

KEEP ROLLING



The ILEIA Newsletter 93/2 focused on "Cutting back on chemicals" in (former) Green Revolution areas. Readers were asked to reflect on the content, to question its conclusions and to respond with arguments based on their own practical experience. A compilation of the reactions of fourteen readers is given below. In general, the responses (mostly from Africa) confirmed the analyses presented in Newsletter 93/2. We were glad to receive constructive criticism in the form of complementary views and experiences. We would like to encourage you as a reader again to continue to send in your reactions and experiences on this theme. They may form the basis for a next issue that carries on to deepen the important theme of the future role of chemicals in making agriculture more sustainable. If you are interested to receive a full copy of (one of) the article(s), please forward your request to Lila Felipie at ILEIA.

Coming back on chemicals

While confirming Andrew Wardell's analysis on declining yields of hybrid maize in Njombe District, **Jo Thomas**, working with the NGO CONCERN in Iringa, Tanzania, highlights in her article *Building on farmer's knowledge* the failure of research and extension systems to focus on the majority of resource poor farmers. CONCERN has targeted its agricultural extension to the constraints of resource poor farmers by focusing on low-cost, low-risk interventions that build on traditional knowledge. Jo writes: "In Ismani and Malangali Division maize has displaced traditional crops such as sorghum, millet and cassava as the dominant and preferred crop. An evaluation of the Ismani project conducted in 1991 compared the net income and return to man-days for maize farmers at different performance levels on 0.4 ha: non-project smallholders, LEISA farmers and high-input farmers. Economic return to man-days are highest for the high-input system, followed by LEISA. However, at today's prices, the return to man-days is highest for the LEISA approach." (Jo Thomas, PO Box 701, Iringa, Tanzania)

Oderinde Maidele Soji from Ibadan, Nigeria stressed that "the Newsletter did not report on any case of yield decrease after farmers reduced mineral fertiliser and/or synthetic pesticides, which often happens though. Cutting back on chemicals has become possible in Iddo, the local government area of Oyo State, and in other areas of Nigeria due to a recent increase in the cost of chemical fertilisers and herbicides in addition to the problem of timely supply. Most farmers in this area have taken to poultry keeping for eggs as it brings more and instant income. Poultry dung is used on nearby farm land, weeds are biologically controlled by planting sweet potato between the maize. In some cases leguminous cover crops are planted between the crops. Cowpea usually follows maize. Indigenous resistant varieties of seeds are usually preserved by the farmers for their better harvest per hectare. All grains are usually treated with *Apron plus* before planting to prevent fungal attack. Mixtures of pesticides

are no longer used in spraying cowpea, only a single insecticide (*Decis*) which is said not to have any residual effect. Yields of maize have increased from about 2.5 to 4-4.5 t/ha, cowpea from 1.6 to 2.25 t/ha." (Oderinde Maidele Soji, PO Box 982, Agodi, Ibadan, Oyo State, Nigeria)

P Bhattacharya of the Regional Biofertilizer Development Centre in India writes: "Despite several constraints, organic farming based on biological N-fixation can offer an economically attractive means to reduce the use of costly chemical fertilisers. Biofertiliser cannot replace them fully, but it can supplement its use substantially. 80-90% of the N-demand of legumes can be met by *Rhizobium* and 10-15% of N-demand of cereals and vegetables can be furnished by other biofertilisers. In India, the present biofertiliser consumption is 1500 t and the demand is increasing every day. Under rainfed conditions, the use of biofertilisers is widely accepted. Farmers can save Rs. 700-1500 per ha, depending on the crop and biofertiliser."

Chemical fertilisers

Jepshi Midang Yonbish, who taught at Boys Secondary School in Gindir, Nigeria shared the outcome of an experiment comparing the yield of yellow maize, using organic manure from poultry and chemical fertiliser. "I had an acre of land and divided it in two equal parts. After the rain had established, I cultivated the two parts and planted the yellow maize the same day. On one plot I used only chemical fertiliser in two doses. It yielded 325 kg maize per half acre. The other plot received poultry

manure with 3 kg NPK added to it. This plot only received one dose and gave a yield of 311 kg per half acre. Looking at the two plots, one would not make any obvious distinction between the maize plants. Now that the price of chemical fertiliser has made it out of reach for small farmers, why don't we launch a campaign to encourage them to use organic manure? Besides, maize grown with organic manure also tastes better and sweeter. Chemical fertilisers have so much affected the soil that nothing can grow without its application.

To avoid using chemicals for storing, I ensured that the crops were properly dried. I tied the cobs together in pairs by their husks and hung them on separate branches of a big flame tree standing directly in front of my house. So far, I have seen no significant damage by pests. And people rush to buy our seeds for planting!" (Jepshi Midang Yonbish, Boys Brigade Nigeria, PO Box 9, Yaba, Lagos, Nigeria)

Ann Enwereuzo of the Women's Desk of the IMO Self Help Organisation in Nkwerre, Nigeria, read this Newsletter "from cover-to-cover twice as I am thrilled to read about cutting back on chemicals. My studies are against the use of chemical fertilisers, but I do not have enough facts and evidence to convince my organisation." (Ann Enwereuzo, No. 2 Ugochukwu St., Box 408, Nkwerre, Imo State, Nigeria)

I.O. Banmeke, managing director of Amazing Horticulture, Lagos, Nigeria states that the Newsletter "truly reported that if organic manure is supplied with the same nutrient content as mineral fertilisers, then the result is good. Due to the urgent need of land re-nourishment for continuous farming, we shifted to mineral fertilisers. But organic materials are still available locally to produce enough cotton and food. Kieft and Coulibaly are wrong. Mineral fertilisers usually make the soil acidic. Animal and other organic manures are better. Those who have continuously used mineral fertilisers on a maize farm with laterite soil confirm that the soil is rendered useless for further arable cropping

Dung beetles will be rolling up the themes again. When we publish a Newsletter on a certain theme, we hope that readers will digest it so that new ideas can emerge. In this section "Keep Rolling" you have a chance to present further information about themes highlighted in previous issues, thus giving still more food for thought and action.

after about five years. That is why most farmers in Western Nigeria usually reject mineral fertilisers." (IO Banmeke, PO Box 2415, Mushin, Lagos, Nigeria)

Cultural practices

"My reaction to Winarto and v.d. Fliert's report on increased pest occurrence due to the use of pesticides cannot be categorically yes nor no", writes **Aida D Solsoloy** of the Cotton Research and Development Institute in Batac, Philippines. "Pest occurrence can be induced also by wrong cultural management practices. This situation was well documented for some cotton-growing areas in Alabel, South Cotabato, a province in Mindanao. The areas are marginal and do not allow other crops except cotton to grow. Instead of following the cotton-free period after harvest, the farmers either ratooned or regrew. The pest situation could not be contained with chemicals and farmers instinctively resorted to indiscriminate application of whatever chemicals were available or mixing two or three chemicals to potentiate toxicity effect. The apparent ineffectiveness of the chemicals could be due to the presence of a tolerant pest population which could have reproduced in magnitude without limits. Final economic analysis indeed showed the practices were not profitable. The benefit-cost ratio was low for regrown and ratooned cotton because of the marked reduction in yield. This situation is pathetic because the practices are still being continued today. Farmers complain that they do not have any alternative crop. Besides, they find the practices convenient since they prepare the land only once. They only apply insecticides frequently at high dosages and mix them with foliar fertilisers to enhance cotton growth. Therefore, application of pesticides does not directly cause pest incidence, but it is the harmful practices." (Aida D Solsoloy, Mariano Marcos State Univ., Batac, Ilocos Norte 2906, Philippines)

"The use of cultural practices to control pests is the missing link in 93/2" writes **Anikwe Martin** of NTE Farms LTD, Enugu, Nigeria. "I found that most people in thinking about cutting back on chemicals did not think about available substitutes for replacing chemicals. An example. Farmers use cultural practices to control pests in maize and cotton. They manipulate the crops and land, making the environment unfavourable for pests. Maize stalks are often left in the field and can harbour up to 90% of maize stem borers. It's better to burn the stalks, use them as fuel for cooking or compost them. Use of "closed seasons" has been successful in Nigeria to reduce infestation of pink boll worms in cotton. Farmers in the north are not to grow cotton from 1 March to 1 July and those in the south not from 15 March to July. Other cultural practices like manipulating dates of planting and harvesting, mixed cropping, weeding, ploughing, land and crop rotations and plant densities can also help to cut

down on the use of chemicals. Also trap or decoy crops play an important role. In an experimental plot I was researching the response of castor (*Ricinus communis*) to N and P fertilisation on an acid ultisol. At about eight weeks, when the castor had just established, flea beetles attacked the crops. Just as I was thinking of using pesticides to control the pests, a three weeks old cowpea planted adjacent to the experimental plot did the job for me, clean. All the pests transferred to the cowpea which was on a smaller portion. Only the cowpea was sprayed with a little pesticide.

I agree with Padilla et al that before "Cutting back" will have a meaningful impact on village level and other farmers, alternative technologies like intensified use of cultural practices, although not new, but "forgotten", must be perfected by our scientists." (Anikwe Martin, NTE Farms, PO Box 584, Enugu, Nigeria)

ture in the future. But in my country, many agriculturalists and extension agents are odd to this concept. So we have to change the mind of this concerned group first. Even I was wondering to read such documents for the first time. What is missing? Let me try. You don't mention the destiny of so many lives that depend on great international networks of chemical fertiliser and pesticide industries. So when we are cutting back, aren't we also enhancing unemployment? Converting chemical industries into beneficial and ecologically sound industries should be enhanced. This is priority besides working on farmers' acceptance." (Bahiru Asfaw, PO Box 2, Baditi, Semen, Ormo, Ethiopia)

The ground is fertile

"The reason why the articles in 93/2 hardly address the role of women farmers in cutting back in chemicals is probably because women involved in the struggle to cut back have



Maize cobs hanging in a flame tree to dry.

"Every farmer knows that a crop that is not healthy can easily be susceptible to pest attack. The healthy ones can easily develop immunity to any pest or even develop their own defence mechanism" writes **IO Banmeke** from Nigeria. Cultural practices are also emphasised by **Haileyesus Iyasu** from Ethiopia as important means to depend less on chemicals.

Extension services

"In my location, the following problem arises" writes **Bahiru Asfaw** from Baditi, Ethiopia. "The use of chemicals is still advocated by policy makers and extension agents. Of course there is traditional organic farming and although farmers are aware of its benefits, there are some constraints to use it widely, like shortage of organic material and high labour input. Anyway, training and dialogue with the farmers may foster organic agricul-

not talked or written about it" says **Florence Sanyu** from Kampala, Uganda. "I will share what little I have done. Working as an extensionist for the Ministry of Agriculture, I have to educate farmers on new technologies developed by the Ministry's research centres. My main clients are women as they do most of the agriculture, both crop and animal. I have been a big advocate of pest management using chemicals and chemical fertilisers, as duty compelled me to. However, I joined the Young Women Christian Association (YWCA) in Uganda. YWCA availed me opportunities to attend workshops on sustainable agriculture. After realising the harmful effects I now try to make people aware of the dangers. I try to reach out to policy makers, eg. by fielding a lady practising organic farming in the Annual National Agricultural Competitions in 1991. I asked my district Agricultural Officer to include

"Organic Farming" as one of the topics to be entered. My district not only won under this topic, but also won a credit for innovativeness." Florence writes enthusiastically about prizes won by organic farmers; about sponsoring one of the farmers, Mrs. J. Kidza of Masaka district, to a three months course in the UK, workshops on sustainable agriculture with over 50 participants attending each time, clubs receiving intensive training in organic farming, members using botanical pesticides, organising a sub-region workshop, producing training guides, etc. "At present, there are efforts to establish the Uganda Centre for Sustainable Agriculture (UCSA) with founder members of people exposed to sustainable agriculture (three NGOs) and people from the Ministries of Agriculture and Environment and Makerere University. We are looking for collaborators and sponsors for our many ideas. There is yet a lot of sensitisation to be done and the ground is fertile. My one problem is how to reach all, that is why I would like to take this chance to call on all interested in helping our UCSA which has technical know-how, but no funds, to come to our aid. Membership is open to all interested and practising sustainable agriculture." (Florence K Sanyu, PO Box 281, Kampala, Uganda)

Look at system level

A major missing link stressed by several readers is the need for an (eco)system approach when cutting back on chemicals rather than concentrating on mere techniques and methods. "There are many more hidden factors (dynamic relationships) waiting to be unearthed" writes **Gavin Armstrong** from South-Africa. "Most answers are already in the field, and their discovery cannot and should not be left exclusively to scientists and academics." He has worked for 16 years as "a farmer/amateur researcher, at Camphill Village in Kalbaskraal, South Africa and has

been working along LEISA lines long before the concept was "coined" and became popular. Camphill Village is a welfare organisation, aiming at a meaningful existence for mentally handicapped adults by creating constructive employment. The work is conducted on a marginal 260 ha farm, highly leachable siliceous sands and 500 mm average rainfall. In the area, dryland farming (mainly wheat and sheep) with commercial agrochemical agriculture is the rule. The farm includes a wide range of livestock initiatives: breeding of a hardy pig and fowl, introduction of indigenous Nguni cattle, cross-bred with Jersey cattle, introduction of Damara sheep, multiplication of Chinese geese, Muscovy ducks, meat pigeons and rabbits. These animals receive feed from hedgerow intercropping (eg *Acacia saligna*, *Chamaecystis plamensis*, *Teline canariensis*) with rainfed crops (lupin, rye, oats, canola, cabbage, fodder carrot). The most salient features of this system are the functional relationships between the techniques: what emerges is a complex but easily grasped system, with a set of strongly linked rather than a set of disparate techniques." (Gavin Armstrong, Camphill Village, PO Kalbaskraal 7302, South-Africa)

"In my opinion, it is necessary to think in terms of ecological and social dynamics of complete ecosystems, with active involvement of small and medium land-holders and women in the planning process", writes **TV Ramachandra** of the Centre for Ecological Sciences in Bangalore, India. "Our field experience in the villages of Uttara Kannada District, Karnataka, highlights the importance of involving women and poor farmers. We studied the energetics of agriculture and other sectors in these villages and most of them are highly integrated agro-sylvo-pastoral systems with crop lands, grazing lands, forests and water. All components interact with each other resulting in a fine ecological

balance. Systematic lopping of trees in forests provided firewood on a sustained basis which resulted in no burning of cow dung. Cow dung is used for biogas plants and then slurry is used as organic manure. It is important to note the high success rate of biogas plants in these villages. Only few failures are due to poor workmanship or to technology. The use of cow dung as organic manure has helped the villagers to maintain the productivity of their crop lands. Slurry of biogas enabled villagers to reduce dependency on fuelwood for cooking. It conserved the nitrogen content in the cow dung which otherwise would be lost. Less weeds in the crop lands occur and tree leaves and crop residues help to complement fodder for animals during dry months. Thus the holistic enrichment of ecosystems is essential for this self-sustaining system. Any approach should enhance the productivity of all components of the agro-ecosystem and not just focus on agriculture alone. This can only be reached if villagers are involved in decision making". (TV Ramachandra, Indian Inst. of Science, Bangalore 560 012, India)

"The theme of personal responsibility, thinking globally and acting locally is an issue certainly being taken up here in Zimbabwe" writes **Alias Mulambo** of the Nyahodi Learning Centre in Chimanimani. "In my experience, those who do what they advocate are far more effective in their doing than those who don't. In our experience, aims and goals are very important. A holistic decision-making approach based on quality of life usually makes good sense to people but is not easy to achieve. Another theme is "participation" and "expertise" ILEIA Newsletter makes a lot of reference to "popular movements" and statements such as "strengthening people's own opportunity to act responsibly in their own environment" which, though they could be put more strongly, is good. The stick must be handed back or over to villagers to do their own planning. ILEIA should try and keep ahead in this and look at participatory approaches that facilitate and don't just add expertise to consultation. Unless cheaper technologies can be found, only the large-scale mechanised farmers will be able to stay in business.

The next theme is that of target groups. Many organisations target to especially women and the poor. One cannot question the good intention of such an aim. But I wonder whether the situation of women is not a symptom of communities falling apart. And so by targeting to women especially, one is treating a symptom. It's rather like fighting soil erosion on the land - which is also treating a symptom. Although the environment is talked about a lot, decisions continue to be made from very a narrow and reductionist outlook. If this situation continues, environmental programmes will fail". (Alias Mulambo, Box 9, Chimanimani, Zimbabwe)

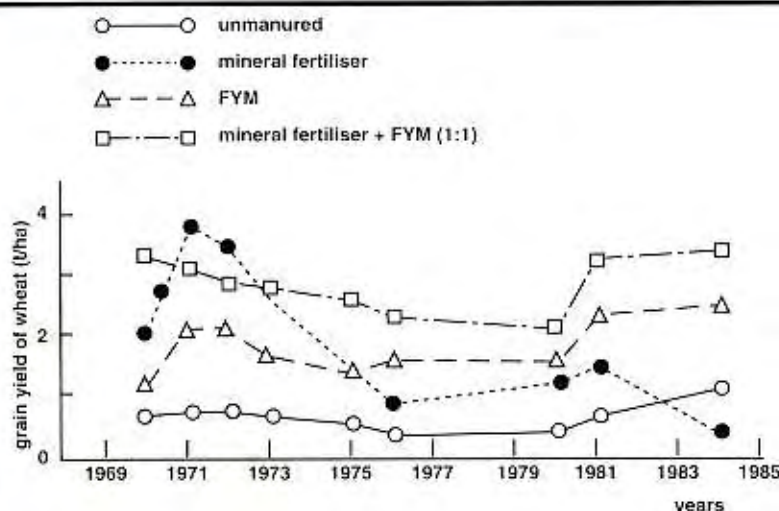


Figure 1: Yield trend in long-term manurial trial on an acid red loam at Ranchi, Bihar, India, over the years 1969-84, (after Nambiar and Abrol 1989)