Empowering women farmers through collective action: a case study of Khanizpur Hamlet, Odisha

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ABSTRACT

Vulnerable landless women farmers face the dual challenge of small farm size and illegality of land tenancy. These smallholders face a lack of bargaining power in input and output markets and economic non-viability of technology adoption. We piloted a collective action model of organizing agriculture production work called “Small Farmers Large Field” with 35 landless tenant women farmers in Khanizpur village, Odisha. Within an embedded mixed method design, the study included the collection of both qualitative and quantitative data. In this QUAL + quan design, the qualitative dataset assumes the primary role. The results indicate that the per acre net income that represented a loss of INR 2,831 in the previous wet season changed to a positive profit of INR 15,065. Much of the increase in net income was due to the 60% increase in yield. Several factors including the use of good-quality seeds and adoption of improved practices contributed to such yield improvement. Apart from the monetary benefits, the collective action among farmers resulted in many non-monetary benefits such as improved knowledge on technology and production practices, stronger social network and civic engagement, and efficient use of water. In addition, farmers had a significant amount of time saving in different field operations.

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Introduction

Women are central to agriculture and make a significant contribution to household food and nutrition security in developing countries. They make up almost half of the agricultural labor force (World Bank, 2017). Their contribution to agriculture is even greater in India, where they account for 80% of the farm work (Oxfam, 2013). There is hardly any activity in agricultural production from planting to harvesting and beyond in which women are not involved in India (Aggarwal, 2003). Women work in land preparation, seed selection and treatment, sowing, transplanting, weeding, fertilization,
harvesting, threshing, winnowing, and storage (GOI, 2019). In key post-harvest activities such as processing and storage, women dominate so strongly that men workers are numerically insignificant (Aggarwal, 2003).

Despite their significant contribution to agriculture, women’s access to resources is much less than their male counterparts, especially access to land ownership. Over the past two decades, more and more women have been managing and engaging with family farms, but that has not translated into a rise in land ownership for them. Land ownership has increased by less than 3% from 10% in 1995 to 12.8% in 2015 (Mohanty & Bhandari, 2014). The absence of land titles makes women engage in agriculture either as tenant cultivators on others’ land or as agricultural laborers on their family farm.

The agriculture census (2011) defines a farmer as the “operational holder” or someone who has responsibility for the agricultural land and exercises technical and financial initiatives. Land is a state subject and state governments consider only people with a land title as farmers. The census (2011) calls anyone who operates a piece of agricultural land a “cultivator” (Bedi, 2018) and has thus labeled 3.6 crore (1 crore = ten million) women (without land titles) engaging in agriculture as just mere “cultivators” and not farmers. As a result, most women in agriculture, including tenant farmers, cannot avail of government schemes meant for farmers, access institutional credit for farming or qualify to receive subsidies. Apart from a land title, limited access to productive resources such as credit, inputs, extension services, transportation, storage, and technical assistance prevents women farmers from adopting new technologies or achieving economies of scale (Vidyakala, 2018).

Constraints faced by women tenant farmers

The extremely small landholdings of women cultivators make it nearly impossible for them to adopt improved technology, including machinery, because of economic non-viability (Mohanty & Bhandari, 2014). In addition, these farmers have limited access to water, fertilizer, pesticide, seeds, and other inputs. They also lack bargaining power in input and output markets because of their farm size disadvantages. In addition, they are forced to borrow at a high rate of interest and purchase inputs such as fertilizer, pesticide, and seeds at market price. When operating as a tenant cultivator, they are denied access to government procurement centers as they cannot furnish the required documents (such as land ownership documents or sharecropper certificates from landowners) to register their names for sale of their produce (Das, 2015). In India, almost all groups of farmers participate in the lease market, but landless women farmers are mostly found leasing in the backward regions (Kumar et al., 2017). “Traditionally, tenant farming refers to farming done by someone (tenant) who carries out the agricultural operations in a land owned by another (landlord)” (Kumar et al., 2017, p. 65). Sharecropping is the most commonly observed land tenure contract in which a tenant cultivates the land for the landowner and the output is shared on some pre-determined basis. The output share ranges from 25% to 50% for the landlord (Chaudhuri & Maitra, 2000). With growing levels of income, the prices of agricultural lands are also going up and, therefore, landless agri-laborers and small/marginal farmers often
cannot afford to purchase new parcels of land (Padhee & Joshi, 2019). They therefore resort to the sharecropping system to gain access to land and to put their available human resources (selves) and sometime draft animal resources to use – with hopes of supplementing their total harvest and farm income (Roy & Rohith, 2018). However, if the crop fails, then the landowner receives the government compensation, not the tenant farmers.

**Objectives of this study**

The innumerable challenges faced by small and marginal women cultivators/farmers require a holistic approach that blends targeted interventions and policy reforms along with changes in socio-cultural practices and belief systems. This article pilots a collective action (CA) model, that is, “Small Farmers Large Field” (SFLF), to address the challenges faced by the millions of small and marginal women farmers, including sharecroppers, of India. The need for CA to minimize the disadvantages faced by small and marginal farmers has been identified by several recent studies, including those of Gulati and Saini (2016), Chand (2017), and Singh (2018), as a key approach for improving their livelihood. The term collective action is used in the sense of “voluntary action taken by a group to achieve common interests” (Meinzen-Dick & Di Gregorio, 2004). Chand (2017) mentioned that CA minimizes the disadvantages of scale and structural barriers. There are several recorded substantiations in the literature that show that CA facilitates association, collaboration, and coordination of small-scale producers to achieve economies of scale in their transactions with input suppliers and buyers, increased bargaining power, decreased marketing costs, pooling of risks, increased access to services, and access to higher-value markets (Department for International Development 2005; Oxfam, 2013). The success of CA depends on participant commitment (Fischer & Qaim, 2011), for which commitment can be described as acting toward satisfying mutual and explicitly stated obligations. Rational choice theory emphasizes that an individual’s decision to engage in CA depends on a comparison of the expected benefits and costs. Individuals will participate only if their benefits (monetary and non-monetary) exceed the costs of participation (Olson, 1971). Despite the proliferation of CA ideas in the literature, there is little evidence on how a CA model of organizing agricultural production work for women farmers can overcome the gender-specific challenges they face in agricultural engagement and livelihood support.

The SFLF model of CA was adapted from the Large Field Model (LFM) of Vietnam. The term “Large Field Model” was first presented by the Ministry of Agriculture and Rural Development in a workshop organized in the Mekong River Delta on 26 March 2011 (Thang et al., 2017). The LFM program gained immense popularity, with area increasing from just 8 hectares in 2011 to 196,000 hectares in 2015 (Mohanty et al., 2017). The LFM development programs also attracted the participation of large rice production companies and farmer cooperatives. The major companies included Loc Troi group and Vinafood 2. The Loc Troi group in 2014 facilitated the establishment of 471 farmers’ cooperation groups, with a total production area of 40,000 hectares. According to Dang (2016), technical support was also provided to farmers by these companies, and this helped them to increase their profits by VND 2.5–4.0 million (USD
110–180) per hectare. In Vietnam, the LFM has also contributed to improving the quality of rice production for export. As farmers followed standardized crop schedules, these companies could maintain harvesting dates in their production zones in sequence, thereby optimizing capital investment, labor supply, and storage (Thang et al., 2017). Over the years, different forms of the LFM have been operational in Vietnam (Ba et al., 2019). Some of them are quite formal, with actual land pooling from farmers to set up a company, operating like a private business with farmers as shareholders, and others operating as an informal entity with synchronization and harmonization of only selected operations for improving efficiency and lowering cost (Mohanty et al., 2017).

An informal LFM with synchronization and harmonization of only selected operations was customized to work in Indian situations and is called the Small Farmers Large Field (SFLF) model. Under this model, the participating farmers organize themselves into groups to purchase inputs, contract machine service providers for transplanting and harvesting, synchronize their operations by adopting a single variety, establish group nurseries, and transplant and harvest around the same time, thus essentially converting their small plots into a large field or patch. This approach enables farmers to diminish costs through bulk purchases, improve efficiency by synchronizing operations, and improve quality by adopting improved production practices and using a single variety of good-quality or truthfully labeled seeds. Each participating farmer collectively commits to a group to follow the same cropping calendar, production practices, and product selling plan. Timelines need to be managed as a group so that, during mechanized steps such as transplanting and harvesting, a single machine can be maneuvered in the entire patch. Within a patch, which is formed by individually owned contiguous plots, every farmer is responsible for cultivating her own plot. Also, timely accomplishment of farming activities and arranging the capital for one’s own plot are an individual’s responsibility and thus there is no profit sharing for a patch and each participating farmer earns individual profit from her own plot.

The remainder of the article is organized as follows. First, a description of the pilot is provided, followed by methodology and data collection. The final section includes results and a summary.

**Description of the pilot site**

The pilot site, Khanizpur Pradhansahi, is a small hamlet in Gop block¹ of Puri District of Odisha, an eastern state of India. The hamlet is inhabited by just 45 households. Agriculture in Khanizpur is mostly managed by the women as all the men work outside the hamlet as laborers in factories, construction sites, and in the nearby markets. More strikingly, 90% of the households do not own any land and therefore lease/rent land every season to cultivate paddy for household food security. They plant paddy only in the wet season and leave the land fallow in the dry season because of no irrigation facility. As all farmers are tenant farmers, their operating plots are not always close to their hamlet and the landowners of the plots do not invest in installing any irrigation infrastructure such as tube wells and diesel pumps. Also, the government database has no record of any of the Khanizpur inhabitants owning any agricultural
land and thus the hamlet has not been covered under any of the state government’s irrigation schemes.

Methodology and data collection

This study uses an embedded mixed method (EMM) research design. In mixed methods, the researcher combines elements of both qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for a better understanding of research problems and corroboration (Schoonenboom & Johnson, 2017).

An EMM design occurs when, in a traditional quantitative or qualitative design, a strand of the other type is added to enhance the overall design (Creswell & Clark, 2011).

According to Schoonenboom and Johnson (2017), one can consider mixing with any or all of the following research components: purposes, research questions, theoretical drive, methodology, paradigm, methods, data, analysis, and results.

This study is designed and organized on the paradigm of pragmatism. It believes that “actions cannot be separated from the situations and contexts in which they occur” (Morgan, 2014, p. 26), and in real-world practice, action, and change. Pragmatism always looks at “what works” and the use of all approaches available to understand the problem (Rossman & Wilson, 1985), embracing a plurality of methods. It is based on the proposition that researchers should use the philosophical and/or methodological approach that works best for a particular research problem (Tashakkori & Teddlie, 1998), thus paving the way for mixed methods research.

To understand the multivariate characteristics and outcomes of this SFLF pilot, the study used an EMM research design, which mixes both qualitative and quantitative datasets at the design level, where a few sets of quantitative close-ended questions were embedded within a larger qualitative methodology and procedure. In the QUAL + quan design of this study, the qualitative methodology or dataset assumes the primary role whereas the quantitative dataset becomes secondary or supportive.

Data collection

The first group of data included key informant interviews on the prospective plan of the SFLF model and detailed group discussions on the prevailing production practices of the participating farmers. This was followed by quantitative baseline data collection on the prevailing practices and their cost using a structured survey questionnaire through a trained enumerator. The baseline data were collected using a recall approach. Quantitative data collection was done from the whole population of the participating farmers. Quantitative data were required in this predominantly qualitative research design to mainly calculate the cost and the net profit of the model.

During the intervention period, regular qualitative data collection was done to record various emergent issues and situations. In addition, the enumerator collected different components of costs and returns throughout the season as occurs on a real-time basis.
Qualitative data collection was done using maximum variant purposive sampling of the participating farmer population. The methods employed for the qualitative data collection were unstructured interviews, focus groups, in-depth key informant interviews, and participant observation. Qualitative data were collected throughout the intervention process used to assess how these SFLF interventions affected the knowledge of participating farmers on rice production technology and practices, strengthened relationships among the participating farmers, and impacted the efficiency of water use and time management.

Results

SFLF participation and implementation

Thirty-five female tenant farmers from Khanizpur hamlet joined the SFLF pilot in the wet season of 2017. More than half of the participating women farmers (20 out of 35) are less than 50 years old (Table 1). All 35 participants are Hindus. However, only two participants belong to the general class whereas a majority of the remaining women farmers (30) belong to the other backward class (OBC). Seven of the 35 participating farmers (a majority older than 50) are illiterate. As expected, most of the participating farmers less than or equal to 50 years old are literate (18 out of 20). All 35 participating women farmers are below the poverty line (BPL).

Altogether, they allocated 38 acres by putting together 111 individual plots organized in three big patches. In the previous dry season, some of these women farmers had visited another SFLF site in a nearby village and had discussed the benefits of this model. All of the participating farmers were tenant farmers and operated on very small plots (average land size of 1 acre). They practiced agriculture with very low investment because of the risk of losing their crop to flood and drought and lack of financial resources. There was also no incentive to invest in production processes because of the requirement of giving half of the production to the landowners.

The farmers selected an eight-member committee to take on the role of facilitators to ensure synchronization of timing of field operations. The first key decision made by the group was to grow one single variety to avail of the benefits of bulk purchase at a discounted price and to receive a premium price on the sale of their produce because of uniform grain quality and no varietal mix. The variety chosen was Swarna-

| Variables                          | Age of respondents |
|------------------------------------|--------------------|
|                                    | ≤50 years old | >50 years old |
| Number of respondents              | 20            | 15            |
| Religion                           | Hindu          | 20            | 15            |
|                                    | Non-Hindu      | 0             | 0             |
| Caste/class categorization         | General        | 1             | 1             |
|                                    | Other backward class | 19       | 11            |
|                                    | Schedule caste | 0             | 3             |
| Education level                    | Literate       | 18            | 10            |
|                                    | Illiterate     | 2             | 5             |
| Below poverty level                | BPL card holder | 20            | 15            |
| Average area under cultivation     | Sharecropping  | 1.89          | 2.12          |

http://ncsc.nic.in/files/Chapter%202.pdf. BPL: below the poverty line.
Sub1, a submergence-tolerant rice variety. The group pooled money to purchase seed from a certified seed producer. The first synchronized activity involved raising a group nursery bed for seedlings. As mentioned earlier, the farmers were organized in three small groups to work in the three patches based on the location of their individual plots. The participating farmers were then connected to input suppliers and the suppliers were also happy to supply the required inputs as they received a bulk order at the same time and from the same place. As a result, a good discount could be obtained in terms of transportation cost of the inputs.

The next collective task involved land preparation and transplanting in the three patches. All of the farmers hired tractors and puddlers for land preparation, but seedling transplanting was carried out manually because of the uneven terrain of each patch and surplus family labor. A majority of the land rented by the female farmers was sloping and patchy; thus, it was difficult to operate a mechanical transplanter or a combine harvester on such uneven and patchy land. In addition, only 15% of the farmers operating on the medium elevation land type could convince their landowners to allow them to use a mechanical transplanter and thus 85% of the farmers opted for manual transplanting with proper spacing between plants.

Inputs such as fertilizer, pesticide, and herbicide were procured from the Indian Farmers’ Fertilizer Cooperative Limited (IFFCO). Since this was a bulk purchase for 35 farmers, it was possible to convince IFFCO to supply the inputs at the doorstep and at a price that was 15% lower than the prevailing retail price. The group decided to manually harvest the crop as they needed rice straw for their thatched roof, fuel, and animal feed.

Before the harvest, a few local millers were invited to visit the site at Khanizpur. On seeing the crop health, the millers said that they would be interested in purchasing all the harvest at a price higher than the market price. Thus, the SFLF farmers sold their crop at a higher price because of the large quantity of good-quality paddy with no varietal mix.

Costs and returns analysis

The survey data were used to estimate costs and returns before and after intervention and are presented in Table 2. The average per acre profit for Khanizpur farmers was estimated to be INR 14,579 vis-à-vis a loss of INR 2,831 in the previous wet season (Table 2). Most of the rise in net income can be attributed to higher yield, which increased from 1.5 to 2.4 tons per acre because of good-quality seeds and the adoption of improved practices such as transplanting of young seedlings and timely application of the right dosage of fertilizer. Golap Pradhan, a participating farmer, shared that, before engaging in the SFLF model, her fellow farmers of Khanizpur had only one way of selling their small quantity of produce without any bargaining power, which was to the village middlemen or village traders. As tenant farmers, 50% of their produce had to be given to their landowners and, from the remaining 50%, they would save some for self-consumption and a very small surplus would be available for selling. For such a small amount of produce, an individual farmer’s effective price
negotiation was never possible with the village-level traders. She and her fellow farmers had never made a good profit from rice farming in the earlier years, but they continued growing rice as it was their main staple.

**Improved knowledge of production practices**

Apart from increasing net farm income, the SFLF model also improved the knowledge of the participating farmers on the significance of using good-quality seed, seed treatment, soil testing, timely and right dosage of fertilizer and pesticide application, and nursery bed preparation. Before the intervention, a set of binary choice questions with “yes or no” answers were asked of the participating farmers. As shown in Table 3, all 35 participating farmers reported having no prior knowledge on certain crucial steps of production such as know-how on the right type of variety to select, reliable sources for seed procurement, need for seed treatment, soil testing, and correct doses of fertilizer and chemicals. The majority of the farmers responded that they had no prior knowledge of plant protection measures (86%), followed by nursery bed preparation (80%), method of fertilizer application (71%), and marketing of produce (69%). Nearly half of the farmers responded that they had no prior knowledge of land preparation, time of sowing, mechanical transplanting, and irrigation schedule.

The farmers shared that, because they were operating on small plots, they could not attract the attention of government field extension officials. Rarely did the village agricultural officers (VAWs) visit their rented farms and, even when they did, they would share only some verbal information. The VAWs never organized any practical demonstration of agricultural technology and techniques in their hamlet.

### Table 2. Per acre costs and returns, Khanizpur Village.

| Item                        | Baseline | SFLF  |
|-----------------------------|----------|-------|
|                             | Mean     | Range | Mean     | Range |
| Yield (tons/acre)           | 1.5      | 1.4–1.7 | 2.4      | 2.1–2.6 |
| Price (INR/quintal)         | 1107     | 1000–1250 | 1324     | 1280–1510 |
| Gross income (INR/acre)     | 16,605   | 13,400–18,800 | 31,773   | 26,850–38,800 |
| Costs and returns per acre  |          |       |          |       |
| Seed                        | 513      | 71    | 435      | 435    |
| Seed treatment              | 0        | 0     | 0        | 0     |
| Nursery bed preparation     | 390      | 20    | 310      | 280–390 |
| Land preparation            | 2029     | 86    | 1670     | 51     |
| Irrigation                  | 0        | 0     | 0        | 0     |
| Crop establishment          | 5150     | 211   | 4629     | 107    |
| Gap filling                 | 0        | 0     | 0        | 0     |
| Manual + chemical weeding   | 2386     | 245   | 1869     | 149    |
| Fertilizer application      | 2616     | 282   | 2226     | 0      |
| Pesticide                   | 559      | 111   | 579      | 38     |
| Harvesting (manual)         | 4386     | 238   | 4155     | 223    |
| Threshing and winnowing     | 1100     | 136   | 993      | 119    |
| Storage                     | 289      | 32    | 329      | 29     |
| Total costs                 | 19,418   | 558   | 17,194   | 438    |
| Net returns                 | –2831    | 1657  | 14,579   | 2203   |

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Another fact reported by the respondents of the hamlet was that earlier they used only saved seeds of traditional or local varieties. They had no idea about seed classifications such as breeder seed, foundation seed, or certified seed. They knew only the names of three local rice varieties (Pooja, Mussoorie, and Rangabati) and all other seeds about which they did not have any knowledge were referred to locally as “Company Seed.” And the general perception was that Company Seed or any non-local seed could not be trusted. As tenant farmers, they feared using any new or unknown variety as they would risk losing access to a future tenancy contract if something went wrong with the adoption of a new variety. Sanjukta Nayak, another participating farmer, shared that she and her fellow farmers from the hamlet were very happy to learn about flood-tolerant rice variety Swarna-Sub1 as flood was a regular phenomenon in their low-elevation agricultural patches. After learning that this variety could withstand flood up to 17 days, they decided to try it. The farmers also mentioned that earlier they had no idea or information about the procedures of seed treatment that could benefit their crop in increasing germination, ensuring uniform seedling emergence, and protecting against early-season diseases and insects. Later, after the completion of the 2017 crop season, the farmers attributed the improved crop emergence and growth to seed treatment. Before the 2017 SFLF intervention, they applied whatever quantity of fertilizer they could purchase - at no fixed interval depending on availability and affordability. Conducting soil tests of their plots and receiving fertilizer recommendations and an application time chart were new knowledge for most of the participating SFLF farmers. These farmers shared that they had never done any soil testing before engaging with the SFLF model and had always applied fertilizer on their own assumption, without any prescription, and there had also been instances in previous years when the local input dealer sold pesticides to them after the printed date of expiration. The farmers also reported that learning

### Table 3. Baseline knowledge of participating farmers on paddy production, marketing, post-harvest handling, and storage.

| No. | Practices                                      | Farmers responding “yes” | Farmers responding “no” |
|-----|-----------------------------------------------|--------------------------|-------------------------|
|     |                                               | Number (Percentage)     | Number (Percentage)    |
| 1   | Seed variety and seed procurement             | 0 (0)                    | 35 (100)                |
| 2   | Seed treatment                                 | 0 (0)                    | 35 (100)                |
| 3   | Nursery bed preparation                        | 7 (20)                   | 28 (80)                 |
| 4   | Land preparation                               | 18 (51)                  | 17 (49)                 |
| 5   | Time of sowing                                 | 16 (46)                  | 19 (54)                 |
| 6   | Mechanical transplanting                       | 15 (43)                  | 20 (57)                 |
| 7   | Irrigation schedule                            | 20 (57)                  | 15 (43)                 |
| 8   | Gap filling                                    | 25 (71)                  | 10 (29)                 |
| 9   | Weeding                                       | 24 (69)                  | 11 (31)                 |
| 10  | Soil testing                                   | 0 (0)                    | 35 (100)                |
| 11  | Correct dose of fertilizer and chemicals       | 0 (0)                    | 35 (100)                |
| 12  | Method of application of fertilizer            | 10 (29)                  | 25 (71)                 |
| 13  | Plant protection measures                      | 5 (14)                   | 30 (86)                 |
| 14  | Harvesting time                                | 28 (80)                  | 7 (20)                  |
| 15  | Harvesting method                              | 26 (74)                  | 9 (26)                  |
| 16  | Threshing                                      | 30 (86)                  | 5 (14)                  |
| 17  | Drying                                        | 32 (91)                  | 3 (9)                   |
| 18  | Storage                                        | 34 (97)                  | 1 (3)                   |
| 19  | Paddy sale                                     | 11 (31)                  | 24 (69)                 |
continued throughout the entire wet season of 2017 on different aspects of crop management, including pest and disease management and post-harvest handling of paddy.

**Stronger social network support and civic engagement**

The model also strengthened the relationship among the participating farmers, especially within the three smaller groups corresponding to the three patches of contiguous plots. The participating farmers shared that they were members of 12 different self-help groups (SHGs); thus, this model also improved the network of these 12 SHGs. Farmers within each group supported each other by providing exchange labor and supporting each other’s farm responsibilities in times of emergency.

The farmers also mentioned that the SFLF model of group farming has improved their relationship with input dealers, millers and traders, and government organizations. The eight-member SFLF committee has resulted in creating a new leadership role at the community level. Three SHG leaders engaged in SFLF were invited by the block-level agriculture officer to participate in an agriculture workshop, in which they were asked to share the learnings, experience, and gains of participating in the SFLF model. Before the SFLF engagement, there was only one female representative from their hamlet on the village management committee of the larger revenue village, but the successful paddy season of 2017 led to increased acceptance of female leadership in the hamlet. Two new female members from the hamlet were nominated to the village management committee. Sukanti Swain, an SHG cluster leader and a participating SFLF farmer, mentioned that she was invited to their block’s official farmers’ day celebration organized by the District Agriculture Office, where she presented the case of the SFLF model of paddy cultivation and won the best farmer award for her presentation.

**Efficient water use and time management**

This CA model significantly demonstrated efficiency of water use. The participating farmers reported that, when farmers practiced an individual mode of farming, every field needed water at a different time and the farmers faced difficulty in coordinating effective irrigation. The situation became complex when one plot needed irrigation and the adjacent plot belonging to another farmer had mature standing crops in it, as seepage of water into the other field with mature crops would make it difficult to harvest. Often, this created misunderstanding among the farmers. But the selection of a single variety and synchronization of land preparation and transplanting timing were able to avoid those misunderstandings and water wastage as all the plots/fields in one patch required water at the same time.

The bulk purchase of inputs such as seeds, fertilizer, and pesticide for the entire group and combined field operations saved a significant amount of time for the farmers. Savings were observed across all joint activities from nursery bed preparation to storage and marketing. The average number of days of person-labor saving was estimated to be 32 (Table 4). Some women farmers used these extra days to lend a hand
to their husbands in betelnut farming and other non-farming activities and others used these days for their own non-farm activities. At a minimum, these labor-saving days had a value of at least INR 11,200.

Despite all these monetary and non-monetary benefits, scaling up of the SFLF model in India faces several constraints. First and foremost, the highly restrictive land tenancy law is a big obstacle preventing tenant farmers from participating in group SFLF farming. This was evident at the pilot site where the majority of the participating women farmers were sharecroppers and had difficulty with the landowners in agreeing to the terms and conditions of the SFLF group farming. Second, India’s Agriculture Produce Market Committee prohibits farmers from selling their crops directly to traders/supermarket and instead requires them to sell to authorized agents at authorized locations. This system does not adequately compensate for quality differentials, which discouraged farmers from joining SFLF farming, with which higher quality output is produced with good-quality seed and improved production practices. Third, the small farmers in the rainfed regions where they are frequently exposed to flood, drought, and other weather extremes did not want to invest more in the form of certified seeds and timely fertilizer application in appropriate quantity because of the high risk. At the pilot site, the tenant women farmers were exposed to flood and drought and did not want to invest more in the form of certified seeds and recommended fertilizer application because of their fear of losing their crop.

Fourth, the SFLF model requires timely payment by participating farmers for seeds, fertilizer, and machinery rental from service providers to be able to obtain a price discount on bulk purchases. This was a huge problem for many farmers and sharecroppers at both pilot sites.

Finally, the SFLF farming model requires significant handholding and facilitation in the first couple of seasons to make it successful. In the pilot exercise, a full-time field technician was employed to work with the farmers throughout the season to make it successful. But the good news is that, once farmers realize the benefits, the model is highly sustainable.

**Policy recommendations**

The following policy reforms could address the constraints faced by SFLF farmers. Land tenure reforms for legalization of tenant farmers will encourage tenants to...
participate in a CA model such as SFLF. On the one hand, this will remove the fear on the part of the landlords of losing the land to the tenants and, at the other end, this will enable the tenant farmers to apply for institutional loans, insurance, and disaster relief. The development of a private market and the direct trade of agricultural products from farmers to consumers that will enable them to receive a premium price for good-quality produce will encourage them to participate in SFLF for improving quality. Third, the introduction of appropriate yield or weather insurance index products that will minimize production risk faced by the farmers due to more frequent extreme weather events such as flood, drought, and untimely rain will encourage farmers to participate in SFLF by investing in good-quality seed, the right dosage of fertilizer, and mechanization. Finally, the government needs to adjust its input and credit availability policy to encourage sustainable production practices, which is a requirement of SFLF.

**Summary and conclusions**

The role of women is changing in Indian agriculture because of rising outmigration of rural youth and male members of farm households in search of better economic opportunities. Apart from contributing to different activities in farming, more and more women are now managing their family farm in the absence of male household members. Despite the central role they play in agriculture and their growing contributions, they account for only 12.8% of the landholdings. Their involvement in decision making for these activities is limited, which is a true indicator of empowerment.

Among those millions of less-empowered women engaged in agriculture, the landless daily wagers are at the bottom of the pack with the drudgery of farm labor. The good news is that these women agricultural workers with hopes of earning both increased income and dignity are becoming tenant farmers or sharecroppers by cultivating on rented land. But the bad news is that these tenant farmers are not recognized by the system for formal credit and are deprived of many government benefits and other facilities because the land they till is not in their name. This most vulnerable group of landless women tenant farmers faces the dual challenge of small farm size and illegality of land tenancy. These tenant farmers who are even smaller than a normal small farmer in India, that is, with a landholding of 1 hectare, suffer from a lack of bargaining power in input and output markets, economic non-viability of technology adoption (including mechanization), and the rapidly rising wage rate. This is compounded by the illegality of tenant farming that deprives them of institutional credit, subsidies on agricultural inputs and implements, minimum support price, and benefits of compensation paid against crop damages caused by natural calamities.

In this study, a CA model, Small Farmers Large Field (SFLF), was piloted in Khanizpur with landless women tenant farmers to examine to what extent they could be empowered to overcome the gender-specific challenges they face in agricultural engagement and livelihood support. The SFLF model aims at improving the capabilities of small and marginal farmers by strengthening their backward and forward integration along the supply chain, thus giving them greater bargaining power in input and output markets through CA.
A group of 35 women farmers pledged 38 acres of land in 111 plots to the SFLF model. All of the participating women farmers were tenant farmers and operated on very small plots (average land size of 1 acre). The model was customized to fit the requirement of the group. Bulk purchases of seed, fertilizer, pesticide, and herbicide were made to obtain a discount and several activities such as seedbed preparation, transplanting, and harvesting were synchronized to improve efficiency and save time. A key synchronized group activity involved raising a nursery bed for seedlings. The farmers were organized in three small groups to work in three patches, based on the location of individual plots.

The results indicate that the per acre net income, which was a loss of INR 2,831 in the previous season, changed to a positive profit of INR 15,065. This increase in net income was due to a 60% increase in yield from 1.5 tons per acre to 2.4 tons per acre. Several factors, including the use of good-quality seeds and adoption of improved practices such as transplanting of young seedlings and timely application of fertilizer of the right dosage, contributed to this huge yield improvement.

Apart from the monetary benefits, the CA among farmers resulted in many non-monetary benefits such as improved knowledge on technology and production practices, stronger social network and civic engagement, and efficient use of water. In addition, the farmers had a significant amount of time saving in different field operations and purchased inputs, which were used in supporting other family activities.

The recent farm policy reforms of liberalization of the restrictive land leasing system in the country could do a world of good for these downtrodden landless women tenant farmers. Legalization of the tenancy act will recognize tenants as the operators of land and will enable them to apply for institutional loans, insurance, and disaster relief and participate in government schemes. This will also encourage these women tenant farmers to participate in a CA model such as SFLF to improve efficiency and diminish cost. During our pilot study, many sharecroppers were not able to participate in the SFLF model because of restrictions from the landlords. Therefore, legalization will give freedom to tenants to participate in any activity, including SFLF and other forms of land consolidation if deemed beneficial to them.

Notes
1. A block is a sub-district administrative division. India is a large country comprising 28 states and 9 union territories. These states and the union territories are divided into districts. At the time of the Census 2001, there were in all 593 districts. Each district is further divided into sub-districts, which are known differently in different parts of the country (e.g., tahsil, taluka, community development block, police station, mandal, revenue circle, etc.).
2. Hindus regard themselves as culturally, ethnically, or religiously adhering to aspects of Hinduism.
3. The Constitution of India lists four major categories (general, OBC, scheduled caste [SC], and scheduled tribe [ST]) under its reservation policy. Those who come from privileged groups or class and did not face discriminations in the past are listed under ‘general’ category.
4. OBC is a collective term used by the Government of India to classify groups that are educationally or socially disadvantaged. It is one of the several official classifications of the population of India, along with general class, SCs, and STs. The OBCs can be found amongst
all religious groups like Hindus, Muslims, Christians, and so on. http://www.ncbc.nic.in/user_panel/GazetteResolution.aspx?Value=mPICjsL1aLvAXpHv5rPBH9SN4In7SbbD8whXeYIuxpZweUFXyi3QG8Lj9dBxfedR

5. The current poverty line is INR 1,059.42 (PPP USD 62) per month in rural areas and INR 1,286 (PPP USD 75) per month in urban areas.

6. Tolerant of complete submergence from 14 to 17 days.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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