

Evaluating the Women's Advancement in Rural Development and Agriculture programme

Stuti Tripathi
International Initiative for Impact Evaluation (3ie)

Pooja Sengupta
3ie

Priyanka Dubey
3ie

Francis Rathinam
3ie

Marie Gaarder
3ie

Process evaluation report

July 2020



**International
Initiative for
Impact Evaluation**

Note to readers

This process evaluation report has been submitted in fulfilment of the NRLM Professional and Advisory Service and the grant title is Consolidation of Evidence, Learning and Measurement Capacity for the National Rural Livelihood Programme in India. The content has been copy-edited and formatted for publication by 3ie.

All content is the sole responsibility of the authors and does not represent the opinions of 3ie, its donors or its board of commissioners. Any errors and omissions are the sole responsibility of the authors. All affiliations of the authors listed in the title page are those that were in effect at the time the report was submitted. Please direct all comments or queries to Stuti Tripathi at: stripathi@3ieimpact.org.

3ie receives funding for the National Rural Livelihoods Mission from The Bill & Melinda Gates Foundation. A complete listing of all of 3ie's donors is available on the [3ie website](#).

Suggested citation: Tripathi, S, Sengupta, P, Dubey, P, Rathinam, F and Gaarder, M, 2020. *Evaluating the Women's Advancement in Rural Development and Agriculture programme*, 3ie Process Evaluation Report. New Delhi: International Initiative for Impact Evaluation (3ie). Available at: <https://doi.org/10.23846/NRLMPE01>

© International Initiative for Impact Evaluation (3ie), 2020

Acknowledgements

We wish to thank the TechnoServe team, the JEEViKA state team and district teams at Purnea and Muzaffarpur, and the JEEViKA community cadre for their support at every stage of the evaluation. We are particularly grateful to Muhammad Shoaib Rahman, Debaranjan Pujahari and Shankar Talwar from TechnoServe for their patience with our many data requests, assistance in the field and most importantly, ongoing input that helped to strengthen our understanding of the programme.

We also wish to thank the self-help group women (*didis*) for taking the time to speak to us and provide much needed information that contributed significantly to the insights presented in the report. Acknowledgement is also due to Thomas de Hoop from the American Institutes of Research for his extensive feedback, which helped to improve the report.

We would also like to thank the Bill & Melinda Gates Foundation for providing funding for the study. We are grateful to Yamini Atmavilas, Chiara Kovarik and Vicki Wilde for providing input through the course of the study, which helped to sharpen its focus and findings.

We also thank Ritwik Sarkar from 3ie, for his contribution during the inception phase of this study.

Summary

Profitable marketing of agricultural produce remains one of the biggest challenges faced by small and marginal farmers in India. Literature on smallholder farmers in India shows there are significant losses to farmer income due to limited access to markets, lack of price information and unfair local trading practices. Additionally, there are barriers related to access to credit, poor agricultural infrastructure and lack of technical know-how, which compound the livelihood challenges that confront small and marginal farmers.

Farmer producer organisations hold the potential to address some of these issues by leveraging the benefits of aggregation; however, successful examples remain few and far between. It is with this backdrop that JEEViKA, a poverty alleviation initiative in rural Bihar under the National Rural Livelihood Mission, implemented the Women's Advancement in Rural Development and Agriculture (WARDA) programme to strengthen the livelihoods of small and marginal women farmers through the revival of farmer producer companies (FPCs) in the state.

Supported by the Bill & Melinda Gates Foundation, WARDA is a technical assistance programme through which TechnoServe is helping JEEViKA to establish scalable agri-based value chains that link farmers to markets. It leverages JEEViKA-promoted community-based institutions such as producer groups (PGs) and FPCs that use the self-help group (SHG) platform to mobilise women's membership of these institutions.

This study is a process evaluation of the WARDA model, which documents its implementation fidelity and assesses programme barriers and facilitators in order to evaluate its potential for sustainability and scale-up. Though the scope of the WARDA programme was much larger, this study looks at only three value chains – maize, litchis and vegetables – implemented through two FPCs in the districts of Purnea and Muzaffarpur in 2015–2016. The study team used a mixed-methods approach and conducted 102 interviews and 12 focus group discussions with major stakeholders and programme participants. In addition, MIS data from TechnoServe and a programme results tracker were also analysed.

The key objective of the WARDA programme was to link farmers to markets by eliminating middlemen and motivating farmers to sell to FPCs as a means of obtaining better prices for their produce and increasing their agricultural income. As the FPCs are women-owned institutions, it was envisioned that investing resources to build well-functioning, profit-generating FPCs would result in women's empowerment by increasing their mobility and control over household income. This required intervening at various levels, and WARDA adopted a multipronged strategy to achieve its stated objectives.

This process entailed strengthening the capacities of implementing agencies at all levels – JEEViKA in this case – and working directly with community institutions. TechnoServe held multiple trainings and provided hand-holding support to build capacity in business planning, value-chain development and post-harvest management practices; this aimed to improve the quality of crops produced, streamline procurement systems and identify high-value markets that would fetch better prices.

WARDA introduced transparent procurement practices by using digital scales and providing crop price information to PG members daily during the procurement period. It

also tried to advance the financial inclusion of women by making payments directly into their bank accounts within five to seven days of procurement. One of the major benefits of the programme has been the patronage bonus extended by the FPCs to its members as procurement volumes and profits increased with time.

Raising working capital has been a major challenge for FPCs in India, given their limited access to credit. WARDA successfully mobilised idle funds from PGs and cluster-level federations under JEEViKA, and also raised credit from formal financial institutions by increasing the creditworthiness of FPCs. TechnoServe further helped FPCs to establish effective market linkages by facilitating contracts with institutional buyers and setting up systems and processes for the procurement, transportation and storage of produce.

The programme tried to strengthen FPC governance and operations by training board members, establishing a proper human resource structure, and laying out meeting procedures, quorum requirements and other important aspects of FPC administration. In order to make the FPCs sustainable in the long run, TechnoServe also invested in building partnerships and collaborations with various government and non-government entities to improve FPCs' capacity and ability to deliver on their mandates.

Despite its successes, there remain several design and implementation challenges that the programme must resolve before scale-up. The process evaluation identified challenges at three levels, which pose a risk to FPC sustainability. These include crop-specific challenges, systemic challenges faced by FPCs and facilitator-level challenges pertaining to JEEViKA.

With regard to maize, forecasting has been problematic, with more farmers offering to sell to the FPC at the time of procurement than had been originally estimated. At the same time, a shortage of working capital has prevented the FPC from meeting this excess demand and expanding operations, thus affecting its profitability. An absence of drying infrastructure has impacted farmers' ability to adopt recommended post-harvest management practices to improve the quality of their grain and supply Grade A maize to the FPC.

The litchi value chain suffered from administrative issues; therefore, TechnoServe operations were restricted to an area where only a few PG members cultivated litchi commercially, leading to very low procurement volumes. As with any perishable crop, litchis are associated with several post-harvest, storage and transportation challenges, which TechnoServe is striving to address.

In the vegetable value chain, the procurement of high-quality produce has been a challenge, making it difficult to fulfil buying arrangements from high-end retail players. FPCs, on the other hand, continue to face important operational challenges. There is over-reliance on funds from cluster-level federations and PGs for working capital, and FPCs continue to remain too understaffed to manage the growing scale of operations.

Financial sustainability remains a distant goal, with JEEViKA subsidising the cost of FPCs' human resources, including the large community cadre who are critical to FPC operations on the ground. Despite efforts from JEEViKA and TechnoServe to encourage active involvement of PG members in FPC decision-making, it seems it will take a long time before community women are equipped with the skills to handle FPC operations.

Though JEEViKA's commitment towards building sustainable FPCs has been a crucial enabling factor in reviving FPCs under WARDA, administrative issues like staff turnover and delays in payment to the community cadre have adversely affected the project. This has often undone the progress made in establishing systems and relationships, which are critical to programme success. Other problems include JEEViKA's SHG model-specific challenges that have a bearing on women's participation in PGs, given their overlapping membership.

When measured by FPC crop procurement and profit, the WARDA model has seen varied levels of success across the districts of Purnea and Muzaffarpur. Overall, WARDA effectively leveraged JEEViKA's SHG platform to revitalise the defunct FPCs and disrupt the traditional value chain by introducing important innovations in the procurement process. That said, WARDA is still in its nascent stages, and continued technical support from TechnoServe and JEEViKA remains essential to make the FPCs sustainable.

Contents

Acknowledgements.....	i
Summary.....	ii
List of figures and tables	vi
Abbreviations and acronyms	vii
1. Introduction	1
2. WARDA: revitalising women’s farming collectives	2
3. Objectives and methodology	7
4. Programme implementation.....	10
4.1 JEEViKA and FPC capacity building	12
4.2 Building community cadre capacity	13
4.3 Technical assistance to producer groups	14
4.4 Establishing market linkages.....	14
4.5 Enabling value-added services for PG members	16
4.6 Leveraging FPC working capital.....	16
4.7 Transparent weighing and pricing	18
4.8 Digital payments	18
4.9 Patronage bonus	19
4.10 Strengthening FPC governance	20
4.11 Building convergence with other stakeholders	20
5. Programme challenges.....	21
5.1 Crop-specific.....	21
5.2 Farmer producer companies	27
5.3 JEEViKA	30
6. Conclusion	34
Appendix	36
Bibliography	66

List of figures and tables

Figure 1: WARDA model	3
Figure 2: Traditional maize value chain	4
Figure 3: Transforming agri-value chains in Bihar	4
Figure 4: Theory of change for the WARDA model.....	5
Figure 5: Resources engaged in the WARDA model.....	6
Figure 6: Timeline of the study	10
Figure 7: Intervention coverage 2015–2016	11
Figure 8: Market linkages facilitated by TechnoServe.....	15
Figure 9: Activities in the maize value chain	23
Figure 10: Activities in the litchi value chain (without pre-harvest contracts).....	25
Figure 11: Activities in the litchi value chain (with pre-harvest contracts).....	25
Figure 12: Activities in the vegetable value chain	26
Figure 13: FPC organogram.....	28
Table 1: Sampling	7
Table 2: Producer group selection for sampling.....	8
Table 3: Study triangulation methods	9
Table 4: WARDA coverage	11
Table 5: Crop-wise procurement and revenue generation	15
Table 6: Warehouse rental details for Aranyak FPC	16
Table 7: Fertiliser purchase from Aranyak FPC	16
Table 8: Long-term borrowing for Aranyak and Samarpan FPCs (INR)	17
Table 9: Aranyak and Samarpan FPCs' financial statements prior to WARDA	17
Table 10: Profits and patronage bonus for producer group members	19
Table 11: Litchi procurement in 2016	24
Table 12: Community cadre staffing	29
Table 13: Community cadre incentive structure	29

Abbreviations and acronyms

CLF	Cluster-level federation
FPC	Farmer producer company
FPO	Farmer producer organisation
MoU	Memorandum of understanding
NCDEX	National Commodity & Derivatives Exchange Limited
NRLM	National Rural Livelihoods Mission
PG	Producer group
SEW	Skilled extension worker
SHG	Self-help group
VRP	Village resource person
WARDA	Women's Advancement in Rural Development and Agriculture

1. Introduction

TechnoServe, a global not-for-profit organisation, is working in 16 districts of Bihar to strengthen agriculture value chains as part of the [Bill & Melinda Gates Foundation](#)-supported Women's Advancement in Rural Development and Agriculture (WARDA) programme.

WARDA aims to economically empower smallholder women farmers and increase their agricultural income through market-led interventions. This requires intervening at multiple levels, including: (1) supporting women-owned farmer producer companies (FPCs); (2) building the capacity of women to engage in the production and sale of high-quality agricultural produce; and (3) strengthening the ecosystem through greater private sector participation and improved capacities in government institutions. (TechnoServe 2018).

WARDA is a technical assistance programme that works with JEEViKA and its self-help group (SHG) platform to deliver on its mandate. JEEViKA is the State Rural Livelihood Mission for Bihar, launched in 2007 as part of the larger nationwide initiative, the National Rural Livelihoods Mission (NRLM).¹ JEEViKA uses the NRLM implementation framework, mobilising women from poor households (especially from scheduled castes and scheduled tribes) into SHGs to help them access affordable credit from formal financial institutions and build sustainable livelihoods (farm and non-farm).

NRLM focuses on alleviating poverty, building social capital and empowering women to address structural impediments to their inclusion. The success of SHGs as community-based platforms, and their strong institutional architecture, has made them important conduits for last-mile delivery of a range of services across various sectors.

Leveraging SHG programme outreach (Datta et al. 2015), JEEViKA extended its mandate, organising SHG members into producer groups (PGs) and promoting FPCs to help smallholder farmers benefit from economies of scale by procuring farm inputs and selling agricultural produce at better prices.

Starting in 2007, JEEViKA promoted a few FPCs, provided INR10 lakhs (approximately USD13,500) in grants as start-up capital, and mobilised PG members to become FPC shareholders. PGs exist at village level and typically consist of 80–120 women. The FPCs, however, struggled as business entities and made losses year after year.

In 2015, TechnoServe initiated the WARDA project in the Purnea and Katihar districts of Bihar to strengthen participation of smallholder farmers in the maize value chain. Maize is the predominant crop in the region, having the largest marketable surplus compared to other crops like rice and wheat. The following year, TechnoServe started work with litchi farmers in Muzaffarpur through a different FPC.

The Gates Foundation commissioned the [International Initiative for Impact Evaluation \(3ie\)](#) to conduct a process evaluation of the WARDA project as implemented in Purnea, Katihar and Muzaffarpur. The objective of the evaluation was to document the

¹ NRLM is the one of the world's largest poverty alleviation programmes implemented by the Government of India, with over USD6 billion in funding and an outreach of close to 70 million poor households in rural India.

programme's implementation fidelity, identify the barriers and facilitators to implementation, and assess programme sustainability and potential for scale-up. The process evaluation provides a programme theory of change developed in consultation with the TechnoServe state team and uses primary and secondary sources of data to assess implementation. We provide more detail on our approach and methodology in the following sections.

2. WARDA: revitalising women's farming collectives

Though the Indian agricultural sector can boast of its self-sufficiency in food and leading production in certain horticultural, dairy and high-value agricultural products, there are signs of growing agrarian distress, especially among smallholder farmers, who constitute the bulk of the agrarian economy (Chand 2017; Dalwai 2017; Dev 2012).

Small and marginal farmers hold almost 86 per cent of agricultural landholdings in India (GoI 2016). The state of Bihar is no exception. In 2010–2011, 74 per cent of landholdings in the state were less than 0.5 hectares in size, and 91 per cent were less than 1 hectare (DoAC 2015). These percentages have increased rapidly over time. The average size of holdings, already very small in 1995–1996 (0.75 hectares), declined to only 0.39 hectares by 2010–2011.

In this context, farmer producer organisations (FPOs) have the potential to remedy some of the challenges that small and marginal farmers face, by offering them the benefit of aggregation and economies of scale in procuring agricultural inputs and selling outputs. The National Bank for Agriculture and Rural Development – an apex development finance institution in India – defines a producer organisation as a formal body constituted by 'primary producers, viz. farmers, milk producers, fishermen, weavers, rural artisans, craftsmen' (NABARD 2015). The allowed legal forms of producer organisations are producer company, cooperative society, or any formal body that provides for the distribution of profits among its members (DoAC 2013).

Additionally, there has been a marked shift in terms of the overall approach towards developing the agricultural sector. The following excerpt from the preamble of the Policy & Process Guidelines for Farmer Producer Organisations (2013) emphatically illustrates the market orientation as well as the focus on smallholders:

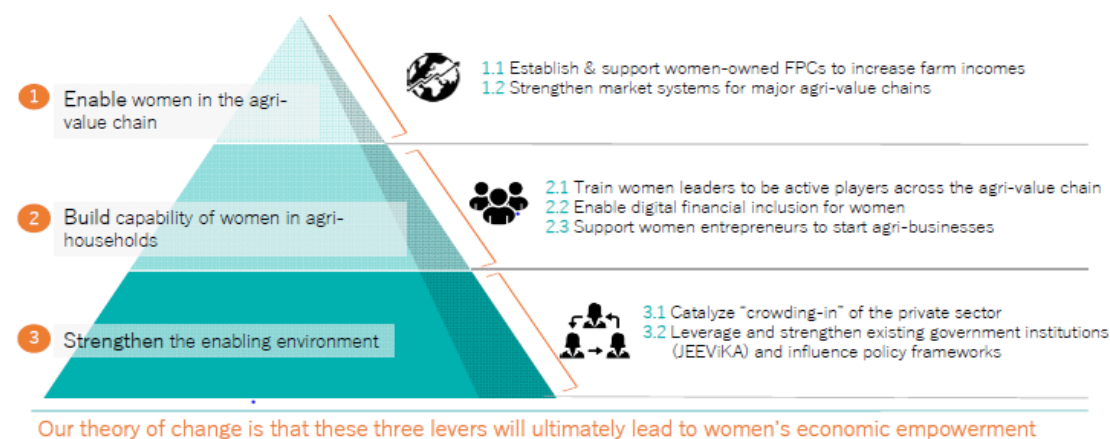
Collectivisation of producers, especially small and marginal farmers, into producer organisations has emerged as one of the most effective pathways to address the many challenges of agriculture but most importantly, improved access to investments, technology and inputs and markets. (DoAC 2013, p. 16)

FPOs have spread widely in India and a recent estimate puts their total number at approximately 6,000 (Srinivasan and Srinivasan 2018). Going by recent trends, the FPC has been the preferred legal form of FPOs and covers all 29 states of India; this has been most evident in data published by SFAC (2018).

Efforts towards evaluating FPOs are still nascent, with little evidence of a successful model of producer collectivisation in India.² Recent studies outside India suggest mixed and context-specific impacts of FPOs on farm income, productivity and resilience and other social sectors (Falkowski and Ciaian 2016). Given the sparse literature, little is understood about the impact of FPOs, and even less about their barriers and enablers and the role of the ecosystem in facilitating their effective functioning.

WARDA is an attempt to revitalise JEEViKA-promoted producer organisations, which in addition to linking small and marginal farmers to markets, aims to put women at the centre of the agricultural movement. WARDA seeks to leverage SHGs to help smallholder farmers achieve better income and to set in motion mechanisms to enable their empowerment. Given the complexity of the task, the programme needs to intervene at multiple levels. Figure 1 summarises TechnoServe's multipronged approach to achieving the twin objectives of revitalising the FPC and ensuring women's active participation in its operation.

Figure 1: WARDA model



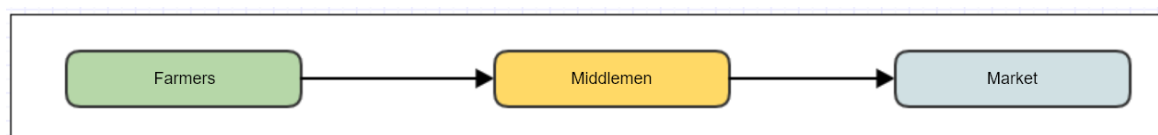
Source: TechnoServe (2018).

The process evaluation systematically investigates the three levers of change as envisioned in the WARDA model, and documents the factors that facilitated (or inhibited) their full or partial achievement. The key achievement of WARDA lay in disrupting the traditional value chains and substituting them with a system that allowed more direct participation of smallholder women farmers in the market through women-owned and -managed FPCs.

As mentioned earlier, JEEViKA-promoted FPCs were either lying defunct or facing massive losses in the absence of clear mandates and well-crafted business plans. This meant that despite being shareholders in the FPC, it was business as usual for farmers. They continued to sell their produce to village traders or middlemen, who underpaid them by resorting to unfair practices. The middlemen would purchase all produce at a uniform rate without differentiating the quality of grain, and bargain for extra units of produce per transaction.

² A few comparative studies, like Nayak (2017) and Singh and Singh (2014), are exceptions as they consider multiple cases across multiple states in India.

Figure 2: Traditional maize value chain

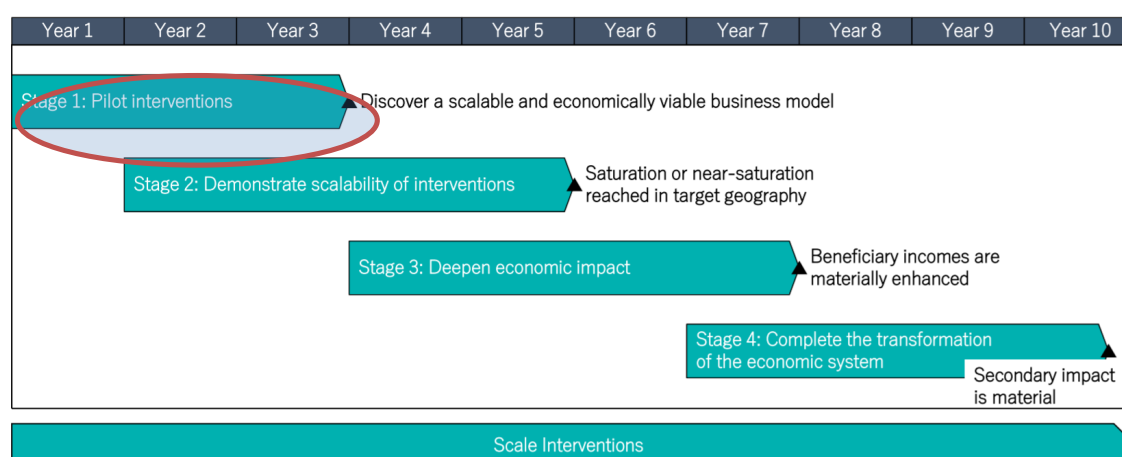


Source: TechnoServe (2018).

The practice of selling agricultural produce to middlemen is motivated by factors more complex than convenience, which are entrenched in the context. Farmers depend upon village traders for credit, especially during sowing and harvesting. Upsetting this relationship has wider socio-economic ramifications and prevents farmers from making a rational switch to a more just procurement system.

Given the complexity, TechnoServe has a 10-year horizon for effectively transforming agriculture value chains in Bihar (Figure 3). The process evaluation is looking at pilot interventions focused on producer groups that consist of farmers producing maize, litchis and vegetables during the first two years of WARDA.

Figure 3: Transforming agri-value chains in Bihar



Source: TechnoServe (2018).

Figure 4 outlines the programme theory of change the study team developed in consultation with TechnoServe, which provides the guiding framework for the process evaluation.

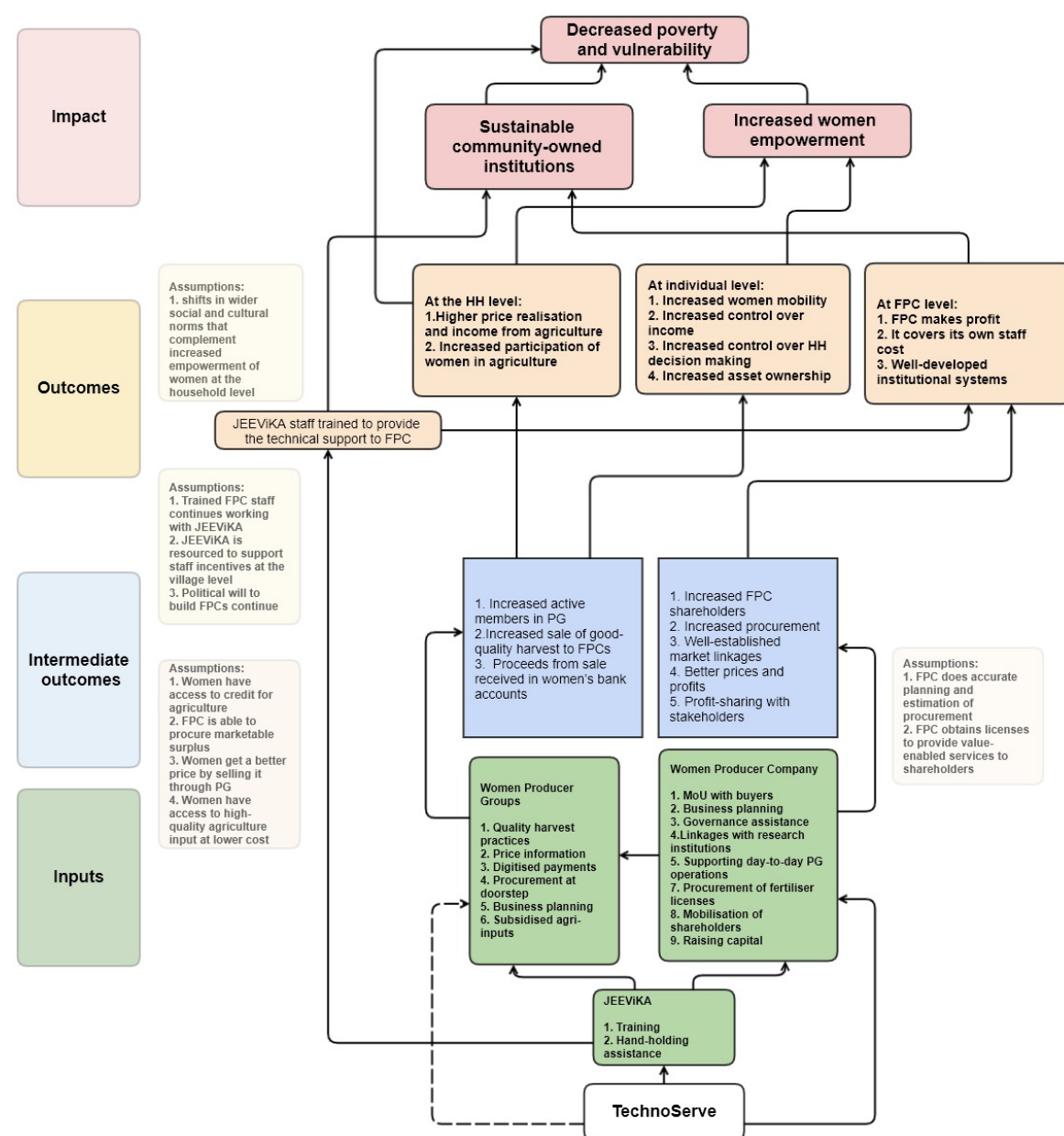
JEEViKA frontline workers, comprising village resource persons (VRPs) and skilled extension workers (SEWs), aggregate SHG members into PGs at the village level. Members of the PG are then mobilised to become shareholders in FPCs that can conduct business on a commercial scale. Under the WARDA programme, TechnoServe is working with JEEViKA, PGs and FPCs to pilot approaches to strengthening value chains for the identified crops.

The theory of change lays out the pathways to change envisioned as part of WARDA. Per the original plan, TechnoServe was expected to work only with JEEViKA and FPCs, building their capacity to help PGs develop business plans, which would then feed into FPC procurement estimates. In actual practice, however, TechnoServe also worked extensively with PGs, helping them to develop these business plans and manage other

field-level operational issues that we discuss later in the report. The theory of change, illustrated in Figure 4, therefore has a dotted line that connects TechnoServe to PGs.

WARDA aims to achieve outcomes at three levels. At FPC level, it seeks to build an institution that is financially sustainable, and women-owned and -governed. At household level, it seeks to increase agricultural income through better price realisation and participation in markets. Finally, at farmer level, it aims to help women attain greater mobility and control over household resources and decisions through increased participation in agriculture and control over agricultural income.

Figure 4: Theory of change for the WARDA model

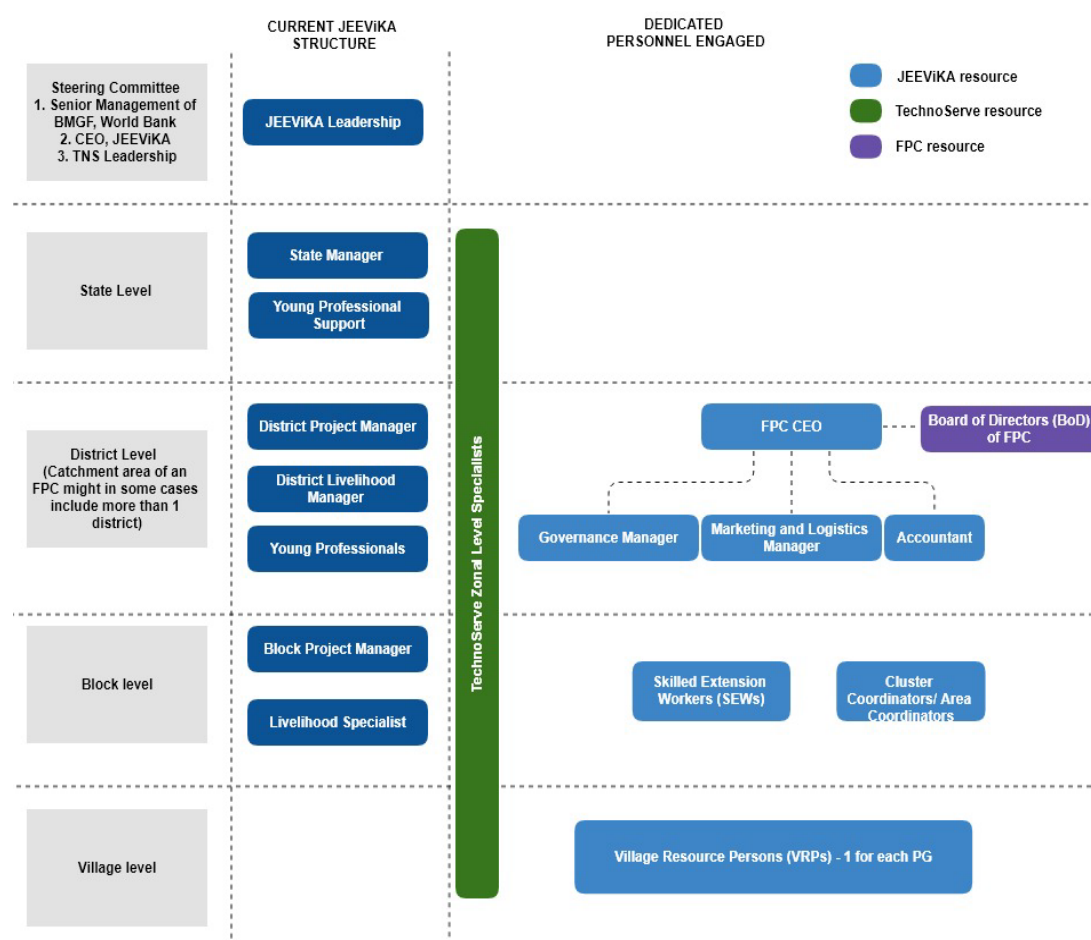


Source: Developed by the study team.

Note: HH = household.

WARDA is primarily a technical assistance programme to build JEEViKA's capacity and facilitate its efforts towards revitalising the FPC. Figure 5 provides an overview of how JEEViKA, TechnoServe and FPCs work together as part of WARDA to achieve the key outcomes of the programme theory of change discussed earlier.

Figure 5: Resources engaged in the WARDA model



Source: TechnoServe (2018) and primary interviews (2017–2018).

At district level, two young professionals are engaged in monitoring FPC operations and providing implementation assistance to the district project manager and livelihood manager. At the FPC level, JEEViKa employs the chief executive officer, governance manager, marketing and logistics manager, accountant and SEWs. However, FPC professionals work part-time and are also engaged in other JEEViKA activities. At block level, the block project manager provides managerial and implementation assistance to the FPC and the PGs.

The livelihood specialist prepares PG business plans and provides monitoring assistance to the block project manager. JEEViKA has a strong community cadre consisting of VRPs and SEWs, who are the most critical nodes in the WARDA model. They are involved in mobilising the community by generating awareness about the FPC and the benefits of associating with it, and managing the procurement process in the villages. The model depends upon them procuring the right quality produce at the right time. Each village has one VRP and there is one SEW for a cluster of villages. VRPs and SEWs have a relationship of trust with PG members.

3. Objectives and methodology

The main objective of the process evaluation is to document fidelity of implementation, including the identification of enabling factors and implementation challenges that determine the programme's success and WARDA's potential for sustainability and scale-up.

To inform the process evaluation, the study team used a mixed-methods approach. Qualitative data for the study comprised interviews and focus group discussions with a range of stakeholders, while quantitative data primarily included procurement data provided by TechnoServe.

Prior to designing the evaluation methodology and questionnaire schedules, substantial time was spent in understanding the programme and developing a theory of change in consultation with TechnoServe programme and monitoring and evaluation staff in Patna, Bihar. The theory of change and preliminary field visits fed into identifying the evaluation questions and key stakeholders involved in the programme. Table 1 provides details of the type and number of stakeholders interviewed across the two intervention districts of Muzaffarpur (under Samarpan FPC) and Purnea (under Aranyak FPC).

Table 1: Sampling

Stakeholders	Purnea	Muzaffarpur	State level
In-depth interviews			
PG members (active, attriters and inactive)	24	16	
Non-participants	5	6	
Aggregators	2	3	
JEEViKA staff/community cadre	8	14	1
Producer company officials	5	2	
TechnoServe staff	1	2	2
Husbands of PG members	3	6	
Relevant NGOs		1	1
Focus group discussions³			
PG members	9	3	
Total	57	53	4

The data were collected over the course of six months (September 2017–February 2018). Across the two districts of Purnea and Muzaffarpur, seven PGs from the intervention blocks and one PG each from the non-intervention blocks were randomly selected. For key informant interviews, we performed purposive sampling of PG members to capture diverse perspectives and ascertain whether they varied by FPC membership and how often the members sold their produce through PGs.

³ Focus group discussions were conducted with 8–10 women who belonged to the same PG.⁴ Along with fruits and vegetables, moong (mung beans) were procured from 26 PGs in Saraiyya block, Muzaffarpur.

Table 2: Producer group selection for sampling

District	Purnea		Muzaffarpur			
Block type	Intervention block	Non-intervention block	Intervention block			Non-intervention block
Block name	Dhamdaha	Baisi	Sakra	Saraiyya	Meenapur	Bochaha
Producer groups	Dharti	Hariyali	Jagriti	Jejuna	Ganga	Suraj
	Dhansahyog		Kishan	Satyam		
	Rakshadhan		Shivam	Raushni		
	Dhanpurna					
	Dhahran					
	Dhanganga					
	Dhartidhanwan					

In the intervention blocks, we interviewed both active and inactive PG members, as well as attriters who sold to FPCs in the first year of the intervention but not the second year. We interviewed women who did not become members of the PG in the intervention blocks in order to understand factors affecting participation. We also conducted interviews with JEEViKA staff at the state, district, block and village levels, who consisted of livelihood managers and specialists, young professionals, SEWs and VRPs. FPC officials, including women board members from the community, were interviewed to understand the functioning of the company.

Given that WARDA directly impacts the traditional value chain, aggregators at the village and *mandi* (large market) levels were interviewed. Other NGOs involved in similar activities were identified and their perspective elicited on issues around market linkages and women's participation in agriculture. Ten focus group discussions were conducted with women PGs in the intervention blocks to understand the workings of PGs, including issues and challenges. In the non-intervention blocks, two focus group discussions were conducted with women PG members to assess how agricultural activity and selling in these groups compared to PGs under the WARDA programme.

Interviews and focus group discussions were conducted in the local language, audio-recorded with participant consent and transcribed into English. They were conducted within the analytical framework of grounded theory (Corbin and Strauss 1990), and transcribed interviews were coded in NVivo software to facilitate thematic analysis of data.

The interviews, observations and focus group discussions were guided by themes derived from the study objectives, but not restricted to them. During data collection and analysis, themes were expanded to include new and relevant learning. The study team's objective was to ensure that all facets of the research (for example, data collection, data management, data analysis and reporting) systematically cohere with an aim to ensure the credibility of the findings.

Grounded theory is a systematic means of collecting and managing qualitative data, and involves the systematic coding of common themes and an iterative triangulation process that promotes consistency in all facets of data collection and analysis (American Institutes for Research 2014).

As in other qualitative approaches, the data for a grounded theory can come from various sources. The data collection procedures involve interviews and observations, as well as other sources such as government documents, videotapes, newspapers, letters and books. Each of these sources can be coded in a way similar to how interviews or observations are coded (Glaser and Strauss 1967). In order to establish the credibility of data collected from the field, the study carried out three types of triangulation, which are set out in Table 3.

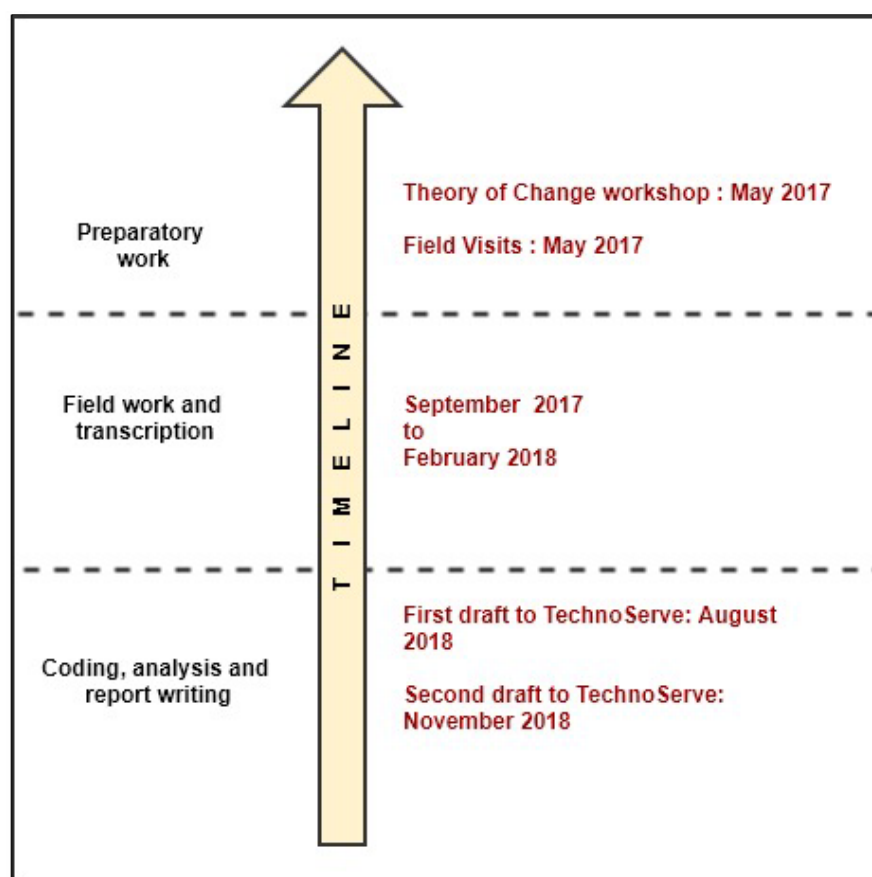
Table 3: Study triangulation methods

Type of triangulation	Objective	Rationale
Data triangulation	Collection of data from multiple sources and persons, and of multiple types	This technique ensures several perspectives, as well as opportunities for confirming the information received from the sources.
Methodological triangulation	Use of multiple methods within the context of the same research study or activity	The incorporation of multiple complementary qualitative research methods bolsters the research design and ensures that limitations in one method are mitigated by the other.
Investigator triangulation	Use of multiple researchers to investigate the same source(s) of information	In qualitative research, the researcher is considered a key research instrument. Using multiple researchers (as each brings a different schema to the context) will help to promote data analyses that are informed by multiple perspectives.

Source: American Institutes for Research (2014).

While all qualitative studies suffer from limitations, it is expected that cross-verification of data – through multiple researchers and methods and from different sources – will reduce them and increase the credibility of interpretations drawn from qualitative field data. TechnoServe MIS data was used to corroborate observations from the thematic analysis. Below we present a snapshot of activities undertaken during the study.

Figure 6: Timeline of the study



Note: FGD = focus group discussion; KII = key informant interview.

4. Programme implementation

In 2015, TechnoServe began work by intervening in the maize value chain through the JEEViKA-promoted Aranyak FPC in Purnea and Katihar districts. Maize is the largest cash crop in Bihar, and third only to rice and wheat in terms of acreage. Maize is primarily sold to middlemen and the region has a significant marketable surplus at the household level. In 2016, the model was rolled out in Muzaffarpur district to procure litchis and vegetables.

In 2015, the FPC in Purnea procured only from 10 PGs in the Dhamdaha block. In the second year, TechnoServe intensified its operation in Purnea and expanded to Muzaffarpur to pilot the model in the litchi, moong and vegetable value chains. According to TechnoServe's 2016 monitoring data, 17 PGs were added to the existing 10 PGs in Dhamdaha.

In Muzaffarpur, Samarpan FPC procured litchis and vegetables from 20 PGs⁴ in Sakra and Saraiyya blocks. Table 4 shows WARDA programme coverage by crop in terms of the number of PGs, the number of FPC shareholders and the number of FPC shareholders who sold through the PGs.

⁴ Along with fruits and vegetables, moong (mung beans) were procured from 26 PGs in Saraiyya block, Muzaffarpur.

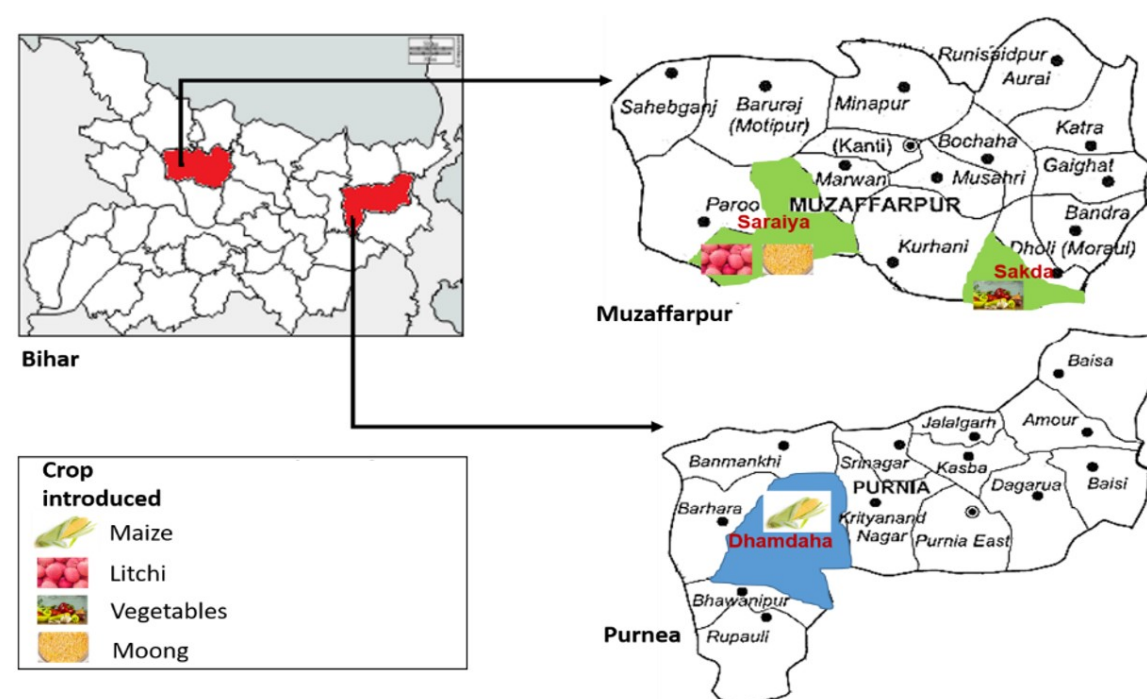
Table 4: WARDA coverage

District	Crop	No. of PGs		No. of FPC shareholders		No. of shareholders who sold to FPC	
		2015	2016	2015	2016	2015	2016
Purnea	Maize	10	17	1,248	2,601	299	818
Muzaffarpur	Vegetables	N/A	15	N/A	933	N/A	87
	Litchi	N/A	5	N/A	496	N/A	12

Source: TechnoServe monitoring data (2017).

Note: The values for 2016 are cumulative figures of 2015 and 2016.

Figure 7: Intervention coverage 2015–2016



Source: Monitoring Data, TechnoServe (2017).

Note: Map not to scale.

In order to identify target PGs for maize procurement, TechnoServe conducted a survey of 1,418 members across 20 PGs in Purnea to map the cropping pattern, understand harvest and post-harvest management practices prevalent in the region, and estimate the marketable surplus and farmers' access to the market. However, in the case of litchis, Saraiyya block was selected for the intervention, largely because it serves as the quality checkpoint for all litchis passing through the district.

We discuss below the major activities undertaken in WARDA, noting key deviations (or improvisations) in programme implementation and strategy from the original design. It is important to note that the study team was constrained in carrying out a comprehensive analysis of the programme's implementation fidelity in the absence of a project implementation plan document that clearly laid out the implementation strategy and roles of various stakeholders.

TechnoServe provided documentation that broadly laid out the programme scope and model. In the absence of an implementation plan, our references to departures from the

original plan are derived from a collective understanding of the programme's scope and approach among its stakeholders. In terms of fidelity, the majority of the output targets that the programme had set for 2015 and 2016 have been delivered. Programme targets and achievements as referenced in TechnoServe's report to the Gates Foundation are summarised in Appendix A1. Appendix A2 gives a complete list of programme documents obtained from TechnoServe.

4.1 JEEViKA and FPC capacity building

TechnoServe staff trained JEEViKA personnel at the state and district level on a range of topics that were key to the WARDA model. A three-day training programme on business planning and value chain development was organised for JEEViKA and FPC officials, covering:

- The basics of agribusiness;
- An introduction to FPCs as business entities and the key characteristics that make it unique, setting it apart from other agribusinesses; and
- Training in business planning and financial record keeping, including maintaining financial statements, forecasting, tracking financial ratios, and cash flow analyses.

TechnoServe assessed training quality in terms of improved participant knowledge, measured through a survey administered before and after the training. Results from the survey indicated an overall increase of 65 per cent in participants' understanding of value chain development and business planning. We are not privy to the survey and hence unable to comment on the appropriateness of the instrument. It is also not clear if survey results were used to change or improve training modules. A second training on business planning and the use of MIS was conducted for 43 JEEViKA staff.

Seventy-four members of JEEViKA staff were trained to administer the maturity assessment index to gauge PGs' readiness to participate in the project and sell their produce to FPCs. Among other things, the index mapped PGs based on their proximity to the road, their ability to generate a marketable surplus, and the presence of members willing and eager to understand the programme's objectives and participate. However, the index was not shared with the study team on the grounds that it was proprietary material.

The study team could not obtain all relevant documents pertaining to the aforementioned trainings, but our interviews with JEEViKA staff confirmed their participation in these trainings. Discussions with TechnoServe staff highlighted resource limitations and a focus on programme implementation and establishing proof of concept, rather than documentation, as primary reasons for non-availability of training-related material. Lack of clarity on whose role it was to document project activities might have exacerbated the problem.

The chief executive officers of both FPCs stated that the trainings were instrumental in introducing professionalism into their work and helping them transact business more efficiently – a sentiment echoed by JEEViKA young professionals. A few respondents voiced the need for refresher courses to aid better understanding of complex topics, as a one-time training is not enough to internalise the course content:

TechnoServe must provide training every year as these are technical concepts which if not refreshed every year, the learning does not get internalised. —
JEEViKA officer, Purnea

To enrich its course content and provide quality training, TechnoServe collaborated with various line departments and government organisations like the Agriculture Department, Krishi Vikas Kendras, agricultural universities, the National Bank for Agriculture and Rural Development, and the Indian Council of Agricultural Research-National Research Centre on Litchi.

A majority of the JEEViKA respondents noted that the WARDA programme contributed to a behavioural shift among JEEViKA staff. No longer indifferent and casual in their approach, they now were motivated to perform better at their jobs to revitalise the company and work towards its sustainability:

Support from TechnoServe has been incredible, especially on the marketing and value chain front. I learnt a great deal from them about value chain management. Now I see a sort of professionalism in JEEViKA which was not visible during my earlier stint as a block project manager. I learnt how important the company is for farmers and that every kilogram of produce matters. Before TechnoServe came in, the company only procured wheat, but now the company has expanded its operations to include other commodities – vegetables, fruits and pulses. The company could have done this earlier but at a much slower pace of operations. TechnoServe has brought in greater efficiency and professionalism to the whole process. — JEEViKA staff, Muzaffarpur

4.2 Building community cadre capacity

JEEViKA's community cadre is at the forefront of engagement with PG members, and is therefore key to the programme's success. The original plan required JEEViKA to train its community cadre on key topics like business planning, value chain development and post-harvest management practices. However, during implementation TechnoServe assisted JEEViKA by becoming directly involved in training the VRPs, SEWs, and area and cluster coordinators.

TechnoServe trained the community cadre on conducting scoping studies at the start of every agricultural season to estimate land under maize cultivation, expected yield and farmers' willingness to sell to the company. The scoping study interviewed PG members and provided important data for FPCs to draw up estimates for procurement, make plans for storing the produce procured, and raise working capital. The trainings took place at JEEViKA's block office for all VRPs and SEWs in the block.

Given the criticality of procuring high-quality agricultural produce for a company's profitability and business sustainability, TechnoServe trained JEEViKA's community cadre on best practices in post-harvest management and quality assurance. The trainings were provided on a needs basis with no fixed training calendar.

Aside from classroom training, TechnoServe provided field demonstrations to the community cadre in aspects of the programme such as grading and weighing agricultural produce at the PG member's doorstep. Hand-holding support was provided to help VRPs and SEWs problem-solve issues in the field and prepare them to work independently in the long run.

The community cadre attested that these trainings were held, and were appreciative of the hand-holding support provided by TechnoServe. Almost all VRPs and SEWs we interviewed demonstrated a good understanding of the procurement process. While in year one TechnoServe took the lead in procuring agricultural produce from the villages (accompanied by VRPs and SEWs), this changed in year two when the community cadre took the lead, reaching out to TechnoServe staff only to troubleshoot. The proactive efforts demonstrated by VRPs and SEWs were reflected directly in the high volume of procured goods in the second year (Table 7).

TechnoServe trainings were provided in addition to routine trainings conducted by JEEViKA on community mobilisation, promotion of agricultural best practices and increasing awareness of new policies and schemes.

4.3 Technical assistance to producer groups

Raising awareness among farmers was important in building their understanding of issues of fair procurement and pricing and ensuring their continued engagement with the FPC. Over two years, the community cadre trained close to 700 PG members in various aspects of procurement (including quality control measures), the role of the FPC in linking them directly to markets, and the benefits that would accrue to them as shareholders. PG monthly meetings facilitated by the VRP were important occasions for communicating these messages and were recorded in the meeting minutes.

On JEEViKA's request, TechnoServe developed a module for SEWs to help PG members view farming as a business activity. JEEViKA and TechnoServe jointly held a training of trainers for the SEWs to familiarise themselves with the module and learn how to deliver it to PG members. TechnoServe provided the study team with the module and a record of all trainings conducted by SEWs with the PGs.

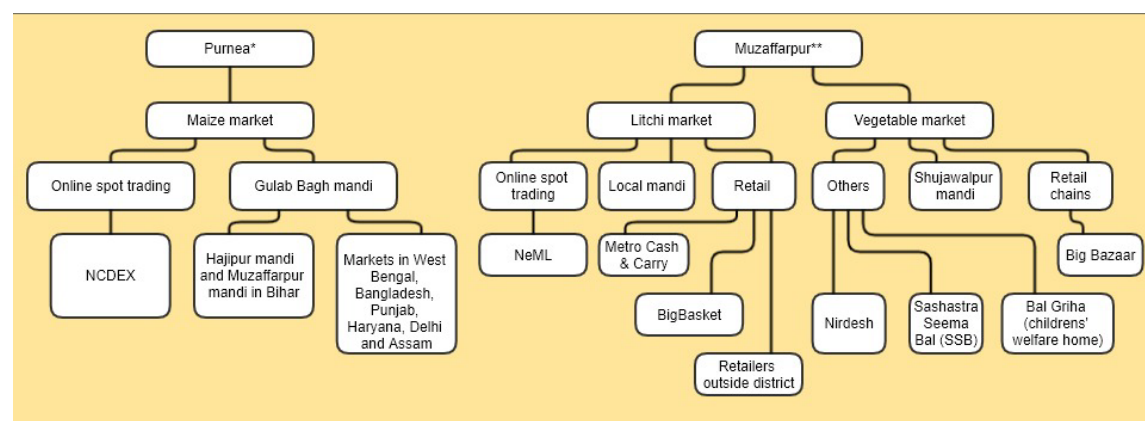
Maize farmers were trained in post-harvest practices like drying and cleaning maize crops to enhance grain quality. WARDA introduced moisture meters and digital weighing scales in maize procurement to avoid fraudulent transactions such as those practised by local aggregators, and trained PG women in the use of these devices. The women were made aware of the different grades of maize in the market and how proper post-harvest practices could help them obtain better prices.

Litchi farmers were trained to grade their produce during the procurement season. Information was provided on how and when the litchis should be harvested, packed and labelled in order to fetch better prices in regional markets. The National Resource Centre was brought in to provide training to the JEEViKA cadre and farmers on other aspects of litchi farming.

4.4 Establishing market linkages

TechnoServe helped FPCs to establish effective market linkages in order to increase their profits and provide higher patronage bonuses to shareholders. In Purnea, TechnoServe facilitated an MoU between Aranyak FPC and the National Commodity & Derivatives Exchange Limited (NCDEX), an online multi commodity exchange platform, to find buyers for maize procured from PG members. TechnoServe also facilitated contracts with regional aggregators and companies in Gulab Bagh *mandi* in Purnea.

Figure 8: Market linkages facilitated by TechnoServe



Sources: * Bihar Maize Report (n.d.), IL&FS Cluster Development Initiatives.⁵

** TechnoServe Monitoring data (2017).

Note: NeML = NCDEX e Markets Limited.

With regard to litchi procurement, Samarpan FPC signed MoUs with institutional buyers like BigBasket, Metro Cash & Carry and NCDEX e Markets Limited, as well as targeting *mandis* within Bihar. For the vegetable intervention, Samarpan FPC linked up with retailers like Big Bazaar⁶ and local aggregators at the Sujawalpur *mandi* and entered into contracts with Nirdesh (a local NGO), and Sashastra Seema Bal (the armed border force).

For litchis and vegetables, TechnoServe's market strategy entailed selling higher-grade fruits and vegetables to big pan-India retail chains and targeting local aggregators in regional *mandi* for the rest of the produce. However, the value chain for litchis and vegetables is still evolving, and TechnoServe is constantly improvising its approach to ensure better returns to farmers. Table 5 shows the procurement volumes of different crops and revenue generated during 2015 and 2016.

Table 5: Crop-wise procurement and revenue generation

Crop	Procurement (metric tonnes) ⁷		Revenue generated (INR)	
	2015	2016	2015	2016
Maize	1,014	3,064	12,836,480	48,396,430
Litchis	N/A	6	N/A	551,295
Vegetables	N/A	42.92	N/A	Data not available

Source: TechnoServe monitoring data (2017).

⁵ Available at: <www.udyogmitrabihar.in/docs/maize-bihar-report.pdf> [Accessed on 3 December 2017].

⁶ The contract with Big Bazaar was terminated in 2017. Per the original agreement, Big Bazaar would buy an agreed volume of vegetables from the FPC and if they were left unsold at the end of the day, it would bear the loss. However, Big Bazaar then unilaterally changed the terms of the agreement, which were extremely unfavourable for the FPC. It proposed that the FPC employ a member of their staff in Big Bazaar to sell all their vegetables and take back all unsold vegetables in the evening.

⁷ One metric tonne is the equivalent of 1,000 kilograms.

Besides market linkages, TechnoServe also facilitated contracts between Aranyak FPC and warehouses like Star Agriwarehousing and Collateral Management Ltd, and LTC Commercial Company Ltd. Table 6 shows the warehousing facilities rented by Aranyak FPC in 2015 and 2016.

Table 6: Warehouse rental details for Aranyak FPC

Year	Warehouse company	Warehouse rented by FPC in Purnea	Capacity (metric tonnes)
2015	LTC Commercial	Manoj Kedia Warehouse	600
2016	Star Agri	Metro Campus Chamber no. 16	2,200

Source: TechnoServe Monitoring Data (2017).

4.5 Enabling value-added services for PG members

In Muzaffarpur, purchase committees (*khareed-dari samiti*) within PGs procure agricultural inputs like seeds, fertilisers and pesticides in bulk to reduce costs. Facilitated by VRPs, the purchasing committees identify demand for various agricultural inputs from PG members and procure these in bulk. Farmers buy inputs from PGs on credit and are typically required to pay within 15 days of purchase. In practice, however, most farmers are unable to pay until the harvest.

In Purnea, however, we found no instance of such committees. Aranyak FPC has acquired a fertiliser licence enabling its members to purchase high-quality fertilisers at competitive rates. However, only a small percentage of active FPC members reported buying fertiliser from the company (Table 7), for two reasons. One, the fertiliser could not be bought on credit and required upfront payment. Two, accessibility was an issue given that the fertiliser shop was located in block headquarters, and the travel cost often exceeded the potential savings from purchasing inputs at the shop:

Fertilisers are made available to PG members at subsidised prices through a licensed FPC shop. However, the shop is located in Dhamdaha. Many PG members don't want to travel to Dhamdaha to purchase these inputs as they have to pay travel expenses. — VRP, Purnea

It is premature, however, to comment on the appropriateness of the product line as it might take a couple of years before the shop can sell high volumes.

Table 7: Fertiliser purchase from Aranyak FPC

Year	2016	2017
Registered FPC members	2,601	5,487
Active FPC members	957	3,637
Active FPC members who purchased fertilisers from FPC	167	256

Source: TechnoServe Monitoring Data (2017).

4.6 Leveraging FPC working capital

The FPC has limited financial resources, with most of its working capital coming from the grants extended by JEEViKA. TechnoServe has facilitated MoUs between PGs, cluster-

level federations (CLFs)⁸ and FPCs to help the FPCs to use idle funds with PGs and CLFs during crop procurement.

PGs receive community investment fund assistance: a one-time grant of INR1.10 lakhs (approximately USD1,300) and an additional sum of INR3–5 lakhs (USD3,900–6,500) as working capital for operationalising their business plans. The funds extended to the FPC from the PGs are interest-free loans. FPCs that receive funds from CLFs must pay interest of 7 per cent per annum. Table 8 shows the amount raised by Aranyak FPC through long-term borrowing from PGs, CLFs and other institutional funders.

Table 8: Long-term borrowing for Aranyak and Samarpan FPCs (INR)

Financial year	Amount raised (INR)	
	Samarpan FPC	Aranyak FPC
March 2016	N/A	15,50,000
March 2017	nil	16,567,893

Source: Audit report for March 2016 and 2017.

Prior to WARDA, the FPCs had not been able to raise capital from formal financial sources. The audit reports for Aranyak and Samarpan FPCs – until they became a part of the WARDA programme – showed both companies incurring losses (Table 9).

Table 9: Aranyak and Samarpan FPCs' financial statements prior to WARDA

Audited financial statement	Profit incurred (INR)	
	Samarpan FPC	Aranyak FPC
March 2015		-50,503
March 2016	-43,456	

Source: Audit report for March 2015 and 2016.

TechnoServe focused on building good financial and accounting practices in the FPCs and helped to increase their creditworthiness by introducing good business planning and increasing financial turnover. This involved the onerous task of putting company financials in order retroactively since their inception in 2009. Entries in tally, internal audit, statutory audit, reporting of financial information to the compliance authority, and other such mandatory financial practices were absent, making it impossible to approach formal institutions:

A couple of years ago a loan from IDBI Bank of an amount of INR3 crores (about USD400,000) was not sanctioned because the company was not able to furnish proper audit details to the bank due to lack of records and human resources in the form of accounting staff. — FPC official, Muzaffarpur

TechnoServe spent significant time re-creating these historical transactions, which were accurate and compliant with standard financial practice protocol. TechnoServe used the services of a seasoned banker, along with a local auditor employed by the company, to put records in order.

⁸ A CLF is a platform created to extend mobilisation, capacity building, monitoring and financial management support to SHGs, the community cadre and village organisations. A village organisation is a federation of SHGs at village/hamlet or *panchayat* (local council) level; those existing within a cluster of villages federate to form a CLF (MoRD n.d.).

4.7 Transparent weighing and pricing

The traditional maize value chain involved PG members selling their produce to middlemen, who underpaid farmers by resorting to fraudulent practices like *dhalta*.⁹ Aggregators not only purchased all produce at a uniform rate without differentiating for the quality of grain, but also paid less for every quintal¹⁰ of produce they purchased due the practice of *dhalta*. Under WARDA, however, digital scales were introduced to weigh the produce and farmers were paid for the entire volume purchased. This was perceived as an important benefit by the farmers as it allowed them to secure a fair price for their produce:

Earlier the trader would try to dupe me on several occasions and not just during the payment. He would engage in faulty weighing practices using traditional scales and would demand an additional 1 kilogram of wheat for each quintal sold as charges incurred for transport losses. However, at the PG we have a digital weighing scale and I get paid for the exact amount that I have sold. — PG member, Purnea

The provision of price information is another important component of the programme. Fifty per cent of the women interviewed mentioned that they received information on the prevailing price of crops (for a particular day) through SMS or voice message. Where women could not read or write, they appreciated receiving voice messages. In addition to communicating prices over the phone, the rate board in the PG office was also updated daily. We found that women valued pricing information as it introduced transparency into the system and helped them get a better rate, even when selling to the local trader. Earlier, farmers reported accepting whatever rate was offered by the local traders and village middlemen.

In Muzaffarpur, traders set up pre-harvest contracts with litchi farmers, which were non-transparent and primarily verbal. As part of the WARDA programme, JEEViKA introduced documented pre-harvest contracts, which were transparent and clearly laid out the terms and conditions.

4.8 Digital payments

Financial inclusion of women has been one of the most important contributions of the model. Farmers reported receiving payments directly into their account within a week of selling their produce:

Previously, traders never paid on time and I had to chase after them to get my payment. But now with the PG procurement, the payment arrives in five days in the bank account which is a huge benefit. — PG member, Purnea

⁹ *Dhalta* is the local practice of village middlemen arbitrarily bargaining for extra units of produce per transaction, citing poor quality of produce and/or losses that they would incur in handling and transporting maize to local *mandis*. Village middlemen do not distinguish between different qualities of maize being sold by the farmers, and offer an aggregate price for the entire lot.

¹⁰ One quintal is equivalent to 100 kilograms. It is a unit commonly used in rural India.

Money is transferred into accounts held by women (at times jointly with their husbands), who then travel to the bank to withdraw money. While women preferred payments in their bank accounts to prevent buying non-essential items and immediate spending, none of the women we spoke to mentioned having any greater control over the money.

Additionally, our review of the 2015 and 2016 MIS data showed that FPCs made multiple payments into one savings account. This meant that women were using other members' accounts to receive payments, which could be problematic as it is difficult to ascertain whether the full amount owed to the farmer was in fact reaching them or if there were leakages. This was not explored in PG member interviews as the study team discovered this much later.

The model seems to work better for maize farmers where payments are annual in nature, as opposed to vegetable farmers whose payments are small, frequent and entail higher bank transaction costs. In early 2018, however, the model was changed to allow cash payments to vegetable farmers. Farmers now bring their produce to an FPC kiosk at Shujawalpur *mandi* in Muzaffarpur and are paid in cash after the vegetables are sold.

4.9 Patronage bonus

In Purnea, the FPC has paid a patronage bonus of INR50/quintal (less than USD1) in 2015 and INR60/quintal in 2016 to company shareholders. In Muzaffarpur, Samarpan FPC has not yet been able to pay any patronage bonus to its shareholders selling vegetables due to insufficient procurement and not enough profit. However, litchi farmers have been able to pay INR50/quintal in bonus payments. Table 10 provides the profits and patronage bonus accruing from procurement in 2016–2017.

Table 10: Profits and patronage bonus for producer group members

Crop	Profit on selling price when sold to FPC	Patronage bonus received from FPC
Maize (INR per quintal)	Variable	50 to 60
Litchis (INR per kg)	10 to 15	1.45
Vegetables (INR per kg)	1	Not received yet

Source: Field interactions with various stakeholders, Purnea and Muzaffarpur (2017).

In order to ensure business sustainability, the FPC board of directors determines what proportion of the profit will be set aside for the FPC as future capital and what proportion will be distributed as a patronage bonus. In 2015 and 2016, Aranyak FPC distributed 50 per cent of its net profit as a patronage bonus.¹¹ The individual share of the patronage bonus is determined by the quantity of produce sold to the FPC. The FPC and PG divide the remaining 50 per cent net profit in a 60:40 ratio. A contract between the FPC and PG governs the split of profit between the two entities.

¹¹ Net profits are calculated after the FPC has recovered its working capital from the proceeds of the sale.

4.10 Strengthening FPC governance

Prior to WARDA, the FPCs were running losses, as borne out in the company balance sheets. The board of directors, comprising women from the community, had limited skills to provide the vision and leadership needed to run the company. JEEViKA also did not invest in building their capacity to govern and manage a for-profit entity. This stemmed from JEEViKA's own limited experience in setting up agribusinesses.

In the programme's early days, TechnoServe focused on training FPC staff on issues such as building market linkages and establishing backward linkages to improve access to agricultural inputs. In the second year, TechnoServe helped to set up processes to regularise board and general body meetings and use these occasions to review FPC performance and plan future business strategies.

On TechnoServe's advice, JEEViKA started compensating board members and offered an honorarium of INR300 (USD4) as a sitting charge for each meeting to cover travel and time spent on administrative work. Though the board members are now more aware of their role and feel more confident about discharging their duties, they are still a long way from taking decisions independently. TechnoServe provides much guidance and hand-holding to the members at each step:

Training of board members by TechnoServe on value chain development and business planning is not restricted to a one-time workshop and is in fact ongoing through various interactions. — FPC official, Purnea

TechnoServe tries to ensure FPC adherence to good governance practices and company bylaws. Since 2009, when the FPCs were registered, there was no rotation of board members until 2017. To remedy this and other governance issues, JEEViKA and TechnoServe developed the Governance and Community Capacity Building Operations Manual. This aimed to provide FPCs with an appropriate governance framework, including laying down roles and responsibilities for FPC women leaders, meeting procedures and quorum requirements. It also included a monitoring and capacity-building component. The FPC boards in Purnea and Muzaffarpur were reconstituted in 2018 to comply with the manual.

4.11 Building convergence with other stakeholders

To build sustainable businesses, it is important that FPCs collaborate and leverage other initiatives. TechnoServe scanned the environment to identify partners and programmes that could help FPCs to achieve better business outcomes.

TechnoServe worked with the State Agriculture Department to promote custom hiring centres and village toolkit bags. Close to 30 custom hiring centres have been set up across Bihar, providing small and marginal farmers access to costly farm machinery and equipment like tractors, tillers, sprinklers and so on, thus helping them reduce the cost of cultivation. The department also helped Aranyak FPC to obtain its fertiliser licence from Indian Farmers Fertiliser Cooperative Ltd.

Samarpan FPC in Muzaffarpur collaborated with the Department of Horticulture to set up six vegetable polyhouses¹² to help farmers cultivate vegetables like red and green bell peppers, beetroot, carrots and red cabbage. There is high demand for these crops in supermarket chains like Big Bazaar, but they are not generally grown in Bihar. The Department of Horticulture funded 50 per cent of the total cost of setting up the polyhouses while the remaining 50 per cent was borne by the CLFs. The department also supplied crates for packaging and transportation of litchis and vegetables, and biopesticides for PG members.

JEEViKA is also forging alliances that stand to benefit the model in the near term. MoUs have been signed with agriculture universities and several *Krishi Vigyan Kendras* (agricultural science centres) in Purnea and Muzaffarpur to provide seed demonstrations and other agriculture-related training to PG members. Additionally, scientists from the National Resource Centre at the Indian Council of Agricultural Research are training litchi farmers in best practices to help them achieve high-quality yields.

JEEViKA has signed an MoU with the National Institute for Rural Development and Panchayati Raj and the Syngenta Foundation to train women farmers in PGs and CLFs in agri-value chains, input supply management and produce procurement. This will be a two-month residential course in the National Institute for Rural Development.

An MoU has also been signed with BASISIndia to train block project managers and other block-level JEEViKA staff on business development and value chain development. JEEViKA will also be working with the Development Management Institute to design a course for the JEEViKA community cadre and staff to train them on FPC management and governance.

5. Programme challenges

Though WARDA has made considerable headway in revitalising the FPCs and establishing crop value chains, TechnoServe has been constantly working on improvising the model to respond to operational issues, as well as more systematic institutional- and ecosystem-level issues that threaten its sustainability.

Based on our fieldwork and interviews with stakeholders, the issues facing WARDA broadly fall into the following three categories:

1. Crop-specific procurement and marketing issues;
2. FPC-related issues; and
3. JEEViKA-related issues.

We discuss these in detail in the subsequent sections.

5.1 Crop-specific

Among the value chains examined by the study, maize was by far the most successful, with Aranyak FPC procuring large volumes of grain from PG members year-on-year.

¹² A greenhouse or polyhouse is structure made of transparent material like glass or polyethylene wherein plants are grown under well-controlled climatic conditions. It is built specifically for crops that require such conditions.

This however came with its own set of challenges.

Though Aranyak FPC assesses the volume it will likely procure from PGs before each procurement season, its estimates have been lower than in reality for two reasons:

- As the benefits of selling through the PG (mainly better prices and timely payment) become more evident, many PG members who had earlier planned to sell to local traders grew interested in selling to the FPC instead; and
- In many instances, farmers who were not part of the PG also sold their produce to the FPC through PG members.

Consequently, when planning procurement, Aranyak FPC has not been able to mobilise the financial and logistical resources needed to procure and store grain from farmers willing to sell to the FPC, leading to some discontentment. Provisioning for an additional 20–30% procurement capacity over and above the estimate will help to avoid turning away farmers.

Respondents also voiced concerns about procurement timing. Aranyak FPC has a one-month window during which it procures maize. This means that farmers who sowed maize early or late are likely to miss the opportunity to sell their produce to the FPC and are therefore compelled to depend upon local traders. Going forward, the FPC can benefit from adopting a phased procurement plan and buying grains from farmers harvesting at different times.

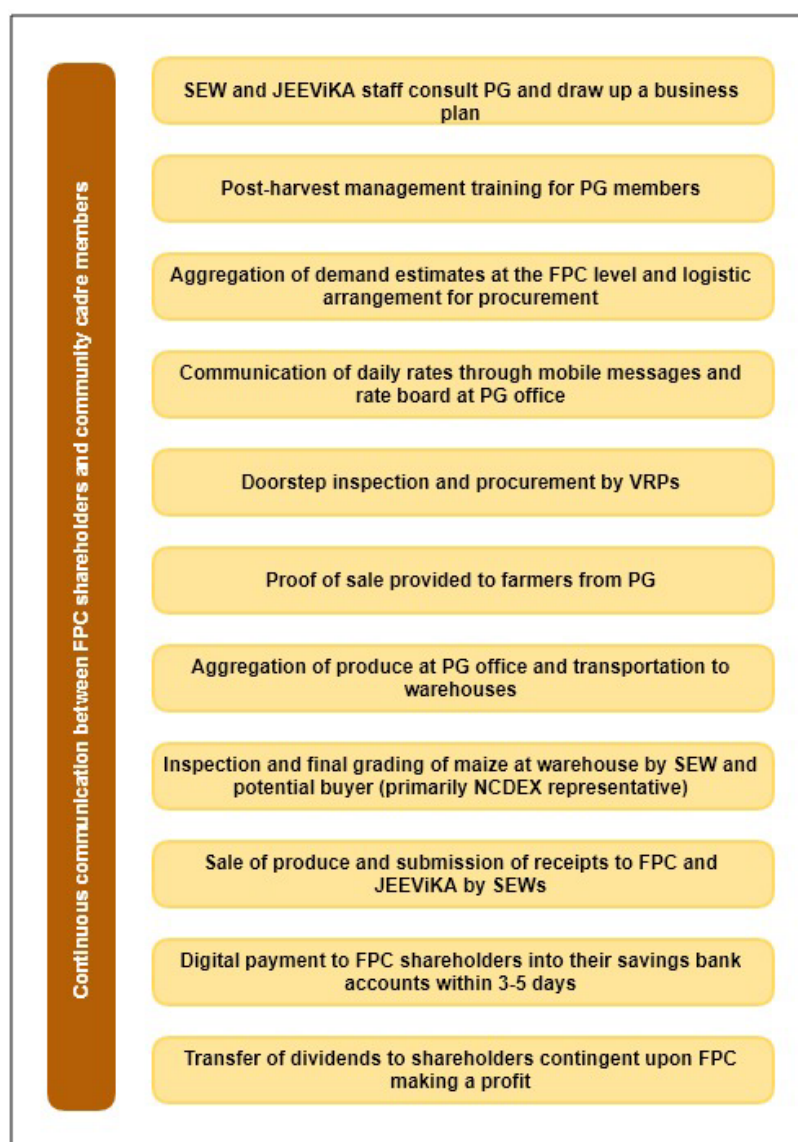
The procurement of only Grade A quality maize has also posed issues. In the absence of proper infrastructure to dry maize and reduce moisture content, farmers often leave the crop in the open to dry. In the likely event of rain – given that procurement time coincides with monsoons in India – farmers often run the risk of ending up with poorer-quality maize:

The rains arrive. There is no place to either store or dry the grains during rains. Where will *didī* (sister) store so much maize? So we have to sell to the local traders. Every day the VRP comes and tells us that the moisture is still high and to dry the maize for another day. So sometimes in anger too, we sell it all off to the local traders. — PG member, Purnea.

In addition to this, operational hiccups such as delays in the provision of sacks to farmers for packaging their grain has led them to delay harvest once again and risk crop damage from rain.

TechnoServe is constantly working on improving the model to maximise procurement and minimise costs for the FPCs. As more PG members begin to appreciate the benefits of selling to FPCs, TechnoServe is looking to transfer part of the transportation costs back to farmers. In the current model, the VRPs collect maize from farmers' doorsteps (checking quality, weighing and packing it) and transport it to the warehouse.

Figure 9: Activities in the maize value chain



In the proposed model, TechnoServe will set up one collection centre for every 4–5 villages, where farmers can bring their produce after VRPs have verified grain quality. The area coordinators will perform a second quality check at the FPC collection centre and issue payment receipts to farmers. This will make it easier for JEEViKA to monitor procurement and make the model more cost-effective, with reduced transportation and human resource costs.

However, a pilot with a strong component on building awareness among PG members is required to gauge the feasibility of such a model, to ensure it does not adversely affect farmers' engagement with the FPC or involve prohibitive costs that will offset the benefits of selling to the FPC. The produce is stored in warehouses rented by the FPC before every procurement season. In the current model, the FPC sells 40 per cent of stock within the two to three days of procurement, while the rest is stored to be sold later in the year when prices are higher. However, this strategy has not worked well for the FPC. Delaying sale did not fetch better prices and the FPC incurred additional storage costs by renting warehouses for an extended period.

The cost of renting an entire warehouse is approximately USD2 per tonne per month, with a lock-in period of nine months. The FPC chief executive officer mentioned that Aranyak FPC was now considering putting aside only 20 per cent of its total stock for sale later in the year, which would significantly reduce rental costs as the FPC can then rent warehouses with smaller storage requirements.

For **litchis**, TechnoServe selected¹³ Saraiya in Muzaffarpur district as the intervention block for piloting the value chain. Saraiya is a quality checkpoint for all litchis produced in the district. Despite being a litchi hub, most of the FPC members in the block ironically did not own litchi trees, or owned too few trees to be able to sell to the FPC (Table 11). Most members instead cultivated vegetables and pulses. The members therefore unsurprisingly expressed displeasure at the choice of crop.

The modest numbers in litchi procurement are also a function of TechnoServe's conservative approach when venturing into a new and highly perishable commodity. The aim of the pilot was not to transact in large volumes, but to test the logistics involved in successfully procuring, transporting and marketing litchis.

Table 11: Litchi procurement in 2016

PGs under WARDA	Total FPC members	Members growing litchis*	Members who sold to FPC*	Members who sold to FPC*
Satyam	120	17	5	5
Shivam	60	8	1	1
Vaishali	120	5	1	1
Kisan	76	8	4	4
Dharti	120	10	1	1
Total	496	48 (10%)	12 (or 25% of litchi producers in FPC)	12 (or 2.4% of total FPC members)

* TechnoServe Scoping Study data.

Marketing litchis and developing a streamlined system for procurement and transportation has been a challenge. Buyers require litchis be delivered the same day they are harvested. Retailers like BigBasket ask for the produce to be delivered to them by 9am. Similarly, for markets outside Bihar, the produce needs to reach Patna airport in time for early morning flights. For better price realisation, targeting markets in Mumbai, Bangalore and Kolkata becomes imperative.

Harvesting therefore needs to begin by 4am. During the pilot phase, TechnoServe and JEEVIKA staff personally supervised litchi harvesting, sorting, grading and packaging in the orchards in the presence of women farmers and farm labourers. Compared to maize, women's participation in litchi cultivation and sale is minimal.

When litchi trees are flowering, men sleep in the orchards to deter theft. They also negotiate contracts with local traders, which are typically of higher value compared to maize. Often to save effort and loss due to theft, farmers sell trees at the time of

¹³ Our subsequent discussions with TechnoServe revealed that JEEVIKA allotted Saraiya block for the intervention to prevent different organisations from working in the same geographical area.

flowering to local traders, who are then responsible for tending to trees, handling the harvest and transporting the produce. This practice is a disincentive for farmers to sell to FPCs, as it would require substantial household or hired labour to tend to trees before the litchis are ready for plucking.

The model would require careful thinking as to how FPCs can provide prices and generate profits that will make it lucrative for litchi farmers to sell to them. Additionally, unlike the maize model, it is important to find ways to ensure the meaningful involvement of women in the litchi model – an important challenge requiring creative solutions. In the absence of this, even if the FPC were to establish a sustainable value chain for litchis, it would miss the objective of women’s empowerment.

Figure 10: Activities in the litchi value chain (without pre-harvest contracts)

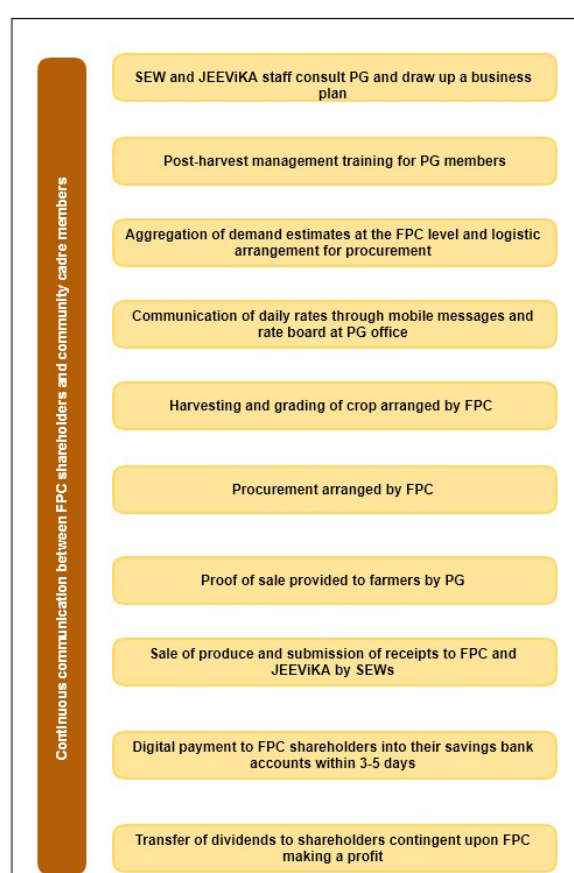
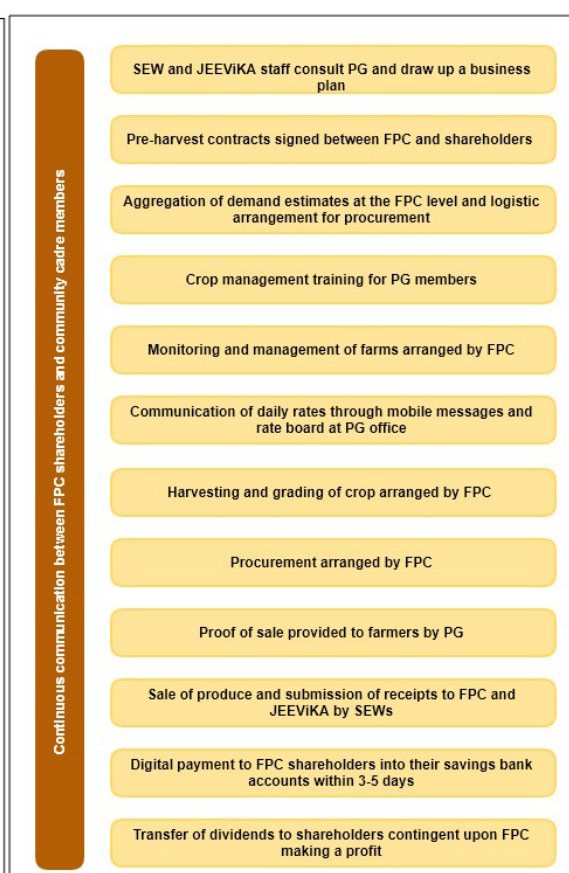


Figure 11: Activities in the litchi value chain (with pre-harvest contracts)



Establishing a **vegetable** value chain in Sakra and Saraiya blocks of Muzaffarpur has been equally challenging. Initially, only Grade A-quality vegetables were procured at collection centres, with one centre catering for 3–4 villages. However, this model did not work and procurement was halted for over six months.

Selling to the FPC proved costly for some farmers as they could sell only part (Grade A quality) of their produce to the FPC. The remainder (lower-quality produce) had to be carried to the local market, and fetched an even lower price on average than if they sold all their produce in the *mandi*. In a few instances, farmers mentioned a preference for selling to local traders who would harvest and transport the crop at their own cost. This

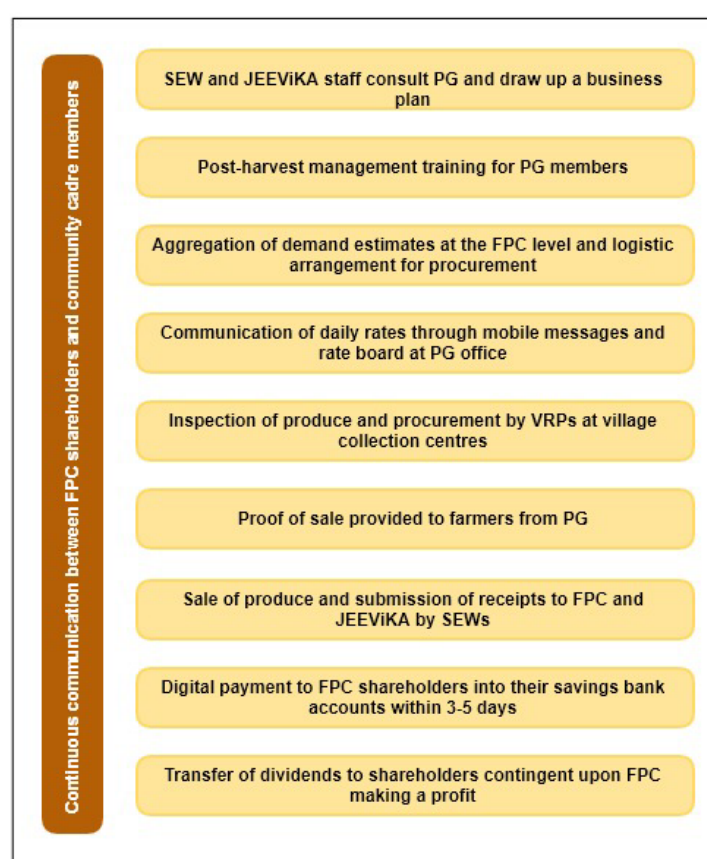
arrangement was especially beneficial for labour-scarce households, a common phenomenon in Bihar given migration to other Indian states:

One of the biggest complaints from PG members is the fact that the collection centres only purchase good-quality vegetables leaving the farmers to sell the lower quality produce in the market. Latter fetches them a much worse price than if they were to sell the entire produce in the market. — TechnoServe staff

TechnoServe was instrumental in the FPC signing an MoU with Big Bazaar for vegetable procurement. However, despite the FPC's stringent quality parameters, the vegetables from farmers could not match the quality standards of market players like Big Bazaar and NCDEX e Markets Limited, and the agreement was terminated.

Though there were other buyers like Nirdesh, Bal Griha and Shashatra Seema Bal with less stringent quality parameters, they procured much smaller volumes that constituted only a small proportion of the FPC's total sales. The FPC struggled to break the low productivity-low quality-low procurement cycle.

Figure 12: Activities in the vegetable value chain



According to TechnoServe, in order for vegetable trade to be profitable and cover the cost of transportation and commission to regional aggregators, a collection centre should procure at least four quintals of vegetables per day. *Mandi* traders levy at least 5 per cent as commission over the vegetable sale price, and transportation from the collection centre to the *mandi* on average costs about INR500–700 (approx. USD7–9) for a distance of 18–25 kilometres.

Collection centres were closed down given the lack of procurement. This had a demoralising effect on PG members and threatened to make PGs defunct again. Given that the vegetable intervention never really took off, it is perhaps unsurprising that interviews with PG members showed their limited understanding of the FPC and the benefits of aggregation. Unlike maize farmers, vegetable farmers did not fully understand the procurement process or what constituted good-quality vegetables. They also did not receive any patronage bonus, as the FPC did not make any profit.

TechnoServe plans to go back to the drawing board to see what changes need to be made to the model. The plan is to perform a re-estimation of the marketable surplus for different vegetables in the region and use that to draw up a plan for mapping potential buyers and establishing market linkages.

In the next phase, TechnoServe plans to open a vegetable collection centre for PG members in the local market, which would purchase vegetables of all grades. The farmers would be trained to segregate vegetables based on quality and the FPC would buy these at the prevailing market rate, which would vary according to quality.

SMS notifications from the FPC would inform PG members of the day's rate for each vegetable. The best-quality vegetables would be sold to organised retail outlets in Muzaffarpur and Patna, the next-best to big traders at the *mandi*, and the lowest grade to the small eatery establishments within the catchment area of the market.

For Grade A vegetables, Big Bazaar, Reliance Fresh and BigBasket in Patna have been identified as potential partners. There is also a potential market in Siliguri, but this is yet to be explored. During the first month of the implementation of this model, and until partnerships are formalised, all vegetables irrespective of grade would be sold within the local market to different buyers, as long as there was a profit margin of INR1 per kilogram. This would also provide time to establish processes for the steady supply of vegetables from PG members and get a better estimate of daily volumes for varying quality of vegetables.

5.2 Farmer producer companies

FPC operational efficiency and financial sustainability is key for WARDA to deliver on its mandate. Poor FPC functioning affects the model and its success in establishing efficient and profitable value chains.

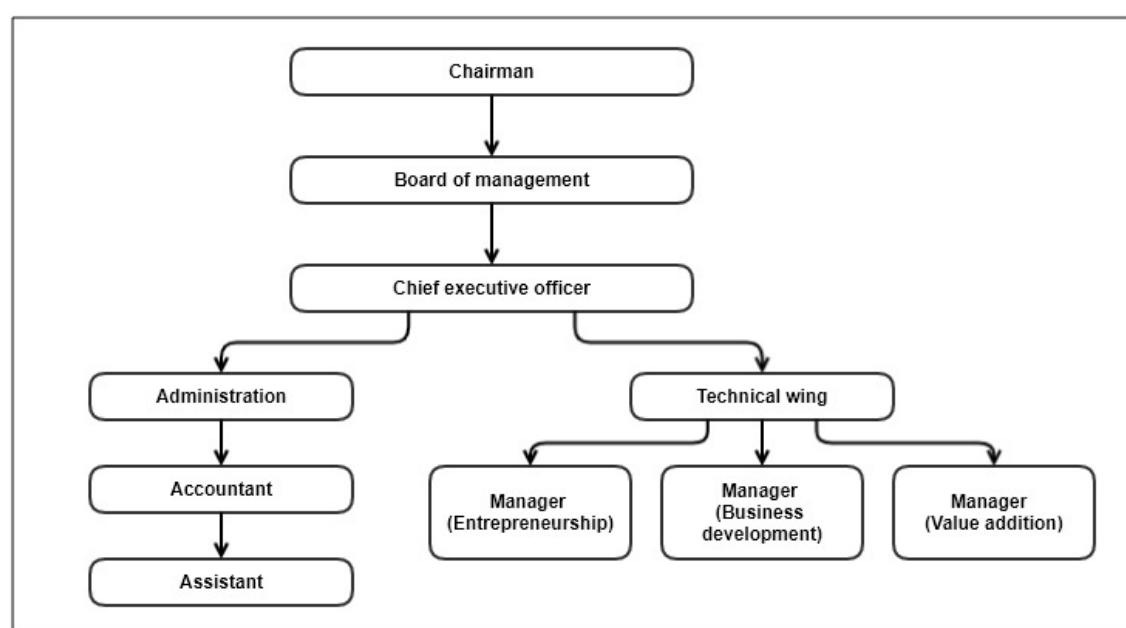
We discuss below the challenges and issues that continue to ail the FPCs. This assessment, however, is based on less than two years of project implementation – a period too short to turn a defunct agribusiness into a profit-making entity.

Raising working capital to fund operations has been one of the biggest challenges for FPCs, preventing them from expanding operations to their full potential. This is particularly true for Aranyak FPC, where TechnoServe has successfully streamlined the procurement process for maize. In 2016, Aranyak FPC abruptly stopped procurement because sales to the FPC far exceeded the estimated amount, and the company struggled to arrange transportation and storage for the additional produce, leading to dissatisfaction among PG members who were keen to sell to the company.

FPCs currently depend heavily on funds from CLFs and PGs. Almost 63 per cent of the working capital for Aranyak FPC and 100 per cent for Samarpan FPC has been leveraged through the CLFs and PGs.¹⁴ Aranyak FPC has been able to raise funds from banks, though not enough to support the scale of its operations. Nonetheless, it is an important step towards building a credit history with the banks and raising capital for expanding operations in coming years.

Building FPCs as well-governed institutions with strong systems and HR practices is equally critical for their sustainability. Despite TechnoServe and JEEViKA's efforts to build the capacity of FPC board members, it will be a long time before community women are equipped with the skills to make decisions with support from FPC staff. Below is the FPC organogram.

Figure 13: FPC organogram



Currently JEEViKA, rather than the FPC, funds all the positions, the majority of which are lying vacant in both the FPCs. Only recently has JEEViKA recruited a part-time accountant for both companies. However, interviews with part-time staff reveal that they are hard-pressed to maintain the company accounts, which requires dedicated effort from a full-time staff. Staff shortage affects the FPC's ability to adhere to good account- and record-keeping practices, which in turn makes it difficult to secure credit from formal financial institutions.

Additionally, the current FPC function depends heavily upon the JEEViKA frontline workers, comprising VRPs and SEWs, mobilising and training the community and managing procurement, including maintaining field-level records. The current WARDA model is extremely human-resource intensive. Table 12 provides an estimate of the number of VRPs and SEWs involved in the WARDA programme.

¹⁴ TechnoServe monitoring data (2017).

Table 12: Community cadre staffing

District	VRPs	SEWs	Total
Muzaffarpur	33	12	45
Purnea	138	17	155
Total	171	29	200

Source: Monitoring data, TechnoServe (2017).

There is also a need to rethink the VRP and SEW performance-linked incentive structure as explained in Table 13.

Table 13: Community cadre incentive structure

Metric tonnes procured	VRP (INR)	SEW (INR)
50–100	90	100
100–150	110	120
150–250	150	150
> 250	200	200

Source: Primary interviews with FPC staff and community cadre (2017).

VRPs and SEWs find incentives to be a positive reinforcement which motivates them to work harder and appreciate the value of their work. However, procurement of large volumes alone will not make the model sustainable. To ensure the orderly growth of the FPCs, the incentive system would benefit from equal weighting of other aspects managed by SEWs and VRPs, such as training, record keeping and facilitation. The incentive model should assess VRPs and SEWs on all these various criteria to reward performance.

From a purely commercial perspective, the FPCs need to be mindful that JEEViKA subsidises the cost of their operations, and factor these expenses into their planning going forward if they want to break even as companies.

Operationally, it is also important for FPCs to invest in a robust management information system if they are to evolve into well-managed companies with sound business practices. Currently, the FPCs do not have a system for managing information. TechnoServe responded to most of the study team's requests for procurement-level data, which are maintained in spreadsheets that do not effectively track PG members over time or across activities. To function effectively and at scale, it would be important for FPCs to maintain member-level data that uniquely identify each farmer and her activities.

The first two years of WARDA have amply demonstrated the need for FPCs to diversify their suite of products and services in order to have a competitive edge over local traders. A large number of respondents reported that they were obligated to sell their produce to local traders, since they had bought seeds and fertilisers from them on credit.

Many of the interviewed PG members, inactive members and attriters mentioned their preference for selling to the FPC, provided the company was able to supply them with the agricultural inputs needed at the time of sowing. Some progress has been made in that direction. While PGs under Samarpan FPC have started procuring agricultural

inputs, which are provided to members on credit, Aranyak FPC has been able to obtain a fertiliser licence, which allows it to sell fertilisers at reasonable prices to PG members from its registered outlet in Dhamdaha block.

FPCs have struggled to diversify their pool of potential buyers. Though traders in Bihar are also important players with capacity to buy large volumes of produce, doing business with them can be risky since sales are made on credit with no formal documentation. For this reason, the FPCs have avoided doing business with such entities, despite their ability to take large orders.

The entire model hinges upon the trust and goodwill felt towards FPCs by community members. Since the model is still in a nascent stage, any departures in the approach that prevent an FPC from fulfilling its promise to its members will likely adversely impact FPC credibility and affect its operations.

According to FPC staff, shareholders view themselves more as beneficiaries than partners in the FPC, with little knowledge about company processes. Since shareholder ownership and active participation in FPC processes will only be achieved over time, building and maintaining community trust becomes a crucial step in cementing the relationship between shareholders and the company.

While it may be difficult to mobilise PG members to become FPC shareholders, it is equally challenging to maintain this trust by consistently delivering on the promises made:

This time the company had to halt procurement in Purnea because of several reasons. As a consequence of this decision, many PG members who had prepared their maize to be sold to the company were unable to [do] so. They had to sell their produce to the local aggregators as they had no other options. This has led to the creation of mistrust towards the company among some members. If we don't deliver on our promises, we can't expect to procure from them next season. — VRP, Purnea

Increasing trust and building FPC ownership can be protracted and painstaking, and therefore requires careful and creative thinking about putting in place systems that might accelerate the process. Currently, only PG leaders attend FPC meetings and rarely relay the resultant information back to members. Hence, most PG members are unaware of FPC functions or processes, making it difficult to inculcate a sense of ownership or responsibility towards the FPC.

5.3 JEEVIKA

The FPC model is by design intrinsically linked to the SHG programme, whereby PG members are mobilised from among village organisation members. JEEViKA's very raison d'être for promoting FPCs was to provide SHG women with a livelihood mandate beyond credit and savings, which they had been doing for many years as part of the SHGs.

The success and failure of the FPC model cannot be delinked from the value proposition that the SHG platform and JEEViKA network bring to the model. That said, JEEViKA was

at a loss as to how to leverage its own institutional base and provide FPCs with a mandate. WARDA is filling this critical gap in the JEEViKA-promoted FPC model.

First, the biggest enabling factor has been the commitment and will of JEEViKA officials at all levels (from state to block) to resurrect the FPCs. JEEViKA staff at the district and block levels have internalised the model and are keen on making JEEViKA-promoted FPCs a success. There is in fact healthy competition among block-level JEEViKA officials to procure the largest quantity of Grade A produce from the farmers and achieve the best performance in the district.

To illustrate, we came across an interesting instance where one block-level official was tracking procurement volumes in all blocks to keep a tab on how his block was faring vis-à-vis the others. District-level officials in Pune are excited about the success of the maize value chain and expressed keenness to replicate it in other districts for other crops. JEEViKA cited a perceptible shift in its work culture, with block-level staff engaging more with the farmers and holding frequent interactions with the community cadre.

However, two factors have adversely affected the WARDA programme. First, in the past year JEEViKA faced issues with disbursing payments to VRPs, which greatly affected their morale. Given that VRPs are a critical node in the model, non-payment of dues can greatly undermine FPC profitability through reduced procurement. Since VRPs are the face of the FPC in the community, their hardship signals problems with the FPC to the community. This can affect confidence in the company's ability to make timely payments, given that farmers are unlikely to understand that the two payments depend upon different revenue streams.

Second, the contractual nature of the staff has posed its own challenges. In the last 2–3 years, for instance, several important managerial positions at the district and block levels such as the district project manager, block project manager, livelihood manager and livelihood specialists have seen staff turnover.

TechnoServe's resources are drained as it makes repeated investment in building relationships with new incoming JEEViKA staff and increasing their capacity to contribute to value chain strengthening. TechnoServe informally trained JEEViKA staff on multiple occasions and provided on-the-job support to help them understand and implement the WARDA programme.

In light of staff turnover and the need for refresher training voiced by a number of interviewed JEEViKA staff, TechnoServe can consider partnering with organisations like Digital Green, which are working with JEEViKA to develop video-based modules. In the long run this can significantly reduce costs and time for TechnoServe. Given that JEEViKA staff training and capacity building is core to WARDA's technical assistance model, the programme would benefit from two things:

1. Developing a capacity assessment framework to assess understanding of different stakeholders (community cadre, JEEViKA staff and FPC members) on core concepts like business planning and value chain analysis. Several respondents remarked that the training provided by TechnoServe included complex concepts that are difficult to grasp for those not from a business

management background. It is therefore important to develop tools to test the efficacy of the training and identify areas for improvement in content or delivery; and

2. Documenting trainings provided to JEEViKA staff. As discussed earlier, aside from the trainings stipulated in the original plan, TechnoServe has been providing field training and day-to-day hand-holding support to VRPs, SEWs, livelihood specialists and other JEEViKA staff. These trainings sessions are held on a needs basis, and often no records are available that mention the training topic and participants. Such records will underscore the role of trainings in successful implementation of the model, and help to accurately estimate the time and resource investment of technical assistance providers supporting similar interventions. A thorough documentation of the trainings should involve names of participants, their positions and affiliations (if applicable), training agenda and modules administered, tools to assess changes in knowledge and behaviour, and participant feedback.

As mentioned above, JEEViKA-promoted SHGs constitute the foundation upon which the superstructure of the FPCs stands. Given that Bihar has been one of the better-performing states under the NRLM, the FPC model has a distinct comparative advantage of very strong social capital that it can leverage to achieve its objectives that require robust collective action.

It is important to note, however, that much as FPCs stand to benefit from the JEEViKA community institutions, policy shifts in JEEViKA and any weak links in the SHG model can undermine WARDA's work.

Most PG members are cash-strapped prior to the sowing season and need credit to buy agricultural inputs like seeds and fertilisers. Despite SHGs having been around for five or more years, they are unable to meet the credit needs of farmers:

For credit, the first option for many women is to approach SHGs, but the demand is hardly met. For the rest of the money we have to approach local moneylenders, neighbours, relatives and friends. Moneylenders and neighbours charge a high interest rate. Access to credit during sowing season is a bigger challenge because everybody needs credit at the same time and therefore there is a crunch in available cash resources. — PG members, Muzaffarpur

Other options like the *kisan* (farmer) credit card are available, but only to a small percentage of farmers. Women therefore have no option but to take credit from local moneylenders, which is expensive at an interest rate that ranges between 5 and 10 per cent per month, pledges farmers' produce to the moneylender on unfair terms, and prevents them from selling to the FPC. Its depth of work in savings and credit notwithstanding, JEEViKA has not been able to fulfil the credit needs of farmers or the FPC. While FPCs might over time be able to secure credit from formal financial institutions through better balance sheet performance, provisioning credit at the farmer level would need more thought and possible improvisation of the model.

Despite their strong networks and social capital, SHGs have had limited success in changing gender relations. At the beneficiary level, social restrictions on women continue

to be a reality and women are unable to join PGs due to restrictions imposed by husbands and in-laws:

I am not entirely confident that I will be allowed to join a PG if I wanted to. If I want to join a PG I must first consult with my in-laws and my husband, who are involved in the production and sale of agricultural goods in my household. —
SHG member, Muzaffarpur

Agriculture-related decisions traditionally fall in the male domain, even if women contribute to agricultural activities. This is especially true for commercial crops like maize and litchis, where cultivation, harvesting, marketing and transportation are primarily carried out by men. Though women are engaged in certain activities like the drying of maize and assisting their husbands during the sale of produce, decisions are mostly made by men. In the case of vegetables, a large proportion of smallholder farmers are engaged in kitchen gardening, primarily for home consumption, and women participate in the cultivation and sale of produce alongside men.

Empowering women to engage further and more meaningfully in various activities will require support from men in the community. The programme would therefore benefit by reaching out to men and engaging them in capacity-building activities along with the women members of their households.

Contrary to the above, the study also highlighted instances where farmers were reluctant to organise themselves into PGs despite obvious benefits, because of previous experience of fraud and cheating in village SHGs. Some farmers became sceptical of collective action and rejected all forms of community organisation.

In Purnea, we found instances of village organisation meetings being held infrequently owing to organisational and administrative issues within the SHG federation. This affected the functioning of these organisations and there were instances, for example, of payments not being released for farmer trainings. If in future WARDA were to leverage this resource as a possible way to subsidise its own training costs, issues in the functioning of SHG vertical would need to be taken into account.

The PGs also lack a mandate that would sustain the interests of its members and keep them engaged in PG activities outside of the procurement period. Though JEEViKA requires PGs to meet every month, the groups rarely follow the schedule. It may, however, be argued that this is not problematic, and given women's workload and competing demands on their time it may be pointless to convene meetings in the absence of a well thought-through agenda. Unless an assessment can categorically establish the value of monthly meetings, or a more productive agenda be drawn up, there may be merit in reconsidering this aspect.

Additionally, the implementation of WARDA has required some undoing of JEEViKA's past work with PGs, and this is likely to be true for any initiative using a pre-existing platform. When JEEViKA promoted PGs, there were no clear criteria for recruiting members. Driven by targets, the community cadre recruited as many members as possible. Not surprisingly, women who either did not own or cultivate any land or farmed only for home consumption became members of PGs that were to deal primarily in agricultural commodities.

This has led to concerns in WARDA, as membership benefits percolate down to women who are selling to FPCs and getting a better price for their produce as well as a patronage bonus. Women who are inactive because they have no produce to sell to the FPC, yet have paid to become shareholders of the company, are dissatisfied. Future work should focus on estimating the extent of the issue and finding ways to address it, one of which could include diversifying FPC portfolios to include other commodities.

Policy changes in JEEViKA are difficult to pre-empt and can at times undermine the model in unintended ways. During the interviews with community members, we noted growing dissatisfaction among farmers due to JEEViKA discontinuing its provision of free seed kits for rice and vegetables to SHG members. Dissatisfaction affects their relationship with JEEViKA and makes them reluctant to engage in other initiatives, even at the cost of losing out:

Some farmers developed a negative mindset, wherein they think, since JEEViKA has ended the subsidy for us, we will not work with them or buy seeds and fertilizers from JEEViKA. — VRP, Muzaffarpur

Additionally, SHGs and FPCs have a different ethic, but the same set of stakeholders, which poses its own challenge. For years, SHG women have been used to a subsidised model of service delivery and product provision. Engagement with FPCs, on the other hand, requires thinking commercially. This becomes even more confusing when both streams of work are tied to the same entity – JEEViKA, in this case.

6. Conclusion

Measured by crop procurement and profits, the WARDA model had varied levels of success, with Aranyak FPC dealing in maize doing the best business. WARDA effectively leveraged JEEViKA's SHG platform to revitalise the defunct FPCs in the districts of Purnea and Muzaffarpur. TechnoServe, as a technical assistance provider, adopted a phased approach, focusing first on linking farmers to markets through the FPC, and then working on institutional aspects of system strengthening, whether related to financial management or governance.

Disrupting the traditional value chain was not easy. The relationship between farmers and intermediaries is intricate and not simply economic or transactional. Upsetting this may have grievous consequences for credit-starved rural households. With regard to maize, WARDA was able to make a small dent in this relationship, as borne out by FPCs procuring increasing volumes year-on-year.

Additionally, WARDA was able to introduce important innovations in the procurement process, such as transparent and fair pricing, stringent quality control and direct payments into bank accounts. In a short time frame, the FPCs were able to sign MoUs with big retailers and online platforms, like NCDEX in its bid to find buyers for better prices. Aranyak FPC successfully raised funding from a formal financial institution in just the second year of its operations under the WARDA programme. Though CLFs and PGs continued to provide most of the working capital, raising external funds was exemplary for a company that until recently was lying defunct with no financial practices in place.

Despite these important milestones, much remains to be done. In order to scale operations and make FPCs sustainable, TechnoServe plans to focus on strategies to: (1) raise working capital and optimise its use; (2) use profits to hire additional staff and domain experts; and (3) foster a sense of ownership among PG members through training and awareness generation to increase their role in FPC decision-making.

The FPCs in Purnea and Muzaffarpur have been facing operational issues due to limited working capital. TechnoServe is improvising its strategy to make the companies more sustainable by cutting down on overhead costs, devising plans that reduce labour and transportation costs, and expanding procurement to include different types of crops.

Additionally, the FPCs do not have the required human resources, and TechnoServe often fills this shortfall in staff by hand-holding the management committees at every step of operation. TechnoServe experts who have extensive experience in value chain development are assets to this model. For FPCs to be sustainable, there must be effective transfer of this knowledge and experience, either through intensive capacity building of existing members or hiring staff with the required skill set, including filling currently vacant positions.

If TechnoServe were to withdraw at this stage, it would be difficult for JEEViKA to sustain the progress that has been made with its technical assistance. The contractual nature of JEEViKA staff, the large number of vacant positions, and other claims on JEEViKA staff time are factors that, in addition to capacity, limit its ability to deliver on WARDA objectives. Most stakeholders emphasised the need for TechnoServe's continued engagement to make the FPCs sustainable.

Finally, community ownership is critical to establish FPCs as community-managed and -governed institutions. Aside from investing in building capacity to facilitate meaningful engagement in PGs and with FPCs, women's participation requires a nurturing and supportive ecosystem. A gender-inclusive approach can prove to be more rewarding in the longer run, since shifting gender relations is a time-intensive process and the approach is as critical as the outcome. A very radical shift at this point seems unlikely given that FPC operations are still small scale, and WARDA is touching women's lives, albeit a small part.

Appendix

A1. Programme results framework

Year 1 of WARDA

Outcome/Output	Indicator(s)	Data Sources (If Applicable)	Comments	Target for 2015	Achievement
Needs assessment carried out for JEEViKA Bihar on Producer Group promotion	Need assessment survey	Need assessment survey of 1418 members from 20 PGs conducted to map the cropping pattern, marketable surplus Vs. domestic consumption, Harvest and Post-harvest management, access to market etc.	Completed	20 PGs	20 PGs
Capacity building training provided to JEEViKA Bihar core team on value chain gap-assessment and programme intervention strategy	3 day training conducted on Value chain development and programme intervention strategy for JEEViKA core team in Mumbai	Training attendance sheet (12 JEEViKA core team members trained)	Completed	1 Training	1 Training
ToT support on business planning, business modelling provided to JEEViKA team, for producer groups cluster-level federations	Training on " Need and importance of Business Planning" was conducted in 2 phases	Training attendance sheet (43 JEEViKA team members trained)	Completed	1 Training	2 Trainings
TechnoServe and JEEViKA team co-ordinate to complete gap-assessment exercise in 3-5 value chains	Assessment was done only for Maize crop	Need assessment survey and market assessment survey	Completed	3	Maize value chain completed. Rest of the value chains like vegetables and pulses commenced in December 2015.

Outcome/Output	Indicator(s)	Data Sources (If Applicable)	Comments	Target for 2015	Achievement
Adapted Maturity Assessment Index (MAI) developed and shared with JEEViKA	SOP development in Progress (final submission by 31st Dec, 2015)	Testing of MAI across 40 PGs completed	Rescheduled and completed	1 tool	1 tool
JEEViKA team members trained to operate and use MAI	SOP development in Progress (final submission by 31st Dec, 2015)	NA	Trainings were rescheduled for January 2016	Training rescheduled to 2016	Training rescheduled to 2016
Key metrics for an effective MIS developed for JEEViKA Bihar	6 dimensions, 16 sub-dimensions and 53 Key Performance Indicators developed to rank producer groups	MAI tracker	The task was completed in December.	1 tool	1 tool
JEEViKA team members trained to operate and use the MIS tool	One training to be conducted for the JEEViKA team on the PG MIS by 31st Dec, 2015	Training attendance sheet	Training was rescheduled for January 2016	1 Training	1 Training
Understanding JEEViKA and other stakeholders' priorities and requirements for PG promotion	Joint meeting between World Bank representative, JEEViKA team and TechnoServe conducted	Minutes of Meeting	Completed	1 Meeting	1 Meeting
Preliminary assessment of producer groups conducted	40 PGs were assessed through MAI tool by end of Nov, 2015	MAI tracker	Completed	40 PGs	40 PGs
Producer groups ranked according to their Maturity Assessment Index score	40 PGs were ranked based on the MAI score	MAI tracker	Completed	40 PGs	40 PGs
Target producer groups selected	10 PGs were selected for maize value chain intervention based on the assessment report	Assessment report at PGs level	Completed	5-10 PGs	10 PGs

Outcome/Output	Indicator(s)	Data Sources (If Applicable)	Comments	Target for 2015	Achievement
TechnoServe team provides high-quality business planning, market linkages support to selected producer groups in Purnia district	1014 Metric Tonnes of maize was sold through the Producer company from 10 selected producer groups	PC Business tracker	Completed	NA	1014 Metric Tonnes
JEEViKA core team provided ToT training on business planning, financial planning, record keeping etc. for producer groups	Training on " Need and importance of Business Planning" was conducted in 2 phases	Training attendance sheet (43 JEEViKA team members trained)	Completed	1 TOT	1 TOT
JEEViKA team leveraged to provide capacity building support to producer groups	"Farming As Business" was conducted for 700 members from 20 PGs with support from JEEViKA team	Training attendance sheet	Completed	20 PGs	20 PGs
Interim progress and learning reports shared with project stakeholders	Monthly Progress report shared with project stakeholders	Monthly Progress Report	Completed	12 reports	12 reports
Final project report shared with BMGF and JEEViKA Bihar	Final Progress report shared by 30th Nov 2015	Final Progress report (result framework, budget and progress report)	Completed	1 Report	1 Report
Best practices, learnings and appropriate business models analyzed for future PG facilitation	Best Practices in maize market linkage captured in case study format	Case study on Maize market linkage developed	Completed	1 Report	1 Report
3-5 year roadmap for producer group facilitation shared with JEEViKA	No information	After 1 year completion of the project, the project has got supplemental funding for another 1 year for 2 districts	Received BRLPS PG Policy document. Could not obtain a copy of the roadmap that was shared with JEEViKA.		Based on the pilot experience during phase I and II, TechnoServe helped JEEViKA in revising the PG policy which was rolled out in 2017.

Outcome/Output	Indicator(s)	Data Sources (If Applicable)	Comments	Target for 2015	Achievement
Workshops conducted with other relevant NRLM missions and stakeholders to disseminate information	No information	No information	No information	Completed	NRLM workshop was conducted and the maize intervention in Bihar was selected as the best case study
Manual of best practices for producer group capacitation developed and shared with JEEViKA	FAB training module, Business Plan development, VC development and Programme design shared with JEEViKA team	Training manual, Business development and VC development format	Only received information on FAB training attendance sheet.		

Year 2 of WARDA

Outcome/Output	Indicator(s)	Data Sources	Comments	Target for 2016	Achievement
Improved productivity, incomes and resilience for women farmers in two target districts of Bihar	<ul style="list-style-type: none"> At least 20% of 4,000 women farmers reached by the project achieve increased productivity and/or agricultural revenues attributable to the project. At least 40% of 4,000 women farmers reached by the project agree their economic resilience has improved due to a project supported value chain they work in. 	<ul style="list-style-type: none"> Not measured during project period 	Not to be measured		
Benefits to women farmers of a scaled intervention supporting competitiveness of FPO's demonstrated	<p>Farmer Producer Organizations</p> <ul style="list-style-type: none"> Both FPOs report providing one or more of input aggregation, mechanization service provision, agronomy services, storage solutions, value addition, credit linkages, or access to output markets for members <p>Farmers</p> <ul style="list-style-type: none"> The majority of (>50%) of the two FPOs' members agree their FPO has facilitated improved access to one or more of inputs, mechanization services, agronomy, storage, value addition, credit linkages, or output markets. 	<ul style="list-style-type: none"> Farmer Organization database Project Data (Number of member participated in intervention, Working Capital Loan to FPC and Warehouse Services provider agreement) 	Completed	Completed	<p>Farmer Producer Organizations</p> <ul style="list-style-type: none"> Both FPOs were provided the service namely agri-produce aggregation, warehouse storage facility, credit access and access to output markets <p>Farmer</p> <ul style="list-style-type: none"> About 65% farmer benefited due to working capital credit to FPC, 33% due to value chain intervention, 38% due to training programs and 30% due to warehouse services

Outcome/Output	Indicator(s)	Data Sources	Comments	Target for 2016	Achievement
Women farmers in two target districts of Bihar organized into market oriented Farmer Producer Organizations	<ul style="list-style-type: none"> 4,000 women farmers connected to new or existing Farmer Producer Companies 	<ul style="list-style-type: none"> Farmer Producer Organization Shareholder data 	Completed	4000	4884
Project FPOs participate more actively in the market system for relevant value chains in Bihar	<ul style="list-style-type: none"> Both FPOs have signed agreements with one or more market actors in their relevant value chains (maize, vegetables, or pulses) 	<ul style="list-style-type: none"> FPO records 	Completed	2	4
Capacity of SLRM in Bihar increased to better support FPOs.	<ul style="list-style-type: none"> 75% of JEEViKA teams in the two districts trained in the MAI index test to project standard 75% of 30 JEEViKA team-members trained in FPO support test to project standard on course material and training methodology 	<ul style="list-style-type: none"> MAI toolkit SRLM records Training records 	Both the indicators have been achieved. (There were only 14 members for training on second indicator and all of them have been covered under training program)	44 14	63 14

Outcome/Output	Indicator(s)	Data Sources	Comments	Target for 2016	Achievement
Project learning applied to successful expansion strategy	<ul style="list-style-type: none"> State level workshop conducted with JEEViKA and relevant stakeholders Learnings captured, documented and applied to design of larger planned program Short gender study to learn about project impact completed in Purnea Planning and customization for integration of WEAI and gender dimensions in M&E for larger planned programme completed 	<ul style="list-style-type: none"> Attendance Sheet of workshop Monthly Progress Report submitted to donor Gender Study Report Next phase project proposal 	Completed	<p>Indicator 1: One State level workshop</p> <p>Indicator 2: 12 monthly report</p> <p>Indicator 3: Short Gender Study</p> <p>Indicator 4: Next phase proposal to be based on integration of WEAI learning and gender study</p>	<p>Indicator 1: One state level workshop on MAI</p> <p>Indicator 2: 12 Monthly Progress Report submitted</p> <p>Indicator3: Achieved</p> <p>Indicator 4: WARDA Project Proposal prepared on basis of WEAI and gender study</p>

A2. List of all documents received from TechnoServe

I	Implementation plan
1	Technical Assistance for Developing and Supporting Producer Organisations: PPT explaining intervention for WARDA Phase I-III
2	WARDA Monitoring and Evaluation Plan
3	Creating Technology Enabled Inclusive Markets Electronic Trading Platform for Small and Marginal Women Farmers in Bihar, India: Note on Purnia Pilot
4	The WARDA model (proposal for phase III)
5	Agri Input Business Model
6	WARDA Organogram
7	Business Model Phase I
8	Business Model Phase II
II	Capacity building
1	Farming as business: PG training attendance sheet
2	Farming as business: Training module
3	Business plan training pre and post test results (held on 2-4th Aug)
4	Business plan training agenda
5	Maturity Assessment Index (MAI)-Pre-post test results
6	MAI training of JEEViKA picture
7	MAI related mails between JEEViKA and TechnoServe
8	Scoping Study Questionnaire
9	Scoping study data (Survey February 2015)
10	Value chain development: Training module (held on 28th to 30th Sept, 2015)
III	Data related to intervention
1	Crop calendar of major crops
2	PGs with date of formation
3	PG Mastersheet - 24 Feb 2017
4	Maize scoping study
5	Maps of PG clusters
6	Mastersheet of PG shareholder mapping 2018
7	PC Procurement Master Sheet_2017
8	Purnea Baseline study data
9	Purnea_Katihar block map with current and future intervention
10	Vegetable Intervention Data sheet_Nov 2018
11	AAPCL rented warehouse details 2017
12	FPC Shareholder list 2015
13	FPC Shareholder list 2016
14	Rotation of Fund from PG to PC
15	VRP SEW incentive value 2017
16	Consolidated Litchi Survey Sheet 2017
17	Muzaffarpur -Village scoping study for vegetables (Sakra AND Muraul)
18	PG selection for Muzaffarpur based on production_surplus
19	Samarpan rented warehouse details Moong 2016
20	Shareholder List_Samarpan 2016
21	Shareholder List_Samarpan 2017

22	Vegetable survey 2016 sakra block
23	VRP_SEW Incentive - Litchi intervention 2017
24	Working Capital Transfer_PG -PC 2016_2017
25	FPCs Funding
26	Litchi intervention results
27	Vegetable intervention results
28	List of VRPs and SEWs_Muzaffarpur
29	Micro-Credit Plan for PGs_Muzaffarpur
30	List of VRPs and SEWs_Purnea
31	Micro-Credit Plan for PGs_Purnea
32	PG classification details_Purnea
33	PG Funding details
34	TechnoServe Gender Study
35	Case studies developed by TechnoServe
IV	Audit reports
1	Audit Report 2016-17_Samarpan
2	Audit Report 2014-15_AAPCL
3	Audit Report 2015-16_AAPCL
4	Audit Report 2016-17_AAPCL
5	Audit Report 2013-14_Samarpan
6	Audit Report 2014-15_Samarpan
7	Audit Report 2015-16_Samarpan
V	MoUs and Agreements
1	Aranyak and Star agri warehouse agreement 2017-18
2	NCDEX_Certificate of membership_AAPCL
3	NCDEX e Markets Limited Certificate of Membership_AAPCL
4	NCDEX e Markets Limited Registration
5	MOU with Market Buyers of Wheat - Ergos_Samarpan
6	Vendor registration Reliance Retail 2017_Samarpan
7	Vendor registration with NCDEX 2016_Samarpan
8	CLF-PG-PC MoUs
VI	Performance
1	Monthly Progress Report April 17
2	Results Framework Tracker
3	WARDA Results for Phase I and II
VII	Guidelines and policies
1	FPC Organogram
2	PG Policy
3	Roles and responsibilities: Community Resource Person
4	Roles and responsibilities: JEEViKA
5	Roles and responsibilities: Village Cadre
VIII	Minutes of meeting
1	AGM Meeting Minutes_AAPCL_27-09-2018
IX	Baseline instruments developed by TechnoServe
1	Draft baseline instrument
2	Sampling framework

A3. Tools used for stakeholder interviews

Guide for JEEViKA officials¹⁵ and community cadre¹⁶

Start time: _____ End time: _____

District name: _____

Block name: _____

Designation: _____

Date of discussion: ____/____/____

Place of discussion: _____

Basic details:

	Questions	Current status (Sep 2017)
a.	Year of appointment	
b.	Age (years)	
c.	Gender M...1; F...2	
d.	Education (Numeric values: for example, 5 if 5 years, 10, 12, enter 15 for college, 20 for post college higher degree)	

<p>How has your work evolved? What motivates you to do your job?</p> <p>Probe:</p> <p>What were you doing earlier?</p> <p>How has it changed in the recent past?</p> <p>What are future career prospects being in the job?</p>
<p>Explain your role in terms of function that you perform at different levels (groups and companies)? How is your role different for producer groups?</p> <p>Probe:</p> <p>Duties that you undertake weekly/ monthly?</p> <p>What is the role of the other functionaries in the group – treasurer/ book-keeper/ accountant/ community mobiliser?</p> <p>Procurement, transportation, backward linkages?</p>
<p>What formal induction and training did you provide to improve/ enhance the entrepreneurial skills of the producer group members?</p> <p>Probe:</p> <p>When was the training conducted?</p> <p>Where was the training conducted?</p> <p>For how long was the training?</p> <p>Can you talk about specific topic covered in the training?</p> <p>How many producer groups attended the training?</p> <p>Who conducted these training programmes?</p>

¹⁵ At state, district, block level and young professionals

¹⁶ Village resource person and skilled extension worker

<p>What challenges do you face on ground in implementing activities?</p> <p>Probe:</p> <p>What challenges do you face in engaging with the producer groups/ producer companies, middle men?</p> <p>Vagaries of weather, controlling quality of produce</p> <p>Convincing farmers to become a member of the company?</p> <p>Setting expectations of the members?</p> <p>Any other. Specify</p>
<p>How does JEEViKA and TechnoServe staff support you on day to day basis?</p> <p>Probe:</p> <p>How often do you meet JEEViKA and TechnoServe staff?</p> <p>Where do you meet (on/ off field)? What is the purpose of meeting?</p> <p>What all do you discuss?</p> <p>Do you find these meetings to be useful?</p> <p>Any other. Specify</p>
<p>How was the technical assistance from TechnoServe beneficial to you?</p> <p>Probe:</p> <p>What technical assistance did you receive? In what form did you receive technical training – materials, training, and handholding in day-to-day activities? Kindly elaborate on each of the methods.</p> <p>Did the TechnoServe staff provide on the job training or demonstration on the field?</p> <p>Any other. Specify.</p>
<p>Can you elaborate on the training that you received, in terms of specific topics, numbers of days, method of delivery?</p> <p>Probe:</p> <p>Can you also elaborate on the process in terms of – how were you selected for the training, how many times did you receive the training?</p> <p>Mention specific topics that helped you the most. How? Why?</p> <p>Do you have any other training needs? If yes what kind of trainings would you like to have in the future?</p> <p>Any other that you wish to mention in the context of the training.</p>
<p>How can the TechnoServe model of linking producer groups – companies – market be further strengthened?</p> <p>Probe:</p> <p>Can you point at certain steps in the model that didn't work?</p> <p>Can you explain some of the weak links that can be worked upon?</p> <p>Any other. Specify</p>
<p>How ready are you to work independently without any external support (TechnoServe, in this case?</p>

10. What are the different kinds of fund and facilities that a PG receives?

Type of fund/ asset	Amount	Purpose	Grant/ loan	Flow of fund (process)

Guide for producer group members

Duration (Start time): _____ End time: _____

District name: _____

Block name: _____

Date of discussion: ____/____/____

Place of discussion: _____

Basic details:

Details of producer group:

1. Name of group (if any): _____
2. When was the producer group formed: _____ (note the date of formation)
3. Number of members: _____

Can you talk about the history of this producer group?

Probe:

What was the motivation behind forming the producer group?

How many members came together initially? How many members joined in later? What is the strength of the PG right now?

Did it require a lot of convincing? Who facilitated the group formation and what made you trust them?

What was the selection criteria while forming the PG?

How is the producer group functioning? Did the producer group become dormant at any point in time? How did they become active again?

Is it typical of PG members to drop out and join the group? If yes, how is this managed?

What are the common reasons for drop out? For new members, how is the process managed? Has there been an instance where the group has refused membership to any individual? If yes, why?

Do members typically sell all their produce through PGs? If no, why and how they distribute the sale of produce? Is this also a form of risk management strategy?

What motivated you to participate in producer group?

Probe:

What was that one factor that made you participate in a producer group?

Benefits?

The idea of coming out of poverty?

Did you have to convince your family before you joined the group?

What were some of the doubts you raised and how were these answered?

Any other. Please specify.

Can you explain the structure of the producer group?

Probe:

Explain the different positions within the group?

<p>What are pre requisite to hold the position?</p> <p>How are these positions determined? Voted? Appointed?</p> <p>For how long one can hold the position?</p>
<p>Can you explain some of the functions of producer group?</p> <p><i>If available, take a look at their registers.</i></p> <p>Probe:</p> <p>How often do you meet in a month?</p> <p>What is discussed in these meetings?</p> <p>In case of disagreements, how are these resolved?</p> <p>What registers are maintained at the PG level?</p> <p>Are PG registers updated regularly? Who generally updates the PG registers?</p> <p>What about balance of accounts? Profit statements? Who keeps a check on this?</p> <p>Apart from PGs, who else looks at the registers and how is this information used by them?</p> <p>Can we take a look at the PG registers? <i>Note down the kind of information the PG registers have.</i></p>
<p>Are you aware of JEEViKA and its work with PGs and PCs?</p> <p>Probe:</p> <p>What do you know about the project?</p>
<p>How did you sell your produce before when you weren't a part of the producer group?</p> <p>Probe:</p> <p>How has it changed now?</p> <p>How has middle men changed their strategies? Do they offer you attractive prices?</p> <p>Do you sell your entire produce to PGs? Who else do you sell the produce to? What proportion is this generally?</p>
<p>How many of you regularly sell through the PG?</p> <p>Probe:</p> <p>Note down the range of years since women have been selling their produce through PG.</p> <p>Which crop was the most helpful for marketing purposes (<i>for vegetable and fruits producer group</i>)</p>
<p>Do you all have access to credit for working capital?</p> <p>Probe:</p> <p>Is the credit available to women sufficient?</p> <p>Note down the number of women having credit from bank.</p> <p>Is the credit from bank sufficient?</p> <p>Is it cumbersome to obtain credit from bank?</p> <p>Who assists you?</p> <p>Can you do this unassisted two years from now?</p> <p>Do women still access credit from informal sources? Why?</p> <p>What are the other sources of credit?</p>
<p>Did you all undergo a formal induction and training to improve/ enhance the technological understanding on farm production/ best practices of the producer group members?</p> <p>Probe:</p> <p>When was the training conducted?</p> <p>For how long was the training?</p> <p>Can you talk about specific topic covered in the training?</p>

<p>How many of you attended the training?</p> <p>Who conducted these training programmes?</p> <p>Have you received training/ workshops about anything else? Like menstruation hygiene? Maternal health? Immunization of children? Etc.</p>
<p>How were these training programmes beneficial to you? What skills did you acquire?</p>
<p>How have you been benefitted by being a part of the producer group</p> <p>Probe:</p> <p>Do you think your production has increased?</p> <p>Profit, technology for grading, transportation, branding.</p> <p>Do you think the price they get for the crops now is fair and gone up?</p> <p>Is the pricing information timely, regular and useful?</p> <p>Did they have access to price information earlier? And how?</p> <p>In how many days do you usually receive the payment?</p> <p>Do you get bonus from the producer company?</p> <p>When did you open a bank account?</p> <p>Any other, please specify.</p>
<p>Can you please tell us about the price information system?</p> <p>Probe:</p> <p>What kind of information do you get?</p> <p>How do you receive the information?</p> <p>Is it easy to understand? Why? Why not?</p> <p>Does it help you in taking a decision whether to sell your produce or no?</p> <p>How did you receive the information earlier?</p>
<p>Tell me three things that you are able to do now because of participating in a producer group?</p> <p>Probe:</p> <p>Does that mean that you wouldn't have been able to do this if you weren't part of a PG?</p> <p>Why do you say so?</p>
<p>What kind of support do you receive from producer group?</p> <p>Probe:</p> <p>Does the PG help its members in securing seeds and fertilizers at favourable prices?</p> <p>Does the PG have an arrangement with a transporter?</p> <p>What are some of the other activities that you think the PG can be taking up?</p> <p>Is the PG able to recover its costs for providing these services?</p>
<p>How do you participate in the functioning of producer companies?</p> <p>Probe:</p> <p>How often do you meet with the producer company board members?</p> <p>How many general body meetings have you attended?</p> <p>Do you face any challenges in participating in these meetings?</p> <p>What is discussed at these meetings?</p> <p>Do your representatives at the PC debrief you on what happened at the meetings?</p> <p>Do you discuss the issues internally in your PG that you would like to raise at the PC?</p> <p>Are these issues raised? If yes, how are these issues raised by you solved or addressed?</p>
<p>Can you explain the role of VRP/ SEW staff in supporting the PG?</p> <p>Probe:</p> <p>How often do you meet VRP staff?</p>

<p>Is the same VRP staff throughout or did they change in between?</p> <p>Did the VRP play any role in convincing members to sell their produce through the PG?</p> <p>Did the VRP provide any information on ways to improve agricultural practices?</p>
<p>Can you explain the role of JEEViKA staff in supporting the PG?</p> <p>Probe:</p> <p>How often do you meet JEEViKA staff?</p> <p>Who from JEEViKA come to meet you all?</p> <p>Did the JEEViKA staff play any role in convincing members to sell their produce through the PG?</p> <p>Did the JEEViKA staff provide any information on ways to improve agricultural practices?</p>
<p>Can you explain your role in farm management?</p> <p>Probe:</p> <p>Who takes care of farm and livestock, if any?</p> <p>What processes are you involved in?</p> <p>How do you manage when your husband migrates to other city?</p>
<p>To what extent do you feel you can make personal decisions at household level/ community level?</p> <p>Probe:</p> <p>Do you visit various places such as market, a medical facility, a bank, any government office, outside the village, for your work? Why? Why not?</p> <p>Do you make small purchases for yourself or for your children without your husband's involvement? The money that you use is from your earning?</p> <p>Are you involved in major decision making at the household level? Why? Why not?</p> <p>Any other</p>
<p>Can you explain how has your routine changed since you have been part of a producer group?</p> <p>Probe:</p> <p>Shift in roles.</p> <p>Time allocation to different activities in a day?</p> <p>What are you more involved in? Why?</p> <p>How has the workload changed?</p> <p>Any activity that you weren't involved in earlier but now are?</p>
<p>How has your husband's attitude changed?</p> <p>Probe:</p> <p>Is he more supportive? Why? Why not?</p> <p>Does he respect you more? Why? Why not?</p> <p>How do you deal with it?</p>
<p>Did you face any obstacles while participating in this programme? What are they? How did you overcome them? Do these challenges still persist?</p>
<p>What according to you can be strengthened in the model? What is your vision/ expectation from JEEViKA / producer company?</p>
<p>Would you be able to function without any support from JEEViKA or external resources in two years from now? Why? Why not?</p>

Guide for farmer producer organisation officials

Duration (Start time): _____

End time: _____

District name: _____

Block name: _____

Designation: _____

Date of discussion: ____/____/____

Place of discussion: _____

Key crops/ fruits: (yearly? Do you change your preference yearly?)

This could be either a group interview with all the functionaries or individuals.

Can you talk about the producer company?

Probe:

How did the idea of forming the company emerge?

How many producer groups are part of this company? What are the total number of members in this company right now?

Did you take any steps to make dormant producer groups active? Who helped you in doing so?

Have the groups attrited? If so, why? What attempt is made to keep the groups into the fold?

What is the process for new groups joining? What criteria is followed? Has membership been refused to any group and why?

Was the company defunct at any point in time? If yes, how did it resurge?

Can you please explain the structure of the producer company?

Probe:

Explain the different positions within the company?

What are pre requisite to hold the position?

How are these positions determined? Voted? Appointed?

For how long one can hold the position?

Are any of these positions reserved?

Can you talk about the bylaws?

Can you also explain us about the current bonus structure of the company?

What formal induction and training have you received to improve/ enhance the entrepreneurial skills?

Probe:

When was the training conducted?

For how long was the training?

Can you talk about specific topic covered in the training?

How many of you all attended the training?

Who conducted these training programmes?

Do you think the training was sufficient?

Do you feel the need of refresher?

Did you go on an exposure visit? What new topics would you like to get trained in?
How was the technical assistance from TechnoServe beneficial to you? How does TechnoServe continue to assist?
How did JEEViKA staff technically assist you? How did it benefit you? How do they continue to assist?
Can you please explain the process of procurement from the producer groups in detail? Probe: Explain the entire cycle from the point of start to distributing the bonus.
What services do you offer to a producer group? Probe: Technology – moisture meters Transportation Storage facilities Any other backward linkage?
What are some of the key factors that led to the revival of your company and reached a stage which it had not achieved in last few years?
What are the different source of funds that company currently accesses? Probe: Also, inform us about the different subsidy that company receives on different assets? Who is offering the subsidies? What are the other support that company receives from JEEViKA?
What challenges do you face in running the company? Probe: Engaging with the producer groups Need more training Interference of middle men Online trading Human resource Time intensive Any other. Specify
Can you explain how has your routine changed since you have been part of a producer group? Probe: Shift in roles. Time allocation to different activities in a day? What are you more involved in? Why? How has the workload changed? Any activity that you weren't involved in earlier but now are
How do you envision the future of this company? What steps would you take to realise it? Probe: Are you intending to diversify to other crops? Are you intending to diversify to other agricultural inputs such as fertiliser, seeds, etc.? Are you intending to come up with different products with existing crops, such as poultry feed through maize? Any other. Specify

How can the TechnoServe model of linking producer groups – companies – market be further strengthened?

Probe:

Can you point at certain steps in the model that didn't work?

Can you explain some of the weak links that can be worked upon?

Any other. Specify

Help me fill this out, please.

Type of fund/ asset	Amount	Purpose	Flow of fund (process)

Guide for middle men¹⁷

Duration (Start time): _____ End time: _____

District name: _____

Block name: _____

Designation: _____

Date of discussion: ____/____/____

Place of discussion: _____

	Questions	Current status (Sep 2017)
a.	Number of years in the profession	
b.	Age (years)	
c.	Gender M...1; F...2	
d.	Caste : General...1; OBC...2; EBC...3; SC...4; ST...5; Muslim...6	
e.	Highest schooling grade (Numeric values: for example, 5 if 5 years, 10, 12, enter 15 for college, 20 for post college higher degree)	
f.	Income (last year)	
g.	Income (current year)	

At what level do you operate as a trader?

Probe:

Do you have a license to operate in mandi as well?

What is the profile of your clientele?

Local aggregators only

How many traders are there in total in panchayat?

Can you please explain daily routine of your work?

Probe:

Draw a map of all the activities that is performed as part of the supply chain of agricultural produce.

Do you go to the villages to procure the goods or the farmers come to you to sell their produce?

What is the average rate that you charge from buyers and sellers?

What is your client profile?

What kind of sellers do you procure goods from?

What is your coverage area? (How many villages you normally cover per day)

In your coverage area where is the farmers market?

How do you assess the quality of maize/ or any other product?

Probe:

¹⁷ Traders (at *mandi*), brokers, collection agent (at village level)

<p>Do you use any standard method, for example a digital tool?</p> <p>If no, why not? Do you intend to use it in near future?</p> <p>What other standard procedures do you adopt to assess the quality of maize?</p>
<p>What has changed in last few years? How has it affected your profession?</p> <p>Probe:</p> <p>Has this affected your profit? If yes how?</p> <p>What did you change in your business processes in order to not be affected by the new systems?</p> <p>Did you approach any government or community organization to revive your business?</p> <p>If yes what did you do exactly and how did the community respond?</p> <p>Did you start to offer better price? Where did you get the price details from?</p> <p>Do you offer any complementary service?</p> <p>Do you think you can be part of the new supply chain model?</p>
<p>What is the value addition that you bring to the supply chain?</p>

Guide for TechnoServe staff¹⁸

Duration (Start time): _____

End time: _____

District name: _____

Block name: _____

Designation: _____

Date of discussion: ____/____/____

Place of discussion: _____

Basic details:

	Questions	Current status (August 2017)
a.	Year of appointment	
b.	Age (years)	
c.	Gender M...1; F...2	
e.	Education (Numeric values: for example, 5 if 5 years, 10, 12, enter 15 for college, 20 for post college higher degree)	
f.	Received any additional training for this position? Yes ...1; No ...2	
g.	If yes, number of days of training past year (day / year)	

Explain your role in terms of function that you perform at different levels (groups and companies)?

Probe:

Duties that you undertake weekly/ monthly?

Explain how was WARDA model rolled out? Explain each step in detail.

Probe:

What scoping exercise was conducted?

How did you choose women?

Linking of SHGs to producer groups and producer groups to companies

Account opening in name of women.

What technical assistance was provided to JEEViKA? To whom? In what form did you provide technical training – materials, training, and handholding in day-to-day activities? Kindly elaborate on each of the methods.

Probe:

Can you also elaborate on the process in terms of – how were the staff selected for the training, how many times did they receive the training?

Mention specific topics that was covered in the training. Mode of training? Number of days? Dosage? Where was the training conducted

Any other that you wish to mention in the context of the training.

How do you support JEEViKA on day to day basis?

What technical assistance was provided to producer companies? To whom? In what form did you provide technical training – materials, training, and handholding in day-to-day activities? Kindly elaborate on each of the methods.

¹⁸ At all levels – state, district, block,

<p>Probe:</p> <p>Can you also elaborate on the process in terms of – how were the staff selected for the training, how many times did they receive the training?</p> <p>Mention specific topics that was covered in the training. Mode of training? Number of days? Dosage? Where was the training conducted</p> <p>Any other that you wish to mention in the context of the training.</p>
<p>What formal induction and training did you provide to improve/ enhance the entrepreneurial skills of the producer group members?</p> <p>Probe:</p> <p>When was the training conducted?</p> <p>For how long was the training?</p> <p>Can you talk about specific topic covered in the training?</p> <p>How many producer groups attended the training?</p> <p>Who conducted these training programmes?</p>
<p>How did you help the producer groups in accessing credit for their working capital?</p> <p>Probe:</p> <p>Which banks are providing credit to farmer producer groups/ companies?</p>
<p>How does JEEViKA and TechnoServe staff work together on day to day basis?</p> <p>Probe:</p> <p>How often do you meet JEEViKA staff?</p> <p>What is the purpose of meeting?</p> <p>What all do you discuss?</p> <p>Any other. Specify</p>
<p>What challenges do you face on ground in implementing activities?</p> <p>Probe:What challenges do you face in engaging with the producer groups/ producer companies, JEEViKA staff, middle men?</p> <p>Capacity?</p> <p>Any other. Specify</p>
<p>Do you think that JEEViKA and the producer companies are ready to take over and work independently?</p> <p>Probe:</p> <p>Why? Why not?</p> <p>Has your role changed over time? Have you been able to hand off any tasks to JEEViKA or PCs that you were initially performing?</p>
<p>Specify top three factors that led to the successful roll out of WARDA in pilot blocks.</p>
<p>Specify top three deterring factors during the roll out of WARDA in pilot blocks.</p>
<p>How can the TechnoServe model of linking producer groups – companies – market be further strengthened?</p> <p>Probe:</p> <p>Can you point certain steps in the model that didn't work?</p> <p>Unfavourable context (time, people, certain elements in the larger eco-system)</p> <p>Any other. Specify</p>

Guide for Male respondents

Name	
Age	
Relation with PG member	
Does PG member take part in the cultivation/sale process	
No of HH members	
Educational attainment	
Primary occupation	
Secondary occupation	
No of years of active PG membership	
Crops grown	
Crop procured through PG	
Land owned (mention unit)	

1. Do you know why PGs are formed? How are they useful?
2. What was the nature of discussion at home before your wife joined the PG?
3. Can you tell us about all the activities that take place in PGs related to:
 - Training.
 - Input procurement.
 - Crop procurement
 - Price information and weight transparency.
 - Transportation and sale.
 - Payment and bonus.
4. What is your opinion of JEEViKA PGs? Is it beneficial for income enhancement? If so, how?
5. Are there any adverse effects of your wife joining PGs?
6. What is your view of women running PGs? How do you facilitate your wife's participation in PGs?
7. Does joining either the SHG or the PGs put an extra burden on women? Does it make it difficult for them to fulfil their family responsibilities?
8. Do you think joining PGs has brought about any changes in your wife/family? If yes, what kind?
9. Has there been any change in the perception of the community regarding womens' roles in either the home or work over the last couple of years?
 - a. Economic decision making
 - b. Mobility
 - c. Participation in public activities
 - d. Others

Guide for Market players

Name	
Company and designation	
Number of years in this job	
Age (years)	
Gender M...1; F...2	
Educational attainment	

7. At what level do you operate?
 - a. Within state/outside state?
 - b. What is the profile of your clientele?
 - c. What percentage (and total volume) of your total procurement is from FPCs?
8. Do you hold any MoUs with JEEViKA/FPC?
 - a. Why did you decide to sign this MoU?
 - b. Do you have any plans of extending/renewing your MoU with JEEViKA/FPC if you already have signed one?
 - c. What are the prerequisites that you look for before partnering with an organization for procurement?
 - d. How did you assess FPCs' readiness to get into this partnership?
9. Who do you generally interact with FPC related business?
10. How do you assess the quality of procured product?
 - d. Do you use any standard method, for example a digital tool?
 - e. If no, why not? Do you intend to use it in near future?
 - f. What other standard procedures do you adopt to assess the quality of product?
 - g. Do you think the products sourced through FPCs is different from that of local/regional aggregators? If yes, then how?
11. What are the challenges that you face when you deal with FPCs?
 - a. Timely procurement.
 - b. Quality control.
 - c. Timely payment.
 - d. Lack of human resources from JEEViKA.
 - e. Multiple stakeholders
 - f. Others.
12. What are the market related challenges that you face? How do you cope with these challenges? How do you think these challenges affect the FPCs?
13. Does the absence of the APMC in Bihar affect your trade? If yes, then in what way?

Guide for State level TechnoServe officials

Name	
Company and designation	
Number of years in this job	
Age (years)	
Gender M...1; F...2	
Educational attainment	

1. Explain your role in terms of function that you perform at different levels (groups and companies)?
2. What scoping exercise was conducted? How did you choose PGs? How did it change your approach towards the model?
3. Elaborate upon the opportunities and challenges for operationalizing this model.
4. What technical assistance was provided to JEEViKA during Phase I and II? To whom? In what form did you provide technical training – materials, training, and handholding in day-to-day activities? Kindly elaborate on each of the methods.
5. How does TechnoServe deal with the capacity building of JEEViKA staff who are on a contractual mode and often transferred.
6. What technical assistance was provided to producer companies? To whom? In what form did you provide technical training – materials, training, and handholding in day-to-day activities? Kindly elaborate on each of the methods.
7. What formal induction and training did you provide to improve/ enhance the entrepreneurial skills of the producer group members?
8. Do you have any plans to help the producer PGs/companies in accessing credit for their working capital?
9. How does JEEViKA and TechnoServe staff work together on day to day basis at the state level?
Probe:
 - a. How often do you meet JEEViKA staff?
 - b. What is the purpose of meeting?
 - c. What all do you discuss?
 - d. Any other. Specify
10. How do you evaluate the performance of trained JEEViKA staff/ community cadre?
11. Do you draft a yearly/seasonal work plan for FPCs and who is involved in this exercise?
12. What are the hindrances to establishing market linkages for FPCs in Bihar? How are you resolving these issues? (Probe: Bigbazaar, Nirdesh, etc).
13. AT the PG level, how are you planning:
 - a. To improve PG members' access to agricultural inputs?
 - b. To augment marginal land owning PG members' incomes?
 - c. To reduce the no of inactive members/attriters?
 - d. To improve PG members access to credit?
 - e. To invest value addition of PG products?
 - f. To enable the PGs to procure other crops?
14. AT the FPC level, how are you planning:
 - a. To increase no of shareholders?

- b. To improve FPC's access to credit?
 - c. To enable FPC's to become sustainable (in terms of finances, manpower and capacity)?
 - d. To improve market linkages for varied products?
15. What is TechnoServe's mandate on building JEEViKA's capacity? How are you measuring this? What has been accomplished?
 16. How is staff intensity changing as the programme expands?
 17. What challenges do you face on ground in implementing activities?
 18. Has your role changed over time? Have you been able to hand off any tasks to JEEViKA or PCs that you were initially performing?
 19. Specify top three factors that led to the successful roll out of WARDA in pilot blocks.
 20. Specify top three deterring factors during the roll out of WARDA in pilot blocks.
 21. How can the TechnoServe model of linking producer groups – companies – market be further strengthened? What are the improvisations that have been made?
 22. Can you specify reasons why maize procurement had to be restricted in Purnea this year?
 23. Do you think that JEEViKA and the producer companies are ready to take over and work independently?

Guide for State/district JEEViKA Officials

Name	
Company and designation	
Number of years in this job	
Age (years)	
Gender M...1; F...2	
Educational attainment	

- a. Can you talk about the collaboration between JEEViKA and TechnoServe?
- a. How was TechnoServe approached and why?
- b. Were there any other contenders to TechnoServe?
- c. What was TechnoServe's original mandate from JEEViKA? What was their scope of work and how has that evolved over time?
- d. What is TechnoServe's particular form of expertise and how has it benefitted you?
- b. Have there been any major policy changes related to FPOs in the last 5 years? Kindly elaborate.
- c. Are there any planned policy changes in the future that are expected to affect the FPOs?
- d. What is the convergence structure for FPOs/How does the WARDA intervention fit in with other livelihood/microcredit/microenterprise/poverty alleviation/welfare interventions in Bihar? Or What is the government architecture within which JEEViKA operates?
- e. What is the role of the Agriculture Ministry in forward and backward linkages? How does their mandate overlap with JEEViKA's? Is there any effort to coordinate with the Agriculture Ministry in the current design?
- f. Why were the PG Management Sub-committee and Producer Business Groups not operationalized?
- g. How does the absence of the APMC affect markets/ stakeholders? How has it influenced consumer and seller behaviors?
- h. What are the immediate and long term challenges in the implementation of the model?
- i. Can you help us map the various stakeholders of the FPOs (all platforms/govt./NGOs/private entities that are involved with FPOs)?
- j. AT the FPC level, how are you planning:
 - a. To increase no of shareholders?
 - b. To improve FPC's access to credit?
 - c. To enable FPC's to become sustainable (in terms of finances, manpower and capacity)?
 - d. To improve market linkages for varied products?
- k. What is the graduation plan for FPOs to become self-sufficient?
- l. Do you have any mechanisms to assess the performance of FPOs?

Guide for FPC Accountant

Name	
Company and designation	
Number of years in this job	
Age (years)	
Gender M...1; F...2	
Educational attainment	

1. Tell us something about your work background and where you are from? How were you recruited?
2. Please tell us about your job roles and duties with the FPC and how these roles have changed over time.
 - a. How much time do you allocate for your FPC related work duties?
 - b. Have you received any training from TechnoServe?
3. What are the different sources of funds that company currently accesses?
 - a. Also, inform us about the different subsidy that company receives on different assets?
 - b. Who is offering the subsidies?
 - c. What are the other support that company receives from JEEViKA?
4. Can you explain us about the current patronage bonus structure of the company? How much patronage bonus has been disbursed?
5. What are the challenges that you face in fulfilling your job duties related to the FPC?
6. Please help us fill out the following:

Type of fund/ asset	Source	Amount	Purpose	Flow of fund (process)

7. Is it possible for us to have a copy of the FPC balance sheet for the last couple of years?
8. How do you think the financial sustainability of the FPC can be strengthened? What kind of support is required to achieve financial sustainability and from whom?
9. Are the accounts audited? Based on queries raised in audit what measures have been taken to strengthen the financial system?
10. How are the incentives for community cadre routed? How much incentive has been disbursed?

Guide for Digital Green officials

Name	
Company and designation	
Number of years in this job	
Age (years)	
Gender M...1; F...2	
Educational attainment	

1. Can you discuss the work that Digital Green does with JEEViKA?
 - a. Kindly discuss the model within which you work with farmers.
 - b. Scope of work with JEEViKA.
 - c. How do PGs fit into your scope of work?
 - d. Since when have you been working with the PGs? What are your target areas?
 - e. How do you think the PGs have evolved over time?
2. What are the various activities which Digital Green is involved in with regard to PG development?
 - a. Training and capacity building themes.
 - b. Number, duration and frequency of training programs.
 - c. Medium of training.
3. Can you name some of your partners who you collaborate with while working with PGs? In what capacity do you collaborate and what is their scope of involvement?
4. Have you worked with TechnoServe in Bihar with regard to the PGs?
 - a. In what capacity have you worked with them?
 - b. What is the scope of your involvement with TechnoServe within the ambit of JEEViKA?
 - c. Can you identify differences between PGs that have TechnoServe involvement and the ones that don't?
 - d. In what way do you think TechnoServe has influenced the development of PGs?
5. What are the challenges that you face while working with the PGs in particular and with JEEViKA in general?
6. What are your future plans for engaging with PGs under JEEViKA? How do you intend to make a difference?

Guide for officials from the Department of Agriculture

Name	
Company and designation	
Number of years in this job	
Age (years)	
Gender M...1; F...2	
Educational attainment	

1. Is there any convergence happening with JEEViKA, if yes at what level? If not, what are the plans?
 - a. JEEViKA has a livelihood vertical which is related to agriculture, and therefore how do you intend to converge/ facilitate the process?
2. What is the role of the agriculture department in supporting farmers for backward and forward linkages?
 - a. Who are the target farmers? Are there any provisions for marginal farmers and landless farm labourers?
 - b. Provision of agricultural inputs – seeds and fertilizers
 - c. Capacitating farmers in better farming/ innovative methods
 - d. Support in accessing markets to producer groups/ producer organizations
 - e. Any other.
3. Are there are overlap areas between JEEViKA and agriculture department?
 - a. What are those areas?
 - b. How do you support JEEViKA and at what level?
4. Are you aware of farmer producer organisations? How do you support them?
 - a. Having licences to set up shops for seeds and fertilisers?
 - b. Warehouses/ storage spaces.
 - c. Market linkages.
 - d. Influencing policy level changes
5. Are there any future plans for farmer producer organisations/ producer groups?
6. What are other departments/ institutes does agriculture department collaborate with when it comes to development of PGs?
7. Can you identify the major challenges being faced by the farmer producer companies and suggest ways of tackling them?
8. What does WARDA bring to the table that sets it apart from other similar programmes?

Bibliography

Aggarwal, S, 2018. Do rural roads create pathways out of poverty? Evidence from India. *Journal of Development Economics*, 133, pp.375–395.

American Institutes for Research (AIR), 2014. Process evaluation of Zimbabwe's harmonised social cash transfer programme. Washington, DC: AIR.

Anderson, S and Eswaran, M, 2009. What determines female autonomy? Evidence from Bangladesh. *Journal of Development Economics*, 90, pp.179–191.

Ban et al., 2015. Self-help groups, savings and social capital: evidence from a field experiment in Cambodia. Policy Research Working Paper WPS7382. Washington, DC: World Bank.

Banerjee et al., 2015. Six randomized evaluations of microcredit: introduction and further steps. *American Economic Journal: Applied Economics*, 7(1), pp.1–21.

Behrman, J, 1988a. Intrahousehold allocation of nutrients in rural India: are boys favoured? do parents exhibit inequality aversion? *Oxford Economic Papers*, 40(1), pp.32–54.

Behrman, J, 1988b. Nutrition, health, birth order and seasonality: intrahousehold allocation among children in rural India. *Journal of Development Economics*, 28(1), pp.43–62.

Blundell et al., 2005. Collective labor supply with children. *Journal of Political Economy*, 113(6), pp.1277–1306.

Brody et al., 2015. Economic self-help group programs for improving women's empowerment: a systematic review. Campbell Systematic Reviews, Vol. 19.

Browning et al., 1994. Income and outcomes: a structural model of intrahousehold allocation. *Journal of Political Economy*, 102(December), pp.1067–1096.

Cain et al., 1979. Class, patriarchy, and women's work in Bangladesh. *Population and Development Review*, 5, pp.405–438.

Casaburi et al., 2013. 'Rural roads and intermediated trade: regression discontinuity evidence from Sierra Leone.' Manuscript.

Chand, R. 2017. Doubling Farmers' Income: Strategy and Prospects. *Indian Journal of Agricultural Economics*, January–March.

Chiappori, P, 1992. Collective labour supply and welfare. *Journal of Political Economy*, 100, pp.437–467.

Corbin, J and Strauss, A, 1990. Grounded theory research: procedures, canons, and evaluative criteria. *Qualitative Sociology*, 13(1), pp.3–21.

Dalwai, A. 2017. Doubling of Farmers' Income: Agricultural Growth and Farmers' Welfare. *Kurukshetra*, June.

Datta et al., 2015. Report on the Impact of JEEViKA: evidence from a randomized rollout 2011–2014. *World Development*, 68, pp.1–18.

Datta, U, 2015. Socio-economic effects of a self-help group intervention: evidence from Bihar, India. Washington, DC: World Bank.

De Hoop et al., 2010. Women's autonomy and subjective well-being in India: how village norms shape the impact of self-help groups. Available at: <<https://mpra.ub.uni-muenchen.de/25921>> [Accessed on 16 June 2020].

Deaton, A, 1989. Looking for boy-girl discrimination in household expenditure data. *World Bank Economic Review*, 3(1), pp.1–15.

Deininger, K and Liu, Y, 2012. Evaluating programme impacts on mature self-help groups in India. *The World Bank Economic Review*, 27(2), pp.272–296.

Department of Agriculture and Cooperation (DoAC), 2013. Policy & Process Guidelines for Farmer Producer Organisations. Ministry of Agriculture, Government of India.

Available at:

<https://mofpi.nic.in/sites/default/files/fpo_policy_process_guidelines_1_april_2013.pdf> [Accessed on 16 June 2020].

Department of Agriculture and Cooperation (DoAC). 2015. Agriculture Census 2010-11 (Phase-II). Ministry of Agriculture, Government of India. Available at: <<http://agcensus.nic.in/document/agcensus2010/allindia201011H.pdf>> [Accessed on 16 June 2020].

Desai, RM and Joshi, S, 2013. Collective action and community development: evidence from self-help groups in rural India. Policy Research Working Paper WPS6547. Washington, DC: World Bank.

Dev, M.S. 2012. Small Farmers in India: Challenges and Opportunities. WP-2012-014. Indira Gandhi Institute of Development Research (IGIDR). Available at: <file:///C:/Users/psengupta/Downloads/Small_Farmers_in_India_Challenges_and_Opportunities.pdf> [Accessed on 24 June 2020].

Duflo, E, 2012. Women empowerment and economic development. *Journal of Economic Literature*, 50(4), pp.1051–1079.

Fałkowski, J. and Ciaian, P. 2016. Factors Supporting the Development of Producer Organizations and their Impacts in the Light of Ongoing Changes in Food Supply Chains: A Literature Review. Technical Report No. EUR 27929 EN. Joint Research Centre, European Commission.

Festinger, L, 1957. *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.

Garikipati, S, 2012. Microcredit and women's empowerment: through the lens of time-use data from rural India. *Development and Change*, 43(30), pp.719–750.

Glaser, B and Strauss, A, 1967. The Discovery of Grounded Theory: Strategies for Qualitative Research. Mill Valley, CA: Sociology Press.

Government of India, 2016. Annual Report 2016–17. Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare. Available at: <http://agricoop.nic.in/sites/default/files/Annual_rpt_201617_E.pdf> [Accessed on 16 June 2020].

Jenny, JC, 2010. Information from markets near and far: the impact of mobile phones on grain markets in Niger. *American Economic Journal: Applied Economics*, 2(3), pp.46–59.

Jensen, R, 2007. The digital divide: information (technology), market performance, and welfare in the south Indian fisheries sector. *Quarterly Journal of Economics*, 122(3), pp.879–924.

Khanna et al., 2015. A retrospective impact evaluation of the Tamil Nadu Empowerment and Poverty Alleviation (Pudhu Vaazhvu) Project. *Journal of Development Studies*, 51(9), pp.1210–1223.

McElroy, M and Horney, MJ, 1981. Nash-bargained household decisions: toward a generalization of the theory of demand. *International Economic Review*, 22, pp.333–349.

Ministry of Rural Development (MoRD), Government of India (n.d). Community Operational Manual (COM). Available at: <<https://www.pbrdp.gov.in/documents/6205745/90639222/COM%20Manual.pdf>> [Accessed 26 May 2020].

National Bank for Agriculture Mumbai and Rural Development (NABARD), 2015. Farmer Producer Organisations - Frequently Asked Questions (FAQs). Available at: <<https://www.nabard.org/demo/auth/writereaddata/File/FARMER%20PRODUCER%20ORGANISATIONS.pdf>> [Accessed on 16 June 2020].

Nayak, AK, 2013. 'Economies of scope: context of agriculture, smallholder farmers, and sustainability'. National Conference on Livelihoods, Access Development Services, New Delhi.

Nayak, AK, 2014. Logic, language, and values of co-operation versus competition in the context of recreating sustainable community systems. *International Review of Sociology*, 24(1), pp.13–26.

Nayak, AK, 2017. Optimal institutional architecture of farmer producer organizations for sustainable value creation for small and marginal farmers. In: Mani, G et al. eds., 2018. *Financing Agriculture Value Chains in India*. Springer, Singapore, pp. 239–250.

Prennushi, G and Gupta, A, 2014. Women's empowerment and socio-economic outcomes: impacts of the Andhra Pradesh Rural Poverty Reduction Program. Policy Research Working Paper WPS6841. Washington, DC: World Bank.

Raju et al., 2017. Farmer producer organization in Andhra Pradesh: a scoping study. Rythu Kosam Project. Research Report IDC-16. Patancheru: ICRISAT.

Rosenzeig, MR and Schultz, TP, 1982. Market opportunities, genetic endowments and the intrafamily allocation of resources: child survival in rural India. *American Economic Review*, 72(4), pp.803–815.

- Schaner, S, 2017. The cost of convenience? Transaction costs, bargaining power, and savings account use in Kenya. *The Journal of Human Resources*, 52(4), pp.919–945.
- Shah, T, 2015. Catalysing co-operation: design of self-governing organisations (Foreword to reprint). In *Catalysing co-operation: design of self-governing organisations*. New Delhi: Sage Publications.
- Shah, T, 2016. Farmer producer companies: fermenting new wine for new bottles. *Economic and Political Weekly*, 51(8), pp.15–20.
- Sharma, P, 2014. Leveraging farmer producer organizations to boost production, mitigate risk and strengthen food security: lessons and challenges. *Journal of Land and Rural Studies*, 1(1), pp.41–48.
- Shiferaw et al., 2006. Rural institutions and producer organizations in imperfect markets: experiences from producer marketing groups in semi-arid eastern Kenya. Socioeconomics and Policy Working Paper Series no. 23.
- Singh, S and Singh, T. 2014. *Producer Companies in India: Organization and Performance*. New Delhi: Allied Publishers.
- Small Farmers' Agri-Business Consortium (SFAC), 2018. Annual Report: 2017–18. Available at:
<<http://sfacindia.com/UploadFile/Statistics/SFAC%20Annual%20Report%202018.pdf>> [Accessed on 24 June 2020].
- Srinivasan, N and Srinivasan, G. 2018. State of India's Livelihoods 2017. ACCESS Development Services. New Delhi: Sage India.
- Tarozzi et al., 2015. The impacts of microcredit: evidence from Ethiopia. *American Economic Journal: Applied Economics*, 7(1), pp.54–89.
- TechnoServe. 2018. Women's advancement in rural development and agriculture (WARDA) Exemplar.
- Thomas, D, 1990. Intra-household resource allocation: an inferential approach. *The Journal of Human Resources*, 25(4), pp.635–664.
- Xavier Institute of Management (RTD), 2016. National Round Table Discussion on Optimal Design of Farmer Producer Organizations. Available at:
<https://www.researchgate.net/profile/Amar_Nayak5/publication/301226365_Optimal_Design_of_Farmer_Producer_organization_community_enterprise_system_in_India_2016/links/570dcd3f08ae2b772e432d14/Optimal-Design-of-Farmer-Producer-organization-community-enterprise-system-in-India-2016.pdf> [Accessed 26 May 2020].