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ILEIA NEWSLETTER

FOR ECOLOGICALLY SOUND AGRICULTURE

TRACKING CHANGE

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CONTRIBUTIONS Articles, short communications and news items should be written in easy-to-read English. Articles should be less than 1200 words long, and should include at least 2 illustrations. Authors of published articles will be paid DFL 165 per printed page. A guideline for preparing articles can be obtained from ILEIA.

EDITORIAL TEAM Wietse Bruinsma, Mariëlle Dubbeling, Wim Hiemstra, Ingrid Huibers and Coen Reijntjes (with thanks to Ann Long for editing some of the articles). **RESPONSIBLE FOR THIS ISSUE** Mariëlle Dubbeling and Coen Reijntjes. **TYPING** Marika van der Brom and Lila Felipie. **ADMINISTRATION** Regina Ruane, Marika van den Brom, Lila Felipie **DESIGN & LAYOUT** Jan Hiensch, Leusden. **PRINTING** BDU Barneveld. **ISSN: 0920-8771**

ILEIA is the "Centre for Research and Information Exchange in Ecologically Sound Agriculture" and is funded mainly by the Netherlands Ministry of Development Cooperation. Project funds are assured till early 1999. ILEIA was established in 1982 by ETC Foundation as the "Information Centre for Low-External-Input and Sustainable Agriculture".

ILEIA stands for an agriculture that is economically feasible and based on ecological principles that remain connected to people's cultural roots and changing economic and political environments. For ILEIA agricultural practices are ecologically sound when they restore degraded ecosystems, improve nutrient recycling, increase biodiversity; and when external inputs like pesticide, chemical fertiliser and hybrid varieties are used in a judicious and complementary way. Such practices and resource management strategies are site and time specific.

ILEIA's mandate also includes assessment of the ecological, socio-economic, cultural and political conditions which allow people to earn a decent living from the land in an ecologically sound way. The assessment will take place in three agroeco-zones of contrasting potential considering market access and institutional setting: the dryland savannahs of northern Ghana, the high mountain valleys of Peru, and the humid lowland tropics of the Philippines.

ILEIA seeks to exchange information on ecologically sound agriculture by publishing a quarterly newsletter, bibliographies, books, and its documentation centre collection database ILEIADOC is available on diskette. ILEIA's research programme is supporting learning partnerships in the three agroecozones.

DEAR READERS

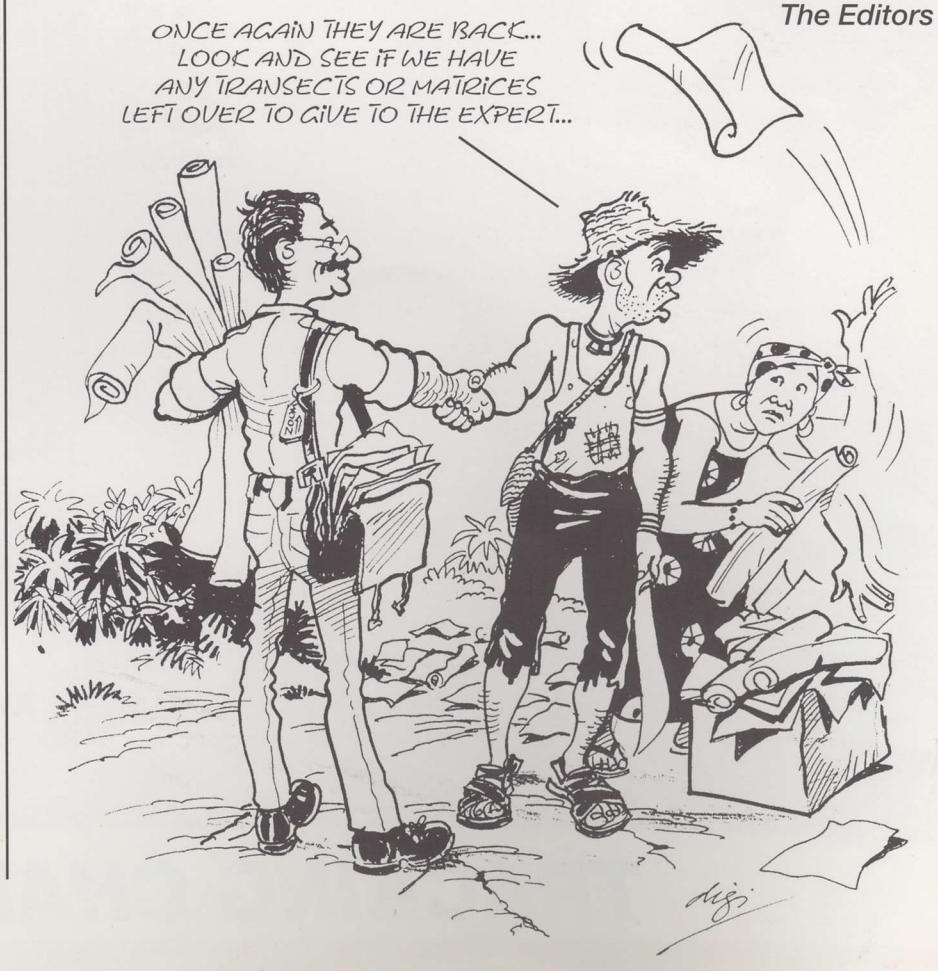
Tracking change is an important aspect in ILEIA's mandate to assess the viability of LEISA and the opportunities and constraints for its adoption. Tracking change may provide important clues to define transition strategies and needed policies that help farmers to adopt practices that are more sustainable. Assessment and measurement of change is a complex enough task for scientists; however, often their well documented experiences lack relevance to farmers. On the other hand, for many NGOs the lack of systematic, documented evidence on the impact of their efforts is often interpreted as lack of success. Hence, tracking change and demonstrating impact are common needs to many stakeholders, yet this need often responds to different objectives.

To track change and demonstrate impact indicators are needed and developed with and by farmers, and other stakeholders. Different stakeholders may use different indicators and this may easily lead to confusion. We could speak of a trap of indicators. The articles in this issue suggest that, unless there is a common understanding of what an assessment is for, whose objectives are being served, and how the data will be used, indicators on their own can constitute a trap. They show how assessment becomes increasingly complex when different stakeholders are involved. Whose objectives are most important when monitoring change jointly? How to agree on indicators to match those objectives? How accurate must data be?

While this theme is of critical importance, at times the Newsletter also allows us to take ourselves less seriously, hence the cartoon. In contrast, our back cover makes reference to the World Food Summit hosted by FAO in Rome in November, an event which is difficult to track for many of our readers.

For ILEIA, this harvest of articles has been most stimulating. Several experiences published in this issue are related to the research work with our partners in Peru, Ghana and the Philippines. Moreover, this issue demonstrates how much ILEIA can learn from the ongoing efforts of our readers.

The Editors



CARTOON by Ato K.G. de Graft-Johnson

COVER PHOTO: Sjef Kauffman

photo: SANREM

Escaping the deforestation mythology

James Fairhead and Melissa Leach discovered how the expert opinion radically contradicts the historic analysis of vegetation change in the forest-savanna transition zone in the Republic of Guinea. They used history to understand landscape rather than landscape to understand history and came to the conclusion that forest islands were not relics of a landscape half empty of forests, but forest outposts in a landscape half full of them. Their methodology included analysing historical data and discussing changes in vegetation use with the villagers. An exciting article to be read on page

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Agreeing on indicators

Irene Guijt & Pablo Sidersky's work in Brazil brings together farmers, farmer groups, rural trade unions, and an NGO to jointly monitor change. This means merging different world views, priorities and capacities; it also means making choices on objectives and indicators. For pragmatic reasons, and as a starting point, the rural trade unions were given priority in determining the choice of indicators. The indicators initially identified were impossible for an understaffed and underfunded NGO to measure. Further discussion led to the realisation that such precise data were unnecessary. For instance, exact organic matter content was less important than knowing if 6 out of 10 farmers have noticed a significant change in soil humidity as a result of planting along contour lines. The indicators were duly condensed into one: the frequency with which positive and negative changes have been noted by farmers planting along contour lines. Read more on page

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Village picture book

Change is not a topic that can be asked about in direct terms if one wants to get beyond the standard answers (less rain, fewer trees, poorer soils, etc.). This is what Valentina Mazzucato and David Niemeijer learned when they carried out a research project in eastern Burkina Faso. The authors explain how making a village picture book created a common ground for discussing change on page

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photo: Sjef Kauffman

indicators to assess a moving target

Tracking change

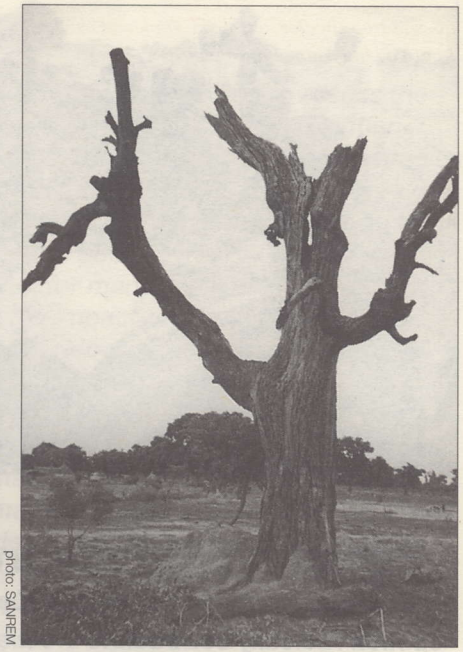

photo: SANREM

Understanding and documenting the conditions which enhance as well as those which limit the expansion of LEISA is a major theme for ILEIA. This requires an understanding of the impact of many conditions which are themselves in constant evolution. Moreover, these conditions are seen differently by different stakeholders. The challenge is therefore very complex as we are faced with many conditions which not only change, but have different meaning to different actors. It is therefore important to focus attention on tracking change. Fortunately, many groups around the world are working on this same theme. NGOs, farmer organisations and research institutes try to define indicators of sustainability that are relevant to their reasons for tracking change. This newsletter contains experiences, success stories and shortcomings in the attempts of different stakeholders. It also gives some examples of cases where farmers, NGOs and researchers tried to find a common language to track change together.

Editorial

Agenda 21 prepared as a result of the 1992 United Nations Conference of Environment and Development, is evidence enough that the need for sustainable development is generally accepted as a desirable goal, and that multiple stakeholders are involved in shaping this goal. However, opinions and interpretation of sustainable development and ecologically sound agriculture differ among different stakeholders. Farmers, as well as development workers, policy makers and donors are confronted with the dilemma of how to grasp, document and demonstrate impact in their work towards sustainable development. "The assessment and monitoring of sustainability appear extremely complex and difficult in regard to the numerous disciplines and sectors that must take part. Every one discipline or sector comes with differences in the understanding and appreciation of the indicators to be used, complicating the process and making all consensus difficult to reach." (Some & McSweeney, p. 12).

Stakeholders and disciplines

In order to survive farmers must be - and often are - experienced "trackers of change" who are open to learn, adapt and innovate.

What is an indicator?

Indicators are used to monitor a state of affairs which is compared with desirable conditions or goals laid out in principles (Kimmins, 1992). An "indicator of sustainability" is a quantitative or qualitative variable which can be measured or described and which, when observed periodically and analysed in connection with other indicators, demonstrates trends towards more or less sustainability (Hardi and Pinter 1995).

Also development workers, researchers and policy makers have developed tools to monitor or to track change, for example, to analyse agricultural development, the impact of projects and agricultural policies or the effectiveness of new farming techniques.

However, many "trackers of change" now realise that the indicators, parameters and norms they have used are insufficient to understand developments and guide actions towards sustainable well-being. Social, ecological, cultural and spiritual dimensions of reality have been overlooked or undervalued systematically by development professionals. Therefore, apart from multiple stakeholders, multiple disciplines have their role to play. Most of the efforts documented in this issue of the Newsletter focus attention more on grasping the interactions between different disciplines. This is manifested in several efforts at defining indicators. The next issue of the Newsletter will shift attention to analysing the interaction of different stakeholders, titled "Forging new linkages". The two dimensions are of equal importance.

Perceptions of sustainability

The wide range of visions described in this issue on how to understand, document and demonstrate impact indicates the complexity of the challenge at hand. "Understanding" refers to perceiving a complex and changing environment, but different stakeholders perceive reality according to their own world view. Perception of environmental degradation may vary even between individuals within a given stakeholder group as a result of socio-economic, religious, gender or age group differences. Lazos Chavero (p. 18) shows the contrasting perception of environmental degradation, as dictated by the values and expectations of different age groups, among indigenous people in Mexico. Perception is also greatly influenced by the media used to capture and communicate it. In participatory assessments, the use of photography may enhance the capacity of different groups to express and share their perceptions (Mazzucato, p. 20) and, on that basis, agree on a common action plan (FAO Pakistan, p. 21). On a different level, the article by Fairhead & Leach (p. 7) demonstrates that pre-conceived ideas by policy makers and scientists on environmental deterioration may well shape the interpretation of data in ways which are surprisingly inaccurate.

Common language

A common language or common reference base for criteria and norms to measure sustainability has yet to be developed. Obviously, this would need further dialogue on what sustainable development really means to people. There are very broad criteria for sustainable agriculture such as "economically viable, ecologically sound, socially just, humane and adaptable" (Gips 1986). But these criteria are valued in different ways by different actors, depending on their profession, resource base, needs and preferences and their vision on agriculture and development as a whole. The article by Some and McSweeney describes the effort by the SANREM project to define indicators across disciplines. Standardising and defining these indicators remains difficult. For example, the International Federation of Organic Agricultural Movements (IFOAM) has developed "Standards for Organic Agriculture". Although these standards have been developed for commercial organic agriculture and fail to recognise site specificity, they could provide a useful input in dialogues on standardising indicators of sustainability.

Agreement on what to measure is important. This requires that different stakeholders agree at an early stage on the specific

Loss of tree species in Dousin, Burkina Faso. Photo by the women of Dousin.

areas of work and to formulate concrete objectives. At this stage parameters and indicators need to be defined by both farmers, researchers and support organisations. This means stakeholders must each select the most meaningful and critical indicators avoiding extensive lists and compare them with each other. Two inspiring cases are those reported by Gündel (p. 16) and by Guijt & Sidersky (p. 9) where visual tools were agreed upon as entry points to allow different stakeholders to agree on how to grasp reality with a view to act on it through participatory action research.

Selecting indicators

Indicators must not only show if things are moving towards sustainability, or maybe better, "away from unsustainability" (Guijt 1996) but should also contribute to a better understanding of the processes that cause change. Contributing to a better understanding, however, requires: 1) common elements of analysis leading to a shared terminology (e.g. parameters, indicators, norms, components, data); 2) mechanisms for recognising and involving stakeholders in defining indicators; and 3) mechanisms to prioritise and select practical indicators to focus on.

Recently several scientific conferences and working groups have studied indicators of sustainability (see "If you want to know more", p. 26). Many recommendations for selection of indicators and monitoring procedures have been formulated. Researchers and development workers have made long lists of indicators. But prefabricated lists, whether long or short, do not seem to work. For each new case, indicators have to be selected and negotiated by the actors involved. Depending on the local situation and processes of change and related to the objectives of farmers and main criteria for sustainable agriculture, a pragmatic framework of indicators needs to be selected. When insights and conditions change, this framework needs to be adapted. In fact, the capacity of farmers and other stakeholders to learn, adapt and innovate is one of the most important indicators of sustainability.

Linking indicators

Having a common language means agreeing on definitions and uses of terms to the extent that one group's parameters (e.g. ecological aspects) and the indicators chosen to monitor that parameter (e.g. recycling, bio-diversity, total biomass production) can be understood in relation to another group's parameters (e.g. economic aspects) along with the indicators chosen to monitor that parameter (prices, returns to labour, etc). The challenge, however, lies in making the linkages between different key indicators. Some & McSweeney describe a first attempt at doing this in conceptual terms. Kauffman (p. 28) looks at several soil-related indicators, while Shiva (p. 22) designed a framework to assess the relation between bio-diversity and (economic) benefit.

Participants at the 1994 *Indicators of Sustainability Conference and Workshop* organised by SANREM (the Sustainable Agriculture and Natural Resource Management Collaborative Research Support Programme) emphasised the importance of community involvement in identifying indigenous and experiential indicators and in assessing of both local and research-based indicators (Bellows, 1995). They stressed that participant involvement in indicator identification and use must entail involving end-users in all stages of developing indicators of sustainability including:

- the identification of indicators and associated assessment processes
- participation in the assessment of indicators, and
- decision making regarding how the results of tracking change will be used in project or policy formulation.

The participants noted that indicators of sustainability are but by-products of a development process that includes a dialogue on problems, defining options, and seeking alternative solutions. Indicators are needed to assess if these really are solutions.

Work to be done

Participants of a session on Physical and Social Monitoring of Sustainable Land Use Development on the sixth ISCO conference (Bonn, August, 1996) concluded that the task of monitoring sustainability, is overwhelming. They have noted that the use of the term "monitoring" in some of the following examples refers to an evaluation process, while others are closer to the focus on "tracking". Many practical dilemmas were identified:

- How to match our ideal of monitoring to reality, given limitations of funds for monitoring, the allowable time lag between information collection, analysis and reaction?
- How to deal with the fear of monitoring that some people have, as it is often associated with a fault-finding, finger-pointing process and the people being monitored don't know if the findings will be abused or not?
- How to deal with the shortness of projects and the length of time needed to see impact?
- How to bridge the language gap between socio-economist and biophysical researchers to come to integrated monitoring?
- How to deal with a dominant interest in quantitative data when often qualitative data is more relevant and revealing?
- To make a significant difference to decision-making about land use, how much information is really needed and how precise does it have to be?

Searching for indicators of sustainability

COAGRES is the co-ordinating group for ecological agriculture of El Salvador, Central America. It brings together NGOs and university programmes which involved farmers in developing ecologically sound systems. The staff of COAGRES felt the need to develop a set of indicators to assess sustainability. A workshop was organised in June, 1996 to review the indicators used by CAOGRES members and seek agreements on assessing sustainability. For many of the technicians, this event was the first of its kind. At the end of the day, a long list of indicators was developed and a small group, "la comisión", was given the task of revising and organising the list.

At first sight all the indicators chosen appeared to be of equal importance. Moreover, it was clear that there were gaps in the area of economic and social indicators. It was agreed that such indicators were necessary and should be added to the list. However, it was also evident that this would lengthen the list further, an issue which was of concern as it is impractical to use a large number of indicators as it is time consuming and requires resources. In addition, it makes the analysis of data problematic. In the end the "comisión" concluded that the major constraint was the lack of a methodology for selecting indicators.

To fulfill this need, the Comisión made use of the SANE/UNDP Program (Sustainable Agriculture Networking and Extension), and contacted Marta Astier and Omar Masera of GIRA in Pátzcuaro, México. They have developed the "MESMIS: Metodología de Evaluación de Sistemas de Manejo Incorporando Indicadores de Sustentabilidad"; a methodology for the evaluation of production systems utilising sustainability indicators. This tool turned out to be very useful to our work in El Salvador. The authors of this method were invited for a training which took place in October, 1996.

We have learned that it is not possible to work in different projects with a standardised list of sustainability indicators. Each context is different and demands it own indicators. We are in the process of involving the 13 member organisations in an assessment process utilising sustainability indicators. During the first year we expect to gain experience and adapt the methodology to our conditions. By the next harvest date for maize in November, 1997, we hope to be in a position to share our results.

Further information on our work and about COAGRES is available through COAGRES, 27 Avenida Norte 1221, San Salvador, El Salvador. Tel/fax: 503 2252547 or 503 2264814

The participants of this workshop came to a long list of recommendations to limit monitoring in scope and scale (see box below). The article by Guijt and Sidersky is a good example where many of the ISCO recommendations are being realised: "what use is it to choose indicators and complicated measuring methods that will be dropped as soon as we pull out?" (p.9)

The articles is this issue of the Newsletter show that methods of tracking change taking into account different stakeholders and multiple disciplines are in the initial stages of development. More experience is needed on how to link indicators and how to exchange information between different stakeholders. Most of the articles describe recent experiences and therefore there is less information on how the results of tracking change have enhanced the learning and decision-making needs of the different stakeholders.

■

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Ways to limit what we monitor and the effort we put into it

- Clarify the objective of monitoring and the intended audience first before starting
- Prioritise the theme or issue to monitor, you cannot monitor all aspects of sustainable land use
- Check if the human capacity to carry out the desired monitoring actually exists. If measurements from less sophisticated methods are acceptable, use them!
- Be more creative with methods - eg. accept photo documentation as evidence of impact.
- Use existing methods / indicators if possible, rather than inventing totally new ones.
- Use participatory methods wherever possible, as they are relatively cost-effective.
- Monitor the monitoring

Selected from recommendations made by participants of the "Session on physical and social monitoring of sustainable land use development." Sixth ISCO confererence in Berlin, August 1996. (Summary by I. Guijt)

Escaping the

Photo: Fairhead & Leach

The landscape of Kissidougou prefecture in the Republic of Guinea is striking. Patches of dense, verdant, semi-deciduous rain forest tower over open expanses of grassy savanna. These islands of forest, in a sea of savanna, are generally round, a kilometre or two in diameter, and conceal villages at their centre. Apart from these islands, dense forest vegetation is found only in narrow strips along streamsides or swampy valley bottoms. This landscape resembles that in many parts of the West African forest-savanna mosaic or 'transition' zone, which stretches along the northern fringe of the forest zone from Sierra Leone eastwards to Nigeria and beyond. In this article the authors show how indicators can lead to a myth if interpreted the wrong way.

James Fairhead and Melissa Leach

Since the first French occupation in 1893, administrators in todays Republic of Guinea have been convinced that these forest patches are the last relics of an original forest which once fully covered the landscape. They suppose that inhabitants have progressively converted the forest into savanna through their shifting cultivation and fire-setting practices, preserving only the narrow belts of forest around their villages. From the outset, this 'savannisation' has been a major policy concern because of the threat it posed to the local agricultural and tree crop economy and to regional climate and hydrology. Today, and with the addition of global environmental concerns, the degraded and degrading landscape of Kissidougou has

deforestation mythology

attracted major international funding for environmental rehabilitation. These concerns are not unique to Kissidougou: they have been expressed thoughout much of the transition zone, and elaborated during a century of scientific investigation.

Deductions and theories

This understanding of vegetation history in Kissidougou has not been based on historical sources. Instead, it has depended on deductions about past vegetation based on observations of present vegetation, and theories concerning how vegetation has been influenced by land use. Our research took a different approach, tracking land use history from historical sources; in effect using history to understand landscape rather than landscape to understand history. The results told a tale almost the reverse of 'orthodox' opinion in this zone. Historical sources combined with detailed research into local land use knowledge and practice showed how forest islands found in savanna owed their existence to inhabitants who had encouraged them to form around savanna settlements. Forest islands were not relics of a landscape half empty of forests, but forest outposts in a landscape half full of them. We also found many instances where 'secondary forest thicket' was not degraded forest as had been thought, but had been established in grassy savannas. In short, the contrast between policy assessments of vegetation change, and the historical data for it could not have been starker. The same evidence which scientists and policy makers had been taking to indicate vegetation degradation actually indicated landscape enrichment by people. How did we reach these conclusions, and why had they been obscured by a century of investigation?

Methods for tracking change

The research used a spectrum of methods to track vegetation change during the twentieth century. The most powerful in conveying the surprising results to a sceptical audience was the comparison between modern air photographic and satellite imagery and old air photographs dating from 1952 and 1979. Borrowed from assorted national and local agencies, these images clearly showed the extension of forest area. Second, we sifted older colonial documentation dating from the 1890s for the landscape descriptions which they contained. These archives, found in Kissidougou, Conakry, Dakar, Paris and Aix-en-Provence (France), contained assorted useful descriptions including the military assessments of forest island 'fortresses' made when the French colonial forces attacked, early forestry assessments for rubber resources, and detailed farming assessments made by an agricultural officer based in Kissidougou in 1909. These sources were key to falsifying orthodox views of rapid and recent forest loss.

To gain more precision about changes in vegetation quality and what these had meant for inhabitants' livelihoods, we relied on the oral testimony of elderly men and women. For reasonsdiscussed below, direct questions about forest change in Kissidougou are problematic, producing standard politicised answers. We therefore used less direct discussion techniques, centred on locally-meaningful indicators of environmental change. We identified everyday aspects of vegetation use which depend on, and thus indicate, a particular vegetation state. We discussed how this aspect of life has changed. While each indicator offered only an aspect of change, we were able to build up a fairly reliable picture of vegetation form and composition by combining and triangulating between multiple indicators, derived from conversations with the different men or women to whom they were of particular significance. Initial indicators were identified from fieldwork. In conversation people would spontaneously come up with other indicators useful in subsequent discussions.

Indicators of change

In south Kissidougou, for example, the following indicators combined to confirm that large areas of savanna had ceded to forest fallow vegetation during the last 40 years:

- Agricultural tasks: past rice-field preparation involved burning off savanna grasses, but tree felling has now become a central element of task sequences.
- Farm hut construction: temporary field shelters were once thatched with grasses, and building poles were either savanna trees, or taken from the village forest island. Now abundant poles of suitable forest species are found in the field when the fallow is cut. Palm fronds have replaced grass for roofing.
- Cattle management: cattle, once abundant, can now find no pasture. With plentiful grass fodder available across the territory, cattle could be herded in accordance with agricultural fallow rotations to avoid crop damage. When pasture was somewhat rarer, cattle were left free to forage widely, necessitating fencing of fields.
- Fuelwood: fuelwood was once difficult to find except in the forest island, and women sometimes resorted to cooking with thick grasses for farm hut meals. Today women find all the fuelwood they need from the abundant favoured species in the highly woody upland fallows, and collect in the forest island only at times of year when not visiting fields.
- Termite mounds and fungi: the type of termite mound found with an edible fungus associated with savanna has been replaced by a different type of mound with a different fungus species, associated with forest;
- Hunting: the form of specialist bird hunting which involved raiding the nests of species nesting in savanna grasses has disappeared. Young men's group hunting of cane rats with dogs, which depends on their congregation in unburnt swamps in otherwise burnt uplands, is no longer feasible.

While such indicators proved particularly useful in understanding the broad shifts

Photo: Fairhead & Leach

As the vegetation changes, so the availability of materials for crafts such as mat making alter.

from savanna to forest which had occurred over large parts of Kissidougou's landscape, the development of forest islands around settlements became most clear to us through discussions of settlement history. It was in relating how their ancestors had arrived and founded settlements, a common genre of village oral history, that elders often made reference to the planting of foundational cotton trees and the establishment of vegetation-based fortifications. And it was through discussing settlement history and patterns that we came to understand other central aspects of landscape development from villagers' perspectives: how habitation and home gardening create superfertile soils which come to acquire woody vegetation, for instance, and how in some places, the multiplication of closely-spaced villages and forest islands served to exclude fire and initiate the conversion of intervening savannas to forest.

Different perspectives

The focus of our research, then, was on understanding villagers' perspectives and demonstrable realities concerning environmental change. But given the gulf between these and the views of Kissidougou's environment which dominated scientific and policy circles, it is useful to reflect on how expert opinion concerning environmental degradation in Kissidougou has been formed and reproduced. The origins and reproduction of degradation visions in Kissidougou since the early colonial period seem to lie in the combination of particular sorts of scientific investigation and reasoning - reasoning which has largely excluded historical sources - and the ways environmental concerns have been institutionalised. Here we highlight and exemplify some of the factors which seem to have been most important.

- Reading change from snapshots: Inferring process from form, forest islands are read as relics indicating an historical process of forest destruction; transition woodland communities are taken to represent savannised forest, and the presence of oil palms is taken to indicate previous forest cover, now destroyed. Similarly, observers infer that short drought periods result from long-term vegetation loss. A decline in forest quality from the foresters' viewpoint is taken to indicate generalised danger to the integrity of the forest island. These deductions are all questionable.
- Drawing long-term trends from short term comparative studies: Observations of more fire this year than last year, for example, are taken to represent an extension of an historically worsening fire problem. Only two satellite images from incomparable years are taken to indicate progressive vegetation degradation.
- Climatic climax reasoning: Actual vegetation is seen as a degraded derivate of a notional 'maximal' vegetation which could exist given prevailing climatic conditions. But was the climate dryer in the past? Or were elephant populations high, meaning that today's potential vegetation does not accurately depict actual historical vegetation?
- Logic of one-way climatic change: Climate change is assumed to be a one way shift from the past wetter conditions to present drier ones. Low rainfalls in the 1960-90 period relative to 1920-60 are seen as an extension of this trend. This is invalid.
- Seasonal and spatial biases in observation: Observers tend to see dry season fire and tree cutting, but not rainy season regeneration; and to take roadside timber exploitation activities and the conversion to farmland of a few forest islands near the town to suggest degradation everywhere.
- Extrapolation from global to local: It is assumed that Kissidougou must conform to global and Africa-wide images of deforestation and desertification, as promoted by international organisations and the media. Thus, in the 1993 prefecture environmental conference, both the prefect and Kissidougou's urban-based environmental NGO framed their speeches in terms of global concern with biodiversity loss and the common West African struggle against desertification. In the 1950s, concern with soils and vegetation in Kissidougou responded to Africa-wide opinion voiced at the 1948 Goma inter-African soil conference.
- Interpretation of West Africa's spatial vegetation zones in terms of a temporal southward shift: There is a tendency to see each vegetation zone almost as the degraded derivate of a previous vegetation type, after desertification, sahelianisation or savannisation of forest. Thus the first forest reserves established in Kissidougou in 1932 were conceived of as a protective 'curtain' to halt the southwards spread of fire and farming-induced savannisation (Guinée Service Forestier, Rapport annuel de fin d'année 1932, ANS 2G32(70)).
- Assessing environmental change under the auspices of institutions with vested interests in degradation: Forestry research was carried out by the colonial environmental services which themselves gained authority over rural resources by imaging local populations as incapable resource managers. They derived receipts from permits and fines linked to policies of repression. Modern diagnostic appraisals for rural development and environmental projects are carried out in the context of major donor attention and financing for redressing environmental problems.
- Disrespect for and lack of attention to rural inhabitants' opinions: Racialist views of African farming and forestry practices were dominant in colonial administrations, and their legacy persists. The social distance, preconceived opinions and hurried visits by external experts, and the attitudes and training of urban-based state functionaries, compound this.
- Teaching of the degradation view within formal education: Deforestation reasoning has been incorporated into Kissidougou's primary and secondary school curricula. Colonial environmental analysis is reproduced in university education and forestry training, reinforced by difficulties in accessing modern ecological studies
- Incorporation of the degradation view into local social and political processes: Ethnic stereotypes of Kissi as 'forest-benign' and Maninka as 'savanna-enhancing' peoples, the latter 'bringing savanna with them' as southwards migrants. This has some resonance in local political discourse despite their broad irrelevance to rural people's practical environmental knowledge. And there is a tendency for villagers to reproduce the degradation view in interactions with administrations, to maintain good relations with them.

Radical contradictions

These processes have combined and reinforced each other over a century, precluding challenge to the degradation vision to date. While the nature of this particular misunderstanding may be specific to Kissidougou, it shows how radical contradictions between local and external opinion about African environmental change can arise and persist; a finding of potentially much wider relevance. Analysis which tracks vegetation change over time, making systematic use of historical sources and giving serious attention to inhabitants' opinions, may not go the whole way towards undermining false orthodoxies, given the powerful institutional pressures which also uphold the latter. But it is an essential step in the right direction.

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Photo: Irene Guijt

Flow diagram with secret voting
In order to test one of the methods developed in Caiana with 7 banana producers, the method chosen took the form of a flow diagram with secret voting. This seemed to combine the value of group-based discussion on noted changes in the banana stand, with the need to generate the frequency and intensity of the impact observed. However, this process needs care: when we tested the method, we found that some farmers tended to give high scores not so much to what had actually happened, but to what they hoped would happen.

Agreeing on indicators

AS-PTA is a Brazilian NGO working in partnership with farmers, associations, and rural trade unions (STR, Sindicatosde Trabalhadores Rurais,whose membership includes some smallholders) of the Northeast, to seek more agro-ecologically and economically sound forms of agricultural development. As can be said of many NGOs, despite the intense and dedicated work of AS-PTA members, there is little systematic, documented evidence on the impact of their efforts. Unfortunately, lack of proof is often interpreted as a lack of success or an absence of evaluation. What to monitor and what indicators to use are among the first steps to be agreed upon in a partnership between farmer organisations and NGOs jointly seeking to track the impact of their work. The following experience tells one story of how to agree on indicators that are meaningful to both farmers and NGOs.

Irene Guijt & Pablo Sidersky

The Northeast of Brazil is known as one of the most problematic regions of Brazil. It provides a precarious living for about 2.5 million smallholders who generally do not benefit from government agricultural research and extension efforts. In the state of Paraiba, one of nine in the northeast, lies the Agreste, a transition area between the semi-arid inland zone and the humid coastal area. It is characterised by relatively high population density and great environmental diversity. Average annual rainfall figures vary between 350 to over 1000 mm per year within very short distances, thus creating many micro-zones. In these diverse niches, smallholders try to grow maize, beans, and cassava, often adding a patch of sweet potato, banana, or potato and keeping some livestock.

Projeto Paraiba

Within a small NGO like AS-PTA, the joint challenge of environmental regeneration and economic viability of smallholder production has forced a clear prioritisation of activities. Community-based seed banks to overcome the lack of timely access to seeds, contour planting for dealing with soil degradation, pigeon pea intercropping for fodder in the dry season, and biological pest management in cash-generating banana plantations are, today, key extension activities. Also ongoing are a series of farmer experiments, covering different themes and ranging from ant control to green manuring of bananas. Yet other activities reinforce the institutional capacity of the partners, and deal with local and regional networking.

Since 1993, AS-PTA has been working with smallholders in two municipalities of the Agreste: Solanea and Remigio. The partnership, Projeto Paraiba, involves three levels of farmer participation:

- A nucleus of about ten farmers, affiliated with the STR, in charge of strategic planning, data analysis, monitoring and evaluation. This group is also responsible for most dissemination and monitoring work in the field.
- The second level of farmer participation involves between 60 and 80 farmers, men and women. It includes community association leaders and individual farmers engaged in joint experimentation. Practically all are also involved in key moments of monitoring, evaluation and planning, particularly those related to the experiments.
- The third level includes activity-specific collaboration with the general farming 'public' and community associations, covering 30 communities and over 500 farmers, who are keen to adopt particular measures.

The big question now, and one faced by many similar organisations, is to track the changes that are brought about as a direct result of these activities.

The need for monitoring

The lack of data is clearly a problem for long-term planning of the project itself and for accountability to donors. It also limits the scope for influencing the debate and spread of alternative sustainable agriculture practices at both a local and national level. For Brazil to shift to an alternative model for agricultural development, dissemination of alternatives such as those suggested by 'Projeto Paraiba' is essential. Proof that such alternatives work not only focuses attention on the concrete impact of agricultural practices, but on the processes that allow their development and implementation - namely, the slow and close work and cooperation between rural trade unions, community associations and farmer groups.

AS-PTA's monitoring approach to date has been largely 'crisis-driven', activated when staff have identified an information gap that needs quickly filling. Basic monitoring and evaluation forms for farmers and STR representatives to evaluate the rate of adoption of certain activities are deployed with varying success. The data thus collected focuses on the number of farmers, workshops and experiments; on the area under the innovation; on the number of seed banks; etc. Yield data are also being collected but accurate recording is proving difficult. Evaluation of the impact of the work is complex since one farmer may use several new technologies at once. And there is no agricultural baseline data in the region, further complicating attempts to establish what the direct impact of 'Projeto Paraiba' has been.

Longer term collaboration is under way to develop, with the STRs and farmer interest groups, a participatory monitoring system to allow the collection and processing of

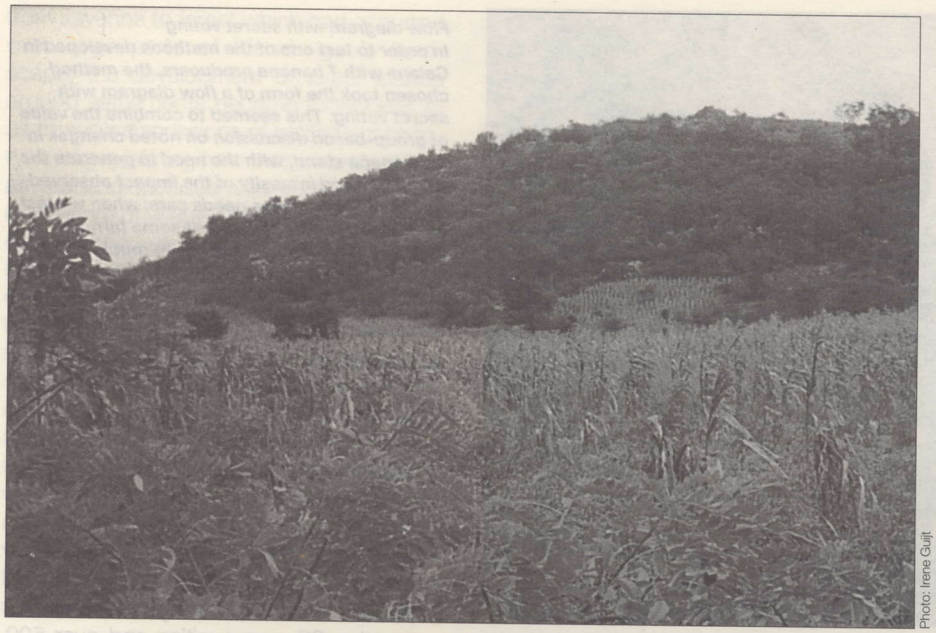

Photo: Irene Guijt

more useful information with less effort. The venture aims to provide i) an ongoing learning experience that can help strengthen group structures and improve the planning-process and effectiveness of interventions; and ii) data to fulfil accountability criteria of donors and to support local and national level policy efforts of the STR, AS-PTA and Rede PTA (a network of 23 NGOs).

Putting theory into practice

The first steps were taken with workshops in January and July 1996 with farmers, STR representatives, and other affiliates. These helped identify:

- the *objectives* of the partnership viewed from the perspectives of AS-PTA and two STR groups, plus prioritising the objectives for monitoring purposes;
- the most useful *indicators* for tracking progress, i.e. the information needed to assess whether objectives are being achieved;
- the best *methods* for collecting and recording information, with several innovations aimed at adapting existing methods to suit the indicators identified and the local cultural context

It became clear early on that not all the dissemination, experimentation, capacity building and networking activities could be monitored at the same time. Through intensive discussions and negotiations spreading over six months, 'Projeto Paraiba' identified four key activities on which to focus monitoring efforts: contour planting, banana weevil control, experimentation with pigeon pea intercropping and pigeon pea as fodder for cattle, and community seed banks.

For each of these activities, AS-PTA and the Remigio and Solanea STRs formulated their own hierarchies of objectives, representing short-term activities, medium-term results, and long-term goals. These were then combined in further discussion to develop a single 'objectives tree' per activity, containing more than a dozen objectives per activity. Within each 'tree', several objectives were prioritised, since it was not possible to monitor all of them. A range of qualitative and quantitative indicators were then formulated for each prioritised objective. Methods were then developed to assess the indicators, drawing on both conventional and more participatory methodologies, such as PRA.

Steps now under way include further adjustment of the methods identified, data collection and analysis, monitoring methodology, and dissemination of the latter to other NGOs and trade unions in Brazil. The existing databank is being modified radically to accommodate new information needs and to remove data that serve no clear purpose.

Besides this process, which has taken place largely with STR representatives and affiliates and AS-PTA staff, monitoring is also being pursued with an important third stakeholder - the farmer experimentation groups. Discussions are starting within each group to obtain farmers' perspectives on: the objectives of experiments; indicators that farmers need for assessing the value of the intended change to the agricultural production system; and appropriate monitoring methods.

The whole process is also expected to serve other purposes, such as building the capacity of farmers to monitor and thus contribute to technology development, creating sustainable local experimentation groups - a rare feature in rural Brazil - and providing data that is useful in evaluation and extension. Documentation of the results of the process in both Paraiba and Minas Gerais is being disseminated throughout the Rede PTA. A final regional workshop is also planned to share the methodology and data with policy makers, scientists, and other farming groups.

Lessons learnt

Spend sufficient time on the objectives. If these are not clear, it is impossible to identify indicators to monitor them. During the January workshop, creating 'trees' to distinguish between short-, middle- and long-term objectives revealed that, contrary to expectations, none of the partners were completely clear about the objectives of 'Projeto Paraiba'. The cause-effect linkages identified were too simplistic. For example, it was thought that contour planting would lead directly to the objective of 'diminishing migration to cities', while, clearly, there are many other factors that contribute to migration. A further three meetings were thus needed. Another two meetings were called

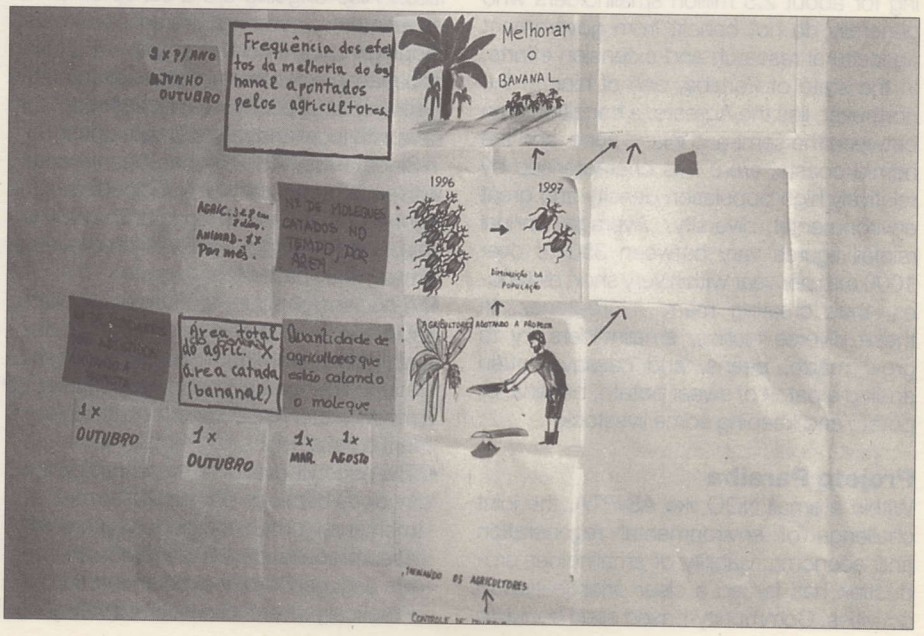

Photo: Irene Guijt

Prioritised objectives tree for IPM work on banana weevil with sample indicators.

to share the results of these discussions and to agree on a common agenda. The process was lengthy though it might not take as long for more established partnerships.

Know the end use of the data collected. Initially, the focus was on the direct measurement of biophysical properties. Yet the degree of accuracy needed is often less than assumed, especially if the data are to be used for general planning or for sensitising farmers. For example, one of the main objectives of contour planting was 'soil and water conservation'. Indicators initially identified for measuring it were soil retention, moisture retention, and organic matter content. But these are impossible to measure for an understaffed and underfunded NGO such as like AS-PTA. When discussing for whom and for what purpose the information was intended, it was realised that such precise data were unnecessary. The information was to be used in farmer-to-farmer extension and donor reporting, both of which (in the case of Projeto Paraiba) did not require scientifically valid data. Exact organic matter content was less important than knowing, for example, that six out of ten farmers had noticed a significant change in soil humidity asa result of planting along contour lines. The indicators were duly condensed into one: the frequency with which positive and negative changes were noted by farmers planting along contour lines.

Work collectively, slowly and realistically. If monitoring is to be part of a sustained learning process it hasto have local relevance and be feasible in the long run. Ensuring long-term monitoring by farmers and STR has meant involving them in every stage of the design. This has taken more time than is usually the case in developing a monitoring system. It has also meant compromises. For example, the temptation to measure everything in order to provide proof for hard-headed scientists, has been firmly resisted. As Paula, one of the agronomists at AS-PTA said during the June workshop: *"I want the monitoring to continue independently of us. What use is it to chose indicators and complicated expensive methods that will be dropped as soon as we pull out?"*

Allow for continual change to the system. Few of the indicators chosen will retain value over a long period, particularly for experimentation groups. As activities are completed or adjusted, objectives will change. External factors will also influence objectives and require the updating of both indicators and methods. Given that such continual change of the monitoring process will be necessary, it is even more important to build local capacity. Sustainability of monitoring will hinge on the farmers knowing when and how to adapt the system.

Allow for different levels of farmer participation. Individual farmers, farmer organisations and NGOs do not have the same monitoring needs and interests. All are plagued by limited time. Choices must therefore be made as to who to involve and when. In our case, for example, the uptake rate of contour planting is crucial information for AS-PTA and STRs, but perhaps less so for the individual farmer. But when it comes to tackling ant-inflicted damage, farmers, STR and AS-PTA will all want to know the effectiveness of proposed measures. These differences led us to organise separate discussions - one involving the STRs and AS-PTA, and the other involving both of these and the experimenting farmers.

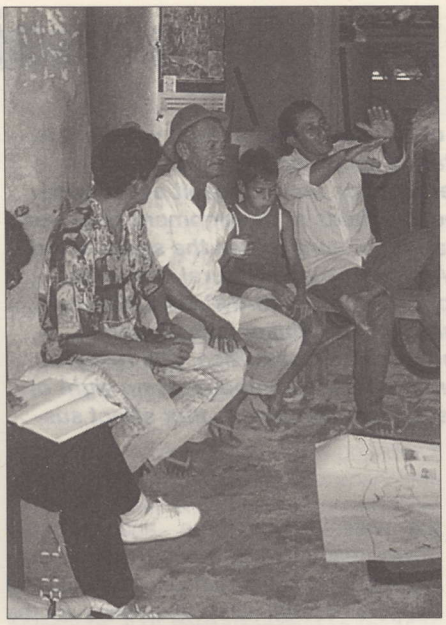

Photo: Irene Guijt

Unresolved queries

Decreasing Unsustainability = Increasing Sustainability?

We are clearly not assessing the overall sustainability of the alternative agricultural approach for smallholder production being developed by Projeto Paraiba. By focusing on change as a result of a limited number of agricultural innovations, the information generated will help assess decreases in the unsustainability of smallholder production. For example, AS-PTA knows that the lack of timely access to seed can have a disastrous impact on yields. Providing seed through seed banks will thus lead to a decrease in this particular constraint, and a decrease in unsustainable production. Data on the number, use, and quality of seed banks should constitute enough 'proof' for donors and farmers that progress towards this is being made. However, whether it represents enough data for policy makers to agree to widespread support for these banks is less clear. And it does not constitute proof that 'agriculture is sustainable'.

Are we measuring the 'right' indicators?

We have consciously left out much that could, in theory, be monitored. In particular, we have left out higher-order impacts, such as sustained improvements in well-being and reduced migration to cities. The higher the objective, the more tenuous the cause-effect linkages become. Have the seed banks really had an impact at that level? What about external factors, or the impact of other activities? Impacts at such levels will almost certainly be a result of a variety of factors, including that of 'Projeto Paraiba' itself. The question we have yet to answer is: are we monitoring at the right level and is it feasible to monitor at higher levels? For monitoring higher order objectives, baseline data become essential: data on well-being, on soil properties, on income levels, etc. Accurate data on this requires a mammoth effort of time and money, and is not within the means of Projeto Paraiba.

How to deal with external influences?

Many monitoring processes simplify causal linkages, particularly those related to farmer participation. For example, an enormous growth in farmers planting fennel without pesticides could be registered two years after the intervention of AS-PTA Nordeste. But this coincided with a new rural credit scheme for the cultivation of traditional cash crops such as fennel. Isolating the impact of AS-PTA's efforts as compared with the influence of the new subsidy becomes a tricky matter. We can only chart significant external influences and attempt to understand the relative weight of their impact.

For whom is the data intended?

Bringing together various stakeholder groups - farmers, STR and AS-PTA - means merging different world views, priorities and capacities. Both AS-PTA and STR identified many higher order objectives, such as 'strengthening social organisation' and 'financial independence of smallholders'. But in the workshops differences emerged in the setting of priorities. To ease the decision-making process, AS-PTA tended to let STR priorities determine the final choice. But it must now continue to monitor its own priorities alongside the shared priorities, some of which will require direct biophysical measurement as proof for the scientific world. This begs the question of the compatibility of participation and science. Of what interest is it to farmers and the STR to move science along? To what extent can AS-PTA ask them to monitor indicators that are not their priority? Who will foot the bill? This picture would become even more complicated if more partners were involved, such as municipal councils, university researchers, government agricultural agencies, etc.

The quest for a sustainable tracking of change has, in our case, only just begun. But we have moved beyond the 'crisis-driven' situation of before. The effort to make objectives and choices more explicit has been an important step. We hope to report soon not only about the monitoring system but also about the impact of 'Projeto Paraiba'. ■

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Assessing sustainab

People may agree on the characteristics of a sustainable system, yet there is still great variability in the relative importance accorded to the different aspects of sustainability. The different perceptions are the result of the wide range of stakeholders' disciplines, the specific fields of development they work in and their institution's interests. This variation complicates the study of indicators of sustainability. The Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program (SANREM CRSP) has research established in the following countries: The Philippines, Ecuador, Burkina Faso, Cape Verde, Morocco, Honduras and Costa Rica. The research focuses on the watershed level or smaller catchments, without losing sight of broader scale environmental, social and economic influences that affect sustainability at the local level.

Salibo Somé and Kevin McSweeney

The SANREM effort is one example of a project experimenting with indicators and searching for common understanding of the different dimensions of sustainability. SANREM has built its research programme to foster a cohesive research agenda that has relevance and benefit at the local level and produces concepts and tools that are broadly applicable. Four cornerstones provide the foundation upon which the research programme is built:

- Landscape/Lifescape Interactions
- Participatory Methodologies
- Interdisciplinary Teamwork
- Institutional Partnerships

The cornerstones provide a framework designed to foster research integration, benefit the end users, and build the capacity for effective transfer and implementation of methodologies, technologies and networks that promote sustainability. The emphasis on landscape requires that research addresses the major land uses occurring within the watershed, and assessment of their impact on each other, the watershed at large, and ultimately downstream. This requires research conducted through a continuum of spatial and temporal scales. Lifescape refers to the social, cultural and economic interactions that are occurring across the landscape. Much of the lifescape research involves the tracking and interpretation of management decisions and their impact on the landscape and the quality of life of individuals, and the various social and cultural groups within the communities. The participatory methodologies are essential for incorporating the knowledge, active collaboration and vision of local people into the research process. Given the complexity of the research agenda, interdisciplinary teamwork and institutional partnerships are necessary to develop the methodologies, technologies and networks for the primary sites and for extension to other localities.

The cornerstones provide themes and embedded principles that are shared collectively by the collaborators. This consensus has proved to be valuable for maintaining coherency and collective purpose in the development and implementation of the research.

The Donsin watershed

Donsin is a small village occupying about 8,500 ha and is located in the Sudan-Sahelian zone, 250 km North East of the City of Ouagadougou, the capital of Burkina Faso. About 1,500 people live in Donsin and its population increases approximately 2% each year. Rainfall in the region averages 500-700 mm with a great spatial and temporal variability, often resulting in crop failure and food insecurity. The native vegetation is typical West African savannah and agriculture is centered on raising mainly sorghum, millet, groundnuts and livestock, primarily cattle, sheep and goats. The soils are highly weathered, ferruginous, acid and low in organic matter and phosphorus. The topography is comprised of plateaus, savannah plains and low-lying, ephemeral streams. The village lies in the bush, about 20 km from Boulsa, the nearest town. Access to the village by car is difficult.

From appraisal to indicators

Initially, only two institutions, the "Institut d'Etudes et de Recherches Agricoles" (INERA), through its farming systems programme, and Plan International, a PVO, had projects in Donsin. SANREM came to the site as a partner with the challenge of fostering an integrative approach to research and development. The first step in the process of SANREM settlement in the watershed was to conduct a diagnostic study of the village and watershed using a participatory landscape-lifescape appraisal (PLLA). The PLLA is similar to "rapid rural appraisal" (RRA) methods, but emphasises assessment and mapping of social, cultural and economic interactions that are occurring across the landscape, as well as the impact that different land uses have on each other via flows of energy and materials. The PLLA provided an initial definition of the potentials and constraints for sustainable natural resource management in the Donsin watershed.

As a second step, a workshop was organised in Ouagadougou to gather all partner institutions and representatives of the Donsin village for critical review and refinement of the PLLA findings. A workshop had the following objectives:

- harmonize understanding on the notion of sustainability,
- identify relevant indicators of sustainability for the Donsin watershed,
- create a working group to coordinate research activities on indicators in watershed.

The third step consisted of writing a framework plan based on the PLLA and workshop results. This document was written by a committee composed of representatives of all partner institutions, with several consultation trips to Donsin for community input. The plan was finalised and then came a call for research projects. A total of ten research projects were selected for implementation. The projects were reviewed and ranked by the community and each involves community participation in the research.

Defining indicators

During some of the sessions workshop participants were asked to identify no more than five indicators for each of the three thematic areas: land quality and supply, productivity and diversification, and water quality and supply. The indicators were then discussed and refined by the group at large. In addition, the ten work plan teams were asked to develop a list of indicators relevant to their research. The representatives of the Donsin producers actively participated in this process and provided community-based indicators which oriented and greatly enriched the discussion. Their indicators include: abundance of trees, herbaceous and ligneous biomass availability for consumption and handicraft, recuperation of bare (eroded/degraded) spaces, and water availability for human consumption and for income generating activities.

The outcome of these sessions was a list of indicators, which was discussed and refined by the group at large. From these discussions, the idea emerged that a given indicator acquires considerable interpretative value if it can be connected with other indicators to establish a broader landscape/lifescape context for gauging changes in sustainability. For example, the community indicator addressing availability or partitioning of water for human consumption and income generation would require several indicators for its construction.

Six broad categories were then established as a guide for development of integrative indicators, which are listed below:

- social relations and resource distribution in the community

ility in Burkina Faso

- community physical health
- diversity of sources of income and opportunities
- income stability and access to resources
- water quality and supply
- land quality and supply

At the conclusion of the workshop a working group was established with the following mandate:

- establish guidelines for incorporating research on indicators into work plans,
- ntegrate research activities on indicators among the work plans, and
- identify gaps in indicator research and implement actions to bridge those gaps.

The composition of the working group includes the American and Burkinabe researchers, the NGO partners and community representatives.

Linking different indicators

Several strategies have been developed by the Indicators Working Group to coordinate indicator research and facilitate creation of linkages among indicators. These include:

Creation and use of Problem/Opportunity Trees by work plan holders to asses issues of sustainability that cluster within and around their specific research agenda. This tool was presented at the Burkina Faso IOS workshop (Nianogo, 1996). The tool is proving to be very useful for establishing chains of connection among indicators and for linking research activities among work plan groups. We are recommending development of problem/opportunity trees by all work plan holders.

Development of Scoring Functions to provide a quantitative or semi-quantitative view of indicator performance relative to an interpretation standard. We are using the scheme proposed by Karlen and Stott (1994) for assessing soil quality to develop this tool. Indicator performance is scored according to the investigators judgment of the degree to which the indicator reflects a sustainable condition. A "0 to 1" scale is proposed, in which higher values reflect a more sustainable condition. We are using three scenarios for scoring:

- 'more is better', e.g., % well-nourished children, native species richness,
- 'less is better', e.g., hair loss in children, % suspended solids in streams,
- 'an optimum', e.g., soil pH, diversity of representation in community decision making.

It is important to emphasise that all proposed indicators should be assigned a scoring function, even though the assignment of a scoring function may be tentative and subjective. As we monitor changes in sustainability over time, we will be particularly interested in trends of directional change. As experience and insight about the landscape/lifescape is gained over time, we can adjust scoring functions and indicator selection as necessary.

We are encouraging scientific collaborators to draw upon their respective disciplinary sources for selection of indicators (i.e. in many disciplines indicators have been proposed and evaluated, which provides a useful source of material). Disciplinary indicators together with those developed independently by researchers and local people can then be used as building blocks or component indicators for creating 'integrative indicators' that explore chains of connection across the landscape/lifescape.

Formulation of integrative indicators which address quality of life and ecosystem integrity, two important outcomes of SANREM. The six integrative indicator categories listed previously serve as umbrella themes. Clearly, the permutations of 'chains of connection' and associated integrative indicators that can be constructed from indicator building blocks are numerous. However, we consider that the six categories can be readily related to the broad goals of improving quality of life and ecosystem integrity. The first four indicators relate most specifically to gauging changes in quality of life, and the last two serve as measures of changes of ecosystem integrity.

Richness in complexity

The integrative research approach undertaken by SANREM-Burkina Faso for the Donsin watershed is rich in complexity, in terms of the variety of disciplines and institutions involved and the diversity of perspectives provided by the community participants. Programme success will depend, not only on a clear definition of the objectives, but also, on a flexible and inclusive vision of sustainable development in the watershed. The workshop provided a valuable start for all of us to work towards an integrative approach for identifying and interpreting indicators of sustainability. We are optimistic that use of scoring functions to 'quantify' component indicators and their further use to construct integrative indicators will provide a robust and flexible approach for monitoring and interpreting changes in sustainability

A workbook was developed on indicators of sustainability for the SANREM CRSP (Bellows, 1995), which together with a conference proceedings (Bellows, 1995) provides much of the conceptual and methodological background for the SANREM-Burkina Faso research programme on indicators of sustainability. ■

'The complexity of sustainability prohibits its direct measurement. Indicators are pieces of easily understood information that provide insight into matters of larger significance and make perceptible trends that are not immediately detectable (Hammond et al., 1995). Or, less technically stated, "indicators help you understand where you are, which way you are going, and how far you are from where you want to be" (Hart, 1995). Indicators include experiential or anecdotal information, easily measured statistics, or indirect assessments of complex systems or interactions. Indicators may represent discrete interactions at the field, household or community level or highly aggregated information at the national or international policy level. Indicators of sustainability differ from traditional or disciplinary indicators in that they describe interactions and balances among environmental, social and economic factors, relationships and interactions among systems. and energy and information flows within and among systems. Indicators of sustainability also relate current conditions to causal pressures and response reactions. Effective indicators of sustainability also describe the direction of change toward of away from sustainability by relating current conditions to baseline or threshold conditions.'

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Grassroots indicators:
Measuring and monitoring environ

This article describes the importance of local people assessing and monitoring change in their environments. The concept of grassroots indicators is introduced using examples from the author's fieldwork as well as studies by researchers from the IDRC-supported Grassroots Indicators Network. Major challenges include finding a common language for farmers and scientists to discuss the patterns of environmental change and plan development activities and finding ways for policy makers to benefit from indigenous knowledge.

Helen Hambly

In the past decade, there has been increasing commitment to involve the people who are most affected by agro-ecosystem health in the assessment of environmental change. This is no small achievement considering the extent to which modernization and modern science have tended to view ordinary, local people, especially those living in resource-poor communities, as part of "the environmental problem", not as part of its solution. While such perceptions have slowly begun to be change, the continuing, if not worsening, severity of environmental problems requires concerted efforts by policy makers and scientists to understand how local people are often best placed to assess ecological change and contribute relevant information and actions to solving environmental problems.

A gap to bridge

In recent years, a substantial amount of work has been dedicated to recognizing the accrued experience and knowledge of farmers and other land users. This has caused some agencies, such as the United Nations Development Program (UNDP) and the Food and Agriculture Organization (FAO) to revisit and reformulate their conventional assessment, planning and evaluation methods. Other organizations such as the World Resources Institute (1991), World Conservation Union (IUCN) and Natural Resources Institute (Ridgeway, 1995) have made similar attempts to rethink conventional state of the environment indicators. Both IUCN and FAO have tackled the topic of "sustainability indicators" for improved environmental planning and management. Although economic, social and environmental indicators are integrated, broad indices have been unable to appeal to indicators which derive more specifically from the perceptions and decision-making of local people.

The International Development Research Centre (IDRC) has attempted to bridge the gap between local knowledge and improved indicators for national and international environmental policy. IDRC and several of its associated researchers argued that the release of Agenda 21 provided global institutions with an approach towards more sustainable or environmentally-friendly development without the mechanisms needed to measure and monitor progress towards its goals. They argued that new development policy and plans as well as their goals and objectives required new indicators. Yet these instruments needed to be formulated in a way which would bring land users own knowledge and commitment to the processes of policy formulation and implementation. By 1993, several IDRC-supported research projects were providing at least some evidence that local people, who are most directly affected by environmental problems, can and do assess change in their own well-being as well as in the health of their ecosystems. With the aim of identifying further such cases of broadening the understanding of environmental standards and indicators, the *grassroots indicators* initiative was started.

Grassroots Indicators

Local environmental knowledge and local capacity to conduct environmental monitoring and measurement of change in ecosystems are essential for the future of agriculture. Agriculture remains the key source of livelihood for millions of people worldwide. Local knowledge of rural ecosystems and farmers' accrued experience in food production can inform and improve modern agricultural science and technology options. Local knowledge of climatic patterns, their variability in space and time, and their contribution to the prediction of weather is an indispensible part of the information farmers in the communal areas of Zimbabwe use to survive. Mavunga (1995) has described how farmers identify overgrazing by the examination of forage for their animals and share reports of changes in vegetation in order to devise indicators or warnings of drought. For instance, to predict the end of the dry season, the bark of indigenous trees is cut to observe the quantity and appearance of its milky sap. If the sap is quick moving and plentiful this indicates that rains are coming. In the opposite case, farmers take heed and economize their food stocks and delay their planting.

Some plants such as *striga* are a common indicator of land degradation. Most indicator species of soil fertility are locally specific plant and animal species. In western Kenya, farmers have reported more than 50 species of plants, to indicate poor or improving soil fertility (Hambly, forthcoming). Many of these "weeds" are examined manually by farmers, and in some cases, farmers bite the leaf of a plant in order to "taste the soil." Farmers have also reported the habits of certain insects and birds as important indicators of changing soil composition (particularly the loss of organic matter) and unexpected fluctuations in moisture regimes, including impending drought.

Sustainable change

Certainly, local knowledge systems offer possible alternatives for agricultural and ecological management. Modern science and technology can solve some problems but positive and sustainable change will emerge from local people testing various options, one or several of which may contribute to solving local environmental problems. This argument is backed up by ample evidence that suggests that some traditional systems of land use may be far more environmentally-friendly than previously recognised by development planners and policy makers.

Traditional systems of land use in dryland Africa are particularly relevant to the quest for development interventions aimed at controlling desertification. In the past, measures to assess, plan and intervene in drought-prone environments have largely neglected local capabilities for assessing and reporting short- and long-term changes in these environments. The result has been very costly in terms of financial expenditure and delay. Kipuri (1996) and Mascarenhas (1993) both say that the history of desertification and

Grassroots indicators is a term used to refer to measures or signals of environmental quality or change formulated by individuals, households, and communities and derived from local systems of observation, practice and indigenous knowledge (Hambly and Onweng-Angura, 1996). They are based on accrued local knowledge of the environment and are used in local level decision making for the allocation of resources and land management procedures. Rarely do grassroots indicators exist independently. Instead, they are more typically used as sets of multiple indicators which contribute to a pattern, or flow of activity representing a particular phenomenon and predicting and stimulating a specific decision or action. A common example is the combined observation of stars, air currents and cloud formation by farmers to predict or monitor rainfall. Such diagnosis may be further elaborated with indicators of animal behavior and the appearance of certain plants and birds generally reinforcing or contradicting the initial assessment.

nental change at the local level

drought intervention has had particularly adverse impacts on the livelihoods of pastoralists in East Africa. The pattern of resource use by pastoralists is maintained on the basis of risk avoidance or reduction. Pastoralists have ensured that mechanisms exist to permit relatively free livestock movement, dispersal, separation and the splitting of herds. Contrary to the view that these are haphazard arrangements, the indicators used by pastoralists and the plans which they make are deliberately used to predict certain phenomena and respond to specific needs. Among the Maasai strategies such as herd diversification and controlled breeding are essential to rangeland management. The use of indicators such as observation of vegetation, measurement of milk yields, condition of animals' fur, mating behaviour and colour and texture of the dung from both wild and domestic animals are used as indicators to modify or adopt a certain land management strategy. Obstacles to the use of such essential knowledge about the dryland environment has ensured more rapid and widespread land degradation.

Assessment and Planning

Regrettably, conventional frameworks for planning and evaluating agriculture and rural development have not been particularly receptive to indicators of environmental change known to and used by local people. Planners are only beginning to acknowledge the significance of grassroots indicators, and researchers have only started to consider the aggregation of grassroots indicators, scaling the data up to higher levels where they can be included in watershed or regional data sets. Further work in this area of research is especially important given that grassroots indicators are often derived from a specific cultural or ecological context which may not be easily compared or aggregated. This is not to say that the "scaling up" of grassroots indicators is not possible. On the contrary, pollution reporting, reports of irregularities in fish or bird migrations and birth defects interpreted by local people have had a major influence on stimulating scientific research and policy making. Ultimately, however, the incorporation of grassroots indicators in environmental assessment relies not on the capacity of the data collection system but on the willingness of its operator and demands of its clients.

From the standpoint of improving agricultural technology development, the absence of grassroots indicators in planning and evaluating agricultural development has meant that an opportunity to improve the flow of information between farmers and scientists has been missed. In this respect, the subject of grassroots indicators is not only an *issue* for agricultural research but a *method* of conducting research which can feature in a more participatory, demand-driven process of agricultural data collection and analysis.

Two-way dialogue

In the various projects represented in the IDRC Grassroots Indicators Network, researchers agreed that grassroots indicators emerge only through careful observation by researchers and two-way dialogue with local land users. Most researchers would agree that traditional survey-type research is incapable of illuminating the indicators known to or used by local people, and the meanings and significance associated with these indicators (Hambly and Onweng-Angura, 1996). Farmers' weighting of certain indicators, for instance, can be very important because indicators rarely exist as individual signs or measures but in combination with one another they reveal trends and conditions of relevance to the land user. In Siaya District, in western Kenya, it was found that farmers in the southeastern part of the district could relate at least three individual signs of climatic change: the appearance of a bright but distant star in the west, breezes at dawn coming from the direction of Lake Victoria and the appearance of buds on indigenous tree species, as indicators of impending rain. Based on this information, farmers decided to clear and cultivate the soil, so that it was ready for planting. Not all of these indicators were observed together, nor to the same degree or emphasis among farmers. Still, each indicator was strongly perceived as contributing to the same trend or condition.

Undoubtedly, participatory methods of research and technology rely, to a large extent, on the capacity of researchers and farmers to communicate. Mwesigye (1996) has argued that solutions to environmental problems are forfeited when there is no clear or common "language" between scientists and people at the grassroots. Grassroots indicators, the researcher argued, open up a unique possibility for farmers to discuss with scientists the patterns of environmental change which they experience and upon which they may base their economic, social and cultural activities.

Just the beginning

There can be little doubt that the future of global agriculture must involve a more determined effort by scientists and land users to understand and identify solutions to pressing environmental problems. The continuing significance of agriculture in many parts of the world requires rethinking the conventional instruments used to measure and monitor environmental change. Not only are the goals and objectives of land use policies called into question but the information sources used to develop plans to implement and evaluate these policies require attention. Questions remain about the role that local people and researchers play in a move towards a more environmentally-sound development. In particular, how can local people's accrued environmental knowledge and experience reach formal processes of environmental assessment or reporting?

As previously mentioned, issues of language, communication and methodology will continue to be central issues for the identification, interpretation and use of grassroots indicators. The ecological and cultural specificity of grassroots indicators can introduce dilemmas for the aggregation and comparison of data over space and time. Whether or not these obstacles are any more or less difficult to overcome than other forms of data collection and analysis can be debated. Possibly, such problems are no more insurmountable than the broader effort towards making better use of qualitative data in environmental planning and evaluation. Still, the fact that grassroots indicators often emerge from a particular world view that does not disconnect the human, natural and spiritual dimensions of land use in the same way in that Western science does, poses a serious challenge for future research, even when it is considered highly participatory.

Perhaps, in this respect, the subject of grassroots indicators does not offer so much as a revolution in agricultural research and environmental management as a further step in the evolution towards more humane science and responsible, if not sustainable, development.

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The traditional slash and burn cropping system in Yucatán, Mexico faces many problems due to changes in the environment. Peasant farmers have a rich vocabulary to talk about these changes. In 1992, the Universidad Autónoma de Yucatán carried out a rural appraisal to initiate community-based research projects on alternatives for improving family livelihoods and natural resource management. One of the initial activities was the introduction of two legumes. This article describes how peasants and researchers got together to discuss innovations and monitor and evaluate changes.

Photo: Sabine Gündel

Facilitating a joint analysis of change

Sabine Gündel

The Yucatán peninsula is located in the south-east of Mexico. The region is characterised by a subhumid climate with a clearly defined rainy season during the summer (May to October) and a dry season in the winter (November to April). The average annual rainfall in the north-west part of the Yucatán ranges from 700-900 mm. As a consequence, rainfed agriculture is limited to one crop cycle per year. The soils are mainly shallow and stony with areas of low forest vegetation. The local agricultural system, known as *milpa*, is a slash-and-burn system, which apart from the soil and vegetation, requires few inputs beyond labour. Every year a new area of forest is cut down and burned during the dry season and then converted into a farming plot for the next two or three cropping cycles. The Mayan peasant farming families were traditionally able to depend on the *milpa* to provided their staple food (maize, beans, marrow, etc.). However, changing socio-economic and ecological conditions have given rise to lower levels of food self-sufficiency in rural communities. One reason for this is the decreasing productivity of the *milpa* system, which in turn is closely related to the scarcity of land left under fallow. As a result, once the vegetation has been burned, insufficent time is given to the *milpa* land to once more become productive.

Changes in the past

Changes through technical means within the *milpa* system are limited to the introduction of external inputs such as herbicides, improved varieties and, to some extent, fertiliser. As the natural conditions (soil) generally do not allow for mechanisation, the *milpa* has remained labour intensive and in terms of external inputs, extensive. Modifications in terms of management strategies, e.g. growing a diversity of crops, or changing the number of cropping cycles on the same *milpa* plot, are being considered as an adaptation to the changing natural and socio-economic conditions. Interviews with peasants from different communities within the region have indicated some crucial changes occurring with respect to their environment:

- The height of the forest vegetation has been declining over the years, and simultaneouly the intensity of the cropping system, in terms of the number of years under cultivation and the diversity of crops grown, has of necessity been reduced. Emergent problems are increasing weed infestation, higher labour requirements, and increasing costs of external inputs such as herbicides, which became necessary to cope with labour peaks.
- The reliability of the rains is decreasing. The rainy seasons are delayed and sudden dryspells can lead to loss of the maize harvest. Delayed sowing is considered risky because of the increased likelihood of attacks by birds and insects.
- Increasing economic need within rural families requires the allocation of labour input into non-agricultural activities, which in turn reduces the labour available for *milpa* management.

Farmers' perception

Peasant farmers in the Yucatán make their comparison of changes over time. Changes in crop performance are observed between cropping seasons (temporal) rather than spatial. Talking about how the forest has changed, they point to the differences between the present situation and the time when their fathers and grandfathers prepared the *milpa*. Information is passed on orally and related to the practical relevance of the information to its local context. For example, the different forest types are classified locally in the Mayan language according to their age, composition of species, etc. A main distinction is made between the *Chee'che káax*, which describes a forest with a dense tree population, and the *Pi'che káax,* which means literally "if you look into the forest, you can see far". As high forest stands are becoming very rare in the region, the Mayan name for them, *Kanaan káax*, is losing its importance in the active vocabulary of younger generations. The typical vegetation type to be found is the *Hub'che,* which refers to a vegetation of two to three years regrowth. There are three different stages of low vegetation - *Hub'che, Kaba Hub'che* (3-4 years regrowth), and *Kana Hub'che* (4-6 years regrowth). The following stage is called *Yaax káax* ("*káax*" meaning forest). On the other hand, new categories are being created as new vegetation types or new ways of using them emerge. For instance, abandoned sisal plantations with forest regrowth are being converted into *milpa* plots as the access to available forest areas becomes restricted. A new category, *Xla'pach,* has therefore been added to the traditional classification system.

Green manure as innovation

In 1992, the Universidad Autónoma de carried out a rural appraisal to initiate community-based research projects on alternatives for improving family livelihoods and natural resource management. One of the initial activities was the introduction of two legumes (*Mucuna pruriens* and *Canvalia ensiformis)* into the local farming system. The choice of these legumes was based on: the university's experiences with them as components of systems other than *milpa*; on the

A group of farmers evaluates the harvest under the new system.

immediate availability of seed material; and their origen, which are not foreign to Mesoamerica. The approach was based on successful experiences in Mesoamerica, where maize production was improved by integrating legumes into the cropping system in order to restore soil fertility. This innovative system presents a major change in the existing concept of soil fertility maintenance. Burning of vegetation and the rotation between fallow and cropping cycle is replaced by a permanent cropping system with intensive management of organic matter.

The aim of legume introduction was to develop with the peasants an appropriate system, which would allow components of the existing system to be integrated into the innovative system. A participatory adoption and adaptation process has been facilitated over the last three years to encourage peasnant farmers to experiment. The integration of the legume based system has led to a series of changes within the *milpa system.*

Green manure plays a crucial role in low-external input agricultural systems and its positive impact on soil fertility maintenance has been reported in many scientific studies around the world. The focus regarding green manure has been at plot level, where changes in soil fertility and organic matter content are analysed. Little attention has been paid in the past to the question of how peasant farmers perceive the changes resulting from using green manure. Do they track changes related to soil quality, or do they share with the scientists the concept of increased yields or economic returns from the innovation? Within the Yucatán context it soon became obvious that the farmers took a broader approach to assessing the changes related to legume integration.

Monitor and evaluate

As the relationship between farmers and researchers in this technology adoption and adaptation process was intended to be interactive process, the creation of platforms for communication and information exchange were crucial. Communication took place at village level through group meetings, and between villages through exchange visits and workshops mediated by one or two researchers from the university. The group meetings at village level normally took place in the late afternoons, when the farmers had finished their regular tasks. The exchange visits were more time consuming and demanded a whole day away from farming plots. It was important therefore to consider beforehand the time available to the participants.

In an initial phase, past changes were analysed with the group by applying tools like time lines combined with resource mapping and seasonal calendars. During this phase, the participants became familiar with visual tools to explain changes, and an analysis of the situation was initiated. Mapping as a visual tool was adopted easily, whereas transects were modified by the participants from a cross-cut sectional view to a "normal" view, considering the transect as the path they have walked through. For the analysis of the visual materials group discussions were encouraged. The phases following focused on the system development by integrating the innovation.

Comparison of different plots within a community where green manure had been established allowed one to obtain a broader picture of different management strategies during one season than by traditional cross-seasonal comparison. Facilitating exchange visits between different communities broadened the picture even more. Transect walks in small groups through different plots (traditional *milpa/legume-integrated system) revealed criteria used by peasant farmers* to track the changes occurring with the integration. Soil properties like colour, texture, humidity and potential to sustain demanding crops like chillies or tomatoes were identified as important to the participants. Changing soil colour was related to existing soil types - the red coloured *Kankab*, and the black *Box luum.*

The participants observed a change from the red towards a darker colour. The texture was experienced through a) the ease of sowing and weeding and b) by looking at the organic material to be found in the soils where green manure had been used. Increased soil humidity was related to the appearance of plants during water stress and was also detected by the soil temperature. Cold or fresh soils were related to more humidity, whereas warm soils were considered to be dry. As the farmers, in their traditional system, also use a patchwork of different crops according to different soil conditions, the relation between soil quality and the capacity to grow crops like chilies and tomatoes, known as demanding crops, were applied for soil evaluation.

Crop diversity was another important issue mentioned after finishing the transect walks. Different degrees of weed infestation were observed and related to the density of the established legume cover. Campesinos recognised the shade provided by the legume cover as important to reduce weed growth. As the main problem caused by the weeds is the time required for weeding, farmers stated that weeds are less a problem in the new system as weeding is easier in a loose soil. During harvest time, maize yields of individual plots were determined by the participants and then compared within the group. Increased yield was one criteria for comparing the new, with the traditional system, but the time of harvest and purpose of the crop were identified as more significant changes. The innovative system allows an earlier harvest, which enables the farmers to sell part of their crops to other community members. The earlier harvest time is achieved through a) the choice of appropriate short cycle varieties, b) earlier sowing in the innovative system as part of a farmer diversification strategy and c) a faster development of the maize crop due to favourable soil conditions.

During a series of campesino/researcher workshops, the importance of the legume introduction for other system components became very obvious. Mapping exercises of the present system and future perspectives for system development showed the links between the legume integration and alternative land use planning (permanent forest areas for fuelwood and construction, wind breaks, etc.) as well as its impact on animal husbandry. The value of the green manure for animal feed was established as a main criteria for legume. The future prospects drawn by the groups of farmers were used to initiated reflection on the favourable and unfavourable factors influencing the visualised changes, which then led to a joint priority setting of future areas or topics to focus on. Social and organisational aspects came up as constraints to the process. Land tenure and power issues were discussed in the groups and these issues showed us - both researchers and local participants - how much remains unsolved in the innovative system. ■

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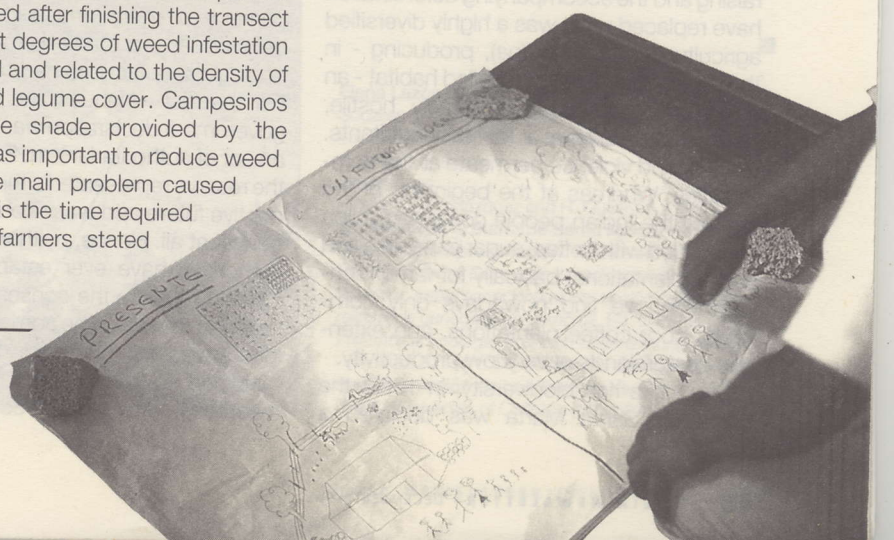

Result of a 'future visioning' exercise during a farmer workshop.

Perceptions

Photo: Elena Lazos Chavero

Before initiating a development project in the Sierra de Santa Marta in southern Veracruz, the perceptions of environmental transformation and degradation were investigated in two villages of the region. Elena Lazos writes about a comparative study of nahuas and mestizos perceptions in southern Veracruz, Mexico. Instead of presuming an alleged harmonic relation of peasant populations with their natural environment, the researchers tried to analyse the connections between the diversity of environmental perception and the decreasing diversity of the natural habitat.

Elena Lazos Chavero

The Sierra de Santa Marta covers an extension of 1200 km^2 and ranges in altitude from sea level to 1750 m. The region contains the most northern rainforest of the American continent. It presents fourteen, primarily native plant communities (Ramírez 1991) and a patchwork of soils, mostly of volcanic origin, that display strong erosion. The forests occupy less than 10% of the Sierra's surface and since 1991 have been deforested at a rate of 425 hectares per annum (Paré et al. 1993).

The Sierra is composed of Indian communities, Nahuas and Zoque-Popolucas of prehispanic origin, and recently established settlements of mestizos who have come from the central region of the State of Veracruz. Since the end of the 1960s, cattle raising and the accompanying deforestation have replaced what was a highly diversified agricultural system (*milpa*), producing - in the core of this highly diversified habitat - an environment which is extremely hostile, poor and problematic for its inhabitants. Poverty and violence permeate all the communities. Whereas at the beginning of the century the Indian people combined milpa production with coffee, sugar cane, rice and cotton plantations, basically for family consumption, we find nowadays only cornfields, poor coffee plantations, and extensive pasturelands of very low productivity.

Due to its rich biodiversity, in 1988, the Sierra de Santa Marta was declared a "national biospheric reserve". The origin of this formal designation may be traced back to 1980 when research institutions were denouncing the accelerated deforestation taking place, and to a declaration by President López Portillo designating it a "Zona de Protección Forestal y Refugio de la Fauna Silvestre". However, this and the later "reserve" designation did little to preserve the forest. Even in the late 1980s a sawmill was still illegally operating.

The communities or *ejidos* (a socio-legal entity concerned with the administration of land and other collective properties) where we hoped to establish the development project are situated on the periphery of this "biospheric reserve". It seemed appropriate, therefore, to first investigate how the inhabitants perceive the 1988 "reserve" designation. To our astonishment, the majority did not know that since this declaration had come into effect one part of their ejido belonged to a protected area where strong ecological restrictions had to be observed. For the rest - Nahuas and mestizos - the government declaration was simply seen as an act of authoritarianism. For the mestizos the reserve represented a threat to their productive future and was seen as being of no benefit at all. Hence, neither state nor ejido authorities have ever established specific rules to regulate the conservation of biodiversity in the area. The complete absence of local participation in decisions that should have led to the conservation of natural resources, provoked a collective lack of interest in conservation projects. Conservation was thus seen as an external project of low priority.

Views on the environment

As government institutions had failed to provide for the people of the Sierra de Santa Marta any viable planning alternative for the declining biodiversity and increasing poverty, in 1991, the NGO Proyecto Sierra de Santa Marta, initiated a development project with the aim of exploring and constructing with the local population, ecological plans for the territory's productive future. But before discussing possible alternatives to the ranching model we needed to know the different perceptions of environmental transformation and degradation held by the local people. We therefore chose two villages that would represent the ethnic and historical patchwork that constitutes the Sierra de Santa Marta. Our research was guided by such question as: What is the perception of the landscape held by women, men and young peasants in the context of cattle-raising? How do men of different ages participate in the construction of environmental discourses? How do young and old women think of their ecological and productive past and future? Who is responsible for the deforestation: the cattle-raisers, the corn cultivators, the government?

As conservation was seen as an external project, with low priority for the majority of local inhabitants, we hoped an understanding of how local, socially different groups perceived the environment and its deterioration, might help reshape this view. In contrast to mainstream research on the rational and integrated use of natural resources by Indian and peasant populations, we did not wish to presume any alleged harmonious relations of such populations to their natural environment. We hoped to try instead to analyse the possible link between environmental perceptions and the decreasing diversity of the natural habitat.

The Nahuas of Tatahuicapan

The perceptions of the Nahuas embody both individual and collective understandings and knowledge. Nahua attitudes and values have been historically moulded by their experiences as a cultural group, but they are also permeated by many individual experiences of contact with external national ideologies. Their attitudes and values towards nature are fundamental to understanding how they have transformed and continue to transform their environment - to the choices they make and the way they act. Every habitat and every ecological relation produces multiple perceptions of those elements and their associations. Furthermore, different world views are influenced by the social sector to which people belong, by the

# of a deteriorated nature

adoption of external ideologies, by gender and age and by education.

From our research, it appears that we can divide perceptions of the deterioration of natural resources into three groups. The first comprises the views of old men and young people who deny any degradation, though they give different explanations of it. The old men say that all animals and plants take refuge under the volcano San Martín, in a sort of magical park called *Los Encantos*. There, plants and animals are protected by the King of Earth (*rey de la tierra o chaneques*) and are not menaced by man's actions. The rivers and the mountains have a sort of "perpetuity assurance", that will never end. At the other extreme, young people do not perceive any deterioration since they have never known the ecosystem's previous complexity, and are not concerned enough to ask about ecological differences with the past.

A second group, largely made up of old men and women but including some of the middle aged, recognise a certain deterioration but explain it using traditional knowledge about natural cycles. They are conscious of the landscape's transfiguration, of the limitation in their extraction activities and of changes in the productivity and diversity of traditional agricultural systems. But they see all this as part of a cycle of transformation. The rainforest has its own process of natural regeneration, even if it may have a very slow rhythm. The deterioration is part of a natural phenomenon - winds, heat, pests etc come and go. They refer to it as the end of times - *el fin de los tiempos*. The notion includes the idea also of new beginnings. The present bad harvests, lack of maize are *los tiempos*, bad at the moment but surely better in future.

A third group, mostly middle-aged (both male and female) clearly perceive the deterioration of the natural environment and try to define its causes and effects. Several believe the cattle to be poisoning the rivers. The indicators of ecological erosion vary from group to group and there are of course differences even within groups. For the older men loss of soil fertility and its consequence for productivity in the milpas is the most important indicator. Older women stress the loss of aquatic life in the rivers and its contribution to nutritional deficiencies. The middle-aged mention many indicators - deforestation, depletion of local fauna, soil fertility, loss of crop diversity, scarcity of firewood, climate changes, the decrease in water sources, pollution, increased garbage, spread of new diseases. The young also remark on the regional problems of urban pollution and the poor management of waste.

The mestizos of Benigno Mendoza

The ties of the first inhabitants with the rainforest were centred on the commercial extraction of forest resources (wood for a regional sawmill, the bulb of the *Dioscorea* plant for the pharmaceutical industry, local fauna to be sold in the cities) and the conversion of *milpas* and secondary vegetation into pastureland.

The mestizos have tried all these activities within a very short period, sometimes because the product becomes quickly depleted, sometimes because there is no market, sometimes because of the growth of plagues. Such changes are correlated with a strong tendency to move from labour intensive towards labour extensive production systems. Mestizos appear no longer to be much interested in agriculture and the conservation of their natural resources. Their perceptions are influenced more by their continual contact with external and national ideologies. In their migration they have passed through several ejidos, transforming the original vegetation into pastureland of low productivity. The mestizos are not tied to the mythical world of the rain forest.

Again, among mestizo people, we can distinguish three groups. In the first we find mostly women, some men and young people. They do not see deterioration because they perceive deforestation as a sign of progress. The second group, mostly men, and some women, see degradation of nature as inevitable in the productive development of their communities. As Don Reyes explained: "the cutting of trees was necessary. The government gave us land to work, not to abandon, therefore we cut and do not conserve, otherwise how would our children eat?" For them, cattle raising is the natural vocation of tropical lands. The third group, made up of young people, see the deforestation but do not worry about the consequences.

Moving beyond perception

For Nahuas and mestizos, the common denominator of these interpretations is the relegation of the rainforest to a resource of insignificant cultural and social value in their lives. The relationship between their perceptions of environmental deterioration and the results of collective actions make it easier for us to understand the responsibilities of these communities in their conservation and productive future. The impact for our development planning has been to incorporate workshops and videos about environmnetal deterioration and the importance of conservation of natural resources for their future. The villages surround a "reserve" rich in biodiversity, but it is clear that in order to conserve it, a more reliable and acceptable alternative for economic development must be found. By the mutual sharing of ideas and information, it is hoped that together with the people our development project might make a contribution. ■

Photo: Elena Lazos Chavero

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Pictures create common ground for dialogue

Tracking change needs changing

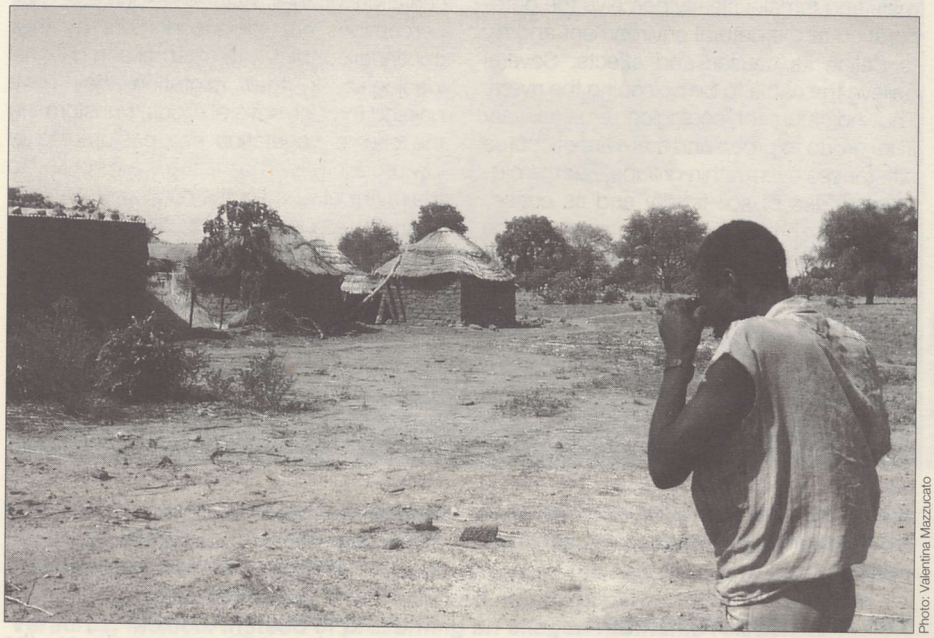

Photo: Valentina Mazzucato

"Our research project analyses processes of technological change in a West African context by studying how soil and water conservation technologies have changed over time and space in four villages in eastern Burkina Faso. Thus, one of our main methodological concerns was how to track change. However, we soon found out that change is not a topic that can be asked about in direct terms if one wants to get beyond the standard answers (less rain, fewer trees, poorer soils, etc.)." In this article, the authors explain how making a village picture book created a common ground for discussing change.

Valentina Mazzucato and David Niemeijer

Environmental change has become a major theme in development discourse (Fairhead and Leach 1996). Villagers are well aware of this, as they receive project workers and state employees who come to inquire/lecture about the damages to the environment caused by current agricultural and animal husbandry practices. As a consequence of this villagers also know the type of answers that form part of this development discourse and do not hesitate to provide these to any questions about changes in their living conditions that are posed.

Finding out about changes in technology is even more difficult because villagers associate technology with development efforts. It is conceived of as coming from the outside world. What farmers do in using their land is not seen as technology, it is simply their way of life. Thus villagers often respond to questions about local agricultural technology by saying that they have no technology and are ready to hear what we have to offer them.

Academic objectives

Before we could proceed with our objective of finding out about changes in soil and water conservation technology, it became clear that we needed first to reach another objective: to avoid development discourse. The difficulties we encountered in tracking change largely stemmed from two characteristics of most academic research: our research topic did not come from the farmers themselves, and it was focused on academically-defined concepts. Our project had a pre-defined problem and the approach was to set up hypotheses based on a chosen theory or theories, and to collect data to prove or disprove the hypotheses with clearly spelled out methods. This approach allowed us to formulate a well-focused proposal that was acceptable in our academic context ... but then we changed contexts. In the field our goal was difficult for farmers to comprehend: why would two people travel such a great distance to ask about *their* cultivation practices? There had to be a hidden development agenda. And as experience has shown them, one must be wary of development agendas for some are helpful and others are damaging to rural livelihoods. As long as our reasons remained unclear, farmers were hesitant to open up to us.

Furthermore, our approach focused on academically-developed concepts that tended to define boundaries that were different from the boundaries perceived by farmers. For example, by looking specifically at what we defined as soil and water conservation technologies, we had greatly narrowed the focus of attention when system compared with the farmers' more holistic perceptions of what and why they do things with their land.

Changing tracks

In order to track change, we needed, as Röling (1994) argues, to change our strategic reasoning in order to create a platform for communication which would allow us to receive academic recognition, and the farmers to find out about our development agenda. In other words, we needed to communicate in a way that would lead to mutual understanding. So we gradually changed our approach to go beyond development discourse to encourage a more open form of communication. That is, we began, ourselves, to change tracks. The changes we made were: 1) to broaden our focus in order to put our research in terms that were understandable and relevant to the farmers, 2) to devote time to building confidence between ourselves and villagers, and 3) to change our attitudes from being 'objective driven' to an openness that allowed farmers' their own interpretations of their context. One of the methods we found useful for doing this was to make a village picture book. Realising that history is important to village people and noting the general interest in photographs in the region, we decided to give villagers an opportunity to create their own village picture book, in which they would recount their lives and history.

Village picture book

We held a series of four meetings per village. We first asked the village chief to select two male and two female participants. We then walked around the village in two groups, the male researcher with the men, and the female researcher with the women, and allowed them to show us whatever they wanted to about their village in preparation for the pictures that they would take. We then gave each of these two groups a 35mm camera with which to take pictures of their lives and history. Finally, the two groups arranged the photographs in an album in the order chosen by them to tell the story they wanted to tell. The photographers then presented the books to the rest of the village.

This method proved helpful, because it allowed us to establish a common dialogue or platform with farmers,which was needed before we could speak about change. The picture book allowed us to put our research in terms that were understandable to them. As mentioned, our interest in changes in soil and water conservation technology required us to broaden what we were looking at so as to understand how people conceived of their own technologies and environment. The simplest way to explain our interest to villagers was to say that we were interested in learning about the way they lived. However, this is not easy to get across convincingly in a public meeting, and it also sounds suspicious. We found the picture book to be a help in showing that our interest in their lives was genuine.

Second, the village picture book helped to build confidence by transforming the unidirectional researcher-respondent relationship ('we ask questions you give answers') into more of a mutual exchange of information. The book sparked off quite a lot of interest and quickly became a joint project: we were interested in getting to know the village and its inhabitants, and the villagers were interested in documenting their lives and history to show to future generations their present way of life.

Platform for dialogue

The picture book is continuing to provide us with an easy way to exchange information, since we are also able to answer their questions about the life and history of the villages from where we come. We had conducted a similar exercise with farmers in the Netherlands and had brought back the picture books to Burkina along with the information that Dutch farmers had given us about their own lives and farming while taking the pictures. Through the picture book we also receive feedback from the villagers about our research. As the research advances, we are using the picture book as a place to document, and therefore make public to all the village, the research output created with the villagers (such as genealogical trees, village territory maps, etc.). This re-states and re-establishes trust.

In short, since direct questions about change often result in standard answers, a different platform for communication was first needed that would allow villagers to express their own views. The picture book was the turning point in our research activities. It allowed us to progress to other methods for discovering the locally-relevant factors that cause soil and water conservation technologies to change. For example, our dialogue with farmers has led us to see the importance of social networks and rituals. Being trained in the western scientific tradition, we would never have associated this with soil and water conservation.

The picture book allowed us to forge a communicative relationship mainly because it gave villagers the freedom to tell the story that they wanted to tell, thus making it also *their* project. Others have asked villagers to makepictures as part of PRA exercises (see, for example, Roncoli and Sendze 1996) or have expressed interest in using the picture book method for tasks such as monitoring and evaluation. Such exercises may give interesting information but they risk losing its most valuable characteristic - that of creating a dialogue. Moreover, adopting an outsider perspective on change, such as requesting the making of pictures on how the environment has changed, may turn the picture book method into little more than development discourse repackaged.

■

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A poster presentation on the method to create a village picture book is available from the authors.

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A slide show competition in Pakistan

Since 1992, the FAO Upland Conservation and Development project has promoted the involvement of women as partof an overall strategy for participatory watershed management and natural resource conservation. The road to empowerment began with the formation of associations at village level, where women learned organisational skills. Speaking before a group on a range of topics, and organising meetings, are examples of such skills. The use of 'slide language' was introduced as a method for developing these skills. Slide language is a media technique whereby slides of the local area are presented to groups so that they can identify issues and problems and agree together on actions to be taken to solve problems, particularly environmental problems. For a 'slide show competition on the use of natural resources', a camera was given to individual women in four women's associations. Each participant was instructed on how to use the camera, and was asked to take 18 slides (or half a slide film) and the camera was then passed to the next women's association. They all wanted to take photos according to a story line, rather than take random photos, and so the activity was adjusted to allow women to produce a set of slides to accompany a story with a definite message. This meant that the photos and stories were produced and 'owned' by village women. On a cool, cloudy day in May, 38 women arrived at 10:30 am by bus from the four associations and gathered under a colourful tent in the village of Nihal Khan to review the slide show presentation and decide on a winner.

The winning story described the arrival of the 'development era', which brought electricity to the region. The electricity allowed landowners to install tubewells to increase the amount of land cultivated and turned into orchards and vineyards. However, this caused the groundwater level to drop and vegetation cover started to disappear. While the landlords' income increased dramatically, the people began to have problems finding fuel and fodder for their animals. Life was becoming more and more harsh. The green fields had turned into a desert. In a discussion that followed the slide show, the women were able to propose solutions: the project should assist villagers to organise a convention of landlords, absentee tubewell owners and owners of the uplands to discuss this serious problem, and to propose actions that they could implement themselves to conserve the use of water.

In three short years, the women in this area have moved far along the road to empowerment. They have demonstrated that when given the opportunity to participate and to contribute to decision making, they have much to offer in the area of natural resource conservation.

From: "Report of a slide competition on natural resource conservation in Noza, Kanak Valley". FAO Inter-regional Project for Participatory Upland Conservation and Development. Quetta, July 1996.

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Towards a biodiversity-based productivity framework

According to the dominant paradigm of production, diversity goes against productivity, which creates an imperative for uniformity and monocultures. This has generated the paradoxical situation in which modern plant improvement has been based on the destruction of the biodiversity which it uses as raw material. The irony of plant and animal breeding is that it destroys the very building blocks on which the technology depends. Forestry development schemes introduce monocultures of industrial species such as eucalyptus, and push into extinction the diversity of local species which fulfils local needs. Agricultural modernisation schemes introduce new and uniform crops into the farmer's field and destroy the diversity of local varieties. Modernisation of animal husbandry destroys diverse breeds and introduces factory farming. This strategy of basing productivity increase on the destruction of diversity is dangerous and unnecessary. Monocultures are ecologically and socially non-sustainable because they destroy both nature's economy and people's economy.

Vandana Shiva

Wanted: diversity

In agriculture and forestry, in fisheries and animal husbandry, production is being incessantly pushed in the direction of diversity destruction. Production based on uniformity thus becomes the primary threat to biodiversity conservation and to sustainability, both in its natural resource and its socio-economic dimensions. Not till diversity is made the logic of production can diversity be conserved. If production continues to be based on the logic of uniformity and homogenisation, uniformity will continue to displace diversity. "Improvement" from the corporate viewpoint, or from the viewpoint of western agricultural or forestry research, is often a loss for the Third World, especially for the poor in the Third World. There is therefore no inevitability that production should act against diversity. Uniformity as a pattern of production becomes inevitable only in a context of control and profitability.

Plant improvement in agriculture has been based on the "enhancement" of the yield of desired product at the expense of unwanted plant parts. The "desired" product is however not the same for agribusiness and Third World peasants. Which parts of a farming system will be treated as "unwanted" depends on what class and what gender one belongs to. What is unwanted for agribusiness may be wanted by the poor, and by squeezing out those aspects of biodiversity, agriculture "development" fosters poverty and ecological decline.

Framework for assessment

Given the rapid changes in agriculture taking place because of liberalisation, there is an urgent need to monitor the ecological costs of globalisation of agriculture using a biodiversity based productivity framework to reflect the health of nature's economy and people's economy. We have developed such a framework over the past decade.

The real meaning of sustainability

Sustainability in agriculture has two dimensions: natural resource sustainability and socio-economic sustainability. Natural resource sustainability is based on the stability of the ecology of agricultural ecosystems based on interactions between soil, water and biodiversity. This sustainability measures the wealth of "nature's economy" and the foundation of all other economies. Nature's economy includes biodiversity, soil fertility and soil and water conservation that provides the ecological capital for agriculture. Socio-economic sustainability relates to the social ecology of agriculture, including the relationship of society to the environment, the relationship between different social groups engaged in agricultural production and the relationship between producers and consumers, which is invariably mediated by traders, government agencies and corporations. Socio-economic sustainability measures the health of "people's economy" or the economy of sustenance, in which human needs of livelihoods and nutrition are met. People's economy includes the diverse costs and benefits both material and financial, that farming communities derive from agriculture.

There are quite clearly two different meanings of "sustainability". The real meaning refers to nature's and people's sustainability. It involves a recovery of the recognition that nature supports our lives and livelihoods, it is the primary source of sustenance. Sustaining nature implies maintaining the integrity of nature's processes, cycles and rhythms.

There is a second kind of "sustainability" which refers to the market. It involves maintaining supplies of raw material for industrial production and long-distance global consumption. In this meaning, markets grow while the soils and rural communities are impoverished. This is the conventional definition of "conservation" as making available sustained yields of raw material for development. And since industrial raw materials and market commodities have substitutes, sustainability is translated into substitutability of materials, which is further translated into convertibility into profits and cash.

The framework

- provides documentation of the biodiversity status of a farm including crop, tree and animal biodiversity
- indicates the contribution of biodiversity to provisioning of internal inputs and to the building and maintenance of "nature's economy" through the conservation of soil, water and biodiversity.
- indicates the contribution of biodiversity to the self-provisioning of food needs by agricultural families and communities and to the building and maintenance of "people's economy".
- reflects the market economy of the farm in terms of incomes from sale of agricultural produce, and of additional costs for purchase of external inputs and food items, when benefits from biodiversity are foregone.

The biodiversity-based productivity framework has been kept simple to allow participatory research by farmers in evaluating agricultural change on the basis of the needs of the land and the needs of farming communities, and to allow for comparisons across diverse ecosystems and farming systems. It can be adapted to reflect the complexity of the socio-economic context of farming. We welcome you to join us in developing this biodiversity-based productivity to realistically and honestly reflect the status of nature's economy and people's economy, which are the economies on which life depends.

Experiences with the framework

The framework has been applied to farming systems in different regions. While this is still work in progress even the early results show that when diversity is taken in account, the "return" to farmers is higher from mixed systems than from monocultures. On the one hand, diverse systems produce more nutrition per acre when all crops and all crop parts are included. On the other hand farmers save money by substituting purchased external inputs such as chemicals and fertilisers with internal inputs provided by biodiversity.

For example, in the Central Himalaya, in the rainfed areas a particular traditional cropping pattern takes place called "baranaja" - which means, literally twelve seeds (Shiva et al 1995). The seeds of twelve different crops (often more than twelve) are mixed and then randomly sown in a field which is fertilised by cow dung and farm yard manure. Relationship between different plants leads to symbiosis, which contributes to increased productivity of the crops. Assessments made at the conservation centre show that if farmers cultivate "baranaja", they get higher produce than the soyabean monoculture which is being propagated by agriculutral agencies. Soyabean sells for only Rs.5/- kg., whereas "jakhia", one of the "baranaja" crops that matures earliest, is selling for Rs.60/- kg. "Phapra" is another high value crop in the "baranaja" family, which has always been cultivated as a cash crop by Garhwal farmers, which used to be traditionally exchanged for salt.

Similarly, in the Western Ghats a small farm typically has 1.5 acres of paddy, 0.5 acres arecanut, and a kitchen garden with vegetables including "brinjal", beans, cucumber, chillies, "obhea", little gourds from which a farmer can earn approximately Rs.20,000/acre in addition to saving Rs.10,000/- on purchased inputs by using the straw and farm yard manure as internal inputs. In the case of a chemical fertiliser based 3 acre paddy farm, the output brings the farmer Rs.15,300/- and he has to spend Rs.8,900/- on purchased inputs, leaving him only Rs.6,400/- or Rs.2,100/- per acre. ■

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The Foundation was set up in 1981 to do independent ecological research to support grassroots movements and local communities and to evolve ecological paradigms as an alternative to the dominant reductionist approach which undermines sustainability.
The Foundation has also initiated "Navdanya", a programme for the conservation of biodiversity in agriculture.

This article is based on Shiva V, 1995. **Biodiversity based productivity: a framework for an alternative economic assessment for sustainable agriculture**. New Delhi, RFSTNRP, 20 p.

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- Shiva et al. 1995. **The seed keepers**. New Delhi, Navdanya, RFSTNRP, 156 pp.
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Real measure of productivity

Overall productivity and sustainability is much higher in mixed systems of farming and forestry which produce diverse outputs. Productivity of monocultures is low in the context of diverse outputs and needs. It is high only in the restricted context of output of "part of a part" of the forest and farm biomass, like only pulpwood, or only grain. These high partical yields do not translate into high total (including diverse) yields. Productivity is therefore different depending on whether it is measured in a framework of diversity or uniformity.

A recent article in Scientific American (Bray, 1994) has developed this approach further and has shown how the economic calculations of agricultural productivity of the dominant paradigm distort the real measure of productivity by leaving out the benefits of internal inputs derived from biodiversity as well as the additional financial and ecological costs generated by purchase of external inputs to substitute for internal inputs in monoculture systems.

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Farmers fenced out in Tamil Nadu

Photo:

India has gone through its Green Revolution and is now in the Era of Liberalisation. Agricultural policies have made large-scale mono-cropping plantations economically attractive to urban investors. Drastic changes have occurred in land use. What it means for small and marginal farm families in dryland tracts in Madurai District, Southern Tamil Nadu, is discussed in this article.

T Fatimson and G Keshav Rao

Since the beginning of the Green Revolution, groundwater tables have declined at an alarming speed, in some areas up to three metres per year. In a study conducted by the Social Forestry Information Project, a NGO based in Madurai, Tamil Nadu, it was found that during the past 12 years 65 of the 198 open wells, owned by small farmers in four villages, had gone dry. This can be explained largely by the fact that since the beginning of the seventies, more well-to-do farmers started drilling borewells. Their purpose was to secure sufficient water, which they needed for the Green Revolution package of high yielding variety crops, fertilisers and pesticides. This was encouraged by the heavy subsidies on the electricity for irrigation purpose. Thus, borewell owning farmers were encouraged to overexploit the groundwater potential.

Changing rainfall patterns

More than half of the total cultivated land in Tamil Nadu is rainfed. The Green Revolution has largely by-passed these farmers as it did not have much to offer to them. However, being solely dependant on rain, these farmers have witnessed a drastic change in rainfall pattern with important consequences for their livelihoods. Twenty years ago there used to be rains for up to 80 days during the monsoon season, but nowadays the rainfall pattern has become more unpredictable, and the number of rain days has significantly reduced. The total quantity may be the same, but is of little help as the water storage capacity of the soil is not able to cope with the volume of water that comes down on these few occasions.

As water has become a very uncertain factor, farmers are forced to gradually shift their cropping patterns to adjust to the changing situation. In irrigated areas farmers have shifted from long duration paddy to less water intensive perennial crops, such as mango and coconut. As a consequence, employment opportunities in these areas reduced for landless and small farmers whose farms were too small to provide them with year-round employment.

Farmers whose wells ran totally dry were forced to return to the traditional system of rainfed farming with millets, pulses and oilseeds. Nowadays, risks of failure of these crops have become so big, that more and more rainfed farm households are giving up farming altogether and leave their lands fallow. Whereas the women still try to make a living from wage labour in their own surroundings, many men have left in search for work in urban centres. This makes life more

difficult for the whole family, but ultimately women carry the largest share of the additional physical *and* mental burden.

Fences: new threats

The processes of leaving rainfed lands fallow, changing cropping patterns and outmigration have been going on for many years. Policy measures have systematically discouraged small-scale rainfed farming (Gopal, KS and Sashi Kumar, ILEIA Newsletter Vol 11 no 4, 1995). However, we now witness a new dimension to this general erosion of livelihoods in the rural areas. Since the past few years, big companies have started coming in and they have turned dryland into a lucrative (?) investment object for urban investors. They are buying up large tracts of land and fencing them all over. Common lands and grazing lands are also taken away, depriving the marginalised people like shepherds from their livelihoods. Some of these lands are being converted into mono-plantations of teak or cashew, but others are simply left fallow. Deep borewells are sunk in the lands and large quantities of water are extracted. Farmers in Dombucherry village in Western Madurai District have started complaining about an increased depletion of their open wells as a consequence of plantations which have come up in their region.

This type of land transfers is markedly different from those in the past decades, where land was bought and sold, but remained within the control of the farming community. It was a source of livelihood with an inherent cultural value. Now land has become a commodity. Corporate buyers have come in a big way and they do not show any regards to cultural sentiments nor to the livelihoods that are being destroyed. There are instances where even approach roads to temples have been incorporated within the fenced plantations.

To be or not to be a farmer

There are different reasons for farmers to decide to either retain and cultivate their lands or to sell them. In either case it is often rather helplessness than economic rationale which explains their decisions. A major motivating factor for small and marginal rainfed farmers to continue cultivating their land is that only in this way they can retain their ownership or user rights. Some of them do hardly anything more than sowing and harvesting whatever there is to be harvested. Medium farmers seem to go for cultivation just to retain their "samsari" status i.e., being an efficient farmer and responsible family man. It is only the large farmers whose decisions are not primarily determined by reasons of security or social pressure.

Similarly, decisions to sell land are determined by outstanding debts or the necessity to raise money for e.g. a daughter's marriage or a sick family member. Occasionally, a farmer can get attracted by the lure of an attractive sum of money being offered for his land.

Agricultural policies

The trend is one of rapid 'corporatisation' of agriculture, at the expense of the farming community. This new development is fuelled by the new agricultural policy which forms part of the liberalisation of India's economy. Legal restrictions are becoming more flexible to create a more conducive climate for investments in dryland. Agricultural income is exempted from tax which makes it more attractive to invest in agriculture. NABARD (National Bank for Agriculture and Rural Development), the apex re-financing agency, is gaining importance. However, given the procedural and security formalities which have to be fulfilled to obtain loans through such institutions, the corporate players are in an advantageous position.

A closer look reveals that several agricultural investment projects actually serve as a 'bait' for the individual urban investors. In Madurai District there are live examples of so-called teak plantations which are nothing but a fenced area of fallow land The money generated from the investors is being reinvested into some other more lucrative project.

Options for farmers

What is going to happen to small and marginal farmers' food security and livelihoods? What options are left for them? There is one ray of hope: still, they have not lost the cultural values attached to owning and cultivating land. There is a drive to try out innovative alternatives to present agricultural practices, and still the desire is there to survive as farmers.

The farmers in Kumburn Valley who are in the vicinity of plantations which have come up during the past five years came together and started to discuss how they can collectively put their land back into productive use. They are considering to set up a collective plantation of perennial crops. "If the companies can do this, why should not we do it?" The key word here is collective action: only if they work out a joint strategy will they be able to win the battle against the odds. Next to a collective spirit, they need resources, both material and non-material. As the land which they are living on is quite degraded, important material investments have to be made to bring it back into productive use.

Many questions

But who is going to make these investments? Would there be ways of attracting urban investors to invest their money in orchards owned and managed collectively by a group of farmers rather than by a big company? How to ensure that such an investment will be ecologically more sound, socially more just, and more sustainable than an investment in a corporate venture, which has profit maximisation as its ultimate motive? We, the NGOs discussing these issues with the farmers, have to ask ourselves some important questions. Are we ready to assist farmers in taking up such new challenges? Is this the way of safeguarding small farm families' livelihoods? How can the inherent cultural value of land be maintained, or regained? How do we effectively advocate the need for legal clauses to check the diversion of agricultural land to non-agricultural purposes? How do we assist in protecting the livelihoods of small and marginal farm households? How can we support the process of building up people's organisations, and how can we assist them in tapping greater benefits from existing policies and programmes? These and many more questions emerge. We are just starting to come to grips with the questions but the changes around us are so drastic and so fast that there is little time for us to search creative solutions.

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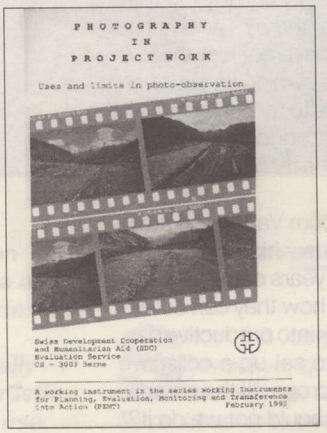
Community forestry: participatory assessment, monitoring and evaluation *by D Davis Case. 1989. 150 p. Food and Agriculture Organization (FAO), Viale delle Terme di Caracalla, 00100 Rome, Italy. (Community Forestry Note; 2).*
This publication from 1989 still contains very relevant information. It is, to our knowledge, one of the earliest systematic manuals on participatory assessment tools, applied in the context of community forestry. There are chapters on concept, methods and tools of Participatory Assessment, Monitoring and Evaluation (PAME). Very practical and richly illustrated. (WB)

Participatory impact monitoring *by U Schmidt. 1993. German Appropriate Technology Exchange (GATE), German Agency for Technical Cooperation (GTZ), PO Box 5180, D-65726 Eschborn 1, Germany.*
This annotated bibliography contains general information on Participatory Impact Monitoring (PIM), a list of keywords and abstracts with indexes and a reader. It is the output of a database on organisations and reading material compiled by GATE on the subject. PIM was developed to better shape development projects to the specific needs and objectives of NGOs and to be able to measure criteria for project progress and success. GATE distributes free copies of this database to those interested. (WB)

Towards quantification of ecological sustainability in farming systems analysis *by JPT Dalsgaard, C Lightfoot, V Christensen. 1995. International Center for Living Aquatic Resource Management (ICLARM), MCPO Box 2631, 0718 Makati, Metro Manila, Philippines. In: Ecological Engineering; v.4 (1995) p.181-189.*
The authors suggest an approach for the quantification of ecological sustainability in farming systems analysis. A list of ecological attributes is proposed: diversity, cycling, stability, capacity. Different types of farming systems are evaluated using these indicators. Diversity is measured by species diversity indices such as the Shannon index. Cycling is measured by cycling indices and flow diversity indices. Stability is measured by buffer capacity, system overhead and resilience. Capacity is measured by soil depth and organic matter content, water colour and biomass/throughput ratio. For this study, use is made of the ECOPATH II computer programme as a structuring tool in the analysis of farming systems. Economic indicators are not taken into account. (MvdL)

Toolkits: a practical guide to assessment, monitoring, review and evaluation *by L Gosling, M Edwards. 1995.254 p. Save the Children, Mary Datchelor House, 17 Grove Lane, London SE5 8RD, UK. ISBN 1 870322 93 2 (pbk). GBP 6.95.(Save the Children Development Manual, ISSN 0966 6982; 5).*
A practical guide aiming at helping development workers to assess and monitor their work in order to improve effectiveness. It deals with underlying principles in implementing development projects. It further addresses a number of practical questions related to monitoring and evaluation. An overview is given of the tools to be used in the different analyses. A number of boxes provide illustrations of issues mentioned, often taken from Save the Children's own project experiences. (WB)



Photography in project work: *Uses and limits in photo-observation. SDC. 1992. Swiss Development Cooperation and Humanitarian Aid, Evaluation Service. Schwarztorstr. 59, CH-3003 Bern, Switzerland. Fax 41 31 3259357*
An insightful summary on how photo-observation can enhance planning, implementation and evaluation of projects. By using photographs it is possible to show the original situation before the realisation of a project, record important changes, support statements in reports, put a learning process in motion through teaching aids, and plan new activities. The document calls for close cooperation between the photo-observer and the final users of photographs. Six basic steps are suggested for photo-observation: formulation of need, decision, planning, realisation, evaluation and classification. For readers in a hurry, the report can be read quickly by studying the summaries and captions of numerous quality photographs. (RR)

Participatory project evaluation: allowing local people to have their say: an NGO guide for community driven project evaluation based on a case study among the Arial of Kenya's arid rangelands. *1996. 118 p. Environment Liaison Centre International (ELCI), PO Box 72461, Nairobi, Kenya. UNEP, DEDEC/ PAC, PO Box 30552, Nairobi, Kenya.*
A guide written for NGOs active in community-based work among pastoralists in drylands. Purpose is to describe a simple method that helps to understand how indigenous peoples classify and use their environment, in the broad sense of the term, including other project activities having an impact on the community. The exercise aims at articulating indigenous indicators, as the authors believe that categories and concerns expressed by indigenous peoples when they describe, classify, compare and rank the activities of a project or a group of projects, are the most important indicators of what is really going on at grassroots level. In a separate appendix, a number of (anonymous) project activities are described and rated, reproducing reactions of various strata in the population: married males, married females, unmarried males, and unmarried females. This yields fascinating reading material, well beyond the direct scope of project evaluation. This is a highly original publication, providing much insight in how target groups of project activities feel and think. (WB)

Grassroot indicators for desertification: experiences and perspectives from Eastern and Southern Africa *by H Hambly and TO Angura (Eds), 1996. Ottawa, IDRC, 168 pp.*
This publication shares the knowledge brought together for a meeting of the African Grassroot Indicators Network (AGRIN) which took place in Uganda in 1995. The book argues that the conventional measures and standards associated with the planning, monitoring, and evaluation of research and development projects have tended to be dominated by western scientific perceptions of environmental and development change using "top-down" approaches to data collection and analysis. Grassroot indicators, the local tools for monitoring and measuring problems, are seen to be a far more powerful tool to identify environmental change and mobilise and empower local people for sustainable development.
The articles deal with the historical and contextual background of development and desertification indicators and changes in methodologies needed to identify grassroot indicators better and to help local people determine the "sustainability" of their natural

Project on monitoring and assessing progress towards sustainability
IUCN, The World Conservation Unit, supported by the International Development Research Centre (IDRC), executes a project to develop and test an approach to assessment involving a set of methods, tools and training materials. The approach is called Systemic User-driven Sustainability Assessment (SUSA). It recognises that people are an integral part of the ecosystem and that every society aims to improve and maintain the well-being of people *and* of the ecosytem. The approach is 'systemic' in the sense that it treats people and the ecosystem together as one system. Both are equally important. It assesses the whole system as well as the parts. It is 'user-driven' in the sense that users choose their own indicators. It is consensus-based and it makes values and judgements transparent. It is fosters a questioning attitude. The project has developed four methods:
Barometer of sustainability, a method for assessing human and ecological well-being, and a tool to synthesise and present the results in an index of sustainability (overall well-being).
Rapid Assessment Mapping for Sustainability (RAMS), a method to quickly obtain a broad understanding of a system and to identify priority areas for action.
Assessing and Planning Rural Sustainability, a step-by-step method for strategy teams working with villagers.
Asking Questions of Survival, a method to help institutions to assess and manage people-ecosystem interactions.
The methods are presently being tested in India, Colombia and Zimbabwe. The general approach, methods and first field experiences are presented in a number of draft publications on each of the methods.
Information on these publication can be obtained from Services on Strategies for Sustainability, IUCN, Rue Mauverney 28, CH-1196 Gland, Switzerland.

resource management. The book contains interesting cases from Kenya, Uganda, Tanzania, and Zimbabwe. It challenges readers to think beyond indicators of natural resource degradation and to put the use of indicators in an action perspective. (CR)

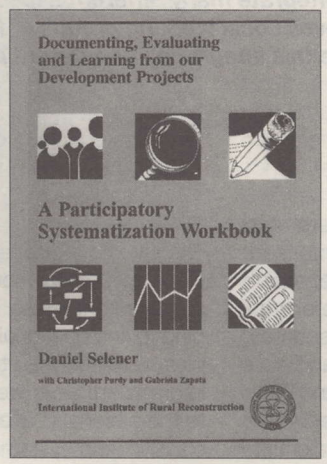
Development of desertification indicators for field level implementation. *by R Ridgeway, 1995. Office to Combat Desertification and Drought (UNDP/UNSO)/ Natural Resources Institute, 33 pp.*
This publication is a literature review on desertification indicators. Active participation of local people in generating field level desertification indicators is considered essential, so as to include their indigenous knowledge. Criteria are given to guide the selection of environmental, social and economical indicators that can be measured. It further describes how they can be integrated within a pressure-state-response framework. A list of field level indicators of environmental and landuse pressure on dryland areas is presented. An outline is given of a method to extrapolate information derived from field level indicators to the national level through institutional development. Finally, the findings of the workshop based on this report are given. The paper provides a good overview on the subject. (CR)

Workshop on sustainable agriculture indicators: proceedings *by SEARCA, 1995. SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA), College, Laguna, Philippines.*
The workshop was one of the activities of the Sustainable Agriculture Network and Extension (SANE/UNDP) programme. Its objective was to provide a forum for multi-sectoral exchange of ideas on and practical experiences with indicators of sustainability in agriculture at farm, community, landscape and national levels. The proceedings contain reports on discussions dealing with the use of indicators of relevance to the lowland, upland and coastal ecosystem of the Philippines. A matrix for sustainable agriculture indicators is provided. (CR)

Performance measurement for sustainable development: compendium of experts, initiatives and publications *by L Pinter, P Hardi & L McRorie Harvey. 1995. IISD: Winnipeg. 301 p. ISBN 1-895536-40-5. CAD$23 + $4 international shipping and handling; Visa and Mastercard accepted. IISD: 161 Portage Avenue East, 6th Floor, Winnipeg, Manitoba, R3B 0Y4 Canada. Tel. 1 (204) 958-7700; Fax. 1 (204) 958-7710*
The International Institute for Sustainable Development' programme "Measurements and Indicators of Sustainable Development Performance" has recently completed this publication with over 200 entries including profiles of experts, and reference to the major institutions and projects with an interest in indicators to monitor sustainable development performance. Annotated bibliographies of more than 125 of the more relevant publications in this field are provided. (RR)

Sustainability indicators in a temperate mountain watershed: two villages of the Upper Beas River, Himachal Pradesh, India *by CE Duffield, 1995. Shastri project on sustainable development of mountain environments in India and Canada. Technical Report No 6, 32 pp. Natural Resources Institute, University of Manitoba, Winnipeg, Manitoba, R3T 2N2 Canada.*
Villages in the Himalayan front ranges of north west India are undergoing a rapid change from self-reliant agriculture and herding to apple monocropping and tourism. The project made an assessment of landuse trends and their impact on the environment. Data were obtained through studies and observations as well as interviews with villagers and local foresters. Thirty-six interviews conducted in the villages Goshal and Chachoga suggest the concept of sustainability indicators makes sense. The top ten indicators were the extent and quality of forest cover, tree species diversity, adequate market access, forest density, orchard area, number of landslides and avalanches, stable hydrology, rate of reforestation and regeneration, family planning, and enforcement of tree-felling rules. (CR)

Change in African farming systems between the mid-1970s and the mid-1980s *by S Wiggens, 1995. In:* Journal of International Development: *Vol 7, No 6, pp 807-848.*
Conventional wisdom holds that Africa has been undergoing an agrarian crisis, marked by falling food production per capita and rising imports of cereals, as seen in national statistics. This paper tries to test whether African farmers have indeed experienced the setbacks suggested, by looking at village-level studies of change in farming systems between the mid-1970s and the mid-1980s. Fourteen studies from six countries were examined. Contrary to the above thesis, there was little evidence of decline, and much of increased production per head, albeit by modest margins. If the studies are representative, then talk of crisis is exaggerated, the national statistics probably seriously underestimate farm output and unspectacular policy may suffice to support African farmers to produce and market more (author's summary).



Documenting, evaluating and learning from our development projects: a systematization workbook *by D Selener with Ch Purdy and G Zapata. 1996. 107 p. US$ 20, mailing included. Available in English and Spanish. International Institute of Rural Reconstruction (IIRR). Apartado Postal 17-08-8494, Quito, Ecuador. Fax: +593-2 443 763. e-mail: daniel@iirr.ecx.ec*
Many development practitioners are departing from the traditional practice of measuring only project results, and are seeking a more comprehensive understanding of its processes as well. Systematisation is a continuous process of participatory reflection on a project's processes and results, undertaken by both project staff and participants. This systematic analysis generates lessons which are fed back to improve the project, strengthening the learning and organisational capacities of development organisations. The project experiences are documented and can be shared with other organisations. This practical workbook provides an understanding of the concept of systematisation; methods to plan for, follow-up, evaluate and improve project processes and results; and some useful tools for conducting the systematisation process. (RR)

Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program (SANREM CRSP).
SANREM CRSP is a research, training and information programme. Its goal is to develop a new approach to research in sustainable agriculture and natural resource management which incorporates community participation, interdisciplinary collaboration among scientists and an understanding of landscape ecology and gender issues.
The identification and testing of indicators of sustainability is one of the programme's objectives. In 1994 an international conference on indicators of sustainability was organised. Participants defined the fundamental principles of sustainability and discussed processes for identifying and using indicators of sustainability which are currently being used to guide research development and monitoring within the programme.
The programme offers several publications: **Proceedings of SANREM CRSP indicators of sustainability conference and workshop**. SANREM Research Report No. 1-95; and **Participatory Landscape / Lifescape Appraisal; Volume 1, The Manupali Watershed, Province of Bukidnon, The Philippines**. SANREM Research Report No. 2-95. It further publishes the "SANREM Ecolinks Newsletter" and "SANREM Update".
Information on these publications can be obtained from the Center for PVO/University Collaboration in Development, Bird Building, Western Carolina University, Cullowhee, NC 28723-9056 USA.

Agricultural indicators and indicator program descriptions *by WRI, 1995.*
The World Resources Institute compiled a document which includes profiles of 37 programmes currently involved in developing indicators of agricultural sustainability.
For information contact Eric Rodenburg at the World Resources Institute, 1709 New York Ave NW, Washington, DC 20006 USA.

• INTERNET •

The IISD Home Page on "Measurement and indicators for sustainable development" can be found at http://iisd1.iisd.ca/measure/
Two additional publications of this relatively new programme area are available through the Web at the following addresses: http://iisd1.iisd.ca/measure/sdperform.rtf and http://iisd1.iisd.ca/measure/demyst.rtf

Integrated soil management - a ch

ILEIA's Research Programme on ecologically sound ways of farming in different agroecologic and socioeconomic environments started end 1995 (see ILEIA Newsletter December 1995). In one of the first research activities farmers and researchers together looked at the characterisation and evaluation of soils of the six pilot areas in Ghana, Peru and Philippines. ILEIA requested three national soil institutions subcontracted (see acknowledgements) by the International Soil Reference and Information Centre (ISRIC) of the Netherlands, to work in close cooperation with farmers and NGOs in the pilot areas to realise this task. For farmers and scientists to compare and exchange their views and knowledge is the central to this activity. Both farmers and researchers recognised that a soil focus, while relevant, fails to integrate many other parameters. They agreed that capacity building is needed to integrate many different aspects of ecologically sound agriculture at the local level. Local working groups of farmers, NGOs and researchers need to orchestrate this integration of different pieces of the puzzle.

Sjef Kauffman

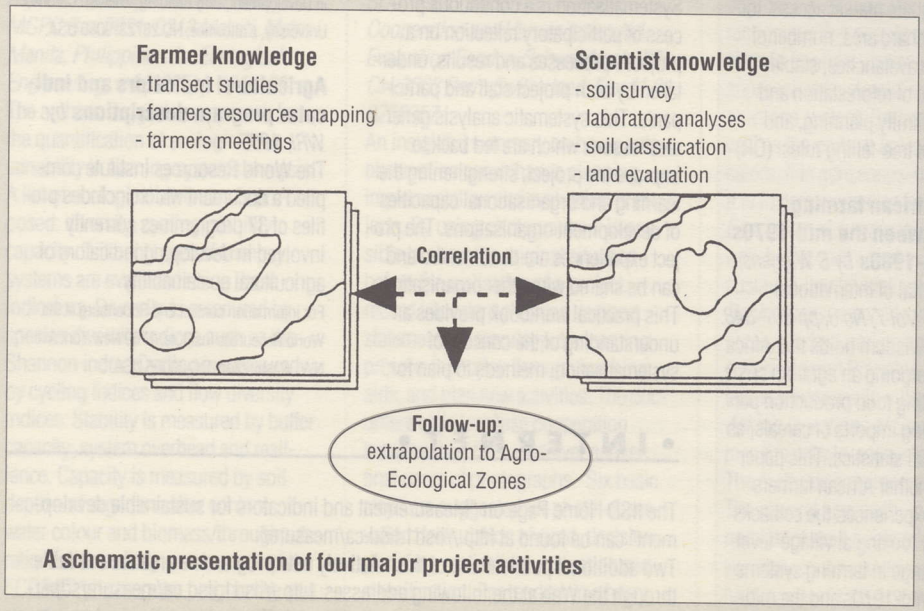
In parallel processes both farmers' and scientists' knowledge are inventorised. To visualise farmers' knowledge, action research workshops were held where farmers prepared maps of natural resources, focusing on landscape, land use and soils (see e.g. the articles by Reg Noble and Edith Fernàndez-Baca in ILEIA Newsletter Vol 12 No 1). In addition, farmers and soil scientists have done joint field observations of soils. In all pilot areas the work focused on soil qualities as perceived by farmers, soil productivity and identification of soil-related constraints which prevent farmers to sustain or increase agricultural production. The procedures did not follow strict rules, they took different forms in each country:

- Ghana: open discussions between scientists and individual farmers
- Peru: a questionnaire based on discussions during field days, complementing the standard soil and land use observations of the soil scientist
- Philippines: scientists organised workshops in which the farmers were requested to sketch their fields and to describe soils using the four senses and land use.

The inventory of scientists' knowledge took place by using various methods. Scientists surveyed and classified the soil/land according to (inter)national procedures. Soil samples were analysed to complement the field information. Soils were classified according to the national (if available) and international classification systems. Land evaluation, following national standard/formalized procedures, focuses on three questions: 1) what are the dominant soil-related constraints to agricultural production, 2) how to manage the soil-related constraints to productivity, and 3) what are the ecological threats of present and future land use?

How to correlate knowledge?

The next activity was aimed at correlating the knowledge of farmers and that of scientists. The first step in this process was joint field observation. Individual farmers and researchers compared and discussed the different perceptions they have of soils and land-use. Farmers have detailed practical knowledge of tillage, management, protection and productivity of the soil, based on generations-long experience with the local soil types and their uses. On the other hand, the soil scientists acquire knowledge of the pilot areas in a relatively short time through survey and testing of local soil types. In addition, the scientist has an overall look at soil distribution in a country and at the potential to correlate the local soil types with (inter)national scientific systems, allowing exchange of knowledge. In all pilot areas, final reports and maps were presented at plenary meetings in the farming communities. Differences and common ground between both approaches were discussed.



A schematic presentation of four major project activities

Ghana

A large number of soil types is distinguished by both farmers and soil scientists. They usually correlate well with the underlying rock type and topography. Soil names given by the farmers correlate rather well with the national soil series system. Dominant differentiating soil properties used by farmers are clay/sand content, soil acidity, rootable depth, and available plant nutrients. Farmers and scientists agree on the most important soil-related constraints. Ranked according to the farmers these constraints are:

action research

Shortage of moisture during the growing season. Average total rainfall during the growing season is sufficient. However, the total amount varies considerably from year to year. In addition, the onset of rains is uncertain and rainfall distribution during the growing season is irregular. These effects are aggravated in sandy and shallow soil types with a low plant-available moisture capacity. Although weather characteristics can not be altered, the amount of rainfall entering the soil (surface run-off can be very high during heavy rain) and soil moisture holding capacity of soils can be improved by using mulch and raising soil organic matter. *Decreasing soil fertility.* Farmers mentioned that yields are declining because soils are exhausted. The main factor is the low natural plant nutrient reserve, which is worsened by a shortening fallow period to restore soil fertility. Very little quantitative information is available to show the trend in declining soil fertility as indicated by farmers. In discus-

allenge for farmers and scientists

Photo: Sjef Kauffman

Farmers and scientist on a field visit near Nahuipuqui (Peru)

sions farmers agreed, for example, that the annual burning of biomass (tall grasses and crop residues) will have a negative effect on soil productivity. Incorporating biomass into the soil with the present-day land preparation tools is a hard task considering the large quantities of tough biomass. One farmer reported that he had stopped burning but got a very serious weed problem.

Soil degradation dominated by water erosion. Reports, already published 20 to 30 years ago, indicated the risk of erosion and the urgent need for conservation. Continuing soil erosion will decrease the soil moisture capacity and plant nutrient content, especially of shallow soils. Farmers are aware of the problem, but because it is a long-term process it is overshadowed by the immediate food production needs. Little quantitative information is available on the effects of soil erosion on productivity. Monitoring of soil erosion and its effects on soil productivity by farmers is of great importance to make consequences evident.

Possible solutions for the major constraints will be discussed jointly by farmers and scientists in future meetings. Soil scientists suggested improved organic matter management in combination with initial essential soil amendments (for example phosphate and calcium), limited fertiliser use and soil and water conservation measures. In addition to farmers own innovative and ecologically sound solutions, these suggestions will be a few of the challenges to be discussed, selected and tested by farmers.

Philippines

Farmers were asked to sketch maps and transects of their fields, to classify soils, to indicate land use and to rank production constraints. In addition to economic problems, farmers mentioned the lowering of the water table caused by excessive use of water-pumps as a serious problem. A second soil-related problem is the enhanced soil acidity, induced by the intensive use of fertiliser (urea). Integrated pest management has reduced the negative effects of excessive of use of pesticides and herbicides. Simple soil testing kits (soil acidity and plant nutrients) and composting techniques for better use of rice straw have been discussed and are being tested by farmers.

Peru

Farmers indicated the following soil-related and other major limitations: low soil fertility, shortage of manure, shortage of water in the lower altitudinal zone, shortage of land, difficult transport of agricultural products to the markets, water erosion and low prices for the dominant crops at the local markets. Water erosion is one of the persistent problems and the need for soil conservation has been reported more than 20 years ago by national land resources institutes. Two contrasting degrees of erosion are observed: severely human-induced eroded land and arable land with slow erosion. The most seriously eroded parts are taken out of production. The question arose why and when this erosion took place? It is important to assess whether this can happen again on the very steep slopes, which are presently increasingly used for agriculture. Less dramatic erosion was observed in agricultural fields, but the farmers acknowledge the slow-acting water erosion in their fields. The slope direction of the furrow of the raised beds, which is mostly perpendicular to the contours, is debated by some scientists as it enhances the risk of erosion by water. Some farmers in the Huancayo pilot zone mentioned that their experience with keeping the furrows parallel to the contour provoked a yield reduction (probably triggered by excess of moisture in the soil). Results of research work by Peruvian scientists on this matter, which was not known by the farmers, should be included in the discussion on suitable options to be tested locally. Several conservation techniques are being re-introduced in parts of the pilot areas. Farmers indicated that probably the most important factors to implement soil conservation are training, organisation at community level and support in the form of tools and financial incentives.

Farmer scientist dialogue

For effective communication between farmers and scientists it is important to have sound data, in a form relevant to both, on soil types and crop productivity. In the pilot areas in Ghana and Peru such data are not available. Farmers express the productivity of their agricultural fields in qualitative terms such as good, medium and low production, and (e.g. in Peru) in terms of a semi-quantitative ratio of seed versus yield. Farmers are interested in quantitative monitoring of productivity changes, and would be assisted with easy, standardised ways of obtaining such data.The boundaries separating the different soil types on the maps of farmers and scientist largely coincide, but some differences do occur. Such differences may be of great interest to understand the reasons of soil differentiation by farmers, however, at this stage not all differences could be fully explained. In Ghana and Philippines local soil terminology can usually be well-correlated with the (inter)national soil classification systems. Farmers recognise different soil layers and the naming of soils is frequently based on topsoil characteristics. This sometimes complicates correlation with the scientific soil name which focuses on the complete soil profile with an emphasis on the subsoil. Knowledge about the subsoil is important to understand processes of root development, moisture and nutrients flows, and salinization. Scientists, when classifying soils, should give more weight to topsoil properties, because these are prominently determining the agricultural productivity of various soils.

In Peru, several ways of describing and classifying the soil are used. Published indigenous soil terminology using Quechua language is occasionally used. Farmers preferably use terms which are directly related to productivity in terms of good, medium or low. Most frequently descriptive Spanish terms are used to indicate soil depth, soil colour, altitudinal zone and position on the slope. ▶

Discussions in the field and at plenary sessions showed the great interest of farmers for self-executed experiments aiming at raising agricultural production. However, results of local research of scientists is little known to the farmers. Moreover, these results are not accessible to the farmers because of the scientific jargon used. Consequently potential techniques are not tested and implemented by the farmers.

Integrated soil management

Farmers of all pilot areas have detailed knowledge of local soil types, their productivity and major constraints for improved performance. This knowledge has been compared to the classification of soils by national soil resource institutions. Farmers and scientists agree on the identification of the major soil-related constraints: plant available moisture, plant nutrients and human-induced soil degradation (acidification in Philippines and water erosion in Ghana and Peru). For each agro-ecological zone, proven techniques to rectify these will be discussed by farmers and scientists. Farmers can then select, adapt and test a number of these techniques which should aim simultaneously at improved organic matter management, optimal plant nutrient cycles, soil and water conservation, and ecological and economic use of soil amendments and fertilizers. The participatory process of farmers and scientists as discussed in this article should result in the development of an Integrated Soil Management approach.

It will be necessary to integrate the results of this approach with the outcome of research from other related ILEIA activities on stakeholder analysis and agroecological resource mapping. Farmers are very interested in the work of soil scientists. However, they often mention the wish that research should be followed by an implementation phase. Soil scientists of the participating national institutions agree with the proposed cooperative effort and believe that participatory development, where stakeholders influence and share control over initiatives on sustainability, will be a cornerstone for success in soil and water conservation.

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Acknowledgements
This paper is based on reports and discussions in the field and in meetings with farmers, soil scientists of the national institutions (Soil Research Institute, Kumasi, Ghana (R. Asiamah); Bureau of Soil and Water Management, Manila, Philippines (R. Concepcion); Soil Department of the Universidad Nacional de la Molina, Lima, Peru (M. Valencia), NGO staff and ISRIC colleagues Niels Batjes and Otto Spaargaren who were responsible for the work in Ghana and Philippines. I would like to thank all for their enthusiasm and dedication to contribute to this most inspiring project.

Detailed reports are available from ISRIC, PO Box 353, 6700 AJ Wageningen, Netherlands.

Photo: Hannah Zemp

Organic farming in Northern Ghana

Part of ILEIA's effort to understand the factors that encourage or constrain ecologically sound farming is to document and learn from existing experiences. Ghanaian journalist, Hannah Zemp-Tapang, was asked to document experiences in ecological farming in Northern Ghana. This article presents some of her findings. A full report is available from ILEIA on request.

Hannah Zemp-Tapang

As we drove into Goziire, the first thing I noticed were fields strewn with decaying millet and sorghum stalks, and I remarked to my husband, "so are these people that serious"? We had by then visited many villages in the northern part of Ghana and none was like Goziire, at this period of the farming season, when the land was being prepared for planting. Unlike Goziire, in many other villages the farmers were gathering the crop residue and burning to make it easier for ploughing. But here, in Goziire, I saw the farmers hoeing among the stalks, preparing the land to sow.

The two agricultural officers of the Nandom Agricultural Project, who accompanied us from Nandom, led us to the Chief, Naa Leo Yiryel, who had encouraged his people in the early 1980s to try out organic farming and later to adopt it. According to Naa Yiryel, after a long period of using chemical fertiliser on their farms, they found that it did not give lasting fertility to the soil. When the government lifted the subsidy on fertiliser and other agricultural inputs, many farmers could no longer afford chemical fertiliser. For the first few years, they thought that the remains of the chemical fertiliser used during the previous years would help. But to their surprise, production was far lower than it had been in the years before chemical fertiliser was introduced.

"What we produced could barely support us and our families all year round", the Chief said. "We became desperate and did not know what to do. Then the Agricultural Project people came to our rescue." Despite their predicament, the people of Goziire did not readily take to organic farming. "We tried it bit by bit, like a child would eat hot porridge", Naa Yiryel said. "You know, we had gone through a lot of changes in our farming systems and couldn't just take this one like that."

Step by step

Gradually, though, the people stopped burning and used some of the crop residue for compost and mulching. They also made compost from household waste and added what little animal manure they could get. In two years, the Chief explained, many of them were already convinced that organic farming was the best for them. The few who had held back also joined, and the whole community embraced it. They made agreements with neighbouring villages to control their fires and not allow them to spread into Goziire. They even formed community fire squads to ensure this.

Vitalis Gyeyri, who was on his farm, stopped working to speak with us. Like many of his colleagues, he cultivates sorghum, millet, cowpeas, groundnuts, sweet potato and a small quantity of maize. The maize, he said, did not do well previously, when his soil had deteriorated, but after a few years of using natural material to rejuve-

Zasilari Organic Farm: Mr. David Agongo with his coppiced leucaena alley.

nate the soil, he can now sow a small quantity of maize to be eaten when fresh (millet and sorghum are the staple foods). Vitalis's four-hectare compound farm produces enough to feed his family and more for relatives. He commented that after some six years of organic farming, his harvest has increased by about 200%. Even though he does not measure his yield, he estimates by sight and compares from year to year.

The people of Goziire overcame the problems of organic farming during the first years of adaptation. Making compost from household waste, and later spreading it, was not easy for the women who were given that part of the work. For the men, it was no easier to deal with millet and sorghum stalks while weeding the farm. But with time, they have become used to it, and now say they have no problems.

A lasting change

We learned, from talking to many farmers, that organic farming was introduced to them in the early 1980s or even earlier by agriculture-based NGOs and some agricultural officers who had foresight and believed in the lasting benefits of using natural material to fertilise the soil. Some of these farmers took to it and practised it so long as their 'teachers' were around. As soon as they left, they gave up and went back to their old ways. One of the communities where this happened is Sagadugu, near Walewale, where a Dutch-supported organic farming project was going on until the leader became less involved and later fell sick and died. Even though the Chief says there are a few farmers practising organic farming in that community, the farmers I met have gone back to their old ways of burning. Their reason is that, since their leader is no longer there, they cannot go on on their own. The real reason might be that they were never really convinced of the benefits of the method. Organic farmers I talked to in other communities who had never had anybody to lead them, had learnt from either watching neighbours or from accidental experience, yet they say they would not try any other method of farming.

Kankpung Jinjir of Bunkpurugu, who was working in his garden, said, "I would never use chemical fertiliser again even if it were offered to me free of charge." Kankpung had the dreadful experience of harvesting very little when he used no fertiliser on his farm, after four years of its use. It was then that he took up organic farming. He knows nothing about green manure and alley cropping but he does not burn his crop residue uses it instead for compost and mulch.

Kwabena Lambon, also of Bunkpurugu stopped using chemical fertiliser three years ago because it was too expensive. He learnt from neighbours that he could use groundnut shells, kitchen waste and crop residue for compost. This, he says, has improved his soil a lot. "I still get as much as I did when I used chemical fertiliser, but now I don't have to use any money and I see that my soil has improved".

action research GHANA

Konjit Laar, a widow from the same neighbourhood, told me that she had wanted to improve the fertility of her farm but could not afford fertiliser. Then she decided to try using kitchen waste and groundnut shells for compost. Since this was small in quantity, it could not cover the whole farm so each year she covered a bit larger portion with compost. "After the first two years, I saw the difference between the crops where I had used compost and those where I hadn't used anything. Then I was convinced that there is fertility in groundnut shells and kitchen waste", she said. Konjit is well known for her love of groundnut shells. But, as she explained, that is the only organic matter she can acquire easily, as there is keen competition for animal manure and decayed matter collected from the community dumping ground.

Learning by accident

Individual farmers who are involved in organic farming in the northern region of Ghana mainly use animal manure, kitchen waste, farm residue and decayed human faecal matter. They do not burn residue and some use the larger stalks from millet and sorghum to form barriers to prevent erosion. This then rots in a year or two and is spread on the farm and fresh stalks are put in its place. From visiting farms in Najong and Bunkpurugu, this appeared to be common practice, even among farmers who had not gone strictly organic.

Osei Duut of Najong said he took up organic farming by accident. He used to gather all the crop residue in heaps and burn it before preparing the land. Some years earlier, he commented, he was either not smart enough to do all his usual duties, or perhaps the rains came earlier than expected and he was thus unable to burn the heaps because of a heavy down-pour. He never found the right time to do so until he had prepared the land and sown. By then it was unnecessary. In the following year, the heaps of crop residue had decayed and he decided to spread it on parts of the land. "When my millet started growing, I could see the difference between the crops growing on the areas with the decayed matter and those without it. And then it occurred to me that the decayed matter was manure. Since then, I have used it in large quantities and also use animal droppings". Osei says his neighbours admire his crops but tease him that the fertility comes from human remains, since he farms on old cemetery ground. "I don't mind them but I know they will gradually acceptwhat I'm doing because a bag of chemical fertiliser now costs C30,000.00 (about US$18), and if they have to use two bags, how much are they going to have harvest to cover all that money and still have something left over for themselves?"

Desperate

Osei's opinion seems to be the order of the day in the northern part of Ghana, which covers about 40% of the country and where the majority are subsistence farmers. Many of them now find chemical fertiliser too expensive and are shifting to animal manure. But animal manure is not for everybody since not every farmer owns animals. Many are desperate to find ways to improve the fertility of their soils, but they do not know that much of it could come from the very crop residue they burn each year. Each year they struggle to get enough to feed their families. In many families, though, hunger is a reality, especially in the upper regions where the soils are poor and overused. The geographical area has a similar historical and traditional background, though made up of different tribes. The area experiences erratic rainfall - usually between 800-1000mm per year. This is mostly irregular, and in many years there is either drought or flood, which does not promote good agricultural production. The soils have been over-used for years and are poor and prone to erosion. This explains why most farmers are desperate, but fear to venture into new methods like organic farming. They give several reasons - from ignorance to fear of snakes and scorpions which could be attracted by the organic matter on the farm. A farmer in Zasilari believes that not burning the farm before ploughing is 'dirty farming'. Another says, when discussing leaving crop residue on the farm, "how can I weed with all these stalks pricking me?"

But, for the farmers in Goziire, dirt or no dirt, stalks or no stalks, organic farming is more beneficial than it is a problem. Vitalis sums it all up when he says, "if we are to produce enough to feed our families and relatives, then we will have to make sure our crops do well. And even though it is easier to apply chemical fertiliser, we cannot ignore the monetary cost and the harm it does to our soils. Therefore I will say organic farming is the best alternative." ■

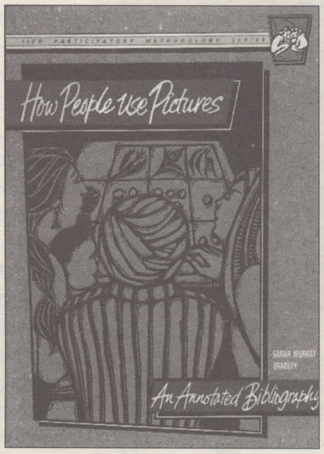
Hannah Zemp-Tapang, Gbilugu Ecological Farm, PO Box 43, Walewale NR, Ghana.

NEW IN PRINT

Directory of training and education opportunities for tropical organic agriculture. *1995. 143 p. International Federation of Organic Agriculture Movements (IFOAM), c/o Oekozentrum Imsbach, D-66636 Tholey-Theley, Germany. USD 10.00.*
Gives an overview of training opportunities presently available in the field of sustainable agriculture in the tropics, with a focus on organic agriculture. Descriptions of the institutes providing training in organic agriculture (grouped per continent), as well as general information on courses (content wise and practical). The topics covered in each course have been inventoried. The intention is to update the directory every two years. (IHG)

Animal health. Vol. 1. General principles *by A Hunter. 1996. 167 p. ISBN 0 333 61202 7. London; Basingstoke: Macmillan Education.*
Animal health. Vol. 2. Specific diseases *by A Hunter. 1994. 214 p. ISBN 0 333 57360 9. London; Basingstoke: Macmillan Education.*
Centre for Tropical Veterinary Medicine, University of Edinburgh, UK. (The Tropical Agriculturalist).
Technical Centre for Agriculture and Rural Co-operation (CTA), PO Box 380, 6700 AJ Wageningen, The Netherlands.
In the practical series "The Tropical Agriculturist", two books have been published dealing with animal diseases and health in tropical and subtropical regions. Volume 1 deals with the causès of livestock diseases, how they are spread and the means available for their control. Simple diagnostic keys are presented to recognise the different diseases. Volume 2 covers individual diseases in detail, including nutritional deficiencies and poisoning. Pictures of most diseases are included. Very condensed basic information. (IHG)

How people use pictures: an annotated bibliography and review for development workers *by S Murray Bradley. 1995. 123 p. Institute for Environment and Development (IIED), 3 Endsleigh Street, London WC1H 0DD, UK. (IIED Participatory Methodology Series). ISBN 1 899 825 05 3. GBP 10.00.*
Deals with visual literacy and the different ways in which people of different cultural and social origin interpret images. This bibliography is a useful reference since communicating through pictures and visual symbols has become a very important tool. It starts with an interesting introduction on motives for using pictures and on

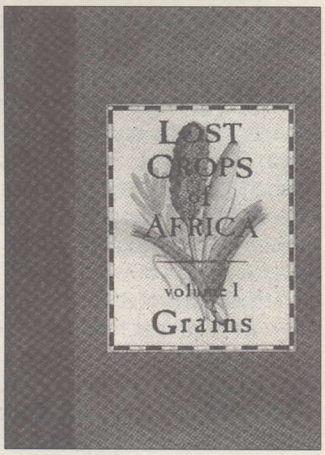


how these relate to empowerment and culture. Obviously, the book contains a lot of informative images that make it very readable. It ends with a resource list of international and regional institutions. (WB)

Sustaining the soil: indigenous soil and water conservation in Africa *by C Reij, I Scoones, C Toulmin (eds.). 1996. 260 p. Centre for Development Cooperation Services (CDCS), Free University of Amsterdam, Amsterdam, Netherlands. ISBN 1 85383 372 X. GBP 12.50. Earthscan Publications Ltd., 120 Pentonville Road, London N1 9JN, UK.*
The message of this book is that African farmers are as concerned about soil degradation and erosion as development workers and have developed methods and techniques over time to control these. It offers a valuable contribution to the discussion about the role of indigenous knowledge and practices, both in terms of geographical coverage and with regard to its search for rationale and effectiveness of indigenous practices and the dynamics of their development. "Indigenous" is used here in a dynamic sense, i.e. including technologies originating from elsewhere which local people have adopted. The 27 analysed case studies of indigenous soil and water conservation practices in more than 15 African countries clearly show the great diversity of these practices, depending on agro-ecological and socio-economic conditions and trends. This diversity and the adaptability of local practices to face changing conditions, particularly the local labour situation, constitute the strength of indigenous practices reported. The reader cannot but marvel at the great ingenuity of African farmers in developing this variety of effective soil and water conservation practices. The book addresses the fundamental question of the role of all the engineers, agronomists and social scientists wishing to improve farmers' livelihoods, only in general terms. While the authors' argument is acceptable that this role should be supportive and complementary to farmers' efforts, the challenge of how this could be effectuated in practice still needs to be answered. A few cases documenting participatory research and extension efforts show in which direction answers can be found. (LvV)

Beyond intellectual property: toward traditional resource rights for indigenous peoples and local communities *by DA Posey, G Dutfield. 1996. 303 p. ISBN 0 88936 799 X. International Development Research Centre (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9.*
Published in the framework of The Working Group on Intellectual Property Rights, subsequently renamed Working Group on Traditional Resource Rights, which was established after the 1990 World Congress of the International Society for Ethnobiology. Aim was to implement a strategy for the use of local knowledge, the involvement of local peoples in conservation and development strategies, and the implementation of alternative, people-centred conservation models. It presents conclusions of numerous conferences, seminars and workshops on Intellectual Property Rights or Traditional Resource Rights. This latter, more encompassing term, was introduced in recognition of the fact that "property" has a different connotation between indigenous peoples and Western thought. It is clear that invoking property rights by indigenous populations is a very complex process having led, thus far, to partial success at the best. This publication aims at providing instruments for improving this state of affairs, leading to strengthening and empowering indigenous peoples. There is a very elaborate resource guide at the end of the book, complete with interesting World-Wide Web sites, an annotated bibliography and addresses of institutions and persons. An interesting well-defined glossary lends a helping hand and completes this carefully written and edited book. An important reference. (WB)

Participatory forestry: the process of change in India and Nepal *by Hobley M. 1996. London: ODI, 1996. 337 p. Overseas Development Institute (ODI), Regent's College, Inner Circle, Regent's Park, London NW1 4NS, UK. (ODI Rural Development Forestry Study Guide 3).*
This publication analyses the historical evolution of approaches to forest management in India and Nepal.
The exploitation by the colonial state and ruling classes led to protection of natural resources against the majority of local resource users. A more recent trend is known as participatory forestry. The complexity of the problems related to the joint management of resources are elaborated upon, including scenarios for the future. Appendices describe exercises for use in training courses as well as useful video material on the subject. (IHG)



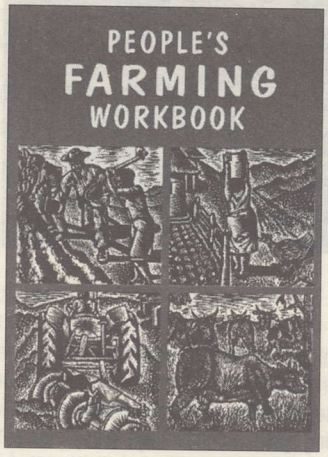
Lost crops of Africa. Vol. 1. Grains. *1996. 383 p. Board on Science and Technology for International Development (BOSTID), Office of International Affairs, National Research Council (NRC), 2101 Constitution Avenue NW, Washington, DC 20418, USA. ISBN 0 309 04990 3. USD 28.95. National Academy Press, 2101 Constitution Avenue NW, Washington, DC 20418, USA.*
Contrary to what the title suggests, this book does not describe truly lost African cereals nor is it a botanical or agricultural survey. It is the first volume in a series of books dealing with undervalued native African crops, which have been overlooked (in that sense "lost") by mainstream interna-

NEW IN PRINT

tional science and people outside the local areas, where they traditionally have been feeding people. The aim is to promote actions to explore and exploit the most promising African grains for increased production and to raise their nutritional levels, as they are well adapted to the African environment. Furthermore, they deserve attention as they diversify agriculture and create economic opportunities. Described are African rice, finger millet, fonio, pearl millet, sorghum, tef, wild cereals and African oats, barley and wheat. Innovations for milling, storing and processing are presented, as well as methods to reduce damage by birds, weeds and insects, in order to boost the production of these crops. The book also contains valuable appendices on research contacts and references. (IHG)

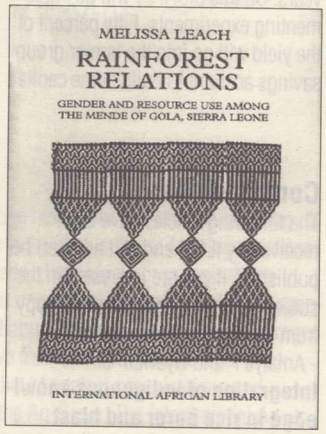
Local crop development: an annotated bibliography *by WMR van der Heide, R Tripp, WS de Boef (eds). 1996. 153 p. ISBN 92 9043 270 5. International Plant Genetic Resources Institute (IPGRI), Via delle Sette Chiese 142, 00145 Rome, Italy; Centre for Plant Breeding and Reproduction Research (CPRO-DLO), Centre for Genetic Resources, Netherlands (CGN), PO Box 16, 6700 AA Wageningen, Netherlands; Overseas Development Institute (ODI), Regent's College, Inner Circle, Regent's Park, London NW1 4NS, UK.*
Genetic conservation used to focus mainly on ex-situ conservation in gene banks. During recent years, however, there has been a shift of attention to local crop development and in-situ and community conservation. This bibliography draws together the scattered literature on this subject and includes extensive abstracts and index words. It is divided into 4 chapters, gathering studies on farmer knowledge and practices; biological studies on the process of local crop development; relevant research methods and field techniques, including methods to encourage farmer participation in formal plant breeding; and policy and institutional factors supporting local crop development and community conservation. The change in conservation perspective makes this bibliography not only useful for plant breeders and geneticists: community workers, development specialists, anthropologists, economists and political scientists have now also become involved in conservation work. (IHG)

Power, process and participation: tools for change *by R Slocum, L Wichhart, D Rocheleau, B Thomas-Slayter (eds). 1995. 272 p. ISBN 1 85339 303 7. USD 17.50. Intermediate Technology Publications (ITP), 103-105 Southampton Row, London WC1B 4HH, UK.*
A manual to provide tools to facilitators in order to strengthen empowerment of marginalised, powerless groups. Even so, this book is about more than just tools: it places methods for empowerment in the context of community change, using numerous case studies. How does empowerment take place? Through consciousness raising, information gathering, decision making, advocacy and action. There is a particular, though by no means exclusive, emphasis on gender as the determining factor as to who participates and who benefits. The interesting introduction on definitions and historical context of presented participatory methods is very useful, in the current plethora of approaches. Insight is provided in the overall approach and ethical viewpoints that underlie this book.. It further gives descriptions of the tools for environmental and social changes.
A very useful manual. (WB)



People's farming workbook *by People's Workbook Collective. 1995. Cape Town; Johannesburg: David Philip Publishers, 1995. 250 p. Environmental and Development Agency Trust (EDA), PO Box 15840, 2028 Doornfontein, South Africa. ISBN 0 86486 112 5. David Philip Publishers Ltd, 208 Werdmuller Centre, Newry Street, Claremont, South Africa.*
The follow-up volume to the People's Workbook, published in 1981, a popular self-help manual for smallholders in the Southern African region. This manual, in the same recognisable and richly illustrated style, constitutes an update of the agricultural section of that publication. Its focus is on farming methods from a biophysically oriented perspective. Although sustainable farming methods are warmly advocated, the illustrated cases are by no means all environmentally friendly: some of the cases presented rely heavily on chemicals. These case studies, presented in boxes, are interesting to read: people narrate their experiences in relation to the issue just dealt with. A multitude of socio-economic problems surface. The manual ends with a list of resource organisations in South Africa. (WB)

The urban opportunity: the work of NGOs in cities of the South *by N Hall, R Hart, D Mitlin (eds). 1996. 128 p. ISBN 1 85339 347 9 (pbk). USD 18.95. Intermediate Technology Publications (ITP), 103-105 Southampton Row, London WC1B 4HH, UK.*
Examines how nine leading British NGOs are responding to the most profound change in human habitat that is taking place: urbanisation. It is estimated that by 2030, urban populations will be twice the size of rural populations. Together with urban growth, urban poverty has become much more acute. The implication is that the existing bias in development thinking towards rural development has to be revised. There is, at this moment, a trend towards a more positive attitude to urban and peri-urban development, in recognition of the fact that rural improvements can no longer exert their influence on urban poverty: urban growth has reached its own, independent, momentum. The study reports about policies and practices of British NGOs in urban areas in developing countries. The common factor of all contributions in this book is the insistence on networking in order to bring people together, to share experiences, to transfer knowledge, and to pool people's strength in order to increase their negotiating power. Proposed strategies for poverty reduction move along three lines: (1) promoting new technology; (2) provision of credit and training; and (3) strengthening local organisations. These aspects are investigated through a number of case studies describing activities of the NGOs in a number of developing countries, covering a wide range of aspects of urban development, including health, older people, city partnership projects, rehabilitation schemes, human settlement, and community-led water and sanitation projects. (WB)



Rainforest relations: gender and resource use among the Mende of Gola, Sierra Leone *by M Leach. 1994. 272 p. ISBN 0 7486 0493 6. GBP 39.50. International African Institute (IAI). (International African Library / Peel JDY, Parkin D (eds) no. 13). Edinburgh University Press, 22 George Square, Edinburgh, UK.*
Examines rainforest resource management in Mende communities around Gola North Forest Reserve in Sierra Leone, one of the last remaining areas of tropical forest in this part of the West African zone. The author argues that, without a concern for gender, no understanding of forest use or effective conservation policies can be achieved: women's and men's different perspectives of resource use are, fundamentally, issues of access and control. The book consists of two parts: (1) Issues, approaches and debates concerning rainforest conservation and gender and the environment at a general level; (2) Gender-specified resource use in the Gola forest. For a long time, West African peoples have had a bad name when it came to forest conservation. Therefore, policies have been oriented towards excluding local activities from forest reserves. In the 1980s, it dawned upon researchers that such an approach is highly unsustainable. This has resulted in making rainforest conservation more people-oriented. Obviously, such an approach necessitates a profound understanding of local perspectives and concerns. In this context, insight in social differentiation is vital, and this means, above all, understanding the role of gender. (WB)

ILEIA NEWS

Pak Yanto

In the July issue of the ILEIA Newsletter you may have read about farmer Pak Yanto from Indonesia and his farmer group. The farmer group decided to use the authors' fee for this article to rent a piece of land for two years. On this plot they will be implementing experiments. Fifty percent of the yield will go into the farmer group savings account to build some capital.

Contributions

The following articles have been received by ILEIA and will not (yet) be published. If you are interested in the subjects, please request a photocopy from Carmen Rodriguez at ILEIA.

- Amatya P and Gyawali S. **Integration of indigenous knowledge in rice borer and blast management**. Describes potential of integrating indigenous rice pest management technologies in IPM in Nepal.
- Ling B. **Biogas digester used to treat nightsoil in schistosomiasis endemic areas**. Describes in detail the technology of biogas digestion in relation to the safe use of treated nightsoil.
- Diyen CA. **The use of leguminous non food crops in agriculture in the North West province of Cameroon**. Gives an example of revaluation of indigenous knowledge by shortly describing the reintroduction of traditionally grown Sesbania and Tephrosia for eriosion control.
- de Fatima Ribeiro M. **Being a farmer: a tool to understand the systems approach**. Describes the use of a "being a farmer"-simulation game in better understanding of the dynamics of farming systems in Southern Brazil.
- van Lierop P. **Ecology education at the primary schools of the Peruvian Sierra**. Describes a special programme in which education on sustainable resource mananagement in the Peruvian highlands is especially adapted to suit primary education.
- Mukalama, J and Thijssen R. **Participatory means together.** Well-written article describing the process of reintroduction of indigenous tree species in Kenya after participatory consultation on agroforestry.
- Nedessa B. **Food security and ecological stability in ensete farming system in Ethiopia**. Describes the interesting ensete farming system in Ethiopia, popular for its stability and and high resistance to drought.

e-mail!

We welcome your reactions to the Newsletter. If you are on e-mail, why not drop us a line? Please note that the old address has been closed. The one and only e-mail address of ILEIA is: ileia@ileia.nl

Delay

This issue of the ILEIA Newsletter has been delayed considerably, for which we apologise. Serious differences in opinion on how to interpret and implement the overall objectives of the ILEIA Research Programme between some staff members of ILEIA on the one hand, and other ILEIA staff members and the implementing agency (ETC Netherlands) on the other, have caused a slow-down period. While part of the team will leave ILEIA, a new team will continue on a new basis for project implementation as approved by the donor. Due to this situation, there will be only three issues of the ILEIA Newsletter this year. Next year we hope to have the Newsletter on schedule again.

Photo: M. Mapatano

Farmers' research in practice:

Lessons from the field

The fourth book in the Intermediate Technology Publications series ILEIA Readings in Sustainable Agriculture is taking shape. It brings together 17 recent cases from the field about farmers' own research. In many parts of the world, farmers are seeking ways to improve their farming systems and to adapt their practices to changing agroecological and socioeconomic conditions. The contributions to this book give evidence of how farmers adopt, adapt and formulate new ideas and innovations, try them out in different settings , evaluate and assess the results, and make decisions about their potential value for improving the way they farm. The first part of the book contains articles from Mali, Central America, Nepal, India and Switzerland, trying to understand how farmers do research. The second part looks at how technical options are added to farmers' experiments. This part includes cases from Tanzania, Sudan, Sri Lanka, Ethiopia, Kenya, Zaire and Zimbabwe. The third part deals with ways to improve the experimental design and includes articles from Brazil, Bolivia and the Netherlands. The final theme is "sustaining the process" with articles from Mali, Colombia and the Netherlands. In a concluding chapter, the editors bring together the lessons learned and review the outstanding issues and challenges which need attention in future efforts to enhance farmers' experimentation. Major lessons for governmental and non-governmental organisations involved in agricultural development are drawn out.

Contest on mountain farming

Entries are still arriving in response to our contest "A view to our future" published on the back cover of the March 1996 ILEIA Newsletter. We are still studying your letters and plan to announce the winner in the next Newsletter.

Bestseller

The book **Farming for the Future** has been reprinted every year since it was first published in 1992. A total of 11,000 copies have been printed and sold. The book gives an introduction to Low-External-Input and Sustainable Agriculture and includes many cases from all over the world. It is available from Macmillan Press Ltd, Houndmills, Basingstoke, Hampshire RG21 2XS, UK. Fax: +44 256 479476. £ 7.25 plus postage.

Future issues

The first issue in 1997 has as its work title "Forging linkages: collaborating with new partners". This issue will look at methodologies for identifying the different actors who work towards LEISA and for evaluating their joint performance; at conflict resolution and joint planning; at the added value of new partnerships and the sustainability of collaborative arrangements. Articles for this issue are to be sent in as soon as possible.

The second issue of 1997 will be a "Keep Rolling" issue. Readers are invited to send in their experiences with a broad number of topics related to LEISA.

NETWORKING is open for (short) contributions from readers. If you wish to ask advice from other readers, or if you wish to announce a workshop or training course or if you just want to react on articles that appeared in the ILEIA newsletter or other hot news items related to sustainable agriculture, please write. We may have to shorten submitted contributions.

Ghana Organic Agriculture Network. The GOAN started in April 1995 and seeks to promote organic and sustainable agriculture and agroforestry in Ghana and currently has 43 member groups and organisations. Its aims are

- to bring together interested farmer groups, individuals, NGOs and institutions who have been working in isolation, to enable them to share ideas and experiences
- to establish a resource base to collate and disseminate global information as well as indigenous knowledge. A question and answer service will be run, and extension literature produced for distribution.
- in the long term, to have a number of local centres and demonstration farms throughout Ghana
- to organise workshops and seminars for farmers, NGOs, school children and teachers
- to carry out a public education campaign to promote awareness
- to establish links with extension, research and educational bodies
- to look at other aspects like the development of local markets for organic produce and establish a local certification body

For more information contact: Emmanuel Antwi, GOAN Secretary, PO Box 6342, Kumasi, Ghana. Fax: +233 51 25306

Village forest reserves. Concern Tanzania is helping villages to get land officially reserved, but with their own management by-laws that are enforceable in the courts. Villagers can be assisted in drawing up a management plan, but it is their decision, through elected village governments. Anyone with any similar experience, especially in East Africa, please take up contact with Concern. They would love to hear your problems, in particular. If anyone in the world has ever tried to do the same thing with e.g. fishing or joint resource management, they are also very interested to hear.

Write to: Simon Levine, Concern Tanzania, PO Box 701, Iringa, Tanzania. e-mail: concernti@africaonline.co.ke

Centro Warisata is an institution of studies and services of information and knowledge for sustainable development. It aims to strengthen technical and scientific capacity of institutions, base organisations, professionals and students of universities. Centro Warisata has a documentation centre with more than 10,000 documents and 5,000 magazines on sustainable development. With its network WARINET, the institution provides services on electronic mail, access to question-and-answer services and computerised information from the documentation centre. A post-graduate course in Sustainable Agriculture and Agroecology is offered.

Write to: Elizabeth Padilla, Centro Warisata, Casilla 5180, La Paz, Bolivia. Fax: +591-2 391458. e-mail: warisata@wari.bo

Powerful Information is an "environmental information service working with economies in transition". They produce bibliographies on a range of environmental subjects. Their so called "briefings" are sold in the West to support their distribution in the South and East. Check out their homepage on the internet (http://www.foe.co.uk/powerinfo).

Write to: Powerful Information, Mike Flood, 21 Church Lane, Loughton, Milton Keynes MK5 8AS, UK. Fax: +44 1908 666275. e-mail: powerinfo@gn.apc.org

The International Ag-Sieve is a four page newsletter that offers a gleaning of recent developments in regenerative agriculture - that is, those farming practices which improve our resources as they are used. Individuals or organisations involved in the operation of an organic farm or garden, or who are utilising regenerative technologies to create a healthy and abundant food supply are encouraged to contact the Ag-Sieve staff in order to have their work publicised. Your work may be featured in an article or added to a list of contact organisations and resources that accompanies each issue of the Ag-Sieve. The International Ag-Sieve is published by the Rodale Institute, a non-profit organisation promoting the importance of and connection between healthy soil, healthy food and healthy people.

To submit a story or for more information, please contact Bill Landesman, Rodale Institute, 611 Siegfriedale Road, Kutztown, PA 19530; Fax (610) 683-8548; Email: wlande@rodaleinst.org.

Indigenous strategies for intensification of shifting cultivation is the title of a workshop to be organised in Bogor, Indonesia, 23-27 June 1997. ICRAF and Cornell University are collaborating with local partner institutions in developing a regional research initiative on this theme. The approach will showcase indigenous knowledge and practices as the point of departure in the search for pragmatic and adoptable solutions to intensify and reinforce the sustainability of highly stessed swidden systems. The workshop is meant to launch the overall research effort.

Technical approaches to stabilizing and improving productity of shifting cultivation systems in the sloping uplands of Southeast Asia have not been successful in identifying alternate technologies widely adoptable by farmers. Farmer rejection of researcher-driven solutions has led to greater recognition of farmer constraints such as labor availability, access to planting materials, and uncontrolled fires or communal grazing. This experience clearly underlined the need for participatory, on-farm research approaches to identify solutions sharply focused to farmer circumstances. There are many examples where swidden cultivators have successfully managed local resources to solve local problems.Farmer responses to intensification pressures include innovations to achieve more effective and more productive fallows. Yet another farmer strategy is livestock-based.

The purpose of the workshop is to present and discuss case studies, with a strong emphasis on innovations in fallow management. The importance of farmer-generated innovations will be highlighted and donor interest in funding further research will be stimulated. The workshop will also try to establish collaborative structure that will enable a regional (SE Asia) research thrust.

For more information contact: Workshop Secretariat, ICRAF Southeast Asia, Jalan Gunung Batu No.5, P.O. Box 161, Bogor 16001, Indonesia. Fax: (63-251) 315-567. E-mail: icraf-indonesia@cgnet.com or icrafind@server.indo.net.id

Improving donkey utilisation and management is the title of a workshop organised by the Animal Traction Network for Eastern and Southern Africa (ATNESA) 5-9 May 1997 in Debre Zeit, Ethiopia. The workshop aims to review existing knowledge (indigenous and international), exchange experiences and identify opportunities for future programme initiatives. Various themes are covered, like using donkeys for transport, tillage, social and gender issues related to donkey use, training and extension, donkey health and indigenous knowledge,

Tracking summits

Parallel to the official World Food Summit (WFS) at FAO Rome, Italy, with Ministers of Agriculture and Heads of states from all over the world, an NGO Forum was organised from 11 to 17 November 1996. The topic of food security was discussed from various angles, ranging from trade, the role of women to sustainable agriculture.

Representatives from over 1,200 organisations from some 80 countries debated and agreed on a statement to the World Food Summit. Many NGOs were not happy with the "half-hearted commitments of world governments to decrease the number of hungry people". However, the World Bank showed a 'mea culpa' on its Structural Adjustment policies, which had neglected agriculture and rural development. In a comment in the Herald Tribune of 15 November 1996, Ismail Serageldin, the vice president for environmentally sustainable development at the World Bank, states: "Rural development is the best way to ensure that poor farmers become more productive, improve their living standards and increase food supplies.... When the small farmer is empowered to produce, local production can rise.... Experience shows that if intensification is carried out in a bottom-up, participatory manner, it leads to improved natural resource management, ensuring sustainable development and food supplies."

The NGO statement to the official WFS indicated that "our collective vision derives from our knowledge that food security is possible. We affirm first and foremost the basic human right to food. Everyone has the right to secure access at all times to safe and nutritious food and water adequate to sustain an active and healthy life with dignity." The NGOs propose a new model for achieving food security through economic and politial decentralisation that challenges the current model, which has produced a concentration of wealth and power that now threatens global food security, cultural diversity, and the very ecosystems that sustain life on the planet.

Text and photos: Wim Hiemstra

I am very positive on the achievements of the NGO Forum. Through the WFS, all the important issues are now out on the table, even among the 160 governments: the problems with industrial agriculture, the need for sustainable agriculture and biodiversity. It will give new impetus to civil society, as the WFS made the space available for NGOs to work on these issues. The space is now open for NGOs to act on them.

Patrick Mulvany,
Intermediate Technology Development Group, England

We hope that the World Food Summit creates an enabling climate for the many African small-scale farmers, who want to produce their own food and be self-sufficient, using means within their reach. This will free them from food aid and free food hand outs.

John Njoroge
Kenyan Institute of Organic Farming, Kenya

It was nice to note that there were a lot of people's movements and farmers organisations. People from the South and the North talk about similar concerns. I was so surprised that we all face similar issues: farmers getting bankrupt, having to sell their lands and cannot continue farming. Sharing experiences reaffirms what we are doing at village level. Right now, it seems that there is more hope that something can be done at global level. Yet, work primarily needs to be done at the local level, we cannot expect international linkages to solve problems in Thai society.

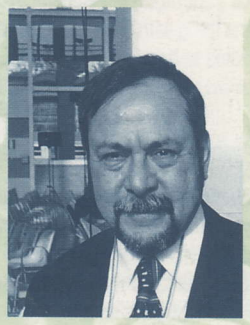
Ravadee Prasertcharoensuk
Rural Reconstruction Alumni -RRAFA, Thailand

In this world of rapidly diminishing resources it is high time to change production and consumption patterns. The most important strategy is to develop agricultural systems based on local renewable resources like solar energy and biological processes, to abolish pesticides and other chemicals and to return clean organic wastes from urban areas to agriculture. The farmers will play an even more important role, not only as food producers but as guardians of biodiversity, environment, culture and in educating consumers about the effects of different consumption patterns.

Inger Kalländer
Swedish Association of Ecological Farmers, Sweden

The NGOs have again demonstrated their capacity to unite and develop proposals. Food security can only be achieved when sustainable agriculture is the aim. This means in the first place to put the farming families in the centre, developing the potentials of their production systems based on careful use of natural resources, develop organic agricultureand the broad concept of agro-ecology. I was impressed by the large participation of farmers' organisations and especially women's groups. Now, the challenge is to implement the proposals in our own countries, building on alliances between farmers organisations and NGOs.

Patricio Yañez
Movimento Agro-ecología Chilena, Chile



We now have a strong, informal movement for safe and sustainable food security and NGOs have been able to strengthen links and build solidarity. The movement is here to stay. The official WFS was disappointing because few of the heads of state of the most economic powerful countries came, but the Pope's message and pitch for equity was well received. The WFS directly or indirectly brought a lot of attention to a neglected area.

Julian Gonsalvez,
International Institute for Rural Reconstruction, Philippines