Report on Endline Study

Economic Empowerment of women Farmers through Vegetable Supply Chain in Munger and Bhagalpur districts of Bihar

*** Note: Photographs were removed prior to publication of the evaluation for data protection reasons.**

Submitted by

Connect
Let Us Grow Together

Table of Contents

List of Tables

List of Figures

Abbreviations

DAP	Diammonium phosphate
DSR	Direct Seeded Rice
FGD	Focus Group Discussion
FPO	Farmer Producer Organization
HH	Household
KII	Key Informant Interview
MOP	Muriate of Potash
SEWA	Self Employed Women's Association
SSK	SEWA Shakti Kendra

Executive Summary

Project "'Economic Empowerment of women Farmers through Vegetable Supply Chain' in Munger and Bhagalpur districts of Bihar" funded by Federal Ministry of Economic Cooperation and Development (Germany) and Oxfam Germany was jointly implemented by Oxfam India and SEWA Bharat covering 3,000 households in 35 villages in 6 blocks of Munger and Bhagalpur districts of Bihar. The goal of the project was, "to contribute to the socio-economic empowerment of women farmers of two districts of Bihar through increased vegetable production, supply chain management, increased bargaining capacity in the market and increased social recognition of women as farmers" with expected outcomes

i. Increased sustainable income of women farmers through vegetable supply chain and sustainable agriculture practices;
ii. Increased bargaining capacity of women farmers in market through institutionalization and capacity building; and
iii. Increased influence of women in local governance and other decisions making bodies and realisation of their rights.

As the project was at its closure stage, an end line study was planned to review, assess and document the level of fulfilment of project impact and outcome culling out learning and recommendation for the future extension planned for the project. In this respect, CONNECT Social Enterprise Development Services, Hyderabad was engaged. CONNECT employed a mix approach involving collection of both quantitative and qualitative information from various stakeholders involved in the project. A household (HH) survey was administered covering a total of 370 samples: 168 from Bhagalpur and 202 samples from Munger district. Following were the major findings

Project Outcome-1 Increased sustainable income of women farmers through vegetable supply chain and sustainable agriculture practices

- **Practice of Sustainable Practices:** Against the target of 80%, at the end line more than 80% of the sample farmers reported to be trained on the sustainable practices such as seed treatment, nursery bed raising, zig-zag sowing, usage of farm wastage as manure, vermicomposting, weed management, irrigation management and sorting and grading practices much above the baseline values (0%). Proportion of farmer trained on indigenous practices for pest management such as usage of yellow cards, pheromone trap, T-guard, usage of organic solutions etc was found to be proportionately lesser as 71% of samples reported to be trained on these techniques. As some of the new field staffs were found to be not much clear of these techniques, this might have impacted the level of percolation of knowledge of these techniques to the farmers. Awareness of farmers on these practices was found to a function of engagement of field staff with the farmers and channelizing the platform of producer groups for knowledge dissemination. The evaluation team found some lacuna in level of engagement of some of the field staff with the farmers, especially among the new joinees as some of the producer groups were found to be remained untouched for quite some time. A systematic and structured design of conduct of producer group meetings could result better dissemination of

knowledge gained through various training programs. With respect to the level of adoption of the sustainable practices, it was found that 86% of the farmers who received training on these practices were found to have adopted at least seven practices. 2/3rd of samples reported of adopting majority of the recommended practices except for the practice on vermicomposting and usage of indigenous techniques for pest management. As under the project, vermicompost pits were constructed as demonstration in limited numbers, availability of enough quantity of vermicompost for round the year cultivation per members require a systematic planning which was found to be lacking during the evaluation study. Some of the pits visited were found to be either empty or about to be empty. Two of the pits were newly constructed and were yet to start functioning. Hence, in order to address the issue of usage of chemical fertilizer with systematic replacement by organic manure like vermicompost, it requires systematic plan and investment which should be thought of in next phase of the project.

- **Production of Major Crops:** Potato was at the most preferred crop to grow as 72% reported to grow the crop. In Bhagalpur, the top three crops grown were Okra, Cabbage and Cauliflower. In Munger, Tomato and Brinjal beat the other crops. In Bhagalpur, farmers preferred vegetable cultivation over other crops, while in Munger vegetable cultivation was at the second priority with growing staple food as top priority. Analysis of yield per acre of major crops revealed that in case of half of the crops, at the end line the average productivity per acre increased significantly in comparison to baseline. The increase was reported in case of chilly, cabbage, cauliflower and okra and in case of sponge gourd the average productivity was same with the baseline. The increase was by 37%, 34%, 21% and 1% in case of chilly, cabbage, cauliflower and okra respectively well above the target of enhancement of yield by 15-20% set under the project. On the other hand in case of other crops like potato, tomato and Brinjal, the average productivity had gone down mainly because there were around 86%, 11% and 27% of the total farmer's samples growing these crops respectively who reported the productivity levels half the baseline values which had an impact on the overall average of the entire sample group. The major reason of low level of productivity levels of these farmers were lack of water for irrigation and disease infestation, especially in case of potato and Brinjal. During Focus Group Discussions(FGD) in both the districts the women shared enhanced level of productivity, especially in case of crops like cauliflower, cabbage, tomato and brinjal roughly by 1.5 times. The women shared that in case of cauliflower and cabbage, the size of the flower was double than the size two years before. The major factors of attribution were availability of good quality seeds from SEWA Bharat and changes in practices like raised nursery bed, line sowing of seeds in nursery, reduction in number of seeds/seedlings sown per place from 4-5 to one-two, maintaining enough plant to plant spacing through adopting double row method of sowing and zig-zag sowing of cabbage and cauliflower. The women were clearly able to link the advantages of these practices on the plant growth and hence the yield.

- **Cost of Cultivation:** Although, overall the cost of cultivation per acre was increased by 28% over the baseline value, considering the factor of inflation in cost of major input items in past two years, the cost of cultivation per acre at the end line was actually reduced over the baseline values. During discussion with farmers during field work, the evaluation team found that the cost of major inputs and cost items like fertilizer, diesel for

irrigation, tractor hiring charges for land preparation, labour charges, etc were increased to at least 1.5- 2 times of costs/charges at the start of the project. Though these costs were increased to almost double their baseline values, the cost of cultivation was not increased to double to its baseline value.

- **Adoption of ICT Based Technology:** The household survey indicated that only 31% farmers among the samples had got their soil tested in last three years, although the project target was met. Lack of awareness about soil testing among the farmers and lack of a clear cut plan to cover all farmers with the SEWA project staffs were the major factors for low coverage of farmers on soil testing. Majority of the farmers were communicated about their report on soil testing orally. The reason cited by the project staff was a technical one as the SSK in-charge were not the authorized personnel from Agriculture University and hence they could not sign any report. The survey revealed that, a large proportion of about 32% of farmers who had given soil samples for testing were not conveyed about the results of soil testing either orally or in the form of a written report. Similar findings were found during one of the FGDs in Munger district. This indicated the need to systemize the soil testing service model. Further, the evaluation team felt that the soil testing service could have been provided in an entrepreneurial revenue based model which was not explored during the project period. The analysis of level of application of results of soil testing by samples who received report showed that around 70% of farmers applied the recommendation of soil testing. 35% of the sample reported use of their phone for getting information related to crop and market information. Out of 35% only 26% reported that they had used their phone for getting information on market price which was lesser than the project target of 30%. Green SIMs under “IFFFO Sanchar”were distrbuted among the women farmers connetcing around 560 women. “Mobile Vani” was also launched which was designed for rural area to access information on gender senstitive financial and digital literacy and agriculture . Linkages with ATMA for provision of a watsapp number for extension services was also established. During FGDs, it was found that even though there were cases of usage and benefits of ICT application for pest attack, those cases were not much discussed in producer groups. Hence, rendering more focus on building awarness of usage of ICT tehcnology for agriculture purpose was a felt need by the evalution team.

- **Access to Quality Inputs and Vegetable Production Technology:** Dependence of women farmers on local un-authorized shop for inputs was reduced to a great extent at the end line as 67% samples reported to be accessing inputs from authorized shops only. Farmers were highly satisfied with quality of seeds supplied from SEWA, though there were complaints about the timely availability of seeds from SEWA. Farmers look forward to seed supply facilitation services from SEWA, even at market prices and not at subsidized rates. Awareness of women on ATMA, KVK and Agriculture universities was significantly increased from 4.5% at the baseline to 59% at the end line. This was because of the trainings attended by women under the project. 42% of samples reported to have participated in trainings organized by these institutions.

Project Outcome-2 Increased bargaining capacity of women farmers in market through institutionalization and capacity building

- **Promotion of Farmers' Collective:** One Farmer Producer Organization (FPO) "Karna Bhumi Krishak Utpadak Company Limited" was established in second year of project (May 2018) with 700 members: 400 from Bhagalpur and rest from Munger, though was planned in first year itself. One FPO was promoted instead of promoting two FPOs in two project districts with a thought that one FPO would work through two separate district units and collection formed under the project. Incorporating one FPO would minimize the operational cost and reduce clerical work of filling several periodic returns (Sales tax and Income tax) without compromising the business and profitability. . Some of the factor contributed to delay in setting up of FPO was Low level of awareness and faith of women on community based models, time taking process for preparation of documentation and time taken by SEWA as an organization to get ready for FPO were some of the reasons for delay. The evaluation team found lack of a membership drive and communication gap among the SEWA project and field staff which resulted in low coverage of women under the FPO. The requisite business licences were yet to be possessed by the FPO which resulted in non-operations of FPO. The FPO was yet to start any business. The board members were found to be concerned about the functioning of FPO. Leaving of Program manager in the last year of the project was cited as the major reason.

- **Training of FPO Functionaries:** The Board of Directors from both the districts articulated the concept of the FPO very well which demonstrated the effects of various training programs and exposure visits attended by the board of directors. Though a business plan exercise was undertaken in the first year of the project to review and assess the potential of the production and connecting these productions to the available market with the objective of fair trade and Develop specific, actionable and practical recommendations to guide refining of project objectives and setting of overall targets for women farmers and their FPO, there was a need to conduct a visioning cum strategic business plan with involvement of all board members so that altogether they can envision for their FPO. Once in every quarter, a board meeting was scheduled. However, last board meeting was not conducted on time due to tight schedule of SEWA team. The board expressed the need for conduct of regular board meetings.

- **Promotion of women Agro-Entrepreneurs:** Around 285 women farmers had established their space in 18 different vegetable vending zones and doing business as regular vegetable vendor. It established identity of women farmers as entrepreneur in their society. In project area 15 women farmer groups initiated business of spices powder to utilize their time during off season.

- **Conduct of Round Table and Interface Meetings with Women:** Three state level interface meetings with Government officials and other stakeholders were organized and conducted under the project. Two round table conferences on rural business development were held aiming at i) integrating the small women farmers in the sustainable and equitable value chain through membership organization; ii) Creating an on-going dialogue and partnership between primary producer and other stakeholders

from the district to state level and iii) Establish the rural business and taking forward the initiative.

- **Income from Vegetable Cultivation:** Overall at the end line, the gross income per acre from vegetable cultivation was increased by 57% over the baseline mainly because of better price realization of various produce. As gross income increased by 57%, the net income increased by 111% over the baseline as the cost of cultivation increased by only 28%.

- **Marketing of Produce:** "Market" became the major source of market information at the end line and not the "Peers" as was the case at the baseline reflecting improved access to market at the end line, as 75% of samples reported the same, which was not the case at the baseline. A systematic approach to gather and disseminate market information to women farmers through SSK can be explored as farmers look for marketing services to distant markets. Collective marketing was yet to be emerged as the major mode of selling, even though women farmers, especially in Munger looked forward to collective marketing. Though, there were some initiatives on collective marketing, those could not be taken across the project because of reasons like fluctuation in market price and lack of capital. Individual interests of farmers also some time stop them to go for collective marketing. The evaluation team observed that even though the farmers expressed the need for collective marketing, there was a gap in understanding of farmers between wholesale marketing and retail marketing. The farmers expected retail prices for wholesale marketing facilitated under the project. A concentrated effort in building farmers' understanding on concept of collective marketing would be useful for taking the concept of FPO ahead. Business model based operating structure for SSK should be thought of integrating with the structure of FPO.

Project Outcome 3: Increased influence of women in local governance and other decisions making bodies and realisation of their rights.

- **Women Trained on Government Schemes:** In comparision to baseline (0%), a significant increase in proportion of farmers trained/explained about Government Programs was reported under the houshold survey. Against the target of 60% of farmer trained on Government programs, overall 64% of farmers reported to be trained on Govermeent programs.
- **Level of Access to Government Schemes:** Overall, in comparison to baseline (0%), proportion of farmers accessing seeds, fertilizer and equipment was reported to be increased to 15%, 14% and 5% respectively, although the project target was to ensure at least 20% of farmers access Government rights and entitlements related to agriculture.
- **Participation of women in Gram Sabha, Village Meeting and Various Forums:** Against the target of 40% of farmers attending gram sabhas and village meeting, it was found at the project level 34% women farmers reported to be attending gram sabha regularly, while 29% reported to be attending only sometimes. During discussions with women farmers, women shared that as very less women attend these meetings, women felt shy to attend these forums. They also shared that men also did not welcome women in these meetings. Hence, if all women attend these meetings, participation of women and ability to actively participate would enhance. This indicated need for a different

approach of organizing women, facilitating discussion on issues in groups and ensuring participation through local women leaders.

- **Access to Credit:** 40% of farmers reported to have taken loan for the purpose of vegetable cultivation. Out of those taken loan, majority (55%) had taken loan from informal institution of women; the Self Help Groups under Jeevika. On the contrary, at the baseline, the major source of credit was moneylenders. Around 24% had taken loan from friend and relatives. Some farmers had expressed of need for bigger among of loans which were currently remained unmet by SHGs. Although Information on the multiple credit options available and application process was covered in capacity building sessions, exclusive trainings on access to credit for women was required.
- **Convention of Women:** Two state and four district level conventions were organized under the project.
- **Perception of Women as Farmers:** The project had brought a change in perception of women about themselves as 85% reported that they thought that they were farmers. During FGDs women expressed that earlier women barely talked about agriculture even though women were involved more than men in vegetable cultivation. With the formation of producer groups, women got a forum to discuss exchange and learn new techniques and practices. The new technology/practices learnt under the project contributed to enhancement of women's acceptance as farmers at home front.
- **Level of Sensitivity of Men towards Women:** Men felt that the women had become more independent and could handle agriculture without involvement of men. The men attributed these changes to SEWA Bharat's engagement with women farmers. However, the men interviewed also expressed that there should be some training programs conducted exclusively for men.

Recommendations:

- Promotion of Agro ecological Practices: Mixed Cropping, crop rotation, climate smart practices like DSR, etc to be promoted.
- Addressing the Need for Input, marketing and Plant Protection Services through FPO:
- Strengthening FPO as Sustainable Business Enterprise
- Building SSK as business units and as integrated part of FPO.
- Strengthening Producer Groups
- Soil testing on entrepreneurial mode
- Sustainable practices are to be integrated with package of practices
- Capacity building of SEWA Bharat staff
- Focus shouldn't be on distribution of subsidized agriculture input
- Exploration of Value addition
- Introduction of new and high value crops
- Irrigation facility assurance
- The project should be extended for at least two years.

1 Context

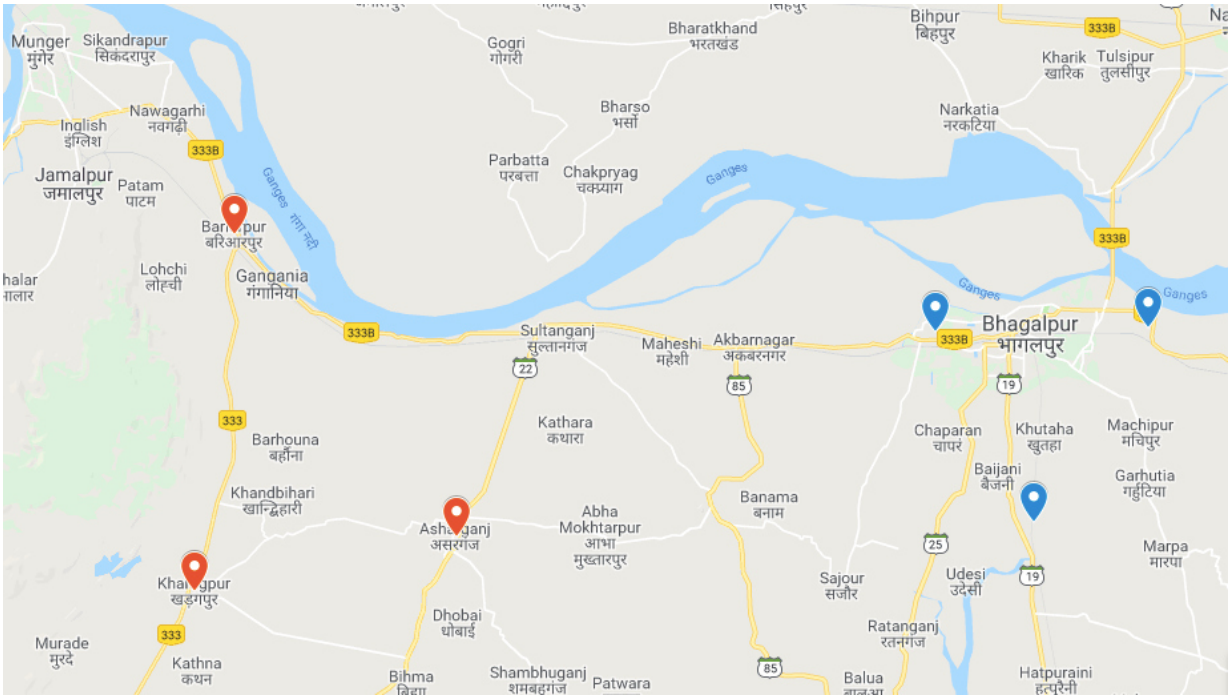
Federal Ministry of Economic Cooperation and Development (Germany) and Oxfam Germany had funded a project titled 'Economic Empowerment of women Farmers through Vegetable Supply Chain' in Munger and Bhagalpur districts of Bihar for a period from 01.05.2016 to 30.04.2019. The project was jointly implemented by Oxfam India and SEWA Bharat.

The goal of the project "Economic Empowerment of women Farmers through Vegetable Supply Chain in Munger and Bhagalpur Districts of Bihar, India' was, "to contribute to the socio-economic empowerment of women farmers of two districts of Bihar through increased vegetable production, supply chain management, increased bargaining capacity in the market and increased social recognition of women as farmers".

The expected outcomes of the project were:

1. Increased sustainable income of women farmers through vegetable supply chain and sustainable agriculture practices;
2. Increased bargaining capacity of women farmers in market through institutionalization and capacity building; and
3. Increased influence of women in local governance and other decisions making bodies and realisation of their rights.

The project was aimed to directly engage with 3,000 households in 35 villages in 6 blocks of Munger and Bhagalpur districts (1,650 households in 3 blocks of Munger and 1,350 households in 3 blocks of Bhagalpur) of Bihar. Indirectly the project would have a reach to around 15,000 beneficiaries.



2 End line Study Details

As the project was at its closure stage, an end line study was planned to review, assess and document the level of fulfilment of project impact and outcomes. The study was also aimed at culling out learning and recommendation for the future extension planned for the project.

A mix approach was adopted for the end line study. Both quantitative and qualitative data collection methods were employed. The methodology adopted for the end line study comprised of review of project documents like project proposal, baseline report, project annual progress reports and training materials, administer of a household (HH) survey covering a total of 370 samples: 168 from Bhagalpur and 202 samples from Munger district to collect quantitative data and conduct of nine focus group discussions (FGD) with women farmers of producer groups, nine FGDs with male farmers, key informant interviews (KII) with Oxfam project staff, SEWA Bharat staff, three collection centre in-charge, Board of Directors of Farmer Producer Organization, two representatives from block, Krishi Vikas Kendra and PRI and direct observations of project interventions. Structured questionnaire for survey with households and guidelines for semi-structured FGDs and KIIs with the above-mentioned stakeholders were developed keeping the project results framework and baseline report into consideration.

As the end line study was conducted during March-April 2019, not much of the standing crops could be seen. In both the districts, because of lack of irrigation facility, summer crops were grown to limited extent. This was one of the limitations experienced by the evaluation team.

3 Major Findings

3.1 Project Outcome-1

3.1.1 Practice of Sustainable Practices

Table 1 Level of Practice of Sustainable Practices

Sl. No	Practice	District	% of sample trained/ explained	% of trained samples adopted the practice			
				Never	Yes , always	Yes, sometimes	Yes, used only once
1	Seed Treatment	Bhagalpur	86%	8%	81%	11%	0%
		Munger	88%	3%	69%	22%	6%
		Overall	87%	5%	75%	17%	3%
2	Raised Bed Nursery with Line Sowing	Bhagalpur	86%	4%	80%	16%	0%
		Munger	83%	2%	72%	19%	7%
		Overall	84%	3%	76%	18%	4%
3	Zig-Zag sowing and double row sowing	Bhagalpur	83%	8%	81%	10%	1%
		Munger	77%	12%	67%	15%	6%
		Overall	80%	10%	74%	13%	4%
4	Usage of Farm wastage as manure	Bhagalpur	83%	5%	85%	10%	0%
		Munger	81%	5%	71%	16%	9%
		Overall	82%	5%	77%	13%	5%
5	Vermicomposting	Bhagalpur	80%	7%	78%	14%	1%
		Munger	85%	18%	53%	22%	7%
		Overall	83%	13%	64%	19%	5%
6	Indigenous techniques for pest attack	Bhagalpur	71%	21%	62%	13%	4%
		Munger	71%	30%	44%	17%	10%
		Overall	71%	26%	52%	15%	7%
7	Weed management	Bhagalpur	85%	5%	83%	11%	1%
		Munger	84%	8%	66%	19%	6%
		Grand Total	85%	7%	73%	16%	4%
8	Irrigation management	Bhagalpur	86%	6%	86%	8%	1%
		Munger	83%	12%	68%	14%	7%
		Overall	84%	9%	76%	11%	4%
9	Sorting and grading practices	Bhagalpur	83%	2%	94%	4%	0%
		Munger	85%	2%	74%	17%	6%
		Overall	85%	2%	83%	11%	4%

Major sustainable practices promoted under the project were

i. Seed Treatment: Treatment of seed before sowing.
ii. Nursery Raising and Sowing: Raised Bed Nursery and Line sowing
iii. Zig-Zag sowing in case of Cauliflower and cabbage and double row sowing in case of potato
iv. Usage of Farm wastage as manure
v. Vermicomposting
vi. Usage of Indigenous techniques for pest management including usage of yellow cards, pheromone trap, T-guard, usage of organic solutions etc.
vii. Weed Management: Timely weed management
viii. Irrigation management: Limiting flood irrigation
ix. Sorting and Grading Practices: Usage of plastic crates, wet jute bag, paper for covering baskets while carrying vegetables to market.

The survey revealed that more than 80% of the sample farmers were trained on the above mentioned sustainable practices, except practice on usage of indigenous techniques for pest management including usage of yellow cards, pheromone trap, T-guard, usage of organic solutions etc. as overall 71% of the women reported that they were trained or explained on these practices. In Munger, little lesser proportion of farmers reported to be trained on zigzag method of sowing. This was in congruence with findings of FGDs conducted with women farmers.

80% of samples were trained on sustainable practices with lesser proportion (71%) of samples trained on indigenous techniques. Accordingly awareness on usage of indigenous techniques for pest management including usage of yellow cards, pheromone trap, T-guard, usage of organic solutions, etc. was least.

During FGDs with women, we found a mix kind of response on participation and awareness of women on sustainable practices. It was found that the coverage of training and percolation of training inputs to all women farmers in a particular village was a function of the capability and engagement of SEWA field staff with the women farmers. We could find two field staff, one in each district who was not much engaged with farmers. As one of the field staff was new, this might be a factor for the above. It was also found that some of the producer groups were remained untouched by field staff in last one year. In those groups the women had not attended any kinds of training and hence were not aware of the sustainable practices. Though, women representatives from producer groups participated in various interactions and forums, it was found that the knowledge gained was not shared with all members in the group. Perhaps, the platform of producer groups could have been utilized more effectively in a structured way for knowledge building and dissemination. Among the practices, awareness on usage of indigenous techniques for pest management including usage of yellow cards, pheromone trap, usage of organic solutions, etc. was least among the women as many of the women were not aware of these techniques, especially about pheromone trap.

Regarding the adoption of sustainable practices, of the samples trained on these practices, 2/3rd of samples reported of adopting majority of the recommended practices except for the practice on vermicomposting and usage of indigenous techniques for pest management. This finding from household survey was found to be in alignment with the findings of FGD conducted with women farmers in both the district. Regarding the usage of vermicomposting, vermicompost pits were constructed under the project as demonstrations in a limited number. During evaluation, there were two different models found in the two project districts. In Bhagalpur, the pits were considered as producer group's property and majority of the group members had put cow-dung into the pits and taken their share of vermicompost. But the issue was with the availability of enough quantity of vermicompost per member. Members shared that the quantity was not enough which poses a question on the expectation of reduction of chemical fertilizer with the usage of vermicompost in-built within the project. We could found that half of the pits (3 pits) observed during field visit were either empty or about to be empty which showed that vermicompost would not be available for the coming cropping season. Other two pits visited were constructed in March 2019 and hence would be able to provide vermicompost only as top dressing during next cropping season. Hence, the evaluation team felt that there was a need to build a system of planning for preparation of vermicompost per pit for ensuring round the year availability of vermicompost per member as members shared that it took three months of time for vermicompost to start the usage.

2/3rd of samples reported of adopting majority of the recommended practices except for the practice on vermicomposting and usage of indigenous techniques for pest management. Overall, proportion of farmers reported practices of at least seven sustainable practices was 86%, with 87% farmers in Bhagalpur and 85% in Munger district.

Regarding the usage of indigenous techniques for pest management, the yellow cards were used only once. One of the reasons was yellow cards were expensive. Also there were complaints of cards getting washed away in rain. Other indigenous techniques for replacement of yellow cards such as plastic bottle painted with yellow colour and grease was also piloted in last year of the project. Since the pilot was initiated in the last year of implementation of project, it could not be replicated across the project. The replication of the pilot can be taken up in the next phase of the project. Clarity on concept of pheromone trap among the SEWA field staff was found to be lacking and hence low level of awareness and adoption of pheromone trap among the farmers could be seen under during the field work. Another reason for low level of promotion of pheromone trap was extremely low level of availability of required solution, not only from locally, but also from external sources. The usage of organic solution with cow urine, cow dung and other materials was done by minimal number of members, 1-2 out of 15-20 members in each FGD. The major reason of non-adoption was i) the process was time consuming and ii) the solution smell bad. The women shared that farmers did not have time to make these solution and use; rather they preferred to buy chemicals available locally and easily. However, women were ready to adopt and use the solution if it would be made available like any other chemical for disease and pest control. Women shared that the sorting and grading practices introduced such as removing the spoiled produce, grading produce based on size were not new for them, though they were not practicing much. The members shared that after attending training, they were

better about the benefits of these practices. A greater level of emphasis on proper practice of sorting and grading can be given in the next phase of the project.

3.1.2 Production of Major Crops

3.1.2.1 Major Crops grown and area of cultivation

Table 2 Major Crops Grown and Area of Cultivation

Crop	District	No. of farmers engaged	% of farmers engaged in crop	Average area per farmer in Decimal (1 Acre=100 decimal, 1 hectare= 250 Decimal)
Tomato	Bhagalpur	59	35%	14
	Munger	77	38%	22
	Overall	136	37%	18
Brinjal	Bhagalpur	36	21%	10
	Munger	54	27%	10
	Overall	**90**	24%	**10**
Chilly	Bhagalpur	42	25%	16
	Munger	14	7%	5
	Overall	**56**	15%	**14**
Okra	Bhagalpur	93	55%	12
	Munger	89	44%	8
	Overall	**182**	49%	**10**
Cabbage	Bhagalpur	76	45%	13
	Munger	41	20%	6
	Overall	**117**	32%	**11**
Cauliflower	Bhagalpur	66	39%	10
	Munger	61	30%	6
	Overall	**127**	34%	**8**
Potato	Bhagalpur	114	68%	15
	Munger	154	76%	12
	Overall	**268**	72%	**13**
Bottle gourd	Bhagalpur	23	14%	7
	Munger	28	14%	6
	Overall	**51**	14%	**6**
Sponge gourd	Bhagalpur	66	39%	11
	Munger	45	22%	11
	Overall	**111**	30%	**11**

The above table indicated that potato was the major crop as 72% of samples reported to grow potato. Among the fresh vegetables, the major crops grown were found to be okra on the top (49%), followed by tomato (38%), cauliflower (34%), cabbage (34%) and sponge Gourd (30%). Brinjal was grown by 24% samples only. Bottle gourd ad chilly was grown by least proportion of samples as only 14% and 15% reported to grow these crops respectively. There were district level variations as reflected in the above table. In Bhagalpur district, more number of farmers was found to be growing various crops in bigger land area than in Munger district, except Tomato and Brinjal. More proportion of farmers from Munger district was growing Tomato and Brinjal.

Potato was at the most preferred crop to grow as 72% reported to grow the crop. In Bhagalpur, the top three crops grown were Okra, Cabbage and Cauliflower. In Munger, Tomato and Brinjal beat the other crops. In Bhagalpur, farmers preferred vegetable cultivation over other crops, while in Munger vegetable cultivation was at the second priority with growing staple food as top priority.

The same was shared during FGDs in both the districts. During FGDs, it was found that the farmers in Bhagalpur district were more intensely engaged in vegetable cultivation than in Munger. In Bhagalpur district, farmers preferred to grow vegetables over cereal crops like paddy and wheat as these crops were not much profitable and were labour intensive. Farmers cultivated paddy in limited land so that the produce would be enough for the purpose of food security. They had utilized rest of their lands for vegetable cultivation. On the contrary, even though farmers in Munger were found to be engaged in vegetable cultivation, they considered paddy and wheat as their main crops. Other crops like maize and chickpea were also grown by farmers in Munger district. Vegetable cultivation was found to be somewhat as the second priority and grown in lesser land area. Remoteness of villages, low market accessibility was some of the reasons of more focus on staple crops with longer shelf life than vegetables in Munger district.

Another pattern was noticed during FGDs. In Bhagalpur district, farmers sow their seeds early, especially in case of crops like cauliflower and cabbage to catch up the market during Dusherra festival when the prices are quite high almost 10 times than normal price. On the other hand, in Munger farmers sow late as they wait till the harvest of paddy crop and field are available for vegetable cultivation. As lands are limited, increase in land area under vegetable cultivation over baseline was not much shared by women farmers during FGDs.

3.1.2.2 Yield of Major Crops

Table 3 Yield of Major Crops

Crop	District	End line Average Yield per Acre in Quintal	Baseline Yield per acre in Quintal	% Change in yield over baseline	% Of farmers engaged in crop with end line yield above baseline yield	Average yield of farmers with yield more than baseline yield in Quintal per acre	% of change in average yield of farmers with more than baseline value over baseline
Tomato	Bhagalpur	90	105	-8%	31%	151	30%
	Munger	101					
	Overall	96					
Brinjal	Bhagalpur	76	95	-11%	43%	132	28%
	Munger	90					
	Overall	84					
Chilly	Bhagalpur	33	25	37%	59%	54	54%
	Munger	38					
	Overall	34					
Okra	Bhagalpur	57	60	1%	49%	86	30%
	Munger	65					
	Overall	61					
Cabbage	Bhagalpur	121	90	34%	74%	147	39%
	Munger	119					
	Overall	121					
Cauliflower	Bhagalpur	99	88	21%	65%	137	36%
	Munger	114					
	Overall	106					
Bottle gourd	Bhagalpur	81	105	-24%	37%	128	18%
	Munger	80					
	Overall	80					
Sponge Gourd	Bhagalpur	67	70	0%	44%	108	35%
	Munger	73					
	Overall	70					
Potato	Bhagalpur	71	88	-30%	14%	117	33%
	Munger	56					
	Overall	62					
Average of all Crops	Overall	79	81	-2%			

The above table depicted that in case of half of the crops, the average productivity per acre increased at the end line in comparison to baseline. The increase was reported in case of chilly, cabbage, cauliflower and okra and in case of sponge gourd the average productivity was same with the baseline. The increase was by 37%, 34%, 21% and 1% in case of chilly, cabbage, cauliflower and okra respectively well above the target of enhancement of yield by 15-20% set under the project. 74% of the farmers who grew cabbage had productivity more than the baseline value with an average productivity higher than the baseline productivity level by 39%. This showed that more than 3/4th of farmers had very high productivity level. This was much above the target set under the project. Similar was the case with cauliflower and chilly crop.

On the other hand in case of other crops like potato, tomato and Brinjal, the average productivity had gone down mainly because there were around 86%, 11% and 27% of farmers who reported the productivity level half the baseline values which had an impact on the overall average of the entire sample group. The major reason of low level of productivity levels of these farmers were lack of water for irrigation and disease infestation, especially in case of potato and Brinjal. In case of potato during FGDs some of farmers reported of low productivity due to disease infestation in last harvest. However, they also shared that they had received bumper crop in previous year. Hence, the reduction in productivity level in potato was the specific case for last harvest. Further, a deeper analysis of the proportion farmers with productivity levels higher than the baseline crops in case of Brinjal and Tomato, it was found that quite a large proportion of around 43% of Brinjal farmers and 31% of tomato farmers reported productivity level higher than the baseline values by about 28% and 30% respectively. This showed that if the farmers who had low level of productivity levels could get higher productivity, the overall average productivity of the entire sample group would have been much higher than the baseline. This indicated that there was a need for crop extension services so that crop loss due to disease infestation could be minimized. This was also expressed by farmers during the field work during the end line study as farmers had shared the symptoms of diseases and expected a support from SEWA Bharat. There were also cases in which though farmers had shared the incidence of diseases and looked for solutions from SEWA Project staff (SEWA Sathi), they could not get the solutions. As, some of the cases were related to virus infestation in Brinjal, which had no cure, SEWA staff could not resolve the issue. However, some of the cases in bottle gourd could have been resolved. Hence, a concentrated effort was required to build capacity of farmers and SEWA staff on crop wise disease and pest management and provide timely remedial services.

Yield per acre was increased by 37%, 34%, 21% and 1% in case of chilly, cabbage, cauliflower and okra respectively well above the target of enhancement of yield by 15-20% set under the project. 3/4th of cabbage farmers had very high productivity level than baseline. Similar is the case for cauliflower and chilly. Yield per acre was reduced by 40%, 11% and 8% respectively for potato, brinjal and tomato. Lack of water for irrigation and disease infestation were major factors for reduction in yield. Need for Crop extension services.

During FGDs in both the districts the women shared enhanced level of productivity, especially in case of crops like cauliflower, cabbage, tomato and brinjal roughly by 1.5 times. The women shared that in case of cauliflower and cabbage, the size of the flower was double than the size two years before. The major factors of attribution were availability of good quality seeds from SEWA Bharat and changes in practices like raised nursery bed, line sowing of seeds in nursery, reduction in number of seeds/seedlings sown per place from 4-5 to one-two, maintaining enough plant to plant spacing through adopting double row method of sowing and zig-zag sowing of cabbage and cauliflower. The women were clearly able to link the advantages of these practices on the plant growth and hence the yield. The demonstration on potato cultivation using drip irrigation was well appreciated among the women farmers, though number of demonstrations was limited and expensive too. It costs INR 25, 000 per unit. Women had shared that yield of potato done under the project was twice than last cycle of cultivation. According to them, because of drip irrigation, the water flow was slow and controlled and that helped the potato to grow.

In terms of consumption of fresh vegetables, 65% of farmers reported that they consumed vegetables from their own farm for 6 and more months. Potato reported to be consumed round the year from own produce only.

3.1.3 Cost of Cultivation

Table 4 Cost of Cultivation

All Costs are in INR/acre

Crop	District	Cost of Ploughing and land preparation	Cost of Seed	Fertilizer, manures	Insecticide/ pesticide	Irrigation Cost	Cost for weed management	Cost for harvesting	Total Cost	Total Cost at Baseline	Change over baseline
Tomato	B	6,688	3,744	7,750	4,439	6,985	6,207	7,648	43,461	33,700	19%
	M	6,583	3,451	5,231	3,341	5,643	5,061	8,026	37,338		
	O	6,629	3,578	6,324	3,817	6,225	5,558	7,862	39,995		
Brinjal	B	6,894	4,436	8,770	5,785	6,849	6,996	5,959	45,689	36,000	15%
	M	5,626	3,682	6,395	5,277	6,538	5,649	5,482	38,648		
	O	6,133	3,984	7,345	5,480	6,662	6,188	5,673	41,464		
Okra	B	6,465	5,377	6,469	5,079	7,507	5,358	7,046	43,301	29,300	40%
	M	5,370	4,316	5,764	4,374	6,277	5,029	7,392	38,522		
	O	5,930	4,858	6,124	4,734	6,905	5,197	7,215	40,964		
Chilly	B	5,560	3,377	7,874	6,010	7,501	5,946	5,706	41,975	33,100	24%
	M	4,595	5,587	7,282	4,972	4,937	5,488	5,750	38,611		
	O	5,319	3,930	7,726	5,750	6,860	5,831	5,717	41,134		
Pototo	B	6,773	9,536	8,201	2,852	5,723	7,606	6,634	47,326	43,600	-5%
	M	5,413	8,498	5,531	2,458	4,507	5,521	5,344	37,271		
	O	5,991	8,939	6,667	2,626	5,024	6,408	5,893	41,548		
Cabbage	B	6,034	4,080	6,413	3,953	6,250	5,332	5,185	37,247	25,800	47%
	M	6,084	5,560	6,984	4,068	6,500	5,198	4,604	38,999		
	O	6,052	4,599	6,613	3,994	6,338	5,285	4,981	37,861		
Cauliflower	B	6,877	6,749	6,446	3,947	5,811	6,131	5,772	41,733	27,500	46%
	M	6,053	5,251	5,836	3,640	6,803	5,377	5,204	38,163		
	O	6,481	6,029	6,153	3,800	6,287	5,769	5,499	40,018		
Bottle Gourd	B	6,826	3,152	4,816	3,719	9,246	6,061	6,504	40,325	30,700	29%
	M	6,181	3,429	4,587	5,200	7,508	5,739	6,159	38,802		
	O	6,472	3,304	4,690	4,532	8,292	5,884	6,315	39,489		
Sponge Gourd	B	6,465	5,377	6,469	5,079	7,507	5,358	7,046	43,301	23,500	74%
	M	5,370	4,316	5,764	4,374	6,277	5,029	7,392	38,522		
	O	5,930	4,858	6,124	4,734	6,905	5,197	7,215	40,964		
Average of all Crops	B	6,509	5,092	7,023	4,540	7,042	6,111	6,389	42,706	31,467	28%
	M	5,697	4,899	5,930	4,190	6,110	5,343	6,150	38,320		
	O	6,104	4,898	6,418	4,385	6,611	5,702	6,263	40,382		

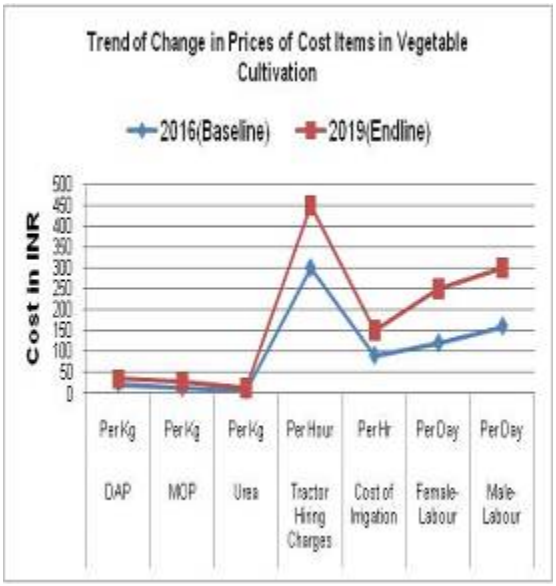
B= Bhagalpur, M= Munger, O=Overall

Although, the above table depicted that overall the cost of cultivation per acre was increased by 28% over the baseline value, considering the factor of inflation in cost of major input items in past two years, the cost of cultivation per acre at the end line was actually reduced over the baseline values. During discussion with farmers during field work, the evaluation team found that the cost of major inputs and cost items like fertilizer, diesel for irrigation, tractor hiring charges for land preparation, labour charges, etc were increased to at least 1.5- 2 times of costs/charges at the start of the project. Though these costs were increased to almost double their baseline values, the cost of cultivation was not increased to double to its baseline value.

Although, overall the cost of cultivation per acre was increased by 28% over the baseline value, considering the factor of inflation in cost of major input items in past two years, the cost of cultivation per acre at the end line was actually reduced over the baseline values.

Cost Item	Unit	2016 (Baseline)	2019 (End line)	% Increase
DAP	Per Kg	23	32	39%
MOP	Per Kg	12	25	108%
Urea	Per Kg	6	10	67%
Tractor Hiring Charges	Per Hour	300	450	50%
Cost of Irrigation	Per Hour	90	150	67%
Female-Labour	Per Day	120	250	108%
Male-Labour	Per Day	160	300	88%

This inferred that because of changes in practices, number of units of these cost items might have reduced which ultimately reduced the cost of cultivation. During FGDs, women farmers had shared that seed quantity per unit size of land was reduced by 30 to 40% as they changed the practice of sowing per place from 4-5 to one-two seeds. Women who had used organic manures like vermicompost and farm manure reported that they had reduced the quantity of fertilizer, though they were not able to quantify. Reduction in other costs like insecticide and pesticide for pest management was not reported as members did not practice much of the indigenous practices. In one of the FGDs, members had reported that the number of irrigation per crop especially in cabbage and cauliflower was reduced to some extent; roughly saving of cost for irrigation for once was resulted.



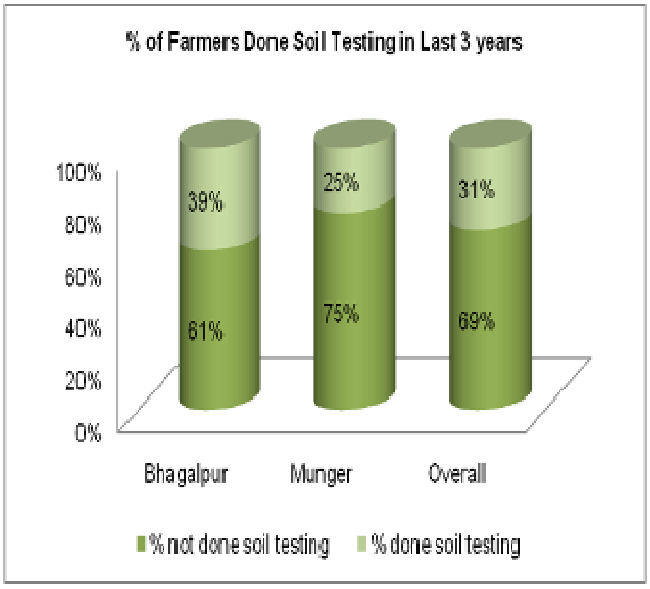
The team also found that cost of cultivation or investment in a crop by a farmer was a function of financial position of the farmer, crop health and market. As in case of potato, in last harvest, 86% of farmers reported reduced productivity in comparison to baseline, this might have influenced their investment in the crop. This might led to reduction in cost of cultivation per acre in case of potato by 5% as depicted in the above table. The similar logic

can be applicable for the reverse case as in case of crops like cabbage, cauliflower. In all these crops the productivity levels were startlingly increased. Accordingly farmers were encouraged to invest more on these crops.

3.1.4 Adoption of ICT Based Technology

3.1.4.1 Soil Testing

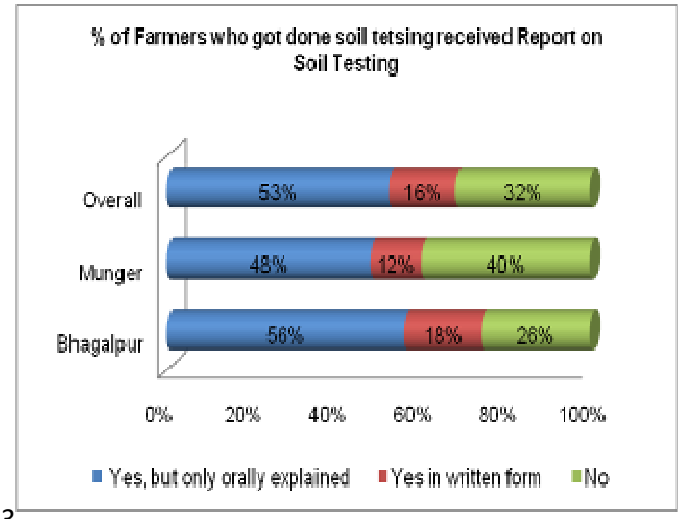
Figure 1 Adoption of Soil Testing



Only 31% of farmers had done soil testing. Lack of awareness about soil testing was a major factor. There was also not a clear cut plan to cover all farmers. Soil test reports were mostly communicated orally, because of technical problem. A revenue based entrepreneurial model could be explored for providing soil testing services to farmers.

The household survey indicated that only 31% farmers among the samples had got their soil tested in last three years, although the project target was met. There was district level variation. In Bhagalpur, more number of farmers had done soil testing than in Munger. In FGDs and interaction with in-charge of SEWA Shakti Kendra (SSK) from which soil testing service was provided, it was found that per SSK on an average soil testing was done for only 100-150 farmers. Major reason of low coverage of farmers under soil testing service was lack of awareness of soil testing among the members. A larger level of effort was required to make the members aware and understand the importance of soil testing. Upon inquiry on reason of not covering all farmers with SEWA, the evaluation team found that there was no clear cut plan to cover all the farmers.

Figure 2 Farmers Receiving Soil Testing Report

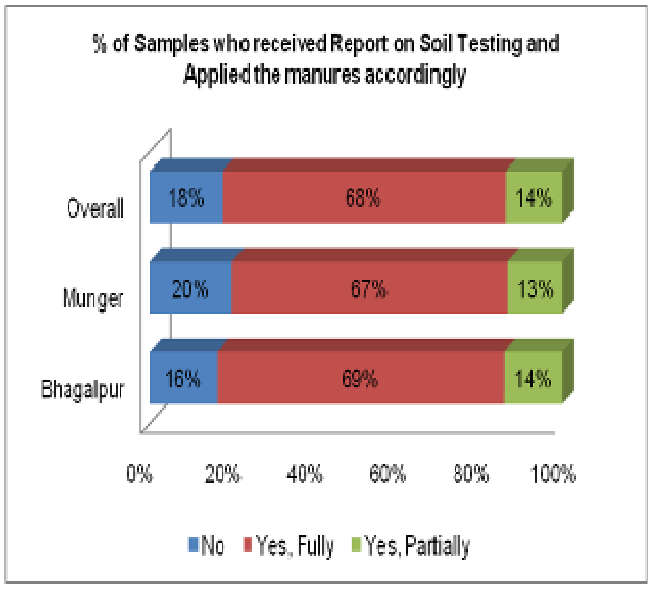


The survey revealed that, a large proportion of about 32% of farmers who had given soil samples for testing were not conveyed about the results of soil testing either orally or in the form of a written report. During FGDs and interviews with women farmers in Munger district, women shared their disappointment with soil testing done at SSK as it was being one year that they had given soil samples and they had not received any communication on the results. Upon inquiry with the SSK in-charge, it was found that soil

testing for those women farmers was not done and their samples were still lying at the SSK as some of the samples were not appropriate to undertake the test while some samples did not have proper tags. However, this message was never communicated to the farmers. This poses a question on level of engagement of SEWA field staff with farmers. Another reason for taking time to provide soil testing report was availability of only one point of contact for preparing recommendations based on testing results. In Munger the SSK in-charge or person responsible for soil testing was not clear about concept of results of soil test. She was not able to clearly articulate the recommendations based on various values of indicators of soil health. More training and handholding support to SSK in-charge was a felt need by the evaluation team.

The survey also depicted that majority of the farmers were communicated about their report on soil testing orally. The reason cited by the project staff was a technical one as the SSK in-charge were not the authorized personnel from Agriculture University and hence they could not sign any report.

Figure 3 Application of Recommendation of Soil Testing Report

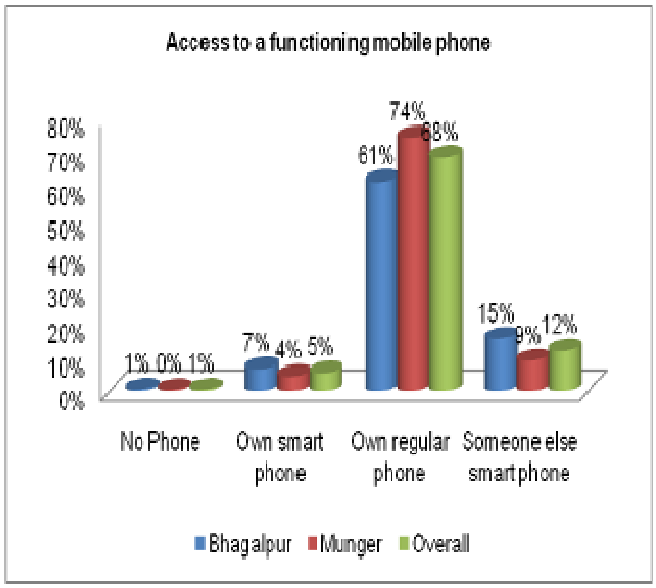


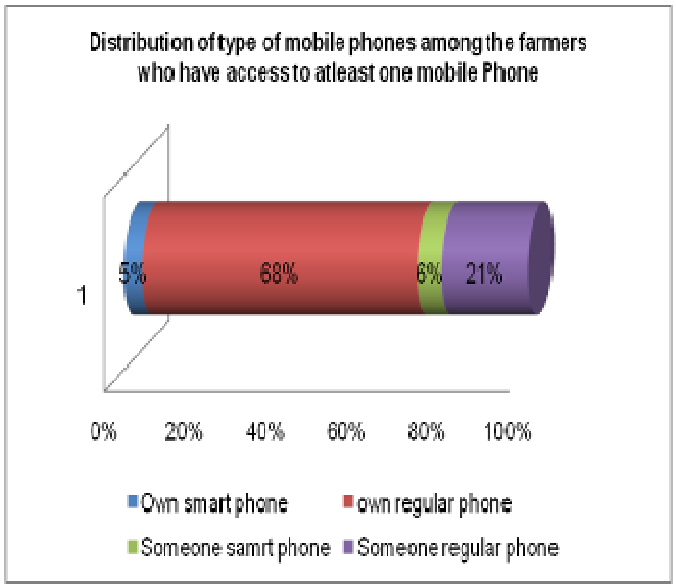
The analysis of level of application of results of soil testing by samples who received report showed that around 70% of farmers applied the recommendation of soil testing. This was also shared during one of our FGDs with women farmers in Bhagalpur, where farmers had applied Boron based on the recommendation which resulted good results.

Overall, the services of soil testing could be provided on a revenue model. However, this was not explored during the project period. An entrepreneurial model for soil testing can be set up and hence should be explored during the next phase of the project. Other organization had developed an online portal for interpretation of soil test results and generation of a report with recommendations. This option can be explored in the next phase of the project.

3.1.4.2 Usage of Mobile Phone for Agriculture Purpose

Figure 4 Access to Functioning Phone

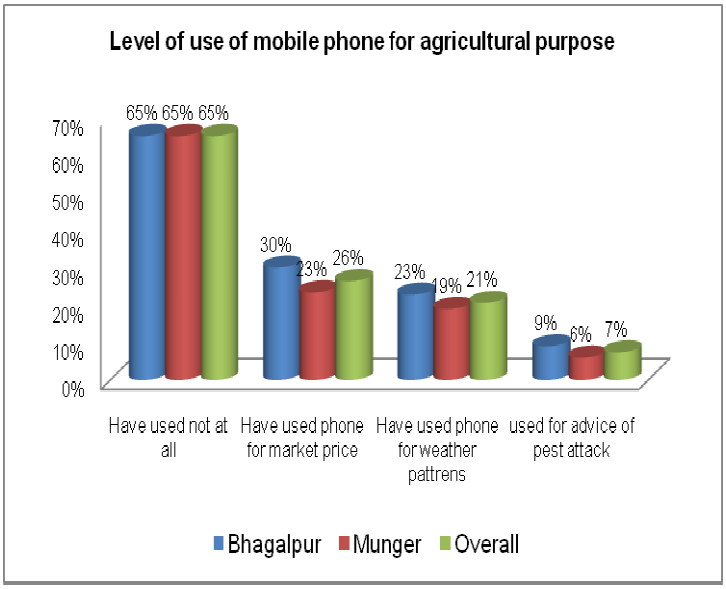




The houshold survey depicted that almost all farmers had access to atleast one phone. Possession of regular phone was found to be more common than possession of smart phone. 87% of samples reported to have access to atleast one functioning mobile phone. Out of these farmers, 68% of samples reported to have their own phone. This showed that around 70% of women had ownership of phone.

In terms of level of usage of mobile phone for agricultural purpose, 35% of the sample reported use of their phone for getting information related to crop and market information. Out of 35% only 26% reported that they had used their phone for getting information on market price which was lesser than the project target of 30%. During field work done under the project, it was found that green SIMs under "IFFFO Sanchar"were distrbuted among the women farmers connetcing around 560 women. "Mobile Vani" was also launched which was designed for rural area to access information on gender senstitive financial and digital literacy and agriculture .Linkages with ATMA for provision of a watsapp number for extension services was also established. During FGDs, it was found that even though there were cases of usage and benefits of ICT application for pest attack, those cases were not much discussed in producer groups. Women thought that those who got SIMs could only get these extension services. Some of the women who had received SIMs reported cases of non-functioning of

Figure 5Level of use of mobile phone for agriculture Purpose



SIM cards, loss of SIM etc. Initially, issues like non-functioning of SIM Cards, balance not received, ect were found and resolved case to case. Some of the women also reported to giving the SIM cards to their husbands or children. Hence, rendering more focus on building awarness of usage of ICT tehcnology for agriculture purpose was a felt need by the evalution team.

3.1.5 Access to Quality Inputs and Vegetable Production Technology

Access to Quality Seeds

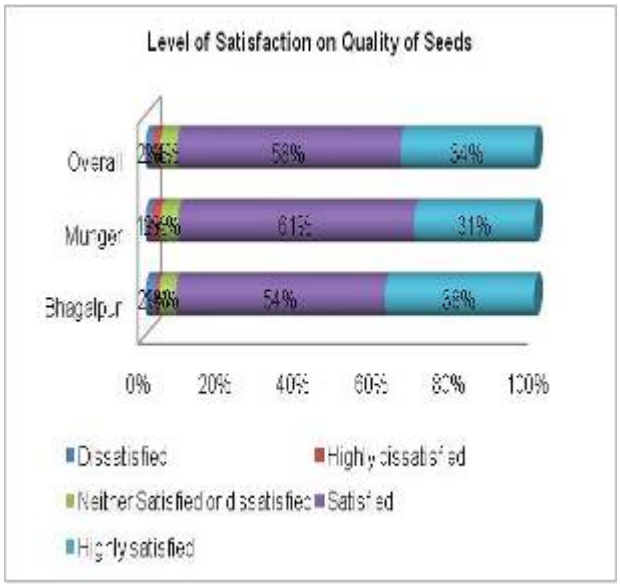
Table 5 Access to Quality Seeds

District	Previously saved seeds	Local Market	Directly from Private company	Local Seed Shops	Government Depart	Others
Bhagalpur	5%	69%	2%	19%	5%	16%
Munger	6%	65%	5%	28%	0%	16%
Overall	6%	67%	4%	24%	2%	16%

Overall at the endline, proportion of farmers acccessing seeds from local seed shops was reduced to 24%, while accessing seeds from authorized shops in local market was increased to 67%. This showed that the farmers were found to be lesser dependent on local shops than baseline. As from Government Department, vegetables seeds were not availble, accessing seeds from Government department was found to be minimal.

Dependence of women farmers on local un-authorized shop for seeds was reduced to a great extent. Farmers were highly satisfied with quality of seeds supplied from SEWA. There were complaints about the timely availability of seeds from SEWA. Farmers look forward to seed supply facilitation services from SEWA, even at market prices and not subsidized rates.

Figure 6 Level of Satisfaction of Quality of Seeds



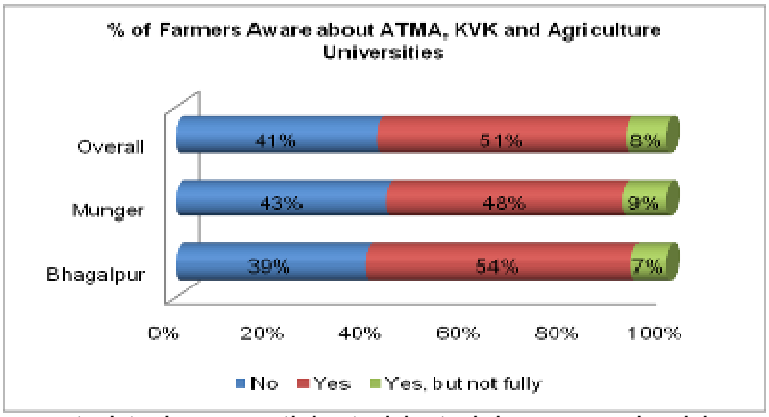
In terms of satisfaction level on quality of seeds, it was found that farmers were mostly satisfied. However, during FGDs with women farmers and male farmers, it was shared that till last year Rabi season farmers had received seeds from SEWA Bharat at subsidized rates at 70% subsidy. Community contribution against seed distribution was done based on Producer groups decisions. The farmers wanted to work towards two things:

1. Prevent misuse or waste of seeds (distributed for free) on field, as was observed by some farmers.

2. Add a source of revenue for sustainability

All farmers across FGDs were very happy with the quality of seeds supplied by SEWA Bharat and in comparison to that the seeds available from local or block level markets were not up to the mark. Farmers shared that there were problems like less germination, disease prone etc with those seeds. However, there were issues in timely supply of seeds from SEWA Bharat. The farmers unanimously look forward to quality seeds facilitated through SEWA Bharat on timely basis. Though interface meetings with private seed companies were arranged and linkages with around 18 companies were established, these linkages could not be channelized to ensure supply of quality of seeds directly to farmers. There were cases reported during field work in which members with the support of SEWA field staff had approached the company dealers, but could not get the seeds. Producer Company was yet to start its business and supply of seeds to its members.

Figure 7 Awareness of Farmers on ATMA, KVK



Awareness of women on ATMA, KVK and Agriculture universities was significantly increased from 4.5% at the baseline to 59% at the end line. This was because of the trainings attended by women under the project. 42% of samples reported to have participated in trainings organized by these institutions.

Interaction with officials of ATMA in both the districts showed that ATMA and KVK were quite involved in the project in conducting training programs on agriculture for women farmers. The officials appreciated efforts of SEWA Bharat in bringing women in some platform and training the women farmers. The officials also shared of experience of addressing women farmers during Convention of Women farmers conducted on International Women's Day.

3.2 Project Outcome-2

3.2.1 Promotion of Farmers' Collective

3.2.1.1 Setting up of FPO

Under the project, two Farmers Producer Organizations (FPOs) were aimed to be established, one in each of the project districts with membership of at least 750-1,000 each by end of the project. We found that instead of two, one FPO was registered in May 2018 with registered office at Munger covering around 700 shareholders; 440 from Bhagalpur district and rest from Munger district. One FPO was promoted instead of promoting two FPOs in two project districts with a thought that one FPO would work through two separate district units and collection formed under the project. Incorporating one FPO would minimize the operational cost and reduce clerical work of filling several periodic returns (Sales tax and Income tax) without compromising the business and profitability. During interaction with SEWA project staff, the evaluation team observed that the staff could not share the exact number of shareholders. Reconciliation of accounts might be one of the reasons for that. The share value was INR 100 and each member could take up to 10 shares. Though, it was aimed at to collect share capital of INR 1, 000 from each shareholder, it was decided to collect in instalments as women were reluctant to deposit the entire amount in one go.

The process adopted for setting up the FPO was as follows: concept of FPO was shared among the producer groups in each village. From 2-3 villages, depending on the number of farmers, one board of director was nominated by the women farmers. As initially two FPOs were planned, ten board of directors from each district were nominated and accordingly documents like Voter ID, PAN Card, photos, bank statements etc. were prepared. Finally, 10 board of directors; 6 from Bhagalpur and four from Munger district were selected for formation of "Karna Bhumi Krishak Utpadak Company Limited".

One FPO was established in second year of project with 700 members, though was planned in first year itself. Low level of awareness and faith of women on community based models, time taking process for preparation of documentation and time taken by SEWA as an organization to get ready for FPO were some of the reasons for delay. Need to increase the awareness of FPO among women, campaign mode of membership drive, immediate operationalizing FPO with requisite business licences.

The FPO was supposed to be established in the first year of the project, but it could be established only in second year of the project. Upon discussion with the project implementation manager, the evaluation team could understand that SEWA as an organization took time to get ready for formation of Farmers' collective and also the decision to form either two or one FPO was delayed by SEWA to some extent. Though SEWA had been working in Munger, but SEWA's previous experience was largely on promoting trade union working in informal sector and not directly on agriculture promotion as a technical programme. Hence, at the initial stage of the project, SEWA took little time to pick up the

agriculture program. Another reason of delay in formation of FPO was building trust of community on community led business model and make them ready to manage this initiative. In some villages earlier experience of community on cooperative and other micro finance institution was not good. In SEWA's way of working, an FPO would be formed only when the women were ready for it and not imposed from above. It took a long time for the women to understand the benefits of an FPO and to get together to make the decision. The registration process was started only after the women gave SEWA a clear message that they understood the concept and were ready to form an FPO. Ensuring legal documents of BOD members required for registration of an FPO also took a lot of time. The first year of project was largely utilized in mobilizing farmers and conducting training programs on agriculture for farmers.

In terms of level of percolation of FPO concept among women farmers, a mix response was found. Again the level of percolation was found to be a function of capability and level of engagement of field staff with the women farmers. In half of the villages covered during the end line study, it was found that even though few of the women farmers per producer group had deposited the share capital, they could relate FPO with only supply of input supply services. The evaluation team felt the need for a campaign mode of awareness generation and collection of share capital. Upon enquiry of reason of limited number of shareholders joining FPO, the field staff shared that there was an instruction from SEWA management to stop collection of share capital until business licences were obtained and FPO would start its business providing services to its members. On the contrary, the project implementation manager shared the need to do reconciliation of share capital collected by board of directors as the reason of conveying the communication for stopping the collection of share capital. A communication gap among the project team could be found during evaluation.

The FPO could get GST registration but was yet to get various business licences such as seeds, pesticides, fertilizer, organic input selling, etc. The current project team was not clear of the licences received by FPO till date as some mentioned of receiving seeds and organic input selling licences while some mentioned of applying only. Fertilizer and pesticides licences were yet to be applied. Upon discussion with the project implementation manager, it was found that the program manager had recently left the project and hence there was not much progress on procurement of business licences. This had raised a question on level of involvement of other staff or system of percolation of knowledge across the project team within the implementation partner organization. As no business licences were obtained, the FPO was yet to start any business. The board and members were also concerned about FPO not doing any business. On the other hand, there was a high level of demand of timely supply of quality inputs not only for vegetables but also for paddy and wheat, especially in Munger district. This showed that there was an immediate need to operationalize the FPO.

3.2.1.2 Training of FPO Functionaries

Interactions with board of directors from both the districts were held as part of the end line study. The Board of Directors from both the districts articulated the concept of the FPO very well. They said, “FPO is our organization; farmers’ company. Through FPO inputs required for cultivation like seeds, fertilizer, etc will be supplied. Through collective selling of inputs, we will be able to procure better quality of inputs at lower price and sell to our women members at lower price. Collective marketing can also be done. The major problem concerning vegetable cultivation is marketing. The nearby markets in Munger district are relatively smaller in size and hence the sale price slashes down drastically once there is over-production of any crop. Through FPO, a proper plan can be chalked out to ensure sowing of a particular crop on planned dates which will ensure harvest of crop on planned dates in volume and accordingly distant markets can be reached. With marketing to distant markets, better price can be realized, especially during the time when the local price is low”. The women also shared their vision for getting into value additions such as drying of tomato, preparation of tomato sauce, potato chip, etc. The board of directors had shared their participation in various training programs, exposure visit to places like Kousalya Foundation at Nalanda, to Ranchi, Motihari, Deharadun and interface and roundtable meetings at Patna. The impact of these training programs and exposure visits could be easily acknowledged with the way the board of directors articulated the FPO concept. Concept of accounts in terms of maintenance of 11 types of registers such as board meeting minutes register, AGM resisters, cash book, bank books, etc. was also shared with the board of directors. The board of directors also shared of formulation of sub-committees for procurement, marketing, accounts etc. within themselves. However as FPO business was yet to start, these committees were also yet to start functioning.

A business plan exercise was undertaken in the first year of the project to

- Review and assess the potential of the production and connecting these productions to the available market with the objective of fair trade.
- Develop specific, actionable and practical recommendations to guide refining of project objectives and setting of overall targets for women farmers and their FPO.
- Train FPO leaders who can design business plan for their FPO in future.

As in the project area farmers were already intensely engaged in vegetable production, plan for value addition could have been a major focus in the business plan developed, at least as part of the long term plan. As at present all the board members are on board and FPO is set to roll, a visioning cum strategic business plan is required to be planned with involvement of all board members so that altogether they can envision for their FPO.

3.2.1.3 Conduct of Board Meetings

Once in every quarter, board meetings were scheduled in which board members from both the district would participate. The last board meeting was conducted on December 3 2018. The minutes of the last meeting reflected that in that meeting only resolution was taken to take business licence as in the month of October 2018 only bank account of FPO was opened. Members shared that for the last three months the board had not met. The reason cited was tight work schedule of SEWA Bharat project staff. The board members felt the need to have regular meetings, even mentioned of need of conducting monthly board meetings. At district level also no structured meetings of board members were done on monthly basis which members felt was needed.

The evaluation team felt that the FPO had lost one more cropping season to do business as no preparation like demand estimation, placement of order, etc. were found. SEWA and the board of directors were still waiting for the business licences to start FPO business. SEWA could have facilitated input supply even informally through private seed companies under the project, as there was a heavy demand of quality inputs in the project districts. This would have resulted in FPO becoming operational and building trust of women members on FPO.

3.2.2 Promotion of women Agro-Entrepreneurs

Around 285 women farmers had established their space in 18 different vegetable vending zones and doing business as regular vegetable vendor. It established identity of women farmers as entrepreneur in their society. In project area 15 women farmer groups initiated business of spices powder to utilize their time during off season.

3.2.3 Conduct of Round table and interface meetings

Interface Meetings

Three state level interface meetings with Government officials and other stakeholders were organized and conducted under the project. The first state level Interface Meeting was organized on 19th Dec, 2016 in state headquarter Patna to discuss and sharing of women farmers concerns, ground realities, challenges and opportunities in the state with participation of higher official from Agriculture Department such as Director, Bihar Agricultural Management & Extension Training Institute (BAMETI), Former Agriculture Production Commissioner, officials from INGOs, CSOs, academia and around 80 women farmers. The second state level interface meeting was conducted on 26th April 2018 at Patna to influence the policy makers to bring out women favouring and gender sensitive procedures in policy and process guidelines for women farmers and Farmer Producer Organizations with participation of Agriculture Production Commissioner, Regional Director, National Cooperative Development Corporation (NCDC), representative from INGOs, CSOs, academia, and around 100 women farmers. The last state level interface meeting was

conducted on 16th April 2019 to create a collective action platform to address the issues related to women farmers, initiate dialogue on sustainable model of community led business institutions and to influence the policy makers to bring out gender sensitive procedures in policy and process guidelines for women farmers and Farmer Producer Organizations lead by them with participation of Deputy Director, Department of Agriculture, Assistant Director, NCDC, State Project Manager – Jeevika, representatives from INGOs, CSOs, academia, and around 110 women farmers.

Round Table Conferences

Two round table conferences on rural business development were held one on 15th December 2017 and 18th December 2018. The Round Table Conferences were aimed towards:

- Integrating the small women farmers in the sustainable and equitable value chain through membership organization
- Creating an on-going dialogue and partnership between primary producer and other stakeholders from the district to state level.
- Establish the rural business and taking forward the initiative

The participants of these conference were higher officials from Agriculture Department , Horticulture Department, Representative from National Cooperative Development Corporation, Bihar Vidyapeeth, INGOs, 14 representatives from companies dealing in agriculture input and farm produce (Arihant International, Pioneer, IFFCO, Bihar Agro, Myhco, Namdhari, Nagarjuna, Dhanuka, Sungrow and many others) and around 100 women farmers in each conference.

3.2.4 Income from Vegetable Cultivation

Table 6 Gross Income and Net Income from Vegetable Cultivation

Crop	District	Gross Income from Crop			Cost of Cultivation		Net Income		
		End line Average Income per Acre in INR	Baseline Average Income per Acre in INR	% Change in Gross Income over baseline	End line Average cost of Cultivation in INR	Baseline Average cost of Cultivation in INR	End line Average cost of Cultivation in INR	Baseline Average cost of Cultivation in INR	% Change in Net Income over baseline
Tomato	B	60,080			43,461	33,700	16,619	24050	37%

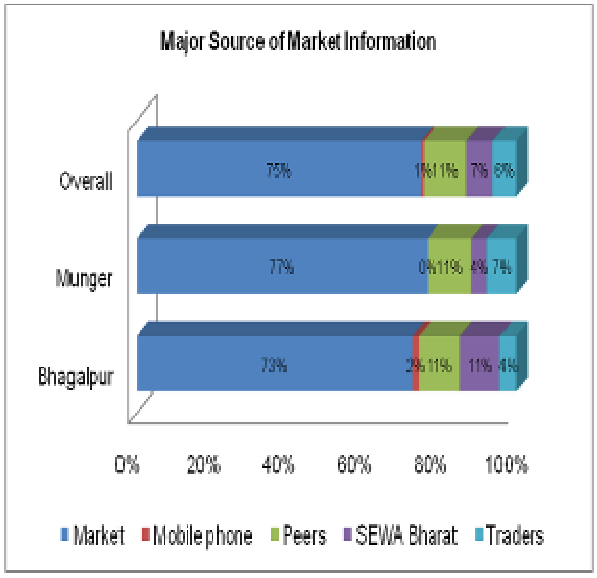
Crop	District	Gross Income from Crop			Cost of Cultivation		Net Income		
		End line Average Income per Acre in INR	Baseline Average Income per Acre in INR	% Change in Gross Income over baseline	End line Average cost of Cultivation in INR	Baseline Average cost of Cultivation in INR	End line Average cost of Cultivation in INR	Baseline Average cost of Cultivation in INR	% Change in Net Income over baseline
	M	82,961			37,338		45,623		
	O	**73,035**	57,750	26%	39,995		33,040		
Brinjal	B	78,296			45,689		32,607		
	M	95,586			38,648	36,000	56,938	30500	55%
	O	**88,670**	66,500	33%	41,464		47,206		
Chilly	B	60,334			41,975		18,359		
	M	67,429			38,611	33,100	28,817	11900	76%
	O	**62,108**	45,000	38%	41,134		20,974		
Okra	B	61,980			43,301		18,679		
	M	71,733			38,522	29,300	33,211	12700	103%
	O	**66,749**	42,000	59%	40,964		25,785		
Cabbage	B	87,646			37,247		50,399		
	M	78,686			38,999	25,800	39,687	14700	217%
	O	**84,506**	40,500	109%	37,861		46,645		
Cauliflower	B	94,931			41,733		53,198		
	M	1,00,665			38,163	27,500	62,502	18260	216%
	O	**97,685**	45,760	113%	40,018		57,667		
Bottlegourd	B	92,467			40,325		52,142		
	M	71,448			38,802	30,700	32,646	14975	177%
	O	**80,927**	45,675	77%	39,489		41,438		
Sponge Gourd	B	70,158			43,301		26,857		
	M	78,406			38,522	23,500	39,884	8000	307%
	O	**73,502**	31,500	133%	40,964		32,538		
Potato	B	65,766			47,326		18,439		
	M	55,472			37,271	43,600	18,200	18000	2%
	O	59,850	61,600	-3%	41,548		18,302		
Average of all Crops	B	74,629			42,706		31,922		
	M	78,043			38,320	31,467	39,723	17,009	111%
	O	76,337	48,476	57%	40,382		35,955		

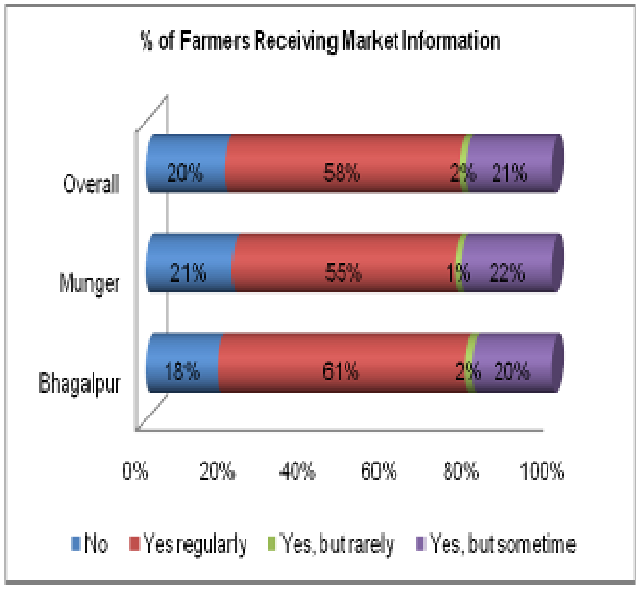
Overall at the end line, the gross income per acre from vegetable cultivation was increased by 57% over the baseline mainly because of better price realization of various produce. As gross income increased by 57%, the net income increased by 111% over the baseline as the cost of cultivation increased by only 28%.

3.2.5 Marketing of Produce

Access to Market Information

Figure 8 Access to Market Information





The household survey revealed that overall 80% of samples reported to be receiving market information against the target of 90% of farmers under the project from various sources such as directly from market, peers or fellow farmers and SEWA/collection centers. In comparison to baseline, the proportion was increased significantly. Analysis of data on major source of market information showed that at the end line the major source of market information was market as 75% of samples reported the same, which was not the case at the baseline. At the baseline 60% of members used to gather market information from peers or other farmers. This inferred that at the end line the women had better access to market. Only 7% of the samples

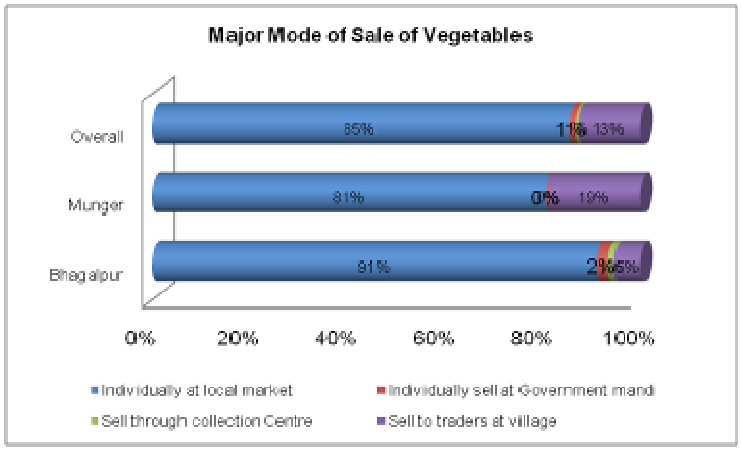
"Market" became the major source of market information at the end line and not the "Peers" as was the case at the baseline reflecting improved access to market at the end line. A systematic approach to gather and disseminate market information to women farmers through SSK can be explored as farmers look for marketing services to distant markets. Collective marketing was yet to be emerged as the major mode of selling, even though women farmers, especially in Munger looked forward to collective marketing. Business model based operating structure for SSK to be thought of.

reported that their major source of market information was SSK or SEWA Bharat. Three SSKs, two in Bhagalpur district and one in Munger district were visited during the end line study. It was observed that though there were display boards on market information, the boards were mostly blank. Upon discussion with SEWA staff, it was found that display boards were started in 2016, however they were no longer in use since year 2017 as the model was changed to connect more people directly to markets and provide market information via calls. Hence, this might be one of the factors that resulted in low proportion of samples reporting SSK as the major source of information. A systematic approach to gather and disseminate market information to women farmers through SSK can be explored as farmers look for marketing services to distant markets as shared during FGDs.

Mode of sales of Vegetables

Overall, it was found that 85% of women reported to be selling their vegetables largely individually at local market. Collective marketing was yet to be emerged as a major mode of selling of produce, though SSKs had partnered with 16-17 traders.

Figure 9 Major Mode of sale of vegetables



A visit to Nathnagar mandi (market place) in Bhagalpur district was done. With the support of project, a proper place was allocated for women farmers in the mandi. Earlier, the women farmers were denied of selling their produce. During FGDs with farmers in both the districts, it was found last year collective marketing was initiated mostly in two SSKs: Jagdishpur SSK in Bhagalpur district and Khargpur SSK in Munger district. Through Jagdishpur SSK, collective marketing was facilitated with produce being graded and sorted to some extent. However in Kharagpur SSK, farmers had mentioned that though they had taken their potato produce to the SSK for selling, they did not sell to the trader as they did not find the rate offered by the trader attractive. Rather they chose to sell their produce individually.

A visit to Peru Mandal Tola village of Munger district was made for the purpose of evaluation. The village is situated at the national highway with very good connectivity with the district market. The major crop of the village is tomato. Two models of marketing were found in the village. Farmers mostly men take their produce directly to Munger district, especially during time when the price is high. When the price slashes down they prefer to sell to local traders. During FGD, it was found that one of the farmers had been trading the produce of other farmers. Farmers mentioned that with the support of SEWA, linkage with another trader was established. Last year, the farmers mentioned of getting good price for tomato through that trader. However, this year the trader did not turn up.

Discussions held with farmers revealed that marketing of produce was a major concern of farmers. Women farmers shared their difficulties in marketing. Women farmers shared that they had to sit for long hours without any facility for sanitation and to avoid such situation women preferred to take less water for hours together. To book suitable place in the market place, family members were usually sent to market in early morning. Market fee, locally called as “chatti-batti” of around INR 10-20 per basket was to be paid by the farmers. Women shared that they had to leave their farm work and go for marketing. Farmers in Munger district shared their major concern on size and absorption capacity of the local available markets. In comparison to Bhagalpur district, the local markets in Munger district were found to be smaller with limited capacity to absorb the full fledged production of various vegetables. Hence, establishing linkages with distant market was a major felt need of the farmers in Munger district. In one of FGDs conducted in Kharagpur block of Munger district, women expressed their deep concern on marketing at Kharagpur. They shared that besides the market day (Monday and Friday), they found marketing at Kharagpur market very difficult, and especially after 9 am as after that the permanent shops got opened and did not allow them to sit in front of their shops. Moreover, as in Munger district migration was found to be a common phenomenon, women farmers expressed that if collective marketing service would be provided, it would encourage more women farmers to get involved in vegetable production.

Overall, it was found that there was a felt need of collective marketing in both the districts which was currently remained unmet. Though, there were some initiatives on collective marketing, those could not be taken across the project because of reasons like fluctuation in market price and lack of capital. Individual interests of farmers also some time stop them to go for collective marketing. The evaluation team observed that even though the farmers expressed the need for collective marketing, there was a gap in understanding of farmers between wholesale marketing and retail marketing. The farmers expected retail prices for wholesale marketing facilitated under the project. A concentrated effort in building farmers’ understanding on concept of collective marketing would be useful for taking the concept of FPO ahead.

Functioning of Collection Centre (SSK)

Under the project, four collection centers or SEWA Shakti Kendras were set up to facilitate collective marketing. Out of four SSKs, three SSKs were visited for the purpose of end line study. Objective of setting up SSK (Collection centers) were:

1. Creating a platform for collectivizing the produces,
2. Building linkages with traders
3. Increasing bargaining power of community in the market
4. Working as knowledge exchange platform

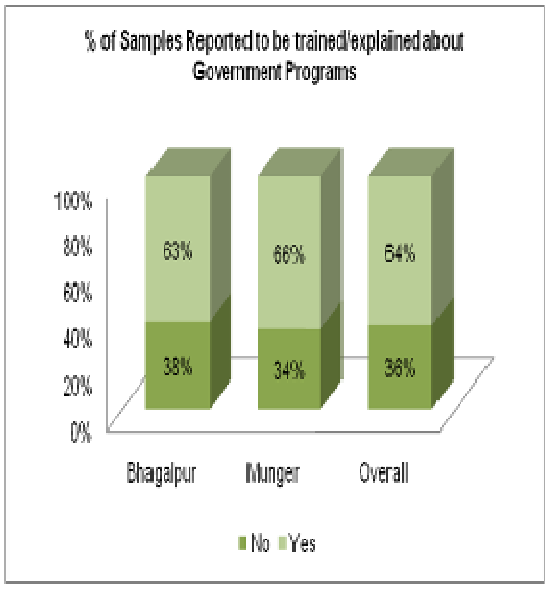
The SSKs were found to be providing all sorts of services related to agriculture including supply of quality seeds, other inputs like organic manure, soil testing, pest control materials like yellow card, pheromone trap, etc, market information, sorting, grading and collective marketing, facilitating access to Government programmes in addition to building knowledge

of women farmers on sustainable agriculture. Training of women farmers, board meeting, etc. were conducted in SSKs. However, currently these services/inputs for various demonstrations under the project were distributed through the SSK. SSKs had worked as distribution centers and not as business/service units earning their own revenues. As per discussion with SEWA staff, the SSK was managed by SSK in-charge who was SEWA field staff. A vision for SSK functioning as a business unit and managed by its own staff was missing among the project staff. Operational structure of FPO with SSKs as integrated part should be thought of under the project.

3.3 Project Outcome-3

3.3.1 Women Trained on Government Schemes

Figure 10 women Trained on Government Programs



In comparision to baseline(0%), a significant increase in proportion of farmers trained/explained about Government Programs was reported under the houshold survey. Against the target of 60% of farmer trained on Government programs, overall 64% of farmers reported to be trained on Govermeent programs.

As mentioned in previous sections, producer groups could be used more effectively for desssiminating knowledge or training inputs gained by few group representative to all group members. Project field staff should be strengthening the producer groups through structured discussions on training inputs.

3.3.2 Level of Access of Women to Government Schemes

Table 7 Level of Access of Women on Government Schemes

District	Accessed seeds from block	Accessed Fertilizer from Block	Accessed equipments from block	Accessed fertilizer from block	Accessed Fertilizer from Block	Accessed equipments from block
	% of total sample			% of sample who have been trained		
Bhagalpur	17%	10%	8%	23%	12%	11%
Munger	12%	17%	3%	14%	18%	5%
Overall	15%	14%	5%	18%	16%	8%

Overall, in comparison to baseline (0%), proportion of farmers accessing seeds, fertilizer and equipment was reported to be increased to 15%, 14% and 5% respectively, although the project target was to ensure at least 20% of farmers access Government rights and entitlements related to agriculture. Upon discussion with farmers, it was found that block office did not provide vegetable seeds. Seeds distributed through block were paddy, wheat and gram. Fertilizers distributed through block office included DAP and urea. The major reasons of non-access of inputs from block office were unavailability of inputs on time, long queue for distribution and less interest in cereal crops.

Farmers' registration with Agriculture Department, crop insurance, compensation for wheat crop loss, etc was facilitated under the project. Mix kind of response was found during FGDs in this respect. While some were quite aware and had done the registration, others sounded to be unaware of these schemes, reflecting scope for improvement in dissemination of knowledge/information. So far about 600-650 farmers were registered through facilitation under the project. Some of the challenges faced by SEWA in this respect included:

- Refusal by block in-charges to register farmers. Complaints were raised to Dist. Agricultural Officer in the past.
- The online link for farmer registration did not work very often. It mostly worked at night around 11-12pm, which made it difficult to access for farmers. SEWA had raised this issue but not yet resolved.
- It was observed that farmers found it difficult to use the 12 digit registration number to apply for schemes and benefits online. SEWA is working on capacity building and facilitating the support to farmers through SSK.

As part of the endline study, interviews with two Block agriculture officials, one from Khargapur block of Munger district and one from Bhagalpur district were conducted. The block officials shared that good linkages with SEWA Bharat were established. The block officials were quite aware of the work done by SEWA in the field of vegetable cultivation. They had facilitated many of the training programs in the form of "kisan choupal event". In Munger, the block official reported of conducting 15 such events. In association with SEWA, the block officials had identified beneficiaries for Government schemes like construction of vermicompost pits (40 pits in Munger district and 20-30 pits in Bhagalpur district), distribution of power sprayers (10 Power sprayers in Bhagalpur) and distribution of seeds, etc. as the coverage of these schemes were limited. According to the block official in Munger district, around 150 farmers from the project area were benefited under the Government schemes. The official also mentioned of registering farmers for 'Prime Minister Kisan Samman Nidhi' through SEWA Bharat.

3.3.3 Participation of Women in Gram Sabha, Village Meetings and Block Forums

Table 8 Participation of Women in Gram Sabha, Village Meetings

Activity	Districts	% of sample participating			
		No	Yes, Rarely	Yes, regularly	Yes, Sometime
Participation in gram Sabha	Bhagalpur	42%	1%	33%	24%
	Munger	30%	3%	34%	33%
	Overall	35%	2%	34%	29%
Participation in village meeting related to agriculture	Bhagalpur	38%	2%	29%	32%
	Munger	27%	1%	31%	41%
	Overall	32%	2%	30%	36%
Participation in block/district/state level forums	Bhagalpur	55%	2%	20%	23%
	Munger	56%	3%	16%	25%
	Overall	55%	3%	18%	24%

Analysis of response of sample farmers on participation in Gram Sabha, village meetings and block/district level forums captured through household survey showed that participation level of women in these forums had significantly increased in comparison to baseline at which none of the farmers reported to be participating in these forums. Against the target of 40% of farmers attending gram sabhas and village meeting, it was found at the project level 34% women farmers reported to be attending gram sabha regularly, while 29% reported to be attending only sometimes. There were district level variations. Higher proportion of farmers in Bhagalpur district reported to be not attending these meeting than farmers in Munger district. Similar pattern was found during FGDs in both the districts.

During discussions with women farmers, women shared that as very less women attend these meetings, women felt shy to attend these forums. They also shared that men also did not welcome women in these meetings. Hence, if all women attend these meetings, participation of women and ability to actively participate would enhance. This indicated need for a different approach of organizing women, facilitating discussion on issues in groups and ensuring participation through local women leaders.

3.3.4 Access to Credit

Table 9 Access to Credit

District	% of total samples taken Loan	Of the samples who have taken loan in past 12 months											
		Money Lender		Friends and relatives		Self Help Group		Village Cooperative		MFI		Bank	
		% taken	Average in INR	% taken	Average in INR	% taken	Average in INR	% taken	Average in INR	% taken	Average in INR	% taken	Average in INR
Bhagalpur	39 %	25	3,386	22	13,862	52	9104	5	55000	8	35,500	6	28,750
Munger	42 %	12	13,350	26	20,955	57	13382	2	30000	2	11,000	4	6,500
Overall	40 %	17	9,247	24	18,320	55	11842	3	45000	5	27,333	5	21,333

The household survey revealed that overall 40% of farmers reported to have taken loan for the purpose of vegetable cultivation. Out of those taken loan, majority (55%) had taken loan from informal institution of women; the Self Help Groups under Jeevika. Around 24% had taken loan from friend and relatives. These loans were mostly interest free loans. Very less proportion (4-5%) reported to be accessing institutional credit. On the contrary at the baseline, the major source of credit was moneylenders. Jeevika had a strong presence in that area and farmers were found to be happy with the services. Some farmers had expressed of need for bigger among of loans which were currently remained unmet by SHGs. Although Information on the multiple credit options available and application process was covered in capacity building sessions, exclusive trainings on access to credit for women was required.

3.3.5 Convention of Women

Conventions of Women Farmers

Two state level conventions were organized under the project, one on 4th December 2017 and another on 14th March 2019 to sensitize and engage various stakeholders towards joining hands for 'Economic Empowerment of Women Farmers of Bihar' and preparing policy recommendation on the basis of sharing of ground issue by women farmers with participation of higher officials from Agriculture Department , Horticulture Department, Women Development Corporation, Bihar, representatives from Jeevika, Development Management Institute, INGOs along with 100 women. Representative of women farmer submitted a 9 point charter of demand to Agriculture production Commissioner, Bihar and Director – Horticulture, Bihar. In addition to the state level conventions, four district level conventions, two in each district were also held. Three of these conventions were held on International Women's day (8th March, 2018 and 2019). The participants of the district level conventions were representatives from Agriculture department, Krishi Vigyan Kendra, Agricultural Technology Management Agency (ATMA), elected representatives Panchayti Raj Institutions, male and women farmers.

3.3.6 Women as Farmers

Table 10 Perception of women as Farmers

District	Woman Considering herself as farmer		Spouse considering woman as farmer		Other people in Village considering woman as farmer		
	No	Yes	No	Yes	No	Not Sure	Yes
Bhagalpur	12%	88%	26%	74%	36%	12%	52%
Munger	18%	82%	23%	77%	32%	4%	63%
Overall	15%	85%	24%	76%	34%	8%	58%

The project had brought a change in perception of women about themselves. During FGDs women expressed that earlier women barely talked about agriculture even though women were involved more than men in vegetable cultivation. With the formation of producer groups, women got a forum to discuss exchange and learn new techniques and practices. The new technology/practices learnt under the project contributed to enhancement of women's acceptance as farmers at home front. Women shared, "Now our husbands ask us about learning from training programs, techniques to sow, etc".

3.3.7 Level of sensitivity of Men towards Women

A total of eight FGDs with men were conducted as part of the end line study. In each FGD, 5-7 male farmers had participated. With the discussion held with male farmers, it was found that the recognition of women as farmers among the men increased significantly. Across the FGDs conducted with men, majority of the men participated shared that they consulted their wives for fertilizer, improved practices or application of pesticides. They shared that their wives had acquired agriculture knowledge through attending various training programs conducted under the project which contributed to enhanced yield. Men felt that the women had become more independent and could handle agriculture without involvement of men. The men attributed these changes to SEWA Bharat's engagement with women farmers. Majority of men shared that it was necessary to work with women farmers as women were involved in vegetable cultivation to a great extent. However, the men interviewed also expressed that there should be some training programs conducted exclusively for men as none of the men participated reported that under the project no exclusive training program was conducted for men. Very few men reported to be participating at village level training programs.

Unintended Impact

In one of the FGD conducted in Munger district, the women farmers shared that now as both men and women were more engaged in vegetable cultivation, occurrence of domestic violence was reduced. No one had leisure time to sit and think negative. They also realized that although workload on women was increased, now their children are studying in good schools.

4 Project Logical Framework at End Line

Achievements (Output)	Target (Indicators)	Baseline figures	Endline Figures
2/3 of the 3.000 female producers will increase their production by about 20% until the end of the project by using sustainable agricultural practises	Per hectare production improved by 15%-20% of at least 2/3rd of 3000 women by end of project period	Current production level of major vegetable crop are (figures are in quintal per acre (100 kg=1 Quintal) Potato –88 quintal Tomato – 105 quintal Cauliflower – 88 quintal Cabbage – 90 quintal Brinjal – 95 quintal Chilli - 25 quintal Okra- 60 quintal Bottle Gourd- 105 Quintals Sponge Gourd- 70 quintals	Production level of major vegetable crop at endline were (figures are in quintal per acre (100 kg=1 Quintal) Potato- 62 Quintals Tomato- 96 Quintals Cauliflower- 106 Quintals Cabbage-121 Quintals Brinjal- 84 Quintals Chilli- 34 Quintals Okra- 61 Quintals Bottle Gourd- 80 Quintals Sponge Gourd- 70 quintals
	At least 20 % reduction in cost of cultivation of at least 2/3rd of women farmers of the 3.000.	Average cost of cultivation of vegetable crop (figures are in INR per acre) Potato – INR 43,600 Tomato – INR 33,700 Cauliflower – INR 27,500 Cabbage – INR 25,800 Brinjal – INR 36,000 Chilli - INR 33,100 Okra- INR 23, 900 Bottle Gourd- INR 30, 700 Sponge Gourd- INR 23, 500 Average cost of cultivation – INR 31, 467 per acre	Average cost of cultivation of vegetable crop (figures are in INR per acre) Potato – INR 41, 548 Tomato – INR 39, 995 Cauliflower – INR 40, 018 Cabbage – INR 27, 861 Brinjal – INR 41, 464 Chilli - INR 41, 134 Okra- INR 40, 964 Bottle Gourd- INR 39, 489 Sponge Gourd- INR 40, 964 Average cost of cultivation – INR 40, 382 increased by 28%.

Achievements (Output)	Target (Indicators)	Baseline figures	Endline Figures
	At least 80 % women (of 3.000 women produces) vegetable producers are trained of which at least 2/3rd are practicing on sustainable agriculture practices.	No. of women trained: NIL No. of women practicing sustainable agriculture practices: Vermicomposting: 26.7% Mulching: 10.4% Farmyard Manure: 11.3% Selection of seed: 49% Seed treatment: 8% Field Preparation: 6% 85 (20%) women claimed someone from their family have received some kind of training and they are aware of methods such as raised nursery bed, vermi-composting, mulching, farmyard manure, seed selection and farm preparation, however only few of the women practice them. Selection of seeds is also discussed with men farmers in family and neighbours.	87% of women farmers trained on seed treatment, 84% on raised bed nursery, 80% on Zig-Zag sowing, 82% on usage of farm wastage as manure, 83% on vermicomposting, 71% on indigenous practices for pest management, 85% on weed management, 84% on irrigation management and 85% on sorting and grading practices. 86% of the women farmers reported to be practising at least seven practices.

Achievements (Output)	Target (Indicators)	Baseline figures	Endline Figures
	At least 30 % vegetable growers of the 3.000 women have adapted Information Communication Technology (ICT) based technology solutions for vegetable production (it will increase fast / instant access to knowledge solution to farmers.)- via surveys and interaction)	No. of women farmers are aware about ICT based technology solutions for vegetable cultivation – NIL	31% farmers had done soil testing. Of the farmers who had soil testing, 32% did not receive any report on report or communication on soil test report. Those who received report on soil test, majority had applied the manures and fertilizer as per recommendation as 82% reported to applying either fully or partially. 355 of women farmers use their mobile phone for accessing information for agriculture.
	At least 60 % women vegetable producers have increased access to quality input and vegetable production technology.	Access to quality agriculture input: 11.2 %, Access to vegetable production technology: 4.7%	67% of women farmers accessing seeds from authorized shop in local markets. Only 24% of women farmers reported to be accessing seeds from local shops, 59% of women farmers reported to be aware of ATMA, KVK. 42% had attended training programs.
	At least 50% of the 3.000 women explain that they consume regularly fresh vegetables form their home-production. This will add to their nutrition diet.	92.6% women farmers said they consume fresh vegetables from their farms except in those six months when the vegetables do not thrive. But we need to promote consumption of nutritious vegetables in all seasons.	65% of women farmer consumer fresh vegetables from their own farm at least for 6 months. 73% of farmers consume potato of their own farm for round the year.

Achievements (Output)	Target (Indicators)	Baseline figures	Endline Figures
At least 80% of 3000 women horticulture producers have improved access to profitable markets and their bargaining power as well as their role in the vegetable value chain is sustainably strengthened. Until the end of the project period these 3000 women are organised in at least two autonomous functioning producer organisations.	At least two women vegetable producer organizations have been established. (Each women farmer producer organization will have membership of 750 – 1000 women farmer till last of three year of project.)	No. of community led business collective presently work there – NIL	One women vegetable producer organization established with 700 women members.

Achievements (Output)	Target (Indicators)	Baseline figures	Endline Figures
	All the 20 producer organization functionaries (10 in each Farmer Producer Organisation) have been trained on business development plan and functioning of farmer producer organizations. They have good management qualifications by the end of the trainings. These trained functionaries will lead this farmer producer organization with support of project and after project period they support to sustain this initiative. They are leading the FPO to a successful structure.		20 functionaries trained. All board of directors were well aware of FPO concept. A business plan was developed but not followed or reviewed. Licences of FPO were yet to be obtained which became a major hindrance for starting the business operation of FPO. No business operation of FPO done under the project.
	Impact of trainings and technical support: At least 300 agri-women (women who do the soil testing, nursery raising, selling of fertilizer etc.) entrepreneurs have been established.	No. of women entrepreneurs – NIL	285 women entrepreneurs were promoted.

Achievements (Output)	Target (Indicators)	Baseline figures	Endline Figures
	At least 15 private sector companies input and output traders have been engaged through round table meetings with the 2 FPOs.		
	Linkages with at least 15 local traders have been established with the two vegetable producer groups (FPO).	Engagement with private sector companies dealing in agriculture inputs –NIL	Linkages with 18 private companies were established during interface meetings and purchase for demonstration under the project. However, the linkages could not be channelized to supply quality inputs to members, even though members had expressed huge demand of quality seeds.
	At least 3 interface meeting with local, district and state government officials facilitate improved access to government services.		Three state level interface meetings with Government officials and other stakeholders were organized and conducted under the project. Two round table conferences on rural business development were also held under the project.

Achievements (Output)	Target (Indicators)	Baseline figures	Endline Figures
	Meetings of women producers collectives happens regularly (meeting will be organise monthly) (according to the set norms of the group) creating a collective force for women rights, improved knowledge/information, and improved presence in the markets, improved income.		Quarterly Board meetings were conducted. Last board meeting scheduled in March 2019 was not conducted due to busy schedule of SEWA Bharat team and year end closing. Board members expressed the need of conducting regular board meeting. Suggestion for conducting monthly district level meeting had come during interaction with board members.
	The income level has improved by at least 10-15% for 2/3 of the 3000 women farmers.	Current income status (per acre) - Gross income from vegetable – INR 48, 476 Net income from vegetable – INR 17, 009	Current income status (per acre) - Gross income from vegetable – INR 77, 337 increased by 57% Net income from vegetable – INR 31, 467 increased by 111%.
	At least 90% of the 3.000 women receive regularly information regarding the recent market prices.	Women farmers are not aware about market price of district and block market. They primarily seek out market information from the peer group/ neighbours/ other farmers – 60 %.	80% reporting receiving market information. The major source of market information was changed from Peer or fellow farmers at the baseline to market at the endline.

Achievements (Output)	Target (Indicators)	Baseline figures	Endline Figures
Until the end of the project the 50% of 3.000 women are actively involved in decision making and are recognized by the government and the local population as farmers and access to governmental development schemes is improved	At least 60% of the 3.000 women producers are trained in government schemes, their rights	Current status – NIL	64% of women farmers were trained/ explained about Government schemes.
	Until the end of the project at least 20% of women farmers of the 3.000 take benefit from various government programmes and schemes and have access to agriculture inputs such as seeds fertilizer, credit.	NIL	15%, 15% and 5% of farmers accessing seeds, fertilizer and equipment from block office respectively.
	At least 40% of the 3.000 women farmers participate actively in decision making about agriculture practices in the village meeting, Gram Sabha, panchayat and block level forums.	Women farmers participate actively in decision making about agriculture practices in the village meeting, Gram Sabha, panchayat and block level forums – NIL	34% attending Gram Sabhas regularly. 30% of women farmers attend village meetings regularly.

Achievements (Output)	Target (Indicators)	Baseline figures	Endline Figures
	At least 40% women of the 3.000 vegetable producers participate actively in Gram Sabha and other village meetings and the women influence decision making in their interest. In the minutes of the meetings it will clearly come out that women related issues have been discussed and that women are involved in decision making.		34% attending Gram Sabhas regularly. 30% of women farmers attend village meetings regularly..
	At least 10 % of the 3.000 women vegetable producer groups have access to institutional credit to buy their agricultural implements at the right time.	None of the institutional credit has been accessed by the women themselves. However the women do access credits from the local moneylender at a higher rate of interest.	40% of women farmers had accessed loan from various sources. Of those availed credit, 55% took loan from informal institution: SHG and only 5% availed loan from banks.
	At least 6 women farmers conventions with around 150 - 200 Participants in each convention would have been organized (knowledge on their rights, advocacy towards government to improve access to schemes.		6 women conventions: 2 state level and four district level were conducted.

Achievements (Output)	Target (Indicators)	Baseline figures	Endline Figures
	At the end of the project at least 70% of 3.000 women express that they feel empowered as farmers (via individual interviews and focus group discussions)		85% of women consider themselves as farmers.
	By the end of the project, male farmers in 35 villages express in focus group discussions that they are more sensitive in regards of women's rights.		Men consider women as farmers and also consult women for knowledge on improved practices as learnt from training programs.

5 Recommendations

i. **Promotion of Agro ecological Practices** – Mixed cropping system should be promoted considering selection of crops based on deep rooted and shallow rooted, maturity time, area coverage of the crop. Crop rotation should be promoted. For crop rotation, similar family of crop shouldn't be repeatedly cultivated in one plot and one legume crop should be added in one season out of three for every plot to maintain the soil health. For organic pesticide promotion, more formulation should be introduced, as one formulation won't be sufficient to control the disease and insect attack. System of root intensification, adding pulse crop, creepers on trellis and creepers nursery in poly tube method, climate resilience cropping system like DSR (Direct Seeded Rice, principal is applicable for other direct seeded pulse) can be promoted for building resilience climate change. As the project area witnesses lack of irrigation facility, summer season specific crops which require less water can be explored. This will improve round the year engagement and improve farmers' income generation through agriculture.

ii. **Addressing the Need for Input, marketing and Plan Protection Services through FPO:** Both the project districts are vegetable production belts. Timely supply of quality seeds and marketing of produce are the major services required by the farmers as expressed during the field visit. Under the project, already linkages with private players have been established. These services are to be integrated with the business model of FPO. As a considerable proportion of farmers had experienced crop loss because of pest and disease attack, a service on plant protection can be provided systematically through FPO and a team of community cadres or FPO field staff can be built for service provision. The service mix of FPO should have provision of timely quality seeds, plant protection measures and marketing of produce to its farmer members.

iii. **Strengthening FPO as Sustainable Business Enterprise**: The immediate step required in this respect is deployment of a fulltime chief Executive officer for the FPO to drive the entire operation. Getting all kinds of business licences would be the second immediate step. A mass level membership drive is to be run across the producer groups and villages. The membership drive can be headed by board of directors. A road map for strengthening FPO is to be formulated with clear cut milestones, measures and activities. Once the operation is started, a visioning workshop followed up by a design workshop with participation of all board members should be conducted. The visioning workshop would enable the board members to envision for the FPO, set up a long term plan and formulate its business strategy. During the design workshop, all systems and process such as operations, HR, accounts and MIS, audit, governance etc. can be designed. As an output of workshop a documented operations policy and manual should be in place. Keeping the service mix of FPO into consideration, a full-fledged HR team of FPO to be in place including CEO, accountant cum store keeper, field staff etc. Accordingly, training of various levels of staff should be organized. Board meeting of FPO should be regularized. The board members are to be trained on formulating a vision for FPO, functioning of board, business performance review, financial literacy, understanding of financial statements, etc. More awareness camps on FPO for members are to be conducted.

iv. **Building SSK as business units and as integrated part of FPO**: SSKs should be integrated part of FPO in service provision to its members.

v. **Strengthening Producer Groups:** As found during the study, producer groups require capacity building on conducting meetings, exchanging knowledge, indent generation in each season, etc.

vi. **Soil testing on entrepreneurial mode:** Currently no service fee is charged on soil testing. Entrepreneurs can be promoted who would be providing these services on fee basis to women farmers under the banner of SSK.

vii. **Sustainable practices are to be integrated with package of practices.** Promotion of sustainable practices is a need of the area as farmers use largely chemical fertilizers and chemicals for disease and pest control. During the field work, it was found that even though sustainable practices were promoted under the project through various training programs, the package of practices designed for various crops do not integrate these sustainable practices. Hence, the sustainable practices should be part of the package of practices and are to be ensured and monitored. Major challenge in adoption of organic solution for pest control as emerged from the study was farmers did not have enough time to spend on formulating these solutions rather they preferred to buy the readily available chemicals. Hence, entrepreneurs can be promoted who would be preparing and packaging these solutions and selling to FPO. FPO in turn can sell these readily available organic solutions to farmers

viii. **Capacity building of SEWA Bharat staff:** As some of the field staff of SEWA Bharat were new and unaware of FPO concept, sustainable practices, interpretation of soil testing results, more training programs for SEWA Bharat staff are required.

ix. **Focus shouldn't be on distribution of subsidized agriculture input**. - Under demonstration, the inputs were distributed to women farmers either on free basis or in subsidized rates. If there is any material or service which is not easily available at block level, only those materials should be subsidized. This would ensure better ownership of assets built as it was found that half of the vermicompost pits were empty.

x. **Monitoring and evaluation** – proper books of record, farmers card, quarterly three days event which includes randomly selected farmer's field visit, discussion with different stake holder and followed by progress review and planning.

xi. **Exploration of Value addition:** As the existing project districts have sizable produce, scope for value addition such as preparation of dried tomato, tomato sauce etc. Should be explored.

xii. **Introduction of new and high value crops:** As farmers are very much experienced farmers in the project districts, new crops like capsicum, French beans, Broccoli etc can be promoted. Some promotional efforts of these crops were already focused during the project and farmers had appreciated the results.

xiii. **Irrigation facility assurance:** One of the major reason of crop loss as experienced by farmers was lack of irrigation facility. Efforts on building convergence with Government programmes on irrigation facility should be concentrated.

xiv. **The project should be extended for at least two years** – as of now farmers have realized the need of support from Oxfam and SEWA Bharat for backward and forward linkages and look for services from SEWA Bharat through FPO. As per the present situation we found that it will take at least two years of time for strengthening FPO to emerge as a sustainable business enterprise.