Securing seed supply

Editorial

Seed is the future of agriculture. For farmers it is the most essential input: without good seed they have no chance of a good harvest. This is a simple truth but the implications are far-reaching. For thousands of years, farmers have been relying on their own harvests, selecting grains, storing them, and then using them as seed for the following season. They have been doing the same with potatoes and other vegetatively reproduced crops. By choosing seeds or planting materials that meet the needs of their particular farming conditions, they have, over time, developed local varieties and breeds which are most suited to their specific context and preferences. As a result, for example, there are thousands of rice varieties in South East Asia. Similarly, it is still common for a farmer in the Andes to know more than a hundred different varieties of potatoes and other tubers by name.

Today, however, many farmers have become highly dependent on seeds supplied by external agents, often large seed companies. As an old woman farmer in India expressed it: "The market has taken agriculture out of our hands. Earlier we produced and managed our own seeds, and in this way we decided what to grow and in what combinations. Now our husbands go to the market, they have to see what they can get there. The shop owner gives them seed on credit, and often leaves them little options as to what seed to buy. We have become totally dependent".

Seed as an external input

The situation started changing about fifty years ago, when improved varieties and hybrid seeds became key ingredients of the so-called Green Revolution. Scientists succeeded in producing varieties that gave higher yields, but only if applied in a package, with chemical fertilizers and pesticides, and with sufficient irrigation. Governments actively promoted these packages as a way of achieving national food security. Farmers too initially saw high yielding varieties as the way out of chronic food shortage and poverty.

There is no doubt that food production has substantially increased as a result of such packages and that this has helped several countries, especially in Asia and Latin America, to become more self-reliant in food. However, it soon became clear that high yields could not be maintained. Repeated high doses of fertilizers and pesticides have resulted in degraded soils, increased resistance to pesticides and declining yields. In addition, the Green Revolution bypassed large areas that are not appropriate for these technologies, especially dry and degraded lands with no or little irrigation facilities.

Using externally produced seeds creates dependency in many ways - commercially produced seeds may not always be available, and farmers may have to choose from what traders, seed companies or research institutions have available, or are promoting. This can lead to a gradual loss of biodiversity in the field, which reduces the potential for agriculture to respond to the changing agro-climatic and social conditions, while increasing the production risks. When farmers in some countries did see greater yields with improved rice varieties, and the uptake of these varieties increased, many rice-producing areas effectively became monocropped. This reliance on one variety is very risky, as seen in the Philippines with the outbreak of the brown planthopper, which famously devastated yields as it passed easily from field to field.

Local seed supply systems

There are areas where farmers have maintained their seed supply systems, even in times of severe stress or drought. Indeed, according to some estimates, up to 95 percent of the small scale farmers in some regions still produce and use their own seed, or rely on seed produced by their neighbours or by others in their own village or region (see Rubyogo p. 27). It is clear that a regular seed supply is based largely on farmers' own efforts and on a series of informal contacts and relationships, all of which ensure the necessary planting material for the coming cropping season. Building on local knowledge and abilities, and on the local resources available, these efforts maintain and increase the rich biodiversity in which small-scale agriculture is based.

However, access to reproductive or propagation material for the coming season is increasingly difficult for small scale farmers worldwide. One reason is the prevalence of pests and diseases which, together with decreasing soil fertility rates, lead to lower yields. The resulting food shortages make it difficult to save enough seeds for the next season. At the same time, through increasing migration, or changing social structures, the social cohesion of rural communities is being weakened. This can have a negative effect on the local mechanisms which replace lost planting material, and can put seed supply at risk.

Many farmers feel that they can only be sure of the seed's quality and production potential if they have produced it themselves or if it has been produced locally. This is related to one basic aspect which differentiates seeds from other agricultural inputs: what Badstue (p. 6) calls seeds' "lack of transparency". While it is possible to easily assess some of the characteristics of seeds and planting material (their weight, purity, their not being diseased), it is not possible to know, by merely looking at them, the vigour of the plants that will grow from them or the potential yield. Commercially produced seeds will be certified, to "prove" that the seeds are in fact what they say they are. But these certificates are of little value when seeds are sold after being stored for too long, when information is not provided, not complete or not available. Not surprisingly, when farmers cannot produce their own seed, they will often turn to friends or neighbours as a first choice.

Seeds of change

There are many advantages for farmers, and for the sustainability of small scale farming systems, to using home produced seed. For example, seed companies and breeders often do not consider that farmers may be interested in more than just high yields. Crop by-products are often an important part of a sustainable farming system, for example in feeding livestock, or using leaves or rice husks to improve soils. Farm families may also prefer traditional or local crops or varieties, in terms of taste, cooking or storage properties. Plants grown from locally-produced seeds are generally better adapted to the local environment, especially considering the local soil types and micro-climates of the marginal rural areas.

Articles in this issue, from countries as diverse as Vietnam and Nicaragua, show that local production is very much related to a greater recognition of farmers' roles and, in particular, of the role played by women farmers. Experiences presented here highlight how farmers ensure the provision of planting material for the coming season, while contributing to wider objectives. Ramprasad (p. 20) describes the seed banks set up by the GREEN Foundation, as a model for storing seed and distributing

Photo: GREEN Foundation

Local seed supply: the best seeds are exchanged through a community seed bank.

it to those interested within a village. The SEARICE staff (p. 24) describe the establishment of seed clubs, with members who produce seed on their fields, following common standards and criteria, and then sell it as a group to other villagers. Efforts such as these not only help in making the seed available: they also ensure that farmers are sure of the seeds they are getting.

Simultaneously, these efforts follow other paths towards a more sustainable agriculture: they encourage the use of local varieties, contributing to maintaining and increasing local biodiversity. They also lead to increasing yields, as seen with the work of the Movement for the Promotion of Indigenous Seeds in Sri Lanka. They validate local knowledge as the basis for sustainable production, giving more importance to farmers' preferences and interests. At the same time, by focusing on the production and distribution of seeds at the local level, these efforts facilitate the exchange of information, and they strengthen community ties.

It is equally important to consider farmers' involvement in broader programmes. Private and public entities are increasingly acknowledging the potential and advantages of *in situ* conservation. *In situ* conservation complements gene banks at regional, national or international levels, facilitating the access of farmers to seeds, and "storing" seeds of traditional or of particular varieties for future use. At another level, more and more crop breeding programmes are actively involving farmers in what are now known as Participatory Breeding Programmes, with positive results. These pay special attention to farmers' criteria for a selecting a variety of a given crop (whether this is resistance to pests, overall yields or culinary properties) and to the environment and socio-economic conditions in which these varieties will later be used. Successful programmes have also led to farmers being in charge of breeding and production activities, even if, as shown by Almekinders *et al*. (p. 14), this is not always an easy or straightforward process: commercial seed production requires farmers to comply with complex national regulations.

One size does not fit all

In order to be successful, the different efforts aimed at locally producing and distributing seeds need to be based on the particular context in which they operate. Starting a seed bank may need the support of an external institution, and then of a strong local organisation, together with motivated members. A system like the one described by Kanna (p. 30), through which some farmers provide others with seed, requires that some of them have access to irrigation, so that they can produce the seed in time for when most farmers need to sow it. In some cases, efforts are made to recover traditional varieties or facilitate access to a "new" or different variety, when traditional varieties are no longer adapted to local conditions, or if consumers prefer new varieties.

The main differences between these efforts, however, relate to the seeds themselves. With vegetative reproduction, tubers, vines or plant cuttings can speed up production, but it is more difficult to transport, exchange or to store them, posing extra challenges when trying to secure the supply of reproduction material for the next cropping season. Similarly, the use of botanical seeds may also require special consideration. Seeds of some species cannot be stored for long periods, so special arrangements may be necessary. There are also large differences between seeds of self-pollinated species and those of cross-pollinated plants. A farmer repaying a loan of rice seeds to a seed bank, for example, will return the same material he borrowed, which in turn can be given to another farmer. Greater generational differences in cross-pollinated species will require additional efforts for ensuring a sustainable supply.

Seeds for the future

As the articles in this issue show, the local production and distribution of good quality seeds is an important aspect of LEISA. Traditional seed systems and innovations facilitate diversity that is both functional to farmers and ecologically sound. More important, they enable farmers to be self reliant. However, local seeds are not always the solution. It may be necessary to introduce seed for example, after natural disaster, social/political instability, when existing seed stock is of poor quality, or growing conditions have changed. This should not minimise the role of farmers, what they are already doing or what they can do. Under all circumstances it is better to rely on local systems, on local capacities, abilities and knowledge, and so ensure the possibilities for sustainable production. Participatory breeding programmes based on the principles of social inclusion and biodiversity can be crucial for the survival of farmers and farming. Farmers have a right to seed sovereignty, while their intellectual property rights with regard to breeding need to be respected and safeguarded. One step in this direction would be to change policies to allow for farmers' certification.

A theme not explored here is the controversy about genetically modified (GM) seed, what it means for small farmers and whether it is desirable or justified. In this issue, we made a conscious choice to highlight the many viable alternatives to GM. Widespread introduction of GM seed would most likely further increase small farmers' dependency on external inputs – if they consider GM seeds as an alternative at all. It has already been shown that the introduction of BT cotton has lead to increased use of pesticides rather than the promised decrease.

Localised seed supply systems are not a romantic idea. They may prove to be critical for the survival of small-scale farmers all over the world. They may well become a core ingredient of a strategy to deal with climatic change. How climate change is going to affect agriculture and what the larger consequences will be, remains to be seen. But it is clear that farming systems based on principles of agro-ecological diversity that rely on diversified seed supply systems, will be far more resilient to climatic shocks than those that depend on the limited choices of externally produced seed.

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