ILEIA Collaborative Research Programme

From 1984, ILEIA has been concerned with collecting, analysing and exchanging experiences on the participatory development of Low-External-Input and Sustainable Agriculture (LEISA). LEISA is sustainable agriculture based on ecological principles. It makes optimal use of combinations of locally available internal and external inputs and indigenous and scientific knowledge adapted to local conditions and needs. LEISA sets out to provide alternatives to unsustainable 'conventional', 'modern' or 'High-External-Input' Agriculture (HEIA) and to unsustainable 'traditional' or 'Low-External-Input' Agriculture practices (LEIA) (see also box 1).

In the cases reported in ILEIA's Newsletter and other publications the reasons for the successes and failures of LEISA experiences were often unclear because many factors involved in their development remained unexplored. In order to come to a better understanding of the necessity and opportunities for developing LEISA, those evaluating Phase III of the ILEIA programme recommended adding a research component to the project's core activities.

In 1994, the Dutch Ministry for Development Cooperation (DGIS) asked ILEIA to initiate and facilitate a research programme mandated to make:

> *A participatory assessment of the viability of LEISA technologies in different environmental and socio-economic settings and substantiate this as far as possible by quantitative data. This participatory assessment should include an attempt to understand the processes that lead to changes in farmers' livelihood and land-use strategies.*

Objectives

This mandate involved implementing three regional research programmes in contrasting economic and ecological conditions. It was intended to provide farmers, researchers, policy makers and funding agencies with convincing insights into the necessity and viability of developing LEISA. It would also show what specific LEISA practices were appropriate for given conditions. Viability in this context meant that when specific LEISA practices were compared to conventional farmer practices they would be both more effective in satisfying farmers' needs and in meeting the economic, ecological and social criteria for sustainability. However, adopting LEISA practices had to be feasible for local farmers.

The second objective was to demonstrate the effectiveness of participatory approaches to technology development by strengthening and supporting farmer experimentation. In this way the knowledge of farmers and scientists would be combined in the interests of developing sustainable agriculture.

The collection of scientifically valid data was imperative. Policy makers had to be convinced of the importance of supporting the development of LEISA and conventional research agendas had to be moved in the direction of the real needs and priorities of farmers, LEISA and sustainability issues.

Box 1 What is LEISA?

LEISA is an approach to sustainable agriculture that builds on:

- Agroecology: a scientific knowledge base from which ecological concepts and principals can be applied to the design and management of sustainable agroecosystems;
- Indigenous knowledge: knowledge farmers have of their locality generated from their own and their ancestors' experiences. It includes knowledge originating from outside the region that has been internalised. Indigenous knowledge is holistic and encompasses all aspects of rural life;
- Scientific knowledge: knowledge base developed by scientists;
- Participatory learning, planning and action: participation of development supporters in local development processes to strengthen farmers' and own capacity to adapt to changing needs and conditions and towards sustainability;
- Economic viability, ecological soundness, social justice and cultural integrity: sustainable development is important but should not be pursued at the expense of the cultural and social values of those segments of the population who have little influence over economic and political decision making.

ILEIA sees LEISA as dealing with the technical and social options open to farmers wanting to improve their productivity and income in an ecologically sustainable way. LEISA builds on the optimal use of local resources and natural processes and, if necessary, acceptable, and feasible, on the safe and efficient use of modest amounts of modern external inputs. LEISA systems, which are highly situation specific, build on indigenous and scientific agroecological knowledge. In its social and political dimensions LEISA is concerned with empowering men and women to use their knowledge, skills, values, cultures and institutions to build up their farming future.

LEISA involves participatory methodologies to strengthen the capacity of farmers and other actors to adapt to changing needs and conditions and make agriculture sustainable. Creating an environment conducive to sustainable agricultural development means making LEISA effective at the policy-making level. As a concept and knowledge base LEISA provides direction, practical options and methodologies for development and achieving sustainable agriculture. LEISA is not, however, a blueprint for this, it is a development approach with a strong political message.
(see **LEISA in perspective; 15 years ILEIA.** *ILEIA Newsletter* Vol. 14 2&3, 1998.)

The research questions

There were two main research questions. First, when compared with other forms of agriculture is LEISA a viable option in the research sites and in situations with comparable farming conditions? Second, how can development/transition processes towards LEISA be supported in the research sites and comparable farming conditions?

Five specific questions followed. To what extent is the type of LEISA envisaged for a particular research site a more viable and sustainable development option than the agricultural practices generally used in the area? Can LEISA technologies satisfy farmers' objectives and to what extent are the preconditions for adopting LEISA technologies? How far are national objectives satisfied by LEISA technologies? And finally to what extent is the policy environment conducive to making a transition towards LEISA?

The vision behind the research approach

To implement this research mandate ILEIA developed an innovative research approach built on the following assumptions:

- Farmers and researchers (and other outsiders) see agriculture in different ways because they have different world visions, values, experiences, needs and objectives. They also use different languages, expressions and categories to describe agriculture.
- LEISA is a holistic approach to land use and can be examined either from the perspective of the interests of the individual farmer or those of society as a whole. Farmers and governments may have conflicting visions and interests.
- Research is too often determined by researchers' individual or institutional agenda's and takes little account of farmers' priorities and knowledge.
- Sustainability is an objective. Farmers' (and other stakeholders') innovative ability to adapt agriculture to often complex processes of change is an essential element in developing sustainable agriculture. The involvement of farmers, development workers and researchers (and at a later stage traders, bankers and policy makers) in processes of 'participatory' development can enhance the effectiveness of learning, farmer experimentation and scientific research in the development of sustainable agriculture.
- Knowledge of the dynamics of the farm-household system and its wider socioeconomic context is necessary in order to understand what conceptual, technical, institutional and policy changes are needed to make the transition towards LEISA feasible.
- As the context, needs and objectives of agriculture are constantly changing, assessment should cover a sufficiently long period of time and include the present and future situation. It should also focus on actual (unsustainable) and alternative (more sustainable) techniques.
- Such an assessment should be convincing both for farmers and researchers.
- Active and sustainable collaboration with local partners is only possible if the research fits the agenda's of farmers, development workers and researchers. It must also have a development perspective, satisfy a felt need for assessment and create a capacity to institutionalise the assessment and monitoring of sustainability at farmer' and other levels.

It was concluded that an assessment of the viability of LEISA should:

- Take farmers' priorities as a starting point and focus on concrete problems;
- Include the visions and categories of farmers and scientists;
- Include farmers' assessment (criteria and indicators) and scientific validation;
- Assess agriculture from a micro and macro perspective;
- Compare technologies and analyse contexts and trends;
- Include relatively large groups of farmers and build on quantitative data as much as possible;
- Run for a sufficiently long period;
- Be firmly rooted in PTD (see box 2) and SCA (see box 3) in working groups of farmers, development workers and scientists;
- Create local capacities in LEISA, PTD, SCA, participatory assessment, the monitoring of sustainability and emphasise a process of long-term concerted learning and action.

Finding research partners

In 1995, three contrasting regions in Ghana, Peru and the Philippines were selected for ILEIA research. Three criteria were used in the selection of partners: their region was representative of specific, contrasting agroecological and socioeconomic conditions; they had long-term working relations, and they had experience with the participatory development of LEISA. Research sites were located in the following zones:

- the sub-humid zone of northern Ghana;
- the high Andean valleys of Central and Northern Peru;
- the humid lowlands of Central Luzon in the Philippines;

In 1997, a fourth region - the dry zone of India's Deccan Plateau - was added when AME in south India (ILEIA's sister programme) became involved. In India, however, research followed its own internal dynamics.

In northern Ghana farmers are mainly subsistence oriented and entirely dependent on locally available resources. In the Andean valleys and on the Deccan Plateau agriculture is partly subsistence and partly market oriented. Production is dominated by one cash crop that uses external inputs. In the lowlands of Luzon irrigated rice is grown for market with high amounts of external inputs. ▶

Box 2 Participatory Technology Development

PTD is essentially a process of purposeful and creative interaction between rural people and outside facilitators. Through this interaction, the partners try to increase their understanding of the main features and dynamics of local farming systems and define problems and opportunities. They also learn how to experiment with a selection of 'best-bet' options for improvement. These options are based on ideas and experiences derived from indigenous knowledge and formal science. This process of technology development does not only attempt to find solutions to current problems. It also tries to develop sustainable agricultural practices that conserve and enhance natural resources for future generations. Most important of all PTD aims to strengthen the capacity of farmers and rural communities and enable them to analyse ongoing processes and develop relevant, feasible and useful innovations.

There are six main steps in PTD:
❶ *Getting started*: building relationships for cooperation; preliminary situation analysis; awareness mobilisation.
❷ *Looking for things to try*: identifying priorities; identifying 'best-bet' options from indigenous knowledge and scientific sources; screening options.
❸ *Designing experiments*: reviewing existing experimental practice; planning and designing experiments; designing, monitoring and evaluating protocols.
❹ *Trying things out*: implementing experiments, monitoring and evaluation.
❺ *Sharing the results*: communicating basic ideas, principles, results, and the PTD process; training in skills, proven technologies, use of experimental methods and farmer to farmer extension.
❻ *Keeping up the process*: creating favourable conditions for continuing experimentation and agricultural development (Veldhuizen et al 1997; Reijntjes et al 1992).

This process of technology development is closely linked with social change and encourages local innovation, self-confidence, and self respect through self-organised planning, implementation and the evaluation of systematic experiments. The process also fosters a cultural awareness as planning and assessment obliges participants to take account of their own situation and the responsibilities and needs of others in the community.

photo: Bert Lof

Box 4 FARMS

FARMS is a computerised farm management data system based on the FoxPro database management software programme. The package was developed by Aavishkar Software Consultancies, Madras, in close collaboration with AME, Bangalore, India and allows quick data entry and cross-checks. It has the potential to rapidly analyse the various aspects of farm management including the results of financial performance, agricultural production, labour requirements and nutrient, energy and groundwater balances. It also provides sustainability indicators at plot, crop, crop group, enterprise and farm level.

Box 3 Stakeholder Concerted Action

SCA aims to strengthening local participatory development processes by creating stakeholder working groups or platforms. In agricultural development such stakeholder groups involve farmers and other land users, development workers, researchers, policy makers, banks and agribusiness. Stakeholders have a clear interest in working together to achieve a common goal while at the same time ensuring that each others interests are taken into account. Concerted actions provide SCA with a focus. These actions imply analysis, developing an action plan, conflict resolution, monitoring and evaluation, information exchange and lobbying. In the ILEIA research programme PTD gave an initial focus to SCA.

LEISA Working Groups consisting of representatives of farmer organisations, NGOs, agricultural research institutes, universities and/or government extension services were set up in each region. These stakeholder groups were the main research partners in the ILEIA Collaborative Research Programme. Other independently operating organisations and consultants were also involved in the programme from time to time.

In each region, one or two research sites were identified. These played a central role in the research. The working groups in each country are described in the country sections later in this Newsletter. ILEIA played an important role in conceptual guidance, backstopping, funding, inter-region coordination and final management. AME played the same role in India with some conceptual and funding support from ILEIA.

Setting the research framework

The research framework was designed as an action-oriented R&D programme by ILEIA staff working directly with research partners and external advisors. It grew out of a common interest in 'assessing the viability of their experiences with developing LEISA' in a participatory way and the need to strengthen regional capacities in PTD.

In a general research workshop held in the Netherlands in June 1997, an overall research framework was finalised, adopted and accepted by delegates from the different working groups, country programme officers and the external advisors.

The ILEIA Collaborative Research Programme was designed to accommodate three interactive lines of activity:

❶ **Stakeholder Concerted Action**: the formation of working groups of farmers, development workers and researchers; setting the research agenda; defining sustainability; selecting key indicators and measuring methods; planning; negotiation; sharing and monitoring programme activities; process documentation; library and information management; programme evaluation; training and networking.

❷ **Participatory Technology Development**: farmer analysis of land-use problems, setting objectives and priorities for research, identifying experiment options, selection of farmer indicators, experimentation, monitoring, evaluating results, dissemination, farmer-to farmer visits and scaling-up.

❸ **Assessment Research**: scientific monitoring and validation of farmer practices; experiments and farm-household systems (FARMS); exploratory studies on history, trends and the sustainability of agriculture in the region; case studies on successful LEISA practices in the region and technical studies on the specific technical problems facing farmers at micro and macro level.

PTD was supported and complemented in the research process by scientific validation. Scientific studies proceeded from the problems and priorities identified by farmers in the research sites and were implemented as much as possible in a participatory way. The working groups provided platforms for SCA to direct, coordinate and evaluate the programme (see also Box 5).

Table 1: Criteria for LEISA

Ecological criteria	Economic criteria	Social criteria
· Balanced use of nutrients and organic matter	· Sustained farmer livelihood systems	· Widespread and equitable adoption potential especially among small farmers
· Efficient use of water resources	· Competitiveness	· Reduced dependency on external institutions
· Diversity of genetic resources	· Efficient use of production factors	· Enhanced food security at the family and national level
· Efficient use of energy sources	· Low relative value of external inputs	· Respect and build on indigenous knowledge, beliefs and value systems
· Minimal negative environmental effects		· Contribute to employment generation
· Minimal use of external inputs		

Source: ILEIA Research Workshop, June 1997

Setting the reference base

A reference base was needed to assess the development of agriculture in the context of sustainability and to assess the comparative viability of LEISA. Such a reference base can be created by criteria for defining sustainable agriculture. This process has to be repeated regularly as insights into sustainable agriculture and the skills needed to measure indicators evolve. The partners in the ILEIA Research Programme proposed and formulated such criteria. These proposals were discussed and combined into a common set of criteria for LEISA during the general research workshop and were subsequently finalised at regional-level meetings (see Table 1). Indicators and norms for each criterion had to be developed further in the ecological and socioeconomic environment specific to each local level.

In assessing the viability of LEISA at the household level, emphasis was placed on farmers' objectives and the preconditions that determine how motivated farmers are when it comes to adopting LEISA production systems. Important at the societal level were national objectives and the premise that sustainable agriculture must be "economically viable, socioculturally just and ecologically sound" (Brundtland 1987).

Answering research questions

The viability of LEISA systems depends on the comparative performance of the technologies involved and the technology development process. Conclusions should be derived from the results of assessment research, PTD and SCA. Figure 1 shows the strategic footsteps taken in order to validate LEISA. At the end of the research programme farmers, scientist and the stakeholders should try to reach a conclusion together.

Agricultural conditions change constantly and the viability of LEISA technologies change with them. Conclusions about the viability of specific LEISA technologies are therefore only valid for a specific time and for specific local conditions. To get answers to research questions that cover longer periods, a system of sustainability monitoring is required. Such a monitoring system should build on farmer experimentation and scientific monitoring and evaluation.

Expected outputs

- Initial analysis of sustainability of current agricultural practices.
- First analysis of viability of LEISA practices in the research areas.
- Collection of scientific information on specific problem issues.
- Strengthening capacity of all stakeholders to implement SCA.
- Strengthen capacity of stakeholder to carry out PTD experimentation.
- Further development of methodologies.

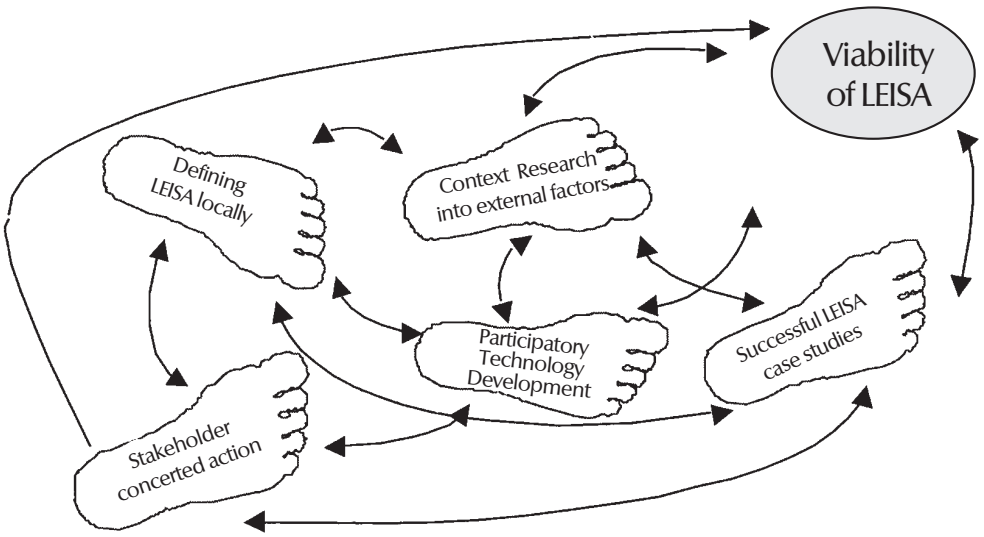
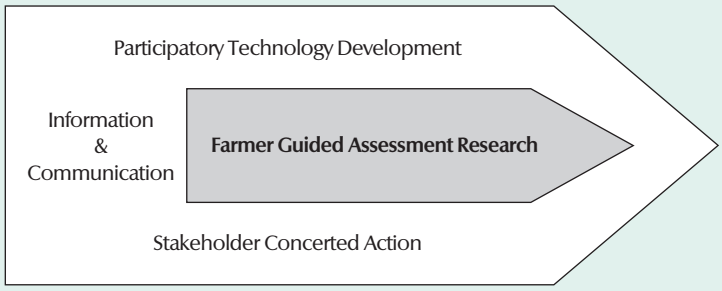


Figure 1. Strategic footsteps: iterative steps in the development – research process

Box 5 **Big and small boats of LEISA development**

Research programme objectives had to be in line with the development agenda and processes of NGOs and other development organisations working with farmers on sustainable land use and poverty alle viation. In the research framework workshop this broader development process was conceptualised as the 'Big Boat' within which LEISA development would take place. In this process farmers' innovate and their land-use practices have an own dynamic with or without external support from interested stakeholders. ILEIA contributed to these processes by providing information, facilitating communication (library support, documentation, Newsletter and other publications) and by supporting PTD and SCA. Development objectives were therefore high on ILEIA's research agenda.

PROCESSES FOR THE DEVELOPMENT OF LEISA



In ILEIA's research programme, the Small Boat of assessment research - carried within the Big Boat' of the development process - had a pilot role. It drew inspiration from and guided and sharpened PTD and SCA activities. Assessment research involved context and case studies, farmer experiments and the scientific monitoring and analysis of farm production systems (FARMS). It focused on specific problems and practices identified and prioritised by farmers at field and macro level. PTD activities associated with farmer experimentation formed an integral part of Small Boat research activities. This was important because ILEIA considers farmer assessment essential to the outcome of the ILEIA research programme. Small Boat research gave direction to the overall PTD process. The PTD and SCA process within the larger development process provided the social mechanisms through which problems and priorities were tackled. Thus, PTD activities occurred both inside and outside the Small Boat.

Assessment was part of ILEIA's research mandate and therefore ILEIA focussed on the Small Boat. Collecting verifiable data was imperative because policy makers had to be convinced it was necessary to support the development of LEISA. Conventional research agendas also need to be better orientated to needs and priorities of farmers.

Although PTD and SCA were not the direct subjects of assessment they were supposed to generate interesting methodological results for the overall research programme. Moreover, they were important in obtaining valid research results from participatory, jointly-implemented research. Therefore, there was close interaction between the activities of the two 'boats'. Both were part and parcel of ILEIA's overall research effort and contributed to the development processes of the 'Big Boat' pursued by ILEIA's partners in the research

Implementation

The working groups were responsible for the day-to-day planning, coordination and monitoring of the programme. Biannual workshops with staff from ILEIA Netherlands were held to formulate general plans. Contracts with terms of reference and budgets were drawn up for each activity. ILEIA (NL) and country programme officers were responsible for budgets, administration, programme monitoring, reporting to the funding agency, quality control, trouble shooting and general support. ILEIA (NL) was closely involved in programme conceptualisation but not in direct implementation. Visits two or three times a year and long distance communication enabled ILEIA (NL) to meet general monitoring, management and support obligations.

The conditions, focus and dynamics of research in Ghana, the Philippines, India and Peru were very different and this was reflected in the process and the results obtained in each country. Serious conflicts within the initial ILEIA research team (1996) caused delays. The research programme outlined here started in early 1997 and it was summer before PTD experiments and studies began. The time available for experimentation was therefore short: two seasons in Ghana and Peru and three in the Philippines. In India the situation was different because AME had initiated the PTD process in 1994.

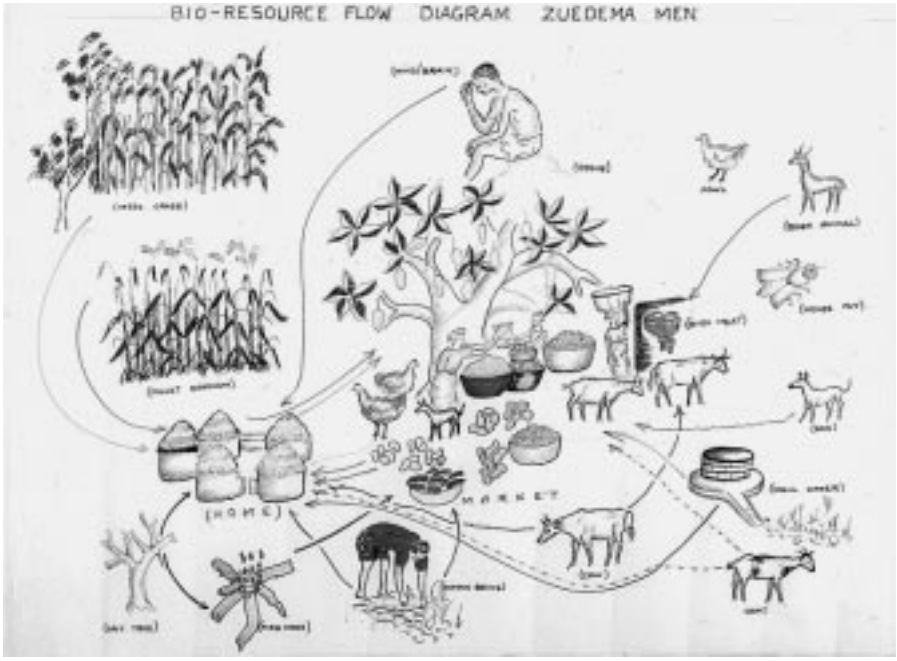


illustration: Ghana Research Archive

Given the limited amount of time available assessment research focused on the first three specific research questions. A start had been made with the FARMS programme but due to software problems this activity had to be stopped. Most of the planned context, technical and case studies were implemented before the end of 1998. Considerable attention was given to capacity building in SCA and PTD at the beginning of the research process. In this way conditions were created for a research effort that could be sustained beyond the planned withdrawal of ILEIA in 1999. Bad weather brought about by El Niño strongly influenced the results of PTD experiments during two seasons in the Philippines and one in Peru.

photo: Bert Lof

Newsletter reports results

This issue of the ILEIA Newsletter presents the research programmes in the four countries. In each country section articles are included on the overall country programme, sustainability problems, the main trends in agricultural development in the region, the case and technical studies carried out, the SCA and PTD process and the PTD results. An introductory article by Kauffman outlines the results of a study in Peru, Philippines and Ghana to compare farmers' and scientists' land use categories. Each country section carries articles on the overall country programme, sustainability problems, main trends in regional agricultural development, case and technical studies, SCA and the PTD process and its results. A concluding article written by the ILEIA team, attempts to synthesis the main results of the programme.

If you would like to know more about the ILEIA research programme and the wide diversity of information and insights gained you might like to consult our Web site for reports, country documents, and other source material. A series of local publications (see country sections for references) will become available during the year 2000.

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