

Integrated pest management

A briefing for the *IPM in Developing Countries Project* funded by the European Commission *Environment in Developing Countries* budget (DGVIII)

This overview aims to introduce Commission officers, delegations, and policy advisers to key elements of IPM, to help them consider their role in promoting and implementing IPM.

The need for change

Agrochemical use has increased dramatically in developing countries in recent decades. Use is concentrated in cash crops destined for export, or the local market: particularly vegetables, rice, cotton, bananas, coffee and cocoa. Unfortunately the regulation of pesticide trade and use and the ability of small-scale farmers to use the products effectively and safely have lagged behind. The result is often environmental contamination, severe health problems and unprofitable crop production.

Changing practise with IPM

Crop production systems which do not rely heavily on chemical inputs, but which nevertheless produce adequate yields, will ensure economic and environmental sustainability. Integrated Pest Management (IPM) is one such system which has been successfully implemented on a wide range of crops and agro-climatic zones. Many aid and development agencies have adopted IPM as the model for the agricultural development they support, and the OECD Development Assistance Committee encourages its Member States to support IPM.

Essential ingredients

IPM enables farmers to make informed decisions to manage their crops. Successful IPM programmes replace reliance on most spraying, including calendar spraying, of pesticides. It builds on the knowledge of women and men farmers of crop, pest and predator ecology, to increase the use of pest-resistant varieties, beneficial insects, crop rotations and improved soil management. Supportive agricultural research, training of extension workers and farmers, and farmer participation in pest management solutions, are key elements. IPM programmes encourage access to information on non-chemical alternatives. Government adoption of IPM as part of its agricultural policy will move IPM from the level of individual projects to increase the take-up, and bring national benefits.

New initiative in Africa

The newly-formed Global IPM Facility, based in the Food and Agriculture Organisation of the United Nations (FAO), in partnership with the World Bank, the UN Development Programme and the UN Environment Programme, has prioritised training programmes with African smallholder farmers, and has initiated training in Ghana, Kenya and Zimbabwe.



Experimental plot in the IPM rice farmer field school, Ghana

“Many factors indirectly subsidise chemical pesticides, and prevent the use of non-chemical alternatives.”

Prof. Hermann Waibel, Pesticides Policy Project, adviser to the Global IPM Facility.

Definitions of IPM

Definitions cover a range of approaches: from safe use of pesticides, to elimination of virtually all pesticide use. The FAO says:

The presence of pests does not automatically require control measures, as damage may be insignificant . . . a system of non-chemical pest methodologies should be considered before a decision is taken to use pesticides.

Suitable pest control methods should be used in an integrated manner and pesticides should be used on an as needed basis only, and as a last resort component of an IPM strategy. In such a strategy, the effects of pesticides on human health, the environment, sustainability of the agricultural system and the economy should be carefully considered.

Information about non-chemical pest management is generally less available than that for chemical controls. It is increasingly understood that farmers may need training to recognise economic damage and decide when pesticides are 'needed'.

Why IPM?

In developing countries pesticides are often used under conditions which generate or exacerbate the hazards to health and the environment. These conditions include:

- > lack of protective clothing
- > poor quality spray equipment
- > lack of training
- > inappropriate or inadequate advice
- > illiteracy or poor literacy
- > labels not in local languages
- > lack of water for washing after spraying, and for regular washing of clothes
- > inaccessible medical facilities

To help overcome these problems, the FAO adopted the *International Code of Conduct on the Distribution and Use of Pesticides* in 1985, which governments and industry agreed to implement. But an FAO survey in 1995 found very limited improvements in health problems and the effect of pesticides on the environment appeared substantially worse.

IPM offers a viable alternative by involving women and men farmers in the development of appropriate pest, disease and weed management options for their specific cropping systems. Minimising the use of external inputs such as pesticides prevents the health and environmental problems associated with their use, and reduces the cost of crop production to farmers. Financial savings are

also passed on to the national economy as a result of fewer chemical imports.

Elements for success

IPM programmes are designed to generate independence and increased profits for farmers, and savings on foreign imports for governments. The experience of implementing IPM training on a large scale has led to the understanding that three elements lead to success:

1. Government and institutional support

A supportive policy environment may remove pesticide subsidies, tax pesticides to cover the 'hidden' costs, adopt IPM as a national strategy, and provide institutional back-up to research and extension services;

2. Technical solutions

IPM must provide farmers with solutions to their crop production problems. Research must be geared to working with farmers, recognising gender divisions of labour, in generating appropriate solutions.

3. Farmer participation

Delivery to farmers through participatory field schools, or their equivalent, which strengthen many good farmer practices and recognise farmers as experts in their own fields.

In applying IPM to small-scale farming activities, farmer training in field schools, or an equivalent, is perhaps the most important element for success. Farmers who have been using pesticides need to acquire the knowledge and confidence to use sustainable alternatives.

IPM in action

Rice has been a focus of IPM, and the most quoted success was its deployment against brown plant hopper (BPH) bug which decimated rice yields in Indonesia in the mid-80s. This was a direct consequence of excessive pesticide spraying which had killed off natural enemies, while BPH developed resistance. An FAO programme of farmer field schools has now trained over 200,000 farmers in Indonesia.

Farmer-participatory IPM is now part of many crops and cropping systems. In Africa, the Global IPM Facility supports national programmes. Cotton IPM was initiated in Zimbabwe in the 1997-98 season with training of extensionists and farmers. The results were positive with sprays reduced and income increased. One farmer, who was refused a loan for pesticides, said (after two months of training) "I thought that was the end, but my cotton is well developed and I have not applied a single spray." Farmers and extension workers in Ghana have been trained in IPM rice production, and a pilot

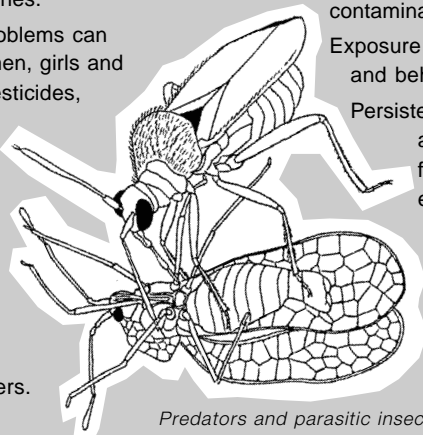
Pesticide problems avoided with IPM

Hazards to health

Acute poisoning: 3 million poisonings including 20,000 unintentional deaths occur annually (WHO).

Symptoms of acute poisoning include severe headaches, nausea, depression vomiting, diarrhoea, eye irritation, severe fatigue and skin rashes.

Chronic ill-health problems can affect women and men, girls and boys exposed to pesticides, whether because of their occupation or because they live near areas of use. Such problems can include neurological disorders, cancers, infertility and birth defects and other reproductive disorders.



Predators and parasitic insects can control pests (Drawings courtesy of IIBC, now CABI Bioscience).

Hazards to environment

Contamination of drinking water and ground water.

Water contamination kills fish.

Soil contamination.

Wildlife and domestic animals can be killed by spray drift or drinking contaminated water.

Exposure may also cause infertility and behavioural disruption.

Persistence in the environment and accumulation in the food chain leads to diverse environmental impacts.

Loss of biodiversity in natural and agricultural environments.

Crop production problems

Pesticide resistance: 520 species of insects and mites, 150 plant diseases; and 113 weeds are resistant to pesticides (FAO).

Resistance can create a treadmill syndrome, as farmers use increasing inputs to little effect, while elimination of beneficial insects causes secondary pest outbreaks.

High cost of pesticides can lead to falling incomes for farmers: newer products are often safer, but are more expensive.

Farming communities lose knowledge of good horticultural practices and become dependent on expensive external inputs.



project in Kenya trained smallholders growing coffee and vegetables.

Implementing IPM

Creating incentives

Initiating IPM in developing countries requires inputs of expertise and funds to support the transition. Extension services and farmers need to be trained, research linked to on-farm solutions, pilot programmes established and national IPM policy and crop workshops held.

To sustain IPM programmes and disseminate awareness of achievements, trainers and policy makers emphasise the value of involving non-governmental organisations (NGOs). Their participation in planning, training and in some cases delivery of IPM is increasingly important.

Removing obstacles

Governments need to examine policies supporting pesticide use, which can include both price and non-price factors. Typically, governments may sell

pesticides at a subsidised price; encourage agricultural credit or crop insurance to be tied to pesticide use; allow favourable foreign exchange rates or import duties on pesticides. Non price support may be represented by investment in pesticide research, insufficient pesticide or environmental regulation, or policies encouraging pest eradication rather than pest management.

“I have sprayed one of my fields only once and have observed that there is no difference with the field sprayed three times.”

Farmer from Jompani, Zimbabwe, after two months of cotton IPM training.

Development agencies often donate chemical fertilisers and/or pesticides, rather than supporting the more sustainable agricultural alternatives. Because donations do not always go through normal trade routes, the pesticides may include some not registered for use in the country. Donors have a useful role in ensuring their policies support, rather than undermine IPM implementation.

International support

- ❖ The newly-established Global IPM Facility is a clearing house for funds and expertise to implement IPM programmes in developing countries. CABI Bioscience (UK) provides technical support and the Pesticides Policy Project (Germany) the policy support.
- ❖ OECD Development Assistance Committee published *Guidelines for aid agencies on pest and pesticide management*, encouraging the aid agencies of Member States to promote IPM as the preferred approach to pest control.
- ❖ The 1992 UN Conference on Environment and Development (UNCED) called for participatory IPM in Chapter 14 of Agenda 21.
- ❖ The World Bank and other development agencies including GTZ (Germany), DFID (UK), SIDA (Sweden) and DGIS (Netherlands) are among the agencies with IPM policies in place.

A role for donors

IPM strategies will develop a stronger and more rewarding agricultural sector and rural economy. Until recently, progress has been slow, because

Key points

- ❖ IPM is a successful, economically viable, and environmentally friendly alternative to pesticide use.
- ❖ Training is the key to success: "IPM is BY farmers, not FOR farmers."
- ❖ Pesticide donations can be an obstacle to adoption of IPM.
- ❖ Development agencies can fund studies of constraints, policy and practical workshops, and projects to get IPM working at farm level.

of ad hoc approaches which address single pests or crops, and which lack strategic planning and policy support. Donors need to offer serious financial and policy support for participatory IPM which includes women and men farmers, research and decision-makers. Development agencies can play a valuable role by supporting initiatives which:

- ❖ analyse political and institutional constraints to IPM adoption;
- ❖ provide policy workshops and exchanges, regionally or nationally;
- ❖ provide farmer field school training, where farmers and rural communities fully participate;
- ❖ provide research, particularly in national agricultural research centres, which focuses on practical solutions in partnership with farmers;
- ❖ eliminate donations and funding of hazardous chemicals used in agriculture;
- ❖ develop information sources on appropriate consultants, data bases and publications;
- ❖ strengthen marketing structures relevant for IPM produce.

Conclusion

Investment in agriculture is crucial in developing countries, particularly in Africa where agricultural exports often form the economic base of development. In small-scale farming communities IPM offers an ideal strategy for improving the income of farming families by cutting their spending on agrochemicals and, in many cases, by increasing yields or quality. African farming communities have limited resources to prevent the health and environmental problems arising from pesticide use. Donor agencies can contribute to fundamental change for sustainable, ecological agriculture.

Resources

Publications

European Commission, *Progressive pest management: controlling pesticides and implementing IPM*, DGVIII, 1998. Contact Michael Dale, Email michael.dale@dg8.cec.be, fax +32 2 299 2908.

ILEIA Newsletter for ecologically sound agriculture (especially December 1997, 'Fighting back with IPM'), LEISA, Kastanjelaan 5, PO Box 64, NL-3830 AB, Leusden, Netherlands, Email ileia@ileia.nl, fax +31 33 4951779.

IPM Working for Development, a bulletin of pest management issues and projects, IPM Forum, C/o. NRI, Chatham Maritime, Chatham, Kent ME4 4TB. Fax +44 1634 883377.

OECD Development Assistance Committee, *Guidelines on Aid and Environment No. 6: Guidelines for aid agencies on pest and pesticide management*, Paris, 1995, fax +331 45 24 82 00.

World Bank publications: (1) Jumanah Farah, *Pesticide Policies in Developing countries: Do they encourage excessive use?* Discussion Paper 238, 1994; (2) Agnes Kiss and Frans Meerman, *IPM and African Agriculture*, Technical Paper 142, African Technical Department Series, 1991. Washington, US, 1994, fax +1 202 477 6391.

Contacts

CABI Bioscience supports national capacity-building in IPM research, training and policy development through its Regional Centres in Africa, Asia, Europe and the Caribbean. Silwood Park, Buckhurst Road, Ascot, Berks SL5 7TA, UK, Email cabi-bioscience-ascot@cabi.org, fax +44 1344 875007.

Global IPM Facility (Dr Peter Kenmore), Secretariat/AGP, (Room B759) FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy. Email: global-ipm@fao.org, fax +396 5705-6227.

IPM CRSP has projects in Africa; and with USAID is developing access to electronic communication in Africa. ICN/Africa IPM Link, Office of International Research and Development, 1060 Litton Reaves Hall, Virginia Tech, Blacksburg, VA, USA 24061-0334. <http://www.ag.vt.edu/ipmcrsp/>, fax +1 540 231 3519.

IPM Europe, coordinating activities of European agricultural research institutions in developing countries, C/o. IAC, PO Box 88, 7600 AB Wageningen, Netherlands. Email f.a.neuman@iac.agro.nl, fax +31 317 418552.

Pesticide Policy Project, University of Hannover (and GTZ), analyses policies which inhibit IPM and promote pesticide use. PPP, Herrenhauser Str. 2, 30419 Hannover, Germany. Email waibel@ifgb.uni-hannover.de, fax +49 511 762 2667.

Many NGOs are actively encouraging and engaged in IPM. Contacts can be sought nationally, or identified with assistance from other NGOs, such as: ILEIA (above), Pesticides Action Network UK, IPM Forum at the Natural Resources Institute UK.



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