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Case studies of seed production and marketing through farmers' groups in Nepal

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SEED PRODUCTION AND MARKETING THROUGH FARMERS' GROUPS: CASE STUDIES

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INTRODUCTION

Seed is the backbone of agriculture because seed quality is one of the key contributors to crop productivity and food production. In the context of agricultural development, a major concern is that good quality seed of improved varieties are not always readily available to farmers. More than 90% of the seed requirement of Nepal is fulfilled by farmer networks or an informal seed supply system (Shrestha, 1996; Baniya et al. 2000). Less that 10% of the country's seed requirements are supplied by the Agriculture Input Corporation (AIC), District Agriculture Development Office (DADO), National Agriculture Research Systems (NARS), agricultural farms and other agencies.

The total area covered by improved varieties is only 56% in rice, 59% in maize and 85% in wheat (MOA, 1994/95). Varietal and seed replacement rates are very low, with a replacement rate for improved seed of rice and maize of ≤1% and for wheat of ≤ 3 %. These rates are even lower in hill areas (Jarvis *et al*. 2000). Thus, the so-called improved varieties grown by farmers are in fact very old, in some cases older than 20 years (e.g., Masuli rice variety and RR21 wheat variety). As a result, varietal performance and productivity has gradually declined.

Decentralisation in seed production and distribution can lead to the availability of good quality seed to farmers and boost total production. This increases food self-sufficiency, keeping other production factors constant, by increasing the seed and variety replacement rate (Joshi, 2001). Apart from government institutions, some private organisations and farmers' groups are also involved in the seed business (seed production and marketing). Strengthening these groups can help to meet local demands, as well as supply quality seed to fulfil the national demand. Some doubt the ability of farmers to produce quality seed (e.g., with high genetic purity, vigour, freedom from pathogens and inert materials), with questions raised about farmer skills and managerial capabilities. Poor market infrastructure is another limiting factor to the supply of quality seed to a large number of farmers, although some farmers' groups have been successful in producing and marketing high quality seed. One good example is the farmers' group of Pithuwa village in the Chitwan District of Nepal. In the following study, we

examine the effectiveness of the seed business managed by farmers' groups on seed production and marketing and attempt to draw lessons from this. It was envisaged that lessons learnt from such a study could be used to develop improved methods of seed production and marketing, in order to meet local and national demands for seed. Findings of two case studies are presented in this report.

CASE STUDY 1: THE PITHUWA SEED PRODUCERS GROUP, PITHUWA, CHITWAN, NEPAL

The Pithuwa seed producers' group of Chitwan is one of the better-known seed producing groups, especially for open-pollinated crops such as maize. Technical and financial support for seed production is provided by the development and research agencies of Nepal.

Objectives of the study

- To determine the effectiveness and sustainability of the subsidy system in the seed business through the medium of farmers' groups.
- To assess the potentials and limitations of farmers' group involved in the seed business.
- To disseminate the successful elements of the farmers' group approach to other seed enterprises.

Methodology

A meeting was organised for an in-house discussion regarding the seed study. A focus group discussion was carried out using a checklist with members of the Pithuwa farmers' group and seed-producer farmers to collect relevant information. Outsiders and neighbouring farmers were also interviewed to verify the information collected. Other organisations, such as DADO Chitwan, the National Maize Research Programme (NMRP), the Participatory District Development Programme (PDDP) Chitwan, AIC Chitwan and Agrovets (an agricultural input business company) based in Chitwan districts, were also contacted to gather relevant information on any technical and financial support they provided. Secondary data (e.g. from reports) were gathered, reviewed and analysed. Frequent visits were made to the study area to directly observe farmers' group activities and for informal discussions with the members of the group.

Results and Discussion

Group formation, mobilisation and development

Before August 1994, the farmers of Pithuwa were producing seeds of the cereal crops as contract growers for AIC. Despite contractual arrangements, there was no certainty that seeds would be bought by AIC.

Furthermore, AIC justified paying the farmers a lower price than Agrovets and other institutions on the basis that the seed was of inferior quality in terms of germination and genetic purity. Due to these problems, farmers decided to form their own seed producers group to produce and market seed independently (Box 1).

The *Seed Producer Farmers' Group* was established by nine shareholders in August 1994 (i.e. Bhadra 2053 B.S in the Nepalese calendar) with the aim of improving the economic and social status of members through seed business, saving and credit motives (Appendix 2). The

Seed Producer Farmers Group was legally registered under government rules and regulations in August 1996. By 2001, there were 61 shareholders in the group and a few of them were government service holders (Appendix 3). The share members of the group formed an executive committee whose members were selected democratically from the general assembly of organised share members and had two years tenure. There were two sub-committees under the executive committee (Figure 1), which dealt with technical and management issues, including selection of seed-grower farmers, maintenance of isolation distance of seed plots, rouging, seed quality inspection, and pesticide application.

Box 1: History of maize seed production and marketing by the Seed Producer Farmers' Group of Pithuwa, Chitwan.

Seed production was initiated in 1994/95 from 3 ha of maize. In 2001, they planned to produce maize seed from 72 ha (Appendix 6), reflecting an increase in interest of the farmers for seed production and marketing. The varieties included in seed production were released varieties such as Arun-2, Arun-1, Rampur Composite, Mankamna-1 and Khumal Yellow.
Seed marketing was not a problem during the initial 3 years (1994-1997) because demand was higher than the supply. Growers sold their seed in local markets. After the introduction of improved varieties, farmers began to retain more seed for their own use, resulting in a reduction in seed sales within the locality. In 1998/99, they could not sell some seed, especially the Rampur Composite variety, so they then started to explore other markets for seed sales. They contacted Agrovets, (I)NGOs and GO offices in several cities for marketing maize seeds. In recent years, they are selling more than 40% of seed to DADOs in other districts of the country.

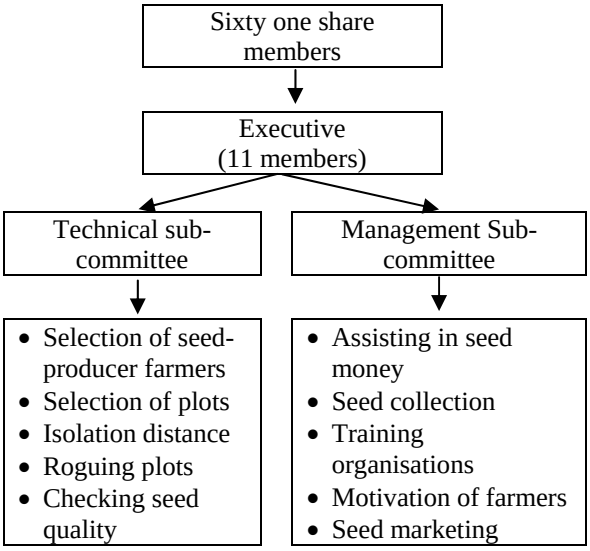

Figure1: Structure of the Pithuwa Seed Producer group

The roles and responsibilities of the group members are described in Appendix 4. Provisions were made for the inclusion of five new general members as shareholders each year. The membership was advertised and application forms were provided to interested farmers. The committee screened the application forms and shareholder membership was provided to those who met the criteria (Appendix 5).

The group raised funds through various means. Monthly savings from the entry fees (initially NRs 50 per member and later increased to NRs 100, where £1 = NRs 124, February 2003) of members, interest from loans provided to farmers, commission from seed sales, charges imposed on outside groups for visits and other earnings such as gifts/prizes.

Whilst the group is involved in the production of a range of cereal seed, it is best known for open-pollinated maize seed production. During the first year (1994/95), seeds of Arun-2 and Rampur Composite were produced. In addition, activities have gradually expanded to include seed production from other crops, such as cowpea (determinate type), lentil, wheat, rice and kidney bean (Appendix 6). Other institutions provided technical backstopping for seed production and marketing and are discussed in the following section.

Support and subsidies

Technical and financial assistance to the group were provided by: the District Agriculture Development Office (DADO), Chitwan, the National Maize Research Programme (NMRP) Rampur, the Seed Testing Laboratory, Hetauda, the Participatory District Development Programme (PDDP) of the District Development Committee (DDC) Chitwan, and the Agriculture Input Corporation (AIC), Chitwan. Support and the subsidies provided to the group were very generous, in addition to inputs from development and research agencies. However, this has increased the group's dependency on agencies, with the result that hardly any group activities were undertaken without their support. The type of support and subsidies provided are summarised below.

DADO Chitwan: Arranged the supply of source seed (foundation seed) for seed production. The organisation also provided financial

support, such as subsidies with seed and free transportation of seeds, as well as technical support. In addition, training in seed production and management techniques were provided, and assistance was given in publicising the group's activities (by documenting activities), organising exposure visits for group members, and assistance in marketing seed.

NMRP Rampur: Provided source seed of maize for seed production and also arranged the supply of seed for other crops. As with DADO, technical support for seed production and management and assistance in seed marketing was provided.

Seed Testing Laboratory: Inspected seed plots at the standing crop stage and provided training in seed quality maintenance and authorised the certification of seed.

Participatory District Development Programme (PDDP): Provided financial assistance to the group. Scheme-based loans were offered to the group, such as those for small businesses or bee keeping and training expenses (e.g., stationery, documentation and computer printing). It also provided training in institutional skills such as record keeping, accounting and resource mobilisation and organised farmer visits within the country, and established links between different institutions and groups.

Agriculture Input Corporation (AIC): Provided chemical fertilizers to the group for seed production, and occasionally bought seed of cereals such as wheat and lentils from the group.

Seed quality

The seed produced by the Pithuwa group was reported to be of good quality. The group adopted the following precautions for the production of quality seed.

Farmers training: The group created awareness among seed producers through training. The training was organised each time before planting of crops for seed production and the trainers were invited from DADO, Chitwan, NMRP, Chitwan and the Seed Testing Laboratory, Hetauda. These institutions provided training free of cost.

Household visits: Before sowing, especially of maize, the members of the technical sub-committee of the group visited the farmers' homes and discussed issues of seed quality and the importance of maintenance of isolation for different varieties.

Verification by seed testing laboratory: Although, the group's technical sub-committee was responsible for seed quality control, the Seed Testing Laboratory of Hetauda supervised all the plots at the standing crop stage. Plots that did not have proper isolation maintenance were rejected. The

laboratory also tested the seed after grading and authorised its labelling.

Field visits: Members of the technical sub-committee visited the field to observe the standing crops and monitor the crops on the threshing floors after harvesting.

Marketing of seed

Price setting. Group members fixed the price on the basis of the actual costs of production, grading, storage and marketing. However, the sale price to the farmers was usually higher than the seed cost because the seed growers needed to contribute a certain amount (Rs 2/kg of seed) to group funds.

Order collection: The group collected orders through NGOs, INGOs, GOs (e.g. the DADO offices in different districts and Agrovets) before the planting season. After collation of orders, the collection of favoured varieties, and the amount to be produced were planned accordingly. The group claimed that approximately 50% of seed was sold through demand collection.

Identification of Agrovets and entrepreneurs: The group has developed market linkages with Agrovets / entrepreneurs in different towns such as Pokhara, Kathmandu and Baglung. The seed producer groups sell seeds through Agrovets and entrepreneurs' channels.

Advertisement: The quantity and range of varieties the group was to produce were advertised through pamphlets and leaflets. However, publicity and advertising was very limited due to the high dependency on institutions with word processing and printing facilities. DADO Chitwan and PDDP took care of such arrangements.

Correspondence through letters: The group corresponded with different institutions working in agriculture regarding their seed production plan, mentioning the names of varieties and approximate quantity of production. After harvest, the group sent letters to these institutions to inform them as to the total seed actually produced. The institutions were the National Seed Board, NARC, DADOs, AICs, (I)NGOs etc.

The major markets: According to the members of the group, the major markets were different DADOs of the country, the AICs, Agrovets / entrepreneurs, NGOs, INGOs and farmers. Of the total produce, the group sold approximately 40% through the government and its networks, 40% to Agrovets, 15% to (I)NGOs/CBOs and 5% to farmers of Chitwan. However, the situation changed every year, and sometimes the group faced marketing problems such as their seed prices being higher than other seed entrepreneurs and poor links with Agrovets or the private sector.

Crops for seed production and reasons for focusing on maize seed

Although the group was producing seed of a range of major cereals and legumes (e.g. rice, wheat, lentil, cowpea and kidney bean) in varying quantities, the major focus was on maize seed production. This was due to the following reasons:

Higher seed demand and better marketing channels: Maize is an open-pollinated crop and the genetic purity of seed deteriorates faster than in self-pollinated crops. Hence, seed saving by the farmers is more difficult because of the higher chance of crossing with other varieties. Farmers wanted to change the seed every time and so the demand for maize seed was high, as was profit.

Source seed: Compared with other crop varieties, it was easy to obtain seed of preferred maize varieties for seed production from NRMP, Rampur.

Storage time and facilities: Farmers planted maize for seed production in the winter and sold the seed after harvest. The time of planting of spring maize in the *Terai* and full-season maize in the hills, coincided with the harvest times of the winter crops. Consequently, farmers did not require well-equipped long-term storage facilities for maize seed. In the case of other crops, seed stocks were sometimes stored for nearly six months, which increased the cost of seed compared to maize.

Seasonal advantage: Farmers had the seasonal advantage of growing maize in the winter/autumn season. Farmers reported that during this season, the incidence of disease was lower, and there was no problem of drying and cleaning seed because of the lower rainfall and shorter storage time.

Support from other institutions: The emphasis placed on maize seed production was due to the support by District Agriculture Development Office, National Maize Research Programme and other institutions in training, technical backstopping and monitoring of the maize seed plots, as well as in marketing.

Supply and marketing of maize seed in the context of national demand.

The seed requirement of maize is more than that of other cereals because of its open pollination and the deterioration of genetic purity within three to four years. According to official statistics, only 59% of the area cultivated by maize in Nepal is planted to improved varieties and the seed replacement rate is very low (<1%). Factors causing difficulties in marketing of maize seed were as follows:

Availability: Surpluses appear to occur in areas where seed is produced, especially in those areas that are accessible by road, and

where technical assistance and other inputs are available. However, most of the maize-growing areas are remote and inaccessible, causing difficulties in obtaining improved seed. In these situations farmers are compelled to grow their own seed, and seed producers cannot sell their produce.

Purchasing power: The farming system of Nepal is based on subsistence, and farmers often have insufficient cash to purchase inputs, including seed (if available) from the market because of high prices.

Price: Lack of mechanisation in seed production, seed transportation, profit percentage of middle men/Agrovets all increase the price of seed beyond the purchasing power of ordinary farmers.

Seed quality: There is no policy for monitoring seed quality in the open market, which may result in the trade of poor-quality seed by the business sector. Once farmers receive poor-quality seed, they lose faith and do not buy new seeds from the market. Instead, they grow their own.

Storage of seed

How crucial is seed storage for the seed business? One of the major factors for seed production and management is storage of the seeds. The storage system influences the quality of seed, whilst price is determined by the storage costs incurred. With respect to seed storage in Pithuwa, few inputs were involved because maize seed was produced during the winter season and the storage time was only 2-3 months (January to March). Maize growers stored the maize seed in a rented room in jute or gunny bags. If seed was not sold during the current season, the seed was kept in DMT (woven polypropylene) sacks with the group's logo under ambient cond-itions with fumigation until the following winter. Seed of other cereals, such as rice, wheat and lentil, needed to be treated and space was required for long-term storage. In the case of maize seed, this cost had to be borne only if the seed was not sold in the first season.

Evaluation of the group

Cost benefit: The seed producers' group of Pithuwa obtained a good return from the seed business. On average, a farmer earned a net return of more than 20.000 Rs/ha each year from maize seed, provided all the seed was sold (source: PRA and discussions with the group and other agencies). The price of the maize seed fixed by the group was reported to be 20% higher than other seed-growing agencies. However, the cost of production was also higher because of the high quality of the seed and lower levels of mech-anisation in production, supervision, cleaning and grading.

Livelihood enhancement: The annual income of the group

members had increased by 25% following the introduction of seed multiplication activities in Pithuwa. Awareness and technical knowledge regarding crop husbandry, seed production and management had also been increased through participation in training and tours. In addition, the group had developed its own identity in seed production and management (tagging, bagging with logo etc). The group had its own fund to provide loans for seed production activities. Farmers and other institutions gave priority to purchasing the seed from this group rather than from Agrovets and other agencies.

Constraints

Seed marketing: Marketing of seeds in remote areas was generally lacking.

Source seed: Lack of availability of source seed of preferred varieties of major crops, together with the higher costs involved in seed and its transportation, presented major constraints to the seed business. However, availability of maize seed was not a major problem, at least for the seed producers' group of Pithuwa.

Storage and grading facilities of seed: Lack of storage space and grading facilities within the community for large quantities of seed was one of the constraints for the seed business. Transportation costs for grading increased the cost of seed.

Table 1: Strengths and weaknesses of the group

Strengths	***Weaknesses***
• The members were well-trained in technical aspects of crop husbandry, seed production and management. • The group had developed its own identity in seed production and manage-ment (tagging, bagging with logo). • The group provided funds for mobilisation in seed prod-uction and loans for group activities.	• Increased dependency upon support and subsidies of many NGOs and other organisations. • Conflict between the group and neighbouring farmers. • Lack of relevant price fixation policy. • Greater priority placed on profit making rather than improve-ments in market-ing channels. • Insufficient time given by member because most are job holders.

Conclusion

The Pithuwa seed producers' group was successful in producing, managing and marketing quality seed, and was running smoothly. The main reasons for its success were the constant technical and financial support from government offices and other external agencies (I/NGOs), with which the group had strong links. The group placed great importance on the quality of seeds produced in terms of seed purity, vigour and germination. Never-

theless, the marketing of seed was not very efficient, as most of the seed was sold to DADOs in different districts and if the DADOs/DOA failed to buy the seed, then the problem of marketing was severe.

The best results were with the production of maize seed due to the higher demand, more effective marketing channels, seasonal advantage and quality of seed production. The group had, therefore, placed more emphasis on seed production of maize than on other food grains. However, lack of storage facilities, low purchasing capacity of farmers and policy factors were some of the limiting factors for maize seed production and supply.

The way forward

Marketing system

The marketing system can be improved if the following strategies are employed:

Linkages and coordination: Although the group had strong links with government and non-government institutions, communication with private seed business agencies, such as Agrovets, was weak. Individual farmers and the group had also reported competition in marketing of seed, and so the group needs to develop better communication between farmers and linkages with the private sector for effective seed marketing.

Investment in seed business: The group was profit-oriented and placed much less, even negligible, investment in publicising its activities. It was highly dependent on other institutions for support and subsidies, from training, publicity, through to construction of the community seed house, establishment of grading machines, etc. The group needs to invest in such activities to increase public awareness and long-term sustainability.

Reasonable pricing of seed: Though the quality of the seed was ensured, the price was reported to be more than 20% higher than that of other institutions. This provided a higher margin to the group and its members, but lower to Agrovets and cooperatives. At the same time the purchasing power of farmers decreased. With this in mind, the group should fix a reasonable price for their seed without compromising seed quality. Participatory methods of price fixing should be practiced and all seed producers should be involved in price fixation.

Market survey: Although the group was marketing most of the produce, it had not conducted a proper market survey of seed requirements. They need to do this in order to identify which crops, varieties and in what quantity were sold/purchased by Agrovets and other agencies in one year. After this market survey, the group should plan their seed production in order to reduce the uncertainty in marketing.

Sustainability in future

The group had raised its own funds, and all members of the group were well trained in seed production and seed management technology. Though the group members were capable, they were highly dependent on the development agencies for financial support and subsidies. The major question is, how will the group be sustained in the future if assistance and subsidies are cut or re-distributed to other groups? Instead of planning and depending on grants, the group should use its own resources to plan and secure its future. The group should invest its own resources for further development and mechanisation of seed production, thus reducing the cost of production and increasing the security of income.

CASE STUDY 2: SPECIAL PROGRAMME IN NEPAL INITIATED SEED PRODUCTION GROUPS

SPIN (Special Programme in Nepal) was funded by FAO and jointly implemented with DADO and District Irrigation Offices (DIO) through farmers groups in four districts: Jhapa, Ilam, Syangja and Nawalparasi. Within these four districts, nineteen sites (villages) were identified by SPIN for its activities. SPIN activities were implemented between mid-October 1995 and August 1997. The programme involved field trial demonstrations conducted with high agricultural inputs, such as irrigation, fertilizers, and pesticides, and training related to agronomic practices, seed selection and production. The overall findings of the study are presented here. Through its partnership programme, the aim of SPIN was to increase food production and resource productivity in order to enhance food security.

Objectives of the study

- To examine the effectiveness of seed production activities of farmers' groups and individual farmers.
- To identify the constraints in seed production activities of farmers' groups.

Methodology

A meeting was organised for an in-house discussion regarding the seed study. The study was conducted in Jhapa, Ilam, Syangja and Nawalparasi districts (16 out of 19 sites) where SPIN had implemented its activities through farmers' groups. Focus group discussions with farmers' groups of the respective sites were undertaken using a semi-structured question-naire (Appendix 7). Discussions were held with the member-farmers of the group 20% of whom participated in the focus group discussions and both male and female farmers were involved. Reports published by SPIN were

reviewed and secondary information analysed. Information from direct observation of the current activities of farmers' groups was also included in the study.

Results and Discussion

Training and skills

Sufficient training was provided to the group and its members, in addition to field extension workers. Generally two types of training were conducted; staff training and farmer training. In the case of the former, staff from the District Agriculture Development Office (DADO), District Irrigation Office (DIO) and SPIN participated. The trainers were Subject Matter Specialists (SMS) from DADO, NARC, the National Seed Board and SPIN. In the case of farmers' training, training in the villages was provided by DADO staff and field-based staff of SPIN.

Farmers' training was categorised either as seasonal training or technical training. Staff training was conducted during the growing season of each crop (i.e. spring and summer season for rice, maize, wheat and potato) and involved crop management demonstrations. Farm-er training included skill-building techniques in agriculture, and need-based on-the-spot training (SPIN, 1997). The latter included crop husbandry, use of irrigation, fertilizers and pesticides (i.e., higher agricultural inputs), cropping systems, plant protection and seed management, with training provided on-the-spot at each site as well as for each crop and growing season. In addition, SPIN provided training in a range of crop production practices to collaborating farmers belonging to the project area.

Major emphasis was given to the use of recommended inputs and cultivation practices. The average number of training sessions provided to the group ranged from 5 to 8, and the number of participating farmers from 10 to 50 in different groups. As far as the gender issue for training was concerned, more than 25% of trainees were reported to be women farmers in each group and site. Adoption of new technology by farmers and yields increased, as reported by SPIN, showing that the training was effective and appropriate for the farmers.

Training also covered seed selection and management practices. The resource persons were invited from the Seed Division of DOA and NARC. The main strategy of seed selection and production training was to 'save your own seed' for the forthcoming season (SPIN, 1997). Most of the villagers of the project areas were found to be using the seed they had saved from those provided by SPIN. However, training on seed marketing was lacking.

Support or incentives

Support for inputs (seed, fertilizers, chemicals/pesticides), supplies (seed

bin, sprayers etc.), and maintenance and rehabilitation of irrigation channels were provided by SPIN in the form of part or full subsidies. All the recommended inputs were used, with the aim of demonstrating that yield increases to a maximum were possible if the complete package of practices was used. After the termination of the project, farmers discontinued the use of the recommended package of practices.

Existing situation of the farmers' groups

It has been reported that the groups still exist at each project site but most of them are inactive. Out of 16 sites studied, only five groups are active and are involved in some activities such as saving/credit. A few farmers from the nine sites are individually conducting a seed business at a local level (Table 2).

The farmers of the project area have been using the varieties which were provided by SPIN from the seeds they had saved. Wheat and potato were the main crop varieties used by farmers of the study site. Farmers of six villages reported that they obtain seed either from DADO or from AIC or some other institutions. The seed produced is marketed through their own house and some sold to Agrovets (Table 3).

Most of the farmers saved seeds for their own use. At present, none of the groups were active in producing seeds for sale in an organised manner. The farmers were not aware of the sources of seed and even if they were aware of them, they were not able to purchase the costly seeds from the government farms and stations. Consequently, there was a lack of self-reliance on seed production, management and its marketing.

Table 2: Seed production and other activities of SPIN initiated groups

Marketing outlet	Responses from 16 groups
Individually	9
From groups	2
Through contact with Agrovets	3
Potato (from cold store)	1

Table 3: Marketing outlets for seed

	Responses from 16 groups	
Questions	**Yes**	**No**
Is your group still active?	5	11
Is your group conducting seed production activities?	2	14
Are any farmers involved in seed production and marketing in your group?	9	7

Mandate crops, yield advantage and seed production

The major crops were spring rice, main-season rice, spring maize, wheat and potato. Project intervention was responsible for the increase in yield of each crop at all sites. Although farmers discontinued the use of recommended inputs such as fertilizer and irrigation after the termination of the project, there was still a 15–20% yield increase compared to pre-project yields, due to a change of seed with the new high-yielding varieties provided by SPIN (Mathema, 1996).

Seed production and distribution at the local level by the farmers from a few sites included preferred varieties of rice and, in larger amounts, wheat, followed by maize and potato. The lower quantity of maize was because of the difficulty in maintaining adequate isolation distances for maize seed production that are required to reduce outcrossing to other varieties. In the case of potato, the groups had a lack of storage facilities. However, a group of Sano Baraghare in Jhapa district was conducting potato seed production in huge amounts and storing seeds in a cold store at Biratnagar (>100 km away from this site).

Major constraints for seed production

A few of the groups were found to be involved in the seed business at the local level but none were involved on a commercial scale at any of the study sites. The participating farmers of each group reported that they saved seeds for their own use. The major constraints identified for seed production were lack of availability of source seed, as well as difficulties in marketing of the seed. Farmers were not aware of seed sources or marketing of the produced seed. Lack of group cohesion, inputs such as uncertain irrigation facilities, fertilizer, and technical backstopping were also reported as constraints to seed production through the group approach (Table 4).

Technical skills and knowledge at farmers' level

The farmers interviewed reported that the technical skills of the farmers were improved through the training schemes provided by SPIN. Almost all the trained farmers were perceived to have sufficient knowledge in crop husbandry and seed selection and management. Each farmer interviewed expressed an appreciation of the programme.

Limitation of the project area

The project was implemented in a small area covering a few households, which limited the effect of the project to a very small area in the first year. However, the area was extended in the final year to neighbouring locations and training was provided to a relatively large group of farmers.

Table 4: Major constraints for seed business

Constraints	Responses from 16 groups
Lack of availability of source seed	16
Marketing problems	12
Lack of availability of chemical fertilizer	9
Technical backstopping	9
Uncertain irrigation facilities	8
Difficulty in maintenance of seed quality	7
Lack of group cohesion	5
Others (e.g., natural calamities, transport-ation, losses in storage)	5

Unavailability of source seed

After the completion of the project, the farmers and groups had no access to source seed (seeds used for producing commercial seed) and they were unable to carry out seed production. However, some farmers reported that they were producing seed from their own seed obtained from the SPIN programme. Only a few farmers were receiving or purchasing new seed from DADO and/or AIC.

Seed marketing

SPIN did not arrange for training on marketing of seed produced by groups or individual farmers of the project area. Although seed storage structures, such as seed bins, were provided at a subsidised cost, farmers did not have either seed marketing skills or access to the seed-marketing network.

Strengthening the farmers' group

There was a lack of activities to strengthen the farmers' groups. No training regarding skill building and capacity building of the groups was organised by SPIN.

Self-reliance of the group and sustainability

Farmers' involvement in the project during the project period was basically motivated by the maximum support and subsidy for inputs and irrigation facility provided by SPIN. However, the lack of availability of inputs at the required time and at reasonable prices, together with the low purchasing power of farmers changed the situation once the project ended. As far as the sustainability of the activities was concerned, farmers could not be classed as being self-reliant in seed production, management and mar-keting.

Conclusion

The SPIN programme was not found to be as successful as the Pithuwa seed producers' group, as it largely failed in marketing of seed on a wider scale. This was because the

training provided to the farmers' groups only focused on production and management of seed, whilst marketing aspects were given insufficient consideration.

Though the support, subsidies and capacity building in technical skill resulted in a yield advantage for major food grains, most of the farmer groups discontinued the seed production program. Only a handful of individual farmers from a few groups were currently involved in seed production.

Other constraints that caused failure of the program included limited coverage of project activities, unavailability of quality seeds, and lack of strong groups to continue the programme.

On the other hand, major constraints identified by the seed business included unavailability of seed and chemical fertilizer, marketing problems, poor technical back-stopping, uncertain irrigation facilities, difficulty in seed quality maintenance, inability to manage group decisions, lack of infra-structure and natural calamities.

The way forward

The contribution of institutions to technical knowledge and inputs during the initial stages strengthened the capacity of farmers' groups or CBOs in seed production and distribution. This can boost total production by providing quality seeds of preferred varieties to local farmers. Thus, the following strategies should be adopted for the success of seed production and marketing business.

Creation of Awareness: Creating awareness of the seed business and its marketing is essential for farmers' groups involved in the seed business. This is only possible through farmer-level workshops, using a mass media approach such as radio and television, and the distribution of publications.

Strengthening groups or CBOs and individual farmers: Seed enterprise is a costly business. Grass root-level farmers can only be involved in the business if they learn by observing the activities of others. Hence, focus should be given to the imple-mentation of the activities by identifying the key or nodal farmers who are most effective and enthusiastic in the seed business. Capacity building through skill development and provision of support and subsidies during the initial stages of the implementation are essential, in addition to strengthening market opportunities and networking.

Training and Gender: Seed marketing is possible if the group is strong enough to contact or search for the market and/or contact seed vendors /entrepreneurs to sell the produced seed. Training should be aimed at seed marketing. Both male and female farmers play important roles in seed production and marketing and both should be involved.

Decentralisation: There are only a few government farms and research stations that can provide foundation or certified seeds to the farmers' groups. It is very costly, both for farmers to get the seeds, and for the farms or stations to provide seeds to the farmers.

In this context, clearly labelled seed would be better than certified seeds. On the other hand, due to wide geographic and socio-economic conditions of the country, there is always variation in demand for seed of crops and varieties. Therefore, foundation seed production and distribution should be decentralised to farmer groups or CBOs.

However, decentralisation in seed production through groups is not the only answer. This should be accompanied by a location-specific and situation-specific strategy in seed production, management and marketing.

Sources of seed and storage facilities: Field experience show that farmers do not have easy access to quality seeds of appropriate varieties. In many cases, even if quality seed is available, farmers cannot purchase it due to lack of cash. Thus, foundation or certified seeds should be made available on loan to the farmers for seed production. Storage of some crops such as potato is a major problem. So provision for transportation and an ensured storage facility are essential.

Support and subsidies: Support and subsidies should be given to the groups at the initial stage of their capacity building. The technical and managerial capability of the groups needs to be developed for sustainability, instead of providing seasonal subsidies for crop production.

Further issues

Quality of seed is always a key issue in the seed business. What are the methods for ensuring the quality of the seed? Is it possible for the authorised agencies to monitor each field? Observation of standing crops in the field, and tagging and labelling of seed are some of the issues. Further study of the seed quality produced by the farmer groups and their monitoring is essential.

Policy makers, researchers and extension workers should critically analyse why seed marketing is a problem in Nepal. The AIC has been the major source of quality seed of food grains through formal systems in Nepal but the private sectors should also be encouraged to supply seed to meet the national demand.

IMPLICATIONS FOR PARTICIPATORY CROP IMPROVEMENT PROJECTS

The successful activities of the two studied organisations have relevance for replication in Participatory Crop Improvement (PCI) project activi-

ties. These activities need to be tested, verified and scaled up through such groups.

Varieties identified through participatory varietal selection (PVS), and developed through participatory plant breeding (PPB), need to be scaled up through groups. Participatory approaches have been successful in identifying farmer-preferred varieties and therefore one of the strategies should be to link these seed producer groups with scaling up programmes of farmer-preferred varieties. Marketing, linkage and coordination strategies followed by the groups can also be replicated in the project areas. However, continuous monitoring and evaluation in a participatory fashion is needed to modify the approach according to the situation.

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Appendices

Appendix 1: Names of the key informants of the Seed Producers Farmers' Group, Phituwa, Chitwan.

1. Gyanshali Neupane, Chairman of the Seed Producer Farmers Group.
2. Tirtharaj Adhikari, Vice Chairmen of the Seed Producer Farmers Group.
3. Ramchandra Adhikari, Secretary of the Seed Producer Farmers Group.
4. Kamalnath Adhikari, Assistant Secretary of the Seed Producer Farmers Group.
5. Ramchandra Pandit, executive member of the Seed Producer Farmers Group.

Appendix 2: Objectives of the Seed Producer Farmers' Group, Pithuwa (SPFGP), Chitwan.

- To help in agriculture development by providing quality seeds of different crops.
- To uplift the social and economical status of group members through commercialised cereal seed production.
- To generate funds for saving and provide credit to members at low rates of interest.

Appendix 3: Occupation of the group members of the Seed Producer Farmers' Group, Pithuwa, Chitwan.

Occupation	Numbers
Government service	7
Teacher	7
Local trader	4
Tractor owners	4
Full-time farmer	39
Total	**61**

Appendix 4: Role and responsibilities of the Executive and share members of the Seed Producer Farmers' Group, Pithuwa, Chitwan.

Members	Role and responsibilities
Chairman	Chair the group during meetings. Participate in decision making. Co-ordination with other GOs/NGOs /CBOs. Implement the decisions of the meetings. Preparation of annual programme.
Vice chairmen	Assisting the chairman and acting as chairmen in his absence.
Secretary	Record keeping. Communication. Correspondence through letters and other matters. Office administration.
Assistant secretary	Provide support to secretary for above activities.
Treasurer	Financial records. Managing financial matters. Provide loans to seed growers. Collection of distributed loans. Assisting with fundraising of group.
Assistant treasurer	Providing support to treasurer for the above activities.
Executive member	Attend group meetings. Provide suggestions and opinions for proposed agendas. Implement the board's decisions.
General share member	Assist in the successful implementation of group activities and programme. Present the annual programme at general assembly. Participate in sub-committees.

Appendix 5: Criteria for membership application in the Seed Producer Farmers' Group, Pithuwa Chitwan.

- Should be permanent residence of Pithuwa Village Development Committee (VDC).
- Should be more than 18 years old.
- Should be a Nepalese citizen.
- More priority to seed grower or a person having seed production-related training.
- Should have a minimum of 10 kattha (0.33 ha) land holding.
- Need recommendation from 5 share members.
- Should participate in the Seed Multiplication Programme.
- Registration fee Rs 50 and entrance fee Rs 100.
- Should pay an amount equivalent to existing share amount of group members.
- Should pay meeting charge @Rs 5/per meeting.
- Executive board reserves the right of accepting or rejecting the application.
- Need a one year probation period.

Appendix 6: Crops, varieties, area and estimated yield of seed from seed production through the Seed Producer Farmers' Group, Pithuwa, Chitwan in 2001.

Crop	No of varieties	Target area (ha)	Estimated yield (t)	Varieties
Maize IS†	5	72	139	Rampur-Composite, Arun-2, Arun-1, Manakamana-1, Khumal-Yellow
Wheat IS	4	35	70	NL297, BL1473, RR21 etc
Rice FS‡	5	37	74	Sabitri, Rampur- Masuli, Radha-4, Radha-12 etc
Cowpea	3	2.5	1.25	Akash, Prakash, and IT line
Lentil	6	16.5	12	Simal, Sindur, Simrik, Shisir, Khajura-1 and Khajura-2

†IS = Initial Seed

‡FS = Foundation Seed

Appendix 7: Checklist for discussion with the SPIN farmers' groups.

LI-BIRD Participatory Crop Improvement Project Seed study checklist

Name of farmer: VDC/MP:
Ward No.: Village:
District:

1. Training Information
Where did SPIN conduct training?
How many groups were involved in the training?
What were the subjects of training?
Frequency of training?
Number of participants in training?
Method of training:
  Theoretically
  Practically
  Both
Place and time of training
Male/female participants

2. Seed Production Information
What were the crops for seed production?
What were the sources of seed?
What were the major criteria for seed production?
Method of seed marketing?
  From house
  From group
  Agrovet/enterprise
How did you store seed?

3. Support and substances
Did you get economical support?
Process of economical support for seed production?
Do you need any support, now?
Did you get any support for irrigation?
What about the technical support?

4. Present Activities
Is your group active?
Is your group conducting seed production?
What are the crops for seed production?
How do you marketing seed?
What is the source of seed for seed production?

5. Problems
Unavailability of seed
Unavailability of chemical fertilizer
Irrigation problem
Technical support
Seed marketing
Poor-quality of produced seed
Group inactive

Interviewer: Post:
Date: Signature:

Appendix 8: Numbers and participants of the training reported by SPIN group farmers.

Site name	No. of trainings	No. of participants
Khilung Deurali, Simalchour, Syangja	10	30 (15)†
Putali Bazar Municipality and Karendada VDC, Syangja	12	15 (6)
Putali Bazar Municipality, Chandikalika VDC, Syangja	6	30 (15)
Sworek-7, Phulbari, Syangja	5	35 (17)
Dumkibas –8 Shiseni, Nawlparasi	14	25 (5)
Nadawa –7- Nadawa, Nawlparasi	n/a	25 (8)
Hakui 3,4 & 5 Hakui, Nawlparasi	18	40 (20)

Appendix 8 continued.

Site name	No. of trainings	No. of participants
Gauradah –4, Jhapa	15	20 (4)
Damak -18, Sano Baraghare, Jhapa	12	50 (n/a)
Surunga -8 Ukusbas, Jhapa	12	10 (5)
Budhabar -1 Bhattetar, Jhapa	15	27 (3)
Laxmipur –1 Bhangtar, Ilam	5	11 (2)
Sagrumba-2, Masarbesi, Ilam	12	12 (1)
Godak-1, Rajduwali, Ilam	6	32 (2)
Godak-3, Setuwabesi, Ilam	12	30 (15)

† *Figures in parenthesis indicate female participants*

Appendix 9: Names of the members of responding SPIN groups.

Site name	Members
Khilung Deurali, Simalchour, Syangja	Mr. Surya Koirala Mr. Lok Prashad Koirala Mr. Ram Bdr Gurung Mr. Gopi Sen Mr. Krishna Bahadur K.C. Mr. Purna Bahadur Shrestha
Putali Bazar Municipality, and Karandada VDC, Syangja	Mr. Bishow Prem Adhikari Cptn. Hum Bahadur Thapa Mr. Ram Krishna Adhikari Mrs. Yam Kumari Aryal
Putali Bazar Municipality, Chandikalika VDC: 6,7, & 8, Syangja	Mr. Bal Krishna Bhandari Mr. Kedhab Giri Mr. Mekh Nath Shrama Mr. Chandra Pandit Bhandari Mr. Indra Pandit Bhandai Mr. Lok Nath Bhandari
Sworek-7, Phulbari, Syangja	Mr. Shaligram Aryal Mr. Bisheshwor Pandit Aryal Mrs. Kalpana Aryal
Dumkibas –8 Shiseni, Nawalparasi	Mr. Rum Bahadur Soti Mr. Bir Bahadur Kunwar Mr. Nathu Ram Darai Mr. Basanta Bahadur Rana
Jahada-1 Majauni, Nawalparasi	Mr. Ishwari Pandit Upadhyaya Mr. Anil Kumar Kahar Mr. Him Bahadur Chaudhary Mr. Paras Nath Chaudhary Mr. Dilli Pandit Upadhyaya Mrs. Ambika Upadhyaya Mrs. Sita Updhyaya

Site name	Members
Nadawa –7- Nadawa, Nawalparasi	Mr. Bijaya Bahadur Chaudhary Mr. Khadga Bahadur Chaudhary Mr. Anirudra Chaudhary Mr. Nam Brikshha Kahar
Hakui 3,4& 5 Hakui, Nawalparasi	Mr. Dhruba Nan Chaudhary Mr. Mohar Tharu Mr. Kodali Chaudhary Mr. Kumare Tharu etc.
Gauradah –4, Jhapa	Mr. Indra Prasad Pokhrel Mr. Jyandra Karki Mr. Roshan Adhikari Mr. Bishwamitra Dahal Ms. Hem Kumai Pokhrel Mr. Khadka Bahadur Karki Mr. Chhabindra Karki etc.
Surunga -8 Ukusbas, Jhapa	Mr. Kalika Pandit Ghimire Mr. Kumar Shrestha Mr. Indramani Subedi Mr. Ram Ghimire Ms. Laxmi Shivakoti Ms. Minu Kumari Ghimire Ms. Ganga Bhujel Ms. Harimaya Bhetuwal
Damak -18, Sano Baraghare, Jhapa	Mr. Narad Bhanadri Mr. Dilli Bahadur Rawat Mr. Narayan Rawat Mr. Basudev Aryal Mr. Dambar Bahadur Poudel Mr. Khadga Rayamajhi Ms. Ganga Bhandari Ms. Dew Maya Bista Ms. Hari Maya Poudel etc

Site name	Members
Budhabar - 1 Bhattetar, Jhapa	Mr. Trilochan Kattel Mr. Rudra Prasad Poudel Mr. Devi Prasad Bajagain Mr. Surya Kumar Bajagain Mr. Khadananda Wagle Mr. Bal Bahadur Adhikari Mr. Khadaga Pandit Gartaula Mr. Nirmal Bhattarai
Laxmipur – 1 Bhangtar, Ilam	Mr. Indra Prasad Poudel Mr. Pravu Narayan Poudel Mr. Bishnu Poudel Mr. Suk Raj Limbu
Sagrumba-2, Masarbesi, Ilam	Mr. Yam Bahadur Karki Mr. Hom Bahadur Karki Mr. Arayan Pandit Acharya Mr. Lila Pandit Gautam
Godak-1, Rajduwali, Ilam	Mr. Dambar Tamang Mr. Dig Bahadur Adhikari Mr. Nara Bahadur Tamang Mr. Ram Bahadur Tamang Mr. Kumar Shrestha Ms. Som Maya Subedi Ms. Budda Maya Juwal etc
Godak-3, Setuwabesi, Ilam	Mr. Netra Sorali Mr. Binod Kumar Adhikari Mr. Gopal Sorali Mr. Agni Prasad Rawat Ms. Hima Devi Adhikari Ms. Parvati Adhikari

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