CENTRE DE COOPERATION INTERNATIONALE EN RECHERCHE AGRONOMIQUE

POUR LE DEVELOPPEMENT

C I R A D

DIRECTION DES RELATIONS EXTERIEURES D R E

MISSION DEFENSE DES CULTURES M I D E C

RAPPORT DE MISSION EN MALAISIE

21 Septembre - 30 Septembre 1991

CONFERENCE ON INTEGRATED PEST MANAGEMENT IN THE ASIA-PACIFIC REGION

Kuala-Lumpur, Malaisia, 23-27 September 1991

J. L. SARAH

Service Entomologie - Nématologie

CIRAD / IRFA - B.P. 5035 - 34032 MONTPELLIER CEDEX

DEROULEMENT DE LA CONFERENCE

Cette Conférence qui s'est déroulée du 23 au 27 septembre 1991 à Kuala-Lumpur (Malaisie), était organisée conjointement par le C.A.B. International (CABI) et l'Asian Development Bank (ADB). Elle visait à faire un bilan, pays par pays, de l'état actuel de l'utilisation de la **Lutte Intégrée** dans la zone Asie-Pacifique et identifier les contraintes majeures faisant obstacle au développement de ce concept de lutte. Un autre objectif était de favosiser la dissémination de ce concept dans les divers pays de la zone au travers des délégations nationales et à réfléchir sur des actions régionales prioritaires dans le domaine de la recherche, de l'information et de la formation ainsi que sur les formes les plus efficaces permettant l'application concrètes des techniques sur le terrain. On trouvera en **Annexe 1** la copie du document général distribué aux participants.

Après trois exposés généraux (concept de lutte intégrée dans le contexte Asie-Pacifique, rôle des groupes de villageois et des gouvernements, recherche d'un consensus régional sur l'application de la lutte intégrée), chaque délégation a présenté un état des lieux (recherche, développement, application...) et dégagé des perspectives. Cette première partie de la conférence s'est terminée par des exposés d'exemples par culture (riz, maraîchage, cultures pérennes, coton, canne à sucre).

La deuxième partie de la Conférence a été réservée à trois sessions de groupes de travail.

La **première session** s'est déroulée dans la matinée du mercredi 25 septembre et était consacrée à la définition du problème et des contraintes principales à la mise en place de l'IPM sur le terrain. Les participants ont été partagés en six groupes verticaux par type de culture:

- Riz
- Coton
- Maïs et Canne à sucre
- Maraîchage
- Soja et Plantes à tubercules
- Plantes pérennes et Fruits

Chaque groupe avait reçu une trame indiquant les diverses étapes pour guider et homogénéiser les discussions d'un groupe à l'autre (voir **Annexe 2**):

-1 Réglementations nécessaires pour favoriser l'IPM
-2 Démarrage d'un programme d'IPM
-3 Recherches à entreprendre
-4 Mise en place sur le terrain
-5 Déroulement et suivi sur le terrain
-6 Evaluation des bénéfices

La **deuxième session** s'est déroulée dans l'après midi du mercredi 25 septembre et a été organisée en 6 groupes horizontaux (correspondant aux 6 étapes ci-dessus) chargés de réfléchir et de faire la synthèse des propositions faites par culture dans les groupes de la matinée. On trouvera une première synthèse de cette session en **Annexe 3** (Brouillon non diffusable en l'état).

La **troisième session** s'est déroulée durant tout le jeudi 26 septembre, selon les goupes verticaux par culture. Un groupe régional Pacifique Sud a été ajouté chargé de réfléchir sur les problèmes spécifiques de cette région. Cette session avait pour but la définition concrète et aussi détaillée que possible d'un programme régional d'IPM pour les cultures (ou la zone) considérées. Dans le groupe auquel je participais (Plantes pérennes et Fruits) recouvrant un grand nombre de cultures, le modèle mouche des fruits a été ébauché et j'étais évidemment très intéressé, non seulement en raison de mon Département de rattachement, mais aussi parceque ce modèle était commun à la plupart des cultures fruitières et recouvrait une problématique typique nécessitant une coordination régionale. Toutefois, les responsables régionaux ont préféré s'attacher au modèle Cacao jugé plus important et plus universel (pour la région) que les fruits.

Après la cérémonie de clôture, une table ronde a réuni les divers observateurs présents (Organismes de recherches et bailleurs de fonds - cf liste des personnes présentes en **Annexe 1** page 35). Chacun a montré sa volonté de collaboration pour des projets concrets dans le région. Les bailleurs de fonds sont dans de bonnes dispositions, notamment l'Asian Bank of Development (co-organisatrice de cette conférence) qui dispose de possibilités de financement assez importantes, tant pour des projets de développement sur le terrain que pour la formation (Bourses pour étudiants de la région). Il y a certainement là des opportunités à saisir pour le CIRAD, dans le sillage de cette Conférence, sans forcément attendre un éventuel appel.

PRINCIPAUX RESULTATS DES GROUPES DE TRAVAIL

Les principales conclusions de la deuxième session sont exposés en **Annexe 3.**

Il serait trop long d'ajouter celles des différents groupes de la session 3. Elles sont toutefois disponibles (cf **Annexe 4**) pour les personnes intéressées. On donnera simplement quelques points importants.

- **RIZ** : Le document reste très général sans insister sur un ou des ravageurs particulier. Du point de vue régional le groupe souhaite le renforcement des réseaux existants (FAO Inter-Country Program et IRRI-IPM Network).

- **MARAICHAGE** : Le groupe s'est surtout consacré aux problèmes des crucifères, mais donne une liste des principaux problèmes par culture. L'AVRDC (Taiwan) a initié un réseau (Asian Vegetable Network) pour la lutte intégrée contre *Plutella*. Curieusement l'aspect risque pour les consommateurs (résidus de pesticides) est peu mis en avant dans les justifications.

- **COTON** : Culture de rapport principal au Pakistan en Inde et en Chine. Un effort pour développer des actions de lutte intégrée est nécessaire sur cette culture notamment contre *Helicoverpa* (= *Heliotis*).

- **MAIS - CANNE** : Papier très (trop ?) général soulignant (parmi les justifications) la difficulté de lutte contre certains ravageurs (borers) par pesticides.

- **PLANTES PERENNES - FRUITS** : Le groupe insiste sur la nécessité de réduire les pesticides sur ces cultures dont la plupart des produits sont destinés à la consommation. Pour le modèle Cacao les problèmes mis en avant sont le Cocoa Pod Borer, le Miride *Helopeltis* et *Pantorhytes*. Le modèle mouches des fruits a été moins développé dans la discussion; le groupe a insisté sur l'importance croissante du marché d'exportation et sur l'impact de ces ravageurs sur ce marché.

- **PACIFIQUE** : Le groupe s'est surtout intéressé aux tubercules et aux plantes maraîchères. Le groupe a insisté sur l'importance des charançons des tubercules, notamment *Cylas formicarius*. Des méthodes d'IPM ont été étudiées à l'AVRDC et au CIP avec des résultats intéressants à Taiwan. En maraîchage, les cultures les plus importantes sont les crucifères et les cucurbitacées; les principaux ravageurs étant *Sodoptera*, *Aulacophora* et *Diaphania*. Un réseau régional doit être développé pour une collaboration plus étroite avec les pays Asiatiques.

Toutes ces conclusions et propositions seront remises au propre et figureront dans les Proceedings de cette conférence. Un premier jet sera envoyé aux participants qui feront part de leurs remarques, la version définitive devant être distribuée début 92.

QUELQUES IMPRESSIONS

L'organisation de cette conférence était assez remarquable. Notamment au niveau logistique, les Comptes rendus des sessions des groupes de travail étant mis à la disposition de chacun avant la session suivante ou avant la réunion finale.

Les exposés nationaux ont parfois été décevants sur le plan des informations. Tout d'abord chacun disposant de 15 minutes on voit les problèmes que cela peut poser pour un pays comme la Chine ou l'Inde, par rapport à Tonga (par exemple). Ensuite les délégations ont régulièrement perdu cinq à dix minutes pour présenter leur pays respectifs, ce qui a conduit à des exposés parfois vivants et plaisants mais peu informatifs sur le sujet de l'IPM. Toutefois, ces différents exposés nationaux figureront dans les Proceedings.

Les groupes de travail ont surtout fonctionnés grâce aux observateurs et quelques délégués nationaux motivés. La plupart des autres délégués sont restés étrangement passifs (Problème de langage ? Manque de motivation ? ...). Il faut noter que ces délégations étaient très hétérogènes, beaucoup étant surtout représentées par des responsables administratifs ou politiques.

La plupart des conclusions des groupes de travail enfoncent des portes ouvertes, et on retrouve beaucoup de similitudes entre les divers groupes qui sont la plupart du temps restés dans les généralités. Cependant les problèmes et les actions souhaitables ont le mérite d'être clairement posés et de former un point de départ concret pour des actions éventuelles. Par ailleurs une lecture attentive devrait être une source d'information utile pour beaucoup d'entre nous.

Le concept de lutte intégrée (IPM) n'est pas toujours bien compris par certains délégués, avec une confusion fréquente entre technique et stratégie et entre but primaires et secondaire (le but primaire étant la maîtrise optimale des populations de déprédateurs, le but secondaire (ou le corollaire voire la retombée) étant la réduction des traitements chimiques.

A noter une grande curiosité vis-à-vis d'une coopération avec la France, notamment dans le domaine de la formation, de la part de nombreuses délégations, notamment celles des îles du Pacifique. Il y a dans l'ensemble un préjugé (voire un jugement, compte tenu du résultat de certaines actions régionales dans lesquelles le CIRAD a été impliqué) assez favorable. Le "poids économique" de certains de ces pays n'est certes pas très grand à l'échelle régionale, et le CIRAD ne peut sans doute pas répondre à toutes les demandes. Une écoute attentive s'impose toutefois.

ANNEXE 1

DOCUMENT PROGRAMME

Conference On Integrated Pest Management (IPM) In The Asia-Pacific Region

23–27 September, 1991

Kuala Lumpur

Malaysia

Jointly Organized by :

Asian Development Bank (ADB)

C·A·B International

THE ORGANISING COMMITTEE

Conference Advisors

Dr Dimyati Nangju, Asian Development Bank
Dr Jeff Waage, CAB International

Members

CAB International, Regional Office for Asia

Mr. Khairi H. Mohamed, Resident/Regional Representative
Mr. Ho Thian Hua, Sr. Scientific Officer (Information)
Dr. Arun Kashyap, Forestry Information Specialist
Ms. Saranjeet Kaur, Administrative Secretary

CAB International, IIBC Malaysia Station

Dr. Peter A.C. Ooi, Scientist-in-Charge

Ministry of Agriculture, Malaysia

Mrs. Zabidah bte Kamaruddin, International Unit

Asean Plant

Dr. Soetikno S. Sastroutomo, Sr. Weed Scientist
Mr. Paul Menalo, Sr. Documentation Officer

Consultant

Dr. Lim Guan Soon, IPM Specialist, Malaysia

MESSAGE FROM THE HON. MINISTER OF AGRICULTURE MALAYSIA

The Ministry of Agriculture is honoured to be associated with the Asian Development Bank and CAB International in organising a Regional Conference on Integrated Pest Management. As a nation very much involved in this ecological approach to pest control, we are proud that this meeting is held in Malaysia. Integrated Pest Management (IPM) has stood the test of time and proven to be a compatible component of sustainable agriculture. Agricultural development devoid of concern for the environment and the well being of farmers is self defeating and will create more problems than solving them.

I am glad this and other issues will be discussed and reviewed in your Conference. I congratulate ADB and CAB International for taking the lead in organising this timely Conference and I hope the exchange of experiences and ideas will augur well for the agricultural development in your respective countries.

I wish you the very best in your deliberations.

(SANUSI JUNID)

MESSAGE FROM DIRECTOR OF AGRICULTURE, ASIAN DEVELOPMENT BANK

I am very pleased that the Asian Development Bank and CAB International have joined hands in sponsoring a Regional Conference on Integrated Pest Management (IPM). As a development institution, the Bank has financed many regional conferences or seminars including those on pesticides. This Conference is of great significance to the Bank and developing member countries because it deals with the problems of agricultural sustainability and pesticide use which are a major concern in developing countries.

Estimates of losses of agricultural production because of pests in the Asia-Pacific Region range from 30 to 60 per cent, varying according to crops, climate, farming practices and other factors. Although there are many methods which could be used to control pests, many developing countries have depended heavily on the use of pesticides. While there has been sizeable economic benefits of pesticide use, over-reliance on chemical pest control for pest management has started creating adverse impact in terms of their effects on health, natural environment and quality and safety of agricultural products. In consequence, increasing attention has now been given to the need for integrated pest management (IPM). IPM seeks to minimize reliance on chemical pesticides by making greater use of economical and environmentally safe alternatives.

This Conference will be attended by senior policy makers as well as prominent scientists from some 20 countries in the Asia-Pacific Region. The Conference will assess the development of IPM in the Region, identify the future direction, and recommend national and regional collaboration and priorities for research, information, training and other related activities on IPM. In addition, the Conference will help the Bank in further improving its future strategy with respect to pesticide use. We look forward to worthwhile deliberations and recommendations which would be of operational significance to the Bank and the DMCs. I hope that the participants will keep these in mind in their deliberations during the Conference.

I look forward to the presentations to be made by the distinguished participants who have agreed to share their knowledge and visions with us.

M. Zaki Azam
Director
Agriculture Department
Asian Development Bank

MESSAGE FROM DIRECTOR GENERAL C·A·B INTERNATIONAL

It is a great pleasure for CAB International to join with the Asian Development Bank in organizing this conference on IPM in the Asia-Pacific Region. Few people involved in crop production today will be strangers to the concept of "integrated pest management". It is a scientific concept which has appealed to all sectors of society - farmers wishing to reduce the costs and increase the sustainability of pest control, governments wishing to achieve similar goals on a national level, and an Asian and Pacific public increasingly aware of the importance of pest control measures which protect the environment and the consumer.

However appealing we find the concept of IPM, we must ensure that it does not remain only that, a concept. The research community in the Asia-Pacific Region has generated opportunities for developing IPM in a range of crop systems, but actual and sustained implementation has so far been limited and patchy. Factors limiting implementation are not only technical but institutional, and relate ultimately to government policy and the way in which farmers, farmer groups, extension specialists and researchers interact in the development of IPM methods.

We have organized this meeting, therefore, not simply to signify once more the scientific sense of IPM, but to address the real problems involved in its further development and implementation. What are the opportunities and constraints for IPM in the Asia-Pacific Region? How can the opportunities be realized and the constraints overcome? How can countries help each other in this process, and how can international organizations and donors best help countries? What are the priorities? The participants in this meeting are uniquely qualified to tackle these questions. They represent not only leading scientists experienced in IPM, but national policy makers responsible for its implementation. We can all expect some substantial results.

To CAB International, an organization dedicated to providing a world service in all areas of agriculture, IPM has a particularly important place. Our biosystematic institutes have a long tradition of supporting the identifications of pests and their natural enemies for our member countries and others in the Asia-Pacific Region. Our biological control institute, through Stations in Pakistan, India and Malaysia has assisted many national programmes in making use of these natural enemies in pest management projects. Biological control is at the heart of much successful IPM. Finally, our information services have brought to this region for decades a continuous and authoritative supply of scientific abstracts summarizing pest management research around the globe. CAB International now seeks a way to provide our services to IPM in the most effective manner to better serve the development of IPM, and look forward to this meeting.

I am assured by the staff of CAB International's Asia Regional Office, who have organized this meeting, that this will be a busy and demanding Conference. On behalf of CAB

International, I would like to thank you for your participation and your forthcoming efforts. We hope that you will find them productive, and that you will benefit not only from the Conference programme but from the opportunity to share experiences and ideas with counterparts from around the Region. Finally I would like to thank Mr. Azam and the Asian Development Bank for their financial support and, as importantly, for their commitment to the development and implementation of IPM, which has made this conference possible.

Don Mentz
Director General
C·A·B International
Wallingford, UK

CONFERENCE ON INTEGRATED PEST MANAGEMENT IN THE ASIA-PACIFIC REGION 23-27 SEPTEMBER 1991 KUALA LUMPUR, MALAYSIA

Background

This Conference on Integrated Pest Management (IPM) in the Asia-Pacific Region is jointly organized by the Asian Development Bank (ADB) and CAB International.

The week-long Conference on IPM in the Asia-Pacific Region aims primarily to establish the present position of IPM in the Region and to identify constraints to its development, and to agree on priorities for future efforts. A total of 21 countries is participating.

Integrated pest management has emerged as a preferred strategy for reducing dependence on chemical pesticides. IPM involves primary reliance on the natural enemies of pests, or biological control, and the use of plant resistance and cultural methods, which are often less expensive to the farmer and safer to the environment.

Intensification of crop production in the Asia-Pacific Region has caused increasing pest problems and greater use of broad-spectrum pesticides. Increasing pest resistance to these pesticides, along with new pest problems which they have caused and environmental and health risks associated with their use, has led countries in the Region to seek more sustainable methods of pest management.

The Conference hopes to address issues vital to the development of IPM in the Region.

Objectives

The Conference further aims to:-

(1) highlight among participating countries the importance of IPM for agricultural production, its sustainability and the environment;

(2) identify the needs for national programmes of the participating countries for the development and implementation of IPM;

(3) determine the scope for regional collaboration and priorities for research, information, training, implementation and other related activities; and

(4) disseminate information about IPM in the participating countries.

Participation

Each participating country has sent delegates who are responsible for pest management on a national scale or have considerable experience on extension/research services and on implementing IPM activities.

Besides country delegates, 30 other international development agencies and research centres have been invited to participate as observers.

THE ASIAN DEVELOPMENT BANK

The Asian Development Bank is a development finance institution engaged in promoting the economic and social progress of its developing member countries in the Asia-Pacific Region.

The Bank began operations in 1966 with its Headquarters in Manila, Philippines. It is owned by the governments of 35 countries from the Asia-Pacific Region and 16 countries from Europe and North America.

The Bank has become a major catalyst in promoting the development of the most populous and fastest-growing region in the world today. The Bank's principal functions are: to make loans and equity investments for the economic and social advancement of developing member countries; to provide technical assistance for the preparation and execution of development projects and programs and advisory services; to promote investment of public and private capital for development purposes; and to respond to requests for assistance in coordinating development policies and plans of member countries. In its operations the Bank is also required to give special attention to the needs of the smaller or less developed countries and give priority to regional, sub-regional and national projects and programs which will contribute to the harmonious economic growth of the region as a whole.

The financial resources of the Bank consist of ordinary capital resources, comprising subscribed capital, reserves and funds raised through borrowings; and Special Funds, comprising contributions made by member countries, accumulated net income and amounts previously set aside from the paid-in capital. Loans from ordinary capital resources, which account for 66 per cent of cumulative Bank lending, are generally made to member countries which have attained a somewhat higher level of economic development. Loans from the Asian Development Fund are made on highly concessional terms and almost exclusively to the poorest borrowing countries.

The Bank has borrowed funds for its ordinary operations from the capital markets of Europe, Japan, the Middle East and United States. The Bank's callable capital, which at the end of 1990 accounted for nearly 88 per cent of its suscribed capital, backs its borrowings in the capital markets.

Operations cover the entire spectrum of economic development, with particular emphasis on agriculture, energy, capital market development, transport and communications and social infrastructure. Most Bank financing is designed to support specific projects. The Bank also provides program, sector and multiproject loans.

The Bank actively pursues co-financing activities with official as well as commercial and export credit sources. The Bank has also entered into equity investment operations.

The Bank has 27 departments and offices-including Resident Offices in: (i) Dhaka, Bangladesh; (ii) Jakarta, Indonesia; (iii) Islamabad, Pakistan; and (iv) Kathmandu, Nepal and a Regional Office in Port Vila, Vanuatu – dealing with various operational, financial, administrative and general support functions. At the end of June 1991, the Bank had 602 professional staff.

C·A·B INTERNATIONAL

C·A·B International is an intergovernmental organisation that provides information, scientific and development services throughout the world. These services are vital to agriculture in both developed and developing countries, providing ready access to scientific information and research back-up and assistance in pest indentification and control. They offer valuable support for sustainable agriculture and environmental management, especially in desirable pest management procedures and the understanding of biodiversity.

C·A·B International

- is an intergovernmental organisation with 30 member countries
- maintains a computerised database containing over 2,000,000 abstracts; another 3,000,000 are available in printed form
- provides 30,000 volumes of abstract journals to 10,000 subscribing institutions in 160 countries
- identifies over 30,000 specimens of organisms of economic and agricultural importance each year
- employs over 250 scientists and 150 support staff
- has a gross income of 14.7 million pounds largely earned by its products and services; contributions from member governments amount to only 1.85 million pounds for which members receive services

Information services maintain the world's largest and most respected bibliographical database on research in agriculture, forestry and related disciplines including social sciences and aspects of human medicine.

In addition to disseminating the contents of the database through 45 printed abstract journals, C·A·B International provides access online through the international telecommunication networks and on magnetic tape and other electronic media. The database back to 1984 is available on CD-ROM. The publication of authoritative books and the provision of review articles in some of the journals complement the database.

Scientific services are provided by three biosystematic institutes (Entomology, Mycology and Parasitology) which are centres of excellence for research and identification of organisms of agricultural and economic importance, and the Institute of Biological Control. The correct identification of pests and disease organisms is vital to crop and livestock protection, as well as to effective plant quarantine and export control. It is also increasingly important to biotechnological and bioindustrial activities. The Institute of Biological Control provides advice and information on biological control of insect pests and weeds, undertakes research and implementation of projects, and participates in integrated pest management programmes. The Institute also provides intermediate quarantine facilities for the screening of biological control agents being moved between countries, chiefly those in the tropics.

Development services are the focus within C·A·B International for the planning, implementation and management of projects designed to coordinate CABI's expertise to assist member countries, and others, to meet their development objectives. Support for CABI's training activities is currently included in Development Services activities.

Library services are based on C·A·B International's specialised library centre. The library also provides a service to scientists around the world, by supplying information on specific topics and providing copies of articles abstracted by C·A·B International or falling within its subject scope.

Information Technology services take the lead in applying new information technology to make the many information resources available within C·A·B International more readily available to users. Developments such as CD-ROM are particularly adapted to meeting the needs of developing countries.

Membership of C·A·B International is open to any government. Members control the organisation through a periodic Review Conference and an Executive Council which meets at least annually. Expert guidance to management is provided by a Governing Board appointed by the Executive Council.

CONFERENCE ON INTEGRATED PEST MANAGEMENT IN THE ASIA-PACIFIC REGION 23-27 SEPTEMBER 1991 KUALA LUMPUR, MALAYSIA

SUNDAY, 22 SEPTEMBER 1991

5.00 pm – 8.00 pm	Registration of participants and resource persons Venue: Conference Secretariat Room (Room Ming 5)

MONDAY, 23 SEPTEMBER 1991

7.45 am – 8.45 am	Registration
	Opening Ceremony
8.45 am – 9.00 am	Delegates and guests assemble Arrival of Y.B. Datuk Seri Sanusi Junid, Minister of Agriculture
	Welcome Address
9.00 am – 9.10 am	Address by Mr. Zaki Azam Director of Agriculture, Asian Development Bank (ADB) Philippines
9.10 am – 9.20 am	Address by Mr. Don Mentz Director General CAB International
	Opening Address
9.20 am – 9.50 am	Address by Y.B. Datuk Seri Sanusi Junid Minister of Agriculture
9.50 am – 10.30 am	Refreshment

SESSION I
BACKGROUND TO IPM IN ASIA-PACIFIC

VENUE: CRYSTAL BALLROOM
CHAIRMAN: Dr. Sebastiao Barbosa, FAO, Rome

10.30 am – 11.15 am	**Integrated Pest Management in Asian Pacific Context** Dr. Lim Guan Soon Malaysia
11.15 am – 11.45 am	**IPM and the Role of Citizens Groups and Governments** Ms. S. Rengam, PAN (I.O.C.U.) Malaysia
11.45 am – 12.15 pm	**Towards Achieving an Asian Pacific Concensus on IPM Implementation** Dr. P.S. Teng, IRRI Philippines
12.15 pm – 1.30 pm	Lunch

SESSION II
COUNTRY REPORTS

VENUE: CRYSTAL BALLROOM
CHAIRMAN: Dr. N.S. Talekar, AVRDC

1.30 pm – 1.45 pm	**Chairman's Statement/Introduction**
1.45 pm – 2.00 pm	Pakistan
2.00 pm – 2.15 pm	India
2.15 pm – 2.30 pm	Bhutan
2.30 pm – 2.45 pm	Nepal
2.45 pm – 3.00 pm	Bangladesh
3.00 pm – 3.15 pm	Sri Lanka
3.15 pm – 3.30 pm	**Discussion/Clarification**
3.30 pm – 4.00 pm	Refreshment
4.00 pm – 4.15 pm	Myanmar
4.15 pm – 4.30 pm	Malaysia
4.30 pm – 4.45 pm	Thailand
4.45 pm – 5.00 pm	Vietnam
5.00 pm – 5.15 pm	Laos
5.15 pm – 5.30 pm	**Discussion/Clarification**
8.00 pm	Dinner hosted by Y.B. Datuk Seri Sanusi Junid, Minister of Agriculture **Venue:** Titiwangsa Seafood Village by the Lake, Kuala Lumpur

SESSION III
COUNTRY REPORTS

VENUE: CRYSTAL BALLROOM
CHAIRMAN: Mr. John Perfect, NRI, United Kingdom

TUESDAY, 24 SEPTEMBER 1991

8.15 am – 8.30 am	**Chairman's Statement/Introduction**
8.30 am – 8.45 am	China
8.45 am – 9.00 am	South Korea
9.00 am – 9.15 am	Taiwan, R.O.C.
9.15 am – 9.30 am	Philippines
9.30 am – 9.45 am	Indonesia
9.45 am – 10.00 am	**Discussion/Clarification**
10.00 am – 10.30 am	Refreshment
10.30 am – 10.45 am	Papua New Guinea
10.45 am – 11.00 am	Solomon Islands
11.00 am – 11.15 am	Fiji
11.15 am – 11.30 am	Kiribati
11.30 am – 11.45 am	Western Samoa
11.45 am – 12.00 am	**Discussion/Clarification**
12.00 pm – 12.30 pm	**Summary of country surveys**
12.30 pm – 1.45 pm	Lunch

SESSION IV
THE IPM EXPERIENCE

VENUE: CRYSTAL BALLROOM
CHAIRMAN: DR. D. Nangju, ADB, Philippines

1.45 pm – 2.00 pm	**Chairman's Statement/Introduction**
2.00 pm – 2.30 pm	**IPM in Rice** Dr. A. Wardhani, BAPPENAS, Indonesia
2.30 pm – 3.00 pm	**IPM in Vegetables** Dr. N.S. Talekar, AVRDC, Taiwan, ROC
3.00 pm – 3.30 pm	**IPM in Plantation Crops** Mr. Liau Siau Suan, Guthrie Research Chemara, Malaysia
3.30 pm – 4.00 pm	Refreshment
4.00 pm – 4.30 pm	**IPM in Cotton** Dr. Zahoor Ahmad, Cotton Research Institute, Pakistan
4.30 pm – 5.00 pm	**IPM in Sugarcane** Dr. A.I. Mohyuddin, PARC/IIBC, Pakistan
5.00 pm – 5.30 pm	**Discussion** Chairman's Summary

SESSION V
WORKSHOP SESSIONS

COORDINATORS: Dr. G. Norton, IC
Dr. P.S. Teng, IRRI
Dr. J. Mumford, IC

WEDNESDAY, 25 SEPTEMBER 1991

8.15 am – 8.45 am	**Briefing to Workshop Groups** Dr. G. Norton Dr. P.S. Teng
8.45 am – 10.15 am	**Workshop Session 1** Defining the problem — constraints to IPM implementation
10.15 am – 10.45 am	Refreshment
10.45 am – 12.45 pm	Continuation of Workshop Session 1
12.45 am – 2.00 pm	Lunch
2.00 pm – 4.00 pm	**Workshop Session 2** Developing a protocol for IPM and identifying regional needs
4.00 pm – 4.30 pm	Refreshment
4.30 pm – 6.00 pm	Continuation of Workshop Session 2
	Discussion
	Reporting by Workshop Groups

SESSION VI
WORKSHOP SESSIONS

COORDINATORS: **Dr. G. Norton, IC**
Dr. P.S. Teng, IRRI
Dr. J. Mumford, IC

THURSDAY, 26 SEPTEMBER 1991

8.15 am – 8.45 am	**Briefing to Working Groups** Dr. G. Norton Dr. P.S. Teng
8.45 am – 10.15 am	**Workshop Session 3** Developing action plans for specific cropping systems
10.15 am – 10.45 am	Refreshment
10.45 am – 12.45 pm	Continuation of Workshop Session 3
12.45 pm – 2.00 pm	Lunch
2.00 pm – 4.00 pm	Continuation of Workshop Session 3
4.00 pm – 4.30 pm	Refreshment
4.30 pm – 6.00 pm	Continuation of Workshop Session 3
	Discussion
	Reporting by Workshop Groups

FRIDAY, 27 SEPTEMBER 1991

Morning	Visit Agricultural Park, Shah Alam **Final Preparation of Workshop Recommendations** - Chairmen/Secretaries/Rapporteurs of Working Groups
12.45 pm – 2.00 pm	Lunch

SESSION VII
WORKSHOP PRESENTATION

VENUE: Crystal Ballroom
CHAIRMAN: Dr. Jeff Waage, IIBC

2.00 pm – 3.30 pm	**Presentation of Recommendations by Working Groups**
3.30 pm – 4.00 pm	**Adoption of Recommendations**

CLOSING CEREMONY

4.00 pm – 4.30 pm	Address by Y. Bhg. Dato' Wan Jaafar bin Abdullah Secretary General, Ministry of Agriculture, Malaysia
4.30 pm – 5.00 pm	Refreshment

INTEGRATED PEST MANAGEMENT IN THE ASIA-PACIFIC CONTEXT

G. S. Lim

Dependence on synthetic pesticides began around the forties, and continued to grow until the "green revolution" stimulated massive increase in their input. Dramatic increase was mostly encouraged by high-response varieties, particularly rice, wheat and maize. For many cash crops (e.g. vegetables), aggressive promotion by the pesticide industry and easy access to a wide range of "effective" chemicals encouraged their widespread use.

Many who continue to adopt "chemical farming", relying solely or heavily on pesticide inputs, are now confronted with many undesirable problems and increasing threat of non-sustainability. Recurring pest outbreaks caused by pesticide-resurgence resulted in serious crop losses. Examples included the early use of wide-spectrum insecticides in Malaysian oilpalm and cocoa plantations. Some recent cases involved brown planthopper outbreaks on rice in many parts of Asia. For diamondback moth, resistance development to most chemicals in use had even forced some growers to abandon cabbage cultivation. On the other hand, excessive pesticide residues in market produce had resulted in commodity rejection, with consequent disruption of local marketing and production systems. Other negative impacts included escalating costs in crop production, rising incidence of farmer poisoning, and general pollution of the environment by agrochemicals.

Notwithstanding the many serious problems already experienced with "chemical farming", there were apparently no significant reduction in crop losses or monetary nett gain in some major crops, even with dramatic increase in pesticide use. The contrary was in fact experienced. Excellent examples are rice in Indonesia and cabbage in Malaysia and Taiwan. Obviously, to continue pouring in more pesticides is not the answer!

The solution would have to come from a technology option that could help create sustainable systems and decrease the need for disruptive expensive and imported inputs (pesticides in particular). The technology would also have to sustain production that is free of farmer poisoning, non-polluting to the environment, and can assure improved public health. Integrated pest management (IPM) can readily meet with these requirements, and is presently the logical option which can offer hope in solving many of the intractable problems experienced by growers. Moreover, IPM experiences of many crops have revealed that the most successful pest control programmes are usually those which have utilized a combination of methods in a single coordinated management system.

Although recognized as vitally important, IPM development and implementation in the Asia-Pacific region is still limited, in particular the adoption of IPM by farmers. There exists various constranits. One concerns IPM misconceptions that give rise to inappropriate focus, and these must be corrected. For IPM development, the programmes designed must address more on

clientele needs. The choice of crops/pests for IPM consideration, however, should be governed by their importance, associated problems, and potential for IPM success. In research, the modus operandi must largely be "bottom up", and prime concern given to the elements of transfer. The mian aspects to receive attention are: assembling IPM "packages", simplifying, delivering, monitoring, and evaluating them. On IPM implementation, human resource development through effective training, communication and promotions is an essential and prime consideration. Training must include practical field skills as well as delivering IPM knowledge to the target audience, while communication and promotions will need to include specific messages whose impact can be readily measured.

In most developing countries, sustained infrastructural support by national institutions and firm governmental policy support for IPM are crucial to ensure IPM success and widespread adoption by farmers. These should therefore receive priority consideration.

Finally, it must be recognized that IPM is basically people-oriented. Development, adoption and promotion of IPM will involve diverse groups of people and bodies, such as farmers, extension workers, researchers, policy makers, non-government organizations and consumers, international bodies, and even the pesticide industry. IPM therefore must extend beyond the biological arena into that of the people concerned. The success will finally hinge on the capacity to effectively integrate all these people and bodies to achieve the common goal of promoting IPM adoption by farmer clientale in the Asia-Pacific region.

IPM AND THE ROLE OF CITIZENS GROUPS AND GOVERNMENTS

Sarojini Rengam

Over the past decade, concern has increased throughout the world regarding the unintended effects of pesticides on humans and the environment. Pesticides can, for example, reduce the diversity of flora and fauna and contaminate soil, lakes, water courses, and groundwater. Pesticides troubling shortcomings include the long-term sustainability of the resources that agriculture itself depends on, and the social and economic structures and viability of rural communities. Some pesticides seem to pose a health threat for farmers who use them frequently. The National Cancer Institute found in a study of farm workers that those who are exposed to herbicides for more than 20 days each year are six times more likely than the average person to develop non-Hodakin's lymphoma. Global severe acute pesticide poisoning are estimated to affect 3 million people according to World Health Organization but other studies point to 25 million people a year in the South suffering from pesticide poisoning.

In addition, a chemical-based pest control tends to have difficulty maintaining consistently high yields because, somewhat paradoxically, the ability of pesticides to control pests decreases over time due to the twin problems of pest resistance and pest resurgence. This created new pest problems including the emergence of the brown planthopper as a pest in rice fields of Asia. As a result, an Integrated Pest Management approach was adopted in some countries in this region and has proved to be very successful in Indonesia.

In the U.S several studies suggested that it is technologically feasible to reduce pesticide use 35 to 50 percent without reducing crop yield. Three recent events in Europe support these assessments. Denmark developed an action plan in 1985 to reduce the use of pesticides 50 percent before 1997. Sweden also approved a programme in 1988 to reduce pesticide use by 50 percent within 5 years. Finally, the Netherlands is developing a programme to reduce pesticide use 50 percent in 10 years.

Widespread adoption of alternative agricultural practices including IPM holds the greatest potential for reduction of chemical inputs, preserving and enhancing natural resources and to protect human and environmental health. To eliminate bariers to alternative agriculture we need policy reforms and government will to put resources into alternative agriculture, the development and implementation of agricultural techniques that reduce chemical use, changes in pesticide registration requirements and the reflection of the true environmental and social costs of pesticides. In the move towards a better agricultural system, governments and citizens groups have an important role to play.

TOWARDS ACHIEVING AN ASIAN-PACIFIC CONCENSUS ON IPM IMPLEMENTATION

Paul S. Teng

The Goal of the Conference is to provide a forum for the exchange of information on all aspects of IPM in the Asia-Pacific Region, from which specific action will be proposed to accelerate the institutionalization of the concept and its field implementation at the regional or country level. The *Objectives* are (1) To review the status of IPM in participating countries, (2) To identify and prioritize intervention targets for IPM that lend themselves to project formulation at the regional or country levels. (3) To determine the requirements for alleviating constraints enccuntered in implementing IPM, including institutional constraints, and (4) To discuss future activities that will facilitate information and technology sharing in the Asia-Pacific region. Although efforts to institutionalize the IPM concept in this region began in the late 1970's, few national programs can point to success stories in 1991. The 1990's has seen an increased concern by many national programs, donor agencies, and international organizations about the issues of agricultural sustainability, environment quality and human health associated with agricultural practices. This has led to a series of *ad hoc* meetings in the region aimed at augmenting current IPM research and implementation programs. This Conference is thus timely because it is *action-oriented*. There will be ample opportunity to share the success stories of IPM implementation in the region, such as the FAO program on rice and private sector programs on plantation crops. The Conference format will additionally allow interested national program persons to interact with those possessing IPM implementation experience and with technical resource persons, all of which is expected to generate two sets of outputs. The first set of output is expected to include general recommendations by the Conference on the pricrities for IPM in the region and guidelines for incorporating IPM in development project. The second set of outputs is expected to include prioritized list of crops or topics for national or regional IPM projects; for each crop or topic, specific steps and requirements would be specified to enable potential donors a preliminary determination of interest and an evaluation of potential.

IPM IN RICE

M. Anwar Wardhani

The current Indonesian National IPM Program is in its third year of implementation. During this time it has worked with over 100,000 farmers and agricultural personnel in an effort to firmly establish IPM as the national crop protection policy. Over the last five years Indonesia has succeeded in substantially reducing the use of pesticides on rice while increasing yields; in effect de-coupling pesticides from the production equation.

Over the last 20 years, and especially since the issuance of Presidential Decree No. 3/1986, IPM in Indonesia has constantly evolved *conceptually* as well as operationally. The current program views IPM not merely as an agricultural program dealing with insect pests and diseases, but as a large scale human resource development program and an entry point to sustainable, ecologically sound agricultural development. As such, the program deals with general agronomic, health, socio-economic, and environmental issues as part and parcel of IPM. The program works from a set of principles and processes which empowers farmers to understand, analyse, and effectively manage their specific local agro-ecosystems, hence IPM is not just an array of control methods.

From experience, Indonesia has found that the components that must be in place for successful IPM implementation are (1) the political will to develop, issue, and maintain strong policy support, (2) a solid field research foundation, (3) explicit emphasis on human resource development, and (4) sufficient resources to sustain implementation and further development.

The National IPM Program is striving for further conceptual evolution by integrating researchers, extension workers, and farmers in applied research activities at the community level addressing immediate agricultural problems faced by farmers. This 'farmer research' program hopes to spur applied IPM research activities to support training activities at the field level as IPM spreads to ever increasing numbers of farmers and farm communities.

IPM IN VEGETABLES

N.S. Talekar

Diamondback moth (DBM), *Plutella xylostella* (L.). is the most destructive pest of cruciferous vegetables in the Asia-Pacific region. The larvae of this insect feed on economically important crucifers such as common cabbage, Chinese cabbage, cauliflower, brocoli, radish, kale etc. As result, the yield and quality of the produce are adversely affected. This insect has high fecundity and short life cycle which enables it to complete 16-20 generations per year. Farmers in the Asia-Pacific region used only insecticides to combat this pest. Insecticide use is intensive as consumers demand clean vegetables. As a result of intensive insecticide use, DBM has become resistant to practically all insecticides used for its control. Since no alternative control measures have yet been developed, farmers are using mixtures of chemicals and spraying them more often. Such insecticide use not only fails to control DBM, but it also kills the natural enemies of DBM and other pests further exacerbating the pest problem.

In order to control DBM, AVRDC imported a larval parasitoid, *Diadegma semiclausum* (Hellen), from Indonesia in 1985 and introduced into Taiwan. Based on a preliminary field study in which this parasitoid effectively controlled DBM, it was introduced to several locations in the island. Within two years it became established in all highland areas, practically eliminating the need to use toxic chemical insecticides. However, it failed to get established in the lowland. In parts of the lowland where insecticide use is absent or minimal, another larval parasitoid, *Cotesia plutellae* Kurdjumov, is giving good control. In lowland area, use of *Bacillus thuringiensis* Berliner sometimes becomes necessary to control other pests and to supplement the DBM control by parasitoid. Based on the success of this program, especially in Taiwan's highlands, the Asian Development Bank in 1989 funded a three-year collaborative research project between the national programs of Thailand, Malaysia, Indonesia, Philippines and AVRDC to control DBM in these countries. This project which is a component of a larger vegetable improvement program called AVNET, involves construction of parasitoid rearing facilities in each country, training of national program scientists at AVRDC, setting up of two pilot projects to introduce parasitoids in each country and information exchange. Through this project, *D. semiclausum* has been introduced into Philippines and Thailand and *C. plutellae* to Indonesia. *Diadegma semiclausum* is now established in the vegetable production areas of Benguet in the Philippines. This introduction is expected to save considerable amount in insecticide cost in this area starting this year. In Malaysia, where this parasitoid was introduced in 1977 by Malaysian entomologists, it is giving excellent control of diamondback moth in Cameron Highlands where farmers reported a significant drop in insecticide use and increased cabbage production. In Thailand, where crucifers are grown mostly in the lowland, *D. semiclausum* is not established but *C. plutellae* is, *Cotesia plutellae* is also established in limited lowland areas of the Philippines, Malaysia and in mid-level areas of Indonesia. Because of infestation of crucifers

by other insect pests, such as *Crocidolomia binotalis* Zell., *Hellula undalis F.* and *Spodoptera* spp., use of *B. thuringiensis* is still necessary in the lowland areas. At present, IPM in lowland emphasizes *C. plutellae,* use of *B. thuringiensis* and an egg parasitoid, *Trichogrammatoidea bactrae* Nagaraja. This egg parasitoid was first discovered by Thai scientists parasitizing DBM eggs in Thailand and is now made available for distribution to the rest of the region through the AVNET collaborative project. Given sufficient resources, this successful project can be easily expanded to other countries in the Asia-Pacific region.

Habitual prophylactic sprays of mostly useless insecticides by vegetable farmers even in areas where DBM parasitoids are established, kills the parasitoids and causes resurgence in DBM population. This is the most important limiting factor in the control of DBM in Southeast Asia, Vigorous extension education efforts are necessary to wean farmers away from this wasteful practice if we are to succeed in any IPM. Simultaneously, strict monitoring of insecticide use and even banning of obsolete chemicals for DBM control is necessary if we are to save crucifer cultivation from ravages of DBM in the region.

IPM IN PLANTATION CROPS

S. S. Liau

IPM is founded on ecological principles. It is the amelioration of pest infestations through understanding and manipulation of factors, both the biotic and abiotic, operating within the agroecosystems. Tropical plantations are comparatively simple agroecosystems of mostly perennial mono-crops where a dynamic equilibrium of these factors prevails over fairly large expanses of land. Without distinct seasonality of weather, crop and fauna, such agroecosystems are relatively stable. Occasionally, natural and man-made ecological disruptions occur to upset the natural balance.

Most pest species of plantation crops are usually present innocuously, maintained at this level by biotic factors which are sustained by the agroecosystem. A breakdown of these suppressive factors results in buildup of the pest population to outbreak proportions. This phenomenon, natural or artificially-induced, was demonstrated and appreciated in Malaysian plantations since the early 1970's. The practical application of this knowledge has contributed to the development of the IPM concept.

With such a background, IPM has been readily adopted and had proven to be a practical strategy in plantations, even in the management of key pests which are not kept below economic thresholds by natural suppression. Judicious use of selective pesticides, prudent application techniques, cultural practices and biological control are integrated into the overall crop protection strategy. The conservation and augmentation of natural enemies, including their relationship to ground vegetation, are actively investigated and incorporated into policies. As plantations mainly belong to large corporations rather than to smallholders, there are centralised decision-making systems therein which facilitate conception and implementation of such IPM policies.

Application of IPM to plantations has yielded a good track record of successes notably in oil palm, cocoa, rubber and coconut. Pests were better managed with minimal pesticidal input, reduced environmental damage, greater safety to operators and often more cost-effective.

There is good technical backup for IPM in plantations. Research, training and extension support are provided not only by government but also by private institutions, including crop-dedicated research stations and institutes of higher learning. Collaborative efforts among related organisations and regular international conferences in the region often provide the forum for the exchange of information and strengthening of the knowledgebase.

The advancement of IPM still needs more fundamental research. Quantitative biological and ecological data required to develop and support a more rational IPM policy are often wanting.

Although the development of IPM has not been too drastically hampered by inaccessibility of modern technology, equipment and machines, the situation can be improved. Computer-aided acquisition, collation, analysis and dissemination of relevant data should be acquired for speedier progress of the science.

In the core of IPM is biocontrol which is not practised in isolation, especially classical biocontrol. Therefore coordination, prioritisation and implementation of biocontrol on a national level is necessary. Also, any establishment of regional and international collaboration on biocontrol further augurs well for the advancement of IPM in plantations.

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ANNEXE 2

WORKSHOP SESSIONS

INTRODUCTION

There are three workshop sessions and six working groups in each session. Each working group has a chairman, members, resource persons and observers. The chairman will elect a secretary who will record the discussions. This record and the required list from each session should be given at the end of each session to a resource person in the group or to an Conference Organizer. We will prepare a copy of all lists for everyone before the next workshop session. Attached please find composition of workshop sessions 1 and 2 (Session 3 will be prepared later), a description of workshop sessions 1, 2 and 3, instructions for chairmen and a timetable. Please note the timetable is different from the printed programme.

WORKSHOP SESSION ONE
"DEFINING THE PROBLEM: CONSTRAINTS TO IPM IMPLEMENTATION"

Objective:

To produce a list of factors that have influenced the success and failure of IPM in particular crop systems.

Groups:

Six groups based on crop systems: rice, vegetables, cotton, fruit/plantation crops, maize/sugar cane, soyabean/root crops.

Output:

A list of factors (1-2 pages) that have influenced the success and failure of IPM in particular crop systems. Brief examples should be listed.

Participants should draw upon their personal experiences and conference presentations. It is particularly important to identify factors that have been difficult to overcome and which have limited the success of IPM.

WORKSHOP SESSION TWO
"DEVELOPING GUIDELINES FOR IPM"

Objective:

To consider the constraints identified in Workshop Session One and to produce a set of guidelines for managing each stage of IPM programmes, from initiation to evaluation, that will be useful both to national programmes and donor agencies.

This will involve consideration of important questions that affect each of the various

This will involve consideration of important questions that affect each of the various stages of IPM programmes. Participants will be divided into six groups to discuss the major issues.

Groups:

1. Policy and policy change
2. Getting IPM started
3. Defining research to fit the needs
4. Implementation
5. Keep778ing IPM going
6. Measuring and demonstrating the benefits

Output:

Each group will be concerned with one stage and will produce a list (1-2 pages) of factors that need to be considered at that particular stage in a pest management programme. They should also present summaries of ideas on how to promote favourable situations and overcome unfavourable cases. Brief examples should be listed.

At a later stage, the output from the six groups will be amalgamated to form a set of guidelines for IPM programmes.

Please use experience and examples from Country Reports and Workshop Session One; wherever possible, give specific case examples. Groups should try to take an objective approach to their topics and try to be as broad as possible in the pest problems they consider.

Example topics for discussion within the groups:

1. Policy and Policy Change

   What policies are likely to cause pest problems and the need for pest management?
   What policies promote IPM as solution to pest problems?
   What policies are antagonistic to IPM?
   To what extent are policies that cause pest problems and prevent IPM changeable?
   Why should policy makers be interested in IPM?
   How can policy makers be influenced to take actions that promote IPM?

2. Getting IPM Started

What sort of stimulation is needed to get a transition from old pest management to IPM? (control crisis, change in technology, policy change, etc)
How do you motivate people at different levels to start IPM?
How can you anticipate, create and take advantage of opportunities to get IPM started?

3. Designining Research to Fit the Needs

How do you decide what are the most appropriate forms of IPM in particular cases?
What is the appropriate level for design and development of IPM (farm, local, national, international)?
What factors determine the most appropriate level?
What factors are likely to affect the feasibility of particular forms of IPM?
What future changes are likely to occur that will affect the chances of implementing IPM? (ie new varieties, price trends, environmental requirements, etc)
What are likely to be key research needs? This will include information and techniques needed to design and run pest management programmes.

4. Implementation

Training - who needs it and what should they be taught?
Extension - what problems can occur with extension that affect implementation? Appropriate targets and means for extension (direct contact, demonstration plots, etc)?

5. Keeping IPM Going

How do keep IPM going once it is started? (How do keep it from failing?)
What aspects of IPM are most likely to need modification to maintain acceptable control?
How do you monitor to know when IPM needs adjusting to maintain acceptable performance?
Funding - what problems can occur and how can these be resolved? What factors will encourage the implementation and dissemination of good IPM practices with a minimum of outside funding?

6. Measuring and Demonstrating the Benefits

What benefits are national government agencies and donors looking for in IPM programmes?
How can these benefits be measured in practice? This will include two further questions - what are the benefits to farmers, and how can they be assessed?
What are the benefits to the environment, and how do you measure them?
How can evaluations best be presented to donors?

ANNEXE 3

CONFERENCE ON INTEGRATED PEST MANAGEMENT IN THE ASIA-PACIFIC REGION KUALA LUMPUR, MALAYSIA 23-27 SEPTEMBER 1991

GUIDELINES FOR INTEGRATED PEST MANAGEMENT

1. Policy and Policy Change

A major factor that can influence all stages of IPM development and implementation is the policy and institutional environment. Policy makers and administrators generally perceive that the use of pesticides provide effective crop protection and contribute to food security programmes. Many official government recommendations are thus often concerned exclusively with pesticides treatments and not IPM methods.

Policies such as pesticides subsidy can be antagonistic to the uptake of IPM practices by reducing the effective cost of pesticides to the farmers. On the other hand, pesticides regulation policy, which controls the import, manufacture, sale and availability of pesticides, can increase the comparative advantage of IPM and lead to greater adoption by farmers. Since these political factors can have such an over-riding influence, it is crucial that those involved in IPM are first aware of the importance of the political environment and second, that ways in which political conditions more conducive to IPM might be created.

Other factors favorable to IPM need to be promoted. Media publicity on the dangers of pesticides, including residues in food, health hazards and environmental pollution, encourages the promotion of IPM. Exposure of policy makers to information on the successful implementation of IPM on a sustained basis, possibly through visiting countries where such success has been achieved will be helpful in initiating an IPM programme in a country. Policy makers can be convinced of the viability of IPM through research results, pilot projects and demonstrations within the country.

In the light of these and other factors, the following recommendations were made:

Recommendations for Government policy on IPM

* Adopt IPM as national agricultural policy
* Earmark specific and adequate funds for IPM
* Reduce or abolish subsidies on pesticides
* Promote the phased implementation of IPM for greater credibility

* Reorient research, extension and agriculture education programmes towards IPM practices

* Establish a national steering body to coordinate multi-disciplinary and multi-agency programmes and policies on IPM

* Establish monitoring system for pesticide residues and publicize the results

Recommendations for Donor Agencies (including international and funding agencies)

* Adopt a deliberate policy on IPM

* Accord priority to IPM in projects

* Provide funding for training, research and extension in IPM

* Promote the flow and exchange of technology and information in IPM

2. Getting IPM Started

IPM can be started for various reasons, including one of excessive reliance on pesticides the case in which a new or previously unimportant pest has achieved an increased status, or need for environmentally, socially and economically appropriate pest control systems. In many cases IPM programmes can start with small-scale efforts as an entry point to a larger programme, for example, control of planthopper (BPH) in Malaysia, Indonesia, the Philippines, Sri Lanka and Southern India. Testimony of farmers about success/need for IPM is especially important.

In either case there must be some stimulus to get IPM started. Therefore the following guidelines are appropriate at this stage:

* Potential participants at all levels (farmers, extensionist, scientists, policy-makers, consumer/public) must be convinced of the need for IPM.

* Potential participants must be convinced of the feasibility of IPM to meet their objectives.

* Information about the following should be provided:

  - unacceptability of current situation (both pest losses and control practices)
  - feasible alternative control components available in IPM
  - environmental benefits from IPM
  - expected cost/benefit ratios
  - misconceptions about the role of pesticides
  - other IPM success stories

* The following actions should be taken:

  - publicize unacceptable crisis in control
  - present simple technology options
  - training in component technology for implementation
  - demonstrations of IPM techniques in the field
  - present policies affirming IPM components
  - working facilities to develop technology

* Responsibility for these actions must be both "bottom-up" and "top-down", the former to stimulate an IPM response to the problem and the latter to support such a response.

3. Designing Research to Fit the Needs

IPM is a knowledge-intensive technology that depends on a scientific base of ecology, sociology and economics. Therefore, research to support IPM must deal with a continuum in systems that ranges from the crop ecosystem (pests, natural enemies, crop, other organisms) to the farmer, to methods for extending IPM knowledge to the farmer. Relevant information must be acquired or generated and these can be attained either through library research, surveys or actual scientific activities.

Effective IPM research requires:

- Policy directions and support
- Definitive plans or guidelines
- Funding (internal and external)
- Trained personnel
- Infrastructure (laboratories, field facilities)
- Ready access to information
- Interdisciplinary approach

Ultimately, any research design to generate IPM packages should consider or satisfy the following parameters:

- Technological feasibility
- Economic viability
- Socio-environmental acceptability
- Farmer acceptability.

Effective IPM requires that research generate knowledge by:

(1) <u>Defining the Problem or the operational environment for IPM</u>

Baseline information needs to be gathered using sample-survey techniques, and this information should influence the selection of IPM components for research. The baseline information will include:

- the knowledge, attitude, practices, perceptions and receptivity of the farmers,
- their socioeconomic status,
- seasonal and historical pest profiles
- aspects of the crop and crop ecosystem, including its value, agronomy and economics of production.

(2) Understanding the crop-based ecosystem (agroecology)

IPM requires a balanced view of the crop and pest being managed, in terms of their relationship to other ecosystem components, such as trophic levels, the physical environment, and management inputs which may affect the biological-physical interfaces. In some crops, IPM has been successfully practized by allowing the crop ecosystem to maintain its natural balances (e.g. by elimination of broad-spectrum insecticides in rice for IPM of BPH). These relationships must be researched before a particular IPM program can be designed for a particular crop ecosystem.

(3) Integrating control techniques to suit the target ecosystem

These components would include control tactics or technologies (e.g. biological control, cultural, chemical, host plant resistance, etc.) and decision tools (e.g. economic thresholds). Research into these components and their integration will form the basis for the generation of interim or initial packages.

These IPM packages should be tested in research plots and further refined. Further testing should involve larger scale/mulatilocational trials in cooperation with farmers. Where appropriate, farmers should be involved in IPM research (e.g. diagnosis of problems, On-farm tests, evaluation and validation of technology) to ensure that their needs be considered or addressed in accordance with their unique agroecological context.

- Basically, this stage is where an IPM programme or package is to be developed, tested and further prepared for implementation.

(4) Developing extension-communication techniques for IPM

Because IPM is an innovative exercise in human resource development aimed at changing the attitudes of not only farmers but extensionists, researchers and policy makers, it is very important that the best vehicle be designed for communicating the IPM message. Research is needed on the receptivity of farmer groups to different techniques,- multi-media techniques (radio, video, leaflets, posters, etc.), classroom-training versus experiential learning - and related topics.

Once research has resulted in IPM technology that can be communicated using an appropriate methodology, the implementation phase (next section) can begin.

4. Implementation

While IPM is farm-based, its adoption and successful implementation should be preceded by a well defined programme aimed at stimulating interest, developing it and eventually transferring it to farmers. However, often the latter has not been achieved because of poor acceptance by authorities or inability to get farmers to participate.

National level activities

In order to optimize adoption and subsequent implementation of IPM at the farm level, eight steps are recommended:

* Initiate by publicizing potential benefits of the programme in the media
* Develop human resources in extension and research
* Organize coordinating committees on IPM at the operational elvel
* Set up demonstration plots to show farmers the benefits of IPM
* Ensure long- and short-term training of trainers, extension agents and farmers
* Identify channels for transferring IPM technology
* Develop pragmatic farmer training methods and materials
* Encourage farmers to implement through removal of price controls on commodity, increased social status of the farmers and preferential bank loans

Donor support

In order to support implementation of IPM, donor agencies may

- provide support material eg. transportation
- Assist in provision of timely and regular pest management information
- Enhance training methods and training material for implementation eg. demonstration, drama and theater, formal staff training
- Encourage the setup of intercountry networking for: farmer exchange, information exchange, expert exchange, coordination of activities

5. Keeping IPM Moving

After farmers have used and adapted IPM in pilot sites, and the national decision has been made to spread IPM to a larger proportion of farmers, then the chief concern is how to keep IPM moving. The sustainability of IPM is more than perpetuation of institutions, it is the continued delivery of benefits from IPM to farmers. This section offers a selection of conditions and actions that have been tried in different national contexts. The categories move from technical through political, managerial, and socio-economic concerns.

In order to match IPM to the specific needs and conditions of farmers in diverse agro-ecosystems try to:

* Design, test, and improve the IPM training process and contents with the active involvement of farmers and local data from ongoing research studies.

* Track significant changes in agro-ecosystems and their effects on IPM.

In order to provide up-to-date documentation of the benefits and impact of IPM for farmers, scientists, and policy makers try to:

* Gather adequate reference data on profitability and sustainability of production from pilot sites for subsequent comparison with frontline demonstration results in comparable new locations.

* Continue a monitoring system that collects standard data for IPM implementors to make better decisions.

* Initiate and sustain case studies and surveys on health, environment, and economic impact of IPM especially for national and international audiences.

In order to create and sustain public support for IPM try to:

* Mobilize people and their political leaders to publicly support IPM

* Build multi-sector constituencies to lobby for IPM, including NGOs, the "green" advocacy groups, and scientists through multi-disciplinary groups.

In order to strengthen and sustain government initiatives and support for the promotion of IPM try to:

* Embody policy support for IPM as law or policy directions.

* Disconnect pesticides from agricultural credit, but extend credit for private IPM consultants, and move towards taxes on pesticides.

* Place IPM at high priority in national loans and grant agreements

* Seek out local funding from local government, NGOs, agro-industry, and the private sector

In order to accelerate institutional transformation to sustain IPM implementation after the stimulus of a newly funded pilot project has faded try to:

* Educate key policy makers and senior administrators (including sectors outside agriculture) by international study tours, briefings and seminars.

* Create and empower IPM "champions" within institutions who convince hierarchy upwards.

* Set new priorities, change job descriptions, and catalyze interdisciplinary groups within institutions to redirect their resources towards IPM.

* Link national and international "upstream" research with IPM.

* Set up multi-institution coordination by identifying key institutions from different sectors, involving key resource persons in mixed function teams, and concentrating on practical problems such as inputs.

In order to promote IPM through appropriate social and cultural means try to:

* Activate small groups of farmers for learning IPM and use group dynamics exercises to enhance mobilization, empowerment, and farmers' ownership of IPM.

* Increase involvement of women extension workers and women farmers in IPM.

* Build IPM on elements of local culture such as indigenous ecological and plant genetic knowledge, traditional communications/theatre, schools and group reinforcing processes.

* Bridge the social and educational gaps among local leaders, researchers, extension staff and farmers.

6. Measuring and Demonstrating the Benefits of IPM

Many groups concerned with and about IPM - Farmers, National Government officials in the form of extensionists and policy makers, donors and international organizations, NGOs - need to make informed judgements about IPM and how it fits into their agenda. This can be accomplished by having data, information or knowledge about the potential and actual benefits accruing from practising or implementing IPM. As with most development approaches, IPM has target beneficiaries when implemented. In the first section, we identify who these beneficiaries are and then relate each to the benefits that IPM can bestow. This is followed by a definition of the parameters that may be used to measure each benefit.

* Determine who will receive benefits from IPM.
  - farmer
  - consumer
  - local government
  - commerce

* Measure the benefits, looking for:

  - Increase in Benefit:cost ratio
    - Reduction in cost of production
    - Increase in net income
    - Increased export of agric. produce

  - Improvement in environment and human health
    - Reduced pesticide residues in produce and environment
    - Reduced health care costs
    - Reduced pesticide poisoning cases

  - Improved human resource development
    - Proportion of farmers accepting IPM
    - Incrased decision-making by farmers

  - Yield stability
    - Reduction in pest outbreaks

  - Reduction in pesticide use
    - Reduced volume of pesticides used by farmers/nation
    - Reduced area covered by pesticides
    - Reduced no. of registered pesticides
    - Savings in foreign exchange

* Demonstrate benefits to all participants in IPM.

* Evaluation of IPM must be related to objectives of the beneficiaries.

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ANNEXE 4

LISTE DES DOCUMENTS COLLECTES

Présentation d'Organismes ou de Programmes

- **CABI-IIBC** - *Annual Report 1990*, International Institute of Biological Control. 80 pages couleur.

- **ICRISAT** - *Legumes Entomology Researche at ICRISAT. Objectives Achievements and Future Activities*. 7 pages. July 1990. Andra Pradesh, INDIA.

- **INDONESIAN NATIONAL IPM PROGRAM (FAO)** - *Farmer as experts*. 19 pages couleur. Juin 1991. Jakarta Pusat, INDONESIA.

- **MARDI** - *MARDI, a brief insight*. 48 pages couleur. 1990. MALAYSIA.

- **NRI-ODA** -*Pest Management Divison. Professional services in support of crop cooperation* (Annuaire des Chercheurs). Non paginé. Non daté.

Etudes diverses, Proceedings

- **IIBC-Pakistan Agricultural Research Council** - *Integrated Control of Mango Pests*. 11 pages couleurs. June 1986. Islamabad, PAKISTAN.

- **ICRISAT** - *Summary Proceedings of the Worhop on Integrated Pest management and Insecticide Resistance Management in Legumes crops in Asia*. 39 pages. Mars 1991. Chiang Mai, THAILAND.

- **ICRISAT** - *ICRISAT IPM Projects needing donor support*. 2 pages. Non daté.

- **MALAKAND FRUIT & VEGETABLE DEVELOPMENT PROJECT (Convention Pakistano-Suisse)**- *Integrated Pest and Disease Control of Fruit Crops in Pakistan*. 100 pages couleurs. July 1990. Saidu Sharif, PAKISTAN.

- **NRI-ODA** - *The Relative Importance of Crop Pests in South Asia*. NRI Bulletin n° 39. 102 pages. 1991.

Manuscrits de présentations à la Conférence.

-**AVRDC** - *Integrated Management of Diamondback Moth/ A collaborative approach in Southeast Asia*. 23 pages. Shanshua, TAIWAN.

-**IIBC-PARC** - *Implementation of Integrated Pest Management of Sugarcane Pests in Pakistan*. 15 pages. Rawalpindi, PAKISTAN.

-**CCRI** - *Integrated Pest Control in Cotton in Pakistan*. 13 pages. Multan, PAKISTAN.

-**INDONESIAN NATIONAL IPM PROGRAM (FAO)** - *Development in IPM: The Indonesian Case*. 12 pages. Jakarta, INDONESIA.

Comptes rendus de groupes de travail de la Conférence

- Action Plan for IPM on Rice-Based Cropping Systems.

- Action Plan for IPM on Cruciferous Crops (titre erroné, car on trouve des références à d'autres cultures maraichères).

- Action Plan for IPM on Cotton.

- Action Plan for IPM on Sugarcane and Maize.

- Action Plan for IPM on Plantation crops and Fruits.

- Pacific group. Action Plan for IPM on Root Crops. Action Plan for IPM on Vegetables.

ANNEXE 5

COMPTE RENDU DE VISITE AU MARDI

Cette visite a été possible grâce à la disponibilité du Dr Loke Wai Hong, responsable de la Division des recherches fondamentales du MARDI. Cette division horizontale alimente en recherches de base les Divisions verticales par culture plus chargées de la recherche d'accompagnement et du développement sur le terrain.

Section Entomologie

M Mohamed Shamsudim Osman correspondant national du réseau NSCRA (Network of Services for Citrus Rehabilitation in Asia) qui a prolongé le projet UNDP-FAO pour la lutte contre le Greening en Asie-Pacifique. Dans le cadre de ce projet M Shamsudim avait reçu une formation sur la lutte intégrée au CIRAD/IRFA à la Réunion en Juin 1988. Les principaux problèmes qu'il a à traiter sont les foreurs (fruits et tiges), la désinfection après récolte (mouches des fruits) et la maîtrise des vecteurs du greening (dans le cadre du réseau). Autre entomologiste rencontré : **M Tan Chai Lin.**

Section Nématologie

MM Abdul Karim Bin Sidam (Senior Research Officer) et **Yuen Pak Mun** (Research Officer) sont les deux nématologistes de la Division. Leurs recherches portent essentiellement sur le maraîchage, le tabac et (de plus en plus) les fruitiers. Un des problèmes les plus sérieux semble être celui de *M. incognita* sur **goyavier**, qui attaque dès le stade pépinière (sol non désinfecté dans les pots) et avec des dommages qui rappellent fortement ce que l'on observe sur café en Amérique Centrale (dépérissement des plants). Des études sur la résistance des porte-greffe n'ont pas donné de résultats intéressants jusqu'à présent.

Sur **bananier** (22.000 Ha avec 50% de Pisang Mas)les nématodes les plus fréquents sont *Meloidogyne* et *Rotylenchulus*. *Radopholus similis* n'est pas présent partout mais provoque de gros dommages. Cette espèce se retrouve aussi sur **Poivrier** avec *Meloidogyne*. Les traitements sur bananier consistent en un traitement du trou de plantation au carbofuran et un parage des souches. Les traitement en plantation sont effectués au fénamiphos, mais pas avant que des symptômes d'attaques n'apparaissent.

Sur **papayer** le problème principal est constitué par *Rotylenchulus*. Sur **ananas** cultivé surtout sur tourbes il n'y a pas trop de problèmes apparemment.

Sur **tabac** le problème n° 1 est *Meloidogyne* qui est maîtrisé surtout par rotations culturales, le piment (chili) et le maïs donnant les meilleurs résultats.

Un programme d'étude sur la lutte biologique par la bactérie *Pasteuria penetrans* est également en cours.