

BANGLADESH

Agriculture is the backbone of Bangladesh economy, which contributes about one third to the country's gross domestic product (GDP). Approximately 84 percent of the country's total population is directly or indirectly dependent on agriculture for their livelihood. About 63 percent of the labour force is employed in agriculture sector of which about 57 percent is engaged in the crop sub-sector alone.

One of the main constraints to increasing agricultural production in Bangladesh is the insect pests, diseases, rodents and other vertebrate pests that cause serious yield loss. A conservative estimate puts the annual loss of rice yield due to the above pests at 10 -15%. In Bangladesh, chemical control has been the primary method of pest control in the past. Over dependence on synthetic pesticides, in the endeavour to control the pests and diseases, is not only expensive but also leads to negative environmental consequences in addition to increased health hazards to the growers and consumers of crop products. Although there has been an increase in the food grain production in recent year, the country has to further increase its good grain production on a sustainable basis to feed the population.

Thus, considering the facts that (a) Bangladesh needs to increase its food production on a sustainable basis, (b) pests and diseases continue to cause serious crop losses, (c) the use of pesticides is the main means of pest management, and d) continued reliance on chemicals for pest control would lead to serious environmental and human health problems, pest resurgence, new pest problems etc., there is a need for an alternative method rather than to rely solely on pesticides. The Integrated Pest Management (IPM) has now been considered as the most appropriate one in this respect.

1. Organization and Funding Arrangements

In Bangladesh, IPM activities first started in 1981 with the introduction of the first phase of FAO's inter-country programme (ICP) on IPM in rice crop. However, it was in 1987 that IPM activities began to expand and became a popular topic among people from all walks of life. From 1989 to 1995, the ICP played a strong catalytic role in promoting the IPM concept and approach among the government officials and donor community. This programme provided IPM training to build the training capacity of the Department of Agricultural Extension (DAE) and introduced Farmer Field Schools (FFS) for training of farmers. A number of persons from the non-government organizations (NGOs) were also given training on IPM. As a result of the success of this programme and on the basis of the need for IPM in Bangladesh, a number of IPM projects in rice and vegetables have started. At present there are eight-IPM projects/programmes operating in Bangladesh. These projects are being implemented either by the Government or NGOs with funds received from different donors.

The projects are now in operation listed below:

1. DAE-UNDP/FAO IPM Project (BGD/95/003)
2. DAE-DANIDA Strengthening Plant Protection Services (SPPS) Project
3. Command Area Development Project(CAD)
4. CARE-New Options for Pest Management (NOPEST)
5. CARE-Integrated Rice & Fish Project (INTERFISH)
6. AID-Comilla's Integrated Pest Management Project
7. USAID funded IPM Collaborative Research Support Programme (IPM CRSP)
8. FAO's Regional Cotton IPM Project

Of these projects / Programmes, the IPM CRSP is the only IPM research project in Bangladesh and its major research emphasis is on vegetables. The other IPM projects are extension oriented and their major emphasis is given to develop the IPM trainers through the Season-Long Training of Trainers (SLTOT) and these trainers impart training to farmers through Farmer Field Schools. They follow a set of curriculum for SLTOT and also for FFS. A brief description of these projects are given below:

DAE-UNDP/FAO IPM Project: The DAE-UNDP/FAO IPM Project (BGD/95/003) started functioning from May 1996 and funded by UNDP with technical assistance from FAO. The project is solely working on rice IPM. The Government of Bangladesh (GOB) has also contributed to the project. It is a nationally executed project of UNDP. The National Project Director (NPD) is the coordinator of the project. There were one expatriate IPM Advisor/Team Leader and 4 national experts (with different level of efforts) working in the project. All of them have left the project after the completion of their assignment except the IPM training expert. One admin./accounts assistant one secretary and two computer operators are also working. In addition there were 26 Master Trainers but they were available only during Season Long Training of Trainers (TOT). The project has two main objectives as follows:

- a) to develop the capacity of DAE and selected NGOs to undertake effective IPM training in an initial 122 selected upazilas of 41 districts, and
- b) to develop a National IPM Policy and a National IPM Program Framework supported by a medium-term action plan to promote and facilitate expansion of IPM activities nationwide.

The project will be ending in December this year. The project is considered as one of the most successful projects funded by UNDP in Bangladesh. Its both physical & technical progress are found to be very satisfactory. The project has made remarkable progress in building up the capacity of DAE in providing IPM training by producing a large number of DAE and farmer trainers. Besides, it has provided direct training to farmers, introduced community IPM concept in Bangladesh, which serves as a model to other projects in the country. Though the variety of activities the project has created a great awareness on IPM in the country. The project has also developed a draft IPM policy and a national IPM framework. Thus, the project has played a leading role in the building up a strong IPM base in Bangladesh.

Strengthening Plant Protection Services (SPPS) Project: Strengthening Plant Protection Services (SPPS) Project funded by DANIDA and GOB started functioning from July, 1997. The project administration is controlled by the Project Director (PD). This project has one Chief Technical Adviser (CTA), one expatriate training expert, one local training expert, 10 full time master trainers and about 109 other Departmental Officers & Staff are involved with this project. The project has five components:

1. Integrated Pest Management (IPM) in Rice and Vegetables,
2. Pest Surveillance, Forecasting and Early Warning System,
3. Pesticide Administration and Quality Control,
4. Pest Management Practices that are Compatible with IPM, and
5. Strengthening Plant Quarantine Services (Supported only by GoB Contribution)

In relation to IPM, the SPPS project has three main objectives:

1. to develop the capacity within Bangladesh to undertake effective IPM training in an initial 137 upazilas of 47 districts,
2. to support DAE-UNDP/FAO IPM Project to develop a National Policy and National Program Framework on Integrated Pest Management, and
3. to develop the capacity of DAE to deal with pest Problems in a manner compatible with IPM practices.

Command Area Development Project: Under the Command Area Development Project one upazila of Chandpur district and three upazilas of Pabna district was selected for IPM activities funded by ADB. This Project was functioning from October 1997 and ended on September 2000. A total of 115 DAE officials, 10 officials of Bangladesh Water Development Board (BWDB) and 5 staffs of NGO have been given season long ToT course. Through FFSs this Project has given direct training to 9000 farmers and IPM exposure to 90000 farmers by field day.

CARE Bangladesh: Through the joint effort of DAE and FAO-ICP, 156 officers of CARE received training on IPM. These trained personnel are engaged in establishing FFS in their working places.

Currently CARE Bangladesh is working on two projects on rice IPM and these are the Integrated Rice and Fish Project (INTERFISH) and the New Options of Pest Management (NOPEST). INTERFISH began in July 1993 and NOPEST in July 1995. INTERFISH is funded by the ODA and NOPEST by the EC. These projects are being implemented with several hundreds of FFS groups in Rangpur, Jessore, Naogaon, Bogra, Comilla, Sherpur, Kishoreganj, Mymensingh and Rajshahi districts. The overall goal of these projects initiative to increase the productivity of the rice field by improving the decision making ability of the farmers. A total of 240500 rice farmers have been targeted to participate in these projects.

AID Comilla: A local NGO has also started working on IPM from June 1999 in 9 upazilas of Noakhali, Feni, and Laxmipur districts. It is funded by DANIDA. The target of the project is to establish 288 FFS and train 8640 farmers on rice IPM.

Collaborative Research Support Project (CRSP): This is a research project funded by USAID through Virginia Poly Tech, USA, and working in collaboration with the Bangladesh Agricultural Research Institute (BARI) and the Bangladesh Agricultural Research Council (BARC). The project coordinator is attached with the Horticultural Centre (HRC) at BARI, Gazipur. The major emphasis of the project is on vegetable IPM.

FAO' Regional Cotton IPM Project: An IPM Programme has been under taken on Cotton from July 2000 executed by Cotton Development Board funded by European Commission and technical support will be rendered by FAO. The curriculum development workshop was held in June 2001. The first ToT programme has been started from July 2001 for seven months duration. Through this project 400 FFSs will be established and 20000 farmers will be trained.

2. Training Achievements

The achievement of training given in this report is mainly of three IPM Projects (DAE-UNDP/FAO IPM Project, DAE-DANIDA SPPS Project and CAD Project) implemented by DAE. A total of 1252 DAE field level staff have been trained through season long training and 119 NGO people also received season long training from these three projects. Project wise season long training target and achievement, are shown in table 1a, 1b and 1c.

Till date the DAE field level trained personnel have been able to establish 8043 farmers field schools in 263 upazilas of 64 districts from which 202762 farmers received direct training in IPM and 1802786 farmers were given exposure to IPM through field days.

The details of FFS and farmers training under the three projects are given in table 2a, 2b & 2c.

Table 1a. Season Long Training in Rice IPM by DAE UNDP/FAO IPM Project (BGD/95/003).

Category	Target	Achievement as of November 2001
SMO/AEO	120	134 ★
JAEO	40	36
PPI	120	105
BS	200	236
TOTAL	480	511
NGO	120	39

★ Includes 11 SMOs trained in vegetable IPM

Table 1b. Season Long Training in Rice IPM under SPPS Project

Category	Target	Achievement (To date)
AEO/AAO	120	127
PPI	120	126
BS	340	358
Other DAE staff	-	15
Total	580	626
NGO	120	75

Table 1c. Season Long Training in Rice IPM under CAD Project.

Category	Target	Achievement
SMO/AEO	8	6
AAEO	4	2
JAEO	4	3
PPI	4	4
BS	95	100
Total	115	115
NGO	5	5
BWDB	10	10

Table 2a. IPM Training to Farmers through Farmers Field School (FFS) by DAE-UNDP/FAOP IPM Project (BGD/95/003)

Particulars	Target upto June 2000	Achievement As Of November 2001
FFS	3200	3914
DIRECT TRAINING TO FARMERS	80000	97850
FARMERS EXPOSURE TO IPM	640000	673400

Table 2b. IPM Training to Farmers through Farmers Field School (FFS) Under SPPS Project

Particulars	Crop	Target	Achievement (To date)	Current Activities	Future Plan
FFS	Rice	3200	2443	622 (T.Aman /01)	350 Boro/ 02
DIRECT TRAINING TO FARMERS	Rice	80000	61075	15700	8750
FARMERS EXPOSURE TO IPM	Rice	800000	678454	157000	87500

Table 2c. IPM Training to Farmers through Farmers Field School (FFS) Under CAD Project

Particulars	Target	Achievement
FFS	300	300
DIRECT TRAINING TO FARMERS	9000	9000
FARMERS EXPOSURE TO IPM	90000	90000

In addition to IPM activities in rice, the FAO inter-country program and SPPS project are also working on vegetable IPM in Bangladesh. The vegetable IPM activities conducted in Bangladesh since the commencement of FAO Inter-country Program in South and Southeast Asia (Vegetable IPM-CP) fall under eight headings:

- ◆ Curriculum Development Workshop (2)
- ◆ Training of Trainers course (2)
- ◆ Farmers Field Schools (59 by DAE-UNDP/FAO and 758 by DAE-DANIDA)
- ◆ Field Studies (Two series in Jessore)
- ◆ Support for CARE, DANIDA and UNDP IPM program
- ◆ Special IPM Workshops
- ◆ Capacity Building within the DAE
- ◆ Study Tours

The FAO inter-country vegetable IPM program conducted two TOTs on vegetables and a total of 62 DAE staff and 2 NGO staff received Season Long Training on Vegetable IPM.

Till to date the SPPS project established 758 FFSs on vegetable and 19139 farmers received direct training on vegetable IPM through the FFS (Table 3 and 4). DAE-UNDP/FAO IPM Project also established 59 FFS on vegetable IPM in 11 upazilas.

Table 3. Season Long Training in Vegetable IPM under in-country IPM program

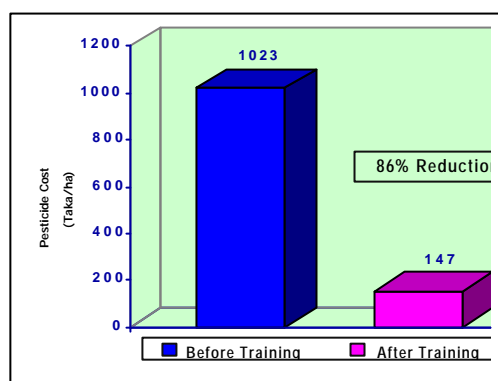
Category	Target	Achievement until May 99	Future Plan
DAE STAFF/SMO	62	62	
NGO	2	2	

Table 4. Season Long Training in Vegetable IPM Training to Farmers through Farmers Field School under SPPS Project

Particulars	Target	Achievement till to date	Current Activities
FFS	1000	758	272(Winter 2001)
DIRECT TRAINING TO FARMERS	25000	19139	6800
FARMERS EXPOSURE TO IPM THROUGH FIELD DAY	250000	203932	68000

Impact on IPM Training:

The impact of the IPM training to farmers for DAE-UNDP/FAO IPM Project was assessed by the Planning and Evaluation wing of DAE. The findings showed that the knowledge on rice pests, parasites and predators of these rice pests, rice ecosystem, effective pest management practices, adverse effects of pesticides on health and environment, and farmers ability to take crop management decisions have increased tremendously among the trained farmers. It also revealed that the IPM trained farmers have reduced their pesticide use by 86%, which reduces the cost of]



Impact of IPM Training on Pesticide usage and cost

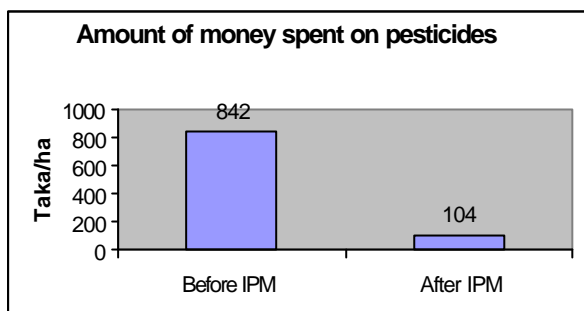
To measure the impact of IPM, DAE-DANIDA SPPS Project conducted review workshop after the end of every crop season and collected data on the application of pesticides, money spent on pesticides and yield. The data from 583 rice FFSs that were conducted by in last T.Aman/2000 were used for the analysis.

Data were collected from FFS farmers before the start of the training (benchmark survey) and at the end of the FFS season (follow-up survey). Like wise, at the end of the FFS season, data were collected from untrained farmers. As few of the FFS farmers cultivated local variety, only the data of HYV are presented.

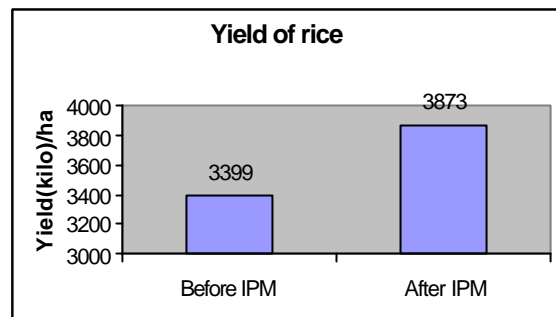
Comparison before and After IPM Training:

	Before (T.Aman/99)	After (T.Aman/00)	Difference	Percentage Difference
No. of spray	1.18	0.11	-1.0799	-90.7%
No. of granular applications	0.73	0.05	-0.68	-93.2%
Cost(taka/ha)	842	104	-738	-87.6%
Yield(kilo/ha)	3,399	3,873	+474	+13.9%

Results are more impressive when data of before IPM training and after IPM training are compared. Trained FFS farmers spent during the T.Aman 2000 season 738 Taka per hectare less on pesticides, compared to the previous season (T.Aman 1999), which is a reduction of 87.6%. At the same time, they produced a 474 kilo higher yield per hectare, which is a yield increase of 13.9%. This can be also shown in graph:



Reduction in the use of pesticides (87.6%)

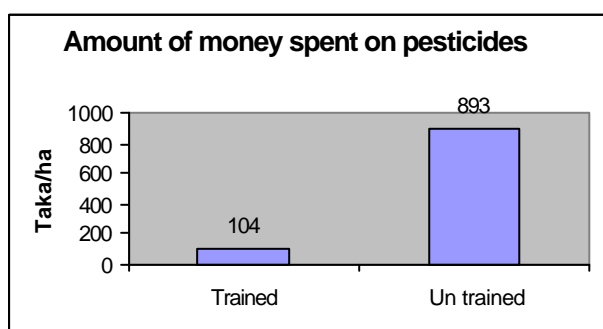


Yield increased(13.9%)

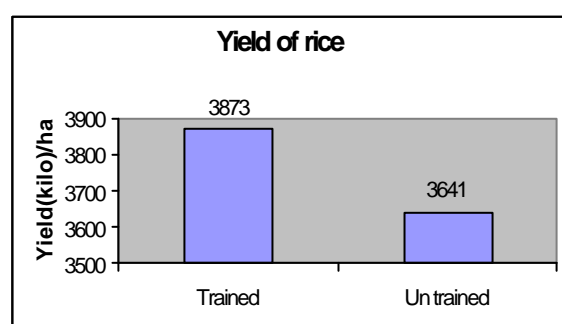
Comparison between IPM trained farmers and untrained farmers

	Trained T.Aman 2000	Untrained T.Aman 2000	Difference	Percentage Difference
No. of spray	0.11	1.08	-0.97	-98.8%
No. of granular applications	0.05	0.64	-0.59	-92.2%
Cost(taka/ha)	104	893	-789	-88.4%
Yield(kilo/ha)	3873	3,641	+232	+6.4%

Result shows that during the T.Aman 2000 season, trained farmers spent 789 Taka per hectare less on pesticides compared to their untrained neighboring farmers, which is a reduction of 88.4%. At the same time, they produced a 232 kilo higher yield per hectare, which is a yield increase of 6.4%. This can be shown in graph also.



Reduction in pesticide use (88.4%)



Yield increased(6.4%)

It also showed from the analysis that in all aspects IPM trained farmers were found to be more aware about the importance of rice ecosystem, pests and defenders (parasitoids and predators). These are some of the positive indications of IPM training to farmers.

Integrated Pest Management (IPM) has made a remarkable impact in the country. It has reduced the frequency of pesticide applications, thereby reducing the cost of pesticides and increasing yield.

3. Policy Developments

At present a number of IPM projects are underway in Bangladesh. Since many agencies and projects are actively involved in IPM and more IPM programs covering a range of agricultural crops are forthcoming, a National IPM Policy needs to be developed and strategies for the coordination of IPM activities have to be worked out.

In the meantime, IPM has created much awareness among the farmers, Policy makers, Politicians and the general public in the country. As a result, the Government of Bangladesh is giving due importance to IPM, which has been reflected in the Fifth-Five Year Plan and also in the National Agricultural Policy (NAP). The Government is actively considering to formulate a National IPM Policy. The goal of the Policy is *"to enable farmers to grow healthy crops in an increased manner and thereby increase their income on a sustainable basis while improving the environment and community health."* A draft IPM Policy has been prepared jointly by the DAE-UNDP/FAO IPM Project and DAE-DANIDA's SPPS Project. Several working groups were formed for the draft policy. A national workshop was also organized to discuss on the draft policy. The draft policy is now with the Ministry of Agriculture for the approval of the Government of Bangladesh.

4. Developments in Community IPM

Over the last decade, there has been a significant shift in the emphasis of IPM programmes throughout Asia, towards a more participatory, decentralized, community-based approach, termed as community IPM in which the farmers become the initiators, implementers and promoters of IPM and not just the recipients. In community IPM, farmers organize, manage and implement their own IPM activities, analyze problems, design field studies and carry out experiments and undertake efficient farming practices.

By producing a significant number of IPM trainers from DAE and by creating great awareness on IPM, the project has helped to lay a solid foundation for IPM in Bangladesh. It is now the right time to begin to concentrate on the matters related to expansion and sustainability of IPM. To this effect, both the DAE implemented projects have been giving emphasis upon community IPM. These project have already started several IPM training activities related to community IPM some of which are described below :

Farmer-Farmer Training: Farmer-Farmer training is considered to be a cost effective, decentralized, community based, farmer first approach that will promote sustainability and expansion of IPM. It will help strengthen the interaction between farmers, the DAE trained field staff and NGOs and set a stage for the continuation of IPM activities beyond the present phase of the project.

In order to train the farmers to become farmer-trainers (FTs), the projects, taking into consideration of the Bangladesh conditions, designed a training programme, conducted curriculum development workshops and FT-TOTs. The projects have already produced 829 farmer trainers. These trainers are currently running FT-FFS.

IPM in Schools: Student Field School (SFS) is viewed as a means to promote lateral spread of IPM knowledge from the school children to their families and ultimately to the community. The SFS participating students are learning the integrated crop management practices through practically doing in the field. They can easily identify Bandhu (friendly insects) and Shatru Poka (pests of crops) in the rice field. Also they know the biology of major insect pests, the damage symptom caused by pests, predation and parasitization and about the agro-ecosystem analysis (AESA). SFS has created a lot of interest among local farmers in the area, parent-farmers, school children, teachers and the public. Last year, one SFS even received a visit from the Honourable Minister for Agriculture. The projects so far conducted 20 SFS and the performance of these SFS was found to be highly satisfactory.

IPM Clubs/IPM Congress: In many places in the country, the IPM trained farmers have spontaneously started IPM clubs. Owing to the close interaction of the club members with the grass-root DAE staff, local leaders and farmer groups in the community, IPM clubs are proving to be a key factor for the promotion and sustainability of Community IPM in Bangladesh.

The range of activities varies among clubs but all are engaged in providing some sort of IPM training to the neighbours and this includes training through season-long FFS. Selected members of some clubs have already completed their Farmer-Trainer training provided by the project and they will continue to establish FFS using the club funds.

Many clubs have their own ways of generating funds which include pest management in rice fields (of club and non-club members) on a contract basis, production of seeds of improved varieties, fish cultivation in rice fields, etc.

In a number of localities, impressed by the IPM training at the FFS, the members of the parliament and other local elites (e.g. Chairman of Union Parishad) have come forward to donate money to build club houses, to buy TV and radio sets, running FFS, etc. In other places, the Upazila Nirbahi Officers (UNO) have willingly provided financial support from Annual Upazila Agricultural Development Programme (AUDP) fund for the club to start more FFS and train farmers. Women participation in IPM clubs is also widely observed as a very positive step in many ways.

These projects have taken a number of initiatives to promote the formation of IPM clubs in the project Upazilas. The DTs and FTs have been respectively requested to help the FFS alumni to start IPM clubs. In addition, the DAE-UNDP/FAO IPM project has been directly involved with selected four IPM clubs with a view to develop them as model clubs. In this regards, the project has organized regular planning and technical meetings with these four clubs, gave basic support for Participatory Action Research (PAR) activities, and provided training to selected club members to become FTs.

The DAE-UNDP/FAO IPM project assisted four IPM clubs (Sarkhola, Jessore; Uttarchalk, Pabna; Fatepur, Rangpur; and Ashrabpur, Mymensingh) to organise IPM congress at upazila level in T. Aman season 2000 where all FFS farmers, upazila and district level officers of DAE, Upazila Nirbahi Officer and even Deputy Commissioner attended. The Member of the Parliament of the respective upazila was the chief guest in the congress. This congress is first of its kind in Bangladesh.

Through DAE-DANIDA SPPS Project 173 IPM clubs have been established and more numbers of IPM clubs are going to be established during the Project period. From the SPPS Project, one Radio, IPM component poster, folders, leaflets and training materials were supplied to the all IPM clubs.

5. Other Developments

In addition to the on going IPM projects under DAE, Small holder Agricultural Project (SAIP) funded by IFAD and North West Crop Diversification Project funded by ADB are planning to operate IPM activities in their project areas in a small scale.

6. Future Plans and Priorities

At present, the Plant Protection Wing of DAE is directly involved in the implementation of IPM activities. No national IPM programme set up exists. In order to address the questions related to promotion, expansion, coordination and sustainability of IPM and to ensure the proper implementation of a national IPM programme, an organizational set up is needed. A proposal for such a set up is proposed in the IPM policy (Annex 1). The proposed institutional set up for the national IPM programme was thoroughly discussed by the working group and also in the national IPM workshop. The draft Policy is now with the Ministry of Agriculture for necessary action.

Action may be taken for GOB's approval of IPM policy to ensure that the system for the implementation of the national IPM programme together with the necessary institutional set up for its implementation is established and functioning as soon as possible.

The first phase of DAE-DANIDA SPPS Project is going to over by the end of June 2002. Considering the performance of project activities DANIDA has agreed to extend the component of IPM programme for next three years i.e. upto June 2005 in the second phase.

Annex. 1:

Institutional Set-up of the National IPM Programme

