Assessing institutional innovations to promote women-led informal seed systems in Eastern India and Nepal

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Acronyms

ASCs	Agro Service Centres
ASTV	Accelerating the Adoption of Stress-Tolerant Varieties
ATMA	Agricultural Technology Management Agency
AVRDC	Asian Vegetable Research and Development Centre
BLF	Block Level Federation
BMGF	Bill & Melinda Gates Foundation
BOs	Block Organizations
CBSPs	Community Based Seed Producers
CGIAR	Consultative Group on International Agricultural Research
CIDs	Certified Input Dealers
CIMMYT	International Maize and Wheat Improvement Center
CRDCs	Community Resource Development Centres
CRPs	Community Resource Persons
CSISA	Cereal System Initiative South Asia
CURE	Consortia for Unfavorable Rice Environment
DADO	District Agriculture Development Office
DoA	Department of Agriculture
DSR	Direct Seeded Rice
EAS	Extension and Advisory Services
ELSP	External Livelihood Support Person
FAQ	Fair Average Quality
FCI	Food Corporation of India
FFS	Farmer Field Schools
FGDs	Focus Group Discussions
FLDs	Front Line Demonstrations
FPC	Farmer Producer Company
FPO	Farmer Producer Organisation
GDS	Grameen Development Services
GEAG	Gorakhpur Environmental Action Group
GPLF	Gram Panchayat Level Federation
GVT	Grameen Vikas Trust
HYVs	High Yielding Varieties
IAAS	Institute of Agriculture and Animal Science
ICAR	Indian Council of Agricultural Research
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IFAD	International Fund for Agricultural Development
IFAD-TAG 706	IFAD-funded Technical Assistant Grant 706
IFFDC	Indian Farm Forestry Development Co-operative
IFPRI	International Food Policy Research Institute
IIOR	Indian Institute of Oilseeds Research
IIPR	Indian Institute of Pulses Research
IQC	Internal Quality Control
IRRI	International Rice Research Institute
KGK	Krishi Gyan Kendra
KIIs	Key informant interviews
KRIBHCO	Krishak Bharati Cooperative Ltd
KSKs	Krishak Seva Kendras
KVKs	Krishi Vigyan Kendras
LAMPCS	Large Area Multi-Purpose Co-Operative Society
LAPCL	Lehra Agro Producer Company Ltd.

LI-BIRD	Local Initiatives for Biodiversity, Research and Development
MKSP	Mahila Kisan Sashaktikaran Pariyojana
MSC	Most Significant Change
NABARD	National Bank for Agriculture and Rural Development
NARC	Nepal Agriculture Research Council
NDDB	National Dairy Development Board
NDUAT	Narendra Dev University of Agriculture and Technology
NGOs	Non-Government Organisations
NICRA	National Innovations on Climate Resilient Agriculture
NPR	Nepalese Rupee
NRLM	National Rural Livelihoods Mission
NRRI	National Rice Research Institute
NSAI	National Seed Association of India
NSC	National Seed Corporation
OAIC	Orissa Agro Industries Corporation Limited
OFT	On Farm Testing
OLM	Odisha Livelihood Mission
OPRM	Orissa Poverty Reduction Mission
OSCSC	Odisha State Civil Supply Corporation Ltd
OSSC	Odisha State Seeds Corporation
OUAT	Orissa University of Agriculture and Technology
PFFCS	Primary Farm Forestry Cooperative Societies
PID	Private Input Dealers
POPO	Producer Organization Promoting Organization
PRADAN	Professional Assistance for Development Action
PRDF	Participatory Rural Development Foundation
PVS	Participatory Varietal Selection
RCM	Rice Crop Manager
RGCT	Rajiv Gandhi Charitable Trust
RGF	Rajiv Gandhi Foundation
RGMVP	RajivGandhiMahilaVikasPariyojana
RKBB	Rajkiya Krishi Beej Bhandar
RRMC	Regional Regulated Market Committee
SAUs	State Agricultural Universities
SGG	Seed Grower Groups
SHGs	Self Help Groups
SIDBI	Small Industries Development Bank of India
SPGs	Seed Producer Groups
SRI	System of Rice Intensification
SRR	Seed Replacement Rate
SSCA	State Seed Certification Agencies
STRASA	Stress Tolerant Rice Varieties for Asia and Africa
STRVs	Stress Tolerant Rice Varieties
SWI	System of Wheat Intensification
UBVN	Uttar Pradesh Beej Vikas Nigam
UP	Uttar Pradesh
VAWs	Village Agricultural Workers
VOs	Village Organizations
VRCs	Village Resource Centres

Executive Summary

This report provides a lucid narrative of the study undertaken to assess the Institutional Innovations used to promote women-led informal seed systems in Eastern India and Nepal. After delving into different institutional models across project sites, what we observed was an interesting, yet diverse, scenario of discrete seed systems adopted differently by each of the STRASA partners at each distinct location. The Stress Tolerant Rice Varieties for Asia and Africa (STRASA) project has been able to plug into various institutional models existing on the ground through its project partners.

Each partner has its own way, and extent, of engaging women/communities to enhance their economic empowerment and/or entrepreneurial capacity. The capacity of the women producers, their socio-cultural context as well as the focus of the partner NGO/network also had a bearing on the nature of benefit, especially those that the women seed producers got from the project intervention. Each partner had their own approach for introducing the Stress Tolerant Rice Varieties (STRVs), in their respective region; and this seed after harvest and processing is either exchanged or sold informally or as "truthfully labeled" seed. Remarkably, women producers have been linked quite effectively to the rice value chain in most of the models.

Project interventions have clearly enhanced women's access to quality seeds and helped them ensure availability of seeds for the next production cycle, reduced cost of production (as they don't have to spent on buying seeds), and eventually boosted income from sale of seeds. But apart from these tangible benefits, the interventions have enriched the capacities of women involved in producing quality seed by raising their awareness on its significance in crop production, and thereby changed their own perception of themselves. They now consider themselves as entrepreneurs engaged in quality seed production and marketing, something which they couldn't even think of before they became part of these interventions.

However, there are still a few challenges that need to be addressed at the producer and programme level so as to sustain and expand these initiatives to achieve greater impact. There is a need to ensure availability of foundation seeds and to provide handholding support to seed producer groups to establish marketing linkages, prepare business plans, and access working capital. Women seed producers would also need access to smaller machines appropriate for different stages of seed production and processing to offset the increased time and drudgery involved in this activity. Opportunities for cross learning among different project sites are yet to be created. At the project level, there is no strategy to guide partner selection that can help engage women effectively in rice seed production, or to scale up the intervention to have much wider impact.

To achieve impacts at scale, these challenges need to be addressed. There are several other actors that are engaged in seed value chain in all these locations and there is a need to identify these actors, engage with them, and then develop partnerships to scale up this initiative. More time and resources need to be invested in enhancing the capacities of these

different actors in scaling up. It is also important to strengthen knowledge management around these interventions, primarily to share experiences and good practices, and this too needs immediate attention.

1. Introduction

Rice farming in Eastern India is characterized by increasing incidence of abiotic stresses, such as droughts and floods, making the enterprise risky and thereby adversely affects the livelihoods of poor, smallholder farming households. A number of stress tolerant varieties have been developed and tested as a part of the Stress Tolerant Rice Varieties for Asia and Africa (STRASA) project led by the International Rice Research Institute (IRRI). While both men and women farmers have expressed preference for stress tolerant rice varieties (STRVs), and see these as a major risk management strategy to reduce crop losses, ongoing research has indicated the non-availability of seed as a major constraint for continued use of these varieties by these vulnerable smallholder farmers.

IRRI, together with partners in Odisha, is promoting a community-based women-led seed system model. In Eastern Uttar Pradesh (UP), some of the partnering non-government organizations (NGOs) of this initiative have started promoting different models engaging women. In 2008-09 an IFAD-supported project implemented by IRRI in Nepal, supported the establishment of Seed Producer Agricultural Cooperatives/groups. Two of the 15 groups are all-women groups, and 10 of them have more than 30% women members.

Promoting women-led seed systems has the potential to address the challenges of both: making good quality seed available to farmers, and also expanding the role women play in rice value chains. Women, generally, have been relegated to the production segments of the rice value chains and are mostly recognised just for their labour contributions. But there are opportunities to engage them in entrepreneurial activities in other parts of the chain as input and service providers that can contribute to their overall empowerment. Women in farming households traditionally played a key role as custodians of genetic resources, including seed. Equipped with indigenous know-how, skill, and experience, they play a significant role in production, storage and exchange in informal and local seed systems. In formal and market-based systems, their role is limited and it is rare to find registered women seed growers or entrepreneurs in Eastern India.

Formal seed systems, particularly for STRVs, are in a stage of infancy and need time before good quality seeds become accessible to poor households, especially to women farmers. In this situation, informal systems can play a key role in filling this gap. Engagement of women as entrepreneurs driving development of such systems can help bridge the gender gap with regard to access to good quality seed. Building women's capacity and providing them access to knowledge, advisory services, technology, and market information in the pilots in Eastern India are proving to be important means for enhancing women's confidence and therefore their engagement in these activities. Viable business models moving towards more formal institutional arrangements can be built at different scales through engagement of the extensive network of women's collectives. This will also address concerns of quality assurance and high cost of production.

The approaches being implemented in Odisha and Uttar Pradesh (UP) in India and Nepal by development partners, including Government agencies and NGOs, offer a rich learning ground on how to enhance access to good quality seed among women farmers. These two

states in India (UP and Odisha) and the project districts in Nepal are fairly diverse agro-ecologically and socio-culturally. The tribal-dominated districts of Odisha (where this is being piloted) exhibit very different social and gender norms as compared to Eastern UP. However, in both places it is drawing heavily on the strengths of Women's Self Help Groups (SHGs) and their federations, which have been fairly successful in these parts of the country.

There are currently five models of seed production and distribution/marketing with different institutional arrangements, being promoted in India and Nepal (Table1). The engagement and role of women and their collectives in the seed value chain varies across these models. This study was undertaken primarily to assess and measure effectiveness and relevance of each of these models in enhancing women's empowerment through their development as entrepreneurs. The study looked at some of the short-term outcomes, such as changes in gender roles in value chain, entrepreneurial capacity development, intra-household negotiation and decision-making, income and nutrition, time use, and other key livelihood parameters. We hope the learning from this assessment will inform adaptation of models so as to make them more effective at contributing to women's empowerment, and also to inform strategies for scaling up and out.

Table 1: A snapshot of different seed systems

Community-based seed reinvestment Odisha: Multiple NGOs & DoA Individual seed production Women SHG-led aggregation, dissemination Obligatory contribution to community seed reserve	***Village level seed bank and seed business*** Uttar Pradesh: RGMVP Individual seed production Seedbank at SHG Village Organization level Seedbank-led aggregation Voluntary contribution to seed reserve Financial transactions Connected to local market
Farmer Producer Organisation (FPO) Uttar Pradesh: GEAG Individual farmer level production Village Resource Committee (VRC) managed Women SHGs involved and engaged in seed collection and processing VRC led aggregation Branding and marketing	***Farmer Producer Company (FPC)*** Uttar Pradesh: GDS A multi commodity FPC Some women members in FPC Individual production and member led aggregation FPC governed seed production and marketing Governing body for operations
Seed Producer Ag Co-operatives and Seed Producer Groups (SPG); Nepal: IAAS Individual seed producers; Aggregation in some/individual sale in others Some women groups, some mixed groups Seed diversification in some cases	

The report is organized as follows: Section 2 presents the methodology (research questions and data collection) followed for undertaking this study. The key observations and findings, especially with respect to women seed producers, are presented in Section 3. Recommendations from this study, especially those focusing on ways to address the challenges and enhance scaling up, are presented in Section 4. The report's Annexures at the end detail the nature of interventions in the project locations and the actor landscape the project can build further on.

2. Methodology

2.1 Research questions

The study addresses the following research questions:

1. How do the different institutional models with diverse ways and extent of engaging women under the STRASA project contribute to their economic empowerment and entrepreneurial capacity?
2. What are the factors that influence sustainability and viability of the various models? How are they affected by the gender gaps in access to resources and services? Do collectives play a role in addressing the challenges?
3. How do women's engagement in seed systems influence, and be influenced by, the intra household/community gender relations, social and cultural norms and, behaviour and attitudes in different socio-economic and cultural contexts? Does this vary by caste or economic status of the households?
4. What is the efficacy of these institutional innovations in improving access to good quality affordable seed? What are the key challenges and opportunities in scaling out such models?

2.2 Data collection

At the beginning of the study the study team undertook a desk review of the secondary literature available. This was followed by an actor system mapping out of the project sites that identified key actors relevant to the functioning of the seed innovation system. Qualitative data needed to answer the research questions were gathered with specific and in-depth focus on seed system pilots using mixed methods.

The research team interacted with the staff of IRRI and partner NGOs involved in the STRASA project, men and women farmers/community members of SHGs involved in seed enterprise, other actors in the seed innovation system such as input dealers, Indian Council for Agricultural Research (ICAR) Krishi Vigyan Kendras (KVKs), Department of Agriculture (DoA), and State Agricultural Universities (SAUs) in India; and Institute of Agricultural and Animal Sciences (IAAS), Lamjung, Nepal.

Key informant interviews (KIIs)of secondary stakeholders were supplemented with focus group discussions (FGDs)with the primary stakeholders (i.e., women farmers/men farmers/SHG members/seed producer group members) in all the five study locations. Pre-designed semi-structured interview schedules were used in the KIIs and participants were asked open-ended questions in order to understand the present status of the seed innovation system in these localities. FGDs with male and female farmers were specially conducted to delve deeper into the gender perspective.

Secondary data sources were referred to wherever needed to understand the agricultural scenario of the study locations and to identify the key actors prior to the study. The qualitative data were analyzed and written in the form of a report. Prior to finalizing the

report, the key findings were presented at the STRASA Annual Meeting in New Delhi in April 2018.

More details of the fieldwork are presented in Annexure A.

3. Key Findings

3.1 Agro-climatic conditions

Each location has unique characteristics (Table 3.1), though what is common to all of them is rice farming in stressed environments, with limited or no access to quality seeds for a large number of small/marginal farmers.

Table 3.1: Unique characteristics of each location

S. No.	Location	Unique characteristics
1	Amethi, Eastern UP	Irrigated tracts of salinity affected soils
2 **3**	Gorakhpur, Eastern UP Maharajganj, Eastern UP	Flood prone irrigated plains which have both submergence as well as drought patches within the same season (which is adjoining the plains or terai of Nepal and face droughts and floods, depending on the rainfall pattern in the hills of Nepal and the resultant discharge of waters in the rivers)
4	Mayurbhanj, Odisha	Drought prone rainfed farming prevalent in hilly undulating terrain
5	Lamjung, Tanahun, Gorkha in Nepal	The mid hills region of Nepal having lowlands, mid uplands, and uplands

3.2 Partner landscape

The review of different institutional models across the project sites of STRASA in India and Nepal revealed that STRASA could successfully piggyback on its interventions through partners who have a robust penetration/presence at the grassroot level. Table 3.2 provides an overview of direct partners of STRASA, and other major actors present in the seed systems in different locations.

Table 3.2 Actor landscape in seed systems across locations

Actors	Location
STRASA Partners	***Eastern India***
Rajiv Gandhi MahilaVikasPariyojana (RGMVP)	Amethi, UP
Gorakhpur Environmental Action Group (GEAG) Surabhi Seeds Producer FPO RohinRapti Vegetable seed producer group	Gorakhpur, UP
Grameen Development Services (GDS), Lehra Agro Producers Company Ltd. (FPC)	Farenda, Maharajganj, UP
PRADAN, Swayamsiddha Federation & Sampoorna Federation	Mayurbhanj, Odisha
STRASA/CURE Partners	***Nepal***
Institute of Agriculture and Animal Science (IAAS)	Lamjung, Nepal

Bhrikuti SPG Saghanbali SPG Majhuwa SPG Harrabot SPG Sunder Seeds Cooperative Pragati SPG	Palungtar, Gorkha Archalbot, Lamjung Lamjung Harrabot, Lamjung Sunder Bazaar, Lamjung Tanahun
Other Actors	
Department of Agriculture (DOA)	Eastern India
KrishiVigyanKendras (KVKs)	Mayurbhanj(1), Gorakhpur(2)
KrishiGyan Kendra (KGK)	Amethi
Cereal System Initiative South Asia (CSISA)	Mayurbhanj
Odisha Livelihood Mission (OLM)	Karanjia, Mayurbhanj
Indian Farm Forestry Development Co-operative (IFFDC)	Amethi
Large Area Multi-Purpose Co-Operative Society (LAMPCS)	Mayurbhanj
Seed Bhandar Nigam	UP
Input dealers	Gorakhpur, MaharajganjAmethi, Mayurbhanj
District Agriculture Development Office (DADO)	Nepal

The partners facilitated greater access to good quality affordable seeds at the doorsteps of the hitherto unreachable poor and smallholder women farmers. Moreover, in almost all the locations interactions with other actors, such as input dealers and government seed suppliers, revealed that the transaction cost for the poor farmer for subsidized seed is quite high. This makes it unattractive for these groups to even try sourcing it through these alternate channels, even with subsidies.

Each partner has its own unique way and extent of engaging women/communities to enhance their economic empowerment and/or entrepreneurial capacity. For instance, PRADAN promoted women-led federations (2 federations consisting of rural tribal women in an essentially undulating terrain) that encouraged resource-poor tribal women to produce and exchange rice seeds, (Sahbhagidhan), through an existing network of knowledge workers. RGMVP in Amethi put in efforts to organize a seed bank approach after creating seed awareness and seed literacy among the women rice producers. The efforts of IAAS to consolidate the work initiated by the IFAD-CURE project has led to women seed producer groups and seed co-operatives being effectively linked to DADO, and other formal seed exchange platforms as the quality of seed they produce is up to the mandatory standards.

In the adjoining districts of Gorakhpur and Maharajganj, GEAG and GDS, respectively, have been able to formalize the producers into producer collectives (FPOs and FPCs) who are experimenting with seed certification, and have showcased that it is possible for smaller producers to be part of the formal seed system through formal institutional arrangements.

Table 3.3 illustrates the seed exchange scenario across various project sites.

Table 3.3: A snapshot of seed exchange scenario across project sites

Seed network	**Odisha:** Sampoorna Swayamsidha (Federation)	**Amethi:** Seed Producer Groups	**Gorakhpur:** Surabhi Seeds Producer RohinRapti Vegetable Seed Producer FPO	**Maharajganj:** Lehra Agro Producers Company Ltd. (FPC)	**Nepal:** Bhrikuti, Majhuwa, Harrabot, Archalbot, Pragati, Sunder Seeds (SPG, SPC)
Seed type	**Informal** Rice	**Truthfully labeled** Rice, wheat	**Truthfully labeled/certified** Rice, wheat	**Certified seeds** Rice, wheat, vegetables, pulses	**Truthfully labeled** Rice, wheat, pulses, oilseeds
Seed exchange	Exchange Sale	Exchange Sale	Sale	Sale	Exchange Sale
Trust in produced seed	Yes	Yes	Yes/No	Yes Only if certified	Yes If quality is maintained

More details on each of these models are presented in Annexure C.

3.3 Process of introduction of STRVs

Each partner has their own criteria for introducing the STRV in their respective field. They understand that the trust which the communities place in them is quite fragile and if the new seeds fail to perform to its potential all their efforts would be in vain. Only a very small quantity of seed was initially introduced on the promise that after harvest the producer would return two times/three times the seed back to the federation.

PRADAN introduced the *Sahbhagidhan* seed in Odisha to only those producers in the first phase who were either following improved farming practices (SRI, line to line sowing, etc.) with specific instructions to use it for medium upland/upland. Some of the knowledge workers of PRADAN were trained in the initial phase of the project on a package of practices (under the CSISA project).

GEAG distributed 4-5 kg of seed to 40 farmers through the VRCs depending on their willingness to experiment with the new variety as well as the land's suitability for the cultivation of *Sahbhagidhan*.

Ramdhan, Swarna Sub-1, Sukha-3, Sukha-6, DRR-44 are some of the varieties tried out in Nepal hills districts after going through Participatory Varietal Selection (PVS), use of mini kits, and farmer field trials (FFTs) as entry point activities (see Box 1).

Box 1: Process of introduction of STRVs in Nepal

In 2005, IRRI started the PVS with a focus on upland rice varieties (2005-08). Sundarbazar was selected as a key site as it was 800 m above mean sea level. PVS, FFT programmes, and providing mini kit to farmers were a few of the entry point activities. In 2007, verification of the technology/ varieties was undertaken, and in 2008 dissemination to other districts started from Palungtar. IRRI and IAAS collaborated in technology dissemination and verified the technology taken up here (upland and lowland rice varieties). The community was involved in PVS, preference ranking was carried out, women and men were invited to rank the varieties, and genotypes were selected before these were released – depending on the ranking/preferred characteristics. Then they were asked to provide 3-4 kg of that seed, which was collected from a single field. Bhrikuti in Gorkha emerged as the first SPG.

3.4 Seed promotion

In most of these locations the produced seed is either exchanged or sold, either informally or after being truthfully labeled. This is possible only because of the trust the producers place in these platforms/networks (SHGs, Federations, FPOs, SPGs, co-operatives, etc.). In Eastern India, during the initial years, a few producers tried STRVs seed production, especially *Sahbhagidhan* (Swarna sub 1 was also tried in lowlands but did not receive the kind of success/traction *Sahbhagidhan* got), and soon it spread to the other producers within these networks. The producers not only produced enough seed for themselves (to keep some of it for the next production cycle), but also for giving back double/triple (as per the norms laid down by the channel/network through which they received seeds initially), and also for exchange and sale (with neighbors, relatives, and other SHGs, informally).

All these transactions had its basis in the trust of the communities in each other, and the culture of co-operation and kinship present (fostered in the case of Amethi by RGMVP) in most of these locations. GEAG established Village Resource Centres (VRCs) for distribution of seeds (see Box2).

Box 2: Channels for seed distribution

GEAG has set up VRCs as channels for distribution of seeds to its SHG members, and for collection and storage of produced seeds. A VRC is managed by the SHGs/SHG members. It procures seeds from seed producers and sells it after adding a margin of INR 20 to the cost of the seed (per kg). Seed banks were established in the VRCs for mass storage of seeds after its procurement.

GEAG has linked its producers to KVKs, the Narendra Dev University of Agriculture and Technology (NDUAT), Faizabad; to PRDF for technical backstopping; and to NABARD for financial support to establish the FPOs of seed growers as well as for revolving fund for FPO activities. It could disseminate knowledge (about varietal selection, seed treatment, neem leaf treatment of storage bins, etc.) to the SHG members with support from its technical partners. However, GEAG did not receive technical support from IRRI on promoted seed

varieties. On behalf of the FPOs, GEAG also procured foundation seeds and certified seeds in bulk from the agricultural universities and KVK.

In Gorakhpur and Maharajganj, the STRASA partners are also venturing into certification of seeds through the FPO and FPC. GEAG has tried to use the facilities of some of the local seed processors (like PRDF) to get seed certification. However, one of the reasons for trying their hand at seed certification is because communities have limited trust in each other in this region, so then certification seems to be the only way forward currently.

In 2017, in Nepal, 203 tons of fourteen rice varieties were produced by seed producer groups (SPGs), co-operatives, and leader farmers. This initiative started from one SPG in Gorkha; now Gorkha alone has 15 SPGs. Some of the groups have started to diversify into the production of Mustard and Maize seed, and just recently into production of Lentil, Onion, and Radish seeds after receiving training from the Krishi Karyalaya. Some of the producers have also realized that it is not easy to produce seed and hence have dropped out of these groups. Most of the SPGs are selling their truthfully labeled seeds to the co-operatives, members of the co-operatives, and a little to DADO. However, some of the groups, like the Majhuwa SPG and Bhrikuti SPG, are finding it difficult to market their seed.

3.5 Key findings with respect to women producers

Prior to the advent of this project, women producers cited primary dependence on private input dealers for access to rice seed, ignorance of different types of seeds available in the market, lack of awareness on how to select seed or how to grow them. The male members in their household would purchase seed from the market and bring it home at the time of sowing. Not only this, the women were not even consulted within the household on the type of seed they should use. However, in some of the locations, as in the case of Odisha, women were already traditionally involved in the storage of the traditional variety of rice seed (even when they were not producing that variety of seed).

Through its multi-pronged approach via different institutional models, STRASA brought about change – not only in the way women producers looked at seed but also in their mindsets. Though the women producers are at different trajectories in the seed production system (from subsistence to commercial) across locations/models, they benefitted in several ways by the links their collectives have to the formal seed systems. These are illustrated in the figure shown below (Figure 1).

Figure 1: Institutional models and seed systems

Across all project sites, women felt that production of seed is much more time consuming and laborious/labor intensive than merely grain production, since it roughly translates into additional time and labor that they have to spend in their farms for the whole process. According to them, it has not impacted the men's amount of time spent in the farms as such. Despite this factor, the women qualify it as well-spent time as it adds value to the entire production cycle. Now they have improved access to quality seed, along with an added skill set of seed production (Box 3).

Box 3: Engendering seed production skills in women producers

Seed production skills are a major takeaway for the women producers under these different institutional models. They have been able to learn:

- how to produce quality seed;
- what are the traits that hallmark 'quality ' in seed;
- how to test the quality of seed (how to conduct germination tests); and
- how to treat the produced seed for storage after proper drying.

This is a skill set which has a lasting impact on their lives. It has boosted their self-confidence, enhanced their intra household role in decision-making; and it is also a skill that can be applied to other crops as well. After exposure and capacity development on seed production the women in Odisha and Nepal play a leading role in decision-making since they are now the harbingers of information to the entire household. In Eastern UP their role in decision-making has improved, as they are now consulted before purchase of a new variety(this is more visible in women only groups in Nepal too).

Impact on income and nutrition

Saving seeds for themselves in a rural household means more savings and not spending on purchase of seeds for the next production cycle. Women feel that keeping seed for the next production cycle (**seed saving**) in a more scientific manner with less spoilage means enhanced production, leading to enhanced food security and income. Moreover, seed fetches more price than grain, particularly important for those who are trying to take it up as a business (Box 4).

Box 4: STRVs' impact on women's lives in Mayurbhanj, Odisha

2016 was a drought year in Mayurbhanj, which coincided with the introduction of *Sahbhagidhan* through the federation of PRADAN in this area. The producers who tried it(there were only a few in the first year who were willing to try a new variety!) were the only ones who could salvage their crop after the drought. This led to widespread acceptance and adoption of this variety in the subsequent year. However, the major reasons for its ongoing success are the following attributes which were narrated by women during interaction with the study team.

Attributes of Sahbhagidhan that made it a success story in Mayurbhanj

- Drought tolerant – can be cultivated with less water;
- Short duration variety (3 months);
- Less input intensive (less water, less pesticide);
- More grain weight of this variety;
- Good in taste (rice, rice cakes, etc.);
- Rice straw liked by cattle – softer, sweeter;
- More harvest potential than the traditional varieties in the uplands and mid uplands;
- Producers received seed awareness as well as attained self-reliance in seed.

In Odisha, women narrated that they could substantially enhance **food security** in their own households (from 5-10 months) by using the STRVs due to higher production. In Amethi, the use of *Sahbhagidhan*as a variety in a cropping cycle not only meant less inputs for the producers but due to it being a shorter duration variety it meant they could grow additional crops (enhanced cropping intensity), such as potato, peas, etc., after harvesting rice. All these factors led to increased income for the producers. Self-reliance in seed (awareness of seed traits/varieties' harvest potential), means that they can produce quality seed by themselves.

*"We are eating better as we have more production and more money to purchase vegetables, fish and meat!"*said an articulate woman producer to the study team.

In Nepal, women felt that cultivation of STRVs increased production (50-60 quintal), and they could save considerably on seed costs as earlier they had to sow more seeds. The sale of STRVs seed has also helped many of them to move onto commercial farming (from subsistence-based farming). This has meant enhanced income, improved lifestyles and better education for their children, more savings, etc.

Changes in gender roles in value chain

Women producers have been linked quite effectively to the value chain in most of these models (with the exception of the FPC in Maharajganj). From pre-production planning, production, storage, processing to sales/exchange of seeds, women producers seem to have set their footprints everywhere in the rice seed value chain in the informal system. However, in the formal systems where certification is also taking place, male farmers dominate (same is the case with FPOs and FPCs). In Nepal, most of the operations in the value chain are handled by women producers. Not only that, some of the groups, like Harrabot SPG, are procuring seed from DADO and selling the seed back to DADO after production (truthfully labeled). Box 5 also illustrates this point.

Box 5: Women are an integral part of the value chain in Nepal

When the Harrabot SPG leader says proudly, "We are confident of the quality of our produce, and hence we can sell!" the rest of the women smile in the affirmative!

There are small handy machines for sewing bags for storing rice seeds that are installed by groups like Harrabot SPG. Basic seed processing (grading) machines are also installed by a few of the other groups, like Pragati SPG in Gorkha. Women leadership is very dynamic in 'women only' groups (Harrabot, Archalbot) in Nepal, inspiring confidence and effective functioning within their groups.

Entrepreneurial capacity development
This is still an area that needs more effort. The project is at the right stage to enhance the entrepreneurial capacity of women. However, more focused interventions are needed to drive the project towards developing more women as entrepreneurs. Since most of the producers are poor and smallholders there are impediments towards achieving this target. But some of the women who already exhibit traits of entrepreneurship can be targeted.

Intra-household negotiation and decision-making
Women feel that their opinions have started to matter! No one was asking them earlier about which seed to sow and which seed to purchase, because they didn't know anything about seeds earlier, so their opinions hardly mattered. Men also feel that women bring useful and reliable information from the collectives. During an FGD in one of the Odisha villages, women said that they are now cognizant of how much they are producing and from which seed. Earlier, they were collecting the harvest mindlessly and bundling it into bags. However, in Eastern UP the social structure still inhibits the decision-making capacity of women. In Nepal, producer groups having only women members are more vibrant, and the women in these groups appear to have more control over their lives than the women in mixed groups.

The approach of the partner is also quite evident in the gender dynamics of each model. The women producers who belong to those initiatives of partners with a strong focus on women empowerment are more articulate and participate more effectively in seed enterprise activities.

Some of the dimensions of the change brought about by seed systems innovation in different models is presented in Table 3.4.

Table 3.4: Key findings with respect to women producers

	Odisha: Federationseed producers	Amethi: Seed Producer Groups	Gorakhpur: Seed Producer FPO	Maharajganj: FPC	Nepal: SPG/SPC
Time use	Increased: Productive	Increased: Productive	Increased: Productive	Increased: Productive	Increased: Productive
Income and nutrition	Food security, additional income	More number of crops along with rice	Enhanced	Few producers	Enhanced
Changes in gender roles in value chain	Significantly	Yes	To some extent	Not visible	Significantly in some groups
Entrepreneurial capacity development	Still nascent-resource poor producers, remote area Needs strategic support	Needs strategic planning	Needs business plan	Needs business plan	Needs strategic planning
Intra-household negotiation and decision-making	Enhanced	Enhanced	Needs more support	Not visible	Quite visible in a few cases, not so in others

3.6 Outcomes in different project sites

In Odisha, communities are heavily dependent on rice cultivation for food security. In other locations even though rice is an important crop, it is one of the many crops harvested by the communities in the cropping calendar. The impact of STRASA has been beyond rice in the seed systems in the other four project locations. Some of the producers, once they learnt how to grow and produce rice seed dabbled with seed production in other crops, such as wheat, pulses (lentils, moong, etc.), oilseeds (mustard), and even vegetables in most of these locations. The local organizations (the STRASA partners), soon realized the potential of diversification into production of other crop seeds. This is a first step towards more sustainable farm income and viable functioning of the various models, especially if seed

processing is the next step for the collectives. In a nutshell the outcomes can be enumerated as follows:

For the Producers

- **Access to quality seed of preferred varieties enabled**: The STRVs are filling a need for the producers. Most of these locations have been experiencing visible climatic stresses in the last decade, hence they need access to STRVs. By producing it themselves/via collectives, the availability of good quality seed with additional traits that help in acclimatizing to stress is a bonus in the eyes of the producers.

- **Reaching the unreached:** Varietal replacement by smallholder farmers has been triggered due to this project. It has brought about a behavioral change in farmers in most of the locations by helping them break out of the routine of mostly growing traditional seeds/older varieties, especially in the upland tracts. This is not as easy as it appears. It took some time to reach the present level. However, once the producers get confident/ used to experimenting with newer varieties/methods they will be quicker to adapt to advanced varieties as well. In general, communities are satisfied with their involvement in this initiative as it has ensured quality seeds for the next production cycle (with the exception of Maharajganj where apparently the flood in 2017 washed away all the stored seed).

- **Improved seed literacy available at the doorstep:** The project has been able to impart knowledge to the producers directly at their doorsteps on: What constitutes a 'good quality seed'?, What are the traits of a seed that they should be aware of/know of? How should germination tests be done prior to sowing to prevent losses in crop? How to clean seed, and how to store the seed after treatment?, etc.

- **Capacity building of smallholder women farmers** were built on the following aspects:
    - *Triggered thinking beyond 'Grain'*: Earlier they knew only how to produce and sell rice as grain. Through these interventions their options have increased as a producer.

    - *Technical knowledge about seed production*: They are now confident of producing good quality seed. This is an additional capacity that is now with the communities, especially with the women farmers in the project sites that is gradually being transferred within close knit family circles/other producers.

    - '*Beyond paddy':* Diversification into other seeds is a phenomenon that is quite visible in most of the locations. Having learnt how to produce one kind of seed they are now comfortable with diversifying into other seeds.

- **Enhanced income:** Decreased need for seed purchases reduce their capital and cash requirements, which is a huge advantage for women who do not have access to finance. Apart from these they are able to get more income from sale of seed at higher prices, along with higher yield, reduced input costs and savings for next year's seed as they don't have to purchase seed for the next sowing.

- **Change in women's own perception of themselves**: Many women reported having higher self-esteem and confidence after becoming seed producers. They are quite proud of the fact that they are able to produce their own seed, something that was earlier outside their domain in their respective communities.

At the Project level

STRASA has been instrumental in triggering systemic change in the Seed Innovation System through its strategy of leveraging large partner networks and their social architecture at the ground level in Eastern India and Nepal. In Odisha, it ensured multi-actor involvement (a nexus of government, non-government actors, and private input dealers) in the seed value chain. By ensuring that the STRV seeds were included in NFSM in Odisha, the project has been able to leave visible footprints on the seed eco system in Odisha. The *Sahbhagi* seed is not only available with the SHG federations promoted by NGOs, but also with the Odisha State Seeds Corporation (OSSC) and its supply chain of registered input dealers.

Though there are bigger aggregators in the form of FPO and FPC in Eastern UP, the outreach is most visible in the case of RGMVP in Amethi due to its closer connection to communities. However, the linkages of the producers to others in the value chain are not so apparent in Eastern UP. In the case of GEAG, they have been trying hard to establish linkages with NABARD for entrepreneurial capacity building of their producers. However, they are also seemingly struggling with several issues, of cash flow, of not being able to sell rice seed, etc. This could be mainly due to weak linkages with the DOA in UP. Even the local KVKs are not into the loop in UP. (More details on linkages among actors in each location are presented in Annexure B.)

In Nepal, DADO is providing foundation seeds to the producers and procuring seeds from some of the community based seed producers (CBSPs). This means not only greater outreach but also acceptance and recognition of the producers' capacity by the national system (greater confidence in the group's capacities). This way these producers are also able to benefit from the incentives provided by the state in the form of subsidies, which makes seed production much more viable for them as an enterprise. But not all producers are that well linked with DADO.

4. Implications and Ways Forward

Though the project interventions have resulted in enhanced access to seeds of STRVs in the project locations, there are still a few challenges that need to be addressed at the producer and programme level, so as to sustain and expand these initiatives to achieve greater impact. These are discussed below.

4.1 Major challenges

At the producer level

- **Availability of foundation seed** for resource poor producers is still a challenge in most of the project sites. In case producers wish to try out newer varieties or even with existing varieties, sufficient amount of foundation seed is not always available. As long as the project is facilitating the process, the linkage exists; however, have enough channels been created for future functioning?

- **Seed producers need continuous hand-holding support for a longer time** to deal with evolving challenges and opportunities *but no reliable mechanisms are in place everywhere.* The needs of the producers are very dynamic and keep on changing. For instance, the FPOs that have started to produce large quantities of seed are finding establishment of marketing linkages a challenge in a few locations. Lack of reliable cash flow or working capital inhibits the aggregation of seed as in the case of FPC, etc.

- **Mechanization in the seed value chain:** Seed Processing is an area that has received only very weak support in these locations. Mechanization in the seed value chain needs to be planned at the cluster level, as was done in some locations in Nepal. Women are spending more time in the fields for seed production-related activities and this has also added to their drudgery. Introduction of smaller machines appropriate for different stages of seed production can make women's lives a bit easier.

- **No cross-learning between different project sites:** Centers of excellence already exist within the project; but few were visible to the study team in their brief foray into the project sites. More effort should be taken to track and share the good practices in these locations. Exposure visit to the locations would be ideal. If not, these experiences could be captured as videos and shared.

- **Lack of a business plan:** To further strengthen and deepen the involvement of women in seed enterprises, the groups should have a business plan and the members need enterprise development training (from practitioners rather than from University lecturers). A few women already exhibit entrepreneurial capacity in some of the groups and they can become motivators for other women/groups at nearby locations. For example, the women from Harrabot SPG in Nepal are already linked to many actors and are raising capital individually to aggregate seed and sell as a collective in order to reap more profits for themselves. The project should

consciously take stock of such motivated, dynamic adopters and employ them for enhancing the outreach and scale of its operations.

At the project level

- **No guidance on partner selection**: The project through its different institutional models provides an eclectic mix of cases. However, what is quite apparent is that the selection of partners for the pilot has been mostly sporadic. There seems to be no selection criteria for partner selection. While this was all right during the pilot stage, a well laid-out guidance note on partner selection is critical for scaling up these initiatives.

- **Lack of monitoring and follow up**: One of the reasons for this is also that in most of the cases the partners received little or no monetary support from STRASA apart from the seed, hence making monitoring of other partners' interventions and efficacy of seed production difficult. Moreover, seed production is incidental to the functioning of most of these partners, even after it has proven beneficial to communities to some extent.

- **No formal project (STRASA) strategy for engaging women in seed production**: The project lacks a strategy, and it is primarily dependent on the partner organisations' approach towards gender integration. In the case of GDS they can learn from some of the other partners on how to be more gender inclusive, and STRASA should play a pivotal role in facilitating this learning. STRASA should be driving the gender strategy for partners in seed innovation.

Has the project been able to facilitate/establish linkages between other actors in the seed value chain or is it something that the producers have achieved by themselves? Should it also focus on enabling linkages for bringing about systemic level changes in the existing seed value chain/seed system capacity? These are a few questions that need self-reflection and analysis at the project level.

4.2 Ways forward

Some of the prospective ways of addressing the above challenges are presented below.

- **Develop a targeted gender strategy:** Having such a gender strategy is important to guide the key interventions in this area and to respond to women's needs, preferences, and priorities (based on a robust targeting strategy and situational analysis).

- **Promote cross learning and capacity development:** Initiate a culture of cross learning to enable partners to learn from each other on successful experiences with women empowerment on the ground, and support capacity building of all project staff so as to integrate gender meaningfully, not merely in partner organisations.

- **More elaborate/systematic approach to select partners and institution models**: Some of the following criteria might be useful to consider. These include alignment with broader project objectives, gender focus, scale of outreach, interest, and experience in working with value chains, having a pro-poor focus, etc. The institutional models that are deemed appropriate for extending the STRVs seeds or for becoming knowledge partners in seed systems innovation should be carefully selected. This selection should be guided by both purpose and context, depending on the aims the project means to target:
    - enhanced food security;
    - women have access to good quality seed;
    - women have seed security and are self-reliant;
    - women engage in seed production as entrepreneurs.

- **Support for mechanization**: Need to partner with those organizations that are specialized in small farm mechanization and development/promotion of women-friendly farm implements in seed value chain. This will help reduce women's time/effort and thus free up additional time for seed production. This will also ensure that all operations are more time-efficient.

- **Monitoring and learning**: Feedback loops should be in place for continuous assessment of the needs of producers and other actors in the seed value chain. Systems for closer monitoring and follow-up are also required.

4.3 Implications for sustainability and scaling up

We present below some of the measures that need to be taken up to sustain the initiatives as well as for scaling up these experiences to achieve enhanced impact.

- **Effectively link rice seed producers to other actors interested in promoting other types of seeds under the Seed Innovation System:** Most of the producers are not content with merely producing rice seed, but have started foraying into other crop seed production as well. Timely linking could be done by facilitating convergence of

producers/partners with other CGIAR (ICRISAT, AVRDC) or ICAR (IIOR, IIPR) institutions for integrated seed interventions that could lead to greater impact. This will make seed enterprises sustainable and financially viable.

- **Diagnosis of seed innovation system for planning and implementing effective scaling up**: Several actors are involved in seed innovation. Annexe C provides a detailed description of the range of actors. The project, in collaboration with its partners, should initiate a diagnostic study of seed innovation system prevalent in these regions and facilitate scaling up by linking with these actors. It is much easier to achieve scaling up in these locations instead of spreading resources too thin on different locations as pilots.

- **Build capacities of actors to promote scaling up**: It appears that the project and its partners need better ideas on how to scale up knowledge, including STRVs. Promoting new insights on scaling up, and enhancing their capacities to experiment with a wide range of tools and approaches in scaling up can benefit the actors even after the project ends. Establishment of seed platforms in select districts that meet and discuss issues in the seed value chain at regular intervals is an idea worth exploring.

- **Strengthen knowledge management**: The STRASA project seems to have under-reported the experiences and successes from the partner's interventions in the seed chain. This is partly due to lack of a communication and knowledge management strategy, and this needs attention. A dedicated web portal to share good practices, blogs, and policy briefs related to STRASA field experiences may be established.

Annexure A: Tools and methods used for data collection

Table A1: Tools and Methods used for data collection

S. no.	Project location	Methods/Tools	Key Informant Interviews (KIIs) and Focused Group Discussions (FGDs)
1	Amethi, Uttar Pradesh (UP)	Desk Review through document analysis Semi-structured interviews with the key informants Focused group discussions, Including institutional ranking	**KIIs** Department of Agriculture (1) RGMVP (3) IFFDC, IFFCO (2) Uttar Pradesh Seed Bhandar Nigam (2) Input Dealers (2) Focused Group Discussions (one each at 4 villages)
2	Gorakhpur,UP	Desk Review through document analysis Semi-Structured interviews with the key informants Focused group discussions, including institutional ranking	**KIIs** Department of Agriculture (3) GEAG (3) KVKs (2) Surabhi Seeds FPO (4) IRRI researcher (Social Science) (1) PRDF (1) Input dealers (2) Focused Group Discussions (at 4 villages)
3	Farenda, Maharajganj, UP	Desk Review through document analysis Semi-structured interviews with the key informants Focused group discussions, including institutional ranking	**KIIs** GDS (2) Lehra Agro Producer Company Ltd (4) Input dealer (1) IFFCO input shop (I) KRIBHCO Sale Centre (1) Focused Group Discussions (at 4 villages)
4	Mayurbhanj, Odisha	Desk Review through document analysis Semi-structured interviews with the key informants Focused group discussions Institutional ranking	**KIIs** Department of Agriculture (3) KVK (2) LAMPCS (3) PRADAN (3) OLM (1) Input dealers (2) Swayam Siddha Federation (4) Sampoorna Federation (4) CSISA project (1) Focused Group Discussions (one each at 4 villages)
5	Nepal	Desk Review through document analysis Semi-structured interviews with the key informants Focused group discussions	**KIIs** IAAS (3) DADO (1) Focused Group Discussions (with 6 SPGs in3 districts)

Note: Data was collected to do network analysis of the institutional partners collaborating in the seed system innovation at various locales.

Annexure B: Check list used for undertaking FGDs

Checklist for undertaking FGDs for assessing institutional seed system models

- Context analysis: Context of rice, seed, and women farmers in the location– cultural issues, farming style/type;
- Age of intervention: Year of establishment, number of farmers (men/women/HH), NGOs involved, introduction of Sahbhagidhan/STRVs;
- What is new: Process adapted to put the system in place? What were the entry point activities conducted with them (demonstration/etc.)? How many farmers were targeted initially from each group/SHG? Was it a saturation approach or more sporadic? How was it monitored? What were the systems in place to map the progress of the seed being adapted? Passed on farmer to farmer; any interesting stories;
- Why was there a need to put new systems in place? Understand the background;
- What is working? Good elements of the model;
- Where is the seed (truthfully labelled) being sold? What are the legalities involved in that? Who does certification (if it is required)? Size of the seed packets;
- Challenges in the seed system in that district/area/region;
- What are the other seed systems – formal/informal/in vogue – in close proximity to the cases being studied?
- Has there been an effort to link seed system and input system?
- Who are the other actors/competitors in the seed system/value chain-supply chain, for example the Odisha State Seed Corporation (OSSC)? Was there any resistance from such actors?
- What are the channels in seed delivery? At present, previously? How has the situation altered?
- Seed indicators/parameters: Yield, seed size, pest resistance, taste and colour – for choice of new variety;
- How does the community/other farmers trust them when it comes to these seeds?
- Who is processing the seeds? Where are they sending the seeds for processing? Seed processing units. Are there any units nearby for it?
- Capacity development: How and who to enhance the adoption? Participatory varietal trials, etc., changes in capacities for providing adequate seed in sustainable manner among different actors – govt., non-govt., private, informal;
- What role did capacity development/training play in bringing about these changes? Any evidence?
- Scale: Number of farmers/women farmers reached through this initiative – %change. How many seed producers have increased over the years? Number of hectares planted, number

of HH targeted, increase/change in yield, income, assurance of seed availability, etc. Implications for scaling up-linkages, convergence with other programmes etc.

- Are small seed organisations viable? Describe.
- Gender/women empowerment: Changes in gender roles in value chain, entrepreneurial capacity development of women, intra-household negotiation, and decision making status of women, income, nutrition, and time use;
- Availability of seed, in time, seed quality (truthfully labelled seeds, etc.) and access to seed;
- Indicators of sustainability and viability;
- What are the lessons learnt/challenges? Implications for scale.

Notes:

1. Apply gender lens to all the interventions of the project.
2. Delve into interesting cases and develop them as vignettes, especially with regard to the most significant change (MSC) theory.

Annexure C: Seed Innovation System in project locations

C1.Amethi District, Uttar Pradesh, India

Context

IRRI introduced and promoted the drought tolerant *Sahbhagidhan* under the STRASA project in Amethi, Uttar Pradesh, through RGMVP with funding support from BMGF. RGMVP has been working on enhancing local availability of quality seeds through SHG federations. For this, over 3000 SHG members were trained as seed producers to multiply and exchange seeds with their friends in their villages. The groups produced 3588 quintal of rice seed during Kharif 2016. Apart from this, women farmers were trained regularly on SRI and SWI techniques, which significantly contributed to increased yields without any increase in the cost of production. With this additional yield, SHG members developed 2,615 grain banks which added to the corpus and risk funds of the VOs[1]. The details of interactions and major findings at Amethi are presented below.

Stakeholder interactions

Table C1.1: Multi-stakeholder interactions at Amethi

Actor domain	Public	Private	Independent
Day 1	RGMVP (District Coordinator and Regional Coordinator)		Self Help Group-I Self Help Group-II
Day 2			Self Help Group-III Self Help Group-IV
Day 3	Dept. of Agriculture Officials of Rajkiya Krishi Beej Bhandar	Input Dealers (2)	
Day 4			IFFDC

Stakeholders

The major actors in the rice seed value chain were identified and are presented in the table below.

Table C1.2: Stakeholder Matrix of Rice Seed System Innovation in Amethi

S.no.	Stakeholder	Partners	Functions
1	Rajiv Gandhi MahilaVikasPariyojana (RGMVP)	BMGF SHG	Implementing partner of the seed systems project Training, demonstration, field visits and field days for technical backstopping Video programmes on technical messages Facilitation of PVS Extensive trainings and exposure on SRI and SWI techniques to women farmers
2	Department of Agriculture (DoA)	NABARD KGK ATMA SAUs	Seed village programme Extension activities for seed promotion SMS-based information dissemination
3	Krishi Gyan Kendra (KGK)	DoA	Training programme for farmers Technical information supply, such as need to

[1] Annual Report, 2016-17

			maintain isolation distance in seed production
4	Private Input Dealers (PID)	Farmers Wholesalers Private input firms	Supply of seeds including hybrids* Fertilizers and pesticides Promotion of modern seed varieties
5	State Agricultural Universities (SAUs)	DoA RGMVP SHG Farmers	Foundation seeds production Seed supply to SHGs and DoA Technical support to Department of Agriculture Organizing partner of Kisan Goshthis and Krishi Melas
6	Self Help Groups (SHG)	RGMVP Input Dealers AUs	Seed production Seed bank implementation Seed exchanges with other farmers Development of Grain Banks
7	Rice Farmers (RF)		
8	Agricultural Technology Management Agency (ATMA)	DoA KGK	Facilitation of agricultural development planning of the district
9	Bill and Melinda Gates Foundation (BMGF)	RGMVP IRRI	Funding partner of the seed systems project
10	International Rice Research Institute (IRRI)	RGMVP BMGF	Technical partner of STRASA project
11	Cooperative Societies	DoA Farmers	Supply of inputs to farmers
12	Banks	SHGs DoA	Facilitating credit linkages for SHGs
13	Rajiv Gandhi Foundation (RGF)	RGMVP	Informal seeds system project with RGMVP
14	RajkiyaKrishiBeejBhandar	DoA	Registration of farmers Seed procurement and seed sale
15	Uttar Pradesh BeejVikas Nigam (UBVN)	DoA	Seed certification

*The input dealers are not involved in the seed systems *of Sahbhagidhan* and sell other major varieties (Damini) and hybrids

Stakeholder engagement across the seed value chain is presented in Fig C1.1

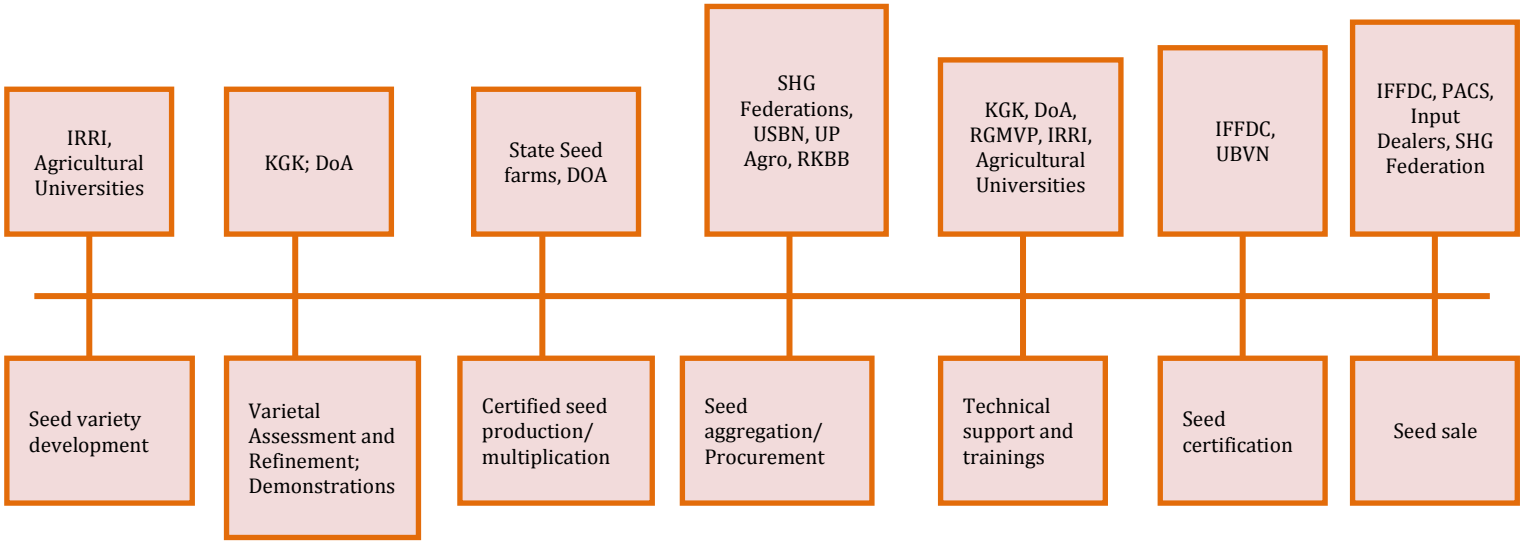


Fig C1.1: Stakeholder engagement across the seed value chain in Amethi

Actor profiles

1. Rajiv Gandhi MahilaVikasPariyojana (RGMVP)

RGMVP is one of the development initiatives of the Rajiv Gandhi Charitable Trust (RGCT). It is one of the largest social mobilization programmes for women's empowerment in the state of Uttar Pradesh. RGMVP was initiated in 2002 and is currently working in 49 districts through eight regional offices that function as Community Resource Development Centres (CRDC) – located at Raibareli, Amethi, Varanasi, Gorakhpur, Lucknow, Shajahanpur, Jhansi, and Banda. It organizes poor women, trains them and arranges support activities to help them build their own social platforms in the form of self help groups (SHGs), and their federations, so that they can access various government services and programmes. RGVMP promotes and develops institutions for the poor which are owned and managed by women SHGs, village organizations (VOs), and block organizations (BOs). To expand outreach and deepen the impact of the programmes, RGMVP has trained a cadre of Community Resource Persons (CRPs) who are trained women from the villages. These CRPs regularly engage with SHGs, VOs, and BOs to impart skills and nurture them as institutions.

Table C1.3: Outreach of RGVMP in Amethi

No. of blocks covered in Amethi	Total number of GPs covered by RGVMP	Number of SHGs mobilized till March 2016	Total number of families covered	Number of VOs formed	No.of resource villages	Number of BOs formed
16	719 (735)	13,975	148,135	674	297	16

Source: Annual report (2016-17)[2]

Key strategies of RGMVP

1. Participatory Identification of the Poor (PIP) by CRPs;
2. Organizing the women into SHGs, VOs and BOs;
3. Capacity building through formal and informal processes and peer learning and mentoring;
4. Savings, inter loaning and livelihood expansion;
5. Collective action to challenge and break social barriers, and access rights and entitlement;
6. Build a prospective institution for individual and collective growth.

These community-based institutions are provided extensive facilitation, handholding support, and training on each programme intervention. Selected women from each of the SHGs are trained in leadership skills to become resource persons for the programme. They are part of the CRDCs promoted by RGMVP across programme districts and work with SHGs, VOs and BOs as co-facilitators of different programmes and activities along with RGVMP staff.

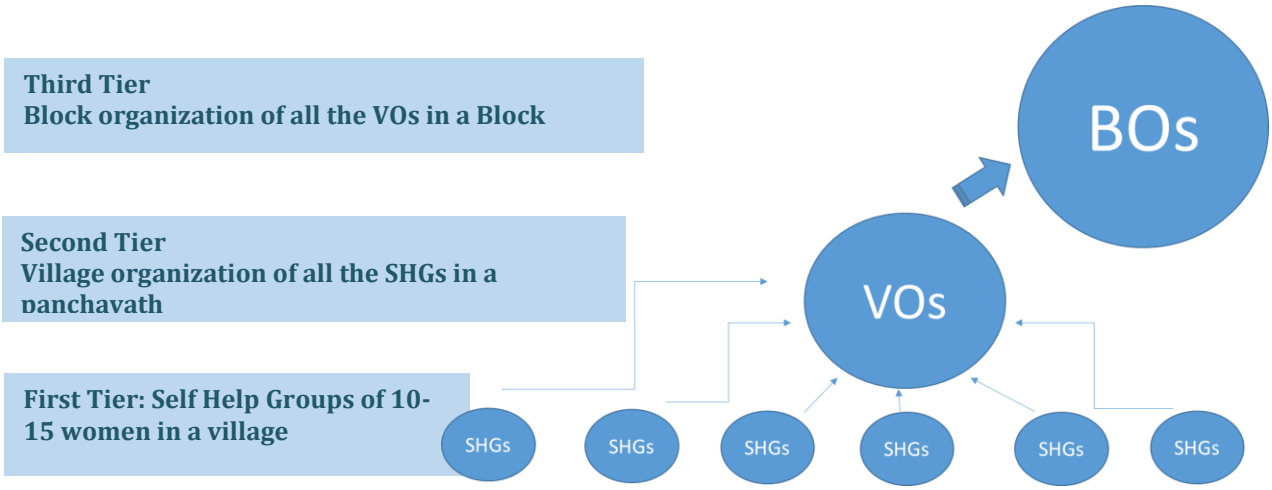
Modes of communication

a. **Videos and Films**: RGMVP has trained CRPs to use PICO projectors for showing videos in the villages during night meetings.
b. **Hamara Sangathan**: A community-based newsletter in Hindi developed to highlight the progress and stories of success and activities of SHGs. It serves as a learning tool for the community, and resource persons elaborate on the best practices in the region.
c. **Udaan**: A bi-monthly newsletter brought out by RGMVP carrying news about the Young Women's SHGs and their success stories.

[2] RGVMP. Enabling citizens, creating communities. Annual Report 2016-17

d. **Call Centre**: (1800- 300-28905): A grievance redressal mechanism for SHG members.

Structure of SHG federations set up by RGVMP in Amethi, which was used as a channel for the disseminations of *Sahbhagidhan* is givenbelow (Figure C1.2).



Source: Annual report (2016-17)[3]

Fig. C1.2: Three-tier institutional model of RGMPVP

Table C1.4: Linkages of RGMVP

S.No.	Organization/Agency	Activity
1	NABARD	Tripartite linkage of NABARD, RGMVP and Society for Elimination of Rural Poverty (SERP). Programme links the SHGs with commercial banks for bank credit.
2	SIDBI	As implementing partner of the SIDBI-initiated project 'The Poorest State Inclusive Growth Project', aiming to foster economic growth among the marginalized by promoting financial literacy, capacity development, and thereby fostering economic independence.
3	IRRI	Technical partner for Agricultural Project
4	NDDB	Livelihood enhancement through promotion of Diary Initiatives Health Clinics
5	Commercial banks and Regional rural banks	Credit Linkages to SHGs
6	Rajiv Gandhi Foundation	Informal Seed systems project
7	BMGF	Community mobilization project in UP

RGMVP has been implementing a three-year project to develop an informal seed production system through SHGs. Funded by BMGF, the project aims to boost local availability of quality seeds in order to enhance agricultural productivity and food and nutrition security. Seeds of improved varieties are sourced from research farms and are multiplied and distributed through informal seed exchange by

[3]RGVMP. Enabling citizens, creating communities. Annual Report 2016-17.

small and marginal women farmers from SHGs. Till date, 202 Ajeevika Sakhis are trained at CRDC block and village levels as resource persons under the Seed Systems programme and over 3,000 SHG members have been trained as seed producers.

Table C1.5: Outreach of RGMVP in paddy season 2016

Total coverage	Number of farmers reached	Seed Produced
165 Gram Panchayats	3506 farmers	3588 quintal of total produce

RGMVP provides extensive hands-on training and exposure on SRI and SWI techniques to farmers. These techniques enhance crop yields – without extra inputs, with reduced water usage, and lower cost of production. With increased yield, SHG members have developed 2615 grain banks which add to the corpus and risk funds of VOs.

2. Indian Farm Forestry Development Cooperative Limited (IFFDC)

IFFDC came into existence formally in 1993, and was basically promoted by the farmers' cooperative, IFFCO. IFFDC has diversified portfolios, such as Farm Forestry and Climate Change, Watershed Management, Nutritional and Economic Security, Livelihoods, Seed Production, Agri-Input Supply, Cross Cutting Interventions, etc. In addition to the above programmes, IFFDC has also started the *Seed Production and Marketing Programme* to provide quality seed to farmers. It supplies certified, processed rice seeds to farmers across Amethi district. With these activities IFFDC also becomes an important actor in the seed system innovation of Amethi. With support from NABARD, IFFDC also implements Self Help Group and Farmers Club Promotion Project.

IFFDC has initiated a 'farmer centric', market-driven Seed Production Programme, which is fast becoming a major activity. Seed is being produced on farmer's fields under the technical supervision of IFFDC and the State Seed Certification Agencies (SSCA). Interested farmers fulfilling the criteria of IFFDC Seed Production Guidelines are organised into Seed Grower Groups (SGG) and their capacities are built for seed quality control along with technical aspects of seed production. The seed is then processed either in IFFDC's own processing plants or in hired processing plants under its supervision as per the Seed Certification Standards. After certification by the SSCA, the seed is being marketed to farmers through the existing cooperative network.

To bring farmers under the ambit of the Seed Production System, the IFFDC is focusing on formation of Seed Growers Groups (SGG), which establishes effective communication with the farmers, helps in capacity building and also ensures quality seed production. These SGGs are being nurtured through regular meetings, training, and other awareness creating activities. For ensuring the quality of seeds produced, the IFFDC has an inbuilt Internal Quality Control (IQC) System which involves inspection and control at various critical stages, viz., arranging seed sources, sowing, field/crop level, post-harvest, processing, certification, packaging, storage, transportation, etc. Wider publicity of IFFDC seeds is being undertaken by organizing various activities. IFFDC has also developed strong linkages with the National Seed Association of India (NSAI), National Seed Corporation (NSC), State Agricultural Universities, Research Institutes, State Seed Corporations and other Agencies for procuring breeder/foundation seed; and also with the State Seed Certification Agencies for getting certification for the seeds produced by it.

Wider publicity for IFFDC Seed has been initiated by organizing 27 Field Days, 9 crop seminars, 13 special sales campaigns, 47 cooperative conferences,377 tractor trolley paintings, along with

participation in 20 exhibition stalls at Farmers' Fairs, display boards and banners, etc., at various places (Annual Report 2013-14, IFFDC[4]).

Totally, 94 Seed Grower Groups with 1200 members have been formed. For soil testing, 1070 soil samples from farmers' fields were analyzed through soil testing laboratories, and balanced application of fertilizers accordingly ensured. Totally 1095 meetings of SGGs were organized that saw participation of 9970 farmers. To impart technical inputs on seed production, and seed quality control, etc., 44 training programmes were organized in which 1200 grower members participated. Besides this, 10 exposure visits to the Agriculture Research Institutes and 12 visits to the Farmers' Fairs of SAUs have also been organized to expose them to new technologies and practices of quality seed production. Moreover, 529 member growers have been linked with IKSL's value-added messaging services and they have thus benefitted from regular information on need-based improved packages and practices of crop/seed production.

Also, to provide quality agricultural inputs, a delivery chain mechanism has been developed by opening IFFDC Krishak Seva Kendras (KSKs) in different states where the cooperatives are weak. Quality seeds are supplied through these outlets to farmers. Furthermore, Primary Farm Forestry Cooperative Societies (PFFCS) are operational that supply vital agro inputs, including quality seeds.

3. Rajkiya Krishi Beej Bhandar(RKBB), Amethi, Uttar Pradesh

These are the organizations authorized to supply certified seeds to farmers. Farmers have to register with RKBB prior to the beginning of the crop season in order to get the stipulated quality seeds. Seeds available with RKBB are mainly acquired from state seeds farms, and agricultural universities. Based on the demand, quality seeds will be distributed to farmers in every crop season. However, timely arrival of the seeds is a major issue faced by RKBB. Also, the seeds procured are delivered to RKBB in large packets of 50 kg each, which cannot be opened and sold in retail due to concerns of adulteration. Hence small farmers who need seed in small quantities are unable to source seeds from RKBB. It is also mandated with procurement of seeds from the farmers. Though the direct benefit transfer (DBT) payment system has been put in place, the due payment for the procured seeds are always delayed and takes a lot of time to reach the beneficiaries.

4. UP Agro Industrial Corporation

UP Agro was established in 1967 as part of the series of Agro Industrial Corporations that were set up at the All India level. The organization provides support to farmers at several levels. It sells agro machineries, agro inputs including seeds, manures and fertilizers, and gives aid for construction of grain storage structures, etc.

5. Uttar Pradesh Beej Vikas Nigam

In view of the need for quality seeds in the state, the decision was taken to set up the Uttar Pradesh Seed Development Corporation on June 29, 2001, and on 15 February 2002, the corporation was registered under Section 25 of the Companies Act. It undertakes finances and promotes measures for production, processing, preservation, storage, and distribution of certified quality seeds. It also acquires, manages and operates seed processing plants and equipment for processing of seeds by farmers.

[4] http://www.iffdc.in/annual%20reports%20iffdc/21st%20Annual%20Report%20(2013-14).pdf

C2. Gorakhpur District, Uttar Pradesh

Context

IRRI introduced seeds of *Sahbhagidhan* to Gorakhpur in 2014 as part of the STRASA project. GEAG was the local partner implementing the project. GEAG was identified as Producer Organization Promoting Organization (POPO) by NABARD and it nurtured two Farmer Producer Organisations (FPOs) in Gorakhpur (Surabhi Seeds FPO and Rohin Rapti Sabzi FPO).Primary producers are the shareholders of the FPO and they contributed 100 rupees each towards the share capital. Prior to the launch of seed production enterprise, a feasibility study was conducted in Jungle Kauria Block of Gorakhpur.[5] IRRI introduced 14 varieties of rice over the years in Gorakhpur, and since the launch of the Surabhi FPO the focus was on farmer-led seed production and its sale through the FPO channel. The details of multi-stakeholder interactions and major findings are discussed below.

Stakeholder interactions

Table C2.1: Multi stakeholder interactions at Gorakhpur

Actor domain	Public	Private	Independent
Day 1	GEAG		Seed Growers Group-I
Day 2	KVK	Input dealer	Seed Growers Group-II Seed Growers Group-III Non-SHG Seed Growers
Day 3	KVK, Gorakhpur Dept. of Agriculture Dept. of Plant Protection		PRDF
Day 4			IRRI Researcher

Stakeholders

The major actors in the rice seed value chain were identified and are presented in the table below.

Table C2.2: Stakeholder Matrix of rice seed system innovation in Gorakhpur

No.	Stakeholder	Partners	Functions
1	Gorakhpur Environmental Action Group (GEAG)	KRIBHCO DoA ATMA State Agricultural University(SAU) KVK	Formation of women SHGs Promoting the seed-based FPO Conducting Head to Head and Cluster demonstrations
2	KRIBHCO	GEAG	Supply of farming inputs through the societies
3	IFFCO		Supply of farming inputs through the societies
4	Private input dealers	CISCO	Supply of farming inputs, including seeds, fertilizers, pesticides and herbicides
5	PRDF	DoA, KVK, SAUs GEAG	Seed production, processing and certification Technical advisory support Seed storage

[5]GEAG Annual Report, 2015-16

			Seed research Organic seed production and promotion
6	ATMA		Multi-stakeholder alliance promotion
7	KVK	SAUs GEAG ATMA Media	On-farm trials of new seed varieties Frontline demonstrations Seed cafeteria Technical training and information support to DoA and GEAG Promotion of technical information using multiple methods, including multimedia (SMS, videos, social media)
8	Primary Agricultural Cooperatives	DoA Farmers	Supply of farm inputs Farmer registration and grain procurement
9	Self Help Groups	GEAG	Agricultural activities, including seed production
10	Department of Agriculture	KVK ATMA GEAG	Seed Village Programme Extension programmes for seed promotion Supply of farm machineries Assessment of seed demand and supply of seeds
11	Department of Plant Protection		Technical services for seed storage
12	IRRI		Introduction of seed varieties Participatory varietal trials and selection Head to Head and Cluster demonstrations
13	Farmer Producer Organization	GEAG, SHGs PRDS	Seed aggregation and sale
14	State Agricultural Universities	KVK, DoA, PRDS, GEAG	Production of breeder seeds Sale of certified seeds
15	Uttar Pradesh Seed Bhandar Nigam (USBN)	DoA	Procurement of seed from multiple sources Supply of Truthfully Labeled Seed (TLS)
16	UP Agro	GEAG	Supply of certified seeds Distribution of chemical fertilizers, pesticides Distribution of the grants provided by the government for the construction and repair of various kinds of bull- and power-driven agricultural machinery/equipment.
17	UP State Seed Certification Agency	KVK	Certification of seeds

Stakeholder engagement across the seed value chain is presented in Fig. C2.1.

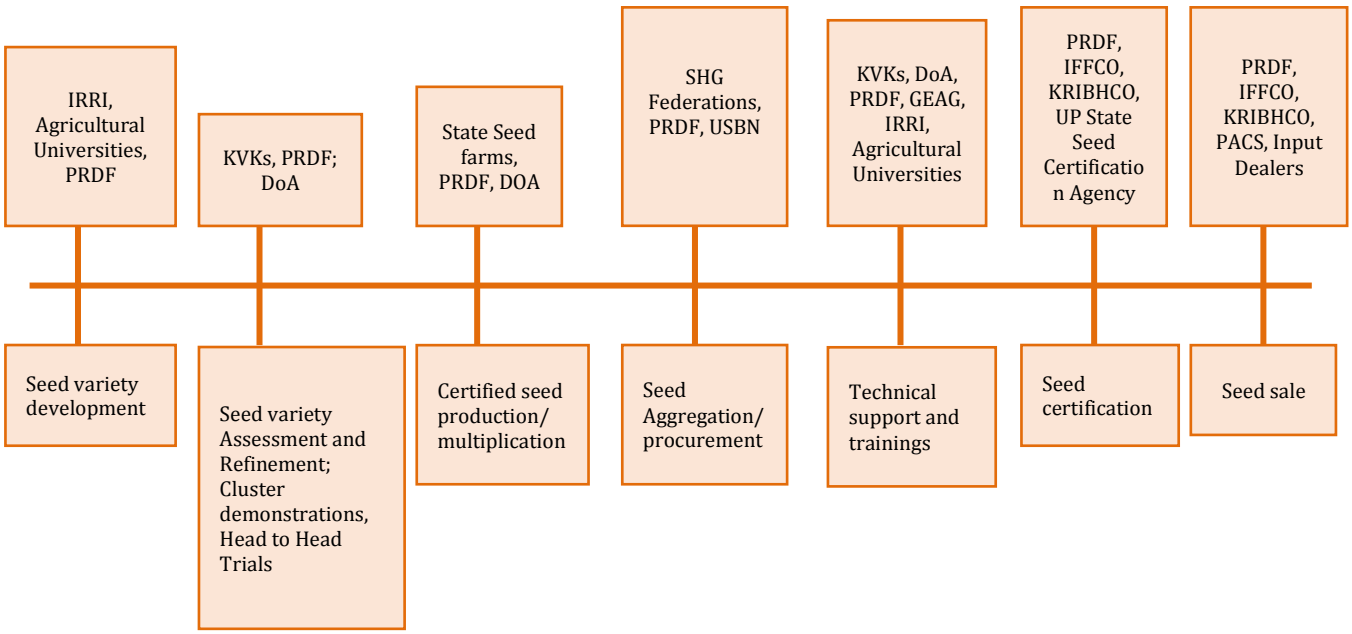


Fig C2.1: Stakeholder engagement across seed value chain in Gorakhpur

Table C2.3: Details of *Sahbhagidhan* variety at Gorakhpur

Name of the variety	Introduced by	Promotion of seeds	Local facilitating agency	Duration	Method of growing	Mode of Sale	Price of sale	Certification of seeds
Sahbhagidhan	IRRI (2014)	FPO model	GEAG	110 days	Transplanting	VRCs from Farm Households	1400/q	PRDS

Head to Head trials were conducted prior to the introduction of the variety by cultivating the new variety as well as farmer's variety on farmer's land.

Actor profiles

1. Gorakhpur Environmental Action Group (GEAG)

Gorakhpur Environmental Action Group (GEAG) (http://www.geagindia.org/) is a voluntary organization working in the areas of environment, climate adaptation, and sustainable development since 1975. It has been actively engaged in implementing several developmental projects, earnestly involved in initiatives for reducing vulnerability, tackling livelihood issues of small and marginal farmers specially women. Overall, their work is based on environmental and ecological principles and employs a gender-sensitive participatory approach (GEAG Annual Report, 2017).[6]

[6] http://www.geagindia.org/pdf/Annual%20Report%202014-15.pdf

GEAG gets technical support from KVKs, the Narendra Dev University of Agriculture and Technology (NDUAT), Faizabad, and PRDF. NABARD provided financial support to establish and promote the FPOs of seed growers (revolving fund for its activities). GEAG has been disseminating technical knowledge about seed production (varietal selection, seed treatment, neem[7] leaf treatment of storage bins, etc.) to SHG members with support from its technical partners. However, GEAG has not received any technical support from IRRI on seed varieties supplied by it. In order to ensure timely availability of quality seeds, and to reduce the cost of input, GEAG started promoting seed production among the communities it has been working with. Foundation seeds and certified seeds are procured in bulk from agricultural universities and KVKs.

Table C2.4: Institutional mechanism utilized by GEAG to spearhead its activities

S. No.	Institutional Mechanism	Function
1	Self Help Groups (SHGs)	SHGs are formed as micro savings and micro credit groups of small, marginal and landless women. They are also acting as a strong platform to access the entitlements.
2	Farmer Field Schools (FFS)	An institutional mechanism to provide an effective platform for sharing experiences and solving agricultural problems. It was technically supported by experts from KVK, SAUs, DoA, etc.
3	Agro Service Centres (ASCs)	Established at the village level; formed of small and medium farmers with the objective of providing organic inputs, and agricultural equipment to local farmers.
4	Master Trainers and Model Farmers	Master Trainers, mostly women, are trained as resource persons (RPs) after receiving intensive training in facilitation techniques and communication skills. They impart technical knowledge to the SHG members on various aspects. Model Farmers are selected by GEAG, based on their interest in experimenting with sustainable agriculture.
5	Federation	A Federation is formed by bringing the office bearers/representatives of all village-level institutions (SHGs, FFSs, ASCs, Morcha, Master Trainers and Model Farmers) on to a common platform.

2. Participatory Rural Development Foundation (PRDF)

PRDF (https://www.prdf-agri.com/) is an NGO established in 1998 by Dr RC Choudhary; it focuses on rural development through sustainable agriculture. The organization is involved in testing and development of new seeds suited to the agro climatic locality, and it provides consultancy services to stakeholders, and training support to user groups. PRDF produces and sells three types of seeds, viz., breeder, foundation and certified seeds. Seeds are tested, mass produced, and made available to farmers through its outlets at various locations in UP. Some of the rice varieties developed by PRDF locally and widely adopted by the farmers in Gorakhpur are: *Kalanamak*, *Baunakalain*, BOPT 5204, Swarna Sub 1, etc. Apart from rice it also produces high quality seeds of wheat, lentil, mustard, and pea. PRDF has been appointed by the Government of India as the Regional Council for Organic Certification. Some of the focused activities of PRDF include frontline demonstrations, high value

[7] *Azadirachtaindica.* Commonly called Neem in India.

crop production, biofortification for Zinc, Iron, and Vitamin A, orange-fleshed sweet potato, and development of drudgery reducing implements for women, etc. PRDF is a technical partner (through resource persons) for GEAG(master trainers) for training FPO members/farmers in processing and storing of rice seed. It also supplies foundation seeds to seed growers of GEAG.

3. Krishi VigyanKendras (KVKs)

Two KVKs are active in Gorakhpur. One KVK in Gorakhpur is hosted by NDUAT, Faizabad, and the other by Baba Gorakshanath Trust (an NGO). The University KVK performs various mandated roles, such as technology assessment and refinement, training of farmers and rural youth, and technology demonstration (zero tillage, direct seeded rice). KVK is also engaged in implementing the NFSM by organizing cluster demonstration as well as by carrying out technology demonstrations under the National Innovations on Climate Resilient Agriculture (NICRA) project of ICAR. This KVK also had collaboration with IRRI for implementing the CSISA project in Gorakhpur. It has deployed various mechanisms for technology dissemination, like mobile-based SMS and applications, KVK portal, voice messages, etc. It also conducts Kisan Goshtis and field days to reach a wider audience. It procures foundation seeds from NDUAT and sells back the truthfully labeled seed. The KVK also supplies small farm machineries to farmers on a custom hiring basis.

The second one is a new KVK hosted by a local NGO; it was recently established in Gorakhpur district. The extension mechanisms deployed by this KVK includes WhatsApp groups of farmers, YouTube videos on good agricultural practices. The crop cafeteria set up by this KVK showcases 34 rice varieties. They also conduct cluster demonstrations on rice, oilseeds and pulses. However, this KVK doesn't have any collaboration with IRRI, though it has linkages with ICAR institutions and universities. The KVK has also put forward a proposal for establishing a seed processing plant to help farmers in grading quality seeds prior to selling. The KVK scientists consider non-availability of quality seeds at the appropriate time as the biggest challenge facing farmers/other stakeholders in this area.

The KVK scientists are helping GEAG in technology backstopping through farmer trainings. The KVKs are also providing technical support to DoA in conducting various training programmes and demonstrations.

4. Farmer Producer Organization (FPOs) and SHGs

GEAG has mobilized 340 SHGs in Gorakhpur so far. The SHGs were organized into a federation by GEAG in Gorakhpur. SHGs were mainly promoting seed production of crops. Initially the federation got the seeds of high yielding varieties (HYVs) of rice from IRRI through the SAUs. The seeds were distributed to the members of SHGs on condition of retuning a specific quantity (1.25 kg for each kg of seed received) after harvest. The seeds thus collected were aggregated at the Village Resource Centers (VRCs) and stored for further distribution.

Currently, seed production and marketing are taken up as an enterprise by launching FPOs from among the SHGs. Rice and vegetables seeds are produced and sold by the FPO through the village resource centres (VRCs). The SHG members have also started production of vegetable seeds under the guidance of GEAG. They are also getting trained for making value-added products from the vegetable pulp after the extraction of seeds. Farmer-to-farmer knowledge exchanges are conducted through Field Days and cross village visits, organized/facilitated by GEAG.

FPO management is depicted in Fig. C2.2 below.

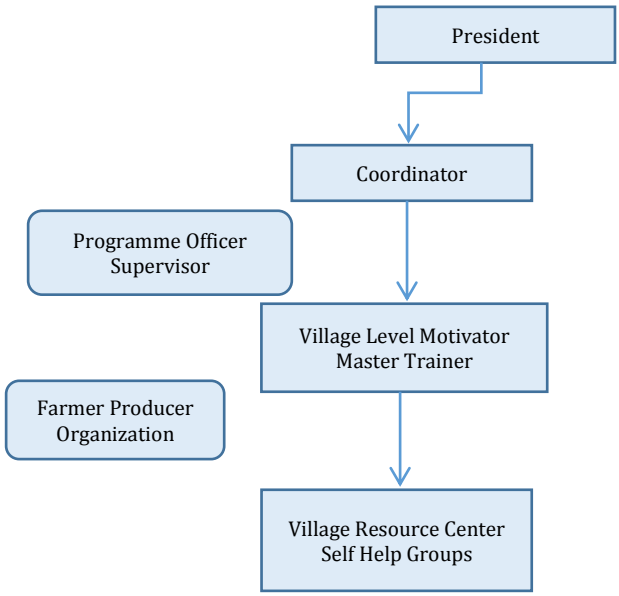


Fig C2.2: Management structure of FPO

Village Resource Centres (VRCs) are channels for the distribution of seeds to SHG members and for collection and storage of returned seeds. The SHG members manage the VRC. The VRC procures seeds from the seed growers and sells it on demand after keeping a margin of INR 20/kg of seed. Initially, GEAG distributed 4-5 kg of *Sahbhagidhan* seed to 40 farmers through the VRCs (to those who were willing to experiment with the new variety and had suitable land for its cultivation). Seed banks were installed at the VRCs for mass storage of seeds after its procurement.

5. Department of Agriculture (DoA)

The DoA is implementing many of the central sector schemes, such as seed village scheme, in connection with the promotion of seed varieties. Seeds come to the department mainly from UP Agro, IFFDC, UP Beej Vikas Nigam, and KRIBHCO as well as NDUAT. The department oversees the distribution of seeds through the cooperative (PACS) to the farmers. It also provides technical support to GEAG in conducting training programmes and demonstrations. DoA makes the indent for the seeds that are in demand in every season, based on the sowing data from the previous year. However, from the KIIs with the department officials it is quite evident that the demanded varieties are rarely supplied. The DoA is equally concerned about the limited seed processing capacity at the district level that becomes a stumbling block in the promotion of seeds system activities.

6. International Rice Research Institute (IRRI)

Under the CSISA project, IRRI had introduced a number of rice varieties in Gorakhpur. GEAG was the local partner and seeds were distributed through the VRCs to the SHG members. IRRI has introduced 13 varieties so far in this locality, including *Sahbhagidhan,* after conducting varietal trials. However, farmers also had preference for other varieties developed by PRDF like *Kalanamak,* which is well-suited locally and performing well. But the role of IRRI was limited to the introduction of new varieties and it had little or no role in providing continuous handholding/technical support to SHG members. IRRI did not impart crucial knowledge, for example on seed storage to the members (as in the case of Odisha where super bags were distributed to seed producers), and technical knowledge on various other aspects. The seed system alliance of IRRI was mainly limited to SAUs, GEAG, and SHG members. This was evident from the KIIs with the other actors, like DoA, KVK and local input dealers. They were not even aware of the varieties promoted locally by IRRI. This can be construed

as a major drawback, which hinders the diffusion of new rice seed varieties promoted by IRRI, and their uptake at scale.

Rice seed scenario at Gorakhpur

Timely availability of quality seed is the major constraint faced by farmers. Besides this, smallholder seed growers are finding it difficult to get the seeds that are procured owing to lack of a procurement mechanism and certification. Farmers have inadequate knowledge about the proper seed storing mechanisms resulting in spoilage of seeds due to excessive moisture content. Confidence in the quality of seeds is a major issue, which makes farmers reluctant to purchase seeds from unfamiliar sources other than the private input dealers and SAUs. Unlike in the case of Odisha, the farmer-to-farmer seed exchange mechanism is not robust in Gorakhpur. Seeds are traded among the farmers only on a monetary basis and free exchange happens rarely. However, the seeds of *Sahbhagidhan* were distributed to the SHG members (500 g each) free of cost to only those members who were willing to experiment with the new variety. On the other hand, according to the FGDs, the SHG members were willing to purchase good quality seeds even if they have to pay for it.

C3.Farenda Block,Maharajganj District, Uttar Pradesh

Context

IRRI, in collaboration with Grameen Development Services (GDS), promoted several rice varieties in the Farenda block, Maharajganj district of UP. Basically the varieties were introduced after participatory varietal trials, and Lehra Agro FPC was used as the channel for promoting the seeds among farmers. GDS is functioning in the Farenda block of the district. This block adjoins Gorakhpur district on one side and the Terai region of Nepal on the other side. It is closer to Gorakhpur than to its own district headquarter. Maharjganj district falls under the Gorakhpur administrative division. Agriculture is a challenging task for the farmers of Farenda as the region is characterized by twin challenges – both floods and drought. The major cereal crops in the district are wheat and rice, whereas sugarcane is the most important cash crop. More than 83% of the farmers of this district have landholdings of less than one hectare and tube wells are the main source of irrigation. The major constraints for development in the district are: deficiency of macro and micro nutrients, especially phosphorus and potassium, uneven use of fertilizers, inadequate power supply, poor availability of HYV seeds of vegetables, lack of post-harvest handling facility for vegetables, dearth of good agronomic practices, poor infrastructure facilities, etc.

Stakeholder interactions

Table C3.1: Multi stakeholder interactions at Farenda Block, Maharajganj

Actor domain	Public	Private	Independent
Day 1	GDS		GDS Personnel FPC Center
Day 2	KRIBHCO	Input Dealer	Seed Producers' Group I Seed Producers' Group II
Day 3	IFFCO Sales Centre		Seed Producers' Group III Seed Producers' Group IV

Stakeholders

The major actors in the rice seed value chain were identified and are presented in the table below.

Table C3.2: Stakeholder Matrix of Rice Seed system Innovation in Farenda Block, Maharajganj

S. No.	Stakeholder	Partners	Functions
1	Grameen Development Services (GDS)	IRRI KVK FPC Seed Growers DoA SAUs	Mobilization of SHGs Organizing the seed growers and formation of Lehra Agro FPC Linkage facilitation for the FPO with banks, SAUs, KVK, UPSCA Construction of seed banks for seed storage Provision of technical information for seed production, seed processing and storage Facilitation of FPC sales-cum-procurement center Sourcing and supplying of foundation seeds for the seed growers from agricultural universities and IRRI Participatory Varietal Trials (PVT) in association with IRRI of 13 rice varieties
2	Private Input Dealers	Plant Protection Department Seed Growers	Supply of inputs, including fertilizers, pesticides and seeds including hybrids Information support for farmers
3	Farmer Producer Company/ Seed Growers	GDS Private companies KVK	Seed production of multi commodities Sale of seed to FPOs
4	KRIBHCO	Input suppliers NSC Agricultural Universities Seed Growers	Sale of inputs Extension outreach activities Conducting Kisan Melas to publicize products, including new seed varieties
5	IFFCO Sales Centre	Agricultural Universities NSC Seed Growers	Sale of inputs Knowledge support Soil testing service
6	Department of Agriculture (DoA)	ATMA KVK,GDS	Technical information and advisory services, including soil testing Seed village programme Supply of quality seeds through cooperatives Subsidy for solar pump and micro irrigation
7	Krishi Vigyan Kendra (KVK)	ATMA, DoA, GDS, SAUs	Production of Foundation seed from Breeder seeds of universities On-farm trials and demonstration of seed varieties

8	IRRI	GDS, PRDF	Provision of seeds of *Sahbhagidhan* PVS in coordination with GDS
9	National Seed Corporation (NSC)	Seed Growers, IFFCO, KRIBHCO, DoA, RKBB	Supply of foundation seeds
10	Rajkiya Krishi Beej Bhandar (RKBB)	NSC, Farmers	Farmer registration for seed supply On-demand generation of seeds using the seed grower network Supply of certified seeds
11	NDUAT	KVK, Seed growers, GDS	Supply of foundation seeds Technical information support
12	UP Seed Certification Agency	GDS, FPC	Seed certification service Supervision of seed production according to the specified norms
13	ATMA	DoA, KVK, SAUs, GDS	Agricultural development planning Coordination of line departments
14	PRDF	IRRI, Farmers, Seed Growers, SAUs	Supply of certified seeds Seed storage facility Certification of seeds

Stakeholder engagement across the seed value chain is presented in Fig. C3.1.

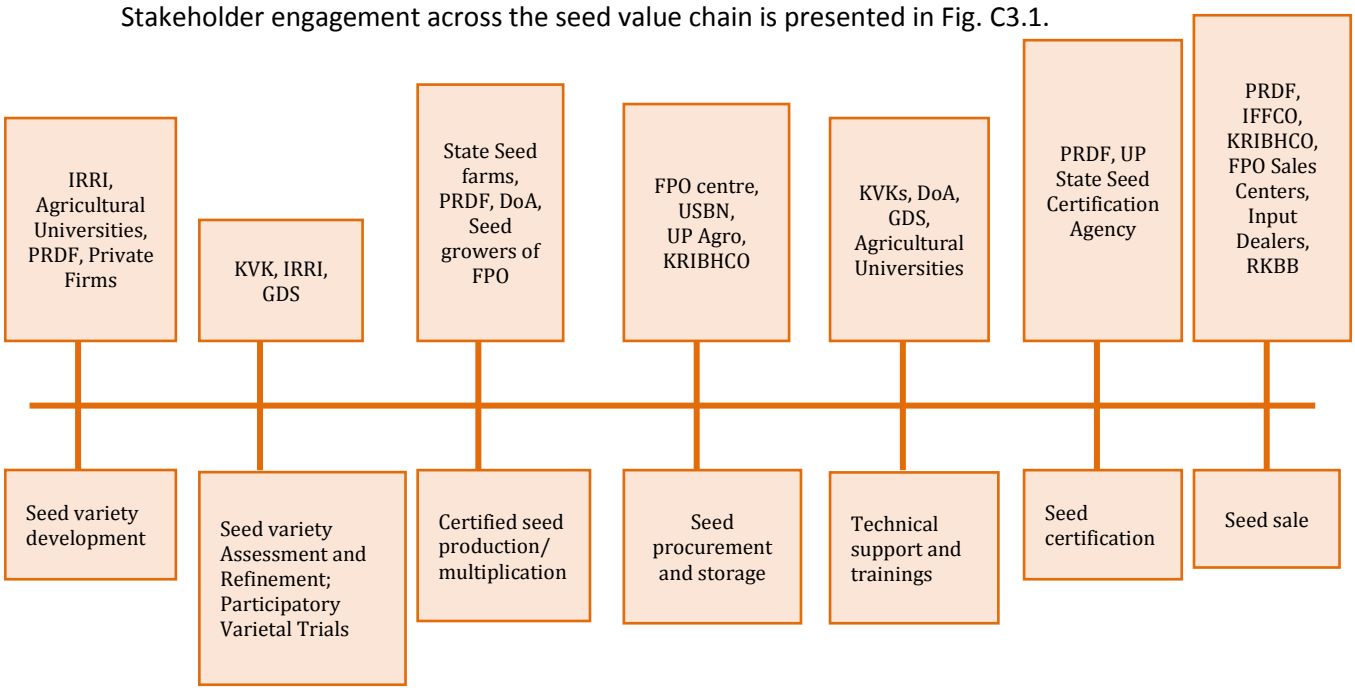


Fig. C3.1: Stakeholder engagement across the seed value chain in Farenda Block, Maharjganj

Actor profiles

1. Grameen Development Service (GDS)

Established in 2000, GDS has a presence in nine different locations. Initially it started working with traditional rural artisans and then broadened its field-based interventions in Eastern UP, focusing on strengthening women's livelihood in the rural areas by organizing poor women into SHGs. It was in 2000 that the organization started its operations in the flood-prone areas of Maharajganj, with focus

on a Community Based Disaster Preparedness model that integrates preparedness, livelihoods and advocacy. Presently it is working in 136 villages, of which 53 are flood prone.

The collaboration with IRRI was initiated in 2008, mainly in the areas of development of drought/flood tolerant varieties (Narendra 97), participatory varietal trials, etc. A federation promoted by GDS, the Grameen Vikas Trust (GVT) is working for the welfare of women and it addresses the issue of domestic violence. Trainings are offered to women on several aspects, such as seed production, nutrition and sanitation. The SHGs also play a catalytic role in facilitating credit to the members.

GDS provides technical knowledge support to the seed growers of the FPC on nursery preparation, seed transplantation, observing certain quality parameters during seed production. GDS also gives advice to farmers on which seed varieties the farmers should select (based on land type) in order to generate awareness on the need for quality checking while using seeds from private companies.

2. Lehra Agro Producer Company Ltd. (LAPCL)

SHGs promoted by GDS were already producing seed since 2003 under the Krishi Samrakshan Sangathan. However, it is only in 2010 that an FPC was established for undertaking organized seed production, its certification, and aggregation for sale. The idea of an FPC was conceived by GDS and it registered it as Lehra Agro Producer Company Ltd., an FPC of seed producers, under the Companies Act. LAPCL has 663 farmers (including 139 women) as shareholders with a share capital of Rs. 10 per individual. It has 10 board members who are elected every year. There are 143 groups under the FPC. However, only 16 seed producers are currently producing rice seed under this outfit.

The varieties multiplied under the rice seed production programme include Sarju 52, *Sahbhagidhan*, Bina 11. The field level supervisors of GDS and the officials of UPSCA supervise seed production. After production, the seeds are collected, processed, graded, packed, and sold under the label of the FPC. LAPCL also provides other services, like supply of certified seeds to members and other farmers, buy-back arrangement for seeds, and supply of farm inputs and agro machinery on a custom hiring basis. Also, it has rented a storage godown for rice with a capacity of 1000 quintals. FCI gave technical training on seed storage to the members of FPC, and the UP Seed Certification Agency gave training on quality seed production.

Initially, the FPC launched extensive outreach activities to convince the farmers regarding its seeds. A group of 10-15 FPC staff visited many villages and had interactions with the villagers. Village-level advertisements were put up by the FPC extension staff who roamed in the villages on bicycles wearing hats with the message, “Paddy before flood” on it. Moreover the FPC identified community leaders who commanded trust among the villagers and deployed them to interact with the farmers. These multi-dimensional efforts helped in gaining the confidence of the farmers in the seeds produced by the FPC.

However, the varietal preference of the farmers was determined by local weather conditions. *Sahbhagidhan* was mainly preferred in drought years whereas *Sambamansuri* was preferred in flood years. FPC sourced seeds from: NSC, SAUs, and private input dealers as well as its own seed growers. It sells quality certified seeds to other farmers in Maharajganj. Though the FPC seed growers initially started with rice and wheat seeds, they have since diversified into production of vegetable seeds (okra, bottle gourd, mung, cowpea, etc.), as well as oilseeds (groundnut).

Problems with the FPC model include the necessity to pay monthly GST returns since it is a profit-oriented company, and lack of adequate working capital. The NABARD funding is mainly for establishing the FPC and making it operational. MFI loans are not preferred as the company is profit oriented. The FPC has availed a credit of INR5 lakh from the SHG federation on 12% interest to meet its working capital requirements. The future focus of the company is to bring more farmers under

the seed production programme, construct/obtain more facility for seed storage, and expand into processing, and develop contingency plans for both drought and flood, etc. The FPC also diversified its business portfolio by selling fertilizers and pesticides in addition to seed. It has a main sale center outlet and two sub centers. It is procuring seeds mainly from NDUAT and IIVR, Varanasi. Other support services offered by the FPO include training on organic manure production, seed production aspects, etc.

3. KRIBHCO

KRIBHCO conducts farmer-oriented activities, like farmer meetings, Kisan Melas, field demonstrations, field days, product promotion campaigns, and so on in and around Farenda block in Maharajganj. KRIBHCO supplies critical farm inputs, such as certified seeds, bio fertilizers, chemical fertilizers, compost, and micronutrients through its sales centre (Sewa Kendra).It has its own network of progressive farmers who produce certified seeds under the technical supervision of KRIBHCO officials and the state seed certification agency according to prescribed seed production practices and gets it passed through all required standards so as to ensure appropriate quality and genetic purity. For quality control it also has a seed-testing laboratory. The seeds produced are being made available to farmers through Krishak Bharati Sewa Kendra, cooperative societies, state cooperative marketing federations, and KRIBHCO dealers. In Maharajganj, the cooperative organization has a Sewa Kendra to serve the farmers.

4. IFFCO

IFFCO, another major farmers' cooperative, has a state-of-the-art input supply outlet at Farenda. The outlet was established recently, and it sells certified seeds and hybrid seeds. The center generates demand for a season based on the previous seasons' seed supply data, and farmers need to get registered to get seeds. Besides seeds the center also supplies fertilizers. The IFFCO head office in Delhi NCR centrally decides all the policies, as well as the functioning of such outlets.

Seed Supply Scenario at Farenda, Maharajganj

Farmers and seed growers linked to GDS procure seed from multiple agencies. Breeder seeds of rice are mainly produced by private agricultural firms, SAUs, PRDF and IRRI (in the vicinity). The seeds are then supplied to contractual seed growers, KVKs, and State Seed Farms where it is multiplied into foundation seed. The National Seed Corporation (NSC) also produces breeder and foundation seeds and supplies it to various organizations, including KRIBHCO, IFFCO, DoA, PACSs, RKBB, etc. PRDF also offers seed certification services to various agencies. The UP Seed Certification Agency is the official government department mandated with certification of the seeds and it offers services to the FPC. Farmers and seed growers (who are the ultimate consumers of seed) get certified seeds from private agencies, RKBB (only the large farmers), PACS (only the influential farmers), GDS, SAUs and PRDF. Even though there is no formal linkage, the FPC also gets seeds from the NSC, if required. However, due to the untimely (late) arrival of seeds, this linkage is weak. Though not robust, farmer-to-farmer seed exchange mechanism also prevails in Farenda where such exchanges are mostly confined to personal relationships, and are limited to villages.

There is a shortage in supply of quality seeds and planting material in this area. Seed Replacement Rate (SRR) of wheat as well as of hybrid seeds in vegetables is poor.[8] During the FGDs it was evident that migration for labor is widely prevalent in the area. The male members of farming families migrate for seasonal jobs to other parts of the country every year. This is leading to more and more involvement of women in agriculture, who have to take the lead in farming including the seed

[8] http://agriculture.up.nic.in/WriteReadData/CDAP-RKVY/Maharajganj.pdf

production activities initiated by the FPC under the GDS. Moreover, the block has witnessed unpredictable weather patterns over the years. Though drought was a common occurrence, last year the entire block witnessed devastating floods leading to widespread crop loss. This had implications on their varietal preference with respect to rice and wheat also. As varieties like *Sahbhagidhan* are more drought tolerant, after the flood last year its demand declined this year; also in many villages the entire stored seed was washed away. Varieties like *Samba mansuri* and Swarna Sub 1 are the preferred varieties in 2018.

The process of seed systems development of *Sahbhagidhan*

Organized seed production under the FPC was started in 2010. Initially the farmers did not readily accept the seeds produced by the FPC as they were skeptical about its quality and performance. The FPC organized a variety of promotional programmes and leveraged the assistance of village opinion leaders to propagate its seeds. The seeds were procured from farmers by paying them 10 percent more than the existing market rate. However, the farmers of the locality had more interest in research varieties and this led the GDS to diversify into wheat seed production (BRRI 75/71) and pulses. Presently there are 28 seed growers who grow rice, wheat, and pulses. To ensure the quality of seeds produced, a team comprising members from FPC (3) and GDS (10) are supervising the entire production. *Sahbhagidhan* was introduced to the farmers only in 2014. So far, *Sahbhagidhan* has been grown for 3 seasons, according to the seed growers and sold back to the FPC at INR 60/kg Earlier, they were growing varieties like Ankur and Swabhiman, which are long duration and high yielding. However, in the absence of rain, these varieties were underperforming, which led to crop and financial losses for them. Farmers had a preference for *Sahbhagidhan* as the grain is good for making local rice dishes (Muri) and the straw is much preferred by cattle. The FPC has established direct linkages with the university to procure foundation seeds. Some farmers were trying to procure *Sahbhagidhan* for cultivation in their uplands for the current season, however, there seems to be a shortage in the supply of foundation seed.

Prerequisites for seed production laid out by the FPC are: 25 acres of land in a village which should be contiguous, and strict adherence by the growers to certain parameters (such as isolation distance, roguing, etc.).

Since 2010, farmer preference keeps on changing with respect to seed variety. Greater preference is for the research and hybrid seeds. The area is water abundant and witnesses occasional droughts and floods. The seed exchanges among the farmers are of two kinds. The first mechanism is purely financial; and in the other, conditional exchanges are happening with return of 1.5 times of seed after harvest.

The main constraints with respect to the adoption of *Sahbhagidhan* are:

- Non-availability of seeds in the open market;
- Performance of the variety is largely based on the land under cultivation – the variety will perform only in uplands and medium uplands;
- Basically a drought tolerant variety; hence it won't perform in case of flood.

Other major bottlenecks with respect to seed production are:

- Lack of technical knowledge on seed storage;
- Mixing of different varieties;
- Lack of knowledge on seed treatment;
- Dependence on traditional knowledge for checking germination viability.

C4. MayurbhanjDistrict, Odisha

Context

This part of Odisha is characterized by proximity to forests, presence of wildlife enclosures, and an undulating rainfed terrain prone to intermittent/recurrent droughts and dependence on Rice (in kharif) as a food security crop. There are patches in this area where maize is also cultivated. Availability of quality Rice seed is one of the major lacunas faced by rural producers inhabiting the remote villages of this district. *Sahbhagidhan* was introduced in 2014 in Jasipur and Karanjia blocks of Mayurbhanj by IRRI through a tripartite agreement between CSISA, PRADAN and SHG federations of women (promoted by PRADAN) in these blocks. Initially, IRRI started varietal trials in this area through CSISA project. Some of the technological interventions/innovations in Rice are enlisted in the table (Table C4.1) below.

Table C4.1: Timeline of introduction of technological innovations in Rice at Mayurbhanj

Year	Innovation	Participating Agencies
2005	Line to line sowing	DoA, PRADAN
2007	Line transplanting	DoA, PRADAN
2010	System of Rice Intensification (SRI)	DoA, PRADAN
2012	Agro machineries	DoA, PRADAN, CSISA
2013	Seed treatment of Rice	DoA, PRADAN, CSISA
2014	Introduction of *Sahbhagidhan*seeds	DoA, PRADAN, CSISA, IRRI
2015-2017	Production of Rice seeds	Federations/ SHG women/farmers

Stakeholder Interactions

The major actors in the rice seed value chain were identified and are presented in the table below.

Table C4.2: Stakeholder matrix in Seed System Innovation inMayurbhanj, Odisha

Institutions	Activities	Linkages	Joint activities
SHGs/Gram Panchayat-level federations (GPLFs)/ Block federations (BLFs) (Collectives of rural poor women at various levels)	Thrift collection Seed distribution	PRADAN	Training Awareness programmes Demonstrations
		LANDESA	Working for land rights
		NABARD	Supply of agro machineries
		OLM	Technical support
Gram Panchayats (PRI)	Basic agricultural planning	DoA OLM	
Department of Agriculture (DoA)	Looking after the MKSP component of NRLM Promote entrepreneurship under MKSP (custom hiring services) Works through Krishak Sathi (on	OSSC LAMPCS Input dealers Line departments through ATMA	For paddy procurement; partnering with cooperative and revenue departments

	contract; 2/GP) Progressive farmers (8-10/GP) VAWs (each one per GP but now only 7) Seed treatment campaign Demonstrations Crop cutting experiments, Field visits Awareness trainings/ Krishak rath (in Kharif and Rabi) Input distribution, extension activities	OLM KVK PRADAN Gram Panchayat	
PRADAN	Seed multiplication scheme (Tripartite agreement) Super bag concept Crop cutting experiments and demonstration plots Trainings for farmer groups on cultivation aspects Drudgery reducing tools and equipment Working on land rights for women Introduced SRI Convening SHG meetings	CSISA SHG Federation DoA KVK LAMPCS Input dealers	Tripartite agreement with SHG federation and CSISA to implement the STRASA project
KVK, Jasipur	Have presence in joint meetings/ platforms OFTs/FLDs/Trainings Village adoption programme Kisan Mobile Advisory Service (reach of 1.5 lakh farmers) Provision of soil health card	OUAT ATMA OSSC DoA OLM	Collaboration with OUAT for adaptive trials
International Rice Research Institute (IRRI)	Trainings to Community Resource Persons (CRPs) Supply of *Sahbhagidhan* seed to OSSC and SHG Federation	PRADAN OSSC	Collaboration with PRADAN and OSSC for seed supply
Odisha Livelihood Mission (OLM)	Credit provision; Capacity building Training, Handholding support and Good practices awareness; Custom hiring services of agro machineries (Common Facilitation Centre); Works at the grass root through Krishi and Bank mitra; Institutional Development Fund; Common Investment Fund; Safe Livelihood Fund; Financial literacy programmes for SHGs which are coming up with micro investment plans	DoA SHG Federation Agro Machinery Firms Tribal Development Cooperative Society	Implementing partner of PRADAN for CB Convergence with TDCC which procures forest produce

Large Area Multi-purpose Cooperative Societies (LAMPCS)	Supply of inputs including seeds (rice) at a subsidized rate; Issue of KCC and credit; Procurement of paddy; Registration of farmers	OACC Paddy Procurement centre; Odisha State Civil Supply Corporation Ltd. (OSCSC); Food Corporation of India (FCI); Regional Regulated Market Committee (RRMC)	Collaboration with OSSC for seed supply; With FCI, OSCSC for rice procurement With RRMC for quality checking of rice
Certified Input Dealers (CIDs)	Supply of seeds, pesticides, fertilizers, agro machineries; Information provision to farmers	OUAT Private Firms OSSC OAIC	With OSSC/ OUAT/OAIC for sourcing inputs like certified seeds
Bank of India (Lead); Canara Bank; Odisha Gramya Bank; State Bank of India; Union Bank of India	Channels for various financial transactions with regard to seed supply	Departments SHG/GPLF/BLF OLM	With PRI, DoA, OLM and SHG federations for channelizing financial transactions
Media	Popularization of various agricultural schemes/programmes		
ATMA	Coordination of line departments for developing agricultural plans	KVKS Line Departments	With various line departments, NGOs and KVK
OUAT	Production of foundation seeds; Resource persons; Information dissemination and trainings	Certified Input Dealer NRRI, Cuttack KVK	With KVK for adaptive trials
CRRI/NRRI, Cuttack	Production and distribution of breeder seeds	OUAT	
Odisha Seed Supply Corporation (OSSC)	Production of foundation seeds; Supply of Certified seed to LAMPCS, Private input dealers	LAMPCS CIDs DoA NRRI, OAIC	With OAIC: developing certified seeds With DoA, CIDs for supply of seeds
Odisha Agro industries Corporation (OAIC)	Foundation seeds production; Agro machineries		With OSSC
NABARD	Formation of Farmer's Clubs	SAMBAND	
CSISA Cereal System Initiative for South Asia (CSISA)	Joint project of IRRI, CIMMYT and IFPRI; *Sahbhagidhan* introduced; Technology dissemination; demonstrations, ICT; Promotion of farm mechanization in paddy cultivation	PRADAN DoA OSSC SHG Federations	SHG federations and PRADAN

Extension mechanisms prevailing at Mayurbhanj to facilitate technology dissemination in Rice is illustrated in Table C4.3.

Table C4.3: Extension mechanisms at Mayurbhanj, Odisha

S. No.	Extension Functionaries	Agency	Activities
1	Krishak Sathi (contracted farmers of DoA)	Department of Agriculture	Trainings, Demonstrations
2	Key Farmer/Progressive Farmer		Awareness on new technology
3	Village Extension Worker, Staff of DoA		Demonstration
4	Krishi rath (Kharif and Rabi)		Awareness and dissemination of technology using exhibits, street plays, videos, printed materials
4	KrishiMitra/Bank Mitra/PraniMitra	OLM	Handholding support, Training to groups of OLM
5	Community Resource Person/ Resource Person	PRADAN	Promotion of GAPs SRI systems New seed varieties Trains Krishi Mitras and SHG members
6	Input Dealers	Agriculture graduates	Supply of agro inputs and machineries Information support to farmers
7	Kisan Mobile Advisory Service	KVK, Jasipur	Weekly mobile advisory to registered farmers
8	Rice Crop Doctor (Decision Support System)	IRRI	Used by the field experts of IRRI/RPs of PRADAN for fertilizer recommendation
9	External Livelihood Support Person (ELSP)	OLM	Offers training to Krishi mitras of OLM and those who are trained by the experienced professionals of DoA

Actor Profiles

1. Cereal System Initiative in South Asia (CSISA)

CSISA is led by CIMMYT, IFPRI, and IRRI and is funded by USAID and BMGF. It is a regional initiative to sustainably increase the productivity of cereal-based cropping systems, thus improving food security and farmers' livelihoods in Bangladesh, India and Nepal. CSISA partners with public and private actors to support widespread adoption of resource conservation and climate resilient farming technologies and practices. CSISA played a pivotal role in promoting the *Sahbhagidhan* variety in the region. CSISA provided training to Master Trainers of PRADAN who then trained CRPS on topics related to:

a. Awareness on characteristics and benefits of Sahbhagidhan;

b. Seeding technology: Direct Seeded Rice (DSR);
c. Recommended dosage of inputs for paddy through Rice Crop Manager (RCM) of IRRI;
d. Custom hiring of farm machineries for the benefit of farmers;
e. Demonstrations and crop cutting experiments;
f. Post-harvest management of rice- introduction of 'super bags';
g. Training on better seed storage and management practices.

CSISA established partnership and linkages with: a) KVKs (KVK farms and farms of adopted villages) were used for trials and demonstrations; b) OLM for supply of machineries; c) DoA to channelize the seed distribution of *Sahbhagidhan* through DoAH (also maize promotion activities); d) Venkys & Eastern Hatchery for supply of maize produce for trials and demonstrations as poultry feed; and e) Seed Companies for supply of seeds.

2. SHG Federations of PRADAN, Jasipur and Karanjia Blocks, Mayurbhanj, Odisha

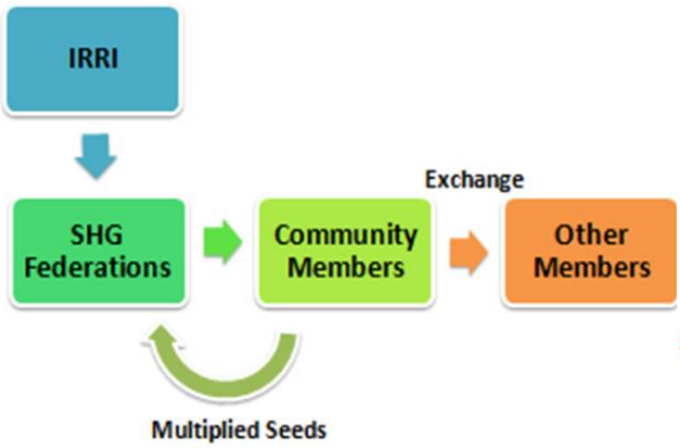
The SHGs are collectives of rural poor women, mobilized by PRADAN mainly in the tribal and far-flung villages in the blocks of Jasipur and Karanjia of Mayurbhanj district. Through these groups, not only does PRADAN work on the social and cultural barriers that hinder the empowerment of women but it also works on the identity of women as farmers. Since agriculture is one of the major livelihoods of the poor, smallholder tribal women in this region, interventions are mainly focused on promoting agricultural activities. These SHGs at the grass root level are a platform for facilitating discussion and dialogue among its members on issues pertaining to their livelihood and daily struggles.

Gram Panchayat Level Federations (GPLFs) were constituted after federating all the SHGs in a particular Panchayat. A GPLF provides a common platform for the SHG members to share their experiences and raise their voice (issues/problems). The GPLF has a GP Governing Board and GP Executive Committee. GPLF provides support services to member SHGs, helps in building linkages with various departments and agencies at the Panchayat level; and assists in consolidating/integrating the village level plans of SHGs within the GP plan.

Grouping all the SHGs in a village, clusters were constituted at a level just below GPLFs. These formed VOs (Village Organizations). VOs facilitate participation of women in local governance and act as the connecting link between SHGs and GPLF. Cluster executive committees are constituted – composed of three members from each of the SHGs. There are three sub-committees for each VO (Livelihoods, Health and Sanitation, and Rights and Justice). It also supports the social, political and economic development of the village and vulnerable families to avail entitlements. Karanjia block has 12 GPLFs, which in turn form the Sampoorna Federation. These 12 GPLFs are active in seed sharing and growing. Similarly, Swayam Siddha federation has been promoted at Jasipur.

Fig.C4.1&C4.2: Structure of SHGs

There are clear-cut guidelines on how one can become a member of the federation. The members need to contribute towards registration and annual membership fee. The society is governed by a general body which is represented by the members from various SHGs and is mandated with looking after the day-to-day activities of the society as well as in establishing linkages with various organizations. The GB operates at the block level.



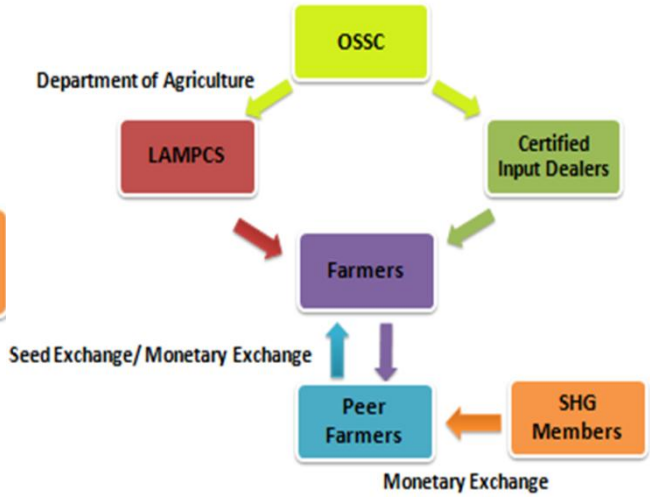


Fig. C4.3: Seed exchange mechanism of SHG federation **Fig. C4.4: Seed distribution mechanism among the farmers**

Some of the activities of SHGs include:

- To create a sense of unity and prepare plans for socio economic and political development;
- Establish bank linkage;
- To select three members to represent the SHG at the 3 committees at the cluster level;
- Select office bearers for management of SHG;
- Hold weekly meetings and discuss various issues.

Table C4.4 clearly elucidates the seed exchange mechanism that prevails among the women SHG members/women farmers.

Table C4.4: Seed exchange mechanisms prevailing among women SHG members

Seeds of *Sahbhagidhan*	Other SHG members	Non-SHG members
SHG members Source of seeds	Exchange on condition of returning the same quantity of seed after the next harvest	Exchange on a monetary basis
SHG Federations (free of cost); Supply strictly based on the condition of returning the same quantity of seed after the next harvest	Exchange with any other preferred seed variety of same quantity (mostly with lowland varieties)	

3. PRADAN

PRADAN started to work in Karanjia block of Mayurbhanj in 2000. Gradually it expanded its outreach to Jasipur block as well. PRADAN promoted two SHG Federations in these blocks: Sampoorna (Karanjia Block) and Swayam Siddha (Jasipur Block). The STRASA project at Mayurbhanj was a tripartite collaboration between PRADAN, SHG Federation, and CSISA. PRADAN conducted a need assessment study by organizing FGDs among the farmers prior to the introduction of the new variety. CSISA trained the field level professionals of PRADAN on the technical aspects for disseminating the *Sahbhagidhan* variety. Training covered several aspects, such as seed treatment, sowing and weed control, pest and disease management as well as post-harvest storage. The trained resource persons of PRADAN trained the SHG leaders in topics related to the cultivation of *Sahbhagidhan*. Emphasis was placed on the need and importance of Seed Replacement during the training as this district has a low Seed Replacement Rate within the state.

Apart from this, specially designed super bags were distributed under this collaboration to the SHG members, at a subsidized price, to store the harvested seeds safely. The seeds were distributed free of cost (@ 2 kg/person) to SHG federations under the agreement that double the quantity would be returned by the producers/purchasers after the harvest. Remarkably, after the harvest most of the members did return the seeds, which were then pooled at the GPLF level and redistributed. The adoption pattern indicated that smallholder farmers with 1-3 acres of land had adopted the new variety to a greater extent, compared to larger farmers. According to the experts of PRADAN, this could have been due to the need for intensive cultivation practices demanded for *Sahbhagidhan*, which dissuaded the larger farmers from adopting it in extensive areas.

CSISA also extended support for better mechanization among the farmers and introduced farm machineries, such as seed driller, rotavator and rice transplanter, and trained the field staff of PRADAN. However, the interventions were limited to post-harvest storage. None of the project partners emphasized the need and scope of value addition of rice or promoting subsidiary enterprises, like mushroom farming, using the by-products of rice cultivation.

Lessons learnt by PRADAN from this partnership

- Only a strong foundation and solid presence enables institutional linkages. Also, the participating stakeholders (in this case, the women SHG members) should be able to claim ownership of the institutions.
- For introducing a new variety, the implementation should be hassle free. All the technological and knowledge inputs should be readily available for better promotion and dissemination of a technology. Messages should be simple as the smallholder farmers have difficulty in understanding complex messages.
- Even after the introduction, there is need for continuous hand-holding support/follow up with the adopters on various technological and material aspects. This was not so rigorous in the case of *Sahbhagidhan*.
- Attention has to be paid to seed sovereignty issues if seed exchange involves traditional varieties.

4. Large Area Multi-Purpose Cooperative Society (LAMPCS)

LAMPCS is a block-level institution of the State Cooperative Department of Odisha. Major functions of these are listed below:

- Receiving certified seeds from OSSC and supply to farmers;
- Procurement of paddy and disbursement of due payment (DBT);
- Registration of farmers and creation of procurement database;
- Quality checking of paddy to confirm Fair Average Quality (FAQ);
- Issue of KCC and credit to farmers.

This institution caters to the input and seed requirement of farmers at a subsidized rate and procures the produce of registered farmers. They connect farmers to the forward chain (for procurement, quality checking and disbursal for processing). LAMPCS is also linked to the backward chain (by linking with OSSC) by receiving registered seeds for selling to farmers. LAMPCS issues an indent for seeds to OSSC based on the previous year's demand for seeds in the block. Farmers, registered with LAMPCS, can sell their produce at a premium price to government procurers. The procedure of registration includes submission of basic details, including landholding of the farmer with LAMPCS. Procurement of rice is strictly regulated by clear guidelines. Only marketable surplus will be procured from a farmer, after deducting the quantity of grains for his family consumption (@ 3 quintal/person) with an upper limit of 40 quintal/day/farmer. The harvested produce will be thoroughly checked for quality (with regard to organic standards and moisture content) and will be accepted by assuring minimum price set by the government. Payment is directly credited to a farmer's account within 2 days of procurement. The procured paddy will be sent to custom mills identified by the Food Supplies and Consumer Welfare Department. Finally, the processed produce is sent to FCI depots or Rice Receiving Centers of the Odisha State Civil Supplies Corporation (OSCSC).

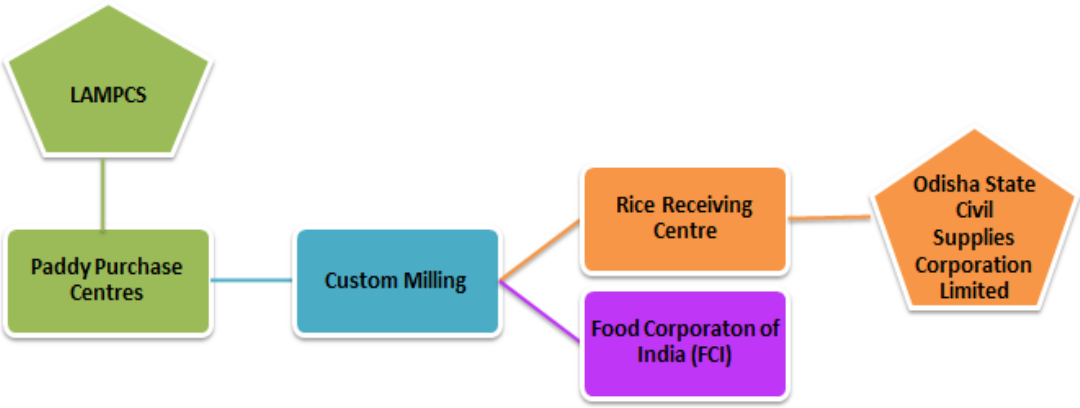


Fig. C4.5: Movement of procured rice from LAMPCS

5. Odisha Livelihood Mission (OLM)

In 2006, the Government of Odisha formed a society named 'Orissa Poverty Reduction Mission (OPRM)' to implement various poverty reduction programmes in the state, which was reconstituted and renamed as 'Odisha Livelihoods Mission' (OLM), an autonomous society under the aegis of the Department of Panchayati Raj, Government of Odisha. The society is implementing the centrally-sponsored scheme of the Government of India called 'National Rural Livelihoods Mission' (NRLM) and The World Bank-assisted project TRIPTI. The project's aim is to enhance social and economic status of the rural poor of all the blocks in30 districts of Odisha through development of self-sustained and community-managed institutions. The targeted poor households are mobilized into thrift and credit-based SHGs, which are in turn federated into higher level institutions at cluster, GP

and block level. Leveraging more funds from banks is an important component under the SHG bank linkage programme. Odisha Livelihoods Mission's aims are to:

• Mobilize all the poor households into functionally effective SHGs and their federations;
• Enhance their access to bank credit and other financial, technical, and marketing services;
• Build their capacities and skills for the development of gainful and sustainable livelihoods;
• Converge various schemes for efficient delivery of social and economic support services to poor with optimal results.

There were 3 GPs under OLM in Karanjia Block, viz.,Badpolasa, Kerkeraand Patbil. OLM has KrishiMitras as the field staff and each GP has 3 such agents. These Krishi Mitras were trained by the External Livelihood Support Person who in turn gets training from experts of the SAU. OLM also had Prani Mitras for the animal husbandry sector, and Bank Mitras to support the members of its SHGs in accessing banking services.

The mission also has a major stake in MKSP in the state, by working with other partners. The focus areas are: a) Sustainable Agriculture; and b) Non-Timber Forest Produce (NTFP). Under the theme of Sustainable Agriculture the emphasis is on ensuring food security at the community level, enhanced managerial capacities of women in agriculture, creating sustainable livelihood opportunities for women, etc.

Scenario of seed exchange in Mayurbhanj, Odisha

2016 was a drought year, which coincided with the trial of *Sahbhagidhan* in this area. As a result many of the producers were able to personally witness the impact of this STRV in this particular location during a drought period. At present, *Sahbhagidhan* is widely adopted by the project-implemented villages and the seeds are available with a large number of women farmers in the community. They are also exchanging these seeds with other farmers within/outside their villages. However, there still persists an unmet demand for seeds from the farming community. This was evident from the KIIs conducted with the officials of LAMPCS located in the study blocks. LAMPCS are the formal channels for the farmers (who are not SHG members) to procure seeds at a subsidized rate (INR 25/kg in case of rice). In 2017 they could not supply the seeds of *Sahbhagidhan* though there was enough demand as they were unable to procure it from OSSC even after raising an official requisition. Certified input dealers are also supplying these seeds at a comparatively higher cost (INR 50/kg of seed), which is often a deterrent for resource poor farmers. Some of the women farmers were also selling seeds to fellow farmers/neighbors on a monetary exchange basis, informally (though such sale needs certification from OSSC). Thus it can be concluded that there should be adequate mechanisms in place to ensure the availability of quality seeds of *Sahbhagidhan*, which has been able to generate high demand in Mayurbhanj. The Community Seed Production Programme implemented by OLM in some other districts and Seed Village Schemes can also be tried for this purpose.

Factors that contributed to the successful diffusion of *Sahbhagidhan*

- Social infrastructure created by PRADAN in the project-implemented villages in the form of women-based SHGs and its aggregation at various levels up to block level federations has helped a lot.
- Vibrant extension activities carried out to create awareness as well as to impart technical know-how about the variety by various agencies like CSISA, PRADAN and DoA through their field level agents. Funding for these activities also came from a variety of sources – MKSP, and direct funding from CSISA project.

- The traditional practice of seed exchange that was already prevalent among the farmers played a large role in successful diffusion of this variety. Involving SHGs as a platform boosted seed exchange.
- Situational or contextual factors prevailing at the locale at the time this variety was introduced, such as drought and water scarcity, also played a significant role.
- Cultivation of the variety in the right kind of terrain helped. The variety is suited to only upland and medium uplands. Due to water logging and submergence during the rainy season, this variety is not suited for lowlands. The agencies sensibly promoted the variety in the right kind of land. Furthermore, they successfully spread this important message among the adopters, which led to its adoption and cultivation only in the suitable plots.

Policy Implications

According to Pandey et al. (2014), the official policy of the state is to achieve a seed replacement rate (SRR) of 33 percent. For rice, farmers traditionally save their own seeds (or exchange with neighbors), and purchased seeds (of high quality) typically account for less than 10% of the total cropped area. In order to encourage farmers to use high quality seeds, various programs of central and state governments are now increasingly emphasizing the production and supply of certified/quality seeds. In the case of Odisha, the SRR for rice increased from a low of 5.4 in 2002/03 to 21.6 in 2011/12. This might result in discouraging the existing exchange systems prevalent among farmers as they might go for purchased seeds in the future. Moreover, experts of DoA and KVK also recommend seed replacement after 3 generations of use.

With respect to Mayurbhanj, the SRR has increased from less than 5 percent to nearly 10% within the same period. Thus it can be concluded that the SRR is gradually picking up in the district though at a low pace.

In LAMPCS there are stringent regulations for procurement of paddy. These are with respect to the inorganic content as well as moisture content in the produce. So farmers should be better sensitized on the quality specifications/aspects on procurement by these agencies.

It is quite clear that even though the demand for *Sahbhagidhan* is quite high, its supply seems to be inadequate. This indicates that the seeds introduced through OSSC and channelized through LAMPCS and private certified input firms as well as the exchange mechanism among farmers are not sufficient. On the other hand, many of the mechanisms to increase the supply of certified seeds, such as community seed production programmes of OLM and seed village scheme of DoA, are not presently functioning in the district. So, these schemes may be launched in these blocks to increase the supply of *Sahbhagidhan* so as to meet the demand for it.

Surprisingly, none of the project-implementing partners have thought of the scope for value addition in rice, and promotion of subsidiary enterprises such as mushroom farming/biogas from the rice by-products. This is an area which still remains under-exploited. KVK, functioning in the district, is not focusing on post-production/value addition of rice. The directives are still focused on farm trials/demonstrations and field visits.

The hay obtained from *Sahbhagidhan* is good for the growth of mushrooms as observed by the SHG members (which has not been validated scientifically). More research in this direction is called for, which may offer an additional source of income for the SHG members cultivating *Sahbhagidhan* on a group basis. Interestingly, the hay obtained from *Sahbhagidhan* was reported to be more appetizing for the cattle than those from hybrids as revealed during FGDs.

It can be concluded that the project succeeded in institutionalizing the age-old practice of informal seed exchange happening among farming communities in Odisha. The social infrastructure in the form of women SHGs promoted by PRADAN in the villages of Mayurbhanj, was well utilized in catalyzing the diffusion of drought tolerant seeds of rice. This not only facilitated in routing the seed exchange through the SHG members – in addition to the farmer-to-farmer direct exchanges– but also ensured speedy diffusion of the variety in the location.

Though IRRI was successful in launching a good yielding rice variety suited to the agro climatic conditions of the locality, it could not track its progress after the launch. At present, with the rigorous field-based interventions of PRADAN along with the vibrant group dynamics of women SHGs, the variety is getting wider acceptance among the rural community. The same variety has been introduced by IRRI at other locales with comparable agro climatic conditions within and outside India. However, there has been no attempt by them so far, in learning/propagating the lessons and good practices deriving from Odisha, where the variety was successfully adopted by the community. Project implementing agencies and farmers from other locations need an opportunity to learn from the factors that contributed to the success of the project in Odisha. In other words, IRRI can facilitate a platform for boosting cross-learning among project stakeholders at different locations.

The KII with LAMPCS of Jasipur revealed that the agency received only half the quantity registered by the farmers for procurement in the last year. According to them, this may be because farmers might be selling the paddy as seeds to other farmers locally. Though only registered firms were endorsed for such sale this may be practiced by enterprising farmers foreseeing the potential demand for *Sahbhagidhan* seeds in the locality. Hence there needs to be a mechanism to ensure the quality of such seeds sold at the local level, along with awareness among the farmers of the need for replacing the seed after three generations, at most.

C5. Nepal

Context

In Nepal, Rice is the most important crop, not only in terms of area under production (grown in 45% of cropped area), but also as a major source of livelihood for more than 70% of farmers. It is grown from Terai (60 masl) to mountain (3050 masl) areas. It is mostly cultivated during the wet season (June to November). It is also grown in spring season (Chaite) under irrigated conditions in small tracts, and in diminishing areas of the upland as direct seeded (Ghaiya). Drought is the major problem affecting rice production in Nepal.

Availability of quality seed of Rice is affected due to very poor systems for formal seed supply of seed in hills where most of the seed comes from the informal sector (farmer to farmer dissemination). The seed replacement in Rice is quite poor – as low as 9%.[9]

Seed supply system in Nepal

The **formal system** of seed supply includes:

[9]2013. Government of Nepal. National Seed Vision 2013-2025. Pg. 8.http://extwprlegs1.fao.org/docs/pdf/nep147056.pdf

- Government (engaged in breeding, seed multiplication, processing, quality control, seed certification, seed storage and distribution);
- Public sector seed company (National Seed Company);
- Private seed companies, seed cooperatives, Agrovets, etc.

The **informal system** of seed supply includes: farmer-to-farmer dissemination (indigenous strategies used by farmers to improve the quality, quantity, and distribution of seed).

Community Based Seed Production (CBSP)

In 2005, IRRI's intervention started with PVS and Farmer Field Trials with eight varieties of paddy – upland irrigated, upland rainfed, and lowland varieties in Tanahun, Lamjhung and Gorkha. Fifteen Seed Producer Groups (SPGs) were part of this programme – 13 are SPGs and 2 are co-operatives under CURE (Consortia for Unfavorable Rice Environment). CBSP originally started in Lamjung, Tanahun, Gorkha and Bajhang districts in Nepal. The project started at Sundarbazar, Lamjung, in 2005 was the key site. Teamwork started first, after forming a farmer's group (Sundar SPG) at Sundarbazar, Lamjung, in 2006. PVS trials on upland rice as well as lowland rice were conducted. It was funded by IFAD TAG 706, BMGF STRASA, IFAD CURE and ASTV.

Box C5.1: Project history in Nepal

IFAD-funded Technical Assistance Grant 706 (IFAD TAG 706), is a rice research project led by the International Rice Research Institute (IRRI), entitled 'Managing rice landscapes in the marginal uplands for household food security and environmental sustainability'. It was launched in Nepal in collaboration with the Nepal Agriculture Research Council (NARC) and the Institute of Agriculture and Animal Science (IAAS). During the period of the project, more than 30 improved technologies in rice and non-rice crops were validated for the mid-hills and Churia hills of Nepal.

After the completion of the IFAD-TAG 706 project in 2008, the IFAD-funded Consortium for Unfavorable Rice Environments (CURE) supported the formation of another seed producer group, Bhrikuti SPG, in 2010. It was the first SPG in Gorkha district. With the establishment of these three SPGs, more and more stakeholders became encouraged to participate as farmers' incomes started rising, and employment opportunities were generated through self-sufficiency, import substitution, and export promotion of quality seeds.

In 2008, Stress Tolerant Rice for Africa and South Asia (STRASA), funded by the Bill & Melinda Gates Foundation (BMGF), provided additional support for the partnership with IAAS. The project aimed to identify drought tolerant, improved rice varieties with good management practices that could be adopted by the farmers; and to develop a seed production network. STRASA conducted its activities in Sundarbazar, Purkot, and Bhanu villages. After two years of participatory research and dissemination of validated technologies, the IFAD and STRASA projects produced positive results – increased yield, improved food security, increased biodiversity, enhanced availability of locally secured rice seed, and higher income for farmers.

Source: Adhikari,Bishu Bilas and Tripathi, Bhaba P. (2016.) Seeds grown in Community-based Seed Production (CBSP) in Nepal promise good quality.

Basis of site selection

- Drought prone area of the villages where drought problem occurs regularly;
- Rainfed lowland (can be transplanted after onset of monsoon and having no assured irrigation facility);
- Rice cultivated in each year;

- Accessible (proximity to road);
- Sunny with medium fertility soil status;
- Recommended by extension workers.

Fig. 1. IAAS research sites in Lamjung, Tanahun, and Gorkha districts in Western Development Region and Bajhang district in Far Western Development Region of Nepal.

Fig. C5.1: IAAS research sites in Lamjung, Tanahun and Gorkha districts in Western Development Region and Bajhang in far Western Development Region of Nepal

Programs Conducted

1. Research activities
2. Development activities
3. Technology dissemination
4. Other supporting activities

Participatory Varietal Selection (PVS)

PVS activities were conducted on upland rice and rainfed rice at Sundarbazar as a key site. Farmers preferred genotypes from PVS trials, and they even requested seeds for their next planting season. Due to the high demand for seeds, the project team realized that the establishment of community-based seed producers, also generally labeled simply as 'seed producer groups' (SPGs), would be the cheapest method, and could be a successful intervention for sustainable seed production. Thus, a seven-member seed producer group named Sundar Seed Producer Group was established in 2007 at Sundarbazar in Lamjung District. Then in 2008, the seed producer group became a cooperative and was re-named Sundar Seed Producer Agriculture Cooperative Limited. When the rice research team out-scaled the CBSP system to neighboring district, Tanahun, another seed producer group was formed in Purkot village. It was called Purkot SPG in 2008 and was re-named as Pragati SPG in 2009**.** Sundar SPG, Pragati SPG and Bhirkuti SPG are the first SPGs of Lamjung, Tanahun and Gorkha district, respectively.

The projection is for 90 varieties to be released by2020. Upto2010, 60 varieties were released and 68 varieties till 2015.

Table 1. Community-based seed production (CBSP) groups established in western mid-hill districts of Nepal under IAAS/IRRI projects with women participation, 2006-2014.

Seed producer group (SPG)/ cooperative	Village	District	Year established	Number of members	Percentage of women	Number of executive committee members	Number of women in the executive committee (vital posts in parentheses)
1. Sundar Seed Ag. Coop. Ltd.	Sundarbazar	Lamjung	2007	42	18%	11	2(0)
2. Pragati SPG	Purkot	Tanahun	2008	60	40%	11	4(1)
3. Harrabot Women SPG	Tarkughat	Lamjung	2010	34	100%	11	11 (11)
4. Tarku SPG	Tarku	Lamjung	2010	36	22%	11	3(1)
5. Majhuwa Women SPG	Sundarbazar	Lamjung	2010	21	100%	11	11 (11)
6. Hariyali Seed Coop. Ltd.	Purkot	Tanahun	2010	25	48%	11	4(2)
7. Jaya Buddha SPG	Bhanu	Tanahun	2010	38	32%	11	3 (2)
8. Gaikhur SPG	Gaikhur	Gorkha	2010	46	48%	11	2(1)
9. Bhrikuti SPG	Palungtar	Gorkha	2010	28	21%	11	2(1)
10. Parakatane SPG	Parakatane	Bajhang	2011	15	34	11	3(3)
11. Rayel SPG	Rayel	Bajhang	2011	15	40	11	3(2)
12. Bhairabnath SPG	Bhairabnath	Bajhang	2011	15	34	11	3(2)
13. Pauwatar SPG	Gaikhur	Gorkha	2012	22	50%	11	2(1)
14. Saghan Bali SPG	Archalbot	Lamjung	2012	25	60	11	4(2)
15. Chardi SPG	Ramgha	Lamjung	2014	22	42	11	4(2)

Figure C5.2: CBSPs in project locations

Note: Major activities include: research (PVS), development, and dissemination. Upland and rainfed lowland (600-1000 masl) was the land that was focused on. Varietal focus was on DTR and NDTR (medium, fine and aromatic).

*Source:*Adhikari BB. 2018. Major seed programs and achievements under IRRI/IAAS-Nepal component. Presented at: Consortium for Unfavorable Rice Environments (CURE), Bangkok, Thailand, 21-23 February 2018.

Table C5.1: Project Districts

Project districts	Lamjung	Tanahun	Gorkha	Bajhang
Project villages	Sundarbazar, Tarku, Tarkughat&Archalbot	Purkot& Bhanu	Palungtar, Gaikhur&Pauwatar	Parakatane, Bhairabnath&Rayel

In 2005, IRRI started the PVS – focus was on upland rice varieties from 2005-08. Sundarbazar was the key site; it is 800 m above mean sea level. PVS, FFT programmes and mini kit were a few of the entry point activities. In 2007 the verification of the technology/varieties was undertaken. From 2008 dissemination to other districts started, from Palungtar. IRRI and IAAS worked in collaboration on technology dissemination and verified the technology taken up here (upland and lowland rice varieties), package of practices, and PVS conducted here. The community was involved in PVS, preference ranking was carried out, women and men were invited to rank the varieties, genotypes were selected before these were released. Depending on the ranking/preferred characteristics, they were also asked to provide the seed, and 3-4 kg of seed was collected from a single field. There was a shortage in availability of quality seed, hence the idea emerged of building a seed production program. Hence seed production groups (SPGs) were started. Bhrikuti in Gorkha emerged as the first SPG. Now, 15 SPGs are in Gorkha alone. Maize-rice-vegetables, wheat and buckwheat are grown in this locality. Earlier the farmers had a system of bartering seeds. –

Ramdhan was introduced in 2007/08; SukhaDhan 1, 2 & 3 were introduced/tried in 2011; SukhaDhan 4, 5 & 6 in 2014; DRR-44 and Swarna Sub-1 in 2017.Fumigants are used for storage. Seven groups have built storage facilities and have also been provided with storage bags. However, super bags are not easily available and they are costlier as well (2-2.5 USD per bag).

Main points that came out of the interaction with members and office bearers of the different groups are given below.

Bhrikuti Seed Producer Group (SPG), Palungtar, Gorkha

Bhrikuti SPG started in 2009 and got registered in 2010. It consists of 71 members, of which 27 are women. Initially there were only 25 members. Each member contributed Rs. 100 as membership fees. The SPG has a building and a place for storage of seeds as well. From this group 15-20 members produce seed every year. Each year, prior to seed production a training/exposure is organized for the seed producers. A total of 25-30 farmers/producers are trained of which 15-20 eventually take up seed production

Criterion for selection of the seed producer: The producer should have an irrigation source, land type compatible for the seed variety, and interest in producing seed. The producer must have a minimum of 0.5 ha of land to undertake seed production.

Management and supervision: There is an 11-member executive committee formed by this group (2 women, 9 men) that meets every month. During the meeting the members plan for the next season and hold a discussion on: what is the requirement of foundation seed? from where can they procure the seed? and who all can be involved in seed production?

A small, 3 to 5 member supervisory committee has been formed for undertaking supervision/quality control. These members are identified from within the group based on their knowledge/expertise, whether they are government staff/DADO staff/extension officer. The IAAS research team also supports this committee. A Farmer Field Day is organized just before harvesting. DADO, IAAS, NGOs and progressive/other farmers are involved in this. Preference ranking is also carried out at this event with the involvement of farmers on the varieties tried out in the season. Produce is then harvested under supervision of the supervisory committee.

Gains: Due to the formation of the seed project and involvement in seed production, the group members feel that they have been able to benefit from improved seed, improved grain and enhanced production due to the use of better quality seeds and scientific methods of farming. This has also enhanced food security, whereas earlier they had faced grain shortage. Now they are able to sell more grain as well, leading to higher incomes, which in turn has brought about a better lifestyle for the entire community. Women producers feel that they can now spend more on children's education, hire bullock, etc., with the additional income.

Challenges: Marketing is an issue for this group. The group is selling 'Truthfully labeled' seed in 30 kg packages. They could only sell 2.5 tons of seed to DADO and take benefit of the subsidy program in 2017. Five tons of seed from the 2017 harvest still remains with them. They were unable to sell as DADO did not purchase the entire amount of seed from them. They also face stiff competition from the seed produced in the Terai (Chitwan, that is 80-90 km away). The Terai producers use mechanization, whereas Bhrikuti producers use manual implements in farming, and hence Bhrikuti SPG seed (NPR 40/kg) cannot match the price of Terai-produced seed (NPR 34/Kg). Nevertheless, the members of Bhrikuti feel that since the mountain air is drier than of the Terai, the seed they produce is shinier and of better quality (Terai has foggy conditions that is not so conducive to seed production). They also sell seed through Agrovets. Some people are known to use social media (Facebook) for advertisements; as well as through the radio. However, the latter has cost implications.

They have to resort to selling the seed as grain if they are unable to sell it as seed. However, this has price implications as grain fetches NPR 10-12/kg less than if sold as seed. The producers retain some of the seed for themselves/for other members for the next season as they also need good quality seed and the Terai seed is costlier. They are keen to diversify into production of maize seed also. However, they do not have enough irrigation facilities in their locality to venture into vegetable seeds.

The group also feels that they lack managerial competencies and need training/capacity building on these aspects.

Saghanbali SPG, Archalbot, DardigaonPallika, Lamjung

This group got established in 2010. Initially there were only 14 members. As people benefited and started to learn from each other, other members joined and now it has 28 members (20 women, 8 men). The group has a corpus of NPR 200,000.

This group started as a seed producer group after being mobilized by DADO/Krishi Vikas Karyalaya. They were motivated with the promise of increased production through varietal replacement. They were interested in seed and IAAS intervened with Rice seed. The producers here started the group so that they could boost their income. They were using locally available seed varieties/traditional varieties prior to formalizing into a group and did not obtain much produce from the cultivation of these varieties. The men from most of the families have migrated to Japan, Australia, USA, Dubai, etc. Women had poor access to credit; and since this village is somewhat remotely located with poor roads and poor transport facilities, there are few amenities here. The group has been involved in trial of seed varieties. Earlier they were using local seed variety called Pokhareli. Lately, they have been trying out newer varieties, such as Loktantra (125 days variety, straw production is good too in this variety, both cattle and goats like it), Sukha-2, Sukha-6, Sugandha (fetches NPR 2/kg extra than other varieties, tastier, and scented), Ramdhan(longer grain). They get foundation seeds from Janakpur and Bhairawa.

The entire village land is irrigated. Apart from Rice, they are producing maize seed (procured from Chitwan campus), and sesame seed. Now they are also trying out newer vegetables, despite not having received any training in vegetable seed production. If they receive training on this then the seed enterprise can become more sustainable. Sabita, the president, trains the newer members as well as women within the groups after herself receiving training at different locations.

The group started with 3 tons of seed production. Currently they are producing 15 tons of Rice seed. They plan to enhance the production to 50 tons (it's a 5-year plan) and are confident of being able to sell it. Farmers from nearby villages come to see their standing crop and word of mouth has travelled for them positively. They advertise their produce in all the meetings the group members attend. The group members feel that the excellent communication skills of the groups' president has helped them in selling its produce (to DADO, other groups, locally). There is more transparency between women members and they can easily converse with each other.

Gains: Due to enhanced production and sale of seeds and grains women have been able to increase their savings, purchase rice cookers (all HHs have rice cookers), and refrigerators – making their lives easier and more comfortable. Men are also paying attention to the advice of women, especially in farm operations (earlier women were only working as farmhands and decisions were taken by men).

Opportunities: They store seed for 7-8 months, which leads to some damage to the seed and wastage. However, when dried properly this wastage reduces. They feel the need for a bag sewing machine as well as a grading machine to enhance/expand their seed business as an enterprise. They have seen the Harrabot group use bag sewing machine and hence got this idea. They plan to procure it soon in order to expand their operations.

Challenges: Had faced the stem borer problem in Rice last season prior to harvesting. They had asked the DADO for troubleshooting, and they were told to uproot the plant as it was quite near to harvesting.

Majhuwa SPG, Lamjung

This SPG was established in 2010-11 with 23 seed producers. Currently there are only 19 members in this group as not all were capable of/interested in seed production. All members of this group are women. Majhuwa SPG has been involved in seed production of Rice, community based nursery, IPM trials as well vegetable seed production. This group received mini kit from IAAS initially. This group is located in close proximity to the Lamjung campus of IAAS and enjoyed ease of technical support. It has a corpus of NPR 50,000. This group had saved NPR 300,000 (savings and seed sale profit) which they re-distributed among each other (NPR 13,000/per member).

The group had a buy-back arrangement with Sunder Seeds Cooperative for the seeds they would produce every season. In 2017, the group produced less than 10 tons of Rice seed, because Sunder Seeds did not provide money in time. They sold 3 tons to Sunder Seeds, while, 7 tons of seed is still lying unsold with them. If they are unable to sell it as seed, then they will use it as grain. This group does not have any storage facilities. They have been unable to sell within their village due to lack of trust within the community. They are totally reliant on Sunder Seeds Co-operative for sale of their seed. Since Sunder Seeds has been struggling with sale, it has stopped procuring seed from these groups. This group does not plan to produce seed for the next season. Seems like a dysfunctional and demotivated group of seed producers. Probably was not a great selection in the first place.

Men are migrating from the families to Middle Eastern countries for work. This village faces monkey menace issues also, making it difficult to produce vegetables. Moreover as women are receiving remittance from their spouses, they are not interested in farming to a great extent, even though they are involved in it to a limited extent. The remittance does not cover all their expenses, hence farming is critical to meet the needs of the families.

Sunder Seeds Co-operative, Paundi Nagar Pallika, Ward No. 7, Lamjung

The Sunder Seeds producer group was formed in 2007. Sunder Seeds was registered as a co-operative in 2009. It has 42 members of which nine are women. It has members from three Nagar Pallikas (Bhanu from Tanahun, Rajnas Nagar Pallika and Sundarbazar Nagar Pallika from Lamjung). The co-operative has formed an executive committee of 9 members and an advisory committee of three members (2 members from co-operative, and 1 technical advisor from IAAS). From the members the co-operative raised a share capital (NPR 2500 per member). It also has credit linkages with banks, linkages with DADO and the Ministry of Co-operatives. Seventy-five percent of the members are also seed producers.

Major challenges: This group started after motivation from IAAS. Earlier, they were using local seeds which had less production potential. Hence, the members formed the group and tried out SukhaDhan at the beginning. They felt that there was potential for the business of producing and selling improved seed variety. In 2016-17 they dealt with 40-50 tons of Rice seed, out of which the co-operative members produced only 27-28 tons. Rest was procured from Archalbot/Majhuwa SPG among others. In 2017, the co-operative could only take11-12 tons, the rest is still with the members/other groups due to shortage of funds/revolving fund. NPR 16 lakhs was spent on the building of a storage facility (11 lakhs was from DADO, out of which 8 lakhs is a loan and 5 lakhs their own including revolving fund, profit and capital). So, not much money now remains to procure seeds even if the storage facility is constructed. In order to meet some expenses this facility is being let out by the co-operative. Groups like Majhuwa are suffering due to lack of buy-back and about to slip into oblivion.

It sells seeds to DADO, Agrovets and farmers. It has also sold seeds to other districts. The members noted that it is not always easy to compete as they face competition from Agrovets. It also sells fertilizers from its shop/premises, as well as hybrid varieties in the season, which are recommended by DADO to earn additional commission.

There were also issues in obtaining the foundation seed of drought tolerant variety in time from DADO last season (2017). Due to climate change, drought incidence has increased and there is a need for more drought tolerant varieties in Rice. Government is also promoting drought tolerant varieties. It feels that farmers need more exposure before going for varietal replacement. Even though seed network has been formed (of which Sunder Seeds is also a member), it is defunct and no formal/initial meeting has taken place. It is still only on paper.

Harrabot SPG (Milijuli Producer Co-operative Limited-512 members, 2006)

Harrabot SPG was established in 2010. The members were part of the Milijuli Co-operative and were buying seed from Sunder Beej Co-operative. Then some of them came together and thought that they should themselves start producing seeds rather than buying from someone else. It started with 32 members, but not all could continue with seed production. Currently there are 27 members (all women) and all are seed producers.

A success story: In 2016,12.5 tonsof Rice seed was produced, and 13.6 tons in 2017. It is linked to DADO, will sell to DADO the lab tested seed – high quality seed produced by them of Ramdhan, Swarna Sub-1, Sukha-3, Sukha-6, and DRR-44. They got all these varieties from DADO and then sold all via DADO only. With these improved varieties, they could gain: increased production, improved lifestyles due to enhanced incomes and also less input costs as they were sowing more seeds earlier (50-60 kg seed sown earlier), now with just 5-6 kg of seed they are able to produce 50-60 quintals of seed. Since they are able to sell this as seed, they have moved on from subsistence to commercial farming, with enhanced incomes, more education for children, more savings, etc. Going on, they have started to produce mustard seed in 2011 and 2012, then maize seed in 2014, and now have diversified into lentil, onion, and radish seeds. They have received training from the Krishi Karyalaya on other seeds.

The president of the SPG represented her district (Lamjung) in a Goshthi in Pokhara, made contacts at that event and is getting repeat orders from there. Initially, the members saved NPR 20 per month for seed enterprise; last season contributed NPR 2000/per member for procuring seed and NPR 10,000 per family was raised to procure paddy seed from the members. This group also received the 1st prize in the district for their functioning as an SPG and a prize of NPR 100,000 from Rashtriya Bal Vikas Department.

The group has a power tiller which they rent out for custom hiring. There is scope for mechanization. It has a collection center for storing seeds, which they built with support from Samartha Nepal. They also have a machine for sewing bags. Group members collect rainwater in drums/tanks at their individual farms, so they don't face any problem in availability of water for irrigation. They have the capacity to produce and sell 50 tons of Rice seeds as they have a co-operative with 512 members. They can build further on the strength of their quality seed.

This is a cohesive group that has hardworking members, dynamic leadership (a confident president with excellent communication skills), well connected to both market and DADO –therefore quite successful so far as a seed enterprise. They have also been good at raising funds internally for procuring seeds from all the members and able to sell. They are well settled and functioning comfortably as a group.

Pragati SPG, Ward No 9, Bhanu Nagar Pallika, Tanahun

Pragati SPG was established in 2009. It is also maintaining the community seed bank, a gene bank on indigenous varieties. In 2006 members started working on biological diversity. Got funding support from LI-BIRD (http://www.libird.org/) and formed the SPG in 2009. LI-BIRD worked in this community till last year (last five years). A large number (1040) of members formed a special group from within the wider community, andare involved in conservation of indigenous varieties.

Initially started with 72 members, it currently has 53 members. The 53 members in this SPG are spread over a radius of 5-6 km under 3 wards in this Nagar Pallika. Earlier they were storing seeds in a rented building, later in 2016 they constructed a building and set up the seed bank there. It can store up to 50 tons of seed of 126 varieties indigenous to central Nepal (mid hills), and caters to three diversity blocks. The local gene bank has 950 local varieties, the first of its kind in the world.

Earlier, there was a shortage in availability of quality seeds, more expensive seeds were coming into the hills from Terai. The members got exposure through DADO, went to Terai and saw seed production done by other groups, and thereby started to produce their own seeds. Also got exposure from IAAS, came to know about the program supported by IRRI, and then got the foundation seed from DADO to start seed production.

Earlier were producing 20 tons of Rice seed, 15 tons themselves and 8-10 tons procured from other farmers. However, due to a pest attack they could produce only 12 tons this year in kharif of five varieties in Rice. They sell some of the seed back to DADO and avail subsidy benefits. So far they haven't had any problems in selling seed as they are part of a bigger network and produce good quality seed.

There was a stem borer attack in 2017 that even DADO could not help them with.

Gains: With this initiative, they have better access to good quality seed, with better availability too. They are able to produce more crop/more harvest with the self-produced seed. This means enhanced food security for themselves as well as sale of surplus grain. Sabitri and Ramdhan varieties are subtlerin taste.

Opportunities: Pragati SPG owns its own tractor (that they rent out at NPR 1800/hr against 2500 being the market rate), and some other tools/implements (bag sewing machine, germination testing machine, weighing balance, etc.) which they hire out to others/members in the vicinity. Members have received training on making business plan from Samarthan Nepal, an NGO. However, they feel that they need refresher training on seed production and training on how to enhance production, since marketing does not pose any challenge for them.