PROMOTION OF DRYLAND HORTICULTURE FOR HIGHER CARBON CREDITS AND INCOME GENERATION

Project title	Promotion of dryland horticulture for higher carbon credits and income generation
Project ID	*Verra Project ID*
Crediting period	01-August-2024 to 31-July-2044
Original date of issue	Pipeline listing: 06-August-2024
Most recent date of issue	07-August-2024
Version	1.0
***VCS Standard* Version**	4.7
Prepared by	ICAR-Central Research Institute for Dryland Agriculture, Hyderabad

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1 PROJECT DETAILS

1.1 Summary Description of the Project

Several horticultural crops are grown in India due to its wide variety of soil and climatic conditions. However, perennial horticultural crops have advantage over annuals as they generally need low inputs such as water, energy, etc., and have high productivity values. Fruit tree-based systems can contribute to carbon sequestration and play an important part in the carbon cycle of terrestrial ecosystems. Because of their propensity to function as carbon sinks and better adaptation to frequent weather aberrations compared with annual crops, fruit tree systems are receiving more attention in recent years and farmers are willing to adopt such systems. Fruit trees such as cashew, mango, guava etc. are reported to have similar carbon sink capacity as forest trees. This capability arises from a variety of factors, including tree lifespan, year-round activity in maintaining living roots, deeper and more widespread root systems; high leaf area index and delayed leaf turnover. Studies from ICCAR-IIHR have indicated that the country as a whole has sequestered 285.005 mt of carbon in its mango orchards.

The carbon sequestration potential of different horticultural cropping systems ranked in the order of mango > cashew > rose > vegetable > medicinal and aromatic plants, and addition of more residues in perennial systems to soil records less emission of CO_2 than annual crops. As a consequence, perennial horticulture-based systems provide economic gain through carbon credits. Further, enhancement of carbon sequestration in perennial systems can be attained by improving soil health and through better carbon management strategies.

Proposed activities:

Under the project activity, fruit trees such as mango, cashew, guava, tamarind etc will be planted in privately-owned, and community landed farmers' fields. To better utilize the inter-row spaces and to improve farm profitability during the initial years, annual crops will also be planted in agri-horti system mode. These trees function as highly effective carbon sinks, as they have the ability to collect and sequester atmospheric carbon dioxide via the process of photosynthesis. Agroforestry systems can increase carbon sequestration by integrating trees into agricultural regions. Trees sequester carbon in their biomass, which includes their trunks, branches, and leaves, as well as in the soil. This process aids in the removal of carbon dioxide from the atmosphere. Additionally, it mitigates deforestation and erosion, while simultaneously fostering biodiversity and sustainable livelihoods.

A brief description of the baseline scenario existing prior to the implementation of the project:

The baseline scenario is the continuation of the conventional agriculture practices including cultivation of annual field crops that predominantly adopts fertilizer intensive cultivation method and may decrease soil organic carbon (SOC) in the agriculture fields.

The project activity instance aims to sequester (tCO_2e) about 1373 tCO_2e / year. The climate benefits of the project include carbon sequestration of approximately 27,460 tCO_2e over the crediting period of the project.

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Validation/ verification	*(DD-Month-YYYY--DD-Month-YYYY)*	*VCS*	*Validation/verification body name*	*One year*
	…			

1.3 Sectoral Scope and Project Type

Sectoral scope	14: Agriculture, Forestry and Other Land Use (AFOLU)
AFOLU project category[1]	ARR
Project activity type	Small scale

1.4 Project Eligibility

1.4.1 General eligibility

The Project is eligible under the scope of VCS Programme as described below:

As per section 2.1.1 of the scope of the VCS program, VCS standard V 4.7, the scope of VCS programme is; The scope of the VCS Program includes:

S.No	**Criterion Scope of VCS Program**	**Justification**
1	The seven Kyoto Protocol greenhouse gases	The project results in carbon sequestration by fruit-based agroforestry systems.
2	Project activities supported by a methodology approved under the VCS Program through the methodology approval process.	The project activity is supported by the VCS methodology VM0047 Methodology Afforestation, Reforestation, and Revegetation, (version 1.0)
3	Project activities supported by a methodology approved under a VCS approved GHG program, unless explicitly excluded under the terms of Verra approval.	The project activity does not belong to any project categories that are excluded by VCS from being part of the VCS program.
4	Jurisdictional REDD+ programs and nested REDD+ projects as set out in the VCS Program	This is not a Jurisdictional REDD+ program, hence this eligibility criterion is not applicable.

[1] *See Appendix 1 of the* VCS Standard

	document Jurisdictional and Nested REDD+ (JNR) Requirements.	
5	Ozone-depleting substances.	The project activity does not involve any ozone-depleting substances.

Regarding the requirements specified in the Registration and Issuance Process, the project aligns with the following deadlines, considering the project's start date is 01-August-2024.

Eligibility conditions	Justification/Description
AFOLU projects must initiate the pipeline listing process (as detailed in the Registration and Issuance Process) within three years of the project start date.	Listing shall be done within the stipulated timeline of three years.
For all AFOLU projects with ex-ante emission reduction/removal estimates of 20,000 tCO2e per year or more, as well as ARR, RWE, and IFM (excluding Logged to Protected Forest (LtPF)) projects of any size, validation must be completed within five years of the project start date.	Validation shall be done within five years from the project start date.

1.4.2 AFOLU project eligibility

The project activity falls under sectoral scope 14. The project aims to increases carbon sequestration by increasing the green cover in project area through planting trees. The justification of eligibility of the project under the scope of the VCS Program is given in the table below.

Table 1: Eligibility conditions for Afforestation, Reforestation and Revegetation (ARR) and description under VCS (According to Appendix 1, Section A1.1 of VCS Standard v4.7).

Eligibility condition	**Justification/Description**
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	The project activity involves plantation of trees on non-forest land and land allocated under Forest Right Act, 2006, which will increase the carbon sequestration of the lands much higher than in the baseline

planting, sowing or human-assisted natural regeneration of woody vegetation	conditions. Apart from that project will also reduce the soil erosion and therefore will increase soil organic carbon sequestration.
Eligible ARR projects may include timber harvesting in their management plan.	The project activity involves the plantation of fruit-bearing crops, and harvesting of timber wood is not part of the project activity.
The project area shall not be cleared of native ecosystems within the 10 year period prior to the project start date, as set out in Section 3.2.4.	The project activity will not clear the native ecosystems. Instead, it will plant only those trees which are suitable and adapted to the native ecosystems of the project area.

1.4.3 Transfer project eligibility

The grouped project activity is not being transferred or CPA seeking registration, thus, this section is not applicable.

1.5 Project Design

☐ Single location or installation

☐ Multiple locations or project activity instances (but not a grouped project)

☒ Grouped project

1.5.1 Grouped project design

The project will be implemented in village Yalagatta and adjoining villages, Challakere Tq., Chitradurga District of Karnataka. This will be further expanded to other regions.

The project activity incentivizes the farmers through additional carbon revenue, providing knowledge to follow Agroforestry systems through various training and awareness programmes, encouraging farmers to adopt best agricultural practises.

The eligibility criterion for the grouped projects is given in the table below:

New Project Activity Instance Eligibility Criteria:

As per section 3.6.16 of the VCS standard v4.7, the eligibility is explained below;

S.No.	**Criteria provided in Standard**	**Evaluation Condition for new instances**	**Applicability to the current instances**
1	Meet the applicability conditions set out in the	Each new project activity instance must meet the applicability conditions set out in the Methodology VM0047	The project activity instance complies with the applicability conditions set out in section 3.2 of this VCS-PD.

	methodology applied to the project.	v1.0	
2	Use the technologies or measures specified in the project description.	Each new project activity instance must involve the introduction of agroforestry systems in village Yalagatta and adjoining villages, Challakere Tq., Chitradurga District of Karnataka.The project focuses on planting trees for long-term benefits	This project activity instance complies with the specified measures by implementing agroforestry-based systems of dryland fruit trees for afforestation, reforestation and revegetation.
3	Apply the technologies or measures in the same manner as specified in the project description.	Each new project activity instance must implement agroforestry systems	The project activity instance adopts dryland fruit tree-based agroforestry systems
4	Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area.	The instances in the project are subjected to the same baseline scenario in the geographic areas Yalagatta and adjoining villages, Challakere Tq., Chitradurga District of Karnataka area in India determined in Section 3.4.	The baseline scenario is the continuation of the conventional agriculture practices including cultivation of annual field crops that predominantly adopts fertilizer intensive cultivation method and may decrease soil organic carbon (SOC) in the agriculture fields.
5	Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area.	Each new project activity is required to demonstrate additionality characteristics that are in line with the first instance of the project activity	The project activity demonstrates regulatory surplus. The project activity, using agroforestry systems techniques, is the basis for a positive list in the methodology VM0047 V1.0, and this project activity instance meets all the applicability conditions described in Section 3.2 of the methodology. Thus, the project is deemed additional, as further described in Section 3.5.

Along with the above points, the Inclusion of New Project Activity Instances follows the below criteria

Grouped projects include new project activity instances subsequent to the initial validation of the project.

Inclusion of New Project Activity Instance:

S.No	Criterion	Evaluation	Applicability to the current instance
1	Occur within one of the designated geographic areas specified in the project description.	Each project activity instance must be in the geographic boundary of, India.	This project activity instance comes under the geographic boundary of India.
2	Conform with at least one complete set of eligibility criteria for the inclusion of new project activity instances. Partial compliance with multiple sets of eligibility criteria is insufficient.	Each new project activity instance must comply with the complete set of eligibility criteria as established in this document.	This project activity instance complies with the eligibility criteria established for new project activity instances.
3	Be included in the monitoring report with sufficient technical, financial, geographic and other relevant information to demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation/verification body.	New project activities will be included in the monitoring report, along with sufficient technical, financial, geographic, and other relevant information to demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation/verification body.	This project activity instance outlines a monitoring plan described in Section 5. It will be included in the monitoring report with all relevant information to demonstrate conformance with the eligibility criteria and enable evidence gathering by the VVB.
4	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	Each new project activity instance must demonstrate ownership by the project proponent from the prospective start date.	This project activity instance is owned and operated by ICAR-Central Research Institute for Dryland Agriculture, Hyderabad, as mentioned in Section 1.6.

	instance (i.e., the date upon which the project activity instance began reducing or removing GHG emissions).		
5	Have a start date that is the same as or later than the grouped project start date.	Each new project activity instance must have a start date the same or later than the grouped project start date,01st , August 2024.	This project activity instance's start date is 01st , August 2024 the same as the grouped project's start date because it is the first instance.
6	Only be eligible for crediting from the later start date of the project activity instance or the start of the verification period in which they were added to the grouped project through to the end of the total project crediting period.	Each new project activity instance is only eligible for crediting from the start of the verification period in which they were added to the grouped project.	The crediting period for this project activity instance begins on 01st, August 2024.
7	Not be or have been enrolled in another VCS project.	Each new project activity instance must not be or have been enrolled in another VCS project.	This project activity instance has not been and will not be enrolled in another VCS project.
8	Adhere to the clustering and capacity limit requirements for multiple project activity instances set out in 3.6.8 – 3.6.9.	Each new project activity instance must adhere to the clustering and capacity limit requirements.	There are no project instances within 10 km of this project activity instance. Project activity does not involve any capacity limits. Therefore, this condition is met.

1.6 Project Proponent

Organization name	ICAR-Central Research Institute for Dryland Agriculture
Contact person	Dr. Vinod Kumar Singh
Title	Director

Address	ICAR-CRIDA, Santoshnagar, Saidabad, Hyderabad 500059, Telangana
Telephone	+91-040 24532243, 24530161
Email	*director.crida@icar.gov.in*

1.7 Other Entities Involved in the Project

Organization name	ICAR-Agricultural Technology Application Research Institute
Role in the project	Implementation of project activities
Contact person	Dr.V. Venkatasubramanian
Title	Director
Address	ICAR - Agricultural Technology Application Research Institute MRS, H.A. Farm Post, Hebbal Boopsandra Main Road Bengaluru, Karnataka 560 024
Telephone	080-23510616, 23410614
Email	atari.bengaluru@icar.gov.in

1.8 Ownership

Land Ownership:

The land parcels adopting the project activity belong to the individual farmers, and the land status is private land. The legal title of the land parcels is held by individual farmers and is indicated through the land certificate records available from the state's local authorities (Tahsildars).

Project Ownership

The ownership of the project, i.e., solely for the 'Rights of access to the Carbon Credits' –a participation agreement will be established between the individual farmers and the project proponent declaring that the carbon credits generated by the implementation of the project activity are exclusively allocated to the developer of the Project. ICAR-Central Research Institute for Dryland Agriculture Hyderabad will have overall control and responsibility for the carbon project as the proponent without violating farmers' rights. ICAR- Central Research Institute for Dryland Agriculture will be the developer of the emission reduction project.

1.9 Project Start Date

Project start date	01 August 2024	
Justification	As per the VCS Standard, the project start date of an AFOLU project is the date on which activities that led to the generation of GHG emission reductions or removals are implemented (e.g., preparing land for seeding, planting, changing agricultural or forestry practices, rewetting, restoring hydrological functions, or implementing management or protection plans). The start date of the project activity is 01-August-2024, when lands were prepared for the tree plantation for the project activity.	

1.10 Project Crediting Period

Crediting period	☐ Seven years, twice renewable ☐ Ten years, fixed ☒ Other (20 years, four times renewable for a total of 100 years)
Start and end date of first or fixed crediting period	01-August-2024 to 31-July-2044

1.11 Project Scale and Estimated GHG Emission Reductions or Removals

☒ < 300,000 tCO2e/year (project)

☐ ≥ 300,000 tCO2e/year (large project)

Calendar year of crediting period	Estimated GHG emission reductions or removals (tCO_2e)
01-August-2024 to 31-December-2024	573
01-January-2025 to 31-December-2025	1373
01-January-2026 to 31-December-2026	1373

01-January-2027 to 31-December-2027	1373
01-January-2028 to 31-December-2028	1373
01-January-2029 to 31-December-2029	1373
01-January-2030 to 31-December-2030	1373
01-January-2031 to 31-December-2031	1373
01-January-2032 to 31-December-2032	1373
01-January-2033 to 31-December-2033	1373
01-January-2034 to 31-December-2034	1373
01-January-2035 to 31-December-2035	1373
01-January-2036 to 31-December-2036	1373
01-January-2037 to 31-December-2037	1373
01-January-2038 to 31-December-2038	1373
01-January-2039 to 31-December-2039	1373
01-January-2040 to 31-December-2040	1373
01-January-2041 to 31-December-2041	1373
01-January-2042 to 31-December-2042	1373
01-January-2043 to 31-December-2043	1373
01-January-2044 to 31-July-2044	800
Total estimated ERRs	27460

during the first or fixed crediting period	
Total number of years	20
Average annual ERRs	1373

1.12 Description of the Project Activity

The project is not located within a jurisdiction covered by a jurisdictional REDD+ program. Under the project activity, fruit bearing species are planted in the agroforestry model in privately-owned agricultural lands. This project activity's goal is to promote dryland fruit tree-based agroforestry systems for carbon sequestration, as well as to help farmers develop their adaptability so they can deal with the effects of climate change. As a result, the project suggests that the activities' implementation will have positive social, economic, and environmental effects. Building the farmers' capacity includes educating them about techniques for adopting agroforestry systems, long-term benefits of agroforestry systems to cope with climate change, generate carbon credits and improve livelihoods of the farmers.

The project will be implemented in village Yalagatta and adjoining villages, Challakere Tq., Chitradurga District of Karnataka.

Enrolment of communities into the project activity

Enrolling farmers in fruit tree plantation activities requires a careful planning, communication, and engagement strategies to ensure their participation and success of the project. The following steps are proposed to effectively involve farming communities in tree planting under the project activity:

- Understand the community's needs, interests, and priorities in terms of agroforestry systems, type of fruit trees preferred etc.

- Identify potential benefits of fruit tree planting that are relevant to the farmers such as improved system productivity, resilience to climate change, higher income generation, and improved soil productivity.

- Engage with local community leaders, organizations, and government agencies for ensuring proper support to the project implementation and convergence.

- Organize meetings and awareness campaigns to educate farmers about the importance of fruit tree planting.

- Engage farmers in the decision-making process. Allow them to participate in selecting tree species, planting locations, and other relevant aspects of the project.

- Empower the farmers to take ownership of the initiative, fostering a sense of pride and responsibility.

- Impart training on tree planting techniques and management practices.

- Provide necessary tools and materials for planting and maintenance.

- Develop a plan for ongoing engagement beyond the initial planting. Regularly communicate with the farmers about progress of the project.

- Regularly monitor the health and growth of the planted fruit trees.

Plantation of fruit-bearing species

Planting fruit-bearing tree saplings requires careful preparation and proper techniques to ensure their successful establishment and growth. The following steps are proposed for planting and management of fruit-bearing tree saplings:

- Procure saplings/seedlings from reputed nurseries or sources.

- Choose planting sites with appropriate sunlight, soil type, and drainage conditions for the specific fruit-tree species.

- Dig the pits as per the recommended size of the pits and spacing for each plant type.

- Mix recommended quantities of compost or farmyard manure with soil to improve soil fertility and survival of the plants.

- Position the sapling in the centre of the pits and fill the pits with the amended soil, gently tamping it down to remove air pockets.

- Water the saplings thoroughly after planting to settle the soil and help establish good root-to-soil contact.

- Apply a layer of mulch around the sapling, if available for moisture conservation and minimize weed growth

- Water the saplings regularly as required.

- If the saplings are tall or in a windy area, provide support with appropriate staking until it becomes established.

- Regularly monitor the saplings for deficiency of nutrients, infestation of insect-pests and diseases and take appropriate control measures.

1.13 Project Location

The project is planned initially in the Chitradurga district that is one of the 30 districts of Karnataka and a place with historical significance which is located to the North West 200

kms away from Bengaluru. It includes taluks like Chitradurga, Molkalmur, Holalkere, Hiriyuru, Challakere and Hosadurga. Chitradurga district enjoys a moderate climate throughout the year. Most of the rainfall is received during south west monsoon is from June to October. The average rainfall of the district is 592.5 mm, with 32 rainy days. Chitradurga district has varied types of soils- both in terms of texture and depth. Out of available geographical area, major area is occupied by deep medium black clay soils (28%) followed by medium deep red gravelly clay soils (15%), medium deep red clayey soils (13.4%), deep alluvial clay soils (11%) and very shallow red gravelly loam soils (9.3%).

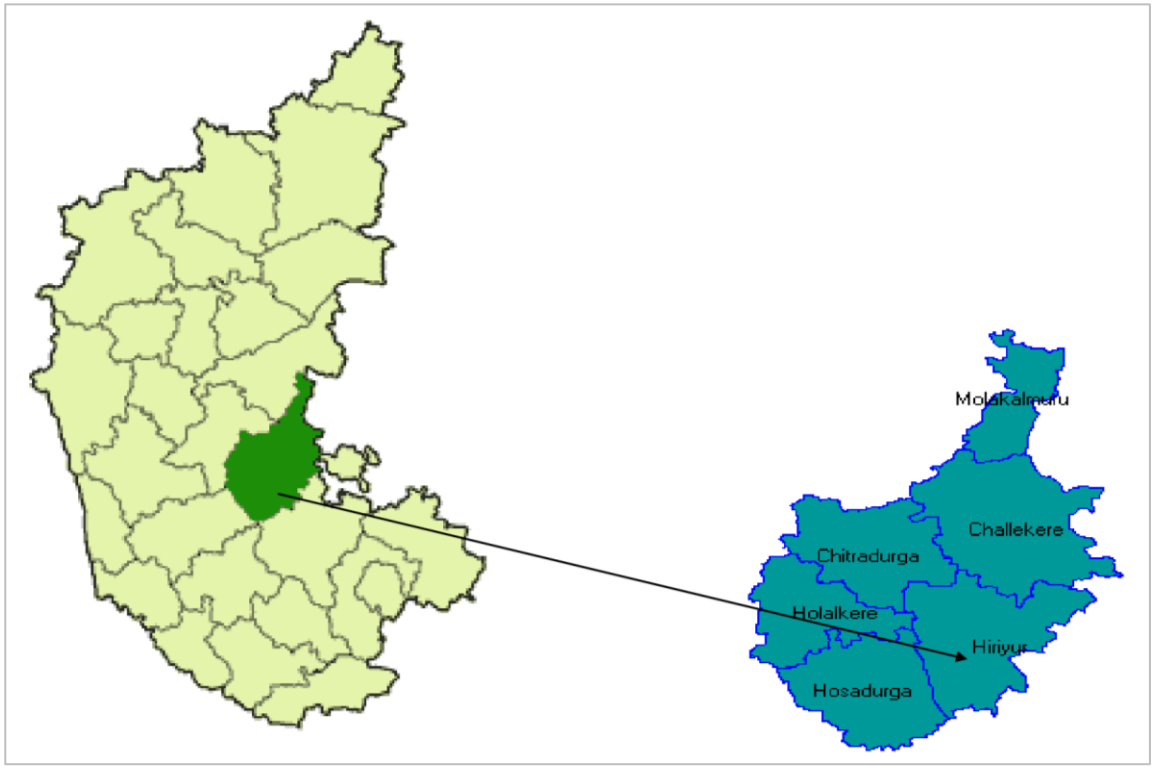

Figure 1. Location of project activity (Chitradurga district, Karnataka)

The soils of the district are of neutral in nature with a mean pH of 7.8 and the pH range of the district is 7.3 to 8.0. The district mean value of organic carbon is 0.40% and the range for the district is 0.36% to 0.44%. Except for few patches in Chitradurga, Hiriyuru, Hosadurga and Molakalmuru taluks, the district is sufficient in available phosphorus (>5 ppm). Available Potassium is sufficient in the entire district (> 50ppm) and the district mean is 137 ppm and the range is 120 ppm to 140 ppm.

Field/horticultural/plantation crops grown in Chitradurga district are paddy, maize, groundnut, sunflower, cotton, bajra, pigeonpea, black gram, green gram, cowpea, field bean, safflower, horse gram, castor, sesame, Bengal gram, wheat, fruit crops, and vegetable crops.

The cropping intensity of the district is 122%, about 86484 ha is sown more than once in the

district. In the district, horticultural crops are cultivated total area of 75239 ha. Under irrigated condition, horticultural crops are cultivated in an area of 61976 ha (82.4%) and under rainfed conditions, it is being cultivated on an area of 13263 ha (17.6%).

1.14 Conditions Prior to Project Initiation

- **Ecosystem type:**

  Chitradurga district falls in Agro-climatic Zone-4 i.e. Central Dry Zone of Karnataka. The district receives scanty and unevenly distributed rainfall and having shallow and poor soils.

- **Current and historical land-use:**

  About 45% of the total area in the project location (Challakere Taluk) is under field crop cultivation. The predominant field crops are paddy, maize, groundnut, sunflower, cotton, bajra, pigeonpea, black gram, green gram, cowpea, field bean, safflower, horse gram, castor, sesame, Bengal gram, wheat, fruit crops, and vegetable crops. There are no major changes in the land use pattern during the last 2 decades.

- **Present and prior environmental conditions of the project area:**

  Chitradurga district falls in central eastern parts of the state and covers a total geographical area of 8388 km^2. It is bounded by Tumkur, Chickmaglur, Davanegere, Bellary districts except Andhra Pradesh state in east. The district has tropical semi-arid dry climate. It receives low to moderate rainfall and is one of the drought prone districts in the state. Normal annual rainfall varies between 668mm in Holalkere in western part to 457mm in Chellakere in the northeastern part.

  Soil types of the district comprise deep & shallow black soil, mixed red & black soil, red loamy & sandy soil. Physiographically, the district comprises of undulating plains, interspersed with sporadic ranges hillocks.

  The district is drained mostly by the Vedavathi, Chikkahangari and Tungabhadra rivers. A number of irrigation canals, tanks and wells are the main water sources of the district. Out of the net area sown, about 9.5 per cent is irrigated by different sources.

  Groundwater occurs under phreatic condition in the weathered rock formations of the 'Peninsular Gneissic Group' of rocks comprising of Granites, gneisses and schist. During pre-monsoon season, the minimum and maximum depth to water level is 2.43 and 13.13 mbgl, respectively. During post-monsoon, water level ranges from 2.75 to 11.75 mbgl. Seasonal waterlevel fluctuation varies from 1.38 m to 1.86 m.

1.15 Compliance with Laws, Statutes and Other Regulatory Frameworks

Agriculture-related GHG emissions are not regulated in India. The project activities, however, abide by all applicable laws, regulations, and rules. Government initiatives may promote specific subsets of project activity, but there are no laws that can be enforced requiring the execution of any project activity or its avoidance. However, the following national laws are listed, and the projects' operations do not violate them:

a) The Indian Forest Act, 1927

b) Forest (Conservation) Act, 1980

c) Environment (Protection) Act, 1986

d) Farmers & Farm Workers Commission Act ,2017

e) Andhra Pradesh State Agricultural Council Act, 2020.

f) The Andhra Pradesh Forest Act, 1967 (Act No.1 of 1967)

g) Andhra Pradesh Agricultural Pests and Diseases Act, 1919

h) Andhra Pradesh water land and trees act (APWALTA)

i) In 1974, the Water (Prevention and Control of Pollution) Act was passed. The project activity conforms with the rule as it makes the best use of water, improving both the quality and quantity of water management.

j) Human rights: The project respects all human rights and does not interfere with the livelihoods of the locals. Consultations with stakeholders have been held to gather their feedback. According to the 1993 Universal Declaration of Human Rights and Protection of Human Rights Act, this initiative is not involved in any form of violence or violation of human rights. The project upholds India's adherence to the International Covenant on Civil and Political Rights, the International Covenant on Economic, Social, and Cultural Rights, and the Universal Declaration of Human Rights (UDHR), to which India became a party on April 10, 1979.

1.16 Double Counting and Participation under Other GHG Programs

1.16.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

If yes, provide required evidence of no double issuance as outlined by the VCS Standard.

1.16.2 Registration in Other GHG Programs

Has the project registered under any other GHG programs?

☐ Yes ☒ No

If yes, provide the registration number and the date of project inactivity under the other GHG program.

Is the project active under the other program?

☐ Yes ☒ No

Project proponents, or their authorized representative, must attest that the project is no longer active in the other GHG program in the Registration Representation.

1.16.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

If yes, provide the program name(s), reason(s) and date for the rejection, justification of eligibility under the VCS Program, and any other relevant information.

1.17 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.17.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

If yes, provide all required evidence of no double claiming as outlined by the VCS Standard.

1.17.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☐ Yes ☒ No

If yes, provide all required evidence of no double claiming as outlined by the VCS Standard.

1.17.3 Supply Chain (Scope 3) Emissions

Do the project activities specified in Section 1.12 affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

If yes:

Is the project proponent(s) or authorized representative a buyer or seller of the product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

If yes:

Has the project proponent(s) or authorized representative posted a public statement on their website saying, "Carbon credits may be issued through Verified Carbon Standard project [project ID] for the greenhouse gas emission reductions or removals associated with [project proponent or authorized representative organization name(s)] [name of product(s) whose emissions footprint is changed by the project activities]."

☐ Yes ☒ No

If yes to all:

Provide evidence of the public statement. Evidence must be provided in this section or in an appendix.

1.18 Sustainable Development Contributions

The project is implemented in rural agricultural regions where conventional practices have led to soil degradation and reduced agricultural productivity. These areas are characterized by smallholder farms that rely heavily on traditional farming methods, resulting in declining soil health and increased vulnerability to climate change. The project sites are selected based on their eligibility and potential for SOC improvement through the adoption of sustainable practices.

Climate Action (SDG 13): By enhancing SOC through sustainable agroforestry and soil management practices, the project contributes to climate change mitigation by sequestering carbon and reducing greenhouse gas emissions from agricultural activities.The project t improves education, awareness-raising and human and institutional capacity on climate change adaptation through adoption of dryland fruit based agroforestry systems. It helps in adaptation, impact reduction associated with soil loss and water stress for agriculture purpose.

Life on Land (SDG 15): The project promotes biodiversity conservation through agroforestry systems that provide habitat for various species, protect against soil erosion, and enhance ecosystem services.

Clean Water and Sanitation (SDG 6): Efficient irrigation and water conservation measures ensure sustainable water use, improving water availability and quality for agricultural and domestic purposes.

Zero Hunger (SDG 2): Improved soil health and fertility lead to increased agricultural productivity and food security for local communities. Sustainable practices ensure long-term soil viability, supporting continuous food production.

The project will ensure sustainable food production systems and implement resilient fruit based agroforestry systems that improve productivity and production, it also helps maintain ecosystems, strengthen capacity for adaptation to climate change, extreme weather including drought.

Decent Work and Economic Growth (SDG 8): Capacity building and training empower local farmers with knowledge and skills in sustainable agriculture, enhancing their livelihoods and economic resilience.

The adoption of these practices can create new job opportunities and stimulate local economies. Improve progressively, resource use efficiency through dryland fruit based agroforestry systems. It also decouples economic growth from environmental degradation associated with crop cultivation. The project will also substantially reduce the proportion of youth not in employment, education or training. This will measure how many indirect and direct jobs have been created as a part of the engagement and how many training programmes have been conducted for the resource persons.

Responsible Consumption and Production (SDG 12): By replacing chemical inputs with organic alternatives and promoting efficient resource use, the project fosters sustainable agricultural production and reduces environmental impacts.

The project will support to strengthen the scientific and technological capacity to move towards more sustainable patterns of consumption and production. The Project will contribute in reducing water consumption in the crop production leading to reduce electricity or fossil fuel consumption for pumping the water.

1.19 Additional Information Relevant to the Project

1.19.1 Leakage Management

The project involves planting agroforestry trees in dryland areas, where the potential for leakage is minimal to zero. The chosen locations are characterized by low agricultural productivity and sparse vegetation, reducing the risk of activity displacement or negative environmental impacts elsewhere. The integration of agroforestry systems enhances soil

organic carbon (SOC) and provides multiple ecosystem benefits without causing harm to surrounding areas.

1.19.2 Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description

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1.19.3 Further Information

There are no other significant laws, technical details, economic factors, industry-specific considerations, social aspects, environmental factors, geographical factors, site-specific details, or time-related information to report that could affect the project's eligibility, the reduction of greenhouse gas emissions or removal of carbon dioxide, or the measurement of the project's reductions or removals.

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2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Use the table below to describe the stakeholder identification process. Where the rows do not apply, provide justification in the cell in the table below.

Stakeholder Identification	The project proponent convened meetings in Yalagatta village of Chitradurga district, Karnataka with farmers and local village committees to identify stakeholders for the project, recognizing their intimate knowledge of the community. The following groups emerged as key local stakeholders: - Farmer households

<table>
<tr><td></td><td>- Village representatives, officials (Panchayat)

- NGOs</td></tr>
<tr><td>Legal or customary tenure/access rights</td><td>The project entails integrating dryland fruit based agroforestry systems in the identified agricultural fields without engaging in legal or customary tenure/access rights.</td></tr>
<tr><td>Stakeholder diversity and changes over time</td><td>The below table summarized the different stakeholder categories, their condition at the project starts and changes over time.

<table>
<tr><th>Stakeholder category</th><th>Description</th><th>Condition at the project start</th><th>Changes Over Time</th></tr>
<tr><td>Farmers</td><td>Individuals engaged in farming activities in the project area</td><td>Lack of knowledge and awareness about dryland fruit based agroforestry systems, Limited access to sustainable agricultural practices and resources</td><td>The project is proposed to introduce farmers to fruit based agroforestry systems, raise awareness about its benefits, and provided access to sustainable agricultural practices and resources.</td></tr>
<tr><td>Government Agencies and Agricultural Extension Services</td><td>Public entities responsible for agricultural development and support</td><td>Limited focus on promoting dryland fruit based agroforestry systems and</td><td>The project would collaborate with government agencies to promote agroforestry systems, integrate them</td></tr>
</table>
</td></tr>
</table>

		sustainable agriculture	into existing agricultural extension services, and support sustainable agriculture initiatives.
NGOs	*Non-profit organizations focused on environmental conservation and sustainable agriculture*	Limited involvement in promoting dryland fruit based agroforestry systems	The project would engage with NGOs in advocating for agroforestry systems, raising awareness about its environmental benefits, and promoting sustainable agricultural practices.

Expected changes in well-being

Impact #1	Improved Soil Health
Type of Impact	Positive, actual, direct
Affected Stakeholder Group(s)	Farmers
Resulting Change in Well-being	Since soil is the fundamental part of farming, increased soil health will increase their crop productivity.

Impact #2	Improved Health Status
Type of Impact	Positive, Predicted, Direct

Affected Stakeholder Group(s)	Farmers, Farmers families, Consumers, Local Environment
Resulting Change in Well-being	By prioritizing soil health and diversification, dryland fruit based agroforestry systems result in providing nutrition from fruits along with food crops, potentially improving human nutrition and health.

Impact #3	Training imparted on climate change, project implementation and monitoring procedures
Type of Impact	Positive, Predicted, Indirect
Affected Stakeholder Group(s)	Project Implementing Staff
Resulting Change in Well-being	Training and skill development related to community engagement, survey implementation, and technical training like conducting Soil Tests will be provided to many stakeholder groups, which is envisaged to empower their lives by not only improving their employment chances but also through increased awareness levels regarding issues related to climate change and social equity.

Impact #4	Enhanced Biodiversity, Improved Environment and Better Water Quality
Type of Impact	Positive, Predicted, Direct and Indirect
Affected Stakeholder Group(s)	Local Community

	Resulting Change in Well-being	Dryland fruit based agroforestry systems enhance biodiversity, support ecosystem health, minimize pollution, and improve soil fertility & water quality.
	Impact #5	Resilient Food Systems
	Type of Impact	Positive, Predicted, Direct
	Affected Stakeholder Group(s)	Farmers and their families
	Resulting Change in Well-being	Diverse dryland fruit based systems are better equipped to withstand extreme weather events and other challenges, contributing to food security and stability.
	Impact #6	Improved Economic Outcomes
	Type of Impact	Positive, Predicted, Direct
	Affected Stakeholder Group(s)	Farmers
	Resulting Change in Well-being	By improving resource use efficiency and system productivity, overall income and profitability would be higher, thereby promoting economic sustainability in farming.
Location of stakeholders	The geographical boundary of the project is Chitradurga district, Karnataka, India and the geographical location of the project activity is Challakere Tq., Chitradurga District. There are no areas outside the project boundary that get impacted by the project.	
Location of resources	The resources belong to the selected villages in Challakere Tq., Chitradurga District, Karnataka, India.	

2.1.2 Stakeholder Consultation and Ongoing Communication

Use the table below to describe the process for and the outcomes from the stakeholder consultation conducted prior to project initiation.

Date of stakeholder consultation	*DD-Month-YYYY*
Stakeholder engagement process	*Describe the process to engage stakeholders in a culturally appropriate manner (e.g., dates of announcements or meetings, language and gender sensitivity). Describe the process or methods used to document the outcomes.*
Consultation outcome	*Summarize the discussion around consent to project design and implementation, risks, costs and benefits of the project, all relevant laws and regulations covering workers' rights in the host country, the discussion of FPIC and the VCS validation and verification process.*
Ongoing communication	*Describe the mechanisms for ongoing communication with stakeholders.*
Stakeholder input	*Describe how due account was taken of all input received during the consultation. Include details on any updates to the project design or justify why updates were not necessary or appropriate.*

2.1.3 Free Prior and Informed Consent

Use the table below to describe the outcome of the FPIC process as part of the stakeholder consultation process.

Obtaining consent	Describe the process used to develop the grievance redress procedure including processes for receiving, hearing, responding and attempting to resolve grievances within a reasonable time period, taking into account culturally appropriate conflict resolution methods.

Outcome of FPIC	Describe the grievance redress procedures developed with stakeholders.

2.1.4 Grievance Redress Procedure

Use the table below to describe the grievance redress procedures developed to resolve any conflicts which may arise between the project proponent and stakeholders.

Development process	A grievance register will be established and prominently displayed on the notice board in each village throughout the project's duration. Contact details, including phone number, WhatsApp, and email of the designated person, will be provided for stakeholders to share comments or suggestions anonymously at any time.
Grievance redress procedure	Various communication channels are available, including phone, WhatsApp, and email. Each village will have a grievance register for farmers to anonymously report issues, with the project proponent conducting regular village visits to gather feedback. Upon receiving a complaint through any channel, the project's grievance redress team will intervene within reasonable time, contacting relevant stakeholders. They will propose a solution or mediation plan based on collected information, aiming to resolve the conflict within 30 days. This streamlined process ensures timely resolution of issues, fostering transparency and accountability in project management.

2.1.5 Public Comments

Summarize any public comments submitted during the public comment period and any comments received after the public comment period. Demonstrate how due account was taken of all comments received. Include details on when the comments were received, and any updates to the project design or demonstrate the insignificance or irrelevance of comments.

Comments received	Actions taken
Summary of comment received	*Provide a summary of actions taken and any project design updates or justify why updates were not necessary or appropriate.*
…	….

2.2 Risks to Stakeholders and the Environment

2.2.1 Management Experience

Demonstrate that management teams have expertise or experience in implementing similar project activities and engaging communities. Where relevant experience is lacking, demonstrate how the project proponent has partnered with other organizations to support the project or have a recruitment strategy to fill the identified gaps.

2.2.2 Risk Assessment

Use the table below to describe the risk assessment and outcome of the potential risks to stakeholders and the environment. Describe the commensurate mitigation or preventative measure(s) in place to prevent or mitigate the risk. Where no risk is identified, write "No risk identified" in the first column, and provide justification in the second column. Add rows as needed.

	Risks identified	Mitigation or preventative measure(s) taken
Natural and human-induced risks to stakeholders' wellbeing		
Risks to stakeholder participation	No risk identified	Local farmers will maintain their usual crop cultivation practices on their lands, with planting of dryland fruit trees. The project activity will impact their farming participation to some extent.
Working conditions	No risk identified	The modifications to existing cropping systems introduced by the project activity are anticipated to have no impact on the working conditions of local

		farmers.
Safety of women and girls	No risk identified	The project activity does not alter the traditional division of labor between men and women.
Safety of minority and marginalized groups, including children	No risk identified	The project activity does not compromise the safety of minority and marginalized groups.
Pollutants (air, noise, discharges to water, generation of waste, and release of hazardous materials and chemical pesticides and fertilizers)	No risk identified	The project activity promotes environmental sustainability and generates positive impacts, encompassing enhanced soil fertility, water conservation, increased food production, and climate change adaptation and mitigation.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

Use the table below to identify and summarize the risks for rights related to labor and work. Describe the commensurate mitigation or preventative measure(s) in place to prevent or mitigate the risk. Where no risk is identified, write "No risk identified" in the first column, and provide justification in the second column. Add rows as needed.

Discrimination and sexual harassment	Discrimination in the job market based on race, nationality, ethnicity, gender, or religion is prohibited by Indian law. The project proponent is committed to adhering strictly to India's Labour Law, Sexual Harassment law and has instituted anti-discrimination measures in project implementation. This includes offering equal job opportunities to qualified workers regardless of gender, race, or religion, without additional requirements for women or minorities, and ensuring equal pay for equal work.
Gender equity in labor and work	Explained above in "Discrimination and sexual harassment"
Human trafficking, forced labor, and child labor	The project relies on the voluntary participation of local farmer households, who cultivate crops on their or leased land. There is absolutely no involvement of human trafficking, forced labor, or child labor.

2.3.2 Human Rights

The project land is owned by the village farmers and they have the right to use the land for farming. The project does not interfere with ownership or usage rights and actively upholds and promotes the protection of these rights.

2.3.3 Indigenous Peoples and Cultural Heritage

The project activity affects only certain aspects of local farming practices, leaving the longstanding tradition of crop cultivation untouched, which has been a cornerstone of agricultural heritage for generations. Additionally, the project does not disrupt indigenous people or their cultural heritage.

2.3.4 Property Rights

Disputes over rights to territories and resources	The land is either owned by farmers or leased by the farmer. There are no disputes over right to territories and resources.
Respect for property rights	Through the signing of a cooperation agreement, the village farmers engaged in the project will entrust the project proponent with the VCS development of project activities on the designated land. The agreement underscores the project proponent's commitment to acknowledging, honoring, and advocating for the protection of ownership rights held by the village collectives and the usage rights held by the farmer households.

2.3.5 Benefit Sharing

Where the project impacts property rights as described in Section 2.4.4 above, use the table below to describe the project's benefit sharing agreement.

Process used to design the benefit sharing plan		
Summary of the benefit sharing		

plan		
Approval and dissemination of benefit sharing plan		

2.4 Ecosystem Health

	Risk identified	Mitigation or preventative measure taken
Impacts on biodiversity and ecosystems	No risk identified	The project activity preserves the current flora and fauna in and around the project area intact.
Soil degradation and soil erosion	No risk identified	Implementing dryland fruit based agroforestry systems will reduce surface runoff and soil erosion.
Water consumption and stress	No risk identified	The project activity has no significant impact on water consumption or irrigation practices.
Usage of fertilizers	No risk identified	The project activity promotes the utilization of crop residues and other on-farm resources. This reduces dependence on chemical fertilizers.

2.4.1 Rare, Threatened, and Endangered Species

Is the project located in or adjacent to habitats for rare, threatened, or endangered species?

☐ Yes ☒ No

2.4.2 Introduction of Species

There is no species introduction.

2.4.3 Ecosystem Conversion

	Risk identified	Mitigation or preventative measure taken
Ecosystem conservation	No risk identified	The project area has been under agriculture land use for more than five decades and the area was

		not cleared or drainage of existing natural systems altered during the past 10 years.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	VM0047	Afforestation, Reforestation and Revegetation	V1.0
Module	VMD0054	Module for Estimating Leakage from ARR Activities	V1.0
CDM Methodological Tool	AR-AM-TOOL-14	Methodological tool for the Estimation of carbon stocks and change in carbon stocks of trees and shrubs in A/R CDM project activities	4.2

3.2 Applicability of Methodology

Methodology ID	Applicability condition	Justification of compliance
VM0047	Project activities increase vegetative cover	The project activity majorly involves promotion of dryland fruit-based agroforestry systems which eventually increase vegetative cover in the project area and significantly increase of carbon stocks
	Project activities cannot involve mechanical removal offsite or burning	The project will not involve any mechanical removal of

	of significant stocks of preexisting dead wood (e.g., for site preparation). Where project site preparation includes chipping, mastication or machine piling, all material must remain onsite within the project boundary	significant burning of biomass stocks.
	The land subject to the project activity does not fall in wetland category	The lands selected under the project activity are privately owned barren and fallow lands or cropland. These lands do not fall in the wetland category. According to Ramsar Convention 4, the definition of wetland is - wetlands are areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters." The lands selected under first project activity instance do not fall under the wetland category as well as there is no water bodies in the initial project activity instance area. The inclusion of project activity instances will be screened to ensure they do not fall in wetland category in the following ways: 1) Collection of geo

		coordinates (latitude and longitudes) of project activity instances. 2) Using remote sensing imagery techniques to identify any water body that fall in the project boundary 3) Ensuring that water body does fall under the definition of wetland according to Ramsar Convention on Wetlands. In addition, it will be ensured than plantation will not take place in designated water body area.
	Project activities that occur on organic soils or in wetlands and result in a manipulation of the water table. Planting species that do not naturally occur in organic soils or wetlands is considered a manipulation of the water table. Where projects take place on organic soils or wetlands and manipulate the water table, they must be developed using a multiple project activity design applying this methodology and a Wetland Restoration and Conservation methodology (e.g., VM0036 Methodology for Rewetting Drained Temperate Peatlands). In such cases, the project activities must comply with all applicable conditions of the selected Wetland Restoration and Conservation methodology and this methodology.	The project areas do not and will not include areas with organic soils or wetlands.
	Area based, census based, or a	Census based approach

	combination of the two quantification approaches may be used provided approach-specific applicability conditions are met.	would be used in the proposed project
	Project activity must be direct planting (i.e., must not involve facilitated natural regeneration)	Project activity involves direct planting of dryland fruit species
	Project activity must not produce continuous tree and/or shrub cover on any contiguous area exceeding one hectare	The project activity involves direct planting of dryland fruit species on cultivated fields of small and marginal farmers. It is unlikely to produce continuous tree and/or shrub cover on any contiguous area exceeding one hectare
	Individual planting units of woody biomass must be clearly defined (e.g., tree, shrub, bamboo clump) and identifiable in the field, with each planting unit given a physical marker onsite with a unique ID and location recorded by GPS with a minimum accuracy of five meters	In the project activity, individual planting units of woody biomass will be clearly defined and identified, with each planting unit given a physical marker onsite with a unique ID and location recorded by GPS with a minimum accuracy of five meters
	Project activity must: a) occur within an area classified as non-forest for the past ten years with less than 10% percent pre-existing woody biomass cover; and/or b) occur in an area subject to continuous cropping, in “settlements”, or “other lands” land use category	The project activity would be implemented in project area with an area classified as non-forest for the past ten years with less than 10% pre-existing woody biomass cover. Further, the direct planting of fruit species would be taken up in areas subject to continuous cropping.
	An initial complete census of all	As required, an initial

	planting units at t=0 must be conducted	complete census of all planting units will be conducted
	Projects are considered ineligible if woody biomass, which serves a similar purpose as the planting units in the project, has been removed within the last ten years (confirmed via pre-project photos and/or attestation)	The project area has no history of planting and removing of woody biomass within the last ten years. Further, since planting of fruit species is envisaged in the project area, farmers seldom remove such plants/tress.
	Any soil disturbance from the project activity (i.e., from site preparation): a) occurs only once during the project crediting period (i.e., at site preparation); or b) does not involve soil inversion to a depth exceeding 25 cm (e.g., that would result from a moldboard plow)	The soil disturbance occurs only once during the project crediting period i.e. at the time of planting of fruit species. Further, the site preparation doesn't involve soil inversion beyond 25 cm depth

3.3 Project Boundary

The relevant spatial boundary for the census-based approach is a 10-meter radius buffer around the recorded GPS location of each planting unit. This is required to ensure accounting boundaries do not overlap when area-based and census-based approaches are used in the same project. This spatial boundary will also be used to assess VCS eligibility and methodology applicability conditions. In the census-based approach, a project area is not used for scaling estimated carbon stocks. Scaling is based on the number of planting units, Nt.

Selected carbon pools included in the project boundary in the census-based baseline and project scenarios are listed below.

Carbon Pool	Included?	Justification/Explanation
Aboveground woody biomass	Yes	Major carbon pool
Aboveground non-woody biomass	Excluded	Conservative to exclude

Belowground woody biomass	Yes	Major carbon pool
Belowground non-woody biomass	Excluded	Conservative to exclude
Dead wood	Excluded	Conservative to exclude
Litter	Excluded	Conservative to exclude
Soil organic carbon (SOC)	Excluded	Conservative to exclude
Harvested wood products	Excluded	Conservative to exclude

The greenhouse gases included in or excluded from the project boundary are shown below

Source		Gas	Included?	Justification/Explanation
Baseline	Burning of biomass (whether by natural or anthropogenic causes)	CO2	No	Conservative to exclude
		CH4	No	Conservative to exclude
		N2O	No	Conservative to exclude
	Emissions from nitrogen fertilizer	CO2	No	Conservative to exclude
		CH4	No	Conservative to exclude
		N2O	No	Conservative to exclude
	Burning of fossil fuels	CO2	No	Conservative to exclude
		CH4	No	Conservative to exclude
		N2O	No	Conservative to exclude
Project	Burning of biomass (natural or anthropogenic causes)	CO2	No	Carbon stock decreases due to burning are accounted as a carbon stock change
		CH4	No	Conservative to exclude
		N2O	No	Conservative to exclude
	Emissions from nitrogen fertilizer	CO2	No	Conservative to exclude
		CH4	No	Conservative to exclude
		N2O	No	Conservative to exclude
	Burning of fossil fuels	CO2	No	De minimis
		CH4	No	De minimis
		N2O	No	De minimis

3.4 Baseline Scenario

The project activity uses the latest methodology 'VM0047 Afforestation, Reforestation and Revegetation' Version 1.0 with census-based quantification approach. The approach uses a project method for setting the crediting baseline. The project activity must:

1) occur within an area with pre-existing woody biomass cover of less than ten percent; and/or

2) occur in an area subject to continuous cropping, in settlement(s), or on lands categorized as 'other lands'.

The lands under the project activity are designated crop lands. These lands were historically crop lands and will continue to remain croplands under the project scenario as well. The lands under the project activity are under the control of respective land owners or farmers. It is extremely difficult that the farmers will grow fruit bearing trees in the absence of the project activity.

3.5 Additionality

Projects using the census-based approach must apply the following steps to demonstrate additionality:

Step 1: Regulatory surplus

Step 3: Investment barrier

Step 4: Common practice

Step 1: Regulatory Surplus

The implementation of the project activities is not mandated by any law, statute, or other regulatory framework in India. These activities represent improved agricultural land management practices that exceed the legal responsibilities of landowners or land users.

Step 3: Investment barrier

The initial investment on establishment of dryland fruit based agroforestry systems is quite high. It includes cost of plants, expenditure on layout, digging and refilling of pits, farmyard manures and pesticides. Another, predominant challenge is that the farmers have to wait for a longer period (at least more than 3 years) for realizing economic returns from fruit trees planting. Hence, planting of fruit plants by farmers in the project area would not be expected without the support of project activity.

Step 4: Common practice

Chitradurga forest division occupies a central position in the eastern plains of Karnataka and its boundaries are co-terminus with those of Chitradurga district. The division has about 1,28,718 hectares of recorded forest area which constitute only about **15.25 of its geographical area of 8,440 Km²** (Source: https://aranya.gov.in). Further, as per the report of ICAR-National Bureau of Soil Survey & Land Use Planning (ICAR-NBSSLUP, Nagpur) entitled "Soils and land use of Chitradurga district, Karnataka, only about 9% of the total area in the district is under forests. Hence, tree cover either on forest or non-forest lands in the district is less than 15%. Hence, the practice of dryland fruit based agroforestry systems is not common in the project area.

3.5.1 Regulatory Surplus

Is the project located in an UNFCCC Annex 1 or Non-Annex 1 country?

☐ Annex 1 country ☒ Non-Annex 1 country

Are the project activities mandated by any law, statute, or other regulatory framework?

☐ Yes ☒ No

If the project is located inside a Non-Annex 1 country and the project activities are mandated by a law, statute, or other regulatory framework, are such laws, statutes, or regulatory frameworks systematically enforced?

☐ Yes ☒ No

If no, describe which mandated laws, statutes, or other regulatory frameworks require project activities and provide evidence of systematic non-enforcement to demonstrate regulatory surplus.

3.5.2 Additionality Methods

- *Where a project method is applied to demonstrate additionality and the procedure in the applied methodology or tool involves several steps, describe how each step is applied and clearly document the outcome of each step. Indicate clearly the method selected to demonstrate additionality (e.g., investment analysis or barrier analysis in the case of the CDM Tool for the demonstration and assessment of additionality). Where barrier analysis, or equivalent, is used to demonstrate additionality, only include the most relevant barriers. Justify the credibility of the barriers with key facts and/or assumptions and the rationale. Provide all relevant references.*
- *Where a performance method is applied to demonstrate additionality, demonstrate that performance can be achieved to a level at least equivalent to the performance benchmark metric.*

- *Where the methodology applies an activity method for the demonstration of additionality, include a statement that notes that conformance with the positive list is demonstrated in the Applicability of Methodology section above.*
- *Provide sufficient information (including all relevant data and parameters, with sources) so that a reader can reproduce the additionality analysis and obtain the same results.*

3.6 Methodology Deviations

Describe and justify any methodology deviations applied, including any previous deviations. Include evidence to demonstrate the following:

- *The deviation will not negatively impact the conservativeness of the quantification of GHG emission reductions or removals.*
- *The deviation relates only to the criteria and procedures for monitoring or measurement and does not relate to any other part of the methodology.*

4 QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

As per the methodology, VM0047 (Afforestation, Reforestation and Revegetation), Version 1.0, the following approach is considered for the calculation of GHG emission reductions and removals from the project site.

Census-based approach, in brief

a) This methodology is adopted for this project activity, does not result in a change in land use and where a complete census of plantings is practical (e.g., urban forestry, agroforestry, forest shelterbelts, plantings directed to rural homesteads, revegetation not meeting the forest definition);

b) In this project, activities include direct plantings;

c) Scales biomass by planting unit to the project level using a complete census of planting units (i.e., the project boundary is defined by the individual planting units);

d) Methodology uses a project method to demonstrate additionality and determine the crediting baseline.

The 10-meter radius buffer as relevant spatial boundary is adopted for the census-based approach around the recorded GPS location of each planting unit. This spatial boundary will also be used to assess VCS eligibility and methodology applicability conditions.

In the census-based approach, a project area is not used for scaling estimated carbon stocks. Scaling is based on the number of planting units, Nt.

The baseline scenario is represented by the absence of the planting units, and carbon stock changes in the baseline scenario are equal to zero.

Leakage and performance benchmark are not included in calculations (implicitly set equal to zero), soil organic carbon is excluded, and biomass carbon is restricted to (live) woody biomass.

4.2 Project Emissions

Project Carbon Stock Changes

Woody Biomass

Change in the carbon stocks in this project, occurring in the woody carbon pools, in year *t* is calculated as follows by Census-based quantification :

Census-based quantification

Carbon stock change in woody biomass in the project scenario is estimated as:

$\Delta C_{WP-woody,} = C_{WP-,}$ ..... (1)

Where:

$\Delta C_{WP\text{-}woody,t}$ = Change in carbon stock in woody biomass in the project scenario through year t (t C)

$C_{WP\text{-}woody,t}$ = Average carbon stock in woody biomass in the project scenario in year t (t C)

t = 1, 2, 3, …, t years elapsed since the project start date

Carbon stock in woody biomass in the project scenario is estimated by applying the number of planting units as a scaling factor, N, to the complete census of planting units (not monitored) adjusted for mortality, Mt, at each monitoring event.

$C_{WP-woody,} = N \times (1 - Mt) \times C_{WP-woody,\_avg,t}$ ..... (2)

Where:

$C_{WP\text{-}woody,t}$	=	Average carbon stock in woody biomass in the project scenario in year *t* (t C)
N	=	Initial population size (number of planting units)
M_t	=	Mortality through year *t* (percent)
$C_{WP\text{-}woody\text{-}pu\_avg,t}$	=	Average carbon stock in woody biomass per planting unit (pu) in the project scenario in year *t* (t C/pu)
t	=	1, 2, 3, …, *t* years elapsed since the project start date

Average carbon stock in woody biomass per planting unit is calculated as:

$$C_{WP-woody-pu\_avg,} = 1/n_t \times \sum_{pu=1}^{nt} (B_{WP-woody-AB,,} \times (1+R) \times CF) \quad \text{..... (3)}$$

Where:

$C_{WP\text{-}woody\text{-}pu\_avg,t}$	=	Average carbon stock in woody biomass per planting unit (pu) in the project scenario in year *t* (t C/pu)
n_t	=	Number of planting units sampled in year *t* (integer)
$B_{WP\text{-}woody\text{-}AB,pu,t}$	=	Estimated biomass stock in aboveground woody biomass in sampled planting unit *pu* in the project scenario in year *t* (t d.m.)
R	=	Root to shoot ratio (t root d.m./t shoot d.m.)
CF	=	Carbon fraction of dry biomass (t C/t d.m.)
t	=	1, 2, 3, …, *t* years elapsed since the project start date

4.3 Leakage Emissions

For the census-based quantification approach, LKt is set equal to zero as per the methodology, VM0047 (Afforestation, Reforestation and Revegetation), Version 1.0. The requirement that the ARR project activity will not produce continuous natural vegetative cover on any contiguous area exceeding one hectare avoids any significant displacement of a pre-existing land use and leakage effects are assumed to be de minimis. The leakage emissions from the project activity are considered to be zero.

4.4 Estimated GHG Emission Reductions and Carbon Dioxide Removals

Estimated Carbon dioxide Removals

Census-based quantification

Carbon dioxide removals using census-based quantification is to be calculated with carbon stock changes in the baseline scenario and leakage, implicitly set equal to zero.

$$CR_t = (\Delta C_{WP\,t} \times (1 - \;)) - (\Delta C_{WP,\,t-1} \times (1 - UNC_{t-1})) - PE_t \quad \ldots\ldots\ldots\ldots\ldots \quad (4)$$

Where:

CR_t = Carbon dioxide removals from the project activity in year *t* (t CO_2e)

$\Delta C_{WP\,t}$ = Project carbon stock change in year *t* (t CO_2e)

PE_t = Project emissions from biomass burning and fertilizer in year *t* (t CO_2e)

t = 1, 2, 3, …, *t* years elapsed since the project start date

Where monitoring intervals are longer than one-year, periodic removals are first calculated for the monitoring interval using the equations above (substituting t − 1 for t minus length of monitoring interval in years) and then annualized by dividing periodic removals by the length of the monitoring interval in years. This produces equal CRt assigned to each year in the monitoring interval.

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)
2024-2025 (01.08.2024 to 31.07.2025)	573	0	0	573
2025-2026	1373	0	0	1373
2026-2027	1373	0	0	1373
2027-2028	1373	0	0	1373
2028-2029	1373	0	0	1373
2029-2030	1373	0	0	1373
2030-2031	1373	0	0	1373
2031-2032	1373	0	0	1373

2032-2033	1373	0	0	1373
2033-2034	1373	0	0	1373
2034-2035	1373	0	0	1373
2035-2036	1373	0	0	1373
2036-2037	1373	0	0	1373
2037-2038	1373	0	0	1373
2038-2039	1373	0	0	1373
2039-2040	1373	0	0	1373
2040-2041	1373	0	0	1373
2041-2042	1373	0	0	1373
2042-2043	1373	0	0	1373
2043-2044 (01.08.2043 to 31.07.2044)	1373	0	0	1373
Total estimated ERRs during the first or fixed crediting period				27460
Total number of years				20
Average annual ERRs				1373

5 MONITORING

5.1 Data and Parameters Available at Validation

Complete the table below for all data and parameters that are determined or available at validation and remain fixed throughout the project crediting period (copy the table as necessary for each data/parameter). The values provided are used to quantify the estimated reductions and removals for the project crediting period in Section 4 above. Data and parameters to be monitored during the operation of the project are included in Section 5.2 (Data and Parameters Monitored) below.

Data/Parameter	*A*
Data unit	ha
Description	Project area - Area of the stratum i

Source of data	Calculated from GPS / GIS data
Value applied	Project-specific - Each stratum area has described in separate table
Justification of choice of data or description of measurement methods and procedures applied	GPS is used for demarcating / delineation the project land parcels with geo-registered referencing corner points, clear landmarks or other intersection points.
Purpose of data	Calculation of project emissions using the census-based quantification approach
Comments	The project activity may contain more than one discrete area of land with unique geographic identification.

Data/Parameter	*R*
Data unit	Kg t dm /yr
Description	Root to shoot ratio (i.e., ratio of belowground (root) biomass to aboveground biomass, per unit area or per stem)
Source of data	IPCC Default Value for South Asian region
Value applied	0.27
Justification of choice of data or description of measurement methods and procedures applied	IPCC Default Value for South Asian region
Purpose of data	Calculation of project emissions using the census-based quantification approaches
Comments	None

Data/Parameter	*CF*
Data unit	t C/t d.m.
Description	Carbon Fraction of tree biomass
Source of data	IPCC Default Data
Value applied	0.47

Justification of choice of data or description of measurement methods and procedures applied	IPCC Default Data
Purpose of data	Calculation of project emissions using the census-based quantification approaches
Comments	None

Data/Parameter	*N*
Data unit	Integer
Description	Initial population size (number of planting units)
Source of data	Complete census / enumeration of planted project area
Value applied	The original population size, *N*, is established via administering and recording an initial complete census of all planting units. For each planting unit, the following is to be recorded: • Unique ID • Geo-referenced point of the location • Year planted • Species
Justification of choice of data or description of measurement methods and procedures applied	Ground work of the planted area by complete census / enumeration of planted project area
Purpose of data	Calculation of project emissions using the census-based quantification approach
Comments	Planting units will be clearly defined (e.g., tree, shrub, bamboo clump) for identification in the field.

5.2 Data and Parameters Monitored

Complete the table below for all data and parameters that will be monitored during the project crediting period (copy the table as necessary for each data/parameter). The values provided are used to quantify the estimated reductions and removals for the project crediting period in Section 4 above.

Data / Parameter	*Mt*
Data unit	Percent
Description	Mortality through year *t*
Source of data	Complete re-enumeration, or sampling in the project site
Description of measurement methods and procedures to be applied	Stratification method of sampling the planted units is followed. An appropriate representative sample would be a stratified systematic sample, within each annual cohort, selecting planting units systematically with a random start from the list of unique censused planting units. Planting units are assessed as dead where: 1) Green vascular tissue (e.g., cambium of trees and shrubs) and green leaves are absent, or It is not possible to relocate the planting unit.
Frequency of monitoring/recording	Every 5 years or more frequently. Sampling for incidence of mortality will be conducted simultaneously with sampling planting units for biomass measurement.
Value applied	
Monitoring equipment	
QA/QC procedures to be applied	
Purpose of data	Calculation of project emissions using the census-based quantification approach
Calculation method	Calculated as a percentage of a sample or census
Comments	None

Data/Parameter	*BWP-woody-AB,pu,t*
Data unit	t d.m.
Description	Estimated biomass stock in aboveground woody biomass in sampled planting unit *pu* in the project scenario in year *t* (census-based

	quantification)
Equations	(1), (2), (3)
Source of data	Field measurement of sample plots using Ravi Altimeter / Clinometer for height and measurement tape or tree caliper for diameter at breast height of the standing trees
Description of measurement methods and procedures to be applied	Aboveground woody biomass is measured via representative sampling from *N* planting units. Stratification (e.g., sub-dividing the census list into annual cohorts) will be followed for precision. An appropriate representative sample would be a stratified systematic sample within each annual cohort, selecting planting units systematically with a random start from the list of unique censused planting units.. All sample measurements will be 1) Be demonstrated to be unbiased and derived from representative sampling; 2) Fixed size thresholds on independent variables used in biomass estimation (e.g., diameter at breast height, diameter at root collar, height), will be maintained through the crediting period. 3) Attributes (e.g., diameter at breast height, total height) incorporated as independent variables in allometric equations are directly measured in the field applying established best practices 4) Aboveground woody biomass of each sampled woody plant (e.g., tree, shrub) is estimated using published allometric equations applied to one or more measured attributes. 5) Equations specific to the species, genus or family within the same ecoregion in which the project is located will be adopted for estimation , 6) Detailed measurement protocols is given in the monitoring section **Parameters:** **Diameter at Breast Height (cm):** It refers to the diameter of a tree's trunk or stem, specifically measured at a height of 1.3 meters (or approximately 4.5 feet) above the ground level. By applying the appropriate allometric equation and carbon conversion factor to the DBH measurement, the total amount of carbon stored in the tree can be estimated. The PP will use Standard Operating Procedure to measure the DBH. DBH is measured at a standard height of 1.3 meters (or approximately 4.5 feet) above the ground level. This height is chosen to provide a

	consistent measurement across different trees and to avoid the variability caused by the root flare and other obstructions closer to the ground. **Tree height (m):** Using Ravi Altimeter / Clinometer, height will be measured. A Ravi Altimeter / Clinometer is a handheld device that measures angles. With a clinometer, the PP will measure the angle from the eye level to the top of the tree and then use trigonometry to calculate the height.
Frequency of monitoring/recording	Prior to every verification event and every monitoring report preparation
QA/QC procedures to be applied Describe the quality assurance and quality control (QA/QC) procedures to be applied, including the calibration procedures where applicable.	QA/QC procedures to be applied Describe the quality assurance and quality control (QA/QC) procedures to be applied, including the calibration procedures where applicable.
Purpose of data	Calculation of project emissions using the census-based quantification approach
Calculation method	It is a measurement value (height and DBH) which is calculated as the average of sample measurements
Comments	Sampled live planting unit is less than the pre-determined size (e.g., minimum diameter at breast height) threshold, it is assigned a value of zero and included in the sample dataset.

5.3 Monitoring Plan

Permanent sampling plots will be used for sampling over the period of time to measure and monitor the changes in tree biomass carbon stocks including above ground and below ground biomass. The location of samples within the plot has been decided randomly to avoid any potential bias. The project boundary will be monitored by monitoring of parcels using GPS. The following tool will be used for the calculation of the sample plots:

A/R CDM Tool - “Calculation of the number of sample plots for measurements within A/R CDM project activities” Version 2.1.02.

From the same tool, to achieve the targeted precision level of about ±10%of the mean at the 95% confidence level, the following equation from the tool will be used:

$$n = \frac{\left[\sum_{i=1}^{m_{PS}} N_i \cdot st_i\right]^2}{\left(N \cdot \frac{E}{z_{\alpha/2}}\right)^2 + \sum_{i=1}^{m_{PS}} N_i \cdot (st_i)^2}$$

$$n_i = \frac{\sum_{h=1}^{m_{PS}} N_i \cdot st_i}{\left(N \cdot \frac{E}{z_{\alpha/2}}\right)^2 + \sum_{i=1}^{m_{PS}} N_i \cdot (st_i)^2} \cdot N_i \cdot st_i$$

Where:

n sample size (total number of sample plots required) in the project area

ni sample size for stratum I

E allowable error of the estimated quantity Q

I project strata

L total number of strata; dimensionless

α α = 1-α is probability that the estimate of the mean is within the error bound E

zα/2 zα/2 = value of the statistic z (embedded in Excel as: inverse of standard normal probabilitycumulative distribution), for e.g. 1-α = 0.05 (implying a 95% confidence level) zα/2=1.9599

Ni maximum possible number of sample plots in stratum I

N maximum possible number of sample plots in the project area

Sti standard deviation for each stratum i; dimensionless, 30%

A total size of all strata, e.g. the total project area; ha

Ai size of each stratum i; ha

A sample plot size (constant for all strata); 0.04 ha

Q approximate average value of the estimated quantity (aboveground wood volume per hectare);m3 ha-1

P desired level of precision (10%); dimensionless

Tree measurement

DBH

Measuring the Diameter at Breast Height (DBH) of a tree involves a standardized procedure to ensure consistent and accurate results. Here's how it's typically done:

Select the Height: DBH is measured at a standard height of 1.3 meters (or approximately 4.5 feet) above the ground level. This height is chosen to provide a consistent measurement across different trees and to avoid the variability caused by the root flare and other obstructions closer to the ground.

Locate the Measurement Point: Stand next to the tree and visually identify the point on the trunk that corresponds to the chosen height of 1.3 meters. It's often helpful to use a measuring tape or a marking stick to indicate this height on the trunk.

Wrap the Measuring Tape: Use a measuring tape or a DBH caliper to measure the diameter of the tree at the marked height. Wrap the measuring tape or caliper around the tree trunk in a horizontal plane. Make sure the tape is snug but not compressing the bark, and that it's perpendicular to the tree's vertical axis.

Record the Measurement: Read the measurement from the measuring tape or caliper where it crosses the trunk. This measurement represents the Diameter at Breast Height (DBH) of the tree.

Multiple Measurements: In situations where the tree trunk is not perfectly round or if there are irregularities, it's recommended to take multiple measurements at different angles around the trunk, and then average these measurements to get a more accurate DBH value.

Units: The measurement can be recorded in various units, such as inches or centimeters, depending on the unit system being used.

Tree Height

Measuring tree height using a clinometer involves measuring the angle from your eye level to the top of the tree and then using trigonometry to calculate the tree's height. Here's a step-by-step guide on how to do it:

Materials Needed:

1. Ravi altimeter / Clinometer (handheld device or smartphone app)

2. Measuring tape or rangefinder (optional, for measuring distance)

3. Pen and paper (for recording measurements)

Procedure:

Choose a Location: Stand at a distance from the tree where you can clearly see the top without any obstructions. The further away you are from the tree, the more accurate the measurement will be.

Hold the Clinometer: Hold the clinometer at eye level, ensuring that the clinometer's sighting line or the smartphone app's crosshair is aligned with the top of the tree.

Take the Angle Measurement: Look through the clinometer's sighting line or smartphone app's display. The clinometer will display the angle between your line of sight and the ground. This angle is the angle from your eye level to the top of the tree.

Record the Angle: Write down the angle measurement. Make sure you're using the same units (degrees) throughout the process.

Measure the Distance (Optional): If you're interested in calculating the tree's actual height, measure the distance between you and the tree. You can use a measuring tape or a rangefinder for this purpose.

Calculate the Tree Height: Using trigonometry, you can calculate the tree's height using the tangent function. The formula is:

Tree Height = Distance × tan(Angle)

Tree Height: The height of the tree you're trying to calculate.

Distance: The distance between you and the tree's base.

Angle: The angle you measured with the clinometer.

Perform the Calculation: Plug in the angle and distance into the formula, and calculate the tree's height. The result will be in the same units as your distance measurement (e.g., feet or meters).

Keep in mind that this method assumes that your eye level is at ground level. If you're on a slope or an elevated position, you'll need to account for the difference in height between your eye level and the ground. This method provides a good estimation of tree height but may have some margin of error due to factors like your own height, accuracy of angle measurement, and variations in terrain.

Using a clinometer can be a practical way to estimate tree height without needing to physically reach the tree's top. However, for highly accurate measurements or scientific studies, more sophisticated methods might be necessary.

Management Structure for Monitoring

The monitoring and management structure of the project activity are as follows:

1**. Project Proponent:**

- Responsible for overall project coordination, planning, and execution.

- Sets project goals, objectives, and timelines.

- Oversees budgeting, resource allocation, and risk management.

- Coordinates with various teams and stakeholders.

- Compilation and data analysis

2**. Field Supervisors/Coordinators:**

- Manage field operations, including planting, maintenance, and site preparation.

- Monitor field activities, ensuring they adhere to project plans and quality standards

- Collect data on planting progress, survival rates, and any issues encountered.

- Provide feedback to the project manager and M&E specialist.

3. Data Collection Team:

- Collects and records data on reforestation activities and related environmental parameters.

- Conducts regular site visits to gather accurate data on tree growth, health, and biodiversity.

- Ensures data accuracy and consistency across different monitoring points.

4. Community Engagement and Outreach Officer:

- Facilitates community involvement and participation in the reforestation project.

- Communicates project goals, benefits, and progress to local communities.

- Addresses community concerns, gathers feedback, and incorporates local knowledge.

Estimated budget outlay for the pilot project under VCM

Head	Sub head	Particulars	1st year	2nd year	3rd year	Total
		(Rupees)	**(Rupees)**	**(Rupees)**	**(Rupees)**	**(Rupees)**
A. Non-recurring	a. Altimeter	i. Procurement of altimeter (4 Nos)	40000	0	0	40000
	b. Digital Calliper	ii. Procurement of digital calliper (4 Nos)	30000	0	0	30000
	Sub total		**70000**	0	0	**70000**
B. Recurring	a. Salary for contractual service	i. Young Professional II (2 numbers) Rs 42000 per month	672000	1008000	1008000	2688000
		ii. Young Professional I (1 number) Rs 30000 per month	240000	360000	360000	960000
	b. Operating cost/ contingencies	i. Awareness/baseline survey (Training Material and Handout, Venue Costs, Refreshments and Meals, Light/Sound/ Projector/ Sitting Arrangement, Banner/Poster/Chart)	250000	400000	400000	1050000
		ii. Capacity Building Experts/Technical Experts (60 man-days with each man-days of Rs 5000 per man-days)	150000	300000	300000	750000
		iii. Land preparation and planting of 15600 trees @ Rs 200/tree	2300000	0	0	2300000
		iv. Plant management of 15600 trees @ Rs 50.00/tree	0	860000	860000	1720000
	c. Hired vehicle and TA/DA	i. Hired vehicle (Baseline survey, awareness/training, planting, data collection, monitoring activity), travel allowance, DA	750000	500000	500000	1750000

	d. Contractual	ii. Third Party Auditor for registration/verification of one single pilot project under VCM (Auditing, site visit, issuing findings, report preparation, submisison of document to carbon standard)	1600000	0	1200000	2800000
	e. Contingencies (Workshop and Publication)	i. Publication, Print and learning workshop (Log book , leaflet, project documents, outcome workshop (venue, Food, kits, banner, projector, notebook, Honorarium)	100000	200000	200000	500000
	Sub total		**6062000**	**3628000**	**4828000**	**14518000**
Total (A+B)			6132000	3628000	4828000	14588000
	Institutional charge 10%		617000	362800	482800	1462600
Grand Total			**6749000**	**3990800**	**5310800**	**16050600**