IPM in the Middle East and North Africa

Report of

the Workshop on

Integrated Pest Management by Farmers

Participatory Approaches to IPM

... 19 November 1997

... Ismailia, Egypt

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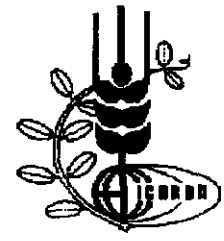

15 – 19 November 1997
Fayed, Ismailia, Egypt

Contents

IPM by Farmers

Participatory Approaches to Integrated Pest Management

I. Introduction

1. The workshop was organised jointly by FAO, GTZ and ICARDA in collaboration with the Government of Egypt. It was convened under the auspices of His Excellency Prof. Dr. Youssef Wally, Deputy Prime Minister and Minister of Agriculture and Land Reclamation, during the period 15 to 19 November, 1997 in Fayed (Ismailia), Egypt.

2. The objective of the workshop was to promote ecologically informed agriculture through the adoption of participatory approaches in IPM, where farmers will be empowered with a variety of sound tactics that will allow them to implement measures that will insure sustainable production of healthy crops without adverse effects on the environment.

3. Around 90 scientists, agricultural officials, and policy makers from Cyprus, Egypt, Jordan, Lebanon, Morocco, Sudan, Syria, Turkey, and Yemen participated in the workshop. Invited speakers and resource persons from FAO, the Global IPM Facility, ICARDA, Sudan, University of Warsaw (Poland), University of Bonn (Germany), BGVV (Berlin, Germany), USAID and the Global Crop Protection Federation also participated in the workshop. The summaries of presentations, the workshop programme and the list of participants are attached in Annex I, II and III, respectively.

4. Opening addresses were delivered by Dr. Chris Akem (ICARDA), Mr. Christian Pollack (GTZ), and Dr. Mahmoud Taher (FAO). They expressed appreciation to the Government of Egypt, the Ministry of Agriculture and Land Reclamation, and the Governorate of Ismailia for housing the workshop and providing all facilities required for its success. They also emphasised the importance of the learning process in allowing the farmer to play an important role in achieving sustainable agriculture and growing healthy crops.

5. Prof. Dr. Bakir Oteifa, on behalf of His Excellency, Prof. Dr. Youssef Wally welcomed the participants to the workshop and stressed the necessity of pooling all resources required for bridging the present gap between food production and consumption in the Middle East and North Africa and minimising the adverse effects of the use of pesticides in crop protection on the environment. He emphasised the importance of Integrated Crop Production and Protection Management in growing healthy crops and providing the public with healthy produce while protecting the environment. Prof. Dr. Oteifa concluded that farmers in the region bring vast experience gained through thousands of years and no doubt they will, with the support of research, extension and the public, live up to our high expectations.

II. Discussion and Recommendations

6. Workshop participants received input from resource persons, visited IPM field sites and farmers, discussed among themselves and with IPM personnel from across the region. The workshop participants conducted focused discussions in three main areas and came up with the following recommendations:

Curricula Development for Participatory IPM Training

7. The participants clarified that "IPM" programs should normally cover the period of the crop from seeding to marketing, including post-harvest. Furthermore, IPM should not be limited to "pests" alone but also cover the healthy production of the crop which has important consequences for control of pests and the response of farmers. Finally, while many definitions of IPM may exist, we feel that it is important to reiterate that IPM is a management system carried out by farmers, thus farmers perform the most important, central role in IPM training.
8. When designing curricula, numerous methods are available for determining the content including formalised PRA (Participatory Rural Appraisal), surveys conducted with farmers, and monitoring methods. However, establishing *Farmer Field Schools* based on the "best knowledge available" then validating with the participation of farmers in the field (similar to on-farm methods) have also been used successfully to define IPM contents. Response in time of crisis, as in the case of California red scale outbreaks in Cyprus, will also provide a very clear context for curricula development.
9. It was pointed out that IPM curricula must have a strong technical core. However, it was felt that participatory methods will ensure an effective educational process and acceptance by farmers and extension workers.
10. While IPM is *by farmers*, it is supported by policy makers, consumers, private industries, and non-governmental agencies. Therefore there should be training efforts for a wide spectrum of society concerned with effective agricultural systems, and the environmental or health impact of these systems.
11. Lastly, it must be realised in curricula development that each country and region is different so that a practical and flexible approach should be maintained to ensure effective programmes.

Recommendations

- Curricula should include all elements necessary for growing a healthy crop and protection against all types of pest from planting to marketing, including post-harvest.
- Curricula should be developed based on farmer's needs, research and extension advances, and must be dynamic in reference to field problems encountered during training.
- Execution of training should have a local flavour and include evaluation by independent, impartial parties. Special concern for the specific needs of women and men should be considered.
- Strong technical content with hands-on participatory methods in the field is a prerequisite for effective *Farmer Field Schools*.

Participatory Approaches to IPM

12. *IPM by Farmers* is by nature a knowledge intensive, locality specific process involving direct field observation, data gathering, and decision making by farmers in their own fields. As such, conventional message/information based extension methods are inappropriate for IPM programs.

13. *Farmer Field School* programs differ from usual extension in that they emphasise *active discovery learning* rather than teaching; a holistic understanding of field ecology across a cropping cycle rather than just specific production components; direct experimentation by farmers instead of mere observation of demonstrations; and the critical testing and selection by farmers of set of options rather than the adoption of a fixed recommendation. In order to implement participatory IPM approaches field workers must become competent facilitators able to encourage participant learning and exchange of experience. IPM *Farmer Field School* facilitators create the conditions and structures enabling farmers to learn for themselves; and the field itself becomes the main learning material.

    The participants at this workshop defined the participatory approach to IPM as *"a process in which all stakeholders share knowledge and experience. In the participatory approach to IPM all participants are actively involved in problem identification, needs assessment, curriculum development, field work, analysis, and decision making. IPM participants set group goals jointly and commit resources to attain these goals. In participatory IPM, the benefits flowing from activities are equitably distributed."*

14. IPM programs in the Middle East and North Africa have made much progress in the implementation of participatory approaches to IPM. Relationships between extensionists and farmers have been improved through regular group meetings. Participatory methods have allowed the inclusion of local farmer knowledge within IPM programs, and field activities have moved toward an ecological approach. The participants at the workshop also noted a number of areas in which improvements can be made, and developed the following recommendations.

Recommendations

- Field staff need to be assigned full-time to IPM activities with sufficient supporting budget allocated such that IPM programs will be able to evolve and grow. There is also a need for developing career paths for IPM field staff in order to insure sustainability of activities and guard investments made in IPM programs.
- Researchers, research agencies, and other specialists need to be more closely involved in IPM field activities so that new inputs can be made available to IPM farmers. Researchers should also be involved in the development of farmer level experiments, field trials, and the development of field exercises for IPM *Farmer Field Schools*.
- Data collection on the impacts, results, and benefits need to be more uniformly and comprehensively compiled. This information needs to be shared more completely and

regularly with colleagues and policy makers through dialogue in order to generate increased support for IPM field programs.

- Information on IPM programs in general need to be more widely disseminated through media and communication forums in order to build a general public awareness of IPM.
- Efforts need to be made to improve the participation of women in IPM programs. This can be done by making sure that fieldworkers receive training on gender issues, and that mechanisms are put in place to ensure access of women to IPM programs in the field.

Impact and Environmental Risk Management of Pesticides

16. The impact and environmental risk management of pesticides used as a component in IPM programmes were discussed by the workshop. It was recommended that pesticides used in IPM programmes should be subjected to registration procedures followed in participating countries. Guidelines provided by the WHO and UNEP as well as the *FAO Code of Conduct on Distribution and Use of Pesticides* should be followed in the registration procedures.

III. General Workshop Conclusions

17. The workshop participants from the Middle East and North Africa were clear in their conclusion that *IPM by Farmers* represents a viable, sustainable, and practical approach to the development of environmentally sound agriculture. The 'vision' of ecologically informed, farmer-driven IPM developed by participants will be highly responsive to the challenges faced by agriculture in coming years and decades.

18. Workshop participants hope that policy makers and agricultural officials from the involved countries will respond positively to initiatives for IPM and commit the resources and personnel necessary for launching, improving, and sustaining ecological *IPM by Farmer* programs.

19. Several countries in the region have already initiated IPM *Farmer Field Schools* programs plus the requisite extension worker training programs. It is the hope of participants that these programs can be broadened, strengthened, and given priority within the agricultural sector. Other countries in the region expressed strong interest in starting-up farmer training programs in IPM and await support from their respective national authorities.

20. Donor agencies such as USAID and others are also called upon to support these initiatives such that IPM can become firmly established within the Middle East and North Africa Region.

IV. Adoption of the Report

The workshop unanimously adopted the report as well as the following declaration:

The Ismailia Declaration on Participatory Approaches to IPM

We, the participants in the Middle East and North Africa Workshop on *IPM by Farmers: Participatory Approaches to IPM*, jointly convened by FAO, GTZ and ICARDA in collaboration with the Government of Egypt from 15 to 19 November 1997 in the city of Fayed (Ismailia), welcome the world-wide interest in participatory approaches to IPM. This was demonstrated by recent developments such as the establishment of the Global IPM Facility cosponsored by the FAO, World Bank, UNDP and UNEP and supported by a number of donor countries and agencies.

We are encouraged by efforts in the Middle East and North Africa to introduce participatory approaches to IPM programmes and farmer-focused activities such as the establishment in some countries of *Farmers Field Schools* stimulated by successful experiences in other regions. However, much still needs to be achieved in this regard.

We stress the need to maintain the momentum achieved by these and other activities leading to the development and adoption of ecologically sound agricultural methods of integrated crop and pest management that will lead to sustainable food security.

We are of the firm view that central to the success of sustainable agricultural systems is the empowerment of farmers and strengthening their skills in ecologically-based IPM methods and practices.

Accordingly we call on:

- **Governments of the region to adopt participatory approaches to integrated pest management as the national crop protection strategy and take all necessary measures and policies to ensure effective implementation of this strategy;**
- **Donor countries and agencies and financial institutions in the region to actively support national and regional efforts promoting participatory approaches to IPM and *Farmer Field Schools*;**
- **The national, regional and international agricultural research centers, as well as universities to give high priority to working with farmers and extension agents at the farm level in the development of suitable technologies, practices and curricula;**
- **Extension and research systems to be further strengthened such that they can support the development of farmer-based ecological IPM;**

The cosponsors of this workshop, and other possible sponsors, to consider convening similar workshops to maintain the momentum achieved, to facilitate exchange of information and experiences and to monitor progress, with the view that this eventually will develop into a full-fledged regional network for participatory approaches to IPM.

Adopted in Fayed (Ismailia)

on 19 November, 1997

V. Closing Session

Eng. Fathi Ahmed Marai, Undersecretary of Agriculture in Ismailia, appreciated the selection of Ismailia as the site of the meeting and thanked the organisers.

Dr. K. Makkouk said that the organising committee was very much encouraged by the interest in the workshop topic as demonstrated by the participation of 90 professionals from the region. He encouraged all participants to follow up on the outcome of this workshop and thanked the Minister of Agriculture and Land Reclamation and the Government of Egypt for their support.

On behalf of the GTZ, Dr. W. Gassert expressed his pleasure about the co-operation among the different sponsors in organising this workshop and hoped that this will continue. He also thanked the facilitators, invited speakers and participants.

Finally, on behalf of the participants, Mr. Iordanou thanked the organisers and the Government of Egypt for the opportunity to attend this workshop. He assured them, that the participants would take much new knowledge back to their countries and that they would do their best to promote and implement the *Ismailia Declaration.*

VI. Annexes

Annex I: Summaries of Presentations

a) Keynote Addresses

1. IPM by Farmers: From Farmer Field Schools to Community IPM

by *Russ Dilts,* FAO, Indonesia

IPM is by nature an evolutionary, dynamic process. IPM promotes the primacy of an ecological, farmer-driven approach. In good IPM, the 'field' is viewed as a complex, living, ecological unit where farmers learn to work with the dynamics of local ecological variables of soil, seeds, plants, water, insects, and other organisms.

In Southeast Asia, IPM at first focused upon the concept of making farmers themselves experts in the own fields; capable managers able to gather data and make ecologically informed crop management decisions. Farmers are hence the active subjects, and not the passive recipients, of IPM programs.

IPM does not end after the last session of the IPM *Farmer Field Schools.* In this sense, the *Field School* is just the first step, just the 'primary school' providing participants with the basics principles of field ecology and the mastery of processes of learning. Participants learn the language necessary to 'read the book', and in IPM the living ecology of the field *is* 'the book'. Subsequent to field schools IPM farmers begin to take on progressively more challenging roles.

IPM BY FARMERS denotes a stage of development of IPM wherein farmers begin to take over roles and activities previously handled by field workers such as IPM training. For example, in Indonesia at present nearly half of all *Field Schools* are run by teams of Farmer IPM Trainers. Currently, over 16,000 Farmer Trainers have been involved in *Field School* implementation. IPM trained farmers also begin to learn about IPM for new crops within their local cropping cycles, and increasingly take over the actual development and implementation of field research on local problems confronting the farm community.

COMMUNITY IPM programs begin when IPM farmers learn the methods of planning and organization necessary to 'take-over' and guide the development of IPM activities in the local areas. At this stage IPM Farmer networks, associations, alumni groups become active in creating plans and mobilizing local funding for sustainable IPM activities. The true sustainability, re: the flow of benefits to the farm community after the cessation of the 'project', is fully in the hands of capable farmers. These community IPM groups can also exert effective demand upon extension and research agencies while bringing in such agencies as collaborative partners for further IPM development.

2. Global IPM Facility

by *Kevin Gallagher,* FAO, Rome

The Global IPM Facility was initiated with the co-sponsorship of FAO, UNDP, UNEP, and the World Bank and is currently financially supported by FAO, World Bank, and the Governments of Norway, Netherlands and Switzerland. GTZ supports the University of Hannover Pesticide Policy Group to provide backstopping to the Facility on IPM related policy issues. A Governing Group that represents the co-sponsors, the core donors and the five geographical regions covered by the Facility will be formed in 1998. On recommendation of the co-sponsors, the Facility is hosted by FAO in Rome.

The key activities of the Facility are:

1. Create awareness and a conducive policy environment through study tours, exchange visits, and briefings demonstrating the potential of IPM to farmers, technical leaders and policy-makers.
2. Help promote, design and facilitate funding for pilot activities to demonstrate the feasibility of a farmer-oriented approach.
3. Assist countries with successful pilot activities to move into a full-scale project phase.
4. Strengthen IPM implementation through greater participation by national and local institutions, including NGO's and farming community organizations.
5. Help establish, strengthen and expand national and regional IPM programs by providing linkages to other national IPM programs and facilitating access to relevant models, experts, research finding and studies.
6. Establish co-operative linkages with relevant officers, bother technical and polity, within aid agencies, international agencies and NGOs to offer assistance in project identification, project proposal screening and policy development with regard to IPM.

Pilot projects in Ghana, Burkina Faso, Ivory Coast, Mali, and Kenya to train IPM trainers and implement *Farmer Field Schools* in rice, coffee-vegetable, and maize-soybean systems indicate that methodology developed in successful IPM programs in South and South-East Asia can be adapted to local conditions to bring about effective educational programs in Africa. These pilot programs are beginning scaling-up activities that will further test the appropriateness of the methods. IPM training in cotton, maize, groundnut, and paprika to begin in Zimbabwe in December 1997 will also apply season-long IPM training of trainers and develop *Farmer Field School* methods for these crops. It should be noted that Facility 'IPM' training activities cover the four basic principles of IPM, namely: Grow a healthy crop, Conserve natural enemies, Observe fields regularly, and Farmers become experts.

b) International, Regional and National IPM Experiences

3. Participatory IPM: USAID Global Plan and Progress To Date

by *Robert C. Hedlund*, USAID, Washington, D.C. USA

The Integrated Pest Management Collaborative Research Support Project (IPM CRSP) is an U.S. Agency for International Development (USAID) funded project to promote collaboration between U.S. and host country scientists and institutions in IPM. The project is implemented by a consortium of U. S. Universities led by Virginia Polytechnic Institute and State University.

The purpose of the IPM CRSP is to develop and implement a replicable approach to IPM that will help reduce: 1) agricultural losses due to pests; 2) damage to national ecosystems; and 3) pollution and contamination of food and water supplies. The research is designed to address five broad categories of constraints: technical information, interdisciplinary collaborative research, socio-economic factors, outreach and extension services and policy issues. The end result should be a stronger global IPM research and education network and improved quality of life in both developing and developed countries. Primary beneficiaries are farm owners, workers, managers and other inhabitants of countries to which developed information and technologies are transferred.

The IPM CRSP uses a participatory approach to all its activities: First to identify pest problems, current IPM practices and constraints to adoption; secondly to design specific IPM strategies, tactics and interventions; thirdly to analyse socio-economic factors affecting implementation; and finally, to evaluate IPM impacts.

When it began in 1993, the IPM CRSP selected four sites in which to begin its global research activities: Mali, Guatemala, Jamaica and the Philippines. Activities in Uganda, Eritrea, Ukraine and Ecuador have been added. In forming its plans for the next five years, the implementers are proposing additional activities in Bangladesh, Albania and Egypt.

Significant accomplishments in the first four years of the project include:
1) the identification of nematodes as the principal pest of onions in the Philippines;
2) the use of strip cropping to reduce pest damage and increase yields of millet in Mali;
3) a sociological description of the forces playing a role in IPM decision making in Jamaica; and
4) resolution, based on scientific investigations, of snowpea detention problems. In this latter case, snowpeas being shipped from Guatemala to the U.S. were refused entry because of an infestation by an unknown leafmining insect. Guatemalan and American researchers were able to demonstrate to the quarantine authorities that this leafminer was common in the U.S. and did not represent a threat to U.S. agriculture.

4. ICARDA Experience in IPM

by *C. Akem*, ICARDA

This workshop brings together researchers, policy makers and farmers. It is a unique opportunity for interaction and exchange of ideas. Researchers will be able to tell farmers what is available for them from research on IPM, farmers will tell researchers what their needs and expectations are and the policy makers will judge if we are on the right track to give them confidence to continue to provide the much needed support.

ICARDA is committed to IPM research. This is evidenced by its recent shift to focus more in

this area of research, with more resource allocation and inputs. One research project of the center's research agenda is devoted completely to IPM research. Within the germplasm enhancement projects, some IPM research is also being carried out in collaboration with plant breeders for varietal screening for pest resistance for use in IPM.

The participatory approach of doing research with farmers is not new to ICARDA. Most of the crop enhancement research projects have been largely decentralised and a lot of the research is being carried out in a participatory mode with national program scientists and farmers in different national programs. IPM research at ICARDA is also shifting in this direction. We realise that this is the logical approach to take, as the research has to be conducted for and with the farmer, who is the end-user of the findings.

5. Cotton Pest Management in Egypt: Past, Present, and Future

by *Bakir Oteifa* and *A. J. Treen*

Cotton pest management in Egypt has undergone a radical change since the early 1990s. Prior to then, pest management was based on a strategy of pest prevention using pesticides, with all field operations undertaken by the Central Administration for Pest Control (CAPC). There were many early season applications, based on casual field observation and the experience of engineers, which decimated populations of beneficial insects. Cotton leafworm was controlled by teams of children hand picking the egg masses, with pesticides applied to heavy infestations. Bollworms were controlled by a series of calendar sprays, initiated by decree from Cairo. Approximately 75 per cent of applications were from the air.

The present strategy is based on the principles of IPM. The various components were incorporated over a five year period, and are implemented by the CAPC. The components consist of:

- Improved ground application techniques
- Crop scouting
- Monitoring of cotton leafworm and bollworms with pheromone traps
- Pesticide treatment thresholds
- Pheromone mating disruption of pink bollworm
- The use of sulphur, detergents and oils for sucking pest control
- Encouragement of natural populations of beneficial insects
- General agronomic techniques

As a result of the IPM strategy there was a reduction in pesticide use per feddan by 60 per cent in 1994, while all applications are now with ground equipment.

In the future, improvements could be made to the existing strategy, and other technical components could be added. However, the major challenge of the future is for the CAPC to withdraw from executive field pest management activities and to adopt instead a supervisory and regulatory role. A risk during the transition period is excessive pesticide use by farmers, and of private companies attempting to maximise profits by promoting pesticide use. This must be avoided at all costs. In addition, there are certain aspects of the strategy, such as mating disruption, which must remain under close government supervision. For these reasons, the liberalisation process must be carefully planned and phased.

c) Country Reports

6. Cyprus

The mild Mediterranean climate of Cyprus allows farmers to grow a tremendous variety of crops including citrus, deciduous tropical and subtropical fruit trees, grapes, olives, vegetables, potatoes, ornamentals, etc. Control of pests in these crops was based in the past mainly on the use of wide-spectrum pesticides as a result of which serious problems were created such as development of resistance of pests to pesticides, high residue levels of pesticides in products, absence of a biological balance, and high costs for crop protection. However, today, elements of Integrated Pest Management are widely used by farmers to various degrees. Non-chemical pest control practices, use of resistant or tolerant varieties, use of healthy propagation material, biological control and sensible use of selected and environment-friendly pesticides, preferably selective ones, those based on micro-biological agents or from the IGR group are applied.

Examples of successful application of IPM programmes in Cyprus are the control of California red scale and other pests in citrus, the control of grape berry moth in grapes and of coddling moth in deciduous fruit trees.

The participation of farmers in IPM programmes in Cyprus is very encouraging.

7. Egypt

The Ministry of Agriculture and Land Reclamation (MALR) has adopted a strategy plan for IPM activities. The policy is based on the reduction of dependence on agricultural pesticides, enhancement of cultural practices combined with proved biological and alternative control technologies. More emphases are focused on research-extension link programs and improving farmers understanding of the total production system approach to IPM. Concerns have been expressed for assuring the safety of current chemical pesticides in use. Risk assessment and risk management studies are proposed to adequately establish the appropriate requirements of the pesticides registration policy system. Cotton, citrus and tomato are examples of high-cash crops where pesticides uses are high and IPM technologies have been partly developed. Accurate identification of key pests and their association beneficials, monitoring of pest population density during the growing season and the determination of the action threshold levels are the major key elements taken into consideration for IPM implementation programs. The technology delivery system in IPM issues is practiced through the interaction of Governorates extension staff with specialists of crop protection research institutes. Farmer participation and co-operation towards IPM approach is still limited. Demonstrable proof that IPM can provide economic and environmental benefits within the major production system of the country is, therefore, an import prerequisite for the future implementation of this pest management concept. Utilisation of natural enemies of pests, development of resistant plant varieties, and employment of biorational products are examples of pest management areas which merit priority attention for research support.

The paper launches the current studies and future plan of IPM in Egypt. Cotton IPM is cited as an example of current recommended pest management practices where decreased dependence on insecticides by strict adherence to action threshold, use of semiochemicals and non-chemical control agents are employed. Further implementation of IPM in the country depends on the progress to be achieved in the co-ordination of research-extension links, more education and training programs to the public on the concept itself and available funds for appropriate management of the system.

8. Jordan

The aim of the Jordanian-German project "Promotion of Sustainable Plant Protection System - Integrated Pest Management", launched in 1995 is to establish ecological and economical sound plant protection methods at the farm level on a sustainable basis.

In Jordan, more than 20,000 plastic tunnels covering 0,05 ha each are planted with tomatoes, cucumbers, peppers, beans and other vegetable crops. At least 100 to 150 US$ are spent per tunnel to control pests and diseases. Through the establishment of a monitoring (scouting) as a first step to implement IPM, pesticide costs were reduced by 40%. Further reduction of pesticide use was achieved through hot spot treatments and proper application of pesticides. Other alternative plant protection methods were successfully introduced for vegetables under tunnels such as tight screening of the plastic tunnels, the release of beneficials, hand-picking of infested plant parts and others.

- Technology development strategy

Crops with relatively easy control possibilities i.e. greenhouse crops were chosen first followed by tree crops and at last open field annual crops.

- Technology adaptation strategy

We started with university educated large-scale farmers who are ready to implement new technologies on parts of their farms, such acting as local experts to evaluate and improve new technologies.

We then contacted a group of widowed or illiterate women as representatives of poor and uneducated small-scale farmers. The adapted technology derived from the large-scale farmers and was now further adapted to their conditions.

- Extension strategies

NGOs: IPM having a strong environmental aspect, environmental protection organisations are interested to conduct seminars and lectures on the subject of pesticide reduction. The Global Environmental Facility of the United Nations is supporting the IPM implementation with small-scale farmers.

Rural women have a strong influence on decisions within their households concerning the use of pesticides or financial matters. The project enables rural women to acquire knowledge and expertise to enact their role more effectively. Based on this concept, the project developed strong working relationships with the Jordanian National Woman's Committee and rural co-operative organisations.

Governmental Organisations: Technical staff of the Plant Protection and Extension Department of the Ministry of Agriculture, as well as the Agricultural Directories in the governorates are trained in the adapted technologies.

National research organisations and universities are engaged in research work on IPM subjects.

The Ministry of Education is encouraged to include IPM subjects into their national curricula.

Private sector: Sales persons and technical staff of agricultural input supply companies and agricultural engineer associations are trained in the new adapted technologies.

An IPM certification system has been set up to improve marketing of IPM products. This has been done in co-operation with traders, retailers and the Amman Central Market.

A private extension company has been created to provide farmers with the necessary know-how to implement IPM-production for certification.

Media: The project promotes the IPM concept through all regular mass media, e.g. radio, television and printed mass-media. A documentary film and a children's book on IPM have been produced.

9. Lebanon

The national plant protection policy of the Ministry of Agriculture in Lebanon is the adoption of sustainable agricultural practices. However, pest control in Lebanon is so far widely dependent on the use of synthetic pesticides. For that, several laws have been enacted to regulate registration and all other aspects dealing with pesticides. Moreover, building stones have been put for the implementation of IPM on some crops. Regarding citrus pests, a laboratory has been equipped to produce 2.5 million/ sterile male Mediterranean fruit fly per week. Furthermore, 7 parasitoids of the citrus leafminer were found and 5 identified as *Ratzeburgalia incompleta, Aginiaspis citricola, Sympiesis spp., Cirrospilus spp.* and *Pnigalio spp.* The level of parasitism of the citrus whitefly *Aleurothrixus floccosus* by *Cales noaki* reached 45% in July 1996. For vegetable pests, *Trichoderma spp.* has been introduced against some soil-borne diseases. Concerning potatoes, surveys on the resistance of *Phytophtora infestans* isolates to commonly used fungicides as well as evaluation of pheromone traps for monitoring and disrupting mating of the potato tuber moth are in progress. There is a great need for coordination of research aiming at identifying pests and their natural enemies as well as studying their population dynamics. The extension policy title at the Ministry of Agriculture is rehabilitation. Work is going on for creating a directorate of extension and education in the organogram of the ministry, which will provide more independence for extension work. It is intended to establish a legal status or terms of reference for the staff and to recruit agricultural engineers, technical assistants, also to reactivate training and inducting courses. A plan is followed for rehabilitation and equipping extension centers. As to farmer involvement, it is minimized due to the shortage of staff, facilities and equipment. Recently, Lebanon participated in a regional project for sustainable agriculture and rural development in the Near East; the main activity in this project was designing environmental education and training modules for extension staff. Financial support is needed for proceeding with IPM.

10. Morocco

Agriculture is very important for the Moroccan economy. The arable area is approximately 9,000,000 ha. The most important crop are the cereals which represent 5,000,000 ha, followed by fruit trees (664,400 ha), olive trees (355,000 ha) and the food legumes. For the export the most important crops are citrus and the vegetables, most of them produced in plastic houses.

In the past the control of plant protection problems was mainly based on the use of pesticides. Since the beginning of this decade several IPM programs on farm level have been initiated. (i.e. olives, deciduous fruit trees, maize, vegetables and citrus). Further research on IPM on different crops such as sugar beets, wheat and food legumes were carried out.

This presentation will focus on the IPM work in tomatoes in plastic houses in the area of Agadir. It is the first program which was started on request of the farmers in that region in 1995. To implement it, a network of farmers and growers associations, the plant protection service (DPVCTRF), extension and development services (ORMVASM, SASMA) and research institutions (INRA, CHA Agadir) was created.

The goals of the network are to reduce the use of pesticides, to develop simple and reliable monitoring methods, to train farmers how to use them and to improve the application of pesticides.

30 pilot farms were selected, which are visited by network technicians in regular intervals. During these visits the crop is inspected by the farmers together with the technicians.

The farmers show increasing interest in this work. They have introduced trapping methods as tools for decision making and on these farms an increase of the number of beneficial insects can be observed.

The major constraints for the implementation of IPM are the absence of efficient links between research and extension, the confusion on IPM definitions and the lack of well trained extension officers,

To enhance IPM in Morocco the co-operation between farmers, extension services and other institutions must be strengthened.

11. Sudan

The work on cotton IPM was initiated in 1979 and the results of this work have been adopted in all cotton growing areas since 1993. The cotton IPM package relied mainly on the conservation of the indigenous natural enemies and made it possible to reduced pesticide applications to two insecticide sprays per season. Bacterial blight and cotton wilt caused by *Fusarium* are now controlled by resistant and immune varieties.

The work on wheat IPM has shown that the ETL for aphids could easily be doubled. The wheat FFS received no spraying and gave high yields through optimising the cultural practices.

Striga is reduced in sorghum fields by nitrogen applications, rotation, resistant varieties and chemical control.

Tomato Leaf Curl Virus (TYLCV) is reduced by inter-cropping with coriander and the use of resistant varieties.

Experimental work proved that spraying of onions against thrips is not needed.

An ETL for jassid on eggplant based on leaf discoloration has been developed for farmers.

Ten field guides for FFS trainers have been produced.

12. Syria

IPM systems have been applied for controlling many pests of major cultivated crops in Syria. Many advantages have been achieved in the field of IPM application. Woolly whitefly (*Alerothrixus floccosus*) was a severe problem on citrus in Syria, and excellent results have been obtained by application of IPM methods, *Cales noaki* was successfully used as a biological agent for the control of this pest, and pesticides have not been recommended. The damage was thus kept under the economic threshold.

Psylla as second pest was the most harmful pest on pear where also great advances have been made using IPM methods: except for summer oil, the number of pesticide treatments were decreased to zero in many locations. The damage was kept under the economic threshold. Other IPM methods were used for controlling many cotton pests such as *Bemisia tabaci*, *Aphis gossypii*, *Heliothis armigera*, and the number of pesticide treatments were decreased to 1 to 3 sprays per season with the damage kept under the economic threshold.

Use of biological control agents such as *Encarsia formosa* and other IPM components for controlling whiteflies and leafminer on vegetables in protected areas did not give significant results. Soil solarization was adopted on a large scale in protected areas of coastal regions to control many soil-borne pathogenic fungi. Many field crops diseases such as Ascochyta blight on chickpea, Fusarium wilt on lentil, Septoria blotch on wheat etc. as well as *Orobanche* were effectively controlled using IPM methods.

Production of certified (virus free) propagation material for stone fruits, grapevine and citrus as major IPM component to control viral diseases is mainly aimed at supplying growers and nurserymen in Syria with healthy and true types plants.

13. Turkey

IPM projects started in the early 70es on cotton, apple and hazelnut and were expanded to other economically important crops since 1989. IPM implementation projects were initiated in 1993 on wheat, potato, apple, protected vegetables, citrus, grapes, peach, chickpea, lentils, cotton, maize, cherry, olive, pistachio, apricot, and hazelnut.

IPM research, application and training projects are being carried out with the co-ordination of the related general directorates, research institutes, agricultural province and county directorates, village groups, grower unions, co-operations and the growers.

A co-ordinating research institute and the member research institutes participate in each country wide IPM project. Projects are co-ordinated and applied by an "IPM Project Co-ordinator" chosen by the co-ordinating research institute throughout the country, "IPM Regional Leader" chosen by the member research institutes in the regions, "IPM Province Responsible" chosen by the "Agricultural Province Directorates" in each province, "IPM County Responsible" chosen by the Agricultural County Directorates in each country. The activity itself is being carried out by leading growers in the villages.

Researchers were trained on the IPM programs. IPM seminars are being held at least once a year in order to make researchers familiar with the IPM principles. A workshop is organised once a year to evaluate and improve the IPM programs. Extension staff and consultants are trained as IPM specialists and to implement the program. The following methods are used during the training of growers: practical training in the field, orchards and vineyards, field days, demonstrations, training by radio and television, training by grower newsletters, brochures, etc.

The main goals of IPM in Turkey are the increase in plant production, the maintenance of good quality products without pesticide residues, the conservation and support of natural enemies, the regular control of the fields, orchards and vineyards, and to make the growers specialists for managing control activities in their own fields, orchards and vineyards. The objectives of IPM programmes are: establishment and development of a suitable IPM research, application, training, and introduction programme, establishment of a national network, training of researchers that will take part in the IPM project and of technical staff working in the extension services, introduction of IPM to decision makers, politicians, growers and consumers, preparation and development of the "IPM Technical Guide" to be applied throughout the country, to improve control methods.

Pilot IPM applications have started in growers' fields orchards and greenhouses in 21 provinces on a total acreage of 245 ha. In three years time, the number of provinces reached 51 with an area of 18,139 ha. Data collected from some of the IPM fields revealed an important reduction of pesticide use, the fact that growers are aware of the importance of natural enemies and of side effects of pesticides. There was also a diffusion effect on farmers not participating in the programme.

In total, four IPM co-ordinators (researchers), 1,548 agricultural engineers, 1,059 agricultural technicians, and 9,060 growers were trained. The reaction of chemical companies was positive: they initiated IPM projects in vineyards and began to register alternative products compatible with the IPM programme. Consumers are made aware of the whole complex by means of mass media.

14. Yemen

Yemen is a country with a variety of ecological zones from cool mountain areas to very hot coastal plains, where a big number of tropical and subtropical crops are grown: sorghum, potato, different fruits, cotton, tomato, coffee, etc. Farmers use different kinds of pesticides to control pests.

The Government of the Republic of Yemen being anxious to reduce the use of pesticides, to conserve natural enemies, to assure a clean environment, the production of healthy crops, defined a five years plan for agricultural development considering these aspects.

IPM programmes have been implemented to improve citrus, potato and deciduous fruit trees, plant quarantine laws have been improved and laboratories have been established for diagnosis of viruses and the control of pesticide quality. Other activities were the survey of antagonists of pests, farm validation, field days, training as well as the production of various publications.

No experience has been made yet with *Farmers Field Schools*, but it is planned to start within the framework of a new IPM project financed by the Netherlands that will start in early 1998.

d) Case Studies

Case Study 1: IPM *Farmer Field Schools* in Sudan

15. *Farmer Field Schools* on Tomatoes and Onions

by *Nafisa Ahmed*, Sudan

In the Sudan, tomato (*Lycopersicon esculentum*) and onion (*Allium cepa*) are the most important vegetables as they occupy 75% of the total area under vegetables. White fly (vector for TYLCV), American bollworm and powdery mildew in tomato and thrips, pre- and post-emergence damping off in onion are the major production constraints. Farmers resort to extensive use of pesticides and inorganic fertilisers to reduce losses and increase yields. This excessive use never achieved the goal of maintaining the pests below the economic level. The logical and cost effective alternative to replace the hazardous use of pesticides is integration of all pest management techniques to reduce major production constraints. Emphasis is based on proper production practices to be utilised in a multi-disciplinary approach. These are cultivation techniques (a prerequisite for healthy crop), high producing varieties, intercropping coriander and wind breaking to limit the vector of TYLCV near or within the crop. Additional measures are the removal of alternative weed hosts and rational use of safe pesticide when needed. The aim being to act in an ecologically appropriate manoeuvre to limit the pests while watching the economy balance. The IPM philosophy is to implement these integrated strategies in a participatory approach with farmers to provide them with aids to decision making and with good technical supports for control of various pests.

The system was modified to include validation of IPM strategies in pilot farmers field schools, educational and participatory training sessions for farmers and extensionists (school trainers) and follow-up and on-site technical advice for all farmers in FFS.

16. *Farmer Field Schools* on Cotton and Wheat

by *Assem Abdel Rahman*, Sudan

Integrated Pest Management programmes were initiated in Sudan in 1979 in cotton. The research work covered the role of the indigenous natural enemies in the absence of insecticides, the ability of cotton to compensate bollworm damage and the validity of the Economic Treatment Levels (ETL) for the key pests. In 1993, an IPM package for cotton IPM was released and has since then been adopted by all cotton growers. This package comprises the delaying of the first application of insecticides, the optimisation of the agricultural practices and the raising of the ETL. This package has reduced two sprays per season during the last three seasons.

Wheat IPM was developed through optimising cultural practices and raising ETL for aphids. Wheat spraying was reduced from two treatments per season to less the one.

Farmers Field Schools (FFS) for both crops were established and operated in the 1995/96 season. Curricula for both crops have been developed. An increase of 0,5 kan/fed in cotton and 0.27 ton/fed in wheat have been obtained in the two FFS, respectively.

17. Extension and Training

by *Alsafar Ahmed*, Sudan

Sudan is the largest country in Africa with an area of 2.5 million km^2. Its population is about 25 millions, most of them engaged in agriculture production.

Cotton, vegetables, wheat, sesame, groundnuts, sugarcane, and sorghum are the main crops. Most pesticide use is directed to cotton and vegetables, therefore, the IPM extension and training activities have been directed to these crops.

The main fault of the conventional approaches is that rural people are seldom involved in planning or given the chance to pay an active role in development. Hence, unless farmers and rural women given means to participate fully in controlling their lives, no real and sustainable development is expected.

The first step towards helping rural people to participate in improving their conditions is to motivate and train farmers and women in establishing IPM Farmers Field Schools (FFS) and Rural Women Schools (RWS) where they could learn how to actively participate with others in improving their lives.

The idea of the IPM FFS was implemented for the first time in Africa (Sudan) in 1993/94. Six, 14, 26, 147 and 300 schools were established during the 1993/94, 1994/95, 1995/96, 1996/97, and 1997/98 seasons, respectively. Five and 12 RWS were established for the first time in the Sudan in 1995/96 and 1996/97, respectively. Farmer surveys were carried out on the impact of IPM FFS and RWS. They showed that there have been changes in members' KAP and their production as well as obvious reductions in the use of pesticides.

In the light of the Sudan experience, the following requirements for the IPM FFS and RWS are considered important: success and sustainability shall be taken into account: patience, preparation before the establishment, school location, faith in farmers' abilities, broad-based policy support, co-ordination, supporting research, an ecological approach, school organiser as a key factor, interaction, monitoring and evaluation of schools performance, and the availability of other necessary requirements.

17. An Overview of the Development and Implementation of the IPM Project in the Sudan

by *Z. T. Dabrowski*, Agricultural Research Corporation, Wad Medani, Sudan

Introduction of Farmers' Field Schools (FFS) in 1993 and Rural Women Schools (RWS) in 1995 by the FAO/ARC IPM project as a new model of extension of new production and Integrated Pest Management (IPM) options is presently widely accepted by policy makers, federal and state ministries of agriculture, large scheme managers, researchers and farmers. The FFS/RWS approach is already used as a standard extension methodology in the Gezira and Rahad scheme; Gezira, Khartoum and Sennar states. First FFS/RWS has been also established in El Obeid area for rainfed agriculture.

The FRS/RWS activities include weekly meetings in the field throughout the whole growing season with a group of 25-30 farmers. The new dimension of FFS/RWS approach includes the following new interaction between farmers/ extensionists/ researchers/ managers/ policy makers: (a) Training the farmers and preparing local extensionists in participatory approach; (b) Exposing scientists to the farmers problems, needs and constrains of production; (c) Training the conventional extensionists and increase their interactions with farmers;

(d) Act as a focal field points, where farmes meet with researchers and extensionists; (e) Raise the awareness of farmers in enviornmetnal and food security issues; (f) Improve the farmers interactions with research extension system because the significant number of farmers graduated from the school can perform a role of local extensionists.

The FAO/ARC IPM project in the Sudan has succeeded in directing research activities towards on-farm research and farmers involvement in developing and validation of IPM on vegetables, wheat and cotton. Much emphasis was given to the essential close co-operation between research and extension. Extensionists were involved from the beginning in the project development, especially on on-farm research and participatory training of farmers; and not only in the end-users phase. Farmers' Field Schools (FFS) and Rural Women's Schools (RWS) were established, validated and implemented on a large scale in central Sudan.

The FFS network includes three level activities and co-ordination. FFS organisers, Area Co-ordination Committees and the National IPM Steering Committee. The FFS organisers report to the Area Co-ordination Committee (ACC) comprising representatives of the local state Ministry of Agriculture, extensionists, plant protectionists, Farmers' Union and researchers of nearby opinions among members on curriculum and validation of IPM options by FFS, makes available requirements such as fuel inputs, incentives and transportation, participates in field visits to evaluate the FFS curriculum and IPM demonstration fields; prepares annual plans and reports. The National IPM Steering Committee is responsible for the implementation of IPM at the national level and is chaired by the Undersecretary of the Federal Ministry of Agriculture.

The FAO/ARC IPM project in the Sudan has demonstrated that the model developed by the FAO Inter-Country Rice Integrated Pest Control Programme in South and South-East Asia could be implemented also on other regions. The prime emphasis was on implementation of existing knowledge through training, rather than on new research. The extension activities did not focus on transferring specific technologies or bits of information in the FFS. They rather sought to capacitate farmers to take sound decisions by providing some basic principles.

Case Study 2: IPM *Farmer Field Schools* in Ismailia

19. GTZ Extension Approach for IPM

by *Gerd Walter-Echols, GTZ, Egypt*

In the process of change from a centralized to a liberalized economy, Egypt must look for a new extension approach which will fit its new economic structure. The traditional extension tasks of transferring modern technologies to farmers will increasingly be performed by private companies, while the government's extension system must concentrate its efforts on issues of national interest (e.g. conservation of natural resources) and farm management training.

This expansion of public sector activities will necessitate a reorientation of the extension approach from technologies toward farmer development. A liberalized economy will need farmers who can make their own informed management decisions and who can cope with the continuous process of change. Rather than being taught, farmers and extensionists will need to learn their new roles together in a participatory manner in learning groups and *Farmer Field Schools*. Training farmers to become competent farm managers will require a process of group activities in which farmers and extensionists experience first-hand the outcome of

on-farm experiments and exercises. Likewise, extensionists will need to learn to become qualified facilitators of this learning process instead of being teachers of pre-packaged solutions.

The Egyptian-German projects can play a vital role in making a new agricultural extension approach a reality within the next few years. By coordinating their extension and training activities with those of the IPM project for *Farmer Field Schools*, the other Egyptian-German projects in the animal fodder, cotton, seeds and cooperatives sectors can help develop the extensionists and farmers the country will need to face the challenges of the next century.

20. *Farmer Field Schools* on Cucumber and Tomato

by *Youssri Ahmed*, Ismailia, Egypt

The first group of 20 *Farmer Field Schools* facilitators was trained in cucumber plant health management in the summer of 1996. The training, which took about 170 hours, concentrated on facilitation skills and disease control through micro-climate management in plastic low tunnels, recognition of active infections, improved low-volume spraying techniques and balanced fertiliser application. At the beginning of the winter growing season 1996/97, 125 groups with 1,270 farmers were formed by 13 facilitators; almost 600 farmers (including 66 women) in 70 groups attended the field schools regularly (more than 5 meetings). About 2/3 of the farmers attended 8 or more of the total of 10 meetings. On-farm trials on plant spacing, netting and tipping of plants were conducted in 36 cases. Farmers in *Field Schools* managed to reduce the number of pesticide sprays by one third and increased their income by 25%. Farmers generally responded positively to the new style of field-based season-long group training.

Another group of 26 extensionists (including 6 women) were trained in tomato plant health management during the summer of 1997. At the beginning of the winter growing season, a total of 87 groups with 1,220 farmers were established. In addition, 8 of the previously trained facilitators established 40 *Farmer Field Schools* on cucumber health management with almost 500 farmers. During the second season of *Farmer Field Schools*, increased emphasis was placed on routine systematic ecosystem analyses and on-farm experimentation as integral parts of the meeting program.

21. *Farmer Field Schools* on Mango

by *Ahmed Awad* and *Raman Revri*, GTZ, Egypt

Aims:
1. To improve mango production and farmer income in Ismailia
2. To teach orchard health principles to farmers and agricultural staff
3. To develop a model for effective extension in a liberalised agriculture
4. To enable district subject matter specialists to facilitate Farmer Field Learning Co-operatives
5. To train future Farmer Field Learning Co-operative facilitators practically in the field

Program Implementation:

Year-long (from October 1996 until October 1997) training for project staff (3) and facilitators (17) who in turn facilitated farmer field learning co-operatives. The total training period for the facilitators was 12 weeks (72 days or 288 hours) distributed over 12 months.

Facilitator Training:

For practical training a mango orchard (0.5 Fd.) was leased. This orchard was then divided into approx. 4 equal parts. Also the 17 facilitators and the three members of the project staff were grouped into 4 groups and each group (Red, White, Blue, Green) received 1 of the four parts of the orchard (15 - 19 trees) to manage it as a farmer would do it. To facilitate the decision making process each group received from the project a credit of L.E. 500 which was then to be returned after the sale of the harvest. The condition behind this exercise was that any profits made after returning the initial credit of L.E. 500 the participants can divide the remaining amount among themselves. Therefore the main objective of each group was to maximise their profit as far as possible. Theoretical know-how gained by the participants during the training was discussed within the group and according to the consensus among the participants the recommended cultural practice was either put into practice or rejected. Decision taken by the groups with reference to pruning show that heavy pruning produced the best results i.e. 4 times when compared with the farmer practice (practically no pruning).

Farmer Field Learning Co-operatives:

Initially 609 Farmers became members of the FFS. After the start-up meeting there was a drastic drop to 439 (72 %) participants attending the first training session. In the second and third meeting there was a further drop to 404 (66%) and 390 (64%). Finally the attendance stabilised at 404 participants participating on regular basis the mango FFS. The ratio owner:tenants:workers in per cent was 83:6:11. In total 564 sessions were conducted.

Yields before and after FFS:

Survey results show that 88% of the participants from the FFS achieved higher yield in 1997 than in 1996. The average difference was L.E. 995/Fd. However, these results are from one single year which at present cannot be representative for the successive years. Mango is a perennial crop with extremely pronounced alternate bearing. More over mangoes a tropical crop is cultivated in Egypt under marginal climatic conditions, the weather plays an important role in determining flower development, pollination, fruit set and fruit development. Cold, moist winters and hot dry summer can have detrimental affect on annual yield.

Cost of Farmer Learning Co-operatives

In comparison to the high training costs (L.E. 6.50 per farmer contact) during the farmer FFS exercise 1996/97 it could experimentally be demonstrated that in case of mangoes the gross margin per fd. could be tripled and the net return increased by at least 75%.

e) Participatory Approach to IPM Development

22. Opportunities for Participation in *IPM by Farmers*

by Russ *Dilts*, FAO, Indonesia

The first issue on participation concerns the actual learning process at the field worker and farmer level. Learning is something that takes place in the learner, not the teacher. The goal of IPM is not to 'teach', but rather to provide the structures and conditions wherein participants can discover and learn for themselves. This requires a very large change from traditional extension approaches based upon the rote transmission of 'messages' and fixed packages of information.

The second issue involves the levels of participation as IPM programs evolve from simple educational activities into more complex community IPM programs.

Presence: this level of participation refers to simple 'attendance' or physical presence, and may extend to making in-kind or required contributions to 'making a success' of a program for the most part owned by outsiders.

Representation: at this second level participants develop a mechanism wherein they can express the wishes and have them acted upon, e.g. suggestions for activities, scheduling, etc.

Control: the end goal of participation is to have participants actively in charge of the planning and execution of programs. All key decisions, especially regarding resource mobilization and utilization, are determined by the participants themselves. Only at this stage do participants, in this case farmers, become true 'subjects' within their own development.

Finally, just as IPM is 'broader than bugs', broad also are the opportunities for involvement of a wide range of actors within IPM. Good IPM programs nearly always begin with the strong involvement of crop protection professionals and researchers (entomologists, plant pathologists) with extensionists and agronomists. This mix, however, quickly grows in response to the wide range of possibilities generated at the farmer level. Many IPM programs find solid roles for health professionals, community activists, economists, consumer activists, non-formal educators, participatory researchers, artists, journalists, students, management specialists, environmental activists, action researchers, and many others. The strength and sustainability of IPM programs often depends upon the level of acceptance and support generated within a broad community: and in this sense real IPM programs take on the characteristics of a broad based MOVEMENT.

23. Curricula Development for Participatory Training

by *Kevin Gallagher*, Global IPM Facility

With liberalization of the world economy, it is a fact that farmers are competing with other across borders. An Egyptian cotton farmer, previously protected under national policies, now must compete more directly than ever with a cotton farmer in California, and therefore there will be a need in all countries to improve the efficiency of crop production. There is a growing potential of food insecurity which must be overcome by increasing the income of farmers. Furthermore, environmental and health degradation arising from agricultural pollutants is a growing concern and becoming unacceptably high and endangering the very resources upon which food production relies (soil, water, etc.). These and other international and national factors require that farmer skills and knowledge are improved and thus there is a growing interest in educational programs for farmers, especially in participatory training.

There are many benefits of the participatory aspects of educational programs including a higher likelihood of relevance to the needs of participants, greater training impact and benefits accruing from training investments, as well as improved social relationships within farming communities (including extension, research, private and public organizations). Participatory training implies that participants of the training have ownership over the program, and provide their own inputs during discussion, decision making, project and training evaluation, and other aspects of the training.

Learning objectives of these education programs should be based on the needs of farmers and derived from a variety of sources including farmer demand, gaps in knowledge and skills as identified by extension or research, emergence of new methods or products, etc. But the training methods for achieving these objectives should allow for the participation of farmers to ensure effective educational programs.

Methods

For participatory IPM programs, a range of methods have been developed and are successfully being implemented in large-scale programs. Some of these methods were discussed and include:

- Study fields and field studies for training of trainers and *Farmer Field Schools*. "Let the field be the teacher".
- Field observation methods: soil, water, weather, plant/crop growth, arthropods, diseases, rats, weeds, etc..
- Analysis and presentation and defense: 'Agroecosystem Analysis'.
- Concept specific hands-on activities.
- Evaluation methods with ballot box and field walk techniques.
- Facilitation and leadership skills.
- Team building and organizational skills.
- Field Days.
- Farmer Boards of Directors for publicly funded extension, and research organizations.

24. Participatory Approaches to IPM Research

by *Richard A. Sikora*, University of Bonn, Germany

IPM was a concept developed in a top-down manner. However, the vast majority of the basic components used in most if not all modern IPM programs came to us through a downstream-upstream flow of knowledge. The basic components of IPM - rotation, resistance, intercropping, fallow, etc. - were initially discovered by farmers and only refined by scientists. IPM is and has been an ever present on-going farmer participatory exercise.

Many modern IPM concepts and new control methodologies are, however, now being developed on the basis of an upstream-downstream flow of knowledge. Streams always flow in one direction, therefore, present research priorities often ignore farmers' real needs. The farmer is seldom a participant in the development process.

My talk is designed to stimulate a movement in the scientific community from the upstream position to what I call midstream, a position closer to the extension/farmer team the true consumers of new technologies.

Two examples, taken from my own laboratory, will be used to demonstrate two different process of research priority development. The first example concerns the biological control of nematodes. This was a "Xerox", "me-too" or "bandwagon" approach to high technology that was misdirected by the lack of consultation with the extension/farmer team.

The second example describes the development of an IPM system for the integrated control of insects and nematodes in banana in Africa where farmer participation was used from the start and led to implementation.

New and effective control techniques are still needed in existing production systems and will be needed for future IPM systems as agriculture develops and changes due to outside pressures. To stimulate Farmer Participatory Research and a midstream approach at the University of Bonn, we developed a funding program with our state government targeted at bringing together university scientists and those working in practical agriculture to solve problems affecting farmers. With this program we have been successful in redirecting the flow of research funding and priority-setting at the scientist level toward solving practical problems affecting the farmer. This has led to research results and concepts that are practical, adaptable and economical.

25. Environmental Protection and Risk Assessment

by *W. Lingk*, Federal Institute for Consumer Health Protection, Berlin, Germany

The widespread use of pesticides and the related public health effects is currently the subject of a lively and often emotional debate. It appears that in many societies a consensus is no longer viable. All legislation world-wide dealing with pesticides aims at protecting human health. It thus becomes the task of public health control agencies to weigh the risks of a given chemical against its benefits and the need for it. Evaluation of health related risks includes acute toxicity, chronic effects such as mutagenic risks, reproductive effects, teratogenicity and carcinogenicity. When people discuss chronic effects of pesticides they nearly only mention cancer.

The classification of carcinogens is done according to national or international regulatory schemes, the most common one is the categorisation scheme developed by WHO. Regulatory consequence of carcinogen classification leads to labelling requirements using differentiated

labelling symbols and risk phrases. It should be pointed out that classification, labelling and other requirements reflect the inherent hazards and not the real risks to humans. That is the reason why nearly no compound, which is classified as BII carcinogen in the USA and in the (almost equivalent) category III in the EU is banned. They are judged in the various registration procedures to be safe if they are handled in a proper way.

The public is mainly concerned with the possibility of cancer or chronic effects as a result of traces (residues) in food. There is a widely held misconception that naturally occurring substances are safe while those that man has synthesised are hazardous. Natural occurring carcinogens are everywhere even they are present in many natural foods. The toxicity of Aflatoxin, for example, is so high that the equivalent of a tiny grain of salt could cause severe illness or even dead.

The desirability and actual need to adopt an "Integrated Pest Management" (IPM) approach to solve certain problems inherent in using pesticides is evident. But for the integration of IPM in modern agriculture there is a need for many active compounds in order to use the best pesticide in the right moment. An automatic banning of possible carcinogenic pesticides can hinder the development of those modern approaches in agriculture.

26. Role of the Global Crop Protection Federation in Plant Health Management

by *Philip Newton*, Novartis Crop Protection, Basel, Switzerland. On behalf of the Global Crop Protection Federation, Brussels.

The Global Crop Protection Federation (GCPF) is introducing its declaration on Integrated Pest Management - the "Way Forward for the Crop Protection Industry". The GCPF monograph illustrates the principles of IPM and ways in which the crop protection industry supports its wider adoption.

In the eyes of farmers and pest control operators, IPM is the best combination of cultural, biological and chemical measures that provides the most cost-effective, environmentally sound and socially acceptable method of managing pests and weeds under the circumstances in which they work. They will only adopt and exploit IPM if it is seen to be practical and adds value to their activities. IPM is a component of Integrated Crop Management (ICM) and is the crop protection system which best meets the requirements of sustainable development and sustainable agriculture.

The crop protection industry promotes IPM in Research and Development (development of IPM-compatible crop protection products, research and development in biotechnology, screening programs on natural enemies, etc.), in Training and Education, through the establishment of IPM demonstration sites and in other ways.

The benefits of IPM for the crop protection industry are thought to be amongst others less risk of restrictions or de-registration, new opportunities for established and novel products, techniques and services, and longer product life-cycles with less resistance to chemical control tactics. The farmers will benefit from IPM through improved consumer confidence in the quality of agricultural products. There will be clear improvements in the profitability of crops where currently available techniques are inadequately applied. Stable and reliable yields and production can result from the reduced severity of pest infestations, and the lower potential for problems of pest resistance. Stable and reliable yields will also secure the agricultural environment for future generations.

Annex II: Workshop Programme

Saturday, 15 November 1997

9:30 **Opening Session**
Koran Reading
Welcome Addresses
Representative of ICARDA
Dr. Chris Akem
Representative of GTZ:
Mr. Christian Pollak, Director GTZ Office Egypt
Representative of FAO
Dr. Mahmoud Taher, Regional Plant Protection Officer
Governor of Ismailia
Mr. Abdel Aziz Salama
H.E. the Deputy Prime Minister and Minister of Agriculture and Land Reclamation
Prof. Dr. Youssef Wally
Key Note Addresses
10:00 IPM by Farmers: From Farmer Field Schools to Community Based IPM
Russ Dilts, FAO, Indonesia
10:30 Global IPM Facility
Kevin Gallagher, FAO, Rome

11:00 Coffee Break

12:00 **Session 2: International, Regional and National IPM Experiences**
Chairman: Prof. Bakir Oteifa
12:00 Participatory IPM: USAID Global Plan and Progress to Date
Bob Hedlund, USAID
12:30 ICARDA Experience in IPM
C. Akem , ICARDA
13:00 Cotton Pest Management in Egypt: Past, Present and Future
Bakir Oteifa and *Tony Treen*

13:30 Lunch Break

14:30 **Session 3: Country Reports on the Status of IPM in the Participating Countries**
Chairman: Mahmoud Taher
14:30 Cyprus
14:40 Egypt
14:50 Jordan
15:00 Lebanon
15:10 Morocco
15:20 Sudan
15:30 Syria
15:40 Turkey
15:50 Yemen
16:00 Coffee Break
16:30 General Discussion on Country Reports
18:00 Briefing on field visits

Sunday, 16 November 1997

Field Visits to *Farmer Field Schools* in Ismailia Governorate

8:30 Departures

- Group 1: Facilitator training and *Farmer Field Schools* on Tomato
- Group 2: Facilitator training and *Farmer Field Schools* on Tomato
- Group 3: *Farmer Field Schools* on Tomato and Facilitator training
- Group 4: *Farmer Field Schools* on Tomato and Facilitator training
- Group 5: *Farmer Field Schools* on Cucumber and Mango
- Group 6: *Farmer Field Schools* on Cucumber and Mango
- Group 7: *Farmer Field Schools* on Cucumber and Mango
- Group 8: *Farmer Field Schools* on Cucumber and Mango

12:30 Return from field visits

13:00 Lunch Break

14:30 **Session 4: Case Study 1: IPM *Farmer Field Schools* in Sudan**
Chairman: Kevin Gallagher

14:30 *Farmer Field Schools* on Tomatoes and Onions
Nafisa Ahmed, Sudan

15:00 *Farmer Field Schools* on Cotton and Wheat
Azim Abdel Rahman, Sudan

15:30 Extension and Training
AlSafar Ahmed, Sudan

16:00 Coffee Break

16:30 An Overview of the Development and Implementation of the IPM Project in the Sudan
Z.T. Dabrowski, Poland

17:00 General Discussion

Monday, 17 November 1997

Field Visits to *Farmer Field Schools* in Ismailia Governorate

8:30 Departures

- Group 1: *Farmer Field Schools* on Cucumber and Mango
- Group 2: *Farmer Field Schools* on Cucumber and Mango
- Group 3: *Farmer Field Schools* on Cucumber and Mango
- Group 4: *Farmer Field Schools* on Cucumber and Mango
- Group 5: Facilitator training and *Farmer Field Schools* on Tomato
- Group 6: Facilitator training and *Farmer Field Schools* on Tomato
- Group 7: *Farmer Field Schools* on Tomato and Facilitator training
- Group 8: *Farmer Field Schools* on Tomato and Facilitator training

12:30 Return from field visits

13:00 Lunch Break

14:30 **Session 5: Case Study 2: *IPM Farmer Field Schools* in Ismailia**
Chairman: Russ Dilts

14:30 GTZ Extension Approach for IPM

G. Walter-Echols, GTZ

15:00 *Farmer Field Schools* on Cucumber and Tomatoes
Youssri Ahmed

15:30 *Farmer Field Schools* on Mango
Ahmed Awad and Raman Revri

16:00 Coffee Break

16:30 Discussions on Case Studies 1 and 2

Tuesday, 18 November 1997

8:30 **Session 6:Participatory Approach to IPM Development**
Chairman: Werner Gassert

8:30 Opportunities for Participation in *IPM by Farmers*
R. Dilts, FAO, Indonesia

9:15 Curricula Development for Participatory Training
K. Gallagher, FAO, Rome

10:00 Participatory Approaches to IPM Research
R. Sikora, University of Bonn

10:30 Coffee Break

11:00 Environmental Protection and Risk Assessment
W. Lingk, BGVV, Berlin

11:45 Role of the *Global Crop Protection Federation* in Plant Health Management
P. Newton, GCPF, Basel

13:00 Lunch Break

14:30 **Session 7: Discussion Group Meetings**
Group1: Participatory Approaches
Facilitator: Russ Dilts

Group 2: Curricula Development
Facilitator: Kevin Gallagher

Group 3: Impact and Environmental Risk Assessments
Facilitator: Bakir Oteifa

16:00 Coffee Break

17:00 **Plenary Presentation of Groups on Preliminary Results and Recommendations**
Chairman: Khaled Makkouk

Wednesday, 19 November 1997

8:30 Discussion groups meet to finalize recommendations and action plans

Program Options:

1. Tour of Ismailia City and War Memorial
2. Visit to *Suez Canal Authority*
3. Visit to Salam Canal and newly reclaimed agricultural areas
4. Demonstration and Practice on Ecosystem Analysis
5. Demonstration of Module: Teaching vs. Learning
6. Forum: Participatory Extension Network - Egypt

15:00 **Closing Session: Presentation of Workshop Summary and Recommendations**
Chairman: Mohamed Zehni

Agreement on Interim Report

Closing remarks

20:00 Farewell Banquet

Annex III: List of Participants

In alphabetical order: Arabic names by first name, European names by family name

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