





Baseline study of Aadarsh Panchayat Bhandari and Humari Paathshaala projects in Sitamarhi, Bihar

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Table of Contents

1	Intr	oduct	tion5
	1.1	Aad	larsh Panchayat
	1.2	Hun	nari Paathshaala7
2	Ab	out th	e study7
	2.1	Met	hodology of the study
	2.1	.1	Sampling strategy
	2.1	.2	Limitations of the study8
3	Fin	dings	9
	3.1	Aad	larsh Panchayat9
	3.1	.1	The standard of living9
	3.1	.2	Situation of land ownership and tenancy10
	3.1	.3	Farming practices- for major crops10
	3.1	.4	Information on animal husbandry
	3.1	.5	Insights from farming community on knowledge resources
	3.1	.6	In-house nutrition through kitchen gardening
	3.1	.7	Summary of agriculture situation
	3.1	.8	Status of local governance
	3.1	.9	Ward level planning- awareness and implementation
	3.1	.10	Summary of governance situation
	3.2	Hur	nari Pathshala
	3.2	.1	Basic information
	3.2	.2	Physical Infrastructure (availability and condition)
	3.2	.3	Water and Sanitation
	3.2	.4	Status of School Management Committee
	3.2	.5	Summary of situation in school
4	Co	nclusi	on





List of Tables

Table 1: Average number of ploughing cycles	11
Table 2: Seed rate for major crops (Kilograms per bigha)	13
Table 3: Yield of major crops (quintals per bigha)	15
Table 4: Average cost and profit of cultivating one bigha plot (in INR)	16
Table 5: Awareness regarding beneficiary	20
Table 6: Quantity of PDS item (kilograms per person)	24
Table 7: Awareness about roles and responsibilities of gram panchayat	26
Table 8: Basic details of project schools	29
Table 9: Infrastructure details of project schools	30
Table 10: Water and sanitation details of project schools	31

List of Figures

Figure 1: Log frame for Aadarsh panchayat project component	6
Figure 2: Log frame for Humari Paathshaala project	7
Figure 3: An image of kutcha house in the region	9
Figure 4: Open waste water disposal	9
Figure 5: Proportion of farmers cultivating major crops	10
Figure 6: Proportion of farmers practicing mechanized ploughing methods	11
Figure 7: Methods of composting applied	12
Figure 8: Average number of irrigation cycles provided to major crops	13
Figure 9: Proportion of farmers using specific chemical fertilizer	14
Figure 10: Use of major fertilizers in major crops (proportional)	15
Figure 11: Percentage of farmers cultivating major crops for commercial purposes	17
Figure 12: Percentage of respondent farmers practicing animal husbandry	17
Figure 13: Milk yield for cows and buffaloes (liters per day)	17
Figure 14: Percentage of respondent who attended farmers' meeting and got their soil tested	18
Figure 15: Proportion of respondent farmers having kitchen garden	19
Figure 16: Awareness about services and facilities of Anganwadi	20
Figure 17: A glimpse of Anganwadi Center	21
Figure 18: Status of MDM menu served	22
Figure 19: Awareness about ration cards	23
Figure 20: Awareness about stipulated quantity and rate of entitlement under PDS	23
Figure 21: Status of functioning of the PDS scheme	24
Figure 22: Awareness about stipulated amount of pension	25
Figure 23: Awareness about schemes facilitated by gram panchayat	26
Figure 24: Status of panchayat level work	27
Figure 25: A glimpse of ward 1 school	28
Figure 26: Condition of kitchen in ward 9 school	29
Figure 27: Locked girls toilet in ward 9 school	30
Figure 28: Awareness levels of SMC members on provisions under SMC	32



Executive Summary

With the prime objective of creating model panchayat and model schools, a project is planned in Bhandari panchayat of Sitamarhi district in Bihar to improve the quality of life of people. The project includes series of interrelated interventions with respect to agriculture practices, animal health care, awareness and implementation of government schemes, availability and functionality of infrastructure in schools and building capacities of ward members and SMC (School Management Committee) members. The present baseline study was conducted to understand the current levels of the indicators pertaining to the situation of agriculture, livestock, good governance and school infrastructure.

The major findings, pertaining to agricultural sector, reveal that the farmers in the study region are using mechanized ploughing methods (tractors) instead of conventional bullock ploughs (more than 95%). But other agriculture practices like sowing, weeding, harvesting are largely done using manual labor with no use of advanced technology like zero tillage, potato planter, maize shellers, etc. The abundance of water and frequent floods leaves farmer with large acres of uncultivable land and dampened harvest respectively. The use of chemical fertilizers in the region includes both conventional fertilizers like Urea and, DAP (Di Ammonium Phosphate) with a considerable proportion using, Potash (four-fifth) and Zinc (one-fourth) as well. However, the use of these fertilizers is not in accordance with soil nutrient balance. This is primarily because most farmers use fertilizers based on the recommendation by the local shopkeeper and not by any formal government officials; only 13% large farmers and 2% marginal farmers have attended farmers' meetings organized by government agriculture department personnel. Soil testing is also limited to 5% respondent farmers and soil health cards are received by only one-fourth of them. Composting is done with primitive methods (92%) and kitchen gardening limited with an average of three types of vegetables/fruits (55%) like bottle gourd, ridged gourd, ladyfinger, potato, tomato, lemons, etc. Due to this, the households are largely dependent on market for consumption. Livestock provides support to more than one-third of the farming population. The milk yield is higher for large farmers having access to resources (the average milk yield for cow is 6 liters and for buffalo is 4.5 liters in a day). There also exist very limited government channels for veterinary services due to which inhabitants rely on highly expensive private doctors for treatment of their animals.

In terms of governance, community is found to be aware about the existence of major government schemes i.e. ICDS (Integrated Child Development Scheme), PDS (Public Distribution System), MDM (Mid-Day Meal), Pension etc. But their in-depth knowledge about the provisions under all the schemes is poor with an exception to PDS scheme. Anganwadi centres (AWC) do not have proper designated space for its operation; most of the centres operate from the residence of worker or helper owing to which some of the ICDS beneficiaries don't feel comfortable enough to visit AWC. Very few respondents (2%) are aware of all provisions like nutrition supplements to infants, pregnant women and lactating mothers; pre-school education; immunization; etc. under ICDS which also hampers the access to ICDS scheme. MDM is served in all the schools about which all the parents are aware. About 60% of respondents found MDM as good, 74% of the respondents are not aware about the menu being displayed in school and 22% do not know if the meal is changed according to menu or not. Lack of awareness about MDM is largely because most of the parents don't visit school themselves. PDS is distributed for ten months in a year and community doesn't report that as an issue. Ward members have limited understanding of their roles and responsibilities. Very few ward members (36%) are aware of GPDP (Gram Panchayat Development Plan) which is a major component of planning and development of a village. The issue of lack of awareness leads to a series of implementation failures like lack of transparency, error of inclusion, and ineffective grievance redressal.





The situation calls for spreading information on the detailed provisions and facilities of these government programs so that action can be taken for effective implementation.

The Right to Education (RTE) was introduced in 2009 in India to provide free and compulsory education to children of resource poor households so as to secure their bright futures. However, despite RTE, the situation pertaining to schools in this region is found to be dismal; the schools lack proper building infrastructure and are forced to share their limited resources with other schools with no building at all. Facilities like toilets, proper playground, boundary and main gate, swings, etc. are completely absent. The condition of the government schools with inadequate physical infrastructure and absence of basic sanitation and other facilities is indicative of the appalling education services available for the population of the study region. This is primarily the reason behind majority (60%) of the households preferring to send their kids to private schools. The provision of inclusion of parents to effective implementation of RTE through SMC formation is also defeated with limited awareness (42%) among its members or the large population for that matter. These elected members have scarce understanding of the provisions under RTE. It is imperative that schools need a physical transformation and improvement in the administrative and management process of SMC functioning as intended by the project.

The project plans to target the above gaps and it is expected that with implementation of various integrated village development activities the situation would likely change for better. An informed community would be the empowered community of tomorrow contributing as a catalyst to the process of development.



1 INTRODUCTION

Agriculture is a vital source of livelihood in Bihar with about seventy-nine percent of its population engaged in agricultural sector. In Bihar, there are around 1.04 crore landholdings of which around 83% are marginal holdings of a size less than one hectare. Approximately 90 percent of the total population lives in rural areas and agriculture is the primary feeder of rural economy, which operates on margins of landⁱ. In addition, Bihar has more illiterate people – by proportion – than any Indian state and although literacy rose 14.8 percentage points over a decade to 2011, there is a crisis in Bihar's primary education system: its classrooms are India's most crowded and have the fewest teachers. Yet, India's sixth-poorest state spends the least money per student (Scroll, 2018)ⁱⁱ. Also, according to Public Affairs Index 2018, Bihar is the worst governed state in the country that is primarily responsible for impoverishment in the region.

With focus on agriculture, governance and education, the Power Finance Corporation, the PTC Foundation¹ trust and Sehgal Foundation² have collaborated to implement an integrated development project in one of the districts of Bihar, *Sitamarhi*. *Sitamarhi*³ is one of the thirty-eight districts of Bihar situated in the north part of the state and sharing its border with Nepal. The region is inhabited by Maithili and Hindi speaking population. The project is planned to be carried out for three years in *Bhandari panchayat* of *Belsand* block of *Sitamarhi* district in Bihar⁴. The rural economy of the region is majorly dependent on agriculture and its allied activities predominated by marginal farmers. A vast majority of these farmers earn less than one-acre plot of land and have to depend on sharecropping to sustain their families. The main crops cultivated in the region are paddy, wheat, maize, potato and sugarcane. A considerable population of landless households are dependent on livestock rearing and labor work for sustenance.

The project has two broad components- (1) *Aadarsh Panchayat*; and (2) *Humari Paathshaala*. The first component aims to develop *Bhandari* into a model *panchayat* using integrated development techniques. The span of activities ranges from agriculture, animal husbandry, livelihood generation, digital literacy to increasing awareness about key government programs. The second component of the project aims at transforming two government schools to provide conducive study environment. The activities under this component includes infrastructure building as well as building capacities of committee responsible for school management.

1.1 AADARSH PANCHAYAT

The project plans to develop *Bhandari* as a model *panchayat* with implementing a series of activities designed specially to provide integrated solutions to the inhabitants of the *panchayat* (Figure 1). The series of integrated activities includes promotion of mechanization in agriculture and providing package of practices to make it more remunerative⁵. The project also plans to support the most vulnerable communities; landless or marginal landowning families; with provision of goat distribution and kitchen gardening so as

¹ PTC being amongst the leading corporate group in India visualizes meaningful, sustainable CSR programs, positively impacting lives of the marginalized section of society and effectively contributing towards India's development goals. ² S M Sehgal Foundation (Sehgal Foundation) is a public, charitable trust registered in India since 1999. The mission of the organization is to strengthen community-led development initiatives to achieve positive social, economic, and environmental change across rural India.

³ The district has its mythological importance and is famously known for birth place of Sita (avatar of a Hindu goddess).

 $[\]overline{}^{4}$ Bhandari panchayat constitutes three revenue villages- Bhandari, Maheshpur and Manchi. The total number of households in the gram panchayat is 2664 inhabited by a population size of 10,499 (Census 2011). Bhandari gram panchayat is divided into fourteen wards.

⁵ Through improved production and reduced cost of cultivation



to increase their sources of income as well nutrition intake. The project also aims to support livestockrearing households through introduction of animal health program which is expected to increase milk production. A lot of emphasis has been planned to be given to the community development initiatives to create awareness among the population about their rights and entitlements and build capacities of the local leaders. This is expected to lead to better utilization of government funds available for development and improved access to government schemes by the population at large. The project plan to train youth, especially adolescent girl, use of digital applications and self-sustaining skills through opening of digital literacy and life skill education centers. The young participants of these centers would be trained on thematic governance so as to empower them to effectively participate in development process.





1.2 HUMARI PAATHSHAALA

The project component aims to transform two government schools⁶ of *Bhandari panchayat* by renovating and creating physical infrastructure coupled with building the administrative capacities of School Management Committee (SMC) (Figure 2). Infrastructure development works would be done to ensure safety of school premises, provide adequate sanitation facility, and improve hygienic cooking conditions with repair of kitchen. The project also plans to complete transform the learning system with installation solar power LED smart classes as visual learning. The set of interventions are expected to attract students thereby increasing the enrollment rate and improving access to cleaner water and sanitation facilities coupled with providing better learning environment for children.



Figure 2: Log frame for Humari Paathshaala project

2 ABOUT THE STUDY

The current baseline study aims to understand the current social, economic and governance scenario in the intervention region. The information is collected on agricultural practices, water levels, awareness and implementation status of various government schemes, physical infrastructure in schools, etc. The information would help to understand the current situation on the project outcome indicators before the implementation of the two projects in the region. This information would be utilized to map the change in the indicators post-project completion to evaluate the impact of the project.

⁶ These schools include primary and middle government school in ward 1 and 9 of the panchayat respectively.



2.1 METHODOLOGY OF THE STUDY

The study triangulates the findings of both quantitative as well as qualitative data collected in the month of August and September 2018. The quantitative research tools include household structured interviews and observation modules. The qualitative research tools include focus group discussions, key informant interviews, and transect walk.

2.1.1 Sampling strategy

The *gram panchayat* under the project (*Bhandari*) is administratively divided into fourteen wards. In order to have representative sample, data is collected from all wards using stratified random sampling. For information on agricultural practices, two strata of farming households are classified- farmers owning less than one *bigha* of land⁷ and farmers owning more than one *bigha* of land⁸. Ten respondents from two strata is interviewed from each ward. The total sample size is 280 farming households⁹. The same information is collected from 140 respondents residing in nearby control *panchayat* having similar socio-economic conditions¹⁰. The total number of forms for agriculture module is 372.

Similarly, for information on governance situation, two strata of beneficiary households are classifiedhouseholds eligible to receive benefit under ICDS scheme and households eligible to receive benefits under MDM scheme. Ten respondents from each strata is interviewed from each ward. The total sample size is 280 beneficiary households¹¹. The same information is collected from 140 respondents residing in nearby control *panchayat* having similar socio-economic conditions¹². In addition to this, Ward members are interviewed separately on utilization of funds available with *panchayat* and ward level development planning. The total number of forms for governance module is 416.

Furthermore, in two project schools, interviews with the Principal are conducted on the availability and condition of physical infrastructure, facilities and study environment in schools. We have also done a non-participatory observation to validate the information collected in the interviews. Since the project activities include training of the School Management Committee (SMC) members, the sample strategy also incorporated fifty percent of School Management Committee members (twelve) to ascertain their present level capacities to fulfill the responsibilities as a member of the committee steering the implementation of Right to Education.

2.1.2 Limitations of the study

The baseline study has certain limitations. The baseline information on current knowledge of youth with respect digital literacy and life skills education is beyond the scope of this study. This is planned to be done

⁷ Termed as marginal farmers for this study

⁸ Termed as large farmers for this study

⁹ However, due to non-availability of adequate number of farmers in ward number 4,5,6, 9 and 10, the final sample size is 232. This includes 112 large farmers and 120 marginal farmers. The reason for non-availability of farmers of is largely predominance of extreme groups- landless households taking land on sharecropping basis and large landowners who do not cultivate land themselves and has given entire land to tenants on share-cropping. Both type of farmers does not quality our respondent eligibility criteria.

¹⁰ In control panchayat, 70 large farmers and 70 marginal farmers are interviewed totaling to 140 farmers

¹¹ The final sample is of 276 households. This is due to unavailability of adequate number of eligible households in ward number 5. Since it is pre-dominated by very large landowners who have access to resources, they prefer to send their kids to private school instead of government schools.

¹² In control panchayat, 70 beneficiary households under ICDS scheme and 70 beneficiary households under MDM scheme are interviewed totaling to 140 respondent households.





after the selection of students enrolled for the course to map the change in knowledge pre and post intervention using purposive sampling.

3 FINDINGS

3.1 AADARSH PANCHAYAT

The project component includes the integrated approach implementing a series of activities to achieve a series of outputs and outcomes for attainment of the long-term goal of developing *Bhandari* into a model *panchayat* (Figure 1). The current section is subdivided into eight sub-sections and discusses status of the selected villages on parameters of *aadharsh panchayat*.

3.1.1 The standard of living

The households in the study region lives in a patriarchal common across rural India with an average family size of four (Census 2011). The inhabitants are mostly engaged in agriculture (approximately 80%) either in form of share cropping or cultivating own land or a combination of both. There is a considerable share of small landowners (approximately 50%) owning less than one *bigha* of land. Both seasonal and permanent migration are undertaken by male members especially among the landless households. The living conditions as observed in the study region are abysmal; majority of the households dwell in *kutcha* houses with mud or bamboo walls coupled with hatch or clay roofs (Figure 3).

Figure 4: Open waste water disposal



Figure 3: An image of kutcha house in the region



Only two-fifth of the road network is reported to be robust. With respect to drinking water situation, it is found that drinking water is available through public hand pumps across all the households. Since the ground water level is very shallow in the region, availability of water for drinking is not a problem. Furthermore, on exploring the sanitation condition, *mukhiya* informed that approximately 80% of the households have toilets in the experimental panchayat. Of these toilets, 40% have been constructed under Swachch Bharat Mission. However, during transect walks, open defecation was observed with human fecal matter visible on the streets itself. In addition, household waste

water is disposed off on the streets as well with complete absence of any of drainage system. 65% respondents from experimental *panchayat* and 51% respondents from control *panchayat* assert that waste water flow is in open. The sight of swamps, water logged streets, sewage water pits is very common in the study region (Figure 4). This leads to multiple breeding grounds for mosquitos and other disease causing insects. According to 97% respondents, it results in mosquito breeding consequently resulting in disease like malaria. One of the project activities plans to form group of female sanitation ambassadors which is expected to improve the hygiene and sanitation condition in the region.

One of the project components is to introduce income diversification activities like bee-keeping and mushroom cultivation. The current situation in the region reveals that none of the respondents of the study





is practicing these occupations. Therefore, introduction of these activities will be a completely new livelihood enhancing opportunity for the population at large.

3.1.2 Situation of land ownership and tenancy

Ownership of land defines the initial endowment which influences the livelihood generation capacity of a rural household. The inhabitants in this region can be divided into three major categories- landless (one third); households owning small landholdings (approximately 50%); and households owning large landholdings (10%). The landless households have limited earning opportunities in form of either of share cropping, agricultural labor and casual daily wage laborer. A small proportion are also found to be migrating seasonally to Punjab, Haryana and Gujarat for agriculture labor work. Another option available for the male member is to settle permanently in cities like Delhi, Pune, Mumbai etc. and send remittances to their family members. Many landless families do not have their own land for residence as well and live in small colonies established on the land of the large landowner and plans to continue to cultivate the same land exclusively on shared contract for the rest of their lives. The small landowners are also found to take additional land on sharecropping to produce sufficiently to meet their ends. The tenancy contract involves no sharing of cost of cultivation between the owner and the tenant. All cost and risk is to be borne by the tenant individually but half of the total harvest is shared with the landlord. Large landowners are largely found to lent out their land either on lease or on share cropping business. These landowners are concentrated majorly in village Manchi and they own large acres of land within and beyond the geographical territory of Bhandari panchayat. They mentioned that a considerable proportion of their owned land is becoming unfit for cultivation. The low lying land is subjected to water logging after the small canal Purani Dhar Bagmati changed its natural course during the monsoons. In the yesteryears, the land was still used for paddy cultivation. But in past few years, the water is polluted with waste from a closely located sugar mill, Riga Sugar Mill. The water logged is now black in color and stays on the field till it gets evaporated during summer making the land unfit for rabi cultivation.

3.1.3 Farming practices- for major crops

Bihar is endowed with dense network of rivers securing the region with abundant water resources. The northern plains having highly fertile alluvial soil is fit for cultivation of wheat in *rabi* season and paddy in

khareef season. The six major crops cultivated in the study region are found to be wheat, mustard, paddy. potato, sugarcane and maize (Figure 5). In addition to these crops, farmers also grow lentils and vegetables but at a very small scale. Due to dearth of land resources, staples



like wheat and paddy are cultivated extensively (more than 95%) for self-consumption and the little left is sold to local trader (popularly known as *baniya*) at prices less than minimum support prices offered by the government. Farmers in the experimental *panchayat* reported that over the years, cultivation of maize and potato has reduced owing to widespread threat from wild boars destroying the standing crops. The third popular choice of crop for the experimental farmers is different in two study groups. In control *panchayat*,



the proportion of maize growing farmers is five times more than in experimental *panchayat*. In experimental *panchayat*, farmers (one-third) growing sugarcane ten time more than the farmers in the control group. Mustard is spread in small amounts together with wheat cultivation only for household consumption. Very few farmers cultivate mustard exclusively (less than 3%).

In the following section, we discuss the cultivation practices of the farmers in the study region for the six major crops. Cultivation process includes ploughing, sowing, irrigation, weeding, use of chemical and organic fertilizers, harvesting. The section also covers information on yield and cost dynamics of the crops under study.

Methods of Ploughing: mechanized or traditional

The primary purpose of ploughing is to turn over the upper layer of the soil, bringing fresh nutrients to the surface, while burying weeds and the remains of previous crops and allowing them to break down (Roger-



Estrade et al, 2010)ⁱⁱⁱ. In the study region, farmers mainly depend on rented tractor for ploughing the field before sowing (96% respondent farmers in experimental panchayat 99% respondent and farmers in control panchayat do not own tractor). The use of traditional method of ploughing is limited to a

very few households (less than 5%) (Figure 6). The findings reveal that farmers plough relatively more number of times (ranging from two to six) by a cultivator as compared to rotavator (once or twice). The per unit rental cost of cultivating with cultivator is INR 40-50 and with rotavator is INR 60-70. On an aggregate basis, rotavator is relatively inexpensive and is used widely. However, farmers believe that cultivator ploughs deeply and is a better way of land preparation but they choose cheaper option. In addition to initial land preparation, rotavator is applied again by almost all farmers post sowing of seeds, specifically in the case of wheat cultivation. Similarly, post plantation of sugarcane shoots, earthing up is a common practice with either use of spade manually or with plough pulled by ox.

Tuble 1. Average number of plougning cycles						
Ploughing cycle	Experimental panchayat	Control panchayat				
Wheat	3.3	3.2				
Mustard	3.3	2.7				
Paddy	3.6	3.3				
Potato	3.8	3.1				
Sugarcane	4.1	3.3				
Maize	3.2	3.2				

Table 1	· Average	numher	of ploughing	o cvcles
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The average number of ploughing cycles is ranging between three to four in all the crops (Table 1). With an average cost of ploughing one *bigha* of land once being around INR 1100¹³, farmers spend approximately INR 3800 per *bigha* on an average on ploughing exclusively. However, none of the farmers are found to be using zero tillage technology. The technology minimizes the number of ploughing cycles and help in direct seeding of wheat and paddy. The project plans to introduce this technology so as to minimize the investment needed in ploughing and reduce the overall cost of cultivation considerably.

Use of compost as fertilizer

Use of decomposed livestock fecal waste in the soil helps in improving soil structure so that soil can easily hold the correct amount of moisture, nutrients and air. This facilitates the growth of the plant as a fertilizer (Dalzell et al, 1987)^{iv}. In the study region, farmers who own livestock are largely practicing the use of compost in field after land preparation. Compost is used by 65% of respondent farmers in experimental

panchavat and 75% respondent farmers in control panchayat. There is limited practice of using purchased compost (11%) in experimental panchayat and 6% in control *panchayat*). Therefore, the amount of compost applied largely depends on compost available at household. Generally, all the animal fecal waste is collected over the year and left to decompose naturally in a heap (92% in experimental panchayat and 88% in control panchayat) (Figure 7). On enquiring about the amount applied as general practice, farmers mentioned that one trolley (76 cubic feet) of compost is applied on 0.2 bigha (four katthas) of land. Thus, on an average 19 cubic feet of compost





is added to 0.05 *bigha* (one *kattha*) land. There is no evidence of added chemicals or microbes to catalyze the process of decomposition in the region. The time taken to prepare compost is reported to be six months but is applied mostly after a year. Some farmers use compost every season and some use once in a year during land preparation. The composting demonstration planned under the project would educate the farmers on scientific methods of composting which not only speeds up the decomposition process but also leads to effective decomposition to produce bio-fertilizers.

Sowing: Type of seeds; seeding practice and seed rate

Sowing is very crucial for the whole cultivation process. There are lot of considerations that need to be made before the final act of sowing. These considerations include choice of time and weather conducive to effective seed germination; type of seeds- local, certified or hybrid; method of sowing- mechanical or manual; broadcasting or line sowing, etc. The project plans to educate farmers on all these aspects and provide demonstrations of efficient seed rate with appropriate seed quality using mechanized sowing methods. This is intended to have huge impact on the final production of the major crops.

In the study region, the method of sowing in case of wheat and mustard cultivation is found to be primarily broadcasting only. While, manual transplanting methods are employed for paddy sowing. The manual labor

¹³ Average cost for one kattha land for one plough is INR 57. Therefore, for one bigha land it is computed to be INR 1140.



cost for transplanting paddy is an expensive activity where the labor rate ranges between INR 100-300 per day. Some farmers also provide one-time meal to laborers in addition to wages in cash. Manual line sowing is a general practice for sugarcane, potato and maize cultivation. There is no evidence of use of zero tillage machine for wheat and paddy sowing. With the use of zero tillage machinery, crops can be sown almost immediately after the harvest of the previous crop which normally coincides with the optimum sowing time^v. Since conventional tillage is a time consuming, optimum sowing usually gets delayed. Additionally, no farmer is found to be using machines like potato planter for planting of potato and sugarcane. The mechanized sowing process is expected to reduce the time, energy and cost of sowing.

	Experimental panchayat	Control panchayat
Wheat	51.1	53.5
Mustard	3.0	2.0
Paddy	6.7	6.9
Potato	633.3	630.0
Sugarcane	1487.7	1550.0
Maize	8.9	7.1

Table 2: Seed rate for major crops (Kilograms per bigha)

The popular choice of seeds is certified in wheat (63% in experimental *panchayat* and 74% in control *panchayat*) with an average seed rate of 51 kilograms in experimental *panchayat* and 54 kilograms in control *panchayat* for one *bigha* land (Table 2). In mustard cultivation, majority of farmers (62%) in experimental *panchayat* are using stored seeds applying 3 kilograms in one *bigha* plot; while, in control *panchayat*, use of hybrid seed (100% farmers) in smaller larger quantity is found (2 kilograms per *bigha*). More than two-thirds of the farmers apply hybrid seeds in paddy cultivation with an average seed rate of 6.8 kilograms per *bigha*. Potato is sown using local seeds (100%) while maize is sown using hybrid seeds (more than 95%). While the shoots for sugarcane plantation are normally purchased locally from neighbor's farm with an average seed rate of approximately 1500 kilograms per *bigha*.

Irrigation

Irrigation is the process through which controlled amount of water can be supplied through artificial means such as pipes, ditches, sprinklers etc. The main objectives of irrigation systems is to help agricultural crop growth providing adequate soil moisture, especially to reduce the effect of inadequate rainfall (Roy and Shah, 2002)^{vi}. Since Bihar lies in the region of abundant water resources, irrigation is provided to almost all the land under cultivation. The common extraction source being used is bore well operated by diesel pumps. To irrigate 0.05 *bigha* (one *kattha*) of land, 0.50 to 0.75 liters of diesel is generally used costing to



INR 30 to 50^{14} per unit of land per irrigation cycle. Farmers who buy water for irrigation purchase at rate ranging from INR 100 to INR 125 per hour. It usually takes half an hour to cultivate a unit piece of land. In wheat cultivation, irrigation is provided twice or thrice in a season (Figure 8). For paddy cultivation, standing water is required

¹⁴ Calculated at an average diesel price of INR 65 per liter



throughout the season which is mainly provided by natural precipitation. In addition to this, farmers are found to irrigation twice or thrice to maintain the four to five centimeters of standing water. All the crops are provided sufficient irrigation cycles due abundance of water resources. Wheat, mustard, paddy and potato receive two-three cycles of irrigation on an average. Crops such as sugarcane and maize require additional one to two irrigation cycles. As part of package of practices, the farmers would be educated on efficient number and time of irrigation.

Weeding

Weeding is an important control method which includes removal of weeds either manually or with use of chemicals. The unwanted plants compete with the crop for space, water and nutrients, and their removal gives adequate space, water and nutrients to the crop under cultivation (Vissoh et al, 2004)^{vii}. Weeding helps to loosen the soil which helps in more rapid infiltration of water and roots of the cultivated plants can develop in a better way. The farmers of the study region are found to be using weedicide in wheat and mustard cultivation while practicing manual weeding in paddy, maize and potato cultivation. The number of days required to remove weeds depends on the density of the weed propped. This mainly ranges between ten days to thirty days per *bigha*. The labor cost for weeding ranges between INR 100 to 150 amounting to cost of weeding ranging from INR 1000 (minimum) to INR 4500 (maximum) for one *bigha* plot of land. Sugarcane does not require weeding.

Use of chemical fertilizers

Use of chemical fertilizer helps maintain the nutrient balance of the soil leading to better farm productivity (Mandal et al, 2007)^{viii}. However, it is important that these chemical fertilizers needs to be used in correct quantities owing to the deficiency in soil to reap maximum benefit¹⁵. Before the initiation of the project, the findings from the selected group of villages reveal that majority (more than 95%) of farmers use traditional chemical fertilizers like Urea and DAP in almost all the major crops. Potash (83% in experimental *panchayat* and 70% in control *panchayat*) has also found to be third favorite followed by zinc (approximately one-fourth farmers in both the regions) (Figure 9). Other chemical fertilizers are used by miniscule proportion of respondent farmers (less than 10%).



Figure 10 provides details of proportion of farmers using four main fertilizers in six major crops¹⁶. The use of these fertilizers is slightly more in sugarcane cultivation as compared to other crops- paddy, wheat,

¹⁵ It has been observed in cases like Punjab where over use of chemical fertilizers have led to double whammy of higher cost and soil degradation.

¹⁶ For example, among the farmers who are growing wheat, 100% are found to be applying Urea, 96% DAP, 79% Potash and 24% Zinc in its cultivation.



mustard, maize and potato¹⁷. Farmers generally use DAP and Potash together before or with sowing. Farmers revealed that combination of DAP and potash can be replaced with composite fertilizer having Nitrogen, Phosphorus and Potassium in ratio of 12: 32: 16 (found to be used by only 1% of farmers). The information of use of fertilizers like Potash, Zinc, Boron, Composite mixture by the farmers has been received from an informal source; the shopkeeper generally suggests the new available fertilizers and has no relation with actual soil deficiency. All these fertilizers are added at the time of sowing in wheat and before flooding in paddy cultivation. The second round of fertilizer is added to field with each irrigation. With each irrigation, two kilograms of Urea is added in cultivation of wheat and paddy.



An important element of package of practices to be distributed includes adequate fertilizer recommendation after understanding the deficiencies in soil of the region. The project would lay special emphasis on use of balanced fertilizer with appropriate dosage so as to reap maximum production benefits with limiting the wasteful expenses on overuse of fertilizers which affects the soil health in the long run. A formal source of information with technical expertise is expected to lead the change in farming practices in study region for better.

Crop economics: yield, cost and income

The output produced is very crucial for farmers being the reward for the economical and physical investment by the farmers. The average yield for wheat ranges between nine to ten quintal per bigha and the average yield of paddy varies between eleven to thirteen quintals per *bigha* (Table 3). It is important to note that a few farmers in the experimental villages have reported spoiled (completely as well as partially) produce of paddy and maize due to floods or menace of wild boars. This resulted in very poor production of these crops in their farms and is also pulling down the average yield figures for the group of experimental farmers.

Table 5: Yiela of major crops (quintals per bigha)					
	Experimental panchayat	Control panchayat			
Wheat	9.8 (220)	10.3 (140)			
Mustard	2.5 (8)	3.5 (3)			
Paddy	11.2 (227)	12.5 (140)			
Potato	31.0 (6)	55.0 (10)			
Sugarcane	179.2 (73)	183.1 (4)			
Maize	16.1 (12)	17.7 (39)			

Figures in the parentheses represent total number of respondent farmers growing particular crop

¹⁷ The use of chemical fertilizer among the farming population is almost identical in all the major six crops



Crops like mustard and potato is cultivated only by a small proportion of farmers. Cultivation of maize and potato have been reducing over the last few years primarily due to menace of wild boars. The average yield of maize in the study region before the implementation of the project is found to be ranging between sixteen to eighteen quintals per *bigha*. All these crops are important from the project point of view; crop demonstrations are planned for wheat, paddy, maize and mustard; zero technology would be introduced in wheat and paddy cultivation, potato planters would be promoted in planting of sugarcane and potato; all these activities are intended to increase the yield of these crops directly or indirectly.

In terms of cost of cultivation, money is spent buying inputs (seeds, fertilizers, water for irrigation) and hiring labor (ploughing, sowing/transplanting, weeding, harvesting¹⁸, etc.) during the months of cultivation. Labor could use his own family labor or hire labor depending on land size, availability of family labor and finances available. Before the implementation of the project, baseline data from the study region reveals that on an average, a farmer spends nine thousand to fourteen thousand rupees in cultivation of one-*bigha* plot for the five of the major crops in the region (Table 4). Mustard requires least investment but also reaps least net income. This could possibly be the reason for low adoption of mustard as a crop in the study region. Potato and sugarcane are found to be most remunerative crops with generation of large amount of net income. The cost saving technology and package of practices might be able to address the gap between the two groups.

	Average cost (INR per <i>bigha</i>)	Net Revenue (INR per <i>bigha</i>) ¹⁹		
	Experimental <i>panchayat</i>	Control panchayat	Experimental panchayat	Control panchayat	
Wheat	9239	9459	4405	4909	
Mustard	5914	7067	2335	4547	
Paddy	10129	10616	2580	3656	
Potato	14933	12300	16842	44075	
Sugarcane	14436	13489	33399	35406	
Maize	12026	10756	4717	7639	

Table 4: Average cost and profit of cultivating one bigha plot (in INR)

Sugarcane is the only crop which is cultivated exclusively for commercial purposes in this region (Figure 11). A considerable more proportion of farmers growing wheat and paddy are found to selling the produce. Potato cultivation in experimental *panchayat* is largely for subsistence. Furthermore, there is very limited access to formal market for selling the agriculture produce. Farmers growing wheat (99%), paddy (93%) and maize (89%) have to rely on local buyer (indigenously called as *baniya*) and take the price offered by him. More than two-third (70%) of potato growers are selling in local market. The sugarcane produce is largely sold to the nearby located sugar mill (80%). Farmers revealed that the amount for last year produce

¹⁸ In study region, harvesting is done manually by employing either family labor or hired labor. The general terms of trade in harvesting of wheat and paddy produce for hired labor is in kind. If the harvest is shared before threshing, labor takes one out of twelve to sixteen bundles. If, however, the harvest is shared post threshing, terms of trade are applied amounts to one- fourth of the total harvested produce. Harvesting of sugarcane produce is dependent on the time of harvest. If the harvest is done during November and December, livestock owners generally harvest the produce for free. They in turn take home the residue used as fodder for their cattle. If the harvest is done during the month of march, the cost of labor is INR 50 per quintal harvested.

¹⁹ Revenue is calculated at average selling price reported by farmers. The average price for wheat is INR 1393 per quintal, for mustard is INR 3350 per quintal, paddy is INR 1138 per quintal, potato is INR 1025 per quintal, sugarcane is INR 267 per quintal, and for maize is INR 1042 per quintal.



is still due. A few farmers (4%) are also found to be processing the sugarcane harvest and produce jaggery which is further sold in the local market.



One of the component of the project includes distribution of solar sprayers for use of sustainable solar energy instead of hand operated/diesel operated sprayers; and of maize shellers for gentle kernels separation of from the cobs and removal of rachis. Before

the implementation of the project, it is found that none of the respondent farmers own these products as a part of their current farming practice.

3.1.4 Information on animal husbandry

Livestock provides financial support to the households with limited means especially during lean season.

More than three-fourth of the respondent families in both experimental and control panchayats practice animal husbandry as a livelihood supporting activity (**Error! Reference source not found.**12). Farmers are largely found to own cows, buffaloes and goats. While cow and buffalo are reared for milk, goat is generally reared for meat. On an average, a household own one cow or/and one to buffaloes or/and two-three goats. The



average milk produced by both cow and buffalo is higher for large farmers in both experimental and control *panchayat* (Figure 133). Since large farmers have relatively more access to resources, they are in a better capacity to provide sufficient nutrients to their cattle. The milk produce is sold to SUDHA Dairy milk collection point at common price. Respondents reveal that price is not related to the quality of milk as there is no fat quantity checked when they sell the milk.



With respect to access to veterinary services, there is limited availability of government services. Majority of the livestock owners call the private veterinary doctor who personally visit the infected animal and provide immediate diagnosis and treatment. Some owners also give medicine to their cattle on recommendation of pharmacist after they have explained their understanding of disease to him. The project aims to address this gap where in animal health camps would



be organized to provide solutions to animal health problems thereby improving the overall productivity of cattle.

3.1.5 Insights from farming community on knowledge resources

The National Mission for Sustainable Agriculture (NMSA) was implemented during the Twelfth Plan with the objectives to make agriculture more productive, sustainable and climate resilient; to conserve natural resources; to adopt comprehensive soil health management practices; and to optimize utilization of water resources among others. Under this scheme, government agencies conduct soil test for farmers free of cost and recommend use of deficient soil nutrients based on the results in the Soil Health Card (SHC). In the study region, soil sample has been tested for only 5% farmers in both experimental and control *panchayat* (Figure 14) in the least three years. The majority of farmers who got their soil tested are relatively big farmers having more than one *bigha* land. The source of soil testing is majorly *krishi salahkaar* only. Among the ones who got their soil tested only 27% of farmers in experimental region received soil health cards. The Soil heath cards reports showed deficiency of Zinc, calcium and boron. The situation is expected to change with the implementation of project through conducting soil test, based on which recommendations of fertilizer would be made.

farmers' farmers have attended meetings in last three years. The farmers who attended farmers' meeting mentioned that these meetings were largely organized by block officer from the agriculture department and krishi salaahkaar. The topics of discussion focused on agriculture issues and solutions with respect to paddy, sugarcane and wheat crops only. A few also mentioned discussions on vermicompost and organic manure.





The reach of these meetings and soil nutrient management advisory services of government is limited to a very small proportion of farmers, who are mostly large farmers. The small and marginal farmer who requires a formal information source for seeking solutions to their concerns pertaining to agriculture have no access to such services. Not just concerns, the information channels available for information on new farming methods, inputs and agriculture extension services are miniscule. On exploring the availability of various sources of knowledge on better farming practices, it was found that vast majority of farmers rely on fertilizer shopkeeper (more than 90%) for recommendation and suggestion. They have limited information on soil deficiency and apply nutrients as suggested by shopkeeper. One cannot ignore the incentive available to shopkeeper to increase his revenue through increased sales since farmers trust his words. *Krishi Salahkar* (government appointed agriculture information officer) has rarely made visit to the villages to spread information. Influential farmers of *Manchi* village having large resource base revealed to be travelling to block office to obtain information schemes and knowledge on farming related issues. The information gap is expected to be narrowed with execution of large number of farmers' meetings and training by technical experts providing customized solutions during the course of the planned project.





3.1.6 In-house nutrition through kitchen gardening

A kitchen garden is an inexpensive, regular and handy way to ensure supply of fresh vegetables which are basic to nutrition. The green vegetables contain vitamins and minerals which protect us against diseases solving the twin problems of food insecurity and malnutrition. As a part of project initiative, kitchen garden would be provided to vulnerable households providing them with consistent supply of nutrition. In the study region, as a part of current practices, kitchen gardens are being used by approximately half the number of households for both type





of farmer groups (Figure 15). The kitchen gardens planted by the respondent households have only three plants on an average. The common vegetables grown are bottle gourd, ridged gourd, ladyfinger, eggplant, potato etc. Common fruit trees planted around the houses are guava, banana, tomato, pomelo, lemons, etc. However, a majority of the respondents (98% in experimental and 97% in control *panchayat*) revealed that these are not sufficient to meet their requirements and therefore they have to largely buy from the market for their consumption. The project with distribution of ten plants (eight vegetables and two fruits) per household would help in reducing the dependency on market considerably.

3.1.7 Summary of agriculture situation

Farmers in the study region are using mechanized ploughing methods (tractors) instead of conventional bullock ploughs (more than 95%). But other agriculture practices like sowing, weeding, harvesting are largely done using manual labor with no use of advanced technology like zero tillage, potato planter, maize shellers, etc. The abundance of water and frequent floods leaves farmer with large acres of uncultivable land and dampened harvest respectively. The use of chemical fertilizers in the region includes both conventional fertilizers like Urea and, DAP with a considerable proportion using, Potash and Zinc as well. However, the use of these fertilizers is not in accordance with soil nutrient balance but with recommendation by the local shopkeeper. There exists no technical support from any formal knowledge source on agriculture. Only 13% large farmers and 2% marginal farmers have attended farmers' meetings organized by government agriculture department personnel. Soil testing is also limited to 5% respondent farmers and soil health cards is received by only one-fourth of them. Composting is done with primitive methods (92%) and kitchen gardening limited with an average of three types of vegetables/fruits (55%) like bottle gourd, ridged gourd, ladyfinger, potato, tomato, lemons, etc. Due to this, they households are largely dependent of market for consumption. Livestock provides support to more the one-third of the farming population. The milk yield is higher for large farmers having access to resources (The average milk yield for cow is 6 liters and for buffalo is 4.5 liters in a day). There also exist a very limited government channels for veterinary services due to which inhabitants rely on highly expensive private doctors for treatment of their animals.

3.1.8 Status of local governance

The Government of India (GOI)has introduced several key welfare schemes for uplifting people from poverty. The government has taken steps to combat under- and malnutrition through the introduction of provision of mid-day meals (MDM) at schools, Integrated Child Development scheme(ICDS) to provide supplementary diets to pregnant and lactating mothers, and subsidized grain for those living below the poverty line through a public distribution system (PDS) etc. The government has also launched pension for the underprivileged group which aims at ensuring minimum national standard for social assistance in



addition to the benefits that states are currently providing. But there are few studies^{ix},^x that points to gaps in implementation of schemes at various levels. To overcome the problem in implementation, SMSF in association with PTC plans to mobilize the community about the above stated social welfare schemes.

3.1.8.1 Integrated Child Development scheme (ICDS)

The Integrated Child Development Services (ICDS) Scheme is one of the flagship programmes of the Government of India and represents one of the world's largest and unique programmes for early childhood care and development. The services under the ICDS scheme includes providing pre-school non-formal education and breaking the vicious cycle of malnutrition, morbidity, mortality through providing Supplementary Nutrition, Immunization Health check-up and referral services. The beneficiaries under the Scheme are children in the age group of 0-6 years, pregnant women and lactating mothers. In this section, we will explore the awareness level of the community and functionality status of ICDS scheme.

Levels of awareness about the scheme

To reap the impact of any programme, mobilization of community and awareness generation plays an important role. The project by SMSF and PTC would impart trainings in *Sitamarhi* to create comprehensive awareness about ICDS which is expected to improve the delivery of scheme. The findings of the study reveal that before the project implementation, all the respondent beneficiaries are aware about ICDS scheme which is available in their village but they are not well aware about benefits and the target groups of the schemes; only 29% respondents of experimental panchayats and 19% respondents of control panchayats are aware of all three types of beneficiaries under the scheme (children below six years of age, pregnant women, and lactating mothers) (Table 5). The services of ICDS are covered under *Anganwadi* Centre (AWC) and only 2% respondents are aware about all the services provided in AWCs (Figure 16).

	Table 5. The cless regarding beneficially					
	Pregnant	Lactating	Children less than 6-	Aware of all three		
	Women	Women	year old	beneficiaries		
Experimental	43.9%	39.6%	93.5%	29.0%		
Control	44.3%	31.4%	100%	19.0%		

	Table 5:	Awareness	regarding	beneficiary
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The ICDS scheme mandates to open AWC for 4 hours and 6 days in a week. Very few respondents (Experimental- 17% and Control- 4%) are aware of how long AWC opens. Also, 55% respondents from experimental *panchayat* sand 29% respondents from control panchayats are aware of number of days an AWC should open. *Anganwadi* Worker (AWW) and *Anganwadi* Worker Assistant (AWWA) are the individuals who execute the scheme. They provide ICDS services to beneficiary including pregnant and lactating women and children aged below 6 years. Majority of the respondents (Experimental-76% and

Control-66%) are aware about AWW and AWWA. In terms of infrastructure, there is no proper space/room for AWC therefore it operates at residence of AWW/AWWA (Figure 17). As AWC operates





at residence of AWW/AWWA, display of menu is not possible. Also, some of the beneficiaries do not visit AWC due to its location.

Figure 17: A glimpse of Anganwadi Center



Status of implementation of early childhood care and development scheme

Among the facilities of ICDS, Auxiliary Nurse Midwifery (ANM) immunize children (upto 6years of age) and pregnant women with the support of AWW and AWWA. The findings reveal that 99% respondents from experimental panchayats and 96% from control panchayats have immunized their child. 72% respondents from experimental panchayats and 40% from control panchayats assert that AWC opens regularly. Among the early childhood care and development services of AWCs, education of children aged three to six years is important component of

ICDS. 68% and 37% respondents from experimental *panchayat* and control *panchayat* regularly visit AWC for supplementary nutritious diet and playschools. One of the mandates of AWC is to provide cooked food to children. Out of those who visit AWC regularly, 63% respondents from experimental *panchayat* and 50% from control *panchayat* assert that they get cooked food. The reasons for not going to the centers are - distance between the AWC and children homes, no playschool for children, and nobody calls the children to the center, etc.

Looking at the community satisfaction, it is found that 66% from experimental *panchayat* and 29% from control *panchayat* respondents are satisfied with the service delivery at the ICDS centers. However, no-one had filed any complaint. The reason for not filling complaint is either government officials hardly listens to them or they are not aware of the proper grievance redressal mechanisms.

In addition to the responses by the beneficiary households, non-participant observation has been done for the physical structures, facilities, and services provided at the ICDS centers in selected panchayats. It is found that most of the centers do not have proper infrastructure and are being operated at the residence of the AWW or in a rented room. On average, everyday AWCs centers opens for four hours in the morning. Only 1 AWCs (Ward No. 1) have a kitchen and in the rest of the villages, meals are cooked in the open or in the kitchen of AWW's residence. 40% of the centers are serving different meals every day (as prescribed), while 60% of the centers are serving either the same meal every day or changes food less frequently. Only one center has sanitation facilities while almost all the centers (10 out of 12 AWCs) have a provision for drinking water. Also there is no Sub Health Centre (SHC), Primary Health Centre (PHC), and Community Health Centre (CHC) in the village. Health centers are approximately 4-5 kms away. For health issues, villagers visit *Belsand panchayat* which is 4-5 kms away.

3.1.8.2 Mid-day Meal scheme (MDM)

Mid-day meal (MDM) is a wholesome freshly-cooked lunch served to children in government and government-aided schools in India. The objective of MDM is to focus on improving nutritional level and attendance. The food is prepared with a minimum content of 300 calories and 8–12 grams of protein and served each day of school for a minimum of 200 days in a year to students of class 1st to 8th. In this section we will explore the awareness as well as functionality status of the scheme in the selected villages.



Levels of awareness about the scheme

To avail the benefit of mid-day meal scheme, creating awareness is necessity. The project plans to increase awareness of MDM among all beneficiaries to ensure better implementation. The findings of awareness level among the beneficiaries in the intervention area reveal that all the respondents in this region are aware about the existence of MDM. However, awareness about the benefits/services of the MDM scheme is less as parents have very limited knowledge about the display of menu and type of meal served in school. For MDM, it is mandate to display the weekly menu of six-day item to be served in MDM, about which 77% of respondents are aware that menu is displayed but the awareness levels on exact items to be served is limited. Also, different kind of food should be served in every day about which 42% respondents from experimental *panchayat* and 40% from control *panchayat* are aware.

Status of implementation of the scheme

It is mandated under MDM that good quality food is served regularly to all the government school children of class 1st to 8th without any discrimination. All of the beneficiary parents responded positively that MDM is served in all the schools. In terms of quality of food, 60% respondents in experimental and 63% respondents from control *panchayat* rank food quality as "good" and only 1% (experimental) have ranked



the quality as "very good", whereas 26% (experimental) ranked the quality as "average" (Figure 188). In terms of displaying food menu in the school, 26% and 20% of parents from experimental and control *panchayat* assert that the menu is displayed in the schools. Furthermore, most of the parents do not visit the schools and therefore they are not sure whether the menu has been displayed or not. 68%

mentioned that there is no discrimination for MDM and 23% don't know about the same. A sizable percentage (75% - experimental and 86% - control) parents are satisfied with the MDM services in the schools. No-one had any complain about the MDM. The reason behind not complaining is no-one (government officials) listens to them and also they are not aware of the available grievance redressal mechanisms.

An observation was carried out for two working days when the MDM was being served in four schools (included assessing physical infrastructure, services and functionality of MDM). It was found that food was served on both the days in all the surveyed schools. Food menu was displayed in all the schools. Kitchens are found to be in poor condition in all the schools and in Ward no. 7 *Manchi* village, food was prepared in a classroom where teachers were also teaching students simultaneously. In all the schools, sufficient utensils for cooking and serving food are available.

3.1.8.3 Food security scheme through Public Distribution System (PDS)

The Targeted Public Distribution System (TPDS) in the country facilitates the supply of food grains and distribution of essential commodities to a large number of poor people through a network of Fair Price



Shops (FPS) at a subsidized price on a recurring basis. The programme/scheme targets three economic groups namely, Priority Household (PH), Below Poverty Line (BPL), and *Antodaya Anna Yojana* (AAY), *Annapoorna Yojana*. In this section, awareness and implementation of PDS in the intervention area has been explored.

Levels of awareness about the scheme

To get the exact entitlement every month under PDS, one has to be aware of their rights and entitlements.

Therefore, the project plans to focus on creating awareness regarding stipulated entitlements. The findings of the study reveals that before the implementation of the project, all the respondents are aware of the TPDS under food security scheme. However, it has been observed that households lack detailed information on their rights and entitlements. The scheme entails different food security provisions for households falling under different income categories



distinguished by the type of ration card issued to them by the government (Figure 199). The data suggests that that more than 90% respondents in both experimental and control regions are aware about the entitlements set by the government explicitly for their own ration card category. Villagers are aware about PDS scheme but there is a gap in the knowledge about stipulated amount of PDS items (Wheat, Rice and Kerosene oil²⁰) to be distributed. Cumulatively, only one respondent is aware of the stipulated quantity and rate of wheat entitlement under the scheme for all category households.

Status of distribution of stipulated commodities under food security scheme



Distribution of prescribed entitlement depends on the awareness level of necessary community. All the respondents have been able to avail benefits regularly in last six months. Stipulate amount of PDS items should be distributed every month. Villagers assert that they get PDS supply for about 10 months in a year and quantity of items received is less than stipulated amount (Figure 2020 and Table 6). Villagers claim that ration depot holder distributes less quantity so that he/she could make

²⁰ For AAY: Wheat-14kg per household at INR2 per kg, Rice-21kg per household at INR 3 per kg, Kerosene oil-1.51 per household at INR28 per litre; Poovikta prapt: 2kg per person at INR2 per kg, Rice-3kg per person at INR 3 per kg, Kerosene oil-1.51 per household at INR28 per litre; Annapoorna: 2kg per person at INR2 per kg, Rice-3kg per person at INR 3 per kg, Kerosene oil-1.51 per household at INR28 per litre; Annapoorna: 2kg per person at INR2 per kg, Rice-3kg per person at INR 3 per kg, Kerosene oil-1.51 per household at INR28 per litre; Annapoorna: 2kg per person at INR2 per kg, Rice-3kg per person at INR 3 per kg, Kerosene oil-1.51 per household at INR28 per litre; Annapoorna: 2kg per person at INR2 per kg, Rice-3kg per person at INR 3 per kg, Kerosene oil-1.51 per household at INR28 per litre; Annapoorna: 2kg per person at INR2 per kg, Rice-3kg per person at INR 3 per kg, Kerosene oil-1.51 per household at INR28 per litre; Annapoorna: 2kg per person at INR2 per kg, Rice-3kg per person at INR 3 per kg, Kerosene oil-1.51 per household at INR28 per litre; Annapoorna: 2kg per person at INR2 per kg, Rice-3kg per person at INR 3 per kg, Kerosene oil-1.51 per household at INR28 per litre; Annapoorna: 2kg per person at INR 3 per kg, Kerosene oil-1.51 per household at INR28 per litre; Annapoorna; Annapoorna



money. There is no bio-metric system for distribution of PDS. The process of linking with the *Adhaar* card is ongoing.

There is no fixed fair price shop in the village therefore depot holder distributes the ration either from their home (in 2 wards) or in a government building (in 1 ward) in village. This infers that the arrangement of the shop is purely temporary in nature. There is no fixed day for ration distribution. The depot holders himself announce the date of PDS distribution or he update the key person to further inform in the entire ward.

	Poorvikta prapt		Annapoorna		AAY	
	Stipulated	Actual	Stipulated	Actual	Stipulated	Actual
Wheat	2	1.9	2	1.9	14	13.8
Rice	3	2.7	3	2.9	21	19.3
Kerosene Oil	1.5	1.4	-	1.4	-	1.5

Table 6: Quantity of PDS item (kilograms per person)

More than half of the respondents are satisfied with PDS delivery system (Figure 211). If PDS services are not satisfactory, then, there is a system of filing complaint against ration depot holder at district or state level. In village, those who are not satisfied with the PDS services, their limited knowledge has restricted them from taking action or utilizing the available grievance redressal mechanisms. Only 2% respondents from experimental *panchayat* have filed complaints against improper delivery of the scheme in their

villages. However, none of these complaints were formal in nature and were limited to verbal communication different to officials. The reasons highlighted for not complaining are their voice is not listened due to poverty (experimental panchayat-21%, cont-15%); no issues (experimental panchayat-56%. cont-62%); limited knowledge on grievance redressal (experimental panchayat-34%, cont-24%); and to maintain



village harmony and peace (experimental panchayat-11%, cont-5%).

3.1.8.4 Pension scheme

The National Social Assistance Programme (NSAP) is a welfare programme implemented by the Ministry of Rural Development. The programme is aimed to ensure minimum national standards in addition to the benefits that the States are then providing or would provide in future. The programme is a Centrally Sponsored Scheme of the Government of India that provides financial assistance to the elderly, widows and citizens with disabilities in the form of social pensions.



Relevant information about the pension scheme can only ensures the precise access to the scheme.



Therefore, project plans to the bencher Therefore, project plans to focus on creating comprehensive awareness about the scheme. In Bihar, old age pension for aged 60-80 years, handicapped pension and widow pension is INR 400 per head for a month and INR 500 for above 80 years of age. The finding from the region before the commencement of the project reveals that villagers are well aware about the existence of all the three type of pensions (Figure 222). However, their knowledge towards age criterion²¹ for accessing the scheme is higher for old age pension (experimental - 86%, control –

76%) than widow pension (experimental - 11%, control - 2%) followed by physically handicapped (experimental - 2%, control - 4%).

In experimental *panchayat*, 5% respondents and 7% from control *panchayat* said that members from their household should get the old age pension but they don't get as officials said that age criteria are not fulfilling. They are above 60years of age but due to lack of relevant documents or mismatched information on documents make them helpless. The problem of eligible old inhabitants not getting old-age pension is expected to magnify for the population at large. Four villagers have complained against the inconvenience and the mode of complaint was informal in nature. The villagers shared that there is no resolution of complaints filed by them.

3.1.8.5 Other government schemes

Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) is an Indian labour law and social security measure that aims to guarantee the 'right to work'. It aims to enhance livelihood security in rural areas by providing at least 100 days of wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work. In *Sitamarhi* villages, it is found so far around 1200-1300 job cards have been issued. In the last two years, work of road leveling has been done and people were paid on an average INR 177 per day.

Pradhan Mantri Awas Yojana (PMAY) - 'Housing for All' has been announced by Prime Minister in order to empower people to get their dream home in 2015. Under this scheme, Central government provides financial assistance through lending Institutions to eligible beneficiaries (Lower Income Group/Economically Weaker Section (EWS/LIG) and Middle Income Group (MIG – I & II)) across all statutory towns as per 2011 census and their adjacent planning area. Under this scheme, in the intervention area, 70-75 houses have been constructed for which subsidy of INR 130,000 has been availed by each household.

Har Ghar Nal Ka Jal Scheme has been launched in 2016 with the aims of providing clean drinking water to every citizen of Bihar, without any discrimination. Under this scheme, piped water supply are provided to

²¹ Age criteria for old age pension is 60 years, handicapped pension is 18 years and widow pension is 18 years



every household with a view to end their dependence on Hand-pumps and other sources of drinking water. In the study area, so far around 500-600 households have been benefitted under the scheme.

3.1.9 Ward level planning- awareness and implementation

Gram Panchayats (GP) are key local government institutions, near and accessible to the local citizens, to promote economic development and social justice in their areas. However, it is often argued that GPs do not function optimally^{xi}. The *gram panchayat* is divided into wards and each ward is represented by a Ward Member who is elected by the community. Key role of the elected members is to represent the interests of the community and the council. This section comprises of knowledge level of ward member and the way they are functioning in the intervention area.

The findings on the awareness level of ward members



in the region before its intervention reveals that all the members are aware of their membership as a ward member but their awareness about their major roles and responsibilities is meagre (Figure 233 and Table 7). Figure 24 provides a glimpse of awareness of roles and responsibilities of ward members along with the work done in their village in the last two years.

Responsibilities of gram panchayat	Percentage of respondents aware
Village level data	7.1%
Mobilize parents regarding education	21.4%
Construction of toilets	64.3%
Development of Drainage, playground	50.0%
Maintain cleanliness	35.7%
Village development plan	35.7%
Provision of water	71.4%
Provision of electricity	42.9%

Table 7: Awareness about roles and responsibilities of gram panchayat

For development of a village, proper plans need to be prepared by the *gram* panchayats which is sent to line departments where budget heads are added, it is then submitted to BDO office. *Gram Panchayat* Development Plan (GPDP) is participatory planning which involves the community, particularly the *gram sabha*, in the formulation of priorities and projects and would also have to ensure the mandates of social



justice and economic development mentioned in Article 243G. The results from the intervention villages



reveal that only 36% of the ward members are aware about Gram Panchavat Development Plan. According to all the ward members, work has been done by *panchayat* in last two years except for 1 member (from Ward No - 3). Ward member of ward no. 3 asserted that she doesn't participate in any village panchayat work, and her husband used to handle all the panchayat work.

Out of 14 ward members, only 5 members knew about

GPDP. Of them, only 80% said the correct composition of members while drafting GPDP. All those members who were found to be aware about GPDP have prepared plan in last 2 years. As per *mukhiya*²² and ward members, the submitted plans of ward no.1, 5, 8 and 12 have been sanctioned and *panchayat* got the fund for development. However, awareness about the sanctioned amount is limited.

Gram Sabha is a meeting of all the members who are above eighteen years of age who live in the area covered by a *panchayat*. 57% ward members asserted that *gram sabhas* are held in their village. It is mandatory to conduct three *gram sabha* in a year. Out of aware respondents, 38% (three out of eight members) said that *gram sabhas* should be held thrice a year and 25% (two out of eight) mentioned that it has been conducted likewise in their ward. Half of the ward members do not know the responsibilities of *gram sabha* and other 50% know only one or two responsibilities of *gram sabha*. Therefore, for development of village, it is required to create awareness about the role and responsibilities, *gram sabha*, GPDP so that same can be implemented for progress in the village.

3.1.10 Summary of governance situation

Overall, community is found to be aware about the existence of major government schemes i.e. ICDS, PDS, MDM, Pension etc. But their in-depth knowledge about the provisions under all the schemes is poor with an exception to PDS scheme. AWC do not have proper designated space for its operation; most, AWC operates from residence of worker or helper owing to which some of the ICDS beneficiaries don't visit AWC. Very few respondents (2%) are aware of all provisions under ICDS which also hampers the access to ICDS scheme. MDM is served in all the schools about which all the parents are aware. About 60% of respondents found MDM as good. 74% of the respondents are not aware about the menu being displayed in school and 22% do know if the meal is changed according menu or not. Lack of awareness about MDM is largely because most of the parents don't visit school themselves. PDS is distributed for ten months in a year and community doesn't report that as an issue. Ward members have limited understanding of their roles and responsibilities. Very few ward members (36%) are aware of GPDP which is a major component

²² The elected head of the panchayat leading the group of ward members.



of planning and development of a village. The issue of lack of awareness leads to series of implementation failure in term of lack of transparency in displaying food menu, the error of inclusion, and lack of resolution of complaints. The situation calls for spreading information on the detailed provisions and facilities of these schemes so that action can be taken for better access and benefits.

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3.2 HUMARI PATHSHALA

High-quality school infrastructure facilitates better coaching, improves student grades, and reduces dropout rates. (Barret et al, 2016)^{xii}. The current project also aims at providing similar outcomes with a series of activities which is inclusive of both physical infrastructure as well as building capacities of responsible management personnel. Under the project, the infrastructure planned for the schools are- room, boundary wall, solar electrified LED providing audio-visual learning systems, playground, toilets and drinking water facilities, etc. The elected members of SMC would be trained on their responsibilities as a part of mandate of the government as well under the sustainability initiative of the project. This section covers the detailed aspect of the current availability and functionality of the physical infrastructure and facilities important for providing conducing learning environment.

3.2.1 Basic information

The total number of government schools sanctioned in Bhandari panchayat is eight. However, only five

schools have physical infrastructure which accommodate staff and students of other three schools as well. The project plans to cover two schools located in ward 1 and 9 in the experimental *panchayat*. The school in ward number 1 (Figure 255) is a primary level school which accommodates students and staff of ward number 3 primary school as well. Similarly, school in ward number 9 is middle level which accommodates students and staff of ward 11 and 12 schools.

In terms of resource sharing, school in ward 9 offers the open area under the tree for the other schools to conduct classes and play since the school itself has paucity of rooms. The meal for the students of both schools is prepared in one shared kitchen. There are five teachers for eight classes of students with an average teacher pupil ratio of 1:60 (Table 8). School in ward 1 also shares the kitchen and classrooms with other school



Figure 25: A glimpse of ward 1 school

students. Sadly, the physical infrastructure of the project schools are themselves dilapidated but have to share their limited resources with other schools as well. The teacher pupil ratio for this school is 1:38 but three teachers are expected to teach students of five classes.

It is also found that while the enrollment rates of middle school more or less stagnant (moderate 3% rise in 2018 and no change in 2017), it is continuous decreasing for the primary school. The dropout rates for ward 1 school are found to be approximately one-fourth in the year 2017. With rising population, stagnant enrollment rate and increasing dropout rates raises a question of the effectiveness of the institution. Discussions with the villagers reveal that almost three-fifth of the children in the study region are studying in private schools. They prefer private schools for better quality of education and facilities.



Table 8: Basic details of project schools

	Rajkiya Buniyadi Vidhyalaya (Ward 9, Manchi village, Bhandari Panchayat)	Prathmik Vidhyalaya Dyodhi Guest House (Ward 1, Bhandari village, Bhandari Panchayat)
Level	Middle	Primary
Number of teachers	5	3
Enrollment	297	113
Proportion of girls	56%	47%
Yearly increase in enrollment from 2017	3%	-14%
Yearly increase in enrollment from 2016	0%	-24%

3.2.2 Physical Infrastructure (availability and condition)

One of the major project activity is to build proper physical infrastructure²³ in schools, it is important to ascertain the current availability of these physical infrastructure. This section details availability of physical infrastructure with respect to classrooms, kitchen, boundary wall, etc. in the two project schools. Furthermore, it describes the functionality and conditions of this infrastructure.

Rajkiya Buniyadi Vidhyalaya (Ward 9, Manchi village, Bhandari Panchayat)

The middle school has only one classroom accommodating 297 studying in eight different class levels

Figure 26: Condition of kitchen in ward 9 school



(Table 9). It also has one staff room for five teachers and two store rooms. Since all the classes are being conducted in a single room, the quality of education is poor. The rooms are in use but are not in good condition and need repair. Similarly, the building is also in a dilapidated situation calling for repair. Currently, there is no boundary wall and being centrally located, it gives opportunities to trespassers to create disturbances. The students of schools in ward 11 and 12 sit in open to study under the tree. The infrastructure of the school fails to provide conducive learning environment for the students where they can read and write with appropriate concentration. There is a dedicated room for kitchen which is also shared by other two schools but the condition of the room is abysmal. It has two big holes in the

main walls and hygiene is often compromised (Figure 266).

The school lacks basic infrastructure with complete absence of support infrastructure like audio- visual learning aid, cycle stands, swings, library, sports material, etc. There is only a large prospective open playground in front of the school. Due to absence of any sport equipment and boundary wall, it is difficult to recognize the same as playing ground. The ground is poorly maintained and become swampy land during monsoons. There is no electricity connection in the school and students have to study in dark rooms without any fans.

²³ Boundary wall, compound repair and beautification, main gate, new classrooms, drinking water facility, toilets construction, etc.





	Rajkiya Buniyadi Vidhyalaya	Prathmik Vidhyalaya Dyodhi
	(Ward 9, Manchi village,	Guest House (Ward 1, Bhandari
	Bhandari Panchayat)	village, Bhandari Panchayat)
Number of rooms	1 Classroom, 1 staff room and 2	3 classrooms and 1 principal room
	store rooms	
Condition of rooms	Rooms are being used but needs	Rooms are being used but needs
	repair	repair
Condition of building	Needs repair	Needs repair
Condition of boundary wall	Needs construction	Needs construction
Facilities	Only playground	No facilities
Teaching methods	Use of blackboard and oral	Use of blackboard
Kitchen	Needs repair	NA

Prathmik Vidhyalaya Dyodhi Guest House (Ward 1, Bhandari village, Bhandari Panchayat)

The primary school has three classrooms for 113 students (38 students per room) (Table 9). The rooms are however shared with students of other school. In addition, there is one room for the Principal. There is no staff room and the designated principal room is rather used as kitchen for mid-day meal preparation. The condition of the rooms and building is average which need repair. The school premise is small with no boundary wall and it is forced to share its limited resources with the other school of ward number 3.

The small premise of the school limits availability of playground and other support facilities. There is no electricity available during the eight hours when school is open. The primary students are taught using blackboard for most of the times. This school finds it difficult to provide conducive learning environment to the students which is also evident from the continuous declining enrollment rate for the last three years.

3.2.3 Water and Sanitation

It is often observed that availability of drinking water and toilets is crucial for enrollment and attendance of the students, especially girl students. This section details the availability of water and sanitation facilities available for the students and staff of the two project schools. It also discusses the yearly functionality of these infrastructures.

Rajkiya Buniyadi Vidhyalaya (Ward 9, Manchi village, Bhandari *Panchavat*)

The middle school has one toilet each for staff, boys and girls constructed in the school premises but none of them is functional (Table 10). There is no water supply and they are usually locked from outside restricting the use completely (Figure 277). In terms of drinking water, the school has access Figure 27: Locked girls toilet in ward 9 school



to two hand pumps in the campus providing uninterrupted supply of drinking water for all (149 students per hand pump). The location of hand pumps is clean and the quality of water provided is reported to be good.





Tuble 10. waler and sanitation defails of project schools			
	Rajkiya Buniyadi Vidhyalaya	Prathmik Vidhyalaya Dyodhi	
	(Ward 9, Manchi village,	Guest House (Ward 1, Bhandari	
	Bhandari Panchayat)	village, Bhandari Panchayat)	
Toilets	One for each-teachers, girls	2 toilate gander not sogragated	
	and boys	2 tonets- gender not segregated	
Condition of toilets	Non-functional (no water in	Functional (absence of water, used	
	either of the toilets)	as urinals)	
Drinking water sources	2 hand pumps	1 hand pump	
Status of water source	Always available and clean	Always available but unclean	
	surroundings	surroundings	

T-11. 10. Water and a sector it at

Prathmik Vidhyalaya Dyodhi Guest House (Ward 1, Bhandari village, Bhandari Panchayat)

The primary school has two toilets constructed in the premises, which are mostly locked (Table 10). Teachers mentioned that the lock is opened on demand of students when in need (57 students per toilet). There is no provision of water inside the toilets and therefore, water needs to be carried from the hand pump in a bucket. With respect to drinking water source, one hand pump supplies water continuously throughout the year (113 students use one hand pump). The water is used for cooking as well as for washing purposes. The location of the drinking water source is unclean making it a breeding ground of mosquitoes and other disease causing germs.

3.2.4 Status of School Management Committee

The section 21 and 22 of the Right to Education (RTE) Act of Indian Constitution mandates the formation of School Management Committee (SMC) for all the government schools in the country. The constitution of this committee for Bihar state government schools includes parents (50% mothers), representatives from Gram Panchayat, Principal, Head of Self Help Groups formed by Jeevika, and representative students. The total mandated number of members are seventeen. The objective of creating a parallel administrative body is to smoothen the management process with inclusion of participation of parents of the students studying in the school. The major responsibilities of these members, according to the constitution, are- (a) monitor the working of the school; (b) prepare and recommend school development plan; (c) monitor the utilization of the grants received from the appropriate Government or local authority or any other source; and (d) perform other such functions as may be prescribed.

In this sub-section, we will discuss the levels of awareness and functionality of the scheme among the SMC members of two project schools. During the course of the project, these members would receive periodic training on their responsibilities and how can they contribute to overall development of the schools. The Principals of the two schools shared the list of members with the enumerators which includes fourteen members in ward number 9 school and ten members in ward number 1 school. For this study, fifty percent of these members were randomly selected and interviewed, the results of which are discussed below.

Awareness level of the SMC members

The members of the committee are expected to perform their responsibilities only when they themselves are aware of its provisions and mandates. The findings of the study reveal that four-fifth of the respondent SMC members are aware of its existence at the school level (Figure 288). Even if they are aware of its existence, the knowledge on the objectives of its formation (17%) and election criteria for its members



Figure 28: Awareness levels of SMC members on provisions



Status of functionality of the committee

(33%) is very limited. The respondent members have no information about the mandate of having regular monthly meetings conducted by all its members. The provision under the RTE Act directs the school authorities to provide free education, uniform and stationery to the enrolled students. The SMC members are expected to monitor the effective implementation of these provisions. Contrary, their understanding of the provisions under RTE is less than their hair's breadth (no one is aware). However, all respondent members except one have reported to know about midday meal provision in the school. Of the ones who are aware about the mid-day meal provision, only 27% understands that it is their responsibility to regularly monitor the quality and quantity of meal served.

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The proportion of members who were aware about the existence of SMC (42%) are the ones who know that SMC is formed in the respective schools as well. Interestingly, according to all these aware members, they learnt about the committee and its existence only when they themselves became member of it. All of these members reported that no meeting has ever been conducted. Also, none of them has ever monitored the quality and quantity of the food being served. However, 40% (two of the five persons) aware respondents mentioned that food is not regularly served.

In addition to the monitoring responsibilities, one important responsibility of the SMC is to prepare school development plan during their meeting and then monitor the progress and budget utilization of the funds received during their following monthly meetings. This creates a transparent process of budget preparation and utilization. In the two project schools, the members reported to have no information on school development plan, its approval and utilization of school budget.

3.2.5 Summary of situation in school

The Right to Education (RTE) was introduced in 2009 to provide quality education to the children of resource poor households so as to secure their bright futures. However, the situation pertaining to schools in this region is found to be dismal; the schools lack proper building infrastructure and are forced to share their limited resources with other schools with no building at all. Facilities like toilets, proper playground, boundary and main gate, swings, etc. are completely absent. The condition of the government schools with inadequate physical infrastructure and absence of basic sanitation and other facilities is indicative of the appalling education services available for the population of the study region. This is primarily the reason majority (60%) of the households prefer to send their kids to private schools and those who can't afford it are forced to compromise the future of their kids. The provision of inclusion of parents to effective implementation of RTE through School Management Committee (SMC) formation is also defeated with limited awareness (42%) among its members or the large population for that matter. These elected members have scarce understanding of the provisions under RTE. It is imperative that schools need a physical transformation and improvement in the administrative and management process of SMC functioning as intended by the project.



4 CONCLUSION

The baseline study was conducted for the integrated project planned for *Bhandari panchayat* of *Sitamarhi* district of Bihar state in India to understand the current agriculture practices, animal health care, awareness and implementation of government schemes availability and functionality of infrastructure in schools and current capacities of ward members and SMC members. Primary quantitative data was collected using stratified random sampling across all fourteen wards, from different class of farmers and beneficiaries of government schemes.

Before the commencement of the project, the baseline data of the study highlights sanitation as a major problem across households with respect open defecation, open disposal of waste, swampy land, and locked toilets for students in school. Another highlighted issue is concerning the limited availability of information channels on agriculture methods, inputs, technology, etc. The methods of cultivation are largely labor-intensive providing livelihood to the large proportion of the landless households. The inequality in ownership of land also creates lot of inequalities in the standard of living. The concentration of land is skewed towards a few households of *Manchi* village, a large proportion of households are marginal owners or landless having access to very limited resources. While the large landowners give their land to tenants on sharecropping basis and enjoy half of the output with no share in costs, landless or small landowners rely on cultivating shared land and give half of their output to the landlords. There lies a huge scope in building capacities of the farmers providing technical knowledge and providing mechanized solutions to marginal landowners so as to reduce cost and improve yield.

In terms of implementation of the government schemes aiming to support the poor households, awareness level about the provision in the schemes is quite low. Little awareness keeps the community away from getting right entitlement. Furthermore, awareness has also limiting impact due to constrained understating of grievance redressal mechanisms because of which they are not able to raise their voice. The unavailability of adequate infrastructure worsens the whole situation. There is no proper building for Anganwadi Centre. The executors of government schemes at ground levels, ward members, have narrow understanding of their roles and responsibilities. Most of them are not even acquainted with *Gram panchayat* development plan as well.

The education system is found to be in shackles both in terms of tangible infrastructure and management. There is dire need to build adequate infrastructure and capacities of management committee so as to secure provide favorable learning environment and securing the future of the present generation. Lastly, the project plans to target the above gaps and it is expected that with implementation of diverse integrated activities the situation would change for better. An informed community would be the empowered community of tomorrow contributing as catalyst to the process of development.

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