Abstracts on Sustainable Agriculture

Compiled by Jürgen Carls

VOLUME 4

1991

vieweg

Deutsches Zentrum für Entwicklungstechnologien – GATE

Deutsches Zentrum für Entwicklungstechnologien – GATE – stands for German Appropriate Technology Exchange. It was founded in 1978 as a special division of the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH. GATE is a centre for the dissemination and promotion of appropriate technologies for developing countries. GATE defines „Appropriate technologies" as those which are suitable and acceptable in the light of economic, social and cultural criteria. They should contribute to socio-economic development whilst ensuring optimal utilization of resources and minimal detriment to the environment. Depending on the case at hand a traditional, intermediate or highly-developed can be the „appropriate" one. GATE focusses its work on three key areas:

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– *Research and Development:* Conducting and/or promoting research and development work in appropriate technologies.

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GATE has entered into cooperation agreements with a number of technology centres in Third World countries.

GATE offers a free information service on appropriate technologies for all public and private development institutions in developing countries, dealing with the development, adaptation, introduction and application of technologies.

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– provision of materials and equipment for projects, planning work, selection, purchasing and shipment to the developing countries
– management of all financial obligations to the partner-country.

Deutsches Zentrum für Entwicklungstechnologien – GATE
in: Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH
P. O. Box 5180
D-6236 Eschborn
Federal Republic of Germany
Telephon: (06196) 79-0 Telex: 41523-0 gtz d Fax: (06196) 794820

Abstracts on Sustainable Agriculture Volume 4, 1991

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PREFACE

This is the fourth GTZ publication to bear the title "Abstracts on Sustainable Agriculture".

These Abstracts grew out of the supraregional intercropping project financed by the German Federal Ministry for Economic Cooperation (BMZ). Once the main objective has been reached the project itself was disbanded, but the Abstracts continued to be published, due to the high, and increasing interest of the users.

Intercropping, however, is just one of the many facets of sustainable agriculture, and it has thus been decided to expand the Abstracts to deal with a broader field. To do justice to the new, enlarged subject matter they have been renamed "Abstracts on Sustainable Agriculture".

The Abstracts are more comprehensive than the usual type of annoted bibliography but they cannot substitute the original publication. For details we advise the reader to refer to the original.

We hope that the Abstracts have a valuable role to play as part of the external input in the drafting of extension programmes. They make no claim however to offer tailor-made solutions. The responsibility for adapting the Abstracts to suit local conditions rests with the reader.

Readers interested in the Abstracts are asked to adress their request to:

F. Vieweg Verlags GmbH
Postfach 300 944
D-5090 Leverkusen 3
Germany

or

Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)
- GATE -
Postfach 5180
D-6236 Eschborn 1
Germany

Eschborn, Februar 1992 Jürgen Carls

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GUIDE TO READERS

Selection of literature for the abstracts has been based on the following criteria:

- Ecological Aspects
  - . Sustainability
  - . Resource stability
  - . Soil fertility
  - . Diversity

- Socioeconomic Factors
  - . Promotion of smallholders
  - . Integrated systems (Animal-Man-Plant)
  - . Transfer of knowledge
  - . Low-external-input agriculture
  - . Sociocultural aspects

- Locational Factors
  - . Regional- and site-specific
  - . Practice-oriented
  - . Alternative uses

THE ABSTRACTS ARE SET UP IN THE FOLLOWING WAY:

(1) Abstract number

(2) Principal key-word: traditional land-use systems, cropping systems agroecology, agroforestry, farming systems research and development etc.

(3) Key-words; if relevant, the geographical demarcation (continent, country) or the agroecological zone is given; the key words "review", "field trial", "field study" or "farm survey" indicate the nature of the paper; common names of field crops, soil fertility, pests, diseases, socioeconomic aspects etc. are used.

(4) Author's name.

(5) Title in the original language.

The subject index, based on the key-words, and the geographical indices are intended to help the reader to quickly find abstracts on specific aspects or areas of sustainable agriculture. The index of authors is intended to help the reader to find all publications by a particular author.

I TRADITIONAL LAND-USE SYSTEMS

778 91 - 1/57

Traditional land-use systems
Review, handbook, farming systems, land productivity, shifting cultivation, intensive agriculture, traditional methods, agricultural sustainability, socio-economy, deforestation, desertification, marginal land, soil erosion, soil fertility, overstocking, agroforestry, farming household, women farmers, land tenure, CTA, IFAP, DANIDA

IFAP

Putting sustainability into context.

In: Sustainable Farming and the Role of Farmer's Organizations, IFAP, Paris, 1990, pp. 7-18

Sustainable has become a very fashionable word and is currently widely used when either refering to agriculture or to development or to both.
Three major interlinked aspects have to be considered. First, sound environmental management and conservation of the natural resource base must be ensured. Second, the attainment and continued satisfaction of human needs for present and future generations must be assured. Third, sustainable farming systems in the long term can only be successful if these are agreed, and implemented, by the whole community.
Sustainable agricultural systems do have certain characteristics. They are generally:

- **stable:** do not disrupt ecological systems or over-exploit natural resources - instead there is a rational use of renewable resources;
- **regenerative:** minerals and nutrients removed by crops are replenished in the soil;
- **productive and profitable:** capable of continuous reliable production levels - creating surpluses above the family needs for minimum survival;
- **resilient:** have the ability to absorb changes, to retain characteristics in the face of disturbances such as adverse weather conditions, or resist attacks by pests, insects, diseases;
- **appropriate:** reflecting, and adapted to both the needs, skills, training and finances of the farmers as well as to the environment;
- **self reliant:** based on the efforts and ideals of the farmers themselves, diminishing the dependence on nonrenewable, often imported resources, such as chemicals and fertilizers;
- **non-disruptive:** do not destroy the socio-cultural environment, for example, forcing people to adopt practices which are against their normal behaviour and traditions, or resulting in migration of rural dwellers to urban areas.

Two types of farming systems: intensive agriculture often associated with cash or export crops and largely dependent on external inputs and traditional shifting cultivation agriculture - are used in this paper to illustrate how the agro-ecological environment, in both cases, can steadily deteriorate through progressive over-exploitation of natural resources.
The overall impact on the system as a whole can, in some cases, be devasting in the longer term. Cultivation of annual crops on forested mountain slopes depletes fuelwood and forage resources. Eventually, dung may have to substitute for wood or charcoal as household fuel, thus depriving the soil of necessary nutrients. Cleared land is often used for intensive cropping using improper cultivation practices. The combination of prevailing heavy rainfall, shallow fragile soils and degraded vegetative cover, which affords little protection, invariably leads to severe soil erosion within a very short period of time, and productivity rapidly declines. The land resource becomes more and more stressed, the farmer more and more impoverished.
These ultimately environmentally destructive farming practices affect not only the present generation of farmers, but can have serious implications for future generations of producers.
There are certain features which distinguish an appropriate farming system no matter where the activity is being undertaken. This could be defined as one that fulfils both the current needs of the farmer: in terms of providing the farming family with sufficient food to survive and/or producing a cash surplus. Yet at the same time, it does not destroy the natural resource base nor depletes the capacity of the land to provide for the needs of present and future generations. It is therefore sustainable over the long-term.
Under relatively stable conditions, many farming practices have fulfilled the above criteria for decades, even centuries.

779 91 - 1/58

Traditional land-use systems
Review, book, developing countries, sustainable development, case studies, traditional methods, human aspect, local people, politics, women, facilitator techniques, training material, ITDG

TAYLOR, L. and P. JENKINS

Time to listen - the human aspect in development.

Intermediate Technology Publications Ltd., 103/105 Southampton Row, London, UK, ISBN 1-85339-004-6, 1989, 76 p.

This book is a collection of 55 case studies presenting situations that face rural and urban communities in developing countries.
The case studies include conversations, exchanges of letters and illustrations to be used for roleplays and discussion starters.
Most of these case studies have been tested on UK and overseas students.
It is essential that local people are involved in development that affects them: not only in implementing projects, but also in the decision-making. We must learn to listen, the authors assert.
Before a project commences, its likely effects must be explored with care and imagination. If time is not taken, the voice of the poorest will not be heard. It may take years before a man understands the workings of his own community. One cannot rush into the communities of others and understand them in days or weeks.
Local people must be involved in development, not only in the implementation of programmes, but in the choice and planning of them. This does not mean just the local development workers, but the actual villagers.
Time must be taken to hear all opinions and listening, accompanied by careful consideration.
This collection of case studies presents experience from real life: a situation, event, process or problem. A handful are taken from radio or television; the vast majority are from direct experience. Though based on situations that actually occured, the wording of conversations, letters, posters, etc. may not be exactly as it was in real life. The names of people and places are disguised, and the photographs of people and places are not those of the actual place or the people involved: they are there to promote imaginative involvement.
The case studies do not attempt to provide answers or solutions to the problems and issues raised, and many leave the situation open-ended. They are starting points for learning, rather than attempts at authoritative conclusions.
The studies are short and easily accessible, and they present many basic aspects of life in the Third World.
These case studies offer stimulating material for people who are active in helping to raise awareness and increase informed support for development efforts worldwide.

All the material in this collection originates from actual experience. It is a small part of a much larger collection of such material used in the training of development and aid workers by Laurence Taylor and his colleagues at the Selly Oak Colleges in Birmingham.
This book is designed to be used at a number of levels, from school discussion groups, to training for Third World volunteers and community development workers in the Third World.
The book will be of use to all those involved in development activities and others looking to extend their general awareness of this exciting area.

780 91 - 1/59

Traditional land-use systems
Review, sustainable agriculture, internal resources, external resources, soil fertility, pest control, intercropping systems, crops, IIED, SIDA

FRANCIS, C.A.

Internal resources for sustainable agriculture.

Gatekeeper Series No. SA8; IIED, London, UK, 1990, 15 p.

The majority of Third World farmers have been untouched by new technologies. The substantial inputs of chemical fertilisers, pesticides, and other fossil fuel derived production inputs needed for these technologies continue to be unavailable or unaffordable to most resource poor farmers.
The alternative is to concentrate research and development efforts on technologies that are low-cost, appropriate in scale and application, safe and affordable.
Sustainable agriculture builds its foundation on the resources which are renewable within the farm and the immediate area. Rainfall, biologically fixed nitrogen, nutrients from lower soil strate, and biological pest control based on crop rotations are some examples of such 'internal resources'. They can be contrasted to external counterparts, namely irrigation water from a distant source, synthetic nitrogen fertiliser or phosphates brought in from outside, and chemical pesticides. Internal and external production resources are explained in detail in this paper.
External resources such as fertilisers and pesticides have greater potential for contaminating groundwater as well as causing family and off-farm health problems, especially where educational level is low and technology is not easily and safely applied in farming. There is also a greater long-term fossil fuel energy investment, since most external production factors are ultimately dependent on this scarce resource.
An external indebtedness ties the farm into a larger economic structure, and benefits are more likely to leave the community. In general an environmentally sound and sustainable agriculture is more likely to be fostered by farming systems under management and financial control of families living directly on the land.
When labour and management are primarily internal - for example a family owned and operated farm - there is an integral involvement of people and their long-term goals with the decisions on the farm. There is greater concern over the safety and health of those working on the farm and the quality of the immediate environment in which they live and work. This tends to build in planning over longer time horizons. Similarly, when the primary source of capital is the family and community, there is a sharing of risk and reinvestment of profits into the farm and the same community.
On the other hand the seeds of self-pollinated crop varieties such as rice, wheat, cowpea, or dry bean can be saved by the farmer for planting in the next season or year, providing some care is taken

to maintain the disease-free nature of the variety through selection of healthy plants and seed. As a result of this process, the seed becomes an internal resource on the farm. Several examples of crop varieties that exploit internal resources in cropping systems are refered to in this paper.
Providing adequate nutrition to crops in the past has emphasised the use of fertilisers.
Internal sources of plant nutrients include those present in the soil organic matter and mineral fraction, nitrogen fixed by legumes and other N-fixing species, rainfall, and lower soil strata. Although not available in all situations, when an internal source of fertility can be substituted for a purchased fertiliser there is a saving in production costs. In addition, most internal fertility sources provide less potential for harm to the environment. Examples of farming practices that can promote use of nutrients internal to the system are explained.
A rational lower cost alternative to chemical control is integrated pest management, a strategy which looks for economic and biological threshold levels before using any chemical or other control. Other internal resource approaches include crop rotations, genetic resistance and biological control.
Much of the production of major food crops in developing countries takes place in complex systems, often involving intensive intercropping with more than one crop in the field at the same time.
Intercropping systems bring diversity and resource use intensity to environments which are often harsh in terms of scarcity of some key resource. This may be water, nitrogen or phosphorus, or chemical inputs to control pests. Farmers are rational in their use of intensive systems to provide some cultural control of fertility, insect pests and weeds. When the crops are destined to provide both food supply and income, the greater diversity of multiple species systems gives a better balance to the family diet - especially when there are limited cash resources to have access to food in other ways.
The greatest potential for improving productivity while reducing purchased fertiliser and chemical inputs is to build an efficient use of internal production resources. This will also lead to systems which have less adverse effect on the environment.
This Gatekeeper Series is produced by the International Institute for Environment and Development to highlight key topics in the field of sustainable agriculture. Each paper reviews a selected issue of contemporary importance and draws preliminary conclusions of relevance to development activities. References are provided to important sources and background material.
Copies of these papers are available from the Sustainable Agriculture Programme, IIED, London (£1.50 each inc. p and p).

781 91 - 1/60

Traditional land-use systems
Latin America, Mexico, Central America, traditional systems, resource management, indigenous knowledge, farmer, energy needs, soil classification, soil management, slope management, water management, climate management, space management

WILKEN, G.C.

Good farmers: traditional agricultural resource management in Mexico and Central America.

University of California Press, Berkeley, USA, ISBN 0-520-05277-3, 1987, 303 pp., USD 47.50

Indigenous knowledge has been rediscovered within the rural development community, and traditional farmers and their functioning systems are being given credit and attention in contemporary project design.
The farming systems that have sustained humanity for centuries have been condemned without trial and have been sentenced to "modernization" without an understanding of their workings or an assessment of their potential.
Farmers in Mexico and Central America have developed effective means of managing soil, water, climate, slope, and space without the use of major modern equipment such as the tractor. Traditional farmers work with the natural forces of gravity, wind, and water to shape the landscape and improve crop environments.
The author set out to learn if particular methods work, what can be learned from them, and whether they can be applied elsewhere. The result is a benchmark study of a region of the Third World known for its complex farming systems.
This book describes the methods themselves in detail and also the associated time and energy costs, thus providing a basis for evaluating their efficiency.
The implications of this study are far-reaching. Far from assigning traditional technology to the trash can of history, Wilken suggests that ancient farming methods are alive and good and are capable of increasing yields while conserving scarce soil and water resources. He argues that mechanization and the substitution of foreign technology may never be appropriate in many areas of the Third World. Understanding and improving the traditional technology used by millions of small farmers presently managing some of the world's best farmlands may be the most effective means of conserving agricultural resources and increasing food production.
Not only is the book well written, but it is also well illustrated. Good Farmers would make an excellent textbook if it were available in a less expensive paperback edition.

782 91 - 1/61

Traditional land-use systems
Africa, Kenya, review, traditional system, taungya system, agroforestry, sustainability, productivity, socio-economy, biology, future prospects, ICRAF

ODUOL, P.A.

The shamba system: an indigenous system of food production from forest areas in Kenya.

In: Agroforestry Systems in the Tropics; Kluwer Academic Publishers, Dordrecht in Cooperation with ICRAF, Nairobi, Kenya; ISBN 90-24737915, 1989, pp. 401-410

This paper briefly describes the system's productivity and functioning and analyses its ecological as well as socio-economic characteristics.
The shamba system, a form of taungya where agricultural crops are grown together with forest tree species, has been quite widespread in the "high-potential" agricultural areas of Kenya since the early 1900s, and is still very popular.
The taungya system is a method of planting forest trees in combination with food crops. Its origin can be traced back to the 1850s in Burma, where it was used as a means of replanting teak plantations on badly degraded land. It is essentially a modification of the traditional shifting cultivation, but various forms of the practice can be found in different parts of the tropics.
The main difference of the shamba system to this system and many other forms of taungya is the considerable integration of the cultivators into the Forest Department (civil service status).
The main objective of permitting farming in forests was to establish exotic forest plantations with minimum establishment costs. Several types of participants, such as serving and retired forest workers, landless peasants and those who live within the immediate vicinity of the forest area, used to be involved in the practice. Under the traditional shamba system, the resident workman would agree to work for the Forest Department for a period of nine months each year, to clear, in his own time, the cut-over, indigenous bush cover from a specified area (usually between 0.5 and 0.6 ha each year). That would enable the Forest Department to plant trees in the cleared land (the "shamba") within two years. Each participant would have four shambas each of about 0.5 ha area at different stages of establishment, ranging from recently allocated (cleared) bush to those with two-year-old trees. The farmers would be allowed to cultivate crops (usually maize, potatoes, cabbages, carrots, etc.) for up to two or three years, the farmers having the sole right to all such produce.
The system continued fairly successfully, mainly because of four factors:
- the availability of sufficient cultivable land;

- the presence of a willing land-hungry farming population;
- the availability of a market for surplus produce; and
- security - protection against wild animals.

The shamba system has undergone substantial changes since its beginning in the early 1900s, the most significant being the increase in the number of participants.
The future prospects of the system can be summarized as follows:
The shamba system will continue to play a major role in forest plantation establishment in Kenya. With high rates of population growth, unemployment and food shortages the system will continue to play a leading role in the economy.
In view of the importance of the system, and the large number of people supported by it, it is essential to undertake research to evolve appropriate technologies to improve the productivity and sustainability of the system.
The provision of easy credit facilities to the farmers for the purchase of fertilizers and other inputs also needs to be properly organized.
When properly practiced, the system allows sustained, optimum production of food crops along with forestry species from the same land and thus meets most of the social and economic needs of the shamba farmer.

783 91 - 1/62

Traditional land-use systems
Africa, Zambia, study, traditional agriculture, farming systems, woodland, ash cultivation, mound cultivation, nutrient cycling, soil fertility, tillage

STROMGAARD, P.

Soil nutrient accumulation under traditional African agriculture in the miombo woodland of Zambia.

Trop. Agric. (Trinidad), 68, 1, 1991, pp. 74-80

Deforestation is prevalent under the increasing population pressure, and there is therefore a need to develop systems of soil and crop management which can facilitate sustained food crop production.
Large areas of East and Central Africa are covered by 'miombo', a single-story woodland with a light but closed canopy, usually attaining a height of 12-15 m, dominated by members of the Papilionaceae and Caesalpiniaceae, especially of the genera *Brachystegia* Benth. and *Julbernardia* Pellegr. The major agricultural activity is an ecologically based shifting cultivation economy, which depends on the miombo woodland as an agricultural fallow crop.
The northern parts of Zambia are renowned for the indigenous agricultural systems which have been developed to suit the varied conditions of soil, vegetation and topography. The traditional agricultural system of the major tribe of the area, the Bemba, is basically one of shifting cultivation, but with many variants which are adaptations to the particular environment.
In the Zambian type of shifting cultivation ('chitemene') trees are not simply felled and burned in situ, but branches are lopped and chopped from a wide sourrounding area and piled into large heaps in a smaller area and burned. The effect of both ash and heat is in this way concentrated in a small area. However, this agricultural system is breaking down for, with increasing population density, vegetation is more frequently clear-felled.
Other agricultural practices are therefore becoming more widespread in the area. Although the 'chitemene' shifting cultivation system of the Bemba is the dominant feature of their agriculture, many other types of cultivation are taking place.
In this paper, the soil fertility aspect of both large-circle and small-circle 'chitemene' shifting cultivation will be compared with three other traditional agricultural systems: the common type of mound cultivation, 'ntumba' in Bemba but known all over Africa, a special flat type of green manuring; 'chibela', where fresh vegetative material is hoed and buried with cassava cultivated on the flat soil surface; and the 'fundikila' system of the Mambwe tribe - a compost-mound system where legume cultivation on mounds alternates with the flat-cultivation of cereals.
In the miombo woodland of the study area, sampling was carried out to obtain soils from different types of agricultural systems.

All samples collected for chemical analysis were either transported by air to Denmark, or processed at Mount Makulu Central Research Station, Lusaka.
The results can be summarized as follows: Two types of wood-ash fertilizer-based shifting cultivation systems were shown to mobilize P, even in deeper horizons, immediately after burning; the changes in cation exchange capacity and amounts of exchangeable macronutrients were most felt in the upper part of the profile. Mound cultivation concentrated soil nutrients of the topsoil with significant effect. K and P concentrations were slightly lower than under ash-fertilization, but CEC values were even higher. As an alternative to mound and ash-cultivation, compost-dependent systems were shown to accumulate nutrients effectively; after four years of legume-cereal crop rotation on mounds alternating with flat-cultivation, more nutrients accumulated in the soil of the mound were present than before the fallow.
The Mambwe people have apparently developed a compost-mound system, where a legume-cereal rotation on mounds alternates with flat-cultivation, as a possible sustainable solution for agriculture in a treeless area. As demonstrated, local cultivation strategies must be included in future agricultural planning. It is a truism to assume that modern agricultural methods are incompatible with indigenous agricultural technology; rather, a balance between the two should be aimed at.

784 91 - 1/63

Traditional land-use systems
Review, book, historical study, ecosystems, people, traditional systems, ecoculture

DE HART, R.A.

Ecosociety: a historical study of ecological man.

Natraj Publishers, Dehra Dun, 17, Rajpur Road, Indra, India, 1984, 178 p. + appendix

In seeking to solve the problems of pollution, malnutrition, epidemics, bad housing and underemployment, much can be learnt from communities throughout the ages which have developed ways of life characterised by positive all-round health, longevity, creativity and organically intensive methods of land-use.
Throughout history the rural community has shown the greatest genius for survival. Despite disasters of all kinds due to natural causes, to wars, oppression and exploitation, it has been the family farm, the village, clan or tribe to its own piece of land, which, by its endurance, perseverance, skills, ingenuity, improvisations and continual creativity has maintained human existence and the essential basis of civilisation.
The unhistorical peasant is the indispensable backbone of all history.
The book is divided into 13 chapters:
- I The womb of nature
- II The city state
- III Tribe and clan
- IV The European village community
- V Non-violence and the environment
- VI The birth of a nation
- VII Fourth World: the conservation of minorities
- VIII China: a study in continuity and change
- IX Land of promise
- X Ecosystems and their peoples
- XI Ecoculture
- XII A moral equivalent of war
- XIII Design for a world

Appendix: Extracts from the great law of peace of the Iroquois.

Robert Hart describes how people have slotted into the natural order of things in the past, how some are seeking to do so now and how we may all do so in the future.
It is important not to underestimate the value of traditional know-how, experience and ways of living of the more advanced peasant communities in many parts of the world. Those people have built up a vast capital of survival techniques, based on personal observation of local soils, climates, crops and livestock.
The author argues that one of man's main hopes of surmounting the basic challenges of this most crucial era in world history must lie in an international programme of comprehensive resource

development schemes, designed to meet essential human needs and to solve the problems of environmental pollution.
This is a book well worth the attention of those concerned with nature, environment and the survival of man. The book is not easily read and most appropriate for scientific audiences.

785 91 - 1/64

Traditional land-use systems
Book, review, Pacific, Papua New Guinea, subsistence agriculture, traditional agricultural

GOELTENBOTH, F.

Subsistence agriculture improvement - manual for the humid tropics.

Wau Ecology Institute Handbook, No. 10, National Library, Papua New Guinea, ISBN 3-8236-1157-7, 1990, 226 p., 2nd. ed.

This manual of subsistence agriculture is the end result of consistency and persistence in the development of appropriate techniques in improving subsistence agriculture production. Subsistence agriculture maintains 80% of the 3 million people in Papua New Guinea (PNG). It is the major preoccupation of the bulk of the rural population. It is their way of life.
PNG is experiencing a rapid depletion of its forest resources through timbering, agricultural development and traditional agricultural practices in a new context of localized overpopulation. Traditional methods involve the cutting of forests for temporary gardens and repeating this process when the soil becomes depleted. With increasing population growth, this method can result in the elimination of the primary forest and create an impoverished environment, such as a grassland, which has nutrient-depleted soils. On the other hand, primary forests may be transformed to monocultures for export commodities without regard to the villagers' needs and the native flora and fauna. This is particularly true for areas where big timber projects are set up.
Since most of the people in PNG still live in villages, some far away from roads and airstrips, subsistence agriculture is very important to their existence. Steps have to be taken through extension of education to modify the practices that result in soil loss and nutrient depletion in subsistence farming throughout PNG. The traditional custom of swidden or slash-burn farming was adequate under the earlier low-population situation, but with current rapid population growth it threatens the forests, especially on slopes. People of the forested and sparsely inhabited areas practise long fallow. In the anthropogenic grasslands, the people fallow their gardens for shorter periods and substitute various soil-enriching techniques for soil regeneration.
A great variety of horticultural practices and strains of food plants have accumulated in PNG over the centuries. They are closely adjusted to the local farming and environmental conditions; thus adaptive agricultural structures are all too easily destroyed by population pressure or cash cropping.
Recognizing the impact of extensive farming systems on tropical forests and resulting environmental degradation such as a decrease in species diversity, species extinction and erosion, and in order to improve the nutrition of subsistence farmers, the Wau Ecology

Institute initiated studies in 1976 toward the transformation, intensification and site-stabilization of shifting agriculture. On the basis of these studies, project activities started in 1982 to combine traditional and improved appropriate gardening techniques and to extend these methods to officials, associations, village groups and the individuals who are expected to do training and extension work.
The intended result of this program is to maintain an effective subsistence agriculture system which provides a self-sufficient food supply and supports the villagers socially, economically and nutritionally.
After only four years since the publication of the first issue of this book, this second issue is needed. The improved version of the book should help to disseminate the information, how the situation of the subsistence farmers in tropical highlands could be promoted. It is also hoped, that it will be an example for others to do similar work for other regions of the tropical zone, an environment already under an increasing stress.

786 91 - 1/65

Traditional land-use systems
Review, book, farming systems, traditional methods, women, economic development

BOSERUP, E.

Woman's role in economic development.

Earthscan Publications Ltd., London, UK, ISBN 1-85383-040-2, 1989, 279 p.

The UN Decade for Women has come and gone. The majority of women, particularly in the poorer parts of the world, were unaware either of the objective or of the impact of such a Decade.
In the vast and ever-growing literature on economic development, reflections on the particular of women are few.
A main characteristic of economic development is the progress towards an increasingly intricate pattern of labour specialization.
Both in primitive and in more developed communities, the traditional division of labour within the farm family is usually considered 'natural' in the sense of being obviously and originally imposed by the sex difference itself.
An important distinction can be made between two kinds or patterns of subsistence agriculture: one in which food production is taken care of by women, with little help from men, and one where food is produced by the men with relatively little help from women.
With modernization of agriculture and with migration to the towns, a new sex pattern of productive work must emerge. The obvious danger is, that in the course of this transition women will be deprived of their productive functions, and the whole process of growth will thereby be retarded. Whether this danger is more or less grave, depends upon the widely varying customs and other preconditions in different parts of the under-developed world. The objective of this book is to identify these patterns and to explain their significance from the point of view of development policies.
Many of the conclusions drawn in the book are necessarily tentative and provisional, and some aspects of the problem had to be omitted for lack of basic information.
However, this is the first investigation ever undertaken into what happens to women in the process of economic and social growth throughout the Third World. It examines what happens to marriage systems and to women's rights in land when agriculture is "modernized". It looks at the changes that occur when, in the process of industrialization, large numbers of families leave their rural homes for the towns. It considers the issue of job discrimination against women in developing industries. The author compares the pattern of female employment typical of Latin America with those of Africa and India, and raises the issue of whether it is more conducive to economic development.

This book has become a classic not only for economists and sociologists but for all those who take an active interest in womens social and economic problems throughout the world.
The book can be recommended to all those interested in development aspects in the Third World and particulary the role of women in this process.

787 91 - 1/66

Traditional land-use systems
Asia, China, study, traditional methods, ethnobiology, development, sustainable farming systems, forest management methods, religion, traditional knowledge

SHENGJI, P.

Ethnobiology: a potential contributor to understanding development processes.

entwicklung + ländlicher raum, 25, 2, 1991, pp. 21-23

Ethnobiology refers to the interrelationships between human cultures and other living organisms and has been further developed as a concept encompassing relationships between contemporary biology, anthropology and ecology.
The basis on which ethnobiology is founded is the recognition of two "systems" of knowledge - one refered to as international and the other as indigenous.
In rural development programmes, ideas involving indigenous or local knowledge could play an important role, not only benefitting the cultures in which the knowledge evolved but also others facing the same or similar problem areas.
Within the last decade, research has begun identifying, documenting and explaining such indigenous knowledge systems in different cultural and ecological zones so that ethnobiology can start making a contribution to sustainable agricultural or rural development programmes.
This paper will illustrate this potential using examples from south-west China and explain how this field deserves international support if the obvious potential is to be turned into practical development work at the implementation level.
The cases based on ethnobiological field expeditions to southwest China may serve as examples of this research:
- Maintaining sustainable mountain farming systems
- Sustainable forest management methods
- Religion, farming and forest use.
If ethnobiology is to contribute to rural and agricultural development programmes, resources have to be developed to researching and documenting traditional knowledge in a variety of cultural and ecological settings.
Land-use patterns should be studied in detail. It is important to understand the components of each land-use system, how farming and forested land-uses interact, how sustainable production is achieved and how cultural and religious restraints affect land-use. Localised farming systems using local crop varieties or plant strains not found elsewhere should be recorded and preserved. Agro-forestry practices and techniques also have to be studied, particularly management strategies of non-timber forest products, fuelwood trees and fodder trees.
Ethnobiological studies can help locate traditional practises which can be put to wider use. Whilst these could bring potential

benefits to the peoples where the discoveries are made, past experience shows that the returns were not made by the peoples in rural areas but exploited by others.
The ethical issues must be discussed so that this knowledge is not regarded as a "free good", rather there should be adequate compensation paid to support rural development conservation projects, environmental management efforts etc. Legal and practical mechanism should be found to protect the "intellectual rights" on traditional knowledge.
Author's summary, extended

788 91 - 1/67

Traditional land-use systems
Africa, Asia, Latin America, Europe, Oceania, USA, review, book, traditional resource management, resource base, regional assessment, traditional methods

KLEE, G.A.

World systems of traditional resource management.

Winston & Sons and E. Arnold, London, UK, 1990

This book is of major interest because it is one of the very few examples that, even at several places, explicitly picked up the challenge that was formed on identifying traditional microclimate management and modification. This is not the case in the paper on Africa, where only the use of mulches, shade, irrigation, erosion control and the use of wind and solar energy for several purposes are mentioned in an essentially ethnoscientific approach. In the paper on the Middle East water control is the main subject with emphasis on the danger of socially unadapted "modern" approaches. However, the chapter on South Asia has a sub-section and a table on microclimate management, including examples of shading, surface geometry management, tillage systems, mulches and wind management, indicating the land type, the resource complex/crop and the locations where these techniques are practised. In comparable tables on soil, water, space and plant/vegetation management, many of these and related aspects return in the same descriptive way. The most saliant feature of the chapter on East Asia is the high valuing of the low external input peasant-gardening resource systems, based on sound ecological principles but nevertheless in a condition of unstable equilibrium with its environment because of a massive submission of all other resource systems to the needs of agriculture. However, it is stated that through an untutored understanding of the basic ecological principles at work, the farmers of the peasant-garden system were able to combat a great many of these problems, partly through the judicious imitation of natural ecosystems in such practices as intercropping, multiple-cropping, and partly through additional inputs of labor directly applied to combatting the environmental damage. This book is rich in tables and one of them mentions here as important examples for our purpose the temperature control in nursery beds (including blackening for warming), straw mulching, ridging and water conservation and erosion prevention. Japan is mentioned as an example where the rich traditional knowledge is getting lost for ever. In the chapter on Latin America, microclimate management figures explicitly again in a sub-section and a table as being found widespread. This includes mulching, temperature control, dew inducement, shading, wind breaking, reduction of evapo-transpiration, reduction of rain impact, and infiltration control, as well as the means of water and space control, crop scheduling, multiple cropping functions, multi-layering functions and ridging/mounding/pitting. It is our task as scientists, this paper

says, to seek out the "essence of palaeotechnic permanence" and apply it to our use of the earth's resources. In the paper on Oceania, sunken gardens and pits, pot cultivation, swidden agriculture and other traditional soil and water conservation practices are mentioned that have microclimatic implications.
Only mulching, mounding, soil erosion controls with trees and shelterbelts are explicitly mentioned, also in the interesting table on lapsed or dying-out attitudes and practices that might be revived, reinforced or modified. It is finally worth mentioning that in the chapter on North America, microclimate management by Southwest Indian horticulture and by Atlantic subsistence farmers of Canada are explicitly mentioned.
Abstract by C.J. Stigter, Netherlands

789 91 - 1/68

Traditional land-use systems
Latin America, Peru, study, traditional potato storage, farmer's knowledge, traditional methods, CIP

RHOADES, R.E.

Traditional potato storage in Peru: farmers' knowledge and practices.

Publ. of CIP, Lima, Peru, Research Series No. 4, 1988, 65 p.

The objectives of this study are to analyze contemporary potato storage practices in the main producing regions of Peru and to understand their function and position within the broader agriculture system.
Although farmers have been storing potatoes in a traditional manner for centuries, rarely have the problems or the knowledge acquired by farmers been studied or incorporated into post-harvest technology projects or seed potato programs.In the few cases where an interdisciplinary approach involving farmers has been tried, successful design and transfer of new technologies and management practices have resulted.
Storage in the homeland of the potato should not be understood in isolation, as a purely technical phenomenon, but rather as a cultural practice which serves the needs and goals of rural households. In this regard, traditional storage is a manifestation of, and in turn influences, production, distribution, seed exchange, marketing, processing, and consumption.
Peru is characterized by a complex potato production pattern, and as such is an excellent case to illustrate the diversity of storage needs, which a complex system precipitates. Potato production in the two main agroecological zones - coast and highlands - have marked seasons dependant on climate. These varying degrees of complexity make storage decisions dificult. In addition to the coastal-highland difference, there is also one major and one minor potato crop in the Peruvian highlands. As in many tropical countries considerable local variation exists as well. The harvest from coastal valleys occurs between the major and minor highland crops and helps guarantee that fresh potatoes are available in some parts of the country throughout the year.
In the highlands, traditional storage of potatoes dates back to the origins of agriculture thousands of years ago in contrast to the coast where potato cultivation is relatively new. On the coast, potatoes are planted during the coolest months of the year; in the highlands, where the larger portion is planted on dry land, planting is determined by the rainfall and frost cycles.
The storage requirement is largely satisfied at the individual farm level where small quantities of potatoes are stored for a range of home uses including future sale. Quantities stored in this way rarely exceed 10 tons but even assuming that only 75% of potato producing farms store 500 kg of potatoes for future sale

this amounts to some 650,000 tons or around 40% of the national annual production.
The willingness to invest in improvements can be influenced by varieties. For example, modern higher yielding varieties are commonly stored at the farm for home consumption and future sale but principally as a means of maintaining cash-flow into the producing household. The locally preferred native varieties, for which there is commonly a strong demand, are stored for both home consumption and profit-making reasons. This practice also reflects the fact that because native varieties cannot be produced on the coast their price responds more directly to the local supply and demand situation.
The coast depends for its potato crop basically on highland seed.
Cold storage is the safest way of storage but accessible to only a few farmers. Rustic storage in the Colca is practiced successfully by very few farmers due to risk of dehydration, rotting, and insects.
Seed tuber storage in the highlands is mainly done in in-house stores.
Potato storage for home consumption on the coast is done among small producers, members of cooperatives, and agricultural laborers, with the objective to save their own supply of potatoes after the harvest.
In the highlands, extreme care is taken with storage for home consumption, since potatoes must last until the following harvest. The storage period varies with the cropping calendar. In the region of Cusco, the storage period can last eight months.
In summary, the traditional storage of potatoes in Peru has complex characteristics. Technical and socioeconomic investigations to improve traditional storage conditions must acknowledge this complexity which involves a myriad of storages facilities and strategies ranging from the household level to the national level. Most attempts, however, to improve storage have concentrated on large-scale governmentally-controlled stores often located outside the main production areas to the neglect of household storage. This study has illustrated that in terms of volume and economic significance local level storage is vastly more important. In the future, the technical needs of farm household storage should be directly addressed by programs.

II FARMING SYSTEMS RESEARCH AND DEVELOPMENT

790 91 - 2/88

Farming systems research and development
Review, book, developing countries, sustainable development, environmental aspects, social theory, global economic system

REDCLIFT, M.

Sustainable development - exploring the contradictions.

Publ. of Routledge, 11 New Fetter Lane, London EC 4P 4EE; ISBN 0-415-05085-5,1989

Sustainable Development examines the transformation of the environment in the course of development. It argues that environmental problems need to be looked at internationally, in terms of the global economic system. The degradation of the environment is not 'natural', but linked to historical processes and to economic and political structures. In developing countries environmental 'management' is assuming more importance as desertification, deforestation and food insecurity becomes more significant.
Development is regarded as an historical process which links the exploitation of resources in the more industrialized countries with those of the South. The perspective adopted is that of political economy, in which the outcome of economic forces is clearly related to the behaviour of social classes and the role of the state in accumulation.
Sustainable development should imply a break with the linear model of growth and accumulation that ultimately serves to undermine the life support systems. Development is too closely associated with what has occured in western capitalist societies in the past.
Beginning with the discussion of the concept 'sustainable development' in chapter 2.In this chapter the ecological theory underpinning sustainability is reviewed, and the role of energy and population are assessed in relation to the environment.
Chapter 3,takes issue with the failure of conventional economics to provide an adequate theoretical account of environmental factors and compares the arguments for a more inclusive economics with the view that other paradigms may provide alternative in sights and policy agendas. The perspectives of 'deep ecology' and orthodox Marxism are discussed, and their limitations revealed.
Chapter 4 and 5 examine the dimensions of the global environmental 'crisis' from the perspective of international political economy, arguing that the process of development cannot be divorced from the international economic system in a specific historical phase. It is international economic structures, as well as intellectual traditions, which impede the progress. Chapter 5 demonstrates how specific economic linkages have evolved between North and South, helping to establish environmental conditions for development and accompanying problems for developing countries. This chapter then

examines the explicit recognition that sustainability must be linked to a new 'style' of development, which has been convincingly argued by the Santiago office of the United Nations Environment Programme UNEP).
Chapter 6 returns to what is happening on the ground, by examining the relation between commodity production under capitalism and the kind of environmental transformation to which commodity production and the market give rise. A detailed case study of Eastern Bolivia reveals the extent to which development solutions that are ecologically and agronomically sustainable confront both structural obstacles in the wider economic system and the conflicting effects of poor peoples' strategies to survive.
Chapter 7 takes a closer look at the 'environmental management' approach which is directed at resolving, or reducing, the contradictions exposed by the development process. It discusses the relevance of environmental management and conservation in developed countries for the experiences of developing countries and argues that the experiences of indigenous peoples in 'managing' their environments should be an essential element in a more relevant approach. The organization of poor people around political struggles for environmental objectives is also discussed, with examples drawn from India, East Africa and Mexico.
Chapter 8 explores the 'frontiers of sustainability' by linking two intellectual traditions of scientific thought. The potential strengths and weaknesses of Marxist approaches to the environment, which view the environment as a 'commodity' under capitalism, are linked to the 'production of nature' via biotechnology and genetic engineering. The weakness of Marxist theory in failing to integrate reproduction and ecological sustainability in its account of the development process is paralleled by the failure in the reproductive and biotechnological sciences to address the social and economic implications of transforming nature. Finally, in the conclusion, the argument is restated and re-examined, both for its intellectual coherence and its implications for future practice. If sustainable development is founded on contradictions, who should seek to resolve them in practical policy terms?
This book is about the destruction of life support systems and their creation through biotechnology and genetic engineering.
In this book Michael Redclift argues that if the work of the World Commission on Environment and Development is to be taken seriously it is necessary to redirect the development process itself, to give greater emphasis to indigenous knowledge and to take effective political action on behalf of the environment.
This book is recommended to all those concerned with environmental degradation, sustainable development and the historical processes behind it.
Author's summary, shortened.

791 91 - 2/89

Farming systems research and development
Book, review, sustainable development, case-studies, Africa, Asia, environmental degradation, wealth, inequity, marginal locations

CARIM, E. et al.

Towards sustainable development.

Published by Panos Publications Ltd., The Panos Institute, London WC1 E7EB, UK, ISBN 1-870670-01-9, 1987

In developing countries, much of the environment is being destroyed in response to short-term economic interests.
The environmental degradation in these countries is a result of a vicious circle: poverty - rapid population growth - and over-exploitation of the shrinking natural resources.
The solution to the problem is to formulate a growth so that natural resources and the environment are protected, to bring about what the Brundtland Commission calls "sustainable development".
Development assistance is today under critical debate.
These 14 reports in this book, commissioned for the 1987 Nordic Conference on Environment and Development, were therefore prepared by independent Asian and African journalists.
The Nordic governments selected the projects; Panos has chosen the authors.
In detail the contents of the book are:

This book puts flesh on the concept of sustainability. A powerful blend of theory and practice, it is the first critique of grassroots development written by independent Third World journalists. It is essential reading for students, and all those interested in the Third World.

792 91 - 2/90

Farming systems research and development
Review, book, developing countries, sustainable development, women's perspectives, development experience, methods, strategies, alternatives

SEN, G. and C. GROWN

Development, crises and alternative visions - Third World women's perspectives.

Earthscan Publications Ltd., 3 Endsleigh Street, London, WC 1H ODD, ISBN 1-85383-000-3,1988, 89 p. + Annex

More than half the world's farmers are women. They are the majority of the poor, the uneducated and are the first to suffer from drought and famine.
This book constitutes the first stage of a program undertaken by DAWN, a network of activists, researchers, and policymakers. Through our analysis and activities DAWN is committed to developing alternative frameworks and methods to attain the goals of economic and social justice.
This book was written through extensive debate and discussion with researchers, activists, and policymakers.
Chapter 1 examines how women's experiences with economic growth, commercialization, and market expansion are determined by both class and gender, tracing these experiences through colonial and post-colonial times. In Chapter 2 the past history of development policies and strategies to the current systemic crises - in the production and distribution of food, water and fuel availability, international debt, militarization, and a growing conservatism opposed to women's changing roles is linked. This chapter also establishes the importance of women's potential for mitigating the effects of these crises through their role in ensuring the reproduction of their families and communities.
Finally, Chapter 3 seeks to broaden the dialogue on the strategies and methods that women need to overcome these crises and move toward a society in which women and men participate equally with justice and dignity. The discussion in this chapter is tentative and in need of elaboration through continuous discussion within the women's movement, but it nevertheless suggests some of the long- and short-term policy changes and strategies consonant with a feminist vision of a better society. Because women's organizations are central to these strategies, the chapter also evaluates the strengths and weaknesses of different types of organizations and suggests the changes needed to make them more effective in shaping and pressuring for a new policy agenda.
This book analyses three decades of policies towards Third World women. Focusing on global economic and political crises - debt, famine, militarization, fundamentalism - the authors show how women's moves to organize effective strategies for basic survival are central to an understanding of the development process.

793 91 - 2/91

Farming systems research and development
Review, book, developing countries, sustainable development, populism, nationalism, industrialization

KITCHING, G.

Development and underdevelopment in historical perspective - populism, nationalism and industrialization.

Routledge, 11 New Fetter Lane, London EC4P 4EE, ISBN 0-415-03448-5, 1990, 207 pp.

Development studies is a complex and diverse field of academic research and policy analysis.
This large and interdisciplinary area and rapidly changing literature pose particular problems for students, practitioners and specialists seeking a simple introduction to the field or some part of the field with which they are unfamiliar.
The Development and Underdevelopment series attempts to rectify these problems by providing a number of brief, readable introductions to important issues in development studies written by an international range of specialists. All the texts are designed to be readily comprehensible to students meeting the issues for the first time, as well as to practitioners in developing countries, international agencies and voluntary bodies.
This book has therefore primarily been written as a textbook for undergraduates in development studies and in economics, politics, sociology and history courses where development issues are the primary concern. Chapter 1 of this book therefore sets out the fundamentals of the theories which have sought to equate development with industrialization, and presents some of the empirical evidence which has been thought to 'prove' the correctness of these theories. A central issue in this first chapter is how far industrialization necessarily implies large-scale production and concentration of industry in large towns and cities.
The second chapter of this book looks at the intellectual origins of this doctrine in the early nineteenth century, its development through the century and the social and political movements with which it was identified. The third chapter then looks at the resuscitation of this doctrine in somewhat modified forms in 1920s eastern Europe. Four modern variants of neopopulism are examined in Chapter 4, in the writings of President Julius Nyerere of Tanzania, in the World Employment Programme of the International Labour Office (ILO) and in the recent academic work of Michael Lipton and E.F. Schumacher.
Having thus in the first four chapters set out the fundamentals of orthodox theories of development and their populist and neo-populist critiques, Chapter 5 of this book attempts an assessment of neo-populist development strategies by examining two developing countries which are often regarded as 'successful' examples of non-industrial development - Tanzania and China.

Chapter 6 looks critically at the nationalist dimension of populist thought, and follows some of those themes through into modern development theory and in particular to the Latin American tradition of 'depency theory' which - mainly through the work of André Gunder Frank - has also had enormous influence in Africa, India and elsewhere. A final chapter reiterates my arguments for regarding both populism and nationalism as inadequate bases for theories of development or underdevelopment, but stresses that economic theory is not everything, and that it is the broader political and social appeal of such ideas which gives them their force. It is suggested, however, that if social and political aspirations are not disciplined by careful theory and analysis, they will lead to false prescription and to development policies which fail. Theory is not therefore a mere intellectual indulgence, but, at its best, the most 'practical' of activities.
In chapter 7 briefly the conclusions of this clearly written book are drawn.
Author's summary, shortened.

794 91 - 2/92

Farming systems research and development
Review, handbook, sustainable development, farmers' organizations, traditional systems, integrated systems, multi-disciplinary approach, know how transfer, women, rural extension ,cropping systems, minimum tillage, economics, marketing, CTA, IFAP, DANIDA

IFAP

Sustainabale farming and the role of farmers' organizations.

Publ. of IFAP, 21 Rue Chaptal, 75009 Paris, France, 1990, pp. 21-35

The majority of smallholders in effect, practice a system approach, aiming to produce a suitable combination of crops and livestock without exposing their families to undue risks. Mixed cropping and phased planting are two common methods practiced within traditional farming systems. These methods have evolved over the centuries for a variety of pragmatic reasons.
Improving farming systems is a complex business, too complex to be left to a particular group of scientists or experts without input and feedback from the practitioner: the farmer. Expecially in smallholder mixed farming, the inter-relationships are complex, and attempts to raise yields of one crop, or part of the system, can have unanticipated or negative results. Improving traditional agriculture should therefore be based on a systems approach which recognises these inter-relationships, and are not confined to an individual commodity-by-commodity approach.
Traditional farming systems focus more on minimising risk of failure than maximising yields. It is estimated that two-thirds of crop failures in southern Guinea can be attributed to erratic rainfall, and the "contingency mixing" of maize and sorghum in Burkina Faso is an example of insurance against this risk.
Farming systems are not static. They are in a constant state of flux: prices and costs fluctuate, some markets become saturated while new opportunities arise, legislation changes, crop pests spread and develop resistance, seeds degenerate. Accordingly, farmers are continuously changing their cropping patterns to suit the changing circumstances.
Likewise, farming systems development - and especially research - should be continuous, dynamic and interactive. To be interactive, there must be strong links with farmers' organizations.
Farmers should be considered as real partners with researchers and scientists, having a mutual interest in finding solutions to agronomic problems. This goes beyond the simple criterion of people's participation, which may be invoked to ease the passage of a scheme planned in a classic topdown way.
Changes in farming systems through the introduction of new technologies can have very different implications for men and women. In much of the developing world, men tend to do the heavy intermittent jobs of land clearing, breaking of land and fencing. Women and men share equally in planting, as they do in the care of

domestic animals. Women, however, hoe, weed, harvest, transport, store, process and market much more than men do. Farm women use very few modern tools or implements. When technology raises the productivity of male tasks such as ploughing and thereby permits men to cultivate more land, women's work load in weeding, harvesting and post-harvest processing can increase disproportionately.
Rural women should be recognized as equal partners working for development so that they become part of - and not apart from - the decision-making process. Nevertheless, special measures are generally required in development programmes to ensure that women benefit from technology change, or at the very least, to prevent the negative impact of modernization on rural women.
An increasing number of rural women should be enabled to take up decision-making positions in village, district and national level farmer organizations. This greatly facilitates the process of consulting women over farming system changes, and provides a channel of information through which women's views and suggestions can be channeled to policy-makers. At village level, the provision of simple technology to women group leaders geared at alleviating their daily work load, or the organization of child-care arrangements, can make all the difference in enabling those women to fulfill their community leadership role. Likewise, at national level, director-training for women moving into leadership positions can provide the necessary additional confidence required to succeed in the new post.
Research and extension priority should take account of those crops and livestock which women themselves regard as important in particular regions, especially with regard to income-raising potential. Rural women are generally heavily involved in such activities as the growing and local marketing of horticultural produce, cultivation of basic food staples and small livestock production near family dwellings.
This handbook has been published in English and French by the International Federation of Agricultural Producers (IFAP).
IFAP aims to make active and constructive contributions to the search for solutions to problems affecting farmers. Specifically, the role of the Federation is to:

- Provide a forum in which world farm leaders can meet and exchange views in order to make recommendations for action to improve the farmers' overall situation.
- Act as a spokesman for the farmer in international meetings.
- Promote the creation and strengthening of farmers' organizations, from grassroots to national level, throughout the world.

Founded in 1946, IFAP is composed of 70 national-level farmers' organizations in 55 countries, of which half are developing countries. The Federation's general budget is entirely financed by its members.

795 91 - 2/93

Farming systems research and development
Review, book, community development, sustainable development, indigenous knowledge, report writing, evaluation results

FEUERSTEIN, M.T.

Partners in evaluation - evaluating development and community programmes with participants.

MacMillan Education Ltd., London, UK, ISBN 0-333-42261-9, 1990, 191 p. + index

This book is designed to help those who want to know more about monitoring and evaluating their own work. It is based on seven years of research and experience on the part of many people across the world.
This book has grown directly out of field experiences in many countries and with many groups of people.
Many ideas and methods may be useful for evaluating aspects of very large-scale development programmes but they still do not meet the precise needs of a wide range of development workers, including those near to community level. At these levels a lot of information is often collected by people in programmes, but they may take little or no part in analysing or even using it.
The first chapter looks at the main questions that always need to be asked as the first step in any participatory evaluation. Chapter two goes into the details of planning and organising evaluation, and shows how various kinds of evaluation methods or tools can be used, depending on theown evaluation objectives.
The third chapter looks more closely at how existing resources, knowledge and experience can be used in a systematic way. For example, by careful and critical study of the own work, records, programme setting, and the people involved, important data can be provide for evaluation.
The fourth chapter looks at different types of evaluation tools such as surveys, interviews, questionnaires, and simple measurements and tests of skills, attitudes and knowledge, that can be used for these purposes.
Chapter five examines the ways in which evaluation results can be summarised, analysed and reported; how to prepare a written report and to include tables, simple graphs and charts of many kinds; how to turn numbers into pictures to help people at community level to understand statistical evaluation results.The last chapter looks at the importance of using evaluation results to strengthen programmes and make them more effective.
Lastly, there is a short glossary of the words that are used most commonly in evaluation, and a list of useful books and information to help improve evaluation skills.
The entire book has been kept short and 'to the point'. Although some of the principles and technical terms commonly used in evaluation are hard to simplify, every effort has been made to use words that are easily understood and easy to translate. This is

particularly important as those who read the book may also be working directly with people at community level. Their main task is to help a range of people to participate in evaluation.
"Partners in evaluation" is both a practical field handbook and a textbook. It is designed to help those who want to know more about monitoring and evaluating their own work. The methods, principles and examples it contains can be used in many different types of programmes but they are particularly appropriate to development and community programmes, whether in health, agriculture, adult education, rural or urban development, and craft co-operatives.
Many available monitoring and evaluation methods are too complex, too costly and inappropriate to development and community programmes. This book advocates the participation of people at community level in various parts of the evaluation process. It is geared towards technologies which are centred on people working as a team, in parthership with project teachers and managers.
This book is written so that it can be used in the field by busy practitioners with little or no formal training in evaluation methodology. In addition, it can be used by students taking such courses. It uses clear and straight-forward language, is well-illustrated, and will be equally valuable to those using English as a second language. Above all it is based on years of research, experience and trial by many people in many parts of the world.

796 91 - 2/94

Farming systems research and development
Review, book, developing countries, development projects, evaluation procedure, participant observer, communication processes, development effects, World Bank

SALMEN, L.F.

Listen to the people - participant-observer evaluation of development projects.

Oxford University Press, New York, USA; published for The World Bank, 1818 H Street, N.W., Washington, D.C. 20433, USA; ISBN 0-19-520559-6, 1989, 145 p.

Listen to the People is an account of the author's experience living among the poor inhabitants of World Bank urban development projects in La Paz, Bolivia, and Guayaquil, Ecuador. By viewing slum upgrading and new housing through the eyes of the people who lived there, he was able to explain some of the projects' failings and to identify some of their unexpected benefits.
The book describes the application of the methodology elsewhere - housing projects in Thailand, fishing and artisanal cooperatives in Brazil, and agricultural endeavors in Bolivia - using observers from the developing countries themselves. It also reports on the participant-observer evaluation method, its advantages and pitfalls, and its uses in the design and management of development projects.
The book testifies to the effectiveness with which anthropological techniques of participant observation can be applied in the context of economic development. It demonstrates how the evaluations of participant observers have enabled project managers to solve some of the problems they encountered and to adapt projects to the values and needs of the poor.
The assignment and the development of the participant-observer evaluation method grew out of a concern in the World Bank to improve the execution of its urban projects. The Bank began lending to help developing countries cope with the problems of urban poverty and rapid urban growth. Its approach was frankly experimental and was often referred to as a process of "learning by doing." The Bank intended its urban projects to pioneer new approaches.
Participant-observer evaluations as described in this book are techniques designed to interpret the real world of the intended project beneficiaries, their perceived needs, hopes, and frustations so as to contribute to the decisionmaking needs of project managers. Decisionmakers thereby receive feedback they can use to improve the projects they are currently working on.
Interviews are conducted in an open, conversational style, both to establish rapport and to allow unforeseen subjects to enter into the discussion. The emphasis is on creating a relationship of trust between evaluator and beneficiary. The people's

interpretation of a project is expressed descriptively and, whereever possible, numerically as well.
The organization of this book reflects the evolution of the approach. Part I discusses the first phase of the experiment, the work of structured observation in La Paz and Guayaquil. Chapter 2 describes the low-income communities that were the sites of the projects and my living arrangements in those communities. This is the only largely descriptive chapter of the book. It provides the setting for the participant-observer experience related in the subsequent chapters of Part I, which present the findings and insights of the qualitative-quantitative approach with regard to communication, the catalytic effects of development, and the contexts of the two projects. Part II discusses the transferability of the approach and its precepts. Chapter 6 describes the second phase of the experiment, in which the method of participant-observer evaluation was used in other project areas and other countries where primary responsibility for the approach lay with host-country personnel. The participant-observer evaluation method itself is elaborated in chapter 7. The concluding chapter summarizes the significance of participant-observer evaluation as a tool for project management and as a legitimate development activity in its own right.
Author's summary, shortened.

797 91 - 2/95

Farming systems research and development
Review, book, Latin America, farm management, associative enterprise, analysis of administrative problems, farm accounting, organizational framework, economic performance, employment planning, IICA

MURCIA, H.

Explotación agricola cooperativa - administración. (Associative farm managment).

Publ. of the Inter-American Institute for Cooperation on Agriculture, (IICA), San José, Costa Rica; Educational Texts and Material Series No. 61, ISBN 92-9039-075-1, 1985, 254 p.

This work is a compendium of basic and specialized information concerning associative enterprises for agricultural production, covering the historical and sociological aspects of this type of rural enterprise, from the training required for optimum performance, to specific accounting procedures, physical planning criteria, employment, management and case studies.
A detailed examination of many of these associative forms of production, and of a broad spectrum of other types of production units, reveals that the failure to apply managerial principles and methods is very widespread. Even the most simple techniques are absent from these individual microeconomic units, a fact whose negative repercussions are felt not only in the rural sector, but also on the macroeconomic level.
The book is intended as support material for others to give the farmers conceptual help consistent with their level of education.
Although the text concentrates primarily on the associative form of agricultural production, the universal point of view makes it equally relevant to individual production systems or other types of units. In any case, all systems must be developed in the context of the basic principle of seeking to maximize benefits not only in the strictly physical, technical, and economic framework, but also within the social sphere. This goal is all too often overlooked in the traditional approaches to this science of agricultural management.
The text is divided into four major subject areas organized into ten chapters. The first subject includes the concept of the associative production enterprise and an analysis of its managerial problems. It is an effort to describe this form of production and emphasize the need of adapting classic concepts of agricultural management to the productive structure, allowing for its special characteristics.
The second major subject heading is a diagnosis for planning the associative production enterprise. It defines the basic steps to be followed in the diagnostic process for this type of productive unit, both on the level of the individual enterprise, and in terms of the environment within which it operates. This is why, in addition to the necessary elements that must be included in any

overall diagnosis, emphasis is made on the need to understand the reasons for maintaining effective and organized accounting methods in the individual enterprise. The section ends with the presentation of the overall framework for developing studies on the associative forms of production, in accordance with the findings of research efforts developed and carried out to prove the viability of this type of farm unit.
The third subject introduces the simplest criteria and methods that must go into the planning of associative production enterprises. Physical requirements are discussed, such as the appropriate size of the enterprise and the proper ratio between current use and potential conditions. At the same time, functional models are presented for economic planning in the enterprise on the basis of simple techniques, and methods are described for planning the proper use of available labor, one of the most important elements of the given social goals. The section closes with the presentation of several methods for developing case studies on associative or individual production units. The purpose of this discussion is to demonstrate the need for including diverse aspects in the analysis, diagnosis, and planning of any agricultural enterprise. Examples are given in the last chapter of the section, and the subject of planning thus draws to a full conclusion.
The fourth subject includes suggestions, past experience, and the most important examples developed by the author for training farmers in the management of associative enterprises for agricultural production. This section can stand as a point of reference for the development of similar efforts in other regions, both in the halls of higher education, and in training, research, and extension efforts directed toward the farmers themselves.
Finally, the text closes with several appendices to help illustrate the handling of particular subjects included in the book, and to explain specific experiments developed in several Latin American countries.
Most of the subjects discussed in the text stem from experiments in which the author has participated either directly or indirectly. They have been tested and proved in actual practice, both in research developed during IICA activities, and in the form of joint projects with students and with participants in various courses and studies on the subject. For this reason, the book's major value lies in the almost totally original nature of its source material, with the hope of contributing fresh and renewed experiences to the technical wealth that exists in this particular field.
Author's Abstract, altered.

798 91 - 2/96

Farming systems research and development
Review, case studies, developing countries, Europe, UK, agricultural research and extension, farmers' organizations, international research, IARC's, NAR's, CGIAR, CTA

IFAP

Farmers' organizations and agricultural research.

In: Sustainable Farming and the Role of Farmers' Organizations, Publ. of IFAP, 21 Rue Chaptal, 75009 Paris, France, 1990, pp. 37-44

A fundamental question which has faced agriculture during the last century has been the link between farmers and agricultural research, whether it be in industrialized or developing countries. Advancement and increased specialization in agricultural science and technology has created its own dynamism and institutions. This has been accompanied by increasing emphasis away from the farmer to laboratories and research stations.
While problems do exist in the industrialized countries as regards researcher-farmer link, such problems are of a larger scale in developing countries.
Research is generally organized around a classical topdown structure, from international to local level. International and national agricultural research institutions carry out their work independently, with some guidance from governmental and intergovernmental organizations. What emerges as end products of their work gets incorporated in the extension services of respective countries.
In the present system, feedback on the effectiveness of agricultural research is mainly obtained through agricultural output statistics and other indicators.
Alarm signals, especially regarding shortfalls in food production, usually result in further investments in international and national research, with little or no consultation with farmers, thus perpetuating a vicious circle.
Farmers are the last in this research and application chain. They cannot participate in the decision making process concerning direction of research, neither can they participate in the decisions concerning what should be incorporated into extension services. Their only power is through silence, by ignoring the new techniques proposed by extension services, or quietly adapting some aspects of the new techniques.
If this system is to become effective, and serve the farmers, the system has to be made more responsive to the farmers, and give them much more influence in research objectives.
As farmers are very numerous, effective representation of farmers' interests as regards agricultural research has to be done through representative farmers' organizations.

Farmers' organizations face special circumstances and certain obstacles must not be overlooked:
- Lack of awareness of the importance of farmers' organizations
- Urgent problems of mainstream agriculture
- Financial constraints
- Fear of being a testing board
- Fear of diffusing wrong information

In summary, the following steps need to be taken:
- inclusion of farmers' organizations in the consultation and decision-making process at all levels;
- in order that such inclusion does not distract from other urgent tasks, allocation of funds specifically for enlarging represential capacity, own research and testing is essential.

When discussing possible researcher-farmer links, the tendency is to think of possible links at grassroots level. Although good functional links at grassroots are indispensible, they are not sufficient to bring about a real farmer participation.
Farmer participation in research, through field days or through on-farm research is not uncommon. Successful cases are when farmers feel encouraged enough to talk openly, to comment on what they see and what they know: for example, they may give their views on a particular high-yield variety, or a particular intercropping practice. However, they will not be able to comment on all the chain of higher level decisions, or on all the research efforts which are being done on their behalf.
Individual farmers who participate in such on farm-research are faced with the following dilemmas:
- farmers often participate without knowing adequately the purpose of the demonstration plot. Although some explanations are usually given, these are mostly relatively superficial;
- farmers are usually not made aware of the positive role they can play, besides "following the instructions";
- farmers are recruited as individuals whereas research station officials represent institutions. In these circumstances, it is difficult for farmers to participate on an equal basis, point out problems and offer suggestions.

These, as well as other related points act as a real barrier. Farmers are not able to contribute to research consultation because there is a lack of recognition of their:
- professional skill and experience;
- know-how of traditional farming system.

If improvements are to be made, the involvement of farmers' organizations is essential.

799 91 - 2/97

Farming systems research and development
Review, guidelines, farm trials, sociocultural aspects, smallholder, farmer evaluation, CIP, IDRC, Rockefeller Foundation

RHOADES, R.E.

Understanding small farmers: sociocultural perspectives on experimental farm trials.

Publ. of CIP, Aptdo. 5969, Lima, Peru; Social Science Departm. Training Document 1982-3, 1982, 9 p.

The purpose of this paper is to provide some simple perspectives for the applied scientist or practical field technician on how to understand the farmer's point of view, especially in relation to on-farm experiments. These guidelines should be relevant whether dealing with fully commercial farmers or remote, marginal peasants. This document serves as a sociocultural supplement to two other CIP training documents which deal with agronomic and economic evaluations.
Farming in most developing countries is more than simply a business. For small-scale and subsistence farmers and their families it is a way of life that has evolved over time, often centuries. Such rural populations have experimented with nature, manipulating resources, and adjusting human culture and technology to the demands of their physical environment. They have, through trial and error, learned to arrange themselves socially and psychologically in order to successfully execute the tasks of day-to-day farming.
When agricultural scientists enter a rural area with new technology or programs not indigenous to the local culture, they encounter a farming way of life that works and is valued by those who practice it. The system may not be perfect but it serves well enough so that farmers will invariably cast a questioning eye on practices proposed by outsiders. This is because farmers are concerned with risk which simply means the possibility or chance of suffering loss. Farmers determine a new technology's level of risk by experimenting on their own, over time, under their conditions, and in more fields than one. If new practices prove worthy, farmers will accept. They are not traditional or conservative in a negative sense; they are simply cautious toward unproven ideas.
Agricultural scientists and farmers cope often with different worlds. And they see those worlds through different eyes. The productivity of scientists, often measured by reports and publications directed toward other scientists or policymakers, is not the same as farmers' productivity, measured by basic survival, maintenance of family or increased profits.
The trick, therefore, is to bring farmers and scientists into meaningful communication so that scientists are working on real problems rather than imaginary ones.

This is one basic reason for on-farm trials and actively bringing farmers into the research process. It helps scientist understand if their technology is worthwile.
Scientists or field technicians should be aware of their own biases in selecting cooperating farmers and locations for trials. On-farm research under farmers conditions is normally difficult to carry out logistically. It is natural at times to be inclined toward: (1) elite farmers who are economically above the average; (2) cooperating with men only, excluding women; (3) locating trials near the best roads and (4) selecting villages that are more prosperous although not necessarily representative of a region. There is no easy way around these biases, some of which may not be necessarily negative. However, if they are restricting the representativeness of trials, one should seek ways to correct them.
To help understand small farmers the author of this paper poses the following seven basic questions:
- Is the problem to be solved important to farmers?
- Do farmers understand the trials?
- Do farmers have time, inputs, and labor required by the improved technology?
- Does the proposed technology make sense within the present farming system?
- Is the mood favorable for investing in certain crops in a region?
- Is the proposed change compatible with local preferences, beliefs, or community sanctions?
- Do farmers believe the technology will hold up over the long-term?

Concluding, it is easier to adapt a specific piece of technology or practice to a complex farming system than to ask the farmer to change his farming system to fit our technology.
In the end, the acceptability of a technology depends on what the farmers actually do. One can discover this only in a final stage of farmer testing where farmers themselves take over the new technology and incur all risks, costs, and benefits. Until this final step is taken, all other evaluations remain only suggestive of the technology's potential.

800 91 - 2/98

Farming systems research and development
Latin America, Dominican Republic, study, rice, cropping systems, ratoon cropping, adaptive research, farmer's adaptations, production constraints, agricultural policy

DOORMAN, F.

Farmers' adaptations to production constraints and their implications for agricultural policy: the case of rice cropping systems in the Dominican Republic

Trop. Agric. (Trinidad), 68, 1991, pp. 171-176

In this paper rice cropping systems in the Dominican Republic are analysed in relationship, first, with the production conditions that have generated them, and secondly, with government policies directed at increasing production.
Rice is the most important staple food in the Dominican Republic. National self-sufficiency in rice production has been one of the major objectives of government agricultural policy.
To obtain maximum benefits with the semi-dwarf varieties, a package of recommendations was developed based on double-cropping, careful water management and seedbed preparation, and the use of modern inputs such as certified seed, NPK fertilizer, systemic insecticides, fungicides - particularly against *Pyricularia oryzae* - and pre-emergent and post-emergent herbicides.
Various studies have indicated that small farmers are quite skilled in the development and use of technology adapted to the specific production conditions of their farms.
The indigenous knowledge on which these skills are based does not usually result in very high yields in absolute terms. It helps farmers to obtain optimum results in terms of fulfilling their production goals with the limited resources available in their particular farming system.
This low-input, low-yielding local technology contrasts with the high-yielding, high-input technology developed at research stations and promoted by government agencies. In many instances, the contradictions between local and recommended technology have led to low adoption rates of the latter, in spite of government policies combining positive incentives.
This paper aims to show that the ratoon and other local rice cropping systems employed by small farmers in the Dominican Republic are well adapted to the production conditions in which they are practised.
Four rice cropping systems, used by Dominican farmers have been discussed in relation to the production conditions in which they occur. When given the choice, farmers prefer either double-cropping or ratooning. The official stand on rice cropping systems is that maximum production should be obtained through double-cropping. Considerable groups of farmers prefer ratooning over double-cropping because of higher net benefits, lower production costs and less work. At the macro-level, ratooning economizes on

scarce resources such as irrigation water and capital - particularly credit from the state-run Agricultural Bank - and imported mechanical and chemical inputs. The savings in foreign currency in the latter two commodities were shown more than to compensate for the rice imports needed to make up production differences between the ratoon and a sown crop.
The objective of this paper is certainly not to advocate overall replacement of double-cropping by ratooning. In many farms with less-than-optimal water management conditions, double-cropping will be a more feasible alternative than ratooning. However, it is suggested that ratooning is taken into consideration in rice research activities. Ratooning capacity could be included as a selection criteria in rice breeding. Also, agronomic research could be executed on such topics as water management, weed control and fertilization. Considering farmer experience and obtained results in ratooning, it would be advisable to base this further development of ratooning technology on an inventory of already existing local knowledge.
Therefore, a re-examination of the official view on rice cropping systems is recommended, as well as the incorporation of the ratoon in programmes directed at the development of new rice technology.

801 91 - 2/99

Farming systems research and development
Africa, Sierra Leone, Tanzania, study, project preparation, multidisciplinary approach, strategy, constraints

MINJA, P.K. and O. WILLIAMS

A multidisciplinary approach to project preparation - MUDAPP.

entwicklung + ländlicher raum, 24, 6, 1990, pp. 14-15

This paper highlights the types of information covered in project preparation and the need for multidisciplinary input in project preparation.
Before a project can be considered, it is generally appropriate to carry out an objective look of the proposed project from all the dimensions - political, social, economic, financial, environmental etc. This provides an opportunity to examine every aspect of the project plan to assess whether the proposal is appropriate and sound before large sums are committed.
Project preparation can therefore be defined as an analysis of a proposed investment to determine its merit and acceptability in accordance with established decision criteria.
In most cases the ultimate decision on whether a project is to be implemented will usually be related to its economic and financial viability although some political considerations are important.
A framework is necessary within which one can prepare the economic and financial elements of feasibility studies. This rigorous process involves a mix of disciplines as follows:
- Technical
- Financial
- Commercial
- Economic
- Managerial
- Organisational
- Social
- Environmental

Sources of information in any country are numerous and diverse, much is never written up and the quality and presentation will vary considerably. The following are some of the institutions which may produce useful information when preparing a project:
- National Bureau of Statistics;
- Ministry of Finance;
- National Planning Commission;
- Production and Service Ministries (e.g. Ministry of Agriculture and Livestock Development);
- Official Research Institutions.

Some of the limitations of the application of MUDAPP are identified as follows:
- The availability of the relevant disciplines, locally.
- Limited use of poor incentives for local experts.

- Project teams still think that they possess all the knowledge and usually fail to consult other relevant contacts for the successful preparation of the project.
- In a developing or an underdeveloped environment relevant data to "plan with" and to "plan from" from the various disciplines are very difficult to obtain.
- A major constraint in adopting MUDAPP is the problem of coordinating many disciplines in the final production of a holistic dossier.
- When data are available their update may be difficult.
- The refusal by some institutions/disciplines to cooperate is a major issue.

Concluding, it can be said that the examples from Tanzania and Sierra Leone in the adoption of MUDAPP are not isolated. In most cases similar experience can be found in other developing countries.
Project preparation involves a broad spectrum of disciplines. A worthwhile dossier will require the inputs from the major disciplines. Although such a cooperation may not in itself guarantee the success of a project it has been proved a major element for successful implementation.

91 - 2/100

802

Farming systems research and development
Latin America, Ecuador, farmer organisations, adaptive research, extension, user constituency function, agricultural policy, IIED

BEBBINGTON, A.

Farmer organisations in Ecuador: contributions to farmer first research and development.

Gatekeeper Series No. 26; IIED, 3 Endsleigh Street, London, WC1H ODD, UK, 1991, 15 p.

In Ecuador resource poor farmers are formally organised at several levels. Above the household group, there is the base organisation: the association, cooperative or community, made up of between 25 and 150 farming families. In some regions these base organisations are federated into second order organisations existing at parish and country levels. Above these there are Provincial federations, and then organisations seeking to cover the Andean and Amazonian regions. This should not be seen as a formal hierarchy, as some levels act independently of others: many base and second order organisations are, for instance, not affiliated with the national organisations and are administratively independent. It does provide a useful model of the linkages that exist between farmer organisations within Ecuador.
Farmer organisations (FOs) can help build sustainable livelihoods for the rural poor in several ways. They can:
- act as an 'interface' between the research and extension worlds of development agencies and the livelihood conditions of the resource poor farmer population;
- actively adapt and disseminate agricultural technologies in programmes that they themselves control and administer and
- act as a 'user constituency' for the rural poor, pressing public sector and non-governmental agricultural agencies to orient their work to the needs of the rural poor.

These three functions are not always independent, and organisations may perform all at the same time, or may move from one to another as the organisation matures. Although the distinctions are not rigid, there is a tendency for the smallest local groups to perform primarily an interfacing function. The active research and extension function and the user constituency role are more frequently found in higher level groups.
Farmer organisations have a number of comparative advantages for the design and administration of agricultural research and extension when compared with more orthodox approaches. In particular they:
- draw on local knowledge and resource-poor farmer concerns;
- are more easily accessible to resource-poor farmers;
- often deliver services to locations which are rarely visited by formal sector researchers and extension agents;
- have lower operating costs; and

- build upon and sustain earlier organisational experiences and qualities.

But there are also limitations on what FOs can do. In particular they:

- lack certain formal technical skills needed for proper and safe use of modern technologies;
- lack certain modern administrative skills;
- lack access to public sector resources such as good seed;
- have few resources to remunerate farmer extensionists who therefore cannot dedicate sufficient time to their extension tasks; and
- are sometimes institutionally fragile.

These benefits and limitations of FOs suggest that much could be achieved by combining public sector and FO resources.
Government services will be inefficient if they work independently of FOs, and similarly FOs need the support of the formal sector. They need its special formal scientific expertise for problems they are unable to solve; they require financial support; they require farmer-first orientations in agricultural policy. Because FOs will also act as pressure groups, they will not always be in agreement with the public sector. But it is still the case that FOs and the public sector can complement each others' work by combining formal and farmer expertise, and increasing the efficiency of resource use in a farmer-first strategy.

803 91 - 2/101

Farming systems research and development
Review, proceedings, workshop, sustainable agriculture, participatory technology development, assessment of experiences, strategies, concepts

ILEIA

Participatory technology development in sustainable agriculture.

Proceedings of a ILEIA Workshop on Operational Approaches for Participatory Technology Development in Sustainable Agriculture; Leusden, The Netherlands, 1989, 66 p.

The application of modern agricultural technologies which depend heavily on the use of external inputs requires a certain minimum rural infrastructure to allow supply and maintenance of external inputs and services, assumes capital investments at farm level and needs a stable environment.
Due to the growth of the population, the low prices for agricultural produce, structural changes in nomadic and sedentary agriculture as well as apparent short term successes of introductions of modern technologies and their appeal to status, the more traditional agricultural systems no longer seem to satisfy the needs of the people.
For the "Low Resource Areas", where an estimated 1 to 1.5 billion people find their living, a different type of agricultural technology and a different way of technology development is essential.
More and more people are concerned about the lack of effectivity of agricultural research, and extension services in these areas.
The experiences of farmers and researchers in areas where external inputs are not available, where prices of external inputs are too high to justify their use, or where the ecological effects are too heavy have led to a number of practices which are categorized under the heading of Low External Input and Sustainable Agriculture, or briefly, LEISA.
The experiences have shown that decreases in risks, increases in production and sustainable productivity are possible through the application of one or more of the following principles:

- The deliberate use of the diversity in the ecosystem and the exploitation of the linkages and combinations of diverse components in the creation of sustainable and stable systems.
- The use of an integrated approach by taking into account the total effects of the agricultural practices on production as well as on the environment, thus looking upon agriculture as a cyclic process.
- The focus on locally available resources and thus considering unconventional plants, animals and physical resources.
- The recognition of local and indigenous knowledge and the importance attached to the need to strengthen farmer's capacity to develop technology.

Economic and ecological reasons have led to a re-assessment of the technologies used in agriculture and practice has proved that the approach of "Low External Input and Sustainable Agriculture" can lead to remarkable improvement of agricultural systems. Practices such as soil and water harvesting, agroforestry, integrated pest management, intercropping, crop/livestock integration, microclimate management and the use of unconventional animals and plants in food production receive much more attention than in the past. Experts expect a great impact from these practices, especially in the (semi)-arid rainfed areas and other areas which so far are considered to have a low production potential, because of their alleged "low resource base".
This change in thinking about agricultural technology has also led to a rediscovery and re-assessment of Indigenous Technical Knowledge."
These proceedings document the result of an international workshop of professionals in Participatory Technology Development and contains an inventory and assessment of descriptions of practical experiences with participatory technology development.
The ILEIA workshop has made an important contribution to the emergence of operational approaches to sustainable agricultural technology development. A great number of cases and descriptions of field experiences has been compiled and assessed, existing networks on participatory technology development have been linked and a number of proposals for further development of field activities have been formulated.
Authors' Abstract, shortened

804 91 - 2/102

Farming systems research and development
Review, book, case studies, Bolivia, Ecuador, Gambia, Philippines, sustainable development, NGOs, research methodology, farmer innovation, institutions, producers organizations

CHAMBERS, R. et al.

Farmer first.

Intermediate Technology Publications, London; ISBN 1-85-339-008-9, (Hbk), 1-85339-007-0 (Pbk), Reprinted 1990; price £12.95 (Hbk), £2.50 (Pbk)

The 29 papers in this volume were originally presented by natural and social scientists at a workshop entitled 'Farmers and Agricultural Research: Complementary Methods' held at the Institute of Development Studies in July 1987. They are organized here into four sections: Farmer Innovation; Farmers' Agendas First; Practical Participation and Institutions; and Practical Change, each with an editorial summary. The editors loosely follow the Brundtland Commission's classification of agriculture into 3 types: that in industrial countries and certain enclaves in developing countries, that in high potential irrigation and reliably rainfed areas; and that in complex, diverse and risk-prone areas, and focus on the third of these in which almost a quarter of the world's population seeks livelihoods.
The theme underlying Farmer First is that the sustainability of systems in risk-prone environments presents a challenge to agricultural policy and to the agricultural sciences which can only be met through the development of new research methodology. Emerging from the case studies are new approaches which are highly participatory in character and which have scored some success in identifying technologies acceptable to farmers.
The methods range across a wide spectrum: how to identify the priority issues that farmers wish to see researched is a theme of several papers (Lightfoot et al.; Mathema and Galt); the development of technology in experiments conducted jointly with farmers is another major theme (Ashby et al.; Norman et al.; Fernandez and Salvatierra). Other papers address explicity the respective roles of farmer and scientist (Sumberg and Okali), and the practical changes needed to the training of scientists (Raman) and in institutional arrangements for conducting research (Sanghi). A formidable array of evidence is presented against the view that farmers operating at or near subsistence level lack interest in innovation: providing that new technology addresses their requirements, is affordable, and can be managed without major investment in new skills, there are good prospects that it will be adopted. More importantly, farmers do conduct their own experiments and their investigative capacity needs to be recognized, and strengthened as a complement to what researchers can offer.

The book is weaker, however, when it comes to identifying the contribution that formal science can make. It is one thing to state that 'the new behaviours and attitudes ... conflict with much normal professionalism and with much normal bureaucracy'(p. 181), normal professionalism underlying the tendency to think in terms of 'transferring' technologies to passive and receptive farmers and normal bureaucracies tending towards the hierarchical and centralized. It is quite another to identify ways in which practical changes can be introduced to make them more responsive to farmers' needs. Farmer First envisages that farmers should analyse, choose and experiment, and that outsiders, including research scientists, should act as, for example, conveners, catalysts, advisers, suppliers and consultants. This is an extreme position which does justice neither to the contribution which formal science has made and can continue to make, nor to the as yet isolated but successful attempts to shift the activities of research institutions into a more participatory mode.
Similarly, several papers (e.g. Bunch) focus on the need to strengthen farmers' capacity for experimentation if sustained efforts are to be made to develop new technology. Some cases - particularly those involving NGOs - are reported in which outsiders have contributed cost-effectively to this process, whereas other efforts have involved heavy inputs of government or university research staff in high-cost 'special projects' and so are unlikely to be replicable. In other studies (such as that currently being led by the Overseas Development Institute, London) numerous cases have been identified, from for example, Bolivia, Ecuador, the Gambia and the Philippines, of institutional arrangements worked out over a long period which have the twin objectives of cost-effectiveness and complementarity between publicly funded services, a range of intermediate organizations (NGOs, producers' organizations) and farmers. Much remains to be learned from these.
Abstract from J. Farrington

805 91 - 2/103

Farming systems research and development
Africa, Burkina Faso, study, women farmers, technology transfer, food crop production, agriculture products, food conservation, technical training, IFOAM

SANWIDI, R.

Women farmers and technology transfer.

In: Proc. of the 7th IFOAM Int. Sc. Conference, Ouagadougou, 1989, pp. 51-56

In Burkina Faso, about 52% of farmers are women. In some regions, this rate is growing because the men emigrate to look for paid work.
Women are mainly present in food crop production in the form of personal fields planted with rice, millet, cowpeas, voandzou, peanuts, benniseeds, etc. In spite of agricultural technical support for more than half a century, modern agricultural techniques are seldom used. This is due to the fact that technical support was given for cash crops.
In most cases in Burkina Faso, women's fields are individual plots close to the large family field managed by the Couple Head or the Family Chief.
The improvement of women productivity requires the use of a minimum number of techniques such as: the use of organic matter, erosion control, the right sowing density and mechanization.
The social laws in force in the different ethnic groups constrain the women to have their own income. As long as these laws are in force, a new mentality must be developed so that the family farm and the different individual fields can be considered as a cooperation on a small scale.
Before the setting up of small industry, women were the main processors of agriculture products.
Cereals are ground into flour between two stones or pounded in a mortar. This situation still prevails in a lot of villages but the small cereal mill is gaining ground.
Oil is extracted from peanuts and butter from sheanuts.
Dolo which is the national drink is an important source of income for women even in urban environment. The use of wood for fuel is beginning to set problems.
In the stock-breeding areas, women look after dairy produce.
For the moment, the popularization of cereal mills should go on. The perfection of small presses which are now being experimented is to be encouraged.
Some products like mango, guava and some vegetables become rotten during the production period in some regions. The popularization of techniques to produce jam, fruit juices, etc. on a small scale would improve the commercialization of these products.
For the niebe (*Vigna unguiculata*) there are several techniques: mixing with ashes, heating, use of insecticide plants, storage in earthenware jars or in earth granaries.

Cereals, peanuts and benniseed do not get any particular treatment.
Corn is preserved on the cob hung in trees, sorghum and millet are also preserved on the cob.
Many studies have taken stock of all the traditional conservation techniques in order to improve them but results are poor.
Women are a low income group with a low technological level. Their transition from the present situation to a high productivity and technology level without difficulty cannot be considered. Financial means remain a major constraint.
At the present stage, there is a need for a cheap technology with few inputs from outside but on the contrary making the most of local resources. It should be simple as well as effective. The time factor should also be taken into account because the woman, with the sexual division of labour must face a multitude of daily activities.
After analyzing the problems of support in the field and sociological constraints to the training of different target-groups, a support method was proposed, based on groups. The meeting with the popularizer is collective and takes place in the school-field, every 15 days. Training takes place during work time in the family field; the husband, to avoid losing a day's work, leaves the women and the youths and comes alone to the training place or sends a representative.
Women who do not work in the family field are easier to give technical support on specific topics.
Summarizing, technology transference problems, as far as women farmers are concerned, are set in terms of financial cost, time saving, simplicity and social constraints.

806 91 - 2/104

Farming systems research and development
Asia, Sri Lanka, study, organic farming, NGO, people movement, sustainable development, socio-economy, IFOAM

ARINESARAJAN, S.

Sarvodaya movement and organic farming in Sri Lanka.

In: Proc. of the 8th Int. IFOAM Conference, Budapest, Hungary, 1990, pp. 154-156

Sri Lanka is basically an agricultural country. Always priority is given to rice (paddy) production, beside plantation which brings foreign exchange earnings. Traditionally rice cultivation was the main agricultural activity. This was undertaken throughout the island. Paddyland was ploughed by using animal and man power. Bullocks were used in dry zones, buffaloes were used in wet zones for ploughing. Simple implements, which where turned out in the rural areas were used to plough and level the fields. Paddy is either sown by throwing the seed paddy evenly in the ploughed field or by transplanting them from the nurseries, using human labour - mostly woman. The livestock kept on the farm houses and those used to work in the field controlled the weed growth by feeding on the weeds and/or trampling. So there was a biological control of weeds. Most of the fields in the Southern part of Sri Lanka used to burn along with the straw after harvesting. This did not only kill the weeds but also added some of the nutrients to the soil fertility. Only in some extreme cases weeding was done manually, using labour.
The traditional agricultural practices were slowly replaced by the introduction of the high yielding varieties of paddy, which performed well only with fertilizer and irrigation. As the natural fertilizer became scarce, artificial fertilizer was introduced, which changed the acidity of the soil, leading to an imbalance in the ecology. Weeds started to come up. Pests were attracted. Pesticides only resulted in generating pesticide resistant food and poison in the food.
The animals which were ploughing the fields, controlling the weeds, leaving the water for irrigation in addition to giving milk and meat were replaced by high-cost farm machineries, creating dependency on foreign countries.
All these changes were thrust on the poor farmers by the extension staff under the pretence of modernisation. Several farmers resisted these changes at first, fell prey to the high hopes given by the extension workers. But a fair amount of farmers still continue to adopt the traditional practices.
Sarvodaya movement which started several years back in Sri Lanka is mainly based on the principles of Gandian movement. This is a non-governmental movement working for the people without any material profit motives. It works for the socio-economic upliftment of the poor, thus working towards eradication of poverty in the rural areas.

The target groups with which Sarvodaya works are smallholders.
The movement has branches in various regions of the country. The extension service arm is well developed. Before initiating activities it identifies its target group. Its extension workers live in the rural areas and work directly with the target groups. This is one of the reasons of success of the projects which are being implemented by the movement. Some of these projects are self-managed by the members of the target groups.
There is a very cordial relationship between the members of Sarvodaya and the people. The movement not only concentrates on the improvement of the living-conditions of the households but also tries to influence the situation in which these households exist. One of the characteristic of the people concerned is lack of organisation leading to dependency. This is overcome by the involvement of the movement, which gives the people a higher degree of self-reliance and strength, both morally and economically.
The emphasis of the government is on the poverty alleviation. There are several programmes and projects launched to achieve this objective. Therefore Sarvodaya is accepted by the government. Further, the government has always recognised the importance and the services of the movement in achieving rural development. Though it receives the blessing of the government, it has always kept its political neutrality.

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Farming systems research and development
Study, on-farm experimentation, land-use, ecology, agroforestry, experimental design, ICRAF

HUXLEY, P.A. and R. MEAD

An ecological approach to on-farm experimentation.

ICRAF Working Paper No. 52; ICRAF, P.O.B. 30677, Nairobi, Kenya, 1988, 33 p. + Appendix

This paper introduces two approaches that are particularly needed for on-farm research.
In the first part some of the factors involved in using a method to investigate the environmental interactions of an established tree with its immediate site are discussed. The second part is concerned with some of the short-comings in trying to adapt experimental techniques that originally were designed for on-station experimentation to on-farm situations, and a new approach is proposed.
The needs and opportunities to collect more biophysical data about agroforestry systems and components are becoming increasingly apparent, wether these are from surveys or from field experiments. Experimental questions have to be tested on-farm at an early stage because the biophysical complexity of land-use systems demands a high level of site-specific validation, and there is a critical need to be aware of the land-user's precise reasons and attitudes to any introductions.
Basically, on-station designed experiments, for which there is very wide choice of regularly-shaped field designs, use sets of treatments chosen to provide answers to clearly identified, well focussed questions. Their size and often rather formal structure do not make them suitable for on-farm trials with subsistence farmers having only small fields, especially where such farmers are on slopes, sometimes even with terraces. Nor do such old fashioned and formal designs lend themselves to "miniaturization" either in size, complexity, or both. This is because at the on-farm scale they may become unsatisfactory both biophysically (e.g. plot size too small), and statistically. Furthermore, farmers do not see such layouts as relevant to their normal farm conditions, nor to their goals. So that this can markedly limit their impact.
These comments apply to on-farm agroforestry as compared with agricultural trials, because of the larger size and complexity of the latter. Additionally, an agroforestry experiment can be expected to last for several to many years.
In general, two ways have been adopted in order to modify the design approaches to agricultural on-station research to make them more suitable for on-farm investigations.
The methods are discussed: studies of single, established multipurpose trees and on-farm experimentation. Some of the complexities of the former are described and briefly illustrated. A new approach to on-farm experimentation is proposed which

involves natural on-farm conditions which are selected to be relevant ("ecological" treatments), and/or with added manipulations ("interference" treatments). The advantages of this ecological approach, using any "quadrats" designs, are discussed vis-à-vis classical conventionally designed experiments, which may not be perceived by the farmer as so relevant, nor lend themselves to his active participation so readily.

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Farming systems research and development
Latin America, Peru, sustainable development, peasant community, NGO's, institutions, administration, terrorism, rural development programs, DESFIL, USAID

MAYER, E.

An alternative development strategy for rural Peru.

Publ. of Development Strategies for Fragile Lands (DESFIL), Washington, D.C. 20001, 9th Street, NW, 6th Floor, USA, 1990, 33 pp.

This paper outlines a policy to support Peruvian peasant communities (Comunidades Campesinas) in rural areas. The policy is designed to improve the capacity of communities to organize themselves through the execution of small-scale development programs, and thereby achieve a political response against terrorism. The assumption is that revitalized grass-roots institutions will be able to counter terrorist insurgents. This proposed policy will also benefit the Government of Peru (GOP) by providing a new initiative to the current economic crisis, by utilizing resources on marginal lands in a sustainable manner to benefit rural areas.
Regardless of the political situation, the implementation of this policy implies a fundamental change in the development approach of the GOP. The state will move away from the frustrating and difficult task of directly executing development programs and become, instead, the financier and facilitator of small-scale development projects. Adoption of this policy will strengthen the state's position in rural areas by making the GOP more responsive to local needs and more effective in providing means for solving local problems. By directly providing communities with the financial means to carry out urgently needed local projects, such as water management and soil conservation, the policy will support local peasant community priorities and release local energies towards constructive efforts.
As a means of addressing the current political crisis, the policy provides an alternative to a purely militaristic response to terrorism. The government will gain new tools to counteract terrorism by opening the doors to civil actions of reconstruction and pacification.
Section I of the paper outlines the substance of the proposed policy. Section II provides background information on the political crisis in Peru that has almost closed down development efforts in rural areas. It is imperative for the GOP to respond in a new way to present political and economic crisis. The third section (III) analyzes the current legislative and institutional framework under which such a policy could be implemented. Section IV restates the policy proposal and further outlines the justifications for such an approach to rural development and anti-terrorist measures.

The rationale for the proposal is based on the following factors:
- communities need to rebuild essential infrastructure and have already developed priorities.
- local control of projects will foster growth, learning, and capacity-building.
- peasant perceptions of dependency on outside agencies will be reversed through participation.
- self-confidence generated through community responsibility will help impede terrorist insurgency.
- government bureaucratic structures will shrink as communities undertake project planning and implementation.
- efficiency in implementation will increase if communities assess the feasibility of projects.
- civilian initiatives are a positive, non-violent model of development at a time when terrorist and military violence dominate the countryside.

This proposal provides the GOP with a simple but effective method of building civilian resistance against terrorism in the rural areas of Peru through community self-help projects.

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Farming systems research and development
Latin America, Ecuador, sustainable development, population, policy, agriculture, forestry, natural resources, native areas, protected areas, economics, sociology, DESFIL, World Bank

HICKS, J.F. et al.

Ecuador's Amazon region: development issues and options.

World Bank Discussion Papers, No. 76, Washington D.C., World Bank, 1990, 49 pp., price USD 5.95

This paper is divided into three chapters. The first provides an overview of the economic, environmental, and population characteristics of Ecuador's Amazon region. The second chapter briefly assesses the current situation and trends. The third chapter discusses development issues and suggests policy options. An appendix by Shelton Davis characterizes briefly the native populations of the region. Another appendix, using data from a 1988 Fundación Natura study, summarizes legislation affecting the Amazon region.

In my view, the poverty and economic ills of the people of Ecuador and the continuing destruction of its environment, particularly in the Amazon region, stem from two fundamental causes: a high population growth rate and a class structure that perpetuates from great economic inequity. This paper addresses the first, albeit in terms so bland it is unlikely to have any significant impact on decision makers. For example, the recommendation is made that the government consider population policy - the nature of which is left unspecified - to be a necessary but not a sufficient condition for sustainable development. Nowhere is the reader told what might constitute sufficient conditions.

Another recommendation is that the government undertake a study of the human carrying capacity of the entire country. This recommendation is potentially harmful in that it will waste time, talent, and money and provide no new insights. Numerous studies have already been done in analogous environmental settings. Another study is not required to determine the effects of human use on these ecosystems under given technologies.

The second problem - class structure - is ignored (except for token mention of the "Indian Problem"). Consequently, the entire analysis is seriously flawed and the recommendations based on it miss the mark. None of the recommendations made by Hicks et al. concerning population policy, the petroleum industry, natural resources, agriculture, forestry, transportation, native areas, and protected areas can possibly be effective without first addressing the problems of social inequality, unequal justice, and economic inequity, and providing for redistribution of land and other resources.

DESFIL