LEAD LEVERAGING EVIDENCE FOR ACCESS AND DEVELOPMENT
KREA UNIVERSITY

Deshpande Foundation

EVALUATION OF **DESHPANDE FOUNDATION's FARM POND PROGRAM**

EXECUTIVE SUMMARY

About Deshpande Foundation

Deshpande Foundation is a Non-Governmental Organisation (NGO) established in 2007 to bring about a sustainable change by economically empowering rural and semi-urban communities in India. While it started as a grant-making and skilling organisation in Hubballi district of Karnataka state, it transitioned itself into an implementing organisation due to the trust it had developed with the community and increased connection at the ground level. The Foundation has persevered to continuously improve their understanding of the ecosystem, the need, and the challenges of rural and semi-urban India. Gradually, this has resulted in pilots and programs that have the capability of tackling the burning issues of our communities at scale. With the vision to *"Create an ecosystem that nurtures entrepreneurial mind-sets to impact grassroots problems through innovation, collaboration and sustainability"*, they have been implementing programs that focus on Micro-entrepreneurship, Agriculture, Edu-Skilling, and Startups (MASS). The Foundation now operates in 18 districts in the states of Karnataka and Telangana and aims to provide productised services which have a defined scope and price. Their services align with several of the United Nations Sustainable Development Goals (SDGs).

About LEAD *at* Krea University

LEAD is an action-oriented research centre of IFMR Society that leverages the power of research, innovation and co-creation to solve complex and pressing challenges in development. LEAD has strategic oversight and brand support from Krea University (sponsored by IFMR Society) to enable synergies between academia and the research centre. Since 2005, LEAD has been at the forefront of development research and programming in India, and has managed a portfolio of over 280 projects in collaboration with over 300 academics, governments, NGOs and private sector organisations from across the globe.

Acknowledgements

This report presents findings from an evaluation of Deshpande Foundation's Farm Pond Program, conducted by LEAD at Krea University. This evaluation was commissioned by the Foundation to understand and assess the impact of the Farm Pond program in the states of Karnataka and Telangana. The views expressed in this report are those of the research team, based on findings from the study, and do not reflect the views of LEAD and Deshpande Foundation.

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Abbreviations

DF: Deshpande Foundation

CGIAR: Consultative Group on International Agricultural Research

FP: Farm Pond

IFMR: Institute for Financial and Management Research

KII: Key Informant Interviews

LEAD: Leveraging Evidence for Access and Development

SDG: Sustainable Development Goal

Executive Summary

Background and Context of Evaluation

Groundwater depletion or contamination affects more than half of India's states[1], and about 820 million people have per capita water availability close to or lower than 1000 cubic metres – the official threshold for water scarcity[2]. In addition, highly populated states in India are prone to droughts, which further adds to the water stress[3]. Furthermore, about 60% of the total net sown area comes under rain-fed lands. Each year, farmers in rain-fed areas face several adversities such as climate variability, crop failure, non-remunerative prices, and lack of water during the cropping season.

This situation is critical, particularly in Southern India, where moderate-to-low rainfall has given rise to severe drought conditions and exacerbated water scarcity (Mishra et al. 2021)[4]. States like Karnataka, Telangana, Tamil Nadu and Andhra Pradesh are prone to water stress, and hence droughts. Due to the failure of the north-east monsoon, Southern parts of Andhra Pradesh[5] and Tamil Nadu[6] witness drought-like conditions, leading to poor agricultural productivity, rural distress, acute shortage of drinking water and fodder. Similarly, nearly 90% of Karnataka's cultivable land in the Rabi season (which is approximately 30.5 lakh hectares) is in the northern regions of the state, which are amongst the worst-affected by drought[7] and water stress. The situation is similar in the neighbouring state of Telangana[8]. Both the states have experienced severe droughts in the past decade.

In drought-prone/semi-arid regions, water harvesting - a low-cost alternative for irrigation, is one of the key adaptation strategies for successful rain-fed farming[9]. Water harvesting is a directly productive form of soil and water conservation, which can improve yield. Addressing this critical need, **Deshpande Foundation** (DF) started the Farm Pond program in 2014. Under this program, farm ponds (of different sizes) are constructed as per farmers' requirements. Since 2014, more than 15,750 acres have been irrigated with the construction of 6,000 farm ponds, reaching over 24,000 people in Karnataka and Telangana. With the help of earth excavators provided by DF, numerous farm ponds have been constructed across seven districts of Karnataka (Dharwad, Gadag, Haveri, Belgaum, Bagalkot, Ballari, and Vijaypura) and two districts of Telangana (Siddipet, Nalgonda). DF looks forward to scale up this program to benefit one lakh farmers in the near future.

The Foundation commissioned **LEAD at Krea University** to conduct an evaluation of the program's impact in Karnataka and Telangana. The evaluation aimed to assess the impact of farm ponds on the lives and livelihoods of the program's beneficiaries in Telangana and Karnataka. This evaluation also tried to understand the effectiveness of the program at the community and individual level, and informed scale-up efforts. This study further helped in mapping and aligning the findings to NITI Aayog's Sustainable Development Goals (SDGs) for India Indicator Index.

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[1]Chindarkar N; Grafton Q.R.2019. India's Depleting groundwater: When Policy Meets Science. Asia & Pacific Policy Studies. The paper can be accessed at: https://onlinelibrary.wiley.com/doi/full/10.1002/app5.269#app5269-bib-0068
[2]Niti Aayog. 2019. Composite Water Management Index. The report can be accessed at: http://social.niti.gov.in/uploads/sample/water_index_report2.pdf
[3]ibid
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[9]Islam Z.K. et al. 2014. Low Cost Rainwater Harvesting: An Alternate Solution to Salinity Affected Coastal Region of Bangladesh. American Journal of Water Resources. The paper can be accessed at: https://www.researchgate.net/publication/286175703_Low_Cost_Rainwater_Harvesting_An_Alternate_Solution_to_Salinity_Affected_Coastal_Region_of_Bangladesh

The DF-Farm pond program evaluation answered the following questions:

- What is the economic impact of the construction of farm ponds in terms of changes in income, employment, and agricultural outcomes in the lives of the beneficiaries, in Telangana and Karnataka?
- What is the environmental impact of the project in improving the biodiversity and greenery around the vicinity of the farm ponds?
- What are the recommendations for successful implementation and further scaling up of the farm ponds program?

Methodology, Sampling and Statistical Analysis

To assess the impact of DF's farm ponds program, the data for both treatment group (i.e. the group which received the farm pond construction), and control (or a comparison) group (which did not receive the construction of farm pond) was analysed using a mixed methods evaluation design.

Mixed-methods design uses both quantitative and qualitative data. Data was collected using in-person surveys and key informant interviews (KIIs) with farmers in Karnataka and Telangana. Findings were triangulated from in-person surveys and KIIs, to evaluate the impact of farm ponds at three levels - on individual farmers, their households and the community.

To evaluate the impact on farmers and households, we used a pre-post analysis for the treatment group. For this, we compared the outcomes of interest for the program's beneficiaries across two time periods – prior to the construction of farm ponds and after the construction of farm ponds. In addition, we used the control group to estimate indicators where a pre-post analysis of the outcomes for beneficiaries was not possible. The control group was also used to understand the perspective, perception and focus areas to be considered for potential beneficiaries of the farm pond program.

The evaluation thus assessed the impact of farm ponds on water availability, land cultivated, land irrigated, cropping intensity, cropping pattern, crop diversification, crop productivity, cost of inputs (labour/monetary/machinery etc.), pumping systems, source of irrigation water (bore well, canal etc.), labour employed, revenues, income and farm profits, resilience to climate change, and risk preference/appetite of farmers. The additional/alternative livelihood sources created as well as any non-agricultural use of ponds, impact on community and changes in biodiversity in the vicinity of farm ponds were examined using qualitative insights from the KIIs.

Findings

The findings section details the impact of farm ponds on various outcomes of interest such as water availability, irrigation, cropping, input, revenues, profits, income etc. We summarise an overview of findings in the table below.

Summary of Key Findings

Indicator[10]	Findings
Water Availability	**74%** of farmers observed an improvement in water availability **3 percentage point** increase in water sufficiency from 74% to 77% **7 percentage point** increase in water sufficiency for Rabi season from 73% to 80% Farm ponds have been helpful in meeting farmers' water requirements

[10] The definitions of all indicators have been given in Annexure

Land Irrigated	**88%** of farmers observed an increase in irrigated land **12%** increase in irrigated land from 5.2 acres to 5.8 acres **17%** increase in irrigated land for Rabi season from 5.4 acres to 6.3 acres Due to increased water availability from farm ponds, farmers can irrigate more land area
Source of Irrigation	**23%** of farmers depend solely on farm ponds for irrigation, post construction of farm pond **37%** of farmers use farm ponds and borewell as a source of irrigation, post construction of farm pond Farm ponds are a good source of irrigation due to their reliability throughout the agricultural season
Pumping System	**65%** of farmers added new pumps, mainly diesel and electricity pumps **262%** increase (from 11.7% to 42.4%) in the number of farmers using diesel pump post construction of farm pond In order to extract water from farm ponds, farmers added new pumps (mainly diesel and electricity pumps)
Cropping Pattern	Increased **horticulture** post construction of farm pond Farmers started growing additional crops (like Citrus, Banana, etc.) post construction of the farm ponds
Crop Productivity	**65%** of farmers observed an increase in crop productivity **14%** increase (from 15 quintal/acre to 17 quintal/acre) in crop productivity **30%** increase in crop productivity for rice, followed by sunflower (21%) **Small and semi-medium** farmers report the highest increase (**~26%**) in crop productivity Farmers' crop productivity increases post construction of farm ponds
Cropping Intensity	**19%** increase (from 134% to 160%) in cropping intensity for **semi-medium farmers**, followed by **small farmers (13%)** from **152%** to **172%** Post construction of farm ponds, semi-medium and small farmers are able to grow more crops in their field, in an agricultural year
Land Cultivated	**79%** farmers reported an increase in land cultivated **4%** increase (from 8.3 acres to 8.6 acres) in land cultivated **5.6%** increase (from 9 acres to 9.5 acres) in land cultivated in Kharif season, as compared to 1.3% increase (from 7.5 acres to 7.6 acres) for Rabi season **82%** of farmers reported an increase in land-use efficiency **89%** land-use efficiency after the farm pond was constructed After the construction of farm ponds, farmers cultivate more land, and their fields are occupied for a longer duration
Inputs	**14%** increase in input costs - **16%** increase in agricultural inputs' cost, **15%** increase in labour cost, **11%** increase in machinery cost After construction, farmers need to use more inputs, as their land under cultivation has increased
Labour Employed	**37%** rise (from 210 to 287) in labour employed **45%** increase (from 156 to 226) in average labour hired for semi-medium farmers, followed by medium farmers (33% from 271 to 362) **75 days** of additional employment generated Farm ponds have led to the generation of employment

Revenue, Profits, and Income	**63%** increase in revenue from **rice** followed by a **53%** increase in revenue from **sunflower** **40%** increase (from INR 46,296 to INR 64,573) in profits in **Rabi** season; 11% increase (from INR 1,03,867 to INR 1,15,736) in profits in Rabi season **Kharif season**: **54%** increase (from INR 22,327 to INR 34,412) in profits for **marginal** farmers, followed by **small** farmers (**28%** from INR 46,457 to INR 59,609) **Rabi season: 78%** increase (from INR 26,056 to INR 46,391) in profits for **small** farmers, followed by **semi-medium** farmers (**73%** from INR 24,985 to INR 43,329) **20%** increase in income (from INR 2,93,683 to INR 3,51,347) **77%** of the farmers observed an average of 64% increase in their incomes Across all farmer categories, income has more than doubled for **15%** of the farmers (from INR 1,19,582 to INR 3,63,439) **36%** increase (from INR 1,32,641 to INR 1,80,167) in income for small farmers, followed by **marginal** farmers (**29%** from INR 1,00,712 to INR 1,29,694) **36%** increase (from INR 2,70,426 to INR 3,67,388) in income for farmers who used borewell pre construction of the farm pond, and now use borewell and farm pond **12%** increase (from INR 2,60,968 to INR 2,91,294) in income for farmers who were dependent on rainfall prior to construction, and now rely solely on farm ponds Construction of farm ponds has led to increased revenue, profits and income for farmers
Resilience to Climate Change	**Beneficiaries: 11%** of farmers were exposed to both drought and excess flooding; grow risky crops (crops that are more affected by weather changes/climatic events) along with the non-risky crops **Non-beneficiaries (farmers in the control group):** were affected by drought, **67%** by flood, **34%** by pest or locust attacks, and **32%** by irregular rainfall patterns; **25%** of the farmers diversified their crops (to drought-tolerant crops, or changed their cropping pattern to mixed cropping) Beneficiaries are more resilient to climate change after the construction of the farm ponds
Risk Preference/ Appetite of Farmers	**77% of** beneficiaries are risk loving, as compared to **61% of** non-beneficiaries Risk loving attitude of beneficiaries increases their willingness to try new technologies and improved means of cultivation, which can lead to improved economic outcomes
Non-agricultural Use of Ponds	**94%** of farmers use farm ponds for supplying drinking water to animals; **34%** use them for drinking water for households; **30%** use them for household-related activities Farm ponds are useful to provide water for non-agricultural purposes
Biodiversity in the Vicinity of the Farms Where Ponds Have Been Constructed	Increased **water availability on shrubs** around the pond Marked **increase in greenery** around the pond **Source of drinking water** for birds and small animals Farm ponds improve the quality of the surrounding environment
Biodiversity in the Vicinity of the Farms Where Ponds Have Been Constructed	**67%** farmers interested in construction of farm ponds; **37%** approached Deshpande Foundation for the same DF's farm pond program has been successful in generating demand for farm ponds amongst non-beneficiaries of the program

Impact on Water Availability, Irrigation and Cropping

The findings suggest that the construction of farm ponds have increased water availability for **74%** of the beneficiaries. As suggested by the water availability indices, water availability increased up to **77%** across both Kharif and Rabi seasons. We see that this increase is more prominent in the Rabi season, especially in Telangana (**84%**) where the water availability increased significantly, as compared to Karnataka (**61%**).

As a result of the increased water availability, we find an increase in irrigated and cultivated land. We find that, on average, irrigated land (ratio of total land irrigated to the total land holding) increased approximately from **5 acres** to **6 acres** overall for 88% percent of the farmers. This increase in irrigated land was higher in Karnataka (5.9 acres to 7.5 acres) than in Telangana and was more prominent in **Rabi season** (5.7 acres to 7.5 acres **- a ~31.6% increase**).

We further explored various sources of irrigation and found that pre construction of farm ponds, nearly 36% of the farmers did not have access to any source of irrigation and were dependent solely on rainfall. Additionally, for other farmers who had access to irrigation, borewells (**36%**) and canals (**22%**) were the primary sources of irrigation. However, these sources of water were not sufficient to meet water requirements, especially in seasons of scanty rainfall (as only **73%** of water requirements were being met in Rabi season, pre construction of farm ponds).

After the construction of farm ponds, with improved water availability (up to 80% in Rabi season), the dependency on secondary sources of water (borewells, canal etc.) had declined, with most of the water requirement being met by the farm ponds. Nearly 23% of the farmers did not require any additional source of water other than the farm ponds. We also observe that the percentage of farmers depending on canal water fell from **22%** to **17%** post construction of the farm pond. The survey data also shows a reduction in the dependence of other sources for irrigation water, including open wells, rainwater, and tanks. The farm pond, according to the respondents, therefore, reduced the burden of depending solely on rainwater or canal water to meet irrigation requirements.

The farmers also mentioned how their farm ponds have now mitigated issues of water insufficiency in the Rabi season (the season with high water scarcity) as they are able to store water during the monsoon for later use. With the stored water in the farm pond, farmers have confirmed enhanced irrigation capacity as they are able to irrigate up to **3-4 times**, meeting their water requirement. In addition, we find that nearly **65%** of the farmers added new pumps in their fields after the construction of the farm ponds (with **55%** of farmers undertaking the latter in 2018). This may have been due to increased water availability from the farm ponds.

We also observe that after the ponds were constructed, farmers practiced multiple cropping and had changed the type of crops grown over the years with **additional crops** (like citrus, grapes, banana etc.) being added to the list post construction. Additionally, we found that the farmers in Karnataka and Telangana grow **24 different kinds of crops**, of which Green Gram, Cotton, Maize, Wheat, Jowar are most commonly grown across all years.

A significant positive change was witnessed in crop productivity (average output in quintals per acre of land). Crop productivity had 15 quintal/acre to 17 quintal/acre (a **14% increase**), post construction of the farm pond. Amongst all farmer categories, small and semi-medium farmers report the highest increase in crop productivity (17 quintals/acre to 22 quintals/acre, and from ~14 quintals/acre to 17 quintals/acre respectively) - a **26%** increase. The maximum change in crop productivity was observed for rice (**~30%** increase from ~79 quintals/acre to ~102 quintals/acre), followed by sunflower (**~21%** increase from ~29 quintals/acre to ~34 quintals/acre).

Similarly, post construction of farm ponds, semi-medium farmers reported the highest change (**~20%**, from 134 to 160) in cropping intensity (ratio of land cultivated by land available), followed by small farmers (13% from 152 to 172).

Impact on Agricultural Input, Input Costs, Revenues, Farm Profits, Income and Credit Needs of the Farmers

The study also looked into how the agricultural input costs (labour, machinery, land etc.) has changed over the years. There was an increase in all of the input costs, with a **16%** rise in costs of agricultural inputs such as seeds, fertilisers, pesticides, **15%** rise in labour expenses; **~11%** rise in expenses on machinery, with a **~4%** increase in cultivated land (from **8.3 acres 8.6 acres**) post construction of the farm pond.

We find that only **10%** of all farmers, across states and years of construction of farm ponds, had used household labour in agricultural activities, while the remaining **90%** had hired labour to meet their labour requirements. The average labour employment per worker increased from seven months (210 days) to approximately nine months (287 days) per year during this time, creating **2.5 months** of additional employment on average; with annual wages ranging from **INR 62,467 to INR 80,187** approximately. We also observe that there has been an increase in farm mechanisation, as implied by a **11%** increase in the machinery cost (from **INR 33,479** to **INR 36,979**).

The cumulative effect of these changes has led to improved revenues, farm profits and income of the beneficiaries, as suggested by the following analysis. We find that the average revenue for rice increased by **63%** (from INR 1,40,170 to INR 2,27,903), followed by **53%** for sunflower (from INR 71,147 to INR 1,08,533). On account of increased revenues, farm-profits also increased, in both Kharif and Rabi seasons, by **11%** and **40%**, respectively. We find that in the Kharif season, the maximum increase in profits was for marginal farmers (**54%** from INR 22,327 to INR 34,412), followed by the small farmers (**28%** from INR 46,457 to INR 59,609). Additionally, **~21%** of the farmers reported a **296%** increase (from INR 51,230 to INR 2,03,140) in their profits for the Kharif season. Similarly, for Rabi season, small farmers reported the highest increase in profits, (**78%** from INR 26,056 to INR 46,391), followed by semi-medium farmers (**73%** from INR 24,985 to INR 43,329). **~20%** of the farmers observe a 309% increase from INR 25,750 to INR 1,05,425 in their profits for the Rabi season.

As a result of the higher profits, farmers' incomes also increased, post construction of the farm ponds. Beneficiaries reported an increase in income by **~20%** (from INR 2,93,683 to INR 3,51,347). Again, small farmers experience the maximum increase in income (**36%** from INR 1,32,641 to INR 1,80,167) followed by marginal farmers, **(29%** from INR 1,00,712 to INR 1,29,694). Moreover, overall **15%** of the beneficiaries report a quadruple increase (**203.9%** from INR 1,19,582 to INR 3,63,439) in their incomes. We further try to understand how the choice of source of irrigation pre and post construction of farm ponds affects the income of the farmers. We find that income increased by **36%** (from INR 2,70,426 to INR 3,67,388) for farmers who used borewell as a primary source of irrigation (i.e. pre construction of the farm pond), as well as a secondary source of irrigation post construction of the farm pond. Moreover, **36%** of the farmers who relied only on rainfall for irrigation, before the farm pond was constructed, and later used farm ponds to irrigate their lands, observed an increase of in their incomes from **INR 2,60,968** to **INR 2,91,294**.

Additionally, **55%** of the farmers reported that their ability to repay loans has improved post construction of the farm ponds. This could be attributed to the increased revenues, farm-profits and incomes of these farmers.

Impact on Farmers' Risk Attitudes

To gauge some of the behavioural aspects of the construction of farm ponds, we studied farmers' attitudes towards risk, using Multiple Price Lotteries methods. We found that the farmers in the beneficiary group are less risk-averse (or more **risk-loving**) than the farmers in the control group. Evidence from existing literature suggests that farmers with a risk-loving attitude are more willing to try new technologies and

improved means of cultivation, which can lead to improved economic outcomes.[11] The risk-loving attitude among the farmers in the treatment group may have been instilled over the years due to the exposure to various initiatives like the farm pond and sensitisation programs by Deshpande Foundation that has built confidence in the farmers to be willing to make choices with uncertainty that lead to higher benefits.

Beneficiaries' Experience With Farm Ponds

Additionally, in-depth interviews with beneficiaries provided an insight into the experiences of the farmers post the construction of the farm ponds. We find that the motivation for the farmers is to construct farm ponds, store water, and reduce their reliance on rains to meet their water requirements. Farmers used farm ponds for various non-agricultural uses as documented in surveys: for approximately **94%** of the farmers, the farm ponds were a source of water for their animals, **34%** used it as a source of drinking water for the household, and **30%** used it for other household activities such as bathing/cleaning etc. Some of the farmers shared the water from the farm ponds with their neighbours who used their farm ponds to provide water to their cattle and livestock. This shows that farm ponds have a notable impact on building community.

Farm ponds have also led to improved biodiversity by increasing **greenery, rich flora and fauna** in the vicinity of the farm ponds, as reported by the farmers in the qualitative interviews and the surveys.

Potential Beneficiaries and Demand for the Farm Ponds Program

We find a high level of awareness about the program, even among respondents who did not participate in it. We find that **76%** of the farmers in the control group were aware of workshops conducted by the Foundation to promote the uptake of the farm ponds program, but only **39%** of them had participated in such workshops. Additionally, the respondents were aware of the potential uses and challenges of the farm ponds. Approximately **90%** of the respondents said that farm ponds are a major source of irrigation. They also cited some of the alternate uses of farm ponds with **54%** of the farmers saying farm ponds to be a source of water for livestock, or drinking water (either for households or animals) and fisheries. Considering such uses and potential benefits of access to a farm pond, **67%** farmers are willing to construct a farm pond provided that they are given technical or financial assistance in the process. **84%** of the farmers perceive that additional water availability from farm ponds would increase their yields, and also encourage them to take up crop diversification or multiple cropping. However, **31%** of the respondents consider the high maintenance cost of the farm ponds to be a major challenge in maintenance post construction. Nonetheless, **67%** of farmers were interested in construction of farm ponds, and **39%** of them approached **Deshpande Foundation** for the same.

Feedback on the Farm Pond Program

Through qualitative interviews, we sought to understand the overall perception of the program on various aspects like sensitisation workshops, follow-up advisory, additional services offered etc. We find that **30%** of the farmers received additional services related to maintenance of farm ponds, and training and sensitisation workshops on best practices. The farmers were asked to rank the farm ponds program and the services offered by Deshpande Foundation. **89%** of the farmers were satisfied with the program, and **96%** of the farmers were likely to recommend the farm pond program to other farmers. An important spillover of the program was that it also motivated other members of the community to construct a farm pond, post participants sharing their experiences, resulting in higher uptake of the farm pond as a source of irrigation and benefiting the community.

[11] Alisa Spiegel, et al. Risk, Risk Aversion, and Agricultural Technology Adoption-A Novel Valuation Method Based on Real Options and Inverse Stochastic Dominance (2021). A Journal of Agriculture, Climate, Environmental, Food, Resource, and Rural Development Economics

Recommendations

While the above-mentioned findings suggest that farm ponds are noteworthy in helping water-scarce regions contribute to and move closer to the sustainable development goals of no poverty, climate action and life on earth, more efforts can be undertaken towards addressing the sustainable development goal of gender equality.

Beyond-The-Farm Activities: As recommended by Choudhary and Mukherjee (2019)[12]; Giordano and de Fraiture (2014)[13]. Deshpande Foundation should also focus on "beyond the farm" activities, such as improved storage facilities and strengthening of market linkages. This would enable the farmers to hedge the volatility of the market. In addition, strong linkages should be made between the DF farm pond program and other programs like DF-Farmer Producer Organisations (FPOs) that would by default ensure a farmer's membership in the FPO and the construction of the farm ponds.

Plastic Tarps, Lining, and Fencing of Ponds: Some farmers mentioned that during the summer months, water from the farm ponds gets depleted before the next round of irrigation can be carried out. Based on this, DF should consider providing plastic tarps to cover the pond bed and top to avoid water percolation and evaporation. Some farmers have also mentioned that there have been incidents where animals have fallen into the pond. Given this, DF should consider fencing around the ponds to avoid such accidents and mishaps. In addition, Deepika S., Rao B K., (2018)[14] ; Getaneh, (2013);[15] Samuel, 2013[16]; Jayanthi (2004)[17] studied that ponds without lining lead to seepage losses, which ultimately deteriorates the fertility of the adjacent field. They, therefore, recommend lining the farm ponds to avoid such losses.

Water-Saving Technologies: Less than 15% of farmers use drip irrigation - a water-conserving technology. Therefore, farmers should be encouraged to use technologies like drip irrigation to conserve water (Palinasami and Kumar, 2009)[18].

Additional Aid: The major cost item for maintenance of the farm ponds is adding a new pump, new pipelines, and cleaning ponds. Therefore, Deshpande Foundation should consider providing aid to the farmers in uptake and maintenance of farm ponds, and this will help in further scaling up of the program.

Improved Workshop Programs: We recommend DF arm ponds program should ensure some handholding support to the farmers post construction of farm ponds on not just maintenance of the farm ponds but also to guide them on various income-earning opportunities from farm ponds like fishery, lotus cultivation etc. In addition, given that only 17% of the farmers received training and sensitisation workshops from DF, DF should also focus on covering more farmers for such training, and increase awareness of the program amongst non-beneficiaries of the program.

Management Information Systems (MIS) Platform: There should be a dedicated MIS and project monitoring platform where project-related data is verified and uploaded at regular intervals. This could be integrated as a dashboard on the DF website. This would help track the progress of the project; in identifying if there are unaddressed gaps like delayed construction of farm ponds due to administrative lags. This will further help strengthen the project by identifying loopholes in project implementation.

Gender Balance: Currently, 99% of the beneficiaries of the DF farm pond program are male farmers; the program can set goals to achieve gender equality as a set target matching the Sustainable Development Goals. DF can do this by ensuring that each year a set percentage (i.e., 25% or 50%) of the program's beneficiaries are women.

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