Scaling up, and further scaling up participatory development

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Since 1995, AS-PTA has facilitated a successful family-farmer programme in the central-southern part of Paraná, **Brazil**. Thousands of farmers have gone through a process of discovering solutions to their farming problems and thereby improved their understanding of the principles of ecology and agroecology.

This region of Brazil is part of the Atlantic Forest, a very diverse and rich rainforest with a subtropical, cool and humid climate. Average rainfall varies between 1,300 and 1,700 mm per year. The area is hilly to mountainous, with small flat stretches at the bottom of the watersheds. Family farms of less than 50 ha, constituting 90% of all farms in the region, are concentrated on a third of the farmland. Large haciendas account for the remainder. Diverse crops are grown on these farms. Beans and tobacco are the main cash crops, followed by onions, potatoes and *erva mate* (a kind of native tea). Corn is grown by most farmers mainly for home-consumption and fodder. Horses play an important role as draught animals and nearly all family farms have a few heads of cattle, some pigs and poultry.

The farming systems mix traditional and modern features, chemical or organic fertilisers are used depending on the farmer's resources. With generally low average yields, family income varies from US$ 660 to 1020 per year.

The programme initiated by AS-PTA covers 22 municipalities (about 13,000 sq. km) with a population of 250,000 people (roughly 55,000 family farmers).

Farmer experimenters testing herbal herbicides. Photo: AS-PTA

Major problems

Inherent natural conditions like soil acidity and low phosphorous content together with small farmland holdings and reduced fallows, cause a number of social, economic and environmental problems. The lack of financial resources does not allow farmers to take measures to deal with the tendency of soil nutrient depletion and decreasing yields. Steep slopes and heavy rainfall, combined with "up-down" tillage practices causes significant soil erosion. The replacement of traditional bean and corn varieties by improved ones has had devastating effects on agro-biodiversity and crop efficiency. Last but not least, indiscriminate use of agro-chemicals has given rise to toxic contamination among farmers and in the environment, without any significant reduction in pests or crop diseases. Difficulties in access to credit and markets also contribute to low income patterns in the region.

The approach adopted by AS-PTA was to identify major constraints in agriculture through participatory methods and to develop technical solutions through participatory research involving all farmers. Agroecological alternatives were presented by AS-PTA's technical team and by the farmers. These suggestions were then tried and adapted by the farmers on their own fields in small-scale experimental plots designed by them.

Technological innovations

Dozens of possible technologies were tested according to the choice of farmers, either as individual or joint efforts. While any one of these innovations can be adopted on its own (this is not a technological "package"), they proved to be most efficient when applied in combination with each other. Each farmer, having to deal with specific conditions, therefore can chose which innovations to adopt and how to adapt them to his/her concrete situation. At community and regional meetings, the results of these tests were presented and discussed by farmers. Field visits were used to illustrate the better technologies to other farmers. This encouraged others to take up new experiments thus engaging more farmers in the process of discovering more complex and adapted solutions. New participants engaged in the experimentation as information on the first group's results spread through initiatives undertaken by AS-PTA. In order to structure its work, AS-PTA has grouped the proposed technologies into three main technical programmes, along with a few minor ones.

The most widespread programme is on **Genetic Resources** and involves nearly 5000 farmers. It tries to identify traditional varieties of maize, beans and potatoes and to bring them back into general use amongst farmers. The purpose is to seek greater adaptability to a range of environmental conditions and to the farmers' different goals and systems. Genetic diversity of crops has been lost due to strong incentives and policies aimed at the introduction of improved varieties. Such "improvements," however, did not provide the anticipated yield increases as they required a rich soil and a host of external inputs. Farmers could not afford to apply the entire Green Revolution "package," and were, therefore, unable to gain all its benefits. Meanwhile, traditional varieties were disappearing and farmers were left with no option but to use poorly adapted "modern" varieties.

The Genetic Resources programme involved older farmers, some of whom still had seeds of traditional varieties, and tried to encourage farmers to test these varieties for selection. The next step was to identify farmers' seed-production methods and evaluate the more efficient methods. This local knowledge-based

process was also used in breeding new varieties and in establishing methods for seed conservation and storage.

The second major programme aims at **Ecological Soil Management**. A broad range of innovations was tested. Many of them have been adapted by farmers in different ways and combinations. These include managing crop stubble without burning, the cutting of native vegetation after fallow periods also without burning, planting along contour lines, the use of winter and summer green manure crops, improvement of fallow land with green manure, changes in spacing for inter-crops, the use of an organic leaf fertiliser known as a biofertiliser (produced by the community itself), the use of a compost produced by bio-dynamic farmers to accelerate the decomposition of organic matter, the use of lime and rock phosphate etc.

As a result, disease and pest problems have reduced considerably since the varieties tend to be selected for resistance and receive more balanced fertilisation than in the chemical NPK system. When needed, copper sulphate (Bordeaux blue) or sulfocalcium applications are used, and the leaf-based biofertiliser also provides protection against pest attacks. Weed control is much more difficult and complex, and is carried out with a locally developed no-till, no-herbicide system.

The third major programme focuses on **Agro-Forestry**. It essentially involves native forestry in the *araucaria* forests (a large pine tree, native to this part of South America), one of the most biodiverse ecosystems in the world. The key crop in this programme is another native plant, the *erva mate*, used to make a tea that is widely consumed in southern Brazil. Official research and rural extension services have been encouraging farmers to abandon their traditional native forestry systems enriched with

Ashes is used to make compost, locally known as 'independence fertiliser'. Photo: AS-PTA

erva mate trees and move to open-field plantations, as used in Argentina and Uruguay. This innovation causes tremendous environmental damage as it stimulates the destruction of native forests while promoting intensive use of herbicides and insecticides.

The AS-PTA worked with a group of farmers with long experience in forestry to find a way of improving the traditional *erva mate* management system. The basic principle lies in accelerating natural plant succession and in combining unexploited forest species with the *erva mate* (see ILEIA Newsletter Vol.16, No.3, pp 17-18). Another aspect of this programme is to stimulate the planting and management of medicinal herbs inside the native forest areas, in conjunction with the production of teas and the dissemination of a system of practical medicine known as "bioenergy".

One small-scale programme that has a great potential for food and nutritional security is the promotion of **family gardens**. Diverse crops are grown in these gardens without the use of chemical fertilisers and pesticides. Women have taken up this initiative as a means of meeting family food requirements.

Strategy, process and methods

From the beginning, AS-PTA ensured that the development process did not conflict with the farmers' spontaneous cultural, spiritual and organisational forms. It was clear that the communities' own histories were fundamental to understanding what they believe in today. It gave rise to an important process of re-valuing knowledge and beliefs deeply embedded in farmers' world views, which tend to remain hidden and not dealt with explicitly by the modern, technical ideologies that disqualify them. Farmers were able to become partners in their work with the AS-PTA because they were respected and understood within the framework of their ideology, culture, knowledge and beliefs.

AS-PTA began its work by creating relations with the leadership in the region's family-farming communities. This was facilitated by hiring local extension agents who had deep knowledge of the social dynamics of central-southern Paraná. Along with the local leaders, AS-PTA chose three communities in which to begin its work, involving about 30 families in two of them, and a hundred in the third. A **participatory diagnosis** about their agroecosystems helped to identify the key problems and their causes, as well as to motivate farmers and their families to get involved in this local development work. This resulted in an intensive process of **participatory experimentation** with the different options provided.

The practices that were being tested and selected in the first three communities were **disseminated** in different ways to other farmers. This included presentations by farmers or technical workers at church services, visits between communities to exchange experiences, collective planning of municipal and regional activities and joint participation in seed fairs and public-policy mobilisations. These efforts aroused varying levels of interest in the region's different communities, resulting in the formation of farmer-experimenter groups and trainers within the region, who then took the message to other communities, trained more experimenters and stimulated more and more exchanges of experiences. There is now an intense movement of farmers around the region, organising itself independently of AS-PTA, and making demands for support whenever necessary.

Training is an essential aspect in this approach, which is not limited merely to techniques taught by the AS-PTA staff, but also seeks to stimulate creative observation and the ability to innovate and adapt. Great value is placed on the farmers' own knowledge of agronomic practices and their ecosystems, which is then combined with new information introduced by the technical staff. One of the technical solutions that raised the interest of other communities was the re-introduction of traditional crop varieties, with selection and breeding done in community test plots. The AS-PTA provided training to a group of interested farmers, who then took it region-wide and made it a common learning experience.

This regional group, now made up of about 45 farmers, took on the training of other experimenters, who in turn went on training their neighbours. Significantly, it is not only the techniques (how to set up a seed field, breed maize, etc.) that are shared, but also the reasons behind the different innovations, and how to test it freely in order to improve and adapt it to each farmer's specific conditions.

Moreover, a Regional Development Forum was created with 15 municipal Farm Workers' Unions and approximately 200 Community Associations, women's and youth groups. The Forum took over the leadership and management of local

development and has displayed a tremendous capacity for mobilisation, as was seen in the presence of 30,000 people at a regional event in 1999, called the Land Procession.

One interesting impact of this extraordinary activity of social interaction in the region was the breakdown of cultural barriers amongst communities of different ethnic and religious origins. Joint activities have brought the communities together and created a social identity of family farmers taking on their own development.

Without the intense participation of farmers in the process of producing and disseminating new knowledge, it would have been impossible for the programme to take this impressive leap. In five years, this approach allowed AS-PTA to reach out from three initial communities to 160 farmers, and then to 5,000 farmers.

Impact

Agronomic and economic impacts have been very significant considering that the process is far from reaching all the benefits it has to offer these farmers. On-farm seed production has increased substantially, with significant financial savings for at least 10% of the region's farmers. The diversification of traditional varieties has led to the re-introduction of 112 varieties of maize, 98 of beans, 10 of potatoes and 16 of rice (a secondary crop in the region that was not a priority in the Genetic-Resources programme).

Yields of these traditional varieties compare very well with commercial hybrids and the varieties bred at experimental stations run by the State (Instituto Agronômico do Paraná-IAPAR) and federal (Empresa Brasileira de Pesquisa Agropecuária-EMBRAPA) governments. Simply cultivating the best-adapted traditional varieties, with no other changes in farmers' productive systems, brought increases of up to 50% above the regional average, reaching 3600 kg/ha for maize and 1800 kg/ha for beans. Farms that adopt other agroecological techniques in addition to traditional varieties have attained yields of 5000 kg/ha for maize and 3000 kg/ha for beans.

There are no precise records for the impact on tobacco, onions and potatoes, but the farmers' impression is that the results have been just as positive, even though they are more risk-prone crops. More advanced farmers state that they can market high-quality organic produce, including tobacco, with yields comparable to conventional systems.

Qualitative evaluations done by farmers for *erva mate* yields in the new forestry system indicate that they are higher than in the traditional system and that the quality of the product is much better than in the modernised open-field system. Farmers infer that their yields are close to those of the modernised system mainly because major borer attacks have caused damage to open-field plantations, but no precise field surveys have been done to collect data for proof.

Farmers claim that **savings on inputs** are as much a motivation as are yield gains. For example, the introduction of no-till, no-herbicide planting in maize and bean fields on one farm that plants 5 hectares (average for the region) of these crops produced an average gross gain of US$563. The investment for the introduction of this technology costs US$400, meaning an immediate net gain of US$163. Once the no-till, no-herbicide system is established, yearly expenses are a little over 10% of the average fixed costs. This means that, from the second year on, a farmer can obtain a net gain of over US$500, just in maize and beans.

Another advantage of agroecology highlighted by farmers is the system's **greater resilience**. There is a higher tolerance to and lower occurrence of pests, fungi and nematodes, and less vulnerability to occasional dry spells. Tobacco, potato and onion farmers – who use the most insecticides and pesticides – show great interest in the human-health gains from replacing these inputs due to the many poisonings in the region. Less use of these inputs also implies a reduction in labour costs. Farmers who have a low investment capacity and break-even in the traditional system are attracted to these technologies that have a lower dependence on purchased external inputs.

Exchange of information on traditional maize varieties. Photo: AS-PTA

What is interesting about this programme is the wide adoption of techniques that were not essentially new to the region and its farmers. In fact technologies like green manuring and no-till planting had been promoted for a long time by public research and rural extension agencies without wide acceptance by farmers. Now, over 5,000 family farmers are directly involved in using the techniques, along with an unknown number of others who have been "contaminated" by the participants.

Conditions for the successful results so far

Well-established **community structures** in combination with the recent dynamics in social and political life at municipality and regional levels have been the basis for the achievements of the programme.

Another important factor that could be described as "ideological" is that the conventional Green Revolution model had reached its limits for many local farmers. In addition, the political and social dynamics of the 1980s that had demanded for greater access to Green Revolution facilities had already run its course. In its place, the alternative development model presented by the approach of agroecology and self-reliance has raised the expectations of farmers.

Partnerships between the local technical staff and farmers, and very clearly amongst the farmers themselves, complemented by external expertise, were the key to success. The AS-PTA core staff played an intermediary role in the search for new knowledge that could be assessed, adapted and incorporated by the farmers. Visits to other NGOs in southern Brazil helped to build up a pool of technical options to be experimented with locally.

Partnerships with research institutions were built slowly, and now include collaboration with the University of Londrina (genetic resources), IAPAR – the Agronomic Institute of Paraná (no-till planting), EMBRAPA-CNPAB –National Centre for Research in Biological Agriculture (green manure) and the UFRRJ – Federal University of Rio de Janeiro, Agricultural Development Research Centre (CPDA, public policy assessment). These partnerships are useful for the scientific assessment of techniques and results, and for the identification of bottlenecks and possible solutions or improvements.

According to one external technical evaluator who visited the programme, most of the techniques in use do not involve major innovations, but the way they are used, combined and adapted can be considered revolutionary.

Obstacles and limitations

The programme is currently facing two major limiting factors along with others of secondary importance.

Firstly, the farmers' lack of **access to capital** and the totally inadequate credit system slows down the process of incorporating new technologies. Although these innovations are inexpensive and do not demand recurrent expenses, farmers often cannot afford the investments. Adopting the no-till, no-herbicide technique, for example, demands an initial investment of 40-60% of the average annual family income.

Access to seeds for green manure. Seeds for green manure are expensive and hard to find in Brazil, especially considering the great diversity of species (over 30) used in the programme's experiments. Farmers depend on the on-farm multiplication of green-manure seeds, and therefore take a long time to transform their farms. The AS-PTA provides small amounts of seeds for farmers' test plots. Each of them is responsible for passing on a certain amount of seed to others for experimenting, and to multiply seeds for their own use.

A third major limiting factor has to do with the **market**. A handful of intermediaries control the buying of beans, onions, potatoes and tobacco, leaving farmers totally dependent on them. Consequently, prices are so low that they discourage production. "Why work so hard to change, if the profits end up in the middleman's pocket?" is a common question posed by farmers. These middlemen have also imposed the use of two high-input demanding bean varieties, sold by Monsanto and IAPAR, based on the preferences of supermarkets in Rio de Janeiro who buy most of Paraná's black beans. Trials done with one medium-sized supermarket outlet, however, have shown that consumers are interested in buying traditional bean varieties as long as they are mixed in "blends" with the same cooking time.

The same problem exists with other products, particularly potatoes and tobacco. For potatoes, size, shape and the absence of spots on the skin are more important than taste or nutritional value. With tobacco, the cigarette industry totally controls its contracted farmers, by supplying them with inputs and strictly controlling application thereof. Whatever the quality of the leaves, farmers who do not use the industry's "package" have no chance of selling their harvest.

Other constraints to scaling up the programme are related to the funding available with AS-PTA to support learning and exchange among farmers, to the limitations farmers face in buying small equipment, e.g. a grain dryer; and to public authorities creating countless problems, eg. making loans conditional to the use of "technological packages" or distributing commercial seeds for free.

Proposals to scale-up the programme

Credit will be a key to accelerating the process of adoption. On the short-term, there is no chance that market credit policies for family farmers will change. But, a larger-scale experience in this region with an alternative credit programme could help stimulate changes in the official credit program. The credit agents should be the Community Associations organised in a centralised support structure that would raise and distribute funds. This would simplify access to credit with each farmer's collateral guaranteed collectively, in solidarity, by the community. A loan of US$ 400 per farmer is enough to convert an entire farm. Under normal conditions the gains from the first year's harvest will be enough to pay back the loan.

Also organisation and administration of this flow of funds, including the training of community agents, will be important. There are already some experiences in the region on which to draw upon for organising and training work. The rate of expansion will also depend on increasing the farmers' ability to extend the social dynamic of training and experimenting. This means that the core of experimenters/trainers who lead the region's development process has to be increased.

The third important aspect in gaining scale is market access. To overcome the monopolies limiting the local producers' marketing potential, the family farmers' small cooperatives must have more infrastructure, as well as equipment to process the harvests. This means community grain dryers, drums for seed storage, humidity gauges, scales, sacking machines, sewing machines, elevators, conveyor belts, silos, corn threshers, huskers, greenhouses, *erva mate* processors, classifiers etc. The investment cost, about US$100 per farmer, could be supplied by loans as well. The operating costs of most of this machinery can be covered collectively by participants, as is already the case in today's smaller-scale experiences.

This investment is not aimed at replacing existing commercial agents, but at breaking down monopolies and obliging them to negotiate better prices with the farmers. Channels for direct access to supermarkets in Rio de Janeiro have already been opened, through which farmers' organisations could sell about one third of the total 100,000 tons of black beans produced in the region every year.

Conclusions

Our experience in central-southern Paraná shows how the work of one organisation through intensive social participation has been able to increase, 30 fold, the number of beneficiaries within 5 years. Further scale-ups will depend on greater investments in these new directions for Brazil's rural development. However, this budget is lower (around US$ 35 per year per farmer) than the amount spent on public rural extension services and the cost of agricultural research in Brazil (around US$ 1,000 per year per farmer).

AS-PTA's proposal for central-southern Paraná can point the way to new approaches for rural credit, as well as for public research and extension services. If implemented, the impact of these new approaches on sustainable family farming in Brazil will by far surpass the meagre results shown by the huge volumes of funds spent today in this social sector that includes a great majority of Brazilians now living in poverty. ■

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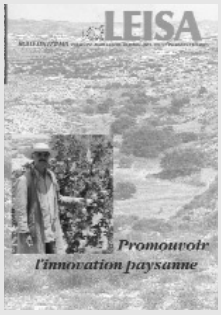

MERCI (thanks) to our French readers!

In January 2001, ILEIA published a French version of its issue on "Grassroots Innovation" (vol 16.02). This special issue was sent out to over 3000 addresses in French speaking countries of Africa. Of the 1300 that included a reply form, around 200 were returned to us. The response is very encouraging. The French readers complimented the LEISA Magazine with "very well done", "an efficient tool for participatory development", "the Magazine helps researchers and farmers to collaborate closely for a better tomorrow" and many more. They also gave us some good suggestions for improvements and stimulated us to continue with the idea of a regular French language edition of the LEISA Magazine. Meanwhile, we have approached a number of funding organisations to get this project off the ground. We hope to make a start, together with our African partners, early next year.

MERCI, once again, for your stimulating response!
And AU REVOIR