



# ILEIA



Newsletter INFORMATIONCENTRE for LOW EXTERNAL INPUT AGRICULTURE Number 1, december 1984.

## MAY WE INTRODUCE TO YOU . . . ILEIA .

This is the first issue of the ILEIA newsletter. To understand this abbreviation you have to know what and who are behind it. Briefly, ILEIA stands for Informationcentre for Low External Input Agriculture.

### Informationcentre.

From our informationcentre we want to supply and exchange information about low external input agriculture. But in order to achieve this, there have to be people who gather the information and others who need it. The readers which we want to reach are field workers, expatriate as well as local, working in agricultural development projects. The majority of these projects are linked in some way or another with countries in the industrialized world.

The information which we have at our disposal is partly based on our documents: books, reports, magazines etc. concerning agriculture and related subjects (e.g. water, energy, extension). For the classification of all these papers we are using the SATIS system (SATIS stands for Socially Appropriate Technology Information Services).

Our adequately programmed computer can give entrance in the literature from different angles (technics, climat zone, utility etc.) by using a well defined search profile.

We are preparing a list of persons and organisations who are interested in or working with low external input agriculture.

Also slides are available from Brasil, Ghana, India, Rwanda and Tanzania.

If questions can not be answered directly by us, we can consult related persons, institutes or organisations. This newsletter will not only supply information, but especially tries to facilitate the exchange of practical experiences of those working in projects.

### Low External Inputs.

What do we mean with low external inputs? Maybe it can be partly explained by using the opposite: high

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## GLORIA LAND IN INDIA :

a starting - point  
for ecological  
activities.

The dairy farm Gloria Land belongs to the Sri Aurobindo Ashram which is a spiritual community of some fifteen hundred inmates. The ashram is based in Pondicherry on the south-east coast of India. Pondicherry was held as a colony by France until 1954 when it became a regular state of India. As the ashram tries to be self-supporting in as many aspects of daily life as possible it possesses also some farms producing food for the inmates. One of the farms, Lake Estate, produced milk but not sufficiently. To meet the demand it was decided in 1963 to purchase more land in order to grow fodder.

This idea of a production unit exclusively oriented towards fodder proved not to be practical and in 1966 Gloria Land became a dairy farm by itself.

Bore-wells were made in order to be able to produce fodder throughout the year

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# Colophon

The ILEIA newsletter is a publication of the Informationcentre Low External Input Agriculture, established in 1982. It will be issued every three months and is distributed free of charge during the first year of existence among field workers, organisations and individuals who are concerned with the improvement of the situation of small farmers in the third world. The production of the ILEIA newsletter is made possible through financial assistance of the Government of the Netherlands for a period of three years which will end in 1985. According to its nature, ILEIA invites all sorts of articles on agricultural development and low external input practices for publication. The reader is encouraged to reproduce the articles with acknowledgement.

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## EDITORIAL

This first issue of the ILEIA newsletter can be seen as an introduction to ILEIA and its views on agriculture. To this purpose two articles have been written by the editors. The first one is about our Informationcentre and what we are striving after.

The second will give you some idea of the main principles and measures which can be used in an ecologically sound agriculture.

In next issues we want to treat these more thoroughly.

The other articles are directly related to experiences in the field:

- A report of the visit of Kees Manintveld in september 1984 to Gloria Land, a dairy farm in India working already for 13 years according to ecologically sound principles.

- An interview with Driek Enserink about his experiences with Farming Systems Research.

- An article of Tonnie Tekeleburg about his experiences in the Andes of Bolivia.

Furthermore abstracts are given of literature which we consider as standard-works and which are available at our centre.

The contact announcements might bring people together.

In order to give us some idea who are our readers, what their specific kind of experiences are and who are willing to contribute these experiences to this newsletter, we added a questionnaire. We kindly request you to return the completed form back to us.

Finally we would like to thank all those who have contributed to make the first publication of this newsletter possible.

We hope that the contents will meet the need and interest of the reader.

Now we need to know your reactions. We would be very happy to receive them about the concept, contents, layout, illustrations etc. And naturally, we hope that this newsletter will stimulate you to write your questions and experiences and/or to send us some interesting illustrations, photo's or drawings which we may publish in the next issues of this newsletter.

We are looking forward to your reactions.

← front page (*introduction*)

external inputs. These inputs can be defined as chemical fertilizers, high yielding varieties, chemical pesticides and mechanisation. They have to be brought - and bought - from outside the farm (or even country). It is clear that in favourable situations these means of production can lead to a great increase in yields. Small farmers, however, are often not in this favourable position. For them it is economically far more worthwhile to secure their food production by using inputs which are less dependant on external resources. This means that an intensive use has to be made of all possible internal inputs. The use of internal inputs is not only based on the non-availability of external inputs for many small farmers. The idea is also that the ecological balance of an area has to be preserved and if possible improved.

#### Agriculture.

This brings us to agriculture. What we are aiming at with low external input agriculture is the highest possible level of sustainable food production. It implicates that recycling of nutrients is essential for maintaining soil fertility and that a high diversity in agricultural production is necessary to optimize the eco-system and to minimize risks.

#### ILEIA.

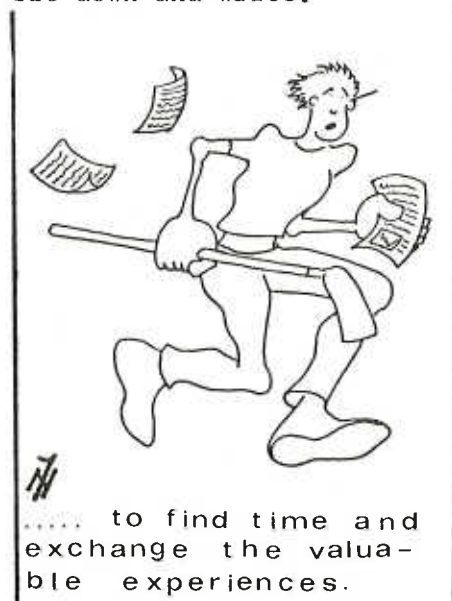
ILEIA was initiated by the foundation E.T.C. (Educational Training Consultants) in 1982. Initially it was mainly focussing on documenta-

tion, but now more attention will be paid to the spreading of information and exchange of experiences.

#### Exchange of experiences.

We think it can be of great importance to facilitate the exchange of experiences between persons or projects who are working on the same problems. There are already various projects working or planning to work on sustainable agriculture. But an adequate exchange of experiences is not existing. So many 'new inventions' have already been tried somewhere else in more or less similar situations: how can we learn from the difficulties which have been encountered e.g. in Vietnam with the introduction of green manure? What kind of plough is tested in comparable situations in India and can be introduced in Africa?

It will surely not be easy to attain this target of mutual learning. Field workers are very occupied with their work. It can be difficult to find time to sit down and write.



..... to find time and exchange the valuable experiences.

It should be clear that it is not necessary that your experiences, though giving the conditions under which they were gained, have scientific account.

#### Spreading of information.

There are two ways to answer your questions about low external input agriculture. This can be done in a personal letter or in this newsletter. The definite form of this newsletter is not yet totally cristalized. We are thinking of contents eventually treating the following items:

- publication of letters and their answers if they are of interest for a greater group of readers.
- Publication of the description of thoughts, feelings and/or activities of field workers in a diary or letters.
- illustrations which sometimes tell much more than a lot of words.
- contact announcement.
- interviews with persons of particular interest.
- information about projects.
- articles on specific subjects.
- announcements of events, seminars, training courses and newly published documents.
- abstracts of relevant documents.

In this way we hope that ILEIA can satisfy the need and interest for more information about low external input methods and that this newsletter will be used by the field workers for getting known to each other in order to exchange their valuable experiences.

## MORE ABOUT PRINCIPLES AND MEASURES IN LOW EXTERNAL INPUT AGRICULTURE.

To give the reader some idea from what viewpoint we are looking at agriculture and agricultural development, a survey is given of the basic principles and often used measures. This is done without having the pretention of completeness. Many agricultural terms are not yet explained. This will be done later in more specialized articles.

As basic principles can be seen:

-the soil is observed as a living organ of the ecological system. Protection and stimulation of soil life is of vital importance to sustain soil fertility. For this reason organic matter, as the only good nutrition of soil life, must be the main material to "fertilize" the soil.

Recycling of nutrients is necessary to sustain soil fertility, specially if there is no money to buy additional fertilizers.

-eco-systems are complicated and diverse. Therefore a high diversity in the production of animals and plants in time as well in place is desirable in order to balance the farming eco-system and to minimize risks of crop failure as far as possible without e.g. the external input of pesticides.

-human relations, self-consciousness and education are the fundamentals of development. Development is asking a balanced co-existing based on good human relations between the participant of the group.

Internal frictions between them will lead to a greater incoherency of the community to be developed or are even making development unrealistic.

Consciousness of the own economic, social, cultural and ecological situation is

the basis of the movement towards self-reliance, the driving power of development.

Education has to support this process of awakening self-consciousness and has to give the base to newly gained skills.

Development can not be given to people, it must be gained by them. Participation of farmers is therefore a logic inevitability.

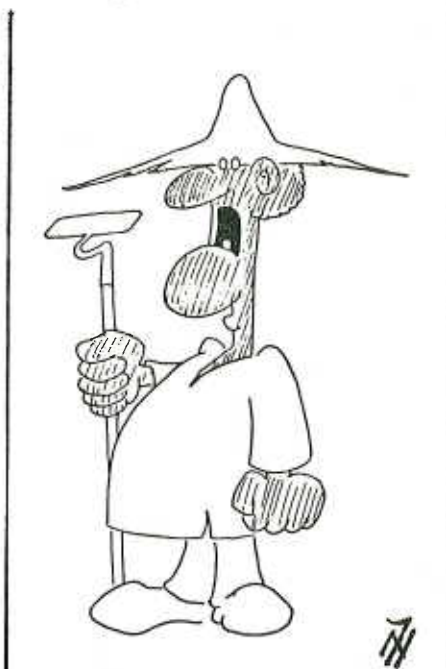
The cultivation measures often used in low external input agriculture are normally also used in

organic agriculture. The purpose of these measures is often multiple. But to get some idea the following division can be made:

- to sustain or to regenerate soil fertility organic manure in the form of animal manure, compost, mulch or green manure can be applied or nitrogen fixing, leguminous plants seeded. In this way the humus and the nutrient content of the soil is increased and hence the cation-exchange-capacity, soil structure, water retention and infiltration capacity are sustained or improved, leaching prevented and pest and disease infection reduced.

Loss of nutrients can be compensated by extraction of nutrients out of deeper soil layers by deep rooting trees or shrubs. If necessary, fertilizers as local rock and rock phosphate can be used and/or eventually mineral fertilizers can be additionally applied in low doses.

- soil erosion and degradation of the biological soil life can be reduced by keeping the soil under permanent covering by annual or perennial cover crops, multi-storey farming, selective weeding and mulching. Also other measures can be used as strip cropping, vegetative wind



Eco-systems ?

I can tell you quite a lot about that, but you never ask me!!

and water breaks, afforestation, terracing etc.

At the same time these measures can optimize water use and contribute to balance the ecological system.

- to reduce the risks related to pest infections, climate, markets and other external dependencies, to obtain a greater degree of biological control of weeds and diseases and a higher production due to a better sustained soil fertility and the allelopathic interactions between plant species, a high diversity in plant and animal production should be strived after. This can be obtained by e.g. crop rotation with sequential, inter, relay, alley or multi-storey cropping and intensive fallows. Also the use of local and/or improved resistant varieties can contribute to this.

- crop protection can be practised by prevention and eventually by the use of integrated methods in order to minimize negative effects on the environment.

#### Labour demand.

High external input agriculture is resulting in replacing labour by machines and/or chemicals. This is increasing unemployment. In low external input agriculture more work force is needed, as compost making, green manuring, mechanical weeding are asking much labour. This, however, does not mean that a higher productivity is not strived after. Locally produced mechanisation is of special interest.

#### Experiences.

Low external input agriculture is still mainly based on experiences in the industrialized countries, although there are many traditional farming practices in 'third world' countries which are based on the same principles. It is very important that these practices are preserved and eventually improved by modern ecological agricultural knowledge and that they are used again in the locally adapted agricultural systems.

#### Farming System Approach.

Introducing new farming practices is not an easy process. Rightly, farmers are not ready to accept new techniques unless they can make these profitable to them. Considering their marginal situation it is understandable that risk minimization is very important. In order to find the locally most suitable and least risky agricultural techniques or farming systems all methodological elements which could be used to meet the project aims should be examined under view of the following criteria:

- economic factors (cost - benefit of inputs, cash demand etc.)
- socio-economic factors (availability of production means, self-reliance, transport, market etc.)
- ecological factors (ecological balance, sustainability, soil and water conservation, external ecological effects etc.)
- cultural factors (self-consciousness, knowledge and experiences, adaptability etc.)

Agricultural activities should be seen against the background of the total activities of the local community.

This farming system approach can only be developed with the aid of an active participation of farmers' families.

Research and extension should start also out of the situation of the local farmers ('on farm research'). Active participation in the experimental stage and acceptance by the farmers have a better chance this way.

Lately several 'Farming System Research'-programs are developed by international research institutes (e.g. CIMMYT) which eventually can be used when introducing low external input agriculture.

#### Education and research.

For the implantation of low external input agriculture, education and research are not less important than in chemo-technical agriculture. The development of a sustainable agricultural system needs a process of awakening consciousness and education. The will to become self-reliant and active participation by the farmers' families are indispensable.

In future publications of ILEIA will these principles and measures be examined more thoroughly.

## ← front page (gloria land)

because rain-fed cultivation was hazardous during the smaller rainy season from May until August and sometimes even during the monsoon from October till December.

Talks with late Arvid Gutschow, a German advocate of ecological agriculture, inspired the farm manager Manindra Pal to develop the 42 hectares according to ecologically sound principles. From 1971 onwards this approach consequently has been the starting-point for further farm activities.

With the gradual growth of the farm, diversification became more important than specialization. Besides fodder also rice, bananas, vegetables and fruits were grown.

Moreover the cattle herd became a specific interest of Manindra because he discovered that certain Indian breeds had good milking qualities. A consequent breeding programme has led to a good herd of 60 milking cows and 190 young stock, both with several different breeds. A mixture of napier grass (*Pennisetum purpureum*) and *Leucaena leucocephala* is cut daily and fed whereas some concentrates are added in the form of malt from a brewery and minerals.

Rice straw is given as a roughage. So it became clear that sufficient fodder of a good quality plays an imminent role in stimulating milk production which attains averagely 10 liter per day per cow.

### Other measures.

To-day the whole farm can be irrigated from 12 tube-wells. Collected dung is digested in a locally adapted bio-gas installation whereas the slurry is used in the irrigation water for maintaining the soil fertility. Also green manuring with legumes (e.g. *Crotalaria juncea* and *Sesbania aculeata*) is extensively practised. Mixed cropping (e.g. napier grass with *Leucaena leucocephala*, several vegetables) and cover cropping (e.g. *Crotalaria juncea* under bananas) are common and practised where useful. Mulching under

bananas reduced the irrigation requirement drastically. Instead of an interval of three days now only once every three or four weeks irrigation is needed. Gloria Land also produces fuel wood mainly by growing *Leucaena leucocephala* as a crop and *Gliricidia sepium* in hedges.

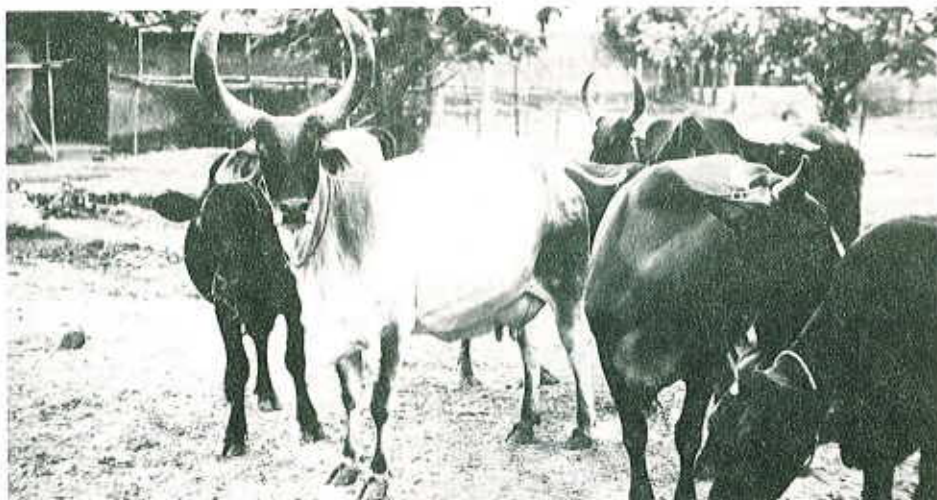
### Support.

Although available financial means would allow more mechanization Manindra chooses for labour intensive technics. His philosophy is: it can not be socially justified to mechanize while so many people in the neighbouring villages are still unemployed and could earn their living by working on the farm. Thus some fifty labourers (men and women) have a regular job whereas in peak periods up to thirty more people find casual work. Since some years more and more surrounding farmers but also agricultural scientists become interested in the approach and its translation into daily practical methods. Although not replicable as a whole for small farmers owning one or two acres of land only, certain methods can be incorporated into their farming system. Some farmers already do so and if needed Manindra supports them in adopting practices to their specific circumstances.

### Future.

In future much attention will be paid to the further up-grading of the dairy cattle, the increase of the bio-gas production, the stabilization of soil fertility and the integration of fresh water fish-farming and beekeeping into the system. In order to offer a more comprehensible system to small farmers it is planned to install one or two plots which will be designed according to local general farming circumstances. It is hoped that contacts with scientists, teachers and policy-makers may lead to a better understanding of the possibilities and chances of ecological farming. To that purpose Gloria Land will be the host for an international course on tropical ecological agriculture in July/August 1985 where participants from all over the world will share their experiences and will be able to learn from this example how food can be produced while strengthening the eco-system simultaneously.

Kees Manintveld.  
October 1984.



Manindra discovered that certain Indian breeds had good milking qualities.

(Photo: Kees Manintveld).

# EXPERIENCES WITH FARMING SYSTEMS RESEARCH IN KENYA.

## An interview with H.J.Enserink.

From 1978 -1982 Mr. Enserink was working in the GK/UNDP/FAO Sorghum and Millet Development Project in the Busia and Siaya District in West Kenya. In this project experiences were gained with the application of "Farming Systems Research" (F.S.R.) in a commodity research programme. at the moment Mr. Enserink is preparing his thesis on F.S.R. as applied in Kenya and is giving lectures on this subject at the Agricultural University of Wageningen in the Netherlands.

What is in your opinion, the essence of "Farming System Research"?

In my opinion F.S.R. is trying to adapt your research to the situation of the farming system as it is existing at that moment and trying to diagnose where the bottlenecks are and where intervention is most helpful. And then try to make a small step forward in the indicated field.

The intention of F.S.R. is that the farming system is analysed in its totality. In practice however, projects are working normally with a very limited mandate, like in our project: the improvement of the sorghum production.

But maybe sorghum was not at all the bottleneck, maybe it was cattle husbandry or soil fertility maintenance!

What I see as ideal is a rural development project with a wide scope in which F.S.R. plays its part and in which one can work for a long period (10-20 years).

For I think that farmers are changing their old farming system only with very small steps.

Implantation of a whole new system may be possible but it is not attainable within

a project duration of only four years. Farmers cannot permit to take many risks. When something is going wrong, who is willing to give them food to eat? For this reason they will not change their local sorghum varieties for new ones as long as they are not completely convinced that they will gain.

Projects should be started in such a way that the project staff, together with the farmers and extension-services, first are going to look how to formulate the project. This approach however, is asking for a more open framework of project-formulation.

What is the function of 'farmers participation' within F.S.R.?

The normal practice of agricultural research is often that the development of new varieties is still done at the research station. Together with the recommendations for cultivation,

**Researchers are forced to look at the problems of the farmers and to listen to them. In this way, status is given to the farmer !!"**

these new varieties are introduced to the farmers without previously testing on the fields of the farmers if these new varieties are appropriate to them. Very often these introductions are without success.

F.S.R. is bringing a change for the better. The researcher is forced to look at the problems of the farmers and to listen to them. In this way, status is given to the farmer! F.S.R. is analysing the local farming system. For this purpose farmers are interviewed. Real participation however can be very difficult. Especially in Africa it can take years before a dialogue can be realized. In other regions like the Philippines or India it may be different. The farmers there have more knowledge about fertilizers, insecticides etc. and how natural systems are functioning. E.g. they may know how insects are developing from egg-larva-puppa to adults. If you showed this to farmers in our project in Kenya, then you were looked at as a magician.

There is a large quantity of experiences stored in the cultural system but nobody can tell you exactly why something is done. In our project region e.g. the chief was indicating the right time of sowing so that everybody was sowing at the same time. Now there are some young farmers who are not any longer obeying the chief and are sowing earlier. In this way they let an insect-plague built up

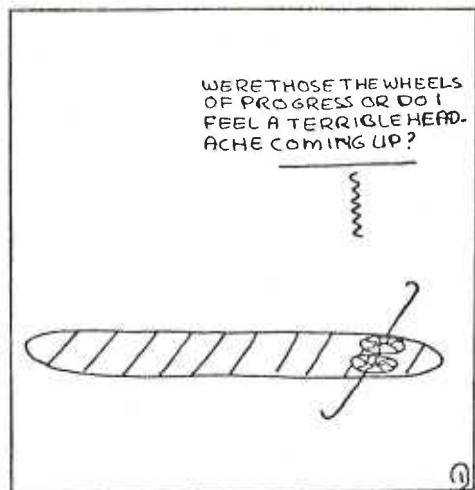
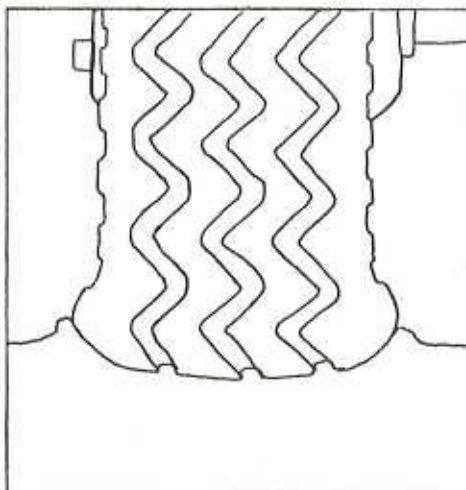
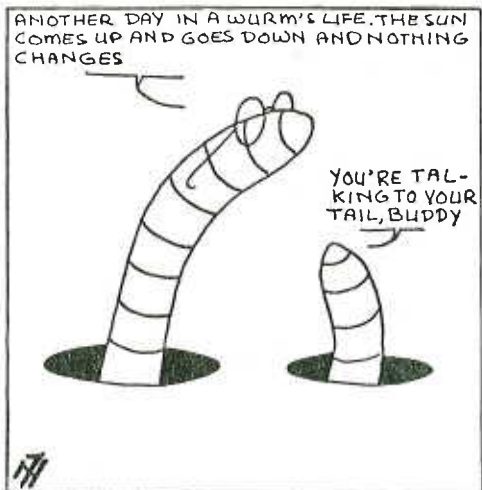
which forms a threat to all the other farmers. Clearly they have no insight why all farmers have to sow at the same time.

How was the exchange of knowledge and experiences between project and farmers? Farmers who were going to work with us were chosen from each village. They got one year in training-service then went back to their own villages where they were going to conduct the extension program in co-operation with local extension field assistants. All the farmers were asked if they were interested to test the new sorghum varieties. The first year there were one hundred farmers participating and the climatic circumstances were favourable so that results were optimal. The next year a thousand farmers wanted to participate, "maybe after all the project would bring something to them"! That year however, the results were not so positive due to the early unreliable rains and the incidence of insect-plagues. But among the farmers a discussion started about the contra's of sowing at diffe-

rent times, resowing with different types of crops etc. This was stimulated by us in so far that we transported on field days farmers with a truck from one farm to another and let the concerned farmer explain them why he had done so, when and what. Now different farmers are going on experimenting how to fit the new sorgho varieties into their farming system. Only if they succeed, the new varieties will be accepted.

What kind of limiting factors were influencing the introduction of the new sorghum varieties? One of the problems was Striga, a parasitic weed, which was occurring more and more especially on fields with a decreasing soil-fertility. On research stations, Striga does not exist. When we discovered the problem of Striga, during the first year of our project, we could forget all the hybrids, for originally they were not bred for Striga resistance. Another limiting factor was labour availability. The farmer did not have time to

weed his sorghum more than twice. Consequently too, short straw varieties of sorghum were useless, they disappeared between the weeds. Shortage of cash was also a limiting factor. The few available resources were used for the rent of labour and oxen, in order to sow and weed in time. So, for fertilizers and insecticides normally no money was left. Therefore sorghum with too high a fertilizer demand could not be used. is all is demonstrating the need of F.S.R., because at the research stations these factors cannot be diagnosed easily. But it must be clear that F.S.R. is not only restricted to the analytical phase of project. You also must dare to stick out your neck and say what has to happen to get better agricultural results. You have to implement and test your plans, under field conditions, because that is the only way to improve the situation of the farmers. Literature: Farming Systems Research in Eastern Africa. Collinson, 1982.



Request form:

1. Are you or your organisation interested to receive the ILEIA newsletter ? yes/no
2. Are you or your organisation interested to participate in the exchange of experiences ? yes/no
3. Are you or your organisation working in the field of low-external-input agriculture in the third world ? yes/no
4. In what kind of subjects concerning low-external-input agriculture do you or your organisation have any experiences or special interest ?  
Could you put therefore on the following list a cross behind the respective subject ?

	experience	interest
soil and water conservation_____	X	X
soil fertility (mulching, composting, biological N-fixation, others)_____	_____	_____
soil management and weed control_____	_____	_____
crop management, crop rotation systems_____	_____	_____
crop protection against insects,diseases, birds_____	_____	_____
forestry, fuelwood production_____	_____	_____
mechanization and farm equipment_____	_____	_____
animal husbandry_____	_____	_____
fodder production_____	_____	_____
agro-forestry_____	_____	_____
pisciculture_____	_____	_____
apiculture_____	_____	_____
farmers' cooperation_____	_____	_____
credit_____	_____	_____
marketing_____	_____	_____
farming systems research_____	_____	_____
extension_____	_____	_____
other subjects		



- 
5. Do you know any other persons or organisations who are working with low-external-input agriculture and would like to receive the newsletter ?
  6. Can you (shortly) characterize the project in which you are working (land, region, climate, soil, target group, aims, specific subjects) ?

# ECOLOGICAL AGRICULTURE AND FARMERS' PARTICIPATION IN BOLIVIA.

Tiraque is a small village in the mountain area of the Bolivian Andes. Cochabamba is the nearest city and easy to reach. It is also the trading centre between products of the highlands and the lowlands. Potatoes, beans, peas and barley are the most important cash crops of the highlands. Mostly however, crops like maize, wheat, oca, quinoa, and tarhui are grown in this region for home consumption. Tiraque is situated at 3.300 m above sealevel. Therefore temperature differs enormously between day and night during the long dry periods. Differences of 40 degrees Celsius are no exception. Due to the high altitude the temperature in the wet season will not rise above 17°C. From december to march there is about 400 mm of rainfall. Soil erosion is caused through lack of organic matter, burning and cultivation of crops in the short growing season on steep lands.

In Cochabamba works PAC: Proyecto Agrobiologia Cochabamba, an institute for research in ecological agriculture. They cooperate with agricultural institutes who apply chemical farming methods. Contacts with farmers have become impossible because of military actions in the past. During my stay from july 1983 until april 1984 for the Agricultural University of Wageningen, I utilized PAC as a study centre.

My main task was to give extension to farmers in the highlands. They wanted information on vegetable growing for home consumption and means for crop protection in agriculture. In order to come into good contact with the farmers and to be able to discuss practical experiences, a vegetable garden was set up on terraces. This could demonstrate important biological aspects like erosion control and soil conservation.

In request of the small farmers we also have set up small beds to raise different tree-species. Not only men, but also women and children were working with us. Therefore we had to adjust our advices not only to the growing season, but also to their situation. Special attention has been given to raise plants in the dry season, being able to transplant them in the wet season (cabbage, salad and beet).

Tiraque has a long organisational tradition. Thus it was easy for us to come into contact with the farmers, through attaining the meetings every two weeks (with 40-60 families). Also the catholic church has an extension-system. The initial task for the farmers' trade union was to execute the landreform of 1953. Now their aim is to improve the position of the rural families. Around Cochabamba, more than 150.000 farmers

are linked with the A.A.P., the Association of Potato Producers. In march 1984 they established a fund to regulate imports, like fertilizers and pesticides for the farmers.

Good contacts with the farmers and the existing trade union tradition made it possible to discuss ecological agriculture on a broad scope (e.g. dependancy on foreign inputs). Now, the prices of fertilizers rise faster than the prices obtained for e.g. potatoes. Devaluation makes foreign products even more expensive.

We have given an approach in which economic as well as ecological aspects were considered. We spoke about the possibilities of organic manures. But also the farmers themselves gave numerous domestic remedies which were proved to be quite useful for crop protection. The farmers have told the Bolivian agronomists, that time has come for them to listen to the farmers on solving national agricultural problems. They emphasized the priority of an agriculture of the people with the slogan: "our knowledge is our power".

In the extreme climate like the Bolivian highlands, ecological agriculture together with the trade union can offer new perspectives for improvement of the situation of the self-sufficient small farmer.

Tonnie Tekelenburg.

## CALENDAR

### COURSES ON ECOLOGICAL AGRICULTURE.

The foundation Agriculture, Man and Ecology (A.M.E.) organizes in close co-operation with E.T.C. courses on ecological agriculture for development workers.

In this way we hope to stimulate the development of a balanced agriculture, so that in future too a fertile and productive agriculture will be possible.

From 1982 on, courses on 'Ecological agriculture in developing countries' have been held for experienced agronomists. The next course will be held in July-August 1985 on Gloria Land in India.

However, junior experts also show interest, especially those who are going to work in remote areas.

Therefore three short courses will be held before the end of 1985 in the Netherlands.

For any further information, contact:

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## ABSTRACTS

Composting in tropical agriculture.

H.W. Dalzell, K.R. Gray, A.J. Biddlestone, International Institute of Biological Husbandry, 1979.

This practical guide describes the basic process of composting for fertilization and proven methods of heap construction. Conclusions are that composting requires low costs, has a little risk of failure, increases crop production, is a simple technology, uses labour force and gives less dependency on imports.

The one-straw revolution. An introduction to natural farming.

Masanobu Fukuoka, Rodale Press, Emmaus, 1978.

After many years of searching, Fukuoka formed his practice of natural farming. Aim is to get a balanced eco-system, working on four principles: 1. No cultivation of the soil. 2. No chemical fertilizers or prepared compost 3. No weeding by tillage or herbicides; weeds are controlled by a mulch of rice- and grainstraw. 4. No dependence on chemicals.

Intercropping in tropical smallholder agriculture with special reference to West Africa, K.G. Steiner, G.T.Z., Eschborn, 1980.

Intercropping is a central part of traditional farming systems in most parts of tropical Africa. This is analyzed in the book. Various aspects are discussed like use of fertilizers, distribution of labour requirements and risk aversion.

A review of the international literature is given, including unpublished results of intercropping and recommendations for applied agricultural research and extension programmes for the promotion of intercropping.

An agricultural testament. Sir Albert Howard, Rodale Press, Emmaus, 1978.

The purpose of this book is to draw attention to the earth's capital: the soil, to indicate some of the consequences of this, and to suggest methods by which the lost fertility can be restored and maintained. The book gives an overview of 40 years of experience in the West-Indies, India and Great Britain in the field of soil management, fertilizers such as compost and green manure, soil erosion, crop variety and pastures.

## CONTACTS

Tropical agronomist from Wageningen, age 30, four years of experience in Nicaragua and Pacific, since many years occupied with biological agriculture, would like to start a research farm and extension/education centre for ecological agriculture in co-operation with farmers of a region in a developing country, pref. Latin America. The aim would be to let farmers work out how traditional agriculture could be improved according to the ecological methods. Anybody interested in the same and knowing of a village suitable for the plan should contact:

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