Integrated Pest Management:

Smallholders fight back with IPM

This issue of the Newsletter is about substituting external inputs for labour, management skills and knowledge. It is about Integrated Pest Management (IPM) and men and women farmers participating in Farmer Field Schools, experiential learning and non-formal education.

from the editors

Although 35 years have passed since Rachel Carson published **Silent Spring** with its devastating account of the effects of the indiscriminate use of agro-chemicals, the one-sided push for increased output continues. Nature is controlled to this end and reliance on pesticide has not diminished. In northern countries, the environmental movement, followed hesitantly by government regulation, has had some impact on stabilising and perhaps curbing agro-chemicals, but in the South the use of pesticides has increased and chemical companies aggressively expand their markets.

Since the 1950s agriculture has been dominated by the vision of modernisation and the potential for using technology to mould nature to this end. This model has dominated the industrial agriculture of the North and the history of Green Revolution agriculture in the South.

Fortunately there have been initiatives within several agencies and governments to implement alternative approaches. FAO's Inter-Country IPM programme, which introduced the participative learning model of Farmer Field Schools, is one such example. First in Asia and later in Africa, many farmers were led to explore the wonderful and complex ecological relations present in their own fields and eco-regions. In this last Newsletter of 1997 we focus on IPM and try to give a picture of the changes that have taken place in recent years.

IPM

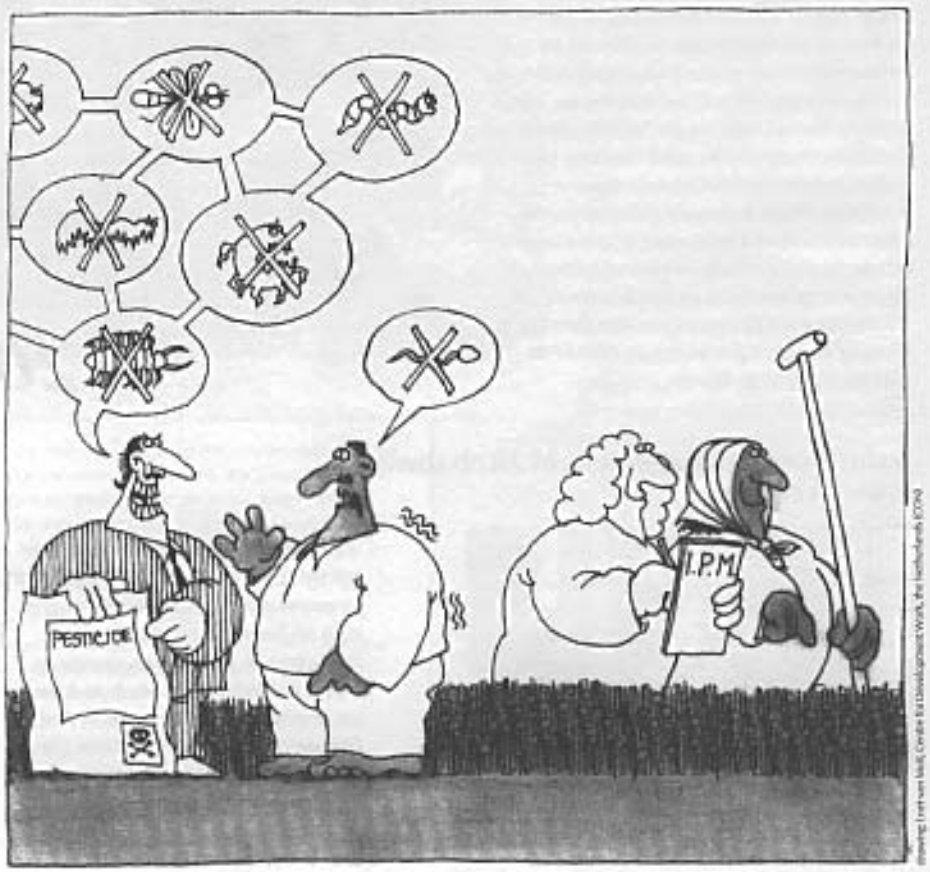
Integrated Pest Management developed in the 1970s as a response to the negative side effects of using pesticides. Pests were becoming resistant to chemical treatments, and the health of farmers, farm workers and consumers was in danger. These hazards were far greater in Third World countries, and today's evidence suggests that the situation has become even more volatile. The latest WHO figures suggest that at least 3 million, and perhaps as many as 25 million, agricultural workers are poisoned each year by pesticides, and some 20,000 deaths can be directly attributed to agro-chemical use. Studies from the Philippines have computed the alarming costs of pesticide to the national economy, showing these negative effects extend far beyond the individual (Pretty 1995).

In its early stages, IPM was a technical approach designed to reduce the number of pesticide applications. It subsequently developed into a methodology in which farmers were encouraged to develop IPM interventions themselves, in the process of coming to a better understanding of their agro-ecosystems. We can distinguish three stages in the development of IPM.

First, **the integration of control methods and target pests**. Technically, IPM consists of a combination of control methods including biological control, host plant resistance, cultural control, and selective chemical control. First generation IPM projects focused on reducing the use of insecticide by introducing the idea of pest population thresholds. Above this threshold, spraying against a particular pest - supervised control - was considered justified. Next, various control methods were combined to combat one or two key insect pests. Second generation technical IPM projects targeted more pests, and by including diseases and weeds, addressed the many crop protection problems experienced by farmers.

Second, **crop protection was integrated with farm and natural resources management**. When it was realised that many agricultural practices influenced pest development, and that crop intensification often leads to increased pest problems, control measures were designed that fitted into overall farm management. Indigenous knowledge and traditional cropping practices were studied, adapted and eventually served as the building blocks in IPM programmes. Natural Resource Management (NRM) became a deliberate objective because of the importance of bio-diversity in biological control and the social value of environmental protection. IPM projects practised Integrated Crop Management to solve the conflicting needs of agricultural production and the environment.

Third, **the integration of the natural and social sciences**. It became clear that fixed prescriptions do not work in tropical agriculture since site-specific agro-ecological and socio-economic conditions determine what is best in any one situation.



Farmers must be able to choose from a 'basket' of technologies. Existing extension systems, such as Training and Visit did not provide sufficient flexibility because they were based on the concept of a 'transfer of technology'. IPM projects started to develop around a more dynamic extension model - the Farmer Field School (FFS). This approach combined training with field-based, location-specific research to give farmers the skills, knowledge and confidence to make ecologically sound and cost-effective decisions on crop health. A number of examples of the ways in which FFS has developed in different countries are discussed in this Newsletter (see the articles by Kenmore, Page, Mangan, Nguyen, Nyambo, Fakih and Rengam).

Instead of promoting the transfer of ready-made techniques, FFSs emphasis building on farmers' ability to experiment and draw conclusions, on enhancing the farmer's ability to make good decisions, and on "empowering them so that they can improve their socio-economic position (Van de Fliert 1993). This new model of IPM extension also generates research questions. The research agenda develops at the point when, in attempting to train farmers, critical gaps in knowledge are identified.

In order to create an environment that encourages farmers to adopt IPM, the problems of research and extension have been addressed and agricultural policies - particularly those that favour pesticide use - have been critically reviewed. The relevance of third generation IPM projects goes beyond crop protection to address Integrated Nutrient Management and Integrated Tillage Management. The involvement and organisation of farmers is essential in maintaining the momentum in this process.

Project design is vital and should be open-ended enough to allow the inclusion of pest problems. Adoyo (see pp 24-25), describes an agro-forestry and woodfuel project in which farmers identified pest control as a priority and began to experiment with botanicals in an attempt to control termites.

Subsistence farming

The existence of indigenous knowledge on pest management cannot be taken for granted. Bentley (1997) reports important misconceptions among Bolivian smallholders about pests and, hence, about ways to combat them. In some situations, this might lead to pesticide abuse. Knowledge and insight are essential if farmers are to invent their own, alternative techniques. Alternative pest and disease control options may exist, but poor communication can prevent this knowledge reaching farmers.

Pesticide is not used much on subsistence crops, and pests and diseases often form only a small part of a farmer's problem. In such situations, an Integrated Crop Management (ICM) approach may be very useful. An interesting example of this is given in the article by Page (pp 13-14). Other acute crop production problems include water availability and soil fertility, issues that call for the intervention of multidisciplinary teams. Such an integrated approach is much more difficult to operationalise and is less easily mobilised for subsistence crops than it is for cash crops.

Participatory approaches

Agricultural development projects that are based on farmers' participation draw on indigenous knowledge. Farmers search for solutions based on their own needs, because farmers understand their own responsibilities and possibilities the best. In Adoyo's article, farmers carry out experiments. As one Kenyan farmer put it at the end of an FFS training session, "We are researchers too and we are proud of our findings".

The participatory approach analyses problems and uses local knowledge. The experimental site is usually the farmer's field or a special experimental site selected by the farmers' group. Farmers are taught to experiment with their local knowledge and this is complemented by new or external information. In the process, farmers and extension workers gain methodological skills which help them develop their own solutions. Such a sequence challenges the conventional research paradigm, and calls for new relationships and respect between the actors.

Trends in product development

Despite the potential of IPM, the use of pesticides continues to grow (Altieri, pp 6-7). The agro-chemical industry is concentrating its efforts on promoting conventional pesticides in Latin America and Asia. In 1996, pesticide use increased by 6 percent in Latin America and countries such as Brazil, China and India have become important producers of conventional pesticides (see Stoll, pp 11-12). In a number of developing countries these can now be obtained very cheaply at the local market, lowering the economic threshold for pesticide use and allowing more frequent application.

In many cases, IPM has been the equivalent of Intelligent Pesticide Management. Crops are scouted to monitor pest densities so action (usually an insecticide application) can be taken when the economic threshold (ET) has been exceeded. As long as the simplified structure of monocultures is maintained, ecological simplification will lead to pest problems. We are convinced that this is not the case in the integrated agro-ecosystem approach.

Working for smallholders

The article by Sam Page (pp 13-14) gives an interesting example of how a small NGO organised itself to meet the needs of smallholders in Zimbabwe. The training given borrowed the 'learning through experimentation approach' from FAO 'Farmer Field Schools'. However, some variations were introduced, in the sense that training was given primarily to farmers directly selected by farmers groups. Those farmers participating in the project abandoned the use of synthetic pesticides and were able to apply for the organic certification that entitled them to a premium for their produce. On returning to their communities, 'Farmer Field Workers'(FFWs) supported by the project, shared their new knowledge and ways of learning with the ten farmers who had originally selected them. The FFWs conduct regular Farmer Field Schools, ensure that individual farmers adhere to the guidelines for organic production and certification, and write monthly reports.

Achievements in IPM amongst small farmers are still modest. Nevertheless, the array of both proven and promising IPM technologies developed by indigenous farmers and researchers described in this Newsletter show the potential that exists for reducing the amounts of agro-chemical used and for improving agricultural sustainability. Farmers cannot simply cut their use of external inputs and still hope to maintain output. External inputs must be substituted by labour, management skills and knowledge. Farmers must, therefore, invest in learning (Pretty 1995). The challenge is how to use local knowledge and skills to motivate national and international organisations to change their research agendas and help fill the gaps in IPM knowledge.

The other challenge is to mobilise organisations such as those described in this Newsletter for a wider eco-regional impact. Care must be taken to avoid the indiscriminate copying of approaches that have been successful in other regions. The Asian FFS, for example, is not necessarily the approach for every African situation. It may well be that the African FFS model will ultimately be very different from the one developed in Asia.

The road to sustainable pest control is not a romantic short cut through the domain of traditional farming. Overcoming the obstacles, detours and deadends will challenge creative farmers and scientists for many years to come (Bentley 1997).

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