

Field experience with LEISA

This article presents the findings of field surveys in the Philippines and Ghana to analyse the applicability of Low-External-Input and Sustainable Agricultural (LEISA) techniques and their contribution to sustainability of farm systems in different field conditions. Although success has been demonstrated in many cases, serious limitations are indicated as well. Successful experiences seem mostly limited to small areas with specific (favourable) conditions and often refer to a limited time period, whereas on a regional scale considerable variation seems to occur. Experiences with LEISA techniques are seldom analysed in a systematic way, which makes it difficult to come to consistent conclusions concerning their replicability. The pre-evaluation survey of ILEIA, carried out by Matrix Consultants in 1992, provided an opportunity for analysis.

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In order to systemise experiences, sites where LEISA techniques were applied were characterised, in relation to each other, by the following factors:

- ECO- and ECO+ refer to the ecological production potential of a certain area. Roughly, it can be said that in ECO- areas rainfall and/or soil fertility allow no more than one reliable crop per year, whereas in ECO+ areas at least one reliable crop may be produced.
- ECONO- refers to areas with poor economic conditions, such as poor infrastructure, low purchasing power, poor and remote markets, little industrialisation and low availability of external inputs. ECONO+ refers to areas with favourable conditions in this respect.

Much of the information and experiences were obtained during two field missions, prepared and executed together with Vickee Garcia-Padilla of the Philippine NGO AGTALON, Pascal Atengdem of the University of Ghana and Malex Alebikiya, coordinator of ACDEP (Association of Church Development Projects in Northern Ghana). The Philippines represented a predominantly ECO+ area in which external inputs, like chemical fertilisers and pesticides, are used intensively (High-External-Input Agriculture, HEIA). Ghana represented a predominantly ECO- area in which external inputs are hardly used for economic reasons (Low-External-Input Agriculture, LEIA). In the Philippines

LEISA techniques are mainly used to replace external inputs and to protect the natural resource base. In Ghana LEISA techniques are mainly used to increase production, to decrease climate and pest related risks and to protect the natural resource base. In both countries NGOs and projects dealing with LEISA techniques were visited. Farmers were interviewed, results in the field were analysed and in-depth discussions were held with various development agencies (NGOs and GOs). The impact assessment concentrated on four clusters of LEISA techniques: maintenance of soil fertility, soil and water conservation, agroforestry and integrated pest management.

Influencing factors

One of the main conclusions of the survey is that the applicability of LEISA techniques seems to be related in the first place to site-specific factors. Other factors that seem to be important are:

- production and income dip during the transition period
- land tenure security
- labour requirements
- government policies
- gender related factors
- availability of appropriate information
- negative experiences with HEIA (eg pesticides on health)

- increasing indebtedness of farmers (eg due to increasing prices of external inputs)
- other supportive services offered by agencies promoting LEISA.

Potentials and constraints: ECO+

In ECO+ areas many farmers apply LEISA techniques and many NGOs promote them. Experiences showed that these techniques have the potential to:

- restore and maintain the soil as biological system, enhance soil fertility and recycle nutrients
- reduce climate and pest related risks
- improve the efficiency of chemical fertiliser use and replace chemical pesticides and herbicides and thus reduce the need for costly and hazardous external inputs, increasing self-reliance and independence of farmers.

As such, LEISA techniques showed considerable potential to contribute to sustainability of farm systems in ECO+ conditions. Techniques such as biofertilisers, agroforestry, contour hedges, biological weed control and natural pesticides are being used successfully. However, the introduction of LEISA techniques is often followed by a period during which production and income decrease. The field survey showed that in both ECO+ and ECO- situations slow results and the inability to bridge this production dip was perceived as a serious constraint. In ECO+ areas, where regeneration processes are relatively rapid, the production dip during transition from conventional HEIA towards LEISA is relatively limited.

In ECO+ areas the major difficulties to successfully apply LEISA are mainly related to factors such as land tenure, politics and (macro) economic factors. For example, GOs commonly subsidised or provided favourable credit systems for external inputs, organised (military) opposition to community organisation, corrupted LEISA enterprises, maintained unfavourable land tenure policies, or supported large traders frustrating small-scale farmers' enterprises. Particularly the Philippines provided several examples of GOs opposing NGOs and farmers' organisations until, sometimes, the success of a LEISA technique could no longer be denied. Political and economic constraints on LEISA are closely related with international economics and GO politics supported by the international community. These factors are largely beyond the influence of agencies implementing LEISA.

Opposing forces

When looking at the relationship between economic conditions and applicability of LEISA techniques, two opposing forces



Farmers in the Philippines apply contour hedges as they increase the productivity as well as the ecological stability of the land.

Techniques reviewed

are important. On the one hand, LEISA techniques seem more applicable under ECONO+ conditions, because of:

- the availability of agro-industrial wastes to be used by resource-poor farmers to boost agricultural production through LEISA techniques (eg upland farmers using lowland or urban wastes)
- better infrastructure, higher levels of organisation, education and health services and a higher purchasing power, including the demand for eco-products.

On the other hand, ECONO+ conditions disfavour the applicability of LEISA techniques because of:

- better opportunities for off-farm employment
- more effective HEIA campaigns and opposition to LEISA.

Potentials and constraints: ECO-

Because the natural resource base of ECO- areas is poor, genetic diversity is low, climate related risks are high and regeneration processes are slow, LEISA techniques need to be adapted to more natural constraints. Food and supporting crops (trees, shrubs, creepers and grasses) strongly compete for limited resources: land, nutrients, water, light and labour. High labour inputs (eg for building stone ridges or composting) and time (slower processes) may be needed to obtain results. Rehabilitation of degraded land takes relatively long, required investments are large, whereas short-term benefits are often uncertain. Poor farmers, who often live in ECO- areas, can not afford to increase labour inputs in their farm system without direct returns, particularly where labour is seasonally or permanently invested in off-farm activities. These factors often make it difficult, especially for poor farmers, to apply LEISA techniques in ECO- areas.

Be careful!

The survey showed that, especially in ECO- areas, application of LEISA techniques was not always successful. LEISA techniques, therefore, should be used with great care because, for example,

- production increases are often only local and the result of a more effective concentration and/or exploitation of scarce resources. If resources are not systematically conserved this can easily lead to further depletion and thus a drop in production.
- production increases can result from a disproportionately high use of scarce resources by farmers who successfully implement LEISA. This may reduce access to such resources for other farmers or land users such as pastoralists
- where profitable off-farm activities are



Photo: Jan-Joost Kessler

an option, labour investments in LEISA techniques are less likely to be made.

Therefore, a system and regional approach should be applied when evaluating the potential of LEISA techniques to enhance sustainability of farm systems.

The PTD approach

The Participatory Technology Development (PTD) approach has numerous benefits when compared to the "top-down" approach which predominated for a long time. However, during the field survey several constraints were mentioned hindering its proper application:

- it is time consuming, both for extensionists and farmers.
- it requires a relatively high level of training of the extensionists, which is seldom encountered with NGOs.
- on-farm demonstrations are seldom properly executed over a sufficiently long period of time to draw firm conclusions.
- awareness increases that, particularly in ECO- areas, profound knowledge of indigenous (traditional) farming systems contributes little to the development of solutions to current problems (scale and character of the problems being of a new order of magnitude)
- the potential of PTD to motivate farmers is strongly related to the possibilities to obtain short-term results.

As a result of these constraints, several observations were made of NGOs introducing LEISA techniques in a rather top-down way, because they lacked the required staff and necessary knowledge and aimed at quick results.

Gender

Whereas the field survey showed that women were more rapid in adopting new LEISA techniques, both NGOs and GOs were still mainly staffed by men and oriented their activities at men. Constraints of LEISA techniques affect women more than men: women generally own less land than men, labour constraints are more pressing and women have less control over the profits of their investments in LEISA activities. On the other hand, in

In Ghana many farmers still see organic fertilisers as the basis for soil fertility management.

Ghana, some women's groups appeared relatively effective in applying LEISA techniques and in managing their profits.

Spreading information

The availability of technical information and examples of successful applications are important aspects motivating farmers to adopt LEISA techniques. These are most seriously lacking in ECO- areas and in areas where ECONO- conditions prevail. On the other hand, in ECO+ areas there is often an overwhelming amount of information on HEIA, which is difficult to counter by low-budget NGOs.

Conclusions

Under ECO+ and ECONO+ conditions LEISA techniques showed potential to enhance productivity and ecological sustainability of farming systems as well as improve the economic situation of farmers. However, under ECO- and ECONO- conditions it proved difficult to improve the economic situation of farmers by other means than production increase resulting from a more intensive use of renewable resources, thus risking to affect ecological sustainability.

Regeneration of degraded land, for which LEISA techniques are often applied, may be feasible only if funding agencies are willing to substantially support the farmers involved, because short-term results cannot be expected.

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