

# Impact Assessment Study of Holistic Rural Development Programme (HRDP) Barwani, Madhya Pradesh– P0296



Prepared For:



**HDFC Bank Corporate Social Responsibility (CSR)**

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## Executive Summary

The present study is an assessment of the Holistic Rural Development Programme (HRDP), which was implemented by HDFC Bank in collaboration with Aga Khan Rural Support Programme (AKRSP), in eleven villages of Barwani district of Madhya Pradesh from September 2019 to September 2022. This study highlights key interventions undertaken in the project duration and evaluates the generated impact. The primary areas of focus within the interventions encompassed Natural Resource Management (NRM), Skill Training & Livelihood Enhancement (ST&LE), Health and Sanitation (H&S), and the Promotion of Education (PoE). At the commencement of the project, a Participatory Rural Appraisal (PRA) was conducted by AKRSP, which included members of village Panchayats, key representatives of the villages, and women members of the community. This exercise was instrumental in identifying the major challenges in the area, as well as in facilitating community mobilisation and identifying entry point activities.

A comprehensive methodology was adopted for the assessment, integrating both qualitative and quantitative approaches in the collection of primary data. This included a sample size of 400 beneficiaries as respondents for the household survey, selected using purposive random sampling. For the qualitative assessment, 8 Focus Group Discussions (FGDs) and 5 In-depth Interviews (IDIs) were conducted.

### Natural Resources Management

A range of land treatment interventions, including Loose Boulder Structures (LBS), farm bunds, staggered contour trenches, and gabion construction, were undertaken to enhance soil fertility across approximately 2,929 acres. Concurrently, water management initiatives, such as stop dams, dug-out ponds, and lift irrigation systems, have established irrigation facilities, benefiting approximately 733 acres of land. Approximately 83 percent of the respondents have benefited from the agricultural activities associated with NRM, with **99.7 percent of these beneficiaries reporting an increase in their annual agricultural income since the project was implemented.** The average gross income increased by 72 percent, from INR 53,442 to INR 91,991. Simultaneously, the mean net income increased by 78 percent, an increment of INR 30,530 from the baseline. Interventions such as the distribution of quality seeds and various irrigation measures, have been pivotal in generating these positive outcomes. About 58.9 percent of the beneficiaries reported a reduction in the usage of chemical fertilisers, while 38.1 percent have adopted the vermi pit method of composting for natural fertilisers, which further reduced expenditure.

Key crops cultivated in the study area are wheat, cotton, and maize. Due to the irrigation support provided in the project, 87.1 percent of the sampled beneficiaries have started wheat cultivation in the Rabi season, compared to about 22 percent before the project. This led to increase in wheat productivity to 966.94 kg/acre, a 31.5 percent rise from the pre-project level of 735.32 kg/acre. Cotton and maize have experienced productivity increases of 26.9 percent and 35 percent, respectively. Additionally, 62 percent of respondents have benefitted from the clean energy support (solar street and home lights) by the project. Approximately, 98.7 percent of these beneficiaries reported that the solar lights contribute to safety from wild animals, while 80.7 percent perceive that it enhances the safety of women.

### Skill Training and Livelihood Enhancement:

The project organised 66 farmers' training sessions and conducted 8 farmer exposure visits. In addition, 17 Pashu Sakhi training and exposure programmes were organized. These initiatives have established a sustainable source of income generation and ensured provision of timely primary veterinary care



services at the village level. Due to the adoption of sustainable farming practices such as conservation agriculture, application of bio-pesticides, inter-cropping, mulching etc. along with interventions under NRM, 71.4 percent of the sampled beneficiaries reported an increase in income and 81.6 percent experienced an enhancement in crop productivity. Furthermore, 73.5 percent of respondents have observed an improvement in soil health, which is further corroborated by the improved productivity of the major crops. Approximately 90 percent of beneficiaries now use organic manure on their farms, marking a 19-percentage point increase since the project's inception. Additionally, the adoption of conservation agriculture practices has increased from 16.3 percent to 38.8 percent among beneficiaries.

About 41.5 percent of the beneficiaries received project's support for Self-Help Groups (SHGs). Among them, 63.9 percent reported revival of defunct SHGs and 56 percent indicated support in bank linkages through the project. Furthermore, 95.3% of beneficiaries reported increased confidence after regularly attending SHG meetings and trainings.

### Health and Sanitation

Interventions focused on menstrual hygiene management were organized, which included provision of training and information to adolescent girls about proper menstrual hygiene practices. In addition, health camps were conducted in all the project villages. Approximately, 90.5 percent of respondents attended these camps, and among them, 94.2 percent also reported receiving rations during the COVID phase of 2020-21. Post-health awareness sessions, **82.9 percent of beneficiaries reported an improvement in dietary habits, 51.4 percent observed an increase in physical activity,** and 74 percent perceive reduced cases of diseases in their villages.

Furthermore, 63.8 percent of respondents received support from the project in establishing kitchen gardens, with quality seeds of various vegetables being distributed. Among these beneficiaries, 85 percent noted an improvement in their family members' nutrition, attributing it to the availability of vegetables at their doorstep. These vegetables are primarily used for self-consumption and shared with extended family members or neighbours. Additionally, 80.8 percent of these beneficiaries reported a decrease in food expenditure due to the kitchen garden. This underscores the project's impact on health, nutrition, and economic well-being in the community.

### Promotion of Education

The project successfully renovated school/Anganwadi infrastructures, established libraries, and provided learning and playing materials. According to the survey findings, 26.3 percent of the respondents indicated that their children's schools received support from the project. Among these beneficiaries, **69.5 percent reported that the schools underwent some renovation work,** including wall paintings, as part of the project interventions, while 49.5 percent reported receiving better sports equipment as part of the interventions.

Additionally, 72.4 percent of respondents noted that their children's schools implemented BaLa or educational paintings to enhance teaching and learning methods. In terms of infrastructure, 54.4 percent believe schools now have improved sports equipment, and 36.9 percent reported enhanced quality of black/whiteboards. These statistics underscore the project's significant positive impact on school infrastructure and educational resources.



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
Increase in net income from agriculture (mean value) (INR)	38,989	69,519	78.3%
Average productivity of Wheat (Kg/Acre)	735.32	966.94	31.5%
Average productivity of Maize (Kg/Acre)	806.76	1089.39	35%
Average Productivity of Kapas (Kg/Acre)	481.06	610.58	26.9%
Average Monthly Income from Livestock (INR)	874	2101	140%

There is over 78 percent increase in average net income from agriculture which is primarily due to enhanced productivity of the major crops (wheat, cotton and maize) during the last year of the project implementation. Project support in goateries (provision of materials for goat shed) in convergence with relevant state schemes and timely veterinary services have resulted in over 100 percent increase in mean monthly income from livestock (sale of goats and poultry)

### HRDI Indicators

The Holistic Rural Development Index (HRDI)<sup>1</sup> has shown an increase of 134.6 percent since the baseline assessment, indicative of the project's effective interventions. HRDI score for ST&LE has increased by 275 percent, 0.04 in baseline to 0.15 in endline. The progress can be attributed to the revival of SHGs and subsequent enterprise support, which was previously non-existent. Within the Health and Sanitation (H&S) domain, the HRDI score has experienced an increase of 228.5 percent. This is largely attributable to beneficiaries establishing kitchen gardens, resulting in enhanced nutrition and reduced food expenditures. The project's provision of quality seeds has been instrumental in positively influencing the health outcomes of the beneficiaries.

**Table 2: Summary of HRDI Scores**

Domain	NRM		ST&LE		H&S		PoE		Total	
HRDI Score	Base line	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline
	0.09	0.16	0.04	0.15	0.07	0.23	0.06	0.07	0.26	0.61
% Change	<b>77.7%</b>		<b>275%</b>		<b>228.5%</b>		<b>16.7%</b>		<b>134.6%</b>	

### Recommendations

- Implementation of agro-forestry and afforestation activities on a larger scale, utilizing a ridge-to-valley approach, holds potential for effectively mitigating soil erosion and concurrently fostering livelihoods among farmers. Active farmer involvement in the planning process, including species selection, is advisable.
- Consider adopting drip irrigation as a viable intervention to enhance water productivity within the region's agricultural practices. This technology not only minimizes water wastage but also offers a more efficient and convenient water distribution system for farmers.

<sup>1</sup> To evaluate the impact of the interventions, the study has employed the existing HRDI created by the programme. The HRDI is arrived at by defining key outcome indicators for each of the domains and developing a composite index.

- Prioritize capacity building for community members, village resource personnel, and panchayat members in the maintenance of solar street lights. This initiative addresses technical issues in their functioning, as reported by select respondents.
- Recommend an increase in the frequency of health camps within the village to ensure regular access to healthcare services for the community, thus promoting overall well-being.
- Recommend installation of solar panels in schools to provide a sustainable and uninterrupted power source. This strategic move addresses immediate electricity needs and lays the groundwork for the introduction of advanced educational facilities, such as smart classrooms and well-equipped science laboratories.

# 1 Introduction

India has made significant advancements in rural development, with 65 percent of its population residing in rural areas as of 2021, and 47 percent depending on agriculture for livelihood (PIB Delhi, 2023). Agriculture and related sectors contribute 18.3 percent to the nation's GDP (Ministry of Agriculture and Farmers Welfare, 2023), and the rural ecosystem has seen an average annual growth of 10 percent over the last five years. Despite this progress, challenges such as inadequate irrigation, poor soil health, disguised unemployment, limited skill development opportunities, unreliable healthcare access, low literacy rates, and increasing environmental degradation persist. Urban development has outpaced rural progress over the past two decades, leading to rural-urban migration. Strengthening the rural economy is crucial for India's overall economic development. In response, HDFC Bank's Corporate Social Responsibility (CSR) initiative 'Parivartan' supports various programmes aimed at providing holistic rural development to enhance 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 which non-governmental organisations (NGOs) across the country are supported to undertake development interventions in four thematic areas:

- a) Natural Resource Management (NRM)
- b) Skill Training & Livelihood Enhancement (ST&LE)
- c) Health and Sanitation (H&S)
- d) Promotion of Education (PoE)

The World Bank defines rural development as the improvement in the social and economic environment of the rural population. The fundamental aims of rural development include planning, creating, and using the resources such as land, water, and manpower to promote equal opportunity for the population reliant on them. Given this context, HRDP strives to enhance the lives of people in rural communities by primarily bringing about sustainable socio-economic transformation and ecological development. Its holistic approach caters to their various needs by addressing development of human capital, effective management of natural resources, economic independence through skilling and livelihood opportunities, basic infrastructure development, and enhancement of living conditions.

## 1.2 Objectives of Impact Assessment

The impact assessment 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 assessment is to add value by showcasing successful initiatives and recommending possible ways to address existing challenges.

It seeks to:

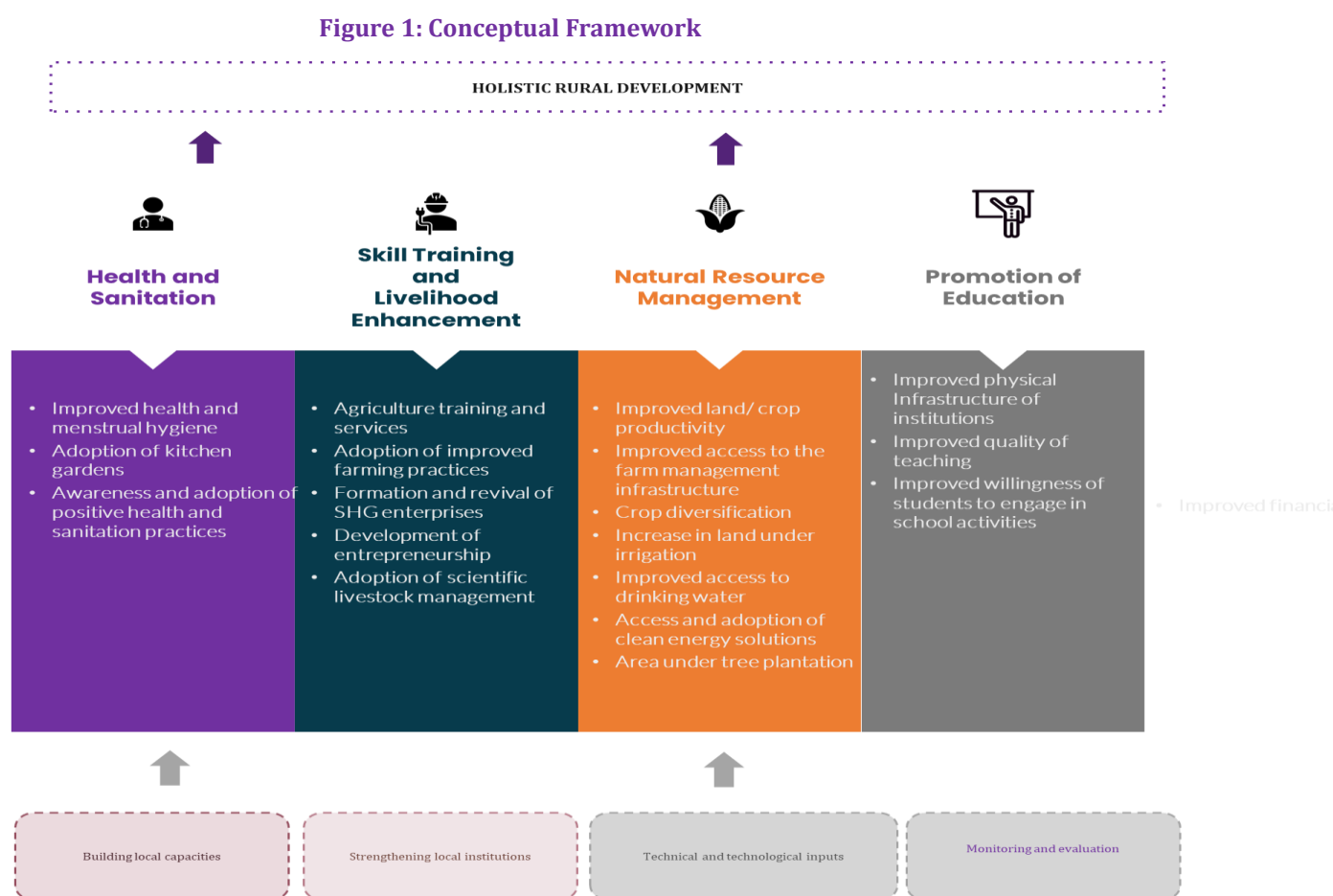
- Critically and objectively evaluate implementation and performance
- Determine reasons for certain outcomes or lack thereof
- Derive lessons learnt and good practices

- Provide evidence-based findings to inform future operational and strategic decisions while planning and funding partner organisations

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

### 1.3 Conceptual Framework Adopted

The conceptual framework and the areas covered under the assessment are depicted below (see Figure 1). The aim is to build local capacities and strengthen local institutions, while giving technical inputs and conducting evaluation across the four thematic areas. The objectives under NRM, ST&LE, H&S and PoE are enumerated in the figure below.



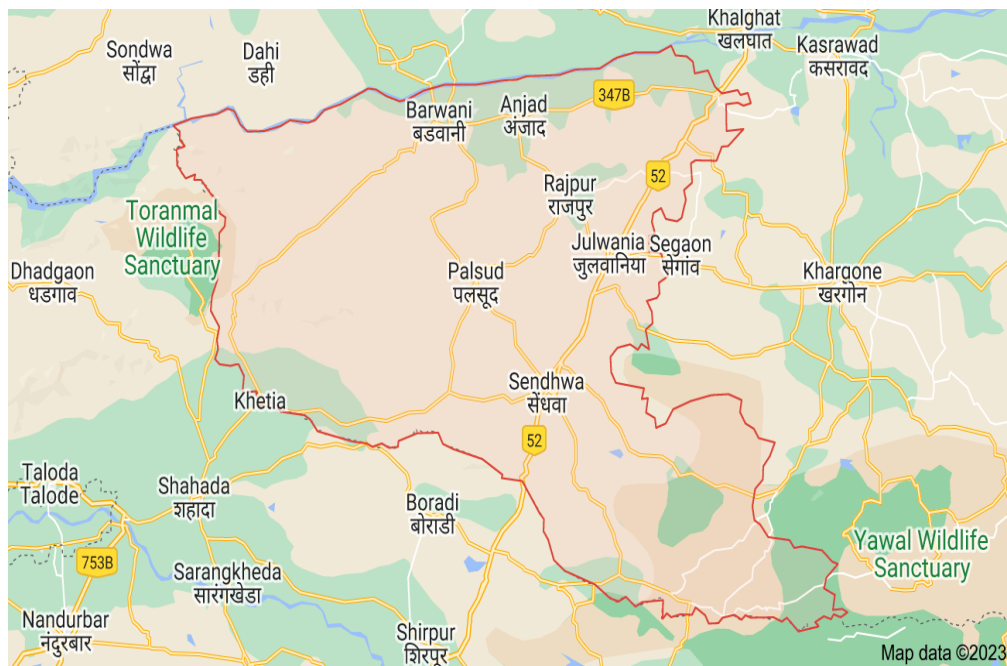
### 1.4 About the Project Area

The assessment provides an independent and detailed assessment report of HDFC Bank's HRDP intervention (under *Parivartan*) undertaken in Barwani district of Madhya Pradesh, implemented by Aga Khan Rural Support Programme (AKRSP). Located in southwestern Madhya Pradesh, bordering Gujarat, Barwani's economy is mainly agricultural, focusing on crops like soybean, wheat, maize, and cotton. The district, identified as aspirational by NITI Aayog, encompasses 5,427 sq. km, including 904.36 sq. km of forest and a cropped area of 398,022 hectares (Census, 2011). In the 11 project villages, over 90% of the population is tribal, facing challenges like uneven terrain, limited irrigation and poor infrastructure facilities. AKRSP has an advantage of being strategically positioned in close proximity to this cluster of villages, facilitating effective program monitoring. The project villages confront multifaceted challenges

in agriculture, livestock, irrigation, livelihoods, financial inclusion, education, and health, requiring holistic interventions.

The project was undertaken during September 2019 to September 2022 and the interventions covered ten villages across two blocks. The assessment study was carried out from November 26, 2023 to December 8, 2023.

**Figure 2 District Map of Barwani, Madhya Pradesh**



## 1.5 About the Implementing Partner

AKRSP operates in 3255 villages across Gujarat, Madhya Pradesh, Bihar, and Maharashtra, impacting over 3.5 million marginalized individuals. More than 80 percent of affected households belong to tribal, Dalit, and minority communities, with women constituting over 60 percent of beneficiaries (Aga Khan Rural Support Programme (AKRSP), 2023). AKRSP employs participatory development approaches, focusing on empowering rural communities, especially underprivileged groups and women. The organization emphasizes collectivization and supports individual enterprises, striving to establish self-reliant people's institutions for financial inclusion, livelihood improvement, and enhanced rural governance. In Madhya Pradesh, AKRSP is working in the districts of Barwani, Khandwa, Khargone, Dhar and Burhanpur.

## 2 Research Design and Methodology

The impact evaluation study has applied a mixed approach that includes both qualitative and quantitative tools to assess the impact of the project interventions in the study area. The impact assessment process was carried out in a consultative manner engaging with key stakeholders involved in the project design and implementation that includes AKRSP.

### 2.1 Criteria for Assessment

For each thematic area, the project activities undertaken by AKRSP were identified based on the project documents, reports, and Management Information System (MIS) data provided by them. The impact of these activities was evaluated using specific criteria, such as:

- Relevance and Convergence
- Impact and Effectiveness<sup>2</sup>
- Sustainability

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

- a) Aligned with the State's plans and priorities for rural development.
- b) Relevant to the local needs of the most vulnerable groups.
- c) Convergent with (and making use) of the Government's existing resources.
- d) 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 the four thematic interventions. The findings were assessed against these values through identifying 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/ 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 mechanism 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 the survey team consisting of 5 enumerators and 1 supervisor, with backstopping by one field coordinator. The primary quantitative data was collected using Computer Assisted Personal Interview (CAPI) method where a mobile application was developed 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 AKRSP, the HDFC Bank programme team, and local leaders from the project area. IDIs were conducted with the specific individuals who were recipients of the project. The qualitative data was conducted by the team's research coordinator.

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<sup>2</sup> While from an evaluation perspective impact and effectiveness are two different aspects, in the report, these are used interchangeably.

**Image 1: An FGD in Progress in Panchpula village**



Secondary data sources included Programme Log Frame (Logical Framework Analysis), Annual Impact Report, Programme implementation timelines, Monitoring reports prepared by the Implementation partner, Closure report and other relevant reports/ literature related to the project.

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

### **2.3 Sample Size and Distribution**

Project was implemented in ten villages of Barwani and beneficiaries were selected using purposive random sampling from a list of beneficiaries obtained from AKRSP. Since beneficiary selection was undertaken independently for each thematic area, the selection of more than one beneficiary from a single household is probable. Also, it is common that a single beneficiary received multiple benefits and support across the four thematic areas. Inclusion of beneficiaries for all thematic areas was ensured to allow for their representation. Nine villages out of the ten were selected for the study and the target sample size across these villages was 400. The thematic area wise sample for the study is as follows:

**Table 3: Sample distribution across thematic areas**

Village	Total HHs	NRM	ST&LE	H&S	POE
Ambapani	55	55	39	50	4
Barukhodra	24	23	10	23	2
Charankheda	51	48	23	48	27
Holgaon	50	50	34	49	18
Malurana	51	51	17	51	12
Panchpula	27	27	15	27	3
Rasgaon	37	24	31	37	3
Raychulli	54	54	32	51	21
Temla	51	49	32	50	15
<b>Total</b>	<b>400</b>				

The research team also conducted qualitative study which included FGDs, IDIs etc. The sample is provided in the table below:

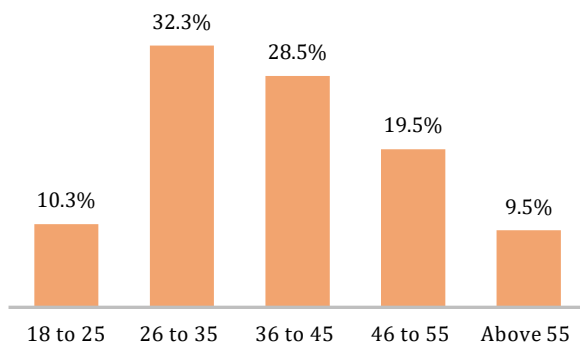


**Table 4: Qualitative sample distribution**

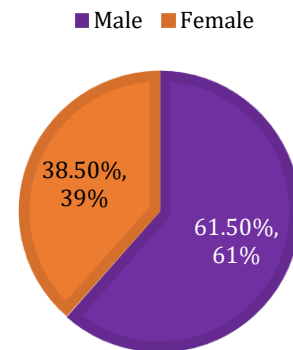
District	FGDs				IDIs			
	VLA	SHG-Micro Enterprise	Community	Teachers	Village Pradhan	Anganwadi Worker (AWW)	Pashu Sakhi	Mandap Cultivation Beneficiary
<b>Barwani</b>	1	1	6	1	1	1	1	1
Total	8			5				

The total sample includes 61.5 percent males and 38.5 percent females, reflecting the gender distribution of the sample. A majority of the respondents belonged to the age group of 26-55 years. 9.5 percent of the respondents were over 55 years of age, while around 10 percent belonged to the 18-25 years age group.

**Figure 4: Age Group wise distribution of Respondents (Years)**



**Figure 3: Gender distribution of the Respondents**



## 2.4 Training of Enumerators

A gender balanced survey team consisting of 5 local enumerators and 1 supervisor with requisite education and experience, were recruited for data collection. Two days of training was provided to enumerators and supervisors by the field coordinator and the research coordinator, at Barwani, Madhya Pradesh. The survey team underwent comprehensive training, which included explanation of the project, familiarity with data collection tools, instruction on utilizing CAPI tool, adherence to data collection protocols, and implementation of data quality control measures. The training methodology involved a combination of classroom teaching and practical mock exercises employing the survey tool.

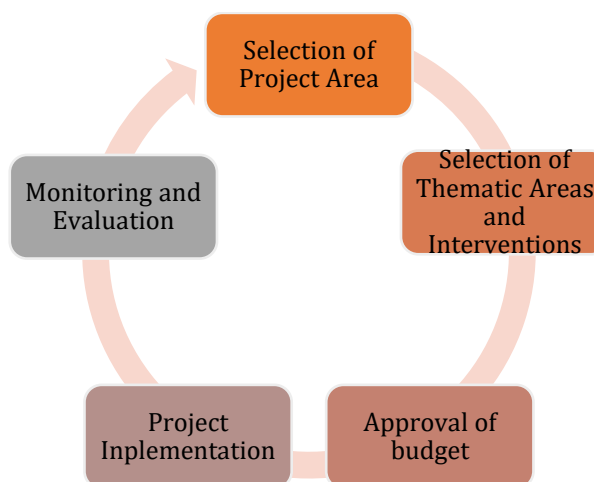
**Image 2: Training on Survey tool, Barwani**



### 3 Review of Project Planning and Implementation

The planning and implementation of the project involved five stages: selection of the project area viz. district, block, villages, selection of thematic areas and interventions, approval of budget, project implementation and monitoring and evaluation. Review of each of these stages is explained below.

**Figure 5: Planning & Implementation Process**



#### 3.1 Selection of Project Area

The selection of program area is primarily based on the existing operational area of the implementing partner. Groundwater is the main source of irrigation and drinking water in Barwani district. The villages in the district face severe water shortages due to low water table. Agriculture is mostly rainfed and insufficient irrigation facilities, which in turn affects the cropping pattern. Due to the undulating terrain of the district, there is limited access to reliable transportation and roads, hindering connectivity to markets and essential services. Inadequate infrastructure, including schools and healthcare facilities are some of the other challenges faced in the district.

AKRSP selected a cluster of 10 tribal villages in the Barwani block and 1 tribal village of Pati block of Barwani district. Barwani is among the aspirational districts selected by NITI Aayog. These villages are selected based on the concentration of tribal villages and level of poverty among these tribal households. More than 90 percent population in the selected 11 villages belong to tribals. These villages have multiple developmental challenges in the areas of agriculture, livestock, irrigation, non-farm livelihoods, financial inclusion, education and health.

#### 3.2 Selection of Thematic Areas and Interventions

Considering the above challenges in the project area, the project interventions have focussed largely on water and farm management in addition to clean energy under NRM theme. This is followed by project support in agricultural training, livestock management, under ST&LE and educational institution development and education support under PoE. Under health and sanitation, menstrual hygiene sessions for adolescent girls and health camps have been conducted in all the villages.

The activities specific to each village under the project were decided after in-depth consultation with the respective Village Level Associations (VLAs)/SHGs, which were constituted at the beginning of the project implementation. Activities under each of the four thematic areas are as follows.

**Table 5: Activities under four thematic areas**

Activity Category	Activities	Output Indicators
<b>NRM</b>		
Irrigation Management	Lift Irrigation, Solar Pumps, Diversion Based Irrigation	Income from agriculture
Water Management	Pond Development	
Farm Management	Farm Bunding, Stone Bunding, contour terracing	
Clean Energy	Solar Lights (Street), Solar Home Light	Clean energy
<b>ST&amp;LE</b>		
Agriculture Training and Services	Field School, Exposure Visit, Farm Techniques Training, PoP Training, Natural/ Organic Farming	Access to Agriculture Training and Services
Livestock Management	Goats and Poultry sheds, goats and poultry provided under convergence, Animal Health Camps, Household Vaccination Service	Livestock Management
<b>H&amp;S</b>		
Health	Health Camp, Menstrual hygiene related awareness sessions for adolescent girls and women	Health Infrastructure and Services
<b>PoE</b>		
Educational Institutions Development	School building renovation, BaLA, construction/ repair of separate washrooms for girls and boys, classroom furniture	Infrastructure in Educational Institutions

Each category has been further broken down into sub-categories and activities, along with the focus beneficiaries.

### 3.3 Project Implementation

The objectives<sup>3</sup> of the project were tailored according to the needs and demands of the study area. The major objectives were:

- Improving the quality of lives of the targeted tribal households through multi-thematic interventions in the areas of natural resources management, sustainable irrigation development, farm livelihoods, livestock development and health, while reducing distress migration.
- Increasing income levels of households in the target villages in the range of 20 percent to 100 percent based on the livelihood activities done with the individual households
- Women empowerment through strong self-help groups
- Work on measures to minimize the soil erosion of top soil of fields and increase the irrigation potential in the line of climate change mitigation approaches.
- Strengthening small and marginal farmer capacity through agricultural best practices for enhancing productivity
- Improvement in goat and poultry rearing

In view of the objectives, the project implementation comprised of a package of interventions ranging from provision of direct materials and services such as quality seeds (for agriculture, kitchen gardens, horticulture, mandap cultivation), lift irrigation, dugout ponds as farm inputs and implements, along with raising awareness about new agricultural techniques - conservation and organic farming. For livestock management it included provision of animal shed such as poultry and goat sheds, along with

<sup>3</sup> Project Closure Report, Barwani, AKRSP

goats and poultry in convergence with relevant government schemes, along with training of *Pashu Sakhis* to cater to the health of these animals.

Under NRM, to address the agricultural challenges posed by the study area's hilly terrain, rampant soil erosion, and low water table, a comprehensive set of interventions were strategically planned. Check dams and stop dams were constructed to arrest water flow, allowing for sediment deposition and groundwater recharge. Dug-out ponds and Diversion Based Irrigation (DBI) were employed to capture rainwater, addressing the issue of a low water table and providing a local water source for irrigation. Farm bunding and stone bunding were carried out as barriers to prevent soil erosion and safeguarding the fertility of the soil. Furthermore, capacity-building initiatives such as training on conservation farming, preparation of organic manure, were provided to educate farmers about sustainable agricultural practices. Clean energy was also a focus area where solar lights were installed at several junctions in the villages.

Farmers were engaged in experiential learning activities, field observations and group analysis through the approach of Farm Field Schools (FFS); the group met regularly with the facilitator at different stages of the crop production to improve their skill and knowledge. To bridge the information gap on government schemes, regular updates were provided on public benefits that could be leveraged during the farmers meetings conducted at the village level at monthly intervals during the agricultural season to augment more income from agriculture and allied activities. The project also promoted goat rearing as an income generating activity among the farmers to provide them with an additional source of income.

To generate awareness on health and hygiene, menstrual health hygiene camps were organized for adolescent girls in all 11 villages. Animal health camps were organised as well.

Under PoE, renovation work was carried out at *Anganwadis* and primary schools. Building as Learning Aid (BaLA) paintings were undertaken to aid in the learning of the students.

The implementing partner positioned a team that was responsible for project implementation. They also inducted community level functionaries for mobilising communities and helping them in implementing project activities.

### **3.4 Monitoring and Evaluation**

The HRDP has a standard monitoring and evaluation approach that was adopted by the implementing partners. These includes reporting of project implementation progress in periodically to the HDFC Bank. In addition, the program implementation team of AKRSP visits the project villages at regular intervals to review the project work sites. participate in the training programs, awareness camps and interact with project beneficiaries.

HDFC Bank has specific ask as regards to the project information concerned from the implementing partner. The project data are primarily managed by the implementing partner in spreadsheets that include details of the village wise activities implemented, beneficiaries mapped against each of the project activities, expenditures among others. In addition, the implementing partner submits an annual progress report on the project activities to HDFC Bank along with the plan for the next year. This document serves as the major source of the information that provides a summary of the activities implemented, outputs delivered, and outcomes achieved.

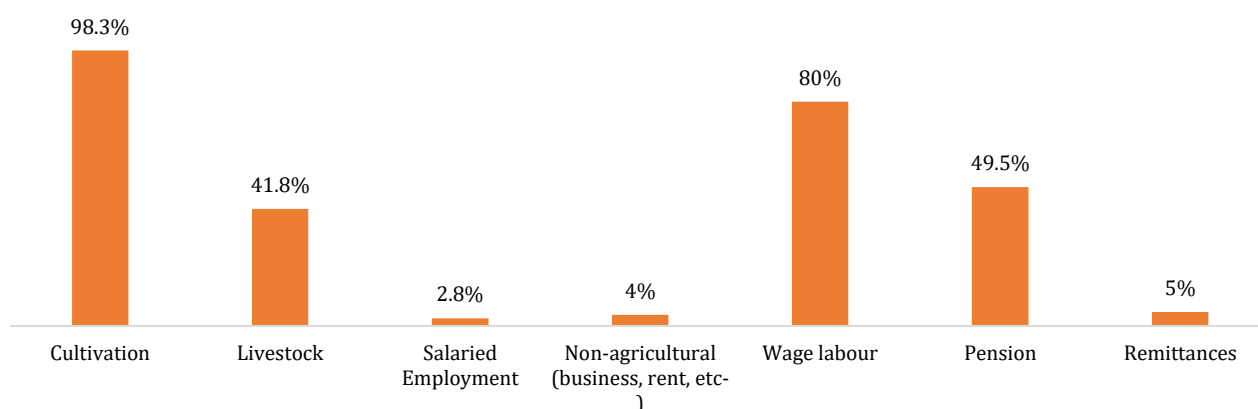
In addition, the HDFC Bank hired Intellectap as an external agency to conduct impact assessment of the project after one year of the completion of the project. This is an independent assessment that evaluated using four criteria: relevance and convergence, impact and effectiveness, sustainability, and replicability. This is backed up by the creation of a Holistic Rural Development Index (HRDI) based on selected

outcome indicators. The impact of each activity has also been calculated and classified as high, medium, or low impact. The annexure C goes into greater detail on these.

## 4 Study Findings

This section provides an overview of the socio-economic profile of respondents surveyed in the nine villages of Barwani district, Madhya Pradesh. Agriculture emerges as the predominant source of livelihood, with 98.3 percent of respondents engaged in this sector. A significant portion, 80 percent, works as wage laborers, emphasizing the diverse employment landscape. Additionally, 49.5 percent of respondents identified pension as one of the major income sources.

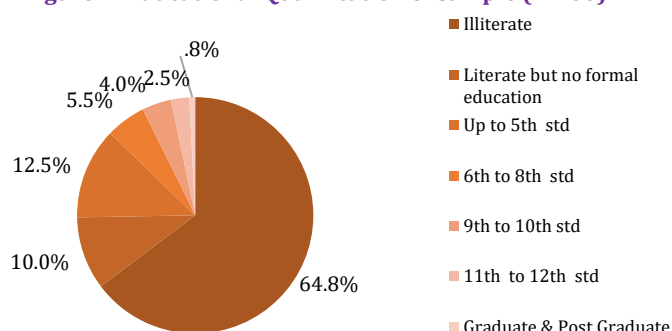
**Figure 6: Distribution of Sample based on occupation (n-400)**



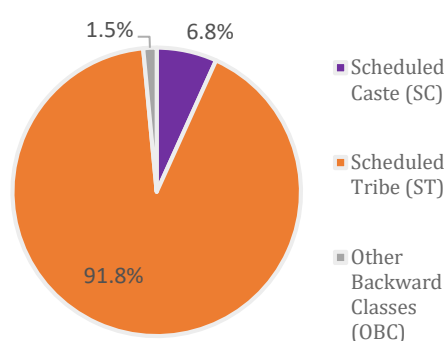
64.8 percent of the respondents in the sample are illiterate, this is higher than the district average of 60.3 percent. Approximately 13 percent have received primary education and less than a percent of the sample are graduate. Hilly terrain of the study area and a difficult topography make it challenging for the people to commute to schools and colleges outside their villages for higher studies, especially for girls.

In the discussions with the beneficiaries, it was reported that in the months between October-March, some residents migrate to work as wage labourers in Gujarat, another major reason for break in children's education. 91.8 percent of the respondents are from Scheduled Tribes and around 70 percent of them hold BPL card, while 20 percent have Antyodaya cards.

**Figure 7: Educational Qualification of sample (n-400)**



**Figure 8: Distribution of sample on Caste basis**



**Figure 9: Distribution of Sample based on Ration Card**

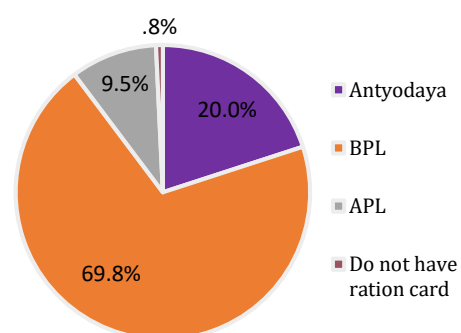


Table 6 presents the details of various activities carried out under each of the four thematic areas. It can be inferred that the emphasis of the interventions has been on land treatment and the provisioning of irrigation sources for the agricultural community, coupled with efforts directed at increasing the water table and improved agricultural productivity.

**Table 6: Quantum of Activities under each activity category of four thematic areas**

Activity Category	Activities	Nos. (as provided by IA)	
<b>NRM</b>			
Irrigation Management	Stop Dam	8	
	Dugout Pond	5	
	Mini Lift Irrigation System	61	
	Solar Pump	2	
	Diversion Based Irrigation	1	
Farm Management	Land Development	1203.88 Ha	
	Plantation (No. of forestry Horticulture plantation)	21087	
Clean Energy	Solar Lights (Street)	114	
	Solar Home Light	150	
<b>ST&amp;LE</b>			
Agriculture Training and Services	Vegetable Cultivation (Mandap)	22	
	Farmer Field School	16	
	Conservation Agriculture (Crop Diversification)	94	
	Input Supply Seed Distribution	230	
	Farmers' Trainings/Capacity Building	66	
	Farmers Exposure Visits	8	
Skill and Entrepreneurship Development	Enterprise Development	6	
	Capacity building of Community Volunteers	6	
	Community volunteers' incentive/capacity building	695	
	SHG Formation and Rejuvenation of old SHGs	61	
Livestock Management	SHGs capacity building	56	
	Goats and Poultry Shelter Support	54	
	Training of Pashu Sakhis	17	
	Incentive to Pashu Sakhis	250	
	Kit for Pashu Sakhis	26	
Health	Animal Health Camps	28	
	<b>H&amp;S</b>		
	Covid Relief (Ration Kit Distribution)	660	
	Menstrual Hygiene Awareness	33	
	Clean home competition	22	
Kitchen Garden	242		



PoE		
Educational Institutions Development	Anganwadi /School infrastructure improvement	5
	School libraries	4
	Learning/playing material for schools	14

(Source: Project MIS from Implementing Agency)

The following table provides details of various water storage structures developed by AKRSP in the study area as part of HDFC project interventions for irrigation and water management under NRM.

**Table 7 Water storage structures developed in project duration**

Water Storage Structure	Village	No.	Impact Area (Acre)	Volume (cum.)	Depth (mtrs)
Stop dam	Barukhodra	1	31.5	1920	1.6
Stop dam	Holgoan	1	18	1890	1.5
Stop dam	Rasgoan	1	26	1900.8	1.6
Stop dam	Panch pula dakshin	1	23	1632	1.7
Stop dam	Malurana	1	29.44	1440	2
Stop dam	Holgoan	1	21.93	1440	2
Dugout pond	Barukhodra	1	3.24	781.88	3.18
Dugout pond	Holgoan	1	4	1026.74	3
Stop dam	Ambapani	1	28	1584	1.6
Stop dam	Raiychuli	1	14	1350	1.5
Dugout pond	Charnkheda	1	3	504.8	1.65
Dugout pond	Malurana	1	4	660.72	2.78
Dugout pond	Temla	1	15.9	562.5	2.5
DBI	Ambapani	1	36	9	1

(Source: Project MIS from Implementing Agency)

The following sub-sections provide details on the major findings in each of the four thematic areas.

## 4.1 Natural Resource Management (NRM)

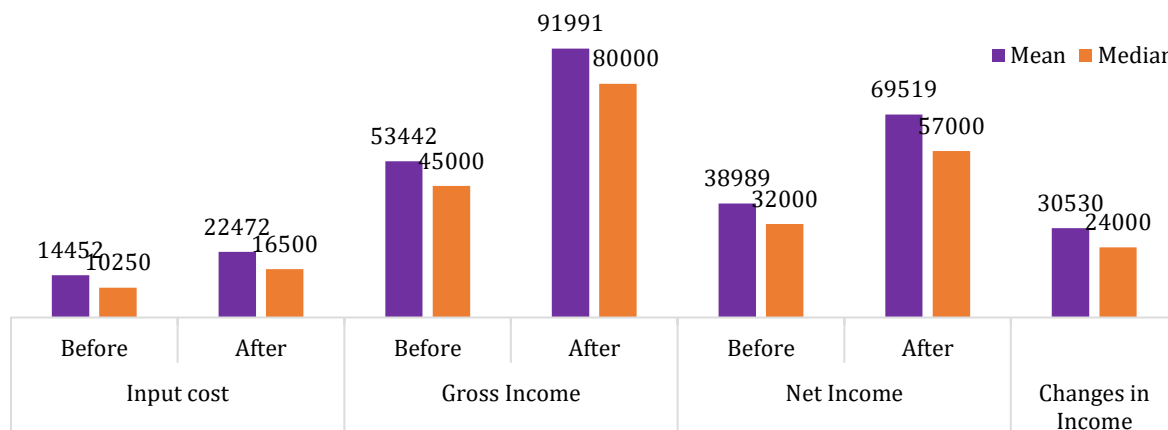
The NRM interventions aimed to enhance crop productivity, increase farmers' agricultural income, improve access to farm management infrastructure for land treatment and irrigation mechanisms, and promote the adoption of clean energy solutions. Strategies such as sustainable agricultural practices, water management, and irrigation improvement measures positively impacted soil fertility, contributed to optimized resource use and increased crop yields. Additionally, efforts to raise awareness and adoption of clean energy solutions such as solar pumps for irrigation further aligned with sustainable agriculture practices, enhancing the resilience of the study area.

### 4.1.1 Income from Agriculture

Approximately, 83.5 percent of respondents availed the benefits from implemented activities in NRM. Among these, 99.7 percent reported an increase in annual agricultural income in recent years due to project interventions. **The mean gross income rose by 72 percent, from INR 53,442 before the project implementation to INR 91,991 a year after the project's conclusion.** Similarly, the mean net

income increased by 78 percent (**Upon conducting a z-test, P-value of 0.000397 (<0.05) was found against a z-statistic of 3.355 (at 95% confidence level) indicating that it is a significant change**). However, input cost has increased by 55 percent in the same duration, attributed to higher market prices for raw materials such as quality seeds, fertilizers/pesticides etc. (cited by 90 percent of respondents) and expanded cultivation areas.

**Figure 10 Income from Agriculture (in INR, Before and After Project Interventions) (n-333)**



A significant 61.9 percent of respondents identified the distribution of quality seeds for crops like wheat, maize, and cotton as a key contributor to the income increase. Furthermore, 33 percent of respondents pointed to the provision of lift irrigation facilities as an influential factor. Notably, the implementation of 8 stop dams, 5 dug-out ponds, 61 mini-lift irrigation systems, and one diversion-based irrigation system has extended the irrigated area to cover over 733 acres of land. Beneficiaries in the sampled villages noted that each lift irrigation point supplies water through pipelines to three families with adjacent arable land.

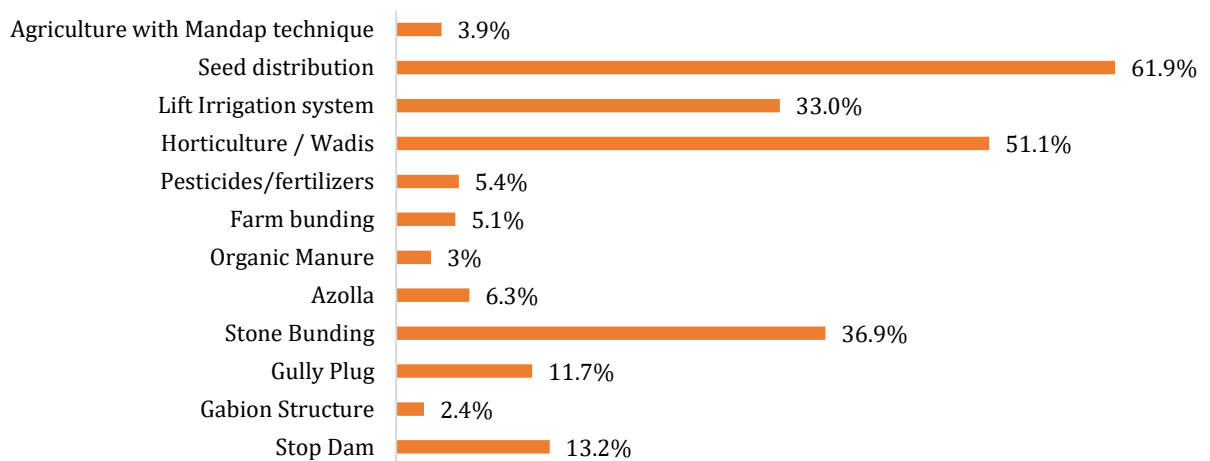
Around 37 percent of respondents mentioned stone bunding as impacting their agricultural income. To combat soil erosion, a total of 2,442 Loose Boulder Structures (LBS) were constructed, covering 686 acres, along with the development of 383 running meters of farm bunds, extending to 1,962 acres. Additionally, 41 gabions were created, encompassing 247 acres in the study area. These combined efforts have improved soil fertility across more than 2,929 acres.<sup>4</sup> The project also established 94 conservation agriculture plots, installed two solar pumps, and developed 22 vegetable mandaps. About 4 percent of beneficiaries attributed the '*mandap vidhi*' method of vegetable cultivation to their increased agricultural income. In this technique, climbing and vine plants grow on a structure or 'mandap', while root vegetables and smaller plants are cultivated underneath, requiring minimal irrigation and proving effective in water-scarce areas. Rekha, a member of the Sri Ganesh Self-Help Group in Panchpula village, Barwani, benefited from the '*mandap vidhi*' technique. She received seeds for bitter melon, spinach, coriander, onion, and tomatoes as part of the project. Following her initial produce sale, she earned an income of INR 25,000 and continues to use this method on a portion of her land, significantly increasing her family's income over the years.

<sup>4</sup> Project Closure Report

Image 3 'Mandap Vidhi' of vegetable cultivation, Temla village

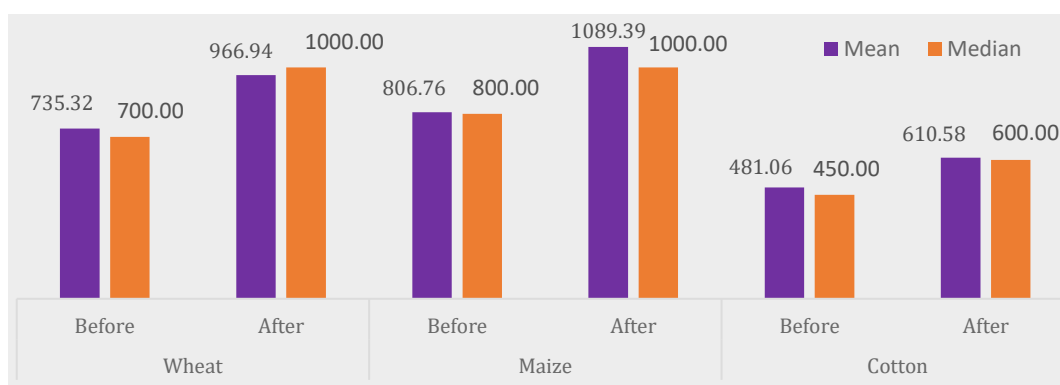


Figure 11: Interventions that helped Increase the Agriculture Income (n-333)



The principal crops cultivated in the study area include wheat, *kapas* (cotton), and maize. Other crops include sorghum, soyabean, groundnut etc. With the expansion of irrigated land, farmers have increasingly adopted wheat cultivation as a second crop. The climate and soil conditions in the study area are conducive to *kapas* cultivation as well, making it a favorable and economically viable cash crop choice for local farmers. As per the quantitative data analysis, **average productivity of wheat has increased to 966.94 Kgs/acre, an increase of 31.5 percent over 735.32 Kgs/acre before the project was implemented. Similarly, the average productivity of cotton increased by 26.9 percent and maize by 35 percent.**

**Figure 12 Productivity of Major Crops (Before & After Scenario) (Kgs/Acre)**



Over 50 percent of the respondents identified the improved irrigation facilities facilitated by HDFC project interventions as a crucial factor that has enhanced crop productivity. The development in irrigation infrastructure has enabled the cultivation of previously unused land, making it feasible for farmers to engage in two-crop cultivation, consequently boosting overall production. According to the survey data, a significant number of them have initiated wheat cultivation during this season (87 percent of beneficiaries at present, compared to only 22 percent before the project was initiated), bringing previously unused or fallow land into production. This is a direct result not only of the irrigation measures implemented but also of various land treatment activities, including farm/stone bunding and LBS. The distribution of high-quality seeds for these agricultural crops was also highlighted as another contributing factor to the improved productivity mentioned by the respondents.

**Table 8 Factors impacting enhanced productivity of major crops (Wheat, n-66, Maize-100, Kapas-147)**

Project Interventions	Crops		
	Wheat	Cotton	Maize
HDFC interventions in seeds and tools	71.2%	36.1%	54%
HDFC interventions in irrigation	50.0%	55.8%	54%
HDFC interventions in organic farming	9.1%	7.5%	5%
HDFC Interventions in land treatment	3.0%	4.8%	1%
HDFC interventions in agricultural installations (e.g. farm bunding)	7.6%	10.9%	4%
Weather	72.7%	70.1%	68%
Increased area under cultivation of crops	16.7%	18.4%	13%
Improved irrigation	81.8%	77.6%	73%

Interventions such as soil testing conducted on farmers' land has helped them in crop selection, nutrient requirements, and optimal fertiliser usage. Farmers in *Malurana* village, during the FGD, emphasised that training in preparing organic manure and bio-pesticides has substantially reduced their expenditure on chemical fertilisers/pesticides. **Previously spending INR 4000-5000 in a season per acre, they now spend INR 500-1000 per acre, supplementing it with homemade manure like 'Paanch Patti Kadha,'** a decoction made from the leaves of five plants, including neem. As reported by

the beneficiaries, in a 400 square meters area of land, using one kilogram of seed input, the current harvest yields approximately 60 kilograms of wheat, which is a significant increase compared to the yield observed before the implementation of these interventions. These practices reflect a more sustainable and cost-effective approach to farming. During discussions with the beneficiaries, it was reported that **vermi kits were distributed in convergence with Agricultural Technology Management Agency (ATMA).**

**Figure 13 Beneficiary of Guava horticulture plantation, Temla Village**



#### **4.1.2 Use of Clean Energy Solutions**

The project successfully installed 114 solar street lights and supported 150 solar home lights, contributing to enhanced safety for villagers during the night. This was a part of the entry point activity during the project initiation. As per the quantitative data, **sixty-two percent of the respondents benefited from the clean energy support provided by the project**, either through solar street lights or solar home lights. Of these beneficiaries, **approximately 90 percent have solar street lights installed in the vicinity of their homes or surrounding areas.** Despite being connected to grid lines, the study area experiences limited power supply, ranging from 4-10 hours a day for most households, and 10-15 hours a day for some. This inadequacy hampers household activities, school studies, and restricts mobility during night time. Given that these sample villages are situated at the foothills of the Satpura ranges, fear of wild animals and a difficult terrain further discourages residents from venturing outside their homes in the dark.

The installation of solar street lights has positively impacted residents' small businesses, enabling them to remain operational until the evening, as brought out by Mr. Dhyani Singh, a beneficiary and owner of a small grocery store in *Ambapani* village. About **98.7 percent of beneficiaries, believe that the solar lights provide safety from wild animals, while 80.7 percent feel that it ensures the safety of women in their households, with better mobility in evening.** This highlights the broader benefits of improved lighting infrastructure in enhancing both economic and safety aspects within the community. Upon the project's conclusion, the upkeep and maintenance of the solar street lights were transferred to the Gram Panchayat. However, discussions with the beneficiaries revealed that certain street lights experienced maintenance issues, highlighting the need for ongoing attention to ensure the sustainability of the installed infrastructure.

Figure 14: Access to Clean Energy Solutions (n-400)

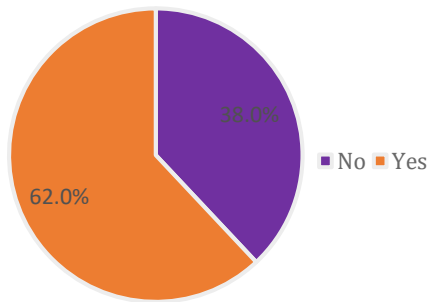
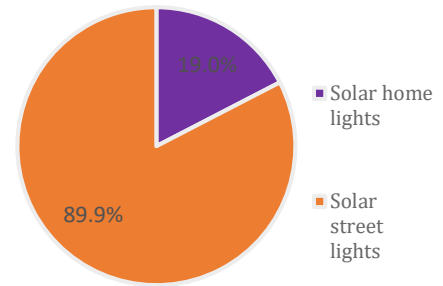


Figure 15 Type of Clean Energy Solutions (n-248)



The home lights distributed amongst the households helped the children in self-study, as reported by over **72.3 percent of the respondents**. **89.4 percent of the beneficiaries feel that solar home lights are reliable and thus it has improved the quality of lighting for them.**

Figure 17: Benefits of Solar Street Lights(n-223)

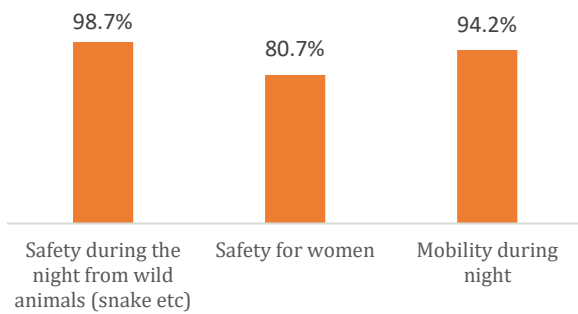
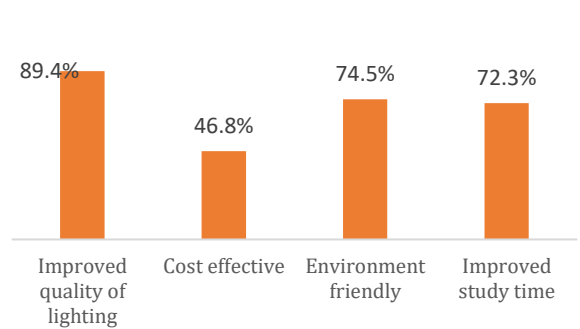


Figure 17 Benefits of solar home lights (n-47)



The beneficiaries have reported to be satisfied with the solar lights. However, a few of the solar street lights in the villages had stopped working in the last year due to a lack of repair and maintenance, as pointed out by 10.6 percent of the respondents.



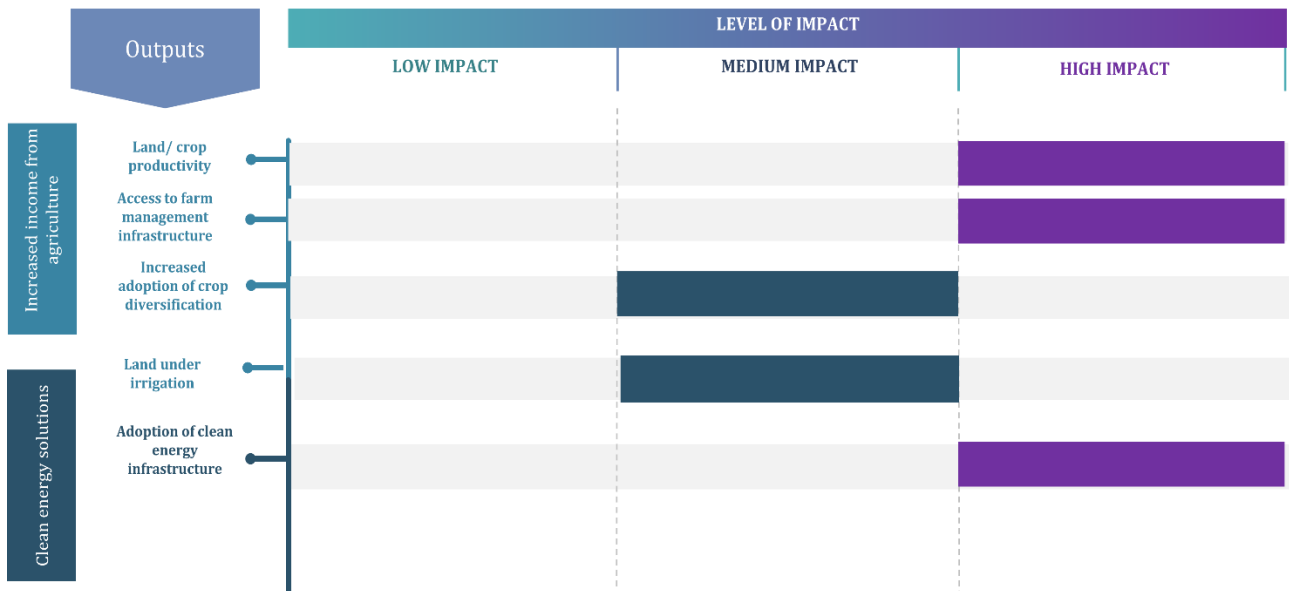
**Image 4: Solar Street Light installed at Ambapani village**



### 4.1.3 Impact Observations

The project interventions have resulted in high impact, particularly in the areas of land/crop productivity and access to farm management infrastructure. This success is attributed to irrigation measures implemented, including lift irrigation and stop dams. The adoption of lift irrigation systems, with one system serving three families, has contributed to increased land and crop productivity and has expanded the total area under cultivation. Furthermore, there has been notable success in the adoption of clean energy solutions, particularly in the implementation of solar home lights and street lights, reflecting a positive and transformative impact on the communities involved. However, support to the community in capacity building for maintenance and repair of street lights and home lights can be extended even after the project’s completion.

**Figure 18: Level of Impact-NRM**





#### 4.1.4 Case Study

##### Diversion Based Irrigation, Ambapani Village



In the village of Ambapani during the 2021-22 period, substantial progress was made with the implementation of Diversion Based Irrigation (DBI). This initiative has positively benefited eleven families owning agricultural land in close proximity. Covering an area of 36 acres, the project has provided a reliable irrigation source through a well-designed system of pipelines while effectively preventing soil erosion. Prior to this development, the beneficiaries relied solely on monsoons for crop cultivation, resulting in an unproductive rabi season. With the introduction of this irrigation system, they can now cultivate wheat and cash crops such as maize and soyabean and have subsequently increased their income. The project includes a cemented tank measuring 3m in length, width, and 1 meter in depth. This tank is equipped with one inlet and one outlet tap, along with a buffer wall for

sedimentation and water filtration. With a capacity of 9000 litres, a 1770-meter-long pipeline has been laid out, featuring outlets at various points of the agricultural fields of the beneficiaries, ensuring efficient irrigation. The water getting collected in the tank used to get wasted as surface run-off before this nature based solution was implemented. Undulating and hilly terrain of the village have worked in favor of the beneficiaries, as this is the only village in the study area where an innovative solution like this has been implemented.

The construction of the Diversion Based Irrigation system in Ambapani incurred an expenditure of INR 4,50,000. It's noteworthy that the beneficiaries actively contributed by providing labor services for the installation of the pipeline. This collaborative effort between the community and the project reflects a cost-effective and participatory approach, further enhancing the sustainability and local ownership of the irrigation initiative. As a direct impact of this service, not all members in the families migrate to Gujarat during October-March, some stay back for children's schooling and wheat cultivation in their own land, which was not feasible before the project.

## 4.2 Skill Training and Livelihood Enhancement

Sixty-six farmers' training sessions, eight farmer exposure visits, 17 Pashu Sakhi training and exposure programmes, and 16 awareness days were organized. These interventions facilitated sustainable income generation and ensured timely primary veterinary care at the village level.

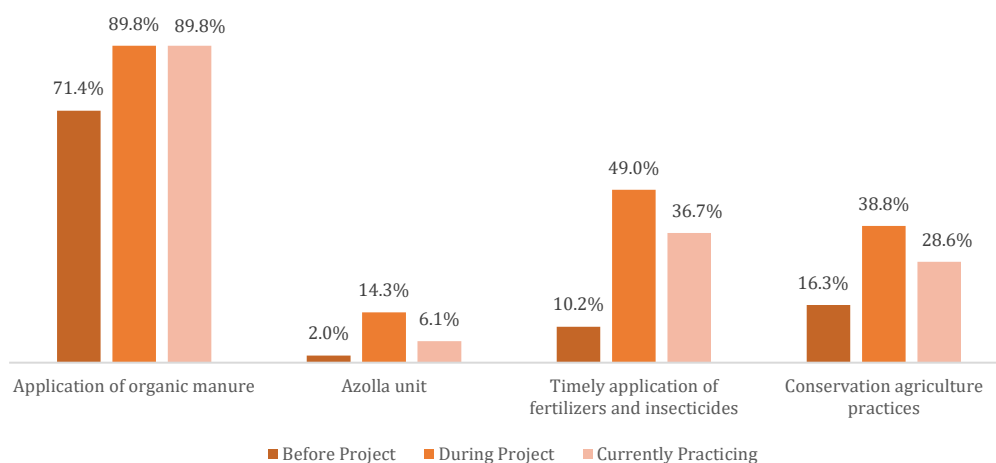
### 4.2.1 Access to Agriculture Training and Services

About **12.3 percent of the respondents participated in the agricultural training provided as part of the project interventions.** It is to be noted that some beneficiaries migrate to Gujarat for wage labour between November and April, impacting the responses of those who attended agricultural training. Some attendees may have received training in the first year of the project and now find it challenging to recall specific details.

Approximately 90 percent of the beneficiaries have a basic understanding of the application of organic manure, while just over 10 percent are aware of azolla units. The training provided to beneficiaries covered the preparation of biopesticides, including '*paanch patti kadha*,' consisting of leaves from *Neem, Aak, Adulsa, Akash Bail, and Sagargota trees*, known for their medicinal and insecticidal properties. Additionally, beneficiaries were instructed in the *preparation of Soyabean tonic (a bio-pesticide)*. The awareness sessions also emphasized the advantages of mixed cropping as a farming practice. This holistic training approach contributes to building knowledge and skills for sustainable and organic agricultural practices. Close to **90 percent of the beneficiaries are currently using organic manure**

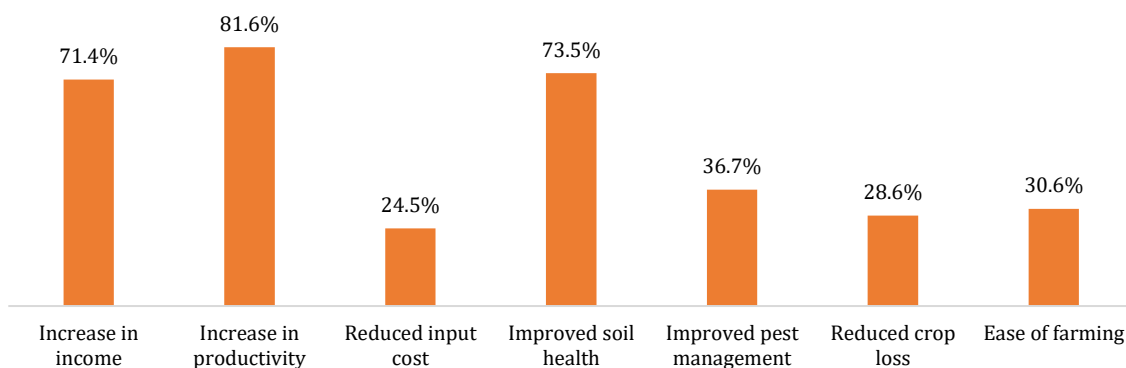
**in their farms**, an increase of around 19 percent points since before the project started. Beneficiaries of conservation agriculture practices increased from 16.3 percent to 38.8 percent. Crop diversification is an important component of conservation agriculture. During various FGDs, respondents mentioned about growing ‘*makka*’ (maize) with sunflower following the concept of inter-cropping, that was instructed during agricultural techniques training in the sample villages. It enhances soil fertility and is an efficient use of available resources.

**Figure 19: Respondents Practising Different Activities Before, During and After the Interventions**



It is noteworthy that majority of the respondents have learnt about the sustainable agricultural practices such as azolla units, bio-pesticides to inter-cropping/mixed cropping, through the project interventions. In the quantitative sample, 5 of the respondents mentioned about attending a Farm Field School (FFS) and going on exposure visits. In the FGDs, respondents provided additional details of the training such as exposure visits to Khargone district for demonstrations of various agriculture techniques. **More than 97 percent of the beneficiaries found the trainings to be useful for their farming practices** and 48 percent of these beneficiaries mentioned that they now spend less on chemical pesticides and prepare their own bio-pesticides and organic manure to be applied in their farms. This has reduced their input cost and also prevented crop losses due to diseases. Additionally, 71 percent of the beneficiaries attribute the increase in their agricultural income to the training provided in the project.

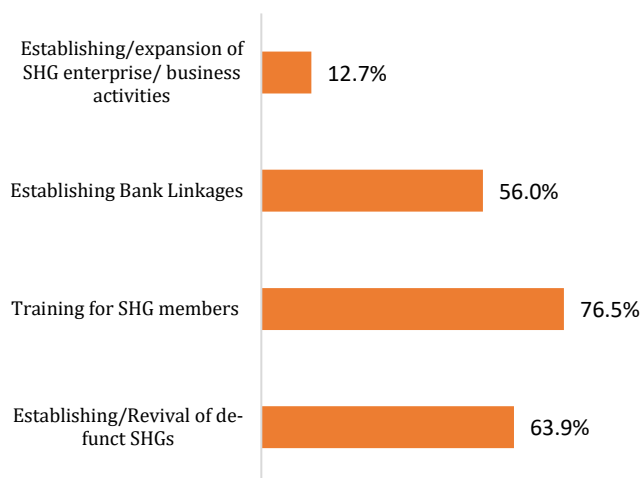
**Figure 20: Perceived improvements due to adoption of agricultural practices (n-49)**



## 4.2.2 Economic Empowerment through Collectivization

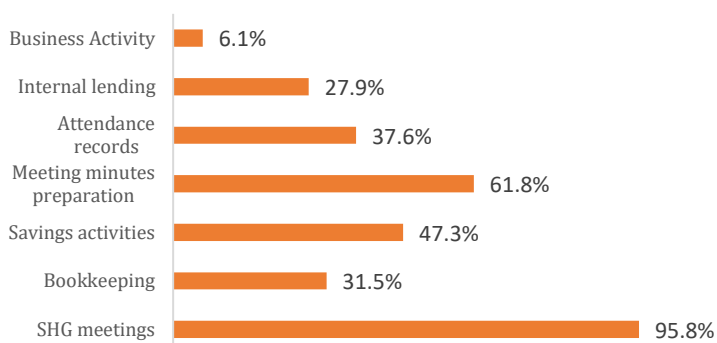
As per the project MIS records, a total of 88 village-level institutions, comprising SHGs and Village Level Associations (VLAs), have been established in the study area. These **SHGs actively engage in regular saving, credit activities, and the promotion of sustainable income-generating activities among their members**. Approximately 41 percent of respondents indicated that the project has undertaken SHG development or other women's group initiatives. Of these beneficiaries, about 64 percent reported that the project has played a role in reviving defunct SHGs in their villages. A significant 76.5 percent of respondents acknowledged the provision of training to SHG members with project support. Additionally, a smaller proportion, 12.7 percent, reported receiving support for setting up enterprises and business activities through SHGs. These findings underscore the project's impact in fostering community-level institutions and supporting economic initiatives among local women.

**Figure 21 Project support in SHG development (-166)**



It is to be noted that, in addition to the entry point activities carried out during the project initiation, formation/revival of SHGs and the inclusion of women members from the communities served as a strategic means to engage with the broader community. The SHGs offered a platform for the implementing team to identify beneficiaries for specific interventions, considering both the available resources and the expressed needs of the beneficiaries themselves. SHG members were included in the PRA activities during the project initiation. Identification of 'Pashu Sakhis' to beneficiaries for various training facilities, land treatment, irrigation measures etc. was based on interest shown by the SHG members depending on agricultural/financial requirement.

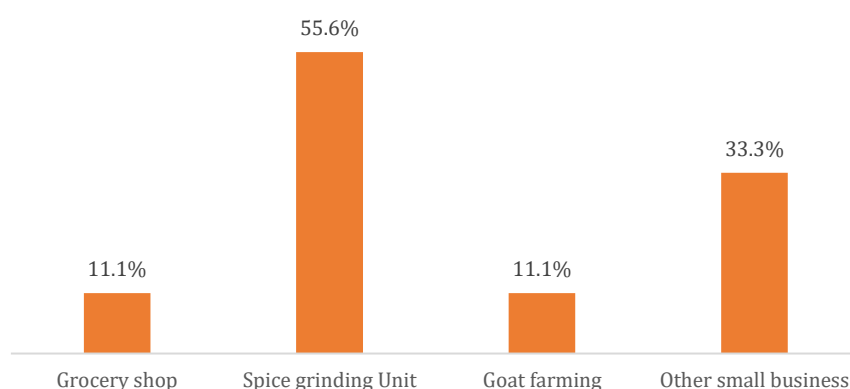
**Figure 22 Activities undertaken by SHGs (n-165)**



Some examples of the business activities supported under the project interventions include setting up of grocery shops (with partial funding from the project), setting up of a spice grinding unit in village *Holgaon* of Barwani block by five members of *Durga* SHG, rearing of goats/poultry rearing in convergence with state government schemes as well as partial funding from the project. For example, in village

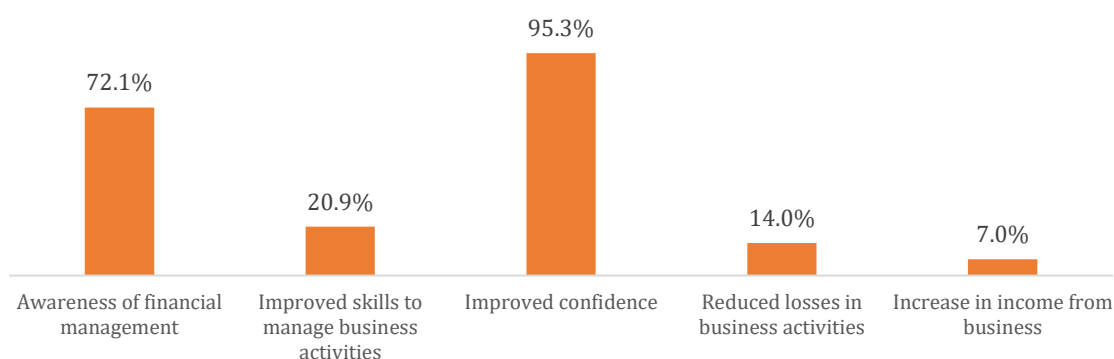
*Rasgaon*, it was reported during the FGD that some of the beneficiaries received material support from the project to develop a goat or a poultry shed, while they provided labor and a partial share of the total amount. This activity was well appreciated by the beneficiaries as it helped them earn a decent profit margin upon sale of the ruminants. However, there is scope for capacity building of beneficiaries in various entrepreneurial activities such as tailoring units, beauty parlors, flour mills etc.

**Figure 23 SHG trainings provided on Business Activities (n-9)**



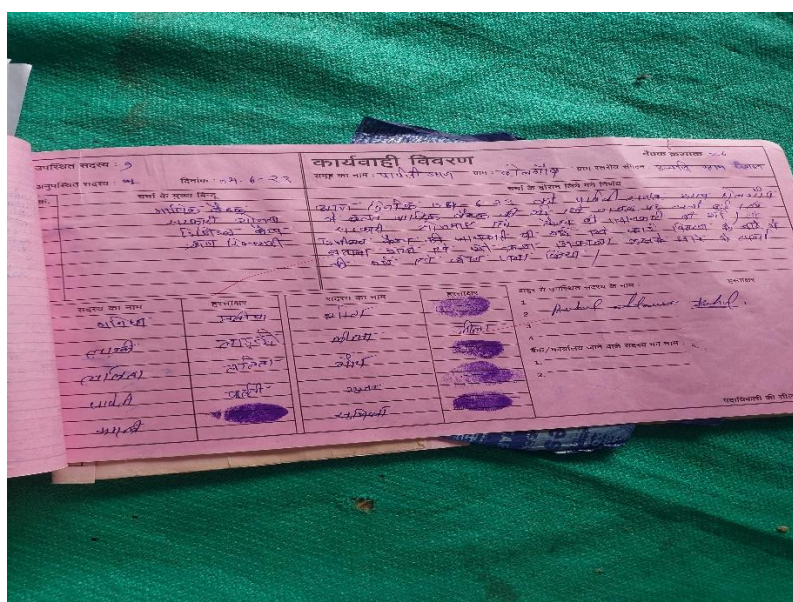
Increase in confidence and enhanced awareness on financial management of their small businesses or at home front are some of the most reported benefits of the SHG trainings provided to the women members of the community. Trainings on business skills have helped them in cutting losses and improve their income.

**Figure 24 Perceived benefits of SHG Trainings (n-9)**



99 percent of the SHGs formed or revived during the project duration, continue to function and carry out activities such as regular savings, maintenance of records, monthly meetings, attendance records. **They continue to save INR 100 per month and provide loans as required by the members.** As per the household survey, approximately, 82 percent of the SHG beneficiaries availed internal loans through their SHGs and the average loan amount is INR 40,322. As reported by the beneficiaries in FGDs, they availed loans from their respective SHGs to cater to household expenditures such as home renovation, weddings, repayment of previous loans, health expenses of family members and only a few reported investments in small businesses such as *kirana* stores etc. This is corroborated from the household data, as only approximately 8 percent of the beneficiaries availed loan to start a new business, and 36 percent used it to expand their existing businesses. SHGs maintain records of these loans in their monthly registers and there is a penalty amount if the loans are not repaid on time.

Image 5 SHG/VLA register in Holgaon Village



As per the quantitative data, the mean monthly income from SHG based enterprises and business activities before the project was initiated was **INR 238, which increased to INR 1395 at the present**. Based on beneficiary responses, 76.2 percent indicated that regular savings within the SHGs contributed to instilling financial discipline in their businesses. Additionally, 57 percent reported receiving project support in procuring raw materials. About 29 percent acknowledged project assistance in establishing bank linkages and accessing loans for their enterprises or businesses, underscoring the multifaceted support provided by the project in fostering financial stability and growth among the beneficiaries.

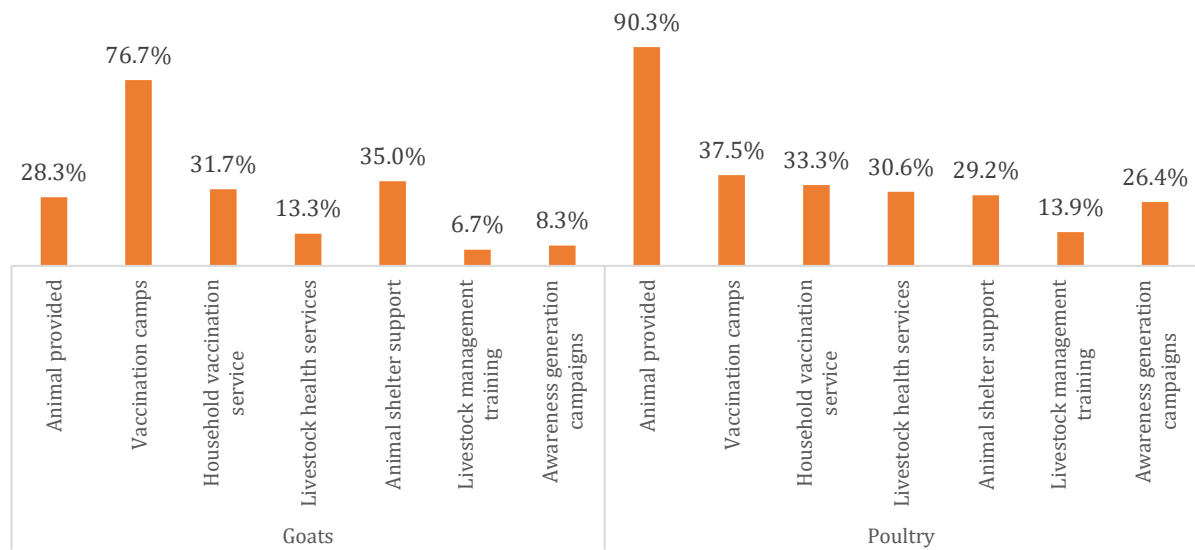
#### 4.2.3 Livestock Management

The HDFC project has supported beneficiaries by providing materials for establishing goat/poultry sheds and facilitating access to relevant government schemes for acquiring poultry. In FGDs, beneficiaries reported that the goats received with partial funding from the project are sold at a profit during Durga Pooja and Eid, resulting in a decent profit margin. This initiative showcases the project's role in promoting sustainable livelihoods and income generation among the beneficiaries through strategic support for livestock and poultry activities.

**Around 77 percent of the respondents who are engaged in goat rearing, availed the services of vaccination camps provided by the project. 35 percent of these beneficiaries acquired materials for setting up animal shelter from the project.** The major benefit reported by poultry owners is that they could acquire poultry through convergence with other schemes.

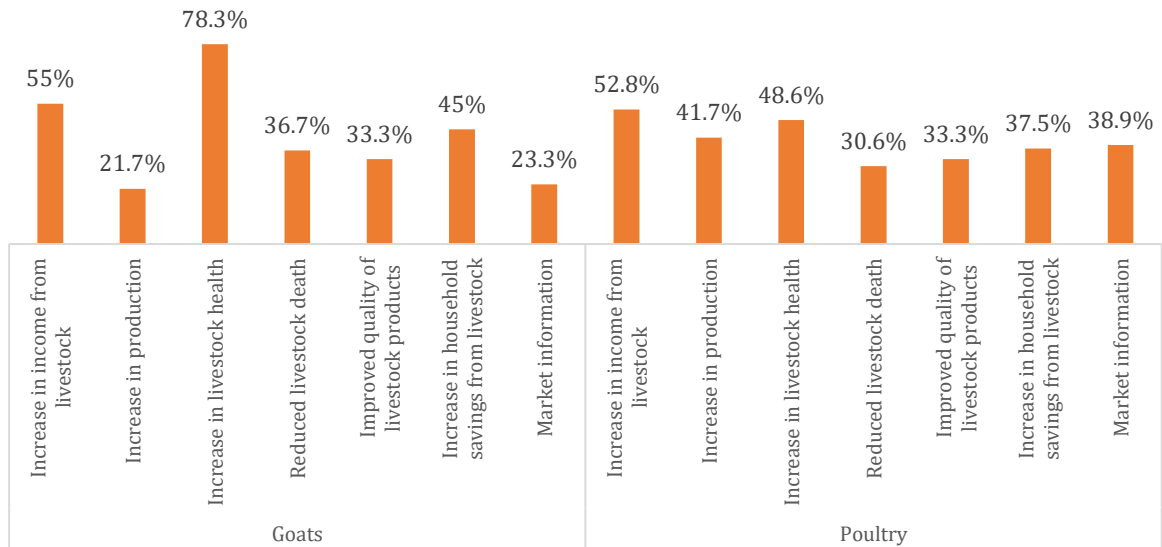


**Figure 25 Support received for different Livestock (goats (n)-60, poultry (n)-72)**



A total of **78.3 percent of goat beneficiaries have reported an improvement in livestock health attributed to veterinary services provided by project interventions.** This improvement has led to a reduction in health expenditures for livestock care. The beneficiaries now rely on *Pashu Sakhis* in their own or nearby villages for vaccination and deworming, saving time and contributing to a decrease in livestock mortality rates. As discussed during one of the KIIs, the pashu sakhis charge a minimal amount of INR 5 per vaccination, which is lower than the amount charged by veterinarians outside the village. This underscores the positive impact of the project in enhancing animal health and the overall well-being of livestock-dependent communities. Notably, 28 animal health camps have been organized in the study area during the project duration. These health camps were focused on increasing awareness of the livestock owners on the importance of green fodder for the small ruminants, regular vaccination and deworming. Free vaccination was also provided to the goats and poultry owners. Awareness generated during these health camps has reduced mortality rates of the small ruminants, as perceived by the beneficiaries thereby stabilizing their livestock income. Mean monthly income from livestock before the project was **INR 874 and after the project increased to INR 2101.**

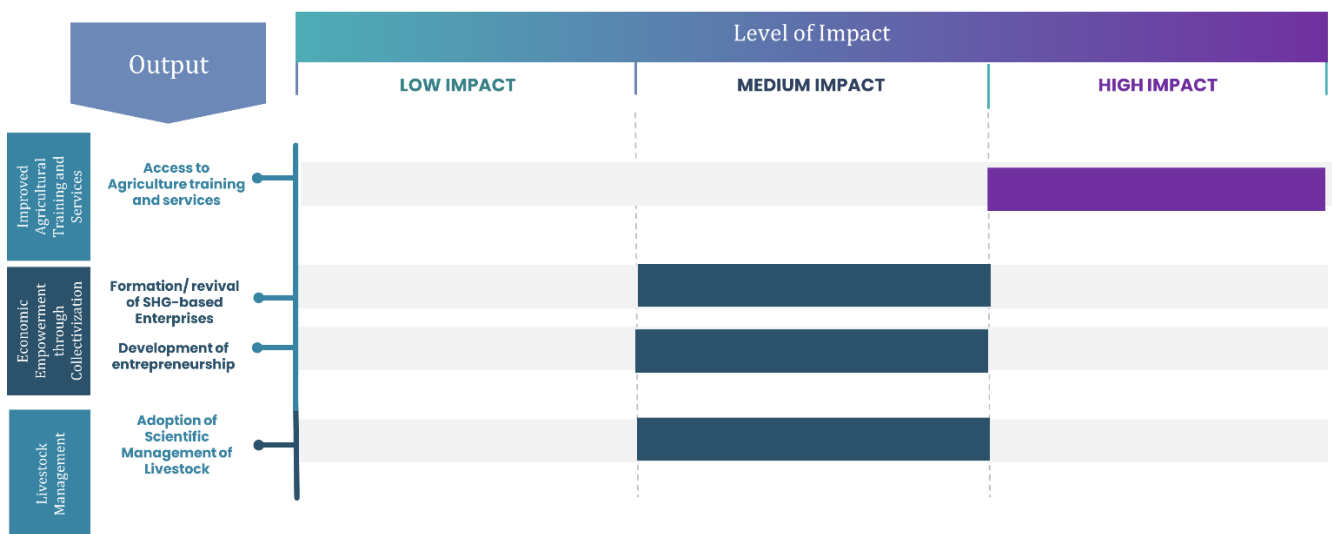
**Figure 26 Primary benefits of availing project support in livestock activities**



#### 4.2.4 Impact Observation

High impact is observed in access to agricultural training services. A noteworthy outcome of the project is the sustained engagement of a significant majority of farmers who initially availed themselves of the services offered during the project phase. Practices instilled during this period, including the establishment of azolla units, development of bio-pesticides, adoption of conservation agriculture techniques and the implementation of mulching methods, continue to be actively embraced by these farmers to this day. The far-reaching influence of the project is exemplified by the reinvigoration of more than 60 SHGs within the study area. These SHGs have served as pivotal platforms, not only for the continuation of agricultural practices but also as dynamic hubs for identifying and involving households in a myriad of other interventions. These additional initiatives span diverse areas such as advanced agricultural training, support for various business activities, land treatment measures, and livestock management. These activities have had a medium impact on the beneficiaries.

**Figure 27: Level of Impact – ST&LE**





## 4.2.5 Case Study

### Spice Grinding Unit: A Case Study of Durga SHG, Holgaon Village



Durga SHG was initially established in 2015 and experienced a revival during the HDFC project phase. Subsequently, it became a part of the 'Unnati' Village Level Association (VLA) formed in the village. The association members engage in monthly meetings to address the needs and requirements of its members. HDFC utilized this platform effectively, using it as a means to identify beneficiaries for various interventions, including kitchen gardens, solar lights, and other forms of support.

In 2021, five members of Durga SHG underwent capacity building training facilitated by the project, focusing on entrepreneurial activities. The training aimed at supporting the establishment of a spice grinding unit. The project incurred a total cost of INR 1,30,000, covering expenses related to acquiring a spice grinder and a packaging machine. The SHG established a linkage with Nimari Farmer Producer Organization (FPO), facilitating

the acquisition of FSSAI certification for the ground spices. Currently, the women members of the SHG are engaged in selling three types of spices: green chilli powder, coriander powder, and haldi powder. The raw materials for the spices are locally sourced, either from the village or nearby markets. These high-quality spices are sold at prices ranging from INR 50 to 100 per 250 grams, showcasing a successful entrepreneurial venture that adds value to local produce and contributes to the economic well-being of the SHG members.

The successful establishment of the spice grinding unit by Durga SHG presents an opportunity for scaling up the initiative. Leveraging the market linkages provided by Nimari FPO can substantially enhance sales and revenue for the SHG. By tapping into established market networks, the SHG can reach a broader customer base, potentially expanding beyond local markets.

This strategic approach not only ensures better visibility for the products but also contributes to the economic sustainability and growth of the entrepreneurial venture. Further collaboration with the FPO can provide access to additional resources, expertise, and support, fostering a more robust and impactful enterprise.

### Pashu Sakhi: The next-door Veterinarian

Ms. Anita Saste, a resident of Barukhodra village, has been serving as a Pashu Sakhi since 2022. Her journey in this role began with her participation in capacity building training for Pashu Sakhis. Ms. Saste has been an active member of the Shivani SHG in her village since her teenage years, and with the support of her SHG, she participated in skill and entrepreneurial training provided under the HDFC Parivartan project. Opting to focus on veterinary services, she acquired expertise in de-worming, vaccination, and the management of minor diseases in small ruminants, including poultry and goats. Her commitment to continuous learning led her to attend further training sessions organized in Palsut and Sendhwa blocks as part of the project's collaboration with the State Livelihood Mission.

Anita radiates pride and contentment as she shares that she earns a steady income ranging between INR 8000 and 9000 per month. Her success as a Pashu Sakhi, coupled with the skills acquired through the HDFC Parivartan project, has not only empowered her individually but has also enabled her to provide valuable

support to her family. Further, she yearns to learn more, get further training to treat livestock such as cow, buffaloes so that she can reach out to help as many community members as possible.



### 4.3 Health and Sanitation

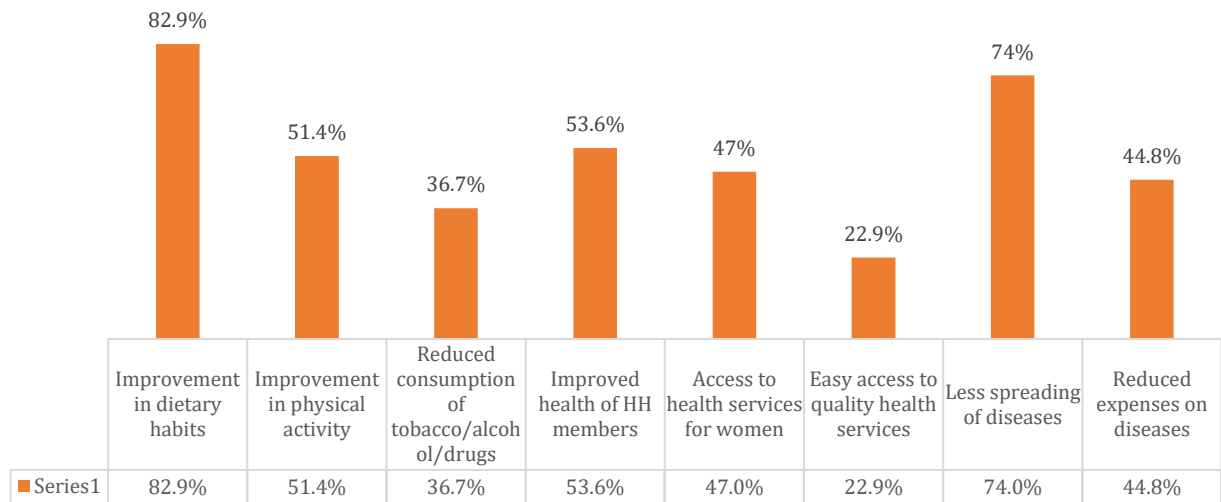
A total of 33 events focused on menstrual hygiene management were organized, providing training and information to adolescent girls about proper menstrual hygiene practices. Additionally, 21 clean home competition activities were conducted, involving over 1000 households, to raise awareness about menstrual hygiene. These initiatives reflect a comprehensive approach to promoting hygiene practices and creating awareness within the community.

#### 4.3.1 Health Infrastructure and Services

Around **90.5 percent of the respondents have accessed various health support services provided by the project.** These services include health camps and menstrual hygiene awareness sessions. In FGDs, beneficiaries reported that the health camps, organized at the project's onset, included the diagnosis of sickle cell cases through blood samples. Additionally, menstrual hygiene awareness sessions were conducted to educate young girls about best practices during menstrual cycles, dietary guidelines, and how to manage illnesses or cramps during that time. This holistic approach to health support emphasizes both preventive and educational aspects, contributing to the overall well-being of the community.

83 percent of the beneficiaries reported an improvement in dietary habits after attending the health sessions. 74 percent reported that there are less cases of disease spread in their villages while 45 percent quoted reduced expenses on health as they have started taking suggested precautions.

**Figure 28: Perceived Benefits of HDFC Bank Supported Health Camps/Clinics**

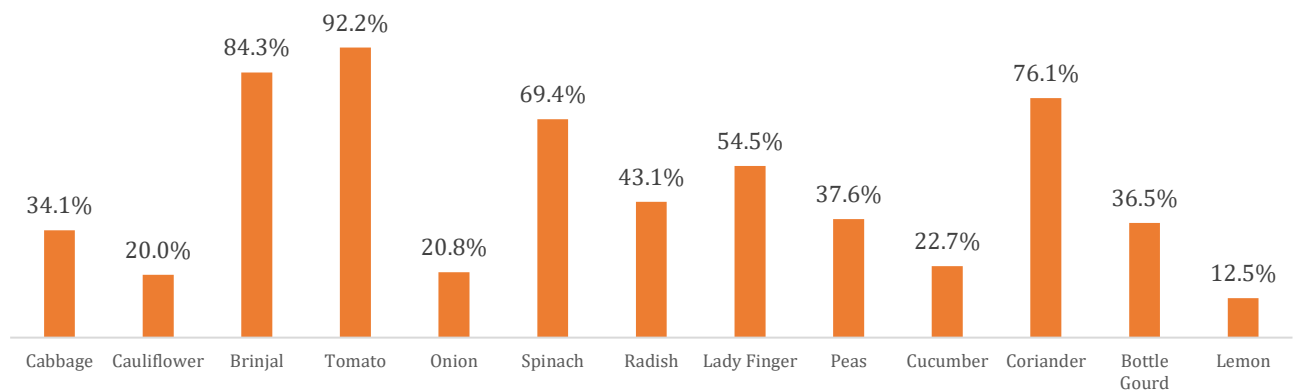


During Covid-19, 94 percent of the beneficiaries reported receiving ration from the project to support them. This was the time when they had difficulty accessing groceries for their families and the project team provided timely support in that phase. In Rasgaon village, for example, 30-31 families were provided with ration kit during Covid-19. Mr. Bhima Solanki, the head of Ambapani village during the project's duration, highlighted that the village received ration support as part of the project's initiatives amid the Covid-19 pandemic. Despite the lack of concrete roads in the village, which poses a challenge to accessing basic healthcare, the project addressed this issue. Health camps were organized, and sessions on menstrual health hygiene for adolescent girls were conducted.

### 4.3.2 Kitchen Garden

63.8 percent of the total sample availed the vegetable seeds provided to set up kitchen garden/nutrition garden as part of project interventions. Apart from seeds, they were provided with training on maintenance of the kitchen garden. The major vegetables were brinjal, tomato, coriander, spinach, bottle gourd. 86 percent of the respondents use the produce for self-consumption and share it with extended family members/neighbours. During the qualitative interviews with the beneficiaries, it was mentioned that they use the produce from kitchen garden primarily for self-consumption.

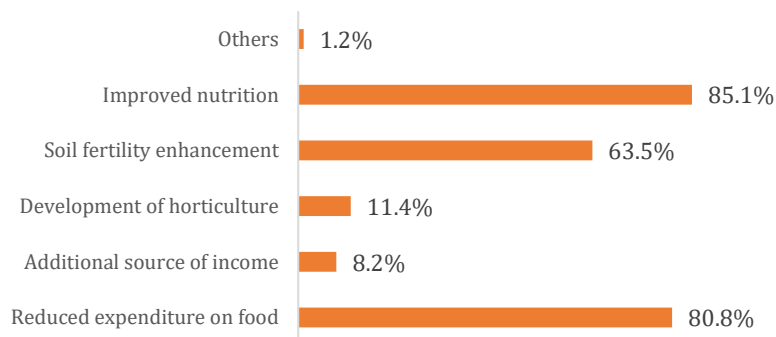
**Figure 29 Vegetables seeds provided for Kitchen Garden**



A substantial 81 percent of beneficiaries reported a decrease in their expenditure on vegetables since they began cultivating them, while 85 percent noted improved nutrition for their family members. **On average, beneficiaries are able to save INR 259 per week through their kitchen gardens. As**

reported by the beneficiaries during qualitative discussions, they have, on an average, earmarked 275 square feet of land for vegetable production. Importantly, one of the selection criteria for kitchen garden beneficiaries was the availability of a small backyard in their houses.

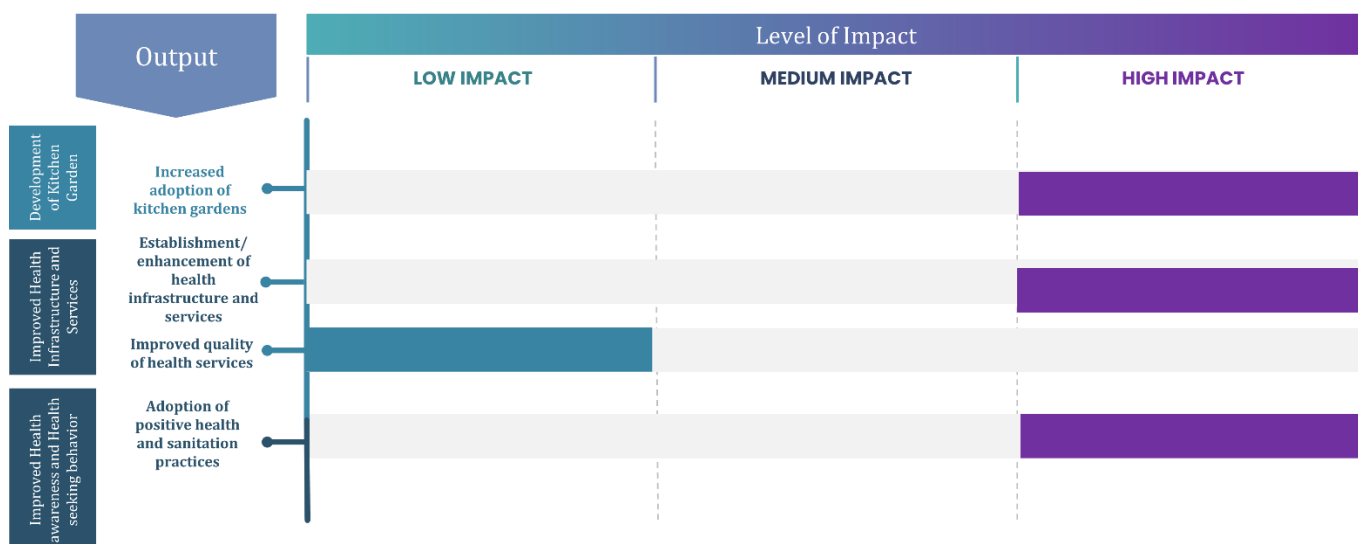
**Figure 30 Perceived benefits of Kitchen Garden**



### 4.3.3 Impact Observation

The distribution of seeds for establishing kitchen gardens has been perceived as having a high impact by beneficiaries. These gardens not only contribute to self-consumption but also enhance nutrient intake, thereby saving on food expenditures. Additionally, menstrual hygiene camps organized for adolescent girls in each village have played a vital role in promoting healthy lifestyle practices and dietary habits. However, challenges persist in terms of healthcare services, particularly in accessing medical clinics. In villages like Ambapani, the recent development of roads connecting them to blocks and districts is a positive step. Nonetheless, within the villages, accessibility to certain households remains a challenge, often requiring travel on foot or two-wheelers at best. Addressing these infrastructure gaps is crucial for ensuring comprehensive healthcare and overall well-being in these communities.

**Figure 31: Level of Impact - H&S**



## 4.4 Promotion of Education

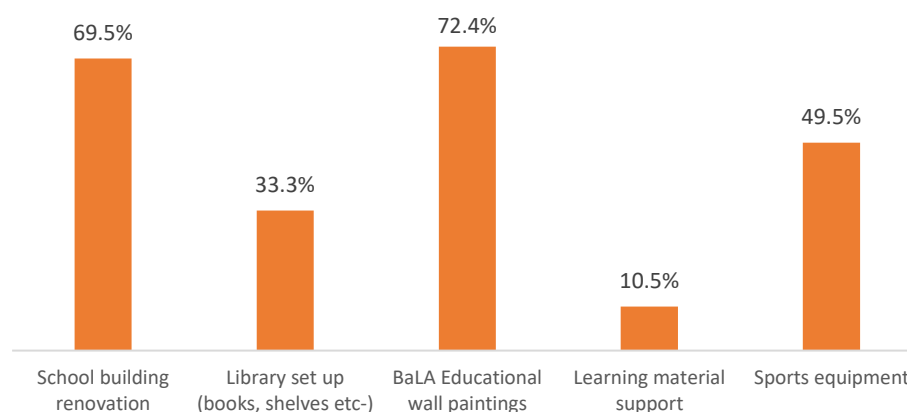
According to the project's MIS, renovation has been carried out on 5 school/Anganwadi infrastructures, 4 school libraries have been established, and learning and playing materials have been provided to 16

schools. These initiatives were aimed at enhancing the educational environment, catering to children's interests, and contributing to improved learning outcomes and increased student enrollment.

#### 4.4.1 Infrastructure in Educational Institutions

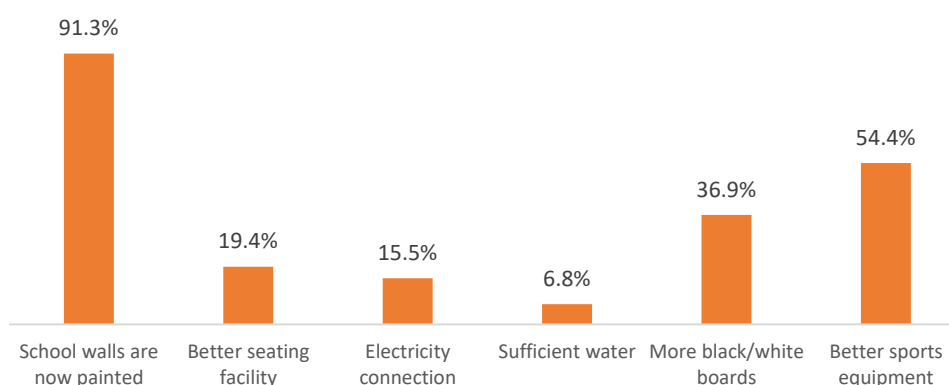
Approximately, 69.5 percent of the household respondents reported that their children's schools had some renovation work being undertaken during the project duration, while 49.5 percent reported availability of better sports equipment since the project started.

Figure 32 Interventions undertaken by the Project



**91 percent of the household respondents reported that school walls are now painted.** Better seating facilities, boards and electricity supply are some of the positive changes reported by the beneficiaries. 81 percent reported that their wards find the classes more interesting, while 70 percent mentioned about reduction in dropout rates in last few years. Emphasis on sports and provision of quality reading materials have had an impact on the students in bringing out the desired impact. During an IDI with the teachers of the middle school in Rasgaon village, it was mentioned that student's participation and attendance rates have improved in the class since play kits were distributed to them. The play kit included bats, football for outdoor games and carrom for indoor games. Study materials such as note books, pens were distributed and this made the students attentive. It was also mentioned that improving the quality of food served at mid-day meal might further enhance student's participation.

Figure 33: Perceived benefits from improvements in school facilities/ buildings



In interaction with the students, it was reported that almost all of them make use of the library facilities provided in their school, and more than half of them reported using it every day of school.

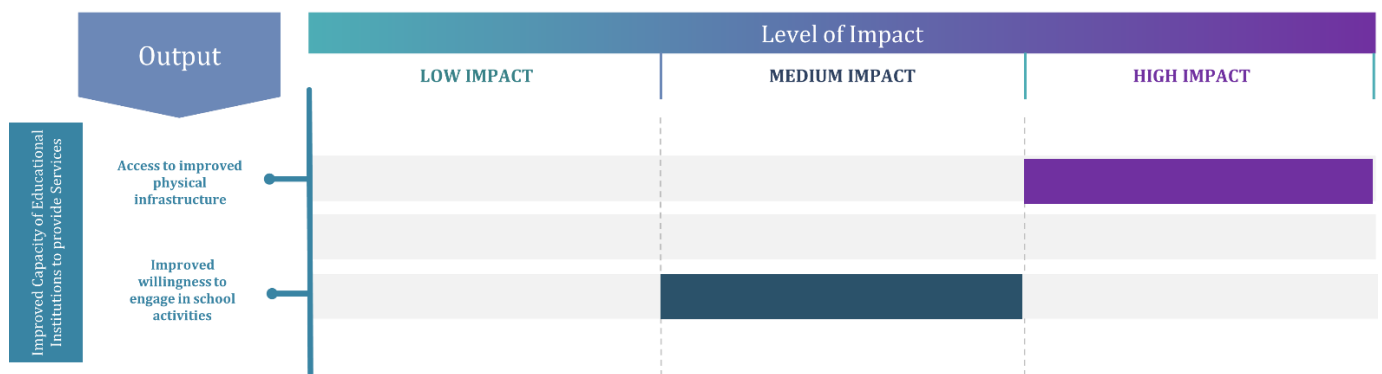
Image 6 BaLa paintings on the school walls in Rasgaon village



#### 4.4.2 Impact Observation

The repair work carried out in anganwadis and schools within the villages has resulted in improved student attendance, while BaLa paintings have sparked curiosity and served as valuable learning aids for teachers. Despite these positive changes, there is room for additional interventions in the area. Enhancing the availability of reading materials, ensuring a reliable power supply through the installation of solar panels, and introducing smart classes could further augment the educational environment. Community interactions have highlighted a high drop-out rate after the 8th or 9th standard. Fostering a learning mindset from an early age is identified as a key strategy to address this challenge and enhance the overall education scenario in the region.

Figure 34: Level of Impact - PoE



#### 4.5 Holistic Rural Development Index

Based on the design of the HRDP program supported by HDFC Bank, a composite index has been developed called Holistic Rural Development Index (HRDI) that indicates the achievements of the HRDP interventions leading to overall improvements of the results indicators. Thus, HRDI serves the purpose of quantifying the impact through blending of results of various indicators grouped into four thematic areas. For calculation of HRDI, the values of the impact indicators at baseline and endline were selected and assigned weights based on their relative contribution to the final expected outcome across four themes. Depending upon the variations in the interventions made in each project, the HRDI customized to accommodate the most significant results that attributes to the goal of the HRDP program. The detailed methodology and indicators are explained in detail in Annexure.



There has been a **134.6 percent increase in the overall HRDI score in the project area since baseline**. HRDI score of ST&LE thematic area, increased by **275 percent, attributed to the SHG revival and enterprise support provided by the SHGs to the beneficiaries which was non-existent before the project started**. Similarly, under H&S, there is a 228.5 percent increase in the HRDI score. This is due to adoption of kitchen garden by the beneficiaries leading to better nutrition and reduced expenditure. Quality seeds provided by the project has supported in improving health of the beneficiaries.

**Table 9: HRDI Calculation for P0296, Barwani, Madhya Pradesh**

Domain	NRM		ST&LE		H&S		PoE		Total	
HRDI Score	Base line	End line	Base line	End line	Base line	End line	Baseline	Endline	Baseline	Endline
	0.09	0.16	0.04	0.15	0.07	0.23	0.06	0.07	0.26	0.61
%Change	77.7%		275%		228.5%		16.7%		134.6%	



## 5 Analysis of Assessment Criteria

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

- Relevance and Convergence
- Impact and Effectiveness<sup>5</sup>
- Sustainability

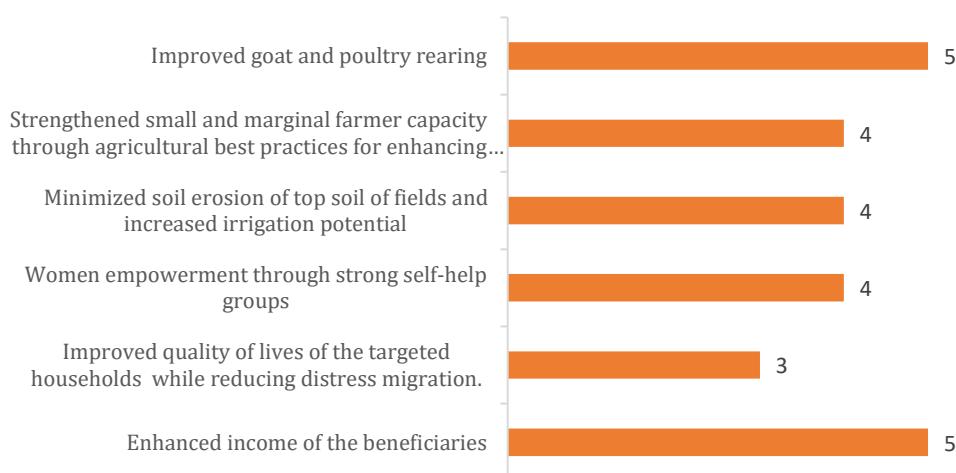
The following sub-sections provide an analysis of the HRDP programme with respect to each of these criteria.

### 5.1 Relevance and Convergence

Madhya Pradesh, with its vast agricultural landscape, grapples with challenges such as water scarcity and its uneven distribution, evident in a low annual average rainfall of around 1,100 mm. Barwani district in the state, faces several challenges such as water scarcity (low water table, excessive run off due to the terrain), soil erosion, uneven economic development leading to income disparities, limited healthcare infrastructure, and educational accessibility issues. Additionally, the district grapples with inadequate road connectivity and a need for improved power supply. In cognizance of this, the interventions across the thematic areas are relevant particularly the NRM activities focused on irrigation, solar lighting, agriculture. Major work under HDFC *Parivartan* focused on reviving agriculture and making it remunerative, while taking steps to arrest the depleting water resources. Focus on women empowerment through formation of SHGs and VLAs was crucial within the context of Madhya Pradesh.

An assessment of the project relevance, based on the mapping of key indicators assessed between two time ranges, on a scale of 1 to 5, where 1 is least and 5 is most preferred score, is provided below. This is a qualitative assessment based on the project's objectives.

**Figure 35 Project relevance on key parameters**



The study noted that the implementation partner effectively utilised convergence with existing government schemes to provide poultry and other small ruminants to communities. National schemes such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), National Rural

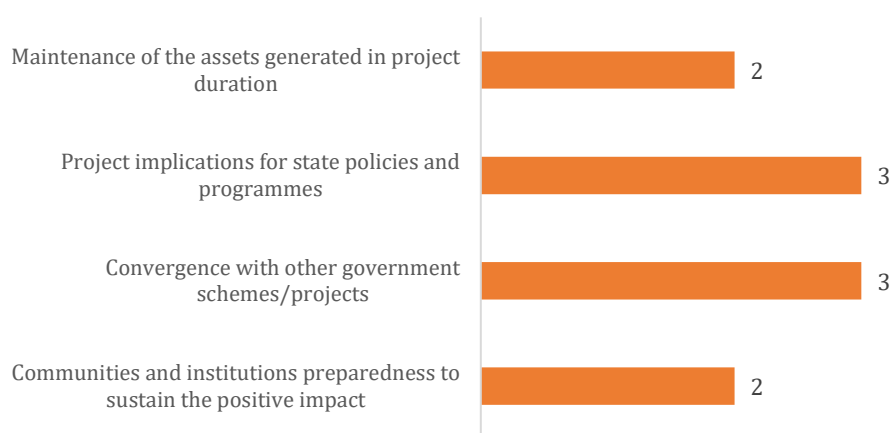
<sup>5</sup> While from an evaluation perspective impact and effectiveness are two different aspects, in the report, these are used interchangeably.

Livelihood Mission (NRLM), and Rashtriya Krishi Vikas Yojana (RKVY), as well as state-specific initiatives from the horticulture, health, and agriculture departments, were leveraged to enhance the effectiveness of the interventions.

## 5.2 Sustainability

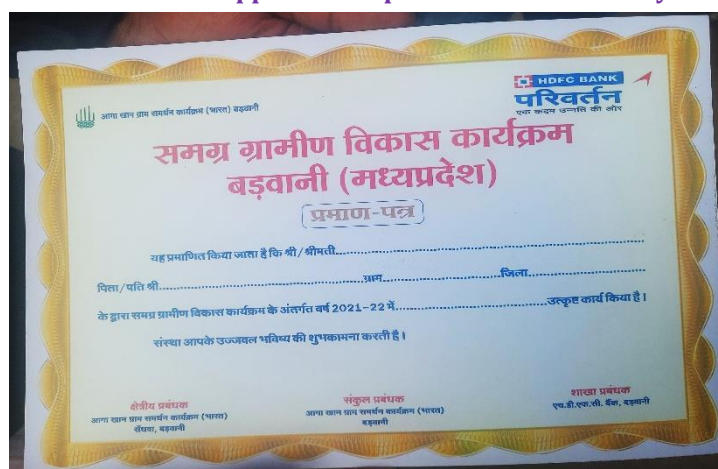
The assets which were generated during the three years of the project, such as stop dams, Irrigation infrastructure, solar lights were handed over to the community for ensuring the effective operation and maintenance of the same by the community. For the community street lights, gram panchayat owns the responsibility of maintenance and repair in case of technical glitches. The assessment of the sustainability of project impact is based on the mapping of key indicators assessed between two-time ranges, on a scale of 1 to 5, where 1 least and 5 is most preferred score.

Figure 36 Sustainability of the project impact



The work conducted under NRM had a strong emphasis on water conservation. Construction of 66 lift irrigation, DBI and several stop dams in order to provide reliable source of irrigation to the community has proven to be highly effective, however, maintenance of these structures in the longer run will ensure sustainability of the benefits accrued. Majority of the solar lights installed continue to function. The structures for irrigation, water and farm management as well as for clean energy have been established, with people understanding its usage.

Figure 37 Certificate of Appreciation provided to community members



The figure above is a sample of certificate of appreciation provided to beneficiaries who participated in village interventions and carried it out sustainably. This is a good model to motivate people to take ownership of the assets and other project interventions. While the project interventions are sustaining in varied manner based on the adaptation by the communities, the institutional infrastructure created such as SHGs and VLAs need capacity development training on project management, financial management and synchronisation with the existing institutional setup at the village and Gram Panchayat level.

## 6 Recommendations

To further improve the outcomes of HRDP in Barwani district of Madhya Pradesh, the following recommendations are made for the HDFC Bank's *Parivartan* and HRDP teams and the implementing partner;

### 6.1 Recommendations to sustain the project initiatives

Some recommendations to sustain the project impact are:

- Along with lift irrigation and stop dams, it is recommended that **drip irrigation be considered as a viable intervention** to enhance water productivity in the agricultural practices of the region. Drip irrigation not only minimises water wastage but also offers a more efficient and convenient water distribution system for farmers. This technology allows for precise control over water delivery to crops, promoting sustainable water use and potentially increasing overall agricultural yield while conserving this valuable resource.
- **It is strongly recommended to initiate capacity building programs for select community members, village resource persons, and panchayat officials** focusing on the maintenance of solar street lights. This measure would prove invaluable in addressing technical issues that have been reported by some respondents regarding the functioning of these lights. By nurturing local expertise in troubleshooting and upkeep, the community can guarantee the long-term sustainability and optimal operation of the solar lighting infrastructure.
- It is recommended to consider expanding the scope of Pashu Sakhis, individuals who have undergone training to address minor health concerns in small ruminants such as goats and poultry. **Providing additional training at nearby veterinary hospitals can significantly augment their proficiency**, enabling them to cater to the health requirements of a broader range of animals and offering essential veterinary services. This approach not only enhances the skills of Pashu Sakhis but also contributes positively to the overall health and productivity of livestock within the community. Such interventions are in alignment with the project's overarching objective of promoting sustainable livelihoods
- To address the issue of discontinuity in maintaining kitchen gardens among respondents, it is advised to **provide training for their maintenance**. While many respondents initially received seeds for their kitchen gardens during the project phase, sustaining these gardens over time requires additional knowledge and skills. Maintaining sustainable kitchen gardens requires expertise in soil management, pest control, and organic practices, as well as skills in crop rotation, composting, and climate-responsive crop selection.
- It is recommended that **with the support of convergence, the project facilitates access to funds and training to the SHGs to establish business units**. For instance, the project has already contributed to the success of a spice grinding unit run by five members of Durga SHG, leading to an increase in their household income. Linkage with FPOs is also recommended to take concrete steps going further, such as streamlining and regularizing the sale of spices.
- It is advised to **install solar panels at the school to provide a sustainable and uninterrupted power source**. This initiative will not only address the immediate need for reliable electricity but also set the foundation for introducing advanced educational facilities, such as smart classes and well-equipped science labs. The integration of these modern teaching tools is anticipated to not only enhance the overall learning experience but also contribute significantly to the reduction of dropout rates among students.

## 6.2 Recommendations to improve the design of the HRDP

Based on these challenges that were observed, the recommendations are made below:

- **It is advised to incorporate agro-forestry and plantation activities on a broader scale**, employing a ridge-to-valley approach (similar to other land treatment interventions). This strategy aims to mitigate soil erosion, enhance the water table, and offer livelihood support to local farmers. It is recommended that farmers be actively engaged in the planning process, which should encompass the selection of appropriate plant species. For instance, planting 'Palash' and 'Tendu' trees, in which the leaves are utilised in the production of 'dona pattal,' would create livelihood opportunities for the farmers.
- Three years is a short span of time to provide sustainable and long-term solutions under NRM thematic area for a place like Barwani. Due to the topography of the area, low water table, high run off, interventions such as farm bunding, dug-out ponds and stop dams are effective solutions but are time consuming work and the positive impact is visible only after few years. **Hence, it is recommended to increase the time duration of the project phase.**
- It is recommended to **augment the frequency of health camps in the village**, ensuring more regular access to healthcare services for the community. Additionally **organising targeted sessions on menstrual hygiene awareness for women** can be incorporated into the health initiatives, aiming to empower and educate them on crucial aspects of reproductive health and well-being. This multifaceted approach is anticipated to have a positive impact on the overall health awareness and outcomes within the village.
- It is advisable that the enhancement of the quality of meals offered under the mid-day meal scheme be regarded as a crucial element in diminishing dropout rates and promoting heightened student participation. The implementation of enhancements in the nutritional value, taste, and general quality of these meals is anticipated to not only enhance academic performance but also establish a more conducive atmosphere for student retention and engagement in educational activities.

The assessment framework incorporates DAC criteria such as relevance, effectiveness, and sustainability. With a sample size of 400 beneficiaries, a comprehensive approach involving stakeholders and qualitative and quantitative data collection was used. The findings show that there are positive effects on income, water management, and energy. Skill development increased confidence in the women members through SHG formation, health camps made them aware about health risks and lifestyle changes required to avoid such risks.

## Annexures

### A Sampling Methodology

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

#### A.1 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 percent (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 (*enter number*).

#### A.2 Quantitative Sampling Methodology

All the nine project villages were selected for the study. The stages of sampling are explained as follows:

##### **Stage 1 - Selection of beneficiaries:**

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

##### **Stage 2- Sampling for villages:**

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 nine villages were covered under the survey.

#### A.3 Qualitative Sample Size Calculation

Qualitative tools of In-depth Interviews (IDIs) and Focus Group Discussions (FGDs) were administered for obtaining information about the remaining themes as well as to enrich the household survey information with a deeper understanding.

Since there was no baseline available for this evaluation, recall method was used in the household survey to assess the change that has happened over time. For this purpose, the respondents were asked to recall the value of critical indicators that they could recall from the time the programme started.



## B HRDI Methodology

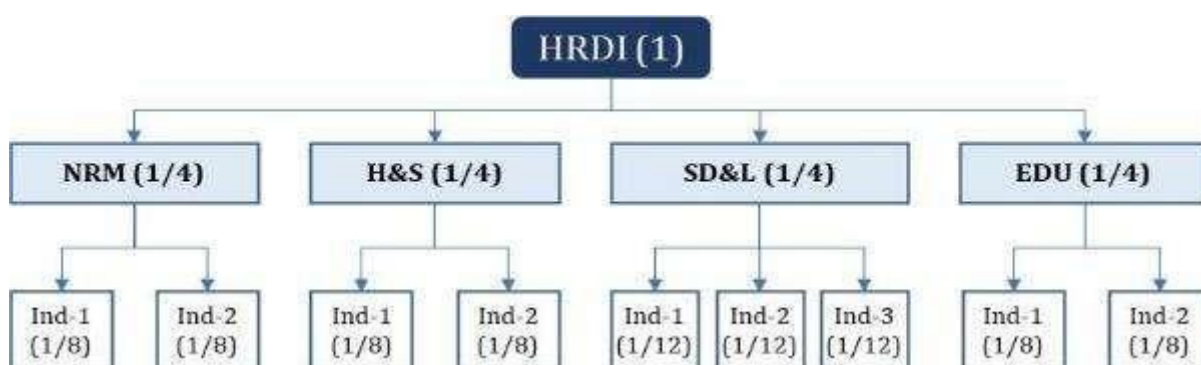
The outcome indicators included in the HRDI were obtained from different domains and are consequently measured on different scales. Therefore, to ensure the comparability of these indicators, all the indicators were converted into discrete variables such that the indicators could be measured between 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.

### B.1 Indicator Weights

Weights were applied to each of these indicators, in similar lines with the HRDI calculation. Attribution of equal weights to all the domains were done in order to create a standard HRDI for each cluster.

Equal weights were assigned to each of the four domains. Further, the domain weight was equally distributed among the indicators of that domain; thereby ensuring that equal weightage of the domains was maintained overall.

Figure 38: Domain and Indicator Weights



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

Table 10: Example of HRDI Calculation

Thematic Area	Indicators	Formula
<b>NRM</b>	Proportion of farmers with net income above median	$(1/4) \times (1/3) = 0.083$
	Proportion of farmers reporting increased productivity of three main crops above median (before and after)	$(1/4) \times (1/3) = 0.083$
	Percentage of farmers reporting access to irrigation	$(1/4) \times (1/3) = 0.083$
<b>ST&amp;LE</b>	Percentage of households who are getting skill training & reporting increase in income from job/enterprise/self-employment	$(1/4) \times (1/2) = 0.125$
	Percentage of HH reporting income above median from livestock	$(1/4) \times (1/2) = 0.125$
<b>H&amp;S</b>	Percentage of households reporting increase availability of drinking water facility	$(1/4) \times (1/2) = 0.125$
	Percentage of households with access to improved toilet facility	$(1/4) \times (1/2) = 0.125$
<b>PoE</b>	Percentage of respondents reporting increased access to functional school physical infrastructure (drinking water posts, separate washrooms, furniture etc.)	$(1/4) \times (1/2) = 0.125$
	Percentage of respondents reporting increased access to functional learning infrastructure (library, science labs, smart class, etc.)	$(1/4) \times (1/2) = 0.125$

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

## B.2 Analysis Plan

HRDI for each district was calculated at two points in time i.e., before and after HRDP and can be compared cross-sectionally to understand which indicators contributed to an increase or decrease in HRDI value. Since the value attribution of the indicators is in proportion, the HRDI value numerically ranges between 0 and 1. Once all the indicators are standardized and weighted, a sum of these weighted indicators are utilized to calculate the value of HRDI.

## B.3 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 50<sup>th</sup> percentile for each indicator before HRDP (baseline). For instance, consider the indicator, Average Annual Income of Farmers. It was considered at baseline, then all the farmers were sorted across the seven blocks/villages in ascending order based on their income. The 50<sup>th</sup> percentile i.e., the median value of the income was taken. This median or 50<sup>th</sup> 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 endline 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: Summed up all the indicators (i.e., weighted sum) to calculate the HRDI value at baseline and endline.

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

The calculation for Barwani has been detailed below.

**Table 11: HRDI Calculation for Barwani**

Domain	Indicators	Baseline	HRDI	End line	HRDI	% Change
NRM	Proportion of farmers with net income above median	0.16	0.09	0.28	0.16	77.7%
	Proportion of farmers reporting increased productivity of three main crops above median (before and after)	0.06		0.19		
	Percentage of farmers reporting access to irrigation	0.13		0.19		
ST&LE	Percentage of households who are getting skill training & reporting increase in income from job/enterprise/self-employment	0.	0.04	0.25	0.15	275%

Domain	Indicators	Baseline	HRDI	End line	HRDI	% Change
	Percentage of SHG members reporting income above median from rural enterprise	0.01		0.04		
	Percentage of HH reporting income above median from livestock	0.16		0.30		
H&S	Percentage of households reporting increase in use of fruits/vegetables from the nutrition garden	0.29	0.07	0.93	0.23	228.5%
PoE	Percentage of respondents reporting increased access to functional school physical infrastructure (drinking water posts, separate washrooms, furniture etc.)	-	0.06	-	0.07	16.7%
	Percentage of respondents reporting increased access to functional learning infrastructure (library, science labs, smart class, etc.)	0.22		0.30		
<b>Total</b>			<b>0.26</b>		<b>0.61</b>	<b>134.6%</b>

## C Overview of Impact Calculation

Impact of the programme was calculated based on the averages of quantitative output indicators as demonstrated below.

**Table 12: Impact Calculation**

Outputs	Output Indicators		Output Avg.	Impact Level
<b>NA. Increased income from agriculture</b>				
N. A1 Land/ crop productivity	NA1. (a) Proportion of farmers reporting an increase in production of crops that were supported under HRDP	95.4%	76.13%	High
	NA1. (c) Proportion of farmers reporting increased income from crops that were supported under HRDP.	99.7%		
	N.A1.i(d) Average increase in income from crops that were supported under HRDP (% change)	78.3		
	N.A1.I (e) Average increase in productivity from crops that were supported under HRDP (% change)	31.13		
N.A2. Access to the farm management infrastructure	N.A2(a) Proportion of beneficiaries satisfied with the quality of available services (in farm management)	100%	79.36%	High
	NA2. (b) Proportion of farmers reporting project interventions in seeds, tools, and irrigation leading to an increase in production	95.4%		
	NA2. (c) Proportion of farmers reporting project interventions leading to increase in income (average of top 4-5 crops)	78.3%		
	NA2. (e) Proportion of farmers currently practicing organic farming/conservation agriculture/other sustainable practices	51.7%		
	N.A2.(f) The proportion of farmers reporting an increase in the use of natural fertilizers?	71.4%		
NA.3 Increased adoption of crop diversification	NA3. (a) Proportion of farmers diversifying their crops with project support.	79.6%	47.3%	Medium
	NA3. (b) Proportion of farmers who report income increase due to crop diversification (base = farmers who adopted crop diversification)	15%		
NA.5 Land under irrigation	NA4. (a) Increased area under irrigation	98.2%	65.85%	Medium
	NA (4). (b). The proportion of farmers who received support for irrigation	33.5%		
<b>NC. Increased use of clean energy solutions</b>				
NC1. Adoption of clean energy infrastructure	NC1 (a) Proportion of HHs using clean energy infrastructure (Base=all)	62%	81%	High
	NC1. (b) Proportion of households reporting benefits from using clean energy infrastructure (Base=clean energy beneficiaries)	100%		
<b>SA. Improved access to agricultural training and services</b>				

Outputs	Output Indicators		Output Avg.	Impact Level
S.A.1 Access to Agriculture training and services	SA. i(a) Proportion of farmers who reported project training services are useful	98%	99%	High
	SA. i(b) Proportion of farmers who demonstrate awareness regarding sustainable farming practices	100%		
<b>SB. Economic empowerment through collectivization (Only for SHG members)</b>				
SB.1 Formation/ revival of SHG-based Enterprises	SB.i(a) Proportion of members who received support with establishing/reviving SHGs	41.5%	51.2%	Medium
	SB.i(b) Proportion of members who received support with establishing/reviving SHG enterprises	12.7%		
	SB.i(b) Proportion of members whose SHGs are currently functioning	99.4%		
SB.2 Development of entrepreneurship	SB.ii(a) Proportion of SHG members who received training	76.5%	69%	Medium
	SB.ii(b) Proportion of SHG members undertaking entrepreneurial activities	12.7%		
	SB.ii(c) Proportion of SHGs with increased savings	91.7%		
	SB.ii(d) Proportion of SHG members reporting improved income	95.2%		
<b>SD. Improved capacity to generate income through livestock management</b>				
SD.1 Adoption of scientific management of livestock	SD.I (a) Proportion of beneficiaries who received support in livestock management services	29%	68.05%	Medium
	SD.i(b) Proportion of beneficiaries reporting an increase in income from livestock management	53.9%		
	SD.i(c) Proportion of beneficiaries reporting improved livestock health	49.3%		
	SD.i(d) Proportionate increase in average income from livestock	140%		
<b>HA. Improved health infrastructure and services</b>				
HA.1 Establishment/ enhancement of health infrastructure and services	HA.i(a) Proportion of beneficiaries who gained access to health services	90.5%	86.7%	High
	HA. i(b) Proportion of beneficiaries reporting lifestyle changes due to improved access	82.9%		
HA.2. Improved quality of health services	HA.ii(a) Increase in no. of beneficiaries reporting improved quality of available services	22.9%	22.9%	Low
<b>H.C. Development of Kitchen gardens</b>				
HC.1 Increased adoption of kitchen gardens	HC.i(a) Proportion of HHs reporting income gains from kitchen gardens	8.2%	71.8%	High
	HC. i (b) No of HHs received seeds/training in the kitchen garden	99.2%		
	HC.i(c) No of HHs with improved vegetable/fruit consumption due to kitchen gardens	94.5%		
	HC.i(d) Proportion of HHs reporting improved nutrition	85.1		
<b>HD Improved awareness and health-seeking behaviour</b>				

Outputs	Output Indicators		Output Avg.	Impact Level
HD.1 Awareness regarding health and sanitation practices	HD.i (a) Improved dietary practices/ reduced tobacco consumption/ improved physical exercise	82.9%	82.9%	High
<b>Outcome EA. Improved capacity of educational institutions to provide services</b>				
EA.1 Access to improved physical infrastructure	EA.i(a) Proportion of students/schools who report gaining access to functioning smart classrooms/ Bala/science labs/libraries/learning aid/furniture/sports equipment	64.3%	81.3%	High
	EA.i(b) Proportion of schools who gained better sports equipment	80%		
	EA.ii(c) Proportion of parents/students/teachers who report improvements in classroom teaching	100%		
EA.3. Improved willingness to engage in school activities	EA.iii(a) Teachers reporting improvements in attendance due to improved infrastructure	38.5%	54.5%	Medium
	EA.iii(c) Proportion of institutions reporting a decrease in dropout rates	70.5%		

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

## D Two Sample Proportions Z 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:

$$z = (p_1 - p_2) / \sqrt{p(1-p) / (n_1 + n_2)}$$

where:

$p_1$  is the proportion in the first sample

$p_2$  is the proportion in the second sample

$p$  is the pooled proportion, calculated as  $(p_1n_1 + p_2n_2) / (n_1 + n_2)$

$n_1$  is the sample size of the first sample

$n_2$  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 ( $n_1p_1n_2p_2 > 10$ ) (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 ( $n_1p_1n_2p_2 > 10$ ).

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 income from agriculture above baseline median.**

**Table 13: Z-test Conducted for P0296**

Indicator	Proportion of farmers with income from agriculture above baseline median
p1 (proportion of first sample-endline)	99.7
n1 (sample size of p1)	333
p2 (proportion of second sample-baseline)	88
n2 (sample size of p2)	333
P	0.2818
Calculation	0.0348
z statistic	3.355
	Statistically significant at 95% confidence level (or $p < 0.05$ )
P-value for the z statistic (calculated here: <a href="https://www.socscistatistics.com/pvalues/normaldistribution.aspx">https://www.socscistatistics.com/pvalues/normaldistribution.aspx</a> )	0.000397

## E Theme-wise Sustainability Matrix

The programme support provided demonstrated the capability to continue even after the programme ended. The programme's support to sustain improved outcomes are enumerated below.

**Table 14: Theme wise sustainability matrix**

Support Provided	Structures Established	Technical Know-how	Usage	Maintenance
<b>NRM</b>				
Irrigation Management	✓	✓	✓	✓
Water Management	✓		✓	✓
Farm Management	✓	✓	✓	✓
Clean Energy	✓	✓	✓	
<b>ST&amp;LE</b>				
Agriculture Training and Support	✓	✓	✓	
Entrepreneurship Development		✓	✓	
Livestock Management	✓	✓	✓	✓
<b>H&amp;S</b>				
Kitchen Garden		✓	✓	
<b>PoE</b>				
Educational Institutions Development	✓	✓	✓	✓