 years is given below:

Tree Age (years)	MAI Height (meter year^{-1})
0-1	2.80
2	2.60
3	2.40
4	2.20
5	2.00
6	1.20
7	1.15
8	1.10
9	1.05
10	1.00
11	0.95
12	0.93
13	0.90
14	0.88
15	0.85
16	0.80

17	0.70
18	0.60
19	0.50
20	0.40

5.3 Leakage

According to AR-Tool 15, Leakage emissions shall be estimated as follows:

$LK_t = LK_{AGRIC,t}$

Where:

LK_t = GHG emissions due to leakage, in year t; t CO_{2-e}

$LK_{AGRIC,t}$ = Leakage due to the displacement of agricultural activities in year t, as estimated in the tool "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity"; t CO_{2-e}

$LK_{AGRIC,t} = (44/12) \times (\Delta C_{BIOMASS,t} + \Delta SOC_{LUC,t})$

$\Delta C_{BIOMASS,t} = [1.1 x b_{TREE} \times (1+R_{TREE}) + b_{SHRUB} \times (1+R_S)] \times Cf \times A_{DISP,t}$

PP has considered the displaced agriculture activity in displaced land which is having no forest or trees. Such assumption is on account of specific prohibition of forest land for any other non-forest purposes under the Act passed by Indian Parliament namely The Forest (Conservation) Act[59], 1980, dated December 27, 1980.

While the land receiving the displaced activity is unidentified, such receiving land being forest land is ruled out because of national regulations. Hence, PP has considered the area receiving the displaced agriculture activities as the cropland, fallow land, or barren land.

Since there were no trees in the pre-project scenario, the only insignificant displacement of agriculture activities has been considered as traditional seasonal agriculture practices of crops which are considered in the category of Shrubs. The value of Shrub biomass is set equal to the applicable value of mean aboveground biomass in forest region of India i.e. 73 $t.d.m.ha^{-1}$

As per Para 3 (a) (iii) of "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities ", Version 1.1.0, estimation of change in soil organic carbon is not applicable. Hence, $\Delta SOC = 0$.

Therefore, $\Delta C_{BIOMASS,t} = b_{SHRUB} \times (1+R_S) \times Cf \times A_{DISP,t}$

[59] https://forestsclearance.nic.in/writereaddata/ACT/Forest%20(Conservation)%20Act,%201980%20Gazetted%20Notiofication.pdf

As per tool 14, Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities, $b_{SHRUB,i} = BDR_{SF} \times b_{FOREST} \times CC_{SHRUB,i}$

BDR_{SF} = Ratio of shrub biomass per hectare in land having a shrub crown cover of 1.0 (i.e. 100 per cent) and the default above-ground biomass content per hectare in forest in the region/country where the A/R CDM project activity is located, default value of 0.10 is considered

B_{FOREST}= Default above-ground biomass content in forest in the region/country where the A/R CDM project activity is located; t d.m. ha^{-1}, default value of 73 is considered for Forest in India as per table 3A.1.4 of IPCC GPG-LULUCF 2003

$CC_{SHRUB,i}$= Crown cover of shrubs in shrub biomass estimation stratum i at the time of estimation, expressed as a fraction, default value of 0.5 is considered as per the CDM AR- Tool 14 Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities, version 04.2, para 64, table 2

R_s=Root-shoot ratio for shrubs, default value of 0.40 is considered

Cf=0.5, Carbon Fraction

$A_{DISP,\,t}$ = Area of land from which agricultural activity is being displaced in year t; ha

5.4 Estimated Net GHG Emission Reductions and Removals

According to the methodology AR ACM 0 003 v.2.0, section 5.7, net anthropogenic GHG removals by sinks shall be calculated as follows:

$\Delta C_{AR\text{-}CDM,t} = \Delta C_{ACTUAL,t} - \Delta C_{BSL,t} - LK_t$

$\Delta C_{AR\text{-}CDM,t}$ = Net anthropogenic GHG removals by sinks, in year t; t $CO_{2\text{-}e}$

$\Delta C_{ACTUAL,t}$ = Actual net GHG removals by sinks, in year t; t $CO_{2\text{-}e}$

$\Delta C_{BSL,t}$ = Baseline net GHG removals by sinks, in year t; t $CO_{2\text{-}e}$

LK_t = GHG emissions due to leakage, in year t; t $CO_{2\text{-}e}$

Since baseline removals and emissions due to leaks is zero, net anthropogenic removals are expressed according to the formula:

$\Delta C_{AR\text{-}CDM,t} = \Delta C_{ACTUAL,t}$

1) Based on data and parameters monitored detailed under section 6.2 below are the estimated net GHG emission removals for 165.41 ha of land parcels in First Project Activity Instance:

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
2019 (28-June-2019--31-December-2019)	0	25	40	-15
2020	0	872	544	328
2021	0	3,430	558	2,872
2022	0	6,713	571	6,142
2023	0	9,985	583	9,402
2024	0	12,695	594	12,101
2025	0	13,232	604	12,628
2026	0	15,844	614	15,230
2027	0	18,549	624	17,925
2028	0	21,322	635	20,688
2029	0	24,140	645	23,495
2030	0	26,996	656	26,341
2031	0	30,055	666	29,388
2032	0	33,178	677	32,501
2033	0	36,354	688	35,666
2034	0	14,986	686	14,300

2035	0	-2,67,479	544	-2,68,022
2036	0	3,430	558	2,872
2037	0	6,713	571	6,142
2038	0	9,985	583	9,402
2039	0	12,695	594	12,101
2040	0	13,232	604	12,628
2041	0	15,844	614	15,230
2042	0	18,549	624	17,925
2043	0	21,322	635	20,688
2044	0	24,140	645	23,495
2045	0	26,996	656	26,341
2046	0	30,055	666	29,388
2047	0	33,178	677	32,501
2048	0	36,354	688	35,666
2049 (01-January-2019 -- 27-June-2049)	0	-3,720	646	-4,367
Total				230,982

2) The long-term average GHG benefit (LTA) is calculated for each strata in First Project Activity Instance using the procedure provided in section 3.2.2 VCS Standard V4.4. Following equation is used to calculate LTA:

$$LA = \frac{\sum_{t=0}^{n} PE_t - BE_t}{n}$$

Where;

LA = The long-term average GHG benefit

PE_t = The total to-date GHG emission reductions and removals generated in the project scenario (tCO_{2e}). Project scenario emission reductions and removals shall also consider project emissions of CO_2, N_2O, CH_4 and leakage.

BE_t = The total to-date GHG emission reductions and removals projected for the baseline scenario (t CO_{2-e})

t= year

n = Total number of years in the established time period; 30 years

Year	Baseline Scenario at year t; BE	Project scenario: to date GHG emission reductions and removals at year t; PE	Annual change in GHG benefit (tCO2e/yr) $PE_t - PE_{t-1}$	Expected Total GHG Benefit to Date (tCO2e) $PE_t - BE_t$	Total VCUs available each year (tCO2e/Yr)	Cumulative VCUs Until LTA Reached
2019 (28-June-2019 – 31-December-2019)	0	-15	-15	-15	-15	-15
2020	0	313	328	313	328	313
2021	0	3,185	2,872	3,185	2872	3185
2022	0	9,328	6,142	9,328	6142	9328
2023	0	18,730	9,402	18,730	9402	18730
2024	0	30,831	12,101	30,831	12101	30831
2025	0	43,459	12,628	43,459	12628	43459
2026	0	58,689	15,230	58,689	15230	58689
2027	0	76,615	17,925	76,615	17925	76615
2028	0	97,302	20,688	97,302	17798	94413

2029	0	1,20,797	23,495	1,20,797	0	0
2030	0	1,47,137	26,341	1,47,137	0	0
2031	0	1,76,526	29,388	1,76,526	0	0
2032	0	2,09,026	32,501	2,09,026	0	0
2033	0	2,44,692	35,666	2,44,692	0	0
2034	0	2,58,992	14,300	2,58,992	0	0
2035	0	-9,030	-2,68,022	-9,030	0	0
2036	0	-6,158	2,872	-6,158	0	0
2037	0	-16	6,142	-16	0	0
2038	0	9,387	9,402	9,387	0	0
2039	0	21,488	12,101	21,488	0	0
2040	0	34,116	12,628	34,116	0	0
2041	0	49,346	15,230	49,346	0	0
2042	0	67,271	17,925	67,271	0	0
2043	0	87,959	20,688	87,959	0	0
2044	0	1,11,453	23,495	1,11,453	0	0
2045	0	1,37,794	26,341	1,37,794	0	0
2046	0	1,67,182	29,388	1,67,182	0	0
2047	0	1,99,683	32,501	1,99,683	0	0
2048	0	2,35,349	35,666	2,35,349	0	0

2049 (01-January-2049 – 27-June-2049)	0	2,30,982	-4,367	2,30,982	0	0
Long Term Average Value for Entire Project Area calculated for Each Stratum for 30 Years				94,413		

The Long-Term Average for the 1st Project Activity Instance is estimated to reach in 10th year of the first crediting period considering final harvest cut.

6 MONITORING

6.1 Data and Parameters Available at Validation

Data / Parameter	Carbon Fraction; C_F
Data unit	t C $(t.d.m)^{-1}$
Description	Tonnes of carbon per tonne of biomass dry matter
Source of data	IPCC "Good Practice Guidance for LULUCF". 2003. Equation 3.2.3
Value applied:	0.5
Justification of choice of data or description of measurement methods and procedures applied	Default value recommended by IPCC
Purpose of Data	Calculation of Project Emissions
Comments	N/A

Data / Parameter	Root to Shoot Ratio; R_j
Data unit	Dimensionless
Description	To estimate below ground biomass
Source of data	IPCC "Good Practice Guidance for LULUCF". 2003. Table 3A.1.8

Value applied:	0.27
Justification of choice of data or description of measurement methods and procedures applied	Default value recommended by IPCC for Tropical dry forest
Purpose of Data	Calculation of Project Emissions
Comments	N/A

Data / Parameter	$CO_{2\text{-}e}$
Data unit	tCO_2/tC
Description	The factor is applied to convert the tree carbon sequestered to tree $CO_{2\text{-}e}$ sequestered.
Source of data	IPCC default value.
Value applied:	44/12
Justification of choice of data or description of measurement methods and procedures applied	Value suggested by the IPCC
Purpose of Data	Calculation of Project Emissions
Comments	N/A

Data / Parameter	A_i
Data unit	Area of Stratum in Hectares (ha)
Description	Project Activity Area
Source of data	Identified using a Geographical Information System (GIS)
Value applied:	First Project Activity Instance Area = 165.41 ha
Justification of choice of data or description of	Eligible Area under the Project Activity Area

measurement methods and procedures applied	
Purpose of Data	Calculation of Project Emissions
Comments	N/A

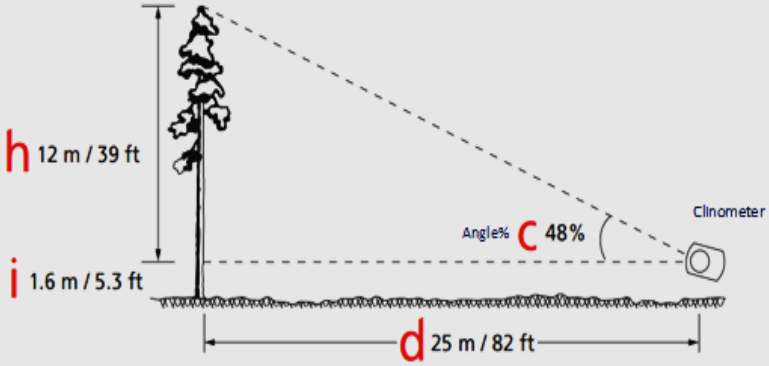
Data / Parameter	Permanent Sample Plot (PSP)
Data unit	Number
Description	Sample plots are chosen randomly from each stratum representing the plantation of respective stratum. Project Activity monitoring is based on the PSPs.
Source of data	Refer excel sheet
Value applied:	5
Justification of choice of data or description of measurement methods and procedures applied	Established PSPs based on A/R Methodological Tool 'Calculation of the number of sample plots for measurements within A/R CDM project activities' (Version 02.1.0)
Purpose of Data	Calculation of Project Emissions
Comments	N/A

6.2 Data and Parameters Monitored

Data / Parameter	DBH
Data unit	Centimeters (cm)
Description	Diameter at Breast Height of the trees
Source of data	Field measurements in Permanent Sample Plots (PSPs)
Description of measurement methods and procedures applied	DBH is measured at 1.3 m above ground, over the bark by the diameter Tape. Measurement of all the trees in the sample area of 20x20 meter grid in permanent sample plots.

Frequency of monitoring/recording	During each verification
Value applied:	Refer to Ex-post Emission Reduction sheet
Monitoring equipment	Diameter Tape, Make – Freemans Fibra (https://www.freemansgroup.com/about-fmi-ltd)
QA/QC procedures applied	Measurement, Verification and Reporting (MRV) personnel have been trained to measure the DBH. The training was imparted to the MRV personnel by Expert in Geo-Informatics through classroom and field training in sample plots. PP has designed MRV SOP for field measurement in line with Field Manual by CDM for 'Measurement for Estimation of Carbon Stock' (https://unfccc.int/resource/docs/publications/cdm_afforestation_field-manual_web.pdf)
Purpose of data	Calculation of project emissions
Calculation method	Readings are taken in centimeters and converted in meters for calculation purpose
Comments	N/A

Data / Parameter	Tree Height (H)
Data unit	Meters (m)
Description	Height of the trees

Source of data	Field measurements in Permanent Sample Plots (PSPs)
Description of measurement methods and procedures applied	Height is measured with Clinometers. The measurement involves the following: i. Angle/degree percentage observation through clinometers ii. Distance in meter of the observer from point of observation to the tree (measure by using Measuring Tape, Make- Freemans Fibra (https://www.freemansgroup.com/about-fmi-ltd and/or Freemans Fo100 Fiberglass Open Reel Measuring Tape https://www.freemansgroup.com/products/viva-open-reel-vo) iii. Height of the observer in meter (measured by using Measuring Tape, Make – Freemans Fibra (https://www.freemansgroup.com/about-fmi-ltd) All the trees in the sample area of 20x20 meter grid in permanent sample plots are measured. Below illustrated figure shows method applied to calculate the height of the tree:  Total height measurement with the help of clinometer
Frequency of monitoring/recording	During each verification
Value applied:	Refer to Ex-post Emission Reduction sheet
Monitoring equipment	Clinometer, Make - Sunnto PM-5/360 (https://www.suunto.com/en-in/Products/Compasses/Suunto-PM-5/Suunto-PM-5360-PC)

QA/QC procedures applied	Measurement, Verification and Reporting (MRV) personnel have been trained to measure the Height. The training was imparted to the MRV personnel by Expert in Geo-Informatics through classroom and field training in sample plots. PP has designed MRV SOP for field measurement in line with Field Manual by CDM for 'Measurement for Estimation of Carbon Stock' (https://unfccc.int/resource/docs/publications/cdm_afforestation_field-manual_web.pdf)
Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	N/A

Data / Parameter	A_i
Data unit	Hectares (ha)
Description	Area of Stratum i
Source of data	Refer Excel sheet containing Latitude and Longitude of the Project Area using Geographical Information System (GIS)
Description of measurement methods and procedures applied	Strata area are selected and mapped in the software as .kml file
Frequency of monitoring/recording	During each verification
Value applied:	Project Stratification for first Project Activity instance is based on the year of plantation. Strata wise total area for the first Project Activity instance using GIS is given in below table:

	<table><tr><td>Strata #</td><td>Year of Plantation</td><td>Area (ha)</td></tr><tr><td>Strata 1</td><td>2019</td><td>12.26</td></tr><tr><td>Strata 2</td><td>2020</td><td>153.15</td></tr></table>
Monitoring equipment	GPS instrument (Make- eTrex e10)
QA/QC procedures applied	Measurement, Verification and Reporting (MRV) personnel have been trained to measure the GIS Coordinates. The training was imparted to the MRV personnel by Expert in Geo-Informatics through classroom and field training in sample plots. PP has designed MRV SOP for field measurement in line with Field Manual by CDM for 'Measurement for Estimation of Carbon Stock' (https://unfccc.int/resource/docs/publications/cdm_afforestation_field-manual_web.pdf)
Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	N/A

Data / Parameter	Size of Each PSPs in the Stratum i ($A_{Plot\ i}$)
Data unit	Hectares (ha)
Description	An area of 20 meter x 20 meter size (measuring 0.04 ha) is measured and marked within each sample land parcel. The selection of 0.04 ha PSP is based on the CDM manual[60] for "Measurements for Estimation of Carbon Stocks".

[60] https://unfccc.int/resource/docs/publications/cdm_afforestation_field-manual_web.pdf

<table>
<tr><td>Source of data</td><td>Measured in the PSPs</td></tr>
<tr><td>Description of measurement methods and procedures applied</td><td>The area is measured with the help of using a measuring tape, measuring out 20 meters from each reference point in opposite directions to establish the four corners of the PSP. GIS Coordinates of each four corners are recorded and marked with waterproof paint.</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>During each verification</td></tr>
<tr><td>Value applied:</td><td>Total area of PSPs is shown in the table below:
<table><tr><td>Strata #</td><td>Stratum year</td><td>Number of PSPs</td><td>Size of each PSPs (ha)</td></tr><tr><td>Strata 1</td><td>2019</td><td>1</td><td>0.04</td></tr><tr><td>Strata 2</td><td>2020</td><td>4</td><td>0.04</td></tr></table></td></tr>
<tr><td>Monitoring equipment</td><td>Measuring Tape</td></tr>
<tr><td>QA/QC procedures applied</td><td>Measurement, Verification and Reporting (MRV) personnel have been trained to measure the Sample Area of 0.04 ha. The training was imparted to the MRV personnel by Expert in Geo-Informatics through classroom and field training in sample plots.

PP has designed MRV SOP for field measurement in line with Field Manual by CDM for ‘Measurement for Estimation of Carbon Stock’ (https://unfccc.int/resource/docs/publications/cdm_afforestation_field-manual_web.pdf)</td></tr>
<tr><td>Purpose of data</td><td>Calculation of project emissions</td></tr>
<tr><td>Calculation method</td><td>N/A</td></tr>
<tr><td>Comments</td><td>N/A</td></tr>
</table>

Data / Parameter	Land Title Records
Data unit	N/A
Description	Land ownership document of each individual farmers involved in the Project Activity and First Project Activity Instance.
Source of data	Land title document for each state in local name is given in below table:

	<table><tr><td>S.No.</td><td>State</td><td>Land Record Name</td><td>Website link</td></tr><tr><td>1</td><td>Maharashtra</td><td>Bhulekh Mahabhumi</td><td>https://bhulekh.mahabhumi.gov.in/</td></tr><tr><td>2</td><td>Madhya Pradesh</td><td>Bhulekh</td><td>http://www.landrecords.mp.gov.in/</td></tr><tr><td>3</td><td>Karnataka</td><td>Bhoomi</td><td>https://landrecords.karnataka.gov.in/</td></tr><tr><td>4</td><td>Gujarat</td><td>AnyRoR</td><td>https://anyror.gujarat.gov.in/</td></tr><tr><td>5</td><td>Telangana</td><td>Dharani</td><td>https://ccla.telangana.gov.in/integratedLandRegistry.do</td></tr></table>
Description of measurement methods and procedures applied	The land title records are checked online through the website link available for each state in the Project Activity and the First Project Activity Instance
Frequency of monitoring/recording	During each verification
Value applied:	N/A
Monitoring equipment	Website Link and Physical copy of the Land Title Documents
QA/QC procedures applied	The PP employee checks the data and PPs appointed CDM manager reviews it
Purpose of data	For verification of land title ownership of Farmers involved in the Project Activity and First Project Activity Instance
Calculation method	N/A
Comments	N/A

Data / Parameter	Contractual Agreement
Data unit	N/A
Description	Contractual Agreement between each individual farmers and PP for the plantation and cultivation of Mahogany.

Source of data	Physical copy of Contractual Agreement signed on Non-Judicial Stamp Paper
Description of measurement methods and procedures applied	N/A
Frequency of monitoring/recording	During each verification
Value applied:	N/A
Monitoring equipment	Physical copy of each contractual agreement
QA/QC procedures applied	The PP employee checks the contractual copy and PPs appointed CDM manager reviews it
Purpose of data	For representation of the following: 1. Carbon Credit Ownership and Authorization 2. Plot Plantation Details 3. Farmers Representation/Warranties 4. Farmers Responsibilities 5. PPs responsibilities 6. Duration of the Contract
Calculation method	N/A
Comments	N/A

Data / Parameter	Survival Rate
Data unit	% (percentage)
Description	The number of trees counted in each sample parcel initially after 3 months of planting and replantation is carried out immediately. Plantation management requires a final survival check three years after planting. The number of trees contained in each PSP is manually counted and recorded during monitoring.
Source of data	Field Measurement

Description of measurement methods and procedures applied	Initial survival checking after 3 months of planting. Final survival checking after 3 years of planting and subsequently at each monitoring event.
Frequency of monitoring/recording	During each verification
Value applied:	Please refer the Ex-post Emission Reduction Sheet
Monitoring equipment	N/A
QA/QC procedures applied	N/A
Purpose of data	Calculation of project emissions
Calculation method	(No of trees available / No of trees planted) x 100%
Comments	N/A

Data / Parameter	T
Data unit	Year
Description	Time period elapsed between two successive estimations of carbon stock
Source of data	Recorded Time
Description of measurement methods and procedures applied	N/A
Frequency of monitoring/recording	N/A
Value applied:	N/A
Monitoring equipment	N/A
QA/QC procedures applied	N/A
Purpose of data	Calculation of project emissions

Calculation method	N/A
Comments	N/A

Data / Parameter	AGB
Data unit	Kg.d.m
Description	Above Ground Biomass in kilogram dry matter (kg.d.m)
Source of data	Calculated Value in Ex-post Calculation Sheet
Description of measurement methods and procedures applied	For calculating the above ground biomass, PP measures Diameter at Breast height (D) at 1.3-meter height from ground and Tree Height (H). The measured values are applied to the allometric equation[61] given below to obtain Above Ground Biomass (AGB): $AGB = \exp(-2.302+0.894 \ln(D^2H)$ For detailed calculation, please refer Ex-post Emission Reduction Sheet
Frequency of monitoring/recording	During each verification
Value applied:	Please refer the Ex-post Emission Reduction Sheet
Monitoring equipment	N/A
QA/QC procedures applied	Measurement, Verification and Reporting (MRV) personnel are professionals equipped with adequate knowledge of using spreadsheet and efficient calculation of above ground biomass
Purpose of data	Calculation of project emissions
Calculation method	Allometric Equations are referred for calculation of AGB
Comments	N/A

Data / Parameter	BGB

[61] Allometric Equation source - https://doi.org/10.4236/ojf.2020.101012

Data unit	Kg.d.m
Description	Below Ground Biomass in kilogram dry matter (kg.d.m)
Source of data	Calculated Value in Ex-post Calculation Sheet
Description of measurement methods and procedures applied	Refer Ex-post Emission Reduction Sheet
Frequency of monitoring/recording	During each verification
Value applied:	Please refer the Ex-post Emission Reduction Sheet
Monitoring equipment	N/A
QA/QC procedures applied	Measurement, Verification and Reporting (MRV) personnel are professionals equipped with adequate knowledge of using spreadsheet and efficient calculation of below ground biomass
Purpose of data	Calculation of project emissions
Calculation method	Multiplying AGB with Root to Shoot ratio
Comments	N/A

6.3 Monitoring Plan

This monitoring plan provides information on monitoring procedures for the Project Activity and First Project Activity Instance. This monitoring plan satisfies the requirement that the Project Activity and First Project Activity Instance have credible and precise monitoring procedures in place to enable project performance evaluation and verification of net anthropogenic GHG emission removals outlined in the methodology AR-ACM0003 and its applicable tools.

Permanent Sample Plots (PSPs) established are used to monitor the changes over time on the carbon content of aboveground and belowground biomass in the plantations under Agrisilvicultural practices. Each plot has a unique number, is geo-referenced, and is located within the Project Area. SOPs are followed to collect reliable data to ensure the credibility of the baseline emission (if any), project emissions, leakage, and GHG removals estimates.

The need for a forest GHG inventory stems from the inability to measure the stocks of the entire project area, necessitating the collection of representative samples of the population. These samples, known as sampling plots or Permanent Sampling Plots (PSPs), are a relatively small proportion of the Project Area that are established over the entire area to obtain estimates of the biomass stock. Permanent Sample

Plots (PSPs) established for ex-post monitoring are then used to monitor the changes over time on the carbon content of aboveground and belowground biomass in the plantations under Agrisilvicultural practices. Each plot has a unique number, is geo-referenced, and is located within the Project Area. SOPs are followed to collect reliable data to ensure the credibility of the baseline emission (if any), project emissions, leakage, and GHG removals estimates.

The monitoring plan is designed to produce biomass stock estimates with a 90% confidence level in line with the precision requirements established in the "Estimation of carbon stocks of trees and shrubs in A/R CDM Project activities" version 04.2 tool. Data collected will be archived electronically for a period of at least two years after the end of the last crediting period of the project activity.

Process for Obtaining the Monitoring Data:

(i) Measurement of Area (A_i) in Stratum, Checking of Land title records

The area of the land parcels involved in the Project Activity and First Project Activity Instance is initially mapped by the PPs representative visiting each land parcels and verifying the land title records. The land title records contain the information of area in which the farmers are cultivating the crops. Area mentioned in the land records is the same area under which farmer shall be cultivating the plantation of Mahogany along with the other crops. The plantation date is recorded by the PP representative under whom the plantation of Mahogany takes place. According to the plantation year, the total area for each stratum is calculated.

The geo-coordinates (longitude & latitude) of each land parcels are mapped which is further recorded in kml files with shape size of involved in the project activity and First Project Activity Instance.

Following image shows the geo-coordinates mapped in kml file for a land parcel involved in the First Project Activity Instance:

Similarly, all the land parcels involved in the Project Activity are recoded, mapped and stratified according to the plantation year.

Land title records checks and mapping of geo-coordinates are conducted during the farmer's inclusion in the Project Activity. These are further checked by MRV personnel during the field measurement.

(ii) Establishment of Permanent Sample Plots:

The Grouped Project Activity area of 15,000 hectares is stratified according to the plantation year, according to the A/R Methodological Tool "Calculation of the number of sample plots for measurements within A/R CDM project activities" (Version 02.1.0). Number of PSPs required for estimation of biomass stock is calculated iteratively. In the first iteration, the number of sample plots for the project area is calculated as:

$$n = \frac{N * t_{VAL}^{\ 2} * \left(\sum_i w_i * s_i \right)^2}{N * E^2 + t_{VAL}^{\ 2} * \sum_i w_i * s_i^{\ 2}}$$

Where:

n = Number of sample plots required for estimation of biomass stocks within the project boundary; dimensionless

N = Total number of possible sample plots within the project boundary (i.e. the sampling space or the population); dimensionless

t_{VAL} = Two-sided Studentís t-value, at infinite degrees of freedom, for the required confidence level; dimensionless; value of 1.645 is taken from tool

w_i = Relative weight of the area of stratum i (i.e. the area of the stratum i divided by the project area); dimensionless

s_i = Estimated standard deviation of biomass stock in stratum i; t d.m. (or t d.m. ha^{-1})

E = Acceptable margin of error (i.e. one-half the confidence interval) in estimation of biomass stock within the project boundary; t d.m. (or t d.m. ha^{-1}), i.e. in the units used for s_i; default value equal to 10% of mean biomass stock is taken from the tool

i = 1, 2, 3,...biomass stock estimation strata within the project boundary

With above equation the number of PSPs are established. The PSPs are then allocated among the strata using the below equation:

$$n_i = n * \frac{w_i * s_i}{\sum_i w_i * s_i}$$

Where:

n_i = Number of sample plots allocated to stratum i; dimensionless

n = Number of sample plots required for estimation of biomass stocks within the project boundary; dimensionless

w_i = Relative weight of the area of stratum i (i.e. the area of the stratum i divided by the project area); dimensionless

s_i = Estimated standard deviation of biomass stock in stratum i; t d.m. (or t d.m. ha^{-1})

i = 1, 2, 3,...biomass stock estimation strata within the project boundary

Number of Permanent Sample Plot (n) established and allocation of the PSP (n_i) is shown in the below table:

Strata #	Stratum year	Area (Ha)	n=Number of PSPs per Strata (roundup)	n_i = Number of PSPs to be Monitored > 50ha
Stratum 1	2019	12	**1**	1
Stratum 2	2020	153	**1**	4
Stratum 3	2021	1,800	**3**	36
Stratum 4	2022	2,100	**4**	42
Stratum 5	2023	6,000	**10**	120
Stratum 6	2024	4,934	**8**	99
Total		**15,000**	**27**	**302**

To ensure statistical independence for each stratum, a minimum of 1 plots will be set for each stratum, and the average area represented by a single sampling plot shall not be more than 50 hectares.

The stratification is based on the Project Design considering the year of plantation and the type of plantation schemes (Block or Boundary):

Parameter	Variants in Project Design		Impact on Biomass Estimation
Species	Only *Swietenia macrophylla,* no other species envisaged		None
Plantation Density	Block plantation with intercropping	1,111 trees per hectare or proportionate thereof	For Block Plantation: 0%
	Block plantation without intercropping (Only for Fallow or Barren land)	1,111 trees per hectare or proportionate thereof	For Block Plantation: 0%
	Boundary Plantation (It may be noted that no boundary plantation has been carried out in First Project Activity Instance of 165.41 ha)	1,111 trees per hectare or proportionate thereof	None for First Project Activity Instance. For Boundary Plantation in future Project Activity Instance: <0.5% (Please see below table 1)
Soil	Homogenous across Project Area as evidenced by nature of traditional crops undertaken		None
Plantation year	For First Project Activity Instance: 2019 – 12.26 ha 2020 – 153.15 ha		Date of plantation will impact biomass estimation, hence considered for stratification according to the plantation year. Section 5.2 of PD MR, indicating Mean Annual Increments in DBH and Height, depicting impact of plantation date on biomass.

Stratification was defined according to section 5.3 of the "AR-ACM0003 A/R Consolidated Large Scale Methodology Afforestation and reforestation of lands except wetlands Version 02.0". The methodology states that if the distribution of biomass in the project area is not homogeneous, stratification should be performed to improve the accuracy of biomass estimation.

As illustrated above, the distribution of biomass in the Project Area is homogenous with respect to plantation density (for block plantation with/without intercropping and boundary plantation), soil and species. Hence, the plantation year was the only parameter considered for stratification.

It may be noted that for the first Project Activity Instance only block plantation with intercropping was involved across 165.41 ha.

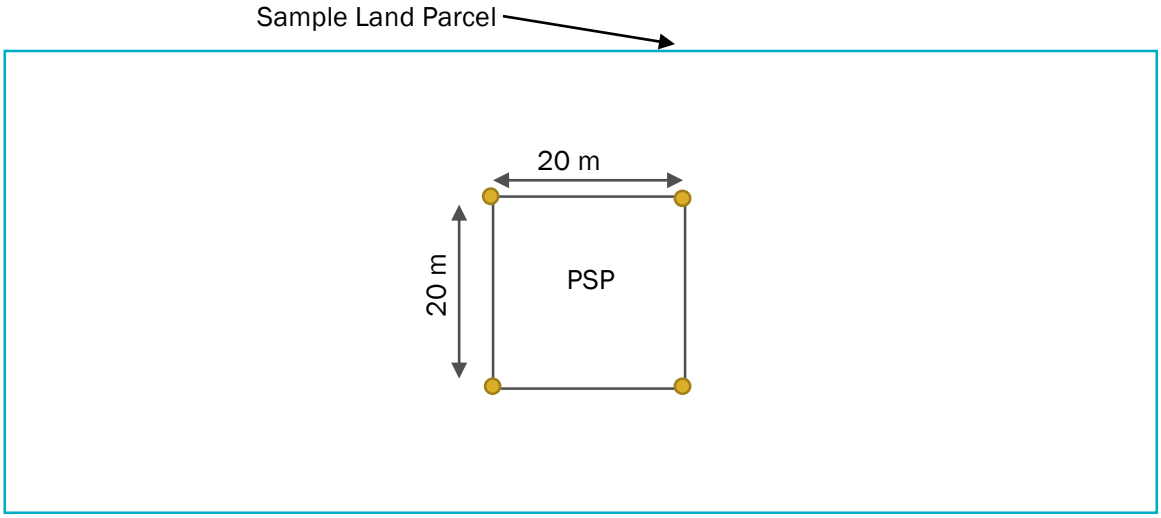
Table 2 : Plantation Density for Boundary Plantation

Total Plot Area (in ha)	Total Plot Area (in m^2)	Boundary Strip Area (m^2)	Boundary Strip Area (ha)	Perimeter (meter)	Calculated No. of tree	Prescribed No. of tree	Equivalent Plantation Density per ha	Variation vs. Project Plantation Density
1	10,000	1182	0.12	400	133	132	1,116	0.44%
1.5	15,000	1452	0.15	490	163	162	1,115	0.35%
2	20,000	1679	0.17	566	188	187	1,113	0.18%
2.5	25,000	1879	0.19	632	210	209	1,112	0.09%
3	30,000	2060	0.21	693	230	229	1,111	0.00%

(iii)Establishment of Size of Sample Plot in each PSP (A_{sp}) and recording Geo-coordinates

The size of plots is set at 400 m^2 (approximately 20 m x 20 m) to establish two reference points, such as trees or other landmarks, that are at least 20 meters apart. These reference points will be used to define the corners of the PSP. The PSPs will be set systematically selected with a random start. It ensures that sampling plots are distributed evenly and randomly across project sites.

The schematic diagram shows selection of PSP in one sample land parcel



Geo-coordinates of each corner points of PSPs are recorded with the help of GPS machine. Below image shows the measurement of geo-coordinates by MRV personnel

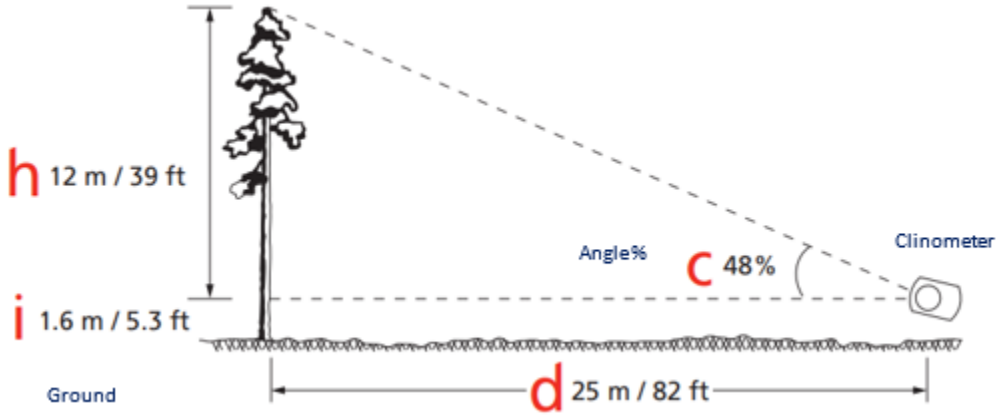
(iv) Measurement of DBH, Height (H) and Survival rate

DBH and Height are the two most important parameters to estimate the change in biomass stock of a tree. The measurement of DBH and Height are carried out in line with the SOP developed by PP for the MRV personnel.

To calculate the DBH, the diameter at Breast Height (GBH) is measured at a height of 1.3 meter from the ground level with diameter tape. The measurement point of 1.3m above the ground is estimated using a reference stick.

Height of trees were measured using Clinometer instrument. A clinometer instrument enabled to measure the distance from the tree and angles to the tree top and the tree base. Using a measuring tape, the distance is measured in meter from the base of the tree to the surveyor, where surveyor stand for measuring angle. Tree height is calculated using the below formula:

Height (H) = [Distance between tree and surveyor (m) x Angle (%)] + Eye level height of the Surveyor (m)



All the trees are counted in the sample land parcel by the MRV personnel for calculating the exact survival rate of trees.

Calibration Frequency of the monitoring equipment is as below:

S. No.	Instrument	Calibration Frequency	Remarks
1	Measuring Tape	Once in Three Years	Calibration shall be carried out by accredited laboratories
2	GPS Instrument	Annually	
3	Clinometer	Annually	

In addition to the foregoing, MRV personnel are trained to measure the DBH and height of trees. Training consists of a classroom session in which MRV personnel are informed of the significance of DBH and Height measurements and how they affect the estimation of change in biomass stock. Guidance on measurement by measuring tape, clinometer, and GPS machine is taught in the classroom. Following classroom training, MRV personnel receive hands-on training in sample plots, where they measure DBH and Height. These trainings for MRV personnel are conducted once every six months.

Field Measurements such as DBH, height shall be measured before each verification event.

Data and Information collected will be archived in electronic and paper form for at least two years following the end of final crediting period.

Organizational Structure, Responsibilities and Competencies

A team of professional Foresters, Managers and Carbon Experts appointed by PP will manage the Project Activity. This team will be in charge of conducting periodic field measurements and analyses. Arrangements will be made with accredited laboratories to ensure compliance with the monitoring methodology's provisions. Internal audits and/or external assistance will be sought to ensure that quality control and assurance procedures are followed.

The PP has established SOPs for implementing and monitoring project activity. These procedures define the responsibilities, activities, controls, and steps required to monitor key features, such as:

(a) Employee Training

(b) Data Collection

(c) Data and Record keeping system

(d) Data Quality Control and Quality Assurance

(e) Instrument Calibration and Maintenance

The methodology entails monitoring the following data, which have been identified as being necessary for calculating the estimated emission reduction:

(a) Plantation Area

(b) Geo-coordinates (Latitude and Longitude)

(c) Area of Sample Land Parcel and PSPs

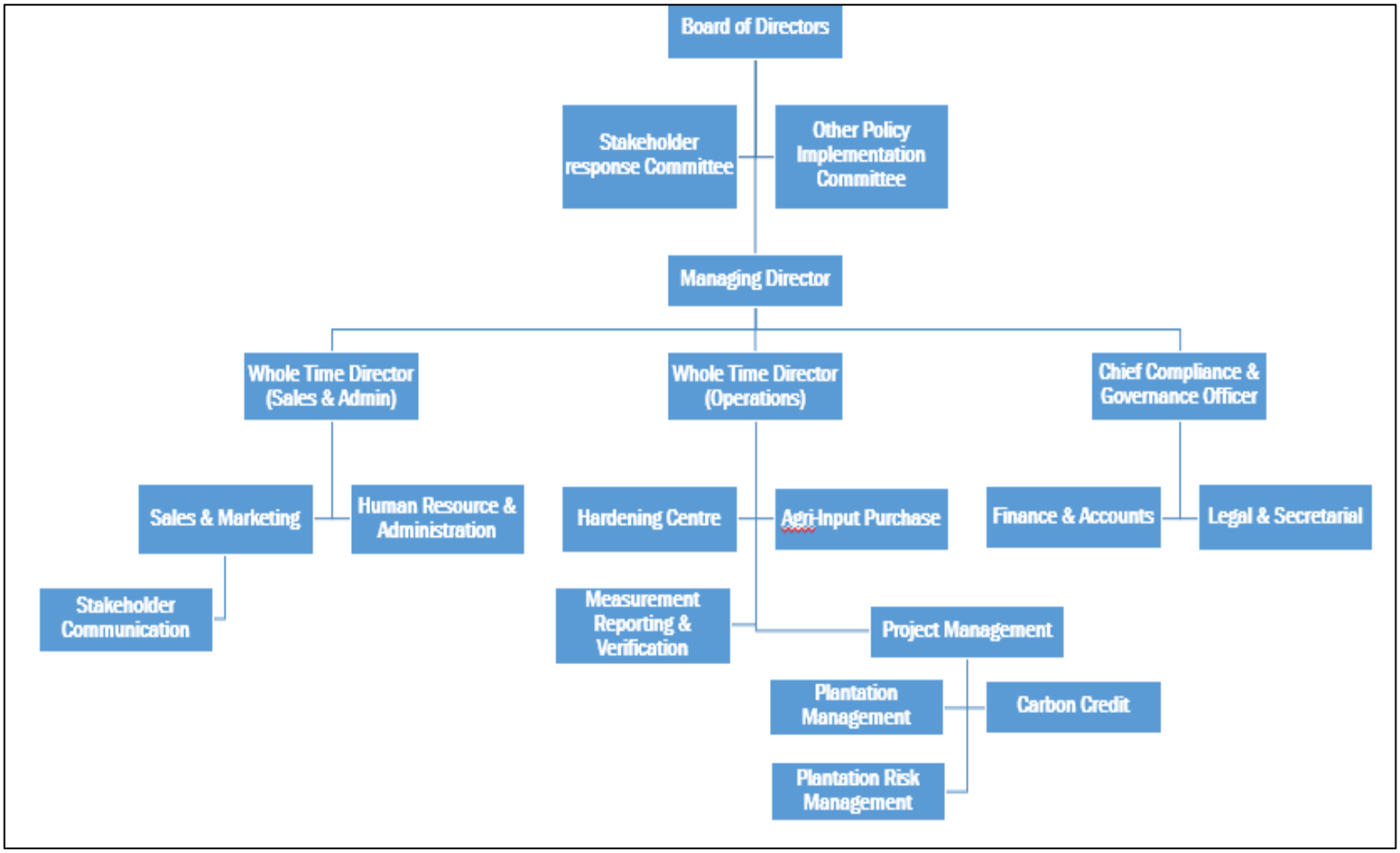
(d) Diameter at Breast Height (DBH)

(e) Top Tree Height (H)

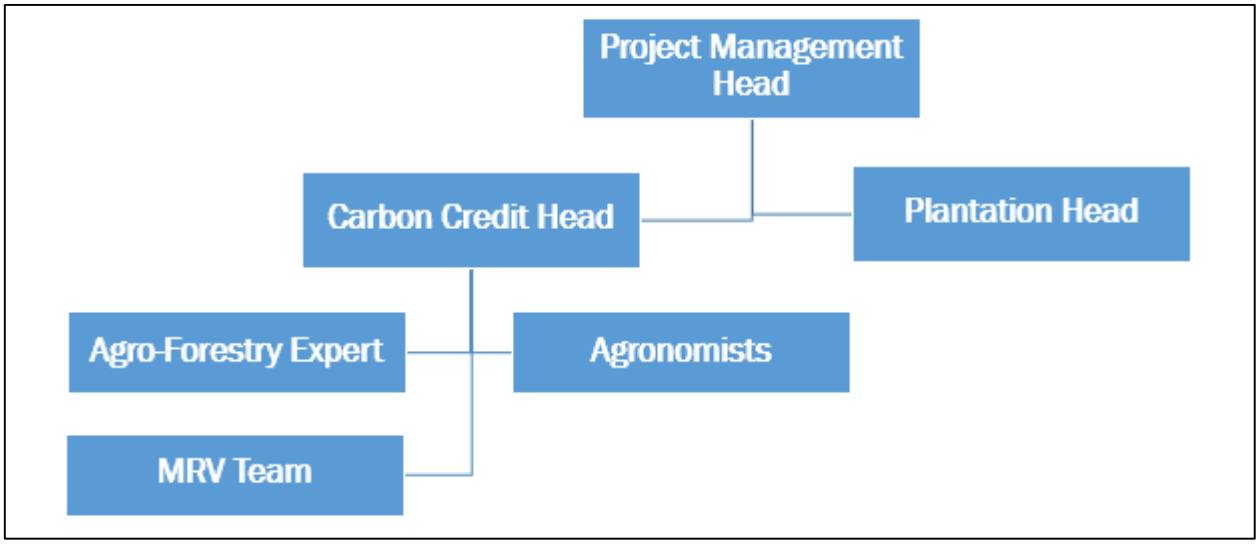
(f) Land Title Records

Roles and responsibilities have been established to ensure that the monitoring procedures are strictly followed. Responsibilities for data collection, recording, and archiving of data, as well as ensuring correct procedure for data collection, correctness of data, and reliability in data entry, have been identified. An audit check is in place, which may be amended during the crediting period if deemed necessary by the PP.

Organogram of Mahogani Vishwa Agro Private Limited is as below:



Below is the Organization Structure for the Monitoring of Project Activity:



S. No.	Designation	Roles & Responsibilities

1	Project Management Head	• Responsible for overall execution of the Project Activity. • Development of Strategies to achieve the target plantation • Conducting meeting with local stakeholders explaining the Project Activity and resolving any queries • Effective Team Planning and Management
2	Plantation Head	• Coordination with District and Village wise plantation in charge for successful implementation of Project Activity • Execution of Contractual agreement between Farmers and PP • Proper upkeep of plantation records • Compilation of all data received from plantation incharge • Ensuring correctness of record • Review of Survival Rate of Mahogany Plantation
3	Carbon Credit Head	• Coordination with Plantation head, Agronomists, MRV team and Agro-Forestry Experts for successful registration of Project Activity under Verified Carbon Standard (VCS). • Entire Documentation of Project Activity related to VCS. • Resource Management and custodian of all GIS mapping and field data of plantation sites. • Arranging calibration of measuring devices. • Coordinating with DOE for validation and verification of the project. • Ensuring verification and issuance and sale of Verified Carbon Units (VCUs).
4	Agro-Forestry Expert	• To provide training to various stakeholders for scientific techniques from plantation to harvesting and replantation. • Training on planting & nursery techniques, changes and developments, soil sample collection • Timely Review and modification (if required) of Standard Operating Procedures (SOPs) • Assessment of Tree growth, Soil Health and Improved Eco-systems
5	Agronomist	• Recording of geo-coordinates of the land parcels involved in the Project Activity • Ensuring plantation of Mahogany seedlings in line with SOPs • Regular site visits of land parcel to ensure proper care is being taken by farmer of the Mahogany as per the SOPs
6	MRV Team	• Demarcation of Permanent Sample Plots • Recording Geo-coordinates of the Permanent Sample Plots • Field Measurements such as DBH, Height, Count of Trees survived as per the SOPs

		• Analysis of the tree growth, form and biomass estimation

Internal audits will be performed on a regular basis to ensure the consistency of monitored data. Prior to any verification, the PP will conduct a final check of the data and analyse project performance. All MRV personnel involved in the Project Activity will receive the desired training for field measurements. The Project Developer will keep records of trained MRV personnel. The Carbon Credit Manager will ensure that only trained personnel shall carry out the monitoring activity.

Any non-conformities identified during the internal audit, a non-conformity report is prepared which consists of the root cause of the non-conformity. Once the non-conformity is reported, Carbon Credit Manager in consultation with Carbon Credit Head, Agronomist, Plantation Head, MRV Personnel, Agro-Forestry Expert prepares the corrective action measures and implements the same. After the implementation of the corrective actions the Internal Audit team conducts assessment on the non-conformity and if found ok, the Internal Audit closes the non-conformity.

QA/QC for field measurements

The collection of reliable field measurements is a critical step in the quality assurance plan. All participants including new employee in the field measurement will receive training in field data collection and data analysis. The training shall ensure that each task team member understands all procedures and the importance of collecting data as precisely as possible. To accomplish this, both a classroom and field examination will be conducted, and only those who pass the examination will be allowed to join the MRV team. The SOPs specify which measurements must be taken and how. Further, new team member shall be adequately trained.

Firstly, Carbon Credit Head monitors MRV personnel during data collection to ensure field measurements SOPs are followed and any technique errors are corrected.

Secondly, a re-assessment/cross-checking of 10% of the sample plots subject to minimum of 1 sample plot in each stratum, shall be examined by Agro-forestry expert highly experienced in Forest mensuration within 7-10 days of first observation. A comparison with the original data will be performed, and any discrepancies will be re-verified. Any errors discovered will be corrected and documented. Any errors found will be expressed as a percentage of all rechecked plots to provide an estimate of the measurement error.

QA/QC for Data Entry

To produce reliable carbon estimates the proper entry of data into the data analyses spreadsheets is required. Errors will be minimised by taking the necessary steps. The results will be reviewed and double-checked for typo error. If there are any unresolved issues with the monitoring plot data, the plot should not be used in the analysis.

QA/QC for Data Archiving

Because of the long duration of the project activities, data storage and maintenance are critical. All electronic data and reports will be copied on long-lasting media, such as External Hard Drives (EHDs), and copies of the EHDs will be kept in multiple locations.

The archives contain the following:

(i) Copies of all original field measurement data, laboratory data, and data analysis spreadsheets;

(ii) Copies of Calibration Certificates of the Monitoring Equipment

(iii) Estimates of carbon stock changes in all selected pools and corresponding calculation excel sheets;

(iv) KML files; and

(v) Copies of monitoring reports.

7 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

7.1 Data and Parameters Monitored

Please see section 6.2 above as the information is identical

7.2 Baseline Emissions

The Project Activity and First Project Activity Instance is Plantation of Mahogany in Agrisilviculture system in the land parcels, which involves the cultivation of Mahogany trees along with farming of crops (e.g. soyabean, cotton, rice, wheat, other food grains, etc.) with harvesting cycle oscillating between minimum 90 to maximum 180 days every year. Hence, the change in dead wood biomass $\Delta C_{DW_BSL,t}$ and change in litter biomass $\Delta C_{LI_BSL,t}$ are considered as zero.

Therefore, Baseline net GHG removals by sinks, $\Delta C_{BSL,t}$ is zero.

$\Delta C_{BSL,t} = 0$

7.3 Project Emissions

Estimation of change in carbon stock in tree biomass ($\Delta C_{TREE_PROJ,t}$) shall be calculated by estimating the biomass at the beginning and end of each verification period. The tool "Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities" is used to determine changes in tree carbon stock.

Ex-post estimation is based on the method of Stratified Random Sampling. The stratification of the First Project Instance across 165.41 hectares of land in the Project Activity is applied on the basis of year of plantation of Mahogany in the land parcels.

Step-1

Estimation of number of Permanent Sample Plots (PSPs) (A/R Methodological Tool "Calculation of number of sample plots for measurements within A/R CDM project activities", Version 02.1.0 is used with the help of following equation:

$$n = \frac{N * t_{VAL}^{2} * \left(\sum_{i} w_i * s_i \right)^{2}}{N * E^{2} + t_{VAL}^{2} * \sum_{i} w_i * s_i^{2}}$$

Where:

n= Number of sample plots required for estimation of biomass stocks within the project boundary; dimensionless

N= Total number of possible sample plots within the project boundary (i.e. the sampling space or the population); dimensionless

t_{val} = Two-sided Studentís t-value, at infinite degrees of freedom, for the required confidence level; dimensionless

W_i = Relative weight of the area of stratum i (i.e. the area of the stratum i divided by the project area); dimensionless

S_i = Estimated standard deviation of biomass stock in stratum i; t d.m. (or t d.m. ha^{-1})

E = Acceptable margin of error (i.e. one-half the confidence interval) in estimation of biomass stock within the project boundary; t d.m. (or t d.m. ha-1), i.e. in the units used for s_i

i = 1, 2, 3,.... biomass stock estimation strata within the project boundary

Based on the above equation, total number of sample plots calculated for the first instance of the Project Activity is 5. Below is the stratum wise PSPs:

Strata	Year of Plantation	Area (in hectares)	Number of sample plots
Strata 1	2019	12.26	1
Strata 2	2020	153.15	4
Total		**165.41**	**5**

Step-2

Measurement of tree height (H) and Diameter at Breast Height (DBH) as described in section 6.3 Monitoring Plan

Step-3

Estimation of carbon stock in the monitoring period using the following equation:

$C_{Tree} = \frac{44}{12} \times CF_{Tree} \times B_{Tree}$

For estimation of Tree biomass, the following equation is used:

B_{Tree} = exp(-2.302+0.894 Ln(D^2H) x (1+ Root to Shoot Ratio) x Area

B_{Tree} = exp(-2.302+0.894 Ln(D^2H) x (1+ R_j) x A_i

Where;

DBH = Diameter at Breast Height in metre, measured at 1.3 meter above ground level

H = Height in meter

R_j = Root to Shoot ratio for tree species j; default value of 0.27 as per IPCC table 3A.1.8 for tropical dry forest;

Area = Plantation Area;

DBH = Diameter at Breast Height in metre, measured at 1.3 meter above ground level

H = Height in meter

According to Appendix 1 (Methods of plot biomass measurement) of the tool, the plot biomass value will be estimated as per the following equation:

$$b_{TREE,p,i} = \frac{B_{TREE,p,i}}{A_{PLOT,i}}$$

$$B_{TREE,p,i} = \sum_j B_{TREE,j,p,i}$$

Where:

$b_{TREEp,i}$ = Tree biomass per hectare in sample plot p of stratum i; t.d.m. ha^{-1}

$B_{TREE\ p,i}$ = Tree biomass in sample plot p of stratum i; t.d.m.

$A_{PLOT,\ i}$ = Size of sample plot in stratum i; ha

$B_{TREE\ j,p,i}$ = Biomass of trees of species j in sample plot p of stratum i; kg.d.m.

Total Project Emissions calculated for the monitoring period from June 28, 2019 till October 13, 2022 (Completion date of MRV for first Project Activity Instance) are as follows:

Calculated value of change in carbon stock in tree biomass for the 1st monitoring period $\Delta C_{TREE_PROJ,t}$ is 4,855 $tCO_{2\text{-}eq}$

7.4 Leakage

According to AR-Tool 15, Leakage emissions shall be estimated as follows:

$LK_t = LK_{AGRIC,t}$

Where:

LK_t = GHG emissions due to leakage, in year t; t $CO_{2\text{-}e}$

$LK_{AGRIC,t}$ = Leakage due to the displacement of agricultural activities in year t, as estimated in the tool "Estimation of the increase in GHG emissions attributable to displacement of pre-project agricultural activities in A/R CDM project activity"; t $CO_{2\text{-}e}$

Since there were no trees in the pre-project scenario, the only insignificant displacement of agriculture activities has been considered as traditional seasonal agriculture practices of crops which are considered in the category of Shrubs.

As per Para 3 (a) (iii) of "Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities ", Version 1.1.0, estimation of change in soil organic carbon is not applicable. Hence, ΔSOC = 0.

Therefore, $\Delta C_{BIOMASS,t} = b_{SHRUB} \times (1+R_S)$

As per tool 14, Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities, $b_{SHRUB,i} = BDR_{SF} \times b_{FOREST} \times CC_{SHRUB,i}$

BDR_{SF} = 0.10, default value

B_{FOREST}= 73, default value for Forest in India as per table 3A.1.4 of IPCC GPG-LULUCF 2003

$CC_{SHRUB,i}$= 0.5, default value as per the CDM AR- Tool 14 Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities, version 04.2, para 64, table 2

Calculated value of leakage emission for the 1st monitoring period for displaced agriculture activity, $LK_{AGRIC,t}$ is 575 $tCO_{2\text{-}eq}$

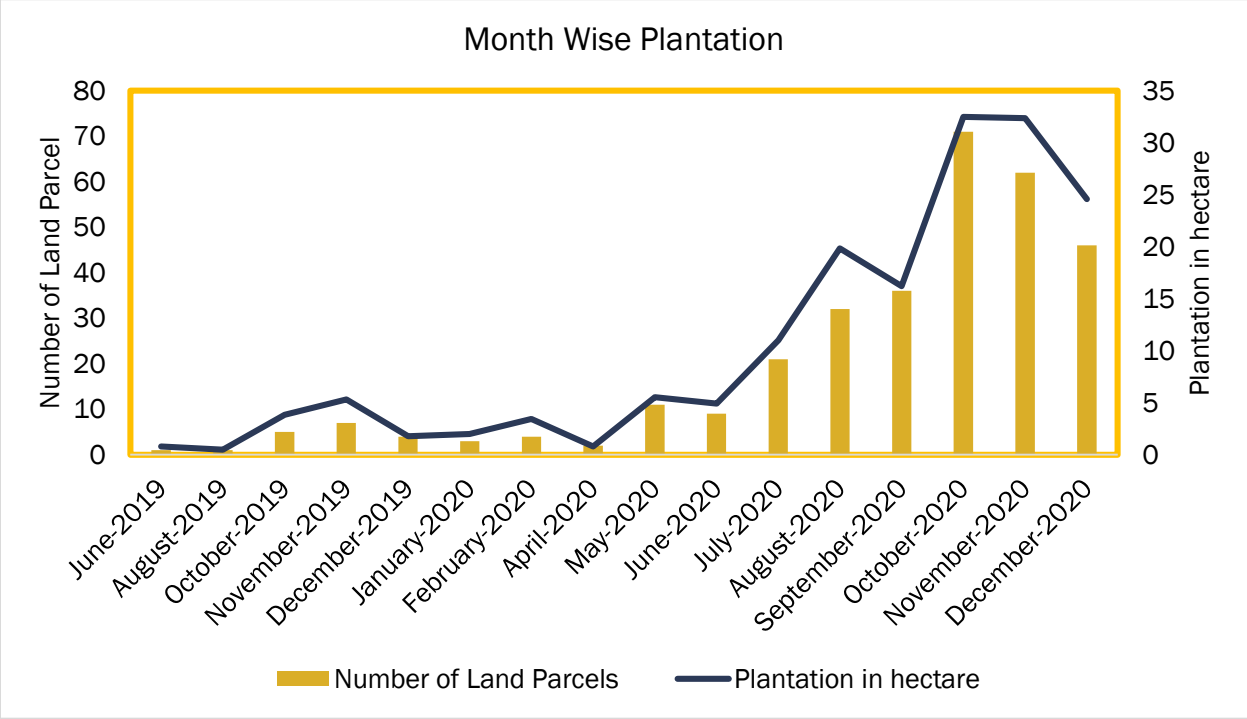
7.5 Net GHG Emission Reductions and Removals

The net GHG emission reductions and removals achieved for this monitoring period is described below. For detailed emission reduction calculation please refer ER sheet.

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)	Buffer pool allocation	VCUs eligible for Issuance (Round down Values)
28 June 2019 – 31 December 2019	0	53	6.6	47	6	41
01 January 2020 – 31 December 2020	0	1,730	204.4	1,525	183	1,342
01 January 2021 – 31 December 2021	0	1,725	203.9	1,521	183	1,338
01 January 2022 – 13 October 2022	0	1,347	159.2	1,188	143	1,045
Total	**0**	**4,855**	**575**	**4,280**	**514**	**3,766**

The estimated ex-ante GHG emission reductions and removals and the achieved emission reductions and removals for the monitoring period from 28 June 2019 to 13 October 2022 is described below:

Ex-ante emissions reductions /removals	Achieved emissions reductions /removals	Percent difference	Justification for the difference
7,981	4,280	(-)46%	Due to difference in plantation date of the land parcel involved in the project area, the actual emission reduction achieved is low compared to the estimated emission reduction. The estimated emission reduction is based on the assumption that the total plantation is completed on the start date of first plantation date for Stratum 1 and start date of calender year for stratum 2, where as the achieved emission reduction is based on the actual plantation date. Below graph details the variation in the plantation date of the land parcel involved in the First Project Activity Instance:


Month Wise Plantation
Number of Land Parcel
Plantation in hectare
80
70
60
50
40
30
20
10
0
35
30
25
20
15
10
5
0
June-2019
August-2019
October-2019
November-2019
December-2019
January-2020
February-2020
April-2020
May-2020
June-2020
July-2020
August-2020
September-2020
October-2020
November-2020
December-2020
Number of Land Parcels
Plantation in hectare

APPENDIX 1: TAXONOMY OF *SWIETENIA MACROPHYLLA*

Taxonomy	
Synonym	*Swietenia Candollei Pittier ; Swietenia Tessmannii Harms ; Swietenia Krukovii Gleason ;* *Swietenia Belizensis Lundell ; Swietenia Macrophyllavar. Marabaensis Ledoux & Lobato.*
Family	*Meliaceae*
Sub-Family	*Swietenoideae*
Kingdom	*Plantae*
English Name	Big-Leaf Mahogany; Honduras Mahogony
Other Names	Aguano, Mogno, Caoba
Dutch Name	Honduras Mahonie
Varieties	*S. Humilis* Proposed As An Ecotype By Helgason Et Al. 1996
Hybrids	Hybrids Of *S. Humilis X S.Macrophylla* (Costa Rica); *S. Mahagoni X S.Macrophylla* (Caribbian Islands)
Morphology	
Crown Habit	umbrella-shaped crown. fast-growing perennial tree with tall straight, cylindrical bole clear of branches for 12-18m, often with high buttresses.
Max. Height (M)	50
Max. Dbh (Cm)	200
Leaf Length (Cm)	16-40
Leaf Petiole (Cm)	0.5-1.2
Leaf Colour Upper Surface	Dark Glossy Green
Leaf Colour Under Surface	Lighter Green
Leaves Arrangement	Pinnate leaves arranged alternately an clustered at the ends of branchlets, each leaf consists of 3-6 pairs of opposite or occasionally sub-opposite leaflets that are typically 9-14 x 3-5 cm, usually oblong to oblong-lanceolate or ovate-lanceolate
Flowering	Takes place annually with the timing varying between locations according to climate, usually takes place when trees are deciduous or just coming into new leaf and shortly before the rainy season.
Flowering Plant	Monoecious, Both Sexes In The Same Inflorescence, With Unisexual Flowers

Flower, Inflorescence Description	Small flowers are borne in auxiliary or sub-terminal inflorescences, unisexual, with both sexes similar, green yellowish, corolla with 5 petals. each inflorescence is 10-20 cm in length with short lateral, spreading, globous branches, generally shorter than the leaves.
Flower Diameter (Mm)	6 To 8 Mm
Pollination	By insects: bees and moths are believed to be the main pollen vectors, thrips may act as pollinators.
Fruit; Length	Large (12-15 X 6-8 Cm), woody, erect, capsules, oblong to slightly sub-globulus. The outer valves are thick and becoming woody with a coriaceous surface when mature. When dry, the 4 or 5 valved fruits split open from the base, or from the base and the apex simultaneously. The centre of the fruit is a thick, woody 5 angled columella extending to the apex from which the seeds hang pendulous by their wing, leaving conspicuous seed scars after their release.
Fruiting	Takes place annually with the timing varying between locations according to climate. In Central America, northern parts of South America, and the Philippines the fruits mature from December-March. In the southern hemisphere is from June-September
Seed; Length	Seeds are chestnut coloured and 7.5-12 cm in length with wings, 1 cm without, irregular forms. there are usually about 35-45 winged seeds per fruit.
Seed-Wing Length	6-7 cm
Weight Of Seeds	13,000 To 20,000 Seeds Kg^{-1}
Seeds Ripen	From End Of January To Beginning Of March, Also In July
Seed Dispersal	By Container, Wind. Median Seed Dispersal Distance of 32-36 M (Bolivia) And A Maximum Distance of Over 80m. This Distance Depend On the Height of the Tree, The Height and Density of Surrounding Vegetation and the Strength of Wind at the time of release.
Habitat	
Distribution	From 20°N to 18°S in Tropical America. Widely Distributed Species occurring from The Atlantic Regions of South-East Mexico, Through Central America (Belize, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama), Northern South America (Colombia, Venezuela, Ecuador, Peru) And Across the Southern Amazon Basin, In Bolivia and Brazil. Mahogany has been planted in forest plantations in many other Indian states, including West Bengal, Maharashtra, Tamil Nadu, Kerala, Orrisa, Bihar, and Mysore. Kerala has the largest mahogany plantation area (more than 1283 acres). These mahogany plantations are primarily dispersed among Kerala's eight forest divisions. In Kerala, the Word Bank initiative established 1735 hectares of mahogany plantations between 1987 and 1999

Introduced Countries	Widely grown across the tropics both on a research scale and as extensive plantations.
Plant Communities Natural Area	Semi Evergreen And Evergreen Rain Forests, Dry Forests, Moist Forests, Rain Forests, Riparian Forest, Secondary Forests
Soil Type, Water	Adapted to Fine and Medium Textured Soils, Not Coarse Soils, Low Moisture. Found Growing On Alluvial Soils of Considerable Fertility, And Soils Derived from Limestone, Granite, Andesite and Other Sedimentary, Igneous or Metamorphic Rock Formation.
pH	Maximum 8.0 And Minimum 4.0
Soil Fertility	Tolerates soils ranging from deep, poorly drained, acid clays of the wooded swamps, to well drained alkaline soils of the limestone uplands. maximum development is attained on deep, fertile, moist, well-drained, neutral to mildly alkaline soils.
Light	Shade Intolerant, Strongly Light-Demanding
"Optimum Natural Development"	Under Tropical Dry Forest Conditions: Annual Precipitation of 1000-2500 mm, Mean Annual temperature of 24 °C and Potential Evapo-Transpiration Ratio of 1-2.

APPENDIX 2: STATE AND DISTRICT WISE COVERAGE AREA OF THE PROJECT ACTIVITY

Maharashtra									
District	No. of Villages	Total District Area (hectares)	Average Village Area (hectare)	Net Sown Area (hectares)	Average Net Sown Area per Village (ha)	District Project Area (ha)	Percentage Coverage of District Net Sown Area	Average Village Project Area (ha)	Percentage Coverage of Village Area
Ahmednagar	1,603	17,04,800	1,064	11,20,700	699	561	0.050%	0.350	0.033%
Akola	998	5,67,300	568	4,42,300	443	296	0.067%	0.297	0.052%
Amravati	2,009	12,21,000	608	6,70,700	334	442	0.066%	0.220	0.036%
Aurangabad	1,372	10,13,100	738	6,44,800	470	1,038	0.161%	0.757	0.102%
Bhandara	876	4,08,700	467	1,71,300	196	197	0.115%	0.225	0.048%
Beed	1,376	10,69,300	777	8,10,800	589	344	0.042%	0.250	0.032%
Buldhana	1,455	9,66,100	664	5,70,600	392	200	0.035%	0.137	0.021%
Chandrapur	1,815	11,44,300	630	3,83,700	211	147	0.038%	0.081	0.013%
Dhule	686	7,19,500	1,049	3,59,100	523	246	0.068%	0.358	0.034%
Gadchiroli	1,681	14,41,200	857	1,42,400	85	197	0.138%	0.117	0.014%
Gondia	952	5,23,400	550	1,60,800	169	49	0.031%	0.052	0.009%
Hingoli	714	4,82,700	676	3,67,500	515	347	0.094%	0.486	0.072%
Jalgaon	1,533	11,76,500	767	8,05,600	526	457	0.057%	0.298	0.039%
Jalna	971	7,69,400	792	6,11,000	629	154	0.025%	0.159	0.020%
Latur	955	7,15,700	749	5,83,800	611	247	0.042%	0.259	0.035%
Nagpur	1,900	9,89,200	521	4,71,200	248	694	0.147%	0.365	0.070%
Nanded	1,620	10,52,800	650	7,06,400	436	245	0.035%	0.151	0.023%
Nandurbar	952	5,95,500	626	2,56,500	269	494	0.193%	0.519	0.083%
Nashik	1,949	15,53,000	797	7,43,400	381	102	0.014%	0.053	0.007%
Osmanabad	741	7,56,900	1,021	6,40,300	864	103	0.016%	0.139	0.014%
Parbhani	851	6,21,400	730	5,14,300	604	234	0.045%	0.275	0.038%
Pune	1,912	15,64,300	818	10,13,500	530	26	0.003%	0.013	0.002%
Sangli	735	8,57,200	1,166	5,19,700	707	297	0.057%	0.404	0.035%
Satara	1,767	10,48,000	593	5,34,300	302	154	0.029%	0.087	0.015%
Solapur	1,167	14,89,500	1,276	10,06,500	862	462	0.046%	0.396	0.031%
Wardha	1,389	6,30,900	454	3,74,800	270	149	0.040%	0.107	0.024%
Washim	793	4,90,100	618	3,29,600	416	98	0.030%	0.124	0.020%

Yavatmal	2,155	13,58,200	630	7,61,200	353	372	0.049%	0.172	0.027%
Maharashtra	36,927	2,69,30,000	729	1,57,16,800	12,636	298		0.245	0.034%

Madhya Pradesh									
District	No. of Villages	Total District Area (ha)	Average Village Area (ha)	Net Sown Area (ha)	Average Net Sown Area per Village (ha)	District Project Area (ha)	Percentage Coverage of District Net Sown Area	Average Village Project Area (ha)	Percentage Coverage of Village Area
Alirajapur	547	3,18,200	582	1,69,191	309	99	0.059%	0.181	0.031%
Balaghat	1,397	9,22,900	661	3,14,513	225	197	0.063%	0.141	0.021%
Badwani	724	5,42,700	750	2,28,444	316	296	0.130%	0.409	0.055%
Betul	1,409	10,04,300	713	4,53,471	322	98	0.022%	0.070	0.010%
Bhopal	522	2,77,200	531	1,64,146	314	98	0.060%	0.188	0.035%
Burhanpur	266	3,42,700	1,288	1,02,175	384	296	0.290%	1.113	0.086%
Chindwada	1,996	11,81,500	592	5,06,553	254	245	0.048%	0.123	0.021%
Dhar	1,548	8,15,300	527	4,99,987	323	147	0.029%	0.095	0.018%
Harda	572	3,33,400	583	1,90,822	334	296	0.155%	0.517	0.089%
Indore	660	3,89,800	591	2,48,251	376	370	0.149%	0.560	0.095%
Jabalpur	1,457	5,21,100	358	2,75,506	189	197	0.072%	0.135	0.038%
Khandawa	781	7,35,200	941	3,07,069	393	245	0.080%	0.314	0.033%
Khargone	1,421	8,02,500	565	4,04,718	285	245	0.061%	0.172	0.031%
Mandala	1,231	5,80,000	471	2,26,142	184	25	0.011%	0.020	0.004%
Seoni	1,593	8,75,800	550	3,99,676	251	98	0.025%	0.062	0.011%

Karnataka									
District	No. of Villages	Total District Area (ha)	Average Village Area (ha)	Net Sown Area (hectares)	Average Net Sown Area per Village (ha)	District Project Area (ha)	Percentage Coverage of District Net Sown Area	Average Village Project Area (ha)	Percentage Coverage of Village Area
Bagalkot	638	6,55,200	1,027	489054	767	246	0.050%	0.386	0.038%
Belgavi	1306	13,43,300	1,029	906353	694	246	0.027%	0.188	0.018%
Bidar	629	5,44,800	866	344708	548	246	0.071%	0.391	0.045%
Kalaburagi (Gulbarga)	932	10,95,400	1,175	901635	967	246	0.027%	0.264	0.022%
Uttar kannada (karvari)	1312	10,27,700	783	1,27,132	97	246	0.193%	0.188	0.024%
Bijapur (Vijaypura)	698	10,49,800	1,504	869255	1245	738	0.085%	1.057	0.070%

Gujarat									
District	No. of Villages	Total District Area (ha)	Average Village Area (ha)	Net Sown Area (ha)	Average Net Sown Area per Village (ha)	District Project Area (ha)	Percentage Coverage of District Net Sown Area	Average Village Project Area (ha)	Percentage Coverage of Village Area
Bharuch	675	6,50,900	964	300613	445	54	0.018%	0.080	0.008%
Chota Udepur	894	3,43,600	384	207051	232	76	0.037%	0.085	0.022%
Dang	311	1,76,600	568	56502	182	76	0.135%	0.244	0.043%
Gandhinagar	291	2,14,000	735	163285	561	76	0.047%	0.261	0.036%
Sabarkantha	1395	7,39,400	530	274867	197	74	0.027%	0.053	0.010%
Narmada	614	2,81,700	459	113711	185	73	0.064%	0.119	0.026%
Navsari	387	2,24,600	580	109118	282	39	0.036%	0.101	0.017%
Surat	740	4,54,900	615	231668	313	100	0.043%	0.135	0.022%
Tapi	492	3,13,900	638	150922	307	49	0.032%	0.100	0.016%
Vadodara	694	7,54,600	1,087	303435	437	73	0.024%	0.104	0.010%
Valsad	467	3,00,800	644	164547	352	55	0.034%	0.118	0.018%

Telangana									
District	No. of Villages	Total District Area (ha)	Average Village Area (ha)	Net Sown Area (ha)	Average Net Sown Area per Village (ha)	District Project Area (ha)	Percentage Coverage of District Net Sown Area	Average Village Project Area (hectares)	Percentage Coverage of Village Area
Adilabad	560	4,15,300	508	199006	355	147	0.074%	0.263	0.052%
Kamareddy	607	3,66,700	604	156776	258	147	0.094%	0.242	0.040%
Nirmal	498	3,84,500	772	143415	288	148	0.103%	0.297	0.038%
Nizamabad	742	7,95,600	1,072	261098	352	198	0.076%	0.267	0.025%
Sangareddy	815	4,46,400	548	2,34,478	288	99	0.042%	0.121	0.022%

Sources:
https://villageinfo.in/
https://aps.dac.gov.in/LUS/Public/Reports.aspx
https://vlist.in/

APPENDIX 3: PARTICIPATION IN AGRI TRADE FORUMS AND EXHIBITIONS

Krishthon
कृषीधॉन
MAHOGANI VISHWA AGRO PVT. LTD.
B-28
MITCON

MITCON
महोगनी + ऊस

MITCON
महोगनी-वनशेती
महोगनी + ऊस
महोगनी + कापूस

APPENDIX 4: DECLARATION ON NO-DOUBLE ACCOUNTING

SABUJ NURSERY

PROP- ANJANA SARKAR, UTPAL SARKAR, SANDIPAN SARKAR
VILL+ P.O.- KASTADANGA, P.S.- HARINGHATA, DIST- NADIA, PIN-741257, WB,
TRADE REGISTRATION NO- 174.
Email- sabujnursery.kastadanga@gmail.com, Contact No- 7811047946.

"TO WHOMSOEVER IT MAY CONCERN"

Date: 16 January 2023

This declaration is in reference to the VCS Project Activity, titled "Mahogany Plantation in India" ID 2479 by Mahogani Vishwa Agro Private Limited (MVAPL). The Project Activity involves the plantation of *Swietenia macrophylla* species in Maharashtra, Madhya Pradesh, Karnataka, Gujarat and Telangana. The total area coverage of the Project is 15,000 hectares of land.

Sabuj Nursery hereby confirms that: -

1. **Sabuj Nursery is the supplier of *Swietenia macrophylla* seedlings to MVAPL.**
2. **Sabuj Nursery shall not be claiming any Environmental Attributes or Any Green House Gas (GHG) benefits from the *Swietenia macrophylla* seedlings Germinated, Grown, Nurtured, Supplied by Sabuj Nursery to MVAPL**
3. **Sabuj Nursery shall not be claiming any Environmental Attributes or Any GHG benefits from January 05, 2019 till the final Crediting Period of VCS 2479 ends by the year 2118.**
4. **If there is change in the name of the Sabuj Nursery, the above confirmation shall be applicable to the changed name of the company and name change shall be communicated to MVAPL accordingly.**

For Sabuj Nursery
Anjana Sarkar
SABUJ NURSERY
Prop.- Anjana Sarkar
Kastadanga, Haringhata, Nadia

Name of Authorized Signatory -
Signature with Date and Stamp
16/01/2023

APPENDIX 5: INCORPORATION CERTIFICATE

MAHOGANI VISHWA AGRO PRIVATE LIMITED

GOVERNMENT OF INDIA
MINISTRY OF CORPORATE AFFAIRS

Central Registration Centre

Certificate of Incorporation

[Pursuant to sub-section (2) of section 7 of the Companies Act, 2013 (18 of 2013) and rule 18 of the Companies (Incorporation) Rules, 2014]

I hereby certify that MAHOGANI VISHWA AGRO PRIVATE LIMITED is incorporated on this Twenty fifth day of January Two thousand nineteen under the Companies Act, 2013 (18 of 2013) and that the company is limited by shares.

The Corporate Identity Number of the company is U01100PN2019PTC181668.

The Permanent Account Number (PAN) of the company is **AAMCM3928J**

The Tax Deduction and Collection Account Number (TAN) of the company is **PNEM28195G**

Given under my hand at Manesar this Twenty fifth day of January Two thousand nineteen .

Digital Signature Certificate
Mr Ibson Shah I

For and on behalf of the Jurisdictional Registrar of Companies
Registrar of Companies
Central Registration Centre

Disclaimer: This certificate only evidences incorporation of the company on the basis of documents and declarations of the applicant(s). This certificate is neither a license nor permission to conduct business or solicit deposits or funds from public. Permission of sector regulator is necessary wherever required. Registration status and other details of the company can be verified on www.mca.gov.in

Mailing Address as per record available in Registrar of Companies office:

MAHOGANI VISHWA AGRO PRIVATE LIMITED
SNO 87/1/1, NANDINI TAKALE NAGAR,, MANJARI BK,, PUNE, Pune,
Maharashtra, India, 412307

* as issued by the Income Tax Department

MITCON NATURE BASED SOLUTIONS LIMITED

GOVERNMENT OF INDIA
MINISTRY OF CORPORATE AFFAIRS

Central Registration Centre

Certificate of Incorporation

[Pursuant to sub-section (2) of section 7 and sub-section (1) of section 8 of the Companies Act, 2013 (18 of 2013) and rule 18 of the Companies (Incorporation) Rules, 2014]

I hereby certify that MITCON NATURE BASED SOLUTIONS LIMITED is incorporated on this Fifteenth day of September Two thousand twenty-two under the Companies Act, 2013 (18 of 2013) and that the company is limited by shares.

The Corporate Identity Number of the company is U01111PN2022PLC214761.

The Permanent Account Number (PAN) of the company is **AAQCM1936Q** *

The Tax Deduction and Collection Account Number (TAN) of the company is **PNEM36490G** *

Given under my hand at Manesar this Fifteenth day of September Two thousand twenty-two .

Digital Signature Certificate
Mr. N.VAIRAMUTHU

For and on behalf of the Jurisdictional Registrar of Companies
Registrar of Companies
Central Registration Centre

Disclaimer: This certificate only evidences incorporation of the company on the basis of documents and declarations of the applicant(s). This certificate is neither a license nor permission to conduct business or solicit deposits or funds from public. Permission of sector regulator is necessary wherever required. Registration status and other details of the company can be verified on www.mca.gov.in

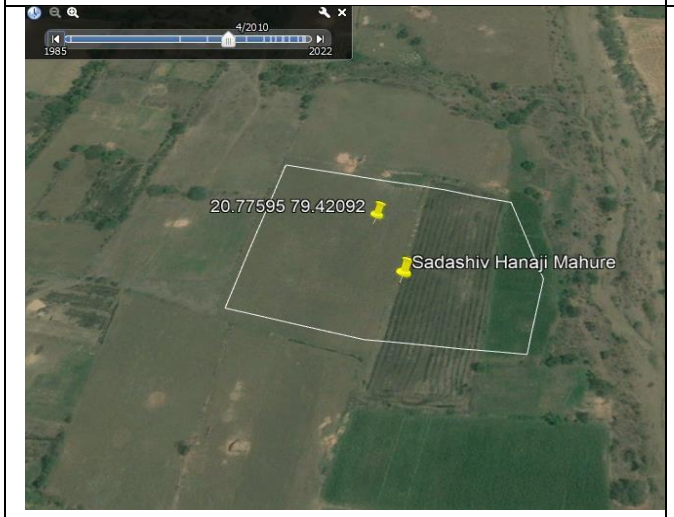
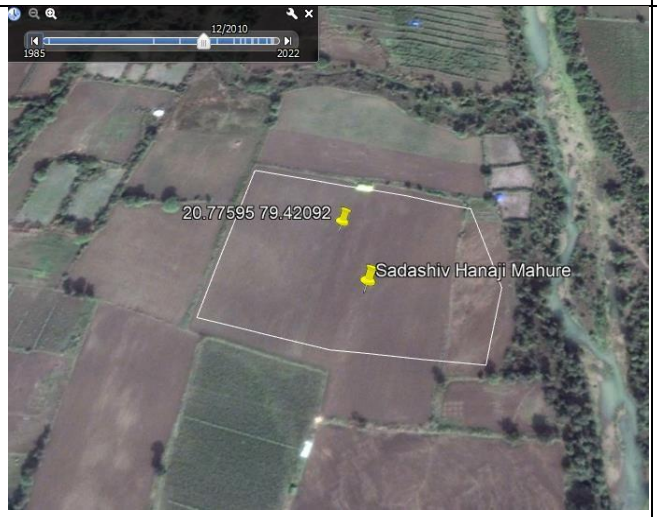
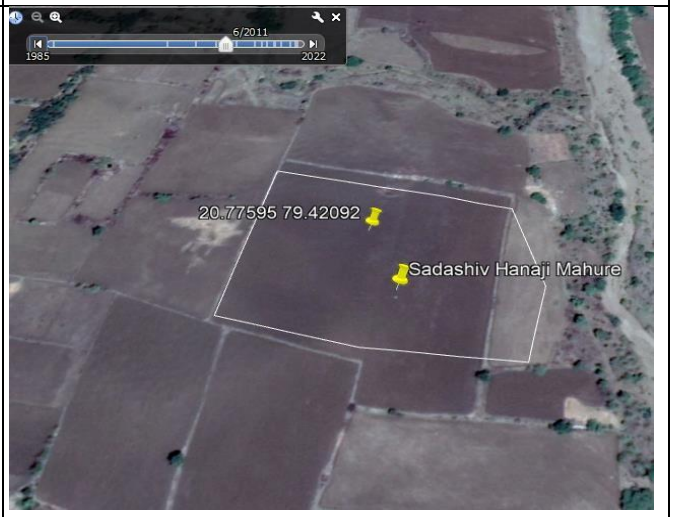
Mailing Address as per record available in Registrar of Companies office:

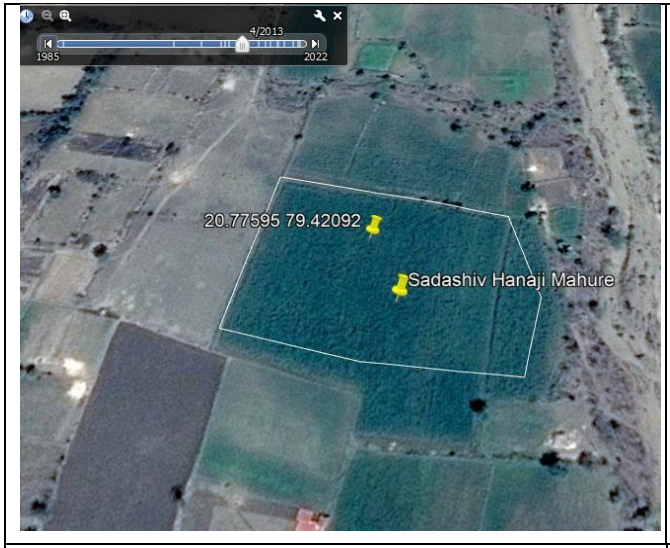
MITCON NATURE BASED SOLUTIONS LIMITED
FIRST FLOOR KUBERA CHAMBERS, SHIVAJINAGAR, PUNE, Pune,
Maharashtra, India, 411005

* as issued by the Income Tax Department

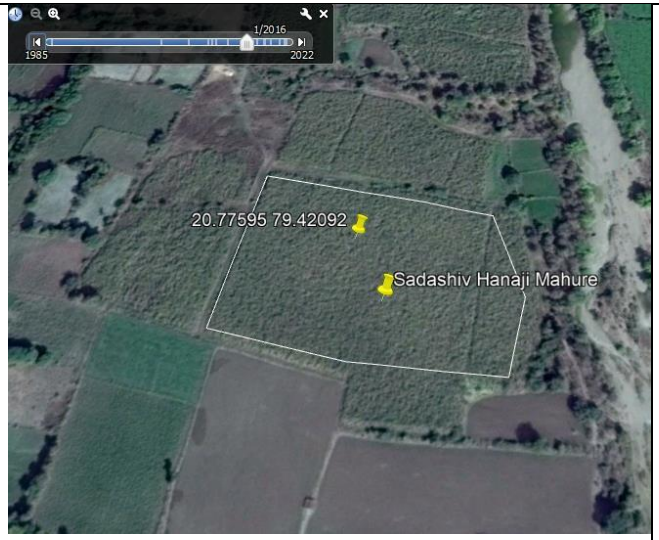
APPENDIX 6: LIST OF FEW FARMERS WITH 10 YEARS SATELLITE IMAGES

1. Sadashiv Hanaji Mahure

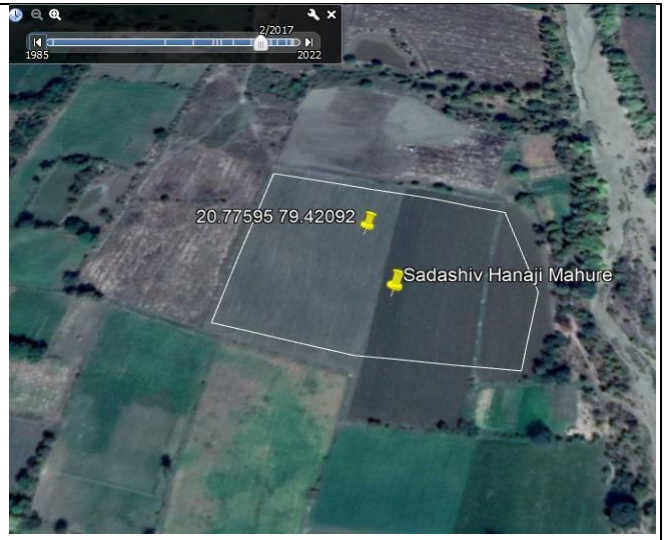
2010-04	2010-12	2011-06
		
2013-04	**2016-01**	**2017-02**



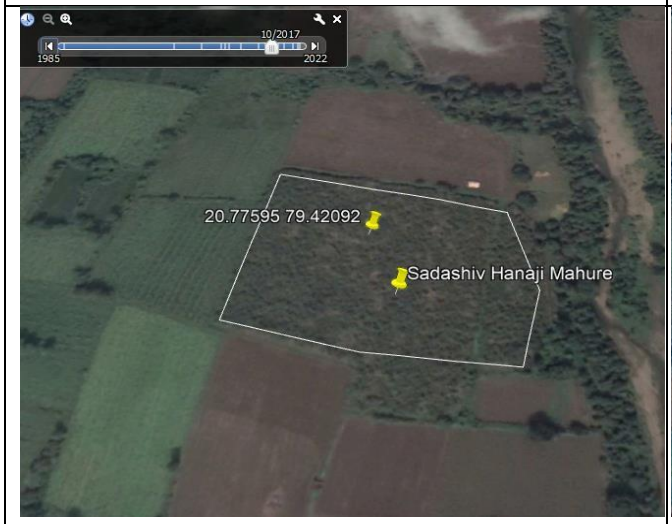
2017-10



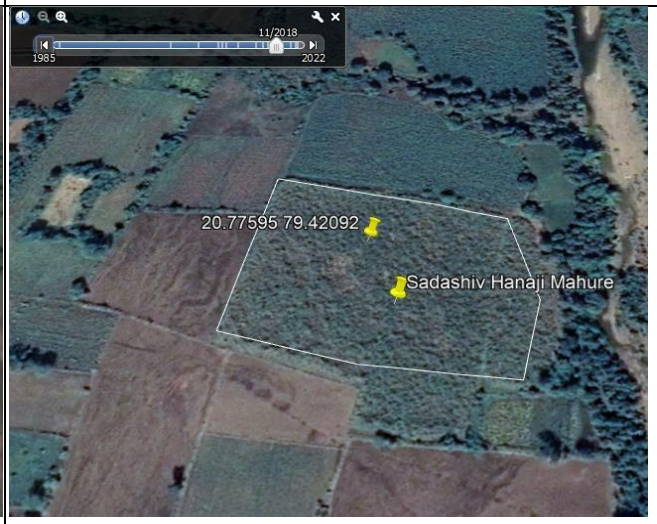
2018-11

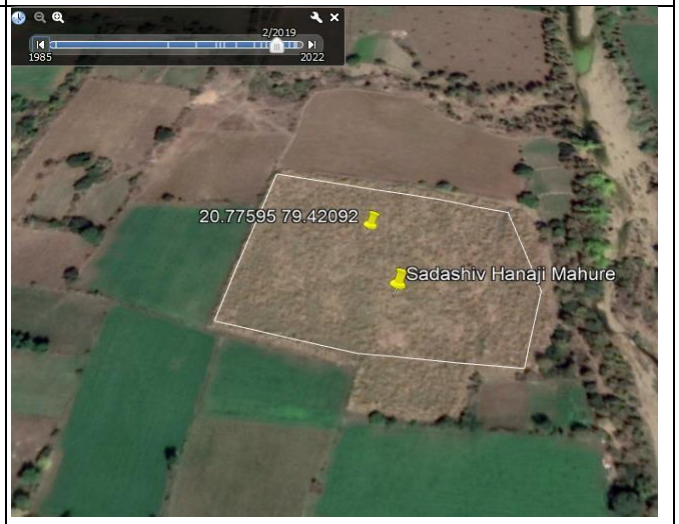


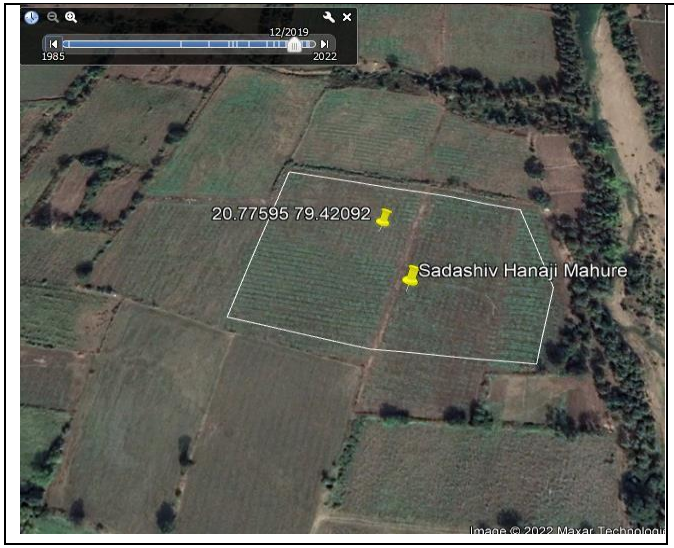
2019-02



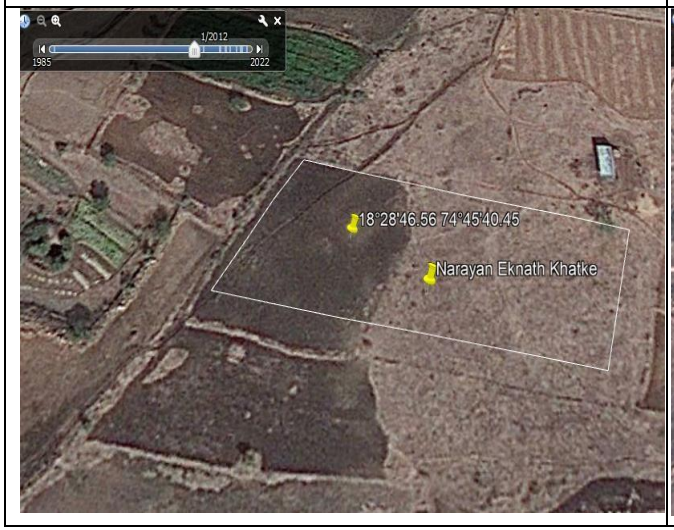
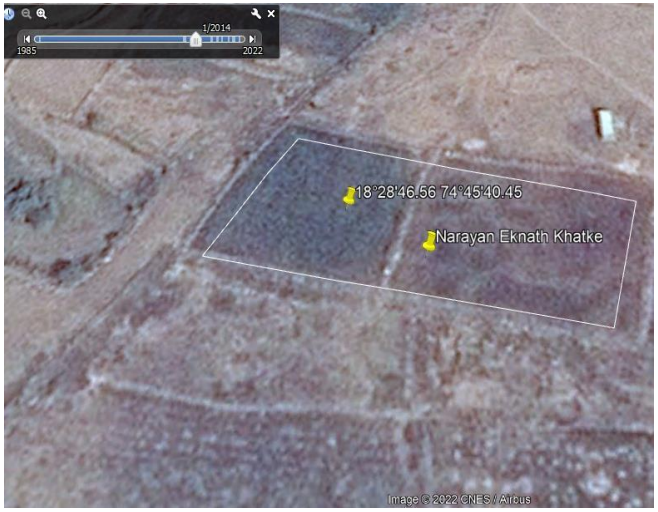
2019-12







2. Narayan Eknath Khatke

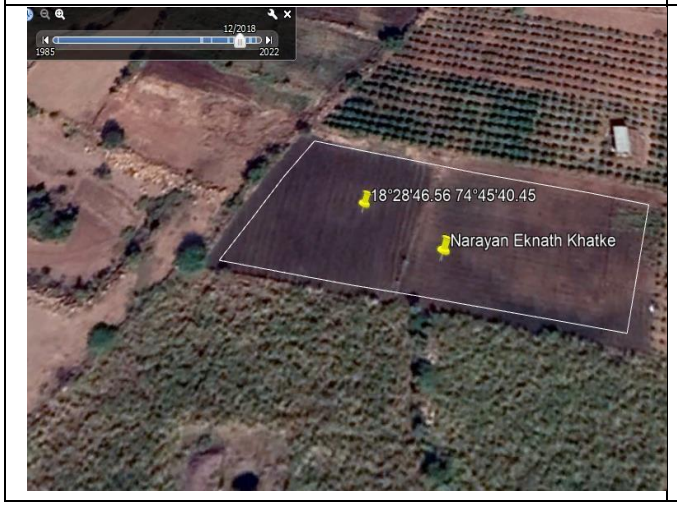
2012-01	2012-04	2014-01
		

2016-12

2017-03

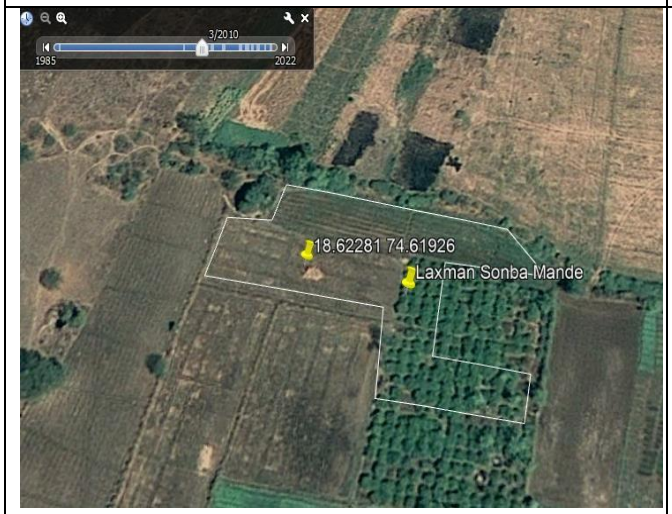
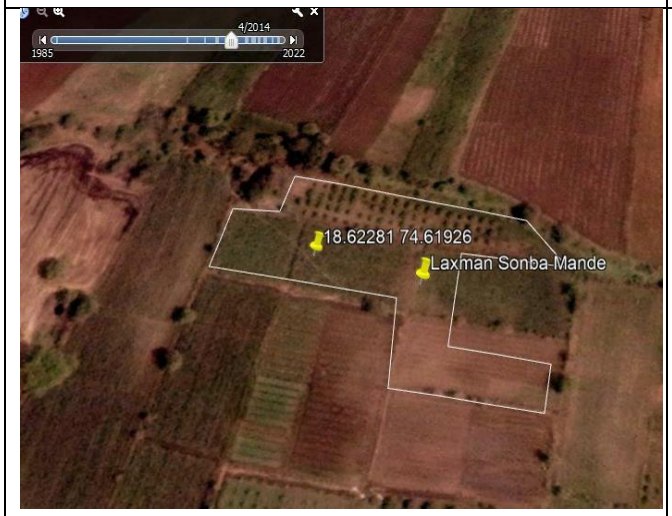
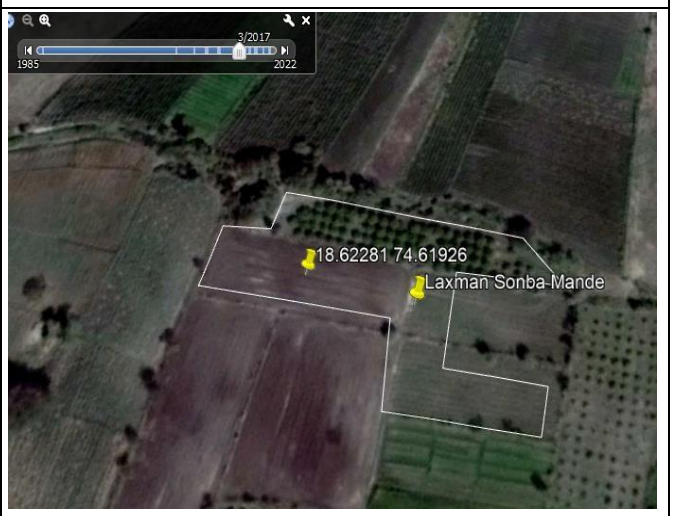
2018-02

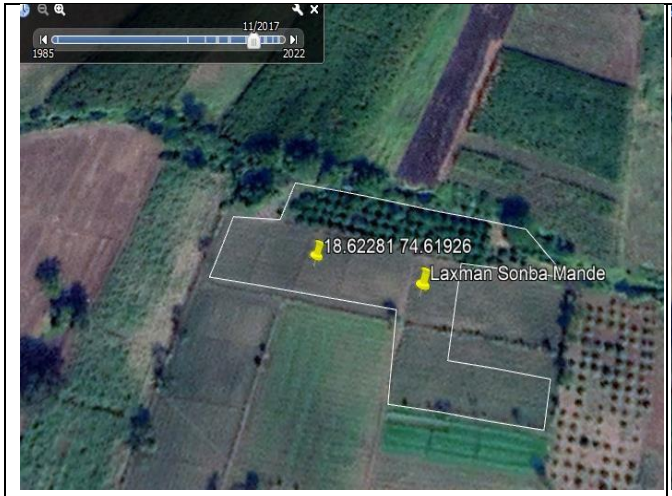
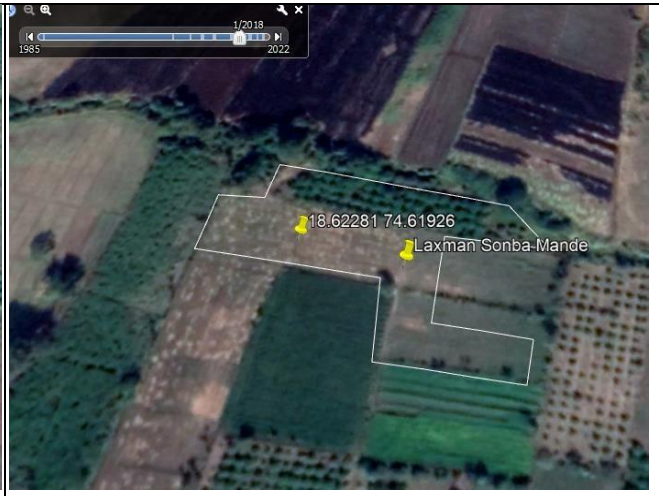
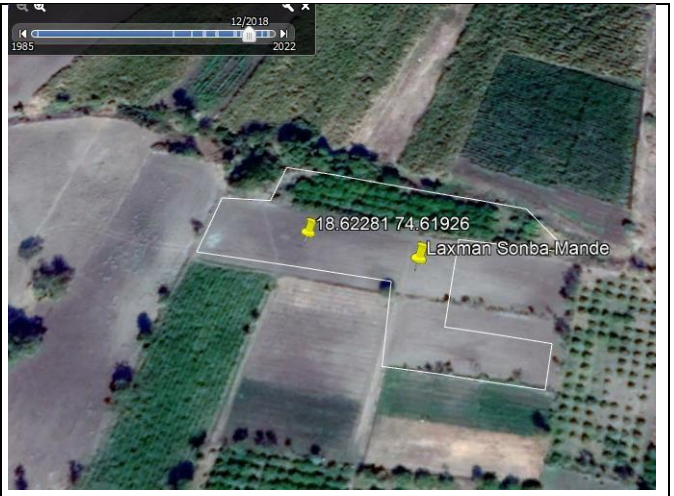
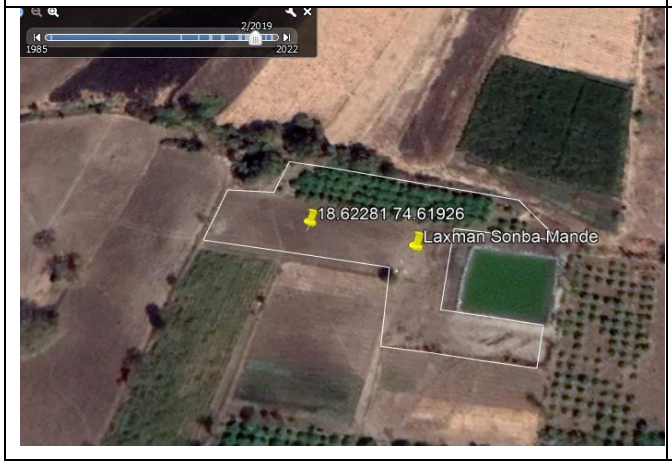
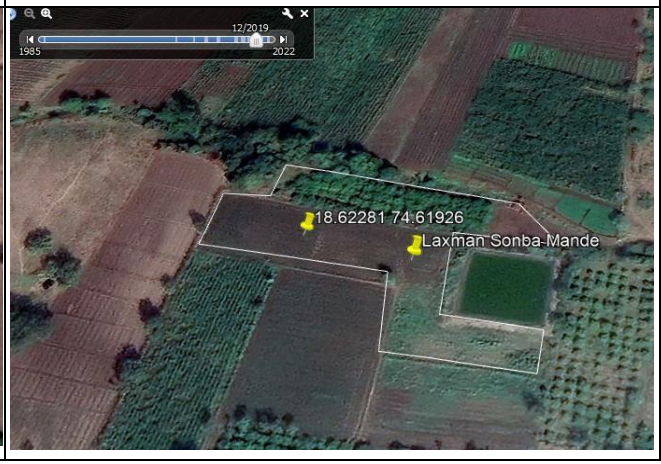
2018-12



2020-03

3. Laxman Sonba Mande

2010-03	2012-04	2014-01
		
2014-04	**2016-12**	**2012-03**
		
2017-11	**2018-01**	**2018-12**

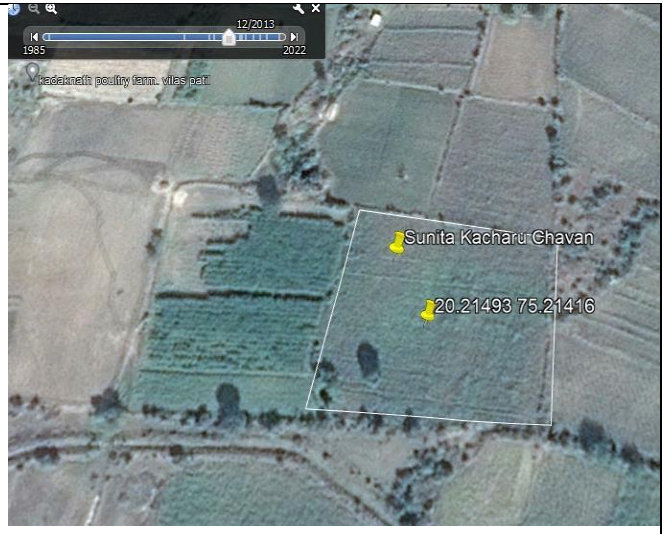
		
2019-02	**2019-12**	**2020-03**
		

4. Sunita Kacharu Chavan

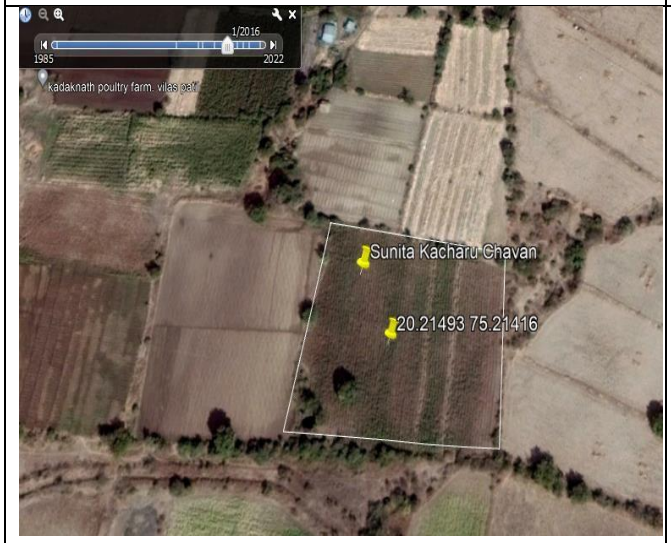
2011-02	**2011-12**	**2013-12**

2016-01

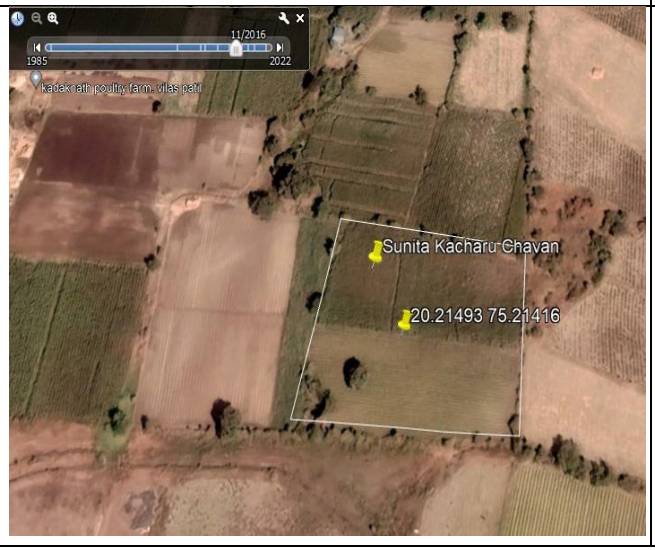
2016-11

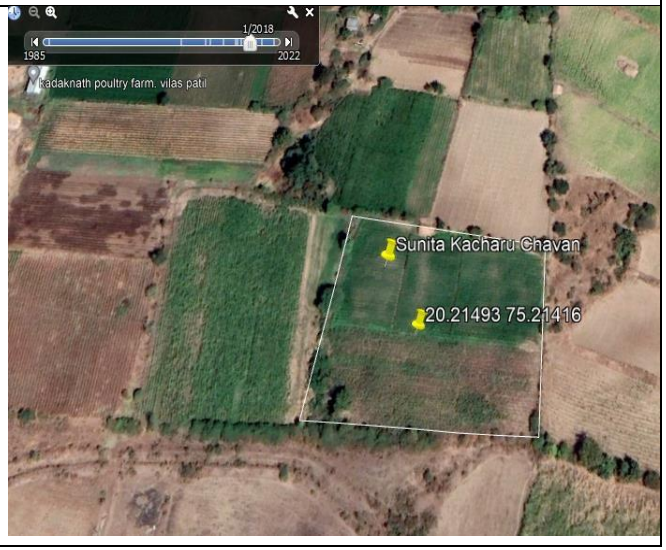


2018-01



2019-03





5. Varsha Balu Gaikwad

2011-01	2012-12	2014-02
2014-11	**2015-01**	**2015-12**

2016-02

2016-11

2017-01

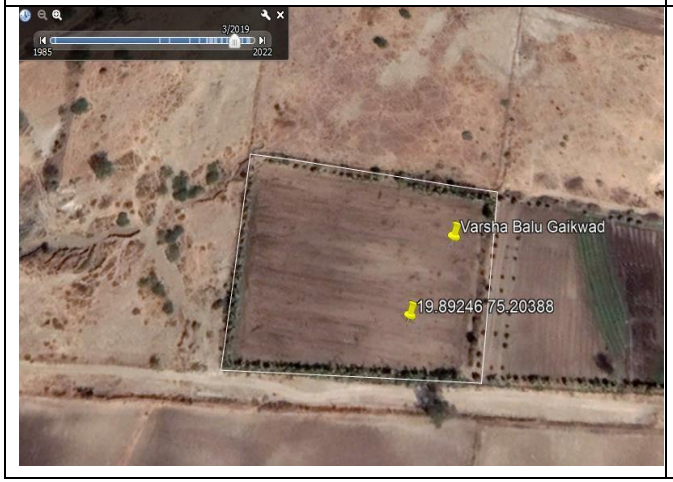
2017-11

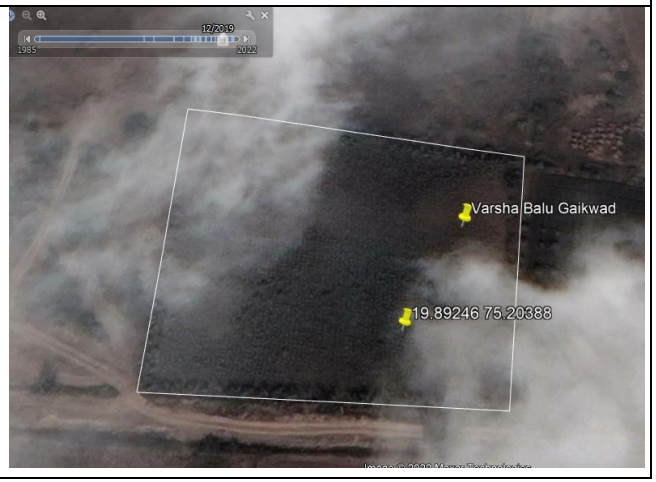
2018-01

2018-10

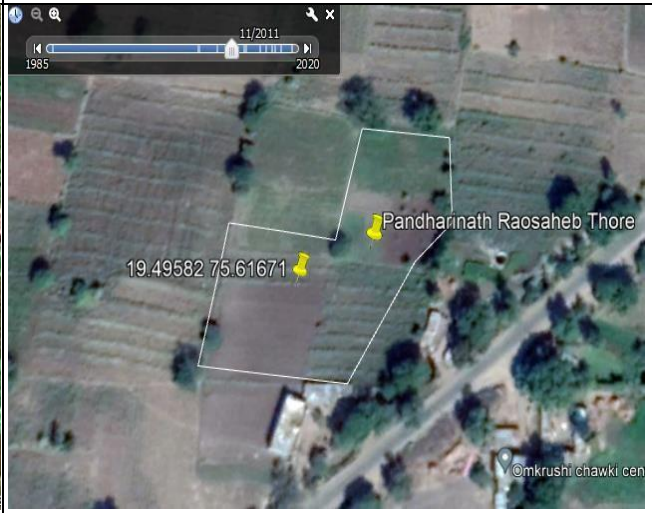
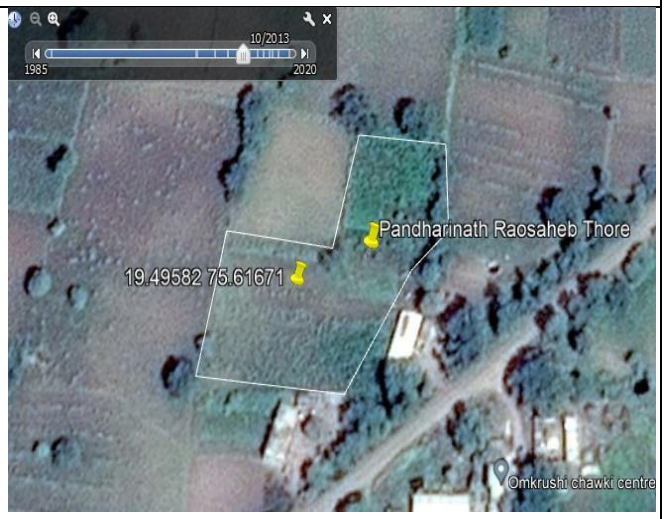
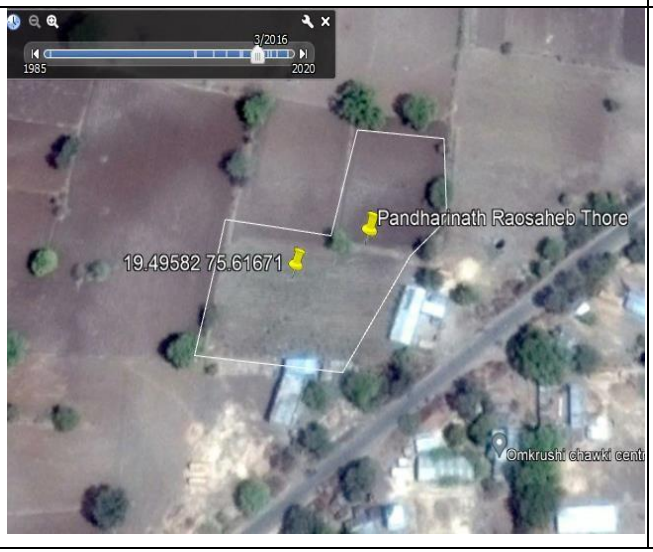
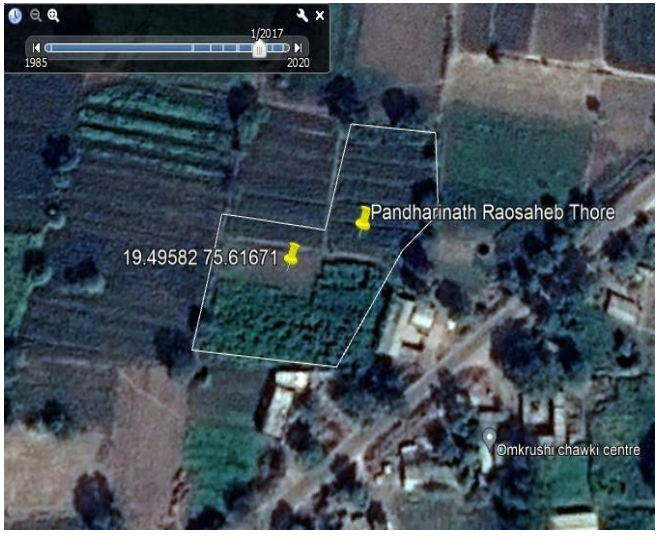
2019-02

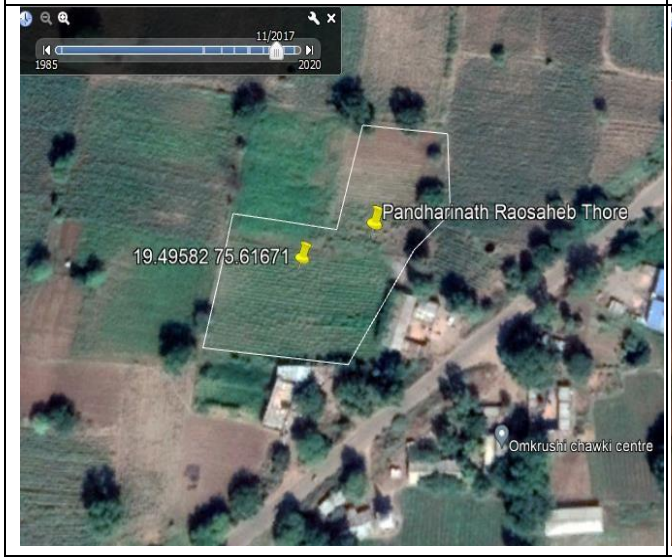
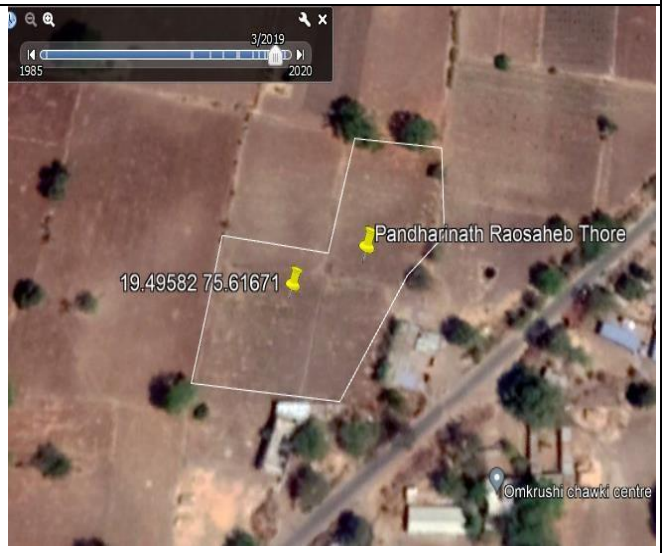
2019-12



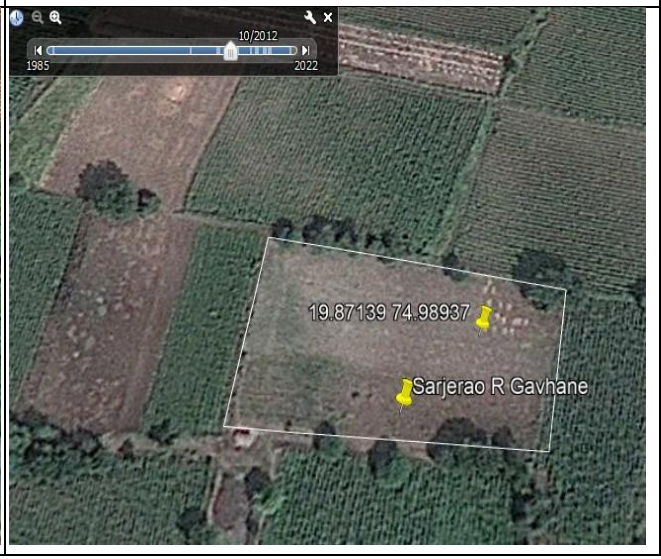


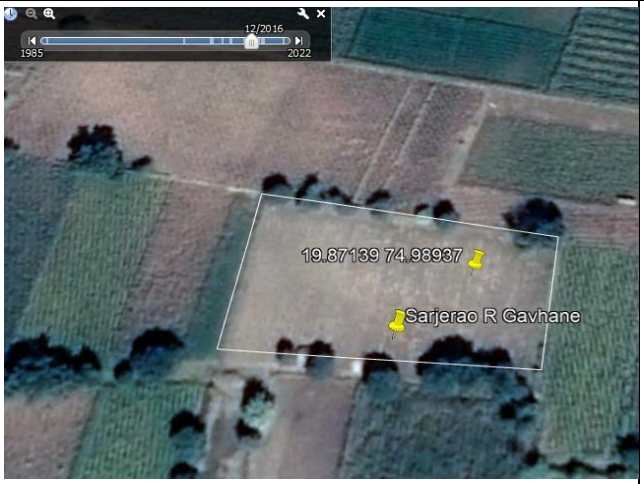
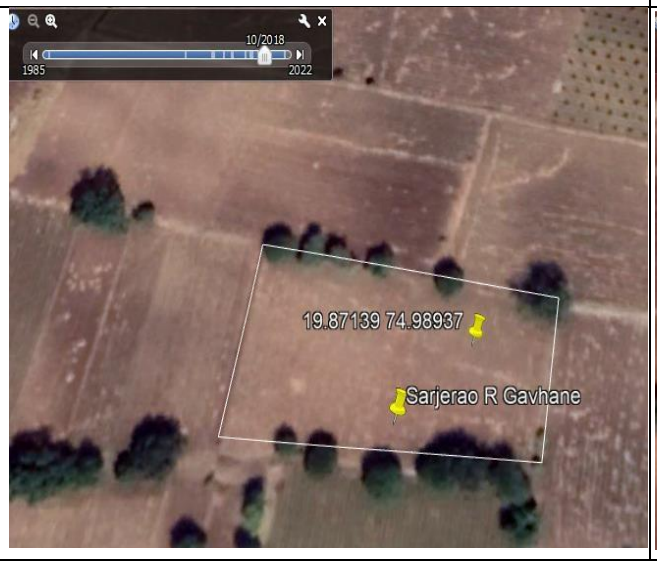
6. Pandharinath Raosaheb Thore

2009-11	2011-11	2013-10
		
2014-02	**2016-03**	**2017-01**
		

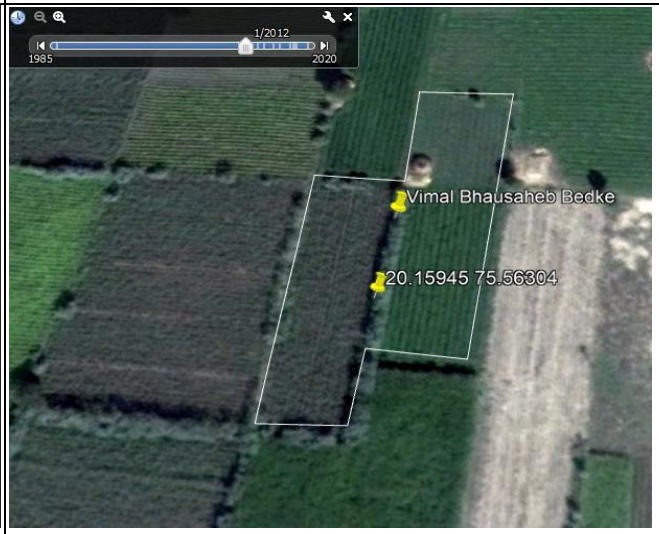
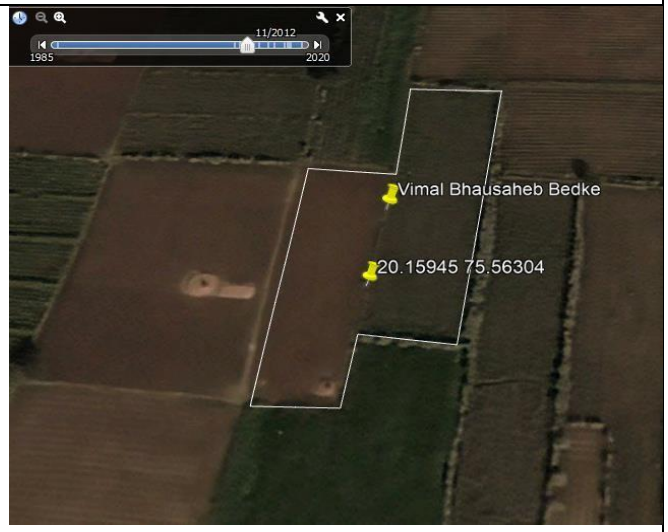
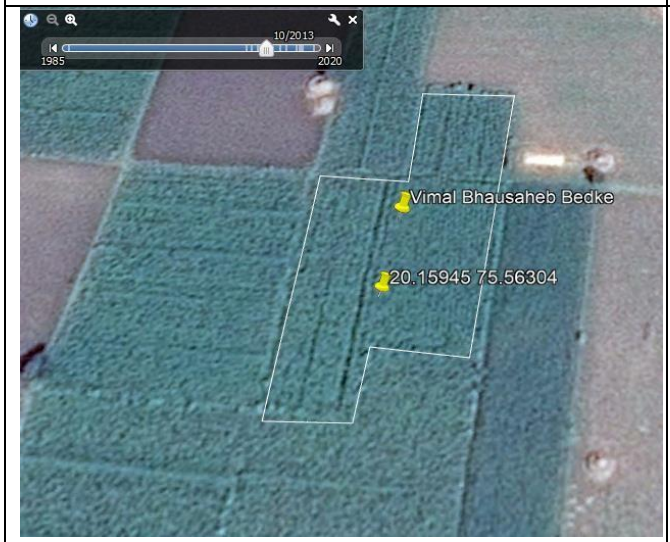
2017-11	2018-05	2019-03
		

7. Sarjerao Ramrao Gavhane

2011-01	2012-10	2014-02
		

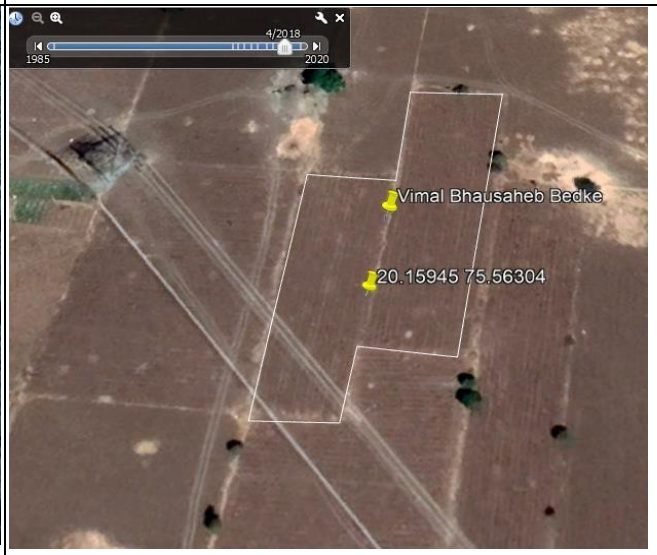
2016-02	2016-12	2017-02
		
2018-01	**2018-10**	**2019-03**
		

8. Vimal Bhausaheb Bedke

2011-04	2012-01	2012-11
		
2013-10	**2014-10**	**2016-01**
		

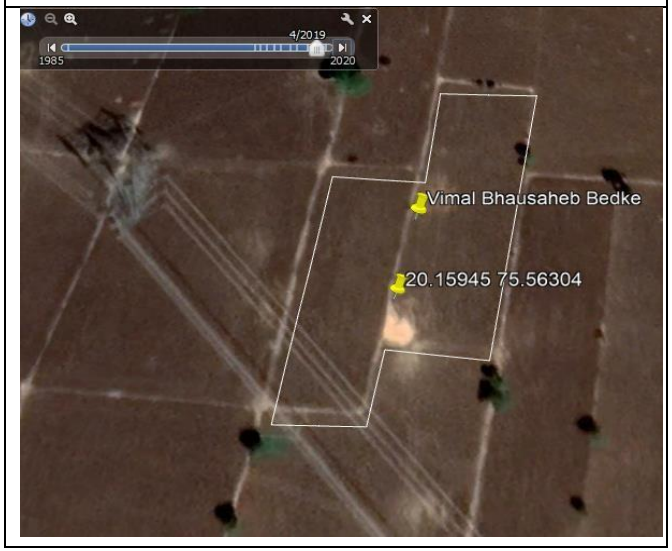
2016-12

2018-04

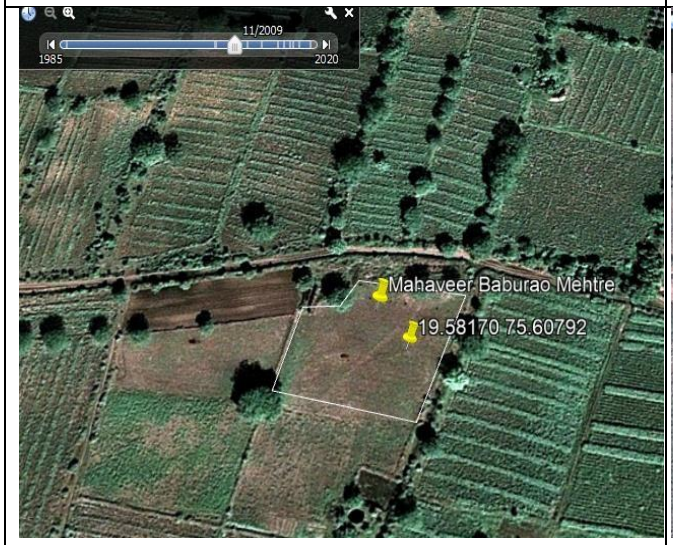
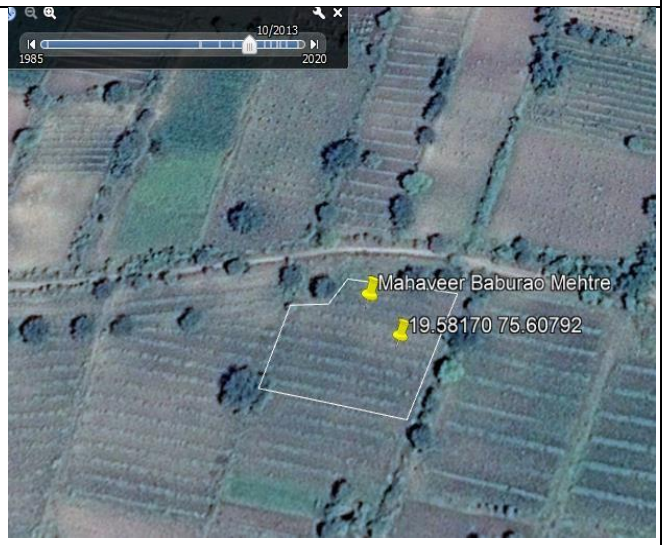
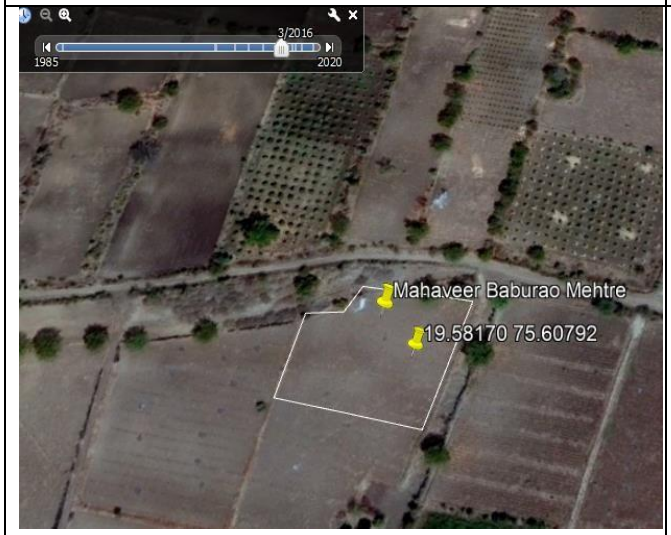
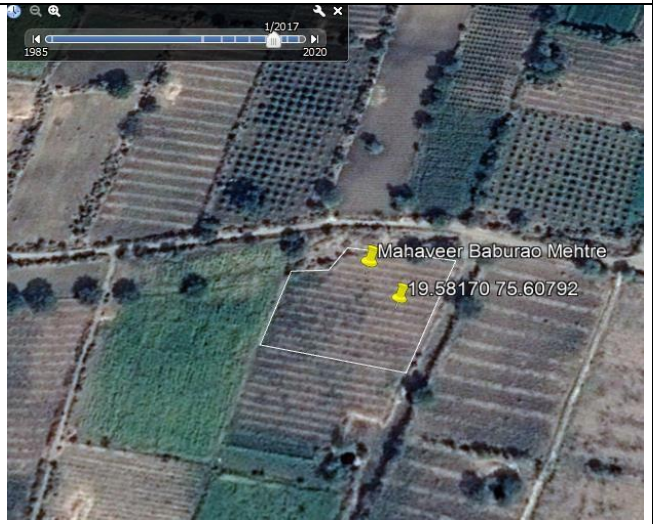
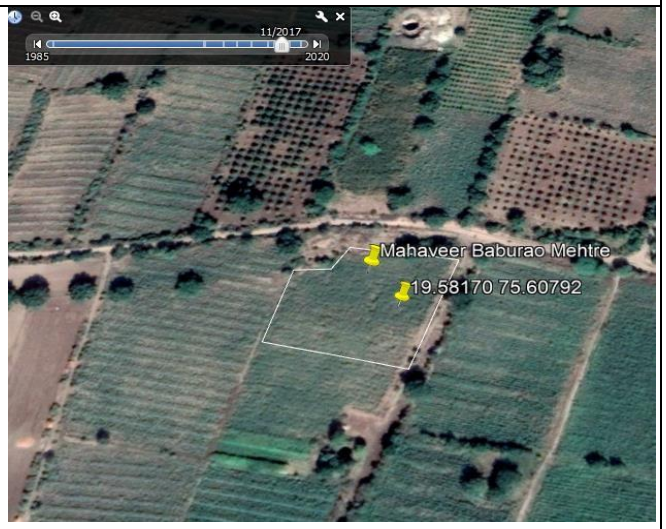


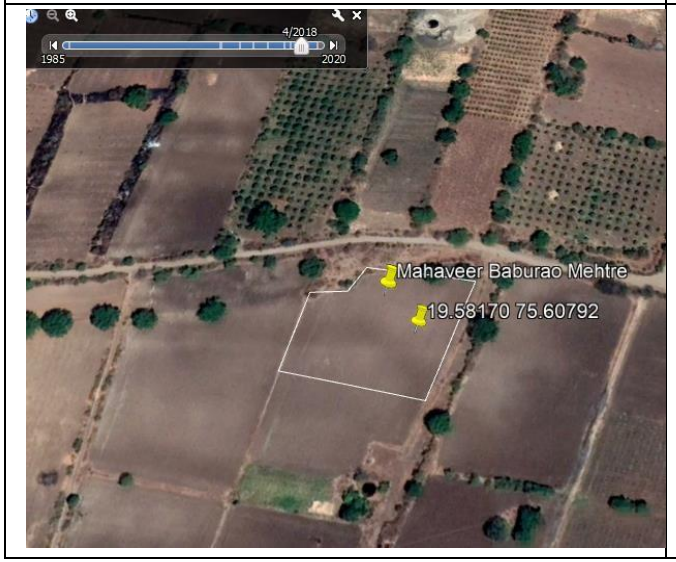
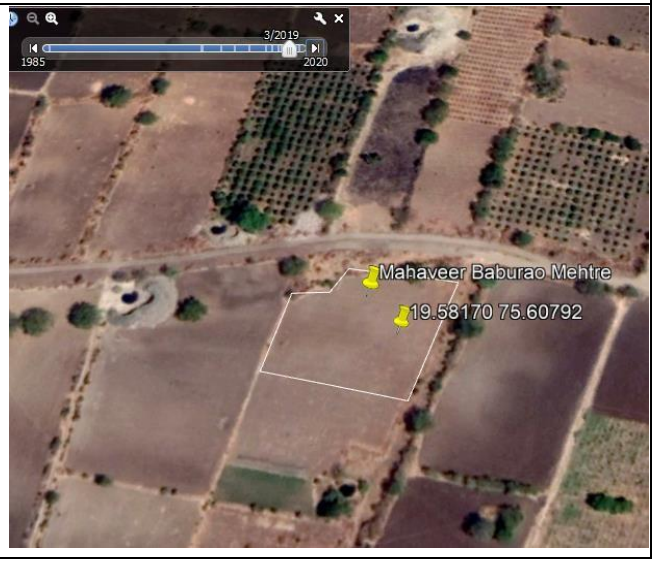
2018-11

2019-04

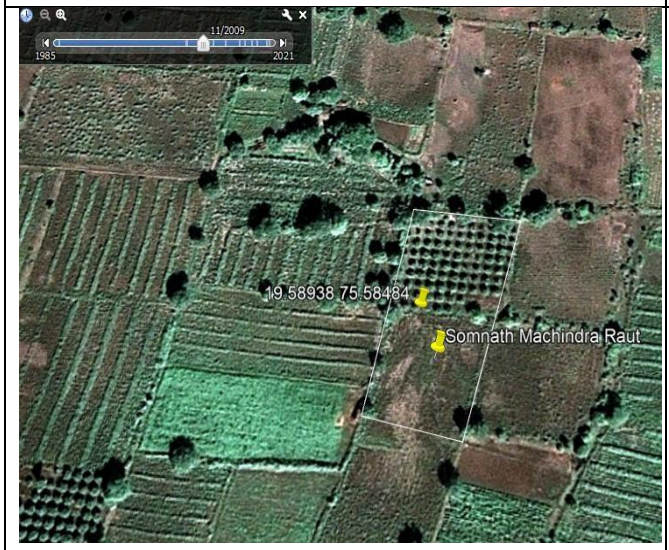
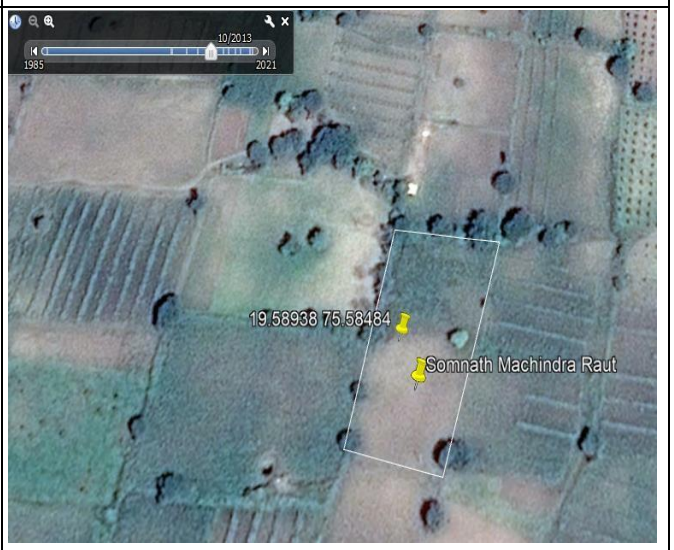


9. Mahaveer Baburao Mehtre

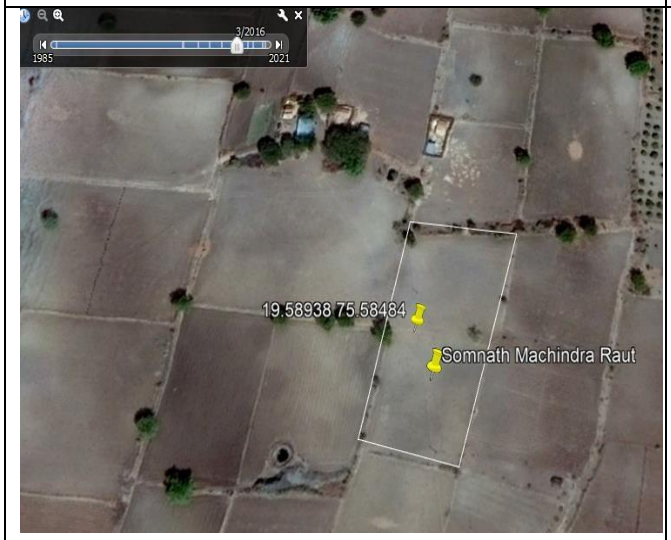
2009-11	2011-11	2013-10
		
2016-03	**2017-01**	**2017-11**
		

2018-04	2019-03
	

10. Somnath Machindra Raut

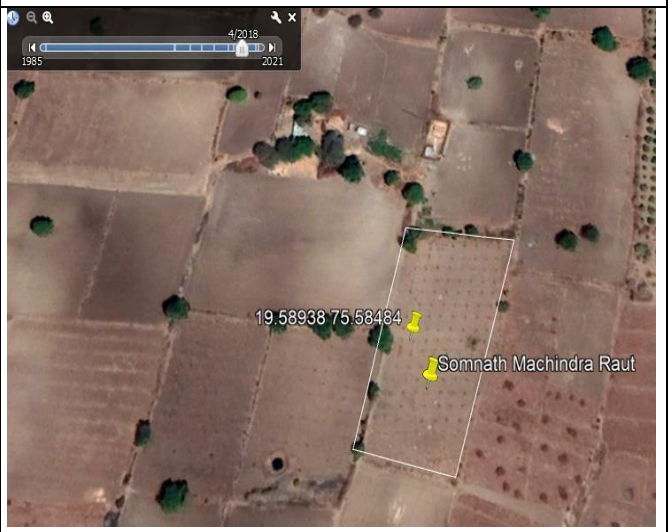
2009-11	2011-11	2013-10
		

2016-03

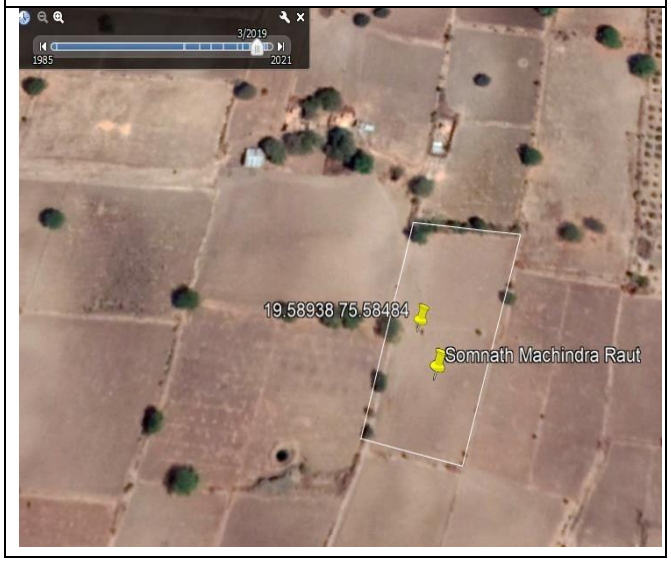


2017-01

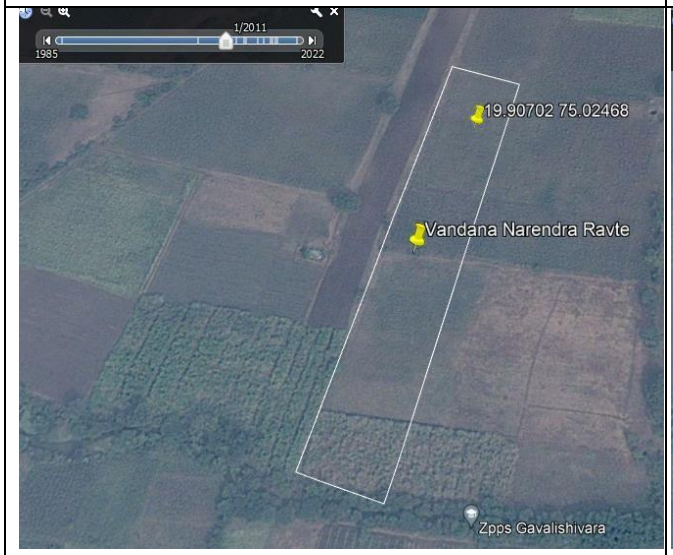
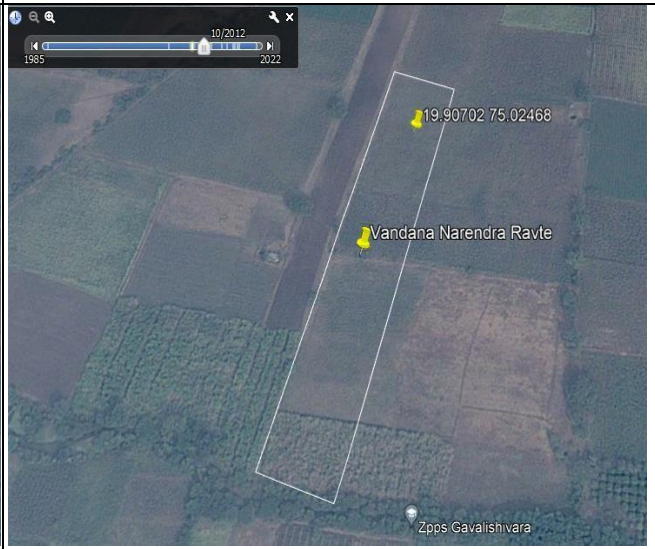
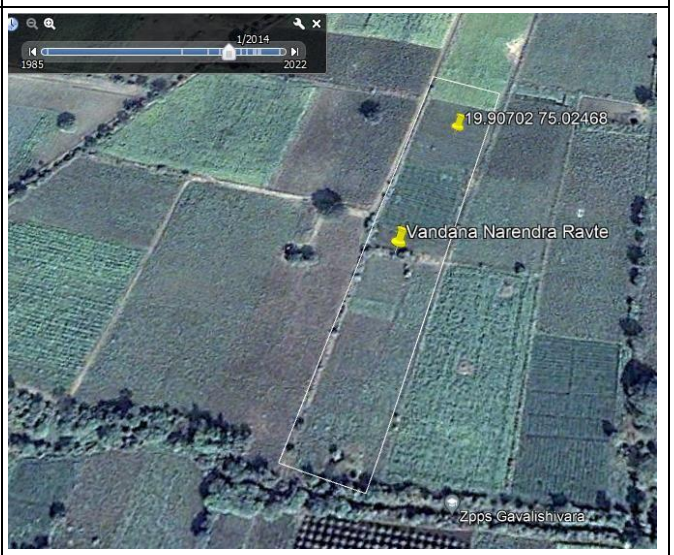
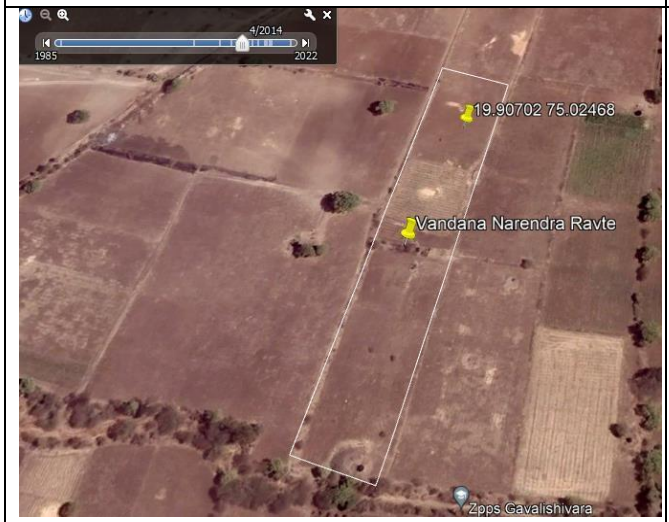
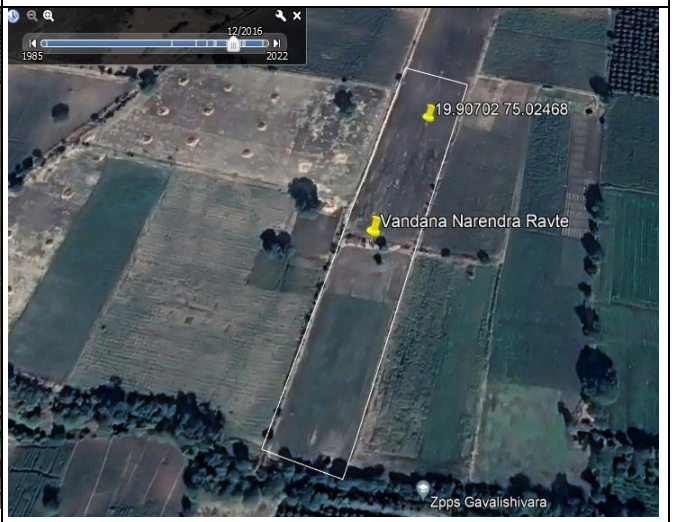
2018-04

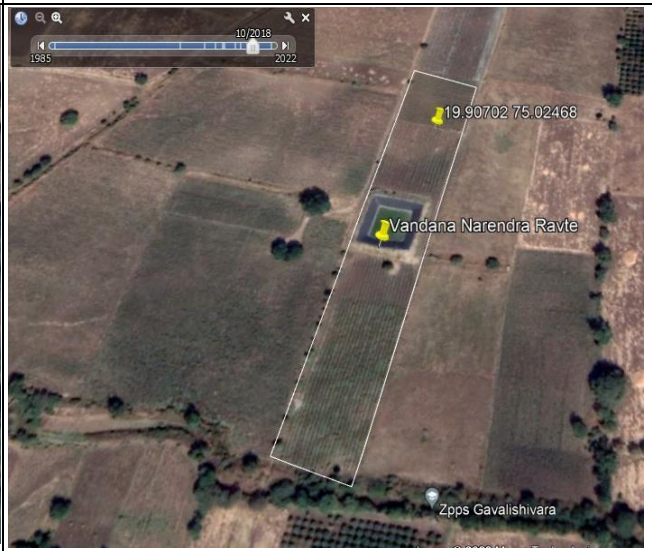
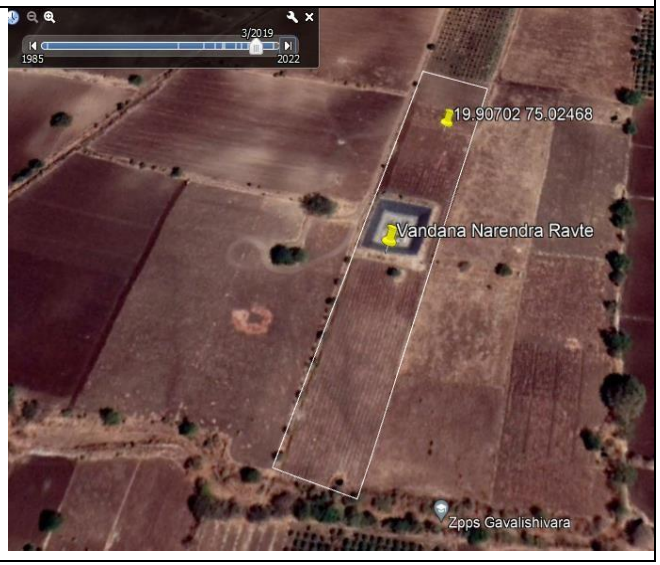


2019-03

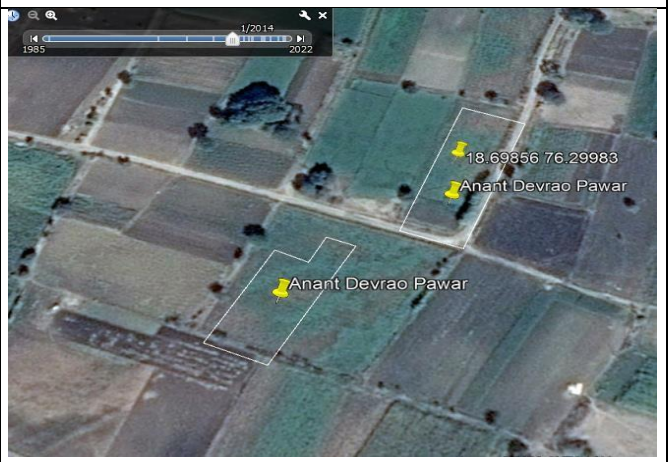


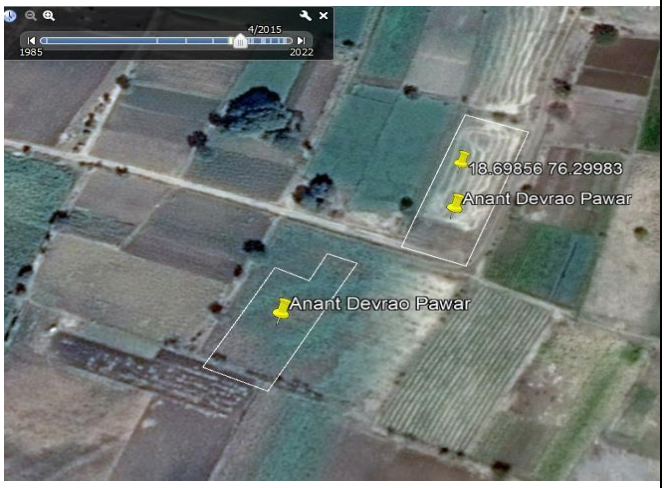
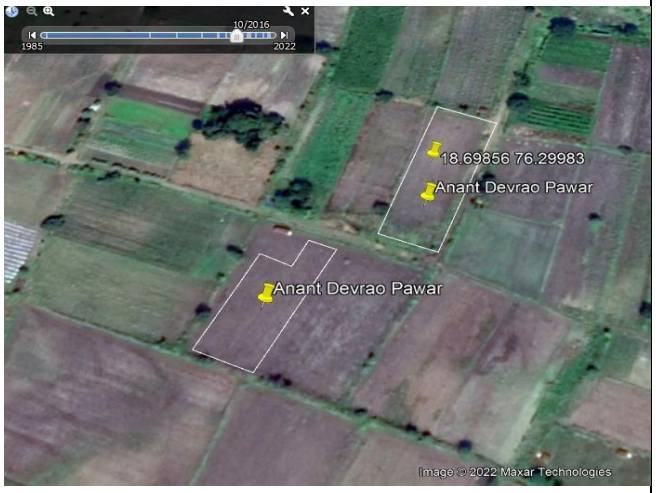
11. Vandana Narendra Ravte

2011-01	2012-10	2014-01
		
2014-04	**2016-02**	**2016-12**
		

2018-01	2018-10	2019-03
		

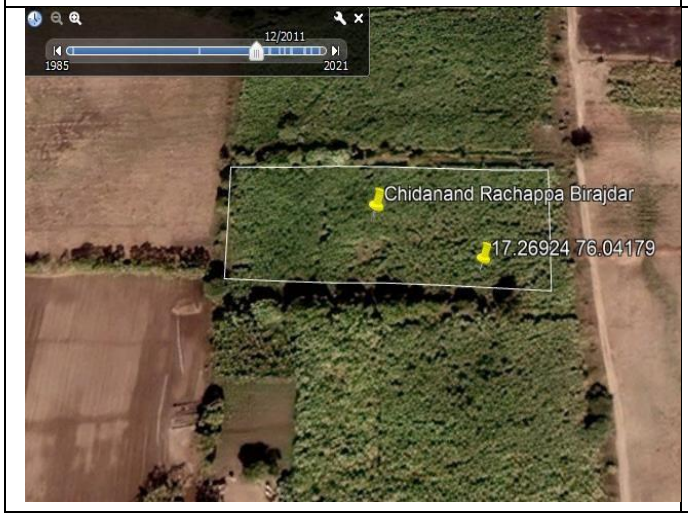
12. Anant Devrao Pawar

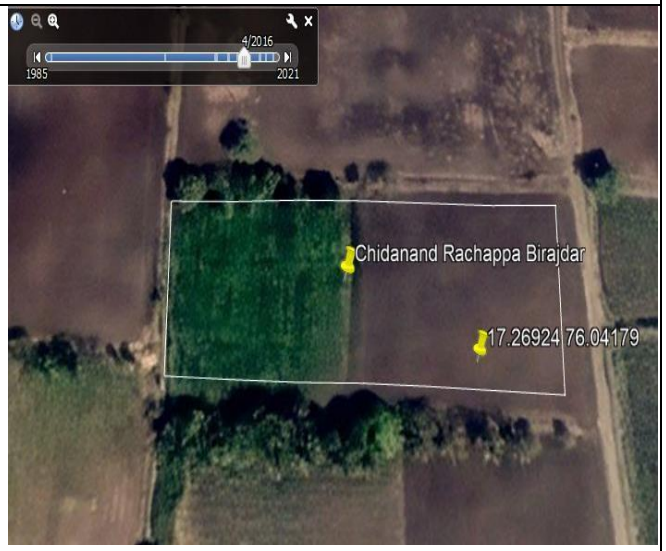
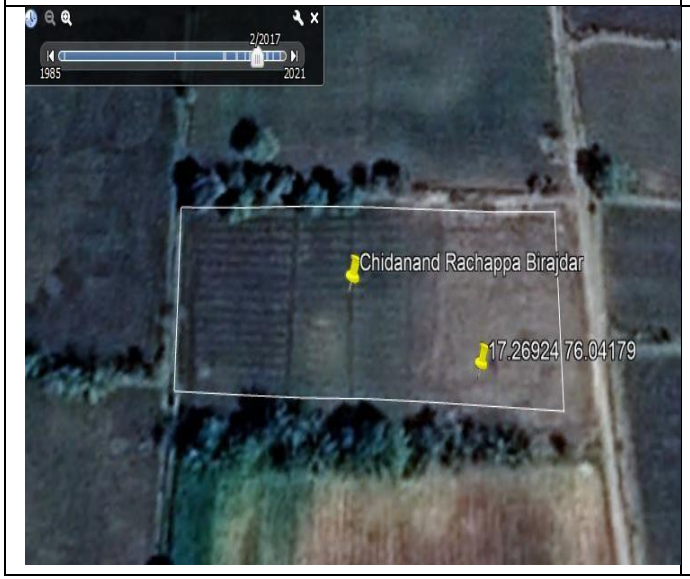
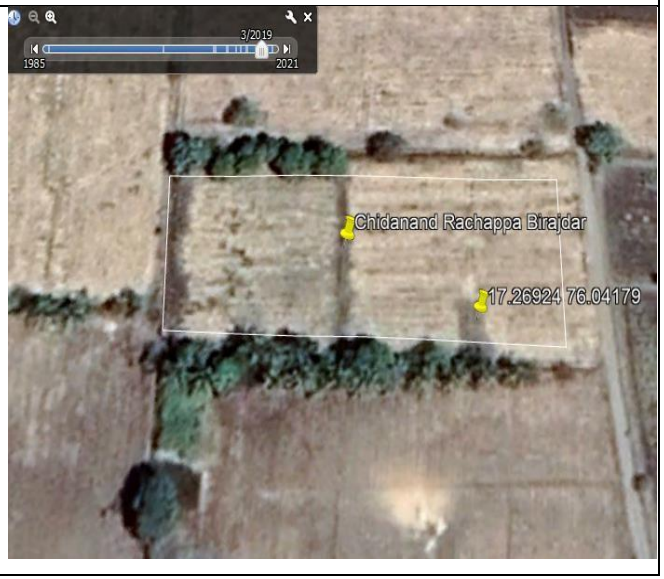
2011-04	2013-11	2014-01
		

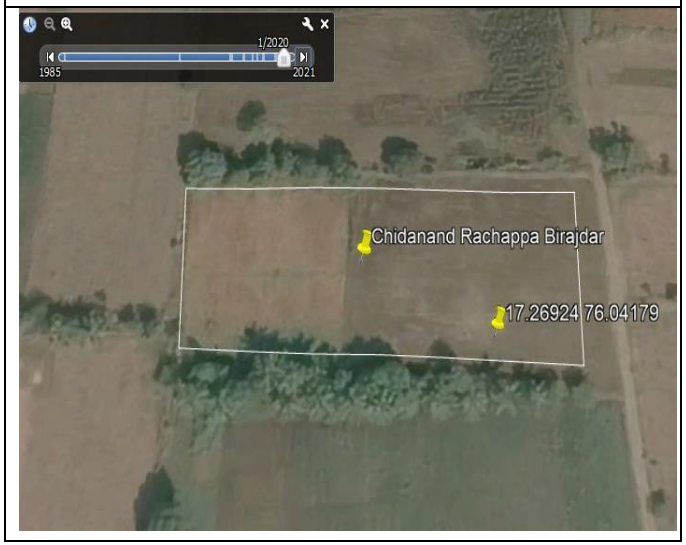
2015-04	2015-12	2016-10
		
2017-04	**2018-10**	**2019-02**

2020-02	

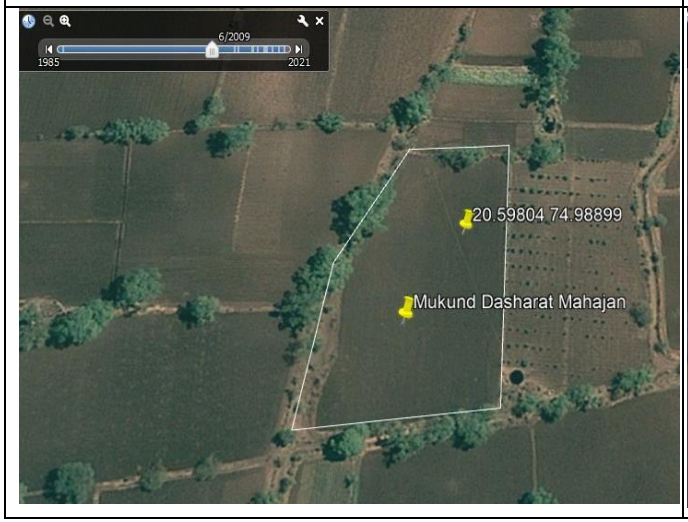
13. Chidanand Rachappa Birajdar

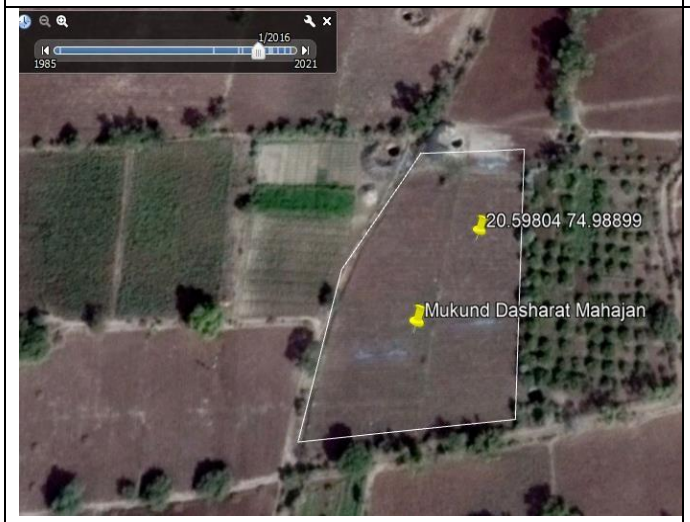
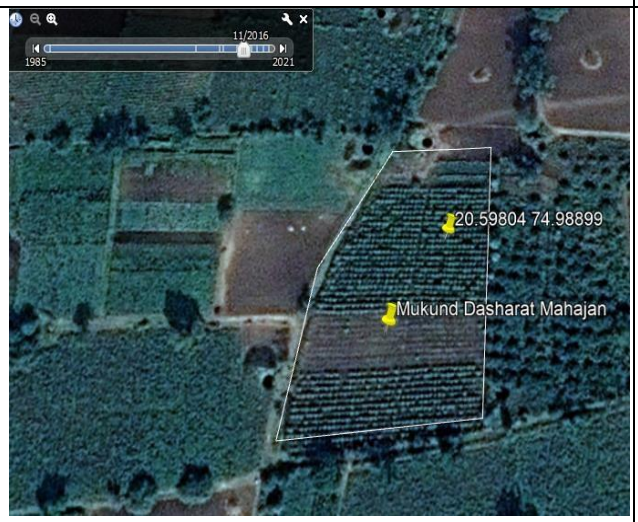
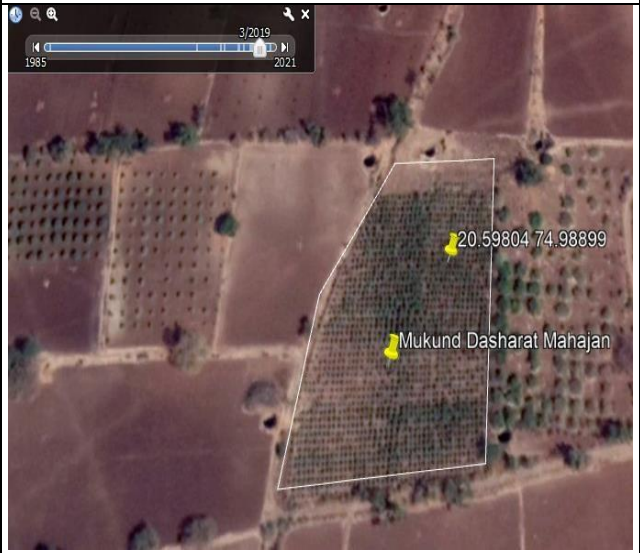
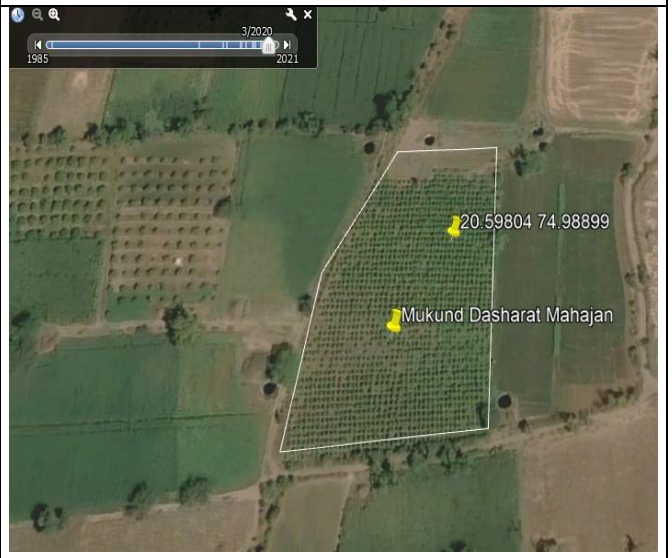
2011-12	2012-04	2013-12
		

2014-03	2015-06	2016-04
		
2017-02	**2018-12**	**2019-03**
		

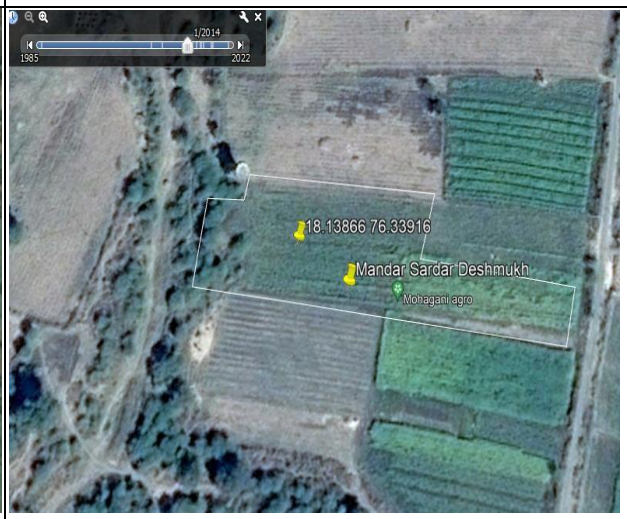
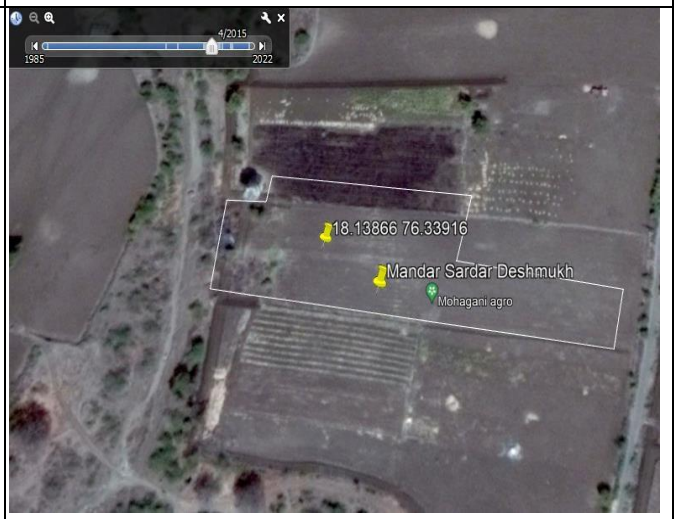
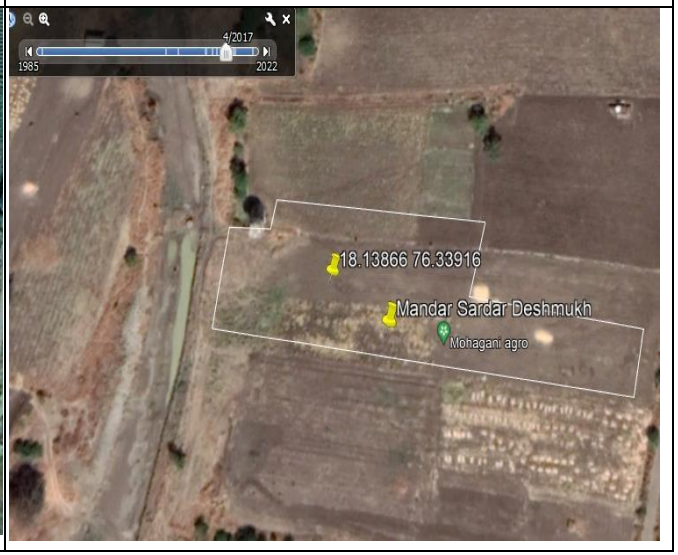
2020-01


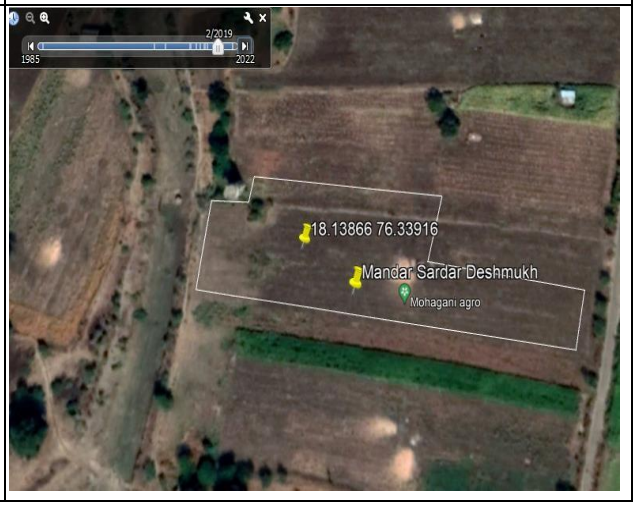
14. Ratnabai Mukund Mahajan

2009-06	2013-04	2013-11
		

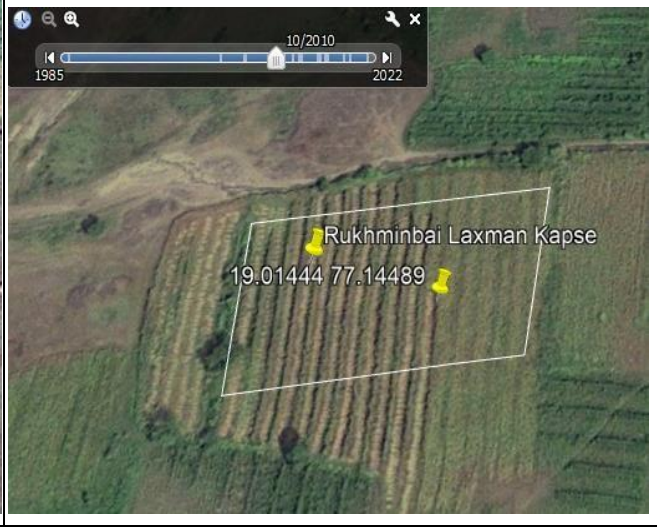
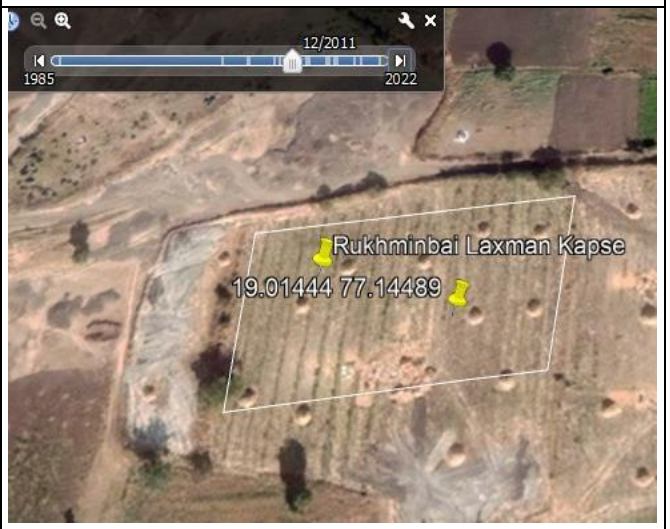
2016-01	2016-11	2017-11
		
2018-01	**2019-03**	**2020-03**
		

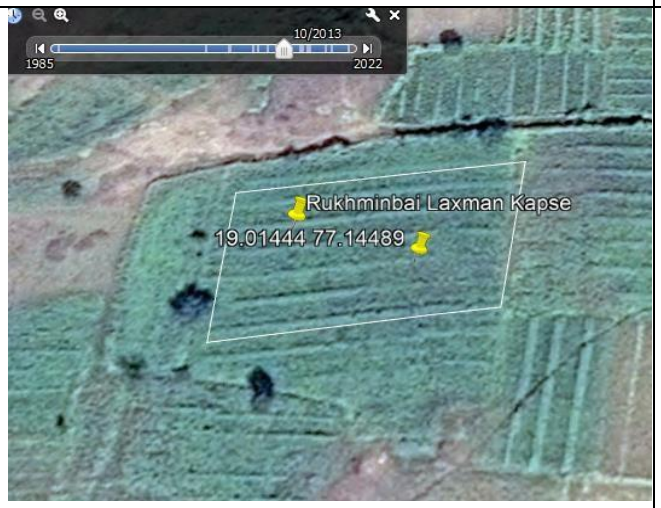
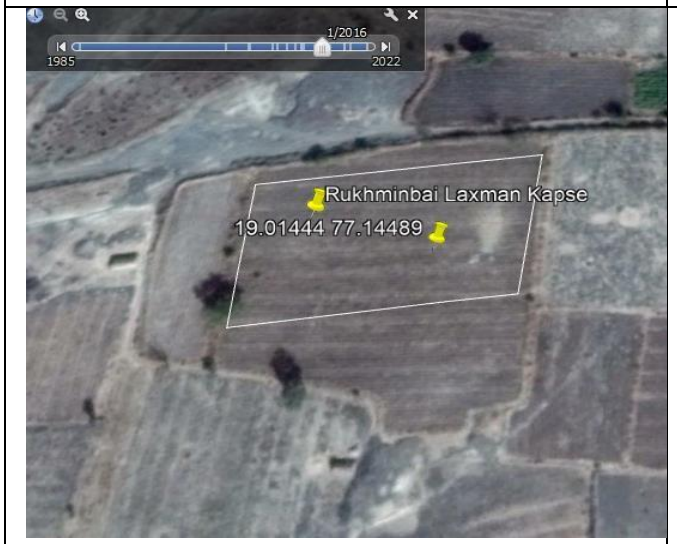
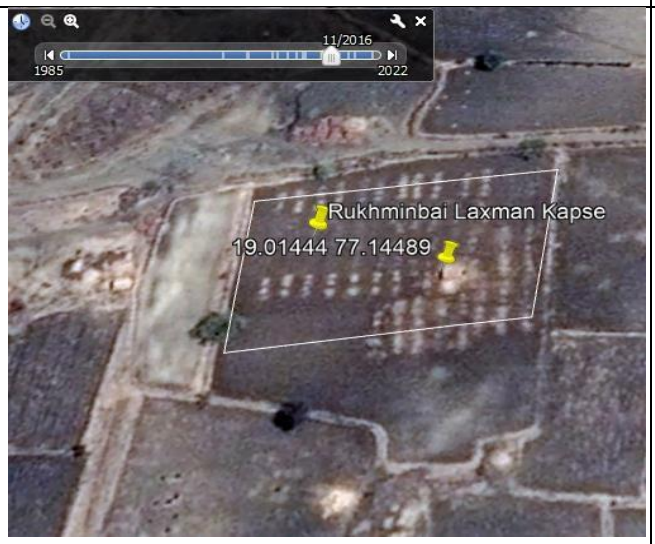
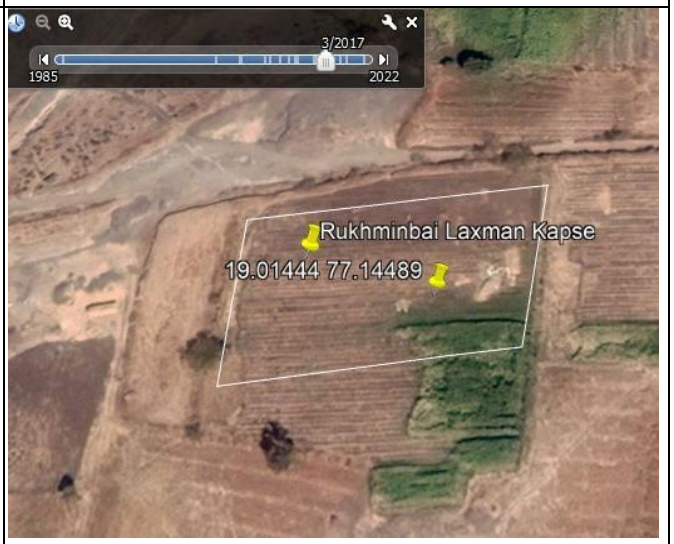
15. Madar Sardar Deshmukh

2009-04	2014-01	2015-04
		
2015-12	**2016-11**	**2017-04**
		

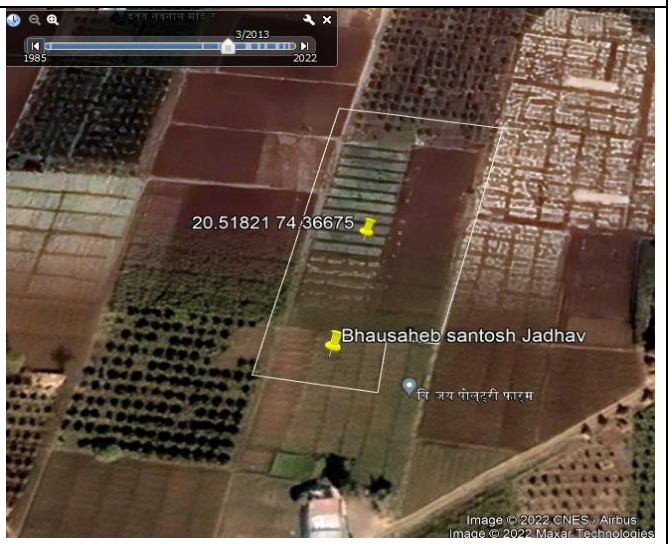
2018-10	2019-02
	

16. Rukhminbai Laxman Kapse

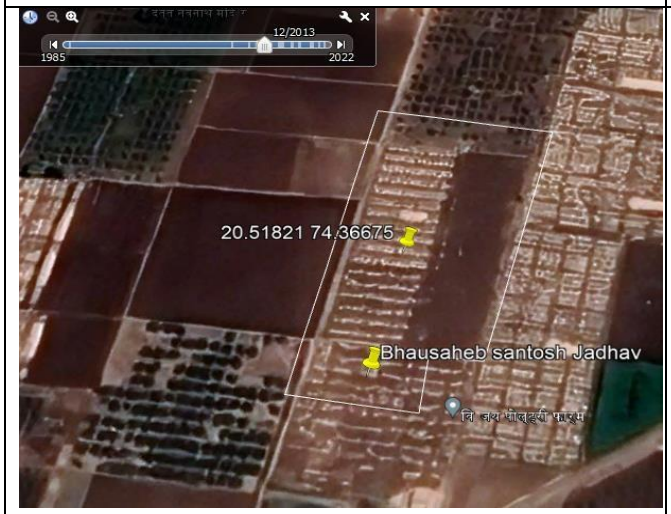
2010-02	2010-10	2011-12
		

2012-12	2013-10	2014-02
		
2016-01	**2016-11**	**2017-03**
		
2019-02	**2019-12**	

17. Bhausaheb Santosh Jadhav

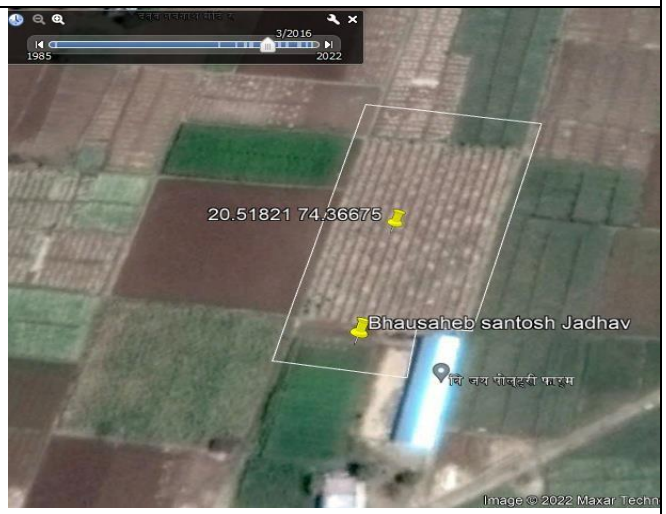
2009-06	2011-12	2013-03
		

2013-12



2014-04

2016-03



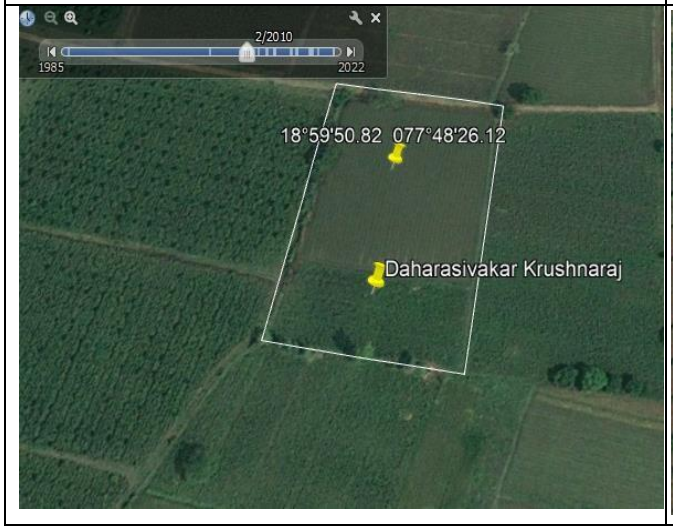
2016-11

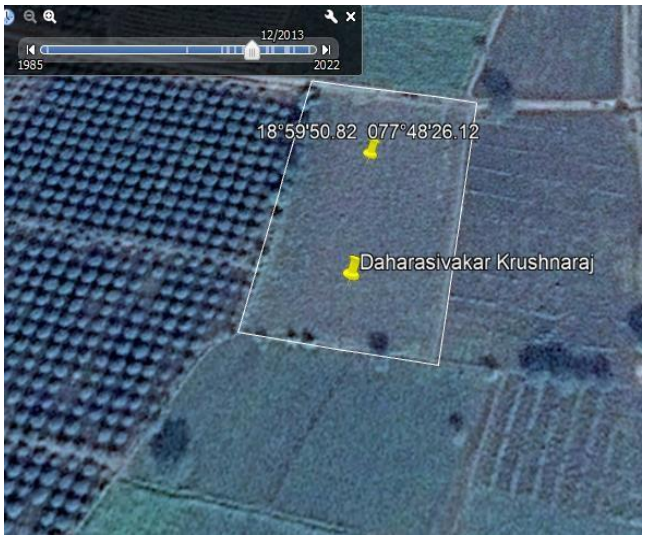
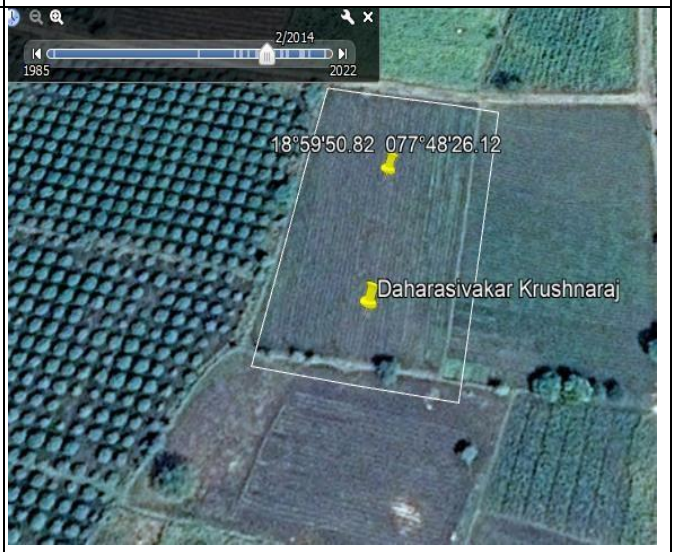
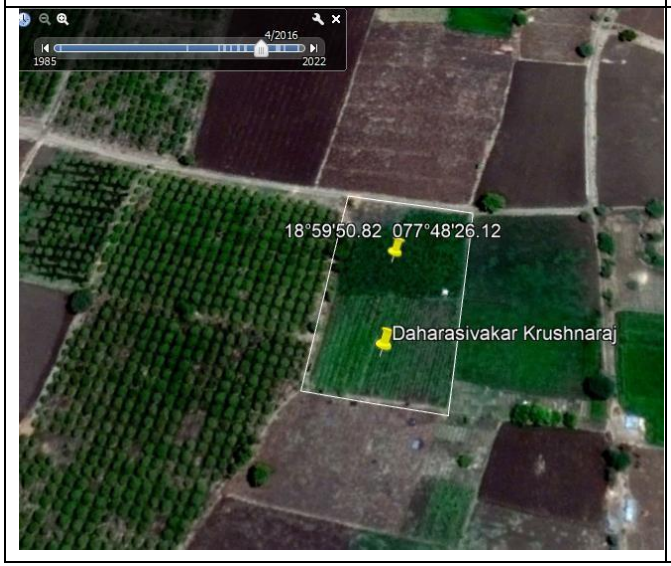
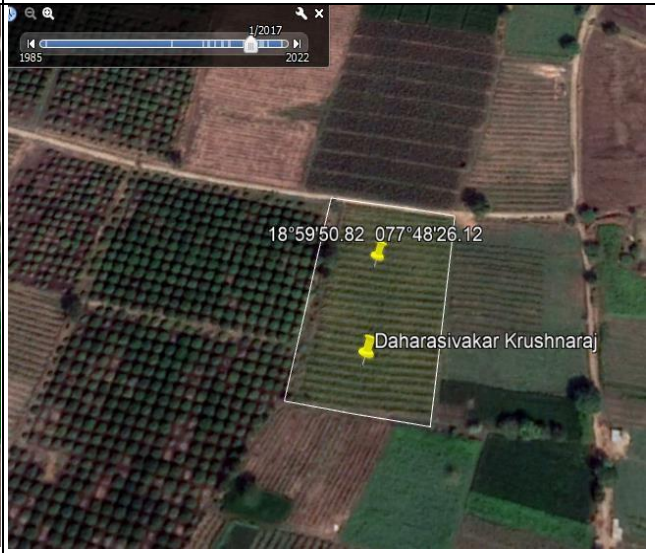
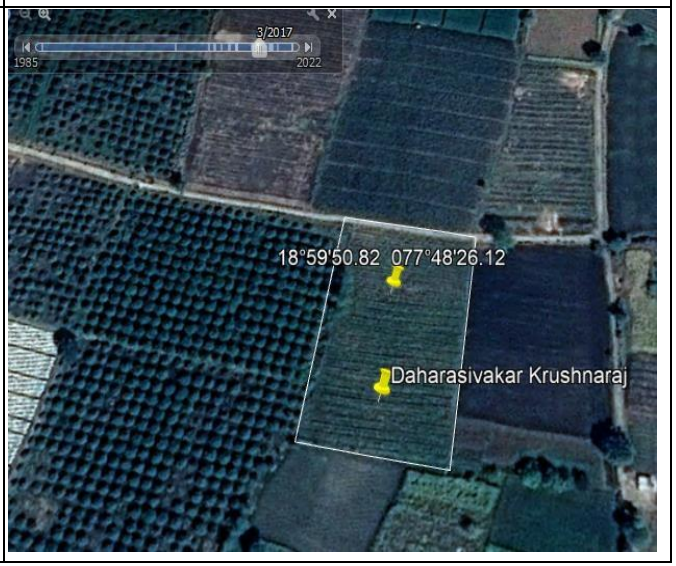
2018-01

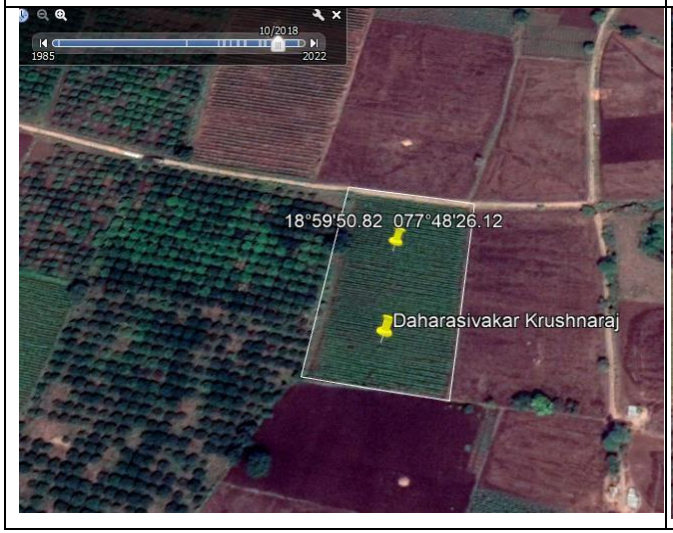
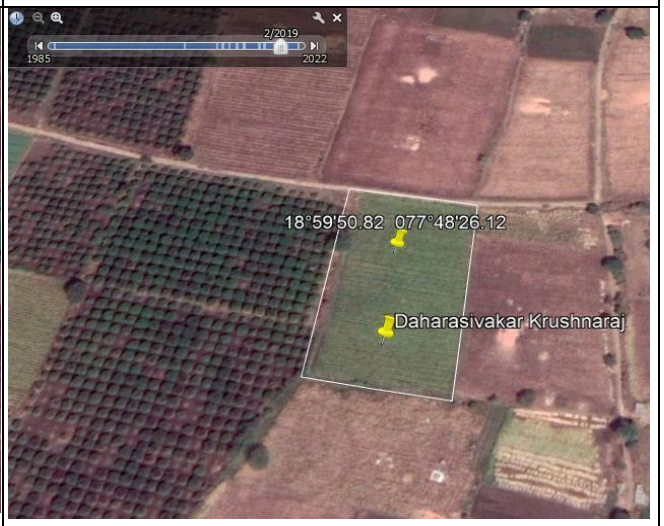
2019-02

2019-05

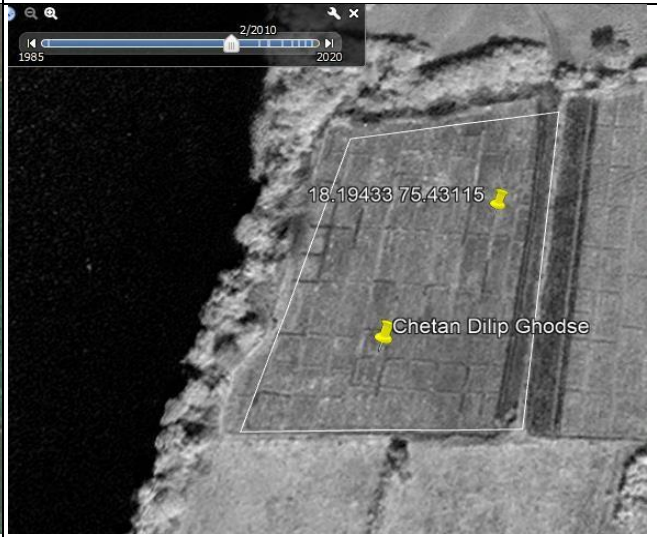
18. Daharasivakar Krushnaraj

2010-02	2010-10	2011-11
		

2012-12	2013-12	2014-02
		
2016-04	**2017-01**	**2017-03**
		

2018-10	2019-02	
		

19. Chetan Dilip Ghodse

2009-04	2010-02	2014-01
		

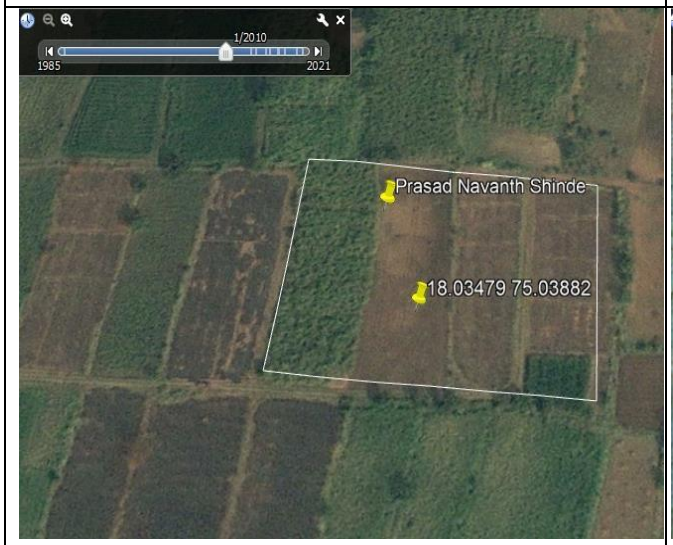
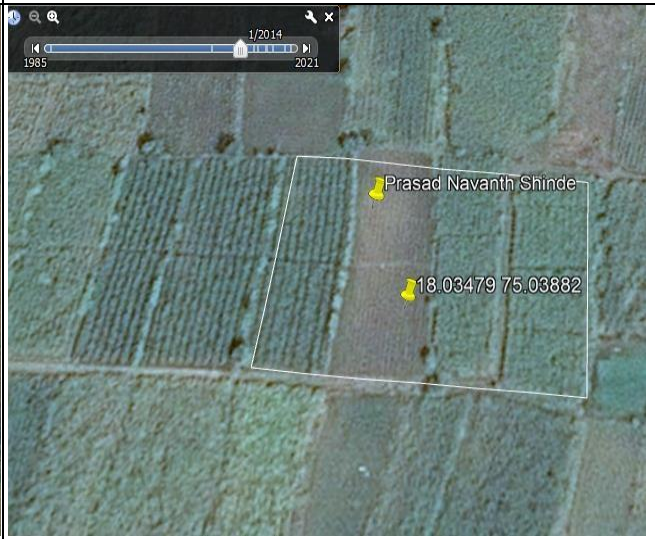
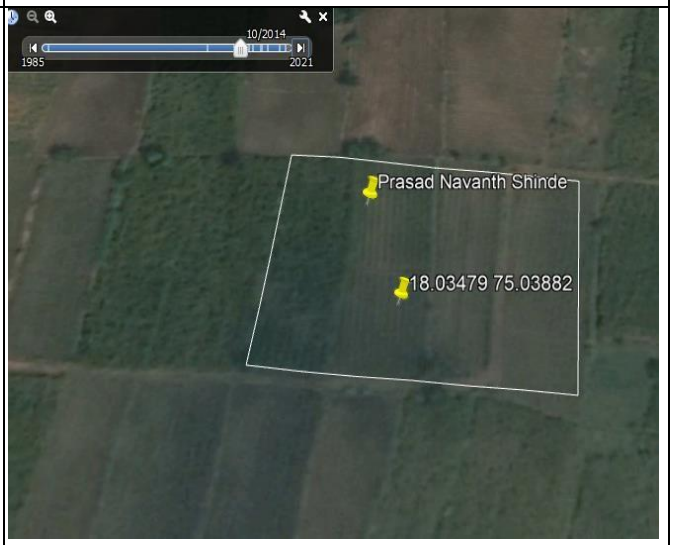
2015-02

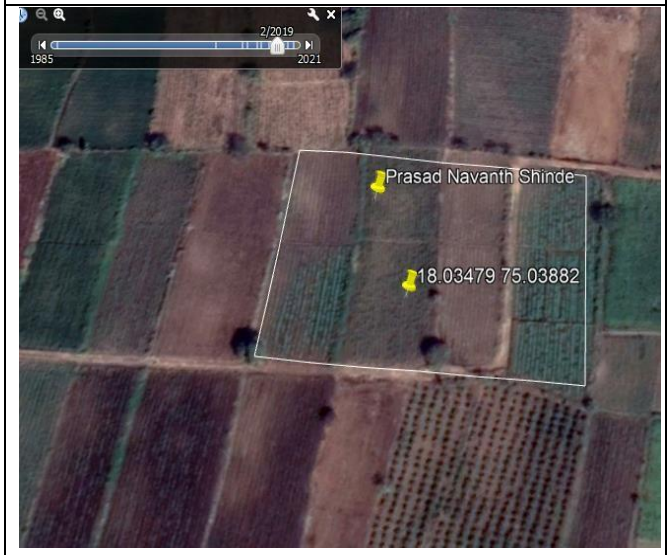
2015-04

2017-02

2019-03

20. Prasad Navnath Shinde

2010-01	2014-01	2014-10
		
2016-05	**2016-11**	**2018-02**

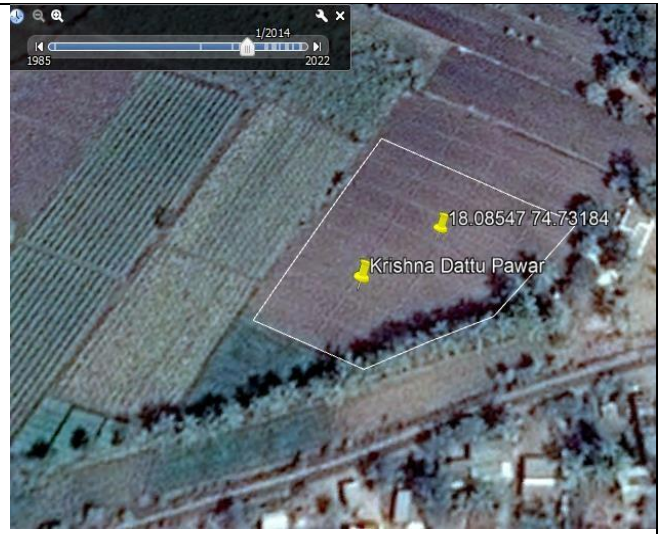
2019-02


21. Krishna Dattu Pawar

2012-02	2013-02	2014-01

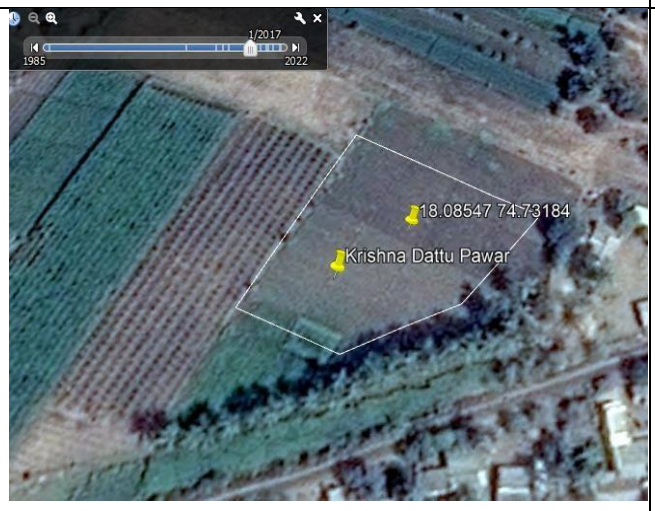
2016-11

2017-01



2017-12

2018-04



2018-12

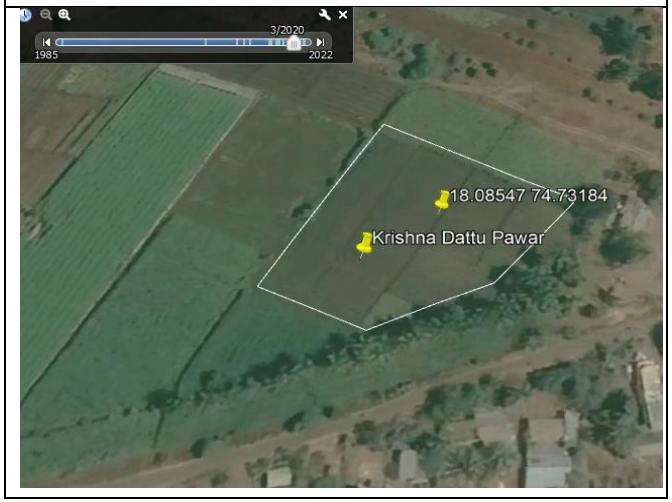
2019-11

4/2018
1985
2022
18.08547 74.73184
Krishna Dattu Pawar

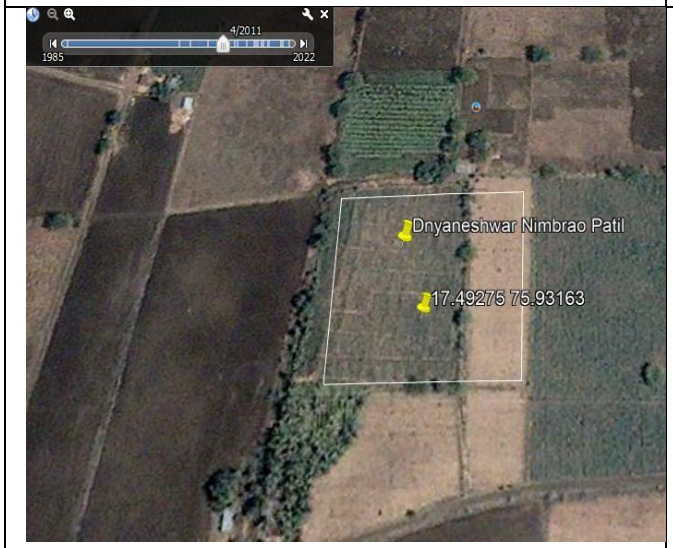
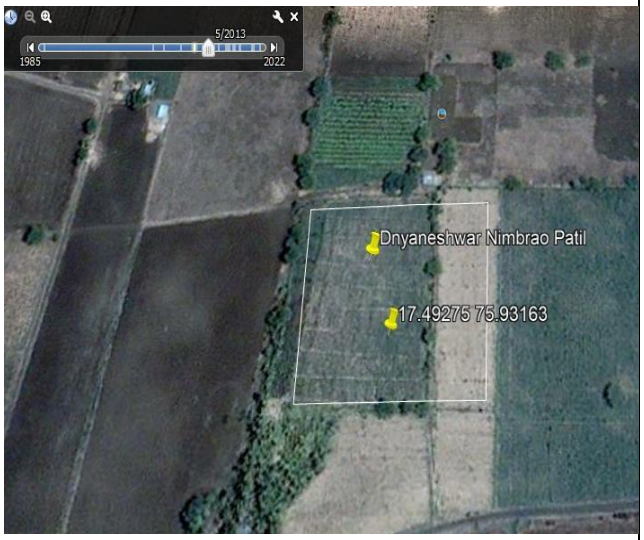
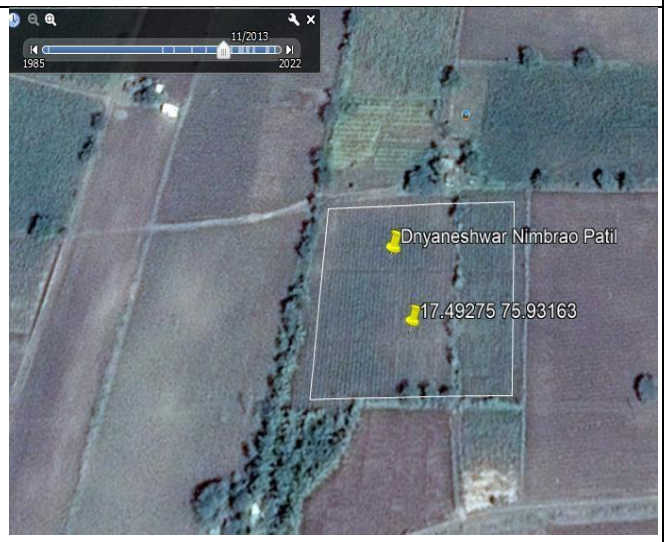
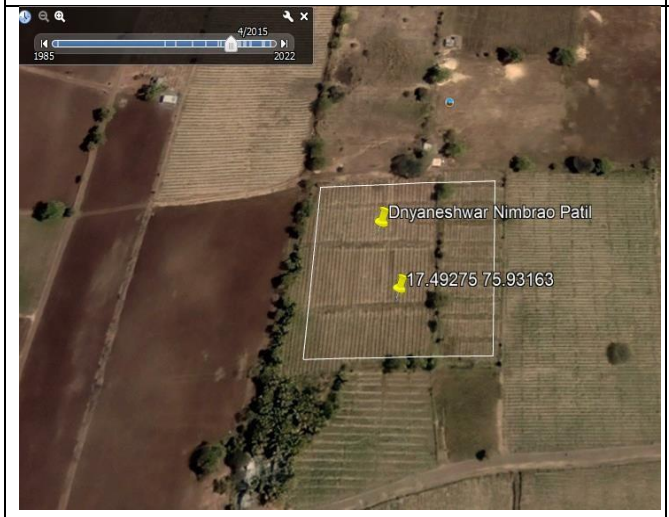
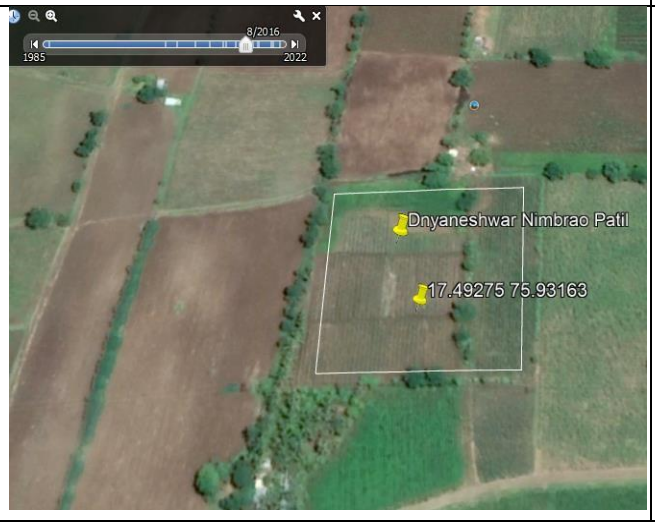
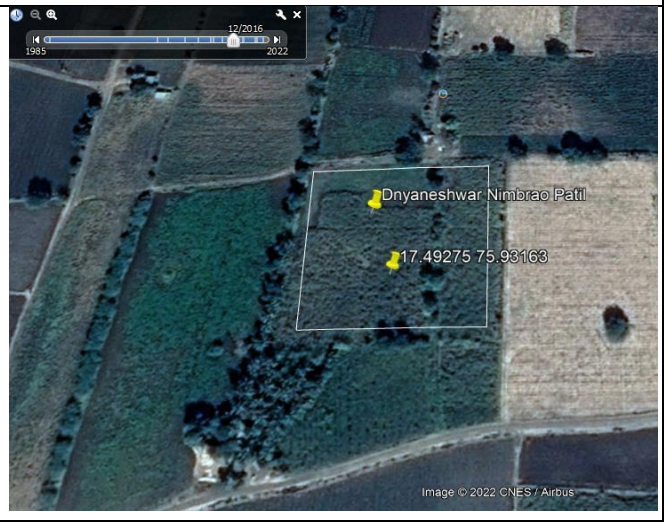
12/2018
1985
2022
18.08547 74.73184
Krishna Dattu Pawar

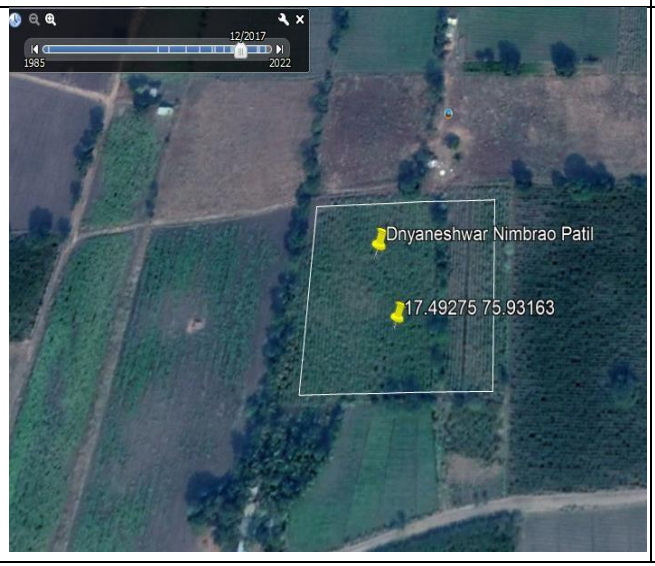
11/2019
1985
2022
18.08547 74.73184
Krishna Dattu Pawar

2020-03


3/2020
1985
2022
18.08547 74.73184
Krishna Dattu Pawar

22. Dnyaneshwar Nimbrao Patil

2011-04	2013-05	2013-11
		
2015-04	**2016-08**	**2016-12**
		

2017-04	2017-12	2018-12
		
2019-02		

APPENDIX 7: SAMPLE LAND TITLE DOCUMENT

Narayan Eknath Khatke

7/12 extract

Report Date : 12/09/2022

Government of Maharashtra

Village Form Seven (Records of Right)

[Maharashtra Land Revenue Records Right and Registers (Preparation and Maintenance) Rules 1971, Rules 3,5,6 and 7]

Village :- **Jalalpur (558599)** Taluka :- **Karjat** District :- **Ahmednagar**

ulpin : **26479896030** Survey No. & Sub Division No. : **146/2**

26479896030

Tenure Type : **Occupant Type-1** Local Name of Farm :

;Area, Unit & Assessment		Khata no.	Name of Occupant	Area	Assessment	Uncultivable.	Mutation No.	Tenancy, Rent & Other Rights
Area Unit	Htr.Area.Sq.mtrs	[~~3~~]	[~~shrirang ram raut~~	~~0.30.00~~	~~0.23~~	]	(2997)	Name of the tenant and Rent
A) Cultivable Area		[~~269~~]	[~~chhagabai shrirang raut~~	~~0.30.00~~	~~0.22~~	]	(2997)	Other Rights
Non-Irrigated	0.60.00	443	narayan eknath khtake	0.60.00	0.45	0.60.00	(2997)	Other
Irrigated	-							(1026)(2533)(2931) (1)
Total Cultivable Area	0.60.00							Loan - sahkari society ikrar
B) Uncultivable Area (Uncultivable)								jv ka se sew ugh ru 2500000/- narayan (3753)
Type (A)	0.60.00							Other
Type (B)	-							kh.ka.se.san. jalalpur narayan eknath khtake loan kami. (4187)
Total Uncultivable Area	0.60.00							[~~Loan - & Liabilities~~](5527)
;Total Area (A+B)	1.20.00							[~~icic bank shakha daund ugh ru 507000/-~~](5527)
Assessment	0.45							Loan - bank of maharashtra
Quit Rent or Special Assessment	-							narayan raru 5,000/- (5538)
								Loan - & Liabilities
								bank amf maharashtra shakha bhambora ugh ..ru 350000/- narayan (5807)
								Pending Mutation : No.
								Last Mutation Number : 5807 Date : 11/08/2019
Old Mutation Nos.. (1)(1621)(4228)(5263)								Boundary & Boundary Marks. :

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Village Form Twelve (Crop Register)

[Maharashtra Land Revenue Records Right and Registers (Preparation and Maintenance) Rules 1971,Rules 29]

Village :- **Jalalpur (558599)** Taluka :- **Karjat** District :- **Ahmednagar**

Survey No. & Sub Division No. : **146/2**

			Details of Area Under Crop					Uncultivable Land		Remark
Year	Season	Khata no.	Crop Type	Name of Crop	Irrigated	Non irrigated	Source of Irrigation	Type	Area	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
					Are. Sq.mtrs	Are. Sq.mtrs			Are. Sq.mtrs	
2020-21	Rabbi		Nirbhel	adsali us	0.5000					
2021-22	kharip	443	Nirbhel	Kanda	0.4000		Nadi			
	Sampooren Year	443	Nirbhel	dalimb	0.4000		Nadi			
		443	Mishra	sitafal	0.4000		Nadi			
		443	Mishra	mahogany		0.0000				
2022-23	kharip	443*	Nirbhel	Kapus	0.8000		vihir			

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ई महाभूमि

8A Extract

Year: 2022-23 — 10/3/2023

VILLAGE SAMPLE VIII-
A REGISTER OF HOLDING LANDS (Agricultural)
(Resident wise Khatawani - Jamabandi sheet)

Village: Jalalpur **Taluka:** Karjat **District:** Ahmednagar

Note from village sample six	Land survey number and subdivision number	holding area			for recovery				Total
		Cultivable area (He.r.sq.m)	Indigestion area (He.r.sq.m)	Total area (He.r.sq.m)	levy or judi Rs.	DUMALA DAMAGE ON GROUND Rs.	Local cess G.P. Rs.	Local cess G.P. Rs.	Rs.
(1)	(2)	(3a)	(3b)	(3c)	(4)	(5)	(6a)	(6b)	(7)
Account no. 443	Narayan Eknath Khatke.								
	131/2	0.30.00	0.0000	0.30.00	0.33	0	2.31	0.33	2.97
	146/1/1	0.40.00	0.0000	0.40.00	0.32	0	2.24	0.32	2.88
	146/2	0.60.00	0.60.00	1.20.00	0.45	0	3.15	0.45	4.05
Personal account holder	173/1/A	0.44.00	0.34.00	0.78.00	0.33	0	2.31	0.33	2.97
	173/1/B	0.42.00	0.0000	0.42.00	0.31	0	2.17	0.31	2.79
	2/2	0.21.00	0.0000	0.21.00	0.25	0	1.75	0.25	2.25
	538/1	0.66.00	0.24.00	0.90.00	0.63	0	4.41	0.63	5.67
	Total	**3.03.00**	**1.18.00**	**4.21.00**	**2.62**	**0**	**18.34**	**2.62**	**23.58**

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ई महाभूमि
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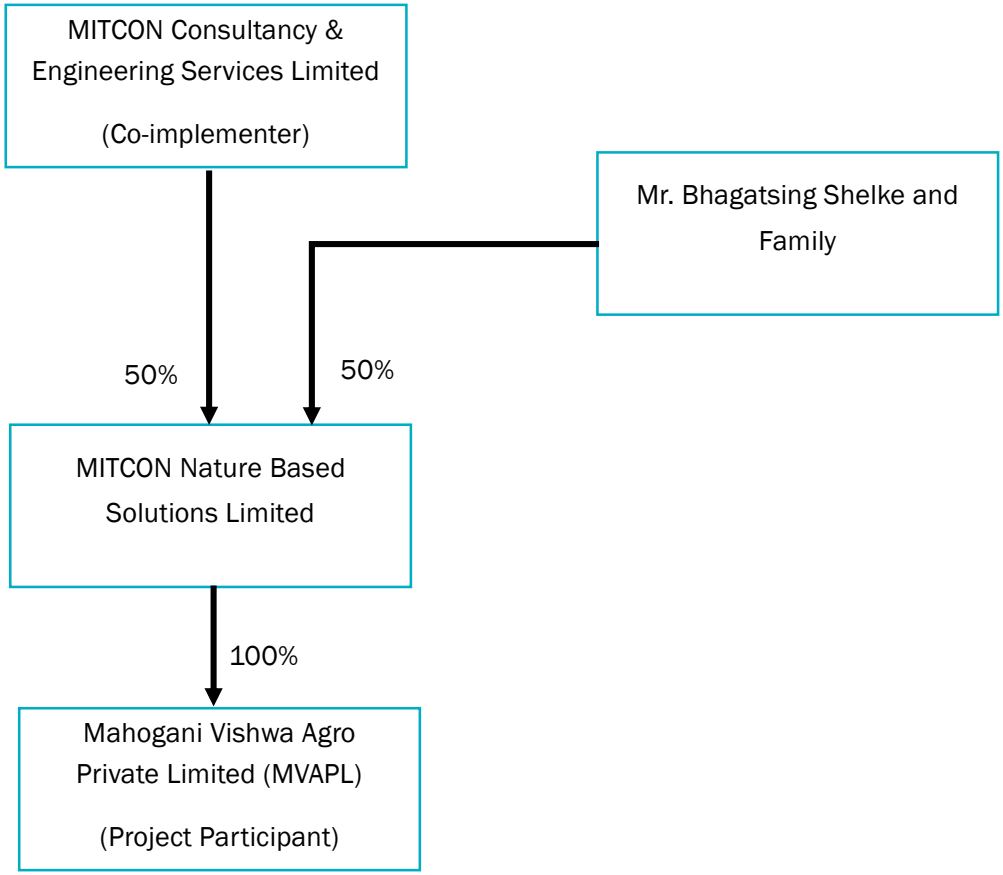
APPENDIX 8: LEGAL HOLDING STRUCTURE



APPENDIX 9: LIST OF 65 DISTRICTS IN THE PROJECT ACTIVITY

S. No.	State	District name	S. No.	State	District name	S. No.	State	District name
1	Maharashtra	Ahmednagar	24	Maharashtra	Satara	47	Karnataka	Gulbarga
2	Maharashtra	Akola	25	Maharashtra	Solapur	48	Karnataka	Uttar kannada (karvari)
3	Maharashtra	Amravati	26	Maharashtra	Wardha	49	Karnataka	Bijapur
4	Maharashtra	Aurangabad	27	Maharashtra	Washim	50	Gujarat	Bharuch
5	Maharashtra	Beed	28	Maharashtra	Yavatmal	51	Gujarat	Chota Udaipur
6	Maharashtra	Bhandara	29	Madhya Pradesh	Burhanpur	52	Gujarat	Dang
7	Maharashtra	Buldhana	30	Madhya Pradesh	Chindwada	53	Gujarat	Gandhinagar
8	Maharashtra	Chandrapur	31	Madhya Pradesh	Dhar	54	Gujarat	Sabarkantha
9	Maharashtra	Dhule	32	Madhya Pradesh	Harda	55	Gujarat	Narmada
10	Maharashtra	Gadchiroli	33	Madhya Pradesh	Indore	56	Gujarat	Navsari
11	Maharashtra	Gondia	34	Madhya Pradesh	Jabalpur	57	Gujarat	Surat
12	Maharashtra	Jalana	35	Madhya Pradesh	Khandawa	58	Gujarat	Tapi
13	Maharashtra	Jalgaon	36	Madhya Pradesh	Khargone	59	Gujarat	Vadodara
14	Maharashtra	Latur	37	Madhya Pradesh	Mandala	60	Gujarat	Valsad
15	Maharashtra	Nagpur	38	Madhya Pradesh	Seoni	61	Telangana	Adilabad
16	Maharashtra	Nanded	39	Madhya Pradesh	Alirajapur	62	Telangana	Kamareddy
17	Maharashtra	Nandurbar	40	Madhya Pradesh	Balaghat	63	Telangana	Nirmal
18	Maharashtra	Nashik	41	Madhya Pradesh	Badwani	64	Telangana	Nizamabad
19	Maharashtra	Osmanabad	42	Madhya Pradesh	Betul	65	Telangana	Sangareddy
20	Maharashtra	Parbhani	43	Madhya Pradesh	Bhopal			
21	Maharashtra	Pune	44	Karnataka	Bagalkot			
22	Maharashtra	Hingoli	45	Karnataka	Belgavi			
23	Maharashtra	Sangli	46	Karnataka	Bidar			