Impact Assessment of Sahakara Mitra Samstha project supported by Kotak Mahindra Bank Limited

Sahakara Mitra Samstha (CCD) (Project ID –KMBL202223081)

April 2025

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Ethical Consideration

Informed consent: The interviews were done after the respondents gave their consent. Even after the interviews were completed, their permission was sought to proceed with their responses.

Confidentiality: The information provided by participants has been kept private. At no point were their data or identities disclosed. The research findings have been quoted in a way that does not expose the respondents' identities.

Comfort: The interviews were performed following the respondents' preferences. In addition, the interview time was chosen in consultation with them. At each level, respondents' convenience and comfort were considered.

Right to reject or withdraw: Respondents were guaranteed safety and allowed to refuse to answer questions or withdraw during the study.

Abbreviations

Abbreviations	Full Form
CCD	Centre for Collective Development
CSR	Corporate Social Responsibility
FGD	Focused group discussion
CCD	Centre for Collective Development
KMBL	Kotak Mahindra Bank Limited
MCA	Ministry of Corporate Affairs
M&E	Monitoring and Evaluation
NMSA	National Mission for Sustainable Agriculture
OECD-DAC	Organisation for Economic Co-operation and Development - Development Assistance Committee
PMKSY	Pradhan Mantri Krishi Sinchayee Yojana
RKVY	Rashtriya Krishi Vikas Yojana
TUG	Tank User Groups
UNSDG	United Nations Sustainable Development Goals

Project Details

Program ID	KMBL202223081
Year of Implementation	FY 2022-23
Program Duration	FY 2022-23 to FY 2023-24
Partner Organization	Sahakara Mitra Samstha (CCD)
Location	Karnataka

Executive Summary

The agricultural sector is grappling with challenges due to poor soil fertility and an excessive reliance on chemical fertilizers. The overuse of chemical fertilizers is causing several environmental problems including soil degradation and low productivity. For farmers with limited resources, transitioning to organic fertilizers presents its own set of challenges, which makes it difficult for resource-constrained farmers to adopt to alternative sustainable farming methods.

The CCD project aimed at enhancing water security for the farmers as a result of overall capacity increase in rejuvenated waterbodies, reduced usage of chemical fertilizer, enhanced agricultural productivity and farmer's income – the project has successfully contributed to higher agricultural yields, increased farmer incomes, and sustainable resource management while aligning with global sustainability goals (UNSDGs) and national agricultural policies.

KMBL undertook an independent impact assessment of the CCD project for the period of FY 2022-23 and 2023-24. The assessment utilized the OECD-DAC framework and involved consultations with stakeholders, including farmers, PRI members and implementing partners.

Key Findings from the study are as follows:

✓ **Agricultural Productivity and Soil Health Improvement**

- 74% of farmers reported reduced fertilizer usage, lowering input costs and improving soil quality.
- Farmers achieving higher yields increased from 11% to 32%.
- 78% of farmers reported reduced water consumption, shifting from high irrigation levels to more efficient usage.

✓ **Economic Benefits and Farmer Income Growth**

- 89% of farmers reported an increase in income (income ranges spanning from 1 to 3 lakhs), showing that higher yields and lower input costs translated into tangible financial benefits.
- 8% of farmers introduced additional crops post-silt application, reflecting a shift toward diversified and high-value agriculture.
- 67% of farmers received training on silt application, water conservation, and improved farming techniques.

Executive Summary

✓ **Environmental and Sustainability Impact**

- 12% of farmers observed increase in local habitat biodiversity, and 9% reported improved vegetation, demonstrating positive ecological recovery.
- Farmers reported better soil moisture retention (57%) and improved water conservation practices (32%), supporting long-term agricultural resilience.
- 2.01 billion liters of surface water capacity created throughout the project.

The project has successfully enhanced agricultural productivity, strengthened water conservation efforts, and improved farmer livelihoods, demonstrating strong sustainability potential. By reducing water and fertilizer dependency, promoting higher crop yields, and empowering farmers with training and financial gains, the project has created a replicable model for sustainable agriculture and resource management. Moving forward, scaling up farmer training, integrating diversified income strategies, and strengthening policy linkages will further maximize the long-term benefits and ensure continued economic and environmental resilience for farming communities.

01
Introduction

Introduction

1.1 Background

This report aims to assess the impact of Kotak Mahindra Bank Limited's Corporate Social Responsibility (CSR) funding for project with CCD (Sahakara Mitra Samastha - Centre for Collective Development) – an environment and sustainable development initiatives. First chapter provides an overview of Kotak Mahindra Bank Limited, CCD, the global and local context of sports, the need for sports programs in India.

KMBL partnered with CCD to enhance water security for the farmers, reduce usage of chemical fertilizer, enhance agricultural productivity and farmer's income. Through this collaboration, KMBL aims to empower farmers by providing them with the necessary resources and training to improve their agricultural outputs, decrease the use of chemical fertilizers, and increase their income, underscoring KMBL's commitment to social responsibility and its dedication to fostering inclusive growth and sustainable development in rural India.

The Sahakara Mitra Samstha - Centre for Collective Development (CCD) is a non-profit organization founded in 2003 with the mission to transform the lives of small and marginal farmers in India. CCD works primarily in the states of Karnataka, Andhra Pradesh, Telangana, and Maharashtra, focusing on building sustainable livelihoods through the establishment of member-owned, member-managed, and member-controlled cooperatives. By educating farmers about the power of collective methods and guiding them in harnessing these techniques, CCD helps reduce systemic inefficiencies in agriculture. The organization supports over 43,000 farmers across 1,200 villages, enabling them to cut down costs, improve yields, receive fair value for their crops, and gain better control over market fluctuations. CCD's initiatives have enhanced agricultural productivity, reduced dependency on chemical fertilizers, and increased farmers' incomes, thereby contributing to the overall socio-economic development of rural communities.

1.2 Local context

In the local context of Karnataka, the importance of water tanks is deeply rooted in the state's history and culture. Water tanks, also known as kalyanis or pushkarinis, have been an integral part of the region's traditional water management system for centuries. These tanks play a vital role in replenishing groundwater, providing irrigation water for agriculture, and serving as a source of drinking water for both humans and livestock.

However, despite their historical significance, many water tanks in Karnataka have been neglected over the years, leading to siltation and reduced storage capacity. Siltation occurs when sediment carried by runoff water settles at the bottom of the tank, reducing its depth and overall efficiency. This not only affects the water storage capacity but also hampers the quality of water and causes environmental degradation.

In his book "Traditional Water Management Systems of South India: Methods, Locations, and Status," author T. R. Shankar Raman highlights the various challenges faced by water tanks in Karnataka, including encroachment, pollution, and lack of maintenance. These factors contribute to the deterioration of water tanks and underscore the urgent need for desiltation and restoration efforts to ensure the sustainability of these vital water sources.

In rural areas of India, the necessity for lake de-siltation has become increasingly apparent due to agricultural negligence, insufficient resources, and limited awareness. This need is further exacerbated by rapid industrialization and agricultural activities. According to a report by the Central Pollution Control Board (Annual report 2021-22, CPCB, Ministry of Environment, Forest and Climate, GoI), a significant percentage of India's water bodies are polluted and suffer from siltation, leading to a decline in water quality and aquatic biodiversity.

This impact assessment report aimed to evaluate the effectiveness of the water tank desiltation project in enhancing agricultural sustainability, increasing farmers' income, and improving overall community well-being in rural areas of India. By assessing the outcomes, challenges, and opportunities generated by the project, the report intends to provide insights for future interventions in CSR and social impact initiatives that promote the synergy between environmental conservation and agricultural development.

1.3 Need for the project

Small and marginal farmers in India face major challenges and they often struggle with low agricultural productivity, high input costs, and limited access to markets, which result in low incomes and economic instability. The larger problem is the disparity and inefficiencies in the agricultural sector, exacerbated by inadequate infrastructure, and over-reliance on chemical fertilizers that degrade soil health. CCD's project addresses these issues by promoting collaborative farming practices, which enable farmers to reduce costs, and improve yields. By providing training and resources, CCD empowers farmers to adopt sustainable agricultural practices, enhance their productivity, and achieve better financial outcomes, which is crucial for fostering inclusive growth, reducing rural poverty, and ensuring the long-term sustainability in agriculture.

1.4 Why impact assessment?

To ensure transparency and accountability, Rule 8(3) of the CSR Rules mandates impact assessments for companies with a CSR obligation exceeding ₹10 crore in the three preceding financial years and for individual CSR projects with an outlay of ₹1 crore or more. The assessment must be conducted by an independent agency, ensuring an unbiased assessment of the project's effectiveness.

Furthermore, companies are required to disclose impact assessment findings in their annual CSR report as part of the Board's Report, demonstrating the measurable social impact of their initiatives. Compliance with these regulations ensures that CSR initiatives contribute meaningfully to societal well-being while preventing tokenism or ineffective allocation of funds.

Ultimately, conducting impact assessments is not just a compliance requirement but a strategic tool for improving the efficiency, effectiveness, and accountability of CSR initiatives. It helps companies demonstrate the tangible impact of their social investments, strengthens stakeholder trust, and contributes to long-term sustainable development.

02
Methodology

Methodology

2.1 Approach

The approach for this study involved a mixed-methods approach, which incorporated both quantitative and qualitative data collection and analysis methods. The study was conducted through a combination of literature review, surveys, focused group discussion, and interviews with key stakeholders.

The research began with a review of existing literature on the topic, to gain a thorough understanding of the current state of knowledge and identify any gaps or areas for further investigation. This was followed by the development of a survey instrument to gather quantitative data from a sample population. The survey was conducted using an offline instrument and was designed to elicit information on the participants' experiences, attitudes, and behaviors related to the thematic area.

Lastly, a series of interviews were conducted with key stakeholders in the field, including farmers, PRI members and implementing partner. These interviews were semi-structured, and allowed for in-depth exploration of the assessment topic, as well as the opportunity to gain insights into emerging trends and best practice.

2.2 Study Components

Following were the main components of the study:

Methodology

Literature review 	A comprehensive review of existing literature was conducted, using both academic and industry sources. This involved a systematic search of relevant databases, publications, and other industry sources available in the public domain.
Survey design 	A survey instrument was developed based on the research questions and objectives. The survey was designed to elicit both quantitative and qualitative data and was pre-tested prior to distribution.
Survey distribution 	The survey was carried out by KPMG resource personnel who physically visited the sample population, using an offline tool as a means of data collection. Respondents were selected using a combination of random and purposive sampling methods to ensure a diverse and representative sample.
Interviews 	Structured, semi-structured interviews and focused-group discussions were conducted with key stakeholders in the field, to gain insights into emerging trends and best practices. The interviews were further analyzed using thematic analysis.
Data analysis 	Quantitative data collected through the survey were analyzed. Qualitative data collected through the survey and interviews were analyzed using thematic analysis to identify patterns and themes in the data.
Synthesis 	The data collected through the literature review, survey, and interviews were synthesized to develop a comprehensive understanding of the assessment topic. This involved identifying key themes and trends, as well as exploring any inconsistencies or gaps in the data.
Reporting 	The results of the research project are reported in this comprehensive final report, which includes a summary of the findings, as well as recommendations for future assessments and better practices.

2.3 Data collection tools

Given below is the list of tools utilized for primary data collections and engaging with key stakeholders:

Identified stakeholders	Sample covered	Tools utilized
Farmers	245	• Structured questionnaire • Focused group discussions
PRI Members	15	• Semi-structured questionnaire
Implementing partner	10	• Semi-structured questionnaire

A sampling approach was adopted with a 95% confidence level and a 5.3% margin of error for defined population size.

Structured questionnaires were used to collect quantitative data, enabling to draw objective conclusions about the relationships between variables in this assessment. The key respondents of the interview were farmers, PRI members and implementing partner; and the purpose of this interview was to assess and measure the overall impact, among other parameters.

Focused group discussions were carried out with farmers to obtain qualitative information and understand their viewpoints, attitudes and experiences concerning the project that was implemented. Focused group discussions (FGDs) were also useful in assessing the impact of interventions on desilting water bodies, gauging the aspirations of the community.

2.4 Limitations of the study

- The study did not include testing of soil for Soil Organic Carbon (SOC). A more detailed and exhaustive study could have included this testing.
- Assessments on biodiversity, life both above and below water, were based on anecdotal insights from qualitative observations during interactions with various stakeholders rather than scientific studies, which may have required extensive resources and time.

03
Findings

Sahakara Mitra Samstha (Project ID -KMBL202223081)

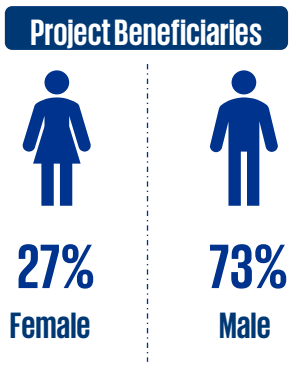
3.1 Inclusiveness

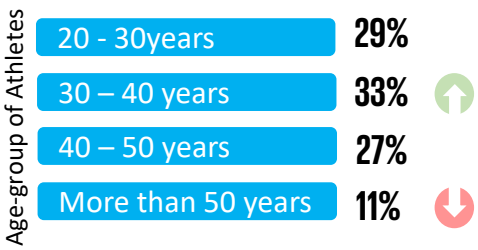
Gender and age distribution

The findings highlighted that the majority of the respondents, accounting for 73% of the total, were male, while 27% were female.

The analysis of the age distribution of respondents indicated that the majority of farmers belonged to the 30 to 40 years age group, comprising 33% of the total participants. Additionally, 29% of the respondents were in the 20 to 30 years age group, while 27% fell within the 40 to 50 years age group. The remaining 11% of the farmers were over 50 years of age.

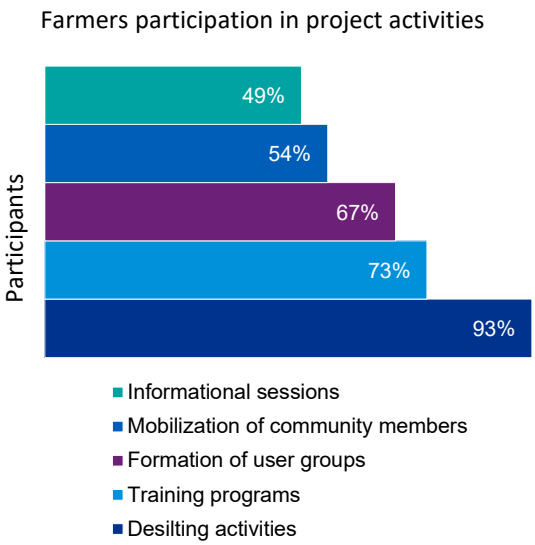
This distribution indicates that the farming population surveyed was predominantly composed of younger and middle-aged individuals, with over half of the respondents (62%) falling between the ages of 20 and 40 years.





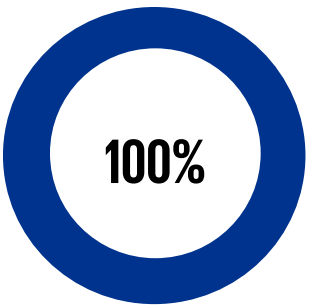
Part of project activities

An assessment of the participation of farmer respondents in project activities highlighted notable engagement across various initiatives. A considerable majority, 93%, took part in desilting activities, indicating a strong emphasis on this activity. Additionally, 73% of the farmers participated in training programs, 67% of the respondents were involved in the formation of user groups, which suggests an active effort to foster collaboration and resource sharing among farmers. Participation in informational sessions conducted through the project was reported by 49% of the farmers.

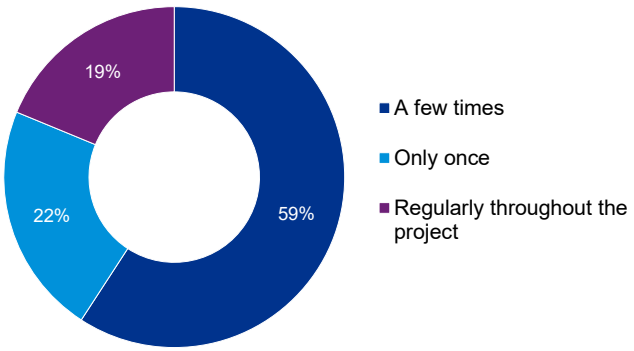


Participation in capacity-building sessions

Participation in the session



Frequency of attending sessions



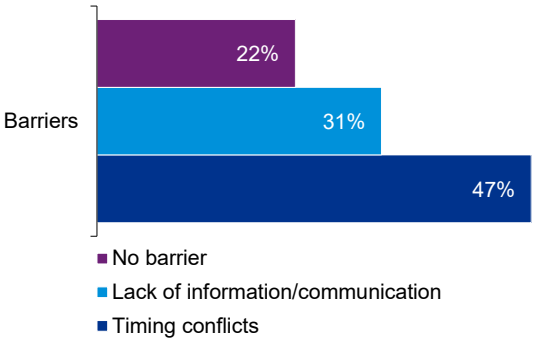
The analysis of farmers' participation in capacity-building sessions indicated full initial engagement, with 100% of farmers attending at least one session. However, a closer analysis of attendance frequency indicated a varied participation–

- ✓ A majority of 59% of the farmers attended capacity-building sessions only a few times, suggesting limited engagement beyond initial participation.
- ✓ Additionally, 22% of the farmers attended only once, indicating either a lack of perceived relevance, accessibility challenges, or competing priorities that hindered further engagement.
- ✓ About 19% of the farmers reported to have attended the sessions during the course of intervention.

The above analysis highlight areas for improvement in ensuring sustained engagement in capacity-building efforts. While the initial uptake of the sessions was strong, the substantial percentage of farmers attending only sporadically or just once highlight concerns about the ability to create long-term impact and retention of the knowledge gained.

The assessment of barriers to attending capacity-building sessions highlighted that while some farmers faced no challenges in participation, a substantial portion faced difficulties that hindered their engagement. 47% of farmers indicated timing conflicts as biggest challenge, which limited their ability to attend the sessions due to other responsibilities.

Barriers in attending sessions

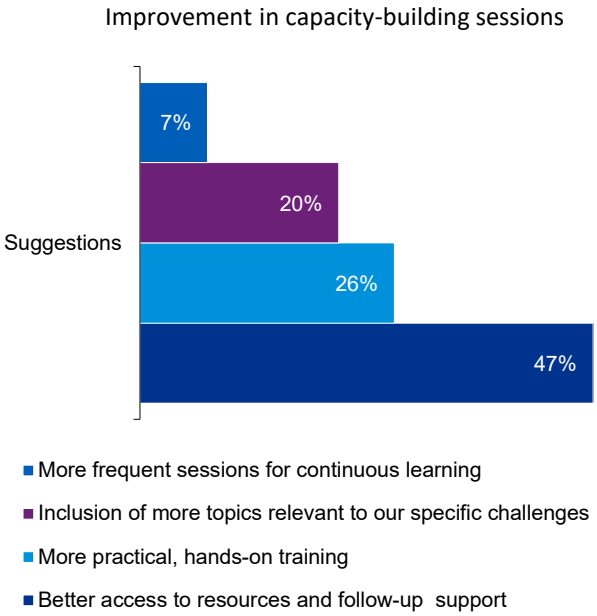


A closer look at the subgroups highlighted that timing conflict disproportionately affected male members; specifically, 71% of the farmers who reported a timing issue were male, compared to only 29% who were female.

Additionally, 31% of farmers cited a lack of awareness or inadequate communication about the sessions as a primary reason for non-participation. 22% of farmers reported no barriers in attending the capacity-building sessions, indicating that for some farmers, the sessions were well-integrated into their schedules and accessible.

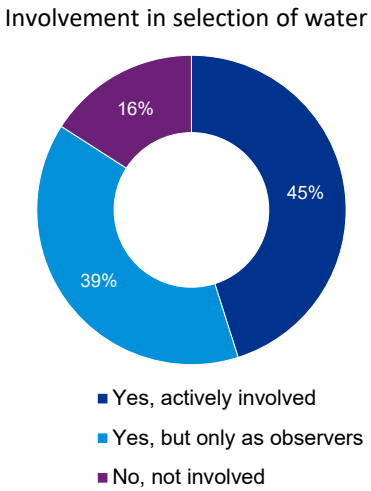
Improvement in capacity-building sessions

When farmers were asked how the capacity-building or training sessions could be improved to better meet their needs, several key areas for enhancement were identified:



- ✓ Better access to resources and follow-Up support: Most respondents, as many as 47%, highlighted the need for better access to resources and ongoing support after the sessions. This suggests that although the training sessions offered useful insights, farmers continued to face certain challenges hence there remained scope for enhancing the overall effectiveness of the capacity-building efforts.
- ✓ More practical, hands-on training: 26% of farmers expressed the need for a more practical, hands-on training opportunities, indicating a preference for experiential learning.
- ✓ Inclusion of more topics relevant to specific challenges: 20% of farmers expressed the need for training to be more tailored to their specific challenges such as crop management and sustainable farming practices, to align with the diverse needs of farmers across crop types, and farming methods.
- ✓ More frequent sessions for continuous learning: A smaller group of farmers, 7% of them, suggested increasing the frequency of sessions to enable continuous learning and reinforcement of knowledge over time.

Solicitation of community members' views in identification of water tanks



While assessing the whether the views of farmers were considered in the water bodies for de-siltation, the findings highlighted varying degrees of participation –
Nearly half of the farmers, 45% of them reported their views were considered during selection of water tanks. Inclusion of community members in key decision-making augurs well for ownership and long tern sustainability of interventions.

A substantial 39% of respondents indicated that they were involved only as observers. This suggests that while they may have had some exposure to the process, their input was limited. Remaining 16% of the farmers reported that they were not involved at all in the selection process of the water bodies.

As highlighted by community members, Aluru Kere, Buppasandra, and Nevile were a few water bodies among the nine water bodies that were not selected for de-siltation. This indicates that the project was largely effective but had scope for further inclusion.

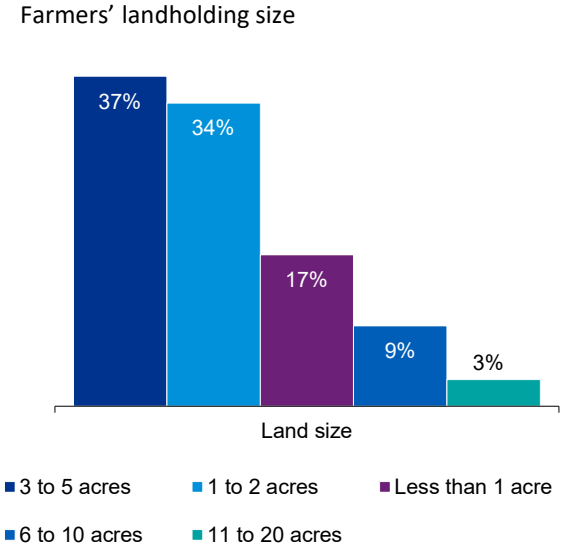
3.2 Relevance

Proximity of farms to desilted water bodies

Radius = 2 kilometers

During interactions with farmers, it was observed that the majority of farmers applied silt within a 2-kilometer radius from the water tanks. The concentration of silt application within a limited radius suggests that the benefits of the intervention were primarily localized. During qualitative discussions with farmers, 9 out of 10 farmers mentioned their agricultural land is located within 2 kilometers of the water tanks. This proximity likely facilitated the efficient application of silt, maximizing the benefits of the intervention.

Farmers' landholding size and pattern



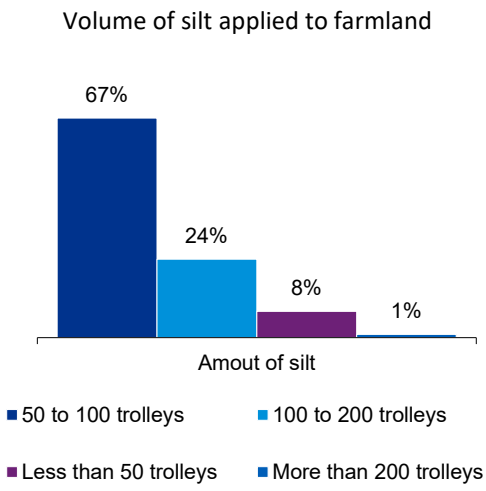
The assessment of landholding sizes among farmers highlights a diverse distribution in the extent of farmland owned, which may have implications for agricultural practices, productivity, and the overall impact of de-siltation projects.

The largest proportion of farmers (37%) reported having land holdings between 3 to 5 acres, indicating a level of farming that may support moderate production and allows for a variety of crops or practices. Additionally, 34% of farmers had land between 1 to 2 acres and a considerable segment of farmers (17%) holds less than 1 acre of land. This group may be comprised of smaller-scale farmers who could be particularly vulnerable to uncertainties, making the benefits of de-siltation especially important for their agricultural outputs.

Findings

The analysis of landholding sizes among project beneficiaries highlights a mean landholding size of 3.33 acres, which closely aligns with the statewide average of 3.36 acres as per FICCI's report '*$1 Trillion Economy: Karnataka's Vision*' published in August 2023. This near parity suggests that the project has successfully reached a representative cross-section of farmers in the region, ensuring inclusivity across different landholding sizes. The similarity also indicates that the project's interventions are well-suited to the agrarian structure in the project location, reinforcing its relevance in addressing the needs of both small and medium-scale farmers. However, given that over half of the beneficiaries are small and marginal farmers, targeted measures such as sustainable farming techniques could further strengthen outcomes, particularly for the most vulnerable farmers within this demographic.

The assessment of silt application among farmers highlighted important insights into their practices, perceptions, and the overall effectiveness of silt distribution efforts. A majority of farmers (84%) reported that they applied silt extensively across all cultivated areas, whereas 16% of farmers indicated that they applied silt only in specific sections or to particular crops reflecting agricultural practices based on crop needs or concerns about the availability or suitability of silt for all areas.



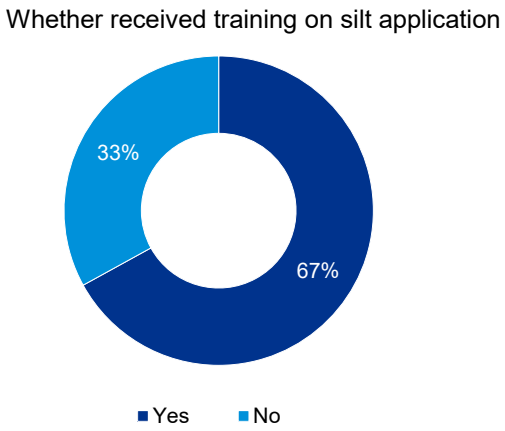
The analysis of the quantity of silt applied by farmers indicated varying levels of usage- The majority of farmers (67%) applied 50 to 100 trolleys of silt, suggesting a relatively balanced distribution and a standard adoption level across most farmers. Additionally, 24% of farmers applied a larger quantity, between 100 to 200 trolleys, likely reflecting larger landholdings or greater soil improvement needs. A small group (8%) applied less than 50 trolleys, possibly due to – limited access to silt, smaller farm sizes or perceived sufficiency of lower quantities for their soil conditions.

The crop diversity among farmers provides an important perspective on agricultural practices in the region. A notable majority of farmers (75%) indicated that they grow cereals as it's a staple component of their agricultural activities. A majority, 65% of farmers reported growing vegetables, indicating a strong inclination towards horticulture. Nearly half (47%) of farmers reported being engaged in pulse cultivation, whereas a smaller percentage (23%) of farmers were growing fruits and flowers, indicating opportunities for diversification and potential benefits. Farmers also reported cultivating Areca nut and Coconut in newly

developed farmland. The inclusion of these crops suggests diversification towards perennial crops as a result of intervention that can provide long-term income.

The majority of farmers indicated facing financial burden in silt transportation and spreading, with a large proportion reporting expenses exceeding ₹10,000 for both activities.

Training on silt application



✓ 67% of farmers received comprehensive training, indicating that a structured knowledge-sharing mechanism was in place for a majority of participants.

✓ 33% of farmers did not receive training but expressed a desire to learn, highlighting a gap in outreach and the need to broader training coverage.

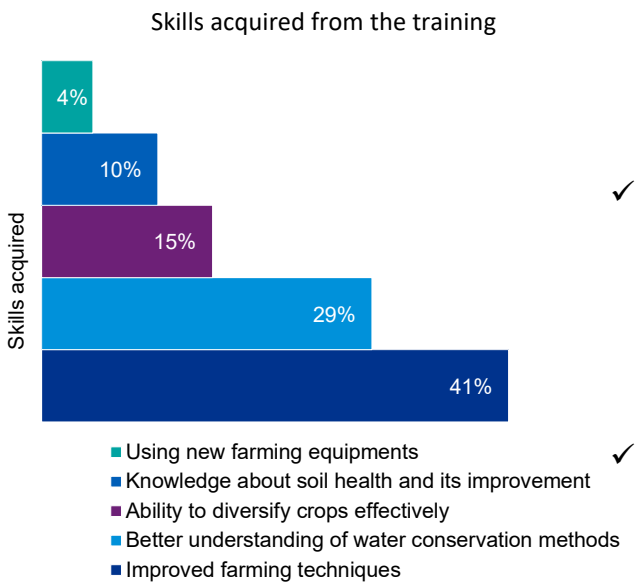
Source of irrigation

The analysis of farmers' irrigation practices indicated the following distribution:

- Groundwater dependence (85%): A majority of farmers rely on wells and borewells as their primary irrigation source.
- Rainfed (15%): A smaller segment relies entirely on rainfall, making them vulnerable to climate variability and drought conditions.
- Other irrigation sources: Some farmers also mentioned lake water, canal irrigation, and drip irrigation systems as supplementary or alternative sources for irrigation.

3.3 Effectiveness

Skills acquired from the training



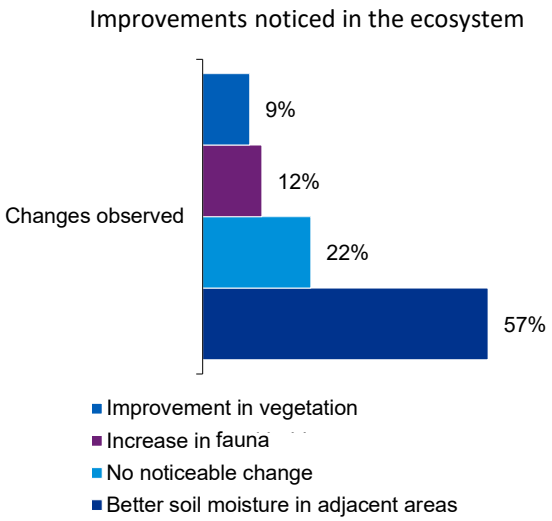
The assessment of skills acquired through capacity-building sessions highlighted a diverse set of learnings among farmers:

- ✓ Improved Farming Techniques (41%): Nearly half of the farmers reported enhanced knowledge of better agricultural practices such as reduced use of chemical fertilizers etc., indicating that the training effectively addressed core farming challenges.
- ✓ Water Resource Awareness (29%): A larger portion of farmers mentioned improved understanding of sustainable water use and irrigation efficiency. This reflects a growing awareness of the importance of managing water resources wisely in the face of increasing agricultural and climatic challenges.
- ✓ Soil Health Improvement (10%): A smaller group of farmers gained knowledge about soil fertility and soil quality improvement, crucial for long-term productivity and sustainability.
- ✓ Crop Diversification (15%): Some farmers developed the ability to diversify their cropping patterns, indicating a shift towards more resilient and profitable agricultural models.
- ✓ Use of New Farming Equipment (4%): A small percentage of farmers acquired skills in handling new agricultural tools and machinery.

The analysis of how farmers incorporated learnings from capacity-building sessions into their farming practices highlighted a diverse trends. More than half of the farmers, 52% of them, actively integrated most or all of the knowledge and skills gained, indicating a high level of acceptance and practical relevance of the training. Another major proportion, 38% of farmers applied only some aspects of the training, suggesting that while the sessions were useful, certain concepts were less adaptable or required additional resources for full implementation. A smaller group (10%) had not yet applied the knowledge, but they intend to implement it soon, possibly due to constraints such as seasonal factors, or the need for further guidance.

Findings

Observing particular enhancements within the environment surrounding treated waterbodies



The assessment of changes in the ecosystem surrounding desilted water bodies highlighted mixed responses from farmers:

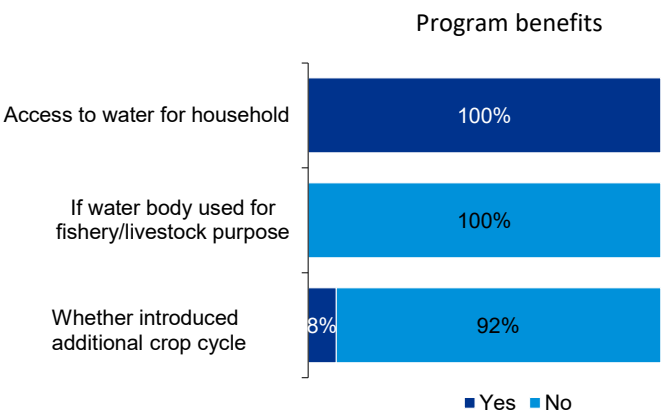
- ✓ Improved Soil Moisture in Adjacent Areas (57%): The most widely observed change, indicating that de-siltation has enhanced groundwater recharge and soil moisture retention, benefiting surrounding farmlands.
- ✓ No Noticeable Change (22%): A substantial portion of farmers did not observe any major ecological improvements, suggesting either a time lag in visible impact or areas where de-siltation had minimal immediate effect.

- ✓ Farmers observed a noticeable increase in local biodiversity, with more birds, aquatic life, and other species. This positive change was likely attributed to better water retention and efforts in habitat restoration. Additionally, there was an improvement in vegetation around water bodies, as some farmers reported enhanced plant growth. This was probably due to the increased availability of moisture and the beneficial nutrients deposited by silt.

Benefits realized from the project

Following realized benefits and missed opportunities from the project were reported by farmers –

- ✓ Every farmer reported better water availability for household use, enhancing water security.
- ✓ Despite improved water availability, rejuvenated water bodies were not used for fishery or livestock-related purposes as it was under minor irrigation department.
- ✓ About 8% of farmers reported that they were able to grow additional crops after applying silt resulting in better soil health and fertility.



3.4 Coherence

The project aligns closely with both global sustainability goals and national agricultural and water resource management programs. By focusing on soil restoration, water conservation, sustainable agriculture, and farmer empowerment, the project contributes directly to several United Nations Sustainable Development Goals (UNSDGs) and complements key government initiatives aimed at improving agricultural productivity, rural livelihoods, and environmental sustainability.

- The project improved soil fertility through silt application, leading to higher crop yields and reduced dependency on chemical fertilizers.
- Farmers reported increased income and better food security, ensuring sustainable agricultural practices and enhanced rural livelihoods.

- Rejuvenation of water bodies contributed to improved groundwater recharge and reduced irrigation water consumption.
- The project's focus on community-driven water conservation aligns with the goal of sustainable water management for agricultural and household use.

- Improved soil moisture retention and reduced reliance on synthetic fertilizers contribute to climate-resilient agriculture.
- By reducing water and chemical input dependency, the project helps mitigate the environmental footprint of farming and supports adaptive strategies against climate change.

- The rehabilitation of degraded soil through silt application promotes land restoration and ecosystem revival.
- Increased biodiversity in and around water bodies demonstrates a positive ecological impact in line with sustainable land management goals.

- Farmers observed an increase in flora and fauna, indicating that biodiversity around rejuvenated water bodies is improving.
- Farmers reported better vegetation growth around water tanks and ponds, which helps stabilize aquatic ecosystems, prevent erosion, and improve water quality.*

The project also aligns with several flagship government schemes designed to enhance water security, agricultural sustainability, and farmer welfare. The project is coherent with PM Krishi Sinchayee Yojana (PMKSY), reducing irrigation water consumption and improved groundwater retention, aligning with PMKSY's objectives of water efficiency and irrigation expansion.

Through improved soil and water management, the project supports NMSA's (National Mission for Sustainable Agriculture) mission to enhance sustainability in agriculture. The increase in farmer incomes and yield improvements aligns with RKVY's (Rashtriya Krishi Vikas Yojana) objective of promoting holistic agricultural growth.

The CCD project demonstrates strong alignment with both UNSDGs and key national agricultural and water conservation policies. By improving soil fertility, water availability, and farmer income, the project directly supports global goals for sustainable agriculture and climate resilience while complementing India's mission for doubling farmer income, promoting sustainable water use, and ensuring food security. Integrating further government support, financial incentives, and technological advancements can enhance the scalability and long-term impact of the initiative, ensuring that farmers and ecosystems continue to thrive in a sustainable and climate-resilient manner.

** This was noted from qualitative interaction with farmers and is not scientifically validated.*

3.5 Sustainability

This chapter evaluates the sustainability aspect of the CCD project demonstrating how the project effectively ensures long-term agricultural productivity, resource conservation, and community empowerment.

Economic Sustainability

One of the key outcomes of the project has been increased agricultural productivity and improved farmer income, ensuring economic resilience for participating farmers.

- Increased agricultural yield: The project enhanced crop productivity, with farmers reporting higher yields per acre, leading to improved food security and marketable surplus.
- Reduction in input costs: Farmers reported reduced fertilizer application and lower water consumption, leading to cost savings and increased profitability.
- Enhanced farmer income: The proportion of farmers earning increased demonstrating economic upliftment.

Environmental Sustainability

The project's focus on water conservation, soil restoration, and biodiversity enhancement aligns with long-term environmental sustainability goals.

- Water conservation impact: The project led to reductions in water consumption, with high-water-use farmers, ensuring sustainable groundwater management.
- Soil restoration through silt application: The use of excavated silt improved soil fertility, reducing the need for chemical and synthetic fertilizers and promoting natural nutrient cycling.
- Biodiversity revival: Farmers observed increase in local habitats and improvement in vegetation, indicating ecosystem recovery around rejuvenated water bodies.
- Lower environmental footprint: By reducing fertilizer dependency and promoting organic transitions, the project minimizes soil degradation and water contamination risks.

Social Sustainability

The project fostered strong community engagement, knowledge-sharing, and capacity-building efforts, ensuring that its benefits are widely distributed and locally driven.

- Farmers reported improved access to water for household use, directly contributing to better sanitation and living conditions.
- Farmers received training on silt application, water conservation, and improved farming techniques, ensuring long-term knowledge retention and skill-building.

Community –owned model metrics with government

- The collaborative nature of initiative was one of the crucial factor in increasing farmers active engagement and participation in the project, which may demonstrate a sense of ownership and commitment but also developed a deeper understanding of the project's long-term outcome and sustainability, leading to increased interest and involvement in the activities.

- The establishment of Tank User Groups (TUG), has resulted in strengthened local relationships with government functionaries. TUGs have built strong networks and acquired knowledge of how to effectively engage with local government officials in order to facilitate the successful completion of similar water resource management projects in the future. Through their established connections and experience, these farmer groups are well-positioned to implement similar initiatives, demonstrating a sustainable and informed approach to community-led development efforts.

3.6 Impact

The project's comprehensive efforts in waterbody rejuvenation demonstrated a substantial impact on the farmers community through the integration of various activities.

Impact areas	Farmers
✓ Improvement in soil quality	90%
✓ Reduced water consumption	78%
✓ Decreased fertilizer application	74%
✓ Ability to grow additional crops	63%
✓ Increased crop yield	88%
✓ Increased income	89%

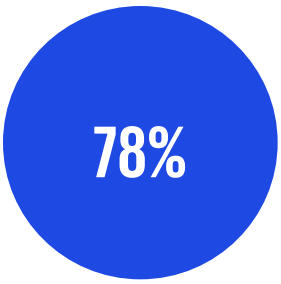
✓ Increased surface water capacity → 2.01 billion liters

The evaluation of the project's impact on soil health, water efficiency, crop productivity, and farmer income highlighted key improvements:

- 90% of farmers experienced better soil quality after silt application, confirming that silt replenishment enhanced soil fertility, organic matter, and moisture retention.
- 78% of farmers observed reduced water consumption, likely due to better water retention in desilted soil, reducing dependency on irrigation.
- 74% of farmers reduced fertilizer use, indicating that the nutrient-rich silt improved soil fertility naturally.

- 63% of farmers were able to grow additional crops, showing that the land became more productive post-silt application.
- 88% reported increased crop yield, confirming that the project directly impacted output and food security.
- 89% of farmers reported an increase in income, showing that higher yields and lower input costs translated into tangible financial benefits.

Reduced water consumption for irrigation



Farmers experienced a reduction in water consumption for irrigation after project implementation

Since the implementation of the agricultural program, 78% of farmers reported a reduction in water usage for irrigation, based on recall data. This major decrease highlights the effective adaptation to improved irrigation techniques promoted by the project. Even farmers with higher water consumption earlier were able to successfully optimized their irrigation efficiency. However, it was noted that some larger landholders may still require additional interventions to achieve further efficiency gains. Overall, these findings underscore the program's positive impact on water conservation for irrigation.

The implementation of the project has led to a considerable reduction in water usage for irrigation, demonstrating the effectiveness of improved water management practices and sustainable irrigation techniques. The findings indicates that across all farmer groups—irrespective of their initial water consumption—there has been a consistent decline in water usage, highlighting both improved efficiency and potential long-term sustainability benefits.

Decreased use of fertilizers

Use of fertilizers	Farmers
• Fertilizer application has decreased	75%
• Fertilizer application has increased	4%
• No changes as such	21%

During interaction with farmers, a clear shift in fertilizer usage patterns was observed, attributed to the implementation of the program.

Reduction in Fertilizer Use (75%): A substantial majority of farmers (75%) reported a noticeable decrease in the use of chemical fertilizers. This trend suggests a positive shift likely driven by application of silt in the farm and enhanced soil health and fertility.

No Perceived Change (21%): 21% of farmers indicated that their fertilizer usage remained unchanged likely due to factors, including crop-specific nutrient requirements, limited access to adequate alternative inputs etc.

Increase in Fertilizer Use (4%): A minority of respondents (4%) reported an increase in fertilizer application likely due to the introduction of new crop cycles or diversification, which may have temporarily elevated nutrient demands.

Changes in yield

Change in yield	Farmers
• Crop yield has increased	88%
• No change as such	12%

The project has improved agricultural yields, with more farmers moving from low/moderate yield levels to higher output categories.

Findings

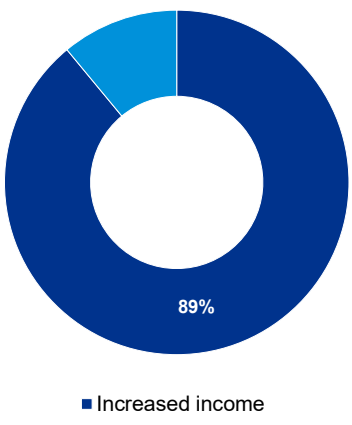
Direct interactions with farmers indicate a positive trend in crop productivity following the implementation of the program:

Yield Increase Reported by 88% of Farmers: A majority of respondents observed a tangible improvement in crop yields. This suggests that the program interventions—such as application of silt in the farms, better input management, or enhanced access to knowledge and resources—have effectively contributed to increased agricultural productivity.

No Change Reported by 12%: A smaller proportion of farmers indicated that their crop yields remained unchanged likely due to the limited adoption of the recommended practices and less awareness.

By sustaining soil fertility improvements, optimizing irrigation, and strengthening market access, these gains can be consolidated and expanded for long-term agricultural resilience and economic growth.

Increased income



The assessment of income change before and after the project implementation indicated a clear upward trend in farmer earnings, with more farmers transitioning into higher income brackets. Analysis of annual household income indicates a positive impact on household income levels following the desiltation initiative. Approximately 89% of the farmers reported a noticeable increase in their annual income, attributing this to improved soil fertility and enhanced crop yields due to the application of silt. 11% of respondents either observed no change or were uncertain about any income variation, suggesting that the benefits may not have been uniformly experienced across all landholding types.

Further insights from qualitative interaction with farmers highlights that 9 out of 10 farmers experienced a shift in their income brackets, moving from the ₹1 lakh to ₹2 lakh range to the ₹2 lakh to ₹3 lakh range annually. This upward mobility reflects the direct tangible economic benefits of the intervention, particularly for marginal farmers who previously operated at subsistence levels.

The most notable change occurred in the highest income category (above ₹3 lakh per year), which increased from 7% before the project to 9% after, showing that a small but growing number of farmers achieved higher economic stability and profitability.

Farmers attributed these income improvements to various project activities, particularly silt distribution, which enhanced soil fertility and reduced fertilizer dependency, leading to lower input costs and healthier crop growth. Additionally, better water retention and improved irrigation efficiency helped increase yields, allowing farmers to harvest more crops and generate higher marketable surplus. With higher agricultural output, reduced production expenses, and better water availability, farmers were able to increase their overall earnings and strengthen their financial resilience.

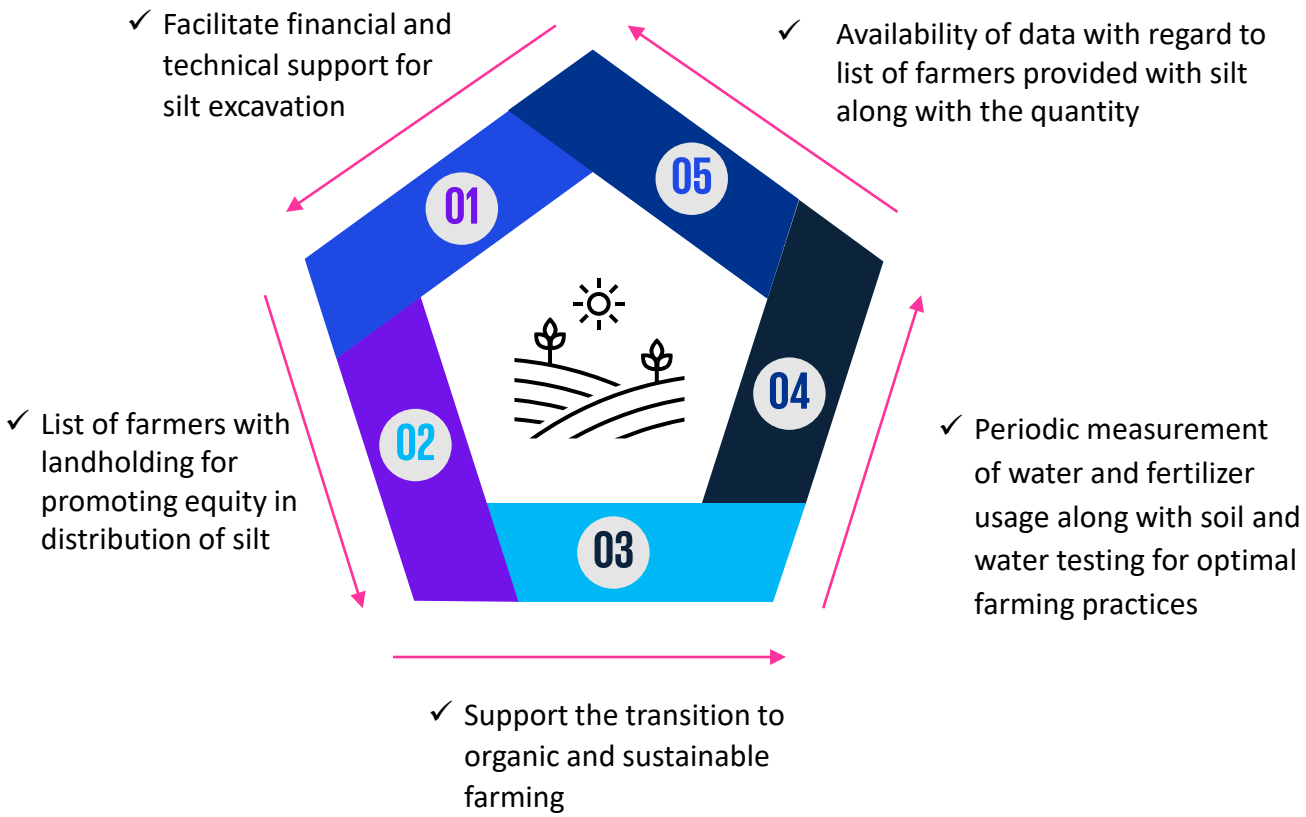
Increased surface water capacity

Based on stakeholder interactions, it was understood that a total of 2.01 billion liters of surface water capacity was created. According to the CCD, the project implementation partner, a total of 201 modules of lake de-siltation activities were completed over two phases. Each module contributed approximately 10,000 cubic meters (or 10 million liters) to the surface water capacity. Verification means – the verification of the surface water volume was conducted through MB recordings and volume metrics, specifically tracking the number of trolleys used to extract silt from the water tanks.

04
Recommendations

Recommendations

The CCD project has led to improvements in soil quality, water conservation, crop productivity, and farmer income. However, to sustain and expand these benefits, targeted interventions are required in key areas such as silt excavation support, community-led water tank management, organic farming transitions, precision agriculture, and access to modern technology. This chapter outlines strategic recommendations to enhance the long-term impact of the project, ensuring that farmers can maximize resource efficiency, adopt sustainable practices, and strengthen their economic resilience. By addressing the identified gaps and building upon the achievements of the project, the following recommendations aim to empower farming communities driving a long-term agricultural growth.



✓ Facilitate financial and technical support for silt excavation:

- Establish funding mechanisms or subsidies to support farmers in silt excavation and distribution, ensuring widespread access to its agricultural benefits.
- Develop public-private partnerships or community-led initiatives to streamline and finance efficient silt extraction processes.

Recommendations

✓ List of farmers with landholding for promoting equity in distribution of silt

- Establish a comprehensive list of farmers in the project area along with their respective landholdings.
- Implement transparent and inclusive mechanisms for monitoring and verifying the distribution of silt to ensure fairness and accountability.
- Establish a feedback mechanism to solicit input from farmers regarding the effectiveness and equity of silt distribution practices, with opportunities for adjustment and improvement as needed.

✓ Support the Transition to Organic and Sustainable Farming

- Provide post-silt extraction training to assist farmers in adopting organic farming methods, including natural soil enrichment techniques, composting, and bio-fertilizer usage.
- Provide financial incentives, market linkages, and certification support to encourage a shift towards sustainable and eco-friendly agriculture.

✓ Periodic measurement of water and fertilizer usage along with soil and water testing for optimal farming practices

- Design and implement a systematic monitoring framework to periodically measure water usage and fertilizer usage by farmers in the project area, capturing empirical data on actual practices and patterns.
- Implement regular soil and water testing programs to provide farmers with data-driven guidance on soil fertility, irrigation planning, and crop selection.
- Introduce appropriate technological interventions, such as soil moisture sensors, weather-based irrigation systems, and nutrient management plans, to enhance productivity and resource efficiency.

✓ Availability of data with regard to list of farmers provided with silt along with the quantity

- Develop a robust data collection system to accurately record and track the distribution of silt to individual farmers.
- Implement regular monitoring and reporting mechanisms to ensure the availability and accuracy of data regarding the list of farmers receiving silt and the corresponding quantities distributed.
- Establish communication channels with farmers to verify the information on the list and to address any discrepancies or issues related to the distribution of silt quantities.

Recommendations

By implementing these recommendations, farmers can maximize the benefits of silt excavation, improve water resource management, transition to sustainable farming practices, and enhance productivity through technology and policy support. Strengthening these areas will contribute to long-term agricultural resilience, economic growth, and environmental sustainability.

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