IMPACT ASSESSMENT REPORT FOR TREE PLANTATION PROJECT, CHHATARPUR

September 2026

Pernod Ricard India Private Limited

Price Waterhouse Chartered Accountants LLP

Table of Contents

Notice to Reader 3
List of Figures 5
1. Executive Summary 6
1. About PRIPL 9
2. About the project 9
3. Method of Impact Assessment 11
3.1. Sampling plan 12
3.2. Assumptions and Limitations 13
3.3. Need for the intervention 14
3.4. Impact of the intervention 14
4. IRECS Analysis 21
5. Recommendations 23
6. Study Limitations 24
7. Case Story 24

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- Our work was limited to the specific samples/ procedures described in this report and were based only on the information and analysis of the data obtained through interviews of beneficiaries supported under the project, selected as sample respondents. Accordingly, changes in circumstances/ samples/ procedures or information available after the review could affect the findings outlined in this report.

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List of acronyms

CSR	Corporate Social Responsibility
FGD	Focus Group Discussions
IDI	In-depth Interviews
IRECS	Inclusiveness, Relevance, Effectiveness, Convergence, and Sustainability
KPI	Key Performance Indicators
PRIF	Pernod Ricard India Foundation
PRIPL	Pernod Ricard India Private Limited
PWCALLP	Price Waterhouse Chartered Accountants LLP
VDC	Village Development Committee
CRP	Community Resource Person
PRI	Panchayati Raj Institution
NMPM	Natural Manure and Pest Management
UN	United Nations

List of Figures

Figure 1: Key focus areas of PRIPL under the CSR vision 2030 ..... **Error! Bookmark not defined.**
Figure 2: Snapshot of the project under assessment 10
Figure 3: Borewell constructed at Malgose Aashram 15
Figure 4: Solar based water system installation at the Navalganj plantation site at a government primary school 16
Figure 5: Timber tree plantation 18
Figure 6: Intercropping at an individual farmer's land 18
Figure 7: Fencing done by a farmer 18
Figure 8: NMPM Unit at a farmer's house 19

1. Executive Summary

Pernod Ricard India Private Limited (PRIPL), through Pernod Ricard India Foundation (PRIF) and with support from its implementing partner Haritika, implemented the Tree Plantation Project in Chhatarpur district of Madhya Pradesh as part of its CSR commitment to promote sustainable development and strengthen the livelihoods of marginalised rural and tribal farming households. The project focused on sustainable natural resource management, ecosystem restoration, water conservation, and promotion of climate-resilient livelihoods through agroforestry and community-based interventions. Key initiatives included creation of water conservation infrastructure, preparation of village-level natural resource management plans through participatory processes, plantation of fruit and timber species on identified community lands, protection of plantation areas, and establishment of community-based natural manure and pest management centres to encourage sustainable agricultural practices.

PRIPL engaged Price Waterhouse Chartered Accountants LLP (PWCALLP / PW) to carry out the impact assessment of the project interventions implemented during June 2022 to March 2023. PW adopted a qualitative approach to assess the outputs, outcomes and emerging impact of the project. The assessment included Focus Group Discussions (FGDs) and In-Depth Interviews (IDIs) with key stakeholders such as farmers, women beneficiaries, Village Development Committee (VDC) representatives, Community Resource Persons (CRPs), Panchayati Raj Institution members, government officials, the implementing partner, and the PRIPL team. In total, 9 qualitative interactions were conducted. Findings were analysed using the IRECS framework (Inclusiveness, Relevance, Effectiveness, Convergence, Sustainability).

The project details and the approach adopted for carrying out the impact assessment are illustrated below:

Implementing partner
Haritika

Project period
FY 22-24

Research method
Qualitative method

Project budget
INR 1.04 Cr

Sample size
9 key qualitative stakeholder interactions

Research framework
IRECS

Key findings from the impact assessment study:

1. Enhanced water security and accessibility due to the water infrastructure provided

- The project addressed long-standing water scarcity in the Chhatarpur region through creation of water conservation and recharge infrastructure such as a large pond, borewells, gabion structures, dohas and check dam-type interventions, which improved groundwater recharge and water availability for local communities.
- Water availability improved due to these interventions, with stakeholders reporting a rise in groundwater levels, including an increase of around 0.8 metres near the Vijaypura pond. This helped make borewells a more reliable source of irrigation during dry periods.
- Improved water access enabled cultivation beyond the monsoon season. Around 200-250 farmers who had earlier left their lands fallow after Kharif began cultivating in the Rabi season as well, reflecting a shift towards more stable multi-season agriculture.

- The large pond emerged as a key community asset by providing dependable water storage for irrigation and household use. Women beneficiaries reported a reduction in the time and effort required to fetch water, which eased domestic burdens and supported better care for families, livestock and kitchen gardens.
- Gabion structures and drainage treatments contributed to soil and water conservation by reducing runoff, preventing erosion and improving moisture retention in the semi-arid project area.
- Community involvement in the creation and maintenance of water structures strengthened local ownership and supported the long-term sustainability of these interventions.

Changes in Agricultural Productivity and Crop Yields Through Sustainable Practices

- The project promoted agroforestry as a pathway for livelihood diversification and environmental restoration by supporting plantation of fruit and timber saplings such as mango, guava, kinnow, lemon and teak on identified lands.
- Plantation activities were supported through fencing, neem oil cake application and community-led protection measures, which contributed to a reported sapling survival rate of around 95%, with only about 5% losses mainly due to grazing and water stress.
- Improved irrigation access enabled farmers to cultivate beyond the monsoon season, with around 200-250 farmers shifting from single-season cultivation to cultivation in the Rabi season as well, resulting in improved agricultural productivity.
- Farmers reported improvements in crop production and modest increases in income due to better irrigation support, plantation activities and adoption of sustainable agriculture practices. Kharif production was reported to have increased by approximately 20 quintals per acre, while some farmers reported income gains of around ₹20,000-30,000.
- Agroforestry also generated household-level benefits, as fruit trees supported home consumption and reduced market dependence, while teak was viewed as a low-maintenance long-term asset with future income potential.
- Soil health improvements were observed through intercropping, application of organic inputs and reduced grazing pressure, which together supported better moisture retention, reduced erosion and improved land productivity.
- Capacity-building efforts helped farmers adopt improved agricultural practices, including sapling plantation, spacing, vermicompost preparation and plant protection measures.

Natural Manure and Pest Management (NMPM) implementation at the village level

- The project established community-based Natural Manure and Pest Management (NMPM) units to promote zero-budget natural farming and reduce dependence on chemical inputs. These units were designed to serve as shared village-level facilities for preparation of natural agricultural inputs.
- Farmers were trained to prepare and use natural formulations such as Jeevamrit, Ghanjeevamrit, Beejamrit and Nimastra. These bio-inputs supported soil enrichment, seed treatment and natural pest control while lowering cultivation costs and reducing environmental harm.
- Jeevamrit was applied at crop-specific intervals, reportedly 3 times for wheat, 2 times for gram and 1 time for mustard, helping improve soil quality and nutrient availability.
- The NMPM intervention encouraged gradual adoption of sustainable farming practices, with farmers initially testing natural inputs on small plots before scaling up usage, helping build confidence and improve acceptance of bio-input-based farming methods.

- Community access to NMPM units improved local availability of natural agricultural inputs. Farmers highlighted that the units helped save money, reduced dependence on purchased chemical inputs and provided a shared facility that could be accessed by the wider farming community.
- The intervention demonstrated potential to improve long-term agricultural resilience. Village-level stakeholders observed that regular use of natural inputs contributed to better soil condition, improved water retention and greater crop resilience under drought-prone conditions.

Recommendations:

- Strengthen farmer groups, FPCs, SHGs and VDCs to support collective marketing, livelihood planning and better market access. Introduce short- and medium-term income opportunities such as lac cultivation, beekeeping and fruit processing to support farmers during the gestation period of agroforestry.
- Develop a structured post-plantation care system with species-wise aftercare calendars covering watering, mulching, weeding, pruning, manure application and pest checks. Build local responsibility through CRPs or community institutions to ensure continued monitoring and maintenance after project support ends.
- Adopt technology-enabled monitoring through geo-tagging of saplings, GPS coordinates and mobile-based tools to track plantation survival, growth and health, and to enable timely corrective action.

Comprehensive analyses, detailed findings & observations, recommendations, and testimonials are presented in the subsequent sections of this report.

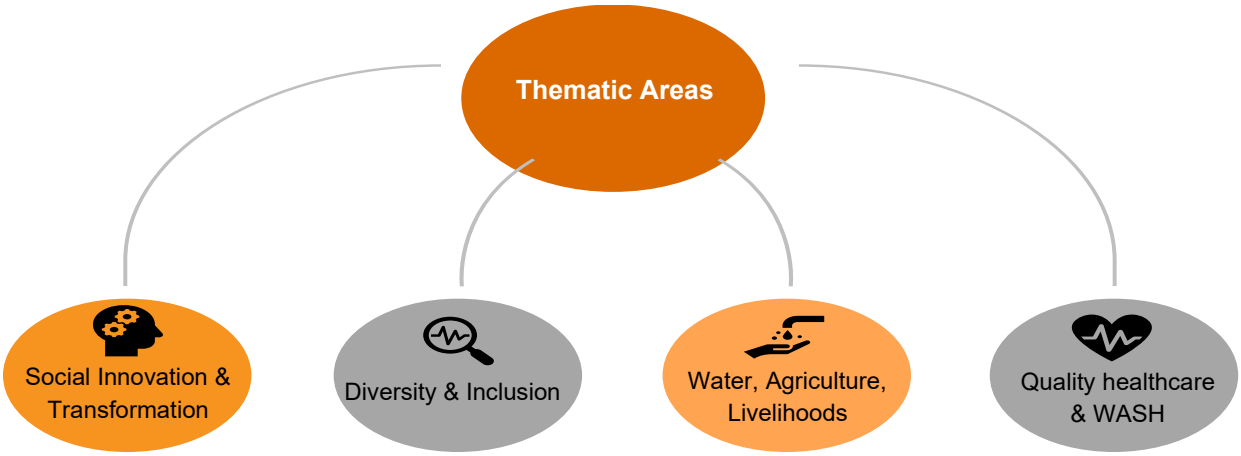
1. About PRIPL

Pernod Ricard India Private Limited (PRIPL) is a multinational alcoholic beverage company and a wholly owned subsidiary of Pernod Ricard South Asia. With a legacy spanning over 30 years in India, PRIPL operates a distillery in Nashik along with 24 production sites across the country.

Committed to responsible business practices, PRIPL actively participates in community development through its Corporate Social Responsibility (CSR) initiatives. These efforts are guided by PRIPL's CSR Policy, focusing on sustainable development and addressing the needs of marginalized and disadvantaged communities within its operational areas in India.

The company's CSR activities are led by Pernod Ricard India Foundation (PRIF), a Section 8 Company and a wholly owned subsidiary of PRIPL. PRIF is dedicated to fostering transformational growth and development in its key program areas. PRIPL collaborates closely with various stakeholders, including government agencies and local communities, to implement impactful CSR initiatives. Through continuous community engagement, PRIPL aims to promote local development, empower communities, and create inclusive opportunities for prosperity. Through its 285 programmes, covering 22 states and 1,600 villages PRIF has reached out to 4.1 million beneficiaries pan India[1].

Figure 1: Key thematic areas



2. About the project

The Tree Plantation Project in Chhatarpur district, Madhya Pradesh, was implemented to enhance livelihoods and strengthen farming communities among marginalised rural and tribal households. The initiative promoted sustainable natural resource management, ecosystem restoration, and water conservation infrastructure, while advancing agroforestry practices and empowering communities to manage non-timber forest produce.

[1] Source: Project Documents shared by PRIPL and the Implementing Partner

The initiative targeted 1,130 farming households and strengthened economic resilience by promoting the equitable and sustainable use of natural resources, rooted in indigenous knowledge. It supported enhancement of household incomes through agroforestry-based practices, ensuring both livelihood security and environmental sustainability.

Table 1: Key activities carried out under this project

Sr. No.	Key project activity as per the MoU
1.	Construction of 3 small check dams/borewells/pumps was planned. Instead, a large pond with a capacity of 2 billion liters was constructed in Vijayapura.
2.	15 doha/gabion structures were built.
3.	Conducted 5 Participatory Rural Appraisal (PRA) in selected villages
4.	Developed 5 Integrated Natural Resource Management (INRM) plans for the selected villages.
5.	Planned to dig 45,000 planting holes with neem oil cake applied in each. However, after identifying suitable community lands, 80,552 saplings were planted.
6.	Fencing was carried out across 30 acres of the plot to be carried out
7.	Under the agroforestry model, 45,000 saplings were to be planted, including fruit trees and timber species such as Shagon, Shisham, Khair, Amaltas, Kachnar, Mango, Guava, and Kinno. In practice, 80,552 saplings were planted following the identification of feasible community lands.
8.	Established 10 Community Natural Manure and Pest Management (NMPM) Production Centres.

Figure 2: Snapshot of the project under assessment

Project Objective

To strengthen rural-tribal livelihoods and resilience by conserving ecosystems, enhancing forest-based incomes, and mitigating climate change through sustainable, community-led natural resource management

Project Coverage

1,130 Household farmers

Total CSR Outlay

INR 0.82 Cr.



Project Locations

Chhatarpur, Madhya Pradesh

Project Timeline

June 2022 – March 2023

Implementing Partner

Haritika

3. Method of Impact Assessment

PRIPL engaged Price Waterhouse Chartered Accountants LLP (PWCALLP) to carry out the impact assessment of the project with a purpose to evaluate the impact created during the project period of June 2022 to March 2023. The scope of work included reviewing the Key performance indicators (KPIs) as defined by the Management of the PRIPL under the framework for implementing the Project for the outputs, outcomes and impact of the Project. Framework adopted was Inclusiveness, Relevance, Effectiveness, Convergence, and Sustainability Framework (the 'IRECS') and recommendations were provided on the Project's performance for their further evaluation and consideration.

The assessment was undertaken using qualitative methods to understand the interventions undertaken under the CSR project in mutual discussion with PRIPL. The overall methodology adopted for conducting the impact assessment study is categorized into four stages as illustrated below:

Stage 1: Desk review

- Inception meeting was done with the PRIPL team and the Implementing Partner (IP) to get a detailed understanding of the interventions.
- Built consensus on scope of work and understanding PRIPL expectations.
- Desk review of project documents (e.g. Project Agreement, Baseline Study, Program and Kick-off Document) was done.
- Based on the desk review and preliminary interactions with key stakeholders from PRIPL, mapping of project stakeholders was done in consultation with PRIPL team for interaction purpose.

Stage 2: Planning and tool preparation

- The data collection plan was finalised in consultation with the PRIPL team.
- Key indicators, research tools were shared and finalised post incorporation of feedback from PRIPL team.
- Digitisation and translation of the developed tools in local language (Hindi) was undertaken.
- PRIPL team was then apprised about the data collection plan for the field visit.

Stage 3: Data collection & field visit

- The field team was trained on the data collection tools.
- The implementing partner (IP) mobilized stakeholders on the field.
- The field data collection process was initiated.
- In-depth Interviews (IDIs) with Village Development Committee Representative (VDC), Community Resource Person (CRP), Panchayati Raj Institution Member), Government Official (Block Officer) and PRIPL Team were conducted. Focus Group Discussion (FGD) with students were undertaken to gauge their views on the project.

Stage 4: Data analysis and report writing

- Assimilated the key findings to better analyse the data.
- Prepared the draft of the impact assessment report to PRIPL team.
- Obtained and incorporated feedback received from PRIPL.
- Prepared and submitted final impact assessment report to PRIPL.

3.1. Sampling plan

The project's impact was evaluated using a qualitative methodology to gain in-depth insights. This approach enabled a nuanced exploration of individual experiences and stakeholder perspectives. Key stakeholders crucial to the assessment were identified, and tailored data collection tools were developed for each group to ensure relevant information gathering. As part of this qualitative assessment, In-Depth Interviews (IDIs) and Focus Group Discussions (FGDs) were conducted to obtain holistic feedback on the project activities from stakeholders:

Table 2: Qualitative sampling plan

Stakeholder Name	Mode of interaction	No. of interactions
Farmers	FGD	1
Women beneficiaries	FGD	1
Village Development Committee (VDC) Representative	IDI	1
Community Resource Person (CRP)	IDI	1
Panchayati Raj Institution Member	IDI	1
Government Official	IDI	1
Panchayati Raj Member	IDI	1
Haritika Team Member	IDI	1
PRIPL Team	IDI	1
Total		**9**

The implementation partner was unable to fully mobilise farmers and women beneficiaries in the Chhatarpur region, which restricted the planned outreach. As a result, engagement was limited to a smaller pool of direct stakeholders during the field visit.

3.2. Assumptions and Limitations

General:

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Pertaining to this report:

- The report prepared by the PWCALLP is based upon the (a) information/ documents provided by PRIPL and its implementation partner and (b) data collected during the field visit to the project location by the PWCALLP team. PWCALLP performed and prepared the Information at the client's direction and exclusively for the client's sole benefit and use pursuant to its client agreement. Our report is based on the completeness and accuracy of the above-stated facts and assumptions, which if not entirely complete or accurate, should be communicated to us immediately, as the inaccuracy or incompleteness could have a material impact on our conclusions.
- PWCALLP's work was limited to the samples/ specific procedures described in this report and were based only on the information and analysis of the data obtained through interviews of beneficiaries supported under the project, selected as respondents. Accordingly, changes in circumstances/samples/ procedures or information available could affect the findings outlined in this report.

3.3. Need for the intervention

Qualitative discussions with farmers and other stakeholders, coupled with the baseline findings shared by the implementing partner, have revealed the following insights faced at the project location:

- **Water Security Challenges:**

  The Bundelkhand region in Chhatarpur district, has long been marked by acute water scarcity. **Erratic rainfall patterns, limited surface water resources, and depleted groundwater levels have made water availability highly unreliable**. This scarcity poses a serious challenge to agricultural sustainability, as it directly influences crop choices and yields, in turn shaping the livelihoods of farmers and their families. In such conditions, traditional rainfed agriculture predominates, but the **uncertainty of water supply restricts cropping intensity and limits opportunities for diversification.**

- **Soil Degradation and Low Agricultural Productivity:**

  The physical landscape of the project area was marked by **rugged, undulating terrain and poor soil quality. Low organic carbon content and inadequate moisture retention** posed a major hurdle for sustainable agriculture, as **degraded soils lacked fertility** and could not sustain high crop yields without significant inputs. To cope, farmers traditionally relied on chemical-intensive practices, which drove up costs and contributed to long-term soil degradation. The predominance of rainfed farming further compounded these challenges, limiting productivity and agricultural diversity. As a result, **fallow and degraded lands were widespread**, reflecting the difficulty of maintaining consistent agricultural output in such conditions.

- **Marginalized Communities and Livelihood Concerns:**

  The targeted villages comprise predominantly rural, tribal and marginalized households that experience **persistent poverty, food insecurity, and limited livelihood opportunities**. Their economic vulnerability is compounded by environmental degradation and scarce natural resources. With agriculture as their mainstay, **these communities face income instability due to fluctuating yields, seasonality, and lack of diversification. Inadequate access to markets, financial services, and capacity-building further restricts their ability to improve livelihoods.**

3.4. Impact of the intervention

1. Enhanced water security and accessibility due to the water infrastructure provided:

The project has made a positive impact on water conservation, agricultural practices, and community well-being in the villages of the Chhatarpur region, addressing long-standing challenges of water scarcity through a carefully planned series of interventions and community engagement initiatives.

- Water conservation interventions were at the core of the project's efforts. Recognizing that water scarcity had been a critical issue for many years, the Haritika team implemented multiple infrastructure interventions. These included the construction of check dams, **a large pond with a capacity of 2 billion liters benefitting approximately 250 families**, **four bore wells, and fifteen gabion structures supporting 20 families**, doubling the anticipated beneficiary count for gabion structures. These infrastructure developments brought measurable improvements to groundwater levels and made water more accessible to local communities. Despite the harsh local conditions, these interventions successfully sustained plantations and provided a reliable water supply that the community had been lacking.

Figure 3: Borewell constructed at Malgose Aashram



- The project also achieved **notable success in raising awareness among stakeholders**. Interactions with beneficiaries revealed that a majority of direct recipients, including household members and farmers, were well-informed about the various water conservation structures created under the project. This awareness underpinned the effective use and maintenance of these resources.

- Initially, **many farmers were hesitant to utilize borewells due to concerns about depleting limited groundwater resources**. However, following the construction of the water conservation structures, groundwater levels began to stabilize and even rise, as illustrated by a significant increase of approximately 0.8 meters near the Vijaypura pond. This rise transformed borewells into a dependable water source, giving farmers direct, on-demand access to groundwater during dry periods outside the monsoon season.

  As a result, **around 200–250 farmers who had previously allowed their lands to lie fallow after the monsoon began cultivating year-round**. This shift from rainfed, single-season cropping to multi-season cultivation contributed to modestly increased crop yields, thereby improving livelihoods in the area. A government official from Bijawar Block emphasized the interconnected functioning of check dams and borewells: the check dams replenished groundwater aquifers, and the borewells provided direct access to this recharged water, collectively creating a stable irrigation system.

  Further adding to sustainable agricultural practices, **solar-based irrigation systems were introduced at selected community plantation sites**. These systems combined borewells powered by solar panels and pumps, harnessing renewable energy to deliver reliable water supply without relying on conventional electricity or diesel. This **environmentally friendly solution lowered operational costs** and reduced environmental impact while ensuring that saplings received adequate water year-round to thrive in this water-scarce region.

  Before switching to the solar pump, the annual operational cost of using a **5-horsepower diesel pump to irrigate around 25 hectares was approximately ₹1,80,000**, which included fuel, oil, filters, and

repairs. After adopting the solar pump, the **yearly operating expenses dropped significantly to just ₹5,000, covering only maintenance costs, as the solar pump required no fuel.**

- The function of **check dams** was pivotal in **combating water scarcity in the villages**. According to members of the Panchayati Raj Institution, these dams were effective in slowing surface runoff, reducing soil erosion, and recharging groundwater. Farmers mentioned that the **presence of check dams directly enhanced water conservation in the area**. Government officials further highlighted that check dams played a crucial role in raising the water table, ensuring a steady supply of water for borewells, and enabling farmers to expand cultivation beyond just the Kharif season into the Rabi season as well.

- The project's large pond emerged as a **reliable and substantial water reservoir impacting 250 families.** For farmers, the pond offered dependable water storage for irrigation. Women beneficiaries particularly emphasized the transformative effect on daily life. Before the pond's construction, women spent **four to five hours daily fetching water, often making multiple trips that only barely met drinking water needs.** The pond reduced these physical and temporal burdens substantially, affording women more time and energy to devote to themselves and their families. The availability of water from the pond also supported kitchen gardens and livestock care, further easing women's domestic responsibilities and contributing to improvements in health and sanitation within households.

- Gabion structures and drainage solutions were additional critical interventions. Farmers identified **gabions as essential in preserving land productivity and enhancing water retention** in the semi-arid area. These structures helped **stabilize soils and prevented erosion**, a significant challenge in the local environment. By facilitating groundwater recharge, **gabions contributed to protecting agricultural fields and increasing water availability for irrigation**, thus benefiting farming communities directly. Farmers underscored the importance of a sustained water supply for agroforestry efforts, noting that teak saplings require about five liters of water each. The project also responded to community needs by constructing drainage treatments like dohas to manage excess surface runoff and prevent soil degradation. These targeted solutions exemplified the project's collaborative approach, with farmers actively involved in both implementation and ongoing maintenance, ensuring these measures worked effectively and were preserved over time.

Figure 4: Solar based water system installation at the Navalganj plantation site at a government primary school



- Community engagement formed the foundation upon which the **sustainability of water security** was built. Farmers and women expressed that the project's holistic strategy tackled water scarcity through a combination of physical infrastructure development, ecosystem restoration, and promotion of sustainable agriculture. Active involvement of community members in building and maintaining

structures, along with comprehensive training and capacity-building efforts, fostered high levels of awareness, ownership, and collective responsibility. According to members of the Village Development Committee, this sense of community stewardship was central to the project's success and is a critical factor in ensuring that gains are maintained over the long term without excessive dependence on external funding or agencies.

"Before, finding enough water was a daily struggle, especially in the dry season. Now, with the new water structures, life is easier, and we can grow crops year-round. For women like me, the pond has been life-changing, freeing up time for family and other activities."

- Women beneficiary during field interactions

2. Changes in Agricultural Productivity and Crop Yields Through Sustainable Practices

The project has markedly contributed to enhancing livelihoods, agricultural productivity, soil health, and community skills through a well-rounded approach emphasizing agroforestry, capacity building, and sustainable practices in the target region.

- Diversification of livelihoods through agroforestry emerged as a key benefit reported by farmers. They received a **variety of fruit tree saplings including mango, guava, kinnow, and lemon**, alongside teak under the agro-forestry initiative. Teak stood out as particularly advantageous, **yielding an income of INR 15,000-20,000 per tree** while requiring zero maintenance compared to the higher water needs of fruit trees. One farmer shared that he utilized spare boundary land to plant 500 teak saplings, which improved everyday life quality even though his overall income remained similar. Male farmers also noted a significant qualitative change at the household level: previously dependent on buying fruits from the market, they now consumed fruits grown at home, reducing expenses and improving nutritional availability. Convergence with local governance was evident as members of the Panchayati Raj Institution reported that the project leveraged gram panchayat land, facilitating plantations on 20 acres of communal land and extending agroforestry benefits to 15–16 households. Panchayat members advocated for further expansion of plantation areas, reflecting institutional ownership and community-driven scaling of the initiative. They however noted that household income improvements from agroforestry had been modest so far.
- The project also brought about a **notable transformation in agricultural productivity and resilience**. Farmers explained that the shift from solely rainfed agriculture to dependable multi-season cropping had been enabled by the water conservation infrastructure such as ponds, borewells, and aquifer recharge structures. Nearly **200–250 farmers** who had previously left their fields fallow after the Kharif season began cultivating wheat and pulses during the Rabi season, resulting in more stable and higher total yields. Specifically, **Kharif production increased by approximately 20 quintals per acre.** Female farmers mentioned they had not received training and continued growing traditional crops like jowar, channa, and wheat for both sale and self-consumption, revealing a gap in inclusion and training. Male farmers, conversely, reported that with the introduction of saplings and improved irrigation

facilities, they had observed a slight income increase of ₹20,000–30,000, indicating progress in livelihood enhancement.

- **Restoration and enrichment of soil health** were also significant outcomes. Farmers highlighted that **intercropping practices improved soil carbon content and moisture retention**, contributing to a **high survival rate of approximately 95% for planted saplings**, with only about 5% losses mainly attributed to grazing by blue bulls or water scarcity. The application of neem oil cake in 45,000 planting pits played a dual role in enriching soil fertility and protecting young plants from pests. Panchayat members confirmed that the **installation of fencing around 30 acres had effectively reduced grazing pressures**, allowing vegetation to regenerate and contributing to a reduction in soil erosion, thus improving land quality and productivity.

- **Community engagement and capacity building** were instrumental to these successes. Farmers reported that the project team **conducted seminars in villages teaching essential techniques such as planting saplings with proper spacing (8–10 feet) and the correct use of supplied chemicals**. Training on vermicompost preparation and plant medicines improved sapling survival rates and overall cultivation practices. A Haritika team member noted that around **290 training and awareness sessions had been conducted**, involving farmers, women, Panchayat members, and government officials. However, farmer feedback suggested that **training sessions occurred only two times per year**, while women reported not receiving any training at all, pointing to a gap in outreach and inclusiveness. Farmers acknowledged the value of these sessions in enhancing their agricultural methods and outcomes but **expressed a need for more frequent and**

Figure 5: Timber tree plantation



Figure 6: Intercropping at an individual farmer's land



Figure 7: Fencing done by a farmer



consistent training to reinforce learning, address new challenges, and promote sustained adoption of sustainable agriculture techniques.

“My children never wanted to continue farming after me because they saw only losses, monocropping, and unstable income. But when I started agroforestry, things began to change slowly. I planted fruit trees like mango and guava, and also teak on spare land. Now we eat fruits from our own fields instead of buying them, and I can see long-term value in the teak. It gives me hope that my children might see farming differently and consider taking it up in the future.”

- A farmer during field interactions

3. Natural Manure and Pest Management (NMPM) implementation at the village level

- The project introduced **Natural Manure and Pest Management (NMPM) units** as a pivotal component to promote zero-budget natural farming (ZBNF) within the project villages, aiming to encourage sustainable and cost-effective agricultural practices. **Ten NMPM units were constructed** to function as community hubs, primarily targeting women farmers, where natural bio-stimulants and pesticides could be prepared and made accessible. The true value of these units depended on their active use when farmers regularly prepared inputs, applied them to their fields, and shared knowledge, the units transformed from mere physical infrastructure into vital, living resources for agricultural sustainability.

Figure 8: NMPM Unit at a farmer's house



- Initially, the transition to utilizing NMPM units was met with challenges. A Panchayati Raj Institution member recalled that **villagers were deeply accustomed to chemical-based agriculture, which, despite its high costs, was familiar and well-established**. The concept and purpose of the NMPM units were initially unclear to community members; it took two community meetings to adequately explain the basics and functioning of the units to gain their acceptance and initiate usage.

- Under the NMPM initiative, farmers prepared a **range of natural bio-stimulants and pesticides**, key among them being Jeevamrit, a liquid microbial solution composed of cow dung, urine, jaggery, and pulse flour. This was applied to fields at crop-specific intervals (three times for wheat, twice for gram, and once for mustard), significantly enhancing soil quality and nutrient availability, thus contributing to higher agricultural production. Complementing Jeevamrit were other cow-based formulations like Ghanjeevamrit, a semi-solid microbial solution applied at sowing time and reapplied after approximately six weeks, which further improved yields. Beejamrit was utilized specifically for seed treatment to enhance seed quality and germination. Natural pesticides such as Nimastra, made from neem leaves and other natural ingredients, were used to protect crops from pests, reducing dependency on harmful chemical pesticides, lowering input costs, and minimizing environmental pollution. Farmers received

extensive training on how to prepare, ferment, and store these inputs, with the overarching goal of fostering self-reliance. By producing their own natural inputs locally, farmers could cut costs, decrease market dependency, and build resilience through environmentally sustainable farming.

- Farmers also highlighted that the NMPM units considerably saved them money and were easily accessible resources within their communities. Each unit was constructed with brick walls, a protective shed, a collection drum, and improved semi-pucca flooring. This flooring upgrade from a slippery 'kuccha' surface to a safer, finished one facilitated the safe collection of urine and prevented accidents involving cattle and farmers. NMPM units were **strategically hosted at selected households in each village, chosen based on criteria such as ownership of two to three cows or buffaloes and possession of at least two acres of land.** The unit facilities were collectively used by all farmers in the village, ensuring broad community benefit irrespective of individual household asset ownership.

- Building farmer confidence in ZBNF practices was a vital component of the project's success. A Village Development Committee (VDC) member noted that regular use of bio-stimulants led to improved soil health, enhanced water retention, and greater crop resilience against climate variability. Success metrics extended beyond immediate cost savings to long-term sustainability of agricultural practices. Farmers practicing ZBNF through NMPM units were better prepared to withstand droughts and unpredictable rainfall patterns. The project advocated for a gradual adoption approach, encouraging farmers to start small, test the methods on limited plots, build confidence through incremental learning, and then expand the practices to larger tracts, thereby supporting sustainable behavioral change.

  However, despite these positive strides, significant gender gaps remained in unit accessibility and utilization. Interactions with women farmers revealed that **they were largely unaware of the NMPM units**, a critical shortfall given that women were intended to be the primary users and benefactors of these units. This highlighted deficiencies in communication, community sensitization, and engagement strategies. The gap underscores the **urgent need for stronger, more inclusive outreach efforts to ensure that women are actively engaged and empowered to utilize NMPM units effectively, thereby maximizing the project's impact on sustainable farming and community resilience.**

"Training on bio-stimulants like Jeevamrit helped us improve our soil health and increase crop yields naturally. We started applying these methods on small plots, which built our confidence before expanding to larger areas. The shared NMPM units made it easier for many farmers to access these inputs. However, more efforts are needed to ensure women farmers, who are key users, are fully involved and aware of these benefits."

- Panchayat Member during our interactions in the field

4. IRECS Analysis

Basis the interactions with the key stakeholders and desk review, the impact of the project was also assessed on the IRECS framework parameters. The IRECS analysis summary has been presented in the table below:

Parameter	Assessment from Study
Inclusiveness	• Beneficiaries and project areas were selected through Participatory Rural Appraisal (PRA) and consultations with Panchayati Raj Institutions and individual farmers, ensuring community involvement and inclusion in decision-making. • The project specifically targeted marginalized rural-tribal households, indicating an inclusive focus on vulnerable and disadvantaged groups dependent on agriculture for livelihoods. • There was active engagement with community members including farmers, Village Development Committee representatives, Community Resource Persons, and local government officials, which reflects an effort to include multiple stakeholders in the project process. • The project established NMPM units hosted at selected households but made these resources accessible collectively to all farmers in the village, ensuring **shared benefit and inclusivity of the farming community.**
Relevance	• Addressed acute water scarcity in Chhatarpur's drought-prone region with erratic rainfall, limited surface water, and depleted groundwater impacting agricultural sustainability. • Responded to soil degradation and low agricultural productivity due to poor soil quality, low organic carbon, moisture retention issues, and reliance on chemical-intensive agriculture. • Focused on enhancing livelihoods and food security through sustainable natural resource management and agroforestry-based adaptation measures. • Implemented water conservation infrastructure (check dams, large pond, borewells, gabion structures) that directly responded to identified water challenges affecting agriculture and daily life. • **Promoted multi-season cropping** by stabilizing water availability, enabling farmers to shift from single-season rainfed farming to year-round cultivation, improving income stability. • Introduced agroforestry including fruit and timber trees to diversify income sources and improve ecological resilience.
Effectiveness	• Water conservation interventions including check dams, a large pond, borewells, and gabion structures noticeably improved water levels and accessibility, sustaining plantations in harsh conditions. • Improved groundwater levels where there was **a 0.8-meter rise at the Vijaypura pond** encouraged farmers to use borewells, enabling a shift from

Parameter	Assessment from Study
	rainfed single-season to multi-season cropping for around 200–250 farmers, increasing crop yields and livelihoods. • Despite initial resistance, farmers adapted to sustainable practices with incremental adoption encouraged through training. • Solar-based irrigation systems introduced for community plantation sites provided sustainable, **renewable energy-powered water supply, reducing operational costs** and supporting sapling growth year-round. • Check dams and gabion structures effectively slowed surface runoff, reduced soil erosion, stabilized soil, and recharged groundwater, helping expand cultivation beyond the monsoon season. • The large pond significantly **reduced women's time spent fetching water**, empowering them to prioritize their wellbeing and care for their children. • Agroforestry with fruit and timber trees improved household consumption and **income diversification**, with farmers expressing satisfaction especially with low-maintenance teak. • **Crop production improved with multi-season cropping**; Kharif yields increased by about **20 quintals per acre**, and farmers reported **income increases of ₹20,000–30,000.** • Soil health restoration through intercropping, use of neem oil cake in 45,000 pits, and fencing 30 acres to reduce grazing pressure contributed to **higher sapling survival (95%) and reduced soil erosion.** • **Community engagement and active participation ensured maintenance of water infrastructure** and sustained adoption of practices, fostering ownership and long-term project success.
Convergence	• Engagement with multiple stakeholders including government bodies, Panchayati Raj Institutions, Village Development Committees, community resource persons, and farmers facilitated coordinated efforts and local ownership.
Sustainability	• Construction of durable water conservation structures like check dams, a large 2 billion-litre pond, gabion structures, borewells, and fencing (30 acres) supports sustained water availability, soil conservation, and protection against erosion over time. • Use of solar-based irrigation systems reduces dependency on conventional energy sources, lowers operational costs, and minimizes environmental impact, contributing to long-term sustainability. • **Encouraging farmers to start sustainable practices on smaller plots and gradually scale-up** builds confidence and facilitates long-term behavioral change towards sustainable agriculture. • Shared use of NMPM units and collective maintenance of water infrastructure support efficient resource utilization and sustainability.

5. Recommendations

The following recommendations are drawn from valuable insights shared by local community, Village Development Committee Representatives, Community Resource Persons, Panchayati Raj Institution Members, Government Officials (Block Officers), as well as our own sector expertise. These can be considered for further improving the efficiency and effectiveness of the project (or similar projects) in future.

Strengthening Community Institutions and Market Linkages to Improve Agroforestry Livelihood Outcomes

While agroforestry initiatives have helped farmers diversify their sources of livelihood, PRI members shared that the increase in income has been "modest so far." This is mainly because tree-based interventions take time to generate returns. For example, teak takes around 15–20 years to mature, while fruit trees usually take 3–5 years to start giving commercial yields. Similarly, higher production through multi-season cropping will lead to better income only if farmers have access to reliable markets.

It is therefore recommended to introduce short- and medium-term income activities such as lac cultivation, beekeeping, and fruit processing to support farmers during the gestation period. In addition, farmer groups may be formed, or existing community institutions such as FPCs, SHGs, and Village Development Committees (VDCs) may be strengthened and more actively engaged to support collective marketing and livelihood planning. VDCs were present in the project area but were not sufficiently involved, and their stronger participation can help improve community mobilisation, coordination with farmers, and follow-up on livelihood activities.

These community institutions can help farmers improve their bargaining power, connect with bulk buyers and digital market platforms, and receive training on sorting, grading, processing, and value addition. Advance linkages with timber markets should also be developed so that farmers are able to secure better returns when teak reaches maturity. These measures will help ensure that increased production leads to sustained improvement in farmer livelihoods.

Enhance Sapling Survival Rates Through Systematic Post-Plantation Care Protocols:

Although as per the Implementation Partner team and CRPs, a sapling survival rate of 95% was attained at the stage of project closure in March 2023, this outcome needs to be sustained for the latter years through a more structured post-plantation care system, especially after the project's direct support for aftercare ended. This should include regular watering, mulching, weeding, soil health monitoring, pruning, organic manure application, and pest surveillance.

It is recommended to develop a standard aftercare calendar for each species planted, such as teak, mango, guava, kinnow, and lemon. The calendar should clearly define the frequency and timing of watering, manure application, pruning, pest checks, and other maintenance activities. This will help farmers and field teams follow a consistent care routine and reduce the risk of sapling mortality.

To make this effective and sustainable beyond the project period, dedicated local capacity should be created. Trained CRPs may be engaged as "Plantation Monitors" to conduct quarterly survival checks during the first three years and guide farmers on corrective measures. Alternatively, community institutions such as farmer groups, VDCs, or plantation management committees may be formed or strengthened to take collective responsibility for post-plantation care once project support reduces or ends. This can also be linked with the earlier recommendation on strengthening farmer groups and market linkages. A portion of the income generated through collective sale of produce, fruit processing, lac cultivation, beekeeping, or

other livelihood activities may be set aside to cover CRP honorarium and routine maintenance costs such as watering, mulching, weeding, manure application, and minor plantation upkeep.

These arrangements will help create a self-sustaining model for plantation maintenance after the project's aftercare support is withdrawn. They will also support early identification of sapling mortality, pest attacks, or growth issues and enable timely corrective action. Over time, this will improve long-term plantation survival and strengthen the overall livelihood impact of the agroforestry intervention.

Establish Plantation Monitoring and Evaluation (M&E) System with Geo-Tagging:

To ensure transparency and evidence-based plantation management, it is recommended to adopt technology-enabled monitoring systems. Geo-tagging each sapling with GPS coordinates, a practice standard under the Green India Mission and state forest department drives enables real-time tracking of plantation health, survival, and growth. Coupling this with mobile-based data collection tools (such as KoBoToolbox) allows remote monitoring and timely interventions.

6. Study Limitations

- **Limited Insights from Women:** Interactions with women from beneficiary households, including those involved in farming and enterprise-related activities, indicated that their awareness of the project interventions and infrastructure support was limited.

- **Challenges in Farmer Mobilization:** Although 4 to 5 focus group discussions (FGDs) were initially planned, each comprising 8 to 10 farmers, limited mobilization efforts by the implementation partner resulted in only a single FGD being conducted. This significantly constrained our ability to gather a comprehensive and representative understanding of the project's impact.

7. Case Story

Following case story has emerged from our interactions with various project stakeholders:

Case Story: Empowering Farmers Through Reliable Water Supply

Ramesh Kumar (name changed for anonymity), a small-scale farmer from Vijayapura village, had long struggled with unreliable water availability. Dependent on erratic monsoon rains, his farming was limited to the Kharif season, and his income was unstable. The challenges of water scarcity made it difficult to cultivate crops during the dry months, forcing him to leave his land fallow after harvest.

With the construction of a large 2-billion-litre pond under the project, Ramesh's situation began to change slowly. This pond became a reliable water reservoir that provided consistent irrigation throughout the year. As groundwater levels near his land improved, Ramesh was able to extend his cropping calendar beyond the monsoon season. He began cultivating wheat and pulses during the Rabi season, which had previously been impossible. Additionally, the reliable water supply enabled him to start growing fruit trees such as mango, guava, kinnow, and lemon, diversifying his farm and creating new income streams.

The availability of stored water reduced his dependency on rainfall; increased crop yields significantly and helped stabilize his household income. Ramesh also noticed that the pond eased the daily water needs of his family, particularly reducing the time and effort his wife and daughters spent fetching water. This saved time allowed them to engage in other productive activities, improving the family's overall well-being.

Ramesh credits the large pond as a cornerstone of his farm's transformation, enabling greater agricultural productivity, resilience to climate variability, and an improved standard of living. This intervention highlights how targeted water infrastructure can empower farmers like Ramesh to overcome persistent water challenges and sustain their livelihoods.

-Farmer at the Agra village

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