

Community-based seed production in Nepal

Validated RNRRS Output.

New community-based systems fill a big need for seed. Now, farmers can get seed of the varieties they prefer. Community networks find suitable new varieties, involve farmers in selection, and produce seed commercially. They are market-oriented, and cost-effective because they involve all stakeholders—farmer groups, government and non-government research and development organisations, seed traders and entrepreneurs. Community-based seed organisations dealing with rice, wheat, maize, kidney bean, chickpea, mungbean, lentil, field pea and oilseed rape already operate in Nepal, and are spreading to India and Bangladesh. They boost local seed markets, open possibilities for people to start seed-trading businesses, and offer farmers a ‘basket’ of their favourite crop varieties from which to choose.

Project Ref: **PSP36:**

Topic: **1. Improving Farmers Livelihoods: Better Crops, Systems & Pest Management**

Lead Organisation: **CAZS-NR, UK**

Source: **Plant Sciences Programme**

Document Contents:

[Description](#), [Validation](#), [Current Situation](#), [Current Promotion](#), [Impacts On Poverty](#), [Environmental Impact](#), [Annex](#),

Description

Research into Use

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Geographical regions included:

[Bangladesh](#), [India](#), [Nepal](#),

Target Audiences for this content:

[Crop farmers](#),

PSP36**A. Description of the research output(s)**

1. *Working title of output or cluster of outputs.*

In addition, you are free to suggest a shorter more imaginative working title/acronym of 20 words or less.

Concepts and approaches of community-based seed production (CBSP) for a sustainable seed supply system in Nepal

2. *Name of relevant RNRRS Programme(s) commissioning supporting research and also indicate other funding sources, if applicable.*

Plant Sciences Research Programme and LI-BIRD

3. *Provide relevant R numbers (and/or programme development/dissemination reference numbers covering supporting research) along with the institutional partners (with individual contact persons (if appropriate)) involved in the project activities. As with the question above, this is primarily to allow for the legacy of the RNRRS to be acknowledged during the RiUP activities.*

NB no individual contact persons given?

R6748, R7542, R8071, R8221 and Programme Development

Local Initiatives for Biodiversity Research and Development (LI-BIRD)
 Forum for Rural Welfare and Agricultural Reform for Development (FORWARD) CAZS-Natural Resources, UK
 Department of Agriculture (DoA) and District Agricultural Development Offices (DADOs)
 Nepal Agricultural Research Council (NARC)
 Social Upliftment through Participatory Programme, Research and Training (SUPPORT) Foundation
 Community Development and Research Centre (CDRC)
 International Maize and Wheat Improvement Centre (CIMMYT), Nepal

4. *Describe the RNRRS output or cluster of outputs being proposed and when was it produced? (max. 400 words). This requires a clear and concise description of the output(s) and the problem the output(s) aimed to address. Please incorporate and highlight (in bold) key words that would/could be used to select your output when held in a database.*

The PSP has initiated, developed and formalised a **community-based seed production (CBSP)** approach for a sustainable seed supply system for poor farmers. It is an approach of producing and distributing seeds with the **participatory involvement of farmers' groups**. In this approach, seed producer farmer associations are formed to multiply the seed of farmer-preferred varieties using a **cost-effective** approach having several unique features. It is **market-oriented** with an unusual characteristic of placing greater emphasis on developing skills in marketing than in **production**. It takes account of the entire **seed innovation system** from initial identification of new varieties through participatory varietal selection (PVS) through to commercial seed production. It involves **all**

stakeholders, and develops strong **linkages between the private sector** and the **community-based groups**.

This builds **sustainable partnerships** for the CBSP groups and governmental and non-governmental research and development organisations, seed traders and entrepreneurs. This has:

- Facilitated the development of a local seed market
- Provided an opportunity for local income generation through the business of selling seed
- Increased productivity and hence food security through the timely supply of large quantities of quality seed of improved varieties to farmers

When produced: The CBSP approach of seed supply began with the successful outcome of participatory crop improvement (PCI) projects that began in 1997 in Nepal. These projects quickly identified new, farmer-preferred varieties and an immediate challenge was to provide seeds of those varieties on a wider scale. Since 2000, the rapid formation and institutional strengthening of farmers' groups to produce and market seed has been widely tested in important crops such as rice, wheat, maize, and kidney bean. Dry season crops e.g. chickpea, mungbean, lentil, field pea, oilseed rape etc were included in the CBSP programme after the initiation of the rice-fallow *rabi* cropping (RRC) project in selected districts of Nepal *terai*.

Problem addressed: Over 80% of the total population of Nepal derive their food security, livelihood and income from agriculture (CBS, 2005). Seed is vital for agricultural development; however, farmers have limited access to quality seeds of improved crop varieties. The formal sector meets < 5% of the total seed demanded of major food crops (Baniya et al., 2000). The National Seed company (NSC), a parastatal organisation, produced and marketed over 3000 tonnes of seed of rice, wheat, maize, lentil, jute, vegetables, and other crops in 2005, of which rice, wheat and maize had the major share (Table 1). The current supply of about 600 tonnes of rice seed through the NSC is just enough to replace 0.55% of the total rice seed demand annually in the country (Table 1). The supply situation of crops other than rice, such as wheat and maize is more alarming. In this context, farmer-to-farmer seed exchange and local seed markets meet most of the seed requirements. There has been a declining government involvement in the seed supply system but there is no viable commercial seed supply mechanism in place to fill the gap. The situation is even worse in remote areas with the result that resource-poor and disadvantaged communities suffer most.

Table 1. Demand and supply of quality seed from government managed seed supply system i.e. through the National Seed Company (NSC) in 2005

Crop	Total area (M ha)	Seed rate (kg ha⁻¹)	Total seed required (t)	Amount. of seed for 25% seed replacement (t)	Supply from NSC (t)	Deficit in seed supply (%)
Rice	1.54	50	55,000	14,000	643 (5‡)	95
Maize	0.83	20	11,000	3,000	11 (0.3)	99.7
Wheat	0.67	120	59,000	15,000	2600 (18)	82
Total	3.04			32,000	3250 (10)	90

‡ NSC, 2006, figure in parenthesis indicate percentage of amount of seed supplied from NSC (formal sector)

Lessons from previously implemented seed projects in Nepal and findings elsewhere (e.g., Cromwell, 1997; Sperling and Ashby, 1997; Tripp, 1997, 2001; Douglas, 1984), suggest that only locally-based organisations can

provide a solution in meeting the demand for quality seeds.

5. *What is the type of output(s) being described here?*

Please tick one or more of the following options.

Product	Technology	Service	Process or Methodology	Policy	Other Please specify
x	x	x	x	x	

6. *What is the main commodity(ies) upon which the output(s) focussed? Could this output be applied to other commodities, if so, please comment*

The priority crops in CBSP in Nepal

- Rice
- Wheat
- Maize
- Mungbean
- Lentil
- Kidney bean
- Chickpea
- Rapeseed and mustard

All the above crops are very important from the point of view of food and livelihood security, income generation and also providing raw materials to most of the agro-based industries in Nepal. In addition, other minor crops are also included as per the local farmers' needs. The process of CBSP is equally applicable to all crops in all agricultural systems in all geographical regions. It is easiest for self-pollinated crops with high multiplication rates and where seeds can be sold without a need for longer storage.

7. *What production system(s) does/could the output(s) focus upon?*

Please tick one or more of the following options. Leave blank if not applicable

Semi-Arid	High potential	Hillsides	Forest-Agriculture	Peri-urban	Land water	Tropical moist forest	Cross-cutting
x	x	x					x

8. *What farming system(s) does the output(s) focus upon?*

Please tick one or more of the following options (see Annex B for definitions).

Leave blank if not applicable

Smallholder rainfed humid	Irrigated	Wetland rice based	Smallholder rainfed highland	Smallholder rainfed dry/cold	Dualistic	Coastal artisanal fishing
x	x	x		x		

9. How could value be added to the output or additional constraints faced by poor people addressed by clustering this output with research outputs from other sources (RNRRS and non RNRRS)? (**max. 300 words**). Please specify what other outputs your output(s) could be clustered. At this point you should make reference to the circulated list of RNRRS outputs for which proformas are currently being prepared.

CBSP is highly compatible with participatory varietal selection (PVS) and client-oriented breeding (COB) as these approaches are based on the identification and promotion of new varieties. These outputs can be clustered with activities related to seed quality, health, improved post-harvest processing and improved seed storage and, demand and supply of agricultural information and any other seed-based technologies, seed priming, enrichment of seeds with micronutrients, processing and improved packaging.

Often farmers do not use the quality seeds of improved crop varieties so the efficiency of CBSP systems can be enhanced through marketing networking. In Nepal, the FM radio network is emerging with a wide coverage throughout the *terai* and most part of the hills. Information networking through such channels in other parts of South Asia and Sub-Saharan Africa would be very helpful in letting farmers know about what is available for particular crop variety. These can also be clustered with outputs that help in capacity building of farmers groups, particularly on seed quality management and marketing. Some of the CBSP groups were, for example, based on existing groups concerned with activities such as livestock or irrigation.

The cultivation of post-rainy season crops in land that was previously fallow also requires group action, and in some *terai* districts farmers groups, facilitated by FORWARD, have already initiated CBSP on post-rainy season crops. This could be strengthened and expanded to new areas in Nepal and elsewhere.

The value of these outputs can be added by clustering with non-RNRRS outputs, e.g., CBSP promoted by CIMMYT-NARC collaboration on maize (funded by SDC) in Nepal, small grant projects funded by the National Agricultural Research and Development Fund (NARDF), Nepal, and research findings on solarisation to produce healthier seedlings of rice by Cornell University in Bangladesh and Nepal.

Because the output involves seed, groups, marketing, information, participation, extension and institutional change it can be linked to many RNRRS outputs.

CPHP, Farmer access to markets, R8274, R8498

CPP, Commercial incentives for groundnut production and farmer led multiplication, R8422, R8105

CPP, Dissemination of improved beans, R8415

CPP, Farmer multiplication systems (groundnut/potato), R8104, R8435

CPP, Finger millet blast resistant varieties, R8445, R8030, R6733

CPP, Good seed initiative, R8480

CPP, Improved access to appropriate farm inputs for integrated maize crop management by small-scale farmers in Embu and Kirinyaga Districts, Kenya, R8219, R7405

CPP, Improving farmers access to and management of disease resistant maize cultivars in the Southern Highlands of Tanzania, R8220, R8406, R8422 (CPHP)
 CPP, Linking demand with supply of agricultural information, R8429, R8281
 CPP, Managing rice pests in Bangladesh by improving extension service information management for policy and planning, R8447
 CPP, Rosette resistant groundnut varieties, R7445, R6811
 NRSP, Participatory irrigation management and Participatory Technology Development, R7830
 NRSP, Participatory Technology Development, R7412
 NRSP, Scaling-up process, R7865
 NRSP, Self-help groups and community action, R8084

Validation

B. *Validation of the research output(s)*

10. How were the output(s) validated and **who** validated them?

Please provide brief description of method(s) used and consider application, replication, adaptation and/or adoption in the context of any partner organisation and user groups involved. In addressing the “who” component detail which group(s) did the validation e.g. end users, intermediary organisation, government department, aid organisation, private company etc... This section should also be used to detail, if applicable, to which social group, gender, income category the validation was applied and any increases in productivity observed during validation (max. 500 words).

The benefits of seed of improved varieties have been validated over many crops, countries and regions in PSP research and this is documented in other dossiers. Here, we concentrate on the validation of the effectiveness and sustainability of the CBSP groups rather than the impact of the seed produced by the groups. This effectiveness has been validated by a participatory evaluation process of the CBSP group development (Gauchan, 2006, Devkota et al, 2006) and from the records kept by the groups on the seed produced by crop, variety and year and by the financial accounts. Important indicators of sustainability of this approach is that many of these groups are running the business with little external financial support, and are independently handling the planning, production and marketing of seeds. Outside support has been limited to technical backstopping. It was found that the groups were very particular about the quality of the seeds they produced and inspected the production plots and rejected those that were considered unsatisfactory.

The effectiveness of the groups from the viewpoint of their customers was validated by focus group discussions (FGDs) with farmers groups in several districts. It was reported that access to quality seeds of new varieties had improved, the price was affordable and the delivery was in time and reliable.

Additional evidence of the long-term commitment of the groups is that they have federated for quality management and seed marketing. In Chitwan the groups established a District Seed Co-ordination Committee (DSCC) to facilitate the supply of source seed, and to have effective quality control of the seed by joint monitoring

and supervision.

Internal validation was done by the members of the seed producers groups (Annex 1). Several District Agricultural Development offices (DADOs) in the *terai* and the hills of Nepal, several of the Nepal Agricultural Research Council (NARC) Stations across country. Similarly Agrovets, NGOs, e.g. LI-BIRD, FORWARD, Community Development and Research Centre (CDRC), SUPPORT Foundation, INGOs CARE and PLAN, CGIAR centres-CIMMYT and projects-Hill Maize Research Project (HMRP), Agricultural Perspective Plan Support Programme (APPSP), Crop diversification project (CDP) have promoted and validated this approach in many districts of Nepal involving thousands of seed producer farmers.

The effectiveness of this approach has also been reported (Koirala et al., 2004; Rajbhandari, 2004) and also validated in most of the districts mentioned above by 2004 and 2005 through the monitoring visit of multi-stakeholders. The effectiveness of these approaches was evidenced by their uptake by several partners both governmental and non-governmental, other projects and CGIAR centres (Joshi, 1999 and Joshi et al., 2006).

*11. **Where and when** have the output(s) been validated? Please indicate the places(s) and country(ies), any particular social group targeted and also indicate in which production system and farming system, using the options provided in questions 7 and 8 respectively, above (**max 300 words**).*

Realising the ever increasing demand of quality seed and declining supply from the government run organizations, a community-based seed production and marketing approach was initiated by LI-BIRD and CAZS-NR at Chitwan effectively from 2000. In 2001, this approach was scaled up in five more *terai* districts - Jhapa, Rautahat, Dang, Kailali and Kanchanpur - with the help of the DADO offices of these districts as the groups need to be formally registered with them to be eligible for technical backstopping and other support. By 2002, this approach was further scaled to four more *terai* districts - Kapilvastu, Sirha, Saptari and Jhapa - by FORWARD under the Rice-fallow *rabi* cropping project (R8221) (Fig.1, Annex 1).

The seeds are produced in the rainfed and irrigated rice production systems in the humid and semi-arid tropics.

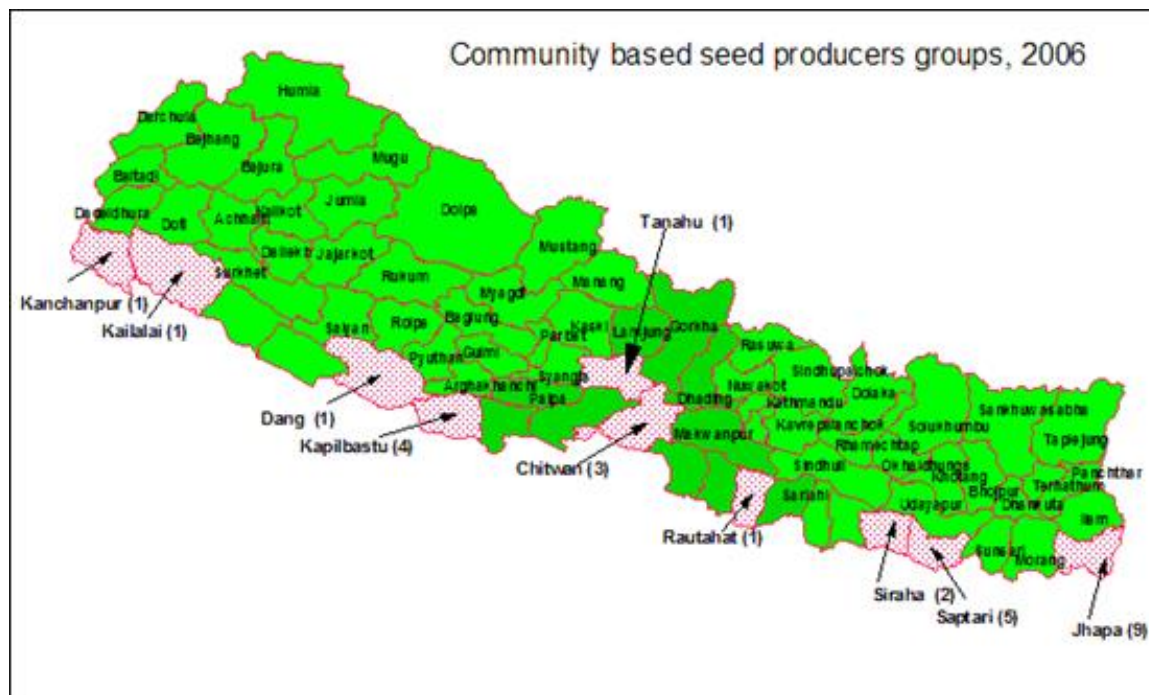


Fig. 1. Functional CBSP groups in the *terai* districts of Nepal (2000-2006). The numbers in the parenthesis indicate the number of groups.

Current Situation

C. Current situation

12. How and by whom are the outputs currently being used? Please give a brief description (max. 250 words).

The group members are the primary users of this output. Each member participates in the decision making on planning, production and marketing and shares in the benefits (Annex 2). This allows groups to be more cohesive and committed to maximising profits. Farming communities across the country are the secondary users of this output. They are getting increased productivity through the use of quality seeds of new crop varieties of their choice.

Currently, this approach is being adopted by several NGO partners in parts of several districts and in many instances this is implemented as a part of special projects. Some elements of the approach are also adopted by government organisations particularly by DADOs of 21 *terai* and 14 hilly districts in their District Seed Self-Sufficiency Programme (DISSPRO). But such groups are still driven by DADOs who market the seeds the groups produce.

Uptake of this approach, from PSP research, is also increasing in other countries, e.g. India and Bangladesh. The Gramin Vikas Trust (GVT) and Catholic Relief Services (CRS) are promoting CBSP in their project areas. In Bangladesh PROVA has initiated CBSP on rice and chickpea.

13. Where are the outputs currently being used? As with Question 11 please indicate place(s) and countries where the outputs are being used (max. 250 words).

These outputs are being used in several agro-ecosystems both upland and low land, irrigated and non-irrigated including areas under cold and moisture stress conditions. In the areas that remain fallow after rice harvest options are available to grow chickpea, lentils, pigeonpea, field pea and mungbean and seeds of them are being produced and marketed. These outputs are also being used in the high barind tract (HBT) of Bangladesh by PROVA in collaboration with Department of Agricultural Extension (DAE) with support from CAZS-NR. In the rainfed semi-arid tropics of western and eastern India GVT and CRS are making use of these outputs with support from CAZS-NR.

14. What is the scale of current use? Indicating how quickly use was established and whether usage is still spreading (max 250 words).

Over 30 groups and cooperatives are producing and marketing a considerable amount of certified, improved and truthfully labelled seeds of rice, wheat, maize, grain legume and oilseed crops (Annex 1). The first significant seed production was in 2001 and by 2005, the quantity of seed of various crops produced and marketed was over 1000 t.

The seed production of the seed groups is much higher than that of the National Seed Company (NSC) (Table 1). Moreover, the NSC does not have a good reputation for the quality of its seed. On average, a seed producer group established only 3-4 years ago is producing and marketing 150 t (Table 3) seed of various crops (Annex 1).

Table 3. Amount of seed of various crops produced by community-based seed producers groups, 2002-2005

Name of seed producers group	District/ Institution	Date of establishment	Total amount of seed produced and sold (t)			
			2002-03	2003-04	2004-05	2005-06
Unnat Seed Producers group, Patihani	Chitwan	Oct, 2001	45	74	258	500
Shreeram Seed Producers group, Parbatipur	Chitwan	Dec, 2002	5	62	149	250
Devujjal Seed Producers group, Gitanagar	Chitwan	Dec, 2002	-	8	46	150
Siddhanath Seed Producers Group	Kanchanpur	2001	-	5	7	20
Kalika Seed Producers Group	Kailali	April, 1998	-	-	3	5

Surayadaya Bahu Uddeshe Krishak Sahakari Sanstha Ltd. Bela - 2 Dang	Dang	March, 1999	23	25	56	70
Nawa Adharsha Farmer Seed Producers Group	Jhapa	1998	2	25	14	20
Total			75	199	633	1015

After four years, these groups are supplying seeds to over 30 *terai* and mid-hill districts of Nepal and Chitwan has become a major source of seeds of several crop varieties. The CBSP has contributed to the dissemination of new crop varieties; many of which have been identified or bred using participatory approaches, PVS or COB. The amount of seed produced and sold was >1000 t (Table 2) annually by just seven groups with a cumulative net profit of over \$10,000.

15. In your experience what programmes, platforms, policy, institutional structures exist that have assisted with the promotion and/or adoption of the output(s) proposed here and in terms of capacity strengthening what do you see as the key factors of success? (**max 350 words**).

The approach was also scaled up by non-RNRRS projects, e.g., the SDC-funded Hill Maize Research Project (HMRP) who promoted CBSP in parts of several hill districts (Fig. 2) as an integral activity of the project.



Fig. 2. CBSP approach validated and promoted by the Hill Maize Research Project (HMRP) in various hill districts of Nepal. However, all the groups get some kind of support from the project and their number fluctuates between years.

The Government of Nepal has initiated a policy to encourage and strengthen farmer's seed producers groups and piloted a District-level Seed Self-Sufficiency Program (DISSPRO) particularly for increasing the access of quality seed of released, pipeline and farmer's preferred popular varieties at a reasonable price in the villages. DISSPRO is being run through the Department of Agriculture (DoA) through their DADOs network. Such groups are strengthened through the provision of revolving funds and grants to a limited number of selected seed producers groups each year in a district. However, these groups do not have the same characteristics of those helped by the PSP and its network of partners. The DISSPRO groups are not based on the demands of farmers so the groups tend to lack ownership, are subsidised more and, most importantly, they lack the basic skills in marketing as DISSPRO places no emphasis on this. Until now more than 125 seed producer's groups were formed through DISSPRO but many have stopped their seed production activities for many reasons. Ultimately most of the groups dissolved as they were not financially viable.

Key factors in the success of the CBSP in the PSP programme was linking groups with DOA/DADO, NARC commodity research systems and NGOs. The most important factor was establishing market linkages with seed entrepreneurs and seed traders. Adequate but not overdue attention was paid to technical capacity strengthening. Moreover, the groups are encouraged to mechanise threshing, grading and packaging to minimise costs and to improve the quality and presentation of their seeds. There may be a strong case for the capacity building of many of the groups formed under DISSPRO through training and interaction with PSP-promoted groups to make them more functional and sustainable.

Current Promotion

D. Current promotion/uptake pathways

16. Where is promotion currently taking place? Please indicate for each country specified detail what promotion is taking place, by whom and indicate the scale of current promotion (**max 200 words**).

The locations of the CBSP groups in Nepal are shown in Figure 1 (Question 11) and Figure 2 (Question 15).

In India, this approach is being adopted for the production of upland rice. This is centred mainly on Orissa but there are some groups in Jharkhand. CBSP in western India have concentrated on maize. Activities have been in Rajasthan, Gujarat and Madhya Pradesh (MP) but now most of the activity is in MP with the Madhya Pradesh Rural Livelihoods Project (MPRLP).

In Bangladesh, the groups with PROVA are centred on several sub-districts of the High Barind Tract and the approach is being used for the production of rice and chickpea seeds.

17. What are the current barriers preventing or slowing the adoption of the output(s)? Cover here institutional issues, those relating to policy, marketing, infrastructure, social exclusion etc. (**max 200 words**).

A major barrier is a **lack of awareness** of the **real constraints** to establishing viable seed producer groups. Several efforts in the past by many projects over many years and the vast majority have ended in failure. Poudel et al., 2003, as part of the PSP research, reviewed the reasons. These were an **overemphasis** of the **technical aspects** of seed production since the people involved in the projects were largely seed specialists and extensionists and an underemphasis on financial and marketing aspects. Essentially, the concept of seed production as a **business rather than a development activity** was not grasped. No attention was paid to the strengthening of groups by helping to establish good cooperative arrangements among their members.

Lack of demand for seed may be an issue in the case of new varieties because of an inadequate supply of information on their advantages. Promoting CBSP can provide added incentives to provide information to farmers about the traits and advantages of new varieties and result in more rapid dissemination of the farmer-preferred varieties.

New groups tend to be limited by capital to invest in seed and infrastructure. Start-up funds in the form of **soft loans** can greatly facilitate the process of forming and strengthening CBSP groups. Most of the CBSP groups face initial difficulties in financing the purchasing of seed and a soft loan or revolving funds are required for six to eight months.

Marketing is a vital issue for the seed business to succeed. More efforts are needed to **impart marketing skills to many farmers and groups**.

18. What changes are needed to remove/reduce these barriers to adoption? This section could be used to identify perceived capacity related issues (max 200 words).

The most important factor to remove the barriers is the changes to the mindset that seed production is a technical, rather than a business enterprise, and that there is no need to try and produce groups that are sustainable even without outside help. Training of staff of government line agencies that have been given the resources to establish seed producer groups is required, and, to a lesser extent, NGO staff. Policy makers need to be brought into a dialogue on this issue in which they are rarely involved. There are substantial funds that can be tapped for seed production activities but norms need to be established on how to help seed producer groups at the start-up phase.

Seed production needs to be included as a topic in the course curricula of the Agriculture University.

Government policy should be favourable to such groups to produce, sell and distribute seed of all categories of varieties (released, near release, farmers' varieties).

19. What lessons have you learnt about the best ways to get the outputs used by the largest number of poor people? (max 300 words).

Using the framework of J. E. Douglas (1984) for the lessons learnt:

1. **Relative advantage** - farmers of CBSP groups have considerably increased incomes and also

perceive that the technology embodied in the new seed has considerable benefits.

2. **Reliability** - the CBSP groups have been established for a relatively short period of time but are delivering profits every year.
3. **Compatibility** - farmers are used to growing the crops for which they are producing quality seed. It does not require significant departures from their customary agricultural practices. The need to work in groups is compatible with previous efforts when the CBSP groups are based on existing groups such as dairy or irrigation.
4. **Visibility** - farmers can directly experience the benefits of belonging to a CBSP group and the purchasers of the seed can readily observe the higher yields and other beneficial traits of the new varieties.
5. **Divisibility** - farmers can only be part of a seed producer group if they are willing to collaborate with others.
6. **Independence** - farmers need to adopt this approach with others although there is a possibility of individuals also being entrepreneurial with additional land for crops not covered by the group.

Profitability of the enterprise is the most important factor that motivates others to participate. The lessons on group building and financial profitability have to be learnt by GOs, NGO and extension workers who have been involved in non-sustainable approaches in the past. Establishing better linkages between seed entrepreneurs and the groups is one of the most important factors in getting this research into use. Besides this, there should be **policy influence** on the policy makers who hold the traditional view of the need for strong regulations for seed when, in fact, deregulation is needed to improve farmers' access to seed. Government monopolies in the seed business are undesirable and regulations need to be relaxed to allow the private sector and civil society to be involved.

Impacts On Poverty

E. Impacts on poverty to date

20. Where have impact studies on poverty in relation to this output or cluster of outputs taken place? This should include any formal poverty impact studies (and it is appreciated that these will not be commonplace) and any less formal studies including any poverty mapping-type or monitoring work which allow for some analysis on impact on poverty to be made. Details of any cost-benefit analyses may also be detailed at this point. Please list studies here.

We have not commissioned any separate studies on the impact of CBSP but the following reports have some information on the impact.

Nepal:

Devkota K. P., Tripathi M. P., Gyawali S., Sunwar S., Poudel D., Shrestha P. K., Joshi K. D. and Witcombe J. R. (2005). Community-Based Seed Production: An Initiative for a Sustainable Seed System in Nepal. Paper presented in good practices workshop, LI-BIRD, Pokhara (in press).

Devkota K. P., Gyawali S., Tripathi, M. P., Joshi K. D., Gurung M., Poudel H., Chaudhary, M., Shrestha P. K. and Witcombe J. R. (2004). Community-Based Seed Production System in Rice: A Case Study of Unnat Seed Producers Group, Patihani, Chitwan. Nepal Agriculture Research Council (NARC) Summer Crop Workshop June 28-30 Kathmandu, Nepal.

Devkota, K.P., Tripathi M., Chaudhary M., Gurung M., Poudel H. and Gyawali S. (2006). Final Technical Report of R8071 -Participatory Plant Breeding in High Potential Production Systems-Validating PPB products, testing different breeding methods and scaling up of new rice varieties. Available at www.dfid-ppp.org

21. Based on the evidence in the studies listed above, for each country detail how the poor have benefited from the application and/or adoption of the output(s) (**max. 500 words**):

- What positive impacts on livelihoods have been recorded and over what time period have these impacts been observed? These impacts should be recorded against the capital assets (human, social, natural, physical and, financial) of the livelihoods framework;
 - For whom i.e. which type of person (gender, poverty group (see glossary for definitions) has there been a positive impact;
 - Indicate the number of people who have realised a positive impact on their livelihood;
 - Using whatever appropriate indicator was used detail what was the average percentage increase recorded
-

The CBSP system provides benefits to the seed-producer farmers and their groups and also provides benefits to the grower who use quality improved seed. The poor thus benefit in two main ways: *directly* those who are involved in the CBSP and *indirectly* those that *purchase* seed produced by the groups either to sell on (entrepreneurs) or to grow (farmers).

Direct benefits. These groups have a clear organizational structure and the members have defined roles and responsibilities. We assume this has helped in the development of human capital and the empowerment of the members of the groups. It adds to the capability of the community to produce seed of improved varieties.

The groups have also generated additional income for their members (Table 4). There are over 370 farmers in the eight groups (Table 4). Given that businesses rarely make much money in the early years, the magnitude of this impact could increase substantially.

Indirect benefits: It is estimated that over ten thousand farmers are using improved seed produced and marketed by seven CBSP groups alone. The seed produced and sold is sufficient to sow several thousands of hectares. Given that the new rice varieties (PSP dossiers 2 and 13) can give very high yield advantages the seed from the CBSP outputs contribute to the improved livelihoods of those that grow them; they include the resource poor, socially excluded, marginal and vulnerable farming communities.

Table 4. Income and expenditure of some of the more well-established community-based seed producers groups (group evaluation), 2001-2004

	Total cost (US\$)			Total income (US\$)			Total profit (US\$)		
	2001-02	2002-03	2003-04	2001-02	2002-03	2003-04	2001-02	2002-03	2003-04
Seed producers group									
Unnat Seed producers group, Chitwan	1925	7942	14085	2108	30	16901	183	1620	2817
Shreeram seed producers group, Chitwan	-	880	10451	-	1048	11570	-	168	1120
Devujjal seed producers group, Chitwan	-	-	929	-	-	988	-	-	59
Surayadaya Bahu Uddeshe Krishak sahakari Sanstha Ltd. Bela - 2 Dang	3225	3437	7028	6155	7070	14620	2930	3634	7592

Environmental Impact

H. Environmental impact

24. What are the direct and indirect environmental benefits related to the output(s) and their outcome(s)? (max 300 words)

This could include direct benefits from the application of the technology or policy action with local governments or multinational agencies to create environmentally sound policies or programmes. Any supporting and appropriate evidence can be provided in the form of an annex.

Direct and indirect benefits:

- The adoption of PVS process widely will reduce the national wastage of testing of varieties that farmers would reject in the end. This would reduce the un-necessary use of inputs for such a testing.
- Increased productivity per unit area without the use of additional external inputs especially pesticides is environmentally beneficial.
- Increased productivity will reduce the pressure to increase the area under cultivation.
- Varietal diversification will help reduce crop loss due to pests and diseases and thereby reduce the use of pesticides. Introduction of new varieties always increased on-farm diversity as farmers adopted many cultivars for different niches.
- Cropping intensity and benefits will be enhanced if farmers are provided earlier maturing varieties.
- The better disease and pest resistance of the new varieties can reduce the use of water and soil polluting agro-chemicals. Reduced use of pesticides and insecticides reduces the risk to human life and help create a more balanced pest-predator cycle.

25. Are there any adverse environmental impacts related to the output(s) and their outcome(s)? (max 100 words)

Any adverse environmental impact is unlikely in the present case as the farmer- preferred new varieties or recently released or promising varieties are scaled up. They do not require any special cultural, management and production inputs.

26. Do the outputs increase the capacity of poor people to cope with the effects of climate change, reduce the risks of natural disasters and increase their resilience? (**max 200 words**)

The CBSP approach aims to increase self sufficiency of seed supply and thereby increase access to a wider range of crops and varieties, both local and improved. Adoption and use of early maturing varieties and short-duration crops will increase the resilience of farmers by making available extra time for other operations, reducing the costs of production, use of water and nutrients as well as, in some cases, increasing cropping intensity (two crops a year in the place of one). Similarly, crop and varietal diversification is a means of coping with climate change. A greater range of crops and varieties with differing maturities will increase options, spread water demands and reduce the risks from natural disasters such as diseases and pests and natural calamities.

Annex

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Annex 1. Seed producers groups and cooperatives

Name	CBSP Group/ Cooperative	District	Fund collection (\$US) ‡	Registered with	Members	Seed production focus§
Unnat seed producers group, Patihani	CBSP group (CBSPG)	Chitwan	66600	DADO	99	R, W, M, Kb, L, Rs.
Shreeram seed producers group, Parbatipur	CBSPG	Chitwan	33300	DADO	35	R, W, M, Kb, L, Rs.
Devujjal seed producers group, Gitanagar	CBSPG	Chitwan	13300	DADO	60	R, W, M, Kb, L, Rs.
Siddhanath seed producers group	CBSPG	Kanchanpur	NA†	DADO	38	R, W, M, Kb, L, Rs.
Kalika seed producers group	CBSPG	Kailali	NA	DADO	20	R, W, M, Kb, L, Rs.
Surayadaya Bahu Uddeshe Krishak sahakari Sanstha Ltd. Bela - 2 Dang	CBSPG	Dang	NA	DADO	46	R, W, M, Kb, L, Rs.
Nawa Adharsha farmer seed producers group	CBSPG	Jhapa	NA	DADO	45	R, W, M, Kb, L, Rs.

Radhakrishna Womens seed producers group	CBSPG	Rautahat	NA	DADO	30	R, W, M, Kb, L, Rs.
Jajaruk mixed farmers group	Group	Jhapa	533	DADO	20	R, Mb.
Bisal female farmers group	Group	Jhapa	467	DADO	25	R, Mb.
Pragatisil female farmers group	Group	Jhapa	667	DADO	25	R, Mb.
Triveni mixed farmers group	Group	Jhapa	600	DADO	21	R, Mb.
Deurali farmers group	Group	Jhapa	460	DADO	30	R, Mb.
Sinha Devi farmers group	Group	Jhapa	270	DADO	25	R, Mb.
Suryodaya farmers group	Group	Jhapa	200	DADO	14	R, Mb.
Bihani Agricultural cooperative	Cooperative	Jhapa	6600	DCA†	50	R, Mb.
Nawadurga female seed production group	Group	Sirha	200	DADO	24	Cp, Mb, R.
Nawajagriti farmers group	Group	Sirha	470	DADO	25	Cp, R, Pp, Mb.
Jagriti Farmers group	Group	Saptari	200	DADO	17	Cp, R, Pp, Mb.
Nawa Jagaran farmers group	Group	Saptari	280	DADO	15	Cp, R, Pp, Mb.
Siddhartha farmers group	Group	Saptari	310	DADO	20	Cp, R, Pp, Mb.
Udaya Farmrs' group	Group	Saptari	130	DADO	24	Cp, R, Pp, Mb.
Shree Mata farmers gruop	Group	Saptari	190	DADO	23	Cp, R, Pp, Mb.
Kalankari farmers group	Group	Kapilvastu	80	DADO	15	Cp, R, Pp, Mb.
Pratisil farmers group	Group	Kapilvastu	470	DADO	20	Cp, R, Pp, Mb.
Janajagaran farmers group	Group	Kapilvastu	200	DADO	21	Cp, R, Pp, Mb.
Srijana farmers group	Group	Kapilvastu	190	DADO	20	Cp, R, Pp, Mb.
Sahayogi mahila multipurpose cooperative	Cooperative	Kapilvastu	5300	DCA†	80	Cp, R, Pp, Mb.
Adarsa Agricultural cooperative	Cooperative	Kapilvastu	670	DCA†	60	R, Pp, Mb.
Kapilmuni Agricultural cooperative	Cooperative	Kapilvastu	640	DCA†	45	R, Pp, Mb.
Bhairav Babva multipurpose seed production group	Group	Tanahun	330	DADO	35	R, M, Mb.

§R = rice; W = wheat; M = maize; L = lentil; Cp = chickpea; Kb = kidney bean; Mb = mungbean; Rs = rapeseed.

†District Cooperative Association

Annex 2. A novel way of seed production and marketing: Case study of Unnat Seed Producer Group, Chitwan, Nepal

With the technical and logistic support from LI-BIRD, a Community Based Seed Producers' group (CBSPG) named Unnat Seed Producer's Group was formed in September 2002 at Patihani Village Development Committee (VDC) and was officially registered with DADO Chitwan. Objectives of this group were: to encourage and strengthen local level seed production and marketing to meet local and district level seed demand and germplasm exchange, develop small scale seed entrepreneurship and facilitate the development of huge seed market in future.

This group has 99 shareholders and a democratically elected Executive Committee and three sub committees (which are elected by voting after every two years), e.g. marketing, technical and advisory to facilitate proper seed marketing, maintaining seed quality for enhancing coordination and linkages with diverse partners and collaborators.

Initially they started to collect US \$1.4 per member per month to sustain the group and initiate seed production activities. LI-BIRD organized on-the-spot training to all the members of the group on group formation and management, co-ordination and linkages with other organizations, book keeping, seed quality, marketing, certification, storage, and seed production technology of individual crops. For the first two years, LI-BIRD bought back the seeds from the group for project activities. From this, they earned some profit, and more importantly got opportunities to develop and strengthen their knowledge and competencies in the field of seed production, and marketing, quality control, development of co-ordination and linkages with other agencies and establishing marketing network. In this way, they have started their seed production activities and have produced 45 t of seeds of released and pre-released varieties of rice, wheat, maize and lentil and have earned profit of US \$183 from selling those seed in first year i.e. 2002/03. They have gradually increased their seed production activities in the recent years and successfully marketed 74 and 258 tonne seeds of released and pre-released varieties of rice, wheat, maize, lentil, mungbean, kidney bean and mustard and have earned profit of US \$1620 and 2817 in 2nd and 3rd years, respectively. Now they have established and strengthened good co-ordination and linkages with government organization like DADOs, and other government's line agencies, several NGOs, Agrovets, other private and public organizations, individual farmers and farmers groups; and selling seed to these partners in more than 30 districts of Nepal. Recognizing them as organized and well managed community based seed producers group and for their outstanding contribution in the local, district, regional and even national level seed supply system, DADO Chitwan in 2004 awarded this group US \$845 as seed money and for the recognition of their excellence in seed business, the group was awarded Gorkha Dakchinbahu Fourth by the King Gyanendra Bir Bikram Shah Dev. Directorate of Agriculture Engineering/Department of Agriculture started a large scale project with this group to establish and install seed processing, storage, harvesting, threshing, seed testing and other accessories. Currently, apart from the seed production and marketing, this group is actively engaged in research in emerging issues e.g. resource conservation technologies (RCTs) like minimum tillage, surface seeding in wheat production in collaboration and partnership with other organizations.

Generally, they produce truthfully labelled and improved seed of released, pre-released, other farmers preferred popular varieties and local landraces of different crops. They have their own bag, tag and other accessories needed for seed production and marketing. Seed quality is maintained by **joint seed quality control mechanism** i.e. seed certification, tagging, monitoring, evaluation, inspection etc is done by the formal seed sector officials, and also through capacity strengthening of the seed producers farmers by providing need based training, farm visit by the group members in the standing crop, seed quality verification from seed testing laboratory etc. For effective marketing, they collect demand prior to seed production, use local FM radios, newsletter, personal correspondence through letter, leaflets, website and participation in exhibition and fare for advertisement etc.

From the experiences, it is now established that governmental or non-governmental organizations working in the seed sector should adopt this approach of community empowerment to make the country self sufficient in seed within few years. This could be one of the best options to increase the accessibility of the improved seed in the country. Since groups are empowered, to some extent guarantee for sustainability.

