Peru Programme

In South America the high valleys of Northern and Central Peru were chosen to represent the Andes ecoregion. This is one of the worldís most diverse but fragile environments. Running through seven countries it is home to some 135 million people. The mountain system itself has been severely damaged by soil erosion, deforestation, overgrazing, mining waste contamination, and poor water management. As a result more than 60% of rural families in Andean countries live in poverty.

In highland Peru farmers may plant up to 50 different crops and work in several fields each in a different agroecological zone at altitudes ranging from 2500 to 4500 m.a.s.l. Farmers risk aversion strategies ensure that at least some plants and crops will survive despite the pests and diseases virulent under any particular set of conditions.

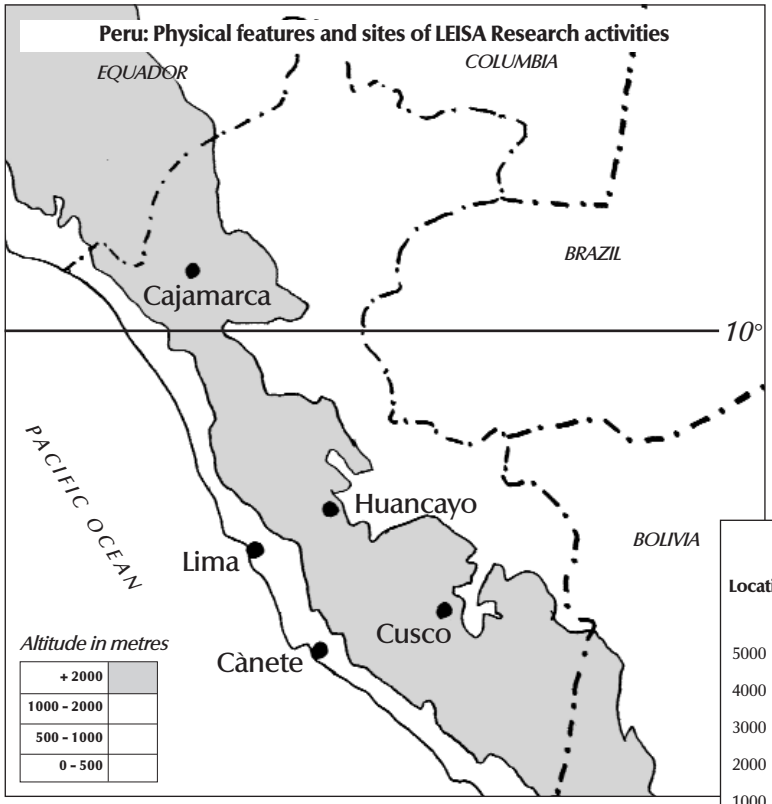
Fields are often inter-cropped and crop rotations keep the soil fertile. In general, ecological and socioeconomic conditions are not particularly favourable to large-scale and high-external-input agriculture except in the lower valleys. These are the most productive areas as they are often endowed with irrigation facilities and have relatively better access to markets.

Farming systems often integrate crops and livestock production. Most farming families live at subsistence level, with only a small part of their production being marketed. Self-sufficient farmers mostly grow rain-fed crops (tubers, corn, cereals and vegetables). Potato is the main crop and there are a large number of indigenous varieties. However, this diversity is slowly decreasing as 'improved' varieties replace indigenous ones. Commercialisation encourages the introduction of high-yielding varieties and the use of agrochemicals to protect them from pests. This process has lead not only to the loss of genetic diversity but crops have become less resistant to certain pesticides. In addition farmers have also been confronted with health problems and relatively high costs (see Gomero Osorio & Lizárraga Travaglini p 58). Abandoning ancient technical and social methods of controlling the way resources are used has also contributed to soil erosion, over-grazing and firewood shortage. Having to face the various challenges that put the sustainability of their production systems at stake, farmers have been forced to find new ways out of their environmental and economic problems.

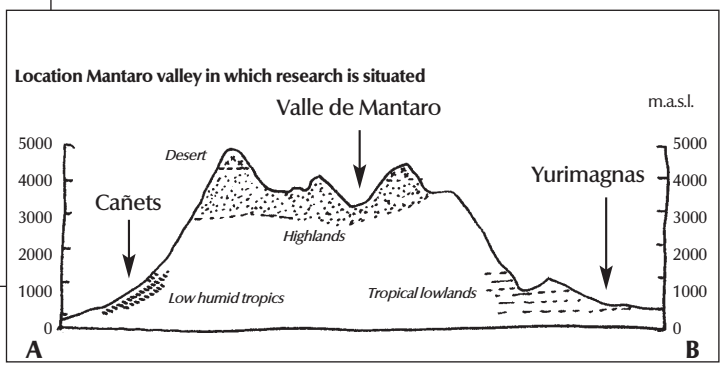
Small-scale farmers in Peru are organised in 'peasant communities' ('communidades') whose lands are divided into farming units known as '*parcialidades*' in the central highlands and '*caserios*' or settlements in the northern highlands. The land is usually tilled by individual families. Community land and collective working practices are saved for public works or for work exchange purposes.

Government policies affecting agricultural research and development have, in general, favoured areas and crops that respond well to high external inputs. Together with the accelerated process of 'modernisation' that began with the initiation of land reform in the 1970s, these policies have led to massive migrations to the coastal towns and to the Amazon region.

Since the 1980s, these policies have resulted in the abolition of government extension agencies. Apart from specialised agencies such as the '*Pronamachs*' (National Soil Conservation Programme), government involvement in agricultural development has mainly been confined to specialised research institutes and universities. NGOs have acquired quite a strong position through their search for alternative development models, especially when it comes to more agroecological approaches. In most cases agendas and priorities are determined by these organisations themselves and farmers only participate in the implementation of pre-determined programmes.



The high valleys of Northern and Central Peru were chosen to represent the Andean ecoregion. Altitudes in the research regions range from 2000 to 4500 meters above sea level. More than 80% of the region's available agricultural land is on steep hillsides and soils are very diverse. In Peru, an estimated 21 million hectares - 58% of the country's arable land is threatened by erosion. Weather varies throughout the region. The rainy season extends from November to April with an annual rainfall of between 200 and 1500mm. This gives rise to semi-dry to humid (micro-climates). Peru has a population of 22,350,000 mainly concentrated in the coastal plain.



Stakeholders join for action

In 1995, ILEIA decided to work in two distinct zones in Peru: Cajamarca in the north and Huancayo in the centre. In both areas working groups of NGOs, universities and agricultural research institutes were set-up: GINCAE in Cajamarca and GIAREC in Huancayo. They started a collaborative programme to explore the potential of LEISA within the cultural, socioeconomic and ecological setting of their working areas. After the initial stage of setting-up stakeholder groups, men and women farmers, NGO staff and researchers made an inventory of agroecological conditions using AgroEcological Resource Mapping (AERM) and participatory soil surveys (see Kauffmann p 9). In the start up phase, technicians, researchers, and key producers were trained in the use of participatory tools and techniques in order to facilitate the process of reflection and analysis.

The dynamics of SCA in GIAREC is described by Norma Canales (p 60). Articles by Alvarez & Nalvarte (p 62) , Canales & Canto (p 65), and Bojórquez (p 67) also give insights into the collaboration between the different stakeholders and their development efforts in the working areas of the different NGOs.

Participatory Technology Development

It was only in 1997 that the two groups in Huancayo and Cajamarca took up PTD. More than 200 farmers (men and women) became actively engaged in a process of problem analysis, prioritisation, experimentation and the identification of possible solutions in trying to find new ways of dealing with their agricultural production problems. After two years, first results show that it is possible to identify adequate solutions that are within the reach of small subsistence farmers and have the potential to be ecologically sustainable. At the same time, the PTD process was important in bringing farmers, NGO staff and research institutes together in a shared action-research activity.

The PTD approach was introduced as a key element of the research programme. ILEIA's partners felt that PTD would contribute to specific goals (see Box 1). The internalisation of the PTD approach took place through an intensive, iterative process of learning by doing in which training and practice followed each other. An external facilitator guided the process of training and backstopping in PTD.

The PTD process was anchored in the following sequence of workshops:

- Training in AERM for farmers (men and women) and staff from the institutions involved in AERM;
- Training of institution staff in PTD concepts and techniques and in the facilitation of farmer' workshops to identify and prioritise problems and identify possible solutions that can be tried out in experiments;
- Training in facilitating farmer workshops to design, plan and monitor PTD experiments;
- Workshops at stakeholder group level to evaluate progress and results
- Joint workshops of stakeholder groups to plan the systematisation and documentation of the PTD process and to strengthen knowledge on PTD.

These workshops included practical sessions with farmers in one of the working areas ('farmer workshops') in order to provide hands-on practice to staff of participating institutions. It is important to note that all these workshops were followed-up by so-called *'replicas'*: farmer workshops repeated in other parts of the working areas. In this way, fast and effective scaling-up of PTD was realised and almost 250 farmers became involved in the PTD process.

The key training workshops focused on internalising PTD concepts, on its stepwise methodology and on communication techniques. The 'farmer workshops', on the other hand, followed a loose set of participatory procedures to identify problems and options (see Box 2). After the farmer-experimental design workshops, farmers started implementing and monitoring the experiments with support from institutional staff.

Box 1 **Expected results of the PTD approach**

- PTD will improve farmer innovation capacities through community endorsed group experimentation, which will permit processes that have a higher chance of generating viable and replicable agricultural technologies;
- PTD will improve existing agricultural production systems through the generation of systematic technological solutions that respond to the real problems of agricultural development and farmer economies;
- PTD will strengthen the LEISA approach permitting an opening towards development alternatives that are economically viable, socially acceptable and technically realistic - also from a gender perspective - and which will permit the development of efficient and equitable technologies;
- PTD will strengthen the convergence of formal science and farmer knowledge, permitting a mutual learning process;
- PTD will improve the capacity of institutions in participatory work by adding new elements;
- PTD will improve and contribute to the LEISA validation process in the ILEIA project's framework of concerted activities with GIAREC and GINCAE.

The articles by Alvarez & Nalvarte (p 62), Canales & Canto (p 65) and Bojórquez (p 67) describe three cases of implementing PTD work in Huancayo. The article by Staub (p 69) indicates the important role played by farmers in expanding the approach. In the final article in the Peru section (Results and impact of the PTD process p 70) , the learning points of two years of working with PTD in the two zones are summed up.

Box 2 **Looking for things to try: a PTD module for designing experiments with farmers**

Procedure:

1. Community meeting for commitment and endorsement of experiments
2. Drawing resource flows for farm enterprises *(Flow diagrams/AERM)*
3. Identifying problems and options for solving them (*Pair wise ranking)*
4. More detailed problem analysis (*Problem tree)*
5. Orienting the farmer experiments *(Ranking)*
6. Agreeing on the detailed design of the experiments (treatments; experiment lay-out; monitoring; etc.)
7. Conclusion: Project idea sheets

Major themes

Problem identification in the various research sites in Cajamarca and Huancayo resulted in a number of themes for backstopping research. Farmers considered potato pests and diseases, inadequate pasture management and livestock disease as the most important problems. In addition, one group focused on soil fertility and one group included an experiment with small scale irrigation. In support of the farmers' experiments, the working groups - together with ILEIA - also identified and commissioned a number of studies focusing on the problems brought forward. These studies made an effort to analyse the wider context and sustainability aspects of the constraints and to identify new options for farmer experimentation and cases of alternative development programmes. The studies were divided into three categories: context studies of the two zones (Huancayo and Cajamarca), technical studies covering the specific themes ('Pasture management', 'Ethno-veterinary control of *fasciola*' in cattle' and 'Pesticide use in Andean Potato Production Systems') and a study analysing the experiences with IPM in Cajamarca. In total six studies were commissioned. The study on pesticide use is presented in the article by Gomero Osorio & Lizárraga Travaglini (p 58). Some results of the study on 'pasture management' have been integrated into the article by Bojórquez (p 67).

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