

Impact Assessment Study under Holistic Rural Development Programme (HRDP) Chhattisgarh – P0299



Prepared For:



HDFC Bank CSR

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Executive Summary

The HDFC Bank supported The National Institute of Women, Child, and Youth Development (NIWCYD) for implementing Holistic Rural Development Program (HRDP) in 8 villages spread across two blocks of Gaurella and Pendra in Chhattisgarh between September 2019 and August 2022. Post completion of the project, Intellecap, conducted an impact assessment of this project.

The impact assessment methodology was developed in order to evaluate the performance and effectiveness of the project's interventions and activities, socioeconomic changes among the beneficiary households, income, and promotion of community-based institutions for project sustainability. To evaluate the project's results and impact, a mixed-methods approach was adopted integrating qualitative and quantitative data collection and analysis. Retrospective recall was used to record the pre and post-project outcomes, providing insights into how the project indicators changed over baseline. The samples for the study were chosen using stratified random sampling and the PPS (Probability Proportional to Size) method. The assessment covered 8 villages, 420 household interviews, 4 In-Depth Interviews (IDIs), 4 Key Informant Interviews (KIIs), and 8 Focus Group Discussions (FGDs). This comprehensive research design enabled a thorough evaluation of the project's impact, learning, and recommendations for future interventions. This report presents the outcomes of a comprehensive project focused on Natural Resource Management (NRM), skill training, livelihood enhancement, health and sanitation, and education promotion in the Gaurella and Pendra regions.

Natural Resource Management (NRM)

In NRM, the activities implemented included implementation of lift irrigation, construction of shallow borewells, establishment of seed banks, support on creeper farming and greenhouse farming, seed distribution, provision of huller machine, implementation of solar streetlights, and solar drinking water supply. The project has yielded positive impacts on increase in median net income of beneficiaries. **70 percent of the respondents have reported an increase in annual income** from agriculture. **Median net income has increased by more than 83 percentage (from Rs. 35500 to Rs. 65000)**. Paddy production **rose from 3,333 to 4,756 kilograms on average per hectare**, and the median **productivity increased by 48 percent** from pre-intervention levels, **surpassing the state average by 34 percent**. Crop diversification has been encouraged, contributing to changes in the cultivation patterns of various crops viz. wheat, gram, linseed, urad, etc., and enhancing the overall economic well-being of local farmers. The implementation of clean energy interventions, including solar water pumps has helped more than 90 percent of the respondents in accessing clean drinking water.

Health and Sanitation (H&S)

Health camps were conducted as entry point activities. Sanitation infrastructure, and provision of vegetable seeds and training for kitchen garden were the activities conducted under health and sanitation. During health camps, **95 percent of the beneficiaries reported their participation in hygiene-related awareness sessions**. The kitchen garden project which included interventions such as **seed provision (99 percent sampled households)** and **training (62 percent sampled households)**, has empowered individuals, contributing to food security, with 90 percent of the produce being utilized for self-consumption. More than 95 percent of the respondents have stated that their expenditure on vegetables has been reduced.

Skill Training and Livelihood Enhancement (ST&LE)

Construction of vermi-compost pits, training for SHG members along with support for income generation activities such as oil pressing unit, bee keeping, bamboo crafting, rice mill, murra machine, dal mill, and vaccination services for livestock are the key interventions supported under Skill Training and Livelihood Enhancement. In addition, for better sustainability of the initiatives with the farmers the implementing partner facilitated setting up of Farmer Producer Organisation (FPO). These trainings and livelihood support provisions enables adoption of sustainable farm practices that has led to improvements in crop productivity (**90 percent respondents**) and increase in income (**61 percent respondents**). The establishment of FPOs by NIWCYD has played a pivotal role in enhancing knowledge exchange and improving infrastructure access, thereby contributing to improved agricultural practices and livelihoods.

The support from HDFC has been instrumental in the development of Self-Help Groups (SHGs), **with 43 percent of them either newly established or revived with NIWCYD's** assistance. Training and support provided to SHG participants have resulted in improved capacity of money management, increased confidence, and enhanced access to credit with lower interest rates.

Promotion of Education (PoE)

The implementation of educational infrastructure includes smart classes, drinking water posts, science labs, and separate washrooms for boys and girls, in the schools located within the project villages. Smart classes have been used well, with 95 percent of students finding lessons more engaging and 57 percent reporting better understanding of the subject. Additionally, **90 percent of students claim reduced health issues due to the installation of drinking water posts inside the school campus.**

Table 1: Summary of Key Impact Indicators

Indicators (based on median)	Before	After	% Change
Increase in average productivity (of three major crops) (quintal/acre)	11.8	17.5	48%
Increase in average net annual income from agriculture	INR 35500	INR 65000	83%
Monthly income from SHG business activity	INR 3750	INR 8688	132%

Three of the 4 key impact indicators have been mentioned here as enterprises were established as part of SHGs and no employment-oriented skill trainings were included in the project design.

HRDI Indicators

The impact of the project was assessed on Holistic Rural Development Index (HRDI), which is a weighted index that gives an index value for each focus area and for the entire project.

The thematic-wise indicators were assigned weights to arrive at the composite **HRDI score of 0.65 indicating a notable positive change of 48 percent toward the desired impact from the baseline score of 0.44.**

Findings showed an improvement in all focus areas as well as the project, as shown below:

Table 2: Summary of HRDI Scores

Domain	NRM		ST&LE		H&S		PoE		Total	
	Base line	End line	Base line	End line	Base line	End line	Baseline	Endline	Baseline	Endline
HRDI Score										

	0.08	0.12	0.02	0.09	0.15	0.21	0.19	0.23	0.44	0.65
%Change	50%		350% ¹		40%		21%		48%	

Recommendations

- The implementing partner may ensure that farmers continue to use the farming techniques taught and facilitate through agriculture experts (preferably from Krishi Vigyan Kendra (KVK) or local agriculture experts from the government) to conduct follow-up visits to the farmers for better adaptation and sustainability of farming practices.
- Similarly, the KVK or other local government agriculture officials at Block level may be linked with the FPO to ensure regular soil testing of farmers in Gaurella and Pendra block.
- The current pump set used for lift irrigation is a low-pressure pump unable to lift and distribute water to more areas. The implementing partner may seek assistance from the state sponsored schemes to replace the water pump with a heavy-duty pump set that can bring more land under irrigation.
- More focus on training and capacity building needs to be given by the implementation partner, both in terms of frequency of the training and increased budget to support the beneficiaries in gaining more information.
- As the FPO is in the initial stage, the members of the FPOs (Board of Directors and Shareholders) needs advanced training on production practices and the use of machines/tools for farmers to keep pace with the demands of the market. The implementing partner may facilitate it seeking support from the State Rural Livelihood Mission or other schemes supported by the state government.
- Frequent health camps may be organised in collaboration with the National Health Mission (NHM) that would benefit the community particularly women who are currently travelling longer distance for their medical needs.

¹ This drastic change can be attributed to the low baseline score.

1 Introduction

Over the years, India has made enormous strides in rural development. While 65% of the country's population lives in rural areas (as of 2021), nearly half, or 47%, is still dependent on agriculture for a living (PIB Delhi, 2023). The rural ecosystem has grown by around 10% per year over the last five years, but it is still plagued by numerous issues, such as a lack of irrigation, deteriorating soil health, disguised unemployment, fewer skill development opportunities, unreliable healthcare availability, low literacy rates, and increasing environmental degradation, among others. To address these diverse yet interconnected developmental challenges, the HDFC Bank, through its Corporate Social Responsibility (CSR) initiative 'Parivartan,' supports several projects that provide holistic rural development to help the rural population grow and prosper.

1.1 About HRDP

The goal of these initiatives is to promote sustainable socioeconomic and ecological development in order to guarantee the development of prosperous and content communities. The program's all-encompassing approach meets the needs of the communities by providing the essential inputs on matters like fostering economic independence through opportunities for skill development and livelihoods, delivering fundamental infrastructural development, and creating a better ecosystem that fosters better living conditions. It intends to bring about a socioeconomic transformation in the lives of the rural community by concentrating on the development of human capital, the management of natural resources, and infrastructure in poor and backward villages.

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

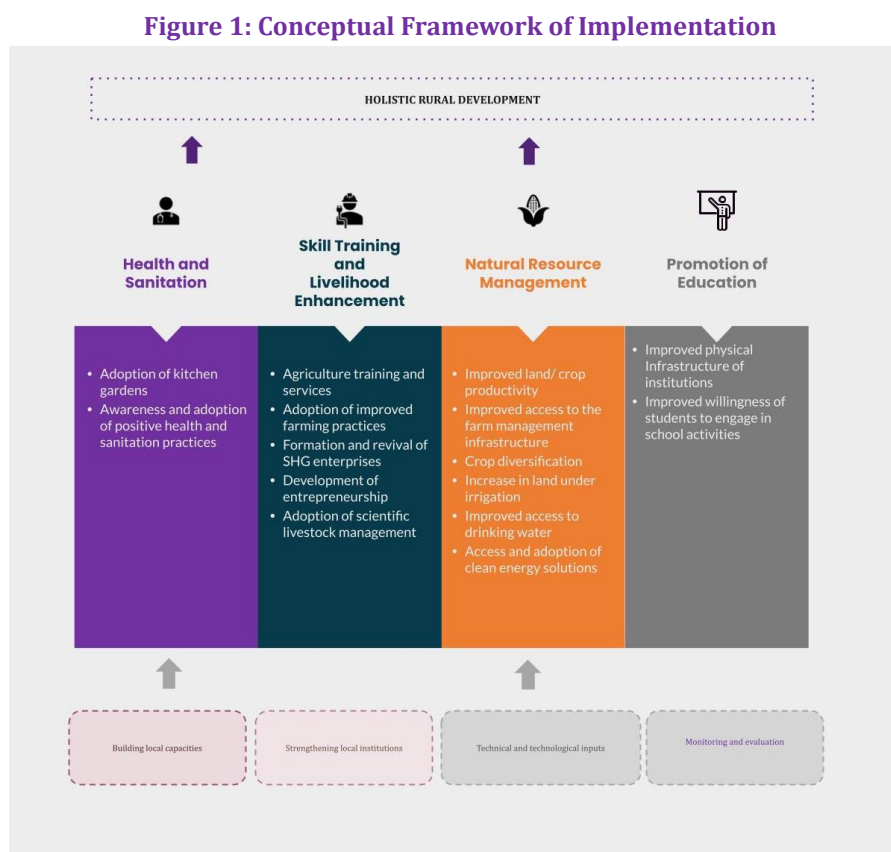
The study seeks to:

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

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

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.

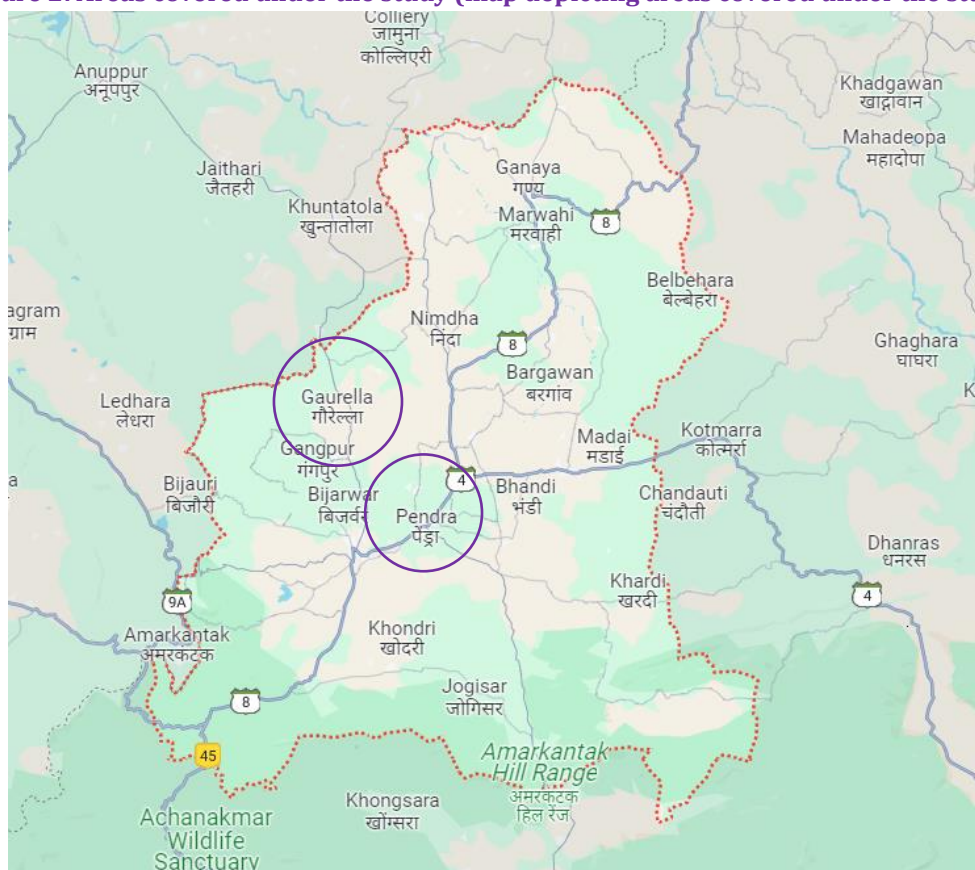


1.4 About the Project Area

Chhattisgarh is a landlocked state in Central India. Despite being a rapidly developing state, pervasive poverty persists within its boundaries. The state's economic reliance is predominantly placed on the sectors of mining, agriculture, energy production, and manufacturing. Approximately 50% of its terrain is designated as farmland, with the central lowland gaining recognition for its prolific rice production. Moreover, the state contributes significantly to the

national supply of tendu leaves, particularly used in the production of bidis. Unfortunately, this economic progress has not translated into widespread prosperity, as approximately 40% of the state's population continues to grapple with poverty. The present study was undertaken in two blocks within the Gaurella-Pendra-Marwahi district of Chhattisgarh, encompassing a total of eight villages. This district was established in February 2020, having been carved out of the Bilaspur district. Forests cover a substantial portion of the state, with around 41% of its total geographical area dedicated to this natural resource. Each district within the state faces the challenge of a significant proportion of its population living in extreme poverty, exceeding one-fifth of the inhabitants in every district. These areas are also agriculture-dependent, so interventions are based on the necessity of the community, after consulting with the village council. Along with clean energy, the HRDP promoted the management of farms and water resources as part of natural resource management. Under "Skill Training and Livelihood Enhancement," "Promotion of Education," "Health and Sanitation," and "Healthcare and Hygiene," the project also focused on agriculture training and support, self-help group (SHG)/women development, skill training, livestock management, and entrepreneurship development.) (See Figure 2)

Figure 2: Areas covered under the study (map depicting areas covered under the study)



1.5 Partner Organisation - NIWCYD

The National Institute of Women, Child, and Youth Development (NIWCYD) was established in 1982 by development workers adhering to Gandhian principles. It was formally registered under the Society Registration Act 1860 in 1985. Functioning as an organization with a nationwide scope, NIWCYD presently operates in four states, namely Maharashtra, Madhya Pradesh, Goa, Chhattisgarh, and certain regions of Uttarakhand.

The organization has undertaken the training of rural youth, preparing them as local workers and establishing cadres dedicated to development initiatives. NIWCYD has successfully managed various substantial projects and currently extends its outreach to 5000 of the most impoverished villages in Central India. The primary focus areas of its interventions encompass natural resource management, forest conservation, as well as the advocacy of women and child rights.

Notably, NIWCYD has been actively engaged in its operational area since the time when Madhya Pradesh was undivided. The geographic scope of its activities also encompasses the integrated working district of Dindori in Madhya Pradesh.

NIWCYD seeks to act as an agent for the holistic development of tribal, rural, and urban communities. Its primary objective is to empower beneficiaries fully, fostering self-sufficiency and thereby diminishing or eliminating their dependence on external assistance for addressing various challenges or difficulties.

2 Research Design and Methodology

The assessment used both, qualitative and quantitative methods. The process was carried out in a consultative manner involving interactions at key junctures with, both, HDFC Bank and NIWCYD.

2.1 Criteria for Assessment

For each thematic area, activities completed by NIWCYD were identified. The impact of these activities was assessed using the following criteria:

- Relevance and Convergence
- Impact and Effectiveness
- Sustainability

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

- 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 project.

To assess the impact and effectiveness of the project, the team established the values of outcome indicators of all thematic interventions. The findings were assessed against the outcome indicators finalized during the outcome harvesting stage. Through 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 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 as well as in-depth interviews (IDIs), Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) with project beneficiaries, the NIWCYD team, and the HDFC Bank project team. IDIs were conducted with a Gram Panchayat member and an Income Generating Practice (rural enterprise) beneficiaries, a school principal of a primary school in Bhandi, SHG member, bamboo drafting beneficiary, and kitchen garden beneficiary. FGDs were conducted with farmers group, SHG group, Vermi compost group, lift irrigation group, VDC group, and with the general population. KIIs were conducted of the Project head at NIWCYD, PRI member, and a vermi-compost beneficiary. The outcome mapping and result chain development was undertaken in consultation with the HDFC Bank team. Standardised key outcomes and indicators were identified for each thematic area (NRM, ST&LE, H&S and PoE). Based on the standardized list of outcomes and outputs, the questionnaire was developed. The details of the qualitative and quantitative data collection events made are given in the next section.

Figure 3: A general FGD in progress



Secondary data sources included HDFC’s CSR Policy, Programme Log Frame (Logical Framework Analysis), Quarterly Progress reports, Project implementation timelines, Communication, and Documentation products, and other relevant reports/literature related to the project.

2.3 Sample Size and Distribution

From the 8 villages of the two blocks where the project was implemented, all the villages were selected. The beneficiaries were selected using purposive random sampling from a list of beneficiaries obtained from NIWCYD. Since beneficiary selection was undertaken independently for each thematic area, the selection of more than one beneficiary from a single household was probable. In addition to this, there were instances where a single beneficiary received multiple benefits and support across the four thematic areas. Inclusion of beneficiaries for all thematic areas was ensured. The target sample size across eight villages was 400, out of which 420 sample respondents were reached. The thematic areas wise sample covered was as follows (see Table 3, Table 4).

Table 3: Quantitative Sample Covered

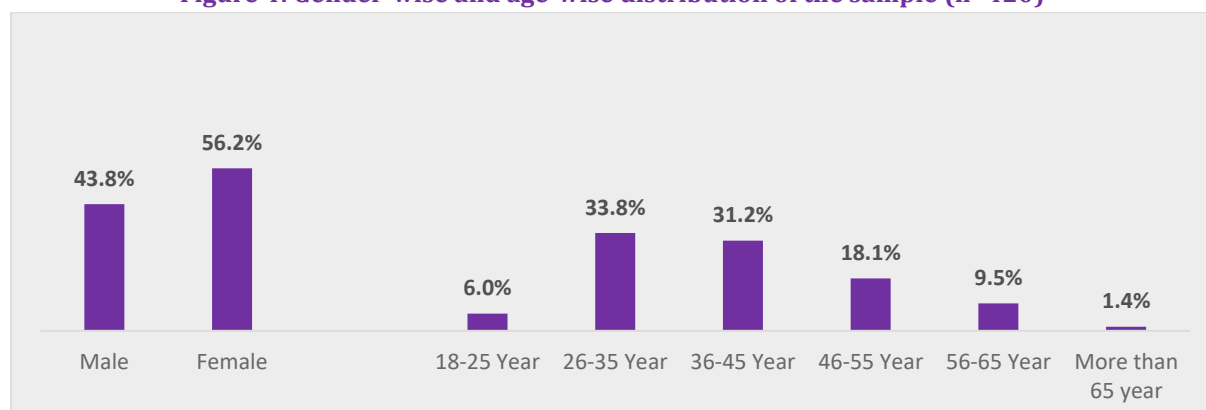
District	Total Households	NRM	Skill Training and Livelihood Enhancement	Health and Sanitation	Promotion of Education
Gaurella	215	317	214	205	287
Pendra	205	459	156	253	223
Total	420	776	370	552	510

Table 4: Qualitative Sample Size Covered

District	FGDs: 8			IDIs and KIIS: 8	
	VDC	Community	Headmaster	Village Head	Micro enterprise
Gaurella	1	3			2
Pendra	2	5	1	1	1
Total	3	8		1	3

Planned	3	8	1	1	3
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Figure 4: Gender-wise and age-wise distribution of the sample (n=420)



Chhattisgarh has a high sex ratio, 991 to 1000 (2011 India Census). This is reflected in the number of beneficiaries in this area, as proportion of **women reached is higher (56%) as compared to men (44%)**. **The youth population (18-45 years)** constituted the majority of beneficiaries **(71%)**, The more older age group **(45 to more than 55 years of age)** constituted about **29 percent** of the respondents.

The quantitative and qualitative sampling methodology has been explained in detail (see page 41).

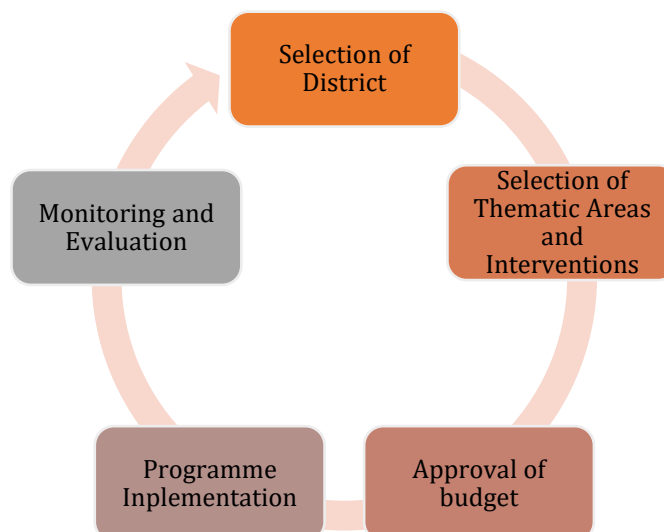
2.4 Training of Enumerators

Teams of local enumerators, with requisite education and experience, were hired for data collection. Two days training in Pendra were provided to enumerators and supervisors by the Intellecapp team.

3 Review of Project Planning and Implementation

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

Figure 5: Planning and Implementation Process



3.1 Selection of Project Area

The state of Chhattisgarh is one of the poorest in the country, with about 40% of them living below the poverty line. In the Bilaspur area, to which Gaurella-Pendra-Marwahi district formerly belonged, 39.4 percent of the population lives in extreme poverty. The project areas were selected in consultation with HDFC. Based on the primary analysis, some of the issues that this region faced were lack of fodder availability, lack of safe drinking water round the year, high usage of chemical fertilizer, low school attendance, among other things.

The project by HDFC Bank and NIWCYD aimed to address these issues through a holistic and integrated approach. The project focuses on empowering the communities in four sectors across livelihoods, agriculture and natural resource management, health and sanitation, and education. The selected panchayats in backward villages of Pendra and Gaurella were strategically chosen for the project based on their socio-economic criteria and proximity to operations. Through this integrated development approach, the project seeks to uplift the communities and bridge the basic development gap in the region, aiming for sustainable growth and improvement in human development indicators.

Figure 6: Solar water pump in Pendra



3.2 Selection of Thematic Areas and Interventions

Considering the above challenges in the area, HRDP interventions focused on promoting water and farm management in addition to clean energy. The project also focused on agricultural training and support, skill training, livestock management, and entrepreneurship development under ST&LE; educational institution development and education support under PoE; health awareness and sanitation practices under H&S. The activities specific to each village under the project were decided after in-depth consultation with the respective Village Development Committees (VDCs), which were constituted during the beginning of the project implementation. Activities under each of the four thematic areas are as follows (see Table 5).

Table 5: Activities under Four Thematic Areas in Gaurella and Pendra

Activity Category	Activities	Output Indicators
NRM		
Irrigation Management	Lift Irrigation	Income from agriculture
Water management-agriculture	Shallow Borewell	
Farm Management	Seed bank, Creeper farming, Greenhouse farming, Seed distribution, Huller Machine	
Clean Energy	Solar street lights, Solar drinking water supply	Clean energy
ST&LE		
Agriculture Training and Support	Setting up/ strengthening of FPO, Construction of vermi-compost pits	Access to Agriculture Training and Services
SHG-Based Women Empowerment	Training for SHG members	Skill and Entrepreneurship Development
Entrepreneurship Development	Oil pressing unit, bee keeping, Bamboo crafting, Rice mill, Murra machine, Lac Cultivation, Dal Mill.	
Livestock management	Livestock health service	Livestock Management
H&S		
Health	Health camps	Health Infrastructure and Services

Sanitation	Household/ community sanitation units (toilets/bathing enclosures)	Sanitation Infrastructure and Services
Kitchen Garden	Seeds, training, demonstrations	Kitchen Garden
PoE		
Educational Institutions Development	Science lab construction/renovation, Smart class, BaLA	Infrastructure in Educational Institutions

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

3.3 Project Implementation

The interventions comprised a combination of providing direct materials and services such as seeds and sprinklers as farm inputs and implements, along with raising awareness about new agricultural techniques. The program's interventions are chosen on an annual basis, and a budget is allocated each year based on a request made to HDFC Bank by NIWCYD. The field team has had extensive conversations with the village committees to study the issues and limitations in the communities based on our interactions with the partner team. Activities and interventions were developed and put together based on their needs.

The HRDP started with the hiring of personnel and Community Resource Persons (CRPs) and the delivery of capacity-building trainings on a variety of topics, including HRDP's goals, roles, and responsibilities. To determine the most pressing problems and requirements of the communities, the project held Gram Sabha meetings and Participatory Rural Appraisals (PRA) in the eight villages. The identified needs were used to create plans and budgets that complemented HRDP's objectives.

The guidance and support that NIWCYD staff provided to all parties was essential in enabling the timely implementation of activities. They efficiently generated reports, made frequent site inspections, received input, and tracked progress.

3.4 Monitoring and Evaluation

The implementing partners used a standard monitoring and evaluation approach for the HRDP. These include reporting on project execution status to the HDFC Bank on a regular basis. Furthermore, the HDFC Bank's programme implementation staff visited the project communities at regular intervals to review the project work sites, participated in training programmes and awareness workshops, as well as connected with project recipients.

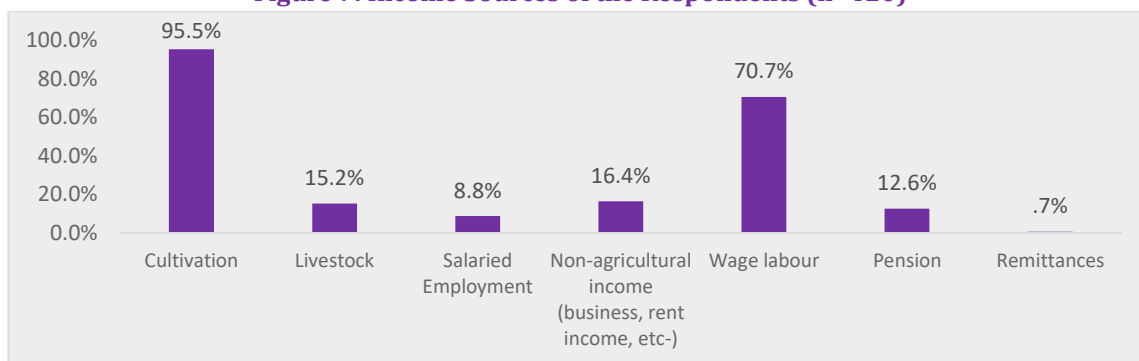
HDFC Bank has specific requests for project information from the implementing partner. The implementing partner manages the project data mostly in spreadsheets, which include information of the village-level activities conducted, beneficiaries mapped against each of the project activities, expenditures, and so on. In addition, the implementing partner submits to HDFC Bank a yearly progress report on project activities, as well as a strategy for the following year. This document is the primary source of information, providing an overview of the actions carried out, outputs produced, and outcomes attained.

The impact of NIWCYD activities was 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 based on selected indicators. The impact (Table 11) of each activity has also been calculated and classified as high, medium, or low impact. The annexure goes into greater detail on these.

4 Study Findings

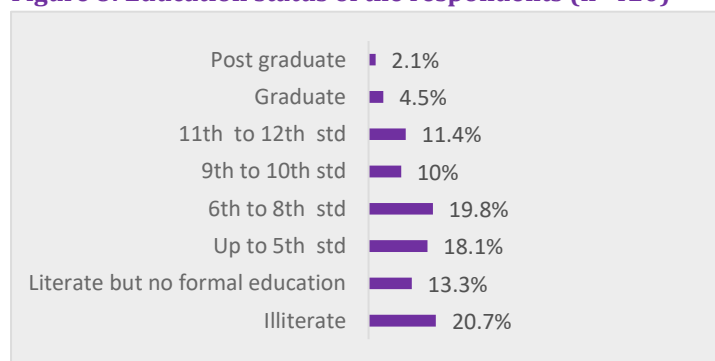
This section provides the analysis of the profile of the respondents covered in the eight villages of Gurella and Pendra region in Chhattisgarh.

Figure 7: Income Sources of the Respondents (n=420)



The income earned by a vast majority of the respondents comes from agriculture (95.5%), while 71 percent of the respondents are wage labourers. Other sources of income are far lesser seen.

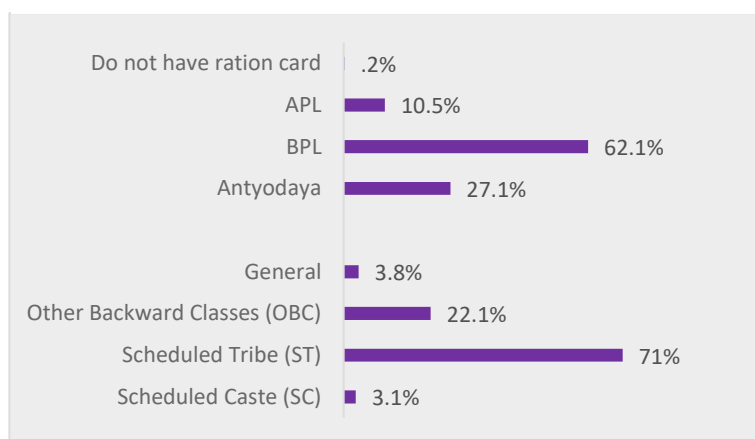
Figure 8: Education status of the respondents (n=420)



The overall literacy rate in the state is 60.21 percent (2011 India Census). However, in this region, only 21 percent of the respondents seem to be illiterate, and a vast majority of them have received some form of formal education.

Figure 9: Caste and economic status

In the Gaurella and Pendra region, **more than 62 percent of the respondents hold BPL cards, while 27 percent hold Antyodaya cards, reflecting the poverty of the region.** This region also sees about **71 percent of tribal respondents**, as it is a forest region. The state records about 32 percent (2011 India Census) as the tribal population. Interventions to help improve their lives was a crucial need.



The following table provides a summary of the quantum of activities carried out under each activity category of the four thematic areas (see Table 6).

Table 6: Summary of Quantum of Beneficiaries Reached Under Each Activity Category of Four Thematic Areas

Activity Category	Activities	No. (as provided by the Implementing Agency (IA)) between 2021-22
NRM		
Irrigation Management	Lift Irrigation	35
Water management-agriculture	Shallow Borewell	161
Farm Management	Seed bank	5
	Creeper farming	80
	Greenhouse farming	11
	Seed distribution	728 beneficiaries
	Huller Machine	31
Clean Energy	Solar street lights	50
	Solar drinking water supply	116
ST&LE		
Agriculture Training and Support	Setting up/ strengthening of FPO	1129
	Construction of vermi-compost pits	78
SHG-Based Women Empowerment	Training for SHG members	1744
Entrepreneurship Development	Oil pressing unit	8
	Bee keeping	21
	Bamboo crafting	97
	Rice mill	10
	Murra machine	20
	Lac cultivation	7
	Dal mill	16
Livestock management	Livestock health service	234
H&S		
Health	Health camps	Not available
Sanitation	Household/ community sanitation units (toilets/bathing enclosures)	347
Kitchen Garden	Seeds	441
	training	23
PoE		
Educational Institutions Development	Science lab construction/renovation, Smart class	259
		566
	BaLA	369

The following section highlights the key findings from the field survey conducted to assess the impact of the project after its completion.

4.1 Natural Resource Management

Under NRM, water conservation and farmer support for better yield were prioritized. The several trainings on improved farming techniques, water interventions, and provision of High Yielding Variety (HYV) seeds have resulted in better productivity and increased income from agriculture. This was important in the area as availability of good quality seeds was an issue. The number of beneficiaries is mentioned in the above table (Table 6).

The objective of NRM interventions was to improve land/ crop productivity and ultimately increase farmers' agricultural income through increased access to farm management infrastructure and irrigation mechanisms. The aim also was to raise the adoption of clean energy solutions. The sections below focus on the impact created with regard to these objectives.

In each village, the establishment of seed banks has been undertaken, wherein farmers receive seeds at minimal or no cost. Recipients of seeds from these banks are obligated to return a commensurate quantity of seeds harvested from their own farms. The seed banks demonstrate flexibility by allowing farmers to forgo seed return in the event of a crop failure, ensuring a considerate approach. This system has not only guaranteed the provision of high-quality seeds to all farmers but has also served as an incentive, motivating numerous farmers to diversify their crops and cultivate a broader range of produce on their land. In Pendra, the Amarkantak FPO was granted a godown by the Chhattisgarh state government, which has been highly helpful to the farmers.

4.1.1 Income from Agriculture

Under agriculture, some of the activities that were conducted include: implementation of lift irrigation systems, shallow borewells, establishment of seed banks, creeper farming, greenhouse farming, seed distribution, and provision of Huller Machine. There has been a rise in the agricultural income in the project areas. The median net income increased from **Rs. 26,500 to Rs. 50,000 in Gaurella**, while in Pendra, **it increased from Rs. 45,000 to more than Rs. 80,000**. The project's positive result in enhancing productivity, agricultural practices, and contributing to the overall economic well-being of the farming communities in the region is highlighted by these positive changes in agricultural income. Overall, households have reported an **83 percent increase** in the net income from agriculture. **Upon conducting a two-sample z-test, P-value of less than 0.0001 was found against a z-statistic of 9.5 (at 95% confidence level) indicating that it is a significant change.** The farmers expressed that before the intervention, they were hardly able to grow one crop a year. **But due to the interventions in water (such as lift irrigation provisions, and shallow borewells) they are now able to irrigate the land throughout the year** and grow at least two crops a year. Many farmers, upon interaction with them during FGDs have reported the increased fertility of land, and that some are able to grow even three crops a year. Figure 10 details out the interventions that have led to increase in income. **This has contributed greatly to the increased income of the farmers.**

Figure 11: Increase in Agricultural Income (in Rs.) (n=356)

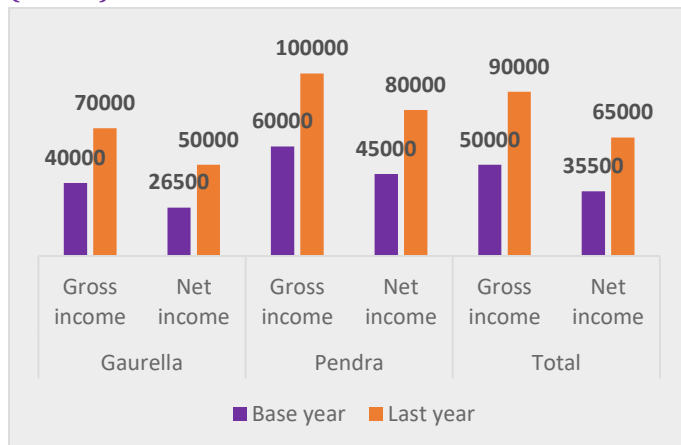
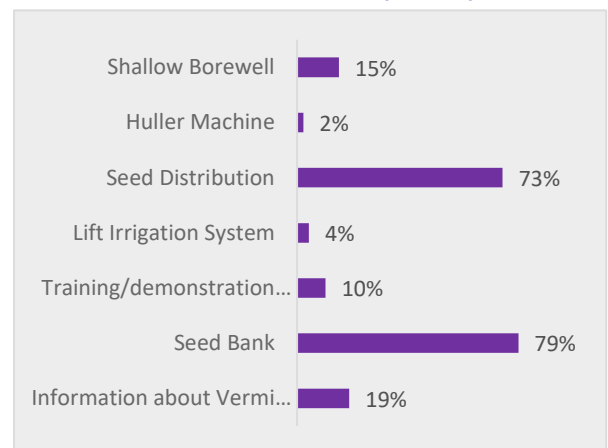


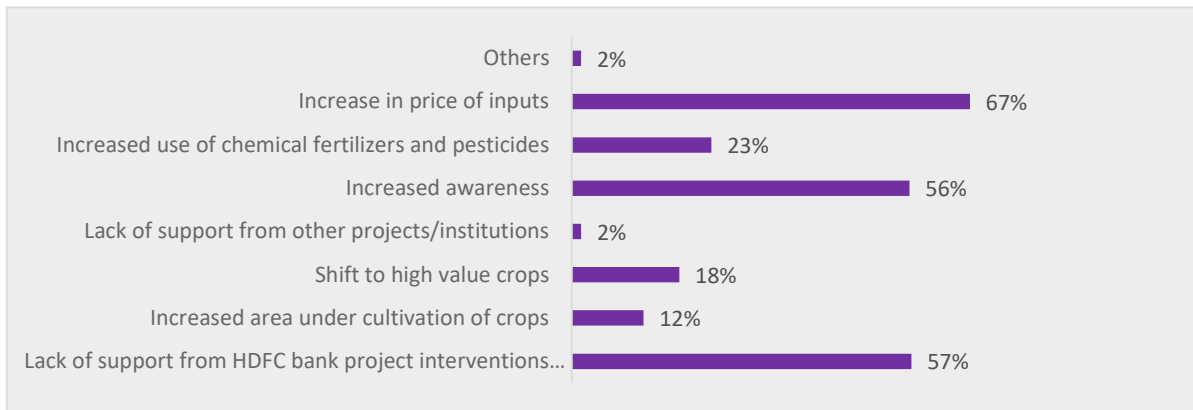
Figure 10: Interventions that have led to Increase in Income (n=354)



Note: Net and Gross Income in Rs. (based on median)

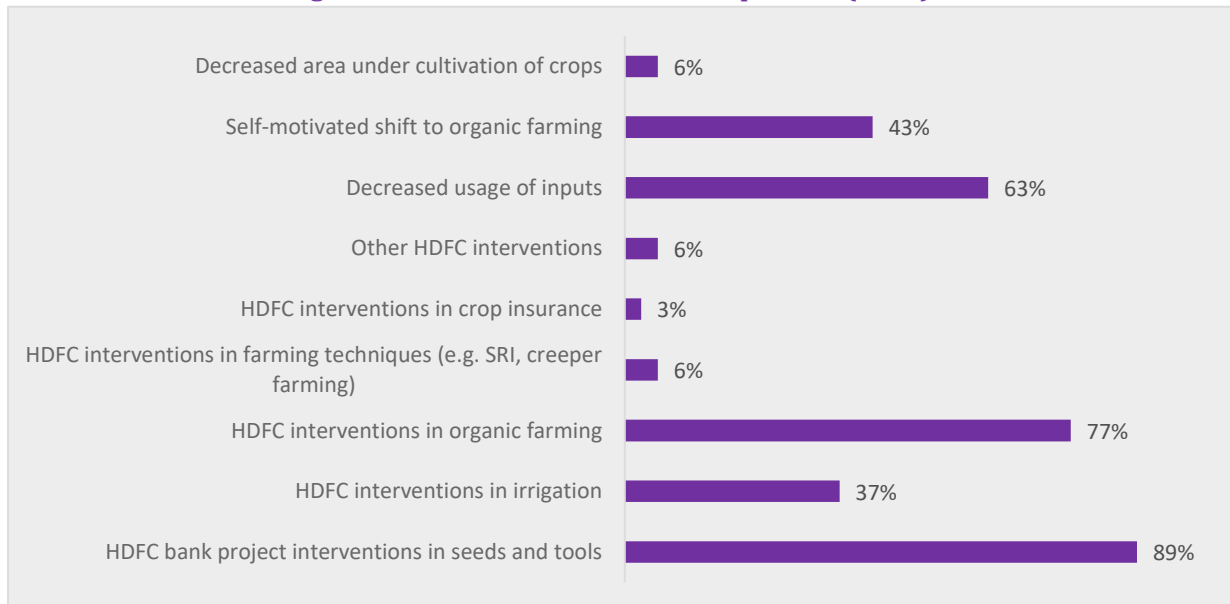
It can also be noted that **despite the increase in input cost, as reported by 89 percent of the respondents, most of their incomes have increased.** The increase in input cost can be attributed to one or more of the following reasons: increased awareness, increased use of chemical fertilizers and pesticides, increased number of crops per year, and most importantly, **increased prices of inputs (Figure 12).**

Figure 12: Reasons for Increase in Input Cost (n=317)



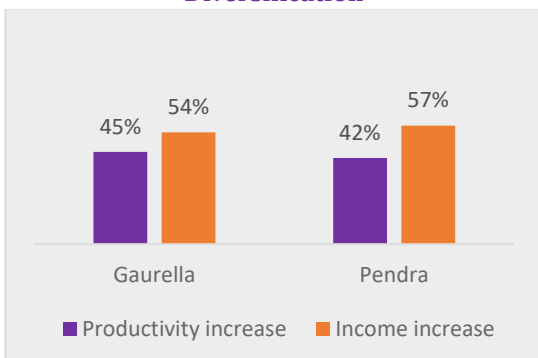
Among the respondents who claimed that their input cost has decreased, it could be attributed to the various interventions that were implemented by NIWCYD and HDFC Bank, as indicated in Figure 13.

Figure 13: Reasons for Decrease in Input Cost (n=35)



More than **86 percent** of the respondents indicated an increase in usage of natural fertilizers, while **55 percent** of them have decreased the usage of chemical fertilizers.

Figure 14: Perceived Benefits of Crop Diversification



However, more than 68 percent of the respondents reported that they use both natural and chemical fertilizers for their crops. There is gradual shift towards organic farming, and with more support and handholding, the shift can be completed.

About 61 percent of the farmers have changed crops grown in their land, as they have now begun growing two or three crops a year, where they only grew one crop a year before the intervention. Approximately 21% more farmers cultivate paddy, while 25% more engage in wheat cultivation. Additionally, nearly 17% more farmers are involved in vegetable cultivation. One of the main benefits of changing crops is increase in income, as shown in Figure 14.

Chhattisgarh is titled as the “rice bowl” of India. Farmers have reported an increase in production for the main crop in the project area: paddy. This can be attributed to the HYV seed distribution and availability of water through lift irrigation and shallow borewells. The average mean production of paddy as stated by the respondents in the Gaurella-Pendra region after the intervention is 4756 kgs/ha, as opposed to 3333 kgs/ha grown before the intervention. The average productivity of paddy in Chhattisgarh is 3212 kgs per hectare², or 1300 kgs per acre.

This is reflected well by the data from the respondents, as seen in Figure 15. While the average median productivity of paddy before the intervention 1183 kgs per acre, it has increased to over the state average, to 1750 kgs per acre. This corresponds to an increase of 48 percent from before the interventions, and 34 percent from the state average².

Support in irrigation, as mentioned above, has been instrumental in supporting the farmers in increasing their production. Before the intervention, 93 percent of the respondents had access to irrigation on their land. Post-intervention, close to 97 percent of them are now able to irrigate their land.

Due to the interventions in irrigation, several farmers were also able to grow horticulture crops as well. About 8 percent of the respondents have stated that they have begun growing horticultural crops after the intervention, with most of the growing guava, papaya, or mango.

Figure 17: Benefits of Horticulture Crops (n=27)

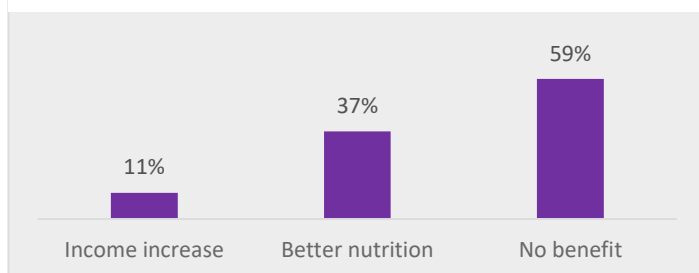


Figure 15: Average Productivity of Paddy (n=352 before, 356 after)

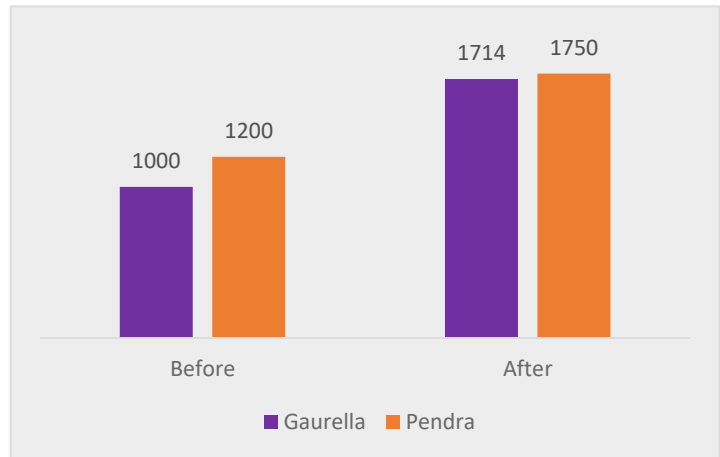
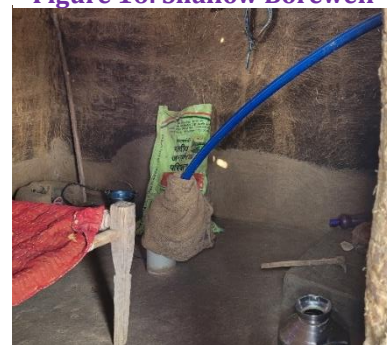


Figure 16: Shallow Borewell

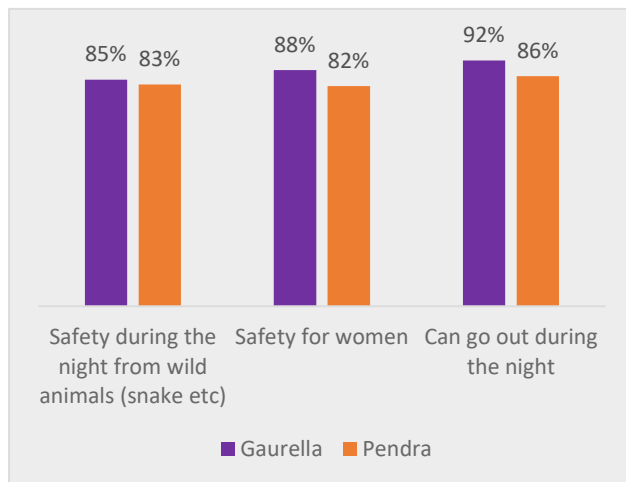


But due to the longer fruiting time of the trees, the farmers have seen little to no benefit as of now. Of the few people who have reported an increase in income, they have stated that they have earned about average mean income of Rs. 7667 in the previous year from horticulture crops.

² [Chhattisgarh's paddy acreage falls nearly 8% in 2023 kharif season](#)

4.1.2 Use of Clean Energy Solutions

Figure 18: Perceived Benefits of Solar Streetlights

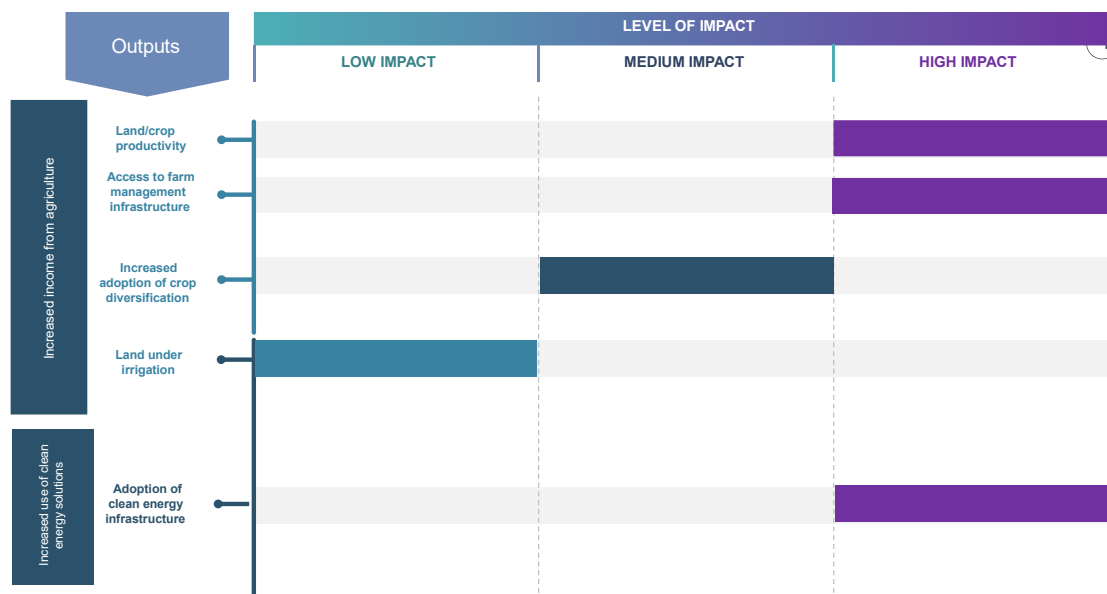


The main interventions that were implemented under clean energy were installation of solar streetlights, and solar water pumps, which has been covered in the Drinking Water section. The solar streetlights are especially helpful during the winter season when darkness envelops the region as early as late afternoon.

During interaction with the community, it was found that several lights were not in working condition. As they were not trained in fixing it, it was expensive for the residents to get the lights repaired. Hence, it remains dark in some parts of the villages.

4.1.3 Impact Observation

Figure 19: Overview of Project Effectiveness and Impact of Interventions-NRM



Land and crop productivity, and access to farm management infrastructure shows high impact on the beneficiaries. Increased adoption of crop diversification shows medium impact as it was limited to only farmers participated in the project rather than universally done in the project area. Adoption of clean energy has seen high impact as it has reached a greater number of beneficiaries. The specifics of impact calculation can be seen in Table 11.

4.2 Skill Training and Livelihood Enhancement

Under ST&LE, one of the pioneer activities that has been conducted by NIWCYD was the setting up of Farmer Producer Organisations (FPOs), which has been highly beneficial for the farmers in

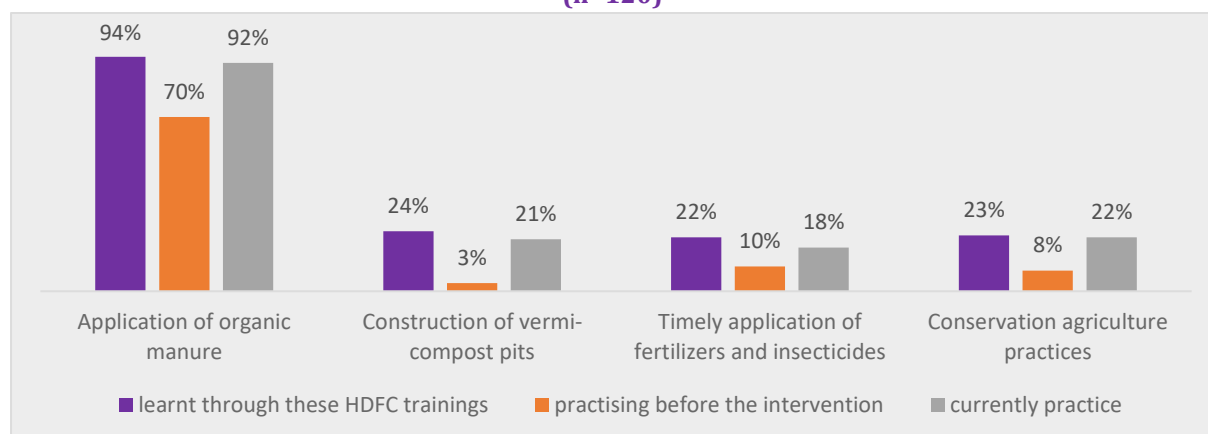
the villages of Gaurella and Pendra. Through FPOs, training/workshops have been conducted on several farming techniques: included but not limited to application of organic manure, construction of vermi pits, timely application of fertiliser and insecticides, and conservation agriculture practices. These have been well received by the farmers and considering that many of the households' occupation is agriculture, these interventions were much required and useful. Women empowerment was another area that this project focussed on. By supporting women led SHGs, providing them training and a means to earn and support their family, the women who were part of this project expressed their happiness at being able to afford schoolbooks and uniform for their children.

4.2.1 Agriculture Training and Services

The project carried out a number of initiatives to support sustainable agriculture. Application of organic manure and creation of vermi-pits improved soil quality and promoted crop growth. Optimal crop protection and nutrition were ensured by the timely application of fertilisers and insecticides. Minimal tillage and multi-tier cropping were examples of conservation agriculture techniques that aided in soil conservation and water efficiency. These interventions enhanced agricultural sustainability and productivity, enhancing the livelihoods of the community and the environment.

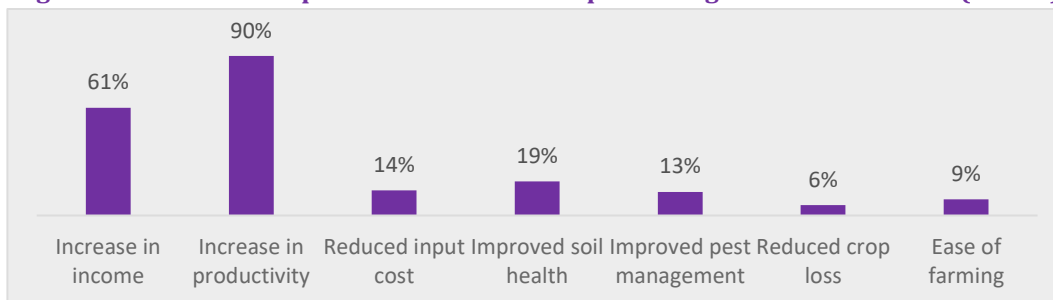
The community's adoption of sustainable agricultural practises has greatly benefited from the HDFC trainings. According to the data, **92 percent of the respondents are currently using organic fertilizers; 94 percent of those respondents learned about it through the trainings.** Additionally, **34 percent of those who have learned about building vermi pits have used this method. 23 percent of participants adopted conservation agriculture practices.** Figure 20 shows that there is an increase in the number of people adopting these agricultural practices, which can indicate a positive acceptance of new practices.

Figure 20: Agriculture Practices Learned through HDFC Trainings and Currently Practicing (n=120)



Adoption of agricultural techniques has produced improvements in the community. These practises have a positive effect on crop yields, as shown by the **90 percent of respondents who reported an increase in productivity.** Furthermore, **61 percent of respondents were pleased with the increase in income,** highlighting the financial benefits of effective procedures.

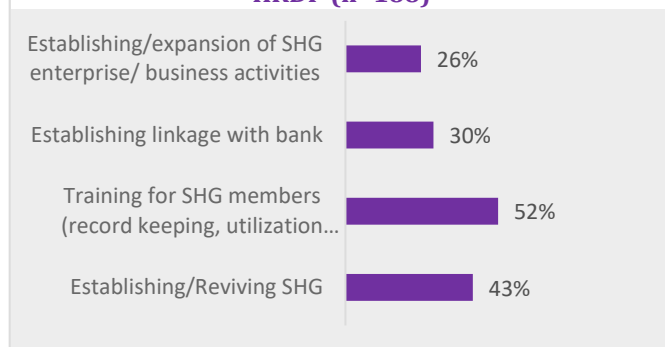
Figure 21: Perceived Improvements Due to Adoption of Agricultural Practices (n=120)



The establishment of Farmer Producer Organizations (FPOs) marked a pivotal initiative by NIWCYD. Typically led by three members, these FPOs encompass numerous farmers as their shareholders. In a conversation with the chairman of an FPO facilitated by NIWCYD, the significance of this initiative became evident, particularly in the context of information dissemination. Given the remoteness of these rural areas, the collaborative exchange of knowledge and improved access to infrastructure emerge as vital factors. This collective approach not only enhances agricultural practices but also empowered farmers to cultivate more robust crops, ultimately contributing to improved livelihoods for themselves and their families.

4.2.2 Economic Empowerment through Collectivization

Figure 22: Support Provided for Groups through HRDP (n=188)



About 45 percent of the sample respondents have received support for SHG development through HDFC. With the help of NIWCYD, **43 percent of the SHGs have been either established or revived.** Additionally, **52 percent of SHG participants have received training**, giving them the necessary know-how and abilities for sustainable development. For **30 percent of SHGs, establishing connections with banks** has been

made easier, ensuring that their initiatives will have access to funding. Even though 25 percent of business owners have received support for starting or growing their operations, HDFC's overall assistance has been crucial in empowering SHGs and promoting socioeconomic development in the neighbourhood.

According to Figure 23, participating in a SHG has many advantages for those involved. The fact that **73 percent of SHG members reported having personal savings** shows improved capacity for money management and security. Additionally, with **84 percent of the respondents stating that their confidence was improved** with the training proves how essential the

Figure 23: Benefits of being a SHG member (n=188)



trainings were for women, enabling them to take an active part in civic and decision-making activities. Only 21 percent of the respondents saw an increase in income generation, while demonstrating the beneficial effects of group efforts and entrepreneurial opportunities, also shows scope for improvement. Additionally, **52 percent of SHG members benefit from having access to loans with lower interest rates**, which provides funding for various projects and individualised needs. SHGs' ability to offer support and group power has been shown to be crucial in promoting members' personal development and economic stability.

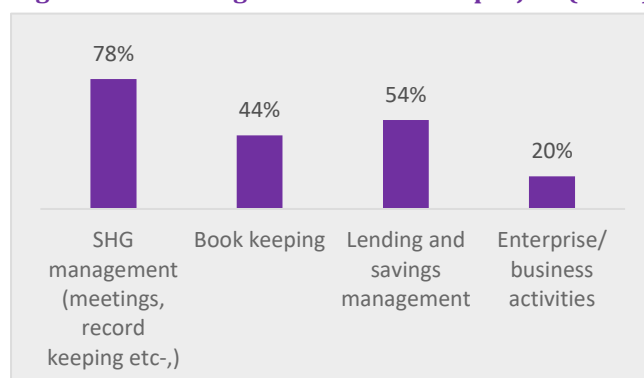
About **51 percent of the respondents have attended training sessions**. According to the data, SHG members have actively participated in a variety of trainings. 78 percent of members showed up for training on SHG management, demonstrating their commitment to successfully managing and maintaining the group. Additionally, 44 percent of them received bookkeeping training, enabling them to keep precise financial records and track their progress. **54 percent of members participated in lending and savings management training, ensuring responsible handling of group funds and promoting a culture of saving**. Even though a lower percentage of members (19%) took part in enterprise and business activity training, these interventions helped the members' entrepreneurial endeavours by teaching them useful knowledge and skills.

Figure 24: How has the SHG Trainings been useful (n=97)



All of the respondents who received training reported that they were very useful. According to Figure 24, **the training has improved their confidence greatly (86%)**, and about 58 percent of the respondents have reported that their awareness of financial management has also improved. These improvements have benefitted them greatly in gaining more confidence in running their own enterprise.

Figure 25: Training received from the project (n=97)

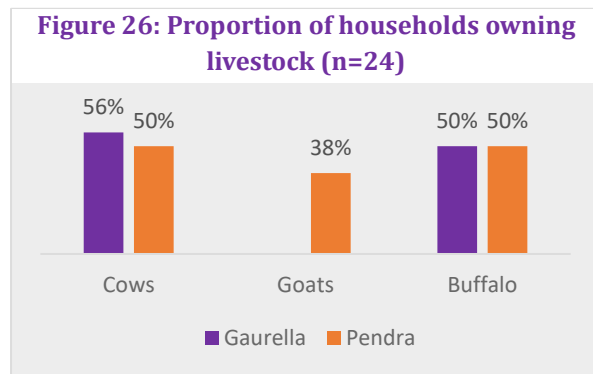


The SHGs in the designated regions have encountered challenges in achieving substantial improvements in income levels, warranting a more targeted focus in this domain. Although the practice of savings, a fundamental aspect of SHGs, has proven effective, the establishment of enterprises has yielded limited positive outcomes. Introduced enterprises, including Murra making machines, bamboo crafts, oil pressing units, rice mills, among others, have faced impediments. For instance, the investment required for raw materials in Murra making machines exceeded the selling price of the final product, leading to financial inefficiency.

Additionally, operational challenges arose during colder seasons, where the high heat demand for the machine proved both difficult and expensive to sustain. Despite training initiatives in bamboo crafting, the crafted products lacked the requisite finishing touches, resulting in diminished market reception at fairs and other outlets. A focused examination of income-generating strategies within SHGs is warranted to address these challenges and enhance overall economic outcomes.

4.2.3 Livestock Management and Training

While Chhattisgarh is a state rich in livestock wealth, livestock management has not been a focus of this project. However, there were several vaccination camps that were facilitated by NIWCYD through the HRD program. Only about 6 percent of the respondents stated that they were beneficiaries of livestock management activities.



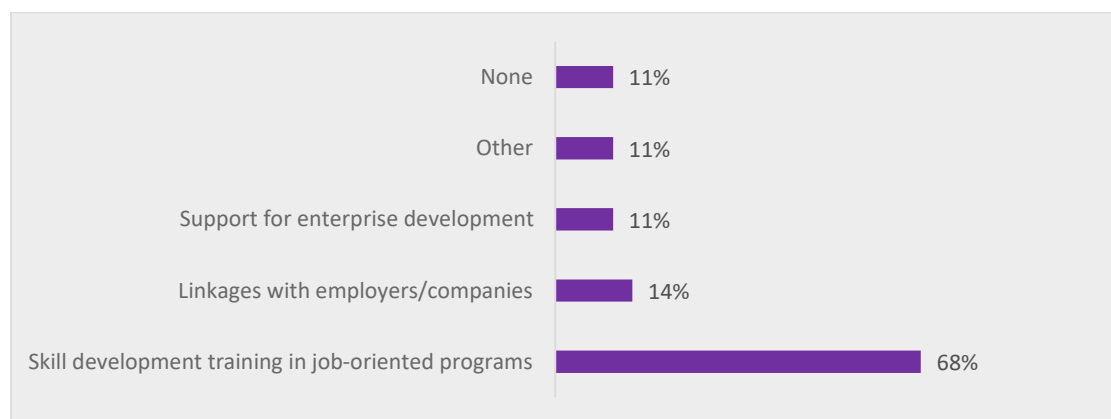
From Figure 26 it is evident that cows and buffaloes are a predominant livestock in the area. Goat rearing takes second place.

All the respondents have availed the vaccination services, which included household vaccination services against diseases. This has helped the respondents increase the lifespan of their livestock.

4.2.4 Skill and Entrepreneurship Development

Most of the respondents (68%) have availed skill training for job-oriented programs.

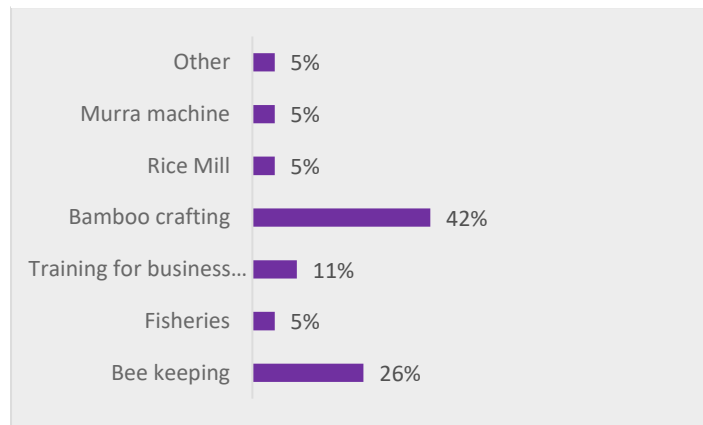
Figure 27: Skill and entrepreneurship development training services accessed through HRDP (n=37)



About 26 percent of the respondents received training on beekeeping, while 42 percent received skill training in bamboo crafting. Other trainings received are shown in the following Figure 28.

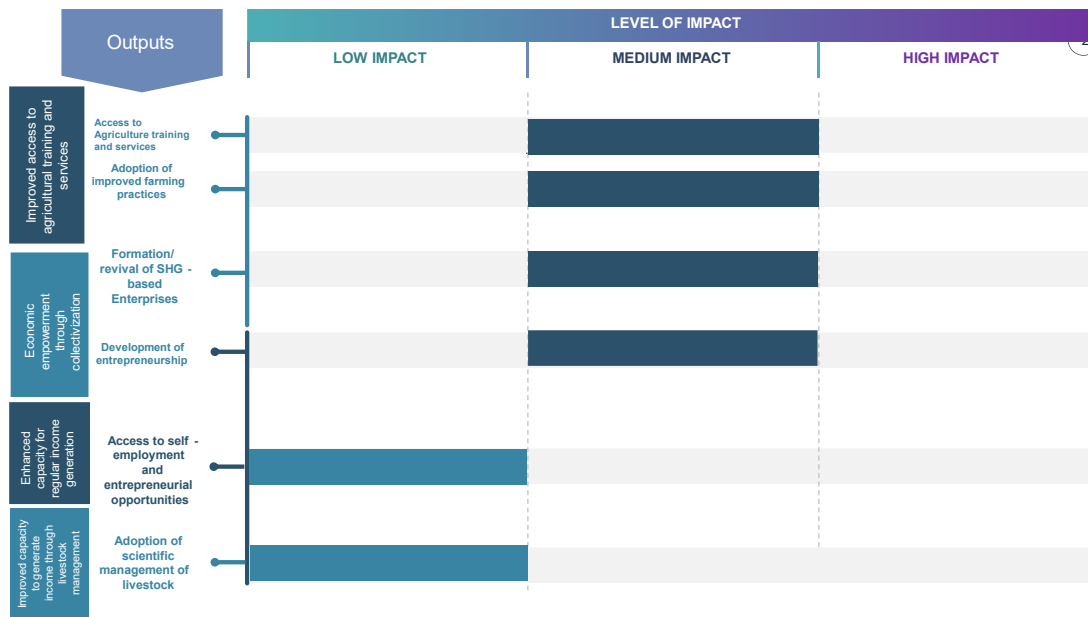
Nevertheless, as articulated in Section 4.2.2, the efficacy of entrepreneurship training exhibited constrained positive outcomes. A multitude of respondents identified various external factors contributing to this outcome, including escalated prices of raw materials for the Murra machine and intensified competition among rice mills, among other pertinent considerations.

Figure 28: Training Attended by the Respondents



4.2.5 Impact Observation

Figure 29: Overview of Project Effectiveness and Impact of Interventions-ST&LE



Interventions in entrepreneurship and agriculture training services has seen medium impact. This can be backed by the increase in income from both of these interventions. Employable skill development and adoption of scientific approach for livestock management have had a low impact on the beneficiaries as they were implemented on a much smaller scale. The specifics of impact calculation can be seen in Table 11.

4.2.6 Case Study

Transforming Agriculture Sustainably: A Case Study of Mrs. Phulvathiya Bai and Rai Singh



In the transformative narrative of Mrs. Phulvathiya Bai and Mr. Rai Singh, a resilient and spunky couple, the implementation of vermi-compost proved pivotal in reshaping their agricultural practices. Beneficiaries of training from HDFC on vermi-compost maintenance, the couple successfully eliminated chemical fertilizers on their 1.5-acre plot, exclusively cultivating vegetables. Their entrepreneurial spirit shone as they sold vermi-

compost to fellow project beneficiaries, fostering community collaboration. However, the looming challenge of water scarcity threatens their vegetable cultivation, prompting the need for innovative water conservation methods. This case study underscores the couple's journey towards sustainable and organic farming, showcasing both the positive outcomes and ongoing challenges in their pursuit of environmentally conscious agriculture within their rural community.



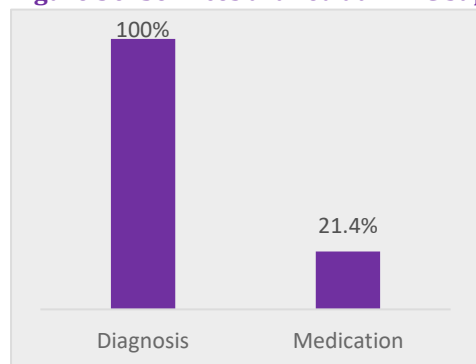
4.3 Health and Sanitation

Health camps were conducted as entry-point activities in this region. About **20 percent of the respondents have availed health and sanitation services**. Few interventions have been supported under Health and Sanitation, while the primary focus had been on NRM and ST&LE. Under H&S, a health camp was conducted every during the inception of the project. Several households were also supported and encouraged to grow vegetables in their backyard for their household consumption.

4.3.1 Health Infrastructure and Services

Health camps and hygiene-related awareness sessions are interventions in the field of health. 16 percent of the respondents have used the health camp, which offered basic medical services. With an astounding 95 percent participation rate from respondents, hygiene related awareness sessions have demonstrated to be very successful in facilitating widespread outreach and raise awareness. The improvements in healthcare access and raising public awareness of good hygiene practises are represented by these interventions.

Figure 30: Services availed at HDFC supported camps/clinics (n=14)



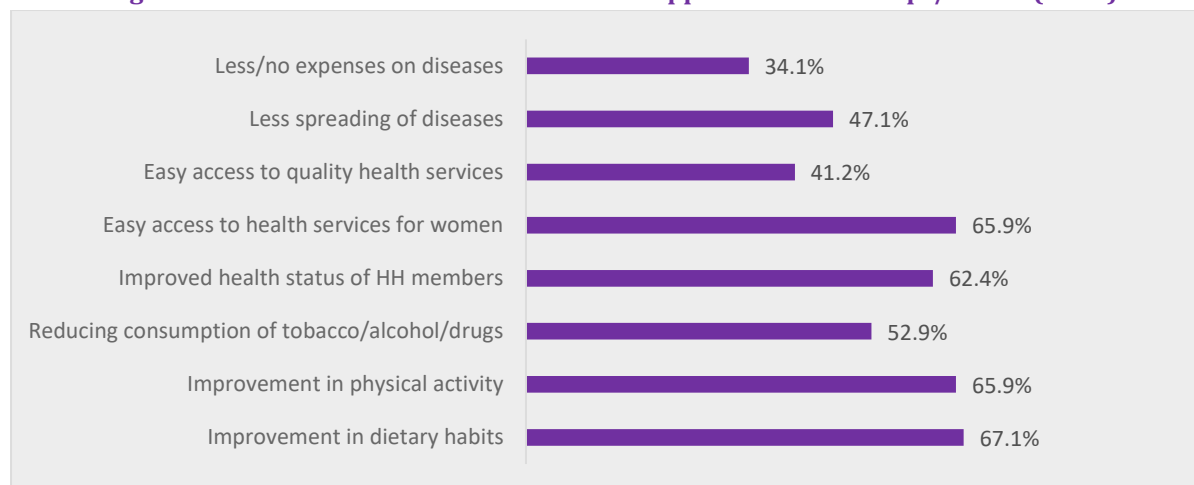
In health camps and clinics, **all the respondents received diagnosis**, while 21 percent percent received medication.

It was discovered, though, after discussion with the community, that more frequent health camps would have been beneficial.

The HDFC supported camps and clinics have brought about several perceived benefits for the community. **67 percent of the respondents reported that their eating**

habits had improved, indicating that there had been a significant improvement in dietary practises. Additionally, **66 percent of the respondents stated that they were becoming more active**, which has contributed to a healthier way of life. The interventions have also **helped 53 percent of the respondents cut back on their use of tobacco, alcohol, and drugs**, improving their general health. Additionally, **66 percent of women can now access healthcare services more easily**, ensuring their wellbeing. 41 percent of respondents agree that healthcare services are now more accessible and of higher quality overall. 34 percent of respondents reported a decrease or elimination in disease-related costs, while 47 percent saw a decline in the spread of diseases.

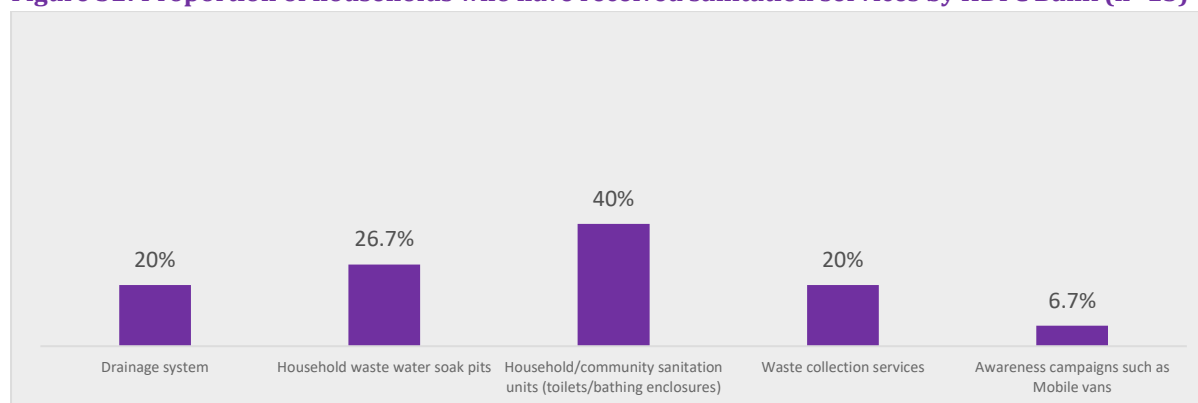
Figure 31: Perceived benefits of HDFC Bank supported health camps/clinics (n=85)



4.3.2 Sanitation Infrastructure and Services

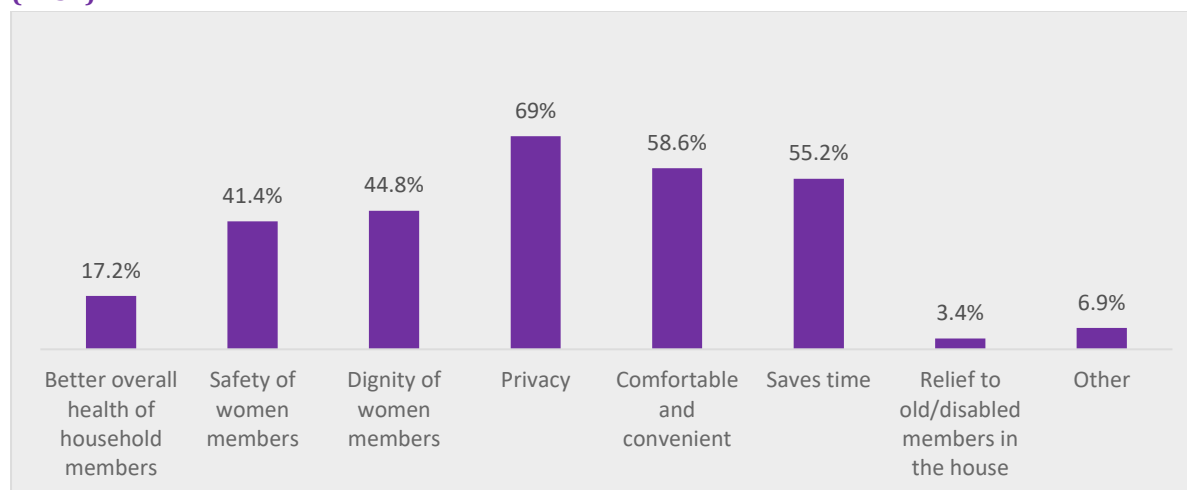
Support in sanitation infrastructure and services were not a major intervention in this area. NIWCYD and HDFC Bank supported a few households in the repairment and building of toilets and soak pits by providing them monetary support.

Figure 32: Proportion of households who have received sanitation services by HDFC Bank (n=15)



Among the respondents, 20 percent reported having access to a proper drainage system, ensuring efficient wastewater management. Additionally, 27 percent of households now benefit from household waste-water soak pits, which contribute to better waste disposal practices. Notably, an impressive 40 percent of households now have access to household or community sanitation units, such as toilets and bathing enclosures, significantly enhancing sanitation and hygiene practices.

Figure 33: Perceived Benefits of HH/Community Sanitation Units/ Waste Management Services (n=34)



The implementation of sanitation services has led to significant benefits for the community, with 17 percent of survey participants noting an enhancement in the overall health of household members. Importantly, **41 percent underscored the heightened safety of women members**, illustrating the pivotal role that toilets play in cultivating a secure environment. The substantial figure of **45 percent concerning the dignity of women members** implies that access to toilets significantly contributes to the preservation of personal dignity. Additionally, the considerable percentages related to **privacy (69%)** and **comfort and convenience (59%)** underscore the transformative impact of toilets in fostering more favourable conditions. The reported benefits of **timesaving (55%)** affirm the increased efficiency resulting from enhanced sanitation facilities. However, the relatively lower percentage (3%) regarding relief to old or disabled members signals a potential area warranting further attention.

4.3.3 Drinking Water

Access to safe drinking has been one of the concern areas in this region, and NIWCYD, in collaboration with HDFC Bank, have set up multiple community water tanks. About **22 percent of the respondents have noted that they have received some sort of drinking water facility**. More than **92 percent of the respondents claimed that the source of their drinking water had changed**.

The intervention came in the form of Community Water Tanks and Solar Water Pumps. The intervention has impacted the community in a positive way, as indicated in Figure 34.

Figure 34: Perceived health benefits of improved drinking water sources (n=85)

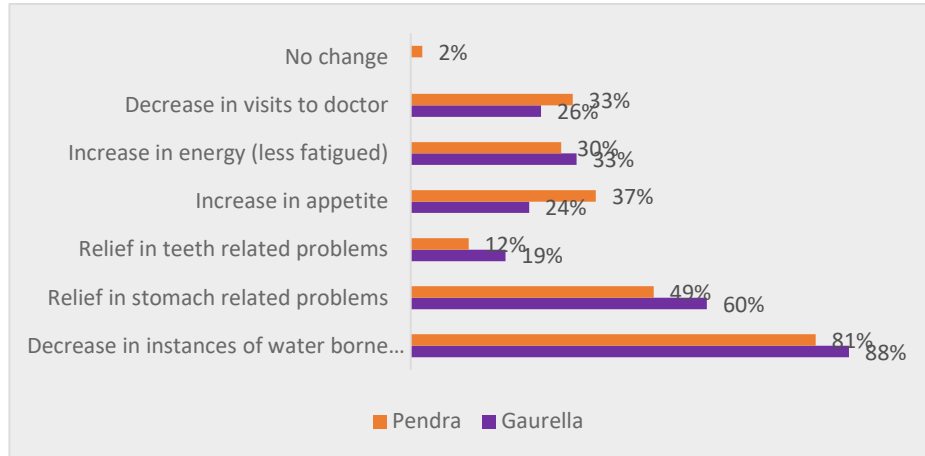
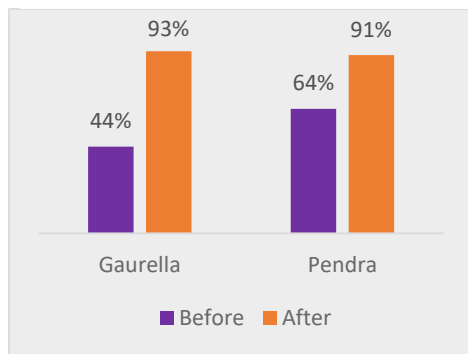


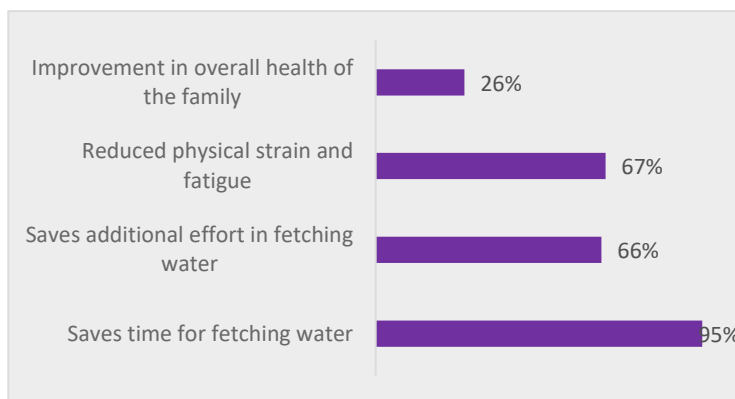
Figure 35: Percentage of households reporting increase availability of drinking water facility (n=92)



Furthermore, more than 90 percent of the respondents have confirmed that the availability of drinking water has increased due to the interventions of the project. This is further proof that drinking water interventions are welcomed.

In addition to this, drinking water facilities have greatly benefitted the women of the households. Close to **95 percent of the respondents have stated that it saves time for fetching water**, and others have responded that it saves additional effort, and has helped in reduced physical strain and fatigue. Women in rural India are historically known to walk for miles to fetch water for their families, hence witnessing fruitful results like this instils further faith in the development sector.

Figure 36: Proportion of households who reported different help in women due to drinking water availability



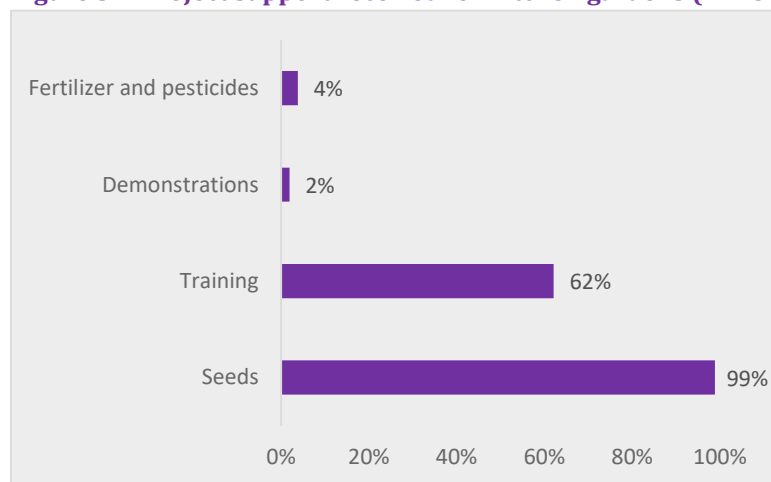
4.3.4 Kitchen Gardens

63 percent of the respondents received support for their kitchen gardens. Upon recognizing the lack of land in several households, NIWCYD came up with an **innovative activity called “bori bhagicha”, which translates to “garden in a bag”**. Several beneficiaries were given gunny bags and were trained to grow vegetable crops in them. This activity has been favoured by many and has been helpful. 98 percent of the participants in the kitchen garden project benefited from the distribution of seeds to start their gardens, which is crucial support for the project. Additionally,

successful cultivation is ensured by the **62 percent of the community who have received training to improve their gardening abilities**. Only 4 percent, however, received assistance in the form of pesticides and fertilisers. Despite this, a sizable number of people have been able to successfully establish and maintain their kitchen gardens thanks to the provision of seeds and training. These initiatives support community improvement in food security, healthy eating practises, and self-sufficiency.

The respondents have mostly received seeds for growing brinjal, tomato, coriander, bottle gourd, among other vegetables. The **self-consumption of more than 90 percent of the produce** results in the direct delivery of wholesome, fresh food to households.

Figure 37: Project support received for kitchen gardens (n=264)

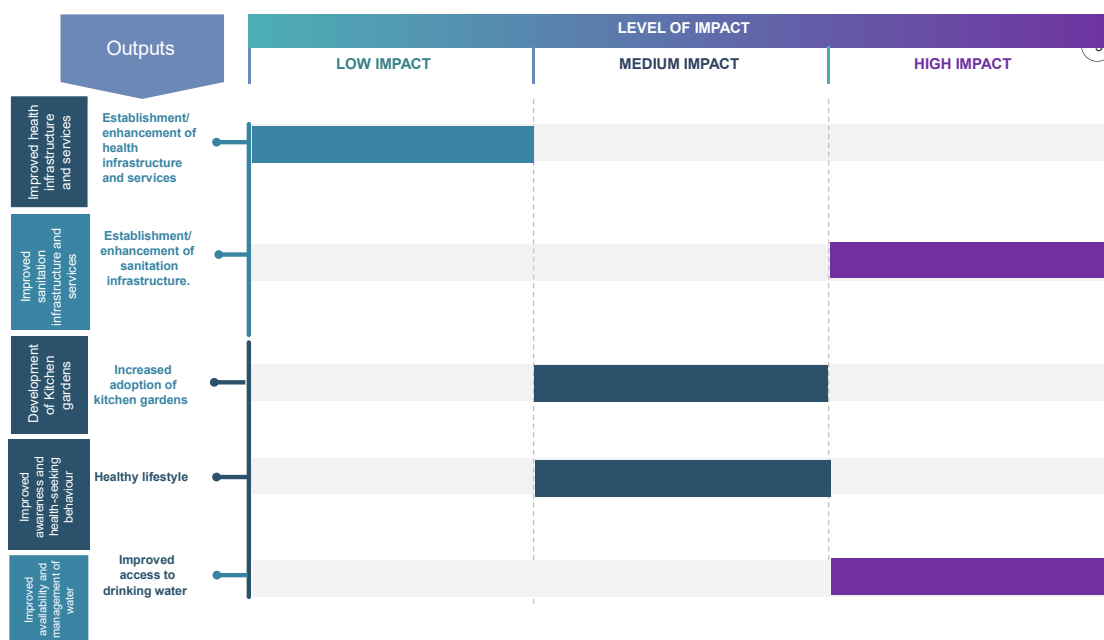


More than **65 percent of the respondents claimed that the amount spent on fruits and vegetables have decreased noticeably, saving an average of Rs. 300 per week**. This is further corroborated with **more than 95 percent of the respondents reporting that reduced expenditure on fruits and vegetables are one of the top three critical perceived benefits** of these kitchen

gardens, **followed by improved nutrition (84%) and additional source of income (23%)**. More than **94 percent of them have reported an increase in consumption of vegetables and fruits** in their daily diet.

4.3.5 Impact Observation

Figure 38: Overview of Project Effectiveness and Impact of Interventions-H&S



High impact has been seen when it comes to interventions in sanitation. It is lower in health, but kitchen garden has been a popular intervention, which shows a high impact. Even though the scale of interventions was not as high as compared to ST&LE or NRM, it has still helped the beneficiaries. The specifics of impact calculation can be seen in Table 11.

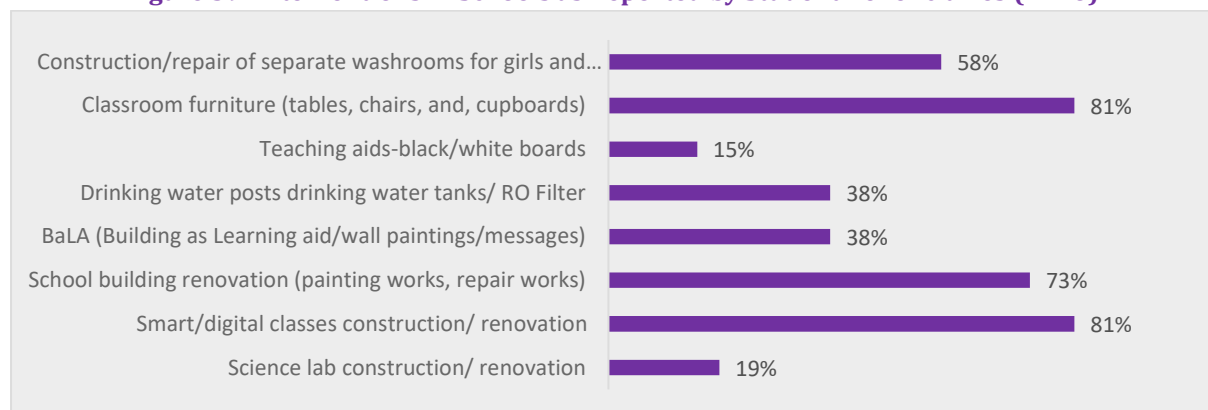
4.4 Promotion of Education

Under education, wall paintings or BaLA, Science laboratories, Digital/Smart classes, drinking water set up, and toilet renovation has been done in 7 schools across Gaurella and Pendra. One of school Principals in a secondary school in Pendra expressed his satisfaction with the support provided by the project. “We received a large monitor for the smart class, and lots of wall paintings. The students are very happy with all of this, and they seem to want to learn more.”

4.4.1 Infrastructure in Educational Institutions

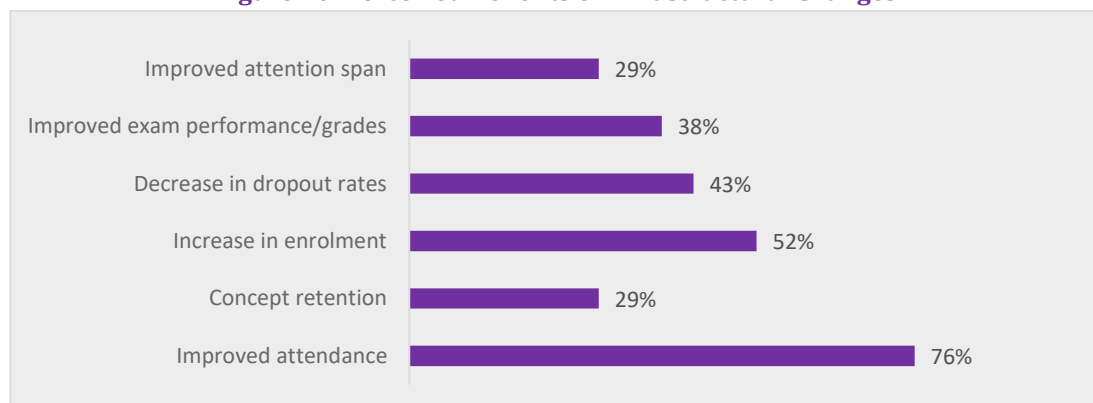
Smart classes, classroom furniture, drinking water posts, BaLA, construction of washrooms for boys and girls were some of the interventions conducted in the schools in Gaurella and Pendra. The scale of these is further elaborated in Figure 39.

Figure 39: Interventions in Schools as Reported by Student Beneficiaries (n=26)

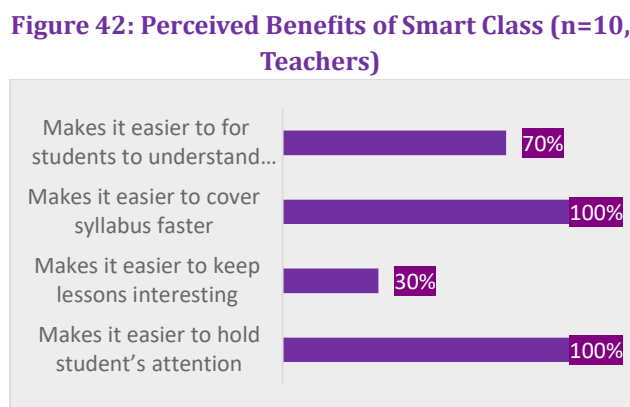
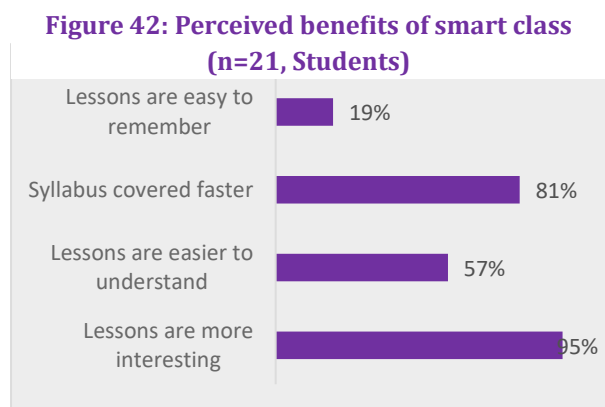


The students have reported that they use all these facilities frequently (every day or most days). 60 percent of the students say that due to having drinking water posts and separate washroom for boys and girls, they can stay in school for a much longer time. This is further corroborated by the responses given by teachers to the perceived benefits of these infrastructural changes (Figure 40).

Figure 40: Perceived Benefits of Infrastructural Changes

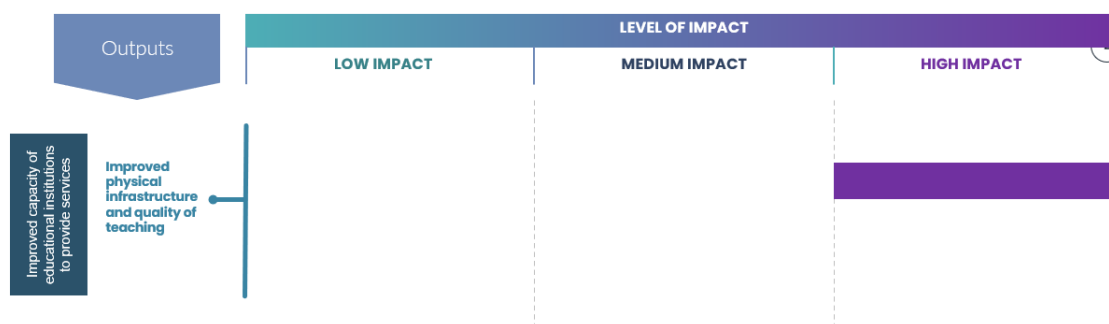


In addition to this, Smart Classes have always been a revolutionary change in any school. Students and teachers have responded very positively to the usage of smart classes, as shown in Figure 42 and Figure 42.



4.4.2 Impact Observation

Figure 43: Overview of Project Effectiveness and Impact of Interventions-PoE



Although the interventions in education were fewer, it had high impact. With time, the scale of intervention could have been increased, thus having a much wider impact on the school students and their learning. The specifics of impact calculation can be seen in Table 11.

In order to reach the greatest number of people possible, NIWCYD and HDFC Bank have worked tirelessly across all sectors in this area. The project, however, was unable to realise its full potential as a result. The project could have gone on for a few more years, which might have had a more beneficial effect.

4.5. Holistic Rural Development Index

There are multiple dimensions involved in achieving the goals of rural development and the resulting blend raises agricultural production, generates new jobs, enhances health, increases communication, and provides better living infrastructure.

HDFC Bank adopted the Holistic Rural Development Index (HRDI) for evaluation of HRDP as it aims to achieve holistic rural development through a multitude of interventions that would lead to overall improvements across related dimensions. Therefore, the project introduced significant variability in interventions across districts. As such, it was not possible to ascribe a single impact indicator that might be able to accurately capture the overall performance of HRDP.

Since there was no baseline data available for this assessment, the Recall Method was used in the household survey to assess the change that beneficiaries experienced before and after project

implementation. For this purpose, the enumerators were trained to ask beneficiaries to recall the value of critical indicators at the start of the project.

The impact indicators with baseline and endline data were selected and were assigned weights based on their relative contribution to the final expected outcome across all theme-wise interventions. While most of the indicators were found to be relevant for the study, a few needed modifications in accordance with the project, the study design and the information collected. The detailed methodology and indicators are explained in detail (see Annexure 0).

Table 7: List of Indicators Used to Calculate HRDI

NRM	Proportion of farmers with net income above median
	Proportion of farmers reporting increased productivity of three main crops above median (before and after)
	Percentage of farmers reporting access to irrigation
H&S	Percentage of households reporting increase in use of fruits/vegetables from the nutrition garden
	Percentage of households reporting increase availability of drinking water facility
	Percentage of households with access to improved toilet facility
Skill	Percentage of SHG members reporting income above median from rural enterprises
	Percentage of households who getting skill training & reporting increase in income from job/enterprise/self employment
	Percentage of HH reporting income above median from livestock
Education	Percentage of respondents reporting increased access to functional school physical infrastructure (drinking water posts, separate washrooms, furniture etc.)
	Percentage of respondents reporting increased access to functional learning infrastructure (library, science labs, smart class, etc.)

Based on our study, the HRDI for the three districts have been calculated.

Table 8: HRDI for P0284

Domain	NRM		ST&LE		H&S		PoE		Total	
	Base line	End line	Base line	End line	Base line	End line	Baseline	Endline	Baseline	Endline
HRDI Score	0.08	0.12	0.01	0.09	0.15	0.21	0.19	0.23	0.44	0.65
%Change	50%		800%		40%		21%		48%	

A remarkable positive change can be seen. The theme-wise indicators were assigned varied weights to arrive at the composite HRDI score of 0.65 indicating a notable positive change toward the desired impact from the baseline score of 0.44. There is a 50 percent positive change in NRM but ST&LE has shown extremely remarkable change of 800 percent, which could be attributed to the low baseline score and the extensive work done. The low baseline score could be because this could perhaps be the first instance of training received by the people in the area. H&S and PoE has shown increase (40% and 21% respectively) over the baseline.

5 Analysis of Assessment Criteria

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

- Relevance and Convergence
- Impact and Effectiveness³
- Sustainability

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

5.1 Relevance and Convergence

Despite being a rapidly developing region, Chhattisgarh required an accelerated pace of development due to persistent challenges, notwithstanding various government schemes and provisions in place. These challenges encompass issues such as poverty, deficient infrastructure, and disparities in education and healthcare access. The project initiated by HDFC Bank and NIWCYD aims to address these issues through a holistic and integrated approach. The project focuses on empowering communities in various sectors, including livelihoods, agriculture and natural resource management, health and sanitation, and education. The selected panchayats in backward blocks of Pendra and Gaurella were chosen based on their socio-economic criteria and proximity to operations. The goal of this integrated development approach is to uplift the communities, bridge the basic development gap in the region, and achieve sustainable growth and improvement in human development indicators.

Several collaborative initiatives have been established in partnership with the Chhattisgarh state government. Mainly, Amarkantak Farmer Producer Organization (FPO), established and registered under the guidance of NIWCYD, benefitted from the state government's provision of a storage space for their produce, offered without any associated costs. This proactive measure by the government contributed to the FPO's operational efficiency. Moreover, recognizing the performance of the FPO, the state dubbed it as a "Model FPO."

More than 90% of the respondents have been satisfied with the agriculture-related interventions. During interactions with farmers, they have also expressed how these interventions could be further improved, such as increasing the power of the motor used for the lift irrigation from 2 HP to 10 HP to counter against the declining water in the river. Women who had received training for income-generating activities, which have been helpful to them, have also suggested ways in which they could expand their business, such as helping them with market linkages, more training, etc.

The ongoing commitment of NIWCYD is evident in its continuous efforts to contribute to community improvement. The organization adopts a collaborative approach by aligning its initiatives with government strategies to maximize impact and effectiveness.

5.2 Sustainability

Positive outcomes in terms of increased output and income have come from the agricultural interventions. More than 80% of the project's beneficiary farmers are currently using the

³ While from an evaluation perspective impact and effectiveness are two different aspects, in the report, these are used interchangeably.

practices and services for farm management. The project's inputs are still being used by the beneficiaries. The farmers are actively using the tools and equipment that have been given to the farmer groups, which are being managed by the members themselves.

Farmers believe that continued adoption of sustainable farming solutions will result in notable improvements in productivity, especially when it comes to organic farming. Fewer farmers have taken up horticulture, which could be due to the long duration that is required for them to begin producing. But adequate support has been provided by the implementing partner, however, more handholding was requested by the farmers. While few solar streetlights have been set up, there have been no mention of training community members to repair when necessary. Several of them have not been working for months now. Seed banks have proven to be one of the most important interventions, which has resulted in several farmers availing the HYV seeds and witnessing the increased production. This has been left under the care of the FPO. This, and the availability of water for irrigation has encouraged them to undertake more than one crop a year.

The trainings provided through the HRDP for SHGs will support them in running the SHG for a long time. More focus on skill development for self-employment could have been undertaken such that they could be more independent. The implementing partners have expressed the need to

Figure 44: Monitor for Smart Class in a school in Pendra



allocate specific budget for training such that training to improve income generating activities can be more focused upon.

NIWCYD recognizes the need for such programmes to be conducted in the region and have continued to work in this region with HDFC and other partners.

6 Conclusion

6.1 Summary of Findings

The report highlights the findings of a project focused on natural resource management, skill training and livelihood enhancement, health and sanitation, and the promotion of education in Gaurella and Pendra.

In NRM, the activities implemented included lift irrigation, construction of shallow borewell, seed bank, creeper farming, greenhouse farming, seed distribution, huller machine, solar streetlights, and solar drinking water supply. On average, the **in Gaurella, the median net income rose from Rs. 26,500 to Rs. 50,000, and in Pendra, it increased from Rs. 45,000 to over Rs. 80,000.** Post-intervention in the Gaurella-Pendra region, **paddy production rose from 3333 to 4756 kilograms on average.** The median **productivity per acre increased by 48 percent** from pre-intervention levels, **surpassing the state average by 34 percent.** The project has encouraged crop diversification, leading to changes in the proportion of farmers growing various crops. The implementation of clean energy interventions, including solar water pumps has helped more than 90 percent of the respondents in accessing clean drinking water.

Health camps were conducted as entry point activities. Sanitation infrastructure, and seeds, and training for kitchen garden were activities conducted under health and sanitation. Health camps achieved a 16 percent participation rate, and **95 percent of the community actively participated in hygiene-related awareness sessions.** The kitchen garden project has empowered the community by providing seeds (99%) and training (62%), contributing to food security and self-sufficiency, **with 90 percent of produce being used for self-consumption.** **More than 95 percent of the respondents report a *reduced expenditure on fruits and vegetables.***

Under Skill Training and Livelihood Enhancement, setting up of FPOs has been a crucial activity. In addition to that, construction of vermi-compost pits and training, training for SHG members, training and providing support in IGA activities such as oil pressing unit, bee keeping, bamboo crafting, rice mill, murra machine, dal mill, and vaccination services for livestock. The adoption of good farm practices for sustainability has resulted in perceived improvements, **with 90 percent of respondents noting increased crop productivity and 61 percent experiencing higher income.** The establishment of Farmer Producer Organizations (FPOs) facilitated by NIWCYD has played a pivotal role in enhancing knowledge exchange and improving infrastructure access, contributing to improved agricultural practices and livelihoods. HDFC's support has been instrumental in the development of SHGs, with **43 percent established or revived** with the help of NIWCYD. The training and support provided to SHG participants have resulted in **improved money management, increased confidence, and enhanced access to loans** with lower interest rates. However, challenges persist in income generation through SHG-led enterprises, emphasizing the need for focused strategies to enhance economic outcomes.

The implementation of smart classes, drinking water posts, science labs, and separate washrooms for boys and girls have shown positive outcomes for students in the project villages. **Smart classes have been well-received, with 95% of students finding lessons more engaging and 57% reporting better understanding.** Additionally, **90 percent** of students claim they have **lesser health issues due to the installation of drinking water posts**, and more children claim that they can spend more time in school.

The HRDI score of 0.65 indicating a notable positive change of 48 percent toward the desired impact from the baseline score of 0.44.

6.2 Recommendations

NIWCYD and HDFC Bank together have worked tirelessly with the community to be able to provide them the necessary facilities to help lead their lives with dignity. However, to bridge the gaps in implementation and address the challenges, some recommendations are discussed below.

Recommendations that can sustain the project initiatives:

- The implementing partner may guarantee that farmers stick to the farming methods that have been taught and assist in conducting follow-up visits with farmers to improve adaptation and sustainability of farming practices. These visits should ideally be facilitated by agriculture experts (ideally from KVK or local agriculture experts from the government).
- In a same vein, to guarantee that farmers in Gaurella and Pendra block receive routine soil testing, the FPO may collaborate with the KVK or other local government agriculture officials at the Block level.

Recommendations that can improve project management efficiencies:

- The low-pressure pump set now in use for lift irrigation is unable to lift and distribute water to larger regions. To replace the water pump with a heavy-duty pump set that can irrigate more land, the implementing partner may apply for support from state-sponsored programmes.
- The implementation partner can put more importance on training and capacity building, both in terms of training frequency and budgetary support for beneficiaries seeking to expand their knowledge.
- As the FPO is in its early stages, its members (BoD and shareholders) require advanced training on production procedures and the usage of machines/tools in order for farmers to stay up with market demands. The implementing partner may help it obtain assistance from the State Rural Livelihood Mission or other state-sponsored programmes.
- Frequent health camps might be arranged in partnership with the National Health Mission (NHM) to assist the community, particularly women who are now going considerable distances for medical care.

Recommendations that can improve the design of the HRDP:

- Extending the project's duration from three to five years can aid in better programme implementation and maintenance.

Annexures

A Sampling Methodology

The quantitative household survey was administered for four thematic areas in each 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% (1.96 for two tailed test);

S_e = margin of error, set at 5%;

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

Thus, the estimated maximum sample size is 400.

A.2 Quantitative Sampling Methodology

Quantitative Sampling Methodology

10 project villages with the highest number of beneficiaries were selected for the study. The stages of sampling are explained as follows:

Stage 1 – Selection of beneficiaries:

The list of beneficiaries in the major components from all villages acted as the sampling frame for the project. This list was obtained from the implementing partner – NIWCYD. 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. 5 villages with the lowest sample size were merged with other villages to make a total of 9 villages to be covered under the survey.

Stage 3- Sampling for activities:

The total sample of 400 was then distributed amongst various themes depending on the significance of activities done.

A.3 Qualitative Sample Size Calculation

Qualitative tools of In-depth Interview (IDI) and Focus group discussions (FGD) 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 at the start of the program.

HRDI Methodology

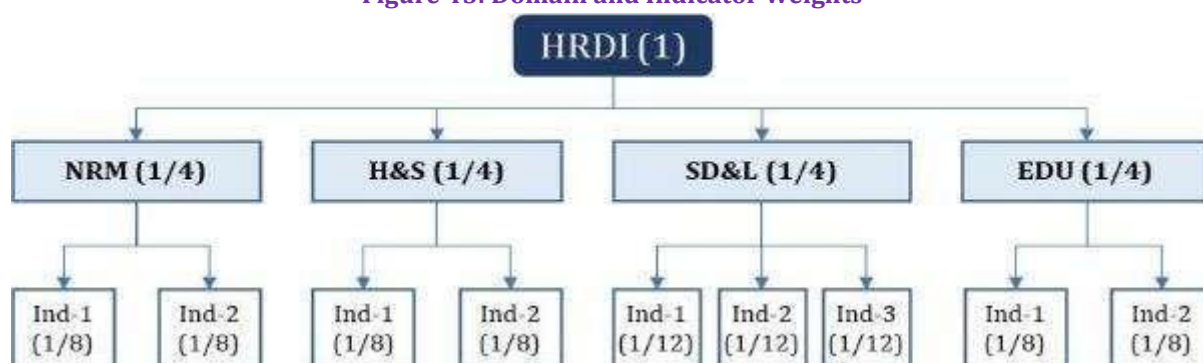
The outcome indicators included in the HRDI were obtained from different domains and are consequently measured on different scales. Therefore, to ensure the comparability of these indicators, all the indicators were converted into discrete variables such that the indicators could be measured between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

A.4 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 45: Domain and Indicator Weights



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

Table 9: Example of HRDI Calculation

Thematic Area	Indicators	Formula
NRM	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	$(1/4) \times (1/3) = 0.083$
ST&LE	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	$(1/4) \times (1/2) = 0.125$
H&S	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	$(1/4) \times (1/2) = 0.125$
PoE	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.)	$(1/4) \times (1/2) = 0.125$
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Once all the indicators were standardized and weighted, a sum of these weighted indicators was utilized to calculate the value of HRDI.

A.5 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.

A.6 Method to Calculate HRDI

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

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

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

Step 4: Calculated the same at the 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 two blocks of Chhattisgarh has been detailed below (see Table 10).

Table 10: HRDI Calculation for Chhattisgarh

Domain	Indicators	Baseline score	Baseline HRDI	End line score	Baseline HRDI	% Change
NRM	Proportion of farmers with net income above median	0.17	0.08	0.26	0.12	50
	Proportion of farmers reporting increased productivity of three main crops above median (before and after)	0.06		0.10		
	Percentage of farmers reporting access to irrigation	0.11		0.13		
H&S	Percentage of households reporting increase in use of	0.16	0.15	0.24	0.21	40

Domain	Indicators	Baseline score	Baseline HRDI	End line score	Baseline HRDI	% Change
	fruits/vegetables from the nutrition garden					
	Percentage of households reporting increase availability of drinking water facility	0.18		0.30		
	Percentage of households with access to improved toilet facility	0.28		0.30		
ST&LE	Percentage of SHG members reporting income above median from rural enterprises	0.01	0.02	0.14	0.09	350
	Percentage of households who getting skill training & reporting increase in income from job/enterprise/self employment	0.03		0.20		
	Percentage of HH reporting income above median from livestock	0.00		0.01		
PoE	Percentage of respondents reporting increased access to functional school physical infrastructure (drinking water posts, separate washrooms, furniture etc.)	0.45	0.19	0.47	0.23	21
	Percentage of respondents reporting increased access to functional learning infrastructure (library, science labs, smart class, etc.)	0.32		0.43		
Total			0.44		0.65	48

B Overview of Impact Calculation

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

Table 11: Impact calculation

Outputs	Output Indicators		Output Avg.	Impact Level
NA. Increased income from agriculture				
N. A1Land/ crop productivity	NA1. (a) Proportion of farmers reporting an increase in production of crops that were supported under HRDP	99%	77%	High
	NA1. (b) Proportion of farmers reporting increased input efficiency after the intervention	56%		
	NA1. (c) Proportion of farmers reporting increased income from crops that were supported under HRDP.	99%		
	N.A1.i(d) Average increase in income from crops that were supported under HRDP (% change)	83%		
	N.A1.I (e) Average increase in productivity from crops that were supported under HRDP (% change)	48%		
	N.A1.i(f) Average decrease in input cost (% change)	NA		
N.A2. Access to the farm management infrastructure	N.A2(a) Proportion of beneficiaries satisfied with the quality of available services (in farm management)	67%	77%	High
	NA2. (b) Proportion of farmers reporting project interventions in seeds, tools, and irrigation leading to an increase in production	94%		
	NA2. (c) Proportion of farmers reporting project interventions leading to increase in income (average of top 4-5 crops)	90%		
	NA2. (e) Proportion of farmers currently practicing organic farming/conservation agriculture/other sustainable practices	38%		
	N.A2.(f) The proportion of farmers reporting an increase in the use of natural fertilizers?	86%		
NA.3 Increased adoption of crop diversification	NA3. (a) Proportion of farmers diversifying their crops with project support.	44.00 %	50%	Medium
	NA3. (b) Proportion of farmers who report income increase due to crop diversification (base = farmers who adopted crop diversification)	56%		

NA.5 Land under irrigation	NA (4). (b). The proportion of farmers who received support for irrigation	10%	10%	Low
NC. Increased use of clean energy solutions				
NC1.Adoption of clean energy infrastructure	NC1 (a) Proportion of HHs using clean energy infrastructure (Base=all)	57%	71%	High
	NC1. (b)Proportion of households reporting benefits from using clean energy infrastructure (Base=clean energy beneficiaries)	85%		
SA. Improved access to agricultural training and services				
S.A.1 Access to Agriculture training and services	SA.i(a) Proportion of farmers who reported project training services are useful	77%	62%	Medium
	SA.i(b) Proportion of farmers who demonstrate awareness regarding sustainable farming practices	47%		
S.A.2.Adoption of improved farming practices	SA.ii(a) Proportion of farmers who adopt scientific agricultural practices	31%	61%	Medium
	SA.ii(b) Proportion of beneficiaries reporting an increase in productivity due to better farm management	90%		
	SA.iii(c) Proportion of farmers reporting increased income	61%		
SB. Economic empowerment through collectivization (Only for SHG members)				
SB.1 Formation/ revival of SHG-based Enterprises	SB.i(a) Proportion of members who received support with establishing/reviving SHGs	43%	55%	Medium
	SB.i(b) Proportion of members who received support with establishing/reviving SHG enterprises	25%		
	SB.i(b) Proportion of members whose SHGs are currently functioning	96%		
SB.2 Development of entrepreneurship	SB.ii(a) Proportion of SHG members who received training	51%	50%	Medium
	SB.ii(b) Proportion of SHG members undertaking entrepreneurial activities	12%		
	SB.ii(d)Proportion of SHGs with increased savings	68%		
	SB.ii(e) Proportion of SHG members reporting improved income	69%		
SC. Enhanced capacity for regular income generation				
SC.1 Enhanced employable skill development	SC.1(a) Percentage of youth who accessed skill development training	NA	NA	Medium
	SC.1(b) Percentage of youth who report improved income through skill development	NA		

SC.2 Access to self-employment and entrepreneurial opportunities	SC.2(a) Proportion of beneficiaries who established/ expanded entrepreneurial activities	15%	36%	Low
	SC.2(b) Proportion of beneficiaries reporting improved capacity to undertake entrepreneurial activities	32%		
	SC.2(c) Proportion of beneficiary HHs reporting an increase in income	61%		
SD. Improved capacity to generate income through livestock management				
SD.1 Adoption of scientific management of livestock	SD.I (a) Proportion of beneficiaries who received support in livestock management services	6%	35%	Low
	SD.i(b) Proportion of beneficiaries reporting an increase in income from livestock management	44%		
	SD.i(c) Proportion of beneficiaries reporting improved livestock health	89%		
	SD.i(d) Proportionate increase in average income from livestock	0%		
HA. Improved health infrastructure and services				
HA.1 Establishment/ enhancement of health infrastructure and services	HA.i(a) Proportion of beneficiaries who gained access to health services	20%	27%	Low
	HA. i(b) Proportion of beneficiaries reporting lifestyle changes due to improved access	62%		
	HA.i(c) Proportion of beneficiaries who consulted medical references from camps	0%		
H.B. Improved sanitation infrastructure and services				
HB.1 Establishment/ enhancement of sanitation infrastructure.	HB.i(b) Increase in no of HHs with access to sanitation infrastructure/ facilities	90%	81%	High
	HB.i(c) Proportion of beneficiaries reporting benefits due to improved access	72%		
H.C. Development of Kitchen gardens				
HC.1 Increased adoption of kitchen gardens	HC.i(a) Proportion of HHs reporting income gains from kitchen gardens	23%	66%	Medium
	HC. i (b) No of HHs received seeds/training in the kitchen garden	81%		
	HC.i(c) No of HHs with improved vegetable/fruit consumption due to kitchen gardens	94%		
HD Improved awareness and health-seeking behaviour				
HD.1 Awareness regarding health and sanitation practices	HD.i (a) Improved dietary practices/ reduced tobacco consumption/ improved physical exercise	62%	62%	Medium

HD.2 Adoption of positive health and sanitation practices	HD.ii(b) Increase in no. of HHs adopting proper solid waste management practices	20%	33%	Low
	HD.ii(c) Increase in no of HHs adopting proper liquid waste management practices	46%		
HE. Improved availability and management of water				
HE.1. Access to drinking water at household and community levels improved	HE.1. (b)The proportion of households reporting improved well-being due to the availability of clean drinking water.	92%	92%	High
Outcome EA. Improved capacity of educational institutions to provide services				
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	57%	90%	High
EA.2 Improvements in quality of teaching	EA.ii(a) Proportion of teachers regularly utilizing smart classrooms/libraries/smart class	90%		
Outcome EB. Improved learning outcomes				
EB.1 Improved exam performance and subject confidence among students	EB.i(a) Proportion of students who gained access to coaching classes	NA	NA	
	EB.i(b) Proportion of students who report improvements in access to reference material	NA		
	EB.i(c) Proportion of students reporting an increase in confidence in various subjects (lessons are easy to understand, more interesting, etc.)	NA		
	EB.i(d) Proportion of students who received scholarships	NA		
	EB.i(e) Proportion of teachers reporting improvements in learning outcomes due to infrastructural facilities at institutions (concept retention, attention span, and exam performance)	NA		

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

C 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 ($n_1p_1n_2*p_2 > 10$) (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 ($n_1p_1n_2*p_2 > 10$).

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 12: Z-test Conducted for P0284

Indicator	Proportion of farmers with income from agriculture above baseline median
p1 (proportion of first sample-endline)	70
n1 (sample size of p1)	356
p2 (proportion of second sample-baseline)	44
n2 (sample size of p2)	356
p	0.1601
Calculation	0.02749
z statistic	9.4593
	Statistically significant at 95% confidence level (or $p < 0.05$)
P-value for the z statistic (calculated here: https://www.socscistatistics.com/pvalues/normaldistribution.aspx)	0.00001

D Sustainability Theme-wise Matrix

The project support provided demonstrated the capability to continue even after the program ended. The project's support to sustain improved outcomes are demonstrated below:

Support provided	Structures established	Technical Know-how	Usage	Maintenance
NRM				
Water Management- Irrigation	✓		✓	✓
Farm Management	✓	✓	✓	✓
Clean Energy	✓	X	✓	✓
Skill Training and Livelihood Enhancement				
Agriculture Training and Support	✓	✓	✓	✓
Livestock Management				
SHG Development	✓	✓	✓	✓
Skill Development		✓		
Health and Sanitation				
Health Camps/clinics			✓	
Kitchen Garden	✓	✓	✓	✓
Promotion of Education				
Educational Institution Development		✓	✓	✓