# Impact Assessment Study under Holistic Rural Development Programme (HRDP) Dholpur, Rajasthan – P0287



Prepared For:



### HDFC Bank Corporate Social Responsibility (CSR)

Prepared By:



Intellecap Advisory Services Pvt Ltd.

# **Table of Contents**

Table	of Contents
List o	f Figures
List o	f Tables
List o	f Images
List o	f Acronyms
Execu	itive Summary
1 I	ntroduction
1.1	About HRDP9
1.2	Objectives of Impact Assessment9
1.3	Conceptual Framework Adopted10
1.4	About the Project Area
1.5	Implementing Partner in the District11
2 I	Research Design and Methodology13
2.1	Criteria for Assessment
2.2	Primary and Secondary Data Sources13
2.3	Sample Size and Distribution14
2.4	Training of Enumerators14
3 I	Programme Planning and Implementation16
3.1	Selection of Project Area16
3.2	Selection of Thematic Areas and Interventions
3.3	Project Implementation
3.4	Project Implementation
3.5	Monitoring and Evaluation
4 9	Study Findings
4.1	Demographic Profile
4.2	Natural Resource Management
4.3	Skill Training and Livelihood Enhancement27
4.4	Health and Sanitation
4.5	Promotion of Education
4.6	Holistic Rural Development Index
5 A	Analysis of Assessment Criteria39
5.1	Relevance and Convergence

5	5.2	Sustainability	40
6	Rec	commendations	41
Anr	iexu	re	44
A	1	Sampling Methodology	44
В	3	HRDI Methodology	45
C	2	Overview of Impact Calculation	48
D	)	Two SampleProportionsZ Test	52
E	2	Theme-wise Sustainability Matrix	53

# List of Figures

Figure 1: Conceptual Framework	
Figure 2: Planning and Implementation Process	16
Figure 3: Type of Houses	
Figure 4: Source of Drinking Water	21
Figure 5: Medium of Cooking Fuel	21
Figure 7: Income from Agriculture (Pre & Post Project) (n- 130)	24
Figure 8 : Interventions that helped increase agricultural income (n-91)	25
Figure 9: Overview of Project Effectiveness and Impact of Interventions	25
Figure 10: Activities undertaken (n-36)	
Figure 11: Perceived benefits from intervention (n-36)	
Figure 12 : Activities undertaken by Goat Resource Centre (n-36)	
Figure 13: Percieved benefits from Goat Resource Centre (n-36)	
Figure 14. Activities undertaken by SHGs (n-195)	
Figure 15: Perceived Benefits from Intervention (n-221)	
Figure 16: Overview of Project Effectiveness and Impact of Interventions (ST&LE)	
Figure 17: Type of activity participation (N-135)	
Figure 18: Perceived benefits from health activities (N-134)	
Figure 19 : Type of project support recieved (n-126)	
Figure 20: Perceived benefits from the intervention (n-126)	
Figure 21: Overview of Project Effectiveness and Impact of Interventions (H&S)	
Figure 22: Areas which have seen improvements	
Figure 23: Changes observed in students post project intervention	
Figure 24: Overview of Project Effectiveness and Impact of Interventions	
Figure 25: Domain and Indicator Weights	45

# **List of Tables**

Table 1: Summary of Key Income Indicators	7
Table 2: Summary of HRDI Indicators	7
Table3: Quantitative Sample Covered	. 14
Table 4: Activities under Four Thematic Areas in Dholpur	. 17
Table5: Distribution of sample (All figures in percentages)	. 20
Table 6: Quantum of Activities under the Thematic Areas	. 21
Table 7: HRDI calculation for Dholpur, Rajasthan	. 38

Table 8: Example of HRDI Calculation	45
Table 9: HRDI Calculation for P0287	47
Table 10: Overview of Impact Calculation	48
Table 11: Z-test Conducted for P0287	52
Table 12: Sustainability Matrix	53

# List of Images

# List of Acronyms

APL	Above Poverty Line
BPL	Below Poverty Line
BaLA	Building as Learning Aid
CSR	Corporate Social Responsibility
FGD	Focus group discussions
FPO	Farmer Producer Organisation
GRC	Goat Resource Centre
НН	Household
HRDI	Holistic Rural Development Index
HRDP	Holistic Rural Development Programme
IDI	In-depth Interview
KII	Key Informant Interview
NRM	Natural Resource Management
SHG	Self-Help Groups
SMC	School Management Committees
ST&LE	Skill Training & Livelihood Enhancement
РоЕ	Promotion of Education

## **Executive Summary**

This study evaluates the impact of the Holistic Rural Development Programme (HRDP) implemented by the Manjari Foundation with HDFC Bank CSR support in Sarmathura block, Dholpur district, Rajasthan (April 2019-March 2023). It examines the implementation process, key milestones achieved, program impact, and challenges faced by Manjari Foundation and HDFC Bank.

The key focus areas of the intervention were Natural Resource Management (NRM), Skill Training & Livelihood Enhancement (ST&LE), Health and Sanitation (H&S), and Promotion of Education (PoE). The framework used for the impact assessment was an adaptive version of the DAC criteria (Relevance, Effectiveness, and Sustainability). This adaptation likely considered the specific context of the intervention to ensure a more relevant and accurate assessment.

The project employed a mixed-methods evaluation approach, utilising both quantitative and qualitative data collection methods. This participatory approach involved all key stakeholders. A household survey (396 households) and a separate survey for teachers and students (28 participants) were conducted using purposive random sampling. Additionally, qualitative data was gathered through focus group discussions (3), in-depth interviews (7), and key informant interviews (1).

#### **Natural Resource Management**

The project area experiences unreliable rainfall patterns, with uneven distribution creating significant challenges for farmers. This variability affects both summer (Kharif) and winter (Rabi) crops. Climate change intensifies these problems, leading to moisture stress for crops even during periods of seemingly adequate rainfall. The unpredictable pattern of heavy downpours followed by long dry spells significantly reduces crop yields. This disproportionately impacts the livelihoods of marginalised and resource-poor farmers, who rely heavily on agriculture for both income and food security.

The NRM component directly addresses these challenges by aiming to boost farmer income through increased crop productivity, diversification, and improved access to land treatment and irrigation systems. Efforts to promote sustainable practices like water management and irrigation upgrades which will enhance soil fertility, optimize resource use, and ultimately increase crop yields were made. This multi-pronged approach aims to create a more resilient agricultural system that can withstand the unpredictable conditions of climate change and ensure long-term food security for the region. **Mean net income from agriculture increased by 33.6%, reaching INR 19,001, while median net income doubled from INR 5000 to INR 10,000 after completion of the project.** 83.5% of the beneficiaries felt that the trainings with respect to organic farming, particularly preparation of Shivansh organic manure, have significantly helped in increasing their farm income.

Under the project 34 water management structures (10-sunken pit, 2 community ponds, 3 anicuts and 1 sunken pit) were developed. Horticultural plants of 3 species were provided to 20 households. Two solar water pumps were also supported with for augmenting irrigation infrastructure.

#### **Skill Training and Livelihood Enhancement**

Efforts under ST &LE initiative were aimed at building up the capacities of households to strengthen their livelihood base Under the farm-based interventions, trainings on PoP for crops like Arhar were given to **75 farmers**. Farmers were also trained and also encouraged to gradually

transition towards organic farming by explaining its benefits and the problems with chemical fertilizers. Exposure visits to successful organic farms were organised. As a result, a significant number of farmers (750 nos) started using organic solutions for their crops. nearly **31% of these farmers indicated an increased use of these organic fertilizers compared to chemical fertilizers.** 

The program also focused on helping communities raise goats as an additional source of income to supplement the income from agriculture and wage labour. Experienced goat farmers were identified, and they shared their knowledge with others through structured classes. This training covered everything from breeding goats to keeping them healthy at all ages. Nearly 1200 farmers were part of the training. A Goat Resource Centre (GRC) was also set up at Sarmathura to act as a hub for inputs, trainings, marketing, innovations, goat milk processing, product diversification and knowledge hub for the whole region, catering to the needs of goat farmers. Gram Haat, a mobile application was also developed as part of the **Goat Resource Centre (GRC) have positively impacted 92.7% of goat farmers, with their average monthly income rising from INR 1644 to INR 5533.** 

Finally, the program helped nine women-led small businesses by working with existing women's groups who were supported with capital to start their own businesses, like shops or raising goats.

#### **Health & Sanitation**

Accessing healthcare in this region is a daunting task. The rugged terrain, remote villages, and harsh weather create significant barriers. The lack of doctors, particularly specialists, forces residents to travel far for even basic care. This limited access is reflected in the basic health indicators of the area.

To improve the situation with respect to this, health camps (4) were organised in villages, offering free consultations and medicines as well as a referral facility and they were accessed by nearly 700 people. Additional support was provided during COVID-19 to safeguard residents' health. Livestock health camps (12) were also conducted to address animal illnesses and educate herders on prevention, ultimately improving the health and productivity of these vital assets for the community's livelihood.

#### **Promotion of Education**

Like most underdeveloped regions, access to education remains a challenge in the project area due to a lack of qualified teachers, and students lack access to good classrooms, clean drinking water, proper toilets, and other infrastructural facilities. This especially discourages girls from attending school, limiting their education. Children from poor families often have to help with chores and farm work, leaving them with little time for school.

The intervention under this aimed to improve select government schools in the project area. Three model schools with improved amenities like smart boards, clean water, toilets, and playgrounds were supported. 124 students benefited from the 3 learning labs. These improvements aim to make learning more engaging and help students succeed. By empowering

students, especially girls, to get a good education, the project hopes to create a brighter future for the entire community.

The following table outlines the achievements of key income indicators across the baseline and endline of the project. Table 1. Summary of Voy Income Indicators

Table 1: Summary of Key Income indicators								
Income Indicators (based on mean)	Before	After	% Change					
Avg. Net Income from Agriculture (INR)	14214	19001	33.67					
Avg. Productivity of bajra (kgs/Acre)	1040	1228	18.07					
Avg. Productivity of wheat (kgs/Acre)	2397	2809	17.18					
Avg. Productivity of mustard (kgs/Acre)	1004	1146	14.14					

### **HRDI Indicators**

Table 2: Summary of HRDI Indicators										
Domain	Domain NRM		ST&LE		H&S		ΡοΕ		Total	
HRDI Score	Base line	End line	Base line	End line	Base line	End line	Base line	End line	Base line	End line
	0.09	0.12	0.08	0.15	0.01	0.01	0.07	0.10	0.25	0.38
% Change	33	3.3%	87.	5%	(	)	42.8	8%	52	%

The table indicates a 52% increase in the composite HRDI score compared to the baseline scenario. This surge can be attributed to planned interventions in the sample villages, particularly in the ST&LE, PoE and NRM sectors. There has been no significant change in H&S due to the limited interventions undertaken in this sector.

## Recommendations

- Need to be part of advocacy efforts with other like-minded organisations to ensure that the traditional usage rights of communities with respect to pasturelands and other commons are not affected.
- Given the remote location of these villages and the absence of a reliable electricity grid, • installing solar street lamps on the main streets would be a practical solution.
- Though no work has been undertaken under toilets, there is a need for these kinds of • activities and a focus on dry toilets.
- The region urgently needs soil and water conservation efforts, water harvesting systems, and improved crop management practices. To address these challenges effectively, a comprehensive watershed treatment plan is crucial.
- Within the context of the project area, where significant efforts have already been made • with earthen bunds and anicuts, prioritizing ravine stabilization remains crucial with respect to ravines.
- While goat rearing has been a lifeline for many facing financial hardship and environmental challenges, it can also become a threat to the environment itself if proper grazing management isn't implemented at the community level.
- The Pani Panchayat initiative needs efforts to develop principles and protocols for water management with active community participation.

- The engagement under MGNREGA needs to be strengthened, and there is a very pressing need to build up awareness of people with respect to its provisions for effective implementation.
- An effort should be made to capture the situation at the ground on certain key parameters of the proposed project intervention through a baseline survey.
- The SHG related component programmes targeting holistic development should also be conceptualised and integrated into the HRDP programme from the beginning especially because has a very innovative model related to SHG and its federation.
- Need for a concerted focus on aspects of climate change, considering rural livelihoods are going to be affected by it in coming years.
- The HRDP project duration of three to four years is too short to make a substantial impact on various themes, including NRM, livelihoods, health, and education and the duration could be increased.
- The clean energy component under the HRDP could promote smokeless chulhas to reduce the drudgery of women as well as to improve the ambient air quality in the cooking area.

# **1** Introduction

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

## **1.1 About HRDP**

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

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

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

## 1.2 Objectives of Impact Assessment

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

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

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

The study seeks to:

• Critically and objectively evaluate implementation and performance

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

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

# 1.3 Conceptual Framework Adopted

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



#### **Figure 1: Conceptual Framework**

# **1.4** About the Project Area<sup>1</sup>

Dholpur, carved out of Bharatpur district in April 1982, is bordered by Bharatpur district and Uttar Pradesh to the north, Madhya Pradesh to the south and east, and Karauli district of Rajasthan to the west. A notable feature of the area is the large number of ravines caused by the erosion of the alluvial soil. The steep slopes and fast drainage contribute to this characteristic. Dholpur stone, famous throughout India, has been used in the construction of many forts and palaces, not only in Rajasthan but also in various parts of the country. The district experiences a

<sup>&</sup>lt;sup>1</sup>Source: District Census Handbook, 2011

dry climate with extreme temperatures in both summer and winter. The average annual rainfall is 744.5 mm.



Image 1. District Map of Dholpur.

Rabi and kharif are the two main cropping seasons, with wheat, mustard, gram, bajra, barley, guar, and potato are the major crops grown here. Animal husbandry is also well-developed in Dholpur.

Despite a lower sex ratio (846) compared to the state average (928), Dholpur boasts a literacy rate (69.1%) exceeding the state average (66.1%). It ranks 9th among other districts in terms of literacy. However, a gender gap of 26.5% persists. Scheduled Castes and Scheduled Tribes comprise 20.4% and 4.9% of the population, respectively.

Agriculture remains the primary driver of the economy, employing 58.1% of the workforce as cultivators or agricultural labourers which is lower than the state average of 62.1%. The district's work participation rate (WPR) stands at 43.4%, with a gender gap of 18.6 percentage points.

Dholpur, in north-eastern Rajasthan, lags behind in development. Its low Human Development Index (0.49) ranks it among the state's least developed districts.<sup>2</sup>

## **1.5** Implementing Partner in the District<sup>3</sup>

Manjari Foundation works in 900+ villages across 23 districts in Rajasthan, Madhya Pradesh, Uttar Pradesh and Uttarakhand. The thematic areas in which the organisation intervenes include women institutions, livelihood (farm and non-farm based) including natural resource management, microenterprises development, health, digital literacy, renewable energy, gender and nutrition. Manjari Foundation has been working<sup>4</sup> in Rajasthan since its inception. The

<sup>&</sup>lt;sup>3</sup><u>https://www.manjarifoundation.in/</u>

<sup>&</sup>lt;sup>4</sup> The institution platform is a three-tier structure starting with SHGs at the grassroots level, that merge into Village Organisations and eventually come together to form Federations at the block level.

organisation has been working<sup>5</sup> in 475+ villages in Dholpur district, mobilising nearly 48700 women in to 4000 SHGs. These SHGs were further federated into 384 Village Organisations, 12 Cluster Level Federations, three Block Level Federations and one woman Farmers Producer Company in the district.



Image 2 : Field Relic: Open Well in Gopalpura village

# 2 Research Design and Methodology

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

# 2.1 Criteria for Assessment

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

- Relevance and Convergence
- Impact and Effectiveness
- Sustainability

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

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

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

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

# 2.2 Primary and Secondary Data Sources

Primary research included a quantitative household survey that was conducted by the survey team consisting of 5 enumerators and 1 supervisor. The primary quantitative data was collected using the Computer Assisted Personal Interview (CAPI) method where we developed a mobile application to collect data. The qualitative research included in-depth interviews (IDIs), Key Informant Interviews (KIIs) and Focused Group Discussions (FGDs) with project beneficiaries and secondary stakeholders such as the team members of Manjari Foundation, the HDFC Bank programme team, local leaders from the project area etc. IDIs were conducted with the specific

individuals who were recipients of the project. The qualitative exercise(s) were conducted by our research coordinator.

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

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) and based on this the questionnaire was developed.

# 2.3 Sample Size and Distribution

Four hundred beneficiaries were targeted for a survey across eight villages in Dholpur, where the project was implemented. Purposive random sampling was employed to select beneficiaries from lists provided by Manjari Foundation. This method ensured inclusion from all four thematic areas of the project. Since selection happened independently for each theme, it's possible that a single household had more than one beneficiary, or a beneficiary received support across multiple themes. The final sample size exceeded the target, reaching 424 respondents, including 28 teachers and students. A breakdown of the sample by thematic area is provided below.

Villago	Theme						
vinage	Total	NRM	ST& LE	РоЕ	H&S		
Narayanpura	47	19	44	0	04		
Khinnot	53	17	48	13	46		
Sarmathura	46	25	29	9	38		
Gironiya	41	12	37	0	0		
Bhampura	51	28	46	0	02		
Shankarpur	51	14	51	0	0		
Gopalpura	57	26	47	18	19		
Madanpur	50	14	39	11	42		
Total	396	155	341	51	151		

Table3: Quantitative Sample Covered

Qualitative methods like FGDs (3), KII (2) and IDIs (7) were also used to collect data from the very same villages covering various themes of the project intervention.

# 2.4 Training of Enumerators

To equip a survey team of five enumerators and one supervisor for successful data collection, a two-day training program was conducted by the field and research coordinators. The program offered a comprehensive orientation on the data collection tool, data collection protocols, and maintaining data quality. It combined classroom instruction with hands-on mock practice using

the survey tool. To contextualize the data collection process, a representative from the Manjari Foundation, the project's implementing partner, provided an overview of the project interventions and introduced the target villages and communities.



# **3** Programme Planning and Implementation

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



**Figure 2: Planning and Implementation Process** 

# 3.1 Selection of Project Area

The project was implemented in Dholpur district, Rajasthan, specifically focusing on villages within the operational area of Manjari Foundation, the implementing agency. Ten villages were selected from the Sarmathura block, encompassing a total population of over 3500 households. These villages face several challenges, including:

- Recurring droughts, coupled with a reduction in the number of rainy days, uncertain rainfall patterns, and its uneven distribution, are significantly affecting the availability of surface and groundwater resources for agriculture and drinking water (potable purposes). The households are facing a severe water shortage, impacting not only their agricultural activities but also their livestock, drinking water needs, and domestic use.
- Despite wage earning being the primary occupation, the combination of smaller land holdings, low soil quality, and resulting low agricultural productivity has driven the growth of the livestock-based economy.
- Stagnant agricultural productivity and a lack of alternative local employment opportunities are forcing a shift from agriculture as the primary source of income. As a result, seasonal migration has become essential for many to secure their livelihoods.
- The lack of essential resources like toilets and drinking water facilities in government schools significantly hinders students' learning experience. In addition, there are an inadequate number of teachers, further compounding the challenges faced by students.
- Government health centres suffer from severe staff shortages, leaving residents with no choice but to seek care from expensive private providers. Water-borne diseases like acute diarrhoea are responsible for higher morbidity and mortality among all age- groups in the population, especially during rainy season.
- Scattered amidst ravines, these remote villages grapple with a lack of essential infrastructure, including all-weather roads and electricity.

# 3.2 Selection of Thematic Areas and Interventions

The activities specific to each village under the project were decided after in-depth consultation with the respective stakeholders. Majority of the villages had been part of Manjari Foundation's intervention in the area earlier. Activities under each of the four thematic areas are as follows.

# 3.3 Project Implementation

Activity Category	Activities	Output Indicators					
NRM							
Water Management	Earthen Embankments, Anicuts, Sunken Pits						
Irrigation Management	Solar Water Pumps	Income from Agriculture					
Farm Management	Plants for intensive farming (Horticulture)						
	ST&LE						
Agriculture Training and Support	PoP Training, Natural/Organic Farming	Access to Agriculture Training and Services					
SHG-Based Women Empowerment	Training on income generating activities	Skill & Entropropourship					
Skill Training	External resource support/IEC material, Training/Awareness program for Panchayat Members, Exposure visit	Development					
Livestock Management	Animal Health Camps/Vaccinations, training on improved goat rearing practices, external resource support/IEC material. Goat Resource Centre	Livestock Management					
	H&S						
Health	Health Camps, Hygiene related awareness sessions	Health Infrastructure and Services					
Kitchen Garden	Seeds, training, demonstrations						
	РоЕ						
Educational Institutions Development	Wall projector, sports kit, toilet repair, BaLA, Smart Classroom	Infrastructure in Educational Institutions					

#### Table 4: Activities under Four Thematic Areas in Dholpur

#### **3.4 Project Implementation**

Based on the needs of the area the project was designed with the below mentioned objectives:

• Empowering 2,000 Goat & Cattle Farmers through Micro-Enterprise Development facilitated by FPO.

This project was to establish a facility to produce high-quality feed specifically for goats and bucks in rural areas. The initiative encompasses building the brand and marketing the feed in major cities and key farming regions. To guarantee quality and customer engagement, lab testing, packaging, and dedicated events were planned. Furthermore, women entrepreneurs were to be empowered through sales training, while a fodder bank ensured year-round availability of raw materials. Finally, on-going support from technical personnel and management experts was to ensure smooth operation and empower farmers.

- Goat Resource Centre for supporting 500 goat farmers
   Improvement in the livelihoods of the households by developing a Goat Resource Centre
   (GRC) to empower 500 local goat rearers with a one-stop support system. The centre with
   arrangements for feed and fodder, advanced equipment, medicine, and disease
   management was to help build up their capacities. Exposure visits and village farm
   schools were to promote knowledge sharing. Technical experts were to facilitate farmer
   support, and monthly "Goat Haat" events, and trader meetings to establish market
   linkages.
- Agricultural production Intensive farming interventions through FPO for supporting 1000 farmers

This project planned to introduce intensive farming practices for vegetables and fruits through a cluster-based, agribusiness model. Farmers were to receive support in implementing balanced fertiliser applications and advanced agronomy techniques with precise tools. The project was to cover the cost of establishing a cold storage chamber to hold produce for marketable lots and buffer against price fluctuations. Additionally, a sorting, grading, and packaging unit was proposed to be built to ensure high-quality produce reaches the market. To further enhance transportation, cryogenic vegetable distribution boxes were to be provided to maintain optimal temperatures for delivery to distant locations. Finally, the project would invest in software and apps to facilitate market-driven production, build brand value through online channels, enable direct-to-home delivery, facilitate B2B transactions, and establish farmer data collection for traceability purposes.

- Improvement with respect to the education aspect by working on the infrastructural aspects as well as building up the capacities of the SMCs.
- Improvement in the health situation of the villages by building up awareness on WASH, menstrual hygiene, etc.

This project aimed to improve the lives of residents in villages' part of Sarmathura block by addressing challenges in NRM, ST&LE, H&S, and PoE themes.

The project was implemented by a dedicated team with the support of community-level functionaries who played a crucial role in mobilizing communities and ensuring their active participation in project activities.

# 3.5 Monitoring and Evaluation

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

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

In addition, HDFC Bank hired Intellecap as an external agency to conduct an impact assessment of the project after one year of project completion. This was an independent assessment that was evaluated using four criteria: relevance and convergence, impact and effectiveness, sustainability, and replicability. This is backed by the creation of a Holistic Rural Development Index (Annexure B) based on selected outcome indicators. The impact (Annexure C) 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 chapter gives a brief overview of the sample households as well as a detailed overview into the findings from the four thematic areas.

### 4.1 Demographic Profile

This section offers a glimpse into the demographics of households surveyed across eight villages in Dholpur district's Sarmathura Block. Agriculture, wage labor, and livestock rearing form the primary sources of income for these households. Reflecting the district's overall situation, illiteracy is a significant concern, with nearly a third of the respondents (35.6%) lacking literacy skills. When it comes to caste, Scheduled Castes (SCs) and Scheduled Tribes (STs) comprise a substantial portion (50%) of the total households. The remaining half is mainly composed of households belonging to the general category. Lastly, it's important to note that nearly 70% of the households belong to the Above Poverty Line (APL) category within the public distribution system, indicating their ineligibility for subsidised food grains.

Age of the respondent		Social Category		Status of Education		Sources of Income		
18-25 yrs.	7.5	Scheduled Caste (SC)	12.5	Illiterate	46.3	Agriculture	88.0	
26-35 yrs.	25.8	Scheduled Tribe (ST)	37.5	Literate but no formal education	19.3	Wage labour	71.8	
36-45 yrs.	22.8	General	41.8	Up to 5th std	12.5	Pension Old Age	24.5	
46-55 yrs.	23.5	Other Backward Classes (OBC)	8.3			Salary	3.0	
Above 55 years	20.5	Ration Card		6th to 8th std	12.0	Livestock	59.0	
		Antyodaya	5.8	9th to 10th std	5.3	Non-agricultural income & Salary	1.0	
		BPL	24.3	11th to 12th std	2.8	Gender of the respondent		
		APL	69.8	Graduate	1.3	Male	15.8	
		Do not have ration card	0.3	Post graduate	0.8	Female	84.3	

Table5: Distribution of sample (All figures in percentages)

A significant portion (**69.3%**) of households still lives in semi-pucca or kutcha houses, despite government housing schemes offered by both central and state authorities. (See figure below.)



Drinking water for household use comes from multiple sources, with dug wells (42.8%) and borewells (33.5%) being predominant. This suggests that government schemes aimed at

providing piped water haven't reached a significant portion of the population (only 23.3%), likely in rural areas. Firewood remains the primary cooking fuel for the majority of households, further highlighting the limited penetration of LPG. This limited access to clean water and clean cooking fuel may have health and environmental implications for the community.





The preceding analysis describes the sample's composition and current state. The following table summarizes the number and types of activities implemented under each intervention category within the four thematic areas.

Activity Category	Nos	
	NRM	
	Renovation of Community Ponds	02
Water Management	Small Pond cum earthen dam development	30
	Sunken Pits	01
	Anicuts	03
Irrigation Management	Solar Water Pump	02
Farm Management	PoP of Arahar cultivation on 25 ha land	75

#### Table 6: Quantum of Activities under the Thematic Areas

	750		
	Horticultural species (3)	20	
	Crop Demonstration (5-10 Decimal Area) & Technology Demonstration to adopt scientific agriculture methods and processes.	20	
	Capacity Building/Meeting/Exposure Visit of farmers.	500	
	Exposure visit of Goat farmers	50	
	Capacity Building of Business Sakhi & Kiosk development for women entrepreneurs	20	
Skill Training	Skill-based training of goat rearers and Supervisors i.e. deworming, vaccination, etc.	450	
	Training of beneficiaries on financial inclusion. Financial inclusion interventions through BC and Bank sakhi model	1200	
	Training of women on business development, supply chain management, entrepreneurship, marketing & Financial Management	50	
	Capacity Building of Team Members & Staff of CBOs on Skill & Capacity Enhancement	10	
	Krishi Sakhi/Pashu Sakhi and village level cadre training		
SHG-Based Women	Setting up a goat-based women owned individual enterprise	15	
Linpowerment	Better breeds goats with women farmers	30	
Livestock	Goat Resource Centre	01	
Management	Animal Health Camps/Sessions	12	
Health	Health Camps, Hygiene related awareness sessions	10	
Kitchen Garden	Seeds, training, demonstrations	n/a	
	РоЕ		
Educational	Developing model school on concept of BaLA, libraries, labs, functional girl toilets, smart classes	4	
Institutions Development	Specialists / consultation from domain experts/ Guest lecturers -for trainings & resource materials	10	
	Supplementary Classes	124	

(Source: Project MIS from Manjari Foundation)

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

### 4.2 Natural Resource Management

Image 4: Red stone fences border farmland in Narayanpura village

The project area experiences erratic rainfall patterns. Annual totals range from 300mm to 500mm, but most rain falls in intense bursts during July to This September. uneven distribution creates significant challenges. Some areas experience excess runoff during heavy downpours, while others face severe water scarcity due to the inconsistent distribution and short dry spells within the monsoon season. This variability impacts both Kharif and Rabi crops. Kharif crops



suffer from these dry periods, while Rabi crops depend entirely on unreliable residual moisture, often insufficient for completing their growth cycle. Climate change amplifies these challenges, leading to moisture stress for crops despite seemingly adequate rainfall. The unpredictable pattern of heavy rains followed by dry spells significantly affects crop yields. This situation threatens food security in the region. Therefore, groundwater conservation becomes paramount in the face of climate change to ensure the sustainability of agriculture and the well-being of these vulnerable communities.

The project interventions under this theme directly address these challenges by aiming to boost farmer income through increased crop productivity, diversification, and improved access to land treatment and irrigation infrastructure. Sustainable practices like water management and irrigation upgrades were promoted to enhance soil fertility, optimize resource use, and ultimately increase crop yields. This multi-pronged approach aims to create a more resilient agricultural system that can withstand the vagaries of climate change and ensure long-term food security.

#### 4.2.1 **Irrigation Management**

Image 5 : Open well at Gopalpura, web of pipes - a vital resource at risk



In this semi-arid region, water is a critical resource, making agriculture highly susceptible to the unpredictable weather patterns brought on by climate change. Open wells, once a reliable source of irrigation, now face increased competition due to these changing conditions. This necessitates implementing measures to improve soil moisture retention, ensuring the long-term viability of agriculture in this vulnerable region. As part of the project intervention structures like earthen embankments, anicuts and ponds were newly constructed or

rehabilitated in 3 villages. (Details given in Annexure G)

#### 4.2.2 **Income from Agriculture**

While project interventions aimed to boost agricultural income, climatic factors and limited irrigation infrastructure posed significant challenges. Fortunately, a few villages benefitted from structures like earthen embankments, sunken pits, and anicuts for irrigation. Moving forward, exploring alternative strategies like drought-resistant crops and micro-irrigation techniques could be crucial for broader success across the project.



# Figure 7: Income from Agriculture (Pre & Post Project) (n- 130)

The above figure shows that there has been a 33.6 % in mean net income at INR 19001 over preproject levels (upon conducting a z-test, a p-value of 0.060811 (<0.05) was found against a z-statistic of 1.547 (at 95% confidence level), indicating that it is NOT a significant change).



#### Figure 8 : Interventions that helped increase agricultural income (n-91)

#### 4.2.3 **Impact Observations**

The interventions achieved a moderate increase in crop productivity (averaging a 16% rise for the three main crops) and improved access to farm management infrastructure. However, the impact on crop diversification and expansion of irrigated area proved limited. Majority of the water harvesting structures had been made in couple of the project villages so the benefits of those activities would be limited to these. The project presents a significant opportunity for further work under MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act). By facilitating effective planning, awareness generation, and mobilizing MGNREGA resources, the project can significantly enhance soil and water conservation efforts in the region. Agro forestry is a promising approach for climate-resilient agriculture in the region. By considering local conditions and promoting these plantations, the project can enhance agricultural sustainability to some extent.



#### Figure 9: Overview of Project Effectiveness and Impact of Interventions

Image 6 : Earthen embankment in Gironia village



#### 4.2.4 Case Study

#### Earthen Embankment Construction and its Positive Impact on Agriculture in Gironiya

Gironiya, a small village nestled among the ravines in this semi-arid region, faces significant challenges in sustaining its agricultural practices. The undulating landscape, surrounded by forests, receives limited rainfall annually, making water a scarce resource. During the monsoon season, while water availability temporarily improves, the strong flow often creates devastating soil erosion. This erosion not only degrades the quality of the land but also significantly reduces crop productivity. Traditionally, villagers have relied on monsoon rains, but these have proven insufficient in the face of increasing water scarcity.

To address water management challenges, villagers were supported by the Manjari Foundation, under the HRDP, in constructing earthen embankments. These structures offer several advantages: local natural materials were used, design procedures were straightforward, and foundation requirements were less stringent compared to other dam types. This is because the broad base of an earth dam spreads the load on the foundation more effectively. While the project bore the majority of the cost, the villagers also contributed financially and provided all the labour. The earthen embankment has significantly improved water management in the village. Increased rainwater capture and storage, combined with reduced soil erosion, have led to a higher water table. This improved soil moisture has now made double cropping a reality.

Prahlad Singh Jhadon, a farmer from Gironiya village, exemplifies the project's success. Jhadon, who lives with his joint family and raises livestock, highlights the importance of these rainwater harvesting structures for enabling cultivation during the dry Rabi season. He cultivates bajra, arhar, and til during the Kharif season. With improved water availability, wheat and mustard now flourish on his 10 acres of land during the Rabi season. Previously, wheat crops were risky due to low yields, limited application of inputs, and insufficient irrigation, all resulting in poor harvests. Jhadon now enjoys increased mustard yields as well, thanks to the ability to provide multiple rounds of irrigation. He reported that while his wheat yields have improved by 3 times and that of mustard by nearly 2 times. This intervention has significantly improved village livelihoods through increased agricultural income and enhanced food security. Dependence on rain-fed agriculture has significantly decreased, opening doors for potential diversification into activities like horticulture.

However, the project hasn't been entirely without challenges. A particularly heavy downpour caused some damage to a few structures. To prevent further damage, a temporary opening was made to release the accumulated water. Subsequently, the spillways of the structures were redesigned for improved functionality, with the villagers readily contributing all the labour required for this improvement. Desilting remains an on-going task, as soil erosion hasn't been completely stabilized. Efforts are underway to address this through catchment restoration work under MGNREGA or a watershed project.

# 4.3 Skill Training and Livelihood Enhancement

The program empowered beneficiaries by building their capacity for diverse livelihood options, including farming, livestock rearing and other ventures. 75 farmers from 7 villages participated in an agricultural management training program on scientific farming practices for Arahar cultivation. The training covered seed sowing techniques, including proper seed spacing, and group field preparation strategies.

The program identified farmers interested in organic farming and educated them through training sessions on the benefits of organic practices and the drawbacks of chemical and bio fertilizers. To solidify their learning's, farmers also went for exposure visits which offered them first-hand experience with successful organic farms. Following this reportedly 750 farmers adopted Jeevamrut, and Bakramrit (another organic solution), for their Rabi crops. In order to build up sustainable use of water resources Pani Panchayat initiative has been promoted through an exposure visit to areas in nearby district where these institutions are functioning effectively. Though there is a committee more efforts would be needed to develop principles and protocols for water management with active community participation

With respect to non-farm interventions the focus was on building up the capacities of the community to take up goat rearing as a livelihood option on a larger scale. This included identifying progressive goat farmers, providing training for others with respect to best practices in all aspects of goat care including breeding, housing, feeding, and raising healthy goats of all ages.

A regional Goat Resource Centre (GRC) was established to empower farmers. This one-stop hub provides expertise and resources across all aspects of goat farming, ultimately leading to increased income opportunities.

The efforts also included promoting micro-enterprises led by women, leveraging existing women's Farmer Producer Organization (FPOs). The existing SHGs were envisaged to play a key role in this.

#### 4.3.1 Livestock Management

Several activities were undertaken in this area, ranging from promoting hybrid Napier grass in farmers' plots to supplement their livestock fodder sources, particularly for goats, to organizing health camps at the village level and training sessions, among others. The majority of these activities were conducted under the auspices of the GRC, established in Sarmathura.

Image 7 : Napier grass cultivation in Narayanpura



The figure below details the types of project activities for the 36 households, categorized by activity type. The vaccination camps in the villages proved to be the most impactful intervention, with maximum numbers being recorded across all animal categories.



Figure 10: Activities undertaken (n-36)

Building on the positive impact of animal health camps, the below figure illustrates the perceived benefits different animal groups receive, according to their owners, from various interventions. Notably, improved herd health and reduced mortality top the list of these benefits.

Figure 11: Perceived benefits from intervention (n-36)



#### 4.3.2 Goat Resource Centre

The figure below shows that respondents identified trainings, disease management classes, and a marketplace for buying and selling goats as the major activities of the GRC. The GRC's activities also extended to establishing financial linkages for goat business expansion, fodder arrangements, and connecting farmers through a mobile application.



The figure below highlights that a majority of respondents reported increased income and savings due to the GRC's activities. The GRC also played a significant role in helping them establish goat businesses and acquire basic business skills.



#### 4.3.3 Economic Empowerment through Collectivization

One of the significant supports provided by the project involved reviving many Women's Self-Help Groups (WSHGs). The project achieved a remarkable success rate, with 95% of respondents indicating revived WSHGs. Additionally, training SHG members on various aspects was a major component of the project support (61.5% of respondents). This training likely equipped members with the skills and knowledge necessary to function effectively.

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

#### Figure 12 : Activities undertaken by Goat Resource Centre (n-36)



Figure 14. Activities undertaken by SHGs (n-195)

The participation in SHG activities offers a multitude of advantages for members with the most significant being improved personal savings management and self-confidence. Furthermore, members enjoyed increased personal savings and access to loans with significantly lower interest rates compared to traditional lenders. However, it's important to note that, as illustrated in the figure, income generation through SHG participation was less frequent.



#### 4.3.4 Impact Observations

The initiatives undertaken under this theme have led to medium to high impacts in the community. Farmers have reported that adoption of improved farming practices have led to a decrease in their input costs. Activities related to entrepreneurship development in the villages have been initiated but it will require more handholding for them to become fully established, but the initial response has been positive. The activities related to livestock management have resulted in a high impact

### Figure 16: Overview of Project Effectiveness and Impact of Interventions (ST&LE)

- 1	and an and a second		LEVEL OF IMPACT	
	Outputs	LOW IMPACT	MEDIUM IMPACT	HIGH IMPACT
Improved Access to Agricultural Training 6 Services	Access to Agricultural training & Services Adoption of Improved Farming Practices			
Economic Empowerment through Collectivization	Formetion/Revivel e			
Improved Cupacity to Generate Income Brough Livestock Mgmt	Adoption of Scientific Livestook Monogement			

Image 8 : Goat Resource Centre, Sarmathura



Image 9: Discussion with women at Gopalpura



### 4.3.5 Case Study

#### Empowering Rural Livelihoods: A Case Study of the GRC in Sarmathura

In this semi-arid region, unpredictable rainfall makes agriculture a gamble for underprivileged communities. Diversifying with livestock, particularly goats, offers a promising solution. However, traditional practices are limited by a knowledge gap and weak market connections. This project tackles these challenges head-on with the innovative GRC which focuses on two pillars: empowering farmers and building a robust network.

- Training programs equip farmers with best practices in goat rearing, covering housing, breeding, feeding, and caring for young goats. This equips them to raise healthy and productive animals.
- Experienced farmers are selected to become "multiplier flock" owners. These flocks provide high-quality breeding stock, ensuring all participants have access to excellent genetics. This fosters knowledge transfer within the community.

#### **Beyond Training: A Holistic Approach**

The project goes beyond training to ensure the well-being of both goats and farmers:

- **Improved Living Conditions:** Clean, well-ventilated housing with stall feeding promotes animal health and productivity, reducing disease risks.
- **Streamlined Marketing:** Progressive farmers receive breeding stock to establish decentralized breeding units. A Farmer Producer Organization (FPO) acts as a central hub, purchasing goats from these breeding centers and facilitating sales to interested buyers, eliminating middlemen and ensuring fair prices for farmers.

#### The Gram Haat: A Marketplace for Success

Held twice a month at the GRC, the Gram Haat provides a dedicated marketplace for farmers from the Sarmathura region. Here, they can buy and sell goats, and access valuable advice on scientific rearing practices. This not only eliminates middlemen but also empowered farmers through negotiation training, allowing them to secure competitive prices. A mobile application Gram Haat too has been developed through which farmers are not only able to buy and sell goats but also seeks medical advice in case of disease outbreak.

By combining training, improved living conditions, a network of breeding centres, and a central marketing hub, this goat rearing development project in Dholpur has the potential to significantly improve the livelihoods of the poor. The Goat Resource Centre (GRC) has empowered local farmers by functioning as a comprehensive support system. From essential inputs and training programs for goat rearing to a dedicated marketing hub for both goats and their milk products, the GRC fosters innovation and knowledge sharing. This impactful initiative is directly benefiting 450 families, with each farmer experiencing an estimated annual income increase of INR 35,000 to INR 50,000.

The GRC acts as a one-stop shop for farmers, providing:

- Inputs: Fodder, feed materials, mineral mixtures, etc.
- Training: Programs on various goat rearing aspects.
- Marketing Facilitation: Assistance with selling goats and goat milk products.
- Innovation & Knowledge Sharing: Introduction of new technologies and a repository of best practices.
- Veterinary Care: Availability of primary healthcare medicines.

Furthermore, the GRC utilizes solar power for its water facilities, demonstrating a commitment to sustainable practices.

# 4.4 Health and Sanitation

The region faces considerable topographical and logistical challenges that impact access to healthcare. The harsh terrain, remote location of villages, and extreme weather conditions create substantial barriers for residents seeking medical care. This is further compounded by a severe shortage of healthcare providers, particularly specialists at secondary and tertiary levels, forcing residents to travel great distances for specialized medical care. Key health indicators, such as low rates of institutional deliveries, inadequate ante and postnatal care, and an imbalanced sex ratio, paint a distressing picture of the region's healthcare status.

The region's significant population of livestock and the dependence of households on these animals for their livelihoods make access to veterinary services critical. Livestock herders need to be aware of good livestock management practices and require access to critical care during times of disease. However, a significant shortage of staff in the veterinary department hampers the provision of affordable and quality veterinary services, negatively affecting the health and productivity of livestock.

In response to these challenges, some health initiatives have been implemented, focusing on organizing health camps in different villages within the project area. These camps offered free consultations and medicines, aiming to improve healthcare accessibility and reduce preventable diseases. During the COVID-19 pandemic, additional support was provided to households to mitigate the pandemic's impacts, ensuring that the health and well-being of residents were safeguarded during this critical period. Livestock health camps were also conducted to address common ailments and educate herders on disease prevention.

#### 4.4.1 Health Infrastructure and Services

The majority of respondents who availed services under this theme participated in the health camps organized at the village level. This was followed by menstrual hygiene related awareness sessions for girls/women and training on WASH related aspects



Figure 17: Type of activity participation (N-135)

While the health interventions have demonstrably improved dietary habits and physical activity, the impact on reducing disease incidence, access to quality health services, and healthcare expenses has been less pronounced.



#### Figure 18: Perceived benefits from health activities (N-134)

### 4.4.2 Kitchen Gardens

While fresh vegetables are essential for a healthy diet, affording them can be a challenge for many families. To address this issue, women from marginal farming and landless households were supported in growing vegetables in their backyards or on the front side of their homes. Almost all participants attended training sessions organized for this purpose, while a small percentage of the respondents received other inputs like seeds, fertilisers/pesticides etc., as can be seen in the figure below.



The intervention has led to a significant benefit such as reduction of INR 320 in weekly food expenses, as reported by respondents. The figure below further highlights this advantage, showing households not only growing fresh, nutritious produce in their own gardens, but also benefiting from the development of a nearby horticultural garden.



Figure 20: Perceived benefits from the intervention (n-126)

#### 4.4.3 Impact Observations

The activities under this theme have been limited solely to health aspects. While health interventions have demonstrably improved dietary habits and physical activity, their impact on reducing disease incidence, access to quality health services, and healthcare expenses has been less significant. Overall, the impact has been moderate.

There is also a need to address sanitation. Considering the underdeveloped state of household resources in these remote villages, sanitation-related activities are crucial. The impact of kitchen garden activities was low. While households reported improved nutrition, income generation from this activity was unsuccessful.



Figure 21: Overview of Project Effectiveness and Impact of Interventions (H&S)

# 4.5 Promotion of Education

Dholpur district faces significant educational hurdles, particularly within government schools located in rural areas. These schools struggle with a shortage of qualified teachers, inadequate access to clean drinking water, and a lack of proper sanitation facilities, especially toilets. This absence of basic amenities disproportionately discourages girls in upper grades from attending classes, hindering their educational opportunities. Furthermore, limited educational opportunities are often perpetuated by the socio-economic background of the students' households. Many children come from poor families and are expected to contribute to household chores and activities like farming and looking after cattle, limiting their time for education.

Recognizing these challenges, the project implemented interventions aimed at improving school facilities and fostering a more positive learning environment. These interventions prioritized innovative approaches to enhance the quality of education and increase student enrolment. Model schools were established, showcasing these approaches. These schools feature modern amenities like smart LED panels for enhanced learning, proper drinking water facilities and toilets for student well-being, and playgrounds to encourage physical activity and social interaction.

#### 4.5.1 Infrastructure in Educational Institutions

The intervention yielded the most significant improvements with respect to school building renovation, drinking water access, BaLA and separate sanitation facilities. While positive impacts were also observed in the provision of classroom furniture, sports equipment and smart classrooms, the initial focus areas yielded the most transformative results.



Teachers are seeing positive results, with students showing significant improvement in both attendance and focus in class. Concept retention has also demonstrably increased. However, there's still room for growth in areas like dropout rates, enrolment numbers, and exam performance.



#### Figure 23: Changes observed in students post project intervention

#### 4.5.2 **Impact Observations**

The interventions under the education theme have led to a medium impact on both access to improved physical infrastructure and student willingness to engage in school activities. While this is a positive starting point, there's room for further improvement since only very few schools in

the area have been covered. Also it would be better if students too are involved in the design process of BaLA paintings or library upgrades to create a sense of ownership.

Contraction of the		LEVEL OF IMPACT	
Outputs	LOW IMPACT	MEDIUM IMPACT	HIGH IMPACT
Access to s Improved Physicol Infrastructure Willingness to Engage in School Activities			

Image 10: BaLA painting in Government School, Narayanpura



# 4.6 Holistic Rural Development Index

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

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

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

	Tuble 77 Tittbi calculation for Dholpal, hajastian						ujustiiui			
Domain	ľ	NRM	ST&	&LE	H	&S	Po	ЭE	То	tal
HRDI Score	Base line	End line	Base line	End line	Base line	End line	Base line	End line	Base line	End line
	0.09	0.12	0.08	0.15	0.01	0.01	0.07	0.10	0.25	0.38
% Change	3	33.3	87	7.5	0	.0	42	8	5	2

The HRDI calculation for project P0282 implemented in Dholpur is given in the following table: Table 7: HRDI calculation for Dholpur, Rajasthan

The table shows a 52% increase in the composite HRDI score compared to the baseline. This improvement can be attributed to planned interventions in the sample villages, particularly in the ST&LE, PoE, and NRM sectors. Limited interventions in the H&S sector resulted in no change in the score for that area.

# 5 Analysis of Assessment Criteria

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

- Relevance and Convergence
- Impact and Effectiveness
- Sustainability

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

## 5.1 Relevance and Convergence

Once lagging behind on many development indicators, Rajasthan has made significant progress in education, health, and poverty reduction over the past two decades. However, vast disparities exist within the state. Some districts, particularly those with a higher proportion of rural population, imbalanced sex ratio, and dependence on agriculture, face harsher realities. Districts like Dholpur, and specifically Sarmathura block within it, exemplify these challenges. Here, extreme weather and geographical constraints create additional hurdles.

This region faces a critical situation where its lifeblood – the land, water, and forests – is under immense strain due to recurring droughts. The vast majority of the annual rainfall arrives in a short burst over a couple of months, followed by long, dry periods. With an average annual rainfall<sup>6</sup> between 500-600 mm, it is simply not enough to sustain the land. Furthermore, much of this precious rain is lost as runoff. Traditional water management systems, once a vital tool, have been largely forgotten by the communities. This severe water stress leaves farmlands parched, crippling agricultural productivity. With farming as the main source of income, low productivity fuels widespread poverty. In such a context, interventions done with respect to water management and farm management aspects are totally relevant and needed by the communities.

Despite these challenges, livestock rearing offers a vital lifeline, particularly for poorer households who often keep a few smaller ruminants, like goats. In fact, it is another major source of livelihoods in the region, with most households raising at least a couple of animals, which can include buffaloes, cows, and smaller ruminants like goats. Therefore, the setting up of GRC in the region under the project is of particular relevance considering that there is lack of scientific management practices with respect to goat rearing and access to resources.

Manjari Foundation had already set up an FPO earlier and has been trying to link its intervention with respect to agriculture, livestock rearing and development of women led microenterprises within the village. This is particularly relevant that the FPO would be able to provide the advantage of scale for majority of the small landholders for marketing their agricultural produce as well as non-farm produce.

Lack of facilities like toilets, water, and interactive learning tools, combined with socio-cultural factors, and has resulted in an increased number of dropouts from the formal education system, particularly with respect to girls in this region. Therefore, efforts with respect to education and

<sup>6</sup> The mean annual rainfall of the district is 563.94 mm (2001-2011). The long term normal annual rainfall (1951-2000) is 722.1mm. https://cgwb.gov.in/sites/default/files/2022-11/dholpur.pdf

improving the overall learning environment in government schools are timely and well needed. Interactive learning tools and improved facilities along with a focus on creating a positive learning environment have resulted in improved attendance levels and students becoming more interested in learning.

Convergence between government and non-governmental organizations strengthens service delivery, empowers beneficiaries, and brings services closer to communities. This fosters alliances that lead to better overall outcomes. While some interventions, particularly in education, seamlessly integrate with government programs, others require more effort. This is especially true for Natural Resource Management aspects like water management, soil and water conservation, and pastureland development.

# 5.2 Sustainability

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

Material support provided under the project was accompanied by awareness campaigns and training, educating beneficiaries on the need and relevance of the work, ensuring their willing adoption of the interventions. The impact of these interventions was measured to ensure their continued use. This resulted in positive results, even a year after the project ended (see Annexure E). This indicates that the majority of the project activities achieved sustainability and continue to benefit the population.

This project aimed to foster socio-economic growth and development for diverse stakeholders, including farmers, livestock rearers, and children. The organisation implemented a three-tiered federation system (SHG – VO – Federation) within the project area. An independent Farmer Producer Organization (FPO) sits at the apex level, ensuring the sustainability of various initiatives. Educational interventions, including model schools, are managed by dedicated School Management Committees (SMCs).

The Manjari Foundation's sustainability plan prioritizes long-term growth and development in beneficiary areas. By transferring resource management responsibility to the FPO, the project empowers the community to maintain and oversee these assets for their own benefit. Additionally, the project focuses on capacity building and raising awareness about sustainable natural resource management practices. This approach fosters strong partnerships with local communities and governing bodies, building a sense of ownership and responsibility to ensure the initiatives' long-term success.

# 6 Recommendations

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

#### A. Sustain Project Initiatives

- Women in the project area bear the primary responsibility for collecting firewood and cooking with traditional *challahs*. This poses a significant health risk. Switching to low-cost, smokeless *chullahs* offers a compelling solution as they are not only environmentally friendly but can also significantly improve household health by reducing indoor air pollution. Furthermore, their higher efficiency can lead to reduced drudgery for women as smokeless *chullahs* are estimated to cut annual firewood consumption by nearly 4 tonnes.
- Given the remote location of these villages and the absence of a reliable electricity grid, installing solar street lamps on the main streets would be a practical solution. This would provide illumination after sunset, enhancing safety for residents.
- Within the context of the project area, where significant efforts have already been made with earthen bunds and anicuts, prioritising ravine stabilisation remains crucial with respect to ravines. A two-pronged approach, encompassing both water management and erosion control, is essential for long-term success. Beyond the existing engineering solutions, this strategy should incorporate vegetative measures like establishing native, drought-resistant grasses and implementing protective afforestation with suitable tree species. This combined approach will not only minimise water erosion but also enhance soil health and biodiversity within the ravines.
- There is a need to tackle the critical water shortage plaguing the district and region by focusing on three key areas: raising awareness about groundwater preservation, promoting rainwater harvesting techniques, and empowering communities to manage and protect their traditional water harvesting systems, such as open wells. These once-vital resources have fallen into disrepair due to a lack of community involvement and local oversight. Their restoration and a shift towards community ownership are essential for ensuring long-term water security. Open-source tools like Composite Landscape Assessment & Restoration Tool (CLART), which enables rural communities in designing measures that would either help recharge of groundwater or augment surface water availability, depending upon the location specific geo-hydrological characteristics, can be used for this purpose.
- The region urgently needs soil and water conservation efforts, water harvesting systems, and improved crop management practices. To address these challenges effectively, a comprehensive watershed treatment plan is crucial. Partnering with organisations like NABARD to secure project funding would be ideal for developing and implementing such a plan.
- Forming a Pani Panchayat in the area is a well-timed step considering the water resource situation. To ensure its success, the initiative needs sustained efforts to develop principles and protocols for water management and demand reduction, with active community participation.
- While goat rearing has been a lifeline for many facing financial hardship and environmental challenges, it can also become a threat to the environment itself if proper grazing

management is not implemented<sup>7</sup>. There is a need to ensure that these factors too are taken into consideration before large-scale expansion of this activity in this ecologically fragile area.

- The organisation should consider participating in advocacy efforts with other like-minded organisations to raise awareness among both policymakers and communities and to lobby for regulations that protect the remaining community lands like *charagahs* from further encroachment.
- While no work has been undertaken with respect to sanitation, there is a need for these kinds of activities and focus on dry toilets.
- There is a need to strengthen engagement with MGNREGA as like in most other places, the scheme faces challenges like transparency in activity selection and limited awareness among community members. To address these and ensure effective program implementation, engagement with Panchayati Raj Institutions (PRIs) is crucial and can lead to improved planning that better reflects local needs, increased transparency and accountability, and ultimately, more effective utilisation of MGNREGA resources for creating sustainable livelihood opportunities. Furthermore, building awareness among community members about their entitlements and participation rights under MGNREGA is essential. This could be achieved through community outreach programs, information dissemination through local media channels, and utilising local self-help groups for peer-to-peer education.

#### **B.** Improve Project Design and Efficiency

- To ensure project effectiveness, conducting a baseline survey is crucial. This initial assessment, capturing data on specific parameters like household income levels, access to clean water, and sanitation facilities, will provide a near realistic picture of the ground realities and areas requiring focused interventions. The baseline data will serve two key purposes: first, it will inform the project design process by highlighting priority areas; second, it will establish a benchmark against which to measure the changes brought about by the project interventions. Relying solely on beneficiary recall of their situation 3-4 years back can lead to inaccurate estimations and hinder impact assessment. A well-designed baseline survey will address this challenge by providing reliable data for project design and robust monitoring and evaluation.
- Self-help groups play a crucial role in empowering communities, but their focus should extend beyond just economic empowerment. The HRDP program should also address social and developmental issues that significantly impact the quality of life for the poor like gender equality, child education, social inclusion, environmental protection, and access to healthcare. By integrating holistic development programs into HRDP from the outset, SHGs can be empowered to tackle these broader challenges. This could involve incorporating capacity building workshops on relevant social topics alongside economic training. A multipronged approach that fosters both economic empowerment and social development will contribute more effectively to improving the overall well-being of the target population.
- Rural livelihoods intrinsically connected to agriculture, livestock, and allied sectors, have been significantly impacted by climate change over the last decade. While the project has components that indirectly address climate change, a more focused effort is needed. To strengthen the project's response to climate change, interventions could target promoting drought-resistant crop varieties and water management practices, supporting livelihood

<sup>7</sup>https://www.downtoearth.org.in/coverage/sariska-np/act-before-vicious-cycle-sets-in-2334

diversification to reduce dependence on agriculture, introducing climate-resilient livestock breeds and improved management techniques, and building capacity for early warning systems and disaster preparedness. By directly addressing climate challenges, the project can contribute to the long-term sustainability of rural livelihoods.

- The 3–4-year timeframe for the HRDP project presents a challenge for achieving substantial impact across diverse themes like natural resource management (NRM), livelihoods, health, and education. Each of these areas requires a focused approach built on deep understanding, which comes from years of experience. Smaller organizations may struggle to address so many issues at once. To maximise effectiveness within the given timeframe, a phased approach focusing on core thematic areas for immediate impact could be considered. Subsequent phases could address other themes based on progress and capacity building.
- Building capacity is crucial for long-term sustainability. The project should invest in training staff to develop expertise in specific focus areas. Additionally, empowering community members through capacity building programs equips them to address challenges beyond the project's duration. Smaller organizations, with their niche expertise, can play a vital role by collaborating with each other. The project can facilitate these collaborations to ensure comprehensive interventions and maximize the positive impact on the target communities.
- Significant portion of rural households still depend on firewood and other local sources for cooking due to various reasons. The clean energy component under the HRDP can effectively address this gap by promoting smokeless chulhas which reduce not only the drudgery of fuel collection for women but also improve the ambient air quality in kitchens. Furthermore, smokeless chulhas can contribute to environmental protection by reducing fuel consumption and consequently, deforestation. The improved health of women and children due to reduced smoke inhalation is another significant benefit.

# Annexure

# A Sampling Methodology

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

## Quantitative Sample Size Calculation

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

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

Where,

N=sample sizeP=key characteristic of the population, set at 50%;Z1-α=standard score corresponding to the confidence interval, set at 95% (1.96 for two tailedtest);.Se=margin of error, set at 5%;Deff=factor for design effect, set at 1 (no design effect)Thus, the estimated maximum sample size is 400.

### Quantitative Sampling Methodology

Sampling methodology to be added

#### Stage 1 – Selection of villages:

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

#### Stage 2 - Selection of beneficiaries:

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

## Qualitative Sample Size Calculation

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

## **B** HRDI Methodology

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

#### **Indicator Weights**

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



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 8: Example of HRDI Calculation**

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

<sup>&</sup>lt;sup>8</sup> NRM: Natural Resource Management | H&S: Health and Sanitation | SD&L: Skill Development and Livelihoods | EDU: Education

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

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

#### Analysis Plan

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

#### Method to Calculate HRDI

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

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

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

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

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

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

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

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

Domain	Indicators	Baseline	HRDI	End line	HRDI	
	Proportion of farmers with net income above median	0.16		0.19		
NRM	Proportion of farmers reporting increased productivity of three main crops above median (before and after)	0.06	0.09	012	0.12	
	Percentage of farmers reporting access to irrigation	0.13		015		
	Percentage of SHG members reporting income above median from rural enterprises	0.00		0.00		
ST&LE	Percentage of households who getting skill training and reporting increase in income from job/enterprise/self- employment	0.15	0.08	0.27	0.15	
	Percentage of HH reporting income above median from livestock	0.17		0.33		
	Percentage of households reporting increase in use of fruits/vegetables from the nutrition garden	0.05		0.05		
H&S	Percentage of households reporting increase availability of drinking water facility	0.00	0.01	0.00	0.01	
	Percentage of households with access to improved toilet facility	0.00		0.00		
EDU	Percentage of respondents reporting increased access to functional school physical infrastructure (drinking water posts, separate washrooms, furniture etc.)	0.24	0.07	0.33	0.10	
	Percentage of respondents reporting increased access to functional learning infrastructure (library, science labs, smart class, etc.)	0.02		0.07		
	Total		0.25		0.38	

#### Table 9: HRDI Calculation for P0287

# C Overview of Impact Calculation

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

Low: 0% - 40% change

Medium: >40% - 70% change

High: >70% - 100% change

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

Outputs	Output Indicators	Output Avg.	Impact Level	
<b>Increased income</b>	from agriculture			
Land/ crop	Proportion of farmers reporting an increase in production of crops supported under HRDP	67.1		
	Proportion of farmers reporting increased income from crops that were supported under HRDP.	83.9	50.2	Medium
productivity	Average increase in income from crops that were supported under HRDP (% change)	33.7		
	Average increase in productivity from crops that were supported under HRDP (% change)	16.3		
	Proportion of beneficiaries satisfied with quality of available services (in farm management)	46.0		
Access to the farm management infrastructure	Proportion of farmers reporting project interventions leading to increase in income	58.7		
	Proportion of farmers currently practicing organic farming/conservation agriculture/other sustainable practices	85.8	55.3	Medium
	Proportion of farmers reporting an increase in the use of natural fertilizers	30.9		
Land under irrigation	Proportion of farmers who received support for irrigation	38.7	24.5	Low
-0	Increased area under irrigation	10.3		

#### Table 10: Overview of Impact Calculation

Outputs	Output Indicators	Output Avg.	Impact Level	
Improved access t	o agricultural training and servi	ces		•
Access to	Proportion of farmers who accessed project training services	46.0		
training and services	Proportion of farmers who demonstrate awareness regarding sustainable farming practices	91.3	68.6	Medium
	Proportion of farmers who adopt scientific agricultural practices	94.0		
Adoption of improved farming practices	Proportion of beneficiaries reporting increase in productivity due to better farm management	84.2	89.1	High
	Proportion of farmers reporting increased income	87.5		
Economic empowe	erment through collectivization	Only for Sl	HG members)	
	Proportion of members who received support with establishing/reviving SHGs	95.0		
Formation/ revival of SHG based Enterprises	Proportion of members who received support with establishing/reviving SHG enterprise	18.2	67.1	Medium
	Proportion of members whose SHGs are currently functioning	88.2		
	Proportion of SHG members who received training	61.5		
Development of entrepreneurship	Proportion of HHs with increase in income from entrepreneurial activities	92.7	77.1	High
	Proportion of SHGs with increased savings	77.1		
Improved Capacity	y to Generate Income through Liv	vestock Ma	nagement	
	Proportion of beneficiaries who received support in livestock management services	9.0		
Adoption of Scientific Livestock Management	Proportion of beneficiaries reporting an increase in income from livestock management	55.5	96.7	High
	Proportion of beneficiaries reporting improved livestock health	86.6		
	Proportionate increase in average income from livestock	236.0		
Improved Health I	nfrastructure and Services			
Establishment/ enhancement of	Proportion of beneficiaries who gained access to health services	33.8	71.4	High

Outputs	Output Indicators	Output Avg.	Impact Level	
health infrastructure and services	Proportion of beneficiaries reporting lifestyle changes due to improved access	61.9		
	Proportion of beneficiaries who availed free medications at camps	92.2		
	Proportion of beneficiaries who consulted medical references from camps	70.7		
	Proportion of HHs reporting income gains from kitchen garden	2.4		
Increased adoption of	No of HHs received seeds/training in the kitchen garden	56.3	23.8	Low
kitchen gardens	No of HHs with improved vegetable/fruit consumption due to kitchen gardens	22.2		
	Proportion of HHs reporting improved nutrition	14.3		
Improved capacity	of educational institutions to pr	ovide serv	ices	
Access to improved physical infrastructure	Proportion of students/schools who gained access to functioning smart class rooms/ BaLA/science labs/libraries/learning aid/furniture/sports equipment	40.9	59.0	Medium
	Proportion of schools who gained access to clean and functioning sanitation units/drinking water posts at education institutions	77.2		
	Improvements in attendance due to improved infrastructure	81.8		
Improved willingness to engage in school	Proportion of institutions reporting increase in enrolment post infrastructure development	27.3		
activities	Proportion of institutions reporting improved interest of students to engage in classroom activities	63.6	57.5	Medium

Change

Impact Level

0%-40% >40% - 70% Low Medium



# D Two SampleProportionsZ Test

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

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

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

p1 is the proportion in the first sample p2 is the proportion in the second sample p is the pooled proportion, calculated as (p1n1 + p2n2)/ (n1 + n2) n1 is the sample size of the first sample n2 is the sample size of the second sample The z-statistic is then compared to the standard normal distribution to determine the p-value of

The z-statistic is then compared to the standard normal distribution to determine the p-value of the test. A p-value less than alpha (typically 0.05) indicates that the null hypothesis can be rejected, and there is evidence to suggest that the two proportions are different.

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

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

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

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

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

Assumptions:

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

The z-test conducted for one indicator-Proportion of farmers with income from agriculture above baseline median-is shown below.

Tab	ole 11	: Z-test	Conducted	for P0287

Indicator	Proportion of farmers with income from agriculture	
	above baseline median	

p1 (proportion of first sample-end line)	56.1			
n1 (sample size of p1)	155			
p2 (proportion of second sample- baseline)	47.8			
n2 (sample size of p2)	155			
Р	0.33516129			
Calculation	0.053620915			
z statistic	1.547903449			
	Statistically NOT significant at 95% confidence level (or $p<0.05$ )			
p-value for the z statistic	0.060811			

# **E** Theme-wise Sustainability Matrix

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

Table 12: Sustainability Matrix							
Support provided (Enter relevant activity categories)	Structures established	Technical Know-how	Usage	Maintenance			
NRM							
Water Management	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			
Farm Management		$\checkmark$					
Skill Training and Livelihood Enhancement							
Goat Resource Centre	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			
SHG-Based Women Empowerment		$\checkmark$					
Skill Training		$\checkmark$					
Health and Sanitation							
Health		$\checkmark$					
Kitchen Garden		$\checkmark$					
Promotion of Education							
Educational Institutions Development	$\checkmark$		$\checkmark$	$\checkmark$			

Table 12. Suctainability Matrix

\*\*\*