IMPACT ASSESSMENT
OF FOCUSED DEVELOPMENT PROJECTS

HDFC BANK

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for impact

IMPACT ASSESSMENT
OF FOCUSED DEVELOPMENT PROJECTS

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Executive Summary

1.1 Background

HDFC Bank is one of the largest private sector banks in India, providing a wide range of financial products and services to individuals and businesses. The Bank is committed to social responsibility and has a strong focus on its corporate social responsibility (CSR) initiatives. The bank's CSR activities are aimed at improving the lives of people in the communities it serves, with a focus on education, healthcare, and rural development. HDFC Bank's CSR initiatives are designed to be sustainable and impactful, with a focus on empowering individuals and communities to become self-sufficient. One of HDFC Bank's key CSR initiatives is its Focused Development Project (FDP). The project partnered with an organization called Grow Tress to plant 1 million trees. To understand the impact and reach of FDP, HDFC engaged TTC to conduct a third-party impact assessment of the project. This report presents the observations, findings, and recommendations of the impact conducted in four sampled states (Uttarakhand, Punjab, Madhya Pradesh and Odisha) from the nine project intervention states.

The main objectives of this assessment were:
- To assess the achievements and impact of the project in an ESG (environment, social and governance) framework
- To assess the future potential environmental impact of the tree plantations in the project
- To provide retrospective recommendations for future such projects

The assessment adopted a participatory and consultative approach for undertaking the assignment. A number of stakeholders, including implementing partners, local governance members, beneficiaries and community members were consulted at all four project locations to get a good grasp of project framework and activities in each location. The team conducted primary as well as secondary research for undertaking the assignment. Primary research included observations of plantations and interactions with stakeholders in the form of semi-structured interviews, focused group discussions and in-depth interviews. Whereas the secondary research included reviewing several and varied documents shared by the HDFC Bank and Grow Trees teams as well as literature studies of government schemes and district and state profiles.

The study team observed, that the major focus areas of this Focused Development Project with Grow Trees have been:
- Spreading knowledge and awareness amongst target communities of the importance ecological conservation
- Conservation of natural resources such as air, water, soil, and bio-diversity
- Carbon sequestration from the atmosphere
- Employment generation and livelihood enhancement of target communities
- Capacity building of local governance to improve their settlements by strengthening agriculture, agroforestry, and their surrounding environment

1.2 Findings

For the FDP project in different locations, execution excellence reflects state-specific nuances, such as the effectiveness of plantation activities, community engagement, environmental

impact, and governance. Project's execution excellence was assessed through a "3P and S" Approach (Plantation, Process, People and Sustainability) The key findings of the assessment around FDP's execution are presented below.

Plantations: Since the objectives of the project differed in each state, the structure of plantations also varied to reflect these ambitions. Dedicated plantation sites were not as commonly observed by the study team, instead, efforts were made to integrate plantations into the community or the surrounding ecology.

For example, in Moga, Punjab, a majority of plantations were done along roadsides to provide shade along village connector roads, whereas in Harda, Madhya Pradesh, saplings were planted along farmland bunds to act as a demarcation of land as well as to give the community a sense of responsibility and ownership of the planted trees. In Nainital, Uttarakhand, trees were planted in forest gaps as to rejuvenate local forests, restore biodiversity habitats, and support community agroforestry livelihood. It should be noted, however, that there were dedicated plantation sites as well, primarily in Odisha, where one large land parcel was identified along the Balukhanda Wildlife Sanctuary buffer zone.

Through qualitative interactions with stakeholders, the study team confirmed that tree species selected for plantation were locally and ecologically relevant to the target areas. It was also observed that plantation trees were mostly healthy and in line with their growth patterns.

The assessment found that of the 5,45,000 trees planted, 4,05,364 survived which is a survival rate of 74.3%. Overall, the survival rates of plantations were impressive, **with a minimum of 63% and a maximum of around 90% in areas like Madhya Pradesh**. The study team further confirmed that sapling were being replanted if they were identified as dead.

Process: Information relating to the process of project implementation had to be gathered from multiple sources such as field observations and interactions with stakeholders (including local implementing partners, supervisors, PRI members and beneficiaries) since documentation of activities and beneficiaries was poor. The plantation process also varied greatly from region to region. Pre-plantation

activities such as nursery development were outsourced in Punjab and Madhya Pradesh, while this may have reduced employment opportunities for the target communities, it also ensured a certain degree of professionalism in development and maintenance of nurseries. In Uttarakhand and Madhya Pradesh, innovative methods were adopted to achieve plantation targets. In Uttarakhand, there was no centralized nursery, instead nurseries were developed in the homes of beneficiaries to strengthen responsibility and ownership of the plantations. Field preparation in Madhya Pradesh was forgone, by waiting for the monsoon reason, where the rains primed the field for sapling plantations.

People: In all states except Odisha, **local governance was highly involved in project planning through tree species selection, plantation site selection and identification of beneficiaries**. PRI members were also consulted on an exit strategy. It was found that the community was not involved for the project planning or implementation in Odisha. The implementing partner, Adibasi Welfare Society, undertook all activities from planning to execution. The Forest department of the area was consulted for selection of tree species and plantation sites.

Implementing partners in all locations other than Odisha ensured to communicate the benefits of the project and the activities that would be conducted under it to target communities. This was usually done through a one-day orientation. Community members were found to be aware of the short and long-term economic and ecological benefits of these plantations. In all states except Odisha, implementing partners and PRIs ensured that beneficiaries were selected to uplift the most vulnerable groups in the community, preferring women and EWS community members. Local governance members reported to TTC that ownership of all plantations had been transferred to respective Panchayats, land owners or forest department.

Sustainability: For FDP, it was seen that sustainability aspects were built in the project models adopted for different states. The most prominent facets for the same were transfer of ownership and current management of the plantations. The survey and qualitative interactions both captured the sustainability mechanisms of the project. **More than 90% respondents in Punjab, Madhya Pradesh, and Uttarakhand reported that plantation was transferred to PRI members/Van Panchayats.**

The discussions with PRI members and Van Panchayats also revealed the same. The study team further observed that the plantation was being looked after by these local self-governing bodies. In Puri, few respondents were aware that the land belonged to the Forest Department. They also noted that since the land belonged to the Department, the officials would only be taking care of the plantation.

1.3 Impact

Over the course of a year, this Focused Development Project provided employment and livelihood enhancement to community members while simultaneously beginning to restore local ecologies that would ultimately lead to conservation of natural resources and reduced carbon dioxide in these regions.

Environmental Impact: The plantation drives under this project were designed to provide environmental impact in the long-term through carbon sequestration and conservation of air, water, soil, and biodiversity. As such, since these plantations are still in its nascency, their immediate impact cannot be gauged. In order to establish the environmental potential of this project, TTC identified perceived changes to target settlements through qualitative interactions with stakeholders and further, observed the plantations' carbon sequestration potential and resource conservation. TTC expects that when plantations would reach maturity, between the next 10 to 15 years, the trees verified from these four states could sequester around 81,07,284 Kg of CO_2. If the survival rate from these sampled locations is extrapolated to the overall project, the plantations can be expected to sequester around 15 million Kg of CO_2 against the proposed 20 million Kg.

Stakeholders from all states were able to identify immediate changes around plantation sites ranging from improvement to soil quality, increased spotting of wildlife to changes in average temperatures and air quality. It was clear to TTC that community members were well informed of the potential environmental benefits of the plantations, and were able to clearly state their observations since the plantation efforts began.

The study team observed all tree species planted either had high carbon sequestration potential or played important roles in local ecology. Karonj trees planted in

Odisha uniquely supported natural resource conservation and supported local biodiversity by producing organic litter for soil fertility and acted as a source of pollen for the production of **"dark honey."** Many tree species selected for the project have high carbon sequestration potential such as Oak, Teak and Sohanjana.

Socio-Economic Impact: The plantation efforts in these four states have provided significant economic benefit to community members. **Plantation activities such as nursery development, field preparation, pit digging and sapling transfer and plantation has generated a total of 9,240 workdays for direct beneficiaries that were interacted with for this study.** Beneficiaries were selected based upon the needs of community members. Marginalised and vulnerable community members were chosen as beneficiaries to uplift these groups socially and economically. Many beneficiaries, especially women conveyed that they felt an increase in confidence because of the project. While payment rates and methods varied in each state, respondents were satisfied with the employment generated under this project. The plantation drives also supported overall livelihood enhancement of these communities by supplying livelihood generating trees such as fruit bearing trees, medicinal trees, timber trees which could be used for its value or sustenance. Respondents highlighted to the study team that, in the future, they expect to be able to sell products from these trees to generate additional income.

Several social outcomes from the plantations were also observed during the study. Chiefly, all project locations (except Odisha) were highly community driven models and involved community members and Local PRIs in every step of the process. This high level of community participation ensured sustainability of the project on ground. Another important impact from the project was upliftment of vulnerable and marginal groups.

Governance Impact: A community-centric governance structure was implemented across four locations, promoting community ownership and recall. Local community members and officials were involved in the project, enabling an understanding of the local context and community needs. Relationships with PRI, Van Panchayat members, and forest department officials were established, facilitating the smooth dissemination of project activities. The project resulted in the establishment of lasting governance structures, with PRIs

and Van Panchayat managing the plantations and allocating resources for monitoring. This change is perceptible, and local governing bodies will be responsible for distributing benefits to community members.

1.4 Recommendations

The key recommendations emerging from the assessment include:

- Maximizing income generation potential through direct community involvement in all plantation processes instead of outsourcing to ensure maximum economic benefit to the community.
- Thrust on community involvement in all project locations even where project model isn't community driven by making them aware of benefits of plantations.
- More diverse range of tree species should be planted to accord primacy to both livelihood, and plantation survivability and environment protection. For instance, in Madhya Pradesh, only timber trees were selected to be planted, which may not be sustainable in terms of contributing to the environment, considering the trees would be cut down in 12 to 15 years to reap economic benefits.
- Project monitoring plans and mechanisms must be established in consultation with PRIs or community representatives during the initial phases of project to ensure maximum survivability of the plantation. Adequate monitoring could also ensure higher survivability and thereby reducing time and resources expended on replantation. Further, community driven plantation mechanisms ensure their higher involvement and ownership.
- Record keeping of activities must be ensured diligently by implementing partners and community representatives to ensure adequate monitoring of the project.
- It is important to ensure visibility of the donor and the project at the plantation site for several reasons, including recollection of project species, identify plantations under the project and evaluation of impact and community awareness of the project and its benefits.

2

Background
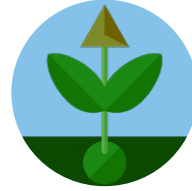
2.1 International Context

Climate change is a persisting global issue that threatens the well-being of people, ecosystems, and economies. Long-term changes in global temperature, precipitation patterns and weather conditions emanating from the burning of fossil fuels and deforestation are reaching a tipping point. Human encroachment on forest ecosystems has created lasting changes in global temperatures and forest flora and fauna, subsequently impacting the livelihoods of many whose income is directly dependent on environmental conditions. Increased carbon dioxide in the atmosphere causes frequent droughts, flooding, and severe weather conditions which damage crops and livestock leading to income loss for communities that rely on agriculture and forestry for their livelihoods. Forests also serve important ecosystem functions such as water regulation, soil conservation and biodiversity conservation, which are becoming increasingly unstable.

The Food and Agriculture Organization (FAO) estimates that climate change could cause a 20% reduction in global agricultural yields by 2050, leading to income loss and food insecurity for millions of farmers and their families.[1] As we continue to realize the influence that humans have on the environment, nations around the world have rallied behind the cause of reversing climate change and mitigating the adversities that it brings along with it.

FIGURE 2.1: SUSTAINABLE DEVELOPMENT GOALS

Building upon the success of the Millennium Development Goals in 2015, 17 Sustainable Development Goals were adopted by the United Nations General Assembly to address economic, social, and environmental changes facing the world today. In the context of deforestation, livelihood insecurity and environmental degradation; **SDG 1:** No Poverty, SDG 12: Ensure Sustainable consumption and production patterns, **SDG 13:** Climate Action, and **SDG 15:** Life on Land aim to guide nations towards sustainable practices and ensure healthy ecosystems and economies.

[1] http://www.fao.org/3/a-i6030e.pdf

2.2 National Context

The threat of climate change is looming large for India too. The country is susceptible to a wide range of climate change-related issues owing to the diverse biomes, climate zones and ecosystems it houses. The Global Climate Risk Index 2021[2] places India 7th overall in countries affected by climate change, India also experienced 280 heatwave days between the period 11th March, 2021 and 18th March of 2022, the highest in 12 years according to the State of India's Environment in Figures 2022[3].

Over the past two decades, climate change has become an integral focus of the Government of India. On June 30th 2008, the National Action Plan on Climate Change (NAPCC) was released, an annual strategy to promote and augment ecological sustainability and support synergy between development and environmental outcomes. The NAPCC comprises eight sub-goals to achieve the nation's vision for climate change risk mitigation. Further, on August 3, 2022, the Union Cabinet, under the chairmanship of the Prime Minister passed the updated Nationally Determined Contribution (NDC) for consideration by the United Nations Framework Convention on Climate Change (UNFCCC), under the Paris Agreement to reach India's aim of net zero emissions by 2070.

National Mission for a Green India is a key sub-goal under the NAPCC that aims to reduce carbon dioxide in the atmosphere and to safeguard the livelihoods of forest-fringe communities by promoting afforestation. Under this mission, 117,503 Ha of plantations have been created between 2015 – 2021[4]. While this is a substantial advancement towards the goal of reduced carbon dioxide in the atmosphere, most states have fallen short of their target plantation area, while some states like West Bengal, Jammu and Kashmir and Himachal Pradesh are still not yet a part of this scheme.

India, still being a primarily agriculture-based economy stands to be highly affected by climate change. States like Rajasthan are extremely vulnerable to droughts and have seen a marked increase in their frequency owing to

changes in precipitation and rising global temperatures. Uttarakhand is highly susceptible to flooding and landslides while Sikkim, Odisha, and Chhattisgarh experience frequent cyclones. All of these contribute to decreased crop yield and culled livestock heavily affecting primary sector-based communities.

To this end, there is a need for businesses to supplement the efforts of the government in restoring ecosystems and engaging in afforestation activities. *HDFC Bank has been a key contributor to the cause of environmental conservation and sustainable development.* Under the *'Parivartan'* project, HDFC Bank has reached out to over a million households across India. Through its **Focused Development Project (FDP)** with Grow Trees (NGO) as its implementing partner, HDFC Bank has been trying to bridge the gap in plantation development across the country. The next section describes the Focused Development Project in detail.

This report presents the key findings of the third-party impact assessment of FDP undertaken by Thinkthrough Consulting.

2.3 About the Project

With Grow Trees as its partner, HDFC Bank, under its CSR initiative Parivartan has funded plantations totalling one million trees across nine states in India. The Focused Development Project aims to eventually sequester 20 million kg of carbon dioxide per year, upon plantation maturity, and create 81,860 workdays for forest-fringe communities engaged with the project. It was implemented in partnership with Grow Trees from October 2020 to September 2021. During this period, the project was implemented in nine states: Rajasthan, Uttar Pradesh, Madhya Pradesh, Sikkim, Uttarakhand, Jharkhand, Odisha, Punjab, and Haryana. These nine states were carefully chosen to cover a wide range of climatic zones and regions.

The project primarily focused on reclaiming degraded lands as primary forests, strengthening forest-based livelihood opportunities for local communities, protecting the habitat of endangered species, uplifting rural communities, combating

[2] https://www.germanwatch.org/en/cri

[3] https://www.downtoearth.org.in/news/climate-change/state-of-india-s-environment-in-figures-india-recorded-280-heat-wave-days-across-16-states-in-2022-most-in-decade-83131

[4] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1813175

air pollution, and rejuvenating water bodies and rural landscapes. Accordingly, the **key activities** undertaken as part of the project included:

1. **Knowledge and awareness:**
   - To spread awareness within the communities about the importance of wildlife conservation by ensuring their participation in the plantation process.
   - To promote afforestation, enhancing the ecosystem with improved green cover and overall ecology.
2. **Carbon sequestration:**
   - To absorb carbon dioxide and improve the overall environmental conditions.
3. **Conservation of resources:**
   - To safeguard biodiversity and habitat of the region.
   - To strengthen forest-based livelihood and energy sources for local communities, ensuring sustainable development.
   - To improve soil fertility and prevent soil erosion.
4. **Capacity building:**
   - To reclaim degraded forest land to promote community-based ecotourism.
   - To improve the groundwater table and enhance water availability for agriculture and agroforestry.

5. **Employment:**
   - To generate employment for rural communities by involving them in the plantation process.
   - To enhance the socio-economic status of rural communities by providing alternate means of resources and employment with the plantation of NTFPs (Non-Timber Forest Produce).
6. **Natural Calamities and Wildlife risk mitigation:**
   - To address crop raiding by wild animals with improved wildlife habitats.
   - To aid the mitigation of future natural disasters.[5]

The activities listed above were implemented in 13 districts across nine states. The following table provides an area-wise snapshot of the project with the number of trees planted and the number of direct beneficiaries:

Based on the information in the table and the project-related documents shared with Thinkthrough Consulting[6], the next section of this report discusses the approach and methodology adopted for the impact assessment study in detail.

TABLE 2.1: STATE-WISE TREES PLANTED AND BENEFICIARIES COVERED UNDER FDP

S.No.	State	District	No. of Trees	No. of direct beneficiaries
1	Uttar Pradesh	Jhansi	50,000	30
2	Punjab	Moga	25,000	20
3	Haryana	Fatehbad	25,000	20
4	Rajasthan	Alwar, Pratapgarh, Udaipur, Bhiwara	1,40,000	105
5	Odisha	Puri	90,000	60
6	Uttarakhand	Nainital	50,000	30
7	Madhya Pradesh	Harda	1,50,000	70
8	Sikkim	East Sikkim (two sites)	72,000	60
9	Jharkhand	Singhbum	4,00,000	120

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[5] *HDFC Impact Assessment, Request for Proposal.*

[6] *Independent third party assessor.*

3

Approach and Methodology of Impact Assessment Study
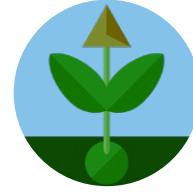
3.1 Objectives and Scope of Assessment

Post-completion of the project, HDFC Bank commissioned Thinkthrough Consulting (TTC) to conduct an independent third-party assessment of FDP. The assessment focused on the project implementation processes, outputs and outcomes regarding environmental impact and community participation.

Accordingly, the ***objectives and scope of the assessment*** included:

- To understand the project context through a secondary literature review and stakeholder consultation.
- To evaluate the impact of the project on all stakeholder groups involved in the project and analyze their perspectives.
- To assess project management arrangements, project outcomes and their impact on project locations.
- To document key findings and inferences to provide recommendations for further inputs in the project with a focus on strengthening project management and implementation processes, efficiency, and sustainability.

3.1.1 Reference period of assessment
The assessment of this project was conducted between March-April 2023.

3.1.2 Geographic Coverage of the Assessment
The project, in its implementation phase, covered nine states and 13 districts. However, for this assessment, TTC only sampled four states, Madhya Pradesh (Harda district), Uttarakhand (Nainital district), Odisha (Puri district), and Punjab (Moga district). These locations have been sampled to provide a varied and diverse understanding of the project's effectiveness and impact. A brief profile of each of these five districts is given below:

3.1.3 Harda, Madhya Pradesh
Harda is Madhya Pradesh's least populated district. It was home to 570,465 people in 2011[7]. Harda's sex ratio is close to the national average at 935 females per 1000 males with a literacy rate of 72.50%.

Consistent with other districts that were selected for this project, Harda is a primarily rural region with 79.08% of its population residing in rural areas. The soil in Harda is

FIGURE 3.1: HARDA DISTRICT, MADHYA PRADESH

[7] https://www.census2011.co.in/census/district/315-harda.html
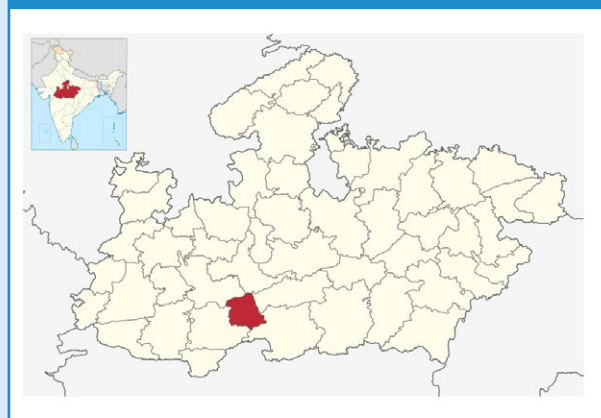
very fertile with largely clay and loamy composition. Field crops such as soybean, wheat and chickpea, and horticulture crops like onion, chilli, tomatoes, citrus, aonla and mango are grown in the district. Like most agrarian communities, Harda is substantially impacted by climate change.

Harda has experienced an increase in the frequency and intensity of floods recently. According to a report by the National Disaster Management Authority[8], Harda district witnessed severe floods in 2015 and 2019 that significantly damaged crops, infrastructure, and livelihood. Harda has also been seeing a decline in crop yield over the years due to changes in rainfall patterns. Overall, climate change is posing significant challenges to the communities in the Harda district, with impacts on their livelihoods, health, and well-being.

3.1.4 Moga, Punjab

Cherishing the rich heritage of the state, Moga is a district in Punjab. Housing 9,95,746 individuals as per the 2011 census, it has an area of 2242 km^2. The sex ratio of the district is 893 females per 1000 males, lower than the national average of 940 females per 1000 males. It is a rural district with 76% population residing in the rural areas.

Moga is primarily an agricultural district, with a significant portion of its population engaged in farming. The soil in Moga

is very fertile making the district one of the largest producers of wheat and rice in Punjab. The major rabi crops are wheat, sunflower, mustard, barley, maize, and gram. The major Kharif crops are cotton, paddy, sugarcane and jowar.

The district has experienced changes in temperature, rainfall patterns, and extreme weather events, which have impacted the local environment and people's livelihoods. The administration has taken several initiatives to promote environmental conservation, including planting trees and promoting sustainable agriculture practices. In 2020, heavy rainfall caused flooding in several parts of the district, causing extensive damage to crop, infrastructure, and property.

3.1.5 Nainital, Uttarakhand

Nainital, which is endowed with picturesque natural splendour and a variety of natural resources, is a shining jewel in the Himalayan chain. Nainital has a varied topography. The district is home to 9,54,605 people covering an area of 4251 km^2.[9] With regards to the sex ratio in Nainital, it stood at 934 females per 1000 males which is almost equivalent to the national sex ratio of 940 females per 1000 males. 61% of the total population lives in rural areas in the district.[10] Farming is an essential activity in the Nainital district and plays a significant role in the region's economy. The district's agriculture is primarily based on rain-fed farming, and the

FIGURE 3.2: **MOGA DISTRICT, PUNJAB**
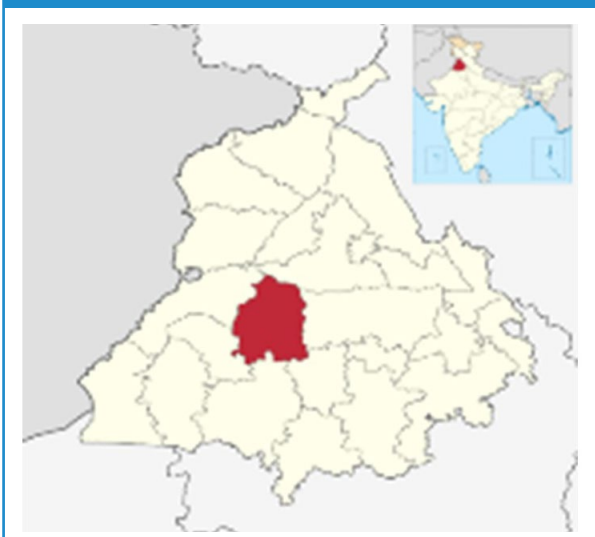
FIGURE 3.3: **NAINITAL, UTTARAKHAND**

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[8] National Disaster Management Authority (NDMA). (2020). District Disaster Management Plan - Harda, Madhya Pradesh.

[9] https://nainital.nic.in/

[10] https://www.census2011.co.in/census/district/584-nainital.html#:~:text=Nainital%20Sex%20Ratio,reports%20of%20Census%202011%20Directorate.

farmers mainly grow crops such as rice, wheat, maize, and vegetables. Nainital district is also known for its horticulture. The district has several apple orchards, and the farmers also grow other fruits such as peaches, plums, and apricots.

The district has a mountainous terrain. The slopes are shielded with dense forests. For the past few years, the ecosystem of Nainital is suffering. The infrastructure around the town is increasing rapidly, affecting the natural ecology of the place. The water level of the lake and biodiversity are decreasing, and the average temperature of the place is increasing. The effects of climate change can be seen clearly in the area. Nainital district is prone to various natural disasters due to its geographical location in the Himalayan region. The region experiences several natural calamities, including landslides, floods, earthquakes, and forest fires. These natural disasters continue to have a significant impact on the district's economy, infrastructure, and ecology.

3.1.6 Puri, Odisha

Puri is a coastal district of Odisha, located on the Bay of Bengal and is one of the major tourist destinations in the state, renowned for its beautiful beaches, ancient temples, and rich cultural heritage. It covers an area of 3479 km^2 and houses a population of 16,98,730 according to the Census of India 2011.[11] The sex ratio of the district is

968 females per 1000 males, which is higher than the national sex ratio. However, 80.40% of the population lives in rural areas of the district.[12] It is a significant cultural, religious, and tourist destination in Odisha, attracting millions of visitors every year. The city's rich cultural heritage, stunning beaches, and delicious cuisine make it a popular destination for both domestic and international tourists. Agriculture has been the major source of livelihood for the population of the district and rice cultivation has been the principal farming activity. Alternative land use and livelihood options such as horticulture, aquaculture and livestock were minor components limited to meeting the subsistence needs of the population. Rice is the major crop occupying 51% of the cropped area. Other important cereals are maize and ragi occupying 2.6% and 2.1% of the cropped area, respectively.[13]

The district is home to several protected areas, including the Balukhanda-Konark Wildlife Sanctuary and the Chilika Lake Bird Sanctuary, which serve as vital habitats for numerous species of plants and animals. The Sanctuary was severely damaged during the cyclonic storm Fani which made landfall in Odisha on May 3, 2019. Around 60 lakh trees, mostly casuarina and cashew, were uprooted by the wind. The crowns of many tamarinds, Karonj, polanga, neem and other trees were also severely damaged.

The district is prone to natural disasters. Apart from cyclones, Puri is also prone to floods, especially during the monsoon season. The region's low-lying areas and proximity to rivers and creeks make it vulnerable to flooding, which can cause significant damage to infrastructure and property.

3.2 Approach to the impact assessment study

To measure the changes that have come about on account of FDP, TTC proposed a mixed-method approach. This approach involved both qualitative interactions and quantitative surveys at the sites in the five states. The use of this approach was essential to understand the relevance, execution excellence, and impact of this project.

FIGURE 3.4: **PURI DISTRICT, ODISHA**

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[11] https://puri.nic.in/demography/

[12] https://www.census2011.co.in/census/district/411-puri.html#:~:text=The%20total%20Puri%20district%20population,969%20females%20per%20 1000%20males.

[13] https://www.kvkpuri.org/upload/menu_1629329079.pdf

FIGURE 3.5: ESG FRAMEWORK ADOPTED FOR THE IMPACT ASSESSMENT
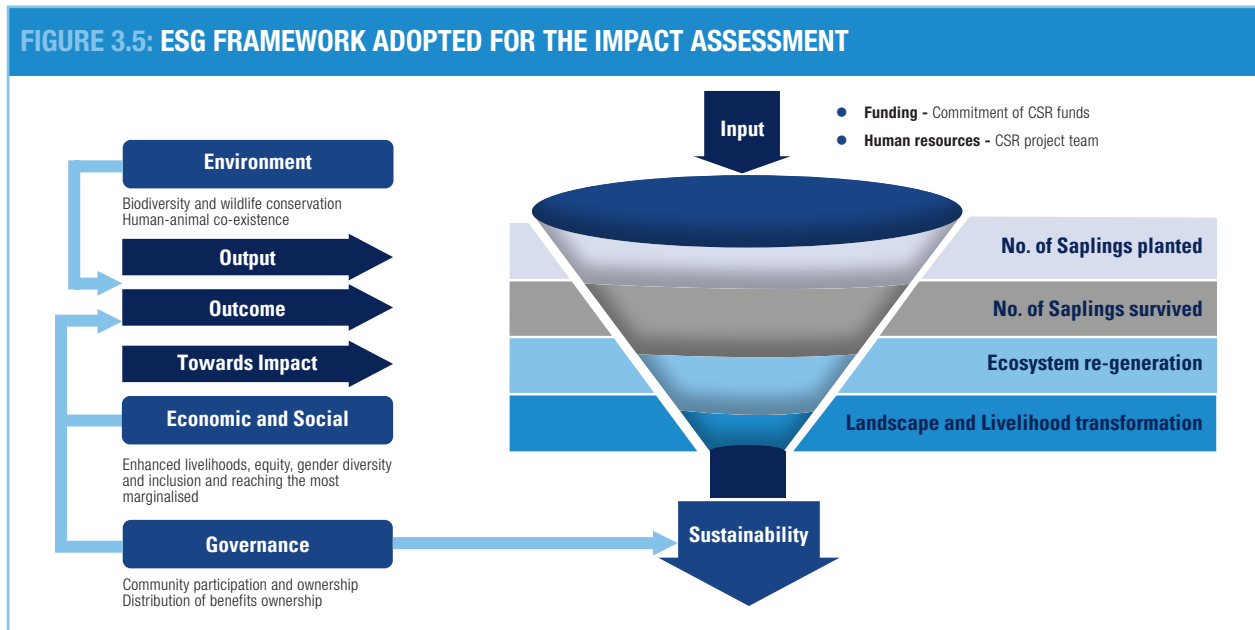
The relevance section in this project has attempted to highlight the purpose of this project i.e., the problem to be resolved, and its benefits to the identified stakeholders. Execution excellence on the other hand combines efficiency and effectiveness and tries to gauge the extent to which the objectives of the project were met. For this, the assessment has adopted the **3P&S approach** wherein the **three Ps** are plantation (no. of trees planted etc.), process (ground implementation process), and people (stakeholders involved in the project and their understanding of the project structure and benefits), and **S** stands for sustainability (replicability and scalability of the project). Finally, the impact section tries to unpack the changes that have been brought forth in the lives of the stakeholders. For this purpose, the impact has been analysed through the lens of **ESG** i.e., environment, social and economic and governance. The same has been depicted pictorially.

For the assessment, TTC adopted the following approach:
- Engaging a multi-disciplinary team with expertise in executing high-quality deliverables to the client. The team had considerable experience working on similar projects across geographies.
- Data collection for analysis and assessment was done through qualitative and quantitative methods to best understand the environmental, sustainability and governance outcomes of the project. At all stages, the HDFC Bank team was involved. All inferences drawn and recommendations made were based on empirical evidence gathered from key stakeholders.

- Each stakeholder group was effectively engaged to understand their perspectives. While engaging with stakeholders, the team ensured a surrounding conducive to free and focused discussion.
- The overall project was consultative and participatory in nature. Checklists and tools were developed in consultation with the HDFC Bank and Grow Trees teams.

The above approach was employed to evaluate HDFC bank's Focused Development Project's ESG impact. Commensurate to the assessment criteria, the assessment of the project was carried out in three phases – Inception, Data Collection and Analysis and Dissemination of Findings.

3.2.1 Phase 1: Inception
This phase involved a desk review of documents and relevant literature to understand the project rationale, project design, and implementation mechanisms in detail. For desk review, the documents analysed were project proposal, reports submitted by Grow Trees, third party audit reports, stakeholder engagement strategies, tree species planned and sustainability plans.

Contingent with insights gathered during the desk review, TTC finalized the sampling method, stakeholder mapping and methodology in consultation with the HDFC Bank team. At this stage, draft field tools were also prepared for interaction with stakeholders.

Sampling

The TTC team undertook physical verification of **about 40% of the plantation sites and 15% (approximate) of the plants through observations and quadrat method** at the proposed locations. The following parameters were used for selection:

- Geographical Coverage.
- Landform and Climate.
- Major thematic areas covered by the project.
- Number of saplings planted.
- Number of direct beneficiaries.

STATISTICAL FORMULA FOR QUANTITATIVE SAMPLING

$n = N*X/(X+N-1)$ where,
$X = Za/22*p*(1-p) / MOE2$, and $Za/2$
is the critical value of the Normal distribution at a/2.

At a confidence interval of 95%, z score of 1.96, margin of error of 5%, 5% non-response and finite population correction factor.

Furthermore, based on the statistical formula, it was decided to conduct quantitative survey of 201 respondents. Additionally, qualitative interaction primarily interviews were conducted with select beneficiaries, community and PRI members, and implementing partners.

3.2.2 Sampling for Geographies and Project Sites

List of Districts and plants under respective states.

3.2.3 Phase 2: Data Collection

Phase 2 involved the collection and collation of data. Both qualitative and quantitative methods were employed for data collection. Quantitative data was collected to understand the health and status of plantations, employment generation and beneficiary inclusivity. The qualitative information focused on community perception and relevance of the project, community involvement in project planning and environmental impact. Qualitative data collection utilized FGDs and KIIs as tools. These tools contained highly in-depth, semi-structured questions. Case studies and significant change stories were also captured wherever possible.

Plantation health verification

The study team employed the **quadrat method** where possible, to verify tree plantation. The quadrat method was used to sample the distribution and abundance of planted trees within a representative study area. Quadrats, which are square or rectangular frames, were placed randomly or systematically in the area, and the number of organisms or plants inside each quadrat was recorded. This process was repeated for enough times to obtain a representative sample, and the data collected was analysed to calculate density and distribution.

QUADRAT METHOD

For the impact assessment, the team first carried out a transect walk of the plantation area/s. Following which they demarcated quadrats depending on plantation site dimensions (example 100m*100m in Odisha 20m by 100m in Hard). In every site, at least three plantation sites were selected. The team then physically counted the plants and ascertained the composition of trees in these quadrats. Based on these calculations, the total number of trees and variety of species planted were determined.

In Uttarakhand, quadrat method could not be used as plantation sites were gaps areas in the forest. There the team visited these gap areas and counted a certain sample of trees physically.

TABLE 3.1: SAMPLE COVERED AS PART OF THE IMPACT ASSESSMENT

State	Climate Zone and Region	District	Village/Sites	Plant Verification
Rajasthan	Desert/Central	1	2	25000
Madhya Pradesh	Plains/ Central	1	2	25000
Uttarakhand	Mountainous/North	1	2	20000
Odisha	Coastal/tribal region	1	2	50000
Punjab/Haryana	Plains/North	1	2	15000
Total		**5**	**5**	**135000**

3.2.4 Phase 3: Analysis and Dissemination of Findings

This phase included collating the information gathered during the field visit. It entailed an intensive review and analysis of the primary and secondary data both of which were cross-validated and assessed for veracity, consistency, and completeness. The data generated were analysed to assess the achievements and impact of the project on the beneficiaries. The present report has been prepared based on these findings.

3.3 Quality Assurance

The following measures were taken to ensure the quality of the assessment:

1. **Rigorous training:** Data collection teams were rigorously trained. It was ensured that the team fully understood the study objectives, methodology and tools during a one-day training session. Mock practice sessions were further held for the team to familiarise themselves with the tools used.
2. **Close Supervision by the Team Leader:** During the data collection, the TTC team deployed, was led by a team leader with strong experience in qualitative and quantitative data collection. At the end of every day on the field, the core team members did a combined debrief of the fieldwork to address any challenges and inconsistencies in administering tools and collecting data.
3. **Review of Data:** Data collection was carried out through a perception survey, ensuring the core team had real-time access to it. Qualitative data were analysed thematically and systematically labelled.

3.4 Limitations of the Assessment Study

Despite the careful planning of the evaluation framework to guarantee high-quality outputs, the study was constrained by the following limitations:

1. Recall bias. It is a systemic error in assessments that involve interviews or questionnaires. It is caused by differences in the accuracy or completeness of the recollections retrieved by the respondents regarding activities or events. For the present project, it was observed that respondents demonstrated recall bias in the case of some activities and their timelines.
2. The insights presented in this report are based on the data/information provided by the various stakeholders including Grow Trees.
3. This report, therefore, sets forth the views based on the completeness and accuracy of the facts stated or provided in the written material shared with TTC and any assumptions that were included; the inaccuracy or completeness of these facts, accordingly, have a material effect on the conclusions.
4. While performing the work, TTC assumed the genuineness and validity of information and authenticity of the documents shared by the HDFC Bank, Grow Trees, and the local implementing partner in each state. TTC has not independently verified the correctness or authenticity of the same.
5. To the best of its ability, the study team has tried to ensure and validate the authenticity of data/information submitted by the respondents. However, it would be fair to assume certain errors in data recording.
6. Grow Trees has worked in project states for the last 5-6 years and doing plantations. Identifying the trees which have been specifically planted for the HDFC project amongst all the trees planted by Grow Trees, posed a challenge.
7. The record keeping/documentation maintained was not maintained in an organised manner by the Panchayat and local communities for the plantation. Rather they have adopted a random approach for selecting the land and planting trees wherever little space is available.

The following are area-specific limitations were faced by the field survey teams:

Nainital, Uttarakhand
1. Accessing the local implementing partner and provision of some documents from them.
2. The plantation sites were spread out in the forest areas. The saplings were planted in gap areas of forest, thus, quadrat method could not be used to determined the number of trees.
3. Survivability of the trees in the long term is a major issue in the area because of frequent forest fires and the dependence of the trees on rainwater only for irrigation.

Moga, Punjab

1. It was Baisakhi festival season in the state and the beneficiaries were busy in their fields. Interacting with them for a detailed discussion posed a challenge as they were eager to go back to their fields at the earliest.
2. The community members and the implementing partner highlighted that the plantation was done in 2020, and three years down the lane they do not remember all the details.

Harda, Madhya Pradesh

1. It was the harvesting season, due to which beneficiaries were busy and were not available for detailed discussions.

Puri, Odisha

1. The actual project implementation partner was not available as it was based out of Puri.
2. The direct beneficiaries were brought in from some other district on the project site to work.
3. The patch of land for the plantation was uneven, and the quadrat method used to identify the number of trees was inefficient, resultantly it was also difficult to ascertain the exact mortality rate of plants.

4

Key Findings
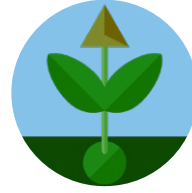
HDFC Bank's Focused Development Project aimed at enhancing the livelihood, quality of life and ecology of communities across nine states and 13 districts in India. The findings section herewith focuses on reporting key takeaways from the environmental and socio-economic impact of the project and showcases the overall governance structure, mechanism, and engagement.

The key findings section consists of three parts – project's relevance, execution excellence (3Ps and S approach) and project's impact as per ESG framework. Based on the findings from the field and understanding the project nuances, the subsequent sections will unpack each of the section in detail to evaluate the project's impact on ground.

4.1 Project Relevance

Climate change is a pressing barrier to sustainable development. The average global temperatures have increased by 1.2 degrees Celsius since 1880, particularly in the late 20th century.[14] The fact that the climate is changing, and that human activity is the main cause of it cannot be disputed. Achieving sustainability and resilience for the planet are closely linked to the climate. Afforestation is a climate change solution as trees are an excellent way of absorbing the CO_2 from the atmosphere, which otherwise would contribute to the increasing temperatures. Afforestation is directly linked to the global SDGs as they have unswerving impacts on the environment. It is directly related to SDGs 1, 12, 13, and 15.

FIGURE 4.1: SUSTAINABLE DEVELOPMENT GOALS LINKED TO ENVIRONMENT

Sustainable Development Goals

1 NO POVERTY

Afforestation contributes to employment opportunities. It also helps in livelihood by providing fruits, timber and other products

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Afforestation has a key role in developing more sustainable ways to produce and extract goods from the ecosystem

13 CLIMATE ACTION

Healthy trees cool the planet by absorbing carbon dioxide and increase the resilience of the ecosystem.

15 LIFE ON LAND

Afforestation and conservation are essential for building better life on land impacting people, flora and fauna.

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[14] *https://sdgs.un.org/topics/climate-action-synergies*

The SDGs are related directly to the afforestation process. Other SDGs are related indirectly to the activity such as SDG 17: Partnership for the goals; peaceful collaborations are the key to implementing the process with superior consequences. SDG 3: Good Health and Well-Being; trees have numerous benefits including cleaner air, healthy food, and clean water. The benefits don't stop here, they also have medicinal value. The international focus on sustainable development has been translated at the national level as well. Forests in India are under stress due to the rapid infrastructure development and accompanying urbanisation.

Efforts at the national level are underway to combat climate change and make resilient communities and ecosystems. Aims and objectives set at the national level are carried forward to the state level so that effective and efficient implementation of these goals can be replicated on the ground with local communities taking ownership and bespoke plan of action. Each state has different climatic conditions in India. Along with that the economic and demographic profile also varies. Thus, mitigating climate change would require localized efforts by each state. Each state has prepared State Action Plan on Climate change to combat it. The figure below showcases state wise action plan on climate change.

Each state action plan for climate change prioritises increasing the green cover in the state through various measures including afforestation and reforestation. Thus, the project aligns with the international, national, and state priorities of planting more trees.

The plantation drive serves the community's needs as well. It is one of the most engaging activities and provides environmental, economic, and social benefits for both in short and long term. Environmentally, it provides cleaner air, improves the biodiversity of the area, improves the quality of soil, and increases rainfall. Trees are the most important link in maintaining balance in the ecosystem. They also provide economic value to the nearby communities by providing fruit, timber, etc. Tree planting is an inclusive activity that brings everyone together and promotes community ownership.

For each district, different themes have been undertaken under FDP for conducting the plantation activity reflecting the community needs of that area. In **Harda, Madhya Pradesh, the theme was "trees for rivers"**. The plantation has been done to protect the topsoil of the region from soil erosion and rejuvenate river flow and prevent run-off of surface water. The trees have been planted near the tributaries of the Narmada River which is considered the lifeline of Madhya Pradesh and the nearby communities are dependent on it for livelihood.

FIGURE 4.2: STATE ACTION PLAN OF VARIOUS STATES

Rajasthan SAPCC
- Focus on 8 sectors including forests and biodiversity
- Dedicated state forest policy
- Afforestation and reforestation measures for promoting adaptation and carbon sequestration

Madhya Pradesh SAPCC
- Focus on Forest Management through viable models
- Promoting afforestation and reforestation
- Development of sustainable forest management plans
- Enhancing green cover outside forests

Punjab SAPCC
- Increase green cover in the state to 15% of the area of the state by 2022
- Enhance plantation in degraded forests
- Increase the incomes generated from ecosystem services provided by the forests.

Uttarakhand SAPCC
- Constitution of Van Panchayats
- Forest fires management
- Increasing the existing area under forests and trees and improving the quality and density of the degraded forests.

Odisha SAPCC
- Increase the forest cover by undertaking afforestation and reforestation
- Increase planting on non-forest land
- Enhance the density of forests
- Undertake sustainable management of forests and maximisation of forest productivity

Moga, Punjab supported the theme "trees for villagers". The major objective of tree plantation in the area was to involve communities and spread knowledge about the benefits of increasing green cover and building a sustainable future. The plantation has been done with the support of local communities and apart from the environmental and economic benefits, the social benefits of the plantation have also been focussed upon.

The Himalayan Ecosystem is very sensitive. The trees in **Nainital, Uttarakhand** have been planted around the theme of **"trees for Himalayan communities"**. It focussed on strengthening the community management system for sustainable development, known as Van Panchayats and also safeguarding the biodiversity habitat of the region. It will further strengthen the forest-based livelihood options and energy sources for the local communities.

Puri, Odisha has a unique need for plantation. The area was impacted by Cyclone Fani in 2019 and the biodiversity was disturbed. Around 60 lakh trees, mostly casuarina and cashew, were uprooted by the wind. The crowns of many tamarinds, Karonj, polanga, neem, and other trees were also severely damaged. This also bothered the fauna of the area. To recoup the green cover loss in Puri, the trees were planted with the theme of **"trees for restoring cyclone-affected region"**. The trees would help in rebuilding the wildlife habitat for deer and other wildlife prominent in the Balukhanda Wildlife Sanctuary and aid in mitigating future natural disasters and would also help the communities' livelihood.

4.2 Execution Excellence

The execution excellence criteria in the impact assessment study ascertain whether the project's interventions are achieving their objectives. In the case of the FDP across geographical locations, project's excellence in terms of its execution will capture the nuances of each state i.e., effectiveness of plantation activity, level of community engagement, environmental impact, governance, and understand scope for improvement or additions for future intervention.

To assess the execution excellence of this project, TTC will be exploring this study through a 3Ps (plantation, process, and people) and S (sustainability) approach.

- **Plantation:** Target objectives set by the project for the plantation and TTC's findings/observations from the field
- **Process:** Implementation model of the plantation drive proposed versus practiced
- **People:** Community perception of the project and knowledge of the benefits of the plantation drives
- **Sustainability:** Replicability and scalability of the project by the members of the community

The section first depicts the overall findings followed by state specific sub-sections.

4.2.1 Overall Findings
The section presents the overall and aggregated trends emerging pertaining to 3Ps and S across the four sampled states.

a) Respondent Profile
For the impact assessment study of FDP, Study team visited and interviewed 201 beneficiaries and community members across the four states (Punjab, Odisha, Madhya Pradesh, and Uttarakhand).

TABLE 4.1: NO. OF RESPONDENTS COVERED IN SAMPLED STATES

State	No of respondents
Moga, Punjab	77
Puri, Odisha	52
Harda, Madhya Pradesh	45
Nainital, Uttarakhand	27
Total (N)	**201**

FIGURE 4.3: RESPONDENTS' AGE PROFILE

Age Distribution of Respondents (%)

N = 201
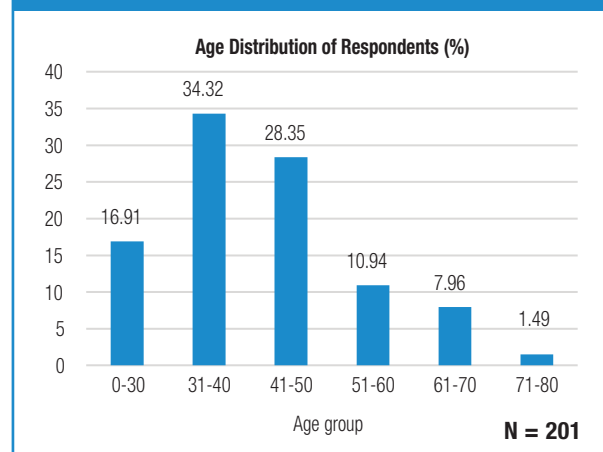
Among the 201 respondents, 122 (61%) were women, and 79 (40%) were men. ***The proportion of women was higher as the project consciously sought greater involvement of women.***

Majority of respondents were adults in the age group of 31–40 years, while 18.9% of respondents were older than 50. Those above 40 comprised PRIs members or village elders. However, some elderlies were also actively involved in the plantation process. Thus, ***the project was successfully able to involve both women and elderly. The engagement of elderly also demonstrated their concern for improving the environment.***

The involvement of economically weaker sections (EWS) was also ensured in the project. ***About 56% respondents were not land owning or were from economically weaker sections of the society.*** This was also corroborated during interviews with respondents and PRI members.

Finding 1 – High involvement of women: Overall the project was able to promote greater involvement of women in the plantation process as direct beneficiaries.

Finding 2 – Representation of marginalised sections: The project consciously ensured involvement of economically weaker sections of the society or indirectly benefitted them. Further the plantation also sought involvement of village elders. In fact, the elderly were involved in direct plantation process. Thus, project ensured involvement of marginalised and diverse range of groups.

FIGURE 4.4: PERCENTAGE OF EWS RESPONDENTS

Composition of EWS respondents (%)

56.22%   43.78%

N = 201

■ EWS respondents   ■ Non EWS respondents
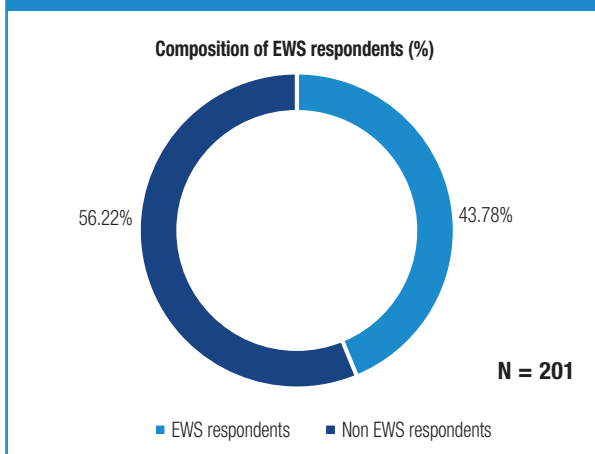
b) Plantation

The section dwells upon appropriateness of trees species, nature of plantation sites, survivability, mortality and replantation rates. The plantation process started in July 2021 across the four states. The study team observed around 1.2 lakh trees across the four states in select plantation sites where the total trees planted were 3,35,100.

TABLE 4.2: NO. OF TREES PLANTED VS VERIFIED

State	Trees planted	Trees verified
Moga, Punjab	8,150	6,100
Puri, Odisha	2,50,000	65,000
Harda, Madhya Pradesh	23,950	15,000
Nainital, Uttarakhand	53,000	35,000
Total	**3,35,100**	**1,21,100**

Plantation sites

The nature and process of selection for plantation sites varied across the four states.

- In Moga, Punjab, plantations were made on a mix of designated patches of land and on the roadside. The selection of plantation sites was undertaken in consultation with PRI members and select community members.
- For Harda, Madhya Pradesh the plantation was carried out in and around privately owned farmlands and on the riverside. Akin to Punjab, PRIs and landowners were consulted to identify the planation sites.
- In the case of Nainital, plantation aimed at filling vacant patches of the forest land. Given the critical role Van Panchayats play in protecting forests in the state, the planation sites were identified through Van Panchayats and community members.
- The plantation in Puri, Odisha was undertaken on a large tract of land present in the buffer zone of Balukhanda Wildlife Sanctuary. Since the land came under the ambit of the Forest Department, they were consulted for site selection.

Tree species proposed

As part of the project a total of 37 species were to be planted across four states. However, the study team verified the presence of 19 species in selected sites. There is a possibility that remaining species were planted in other plantation sites of the state.

TABLE 4.3: PROPOSED SPECIES VS OBSERVED SPECIES IN SAMPLE AREAS   □ Species sighted   ■ Species not sighted

State	S. No.	Proposed Species Scientific Name	Common Name	Observed Species
Punjab	1	Terminalia arjuna	Arjun	Sighted
	2	Terminalia bellirica	Baheda	Not sighted
	3	Delonix regia	Gulmohar	Sighted
	4	Syzygium cumini	Jamun	Sighted
	5	Azadirachta indica	Neem	Not sighted
	6	Melia azedarach	Burma Drek	Not sighted
	7	Moringa oleifera	Munga/Sohanjna	Not sighted
	8	Dalbergia sissoo	Sheesham	Not sighted
	9	Tectona grandis	Sagwan/ Teak	Sighted
	10	Carica papaya	Papaya	Sighted
	11		Chiloor	Sighted
	12	Phyllanthus emblica	Amla	Not sighted
	13	Bambusa vulgaris	Bamboo	Sighted
	14	Psidium guajava	Guava	Not sighted
Odisha	1	Casuarina equisetifolia	Casuarina	Sighted
	2	Pongamia pinnata	Karonj	Sighted
	3	Acacia auriculiformis	Earleaf Acacia	Sighted
Madhya Pradesh	1	Tectona grandis	Teak	Not sighted
	2	Bambusa spp.	Bamboo	Not sighted
	3	Tamarindus indica	Tamarind	Sighted
	4	Mangifera indica	Mango	Not sighted
	5	Phyllanthus emblica	Amla	Sighted
	6	Artocarpus heterophyllus	Jackfruit	Sighted
	7	Annona squamosa	Sitafal	Sighted
	8	Manilkara zapota	Chikoo	Sighted
	9	Psidium guajava	Guava	Not sighted
Uttarakhand	1	Phytolacca emblica	Aaonla/ Amla	Not sighted
	2	Quercus leucotrichophora	Banj	Not sighted
	3	Desmodium tiliaefolium	Bhatula	Sighted
	4	Melia azedarach	Bakain	Sighted
	5	Bauhinia purpurea	Kanol	Sighted
	6	Alnus nepalensis	Utees	Sighted
	7	Quercus glauca	Falyat	Sighted
	8	Quercus lanuginosa	Tilonj	Sighted
	9	Prunus cerasoides	Padam	Not sighted
	10	Grevia optiva	Bhimal	Sighted
	11	Salix alba	Majuna	Sighted
	12	Morus serreta	Shatoot	Sighted
	13	Celtis australis	Karak	Sighted
	14	Peunica granatu	Darim	Sighted
	15	Escules indica	Pangar	Not sighted

During the survey, more than 70% of respondents confirmed that species selection was done in consultation with panchayats and community members. The key considerations for selection of species reported by respondents included plants that were local to the areas, were hardy, could survive in the soil composition and provided fruits, timber or non-timber forest produce. This was not true for Odisha though where species were selected in collaboration with the Forest Department.

Almost all survey respondents agreed and reported that *these species were local and relevant to the area. No new or foreign species were introduced. All respondents saw merit in, and benefits of, the species planted*. This was validated by analyzing the proportion of respondents who were able to correctly identify the species planted. Most respondents were able to correctly identify at least two species. This reflects strong community awareness towards species planted.

Finding 1 – Locally appropriate and relevant species planted: Both the physical observation and surveys with respondents confirmed that all species planted were local and relevant to the state context. Thus, species profile was in consonance with local ecology. The community thus held a very favorable perception towards relevance of species planted vis-à-vis their local context.

Finding 2 – Adequate stakeholder consultation for species selection: It was also noted that project hinged on leveraging traditional knowledge of communities for species selection and sought inputs from panchayats and van panchayats and Forest Department in case of Puri for species selection.

Mortality and replantation rates

Since there was no record keeping for plantation activities, the study team analyzed plantation mortality through a mix of respondent observations and extrapolating from the quadrat method (where dead planting was found).

The study team observed that the nature of plantation sites, community involvement and ownership were pertinent factors determining mortality rates across states. The lowest mortality was reported in Harda, Madhya Pradesh where private landowners took care of the plantation. In Moga, the mortality hovered around 30-40% as many trees were planted on the roadside. Similar mortality rates were reported in Nainital, as post the project duration seed replacement was not ensured. In Puri, the mortality was around 20% due to extremely hot conditions, low rainfall, and sandy nature of the soil. Even though mortality rates varied across all states, the respondents unanimously confirmed that replantation was done for the plants which could not survive. In Puri, the implementation partner confirmed that five local workers stayed on the plantation site to ensure survivability of the plants, where borewells were installed to ensure water supply to the plantation.

Finding 1 – Plantation survivability: A study by the FAO in 1990 surveyed plantation survivability rates around the world where it was found that, in India, a successful plantation drive would be 70% for industrial tree species, 60% for fuelwood tree species and 50% for afforestation plantations[15]. In all plantations survivability of 60% or more was observed. These are impressive figures as they directly reflect that despite challenges posed by the pandemic, the plantations were taken care of and survived. Below is a table representing plantation survival rates for each state as observed by the study team.

TABLE 4.4: PLANTATION SURVIVAL RATES IN EACH STATE

State	Number of proposed trees	Number of trees proposed in sample locations	Number of trees verified through quadrat method	Number of dead trees	Survival rate (%)	Estimated total trees surviving in plantation sites
Punjab	25000	8150	6100	2050	75%	18,750
Odisha	250000	65000	55500	9500	85%	2,12,500
Madhya Pradesh	150000	23950	15000	8950	63%	95,400
Uttarakhand	120000	53000	35000	18000	66%	79,200

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[15] https://www.fao.org/3/v8330e/V8330E05.htm

FIGURE 4.6: PLANTATION SURVIVAL RATE AS REPORTED BY RESPONDENTS AND OBSERVED BY STUDY TEAM

Comparison of plantation survival rate (%)

- Observations from respondents
- Observations from study team
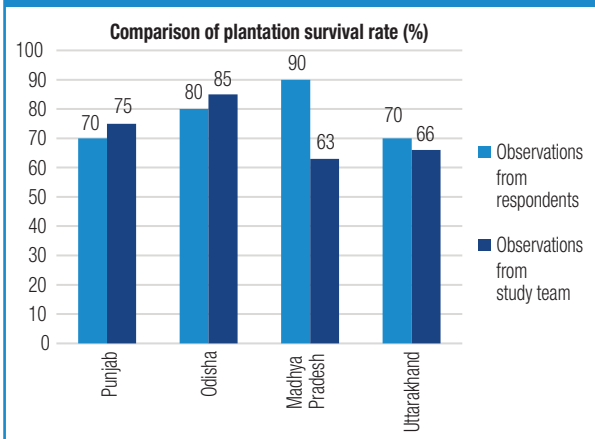
To establish the survival rate of plantations, the study team compared observations from the field to reported survival rates from respondents. In three states of Punjab, Odisha and Uttarakhand, respondent observations corroborated the study team's findings.

It should be noted that since plantations in Madhya Pradesh were done in various strips of private land, the quadrat method might not be able to produce an effective sample of survival rates. This may be because of differing practices of irrigation, monitoring, or manpower.

Finding 2 – Assured replacement: The respondents in all the locations confirmed that replacement was done for plants which could not survive. Concerted efforts for replacing the damaged saplings also contributed to plat survivability.

c) Process

The process of plantation unfolded differently in line with the specificities of the sampled states. The figure gives a snapshot of the process followed in each state. It shows that in Punjab, Madhya Pradesh, Uttarakhand the plantation process involved the PRIs, van panchayats and communities directly. However, in Puri the direct involvement of the community was not sought and only the Forest Department was involved.

In three states except for Uttarakhand, the task of nursery development was outsourced to vendor agencies or local NGOs. For Puri, Odisha the entire process was outsourced to a local NGO.

FIGURE 4.7: SNAPSHOT OF IMPLEMENTATION PROCESS OF FDP IN SAMPLED STATES
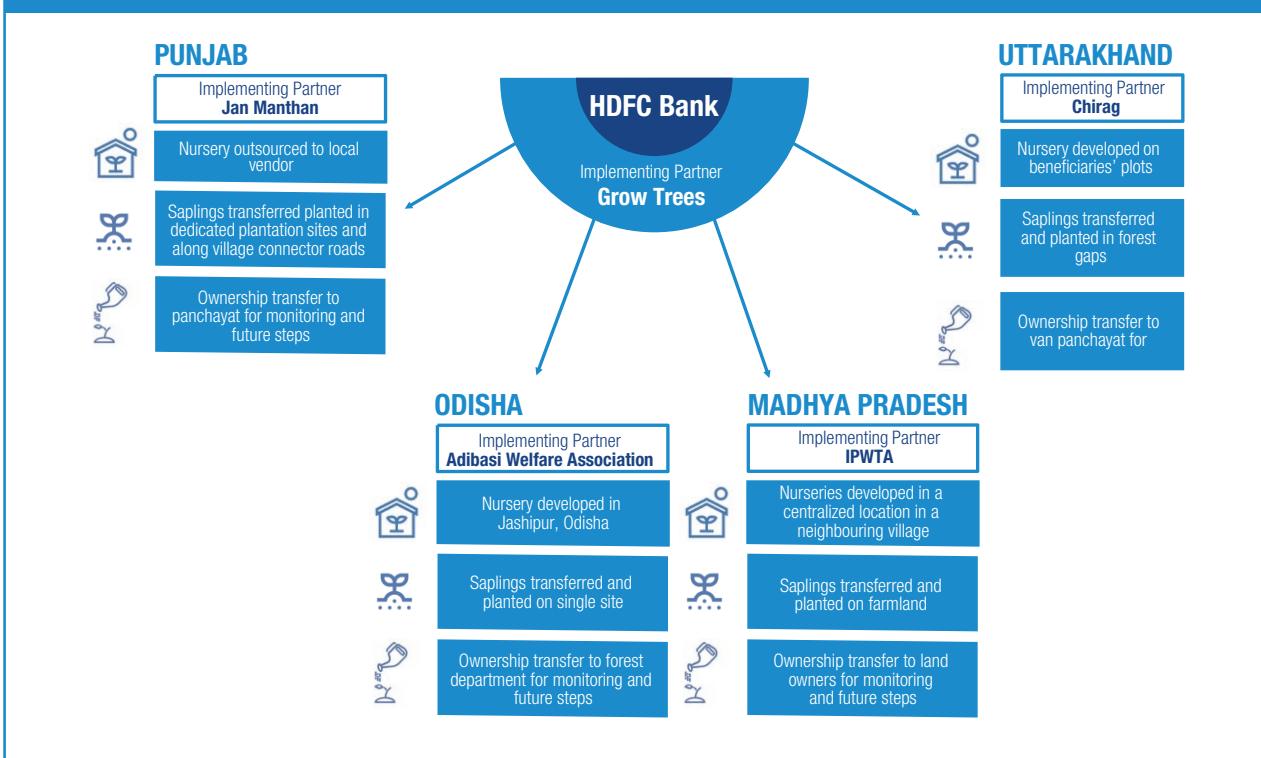
Finding 1 – Community driven model: The project was able to successfully seek community support in three states. In Moga, Punjab, PRIs and local community members were involved in all the steps of plantation process except for nursery development. The project leveraged Mahatma Gandhi National Rural Employment Scheme (MGNREGS) for involving the beneficiaries and providing them economic benefits under project. The women were given priority for planation activities as a result the overall process was very community centric. The plantation in Nainital, Uttarakhand entailed community participation throughout the plantation process including the nursery development.

For Harda, Madhya Pradesh also except for nursery the plantation for all other activities the panchayat and community members were involved. However, landowners also played a critical role in decision making and overseeing the process in Harda. Thus, even though the project was community driven, it was led by the wealthier sections of the community.

Finding 2 – Factoring in state specificities to involve relevant authorities: Since the location of the plantation in Puri, Odisha, was under the jurisdiction of the Forest Department, the project was successful in seeking their support. They were involved in the all the processes of plantation. However, community involvement was missed during the plantation process. Their greater involvement in the process could have ensured more benefits to them.

Finding 3 – Outsourcing of processes: The project had mandated involvement of local communities in all processes of the plantation. But except for Uttarakhand, nursery development process was outsourced to other agencies instead of local communities. In Puri, communities were not involved in any of the plantation activities. Even though outsourcing of activities to other agencies would have ensured professional and high-quality services, community members missed out on deriving the benefits (both economic and skill development) of these processes.

d) People

The plantation processes involved four key types of stakeholders namely, PRIs, van Panchayats, community members and Forest Department. The section elaborates upon their awareness of the project purpose and their own roles and responsibilities.

PRIs

The interaction with respondents revealed that role of PRIs was instrumental in selection of plantation sites, species, and identification of beneficiaries. This was specifically true for Moga, Punjab and Harda, Madhya Pradesh. They were also responsible for nominating persons responsible for monitoring and upkeep of plantations. More than 80% (N=122) respondents in the two states confirmed that PRI members assumed active role in steering the planation process and its monitoring. The qualitative discussions also revealed that PRIs ensured preference to women and marginalised sections of the communities and were impartial in their approach towards selection of beneficiaries. In Madhya Pradesh though, it was seen that privately owned lands of wealthy landowners were selected for plantation as they held sway in the community.

The qualitative interactions with them also confirmed that they had clarity on purpose, objective and their roles and responsibilities. They also mentioned that were adequately oriented and sensitised on the above by the project team.

Van Panchayats

Like PRIs, the involvement of van Panchayats was sought in Uttarakhand. They also showed rigorous involvement in the planation process from selection of sites, species, and beneficiaries to watering of the plants and monitoring their health. All respondents from Uttarakhand confirmed that Van Panchayats proactively shouldered the responsibility of plantations.

The Van Panchayat members specifically noted that the implementing partner placed value on local and traditional knowledge and efforts to conserve forests. They further added that they were apprised in detail on project model and processes.

Community members

The community involvement remained high in the states of Punjab, Madhya Pradesh, and Uttarakhand. Of the total respondents, 157 *(76.62%) were direct beneficiaries (those who received economic benefits)* under the project while 47 (23.38%) were extended community members. About *82.59% (166) were directly engaged in project activities, 35 (17.41%)* were other community members who were involved in plantation drive indirectly i.e., lived in and around the vicinity of the plantations.

TABLE 4.5: RESPONDENT'S INVOLVEMENT IN THE PROJECT AND DIRECT INVOLVEMENT IN PROJECT ACTIVITIES

Respondent's involvement in the project			Respondents' involvement in project activities		
N = 201			N = 201		
	Number	Percentage	Involvement in project activities	Number of respondents	Percentage
Direct beneficiaries	154	76.62%	Directly involved in project	166	82.59%
Other community members	47	23.38%	Indirect involvement	35	17.41%

These community members during qualitative interactions also resonated with the views of PRI and Van Panchayat members that they were informed of the project goal and objectives and processes. They were also trained on benefits of plantation in terms of conserving environment, arresting climate change and providing purified air. Resultantly, many respondents despite not getting the direct economic benefit participated in the plantation process voluntarily.

Even though in Puri, Odisha, community members were not directly involved in the project implementation, they were also sufficiently aware that plantation had taken place after the Fani cyclone, and it was beneficial for the area. They also exhibited strong desire to associate or get involved in the plantation process.

Authorities – the Forest Department officials

The interaction with the implementing partner in Odisha revealed that Forest Department officials extended all possible support to the plantation, and they were actively involved in selection of sites, species and providing necessary approvals. They also monitored the plantation process. The evidence for this was shared by the implementing partners including photographs of Forest Department officials participating in the drives and monitoring them.

Finding 1 – Community institutions entrusted with leadership responsibilities: In the states adopting community-based models, the project was able to involve PRIs and Van Panchayats intensively. As a result, they assumed responsibility and accountability for plantation processes. This was critical in quality assurance and monitoring of the implementation processes and getting community buy in and ownership of the project directly. This is also linked to project sustainability which explained in the next section.

Finding 2 – Community members capacitated on plantation objectives and processes: The community members also reported that they were made aware of the benefits of plantation and were also capacitated on various plantation processes. They strongly linked this sensitisation and awareness activities to their active involvement in the project and reported increase in their existing skills and knowledge of plantation processes.

Image 1: Forest Department Officials in Puri planting the Trees

e) Sustainability

The sustainability of a project hinges on the level of stakeholder engagement; and community structures and governance mechanisms set up to manage activities once the implementing partner and donor exit the project location.

For FDP, it was seen that sustainability aspects were built in the project models adopted for different states. The most prominent facets for the same were transfer of ownership and current management of the plantations. The survey and qualitative interactions both captured the sustainability mechanisms of the project.

Transfer of ownership

During the survey, more than 90% respondents in Punjab, Madhya Pradesh, and Uttarakhand reported that plantation was transferred to PRI members/Van Panchayats. The discussions with PRI members and Van Panchayats also revealed the same. The study team further observed that the plantation was being looked after by these local self-governing bodies. In Puri, few respondents were aware that the land belonged to the Forest Department. They also noted that since the land belonged to the Department, the officials would only be taking care of the plantation.

TABLE 4.6: PLANTATION OWNERSHIP TRANSFER IN EACH STATE

State	Ownership Transfer
Punjab	PRI
Odisha	Forest Department
Madhya Pradesh	Land Owners
Uttarakhand	Van Panchayat

Current governance structures

As explained above, in Punjab, Madhya Pradesh, and Uttarakhand PRI members and Van Panchayats are managing the plantations. In Madhya Pradesh, the landowners have appointed two people to take care of the plantation. In Punjab, the PRI members had nominated two people for monitoring and upkeep of the plantation under MGNREGS. In Nainital, Van Panchayats along with community members were overseeing the plants. However, at the community level no record or documentation was maintained in all project locations, pertaining to the activities carried out under the project, the number of saplings planted or replanted, survivability of plants during and after project completion.

Finding 1 – Community ownership of plantations: The project successfully ensured transfer of ownership to community institutions who are actively taking care of and managing the plantations.

Finding 2 – Community governance mechanism is in place but needs strengthening: The project facilitated the development of community led governance mechanisms for maintenance and upkeep of the plants. These structures have sustained even after the project exit. However, there was a lack of documentation and record keeping processes. This was true even when the project was ongoing. Thus, efficacy of these mechanisms during and post the project could not be validated.

Key Findings from the field

Below is a table depicting findings from all four states pertaining to the 3P and S approach as detailed earlier.

	Innovative approach to achieve targets		Achieved as proposed		Achieved as proposed with slight changes		Did not achieve as proposed

TABLE 4.7: SNAPSHOT OF CONSOLIDATED FINDINGS FOR FOUR SAMPLED STATES

State	Punjab	Madhya Pradesh	Odisha	Uttarakhand
Plantation				
Site	Plantation sites were a mix between designated sites and roadside planting	Plantations were done on private land, on farmland bunds instead of the proposed wastelands/riverbanks	There was one large parcel of land that was selected to be the site of plantation drive in Odisha	There was no dedicated site for the Uttarakhand plantation, instead, trees were planted through gap filling to restore forests
Species	Six out of 14 species were planted which gave a variety of livelihood and environmental benefits	Three species were selected out of the proposed eight. Teak and bamboo trees were predominantly planted for their timber value	All three species that were proposed were planted in the Odisha site	Four out of 15 proposed species were observed in Uttarakhand
Plantation health	Trees were observed to be healthy and on track with growth patterns	Trees were observed to be healthy and on track with growth patterns	Casuarina trees showcased a lesser mortality rate and a more robust spread compared to Acacia and Karonj.	Trees in Uttarakhand displayed much smaller spread and shorter height compared to their growth patterns, this it likely due to canopy cover and forest plantation as opposed to a site
Survival	The study team observed a survival rate of 71% and respondents observed a survival rate of 75%	Respondents reported a high survival rate of around 90-95%, the study team observed a survival rate of 66%	The study team observed an average mortality rate of 19% from sampled plants. This mortality rate is still low, despite intense heat and sporadic rainfall in the area	Respondents reported a 70% survival rate of planted trees. The study team found a survival rate of 63% through the quadrat method
Replantation	Respondents reported a replantation of 100% of dead trees found	All respondents confirmed that dead trees were replanted	Replantation was confirmed through project documents and evidence shared	Respondents reported that where dead plants were replanted. However, since visits are not made regularly, the replantation rate may be lower
Process				
Pre plantation activities	Nursery development and activities were outsourced	Field preparation in Harda was done innovatively. Saplings were planted only once the monsoon season had begun, where the rain automatically primed the field for plantation	Field preparation activities were carried out by Adibasi Welfare society members	Nurseries were developed in private houses. This process enabled the community to feel more responsible towards the project

State	Punjab	Madhya Pradesh	Odisha	Uttarakhand
Record keeping	Data had to be acquired from multiple sources since documentation of activities and beneficiaries were poor	Data had to be acquired from multiple sources since documentation of activities and beneficiaries was poor	Data had to be acquired from multiple sources since documentation of activities and beneficiaries was poor	Data had to be acquired from multiple sources since documentation of activities and beneficiaries was poor
People and Sustainability				
PRI	PRI members were highly involved in plantation planning and execution	PRI members of Masangaon and Fuldi were fully involved in project planning and overseeing of project activities	No local governance or communities were involved in project planning. The forest department of the region was consulted for tree species and site selection	Van Panchayats were very involved in project planning process (including site selection and species selection)
Community awareness and perception	Respondents were aware of the benefits of the plantation and were properly oriented on its processes. Many community members voluntarily supported plantation activities even without direct monetary gain	Having done several similar projects with Grow Trees and IPWTA, the community members were aware of the benefits of the plantation and were well oriented on its activities	Community was not made aware of the project implementation.	The community was aware of the benefits of the plantation and was well oriented with the approach and activities under the project
Beneficiary inclusivity	Beneficiaries of the project were selected to uplift the most vulnerable sections of the community	Direct beneficiaries of the project were selected to uplift the most vulnerable sections of the community	No community members were direct beneficiaries of the project	As per the project's mandate all beneficiaries of the project were women
Ownership transfer	Ownership was transferred to local PRI after project execution	Ownership was transferred to landowners	Ownership was transferred to the forest department	Ownership was transferred to the van panchayat for upkeep
Monitoring and maintenance	Jan Manthan was highly involved in the plantation monitoring, making regular visits to communities to offer support	IPWTA was in frequent contact with PRI members to ensure smooth progression of project	Five members from the original team stayed back for a year to monitor and maintain the plantation	No monitoring mechanism was put in place; however community members often make visits to sites to monitor progress
Future scope	Community members are eager to continue the plantation project or be involved in similar projects in the futur	many respondents felt that ultimately, only wealthy landowners would receive profit from the trees planted. They were however keen to continue such projects because of the livelihood	Through observation and respondent interactions, it was made clear to the study team that the project's sustenance plan was not laid out as many community members expressed that they would have keenly participated in the project and moreover, could have ensured a higher level of monitoring and maintenance	Van Panchayats have been often engaging with community members to discuss future for the plantation

4.2.2 State Wise Detailed Findings
Moga, Punjab

Introduction to FDP in Moga, Punjab - The primary focus of the project here was to improve biodiversity through afforestation. Additionally, the project also aimed at achieving carbon sequestration, employment generation, and promoting knowledge and awareness about ecological conservation to educate the rural community members to build a sustainable future. Under the project's mandate for Moga, it was proposed that *25,000 valued local trees* would be planted in *10 villages* creating approximately *2,000 workdays* for local community members. Additionally, the project also sought to reduce air pollution, increase value standing forests, build awareness amongst community members towards afforestation projects and provide alternate livelihood opportunities for local community members.

For the impact assessment study, three villages i.e., Dhalle Ke, Ghall Kalan, and Khosa Randhir were sampled out of 10 villages in Moga, Punjab. Here, *77 local beneficiaries from Dhalle Ke and Ghall Kalan were identified and interviewed,* and plantations were verified across all the three sampled villages. The pictures below depicts one of the plantation sites in Moga and the increase in green cover over the course of the project. These pictures are taken from Bhuvan satellite imaging (2017) and Google maps (2023) satellite imaging of plantation site in Dhalle Ke village.

a) Respondent Profile

Out of 77 study respondents from Moga, *76.63% of them, working on plantations were female and 23.37% of respondents were male.* A higher number of female members

FIGURE 4.8: PLANTATION SITE MOGA 2017 (LEFT) AND 2023 (RIGHT)

Coordinates: 30.832632, 76.993697

FIGURE 4.9: AGE PROFILE AND OCCUPATION PROFILE OF RESPONDENTS

Age distribution of respondents

Age Group	Value
15-30	1.29
31-40	37.66
41-50	32.46
51-60	16.88
61-70	10.38
71-80	1.29

N=77

Occupation of project respondents

Occupation	Value
Anganwadi worker	2.59
ASHA	2.59
Anganwadi helper	1.29
Labour	24.67
MNREGA worker	68.83

N=77
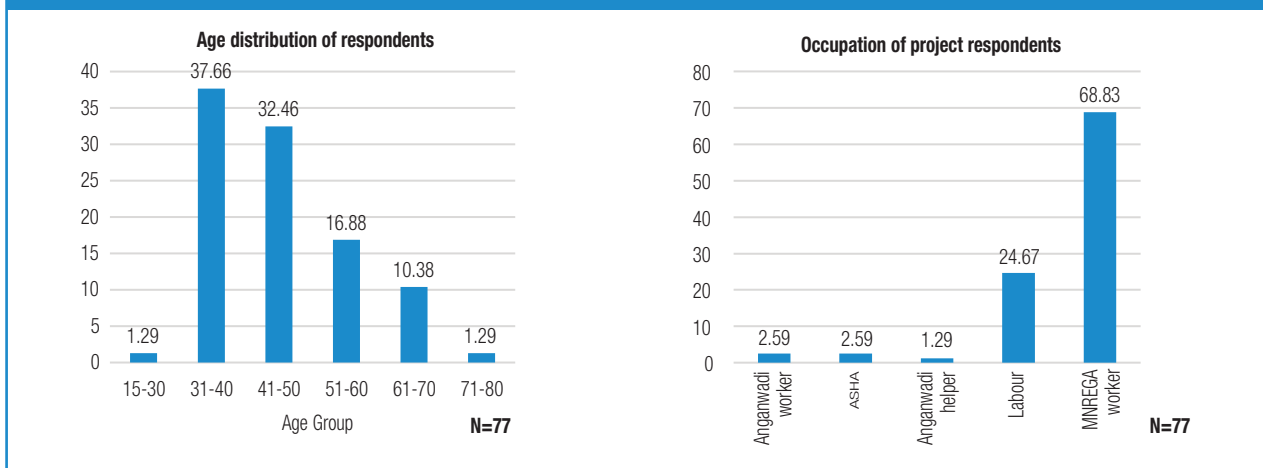
were engaged through the project as per their mandate to uplift vulnerable groups of the population both economically and socially for their well-being.

These respondents belong to the age group of 15-80 years. Most respondents were between the ages of 31-50 years as depicted below.

The current occupation of these respondents is presented in the graph below. It was observed that nearly *70% of respondents were engaged through the MGNREGA* while around 30% of respondents volunteered to work on plantation activities.

It was further observed that ASHA and Anganwadi workers also joined in the activities of the project since they saw merit in plantation activities towards improvement of air quality in the location resulting in improved quality of life for infants and expecting mothers of the community.

b) Plantation in Moga, Punjab

Grow Trees being the implementing agency engaged Jan Manthan to carry out plantation activities in Moga. These plantation activities were carried out from *July 2020 to August 2020*. The study team observed the plantations in three sampled villages -Dhalle Ke, Ghall Kalan and Khosa

Randhir. The key highlights of these sites are mentioned in the table below.

Tree species proposed

A total of 14 species of trees were proposed to be planted in Moga. Out of these species, six species of trees i.e., Neem, Burma Drek, Sheesham, Sohanjana, Amrud (Guava) and Jamun were finalized after consultation with local PRI. The table below showcases the number of trees proposed under each sampled village and the type of species of tree planted.

The next section highlights TTC's findings from the field observations and qualitative interactions.

Plantation site

The study team employed the quadrat method to verify trees in Moga. Since there were dedicated plantation sites as well roadside planting, quadrat sizes differed to accommodate for the variation in sites. Approximately 6,100 trees were observed by the study team out of the 8150 trees that were proposed to be planted in the sampled villages in Moga. Trees observed during site visits were planted at semi-regular spacing and were identified to be *healthy and on track with their growth patterns*. The table below provides a snapshot of trees observed on field.

TABLE 4.8: PLANTATION SITES IN MOGA

Village 1 – Dhalle Ke	Village 2 - Ghall Kalan	Village 3 - Khosa Randhir
Panchayat Land	Cremation Grounds	Community Land
Gurudwara	Roadside	Dispensary
Roadside		Roadside

TABLE 4.9: NO. OF TREES AND SPECIES PLANTED IN SAMPLED SITES IN MOGA

Name of Village	No of Tree	Name of Species					
Khosa Randhir	2100	Neem	Burma Drek	Sheesham	Sohanjana	Amrud	Jamun
Dhalle-Ke	3000	Neem	Burma Drek	Sheesham	Sohanjana	Amrud	Jamun
Ghal Kalan	3000	Neem	Burma Drek	Sheesham	Sohanjana	Amrud	Jamun

TABLE 4.10: CHARACTERISTICS OF OBSERVED TREES IN MOGA

Total Proposed Plantation in 3 sampled villages in Moga	8,150		
Trees Verified from the sample	6,100		
Detailed observation			
Scientific Name	**Species**	**Approximate height (ft)**	**Approximate Spread (ft)**
Terminalia bellirica	Baheda	10-15	5-10
Tectona Grandis	Neem	15	5-10
Psidium	Amrud/ Guava	5	5
Phyllanthus emblica	Amla	5	5
Dalbergia sissoo	Sheesham	10-15	5-10
Moringa oleifera	Sohanjana/Drum Stick	10-15	5-10
Melia azedarach	Burma Drek	10-15	5-10

These plantation sites were spread around village infrastructure such as Gurudwaras, cremation grounds and dispensaries. While there were dedicated plantation sites in the villages, most trees were planted along village connector roads. This was done to add a green belt and canopy cover to these roads.

Finding 1 – Tree species: About 85% of respondents reported that the species of trees planted under the project's mandate were local and valuable trees whose populations have been dwindling over the past years. *Neem* was unanimously observed by respondents, followed by *Amla*, *Kekar*, *Jamun* and *Arjun*. All species of trees observed have economic benefit and were planted to enhance livelihood.

- Medicinal Trees: Neem
- Fruit Bearing Trees: Amla, Jamun, and Sohanjana
- Timber Trees: Sheesham

The respondents were further asked if they knew the existence of all these tree species on ground. It was observed that all the study respondents could recall the plantation of Neem tree species while around 85% of them could mention the plantation of Amla tree in their villages. The study team also observed that respondents spoke about plantation of other kinds of species of trees such as Kekar, Arjun and Sitafal. These trees might not have been planted under the HDFC project's mandate. The graph below showcases the percentage of tree species as recalled by respondents.

FIGURE 4.10: SPECIES RECALLED BY RESPONDENTS IN MOGA

Species recalled by respondents (%)

N=77
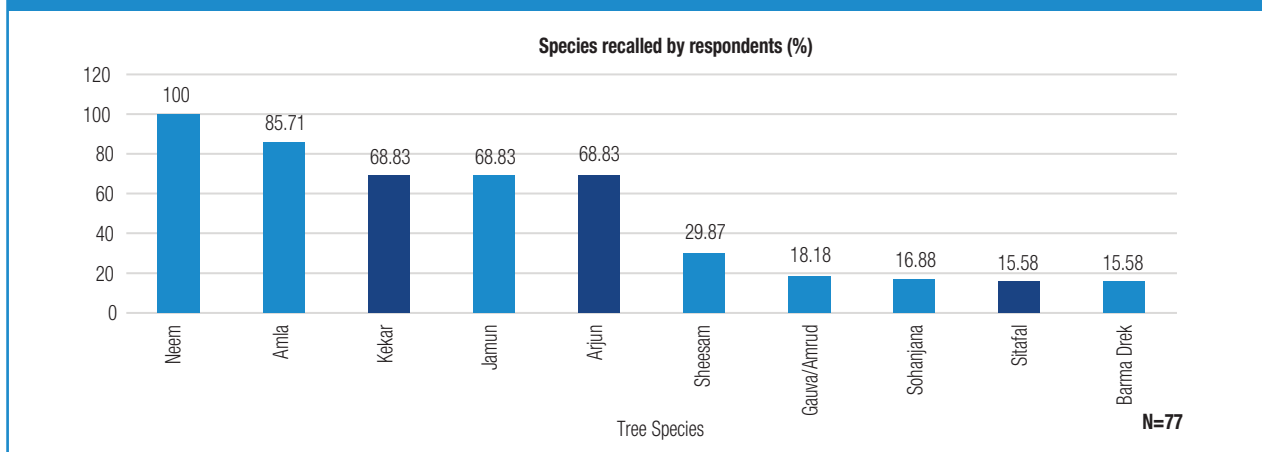
The trees variety marked in 'green' are species of trees that were proposed as per HDFC's project mandate for plantations in Moga whereas species marked in 'blue' are other kinds of tree species that were reported by respondents but was not plated under the project's mandate. It is highlighted that these additional types of plant species observed by respondents are species of trees native to the region and may have been confused with project trees. The study team also observed that some additional varieties such as Baheda trees which were not proposed for plantation in Moga. These also could have been planted as part of a community initiative or through a different plantation drive.

Finding 2 – Mortality and replantation rates: Through qualitative interactions, the study respondents confirmed that replantation was done where trees did not survive. During the survey, beneficiaries and community members were asked about the proportion of trees that were replanted, their responses were split between 30% and 40%. Out of 77 respondents, *68 observed a replantation rate of 30% and nine observed a replantation rate of 40%.*

The study team further observed that a relatively higher mortality rate of trees planted could be attributed to *most trees being planted along roads*, where they are more vulnerable to wildlife foraging and trampling by vehicles. The team through quadrat method observed a mortality of 25% which was closer to rates reported by a majority of respondents.

Finding 3 – Carbon absorption: Some tree species planted have very high CO_2 absorption potential such as Burma Drek and Sohanjana, while other trees such as Sheesham, Neem and Guava (12.08 Kg/year) have lower absorption potential. Fewer high carbon absorbing trees have been planted compared to higher livelihood trees. However, the average carbon absorption is likely to be near the proposed 20kg CO_2 per tree per year.

c) Process in Moga, Punjab

Grow Trees, HDFC Bank's implementing partner engaged Jan Manthan to implement this project in Moga, Punjab. Below is a graphic representing the implementation process of the plantation drive in Moga.

FIGURE 4.11: PLANTATION PROCESS IN MOGA

STEP 1: Nursery Bedding
- Nursery activities were outsourced.
- A buyer-vendor relationship between Janmanthan and the local nursery
- Growing of plants and keeping them healthy was local nursery's responsibility.
- Janmanthan bought the healthy plants.

STEP 2: Field Preparation
- Weeding/ Removing the grass
- Leveling of land/making the surface plain
- Pit Digging
- Maintaining the required spacing

STEP 3: Sapling Plantation
- Deciding the location of plants, where to put the fruit trees, shadow trees
- Putting the sapling in pit
- Watering

STEP 4: Monitoring and Maintenance
- Watering
- Maintenance - protection from animals such as goats
- Monitoring the unhealthy, dead plants and replacing them

**Finding 1 – Nursery bedding:** As per HDFC's project mandate for Moga, nursery development was proposed to be carried out by community members. However, during field visits, respondents noted that nursery development and upkeep was outsourced to a third-party vendor. While this might have reduced the amount of employment generated for the community, a third-party vendor would have been more professional in the process of nursery development.

Finding 2 – Record keeping: The interactions with Jan Manthan representatives and PRIs, revealed that records of beneficiaries, transportation and plantation of saplings and replantation were not kept. Preceding the plantation activities, two community members were identified from the sampled villages by local PRIs who took care of the maintenance of the plantations.

d) People

The sampled communities of Dhalla Ke, Ghall Kalan and Khosa Randhir, were aware of plantation efforts as part of this project, prior to the beginning of the project since Jan Manthan, the local implementing partner, consulted PRIs for planning and implementation of the project. It was noted by the study team that beneficiaries and community members were informed by Jan Manthan and PRIs members about the ecological and livelihood benefits of the plantations and the activities that would be carried out under the project. The diagram depicts the respondents' perceptions of the long-term benefits of the plantation drives. All respondents agreed that the plantations will bring long term environmental improvement. Out of the 77 respondents in the study, nearly

FIGURE 4.12: PERCEIVED LONG-TERM BENEFITS OF PLANTATION AMONG RESPONDENTS IN MOGA

Percieved long term benefits reported by respondents (%)

N=77
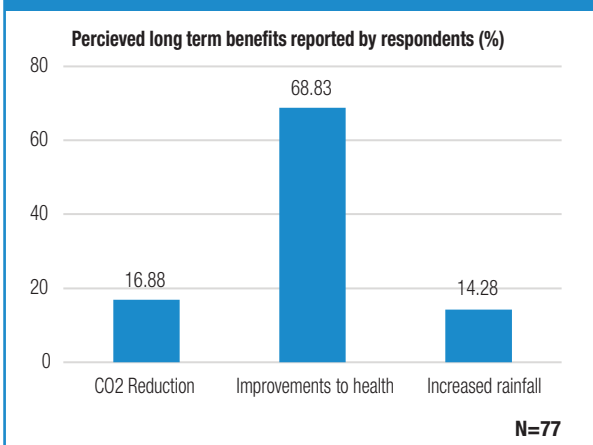
70% expected that the project would positively impact their health by reducing air pollution, improving water quality, and subsequently improving the quality of agricultural produce. Further, respondents also suggested that the plantations would lead to reduced carbon dioxide in the atmosphere and increase rainfall patterns in the region.

Finding 1 – PRI involvement: Through qualitative interactions with PRI members and Jan Manthan, the study team learned that finalization of tree species and plantation sites was done by local panchayats to bolster the livelihood profile of the communities and improve their quality of life. The study team observed that PRI members took an active role in the implementation, supervision, and maintenance of plantation.

Finding 2 – Positive community perception: The study team further observed that respondents had an accurate understanding of the direct and indirect improvements that the plantations would bring to their livelihoods. The direct benefit of plantation was reported in terms of those community members involved in plantation getting direct wage employment. Additionally, respondents suggested that the in the long-term introduction of horticulture (fruit bearing trees) would diversify their livelihood portfolio and strengthen their resilience to economic changes. Respondents also suggested that medicinal and fruit bearing trees could also reduce their expenditure as products from these species could be used for sustenance. Finally timber trees can also be used to generate income once the trees reach their maturity.

Finding 3 – Inclusivity in beneficiaries: Beneficiaries for project activities were selected to uplift the most vulnerable sections of the community. Beneficiaries included both men and women with a higher percentage of women selected for the project. The beneficiaries who were engaged through the project mostly worked under MGNREGA act and were from economically weaker sections of the community. These MGNREGA workers constituted nearly 70% of respondents in this study.

Finding 4 – Community ownership: The interviews and qualitative interactions revealed that around 30% of respondents provided their support towards the plantation drive without any monetary incentive. This is because they were very aware of the benefits that the plantation would have for their community and partook in activities for the

benefit of their settlements and community. The ASHA and Anganwadi workers of the communities were also engaged in the plantation activity without pay since they believed that the plantation would lead to a cleaner environment and ultimately healthier lives for infants and expecting mothers.

Finding 5 – Monitoring: Jan Manthan, the local implementing partner, played an active role in regular monitoring of the project. Personnel from Jan Manthan visited each site at least once a week to stay informed of plantation progress and aided the community where challenges were met. Succeeding the plantation of trees, two community members were identified by PRIs to oversee maintenance activities.

e) Sustainability in Moga, Punjab

The study respondents highlighted that the plantation drive in Moga was very participatory. The local implementing partners involved the PRIs in every step of project planning, from site selection, tree species selection to the project implementation strategy and beneficiary selection. All respondents attributed positive impacts in terms of ecological and livelihood benefits to the plantation. The respondents further suggested continuation of similar drives in the future.

Finding 1 – Community intervention and CIGs: Some community members have begun planting crops like cabbage, tomato and brinjal, where there are dedicated plantation sites. Yield from these crops will be used for sustenance (local consumption) or donation to the local Gurudwara.

Finding 2 – Scope for the future: Through qualitative interactions with respondents, it emerged that community members are eager for a continuation of the plantation

effort or starting another similar project since they believe that the plantation supports the quality of settlements and surrounding environment.

Harda, Madhya Pradesh
Introduction to FDP Harda, Madhya Pradesh: The project in Harda primarily aimed at reducing soil erosion and improving the groundwater table for agriculture and agroforestry. The project was also designed to improve tree cover, rejuvenate river flow, absorb carbon dioxide, and generate employment for local communities through the project's activities.

Under the project's mandate, it was proposed that *1,50,000 mixed-valued local trees* would be planted in *seven villages across the district* along the Narmada River and its tributaries, *especially in wastelands* to rejuvenate the region. In doing so, the project in Harda also aimed at generating employment through plantation activities for 70 community members.

The study team sampled two villages i.e., Masangaon and Fuldi where 45 beneficiaries and community members were surveyed and interviewed. The study team also conducted observations of plantations in the two sampled villages. Below are two pictures from Bhuvan satellite imaging (2016) and Google Maps satellite imaging (2023) showcasing the addition of a green belt along the bunds of farmlands in Masangaon over the course of the project, which is where trees were planted for the project.
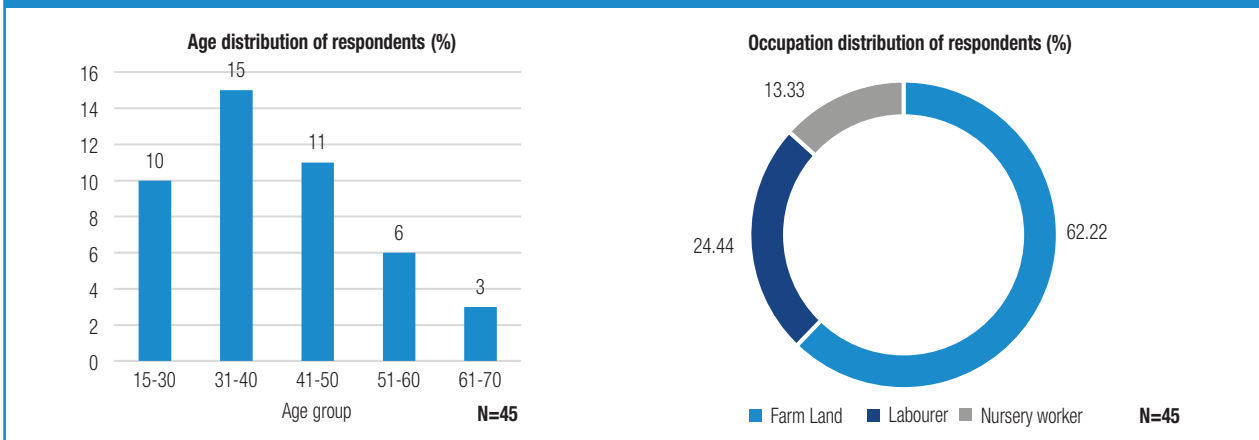
a) Respondents' Profile
Out of the 45 respondents, 33.3% of respondents were within the age groups of 31 – 40 as shown below. The

FIGURE 4.13: PLANTATION SITE HARDA 2017 (LEFT) AND 2023 (RIGHT)

Coordinates: 22.285145, 76.993697

FIGURE 4.14: AGE PROFILE AND OCCUPATION PROFILE OF RESPONDENTS IN HARDA

Age distribution of respondents (%)

N=45

Occupation distribution of respondents (%)

13.33

24.44

62.22

■ Farm Land ■ Labourer ■ Nursery worker   N=45

study team observed that respondents aged higher than 40 years of age tended to be landowners while the younger demographic tended to be direct beneficiaries engaged in plantation activities. **Of the total respondents,** 31.11% were females and 68.89% were males. A higher percentage of males were part of the study since they were landowners upon whose land the plantations were conducted.

From qualitative interactions, the study team concluded that women were favored for plantation related activities such as field preparation, sapling plantation and monitoring of the plantation as per the project's mandate to enhance the livelihood of vulnerable groups from the community.

Of the total respondents, 62% were landowners. They were relatively wealthier than other community members as they reaped good agricultural yield owing to the region's innate fertile soil and larger average land holding size. Apart from landowners, two occupational groups formed part of the respondent group; nursery workers and laborers who performed agricultural and animal husbandry activities for landowners.

b) Plantation in Harda, Madhya Pradesh

Grow Trees, engaged Intellectual Public Welfare and Training for Art Society (IPWTA) as their local partners to conduct plantation efforts in Harda. A total of 150,000 mixed-valued trees were proposed to be planted in seven villages of Harda between July and August of 2021.

Trees species proposed

Eight species of trees were originally proposed to be planted in Harda. Of these eight species, three species of Teak, Bamboo and Mango were selected for plantation after

consulting the PRI and select community members. The table below shows the project's proposed number of trees that were to be planted for each species in the sampled villages of Masangaon and Fuldi.

TABLE 4.11: PLANTATION SITES IN HARDA

Village	Bamboo	Teak	Mango	Total
Masangaon	3,000	3,000	1,500	7,500
Fuldi	5,000	4,000	2,000	11,000

The study respondents (45) across the sampled villages of Masangaon and Fuldi, recalled the plantation of the following species over the course of the plantation drive. Teak and Bamboo were recalled by almost everyone while only a few respondents recollected the planting of mango trees. Below is a chart depicting the observation of tree species planted under the project in Harda.

FIGURE 4.15: TREES SPECIES RECALLED BY RESPONDENTS IN HARDA

Species recalled by respondents (%)

N=45
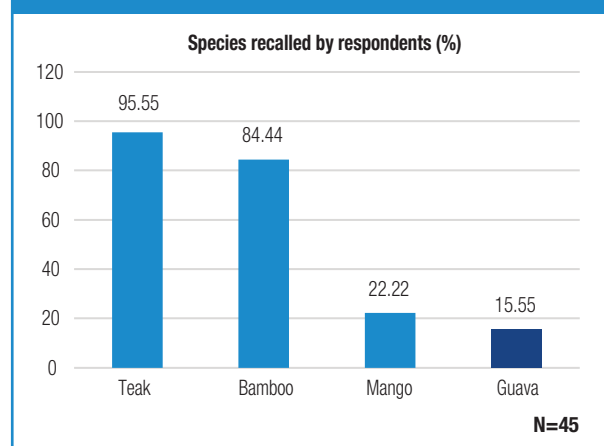
Tree species marked in 'Green' are those species recalled by respondents and part of the mandate under HDFC Bank's plan for Harda, while species marked in 'blue' are those species recalled by respondents, but not part of the mandate.

Plantation site

Considering trees were planted along the bunds of private farmland, the quadrat method could not accurately provide a sample of the plantation drive in Harda. To accommodate for this, the study team surveyed several different private properties where plantations were made. Through a mix of the quadrat method and observations, approximately 15,000 trees were observed by the study team out of the 23,950 trees that were proposed to be planted in the sampled villages in Harda. Trees observed during site visits were planted at regular spacing and were identified to be healthy and on track with their growth patterns. The table below provides a snapshot of trees observed on field.

TABLE 4.12: PLANTATION CHARACTERISTICS IN HARDA

Total Proposed Plantation	23,950		
Trees Verified	15,000		
Detailed observation			
Scientific Name	**Species**	**Approximation height (ft)**	**Approximation Spread (ft)**
Tectona grandis	Teak	2-6	>1
Bambusa spp.	Bamboo	10-12	3-4
Mangifera indica	Mango	2-4	2-4
Psidium guajava	Guava	2-4	2-4

Finding 1 – Community centered plantation sites: The project mandate in Harda suggested that plantations would be carried out in wasteland areas to rejuvenate the land and ground water storage. However, through field visits and interviews with respondents, the study team observed that plantations in the sampled villages were restricted to the boundaries of private farmlands. The field visits and a topographical analysis showed that many plantation sites proposed under the project were not on riverbanks as mandated under the project. Of the two sampled villages, Fuldi is on the bank of Narmada while the Masangaon settlement is around 20 km away from the river. Through qualitative surveys, respondents reported that plantation sites were selected to be on farmland instead of riverbanks or wasteland since landowners would be able to better

monitor tree health, moreover, it presented greater economic benefit to them.

Finding 2 – Timber trees: Teak, Bamboo and Mango were selected for plantation in Harda after discussions with PRI members as these two species are highly sought-after timber trees that would benefit landowners on whose land these trees were planted. Furthermore, Mango fruits also present economic benefit to the landowners to diversify and enhance their livelihood. *100% of respondents agreed that the tree species planted were relevant to the area and beneficial to the community.*

About 15% of respondents of the study also recalled Guava trees (*Amrud*) being planted under the project. However, it was highlighted to the study team through several interactions with the respondents of the study that there were several similar plantation drives conducted over the past two years, many of which had been done by Grow Trees and IPWTA, which made it difficult for community members to recollect exact tree species.

Finding 3 – Mortality and replantation: Respondents of the survey recalled the survival rate of planted trees since the plantation began. 75.56% of respondents *reported a high survival rate of trees around 90–95%*. The figure shows the community's recollections of the plantation's survival rate. Through the quadrat method, however, the *study team observed a survival rate of 66%.* However, this may be attributed to plantations being on private land, where practices and irrigation techniques may vary and ultimately factor into the survivability of planted trees.
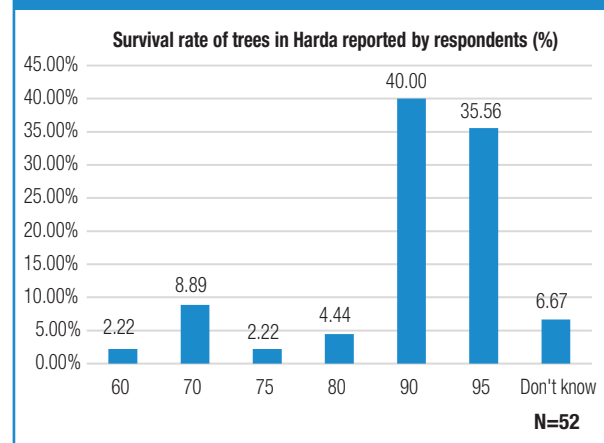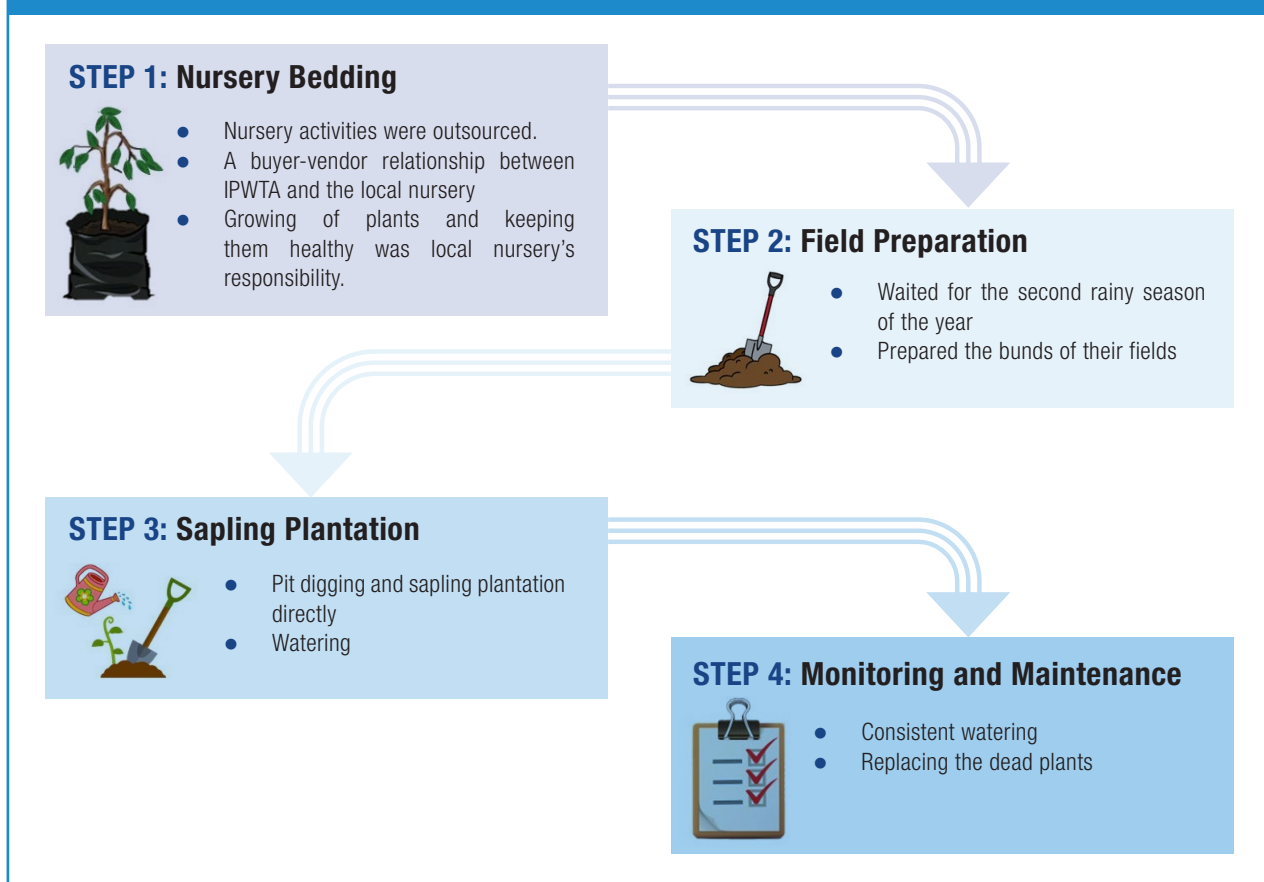
FIGURE 4.16: SURVIVAL RATE OF TREES IN HARDA

Survival rate of trees in Harda reported by respondents (%)

N=52

FIGURE 4.17: PLANTATION PROCESS IN HARDA

STEP 1: Nursery Bedding

- Nursery activities were outsourced.
- A buyer-vendor relationship between IPWTA and the local nursery
- Growing of plants and keeping them healthy was local nursery's responsibility.

STEP 2: Field Preparation

- Waited for the second rainy season of the year
- Prepared the bunds of their fields

STEP 3: Sapling Plantation

- Pit digging and sapling plantation directly
- Watering

STEP 4: Monitoring and Maintenance

- Consistent watering
- Replacing the dead plants

Process in Harda, Madhya Pradesh

The local partner consulted PRIs for site, species, and beneficiary selection. All beneficiaries selected for the project were identified by the PRIs and landowners from the target communities. Beneficiaries were selected for nursery development and field activities. Nursery development was undertaken in a neighboring village which supplied sapling to all project villages in Harda.

Finding 1 – Field preparation: Levelling of land and other field preparation activities were forgone since, as per a village elder's suggestion, plantation activities started after the first two days of rain in the season, which primed the fields for plantation by increasing the soil's moisture content and making it more malleable for pit digging.

Finding 2 – Sapling plantation: Since community members and beneficiaries were engaged in many similar plantations over the years, many respondents of the study were unaware of which project these saplings were a part of.

Finding 3 Monitoring and maintenance: Following the initial plantation effort, monitoring and maintenance of the plants were taken over by landowners since the plantation was done on their fields.

People of Harda, Madhya Pradesh

The plantation drive in Harda was a community driven project and as such many stakeholders from the communities played an important role in the project's implementation.

Finding 1 – PRI involvement: The qualitative interactions with PRI members established that they were consulted in the sampled villages of Masangaon and Fuldi for plantation sites and tree species selection. Further, they were also responsible for identifying direct beneficiaries under the project.

Finding 2 – Community awareness: Having done several similar projects with the communities of Harda, IPWTA had already built a rapport with the members of the sampled

villages. Most respondents noted that similar plantation drives had been done in the past by Grow Trees and IPWTA. All respondents were aware of the process and activities under the project as well as the economic and ecological benefit.

Finding 3 – Inclusion and diversity in beneficiary selection: The respondents who were direct beneficiaries of plantation activities were selected from the sampled communities. The qualitative interactions with beneficiaries and PRIs confirmed that IPWTA and PRI members favored the selection of women and economically weaker section (EWS) members as per the project's mandate.

Finding 4 – IPWTA supervision: Through interviews with community members, beneficiaries, PRI members and the local implementing partner, the study team gathered that IPWTA members were in frequent contact with PRIs and consistently made site visits to ensure smooth progress of the plantations.

Sustainability in Harda, Madhya Pradesh

The study respondents noted that the plantation drive in Harda was participatory. The local implementing partners involved the PRIs in every step of project planning, from site selection, tree species selection to the project implementation strategy and beneficiary selection.

Finding 1 – Economic benefit from the plantation: While direct beneficiaries of the project only received livelihood gain from the plantation activities, almost all respondents agreed that people benefitting the most from the plantations were the already wealthy landowners since they would reap profit from the timber trees from the plantations.

4.2.3 Puri, Odisha

Introduction to FDP in Puri, Odisha: The primary focus of the project in Odisha was to restore the Balukhanda Wildlife Sanctuary, situated along the coast of Puri and this area was severely damaged by the Fani cyclone, that uprooted around 60 Lakh trees. To rehabilitate forest land, *250,000 trees were proposed to be planted* in the buffer zone of Balukhanda Wildlife Sanctuary which is home to a wide range of fauna including spotted deer, jackals, hyenas, jungle cats, monitor lizards and birds. The plantation was also further aimed at improving wildlife habitats and reducing soil erosion.
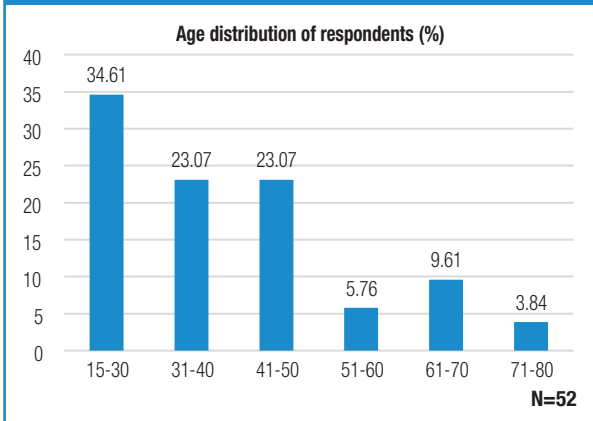
Pictures below show the plantation site in Puri in 2017 (left) through Bhuvan Satellite Imaging and the site in 2023 (right). The google maps satellite imaging picture on the right showcases an increased density of green cover over the years.

For this study, *52 community members from the adjacent village of Harchundi Nagar and Jagannath Sanskrit University were identified and interviewed.* **It should be noted that respondents for this study were not part of the plantation process in Puri, but they were community members of the surrounding area.** The plantation drive in Odisha was not a community driven effort as in the case of Moga in Punjab and Harda in Madhya Pradesh. The plantation activities in Puri were carried out by laborers from an organization called Adibasi Welfare Society who took over all responsibilities related to the project implementation. The sections below will unpack the functioning and findings as observed by the impact assessment study team in detail.

FIGURE 4.18: PLANTATION SITE PURI 2017 (LEFT) AND 2023 (RIGHT)

Coordinates: 19.812184, 85.860369

FIGURE 4.19: AGE PROFILE OF RESPONDENTS IN PURI

Age distribution of respondents (%)

Age group	%
15-30	34.61
31-40	23.07
41-50	23.07
51-60	5.76
61-70	9.61
71-80	3.84

N=52

a) Respondents Profile

Out of the total 52 study respondents, their gender distribution was relatively even at 51.92% females and 48.07% males.

Furthermore, these respondents encompassed several age groups as displayed below. Most respondents, 34.61% of them, were between the ages of 15 – 30 years. This is because of the plantation's proximity to the Jagannath Sanskrit University, where many students were aware of the plantation efforts.

b) Plantation in Puri, Odisha

There was only one plantation site in Puri, a 75-acre parcel of land adjacent to Jagannath Sanskrit University. Since the plantation site was along the coast, the *soil profile of the site was sandy*.

TABLE 4.13: SPECIES PLANTED IN PURI

S.no	Common Name	Trees Proposed
1	Casuarina	50000
2	Karonj	50000
3	Earleaf Acacia	150000

Tree species proposed

As per the HDFC project mandate in Odisha, the following tree species were proposed in a ratio of 20:20:60 for Casuarina, Karonj and Acacia.

Plantation site

Using the quadrat method, approximately 50,000 trees were verified from the total proposed plantation of 250,000 trees. Acacia plants were more frequently observed compared to

Casuarina and Karonj trees, which was in line with the initial proposal and the audit report.

Finding 1 – Tree species presence: Study respondents, 52 members from the adjacent village and university, recalled the presence of following species mentioned in the graph below from the plantation site.

It was observed that 13.46% of respondents recalled the presence of Cashew trees and Neem Trees which were not mandated under the project. It is likely that these species were spotted by respondents since they are endemic to the area. Species marked in 'green' are species observed by respondents that were proposed under the FDP while species marked in 'blue' are those species which are spotted by respondents of the study, in or around the plantation site, that were not mandated under the project.

Finding 2 – Tree species health: The size and height of plants varied with species. The study team saw that height and spread of Casuarina plants in plantation site was better compared to Acacia and Karonj possibly because of their hardy nature. Furthermore, the growth of Acacia and Karonj trees, while healthy, displayed some inconsistencies in height and spread, this is likely due to fluctuations in availability of water as mentioned by the community members during interviews.

Finding 3 – Mortality and replantation rate: The study team observed an average mortality rate of 19% from the sampled plants. Furthermore, a higher mortality rate was noticed in Acacia plants compared to Casuarina and Karonj trees because of extreme heat and inconsistent precipitation pattern as mentioned by study respondents.
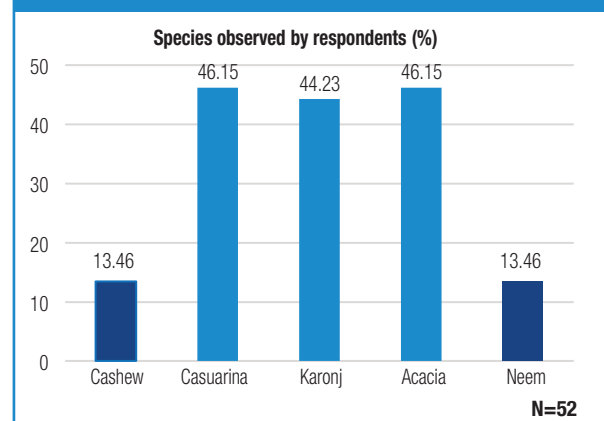
FIGURE 4.20: SPECIES OBSERVED BY RESPONDENTS

Species observed by respondents (%)

Species	%
Cashew	13.46
Casuarina	46.15
Karonj	44.23
Acacia	46.15
Neem	13.46

N=52

TABLE 4.14: SURVIVAL RATE OF PLANTS

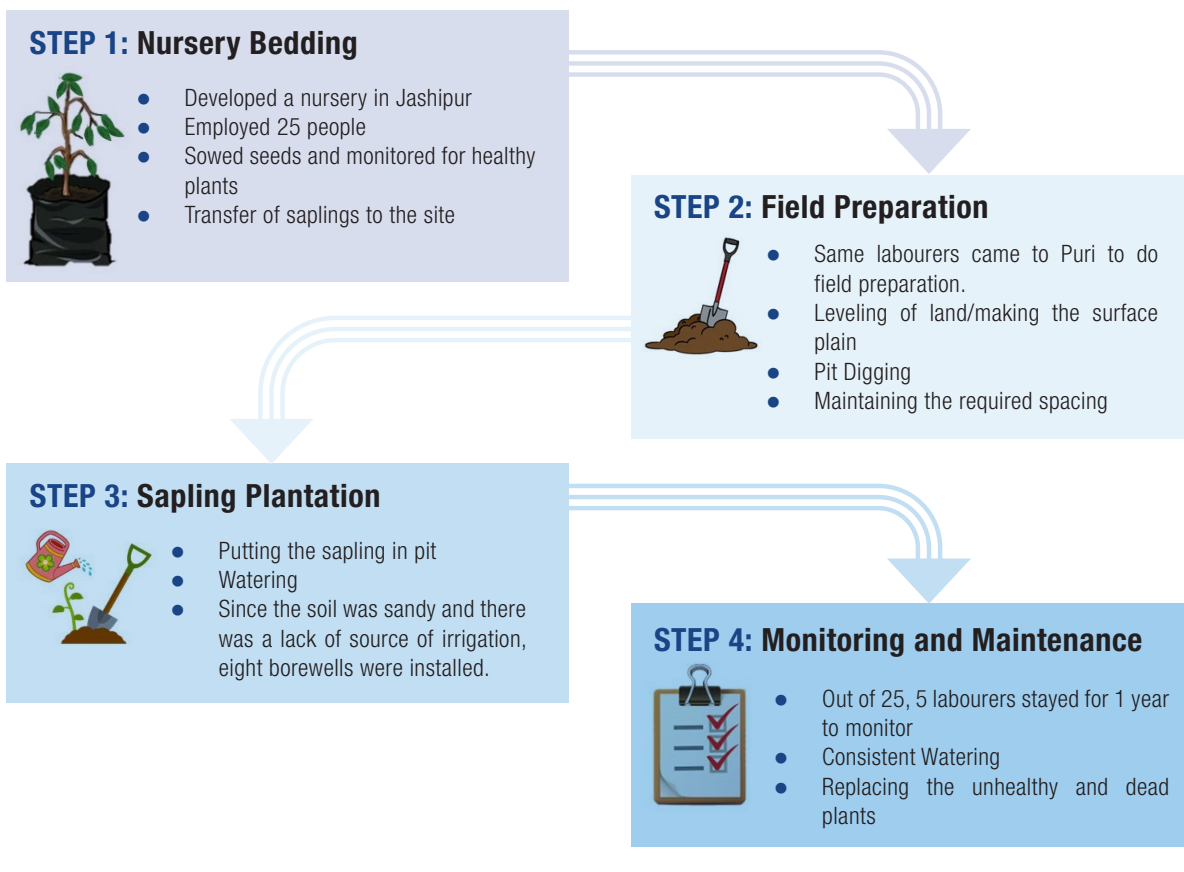| Total Plantation	Sample Verified		Dead Planting		Survivability	
	No	%	No	%	No	%
250,000	65,000	26	9500	19	40,500	81

Finding 4 – Special benefit of Karonj tree: The tree species identified and planted had specific benefits pertaining to the need of the location. During the interaction with development officer, they mentioned that the tree species, Karonj, provided benefit as a medicinal plant and plays an important role in restoring the surrounding ecology that was devastated by cyclone Fani. It produces organic litter through leaf shedding to prevent soil erosion and increases its fertility while acting as a source of pollen to produce dark honey to restore natural habitats to endemic wildlife.

c) Process in Puri, Odisha

Unlike other locations under this project, the plantation drive in Odisha was situated in an urban region, on the outskirts of Puri city. As discussed above, the entire planning and implementation of the project was carried out by Adibasi Welfare Society, Jamshedpur. The graph below highlights the entire process of implementation in Puri.

FIGURE 4.21: IMPLEMENTATION PROCESS IN PURI

A local organization called Adibasi Welfare with the support of the Forest Department carried out plantation. Labourers from Jashipur came to work on the plantation site.

STEP 1: Nursery Bedding
- Developed a nursery in Jashipur
- Employed 25 people
- Sowed seeds and monitored for healthy plants
- Transfer of saplings to the site

STEP 2: Field Preparation
- Same labourers came to Puri to do field preparation.
- Leveling of land/making the surface plain
- Pit Digging
- Maintaining the required spacing

STEP 3: Sapling Plantation
- Putting the sapling in pit
- Watering
- Since the soil was sandy and there was a lack of source of irrigation, eight borewells were installed.

STEP 4: Monitoring and Maintenance
- Out of 25, 5 labourers stayed for 1 year to monitor
- Consistent Watering
- Replacing the unhealthy and dead plants

A total of 25 Laborers from Adibasi Welfare Society were involved in nursery development for the plantation. The nursery was developed in Jashipur, Odisha, where the same people transported saplings to Puri, carried out field preparation, pit digging, and sapling plantation. Of these 25 laborers, five of them stayed back to oversee and maintain the plantation site in Puri for one year. It should be noted that for plantation activities in Puri, the community was not engaged and rather Adibasi Welfare Society took over all responsibilities related to the project.

Finding 1 – Community Engagement in the implementation process: The primary aim of this project in Odisha was to restore the Balukhanda Wildlife Sanctuary and livelihood in the surrounding communities. It was noted that minimal community engagement was displayed during the plantation process i.e., nursery development, field preparation, sapling plantation, monitoring activities etc. Since an external agency was hired to conduct these activities on ground, they consulted the forest department for site and tree species selection.

Finding 2 Monitoring: About five members of the implementation team stayed back for one year to monitor the plantation. Since community members of the area were not involved in the plantation activities, the study team observed that monitoring of the plantation did not continue proceeding the first year after sapling plantation.

d) People
Finding 1 – Community Involvement: Through qualitative interactions with the neighboring university of Jagannath Sanskrit University and the adjacent village of Harchundi Nagar, the study team was made aware that community members were not consulted for planning of the project or selection of species. Although communities were not involved in the plantation efforts, many community members were aware of the project. 70% of study respondents were familiar with the plantation drive and could also recall that plantations had begun two to three months after the Fani cyclone i.e., July – August 2020.

Ownership of the plantation was transferred to the forest department after one year of maintenance and the respondents strongly remarked that had the local communities been involved in the process, upkeep and maintenance of the plantation would have been improved since maintenance activities stopped after one year of the plantation drive.

An interview with the development officer of the adjacent college also highlighted that the project is extremely beneficial for the community since this would reduce soil erosion and act as a wind barrier to reduce the impact of cyclones as well.

Finding 2 – Project awareness and visibility: The interactions with the respondents revealed that the project efforts were attuned to restore the planation post destruction caused by cyclone Fani. Despite the large plantation site, there were no signboards present to notify people of community about the project's effort or about the donor. Many respondents suggested that it would be helpful to add a sign or demarcation to widen reach and knowledge amongst the surrounding communities of the project.

e) Sustainability in Puri, Odisha
In case of project's sustainability, it was observed that a clear plan to ensure a sustenance of project's effort was not laid out. The respondents highlighted that the community could have been involved in the plantation process or in the maintenance of the site since the goal of the project in the given location was to benefit the local community people. Furthermore, university staff members also shared that their involvement in the selection of species and plantation sites could have further improved the project's effectiveness since they are aware of local conditions and would have helped in protecting the plantation sites.

4.2.4 Nainital, Uttarakhand
Introduction to FDP in Nainital, Uttarakhand - The project in Nainital aimed to mitigate deforestation and safeguard the region's habitat for local biodiversity by planting local tree species. To carry out these plantations, the project also intended to strengthen community's forest management and bolster agroforestry livelihood options. Under the project's mandate, it was proposed that *50,000 selected native species* would be planted in *seven villages across the district*.

For this assessment, the study team sampled three villages i.e., Nathuwakan, Meora, and Barinanj where 27 beneficiaries and community members were interviewed. The study team also conducted a field level observation of plantations across the two sampled villages.

FIGURE 4.22: PLANTATION SITE PURI 2017 (LEFT) AND 2023 (RIGHT)

Coordinates: 29.471452, 79.615177

FIGURE 4.23: AGE PROFILE AND OCCUPATION PROFILE OF RESPONDENTS IN NAINITAL
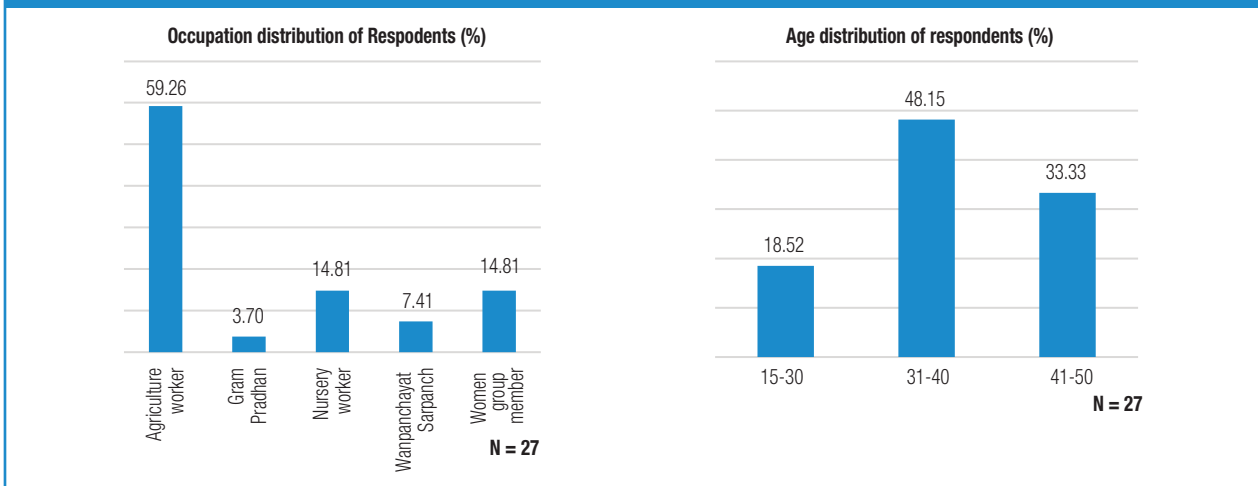
Above are pictures from Bhuvan satellite imaging (2018) and Google Maps satellite imaging (2023) of a plantation site in Nainital. Due to a dense canopy cover in the site, the effects from the plantation project are not clearly visible.

a) Respondents Profile
Out of 27 study respondents from Nainital, *77.78% were women and 22.22% were men.* A higher number of women were engaged throughout the project as per their mandate to uplift vulnerable groups of the population both economically and socially for their well-being. These respondents belong to the age group 15 to 50 years of age. The majority of respondents were between 31 to 50 years. Occupational background of respondents varied from agricultural workers, van panchayat members to women self-help groups. Nearly 60% of respondents in the study were agricultural workers. As per the 3P and S approach, the following findings emerged from the study.

b) Plantation in Nainital, Uttarakhand
The local implementation partner CHIRAG carried out plantation activities in Nainital. The plantation drive was conducted between July 2021 to August 2021.

Tree species proposed
A total of 15 species of trees were proposed to be planted across Nainital under this project. These trees were selected because of their ecological functions in restoring habitats for local wildlife, reducing topsoil erosion, and checking surface runoff. Some of these selected species were also relevant to communities of the region for agroforestry-based livelihood.

Plantation Site
Through field visit, the study team observed four species out of the 15 proposed from the sampled villages of Nathuwakan, Meora, and Barinanj. The table ahead showcases the study

TABLE 4.15: CHARACTERISTICS OF OBSERVED TREES IN NAINITAL

Total proposed plantation in 3 sampled villages in Nainital	53,000		
Trees Verified from the sample	35,000		
Detailed observation			
Scientific Name	**Species**	**Approximate height (ft)**	**Approximate spread (ft)**
Quercus leucotrichophora	Banj	3-5	5-7
Prunus cerasoides	Padam	1	1
Quercus	Oak	2	1
Phyllanthus emblica	Amla	1.5	1

team's observation details of the plantations. Since the plantation drive in Uttarakhand was an afforestation effort and thus employed a gap filling method to plant trees, the quadrat method was ineffective in producing a representative sample. To compensate for this, the study team observed several forest cover gaps and analyzed tree patterns in these areas.

Approximately 35,000 trees were observed by the study team out of the 53,000 trees that were proposed to be planted in the sampled villages in Nainital. Trees observed during site visits were planted at semi-regular spacing and displayed a shorter height and spread than plantation of the same species in the area.

Finding 1 Local and valued trees: All the respondents reported that the species of trees planted under the project were local tree species relevant to the region's ecology. Species of trees observed in Nainital perform the following functions:

- Oak and Banj trees provide habitats for local wildlife such as langurs.
- Padam trees formed canopy cover for forest areas, reducing overall temperatures and absorbing carbon from the atmosphere.
- Amla trees are part of the region's forest-based livelihood.

All the respondents reported that they observed Banj, Oak, Padam, and Amla trees amongst the plantations in sampled villages.

Finding 2 Replantation of trees: Out of 27 study respondents, 85% reported a survival rate of around *70% in the plantations*. The survival rate of these plantations may

be low because the project in Nainital was an afforestation drive rather than plantation in dedicated sites and was therefore monitored less frequently. Respondents of the study, however, reported that all the dead trees, wherever found, were replanted to ensure that the plantation effort reached its targets.

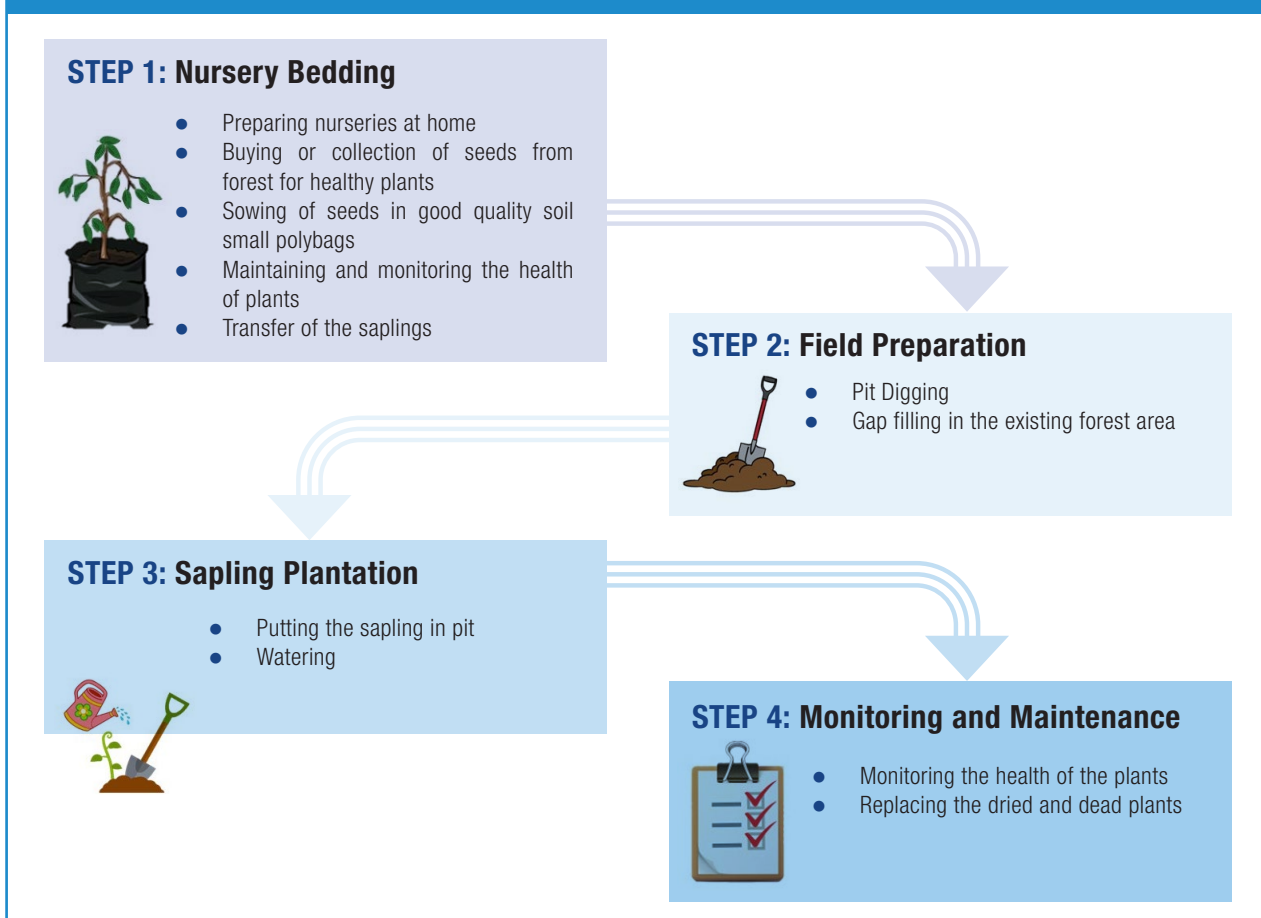### c) Process in Nainital, Uttarakhand

During field visits, the study team interacted with the local implementing partner, van panchayats and beneficiaries to understand the process of implementation of the project in Nainital. The diagram below represents the implementing process employed in Nainital as reported to the study team.

Finding 1 – In-house nursery development: The interactions with local implementation partner revealed that seeds were supplied to beneficiaries who developed nurseries in their own plots. During interview, all the beneficiaries mentioned that they were all given the seeds to develop nursery in their plots which helped them understand plantation process better and get actively involved with the project. This fostered community ownership of the planation drive. Thus, there was no single location for nursery development.

Finding 2 – Community driven approach in plantation: The qualitative interactions with stakeholders confirmed that all beneficiaries of the project took part in plantation related activities i.e., nursery development, field preparation, sapling plantation and monitoring.

Finding 3 – Van Panchayat: Following the plantation effort, ownership and responsibility of the plantation was handed over to *Van Panchayats* of the area who took over responsibilities of monitoring, maintenance, and replanting of trees.

FIGURE 4.24: IMPLEMENTATION PROCESS IN NAINITAL

STEP 1: Nursery Bedding

- Preparing nurseries at home
- Buying or collection of seeds from forest for healthy plants
- Sowing of seeds in good quality soil small polybags
- Maintaining and monitoring the health of plants
- Transfer of the saplings

STEP 2: Field Preparation

- Pit Digging
- Gap filling in the existing forest area

STEP 3: Sapling Plantation

- Putting the sapling in pit
- Watering

STEP 4: Monitoring and Maintenance

- Monitoring the health of the plants
- Replacing the dried and dead plants

d) People

The plantation project in Nainital was community led. The local implementing partner involved local van panchayats in every step of the project's planning and implementation since they had knowledge of the surrounding ecology and had a connection with communities. Beneficiaries and community members from sampled villages were also mobilized through discussions on the benefits of plantation and a one-day training session was conducted as an induction to project activities.

Finding 1 – Inclusivity among beneficiary group: As per the project's mandate, beneficiaries of the project included only women to uplift the most disadvantaged and vulnerable groups in the communities of Nainital. This was done to provide livelihood benefits and raise their status within the community.

Finding 2 – Positive community perception: Respondents of the study informed that they were aware of the benefits of the plantation and were keen to be involved in the project because of continuous discussions with the local implementing partners and van panchayats. Respondents also noted that now they were more attuned to the region's ecology and are in support of continuing the same efforts on the ground.

e) Sustainability

Since the project ensured intensive involvement of community in all processes, they actively oversaw the health and growth of planation process.

Finding 1 – Scope for the future: Post the completion of project, van panchayats informed the study team that they have taken over responsibilities of the planted trees and have held continuous discussions with community members about the future of the plantation, whether newer species can be incorporated into the afforestation efforts or if new plantation sites can be identified for future such interventions. This showcases their close association with the project and a clear motivation towards sustaining its efforts.

5

Impact
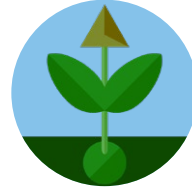
5.1 Overall Impact

Overall, the project has had a positive impact on the environment, in socio-economic aspects of the community members' and beneficiaries' lives. The project has led to the establishment of community driven governance structures as well. The section below will unpack each of the impact areas in detail.

5.2 Environmental impact

Immediate landscape changes: During the survey, many respondents noted improvement in their landscape due to plantations. Currently, around 5% of the respondents stated that they have seen an increase in wildlife species such as

FIGURE 5.1: CHANGES OBSERVED BY RESPONDENTS DUE TO PLANTATION

Changes observed by respondents in their settlements (%)

30.34
26.36
11.94
6.46
5.97
4.97
3.98
4.47

Health improvement | Temperature reduction | Greenery increased | Wildlife spotted | Biofuel | Fresh air | Clean water | No changes observed

N=201

spotted deer. This was observed in Puri, Odisha. Around 6% of them also informed that they have seen a visible change in the landscape's greenery.

They also cited associated benefits due to improvement in the landscape such as improvement in health. For instance, of the 201 respondents across four states, 26% of them mentioned that they have noticed a considerable change in their health such as feeling fresh, active and improvement in breathing.

Improvement in air quality and soil quality: A large proportion of respondents noted that plantations in the long-term will result in improvement in air and soil quality. However, some respondents had already started noticing similar changes. For instance, around 3% of respondents across four states strongly reported observing changes in air quality after the plantation. Across the four states, around 5% agreed and observed changes in the soil quality. The respondents further mentioned during qualitative interaction that *"afforestation is one of the best ways to reduce the environmental pollutions such as air pollution, water pollution, soil pollution, etc. They act positively in reducing soil erosion, increasing its fertility and help soil obtain moisture."* But, since these plants are still at a very nascent stage, respondents have not noticed visible changes yet. However, they positively stated that over the years, they strongly believe that these changes will be observed more prominently.

Carbon reduction: The study team observed a total of 121,100 trees on field. During the interaction with members from Grow Trees and based on calculations done by the
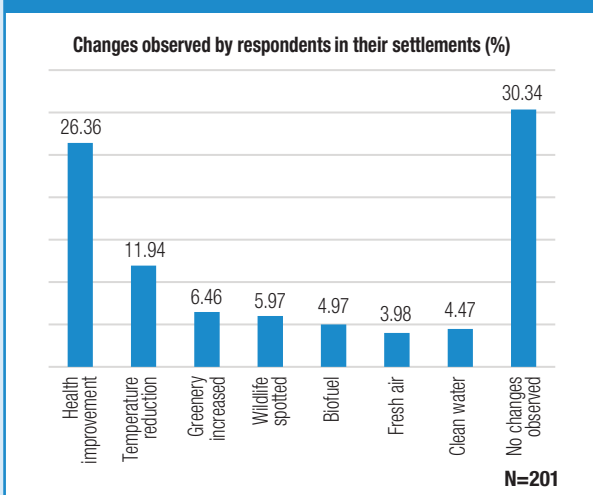
TABLE 5.1: CARBON SEQUESTRATION FROM PROPOSED AND VERIFIED TREES IN ALL FOUR STATES

State	Number of proposed trees	Total surviving trees	CO_2 sequestration of proposed trees (from sampled locations) in kg	CO_2 sequestration of verified trees in kg
Punjab	25000	18711.65	5,00,000	3,74,233
Odisha	250000	213461.5	50,00,000	42,69,231
Madhya Pradesh	150000	93945.72	30,00,000	18,78,914
Uttarakhand	120000	79245.28	24,00,000	15,84,906
Total			1,09,00,000	81,07,284

These figures are indicative and have been calculated by using an average of 20Kg of CO_2 sequestration per tree per year

study team through secondary sources, it was noted that one tree on an average could absorb 20kg of CO_2. Therefore, from the sampled and observed trees, it was found that across the four states, the trees could absorb around 2,400 tonnes of CO_2 annually leading to a reduction in CO_2 from the environment. Since, around 26% of respondents also reported that currently they have observed improvements in health after the plantation of trees. They mentioned that this was lively due to plantation's contribution to overall increase in greenery and fresh air and reduced pollution in their community. Below is a table representing the carbon sequestration potential of plantations for the entire state (tree population in states were derived through extrapolation from survival rate of sampled trees)

TTC expects that when plantations would reach maturity, between the next 10 to 15 years, the trees verified from these four states could sequester around 81,07,284 Kg of CO_2. If the survival rate from these sampled locations is extrapolated to the overall project, the plantations can be expected to sequester around *15 million Kg of CO_2 against the proposed 20 million Kg.*

Furthermore, during the qualitative interactions, the respondents also spoke about any future anticipated environmental benefits they could perceive based upon this project. They spoke about how there might be a consistent rainfall pattern in future if the green cover increases.

5.3 Social and Economic Impact

High community engagement: The project ensured that there is a high level of community engagement and participation during the plantation activity across all states except Odisha wherein forest officials were engaged to implement the project on the ground. The high level of community participation ensured sustainability of the project on ground since all the respondents across Moga, Harda and Nainital mentioned that through this project, they have started taking ownership of the plantation sites around them. They have also started participating in the maintenance and upkeep of these plantation sites. A respondent from Nainital also mentioned that due to this, they feel responsible for the health and status of these trees in the forest. The study team also noticed a lower mortality rate of trees in these locations since the community members mentioned that they took an active role in replanting wherever needed. But in most cases, such as in Puri, the mortality rate of trees could be attributed to harsh weather conditions and other calamities.

Involvement of EWS and Women beneficiaries: The study team observed that beneficiary selection was made based upon the need of these community members. The project successfully targets the EWS workers and women to uplift the economically and socially marginalized group. These vulnerable groups were favored to enhance their livelihood income. Women beneficiaries, especially in Nainital mentioned how earning a livelihood has enabled them to become confident, break gender barriers in their community and take up leadership roles.

Therefore, it was noted that 48% of members were employed in plantation activities such as nursery bedding, sapling transfer and sapling plantation, and maintenance through the project across the four states. The highest employment was generated in Uttarakhand, as shown in graph below.

FIGURE 5.2: EMPLOYMENT GENERATED DUE TO PLANTATION

Employment Generated

N=201
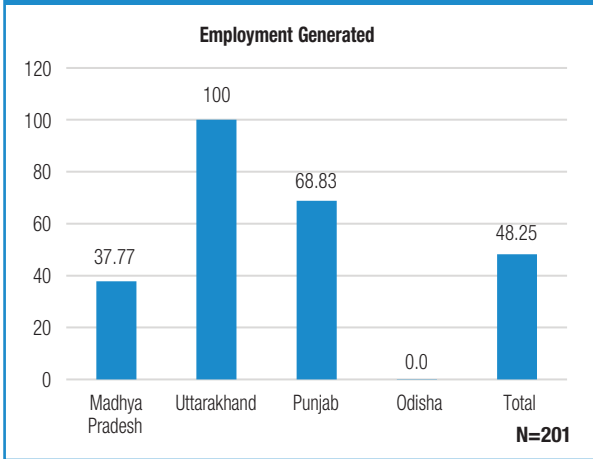
While it was also observed that there was no employment generated in Odisha among the community members since local members were not involved in the plantation process.

To enhance the livelihood options for the community, certain tree species were planted and selected based upon a detailed discussion with the local resource people. For example, in case of Moga, in Punjab, fruit bearing trees such as Guava were planted and in Harda, trees such as Teak, Bamboo and Mango were grown in the location. The community members strongly stated that upon maturation of these trees in the long term and selling the produce, there will be an enhancement in their livelihood and income over the years.

In all the states, the respondents noted that project provided them succour during the COVID-19 pandemic when most livelihood and income generating activities were suspended, and they were under severe economic duress.

5.4 Governance

Across four locations, a strong community centric governance structure was implemented which led to effective community ownership and recall. In all the locations, involvement of local community members or relevant officials was ensured to understand the local context, soil texture, and need of the community. Relationships were built with PRI/van panchayat members and forest department officials to ensure a smooth dissemination of project activities. The project resulted in establishing governance structures where PRIs and van Panchayat are managing the plantations on their own. They have allocated resources for monitoring the plantation. This

has been a perceptible change brought in by the project. These local governing bodies will also become responsible for distributing the benefits among the community members.

**The impact of project activities in each of the states has also been presented below.**

Environmental Impact (State wise highlights)

Moga

In case of Moga, as per the project's mandate, the plantations were proposed to sequester 500,000 kg of carbon annually. These plantations were also aimed at improving soil health, conserving water, biodiversity, and other natural resources.

The observed changes in the settlements as per respondents included improvement in air quality, increased greenery and some reported that new bird species were also sighted around the plantations. Nearly 70% of respondents observed that the plantation in their settlement has resulted in cleaner, fresher air. This is likely a result of reduced carbon dioxide in the atmosphere. Since the plantation is still in its nascent phase, the amount of carbon it is absorbing will continue to increase as it reaches maturity. When the carbon absorption potential of the plantation reaches its maximum, changes such as reduced temperature, increased frequency of precipitation and consistency and increased soil fertility could also be observed. Respondents also remarked about the sighting of new bird species in the area which is indicative of the biodiversity restoration that the plantation resulted in.

The study team expects that the plantations in the two sampled villages can sequester around 374,233 Kg of carbon dioxide

FIGURE 5.3: OBSERVED CHANGES DUE TO PLANTATION IN MOGA

Changes observed in the settlements (%)

N=77
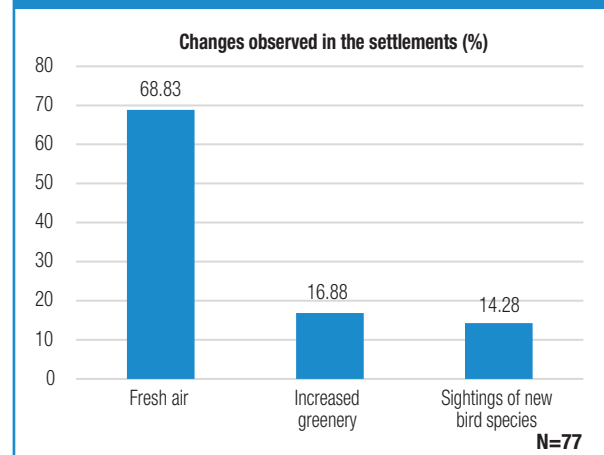
annually based upon the observations of tree species on the field and findings from interactions with the community about replantation and regular maintenance of these trees. During survey and interactions with the communities, the study team observed that all respondents knew how the plantation drive in Moga could restore precipitation cycles of the region and further restore the water table and nearby watersheds since, currently, only 14% of the respondents are irrigating their agricultural land through rainfed method due to reduced and inconsistent precipitation patterns over the last years.

However, it should be noted that since most trees were planted along roadsides as opposed to dedicated plantation sites, roots of the trees may not be able to fully develop as they would under optimal circumstances, reducing their capacity to absorb carbon dioxide.

Harda

In case of Harda, Madhya Pradesh, the plantation drive aimed at reducing soil erosion, recharging ground water of the region, rejuvenating river flow and absorb carbon dioxide from the atmosphere.

Of the total 45 respondents, about 88% noticed environmental changes in the areas surrounding plantations including reduced temperatures, fresher air, and improved soil quality. About 34% of respondents reported that the plantation efforts resulted in fresher and cleaner air while 23% reported that average temperatures in the region had reduced. Teak and bamboo were the most planted trees in the plantations of Harda, both of which have a high carbon absorption rate. Teak has one of the highest carbon sequestration potentials amongst tree species

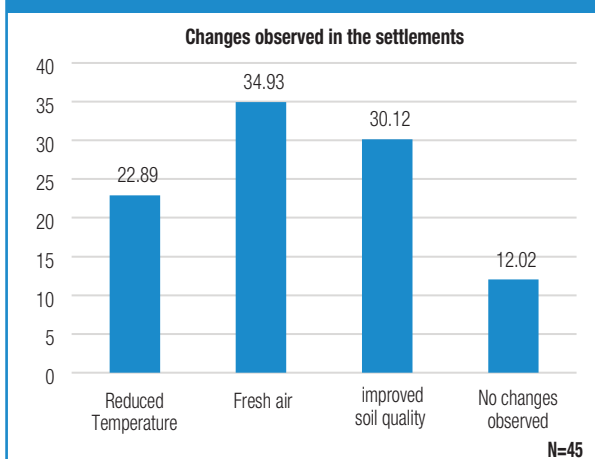in India and could contribute significantly to carbon reduction in the region.

The project's aim in Madhya Pradesh was also to reduce soil erosion in the region. About 30% of respondents reported positive changes to the soil quality with respect to water retention and overall fertility of the soil to the study team. Through survey and interactions with the communities, *89% of respondents expect that the plantations will lead to increased and consistent precipitation patterns in the coming years which could recharge ground water reserves and increase soil moisture retention.* 8,000 Bamboo trees were proposed to be planted in the sampled communities of Harda, which could play an important role in water conservation. Bamboo trees have deep roots which can access water from deep within the soil allowing it to survive with little rainfall or irrigation. Moreover, Bamboo trees are natural water filters which absorb pollutants and purify water from nearby resources such as rivers or watersheds.

The plantation drive in Harda also aimed at rejuvenating river flow and groundwater recharge. However, since plantations were done on inland private farms, and not near the Narmada River or its tributaries as the project mandated, the plantations could not impact riverside areas.
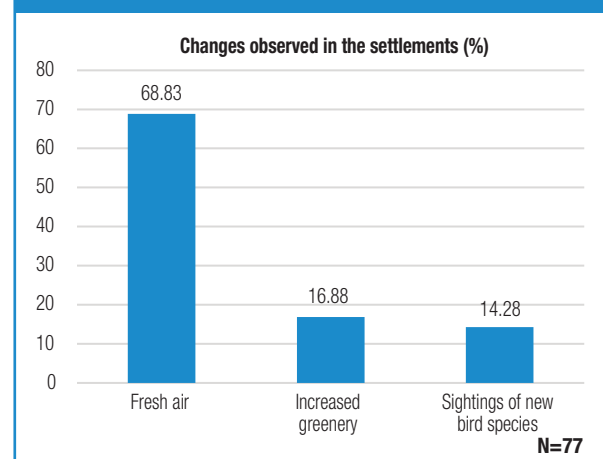
Puri

In the case of Puri, nearly 70% of respondents noticed environmental changes in the region over the past two years since the plantation drive began. These changes include reduced temperatures and increased sightings of spotted deer and other endemic wildlife.

FIGURE 5.4: OBSERVED CHANGES DUE TO PLANTATION IN HARDA

Changes observed in the settlements

Reduced Temperature 22.89, Fresh air 34.93, improved soil quality 30.12, No changes observed 12.02. N=45

FIGURE 5.5: OBSERVED CHANGES DUE TO PLANTATION IN PURI

Changes observed in the settlements (%)

Fresh air 68.83, Increased greenery 16.88, Sightings of new bird species 14.28. N=77

Since the plantation in Puri contained one large parcel of land, the surrounding region would observe reduced temperatures almost immediately. Therefore, 46.15% of respondents observed reduced temperatures due to plantation. As mentioned in other locations as well, the respondents further highlighted that they are expecting a further reduction in overall temperature as the plantation reaches its maturity. 23.06% of respondents also noticed an increased presence of wildlife around the plantation, with 17.3% of respondents seeing spotted deer.

> During interview with a women respondent (community member), it was mentioned to study team that "since the Fani cyclone devastated the local wildlife's natural habitat, the plantation has already started to restore the surrounding area."

It is necessary to note that 30.76% of respondents did not observe any environmental changes to the surrounding area. Since the plantation is still in its nascent phase and it will take some years for the trees in the plantation to grow, therefore, changes in the surrounding environment will become more noticeable over the next few years.

Disaster risk mitigation: Puri being a disaster-prone area, a significant portion of respondents were aware of the forest's ability to act as a wind barrier for cyclonic storms. They also commented on the plantation's ability to improve soil fertility in and around the plantation.

Nainital

Under the project's mandate for Nainital, the plantation drive was an afforestation effort aimed at mitigating forest degradation, absorbing carbon from the atmosphere and safeguarding the region's biodiversity. Since the trees under this project in Nainital are still underdeveloped compared to other locations, there have been little to no visible environmental changes around the plantation. Thus, the environmental impact presented in the section below are changes that respondent envisioned in the future owing to the plantation drive.

Habitat and forest restoration: Trees under this project were planted in areas of the forest where there were visible gaps in the undergrowth and canopy cover. All the respondents mentioned that this plantation drive would rehabilitate native biodiversity by restoring this forest area.

Cleaner and fresher air: Banj, Oak and Padam trees have high carbon absorption rates. Currently, the respondents mentioned that they are highly positive that plantation of these trees will bring cleaner and fresher air to their community.

Social Impact (State wise highlight)

Moga

Since community engagement and participation was an integral facet of the project in Moga, the plantation activity provided a channel for workers to be employed through the MGNREGA and presented an opportunity for the community to come together and be engaged in the project that would uplift their settlement and quality of life. The project impacted the most vulnerable group of the population i.e., EWS community members targeting most of the women population. The detailed social impact is mentioned below.

Upliftment of vulnerable groups: The interviews with Jan Manthan, PRIs and respondents, established that as per the project's mandate, direct beneficiaries from vulnerable demographic groups were included. Specifically, women and EWS community members were favored for livelihood gain from activities of the plantation. The project also encouraged elderly members of the community to be engaged through the plantation activities.

- Out of a total 77 respondents, 68.89% were EWS workers employed under the MGNREGA.
- Out of a total 53 MGNREGA respondents, 86.79% were women. As a result of this plantation effort, many women have taken the responsibility of maintenance and upkeep of the plantations.
- Nearly 20% of respondents for the project were above the age of 50 years, some elderly members enthusiastically participated in the plantation.

Improved predestination in the village: The respondents mentioned that these trees planted along village connector roads will create a canopy cover for them, providing shade for pedestrians to commute between villages in the region.

Conflict Resolution: One plantation site in Moga was developed in a conflict area between neighboring villages. The plantation provided mutual benefit to both communities and subsequently benefited the members in bridging the social tensions amongst them.

PLANTATION BRINGS COMMUNITIES TOGETHER

Charan Singh (name changed) is a 71-year-old man who resides in Dhalla Ke village. Being a village elder, he has helped in selecting the sites for plantation and the species of trees to planted and even attended the plantation sites daily to guide people working on the field. Born and brought up there, he had interesting stories to share about the village. One of the stories shared by him painted benefits of the plantation in new colours. He shared that the plantation has been done on disputed land. Some years ago, a conflict rose about ownership of a piece of land amongst Dhalla ke and a neighbouring village. Many people were killed, from both the villages. That parcel of land has been left barren and unused ever since, as both the villages were sensitive about owning it. Now, however, trees have been planted there and they are healthy and will be fruit bearing in the coming few years. Both the villages have come to a consensus and planted the trees and agreed that though the environmental benefits will be shared by all, they will also share the economic benefits derived from the trees. Any one from any of the two villages can go and take fruits, flowers, leaves from the plantation site as per his/her own will. The plantation is a symbolic representation of peace between the two villages.

Community ownership: As community members were involved in the plantation activity, these members have formed groups for maintenance and upkeep of plantation sites. These common interest groups (CIGs) deliberate on future scope for intervention and adding more trees to the plantation sites to best benefit the community. Therefore, it was noted by the study team that the plantation drives also acted as a mode to bring members together and build their ownership.

Harda

Similarly, in the case of Harda, the plantation drives generated employment for community members and enhanced the livelihood of land owners through plantation of timber and fruit bearing trees. A focus on **upliftment of vulnerable groups was also ensured in this location as well.** Out of a total of 45 respondents in Harda, 38.11% were women and all beneficiaries selected for direct employment through the plantation activities were from the EWS sections of these communities as in case of Moga. For plantation activities, preference was given to women so that their participation in the project activities improved.

Puri

Unlike other regions, the plantation effort in Odisha took place in predominantly urban region. Also, the plantation drive in Odisha did not engage the local community for generating income or restoring livelihood of people in the surrounding areas. Considering these two factors, the study team observed little to no change regarding social impact during interaction with respondents.

In terms of social impact, the respondents, despite not being involved in the plantation process, mentioned about increase in awareness and knowledge on changes anticipated from the plantations' efforts to restore the forest. All the respondents knew that the forests acted as a temperature and precipitation regulator as well as reduced impact from cyclonic storms in the community by acting as a wind barrier. This increase in awareness was attributed to the effort made by the project in the community.

Nainital

Like Moga and Harda, the project in Nainital was centered around community engagement and ownership. It was observed that the project succeeded in creating a sense of responsibility amongst community members towards their region's development. Socially, the project was able to successfully achieve advancement and empowerment of underprivileged women. The respondents highlighted that the project has created a path for them to take on leadership roles in natural resource management. This project has also helped in breaking down gender barriers and promoting gender equality by empowering them to earn livelihood. All the women positively responded that they have noticed a shift in their sense of self confidence and capacities.

Similarly, a strong community ownership was observed wherein van panchayats and community members have begun to take an active role in monitoring the health of the plantation and discussing the next steps to ensure continuity of the project activities. The community now feels that they are responsible for the

TREES ARE PART OF THE COMMUNITY

Rani Devi (name changed) was a beneficiary of the plantation project in Uttarakhand. Rani feels that the trees she has planted are part of the community since they were planted and nursed in her home before being transferred. She says that she and some of other beneficiaries regularly visit the saplings planted in the forest to check on their progress and report changes back to the van panchayat. Rani appreciates this opportunity that was given to her and hopes that similar plantation drive is carried out in the future so that she can introduce more trees to their community.

status of the forest around them and the health of the trees planted.

Economic Impact (State wise highlights)

Moga

Direct earnings from plantations: Plantations in Moga generated *60 days of employment* for community members who participated in field preparation and sapling plantation activities. Workers were paid a sum of INR *282 per day* for each day of activity carried out.

Out of the 53 study MGNREGA respondents, a total sum of INR 896,760 was distributed amongst them since they were engaged in plantation activities between July-August 2021. While most respondents were not directly funded through the project, other community members volunteered to support plantation activities without direct monetary gain. Nearly *70% of study respondents were engaged through the MGNREGA* while around 30% of respondents volunteered to work on plantation activities.

Livelihood Enhancement: Through detailed observation, the study team confirmed that all trees planted for this

project present economic benefits. Fruit bearing trees like Guava, Amla and Sitafal will yield fruits to either to sell or provide sustenance. Timber trees like Sheesham and Keekar take between 15 – 22 years to reach maturity and can be cut and sold for timber in future. Neem can be used by the community for medical purposes. Many tree species planted offer accessory benefits such as Neem tree branches which can be used as an alternative mouthwash. Respondents of the study reported that they were aware of many of these benefits and that this would allow them to save money in future.

Increased farmable land: Through qualitative interactions, the study team learned that plantation sites have provided communities with farmable land where they have begun to grow produce such as cabbage, tomato and brinjal for sustenance and livelihood. It was also highlighted to the study team that community members planned to donate excess yield from these crops to the local Gurudwaras for community benefit.

COVID Pandemic Relief: The project was implemented during the peak of the second COVID wave. Agricultural

TREES AS SAVIOURS FOR MOGA

Lakshmi Kaur (name changed), is a mid-aged woman in Moga from Dhalla Ke village and works under MGNREGA. She has played an active role in the plantation drive and was an active participant in field preparation, sapling plantation and monitoring. She herself planted more than 500 trees in the area under the plantation drive and is delighted that planted trees are giving them free oxygen. She is part of most of the plantation activity and mentioned that pit digging was mostly carried out by the males in the village. She has not only enthusiastically participated in these activities but has also encouraged other members of the village by explaining the benefits of tree plantation to them. She also highlighted the fact that the plantation work opportunity came when the times were stressful and the entire country was affected due to covid pandemic, and since they were hand to mouth, there was a time when they had no money to eat. They were eating from Gurudwaras for free. The income from the plantation drive came as a relief to them. She said "The trees have been a blessing to our village and have brought good luck to us. They will provide us with benefits for a lifetime." She mentioned that more such projects should come to the village, and the villagers will do all the efforts to support such plantation drives.

workers across the country faced livelihood strain due to disruptions in the supply chain reducing agricultural product demand and lockdown protocols restricting their movement. Many respondents of the study (83.11% of respondents) noted that they were under financial stress during the second wave due to a shortage of work. Most respondents reported that employment generation through the plantation drive provided much needed financial aid and supported their livelihood during the project cycle.

Harda

Direct earnings from plantation: Similarly, plantations in Harda generated *60 days of employment* for community members who participated in field preparation and sapling plantation activities. Field workers were paid a sum of INR *200 per day* for each day of activity carried out and nursery workers were paid a total of INR *300 per day*.

Livelihood Enhancement: Only three species of trees were planted under this project in Harda i.e., Teak, Bamboo and Mango. It was observed that all three trees are highly economically beneficial trees. The respondents mentioned that a single mature teak tree can be sold for up to INR 400,000 for timber. Bamboo trees can grow very tall, very fast and with little investment from the farmer. Bamboo trees have medicinal value and can also be sold for timber. Mango trees can generate seasonal livelihood through yield of fruits. Therefore, it was noted that the selection of such species in the given location would be beneficial for the community in the future.

Puri

Plantation activity in Puri majorly focused on restoration of forest and did not involve the local community members in the entire process. Therefore, economic benefit to the community was not majorly observed in the given location.

Nainital

Direct earnings from plantations: Plantations in Nainital generated 60 days of employment for community members. Unlike other project locations, field workers were paid as per sapling planted. Respondents recalled inconsistent rates of renumeration received by them ranging from INR *7.5 per sapling planted to INR 8.5 per sapling* planted. This inconsistency in their recall of renumeration could be because of similar plantation drives in the area around them during similar timeline for which they were engaged.

Respondents also recalled a range of saplings planted over the duration of the project from *1,400 to 3,000 plants* during the project period. The respondents couldn't clearly recall which project they were part of.

Livelihood enhancement: Respondents mentioned that Amla trees that were planted in the region are a source of livelihood for them. Recent deforestation and forest degradation has impacted this facet of their livelihood, which can, in time, be restored due to this plantation drive. The study respondents suggested that plantation of trees such as amla will help in enhancing their livelihood income.

Governance (State wise highlights)

Moga, Punjab

In the case of Moga, a strong community centric governance structure was implemented which led to an effective community ownership and recall. The implementing partner had a very hands-on approach during project implementation. As mentioned before, since the representatives from Jan Manthan visited sites weekly and engaged with community members and beneficiaries to listen to feedback, they were able to regularly meet on any challenges which arose in field.

The relationship built with PRI members ensured that there was regular supervision of the day-to-day activities was also ensured and meet out challenges or constraints faced during plantation activities to Jan Manthan to streamline progress of the project. This led to an overall success of the project in Moga.

Since the ownership of the plantation was transferred to the Panchayat and they further assigned two dedicated community workers to maintain plantation sites and tend to the needs of planted trees, the members mentioned that such a move helped them to closely be in touch with project activities on ground. They further became aware of the processes of maintenance and upliftment of these plantations as they are aware of the benefits these plantations would bring to their settlement. Some community members have begun to think of future for the plantations and possibly additional plantation sites. All respondents were enthusiastic and hoping for another plantation drive such as this in the future. They also reported increased sensitivity towards ecological issues and a better understanding of conservation practices. This reflects a strong sense of ownership among both panchayat and the larger community.

Harda, Madhya Pradesh

Similarly, in the case of Harda, an active involvement of PRI members ensured appropriate selection of sites and species as per community needs and local situation. The direct beneficiaries of the project successfully carried out field preparation, pit digging, sapling plantation, irrigation, and overall monitoring. Presently, the community is managing the plantation.

It is important to note that landowners, upon whose land these plantation activities were carried out had a vested interest in the health of these plantations since teak and bamboo are highly coveted trees and mango is a seasonal livelihood enhancer. These landowners also mentioned that they went beyond the project mandate and employed workers in their fields to maintain the plantation's overall health. A similar impact was found in Harda wherein the community members have actively started taking ownership and pride of the plantation in their respective villages.

Puri, Odisha

In terms of impact at governance level, there was an increase in participation from all relevant stakeholders in the project such as officials from the region's forest department who were consulted through some of the key critical phases. The engagement of such stakeholders resulted in identifying an appropriate site for plantation and in identification of tree species to be planted under the plantation drive. In terms of impact at community and university level, the study team could note that there was minimal to no direct impact on community since the entire model in Puri did not involve the community members in the plantation activities.

Nainital, Uttarakhand

The project was able to successfully engage an experienced organization, CHIRAG, based out of Uttarakhand that has extensively worked on rural management and natural resource conservation, to effectively implement the project on the ground.

A strong involvement of community collectives was observed in Nainital wherein the CHIRAG team was able to efficiently coordinate between other stakeholder groups such as van Panchayat members to ensure community ownership and sustainability of the project. Since these members have an extensive knowledge about local ecology as well as the needs of the forests and communities, the project was able to strongly utilize their current understanding to provide for the need of the location. Similarly, as in case of Moga and Harda, a strong community involvement and ownership was observed due to involvement of beneficiaries in plantation efforts.

6

Conclusions and Recommendations
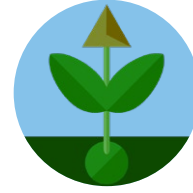
6.1 Conclusions

The findings of the study reveal that the project has significantly contributed to tree plantation efforts resulting in environmental and economic benefits in the intervention communities. The project has also created momentum around environment conservation and social cohesion by sensitizing communities on importance of tree plantation.

Environment protection: The plantation efforts in these states will undoubtedly have an impact on their surrounding environment. As the trees planted approach maturity over the next 10 to 15 years, their ecological role will start to become much more apparent especially in these aspects:

- **CO_2 Reduction:** Trees would play a very important role in reducing carbon dioxide from the atmosphere. They would do this by sequestering/ absorbing carbon dioxide and capturing carbon dioxide emissions (from household or industrial processes) before they reach the atmosphere. Many of the trees planted from this drive are larger trees that have a high carbon absorption rate, such as Teak, Sohanjana, Oak etc.
- **Water conservation:** As water is becoming increasingly scarce and our water resources are being polluted and depleted, plantation drives such as this can help to restore and preserve natural water sources. Trees help regulate temperatures and improve precipitation cycles, soil moisture retention rate and filter pollutants which contaminate ground water resources. They also help They can also slowly strengthen river and stream banks with their roots to enhance river flow and reduce flooding related risks.

- **Rejuvenation of soil:** Trees play a vital role in the preservation of soil; they reduce soil erosion and prevent runoff of nutrients and sediment in streams.
- **Biodiversity conservation:** Many tree species planted in the area are locally and ecologically relevant to the surroundings and can play a very critical role in restoring habitats of local biodiversity.

Livelihood enhancement: The **FDP** provided direct and indirect economic benefit to community members; providing direct employment, for 60 days between July and August of 2021, for members directly engaged in plantation activities. The plantation also served to diversify and enhance the community's overall livelihood profile, by providing alternate sources of income, produce for sustenance and improving soil quality for agriculture activities. Some other observations made by the study team are as follows:

- **Project Beneficiaries:** Apart from Odisha, where community members were not involved in the plantation process, every state contained more beneficiaries than originally proposed in the project mandate.
- **Diversification of livelihood through livelihood trees:** In all locations, expect Odisha, FDP provided economic benefit to the community. Tree species in Punjab provide fruits, timber, and medicinal products. Tree species in Madhya Pradesh provide timber and species in Uttarakhand strengthen local agroforestry products.
- **Financial support during COVID-19 pandemic:** Many respondents of the study reported that employment from the project greatly aided them during the economic downtime of the pandemic. Respondents from Punjab and Uttarakhand further reported that the

plantation would provide them with livelihood resilience against future such disruptions.

- **Upliftment of marginalized groups:** As per the project's mandate most beneficiaries were selected to uplift marginalized groups such as women and EWS members. In project locations like Punjab and Uttarakhand, project beneficiaries were selected to uplift intersecting vulnerable groups as well.

Governance: Most project locations had a highly community driven model, either involving the community in the planning process, or generating awareness amongst the community about environment protection. In Punjab, Madhya Pradesh and Uttarakhand, training and orientations were conducted with community members to ensure that they were aware and on board with plantation activities. Many community members were also trained in maintaining nurseries and monitoring and maintenance.

Ownership of plantations was transferred in all project locations. Plantations in Punjab and Madhya Pradesh were transferred to the PRIs, in Uttarakhand, ownership was transferred to the Van Panchayat and in Odisha, ownership was transferred to the Forest Department.

6.2 Recommendations

In line with the study finding following recommendations are being mooted strengthen project design, implementation and scale up in subsequent phases or its replication in other areas.

Maximize income generation potential through direct community involvement in all plantation processes

In Punjab and Harda, nursery activities were outsourced to a local vendor. Likewise, in Odisha an NGO located in another district of Odisha took on the mantle of the entire plantation process, while this may have ensured professionality in handling of plantation process, it reduced the amount of employment that could be generated through the project in the intervention locations. TTC recommends that training sessions could be conducted in the future with community members to take the onus of entire plantation process with technical guidance and handholding from the implementing partner. Thus, ensuring as much economic benefit to community members as possible. This would also ensure twin benefits increase community ownership of the project

and building capacity and motivation of communities in plantation and environment conservation efforts of similar nature and

Thrust on community involvement in all project locations

Given state specific context and nature of plantations, FDP followed different implementation models and processes. The pliable and evolving nature of the project was one of its unique characteristics and significantly contributed to project impact in terms of successful plantation efforts in different intervention locations. However, the project implementation in Punjab, Harda and Uttarakhand was highly community centric but the plantation drive in Odisha did not involve the community at all. It is plausible that intensive community involvement as direct beneficiaries in the project is not feasible in all locations. However, nearby communities can still play a crucial role in maintenance and protection of the plantations. To leverage community involvement even where project model isn't community driven, TTC recommends that the community members living in and around the plantations should be made aware of the project, its activities, and benefits. This should be done to ensure that the project is relevant to the community, and, in the future, there may be scope to involve local communities specifically during expansion and scale up.

Tree species selection must promote both environmental and livelihood benefits

An integral impact of the project is livelihood generation from planted trees. All tree species observed from target locations were found to be relevant to the local community and ecology. However, in Madhya Pradesh, only timber trees were selected to be planted, which may not be sustainable in terms of contributing to the environment, considering the trees would be cut down in 12 to 15 years to reap economic benefits. TTC recommends that a more diverse range of tree species should be planted to ensure plantation survivability, environment protection and ultimately sustainability.

Establishing stronger monitoring mechanisms

Apart from Punjab and Odisha, where a monitoring plan was laid out, no other location had a monitoring mechanism in place. Adequate monitoring is important not just to ensure survivability but also to warrant that the plantation benefits are distributed among community members in a

transparent and equitable manner. The nature of monitoring mechanisms could vary depending upon the nature of the project model. However, it should be an integral part of the project design. TTC recommends that wherever possible a monitoring plan must be made in consultation with PRIs or community representatives during the initial phases of project to ensure maximum survivability of the plantation. Adequate monitoring could also ensure higher survivability and thereby reducing time and resources expended on replantation. Further, community driven plantation mechanisms ensure their higher involvement and ownership.

In states where community driven models were not implemented such as Odisha, implementing partner in consultation with Forest Department could have worked with communities to create community volunteers from communities in the vicinity to monitor the plantations.

Record keeping of plantations for adequate monitoring

Documentation of nursery bedding, field preparation, beneficiary selection, sapling plantation, monitoring and maintenance were not maintained across all four states.

Because of this, The study team faced challenges in collection and collation of data and it is expected that the project team faced similar such issues that could cause many facets of the project to perform sub-optimally. For example, if records of sapling plantation and replantation were maintained, supervisors or community members could diagnose the reason for higher mortality and attempt to address the problem. Similarly, factors that facilitate the project could also be identified and could be replicated. TTC recommends that records of activities must be maintained diligently by implementing partners and community representatives in terms of plantation sites, no of saplings planted, monitoring visits conducted, mortality and its reasons, replantation rates and ultimate survivability.

Donor Visibility

The study team did not observe any signages or fencing around plantation sites in any of the locations. It is important to ensure visibility of the donor at the plantation site for several reasons, including recollection of project species, evaluation of impact and community awareness of the project and its benefits. For this reason, TTC recommends that signages detailing the project be put up around plantation sites.