Impact Assessment Study under Holistic Rural Development Programme (HRDP)

Yamunanagar, Haryana – P0289

Prepared For:

HDFC BANK PARIVARTAN

HDFC Bank Corporate Social Responsibility (CSR)

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List of Acronyms

APL	Above Poverty Line
BPL	Below Poverty Line
BaLA	Building as Learning Aid
BPL	Below Poverty Line
CSR	Corporate Social Responsibility
CARD	Centre for Advanced Research and Development
FGD	Focus group discussions
HH	Household
HRDI	Holistic Rural Development Index
HRDP	Holistic Rural Development Programme
IDI	In-depth Interview
KII	Key Informant Interview
NRM	Natural Resource Management
SHG	Self-Help Groups
SMC	School Management Committees
ST&LE	Skill Training & Livelihood Enhancement
PoE	Promotion of Education

Executive Summary

The present study is an impact evaluation of the Holistic Rural Development Programme (HRDP) which was implemented by the Centre for Advanced Research and Development (CARD) with support from the HDFC Bank CSR in Chachrauli block of Yamunanagar district, Haryana during April 2019-2023 period. The focus of this study was on understanding the overall process that CARD and HDFC undertook in carrying out the programme activities, the key milestones achieved, the impact created by these activities, and the challenges faced.

The key focus areas of the intervention were Natural Resource Management (NRM), Skill Training & Livelihood Enhancement (ST&LE), Health and Sanitation (H&S) and Promotion of Education (PoE). The framework used for the impact assessment was an adaptive version of the DAC criteria - Relevance, Effectiveness, and Sustainability.

A mixed methodology, comprising both qualitative and quantitative tools, was used for the evaluation which was carried out in a participatory manner involving all the key stakeholders of the programme. Apart from a household survey (389 HHs + 54 students/teachers) where the respondent households were selected using purposive random sampling, qualitative data was collected through the means of focus group discussions (3), Key Informant Interview (1) and In-depth interviews (12).

Natural Resource Management

Under NRM focus was on bringing down input costs, diversification of crops, improving access to farm management infrastructure and increasing the area under irrigation. 52 Farmer Interest Groups (FIGs) were formed and training/Farmer Field Schools/exposure visits were organised on sustainable agriculture practices. Other activities like soil testing lab, soil and water conservation activities to check soil erosion, vermicompost and azolla, provision of improved varieties of poplar saplings, renovation of community ponds, solar fencing and improved irrigation systems (drip and solar water pumps) were also taken up.

The interventions have resulted in an increase in farm income at INR 17,513 over pre-project levels. This could be attributed to various factors among which existing high levels of productivity, crop losses during the last couple of Rabi seasons, benefits of changes in cropping pattern showing results from this year onwards could be counted as major ones. The project interventions have resulted in low to medium impact, particularly with respect to crop productivity and access to farm management infrastructure. This can be attributed to activities implemented ranging from farm field schools, vermicompost, drip irrigation, custom hiring centre among others. There has been success in the adoption of clean energy solutions like solar street lights and many of the local bodies have started taking initiative on this by wanting to cover all the streets within their jurisdiction.

Skill Training and Livelihood Enhancement

The formation of new SHGs, revival of inactive groups, training on basic aspects of SHG functioning and promotion of SHG enterprises and linking them to Mahila Shakti Mart were one of the focus areas under the ST&LE aspect of the intervention. Also, livelihood activities such as backyard poultry, goat rearing, stitching/Dari Weaving, food processing and mushroom farming were promoted to enhance the household income levels with a particular focus on women. A FPO was formed in the project area to support agricultural products processing as also to reduce farm costs through a custom hiring centre.

Promotion of Education

As part of the Promotion of Education (PoE) intervention, infrastructural facilities at government schools were improved. Smart classrooms were developed in some schools to make teaching more interactive. Additionally, twelve schools were supported with teaching and learning materials, BaLA painting, libraries, and science labs. The anganwadis (19) were also renovated by painting the walls to create a livelier environment.

Health & Sanitation

General Health camps, veterinary camps (26), awareness sessions on healthcare were organised under the H&S aspect of the intervention. Household toilets (120) were constructed and efforts were made towards management of waste in four villages through e-rickshaws.

The following table outlines the achievements of key income indicators across the baseline and endline of the project.

Table 1: Summary of Key Income Indicators

Income Indicators (based on median)	Before	After	% Change
Average Net Income from Agriculture (INR)	69601	87114	25.1
Average Productivity of paddy (kgs/Acre)	2293.9	2303.5	0.41
Average Productivity of wheat (kgs/Acre)	1694.5	1747.8	3.14
Average Productivity of sugarcane (kgs/Acre)	25923	27281	5.23
Average Income from livestock (INR)	417	958	129.7

The average net income from agriculture has shown a 25% increase over pre-project levels. Additionally, the implementation of animal health camps, vaccinations, and training on improved goat rearing practices have led to a nearly 130% increase over pre-project levels.

HRDI Indicators

The HRDI for the project has shown a significant 77% increase, rising from 0.26 to 0.46, indicating the positive impact of various interventions in the area. Notably, the Natural Resource Management (NRM) has seen a 25% improvement compared to the baseline figure. The HRDI score for Skills Training and Livelihood Enhancement (ST&LE) has surged by an impressive 400%, which can be attributed to the initially low baseline score and the interventions related to livestock and rural enterprises.

Another notable factor is the higher score for members reporting an income above the median from rural enterprises, despite the actual number of members reporting being just 25. Additionally, Health and Sanitation (H&S) and Promotion of Education (PoE) have shown increases of 60% and 43%, respectively. These figures reflect the substantial progress made in these areas as a result of the implemented interventions.

Table 2: Summary of HRDI Indicators

Domain	NRM		ST&LE		H&S		PoE		Total	
HRDI Score	Base line	End line	Base line	End line	Base line	End line	Base line	End line	Base line	End line
	0.08	**0.10**	**0.02**	**0.10**	**0.10**	**0.16**	**0.7**	**0.10**	**0.26**	**0.46**

% Change	25	400	60	43	77

Recommendations

- Initiatives like FPOs should be preferably started in the initial year to help build up systems and put in processes.
- There is a need for SHGs to be part of a federation for building the required scale advantages. The FPO can also play a supportive role in this respect.
- Services of independent livelihood advisors / Business Development Service (BDS) providers should be taken for livelihood activities.
- Need for concerted focus on climate change because rural livelihoods are going to be inextricably affected by it in the coming years.
- Focus on life (social) and developmental issues related to the quality of life of the poor too should be there apart from the economic empowerment aspect.
- Need for VDCs to build up synergies with PRIs.
- The organisation needs to build up more convergence and linkages with government programmes like MGNREGA, RKVY, SBA and NHM etc.
- The time period of the project intervention should be increased to make a more lasting impact.
- The services of independent livelihood advisors/Business Development Service (BDS) providers should be utilized
- Baseline data should be captured right at the beginning to get a real picture of the ground realities and areas which need focus.

1 Introduction

Though India has made massive strides in human development over the last few decades, the rural areas of the country have not substantially benefited from the growth and development occurring nationwide. Even after seventy-five years of independence, disparities between rural and urban centres in the country have been growing. Agriculture is still the mainstay of the Indian economy due to its high share in employment and livelihood creation, notwithstanding its reduced contribution to the nation's GDP over the last few decades. The challenges in rural areas are diverse, ranging from low productivity in agriculture and a lack of non-farm employment opportunities to the availability of basic amenities like clean drinking water, toilets, and sanitation facilities, to name a few. To mitigate these diverse yet interlinked developmental challenges, HDFC Bank, under its Corporate Social Responsibility (CSR) initiative 'Parivartan,' supports numerous programs that deliver holistic rural development to aid the growth and prosperity of the rural population.

1.1 About HRDP

Under the aegis of *Parivartan*, the Holistic Rural Development Programme (HRDP) is HDFC Bank's flagship CSR programme in collaboration with non-governmental organizations nationwide. The programme focuses on developing human capital, managing natural resources, and improving infrastructure in villages, with the ultimate goal of bringing about a positive socio-economic transformation in the lives of the rural population. Interventions are primarily undertaken in four thematic areas:

a) Natural Resource Management
b) Skill Training and Livelihood Enhancement
c) Health and Sanitation
d) Promotion of Education

The primary objective of HRDP is to provide tools and means forth rural population to grow and prosper both socially and economically. The HRDP takes a comprehensive approach by addressing various community needs, including promoting economic independence through skill training and livelihood opportunities, enhancing basic infrastructure, and establishing a healthier ecosystem for improved living conditions.

1.2 Objectives of Impact Assessment

This impact assessment study aims to evaluate the tangible effects and outcomes of project initiatives. The study has analysed the influence of the HRDP on the targeted areas and populations. The assessment provides insights into the effectiveness and sustainability of the project's interventions. The study aims at understanding:

- Overall process undertaken for implementing HRDP activities
- Key milestones achieved
- Impact created by HRDP activities
- Challenges faced and how they were managed

The guiding philosophy behind this study is to add value by showcasing successful initiatives and recommending possible ways to address existing challenges.

The study seeks to:

- Critically and objectively evaluate implementation and performance

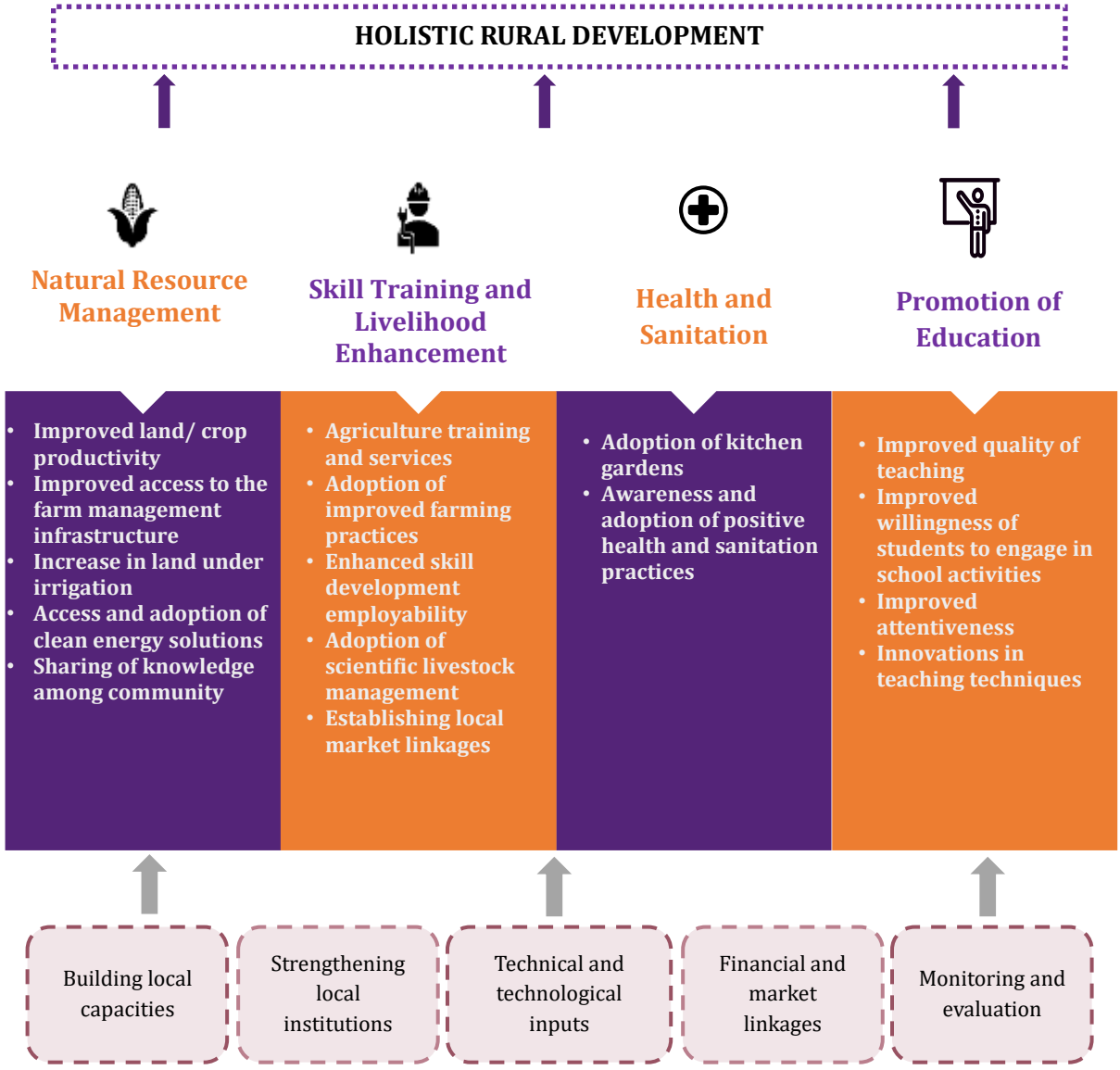
- Determine reasons for certain outcomes or lack thereof
- Derive lessons learned and good practices
- Provide evidence-based findings to inform future operational and strategic decisions while planning and funding partner organisations

This study was also an opportunity to assess the on-ground relevance and effectiveness of the programme.

1.3 Conceptual Framework Adopted

The conceptual framework and the areas covered under the assessment are depicted below. The aim is to build local capacities and strengthen local institutions while providing technical inputs and conducting evaluations across the four thematic areas.The objectives under NRM, ST&LE, H&S and PoE are enumerated in the figure below.

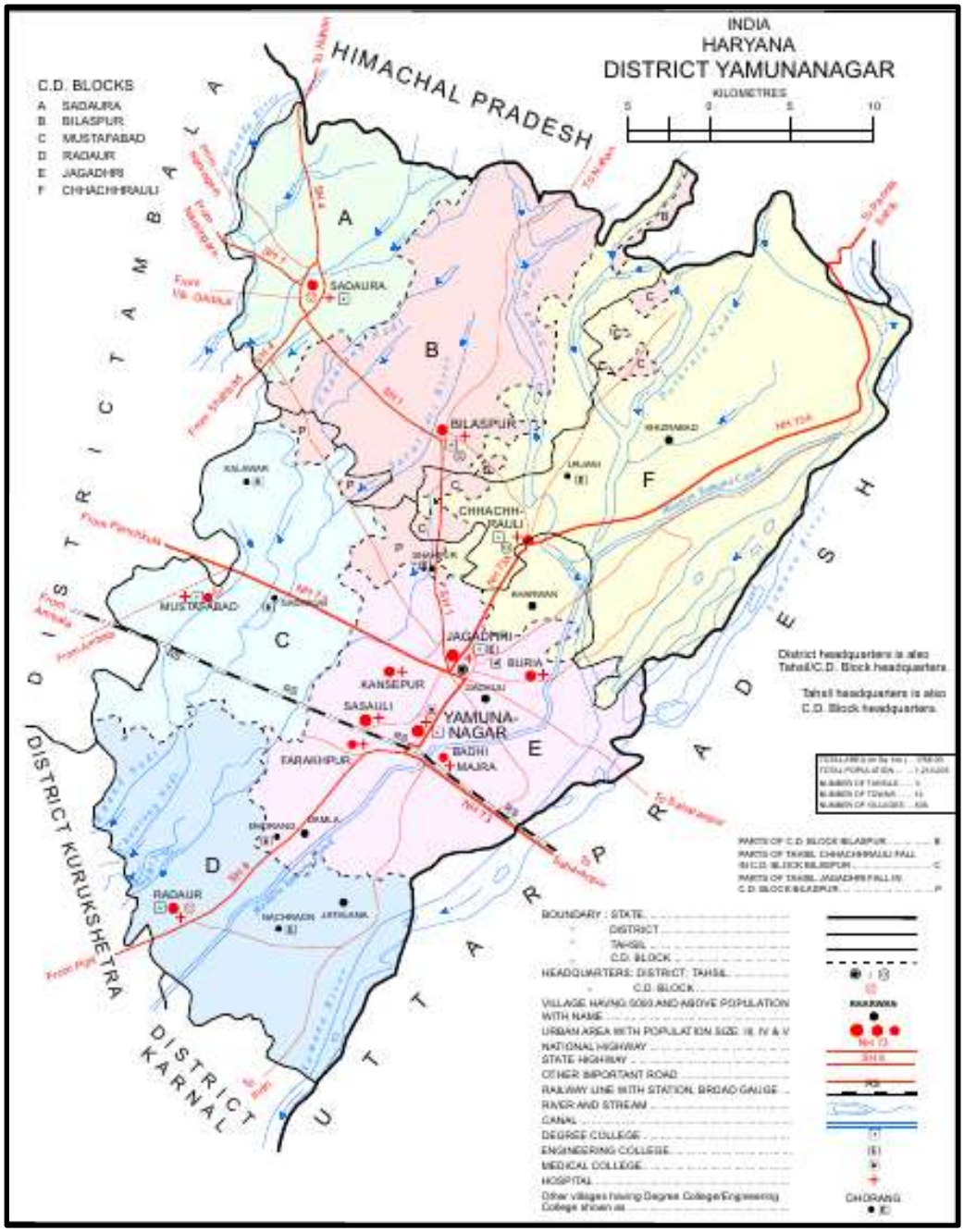
Figure 1: Conceptual Framework



1.4 About the Project Area[1]

Yamunanagar is one of the districts in Haryana, generally known for its plywood units and paper mills. The district has the Yamuna River flowing through it, forming the boundary with the Saharanpur district of Uttar Pradesh. A major part of the district is inundated by seasonal rivers and rivulets, with the general character being broad sandy courses that are dry most of the year but bring heavy flooding during the rainy season.

Image 1. District Map of Yamunanagar.



[1]Source: District Census Handbook, 2011

Image 2:Poplar Plantations

Agriculture is still one of the major sources of livelihood for people in rural areas, though its share has been decreasing over the years. It has a very high proportion of the total land under irrigation (more than 78% of the total cultivated area), with the major sources being tube wells and canals. While paddy and sugarcane are grown during the Kharif season, wheat, pulses, and mustard rapeseed are grown during the Rabi season. Over the last few years, poplar plantations have grown in large numbers in the district. There is a fairly large livestock population, particularly cows and buffaloes, which contribute immensely to rural households' income in terms of milk, manure, and as a source of cooking fuel. The villages have a mixed population, with SCs and OBCs being the majority.

1.5 Implementing Partner in the District[2]

Established and registered in 2000 under the Societies Registration Act of 1860, the Centre for Agriculture and Rural Development (CARD) is an organization working in various states across the country, engaged in a variety of activities in agriculture, horticulture, and rural development. CARD focuses on information dissemination, training, capacity building, and technology exposure by organizing business seminars, technical conferences, farmers' workshops, agro trade fairs, conducting surveys and studies, and adopting villages for sustainable development.

CARD has strong links with the farming and business communities, as well as policymakers, built up over many years of consistent efforts to voice agricultural concerns and facilitate partnerships. It has organized hundreds of rural expos, farmers' seminars, and workshops, and has participated in several field projects. Through a series of activities, CARD seeks to empower farmers with the latest technologies, quality products, and services by organizing several capacity-building sessions, workshops, rural exhibitions, and interaction programs.

To date, CARD has impacted over three lakh farmers through a series of successfully carried out awareness campaigns at district and block levels. To date, CARD has covered 74 districts in various states, such as Uttar Pradesh, Madhya Pradesh, Himachal Pradesh, Haryana, Punjab, Maharashtra, Andhra Pradesh, and the North East region.

[2]Source: https://card.org.in/

2 Research Design and Methodology

The impact assessment used a mixed-method approach that includes both qualitative and quantitative methods to evaluate the impact of the project interventions. The impact assessment process was carried out in a consultative manner, engaging with key stakeholders involved in the project design and implementation, including HDFC Bank and CARD.

2.1 Criteria for Assessment

For each thematic area, project activities completed by the CARD were identified from their project documents, reports and MIS that they submitted to HDFC Bank. The impact of those activities was assessed using the following criteria:

- Relevance and Convergence
- Impact and Effectiveness
- Sustainability

Under the criterion of relevance and convergence, the team assessed whether the design of the project interventions was:

1. Aligned with the state's plans and priorities for rural development.
2. Relevant to the local needs of the most vulnerable groups.
3. Converging with (and making use) of the government's existing resources.
4. Enabling different stakeholders to work together to achieve the intended outcomes of the programme.

To assess the impact and effectiveness of the project, the team established the values of outcome indicators for all four thematic interventions. The findings were assessed against these values through the identification of qualitative evidence and analysis of project outcomes (in light of variables identified in consultation with HDFC Bank). The team tried to understand whether and how the project impacted the lives of community members in the project areas. The findings from primary quantitative data were substantiated by the information gathered from discussions with the communities and beneficiaries, teachers, students, entrepreneurs, and local village-level institutions.

For the criteria of sustainability, the team studied the primary data to understand if the project has worked on strengthening the community's capacity, positioned appropriate institutional mechanisms to ensure sustainability, and if any of the activities or strategies adopted have been or could be replicated.

2.2 Primary and Secondary Data Sources

Primary research included a quantitative household survey that was conducted by a survey team consisting of five enumerators and one supervisor. The primary quantitative data was collected using the Computer Assisted Personal Interview (CAPI) method, where we developed a mobile application to collect data. The qualitative research included In-Depth Interviews (IDIs), Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) with project beneficiaries and secondary stakeholders such as the team members of Centre for Agriculture and Rural Development, the HDFC Bank programme team, local leaders from the project area, etc. IDIs were conducted with the specific individuals who were recipients of the project. The qualitative exercise(s) were conducted by our research coordinator.

Secondary data sources included HDFC's CSR Policy, Programme Log Frame (Logical Framework Analysis), Rapid Rural Appraisal Reports, Programme Implementation Timelines, Communication, and Documentation Products, and those shared by the NGO partner such as Impact Report, Monitoring Report and Target versus Achievement Report.

The outcome mapping and result chain development were undertaken in consultation with the HDFC Bank team. Standardised key outcomes and indicators were identified for each thematic area (NRM, ST&LE, H&S and PoE) and based on this, the questionnaire was developed.

2.3 Sample Size and Distribution

From the nine villages of Yamunanagar where the project was implemented, beneficiaries were selected, using purposive random sampling, from a list of beneficiaries obtained from CARD. Since beneficiary selection was undertaken independently for each thematic area, the selection of more than one beneficiary from a single household was probable. Also, there were instances where a single beneficiary received multiple benefits and support across the four thematic areas. The inclusion of beneficiaries in all thematic areas was ensured. The target sample size across nine villages was 400, out of which 443 (incl. 389 HHs) sample respondents were reached. The thematic area-wise sample covered was as follows.

Table3: Quantitative Sample Covered

Village	Theme				
	Total	NRM	ST& LE	PoE	H&S
Arjun Manjra	28	21	18	01	15
Baniyawala	47	46	25	08	36
Darpur	46	43	37	20	41
KotMustharka	47	44	40	02	40
Manakpur	46	39	44	04	38
Prithipur	42	36	18	04	30
Sehjadwala	46	43	31	02	23
TaharpurKalan	49	49	38	12	40
Mukaribpur	38	33	27	05	31
Total	**389**	**354**	**278**	**58**	**294**

Qualitative methods like Focus Group Discussions (FGDs) (3) and In-Depth Interviews (12) were also used to collect data from the very same villages covering various themes of the project intervention.

2.4 Training of Enumerators

Image 3: Training of the Enumerators

A gender balanced survey team, consisting of five enumerators and one supervisor, were part of the quantitative data collection process. Two days of training were provided to the team by the field coordinator and research coordinator, during which they were given detailed orientation on the data collection tools, and protocols as well as maintaining the quality of the data being collected. The training included both classroom teaching and mock practice of the survey tool. Team members of CARD, the NGO also gave an overview of the project and the area.

3 Programme Planning and Implementation

The planning and implementation of the programme involved five stages: selection of project area viz. district, block, village, selection of thematic areas and interventions, approval of the budget, programme implementation, and monitoring and evaluation. These stages are further explained below.

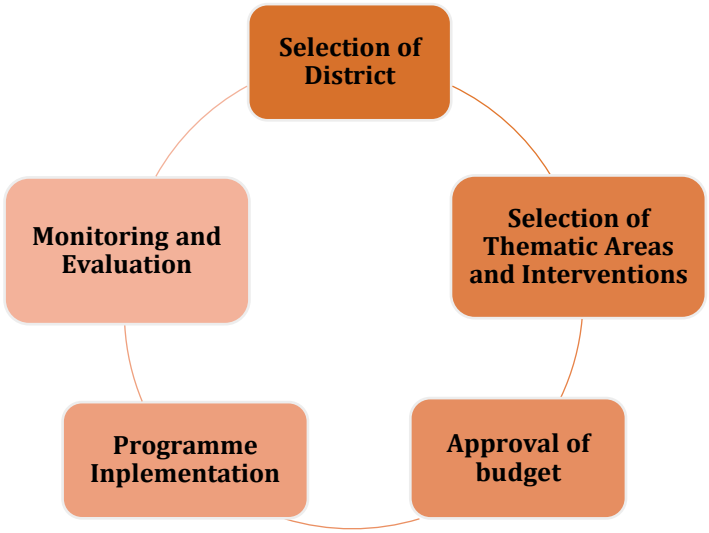


Figure 2: Planning and Implementation Process

3.1 Selection of Project Area

The selection of the project was based on the existing operation area of Centre for Agriculture and Rural Development (CARD), the implementing agency in Yamunanagar district of Haryana. The project was implemented in 13 villages (5 new) in three blocks of Yamunanagar District of Haryana, which has a total population of around 25 thousand households. Major issues in the project villages are:

- High proportion of landlessness (56 %) which limits the ability of households to earn a stable source of income[3]
- Intensive use of groundwater, chemical fertilisers and chemical pesticides, has caused rise of soil-salinity and a depletion of the organic content of the soil.
- The majority of those owning lands are small and marginal farmers, who find it difficult to meet both ends, only through agriculture.

CARD objectives in the project were directed toward these landless, small, and marginal farmer households.

3.2 Selection of Thematic Areas and Interventions

Considering the above challenges in the project area, CARD proposed HDFC Bank CSR under HRDP interventions focused on promoting water and farm management in addition to clean energy under the Natural Resources Management theme. The project also focused on agricultural training and support, skill training, livestock management, and entrepreneurship development

[3]CARD Project Proposal

under ST&LE; educational institution development and education support under PoE; health awareness and sanitation practices under H&S. The activities specific to each village under the project were decided after in-depth consultation with the respective Village Development Committees (VDCs), which were constituted during the beginning of the project implementation. Activities under each of the four thematic areas are given in the following table.

3.3 Project Implementation

Table 4: Activities under Four Thematic Areas in Yamunanagar

Activity Category	Activities	Output Indicators
NRM		
Irrigation Management	Solar Water Pump, Drip Irrigation	Income from agriculture
Water Management	Community Ponds	
Farm Management	Soil testing, tools for agriculture demonstration, vegetable kit, Bunding (Solar Fencing)	
Clean Energy	Solar street light installation	Clean energy
ST&LE		
Agriculture Training and Support	Farmer Field Schools, Exposure Visits, Demo Plots, PoP Training, Natural/Organic Farming, Custom Hiring Centre, FPO	Access to Agriculture Training and Services
SHG-Based Women Empowerment	Training on income generating activities	Skill and Entrepreneurship Development
Skill Training	External resource support/IEC material, Training/Awareness program for VDC and Panchayat Members, Exposure visit for VDC members for water resource management and NRM	Skill and Entrepreneurship Development
Livestock Management	Animal Health Camps/Vaccinations, training on improved goat rearing practices, external resource support/IEC material	Livestock Management
H&S		
Sanitation	Soak Pits, Toilet Construction, Waste Collection & Awareness Campaign	Sanitation Infrastructure and Services
Health	Health Camps, Hygiene related awareness sessions	Health Infrastructure and Services
Kitchen Garden	Seeds, training, demonstrations, fertilisers	
PoE		
Educational Institutions Development	Wall projector, sports kit, toilet repair, BaLA, Smart classroom	Infrastructure in Educational Institutions

3.4 Project Implementation

The project implementation comprised a combination of providing direct materials and services such as seeds, drips, and sprinklers as farm inputs and implements, along with raising awareness about new agricultural techniques.

Under NRM, the project supported improving the capacity of farmers in soil health management by conducting soil tests and suggesting measures to replenish the gap in soil nutrition. Composting kits were provided to selected farmers experiencing nutritional deficiencies in their farmland. Laser levelling was used by farmers to ensure that the land was ploughed uniformly, thus ensuring water reached everywhere. Drip irrigation systems were installed to demonstrate the importance of conserving water and increasing irrigation efficiency. Work was done on water management by rehabilitating community ponds in some of the project villages. Clean energy was also a focus area, where solar street lights were installed at several junctions in the project villages.

Under ST&LE, the project provided skill training as well as livelihood enhancement measures for the farmers. Improved varieties of poplar saplings were given to the farmers. High-density vegetable cultivation was introduced to the farmers. Crop demonstrations as a Package of Practices (PoP) were carried out for wheat. A Farm Field School (FFS) was developed on 1 acre of land in every village to educate the farmers on the latest technological advancements in agriculture. Farmers were taken on exposure visits to the FFS at different stages during the season to enhance their skills and knowledge. The project also promoted goat rearing and backyard poultry as an income generating activity among landless families to provide them with an additional source of income. Tailoring and beautician training were provided to the women of the nine villages to enhance their skills in these professional traits and make them more employable.

Under H&S, attention was given to organizing annual health camps for the public during the project duration, where medicines prescribed by the doctors were provided to the patients free of charge. Individual household toilets were also constructed under the project.

Under PoE, renovation work was carried out at Anganwadis and schools. Smart classes were introduced, and infrastructural support was given in the form of furniture and books. Separate toilets for boys and girls were constructed, and an uninterrupted water supply was ensured under the project. Building as Learning Aid (BaLA) paintings and lab equipment were made available. The implementing partner had a team that was responsible for project implementation. They also inducted community-level functionaries for mobilizing communities and helping them implement project activities.

3.5 Monitoring and Evaluation

The HRDP adhered to a standardized monitoring and evaluation methodology, as endorsed by the implementing partners. This included the periodic submission of progress reports on project implementation to HDFC Bank. Furthermore, the programme implementation team from the bank conducted scheduled visits to the project villages, reviewed the project work sites, and interacted with project beneficiaries.

The HDFC Bank requested project information from the implementing partner. The partner managed project data, detailing village-wise activities, beneficiaries, and expenditures. The partner submitted an annual progress report along with the plan for the next year to HDFC Bank. This document summarises activities implemented, outputs delivered, and outcomes achieved.

In addition, HDFC Bank hired Intellecap as an external agency to conduct an impact assessment of the project after one year of project completion. This was an independent assessment that was evaluated using four criteria: relevance and convergence, impact and effectiveness, sustainability, and replicability. This is backed by the creation of a Holistic Rural Development Index (more details in Annexure B) based on selected outcome indicators. The impact of each activity has also been calculated and classified as high, medium, or low impact. Annexure C goes into greater detail on these.

4 Study Findings

This chapter gives a brief overview of the sample households as well as a detailed overview of the findings from the four thematic areas.

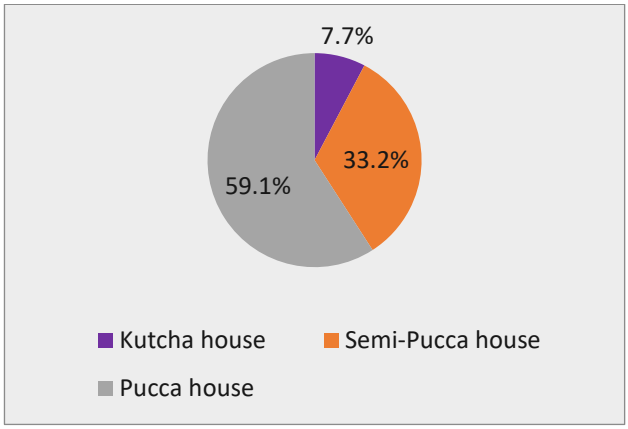
4.1 Demographic Profile

Table5: Distribution of sample (All figures in percentages)

Age of the respondent		Social Category		Status of Education		Sources of Income	
18-25 yrs	5.4	Scheduled Caste (SC)	27.0	Illiterate	12.9	Agriculture	33.4
26-35 yrs	28.8	General	28.0	Literate but no formal education	3.1	Wage labour	35.2
36-45 yrs	33.4	Other Backward Classes (OBC)	44.2	Up to 5th std	18.5	Salaried	3.2
46-55 yrs	17.2	**Ration Card**		6th to 8th std	24.9	Livestock	12.5
Above 55 years	15.2	Antyodaya	2.6	9th to 10th std	21.1	Non-agricultural income	4.5
		BPL	79.4	11th to 12th std	12.9	**Gender of the respondent**	
		APL	16.2	Graduate	4.9	Male	53.5
		Do not have ration card	1.8	Post graduate	1.0	Female	46.5

Despite the rise in living standards and the availability of both state and central government schemes related to housing, there is still a high proportion of households (>40%) living in either semi-*pucca* or *kutcha* houses, as can be seen in the figure below.

Figure3: Type of Houses



Drinking water is mostly (90%) through pipes which come into the households. Firewood and cow dung cakes are slowly getting replaced by LPG for cooking in the villages. (See figures below)

Figure4: Source of Drinking Water

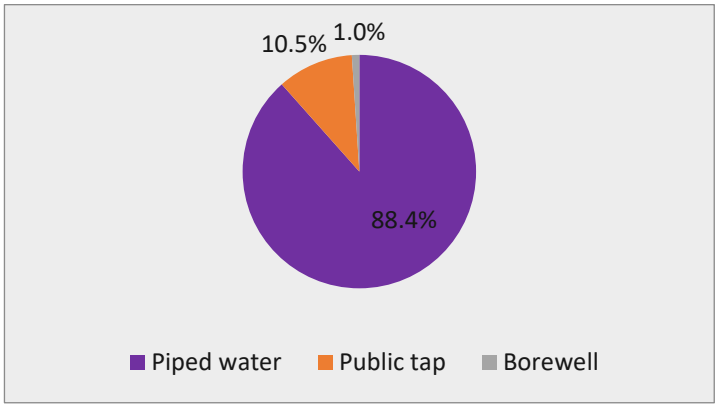
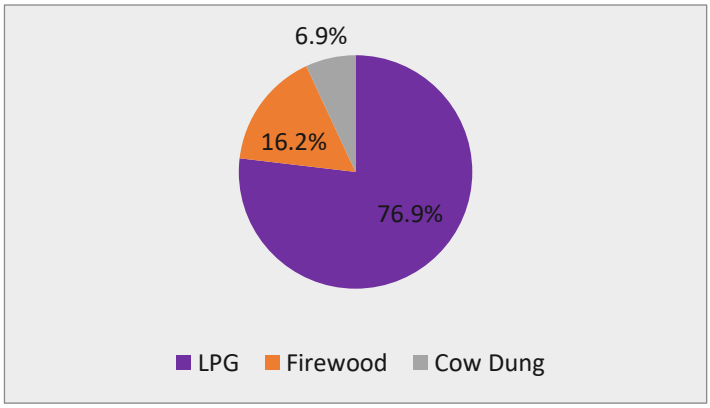


Figure 5: Medium of Cooking Fuel



While the above analysis represents the nature and status of the sample, the below table represents the summary and quantum of activities carried out under each intervention category of the four thematic areas.

Table6: Quantam of Activities under the Thematic Areas

Activity Category	Activities	Nos
NRM		
Irrigation Management	Solar Water Pump	06
	Drip Irrigation	65
Water Management	Renovation of Community Ponds	455
Farm Management	Soil testing	
	Farm Bunding (Solar Fencing)	53
	Vermicompost/Azolla	230/65
	Poplar Plantation	798
Clean Energy	Solar street light installation	65
ST&LE		
Agriculture Training and Support	Training cum Exposure Visits	09
	Farmer Field Schools	13
	Mushroom Cultivation	130
	Kitchen Garden	282
	Demo Plots	156
	Custom Hiring Centre	01
	Farmer Producer Organization	01
SHG-Based Women Empowerment	Training on income generating activities	13
	Goat Rearing Unit	39
	Poultry Rearing	45
	SHG Formation & Revival of Old SHGs	39
Skill Training	External resource support/IEC material, Training/Awareness program for VDC and	Nos n/a

	Panchayat Members, Exposure visit for VDC members for water resource management and NRM	
Livestock Management	Animal Health Camps/Vaccinations, training on improved goat rearing practices, external resource support/IEC material	26
H&S		
Sanitation	Toilet Construction	120
	E-rickshaw Waste Collection	04
	Awareness Campaign	Nos n/a
Health	Health Camps, Hygiene related awareness sessions	Nos n/a
Kitchen Garden	Seeds, training, demonstrations, fertilizers	282
PoE		
Educational Institutions Development	BaLA Painting (School)	12
	BaLA Painting (Anganwadi)	19
	Construction/Repair of separate washrooms for Girls & Boys	11
	Classroom Furniture	12
	Science Lab Equipment	12
	Smart Class Rooms	12

(Source: Project MIS from CARD)

The following sub-sections highlight the key findings from the field survey conducted to assess the impact of the programme after its completion.

4.2 Natural Resource Management

Image 4: Stone Pitching Work on a rivulet

The interventions under this theme primarily focused on increasing farmers income by enhancing crop productivity, diversifying crops, and improving access to farm management infrastructure for land treatment and irrigation systems. Practices such as sustainable agriculture, water management, and irrigation improvement measures were promoted under the project, with the aim being to increase soil fertility through optimized resource use and increased crop yields. Farmers were part of field schools, which are season-long, crop- and field- based training on pre-identified problem and curriculum. Improved varieties of poplar saplings were provided to farmers to support their efforts towards crop diversification. Efforts were also made under the project to raise awareness as well as increase the adoption of clean energy solutions such as solar street lamps and solar pumps for irrigation.

In many villages, rivulets overflow their banks during the rainy season, causing considerable soil erosion. Stone pitching was done on the river embankment, benefiting farmers whose lands were adjacent to it and affected by the erosion.

The incidence of wild as well as domestic animals destroying the crops is on the rise in the project area, like in other parts of the country. The farmers were supported under the project for the installation of solar fencing around their farmland.

In order to enhance the bargaining power of farmers in the market, reduce production costs, and ensure fair prices for their produce, a Farmer Producer Organisation was promoted in the project area. A custom hiring centre for farm implements was also part of the FPO.

4.2.1 Irrigation Management

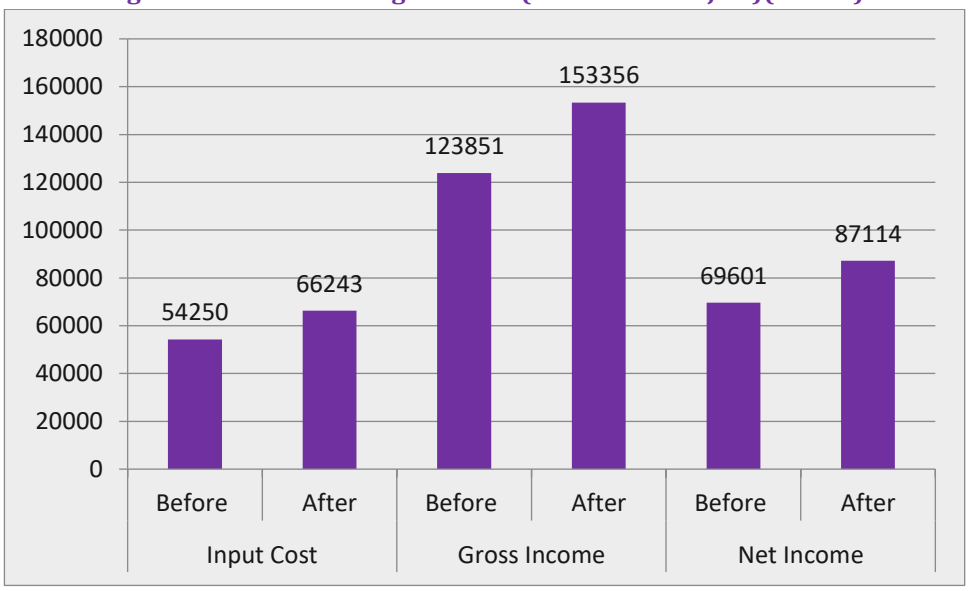
Image 5: Village Pond

The project area, as mentioned earlier, has a very high proportion of irrigated area. The effort was more focused on improving the efficiency of this aspect by promoting drip irrigation systems as well as reducing energy use through the installation of solar water pumps. Some of the community ponds situated within the village were also renovated, with their side walls reinforced and providing a pathway around them. These are multi-purpose ponds used

by the entire village community. Desiltation activities were not taken up in these ponds.

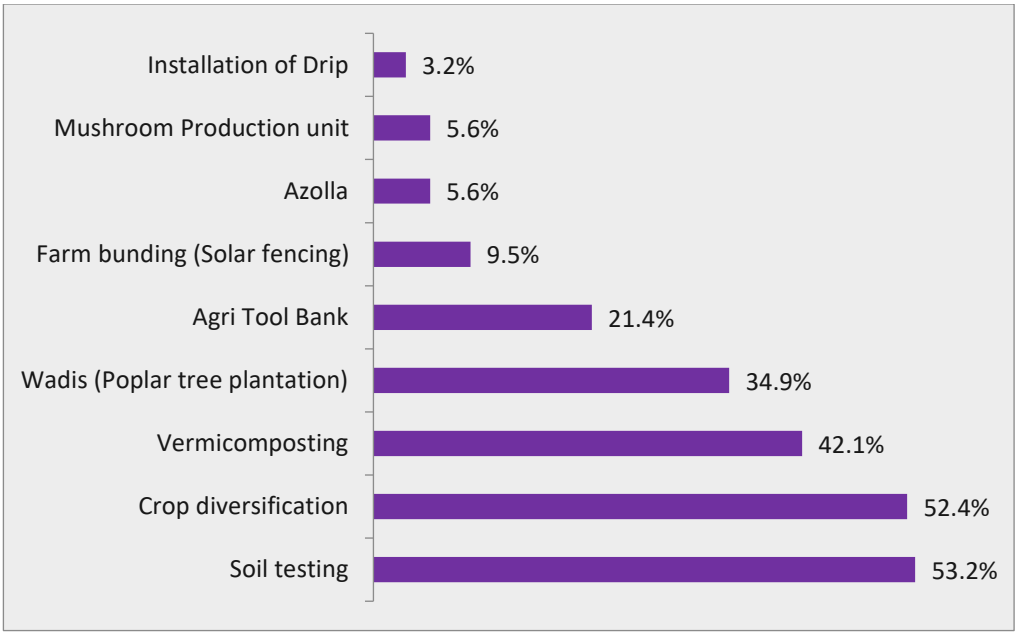
4.2.2 Income from Agriculture

Figure6: Income from Agriculture (Pre & Post Project)(n=126)



The above figure shows that there has been a 25% increase in mean net income taint 17,513 over pre-project levels (**upon conducting a z-test, a p-value of 0.00548 (<0.05) was found against a z-statistic of 2.686 (at 95% confidence level), indicating that it is a significant change)**. This could be attributed to various factors, among which existing high levels of productivity, reduced crop losses during the last couple of rabiseasons, and the benefits of changes in cropping patterns showing full results from this year onwards could be counted as major ones. The majority of the poplar planted under the project would be ready for harvest only during this year, which will substantially add to income considering the price levels of produce right now.

Figure7: Interventions that helped in increased income from agriculture (n=126)



As one can see in the above figure, though there has not been a substantial impact with respect to agricultural interventions, farmers have started noticing a slow change in their farms with

respect to the vigour of the crops and reduced pest incidence, among others. The farmers reported that they are very clear about how much fertiliser has to be given based on the nutritional status of the soils because of the soil testing component of the project. Farmers said during the discussion that there is a herd mentality with respect to the application of fertilisers and pesticides, which is now slowly changing.

The application of inputs earlier was not based on any scientific inputs and was influenced by how much the neighbouring farm was putting in, the advice of fertilizer dealers, etc., among others. But now, slowly, many of them have reduced not only their usage of chemical inputs but have also been using organic inputs for produce meant for self-consumption. They reported that it's not economical to use organic manure on a large-scale basis because not only is there no price differential for organic produce when they go to market, but the cost would also be higher. Farmers reported that the application of organic manures and pest management practices meant higher spending on labour.

4.2.3 Crop Diversification

The project area has been seeing a massive change with respect to crop diversification, particularly agro forestry plantations of poplar. Like other nearby regions of Terai and Punjab, the changes have been slowly taking place over the last decade or so. Poplars are preferred because of their rapid growth rate, diversity of end-use, easy establishment, and adaptability to a variety of soils[4]. Wheat and sugarcane are the intercrops with poplar and cropping is possible for two more years after poplar is planted.

During the discussions, farmers reported that poplars have become a good way to cover their risks from farming. The cost of cultivation is much less compared to any other crop, and there is a ready market, currently, for the produce at rates that have climbed up by 75% at INR 1400per quintal[5]. Farmers usually get cuttings from nearby farms of older trees, but they reported that they were not sure about the parentage of the cuttings they had bought, and sometimes the growth of the saplings was not as expected. Under the project, 798 farmers were supplied with two improved varieties of poplar.

4.2.4 Use of Clean Energy Solutions

As part of an entry-point activity, the organization installed 65 solar street lamps in different villages in the project area. As the below figures indicate, these have resulted in benefits to the populations despite the low numbers, if one looks at them on an overall basis. But taking the initiative forward, some of the Grama Panchayats have either installed more street lamps or have made plans.The Grama Panchayat President Shyam Gupta (also a VDC member) of Taharpur Kalan, one of the project villages, has taken this as a mission to cover all the streets within the Panchayat with street lamps[6].

As one can see from the below figure, the installation of street lamps has gained very high acceptance among the community with respect to safety for women and others. In recent times, instances of wild animals straying into the inhabited areas of the village have been on the rise. Because of street lights, people are able to see wild animals before they have an encounter with

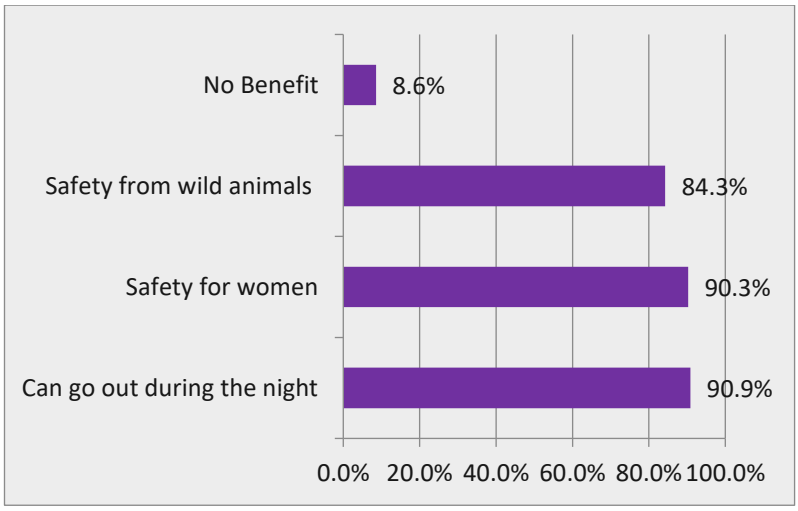
[4]https://www.researchgate.net/publication/225317495_Performance_of_wheat_as_intercrop_under_poplar_Populus_deltoides_Bartr_plantations_in_Punjab_India

[5]https://www.tribuneindia.com/news/haryana/hike-in-price-of-poplar-wood-spurs-yamunanagar-farmers-to-grow-more-trees-468681

[6]Interview

them. More than 90% of the respondents reported access to clean energy solutions like street lamps.

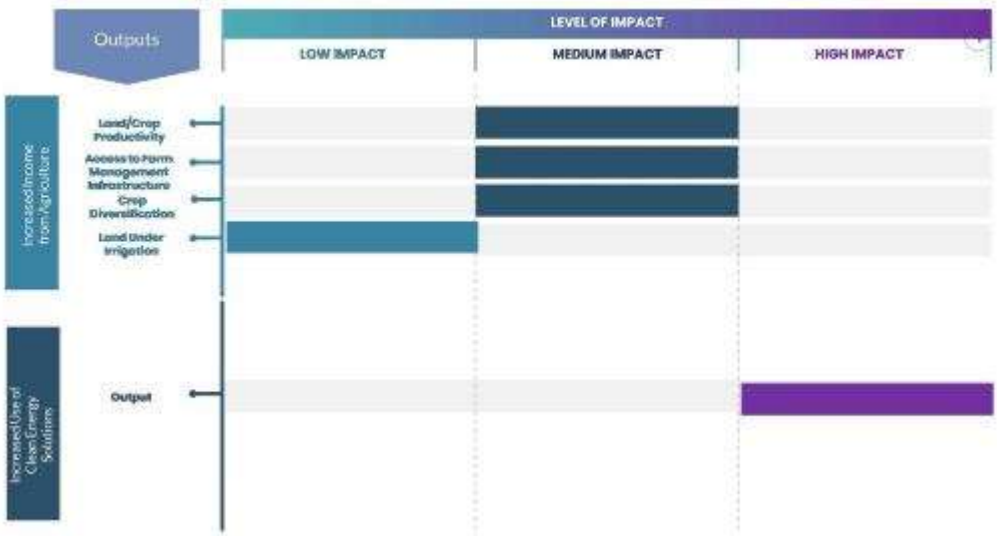
Figure 8: Benefits of Solar Street Lamps



4.2.5 Impact Observations

The project interventions have achieved a medium impact, especially in terms of crop productivity and access to farm management infrastructure. This success can be attributed to a range of implemented activities, including farm field schools, vermicomposting, drip irrigation, and the establishment of custom hiring centres, among others. The introduction of drip irrigation systems has particularly raised farmers' awareness about water conservation, emphasizing its importance as a critical resource and demonstrating how it can reduce weeding costs.

Figure 9: Overview of Project Effectiveness and Impact of Interventions



The project has supported the provision and promotion of organic inputs for the traditionally high-input-intensive agriculture practiced in the area. It has been observed that the addition of organic inputs tends to decrease yield initially before gradually increasing it. Therefore, the interventions have not resulted in a remarkable change in productivity in the short term. Additionally, inclement weather, particularly during the Rabi season, has caused farmers to

sustain losses in wheat crops over the last couple of years. Farmers have reported that the yield loss has averaged between 25 and 30%.

There has been a positive trend with respect to the adoption of clean energy solutions like solar street lights. The fact that local bodies have started taking initiative on this by wanting to cover all the streets within their jurisdiction reflects a positive impact.

4.2.6 Case Study

Solar Water Pump Cuts Diesel Cost & Increases Income

Darpur is one of the villages in the project where an intervention related to solar water pumps for irrigation purposes has been undertaken. While the majority of the farmers in the village now have access to electricity connection, a small group of farmers whose land was located in a place where there was no electricity line had to depend on a diesel pump for irrigation purposes. This is one of the oldest tube wells in the area, with water being available at around 250 feet.

Most of them have small or medium-sized agricultural holdings, thus limiting their ability to afford expensive technology or agricultural inputs. Farmers reported insufficient irrigation facilities and limited water availability as significant barriers to agricultural production earlier. This land was earlier used primarily for growing trees, but now they are able to grow at least one crop of wheat and paddy, along with other crops during the remaining time, because of the intervention undertaken in the project.

Earlier, they needed to spend at least INR 200 per hour (and on average, the pump used to be operated for at least 12-14 hours daily) on diesel. Earlier, they used to spend about INR 25000- 30000 on diesel, an amount that they have been able to save now. The solar water pump has been a boon in terms of recurring costs, as they do not have to spend on diesel anymore. The only drawback, according to the farmers, is that in the absence of a storage battery, they are not able to operate the pump once the sun sets. They want the system to have battery storage capacity. Earlier, when it was a diesel pump, the number of beneficiaries was higher compared to the present six. Some farmers who used to take water from this tube well have obtained newer connections of their own over the years. It was reported by the beneficiaries that the water pressure is much better with solar pumps compared to diesel-operated water pumps.

They had not availed themselves of any other subsidies for this from the government or other agencies and had contributed 20% of the total cost. During the discussion, it was shared that they could probably approach the government or other agencies for some funds for the battery, in addition to contributing their own funds. Although they have already contributed towards the initial cost of the current installation, they believe it is significantly more economical compared to a diesel or electric pump. This cost-effectiveness includes not only the initial expense of purchasing the pumps, which exceeds INR 20,000, but also the ongoing monthly costs associated with diesel or electricity consumption and maintenance.

Case Study- Drip Irrigation for Conserving Water & Income Enhancement

Ramesh Kumar, a small farmer in Sehjadwala village, Yamuna Nagar, owns five acres of land where he grows paddy, wheat, mustard, vegetables, and other crops. The HRDP project introduced the concept of drip irrigation to him. He had already seen it in another farmer's plot in another village, but he did not know many details about it, nor did he have the confidence and resources to adopt it immediately. He has installed drip irrigation on one acre of his holding, where he grows vegetables. There is no storage tank, and he has just connected the drip system to his tube well, which he uses to irrigate the other fields.

He was supported by the project with a 10% contribution to the overall installation cost. He has been using drip irrigation for a couple of years now. and feels that he will go in for drip irrigation on another acre or two, which he plans to bring under vegetable cultivation. Currently, he is not in a position to pay the cost of his contribution (approximately 50% of the total cost) if he accesses the government scheme.

He has been able to increase the area under irrigation with the adoption of drip irrigation. He increased the irrigated area by using the same amount of water as before, reducing his water consumption by more than 60 %. The uniform distribution of water throughout the entire field helps in harvesting higher yields since the distribution of water and nutrients is uniform. Earlier, some sections in the field used to underperform compared to the total. Labour is one of the biggest expenses with respect to vegetable cultivation, especially for removing weeds and other tasks, and he has been able to reduce this by more than 75%.

He felt that drip irrigation also requires less time to irrigate the field compared to surface irrigation methods. There are additional savings on labour, reduced drudgery due to fertigation, and decreased application of fertilizers as well. No labour is required, especially for irrigation. Once the structure is assembled, it remains like that for a couple of crops, and they do not need to make canals in the field every time.

He said, "With drip irrigation systems, I do not have to visit the fields at odd hours for irrigation. Additionally, there is great relief with respect to weed infestation, as it is a significant task to manage under flood irrigation. The weeds can only be managed by hand-pulling by labourers and the application of herbicides, both of which eat up my return from the crop."

4.3 Skill Training and Livelihood Enhancement

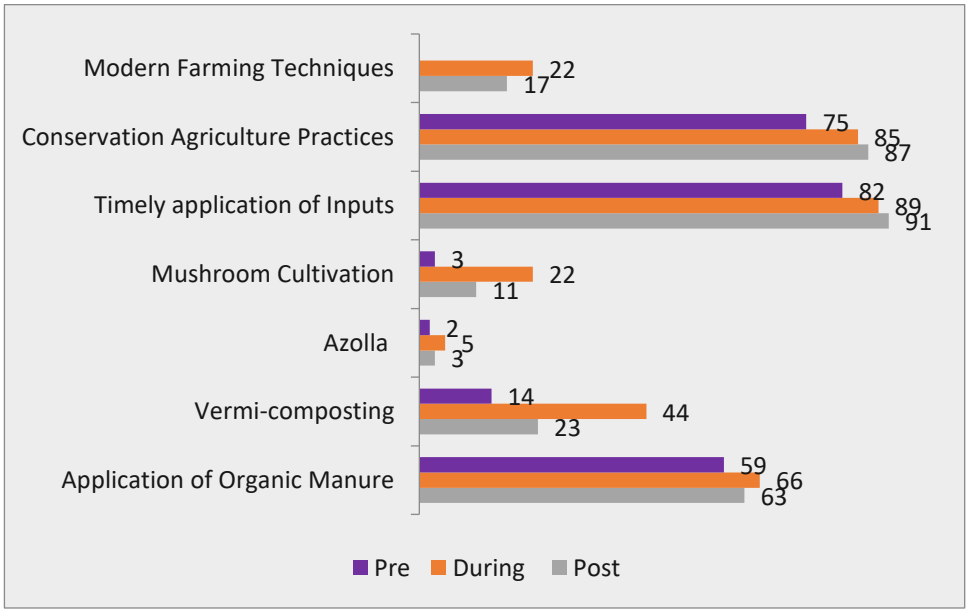
Under this programme, the focus was on building the capacities of the beneficiaries with respect to both farm and non-farm livelihoods. Under the former Farm Field Schools, exposure visits and demo plots were the primary modes through which farmers built up their knowledge base. The aim of farm field school was holistic crop and pest management and usually lasted one full season, with the sessions being held on a farm.

BhavyaKisan Producer Company Limited, a Farmer Producer Organisation (FPO), was formed to initiate collectivised business activities by organising small producers as shareholders to ensure better income for them. One of the aims of the FPO was to help farmers with the marketing of their products. A custom hiring centre was also set up as part of the FPO, wherein the members could rent farm implements like rotovators, seeders, and land levellers, among others, at rates lower than the market.

4.3.1 Agriculture Training and Services

The capacity-building programmes organised with an aim to reduce input costs with respect to agriculture have seen very high adoption rates (see below fig.), particularly organic manures, appropriate levels of fertilisers and pesticides, as well as conservation agricultural practices. Even after the project has wound up, large numbers of beneficiaries have been continuing with these practices. Comparatively, the figures with respect to vermicompost and mushrooms have not been so encouraging, with both reporting a steep drop in the number of beneficiaries who still continue to follow the activity. With respect to vermicompost, the beneficiaries felt that though it's beneficial for the soil, the time it takes to take effect is in years, and the labour effort is greater compared to the application of chemical inputs. Though mushrooms have a good price in urban areas, the distance from the village to the market acts as a significant barrier, the beneficiaries' said during the discussions.

Figure 10: Practice of Different Activities (Pre, During & Post Project)

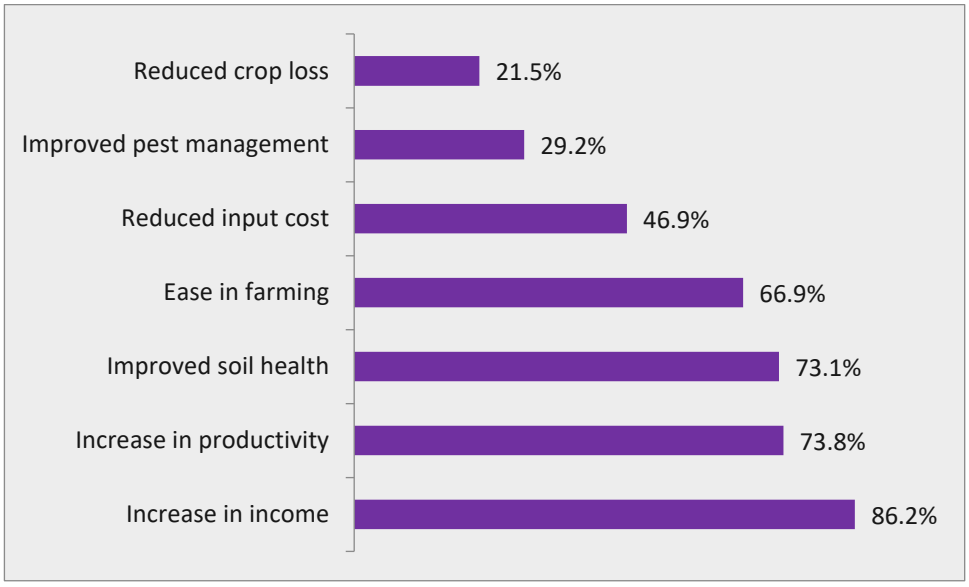


One can also see from the below figure that not only have input costs been reduced from earlier times, but the soil health has also improved because of the practices they have adopted in their

farms after the trainings and demonstrations they have attended. There has not been a significant effect with respect to the control of pests and diseases, and one of the reasons attributed to this was that integrated pest management measures have to be adopted on a large scale. If only a couple of farmers went in for bio-pesticides, pests from farms sprayed with chemical inputs would come and infest these fields.

Many of the farmers reported that they are able to hire farm implements from the Custom Hiring Centre at lesser rates compared to others in the area. But since the number of implements is limited, during the season, not everyone is able to derive benefits from them equally. Also, the systems with respect to tool management have to be more systematic so that everyone knows where the tools are and their availability.

Figure 11: Perceived improvements due to adoption of practices (n=130)



During the discussions, farmers opined that climate change has induced them to go in for multiple crops in one season itself so that even if there is a loss in output from one of the crops, they could recover it from another. Here in this region, as mentioned earlier, poplar has become a staple intercrop with wheat, sugar cane, and pulses.

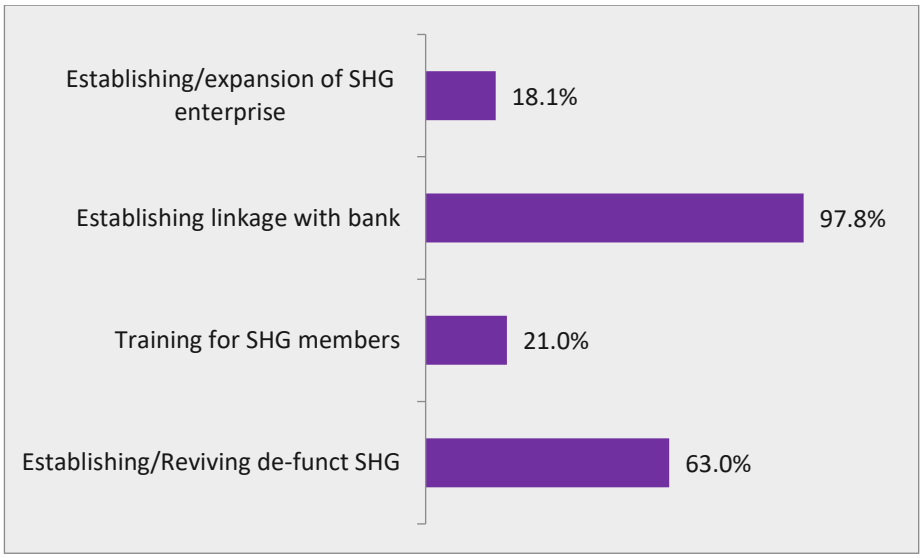
4.3.2 Economic Empowerment through Collectivization

39 SHGs were formed in the thirteen project villages, comprising more than 480 members. Regular training was conducted to strengthen the skills of SHG members in the day-to-day operation and management of their groups. Members were also trained in various income-generating activities like tailoring, *dari*-making, beautician work, and the preparation of snack items, among others. Activities like the kitchen garden, mushroom cultivation, backyard poultry rearing, and goat rearing were also supported with a view to enhancing household incomes, which were primarily done through SHGs. Four enterprises were set up, and they were linked to "Mahila Shakti Mart," a marketing platform set up in a nearby town.

As one can see from the below figure, one of the significant supports given by the project was with respect to linking these SHGs with banks by opening their accounts with them. The project also helped in the revival of many of the SHGs, which had been formed earlier but had stopped functioning over the years. Though comparatively smaller, nearly 18% of the beneficiaries stated

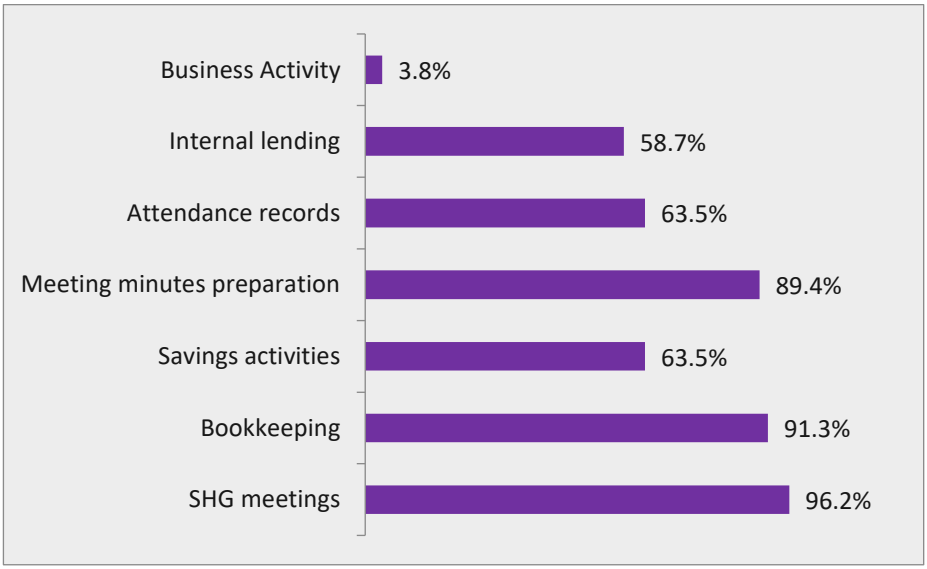
that they had received support for setting up enterprises or business activities through the project.

Figure 12. Support from the project for SHGs (n=138)



Meetings of the SHGs are being held regularly, and so is the regular updating of account books as well as the minutes, as can be seen in the below figures. But less than 60% of the members have taken loans from these groups, which indicate scope for improvement.

Figure 13. Activities undertaken by SHGs (n=104)



4.3.3 Impact Observations

The savings components in the SHG programmes have created an opportunity for women to have savings as a group, but unless they are involved in some regular activities, there is no earning to take home. Nearly 40% of the women have reported not taking any loans from the groups they are part of. Even the average loan amount taken is only INR 9,000, which is comparatively low. Nearly half of those who have taken out loans have used them to meet household expenses, while another third has used them to meet health expenses. While at one level it's encouraging to note

that these groups are able to meet the emergency fund requirements of the members, at another level it reflects on the limited sources of income, particularly for women.

This low loan amount could be due to many factors, ranging from the low fund base of the groups to the non-release of revolving funds to the disinterest of the commercial banks in engaging with members of the SHGs. In discussions, women reported saying that they have submitted papers multiple times in this regard for additional loans and subsidies, but the concerned government official at the Gram Panchayat level does not show any interest at all in the activities of groups that are not promoted by the WCD department.

Image 6: SHG group members with one of their products

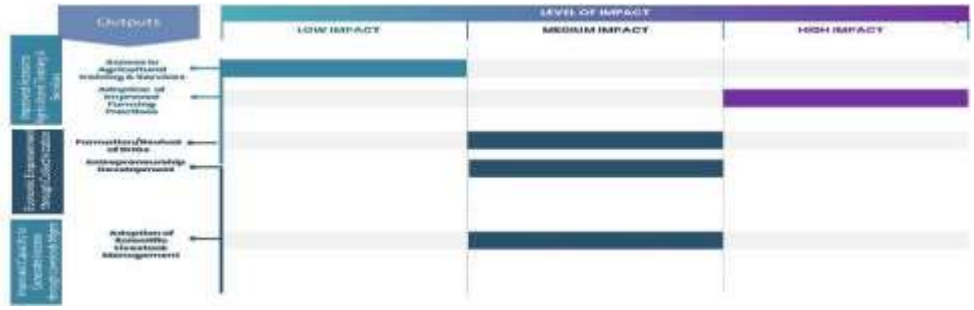
The activities chosen were undertaken for a couple of months, and then when they were unable to sell the final product (because of the higher prices), they lost interest in carrying on with them. It was difficult to gauge how the choice of income generating activity was decided, considering that there were differing observations from the organisation team members and the beneficiaries. Currently, most of them are involved with what they had been doing earlier, which is stitching women's garments like churidar, palazzo and making *durries.* During discussions, women have reported an increase in self-worth and self-esteem as a result of their involvement in money matters within the household over the years compared to earlier times.

The impact with respect to livestock has been very marginal, with only 8% of the sample households reporting any kind of support from the project. Beneficiaries reported that livestock health has improved due to better awareness about diseases and their management aspects. Only a couple of those who were supported for poultry and goat rearing are currently continuing with it[7], with the main reasons cited being lack of interest, inability to sustain the activity, and not enough income being generated.

Capacity-building programs aimed at reducing agricultural input costs have seen high adoption rates. However, the FPO established in the project area requires further support to become fully operational. While the FPO's custom hiring centre offers implements at lower rates, its mechanisms need streamlining.

[7]Discussion with CARD team members

Figure 14: Overview of Project Effectiveness and Impact of Interventions (ST&LE)



4.3.4 Case Study

Case Study-Small Steps towards Sustainable Agriculture through Vermicompost

Jaiprakash and Govind are two farmers from the area who have benefited from interventions under the project with respect to organic manures. The former, having five acres of land, grows sugarcane, mustard, and poplar, as well as cereal crops of paddy and wheat during the season. He says that earlier they used to just dump the farmyard manure out in the open, to be taken on tractors to the field whenever we needed to apply. Now, after preparing vermicompost, a couple of bags of it are as effective as a tractor load of FYM, and that's because of the wonderful work that the earthworms do to the FYM. He still uses chemical fertilisers, but the quantity used has come down significantly. FYM in itself does have weed seeds in it, but once it's put in vermicompost beds, the seeds are nicely decomposed, thus controlling weed infestation in the field. He was supported under the project with vermi bags initially, which he tried on a small area near his homestead. Seeing a very good result, they (along with his son, who works for the police but actively supports him) prepared two vermicompost beds on their own and are today using up all the farmyard manure their buffalo gives.

Govind, the other beneficiary, is a marginal farmer who grows chilli, fenugreek, bottle gourd, sponge gourd, and other crops on around 0.75 acre of leased land that has irrigation facilities. He had been provided support to build a unit of vermicompost, which is located next to his fields, and the manure of his livestock is used to prepare the compost. He said that an opportunity to interact with other farmers who had been successful in composting helped him get a broader idea of sustainable agriculture. His experience with vermicompost has been good, with the quality of the soil improving and plants becoming more resistant to diseases and pests, thus indirectly contributing to improved yields.

4.4 Health and Sanitation

The project area has significant improvements still to be made with respect to health and sanitation aspects. People are dependent on the government health service delivery system, whose services are skeletal and patchy in the interior villages. The other option is to go for the private sector, which is unaffordable for the majority in rural areas.

Across the area, open defecation is still being practiced to a considerable extent for various reasons, ranging from the non-availability of toilet facilities to a deficient water supply inside the toilets to cultural factors. Under the project, efforts were made to promote hygiene and also to ensure the safety and dignity of women through the construction of household toilets. The poorest households were identified among the SHG members, and 120 household toilets were built in all the project villages.

Image 7: An Anganwadi renovated under the Project Intervention

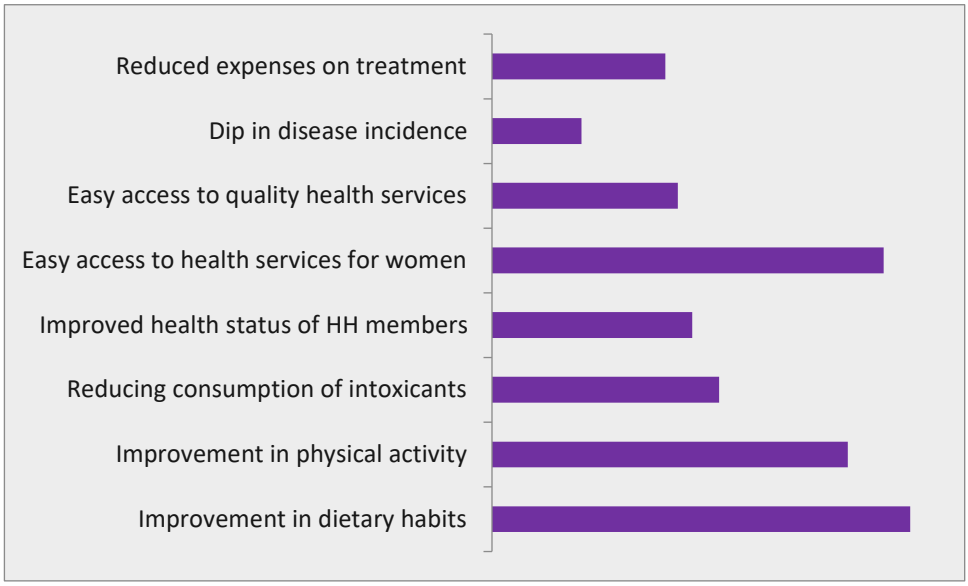
The infrastructural facilities of government primary schools in the project villages were poor, particularly lacking sanitation facilities. This contributed to greater absenteeism and dropout rates among adolescent girls, particularly when they attained puberty. To promote safe hygiene behaviour and practices among children, not only were hand washing units constructed in government primary schools, but kits containing essentials like soap, sanitizer, and nail cutters were also given to children in the project area.

There was no system for solid waste management within the villages earlier, and on a demonstration basis in four villages, e-rickshaws were provided for centralized collection and segregation of waste, which was done by a person appointed by the VDC. Households had to pay a nominal charge for the service.

Women from small and marginal farming households as well as landless households were encouraged to grow vegetables in a vacant space close to their home to meet their own needs throughout the year for family consumption. This would also help in ensuring the supply of nutritious food does not contain harmful chemicals.

4.4.1 Health Infrastructure and Services

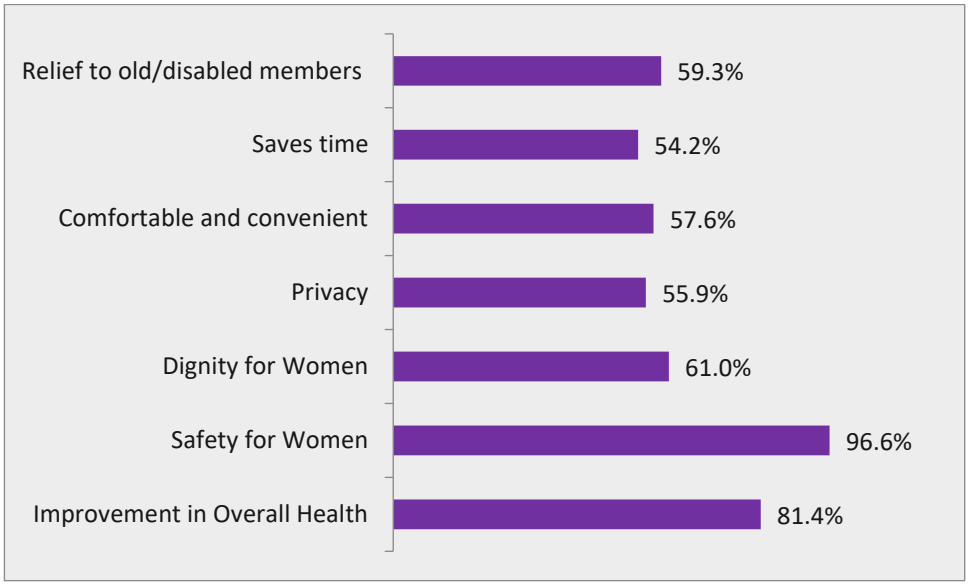
Figure 15: Benefits Received from Health Activities



It can be inferred from the above figure that the interventions under the health aspect have not only brought improvements in dietary habits and physical activity but also helped women access health services easily. But at the same time, the impact with respect to a decrease in disease incidence as well as health expenses has been more muted.

4.4.2 Sanitation Infrastructure and Services

Figure 16: Benefits Received from Sanitation Activities (n=59)



The construction of toilets at the household level, as well as improvements in toilets at educational institutions, has received good responses from the respondents, as shown in the above figure. These measures have not only enhanced the safety of women, as they no longer have to go out to defecate, but also contributed to improving the general health of all family members.

4.4.3 Kitchen Gardens

Figure 17: Perceived Benefits from Kitchen Garden (n=81)

Women from marginal farming and landless households (nearly 21%) were supported to grow vegetables in the backyard or on the front side of the home for improved nutrition and the availability of fresh seasonal vegetables throughout the year for self-consumption. While almost all (99%) of them were provided with seeds of different vegetables, half of them attended training organised on this aspect. This initiative has not only reduced the expenditure (nearly INR 250weekly) on procuring vegetables from the market but also helped the households with fresh and nutritious produce from their backyards.

4.4.4 Impact Observations

Figure 18: Overview of Project Effectiveness and Impact of Interventions (H&S)

The interventions undertaken as part of the project have significantly impacted various aspects of health and sanitation at both household and community levels. The initiative has successfully raised awareness within the community regarding basic hygiene, which can prevent numerous diseases. The toilets constructed in individual households have been widely accepted, with women particularly benefiting from this intervention. Additionally, kitchen gardens were established in many villages and operated effectively during the project period. However, the momentum of this activity appears to have slowed over time. Discussions have identified the lack of seeds and other necessary inputs as limiting factors in maintaining the progress of these kitchen gardens.

4.5 Promotion of Education

As previously mentioned in the report, the area is significantly underdeveloped in terms of educational levels. While basic school infrastructure may exist, other components that enrich the student experience are often lacking. Within the educational sector, girls face particular challenges in accessing education, especially at higher levels where opportunities near their villages are scarce. The digital divide has been a longstanding issue, with rural students frequently deprived of the resources and technology that their urban counterparts take for granted. This disparity not only limits educational opportunities for rural students but also hinders their overall development and prospects for meaningful employment.

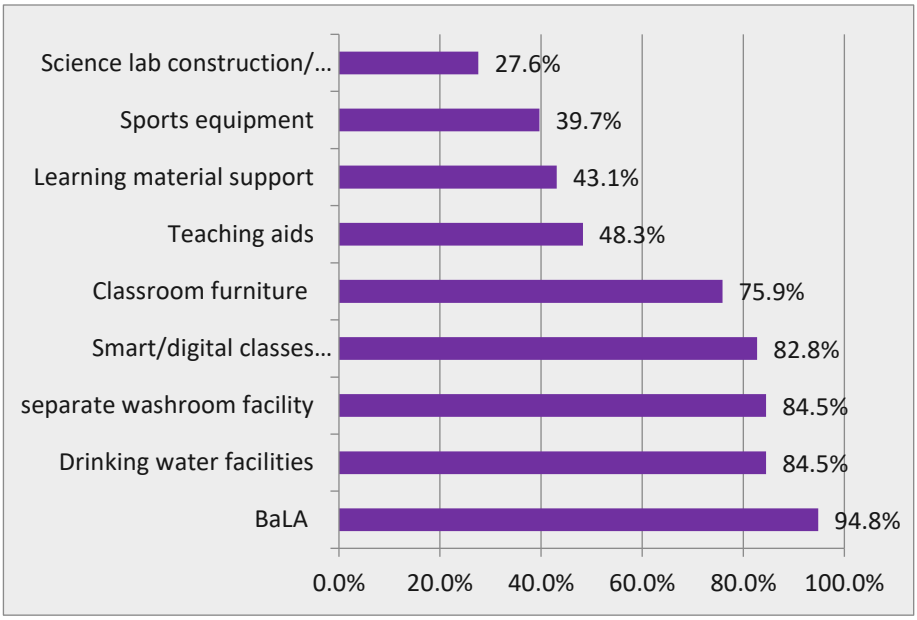
With the support of HDFC Bank, CARD implemented several educational initiatives in the project area. One such initiative was the conversion of classrooms into smart classes in 12 schools to make learning content both interactive and engaging. Additionally, learning materials were provided to students from underprivileged backgrounds. Efforts were also made to improve the infrastructure of these educational institutions, including the development of science labs, enhancements to water and sanitation facilities, and the provision of chairs and tables for classrooms, as well as facilities in computer labs, among other improvements.

The digital divide has long been a pressing concern, with students in rural areas often lacking access to the resources and technology that their urban counterparts take for granted, which not only limits the educational opportunities available to the former but also hinders their overall development and prospects to gain meaningful occupations.

4.5.1 Infrastructure in Educational Institutions

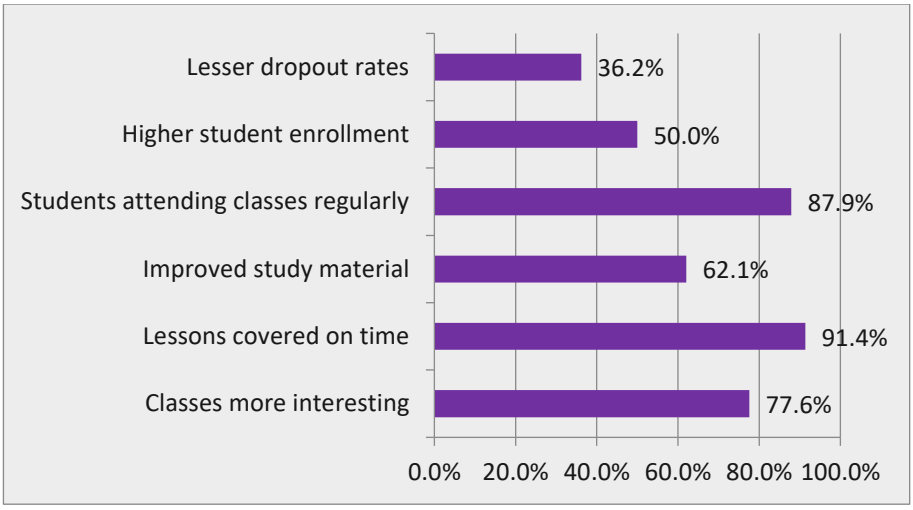
As one can see from the below figure, the initiatives have received a very good response from both teachers and the students, particularly BaLA paintings, which make these usually dull government school walls very colourful and attractive, with very good text messages and images contributing to an overall learning environment. Clean bathrooms as well as drinking water facilities have improved the attendance rates at the schools. The comparatively low figures with respect to science lab and sports equipment could be attributed to the fact that they may not be in use that regularly or may not have started to be used, as was observed during one of the school visits.

Figure19:Areas which have seen improvements (n=58)



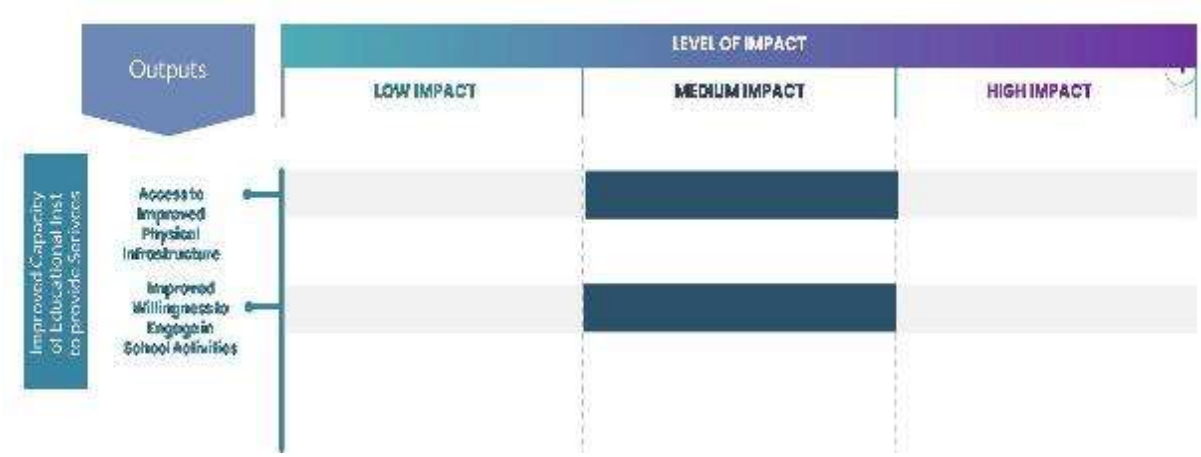
The said interventions have resulted in students attending school regularly, classes becoming more interesting, and the syllabus being covered in time, as can be seen in the above figure. But it has still not contributed much with respect to bringing down dropout rates, where there are other social-cultural factors at play.

Figure 20:Benefits from education related activities (n=58)



4.5.2 Impact Observations

Figure 21: Overview of Project Effectiveness and Impact of Interventions



The interventions in education carried out in both schools and anganwadis within the project villages have yielded a positive impact, albeit not uniformly. BaLA paintings have enhanced the school environment, making it livelier and more attractive for students; however, in some schools, these paintings have faded and worn out. The introduction of smart classrooms has facilitated teaching and made lessons more engaging. Nonetheless, issues such as internet availability and power outages occasionally disrupt classes, indicating a need for provisions to address these factors. Additionally, not all teachers have been trained to operate the new equipment, necessitating capacity-building efforts.

Furthermore, reducing dropout rates, particularly among girl students in higher classes, requires sustained efforts at the community level to shift prevailing mindsets. In this regard, the role of School Management Committees will be crucial.

4.5.3 Case Study

Case Study – Efforts towards Improved Learning Environment in Government Schools

The Government High School at Kot Mushtarka was one of the three schools that were developed as model high schools as part of the project. This school is located in a central location, and students from 3–4 villages come to attend the school. The total enrolment (till date was 460+), which compared to last year (579), was lower, the headmaster admitted. But since there was one more month of the academic year and also because the teachers have been going around the village trying to motivate both children and their parents, they were sure that they would be able to meet last year's performance or even exceed it.

Under the project, support has been given for developing smart classrooms (with projectors, audiovisual systems, and green and white boards), and BaLA painting has been done on most of the walls of the schools, making them look very lively. The Science and Computer Lab have been developed under this, but they have not started to be used fully, and the teachers were sure that from this academic year onwards, the utilization would be full.

Separate sanitation units and toilets for girls and boys have been developed and maintained well. A RO drinking water facility has also been set up in a couple of places within this school. An improved sitting facility, which includes better benches and tables, was also supported within a couple of classrooms. Apart from the project, the headmaster and teachers have also been able to mobilize funds from other sources for a couple of other initiatives within the school premises, and they want to make it a model school for the entire district.

4.6 Holistic Rural Development Index

There are multiple dimensions involved in achieving the goals of HRDP, which include increased agricultural production, the generation of new jobs, enhanced health, and the provision of better living infrastructure, among others.

Based on the design of the HRDP programme, a composite index called the Holistic Rural Development Index (HRDI) has been developed that indicates the achievements of the HRDP interventions that lead to overall improvement in the result indicators. As the programme interventions varied across projects and geographies, it was not possible to assign a single impact indicator that might be able to accurately capture the overall performance of HRDP. Thus, HRDI serves the purpose of quantifying the impact through the blending of the results of various indicators grouped into four thematic areas.

For the calculation of HRDI, the values of the impact indicators at baseline and end line were selected and assigned weights based on their relative contribution to the final expected outcome across four themes. Depending on the variations in the interventions made in each project, the HRDI is customised to accommodate the most significant results that align with the goal of the HRDP program. The detailed methodology and indicators are explained in detail (see Annexure B).

The HRDI calculation for project P0289 implemented in Yamunanagar is given in the following table:

Table 7: HRDI calculation for Yamunanagar, Haryana

Domain	NRM		ST&LE		H&S		PoE		Total	
HRDI Score	Base line	End line	Base line	End line	Base line	End line	Base line	End line	Base line	End line
	0.08	**0.10**	**0.02**	**0.10**	**0.10**	**0.16**	**0.7**	**0.10**	**0.26**	**0.46**
% Change	**25**		**400**		**60**		**43**		**77**	

Referring to the table above, there has been a 77% increase in the composite HRDI score compared with the baseline scenario. This is attributed to the interventions planned in the sample villages across all thematic areas. The HRDI score for Skills Training and Livelihood Enhancement (ST&LE) has surged by an impressive 400%, which can be attributed to the initially low baseline score and the interventions related to livestock and rural enterprises.

5 Analysis of Assessment Criteria

As outlined earlier in 2.1, for each thematic area, activities completed by WOTR were identified and assessed using the following criteria:

- Relevance and Convergence
- Impact and Effectiveness[8]
- Sustainability

The following sub-sections provide an analysis of the HRDP programme with respect to each of these criteria.

5.1 Relevance and Convergence

Haryana, historically an agrarian state, is on its way to becoming an industrialised state, with the share of industry in GSDP rising consistently. Despite high levels of urbanisation and industrialization, because of its proximity to the National Capital Region, there are large areas within the state totally dependent on agriculture and other allied livelihoods. The state has a significant agricultural surplus, contributing substantially to the national production, particularly with respect to cereals, oilseeds, and pulses, among others. Though production has been increasing over the years due to the heavy usage of chemical inputs, not only has the farmer's net surplus income been going down, but it has also posed environmental challenges that demand sustainable solutions.

On the social front, despite access to schools and medical facilities having expanded over the last few decades, disparities with respect to gender, caste, etc. remain, leaving a significant proportion of the population unable to share the benefits of developments equitably. This highlights the need for targeted interventions and awareness campaigns to address deep-rooted societal biases.

In light of the above, the interventions undertaken in different thematic areas are particularly relevant. Efforts have been made under the project to reduce expenses with respect to agricultural inputs, but it will take time for farmers to accept it on a large scale and start showing results. Interventions with respect to SHGs and enterprises are very much needed because there's a significant proportion of households that don't own land and are dependent on wage labour and other sources for earning a livelihood. Despite increased awareness, people are still defecating out in the open due to a lack of toilets at home as well as socio-cultural factors, among others. This has a particularly negative effect on the psycho-social well-being of women, as well as negatively impacting their health. Efforts with respect to education and improving the overall learning environment in government schools are timely and well needed.

The efforts towards convergence with government programmes could have been substantially improved, particularly with respect to some of the themes. The National Rural Livelihood Mission, MGNREGA, Swachh Bharat Mission, RashtriyaKrishiVikasYojana, and the National Horticulture Mission are some of the national-level programmes that are also focused on the themes identified under the project. More effort needs to be made to converge with government programmes so that more beneficiaries can be reached through the intervention in an effective manner. It is not easy to work with government departments, and the relationship needs to be built over a period of time. Some of the activities, like the construction of toilets, could have incorporated the use of environmentally sustainable features to act as a demonstration.

[8]While from an evaluation perspective impact and effectiveness are two different aspects, in the report, these are used interchangeably.

5.2 Sustainability

While it is important for an NGO to aim for social change, it is just as important to be able to sustain their programs to maintain the continuity of work, for without sustainability, it becomes increasingly difficult for them to bring about lasting social change. An inbuilt model of sustainability is a crucial feature for an NGO to create impact in the communities and sectors they work in.

A Village Development Committee had been formed in each of the villages where the project had intervened as part of the project design and was active while the project was being implemented. During the course of the project, the members were taken on an exposure visit to showcase villages like Ralegoan Siddhi, where the committee is managing all the affairs of development with regard to the village. They were also part of training programmes aimed at the overall development of the villages. The expectation is that the VDCs will be able to take the work forward in their villages by coordinating with Grama Panchayats. But the need for more handholding is apparent, as stated in the discussions held at the village level.

Some of the assets created during the course of the project intervention, like solar street lamps, were handed over to the Grama Panchayat. However, it is not very clear how the maintenance expenses of those assets would be met, as during discussions and in the survey, this point about the non-functioning of some of them came up. Many other assets (mostly farm equipment) were bought by the FPO BhavyaKisan Producer Company Limited and are currently in different project villages handled by different point persons. There is a Board of Directors for the FPO, and they are expected to manage the affairs of the organization in a manner beneficial for its shareholders. However, it would be difficult for the board to manage the affairs of the FPO on a full-time basis, and there is a need for a professional management team to chart its future path. The systems with respect to asset maintenance, equitable use, and other aspects all need to be fine-tuned further.

6 Recommendations

To further improve the outcomes of HRDP in Yamunanagar district of Haryana, the following recommendations are made for the HDFC Bank's Parivartan and HRDP teams and the implementing partner:

A. Sustain Project Initiatives

- Initiatives like FPOs should preferably be started in the initial year because they require a lot of handholding, particularly with respect to organizational development. If they need to be commercially viable, then they need to not only have a very well-developed business plan but also a clear roadmap of what they want to achieve in the immediate and long-term future. This would be difficult for the current board members, who are mostly farmers, and would need to be done by professional managers.
- The activities of the Custom Hiring Centre have been appreciated by farmers in general, and it has helped in bringing down costs in many farming activities. However, the system needs to be fine-tuned further so that everyone benefits uniformly and in a timely manner. Currently, the machinery is in new condition, but with age, wear and tear will increase, resulting in higher maintenance expenses and potentially necessitating a repurchase. The FPO needs to consider this and other aspects and prepare a proper management plan.
- Agriculture in this area is very input-intensive, and conservation of a critical resource like water is not on the mind of an average farmer. While a start has been made with the installation of drip irrigation systems, more effort needs to be focused on educating farmers regarding the judicious use of water in different crops without affecting yields.
- The income-generating activities identified within the project have mostly remained conventional, i.e., sewing, embroidery, papad, and pickle production, among others, which generate very little income and also face competition from commercial producers. Most of the SHGs will not be able to market their products directly, considering the competitive environment in which they operate. There is a need for SHGs to network to build the required scale advantages. The FPO set up in the project area could help the SHGs in this respect in the future.
- Village Development Committees formed under the project should ideally function under the local PRIs. This would not only build their capacities but also provide an opportunity to engage with PRIs consistently. The PRIs are responsible for the overall development of villages, though there has been very little devolution of powers to them.
- Engagement from the beginning with the PRIs and government line departments should be built into the project's initiation stages since they are also implementing similar activities in the same area. Almost all components of the project are already part of different departments' mandates. There is a need for more convergence with government programmes like MGNREGA, the National Rural Livelihoods Mission (NRLM), etc.

B. Improve Project Design and Efficiency

- The services of independent livelihood advisors/Business Development Service (BDS) providers should be utilized help groups start business activities during the initial phase of the project. Most NGOs lack experience in this regard. The benefits of this could be availed of by projects being implemented in multiple locations. Micro-financial services can do little to

promote enterprises on their own once the project is over and the implementing organization withdraws from the area.

- SHGs have difficulty accessing the services of commercial banks because they do not understand the procedures, and bank officials are not keen to provide services as they are not sufficiently remunerative. It would be beneficial if the services of local HDFC bank branches were accessed proactively as part of the project intervention.
- Apart from focusing on economic empowerment under the self-help group theme, attention should also be given to social and developmental issues affecting the quality of life of the poor. Programmes targeting holistic development should also be conceptualized and integrated into the HRDP programme from the beginning.
- Rural livelihoods are intrinsically connected with agriculture, livestock, and other allied livelihoods. These areas have been significantly affected by climate change over the last decade. Although there are components within the project addressing climate change indirectly, a focused effort would be beneficial.
- The HRDP project duration of three to four years is too short to make a substantial impact on various themes, including NRM, livelihoods, health, and education. All these areas require a focused approach, which comes from years of understanding built through working in a particular niche. Smaller organisationsmay not have the capacity to address so many issues at once, so there is a need to focus on niches in which organisationshave expertise and gradually build the capacities of the project staff.
- An effort should be made to capture the situation on the ground through a baseline survey, which will provide a realistic view of the ground realities and areas needing focus. This will not only help in the project design initially but also effectively assess the changes brought about by the interventions undertaken in the project. Currently, when trying to assess the beneficiaries' situation 3-4 years back, it is very difficult for them to provide a nearly accurate estimation, which may lead to incorrect conclusions.

Annexure

A Sampling Methodology

The quantitative household survey was administered for four thematic areas in each district.

Quantitative Sample Size Calculation

For this study, the formula for calculation of finite sample size for one-time cross-sectional survey (Cochran's 1977), has been deemed appropriate. The formula used to estimate the sample size for the quantitative household survey is given below:

$$N = Z_{1-\alpha}^2 \times P(1-P) \times D_{eff} \div (S_e)^2$$

Where,

N= sample size

P= key characteristic of the population, set at 50%;

$Z_{1-\alpha}$= standard score corresponding to the confidence interval, set at 95% (1.96 for two tailed test);

S_e= margin of error, set at 5%;

D_{eff}= factor for design effect, set at 1 (no design effect)

Thus, the estimated maximum sample size is 400.

Quantitative Sampling Methodology

Sampling methodology to be added

Stage 1 – Selection of villages:

The list of beneficiaries from all the eight villages acted as the sampling frame for the programme. This list was obtained from the implementing partner—CARD. Simple random sampling was done to select the required number of households from within the list. Since beneficiary selection was undertaken independently for each programme, the selection of more than one beneficiary from a single household was probable.

Stage 2 – Selection of beneficiaries:

Sampling for each village was done using the Probability Proportionate to Size (PPS) method. The percentage of the total number of beneficiaries in a village was taken out from the total beneficiaries. This percentage was then converted into a sample per village. A total of eight villages were covered under the survey.

Qualitative Sample Size Calculation

Qualitative tools such as in-depth interviews (IDI) and focus group discussions (FGD) were administered to obtain information about the remaining themes and enrich the household survey information with a deeper understanding. Since there was no baseline available for this evaluation, the recall method was used in the household survey to assess the change that has occurred over time. For this purpose, respondents were asked to recall the value of critical indicators at the start of the programme.

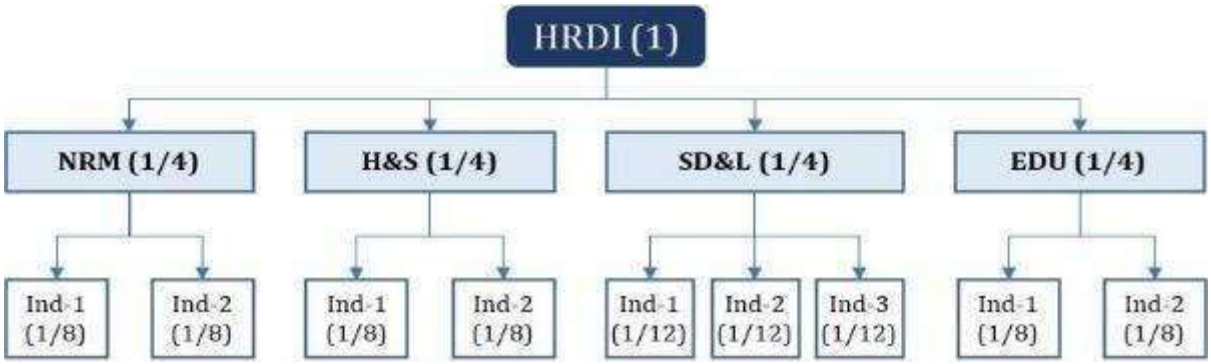
B HRDI Methodology

The outcome indicators included in the HRDI were obtained from different domains and consequently measured on different scales. Therefore, to ensure the comparability of these indicators, all the indicators were converted into discrete variables so that they could be measured between 0 and 1. Indicators such as productivity and income, which were measured on a continuous scale, were converted to discrete variables by setting a cut-off. The 50th percentile of these indicators at baseline was chosen as the cut-off point. Thus, a change in the indicator could be captured by recording the proportion of beneficiaries above the cut-off at two distinct points in time.

Indicator Weights

Weights were applied to each of these indicators, similar to the HRDI calculation. Equal weights were attributed to all the domains to create a standard HRDI for each cluster. Equal weights were assigned to each of the four domains. Furthermore, the domain weight was equally distributed among the indicators of that domain, thereby ensuring that the overall equal weightage of the domains was maintained.

Figure 22: Domain and Indicator Weights[9]



The example above is indicative. The domains as well as indicators were different across all projects, and hence the weights were changed slightly for the purpose of the study, following the principle stated above.

Table8: Example of HRDI Calculation

Project X		
Natural Resource Management	The proportion of farmers with net income above median	(1/4) x (1/2) = 0.125
	Percentage of farmers reporting access to irrigation	(1/4) x (1/2) = 0.125
Health and Sanitation	Percentage of households with access to improved drinking water facility	(1/4) x (1/3) = 0.083
	Percentage of households with access to improved toilet facility	(1/4) x (1/3) = 0.083
	Percentage of households with individual bathing unit	(1/4) x (1/3) = 0.083
	Percentage of SHG members reporting their groups having savings	(1/4) x (1/2) = 0.125

[9] NRM: Natural Resource Management | H&S: Health and Sanitation | SD&L: Skill Development and Livelihoods | EDU: Education

Livelihoods and Skill development	Percentage of households with improved skills in Agriculture	(1/4) x (1/2) = 0.125
	Percentage of students reporting increased access to functional learning infrastructure (library, smart class, BaLA, etc.)	(1/4) x (1/2) = 0.125
Education	Percentage of students reporting increased access to functional school physical infrastructure (hand wash station, separate washrooms, etc.)	(1/4) x (1/2) = 0.125

Once all the indicators were standardized and weighted, a sum of these weighted indicators was utilized to calculate the value of HRDI.

Analysis Plan

HRDI for each cluster/ NGO was calculated at two points in time i.e., before and after HRDP and can be compared cross-sectionally to understand which domains contributed to an increase or decrease in HRDI value. Concurrently, the NGOs can be ranked according to the HRDI score based on their performance across different domains, but care should be taken as the project context varies for each area. Since the value attribution of the indicators is in proportions, the HRDI value numerically ranges between 0 and 1. Once all the indicators were standardized and weighted, a sum of these weighted indicators was utilized to calculate the value of HRDI.

Method to Calculate HRDI

Step 1: All the indicators were cleaned and adjusted for outliers. Only those beneficiaries were considered for the analysis where data on outcome indicators was available for both pre- and post-intervention.

Step 2: A cut-off value was calculated by taking the 50th percentile for each indicator before HRDP (baseline). For instance, consider the indicator- average annual income of farmers, at baseline, then sorted all the farmers across the seven clusters in ascending order based on their income. The 50th percentile i.e., the median value of the income was taken. This median or 50th percentile was taken as the cut-off (baseline cut-off to be precise).

Step 3: Calculated the proportion of beneficiaries above the set cut-off value at the baseline for each indicator.

Step 4: Calculated the same at the end-line i.e., the proportion of beneficiaries above the baseline cut-off for each indicator.

Step 5: Multiplied each proportion of the indicators with the set indicator weights.

Step 6: Sum all the indicators (i.e., weighted sum) to calculate the HRDI value at baseline and end-line.

Step 7: Calculated the relative change in the HRDI value from baseline to end line.

Step 8: Ranked the clusters based on relative change brought about in the HRDI value i.e., the cluster that brought the maximum change in the HRDI value received the first rank.

Table9: HRDI Calculation for P0289

Domain	Indicators	Baseline	HRDI	End line	HRDI
NRM	Proportion of farmers with net income above median	0.49	0.08	0.62	0.10
	Proportion of farmers reporting increased productivity of three main crops above median (before and after)	0.24		0.31	
	Percentage of farmers reporting access to irrigation	0.24		0.24	
ST&LE	Percentage of SHG members reporting income above median from rural enterprises	0.12	0.02	0.92	0.10
	Percentage of households who getting skill training and reporting increase in income from job/enterprise/self-employment	0.00		0.00	
	Percentage of HH reporting income above median from livestock	0.08		0.25	
H&S	Percentage of households reporting increase in use of fruits/vegetables from the nutrition garden	0.93	0.10	1.00	0.16
	Percentage of households reporting increase availability of drinking water facility	0.00		0.00	
	Percentage of households with access to improved toilet facility	0.29		0.97	
EDU	Percentage of respondents reporting increased access to functional school physical infrastructure (drinking water posts, separate washrooms, furniture etc.)	0.41	0.07	0.45	0.10
	Percentage of respondents reporting increased access to functional learning infrastructure (library, science labs, smart class, etc.)	0.11		0.37	
	Total		**0.26**		**0.46**

C Overview of Impact Calculation

The impact assessment process of CARD involves evaluating the effects of various activities. This evaluation is centred on quantifiable output indicators. Impact of each indicator is gauged by calculating the average proportion of beneficiaries associated with it. The overall impact level of an activity on beneficiaries is then determined by the degree of change in these output indicators. The impact levels are categorized into three tiers according to a predetermined scale:

Low: 0% - 40% change

Medium: >40% - 70% change

High: >70% - 100% change

Overview of Impact in the effectiveness section was calculated based on the averages of quantitative output indicators as demonstrated below.

Table 10 : Overview of Impact Calculation

Outputs	Output Indicators	Output Avg.	Impact Level	
Increased income from agriculture				
Land/ crop productivity	Proportion of farmers reporting an increase in production of crops supported under HRDP	65.1	52.1	**Medium**
	Proportion of farmers reporting increased income from crops that were supported under HRDP.	87.0		
	Average increase in income from crops that were supported under HRDP (% change)	26.5		
	Average increase in productivity from crops that were supported under HRDP (% change)	30.0		
Access to farm management infrastructure	Proportion of beneficiaries satisfied with quality of available services	47.9	33.5	**Medium**
	Proportion of farmers that are able to access farm machinery	16.2		
	Proportion of farmers that accessed input support	33.4		
Increased adoption of crop diversification	Proportion of farmers diversified their crops	42.6	47.5	**Medium**
	Proportion of farmers who report income increase due to crop diversification (base = farmers who adopted crop diversification)	52.4		
Land under irrigation	Proportion of farmers who received support for irrigation	3.55	3.61	**Low**
	Increased area under irrigation	3.67		
Increased use of clean energy solutions				
Adoption of clean energy infrastructure	Proportion of HHs using clean energy infrastructure	90.0	90.0	**High**
	Proportion of households reporting benefits from using clean energy infrastructure	91.0		
Improved access to agricultural training and services				
Access to Agriculture training and services	Proportion of farmers who accessed project training services	50.0	47.9	**Medium**
	Proportion of farmers who demonstrate awareness regarding sustainable farming practices	45.9		
	Proportion of farmers who adopt scientific agricultural practices	86.9		

Outputs	Output Indicators	Output Avg.	Impact Level	
Adoption of improved farming practices	Proportion of beneficiaries reporting increase in productivity due to better farm management	73.8	82.3	**High**
	Proportion of farmers reporting increased income	86.2		
Economic empowerment through collectivization (Only for SHG members)				
Formation/ revival of SHG based Enterprises	Proportion of members who received support with establishing/reviving SHGs	63.0	52.1	**Medium**
	Proportion of members who received support with establishing/reviving SHG enterprises	18.1		
	Proportion of members whose SHGs are currently functioning	75.4		
Development of entrepreneurship	Proportion of SHG members who received training	21.0	56.5	**Medium**
	Proportion of SHGs undertaking entrepreneurial activities	18.1		
	Proportion of SHGs with increased savings	94.9		
	Proportion of SHG members reporting improved income	92.0		
Improved Capacity to Generate Income through Livestock Management				
Adoption of Scientific Livestock Management	Proportion of beneficiaries who received support in livestock management services	8.0	61.9	**Medium**
	Proportion of beneficiaries reporting an increase in income from livestock management	36.6		
	Proportion of beneficiaries reporting improved livestock health	74.0		
	Proportionate increase in average income from livestock	129.0		
Improved Health Infrastructure and Services				
Establishment/ enhancement of health infrastructure and services	Proportion of beneficiaries who gained access to health services	63.8	79.0	**High**
	Proportion of beneficiaries reporting lifestyle changes due to improved access	75.2		
	Proportion of beneficiaries who availed free medications at camps	93.9		
	Proportion of beneficiaries who consulted medical references from camps	83.3		
Improved Sanitation Infrastructure and Services				
Establishment/ enhancement of sanitation infrastructure.	Proportion of beneficiaries who gained access to sanitation services	21.3	63.3	**Medium**
	Proportion of HHs with access to Household/community sanitation units (toilets/bathing enclosures)	71.1		
	Proportion of beneficiaries reporting safety of women due to improved access	96.6		
Development of Kitchen Garden				
Increased adoption of kitchen gardens	Proportion of HHs reporting income gains from kitchen garden	12.3	69.3	**Medium**
	No of HHs received seeds/training in the kitchen garden	74.7		
	No of HHs with improved vegetable/fruit consumption due to kitchen gardens	91.4		

Outputs	Output Indicators	Output Avg.	Impact Level	
	Proportion of HHs reporting improved nutrition	98.8		
Improved Awareness and Health Seeking Behaviour				
Adoption of positive health and sanitation practices	Increase in no. of HHs adopting proper solid waste management practices	93.9	46.9	**Medium**
	Increase in no of HHs adopting proper liquid waste management practices	0.0		
Awareness regarding health and sanitation	Improved awareness regarding cleanliness and sanitation practices (Using toilets instead of open defecation)	96.6	87.7	**High**
	Improved awareness regarding waste management	78.8		
Improved capacity of educational institutions to provide services				
Access to improved physical infrastructure	Proportion of students/schools who gained access to functioning smart class rooms/ BaLA/science labs/libraries/learning aid/furniture/sports equipment	67.3	66.1	**Medium**
	Proportion of schools who gained better sports equipment	39.7		
	Proportion of schools who gained access to clean and functioning sanitation units/drinking water posts at education institutions	91.3		
Improved willingness to engage in school activities	Improvements in attendance due to improved infrastructure	87.9	58.0	**Medium**
	Proportion of institutions reporting increase in enrolment post infrastructure development	50.0		
	Proportion of institutions reporting improved interest of students to engage in classroom activities	36.2		

Change	Impact Level
0%-40%	**Low**
>40% - 70%	**Medium**
>70%- 100%	**High**

D Two SampleProportionsZ Test

The two-sample proportions z-test is a statistical hypothesis test used to determine whether two proportions are different from each other. The null hypothesis of the test is that the two proportions are equal; while the alternative hypothesis is that the two proportions are not equal.

The test statistic for the two-sample proportions z-test is given by the following formula:

z = (p1 - p2) / sqrt(p*(1-p)/ (n1 + n2))
where:

p1 is the proportion in the first sample
p2 is the proportion in the second sample
p is the pooled proportion, calculated as (p1n1 + p2n2)/ (n1 + n2)
n1 is the sample size of the first sample
n2 is the sample size of the second sample
The z-statistic is then compared to the standard normal distribution to determine the p-value of the test. A p-value less than alpha (typically 0.05) indicates that the null hypothesis can be rejected, and there is evidence to suggest that the two proportions are different.

The two-sample proportions z-test can be used to test for a difference in proportions between two groups of people, such as men and women, or two different brands of products. The test can also be used to compare the proportions of two different populations, such as the population of a city and the population of a state.

Here are some of the assumptions of the two-sample proportions z-test:

- The two samples are independent.
- The two populations are normally distributed.
- The sample sizes are large enough (n1p1n2*p2 > 10) (Basically the Central Limit theorem should apply for the sampling distribution of the z-statistic can be approximated by the standard normal distribution.)

If these assumptions are not met, the results of the test may not be reliable.

The two-sample proportions z-test is a powerful tool for comparing two proportions. However, it is important to be aware of the assumptions of the test and to ensure that the data meets these assumptions before using the test.

Assumptions:

- Independence: The two samples must be independent of each other.
- Normality: The two populations must be normally distributed, or the sample sizes must be large enough (n1p1n2*p2 > 10).
- Binomial distribution: The population does not need to follow a binomial distribution, but the test is more powerful if it does.

The z-test conducted for one indicator-Proportion of farmers with average productivity above baseline median-is shown below.

Table11: Z-test Conducted for P0289

Indicator	Proportion of farmers with income from agriculture above baseline median
p1 (proportion of first sample-end line)	68
n1 (sample size of p1)	94

p2 (proportion of second sample-baseline)	49
n2 (sample size of p2)	94
P	0.622
Calculation	0.707
z statistic	2.686
	Statistically significant at 95% confidence level (or p<0.05)
p-value for the z statistic	0.00548

E Theme-wise Sustainability Matrix

The project support provided demonstrated the capability to continue even after the programme ended. The support of the project to sustain improved outcomes is demonstrated below:

Table12 : Sustainability Matrix

Support provided (Enter relevant activity categories)	Structures established	Technical Know-how	Usage	Maintenance
NRM				
Farm Management	✓	✓	✓	✓
Clean Energy	✓	✓	✓	
Skill Training and Livelihood Enhancement				
Agriculture Training and Support	✓	✓	✓	
SHG-Based Women Empowerment		✓	✓	✓
Skill Training		✓		
Health and Sanitation				
Health		✓		
Sanitation	✓	✓	✓	✓
Kitchen Garden		✓	✓	✓
Promotion of Education				
Educational Institutions Development	✓	✓	✓	✓

***