National
Integrated Pest Management Policy

Ministry of Agriculture
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Crop Sector in 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.

Within the crop sub-sector foodgrains, particularly the rice crop dominates in respect of both area and production. At present, rice covers about 75 percent of the cultivated land in Bangladesh. Area coverage by other crops are: pulses 4.64 percent, wheat 3.92 percent, oilseeds 3.77 percent, jute 3.71 percent, sugarcane 1.23 percent, potato 1.11 percent, fruits 0.84 percent and vegetables 1.39 percent. Thus growth of rice crop has got substantial impact on the sectoral performance of agriculture. Although there has been an increase in the foodgrain production in recent years, reaching a level of about 25 million metric tons, the country has to further increase its foodgrain production on a sustainable basis to feed the ever increasing population.

One of the main constraints to increasing crop production is the pests. The word "pest" refers to organisms such as insects, pathogens, weeds, nematodes, mites, rodents and birds that cause damage or annoyance to man, his animals, crops or possessions. According to an estimate, annual yield loss due to insect pest alone is 16 percent for rice, 11 percent for wheat, 20 percent for sugarcane, 25 percent for vegetables, 15 percent for jute and 25 percent for pulse crops.

Current Pest Management Practices

In Bangladesh, chemical control has been the primary method of pest control in the past. Up to 1974, the Government promoted the use of pesticides by supplying them free of cost to farmers (100 percent subsidy). The subsidy was reduced to 50 percent in 1974. The Government withdrew subsidy completely in 1979 and the pesticide business was transferred to the private sector. However, to deal with emergency situations, the government should maintain a buffer stock of 15-20 metric tons of pesticides.

After the withdrawal of subsidy, although the use of pesticides declined during early years, their use has been on the increase again reaching 14,340 metric tons of formulated products or 2,462 metric tons of active ingredients in 1999 costing over one billion Taka in foreign exchange (US$ 18.5 million). Increased rice area, increase in cropping intensity and an increase in the area under high yielding varieties led to the increased consumption of pesticides.

At present 96 pesticides (including one botanical) with 304 trade names have been registered in Bangladesh. In the year 1999, 2,462 tons of active ingredients of pesticides were used in Bangladesh over an area of 13.63 million hectare, which is equal to 180 grams of active ingredients per hectare per year. All these pesticides are imported every year expending hard-earned foreign exchange. Although pesticide use in Bangladesh is relatively lower in comparison to neighbouring countries (e.g. India uses 320 grams of active ingredients per hectare per year), the use of pesticides has been increasing rapidly over the past two decades.

The Need for Integrated Pest Management

In the past, pesticides were considered as the 'panacea' for the control of agricultural pests. Although pesticides may provide temporary relief, it is now widely accepted that indiscriminate and excessive use of pesticides and the long-term dependency on them threaten the sustainability of agricultural production. Over dependence on chemical pesticides is not only expensive but also leads to negative environmental impacts, in addition to increased health hazards to both the growers and consumers of crops.

Considering the facts that:

- Bangladesh needs to increase its food production on a sustainable basis;
- pests continue to cause serious damages to crops; and
- the use of toxic pesticides is the main method of pest control and that such continued heavy reliance on chemicals would lead to serious environmental and human health problems, pest resurgence, new pest problems and development of resistance;

there is a need for an alternative method rather than to rely solely on pesticides. Integrated Pest Management (IPM) has now been considered as the most appropriate one in this respect.

The Government of Bangladesh (GOB) is giving due importance to IPM, which has been reflected in the Fifth Five-Year Plan (1997-2002). The Plan stated that:

> *"In the fifth plan period, the integrated pest management (IPM) programme will be intensified and expanded in order to safeguard crops from pests and combat environmental degradation due to pesticide uses. Collaboration among the local government representatives, extension workers and NGOs will be sought to expand IPM programme."*

In the meantime, IPM has created much awareness among the farmers, policy makers, politicians and the general public of the country. As a result, the need for formulating a policy on IPM was considered at the first national conference on IPM held on 11 February 1999 at the Central Extension Resources Development Institute (CERDI), Gazipur**.**

The National Agriculture Policy (NAP) under section 7.1 stipulated that IPM will be the main policy for controlling pests and diseases. The NAP has given importance to the following activities for pest control:

- *Farmers will be motivated to use more pest resistant varieties of crops. Modern cultivation practices will be followed so that the incidence of pest infestation is reduced.*
- *Use of mechanical control measures such as light trap, hand net, etc. will be increased and popularized. Biological control measures will be used to destroy harmful insects and preserve the useful ones.*
- *Regular training and discussion programmes on IPM will be conducted among the farmers under the supervision of Union Agricultural Development Committee with a view to successful introduction and popularization of the method at the farmers' level.*
- *Pest surveillance and monitoring system will be strengthened.*

At present, IPM has a broad approach to crop production based on a sound ecological understanding. Even it goes beyond the production as it also includes the storage of crops at all levels. IPM enables farmers to grow a healthy crop and to increase their farm output and income on a sustainable basis while improving the environment and community health at the same time.

IPM advocates, among others:

- growing a healthy crop through proper management of soil, water, fertilizers, pests, etc.;
- conservation of biological control agents by avoiding or reducing the use of toxic pesticides;
- augmentation of biological control agents;
- use of pest tolerant crop varieties;
- use of cultivation practices that can minimize pest populations;
- mechanical control of pests;
- monitoring of field by the farmer on a regular basis;
- build-up farmers as experts in their own fields in taking crop management decisions;
- income generating activities such as growing of 'ail' crops, fish and prawn culture in the rice field, etc.;
- use of pesticides that are not harmful to the environment as a last resort.

Integrated Pest Management in Bangladesh

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 come into existence which are being executed by different government departments and NGOs.

Through the activities of such projects, a large number of core IPM trainers have been produced in Bangladesh. By the end of 2001, a total of 1,137 persons from DAE and about 300 from different NGOs have been trained as IPM trainers. Also, DAE/UNDP/FAO Project and DAE/DANIDA SPPS Project have so far produced 829 farmer trainers (FTs). In addition to these activities on human resources development, the IPM projects have been active in establishing IPM field schools for the male and female farmers and school children; development and promotion of IPM farmer clubs and in the testing and usage of biopesticides, bio-control agents, etc. Thus, with the strong support of the Government, an effective IPM base has already been established in Bangladesh.

Almost one hundred thousand farmers have already received season-long practical indepth training on IPM. But this represents only 0.27 percent of the estimated 37 million farmers of the country. As in other Asian countries with similar IPM programmes, the IPM-trained Bangladeshi farmers were also able to reduce their pesticide use by as much as 80 percent along with an increased yield of about 10 percent. However, to ensure a significant and positive impact of IPM at the national level, still a large number of farmers have to be trained in IPM and furthermore, they should practice IPM in their fields on a continual basis. For that matter, necessary mechanisms will be established to ensure the expansion and co-ordination for a sustainable IPM programme in Bangladesh.

The National IPM Policy

There are many definitions of Integrated Pest Management. The FAO definition of IPM is as follows:

> *"A pest management system that, in the context of the associated environment and the population dynamics of the pest species, utilizes all suitable techniques and methods in as compatible a manner as possible and maintains the pest populations at levels below those causing economic injury"*

In the context of Bangladesh the term IPM includes elements contributing to an effective, safe, sustainable and economically sound crop protection system. It is not limited to pest management system alone.

Clearly, IPM conserves the natural resources such as the soil, flora and fauna and ensures reliability and stability of agricultural production. Ecological and economic sustainability of agricultural production is the long-term goal of IPM. In fact effective IPM–

- increases self-reliance of farmers by promoting locally developed and adapted crop management practices;
- reduces the risks to farmers, general public and the environment; these include the risks of crop loss and all risks related to the use of pesticides;
- brings enormous savings by reducing the use of farm chemicals;
- reduces use of pesticides at the national level;
- improves the field conditions for beneficial insects and generate extra income as well as nutritious food for the farmers; and
- promotes community activities and the formation of farmer groups (e.g. IPM clubs) and facilitates empowerment of both female and male farmers.

Objective of the IPM Policy

The objective of the IPM 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.*

To achieve the above mentioned objective, IPM Policy will pursue the following strategies:

- to expand IPM on a sustainable basis by establishing a national IPM programme; and
- to facilitate co-ordination of all IPM activities in Bangladesh.

Components of the IPM Policy

The following are the key components of the IPM policy:

- Maintaining ecological balance
- Executing appropriate actions on pesticides
- Operating an effective system for implementing the national IPM programme
- Developing human resources as the core of IPM
- Conducting research on IPM

- **Maintaining Ecological Balance**

Sustainability of farm outputs requires a holistic approach to agricultural production founded on a sound ecological basis. Under high input intensive agricultural regime, farmers tend to use more agro-chemicals including the pesticides. The misuse of such agro-chemicals could easily lead to ecological disturbance threatening the sustainability of agricultural production. GOB fully realises the importance of ecological agriculture and understands that IPM revolves around eco-friendly agricultural production system. The government, therefore, considers IPM as an ideal method for conserving natural resources (preserving bio-diversity and natural enemies of crop pests, appropriate genetic diversity for crop production, conservation of natural aquatic populations, etc.) along the pathway of sustainable agricultural development. Although this method currently largely focuses on rice agro-ecosystems, the IPM policy would be applicable to all crops from large plantations to household gardens. To achieve these:

- efforts will be made to conserve and augment populations of bio-control agents in crop fields through the adoption of the principles and practices of IPM; and
- priorities will be given to the management of pests through the use of parasitoids, predators, insect pathogens, appropriate cultivation techniques, pest tolerant varieties, mechanical control measures, crop diversification, botanical products and bio-pesticides.

- **Executing Appropriate Actions on Pesticides**

In the past, general perception had been that the pesticides alone would provide effective control of crop pests. However, besides being unfriendly to the environment, pesticides could also cause serious health hazards to human beings. Furthermore, long-term dependency on pesticides is inevitably a serious threat to the sustainability of agricultural production. Therefore, a number of specific actions regarding the use of pesticides will include the following:

- GOB has banned all World Health Organization (WHO) Class 1a (extremely hazardous) pesticide compounds, based on formulations, for agriculture purposes and will eliminate compounds in Class 1b (highly hazardous). New proposals for registration of any pesticide fall under the above categories will be declined.
- For the registration of any pesticide in future, experimental toxicity data on beneficial insects, fish and other aquatic animals under Bangladesh conditions must be taken into consideration.
- GOB will not provide free pesticides to the farmers for ground applications, except under exceptional circumstances as determined by the National Council of IPM.
- Aerial application of pesticides for the control of crop pests shall not be undertaken, except if the National Council of IPM deems it necessary under very exceptional circumstances.
- GOB will avoid receiving any aerial formulation of pesticides as overseas development assistance.
- GOB will provide support and incentives to the private sector organizations for producing bio-control agents (parasitoids, predators and insect pathogens such as fungi, bacteria and viruses) and botanical pesticides locally.
- GOB will review pesticide rules and regulations and amend the same as and where necessary.
- GOB will monitor any misleading advertisement toward using pesticides and will initiate appropriate legal actions against such malpractice.

- **Operating an Effective System for Implementing the National IPM Programme**

Many agencies are actively involved in IPM activities in Bangladesh and more IPM projects covering a range of crops are forthcoming. For the promotion, expansion and sustainability of IPM, it is imperative that a national IPM programme together with an organizational set-up for its implementation is developed. In accordance with the National Agriculture Policy (NAP) and the New Agricultural Extension Policy (NAEP), the organizational set-up and the IPM implementation system will have a decentralized, community-based approach that puts farmers at the front, as indicated below:

- The existing multi-sectoral IPM steering committee will be renamed as the National Council of IPM (NCI). This Council will be chaired by the Honourable Minister for Agriculture. The NCI will serve as the apex body for overall coordination of the national IPM programme, especially for integrating environmental and agro-ecological considerations among the major sectors of the national economy (e.g. agriculture, fisheries, health, environment, etc.) by formulating common strategies for linkage, promotion, expansion, coordination and sustainability of IPM activities in Bangladesh.
- The DAE will be the lead agency for implementing national IPM programme. IPM will be the cardinal principle of plant protection. The organizational set-up for implementing national IPM programme will be constituted within DAE with the IPM coordinating committees and coordinators at different levels (e.g. National, Regional, District and Upazila). In addition, there will be an IPM Technical Committee (ITC) to provide support to the National IPM Coordinator (NIC) and the National Council of IPM (NCI). At the grass-root level there will be IPM teams consisting of IPM-trained DAE staff and farmer-trainers.
- The job description of the field level staff involved in IPM will be changed to reflect their full-time work on IPM. These grass-root level IPM staff will, in addition to conduct training of farmers in IPM, undertake community IPM-related activities (e.g. farmer-to-farmer training, formation and registration of IPM clubs and associations, formation of village IPM teams, mobilizing of farm women, participatory action research involving farmers, participatory monitoring and evaluation, IPM in schools, farmer-created media for horizontal communication and FFS follow-up) to ensure the promotion, expansion and sustainability of IPM.
- GOB will ensure reallocation of national resources and also look for external resources to support IPM activities. Specifically, GOB will make an annual budget allocation for IPM activities and place the fund with the National IPM Programme. In addition, GOB will ensure that a certain portion of the Annual Upazila Development Programme (AUDP) fund allocated for agricultural activities in each Upazila would be reserved for IPM activities.
- The National IPM Programme shall strengthen the implementation of bio-control and plant quarantine activities as well as pest surveillance and monitoring.
- Programmes for promoting non-chemical pest control methods (e.g. “food for collecting hispa”, “food for rat tails collection”, etc.) will be strengthened further.
- A regular system for monitoring and evaluation of and follow-up to IPM activities and its impacts at the farmers’ level will be established.

- **Human Resources Development as the Core of IPM**

  - The government will give high priorities to the development of human resources in IPM. Briefings, orientation and field training on IPM for the farmers will comprise the major elements of implementation of IPM programmes.
  - The Human Resources Development (HRD) initiatives would include:
    - farmers, agricultural labourers, school children and teachers (in all cases both men and women);
    - field staff from block level to the district and regional level of the Ministries of Agriculture, Health, Environment and Forestry, Fisheries and Livestock, etc.
    - field staff of NGOs working in rural areas;
    - concerned government staff, policy makers and parliamentary representatives;
    - students, faculty members and scientists of agricultural universities and colleges, agricultural training institutes, and National Agricultural Research System (NARS); and
    - the general public.
  - Efforts shall be made to provide season-long IPM training through Farmer Field Schools (FFS) to as many farmers as possible. The target is to train-up at least one from each farming family.
  - Specific curricula will be included in IPM training courses for women extension worker, woman farmers and other women household members in support of homestead production and post-harvest activities as well as their role in field crop production.
  - IPM training centers at National and Regional levels will be established. At the same time, facilities for supporting field training in Districts and Upazilas will be provided.
  - Strategy for different training programmes will be based on community participation and principles of field-based experimental learning in the light of Non-Formal Adult Education.
  - The modern practical IPM will be incorporated in the curricula of schools, colleges and universities.

- **Research on IPM**

- Agricultural Research Institutes (ARIs) will give priority for the development of IPM compatible methodologies. Multi-disciplinary research will be promoted for the development of:
  - pest tolerant varieties;
  - cultural practices that minimize pests and optimize the environment for natural crop defenders;
  - bio-control agents including parasitoids and predators and entomopathogenic bacteria (e.g. *Bacillus thuringiensis*), fungi, viruses, nematodes, etc.;
  - natural products (e.g. from neem and other botanicals) for pest control;
  - improved methods of preservation of grains after identifying and studying traditional preservation methods, etc.
- Cooperation among crop scientists (including breeders, agronomists, soil scientists, entomologists and plant pathologists), extension workers and IPM farmers will be strengthened.
- Farmer-based crop protection system will be promoted through integration of research and field study activities.

Strategies for Implementing IPM Activities and Institutional Set-up of the National IPM Programme

- **Strategies for Implementing IPM Activities**

  - A National IPM Programme together with necessary institutional set-up for its implementation will be established.

  - The ongoing IPM projects of DAE will continue their activities and expand until a critical mass of at least 20 percent of the farmers in each block would receive adequate training so that they can practice IPM.

  - Availability of adequate government and donor funds for the continuation of IPM activities by the DAE projects and for the implementation of the National IPM Programme is to be ensured.

  - For the expansion and sustainability of IPM, community IPM activities (such as farmer-to-farmer training, establishment of IPM Clubs, etc.) are to be promoted.

  - Collaboration among DAE, NGOs and all other agencies and institutions involved in IPM will be strengthened.

  - "International Code of Conduct on the Distribution and Use of Pesticides" would be observed in relation to IPM activities.

  - Coordination of activities among different Ministries (Agriculture, Fisheries and Livestock, Health, Environment and Forestry, Education, Local Government, etc.) and NGOs will be ensured.

  - The Convention on Persistent Organic Pollutants (POP) in reducing or eliminating the production and use of certain pesticides would be observed and implemented.

  - IPM related publicity will be promoted through the mass media and awareness on dangers of pesticides, pesticide residues in food, health and environmental hazards of pesticides will be created.

  - A mechanism to monitor pesticide residues in food and the environment will be established.

  - A system for certification of pesticide-free agricultural products will be introduced.

  - Pest diagnostic centers at each Upazila are to be established.

  - IPM Congress will be organized for the IPM trained farmers on yearly basis.

- **Institutional Set-up of the National IPM Programme**

A national IPM programme will be developed in order to coordinate all IPM activities in the country. The set-up of this programme will be in conformity with the NAP and NAEP. It will suit the decentralized, community-based IPM approach that puts farmers at the front and will cause minimal changes to the existing organizational set-up of the DAE. The national IPM programme will have the following institutional set-up:

- **Upazila level**

Farmers, Farmer Field Schools, Farmer groups, Farmer associations, and IPM clubs are the ground level operators of IPM.

The Upazila IPM Coordination Committee (UICC): The UICC will be responsible for planning and coordination of all IPM activities at the Upazila level. The UICC will also be responsible for maintaining close liaison with the local government at the Upazila level. The UICC will act as a subcommittee to the Upazila Agricultural Extension Coordination Committee (UAECC). A full-time season long IPM trained Agricultural Extension Officer (AEO) will assist the UICC in all technical matters related to implementation and coordination of IPM activities. Elected public representatives and farmer representatives will be included in the committee.

- **District level**

District IPM Coordination Committee (DICC): The DICC will be responsible for planning and coordination of IPM activities at the District level. The Deputy Director of Agricultural Extension of respective district will be the chairperson of DICC. The DICC will be assisted by a full-time Plant Protection Specialist (PPS) with short training in IPM. A full-time season-long IPM trained AEO will assist the PPS.

- **Regional level**

Regional IPM Coordinator (RIC): The Additional Director of Agricultural Extension of the respective region will be the RIC. The RIC will be responsible for the management, monitoring and coordination of all IPM activities in the region. The RIC will be assisted by a Deputy Director and a full-time season-long IPM-trained AEO.

- **National level**

Deputy National IPM Coordinator (DNIC): Director of the Plant Protection Wing of DAE will be the DNIC. The DNIC will be solely responsible for the day-to-day implementation and management affairs of all IPM activities throughout the country. The DNIC will also assist the National IPM Coordinator (NIC) in this connection. An Additional Director (IPM) and a Deputy Director (IPM) will assist the DNIC on full-time basis.

National IPM Coordinator (NIC): The Director General, DAE will be the NIC who will have the overall responsibility for implementing the national IPM programme and coordinating all IPM activities throughout the country. The NIC will also be responsible for the establishment of sectoral linkages and promotion, expansion and sustainability of IPM in

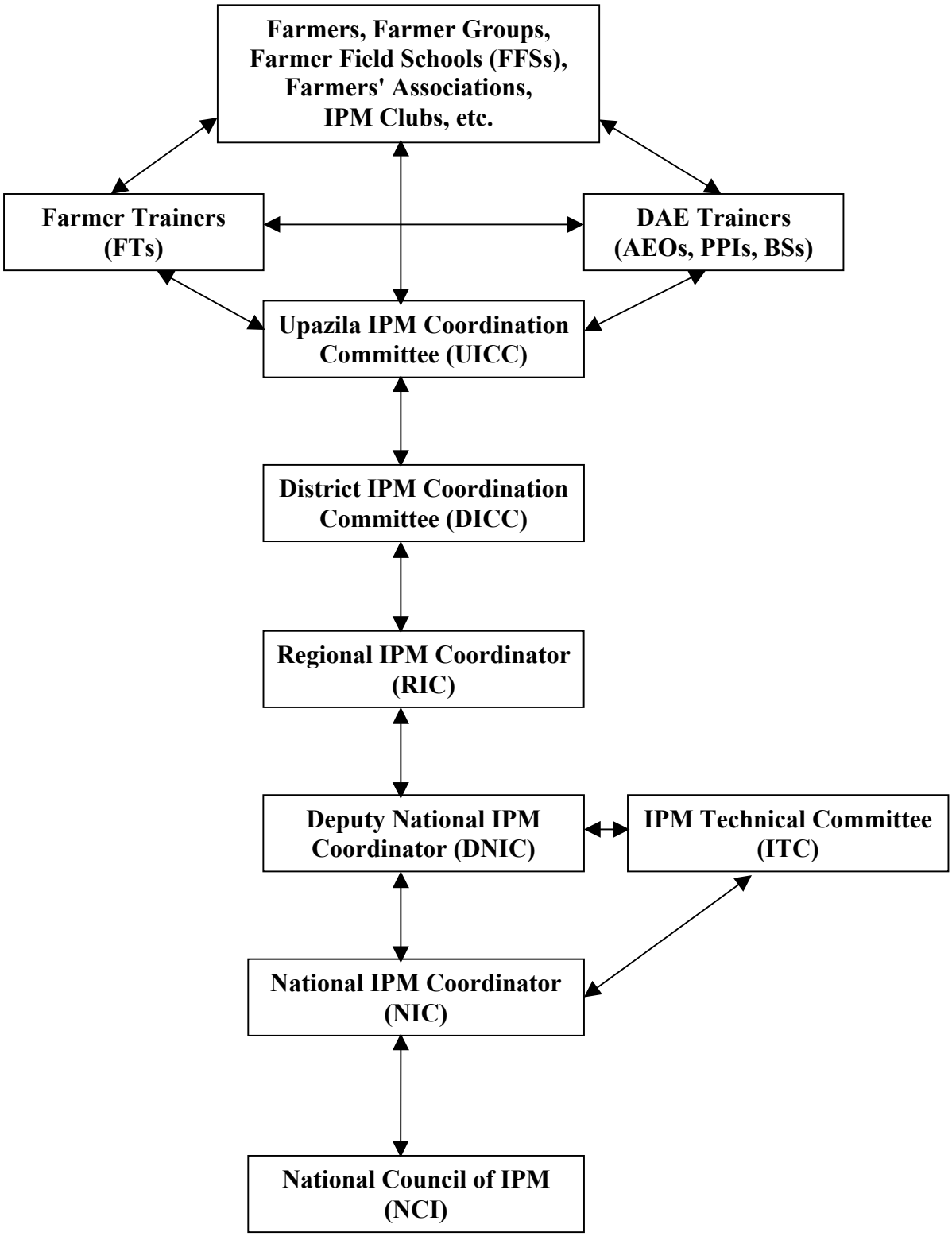
Bangladesh. The NIC will provide all necessary assistance to the National Council of IPM (NCI) as member-secretary of the later.

IPM Technical Committee (ITC): The ITC will provide support to the Deputy National IPM Coordinator and the National IPM Coordinator in all technical matters. The members of ITC will be the Director Plant Protection (Chairperson), national experts and technical advisors of different ongoing IPM projects, representatives of different sectors (agriculture, health, education, environment, fisheries and livestock, etc.), representatives of NGOs, agricultural universities, agricultural research institutes and representatives from the private sector involved in pesticide business.

National Council of IPM (NCI): The Honourable Minister for Agriculture will be the chairperson of the NCI. The existing multi-sectoral IPM steering committee will be renamed as the NCI. Its members will include representatives (not below the rank of Joint Secretary) from different Ministries (e.g. Environment and Forestry, Fisheries and Livestock, Health, Local Government, Planning, Finance, Education, Information, etc.), the Executive Chairman of BARC and the Director Generals of DAE, BARI, BRRI, BJRI, BSRI, FRI, BLRI, BFRI and BINA. The chief technical advisors and senior technical advisors of ongoing IPM projects, representatives of NGOs, private sector and professional organisations involved in IPM will also be the members of NCI. The National IPM Coordinator will be the member-secretary of the NCI.

The NCI will serve as the apex body for overall coordination of the national IPM programme. The Council would act especially for integrating different IPM issues into the agriculture, fisheries, health and environment sectors of the national economy and will deal with common strategies, linkage, promotion, expansion and sustainability of IPM activities in Bangladesh.

Fig. 1: Institutional Set-up of the National IPM Programme



Conclusion

IPM has a broad-based approach founded on a sound ecological understanding towards producing and preserving different crops. Now-a-days, IPM has been considered globally as one of the best methods in this regard. It is hoped that the country's crop production and preservation system will be much developed through the implementation of National IPM Policy, which has been formulated with a view to get the full benefit of this unique method. At the same time, working relationship and cooperation among the extension workers, farmers and NGO staff will be developed through their involvement in the process of IPM training, resulting in efficiency and acceptability of IPM activities throughout the country. The use of harmful pesticides will be much reduced if the farmers practice IPM in their fields, which in turn, will enhance the production level and improve the environment and the public health. Proper implementation of this policy would increase the farm output that will raise the income level of vast majority of the country's farmers. Thus a positive impact on the overall economy will help reduce the country's poverty situation which would be expected through implementing this policy. However, the National IPM Policy will be reviewed in respect of time and be revised and up-dated in line with the changing agricultural production system of the country.