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BANGLADESH AGRICULTURAL RESEARCH PROJECT PHASE-II

BANGLADESH INTEGRATED PEST MANAGEMENT :

Report on a Training Workshop

13-24 January 1985

**Lynwood Fiedler
Edward H. Glass
H. David Thurston**



BANGLADESH AGRICULTURAL RESEARCH COUNCIL
INTERNATIONAL AGRICULTURAL DEVELOPMENT SERVICE
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Executive Summary
of
Bangladesh Integrated Pest Management Training Workshop
January 13-24, 1985

Instructors:

Lynwood Fiedler, Vertebrate Specialist
Edward H. Glass, Entomologist
H. David Thurston, Plant Pathologist

Introduction

Integrated pest management (IPM) provides a long-term strategy for minimizing losses caused by pests with the least possible cost to the farmer or negative disruption of the environment. IPM treats pests as a component of the total system of crop production which includes not only crops and pests, but also the physical, biological, and socio-economic environments in which the pests occur. The goal of an IPM program is to coordinate crop protection activities with all crop practices to achieve economical and long-lasting solutions. In IPM, the emphasis is on anticipating and preventing pest problems whenever possible, and applying needed corrective measures systematically on the basis of sound economic rationale.

Each farming situation requires a somewhat different set of production and pest management inputs to achieve the greatest yields and profitability, and the requirements may change from year to year. IPM should reduce the risks faced by farmers. Climate, soil type, cropping and pest history, cultural practices, variety, and the nature of the surrounding environment all affect pest problems on a given site and, consequently, the requirements of the IPM strategy.

Development of a specific IPM program must be based on an understanding of kinds of pests affecting the crop, the relationship of plant development and the crops susceptibility to the pest, anticipated crop yield and potential, natural forces (e.g. weather, natural enemies) operating against the pests, socio-economic characteristics of the farming system, availability of control inputs, both chemical and non-chemical, and the impact of the control methods on human health and environment. Once these factors are reasonably well understood, an IPM program can be developed, validated, tested on farmers fields, and finally implemented on larger areas.

IPM Training Workshop Objectives

The objectives were to: (1) provide senior Bangladesh crop protection scientists with a comprehensive understanding of the principles and concepts of IPM, (2) to identify crops in Bangladesh where IPM can be developed and implemented, and (3) based on existing knowledge, outline IPM projects for a few crops and develop one project that would integrate vertebrate, plant pathogen and insect pest management into one coordinated multi-disciplinary project. The latter was expected to be projected to pilot scale validation trials in farmers' fields.

Design of IPM Training Workshop

The first five days of the workshop included one day of opening ceremonies and the orientation of the participants to the course schedule, objectives, expectations, and making reading assignment in their source book. The next four days involved

lectures on the general principles and concepts of IPM applicable to all pest classes with periods for discussion by the participants. For the next two days the participants were divided into three disciplinary groups (vertebrate pests, plant pathogens and insects). The concurrent sessions of lectures and discussions dealt with the specifics of IPM technologies related to each class of pests. These same groups of participants spent the next two days exploring the application of IPM to Bangladeshi crops and designing preliminary outlines of IPM approaches. On the final day, participants from each of the sub-groups reported to a plenary session the results of their respective IPM project designs. They then selected one crop for which IPM components were available-vertebrate, plant pathogen and insect pests and integrated these components into one coordinated management project. They also outlined interdisciplinary-interagency procedures to implement pilot evaluations (validations) in farmers' fields. (See Appendix I for workshop schedule).

IPM Training Workshop Participants

There were 24 participants in the training workshop representing the disciplines of entomology, plant pathology, and vertebrate pest management. They were senior scientists from Bangladesh Agricultural Research Council (BARC), Bangladesh Agricultural Research Institute (BARI), Bangladesh Agricultural Institute (BAI), Bangladesh Rice Research Institute (BRRI), Bangladesh Jute Research Institute (BJRI), Department of Agricultural Extension (DAE), Bangladesh Agricultural University (BAU), Bangladesh Institute of Nuclear Agriculture (BINA), Sugarcane Research and Training Institute (SRTI), Bangladesh Tea and Research Institute (BTRI), Ministry of Food and Chittagong University (See Appendix II for list of participants).

Results of IPM Training Workshop

Suggested Model IPM Project

Two days of the IPM Training Workshop were dedicated to concurrent sessions to design IPM projects for plant pathogens, vertebrates, and arthropods. Finally, a plenary workshop was conducted to design IPM projects combining the three classes of pests. Reports were given and initial planning was made for IPM projects on wheat, jute, mango, and tea. The greatest effort and attention however, was given to an IPM project on sugarcane, and detailed reports were made to a plenary session on the three major classes of sugarcane pests in order to translate the considerable knowledge, expertise, and experience on sugarcane pests into an action IPM program. Thus, the following sugarcane IPM project is proposed:

First, several project areas should be chosen using all available information on the sugarcane crop production systems and areas. Two groups of our farmers will be needed. First, a

group of farmers using existing practices common to sugarcane culture in Bangladesh and secondly, for comparison, a group of farmers using a carefully designed IPM package. The following are items to be used in the IPM approach:

A. Preplanting

1. All standard and recommended agronomic practices will be applied as applicable to the area

(Note: Similar fertilizer practices should be used for both groups or at least taken into account, or this factor could confound calculations of pest control benefits)
2. Resistant varieties will be used. Resistance to red rot will receive first priority and resistance to other diseases and pests will also be used as possible.
3. Clean, certified seed from SRFI (Sugarcane Research & Training Institute) will be used. This seed will have initially been treated with hot water and grown in carefully isolated and rogued seed plots.
4. Setts will be treated with pesticides
 - a. Setts will be dipped in heptachlor for termite control
 - b. Setts will be drenched with fungicides in the planting trench

B. After Planting

1. Regular scouting (monitoring) will be conducted for problems caused by diseases, insects, and rats.
2. Perimeter baiting with rodenticides will be used for rat control
3. When necessary, mechanical control will be used after scouting (e.g. rat trapping, collection and destruction of insect egg masses, etc.)
4. Removal of weeds and stubble will be practiced.
5. Although economic threshold levels (ETL's) are not available for all pests, ETL's will be used as determinants for action when possible (as can already be done in the case of some sugarcane insects).
6. The workshop participants believe that such a pilot project, properly funded and staffed, will provide tangible economic benefits in the pilot area in the short run, and in the long run serve as a model for larger IPM

projects not only on sugarcane but on the other crops of importance to Bangladesh. Initiation of this project is considered an essential first step in introducing the IPM concepts into farming in Bangladesh.

Assessment of IPM Training Workshop

The three major objectives of the IPM training course were met. Participants expressed a general knowledge of IPM concepts by incorporating several pest management methods in an integrated scheme for Bangladesh sugarcane as well as several other crops. Each discipline, including the entomology, plant pathology, and vertebrate group, presented an IPM program that appeared both practical and economically beneficial while presenting no increased risk to the farmer. The pilot IPM project in sugarcane should provide a basis for further improvements as well as serve as a model for implementing other crop/pest IPM pilot projects. The importance of an interdisciplinary approach involving representatives from research, extension, teaching and management was highlighted, since all were represented at the training course and worked together in developing specific IPM programs.

Although some hesitancy was expressed by some participants about implementing the specific IPM proposals due to a lack of some knowledge, the concept that IPM must begin, even without all the answers, was eventually adopted. All agreed that the ultimate test of what was accomplished in this workshop will be determined when IPM technology is used successfully on the farm by farmers. Therefore, the final assessment of this workshop lies in the future.

Recommendations

1. An interdisciplinary, interagency crop protection committee should be formed at the administrative level to ensure that an IPM focus will continue. The Primary objectives of this committee should include: a) identification and recommendations of IPM programs; b) sponsorship of an annual crop protection conference that will focus on IPM; and c) to provide information to the government on research policy and planned development in crop protection. This annual conference should include representatives from each crop protection discipline and involved agencies.
2. The participants recognized that weed pests are not only an important constraint to crop production per se, but also contribute significantly to vertebrate, insect, and disease problems. Therefore, weed control should be included in all future IPM, research, extension, training, and planning activities.

3. It is recommended that there be increased interaction with and involvement of extension with other agencies in the development as well as in the field validation and implementation of IPM programs.

Participants should now use their knowledge to organize and present regional IPM workshops for training their respective peers. Such workshops will transmit IPM technology to local levels and in so doing, multiply the positive effect of this workshop. Agronomists, breeders and other crop production scientists might be included so that they have a better understanding of IPM concepts.

5. Planning should begin now to evaluate at some future appropriate time the adoption of IPM methods by farmers.
6. While IPM programs must remain under the control of crop protection specialists, the need for inputs by agronomists and plant breeders is recognized.
7. In as much as strong research programs are essential for the development of IPM projects, it is recommended that IPM oriented crop protection research be strengthened.

Appendix I

BANGLADESH IPM TRAINING COURSE SCHEDULE JANUARY 13-24, 1985

Sunday Jan. 13	09:00 am - 12:00 pm	Opening ceremonies and participant orientation at BARC.
Monday Jan. 14	09:00 am - 3:30 pm	Lectures and discussions on IPM general principles and concepts, at Citrus and Vegetable Seed Research Center, BARC.
Tuesday Jan. 15	continued	
Wednesday Jan. 16	continued	
Thursday Jan. 17	continued	
Friday Jan. 18	Free day	
Saturday Jan. 19	09:00 am - 3:30 pm	Concurrent lectures and discussions on specifics of IPM for plant pathogen, vertebrate and arthropod pests.
Sunday Jan. 20	continued	
Monday Jan. 21	09:00 am - 3:30 pm	Concurrent workshops to design IPM projects for plant pathogens, vertebrates and arthropods.
Tuesday Jan. 22	continued	
Wednesday Jan. 23	09:00 am - 3:30 pm	Plenary session to present and discuss projects designed Jan. 21 and 22. Also design IPM project for one crop combining three classes of pests
Thursday Jan. 24	09:00 am - 10:00 am	Closing ceremonies and certificate awards at BARC
Instructors:	General principles and concepts	Dr. Edward H. Glass
	Specific principles for vertebrates	Mr. Lynwood Fiedler
	Specific principles for plant pathogens	Dr. H. D. Thurston
	Specific principles for arthropods	Dr. E. H. Glass

Appendix II
IPM Training Workshop Participants
January 13-24, 1985

• B I O - D A T A

=====

Name : Hamiz Uddin Ahmed, PhD
Position : Chief Scientific Officer & Head,
Plant pathology Division, BARI.
Discipline : Plant Pathology
Specialization : Fungus diseases of field crops
: Management of sugarcane diseases
: Fungal physiology.

=====

Name : Mohammed Abdul Karim, PhD
Position : C.S.O. & Head, Entomology Division,
BARI, Joydebpur, Gazipur.
Discipline : Entomology
Specialization : Sugarcane insect pests management
: Potato tuber moth management
: Vertebrate Pests Management

=====

Name : Idris Ibnal Azim, PhD
Position : Professor of Entomology
Bangladesh Agril. Institute
Discipline : Entomology
Specialization : Teaching
: Economic Entomology
: Fruit (mango) & vegetable pests

=====

Name : Md. Dummuzaman, B.Ag: MS; Diplo(T.F.)
Position : Prof. of Plant Pathology and Head,
Dept. of Plant Pathology, BAI (BARI),
Teaching.
Discipline : Plant Pathology

Specialization : Rice Pathology - Race studies of
Eyricularia griseae, Cav.
Entomology - Insect Pathology (Minor)
Teaching Methodologies, Agril.
Extension, Rural Development etc.

Name : Kazi Moslehuddin Ahmed, PhD

Position : Principal Scientific Officer,
Division of Plant Pathology,
BARI, Joydebpur.

Discipline : Plant Pathology

Specialization : Plant virology/Mycoplasma/viroid
diseases/crop loss assessment/pest
management.

Name : Md. Iemal Hossain Mian, PhD

Position : Senior Scientific Officer, RARS,
BARI, Jessore.

Disciplines : Plant Pathology

Specialization : Plant Pathology
: Plant Nematology
: Diseases of wheat, maize, vegetable,
oil seeds, pulses, and sugarcane.

Name : Md. Yousuf Mian, M.S.

Position : Senior Scientific Officer
Vertebrate Pest Section,
Entomology Division, BARI.

Discipline : Vertebrate Pest Management

Specialization : Rodent ecology in deep-water rice
fields and in farmer's houses.
: Post harvest food losses in farmer's
storage condition caused by rodents.
: Damage assessment in wheat and deep-
water rice.
: Rodent control in farms and villages.
: Rodent behaviour.

Name : Md. Sayed Ahmed, M.Sc(Ag), M.S.
Position : Senior Scientific Officer,
Entomology Division, BARI, Joydebpur
Discipline : Entomology/Vertebrate Pests
Specialization : Bio-ecology and population dynamics
of major rice insect pests in Bangladesh.
: Rodent control and management in
Bangladesh

Name : Md. Abu Taher Mia, M.Sc. (Ag)
Position : Scientific Officer,
Plant Pathology Division
BRRI, Joydebpur.
Discipline : Plant Pathology
Specialization : Rice production
: Seed pathology
: Rice fungal diseases
: Ph.D. thesis has been submitted

Name : Md. Qudrut-E-Kabir
Position : Senior Scientific Officer
Plant Pathology Division
Agric. Wing, BJRI, Dhaka
Discipline : Plant Pathology
Specialization : Jute disease
: Virology
: Elimination of Jute diseases through
crop rotation.
: Isolation of fungal pathogens.

Name : Anwarul Azim, PhD
Position : Deputy Director
Department of Agric. Extension and
Head of Surveillance & Monitoring,
Vertebrate Pest Control and Diagnostic
Sections.
Discipline : Entomologist
Specialization : Taxonomist, Hymenopterous parasites.
(Encyrtidae, Aphelinidy
: Biological control
: IPM (Surveillance)

Name : Quazi Tafazzal Hossain
Position : Deputy Director (Operations),
Plant Protection Wing,
Dept. of Agric. Extension, Dhaka.

Disciplines : Entomology

Specialization : Pest surveillance and monitoring
: General pest control

=====

Name : Golam Ali Fakir, Ph.D.

Position : Prof., Dept. of Plant Pathology,
BAU, Mymensingh.

Discipline : Plant Pathology

Specialization : Seed Pathology
: Diseases of Pulses & Oilseed Crops
: Forest Pathology

=====

Name : Md. Mohsin Ali Sardar, Ph.D.

Position : Associate Professor
Dept. of Entomology,
BAU, Mymensingh.

Discipline : Entomology

Specialization : Insect Pest Management
: Mite Ecology

=====

Name : Muhammad Hussain, M.Sc. (Ag.)

Position : Senior Scientific Officer and
Head, Entomology Division,
BINA, Mymensingh.

Discipline : Entomology

Specialization : Insect taxonomy
: Radio-entomology
: Insect Ecology and Pest Management

=====

Name : Md. Jalaluddin, M.Sc. (Ag.) Plant
Path.; M.S. in Agronomy, USA.

Position : Senior Scientific Officer and
Officer-in-Charge,
Plant Pathology Division,
BINA, Mymensingh.

Discipline : Plant Pathology
 Specialization : Disease resistance.
 =====
 Name : Muhammad Abdul Hamid Miah
 M.Sc. (Ag.), Ph.D.
 Position : Principal Cane Entomologist
 SR&TI, Ishurdi, Pabna
 Discipline : Entomology
 Specialization : Radiation Entomology
 : Sugarcane Entomology
 =====
 Name : Md. Abdul Malek, Ph.D.
 Position : Principal Pathologist & Head,
 Division of Plant Pathology,
 SR&TI, Ishurdi, Pabna
 Discipline : Plant Pathology
 Specialization : Sugarcane Diseases.
 : Jute Diseases
 : Wheat Diseases
 =====
 Name : Md. Ikramul Haq, M.Sc (Dhaka)
 M.Sc (U.K.)
 Position : Scientific Officer (Entomology)
 Pest Management Division, BTRI
 Discipline : Entomology
 Specialization : Applied Entomology
 : Specialized in Tea insect-pest.
 =====
 Name : Mainul Haq, M.Sc. (Dhaka)
 M.Sc. (U.K.) in Technology of
 crop protection.
 Position : Asstt. Scientific Officer
 (Plant Pathology),
 Pest Management Division
 BTRI, Srimangal, Sylhet.
 Discipline : Plant Pathology
 Specialization : Isolation, Culture, Identification and
 morphology study of pathogens on Tea
 and ancillary crops

- : Survey of diseases on tea and ancillary crops.
- : Evaluation of fungicides for specific Tea diseases.

=====

Name : Md. Amin Uddin Mridha, Ph.D

Position : Asst. Professor of Botany
Chittagong University

Discipline : Plant Pathology

Specialization : Epidemiology of fungal diseases
: Seed borne diseases
: Fungicidal control
: Forest seedling diseases

=====

Name : Md. Habib Mansur, B.Sc.

Position : Deputy Director,
Management Information System,
Ministry of Food.

Discipline : Pest Control in Stored Grains.

=====

Name : Mafizal Haque Khan, M.Sc. (Ag.), Ph.D.

Position : Principal Scientific Officer for Member
Director, Crops, BARC, Dhaka.

Discipline : Entomology

Specialization : Citrus Applied Ecology.
: Research Management.

=====

Name : Md. Nurul Alam, B.Sc. (Ag.),
M.Sc.(Ag.), Ph.D.

Position : Principal Scientific Officer to
Member-Director (Planning), BARC.

Discipline : Entomology

Specialization : Research Management

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