

**Report from**  
**Regional Public Hearing Workshop on GMO**  
**Dhaka, Bangladesh, 12 February 2006**



Prepared by           Orbicon, Denmark and  
                              IUCN-Bangladesh

Prepared for         Royal Danish Embassy  
                              Dhaka and  
                              IPSU, Ministry of Environment  
                              and Forestry, Bangladesh

# **Report from Regional Public Hearing Workshop on GMO**

**Dhaka, Bangladesh  
12 February 2006**

## **Prepared for**

Royal Danish Embassy  
Dhaka, Bangladesh

Contact person: Michael Andersen  
Address:  
Road 51, House 1  
Gulshan, Dhaka

Tel: ++ 88802 882 56 61

## **Consultant**

Orbicon  
Ringstedvej 20  
DK-4000 Roskilde  
Denmark  
Tel + 45 46 30 03 10  
Fax + 45 46 30 03 11  
WWW.orbicon.dk  
Journal 362.05.933  
Project leader Heidi Skov Andersen  
Project consultant Frede Danborg  
Quality assurance Morten Kvistgaard

Issued 10. May 2006

# Workshop Report

## LIST OF CONTENT

<b>1. SUMMARY AND RECOMMENDATIONS</b>	<b>5</b>
1.1. The GMO workshop	5
1.2. Summary of presentations and opinions at the workshop	6
1.3. Recommendations to Bangladeshi authorities and donor agencies supporting Bangladesh agricultural sector	8
<b>2. INTRODUCTION TO GMO IN BANGLADESH</b>	<b>10</b>
<b>3. OPENING SESSION</b>	<b>13</b>
3.1. Opening Address by the Workshop Chairman Dr. Ainun Nishat	13
3.2. Speech of the Chief Guest Kazi Abul Kashem, Honourable Secretary, Ministry of Agriculture	14
3.3. Welcome and introduction By Michael Andersen, Counsellor	16
3.4. Introduction to the Cartagena Protocol on Biosafety By Professor Banpot Napompeth of Kesetsart University	18
3.5. Policy and legal regime of biotechnology in Bangladesh By Dr. Abdur Razzaque, BARC and Md. Qamar Munir, IPSU	19
3.6. Questions and discussion after the opening session	20
<b>4. REGIONAL EXPERIENCE ON IMPLEMENTATION OF THE CARTAGENA PROTOCL AND THE USE OF GMO IN ASIA AND CURRENT ACTIVITIES IN BANGLADESH</b>	<b>21</b>
4.1. Implementation of the Cartagena Protocol and the use of GMOs in Thailand By Prof. Banpot Napompeth of Kesetsart University	22
4.2. India's experience with the implementation of Cartegena Protocol and the use of GMOs By Dr. Veena Chhotray, TERI, India	23
4.3. Presentation on UNEP-GEF Bio-safety project in Bangladesh By Dr. Nilufer Hye Karim, National Project Coordinator, MoEF and Mr. Mahmood Hasan Khan, National Project Director, MoEF	24
4.4. Highlights of the USAID Supported Biotech and GMO Activities in Bangladesh By Shahidur Rahman Bhuiyan, USAID	25
4.5. Questions and discussion after the second session	26
<b>5. KNOWLEDGE ABOUT GMO AND POTENTIAL IMPLICATIONS</b>	<b>27</b>
5.1. Biotechnology and genetic modification for crop improvement for Bangladesh By Dr. Zeba I Siraj, Dhaka University	27
5.2. Issues and concerns on GMOs often raised in the public debate in Bangladesh and elsewhere By Dr. Ferdousi Begum, DEBTEC	28
5.3. Questions and discussion after the third session	29
<b>6. EXAMPLES OF IMPLEMENTATION PROCEDURES AND THE USE OF GMOs IN DENMARK</b>	<b>30</b>
6.1. The Danish Cartagena implementation procedures and the use of GMOs in Denmark By Bettina Helle Jensen, the Danish Forest and Nature Agency	30
6.2. Genetically modified crops in developing countries – challenges for the development aid By Bjørn Bedsted, Danish Board of Technology	31
Regional Public hearing workshop on GMO, Dhaka, Bangladesh Orbicon, Denmark	2



6.3. Questions and discussion after session 4	32
<b>7. CLOSING SESSION</b>	<b>33</b>
7.1. Closing questions and discussion	33
7.2. Summing up on the presentations and discussions By Workshop Chairman Dr. Ainun Nishat	33
7.3. Vote of Thanks by Dr. Ainun Nishat	34
<b>8. FOLLOW-UP WORKSHOP</b>	<b>35</b>
8.1. Participants at follow-up workshop	35
8.2. Concept of Follow-up workshop	35
8.3. Results from group work	36
8.4. Recommendations to Bangladeshi authorities and donor agencies	39

### **Annexes 1-3**

#### **Paper presentations**

Annex 1	Background paper, Orbicon	42
Annex 2	The Danish Cartagena implementation procedures and the use of GMOs in Denmark, The Danish Forest and Nature Agency	58
Annex 3	Genetically modified crops in developing countries – challenges for the development aid, Danish Board of Technology	65

### **Annexes 4 -13**

#### **Power point presentations**

Annex 4	Welcome and introduction by Michael Andersen, Counsellor, DANIDA
Annex 5	Policy and legal regime regarding biotechnology in Bangladesh by Dr. Md. Abdur Razzaque and Qamar Munir
Annex 6	Implementation procedures of Cartagena and the use of GMOs in Asia: A case study on Thailand by Prof. Banpot Napompeth of Kesetsart University
Annex 7	Implementation procedures of Cartagena and the use of GMOs in Asia: A case study on India by Dr. Veena Chhotray
Annex 8	Presentation on UNEP-GEF Bio-safety project by Dr. Nilufer Hye Karim, NPC, UNEP-GEF Biosafety Framework Project
Annex 9	Presentation on USAID of the ongoing activities in biotechnology and GMOs in Bangladesh supported by USAID by Shahidur Rahman Bhuiyan, Project Management Specialist
Annex 10	Issues and opportunity regarding GMO in Bangladesh, Dr. Zeba I Siraj, Dhaka University
Annex 11	Issues and concerns on GMOs often raised in the public debate in Bangladesh and elsewhere, Dr. Ferdousi Begum.
Annex 12	The Danish Cartagena implementation procedures and the use of GMOs in Denmark by the Bettina Helle Jensen, The Danish Forest and Nature Agency
Annex 13	Introduction to the Danish Board of Technology and their role in the Danish debate concerning the use of GMOs by Bjørn Bedsted
Annex 14	Workshop Programme
Annex 15	List of participants

## **Foreword**

The present Workshop Report compiles and summaries the papers, the discussions and the recommendations from the Regional Public Hearing Workshop held in Dhaka, Bangladesh 12 February 2006 and from the smaller Follow-Up Workshop 13 February 2006. The Workshop Report has been compiled by Orbicon and IUCN-Bangladesh.

The papers are put in the report in the sequence, which would be natural for the reader, and not always in the order they were presented at the workshop.

## 1. SUMMARY AND RECOMMENDATIONS

### 1.1. The GMO workshop

The purpose of The Regional Public Hearing Workshop on GMO held in Dhaka 12 February 2006 was to provide a forum for information sharing and dialogue on the GMO issues. The use of biotechnology and genetically modified organisms (GMOs) has been a growing issue in Bangladesh during several years. However, this is the first time in Bangladesh where a greater forum of stakeholders and GMO critical groups as well as GMO positive groups meets together for sharing information and viewpoints based on knowledge and science.

Different donors (UNDP, FAO, USAID) are giving assistance to institutional and policy support on the use of biotechnology and GMOs in Bangladesh, but are not supporting awareness raising and a public debate on the introduction and use of GMOs in agriculture.

Bangladesh made a Biosafety Guideline in 1999 which is under review, signed the Cartagena Protocol in May 2000 and ratified it February 2004. But there is still a need for creating consciousness and understanding about the use of GMOs and the potentials and constraints of using biotechnology in the agricultural sector.

The purpose of the workshop was therefore mainly to have a public debate and generate more awareness of the use of biotechnology and genetically modified organisms (GMOs) in the agricultural sector, the security procedures of introducing GMOs and the implementation of the Cartagena Protocol on Biosafety in the legislation.

The Danish Embassy in corporation with IUCN-Bangladesh, Institution and Policy Support Unit (IPSU) of the Ministry of Environment and Forest (MoEF) and Orbicon did prepare the workshop, which was funded by the Royal Danish Embassy in Dhaka. Earlier the MoEF had agreed to hold this workshop.

The workshop participants included 105 persons from many areas of the Bangladeshi community; research institutions, central level authorities, commercial companies, national NGOs and donor-funded projects. No farmers or farmers' representatives participated in the workshop.

The papers presented during the workshop included presentations of the Biodiversity Convention and the Cartagena Protocol and Danish, Indian and Thai experiences on these issues as well as the legislative status and research and development on GMOs in Bangladesh. The presentations of papers alternated with discussion sessions. The debate was eager and sometimes emotional during the exchange of viewpoints displaying the necessity of the workshop.



The 13 February 2006, a Follow-up Workshop was held for a smaller group of people for summarising the main workshop and to provide recommendations to Bangladeshi authorities and donor agencies on how to support Bangladesh government and farmers to make an informed decision regarding use of GMOs.

## **1.2. Summary of presentations and opinions at the workshop**

The following summary indicates what most, many or some of the participants presented and argued for during the workshop. However, an agreed workshop statement was not produced and was not the purpose of the workshop.

The overall feeling of the workshop was that there are significant potentials of the technological options offered by GMOs that may be maximized, but at the same time one should take into account all the causes of concern. Furthermore, all research projects should comply with due diligence to the provisions of the biosafety rules and the recommendations of the Cartagena Protocol.

In countries where the legal framework is not in place, current activities are limited to laboratory and confined field level trials. Actual field trials would be allowed only after the legislation is in place.

The representatives from India, Thailand and Denmark informed that they are signatories to both CBD and Cartagena Protocol and have applied the provisions of the Cartagena Protocol by developing appropriate regulatory frameworks.

The international experts reported about a precautionary approach, which many workshop participants found also should be the natural direction for the Bangladeshi case. Some countries that are further ahead than Bangladesh regarding the Cartagena Protocol have so far not been ready to release GM food and feed and Bangladesh should take note of this precautionary approach.

The workshop was presented for evidence that each of the GMO varieties must be evaluated on a 'case by case' basis. Also, location specific situations must be evaluated in assessing the effectiveness of GM crops.

The workshop noted that in Bangladesh appropriate institutional framework has been recommended in the biosafety guidelines. However, it is important that the established committees start working immediately and that their Terms of Reference are effectively followed.

Several participants expressed concerns that the overall control of GMOs should be managed by national institutions and not driven by trans-national corporations.

Another discussion did concern on what would be the goal of GMO crops? The baseline for the GMO discussion was stated to be the ever-growing population in Asia and the limited or even decreasing agricultural land, which raise long term needs for a large increase in productivity. However, so far GMOs have not been targeting higher yields as such, but resistance to pests or pesticides, which indirectly may increase yield.

Researchers and some development projects have already made own prioritisation on the GMO research including late blight resistant potatoes, drought and salinity tolerant rice, pod borer resistant chickpeas and fruit and shoot borer resistant eggplants.

The meeting concluded that weed control should not be the goal of GMO research in Bangladesh (e.g. round-up resistant plants) as used in e.g. USA as labour for weeding is easily available in Bangladesh.

Whereas most participants agreed to the opportunity of avoiding the current heavy use of pesticides in growing eggplant (treatments each second day) through using resistance GMO eggplants, there was no general agreement to the prioritising of research on GMOs for salinity resistance. For example it was proposed to deal with problems of salinity through direct reducing the salinity rather than developing salinity resistance GMOs.

Some participants stated that national priorities are not reflected adequately in the on going research topics and proposed to include research on jute (instead of cotton) or mango in research priorities.

It was also argued by some participants that prioritisation and selection of research agenda should be on the basis of the needs of the country, which must be established through detailed consultation with farmers.

Researchers expressed wishes to continue and strengthen the GMO research pointing out that GMO research takes 10 – 20 years to reach commercial results.

Several participants pointed out that gene modification was just one technique among many, and that the farmers have many urgent issues to take care of and that high quality seed is only one of them.

GMO have come into Bangladesh in different ways and GMO research is on-going. Some participants advocated that a status report should be prepared on what type of research is on-going and whether the research is being conducted following the safety measures.



It was proposed that support should be provided for capacity building in the country for carrying out research on biotechnology as well as for capacity building in maintaining the safety requirements. Capacity to assess impacts must also be built and towards this educational institutions may offer diploma level programmes.

GMO food products were said to be already available on the Bangladeshi consumer market and to ensure a free choice the need for labelling was repeated by several participants. It was also argued that proper labelling and disclosure of information, avoidance of gimmicks and misinformation must be ensured through proper screening methods.

Till now most seed for sowing has been traded on a farmer-to-farmer basis, and the concern was raised on how to protect small farmers from uneven dependencies on large seed companies as well as the concern for unsettled intellectual properties rights.

Finally the meeting called for promotion of similar debates and neutral platforms for discourses. There was a need for more consultations putting all the views into perspective and to facilitate further debate so that informed decisions can be taken. In this process all stakeholders should be involved, especially the farmers.

### **1.3. Recommendations to Bangladeshi authorities and donor agencies supporting Bangladesh agricultural sector**

During an extended period donor support has provided comprehensible assistance to the Bangladeshi agricultural sector. It is recommended that the future assistance also will include technical support regarding the GMO issues now emerging in Bangladesh.

Donor agencies will be able to support the Bangladesh government and Bangladeshi farmers in several ways regarding GMO issues. The recommendations in this regard all have the aim of developing Bangladeshi capacities so that they will be able to make own choices following own priorities regarding GMO. Thus, the activities recommended below are not aiming at supporting the introduction of GMO into Bangladesh agriculture and consumers' market, and just as well it is not aiming at "keeping Bangladesh free of GMO and GMO products". GMOs are part of the globalised world and a reality, which all countries, including Bangladesh, have to be able to handle.

Four types of support activities are identified and prioritised. (I) Awareness raising activities, (II) Capacity building at selected institutions and levels, (III) Technical assistance to implementing the Cartagena Protocol and (IV) Information dissemination among Bangladeshi farmers.

### **(I) Awareness raising activities**

These activities have the aim of raising awareness among stakeholders and decision-makers on GMO legislation (Biodiversity Convention and Cartagena Protocol) to focus attention, motivate decision-making and progress and support the formulation of stakeholders' interests.

Two main types of activities are proposed:

(a) Scenario workshop among stakeholders, e.g.: lawmakers, central authorities, researchers (including economists and social science), NGOs, farmers (-representatives), seed supply companies and retailers. The scenario workshop is a structured discussion on future scenarios prepared before the workshop based on different developments regarding GMO utilisation.

(b) Citizens-jury. This activity would include mainly farmers and extension personnel and possibly a few central level decision-makers. Farmers are seen as the key stakeholders in utilising GMOs. Participants of the citizens-jury activity will discuss future scenarios with the aim of supporting the farmers expressing their opinions and interests and provide input to preparation of GMO legislation.

### **(II) Capacity building at selected institutions and levels**

There is a need among the government authorities, public administration and institutions of expertise (e.g. research institutions) for understanding and handling GMO issues.

It is proposed to provide support through study tours to e.g. Denmark for visiting Danish focal point and Biosafety Clearing House.

It is proposed to provide support through fellowships regarding GMO. In this respect it would not necessarily cover GMO research, but just as well GMO legislation, biodiversity conservation, Cartagena Protocol administration and international trade and law.

Support could also be provided to assist Bangladesh making a road map towards final implementation of the Cartagena Protocol. This would review - and build on - the various activities already completed or on-going in Bangladesh regarding GMOs.

It is proposed to support the establishment of a multi-stakeholder platform as an "open-forum" that can be a national forum for debate and expertise on GMOs research, utilisation and legislation. International experts should be part of the "open-forum".

### **(III) Technical assistance to implementing the Cartagena Protocol**

Bangladesh is already a signatory to the Cartagena Protocol, but the legislation and institutions are not in place to implement and administrate the Cartagena Protocol. The technical assistance would include support to strengthening the focal point and the Biosafety Clearing House; develop



application and approval procedures for GMOs, development of criteria for decision-making as well as the role of the approving authorities. Such technical assistance will include legislation development, institutional building and in-service training.

#### **(IV) Information dissemination among Bangladeshi farmers**

This is a further stage of support after Cartagena Protocol actual has been implemented and when GMOs might be an option for the farmers. The support will be provided through the regular extension service informing farmers about the characteristics of GMOs and on possible benefits and possible risks. This activity will need to start with training of the Extension Technicians (training of trainers) before the farmers can be reached through e.g. farmers' meetings, leaflets and training.

The four types of support (I – IV) can partly be implemented parallel, but still with (I) as the first and (IV) as the last.

## **2. INTRODUCTION TO GMO IN BANGLADESH**

Scientific breakthroughs and innovations have made it possible to transcend traditional boundaries and actively manipulate the genetic set up of organisms of different species, i.e. development of GMOs. Biotechnology, while offering countless possibilities for human welfare, may also possess risks to human health and nature, much of which is yet to be discovered. Biosafety measures or the procedures for ensuring environmentally safe application of biotechnology have thus become a primordial for countries inclined towards GMOs.

Biosafety issues have been extensively addressed in the Convention of Biological Diversity (CBD). Article 8 (g) of the convention encourages the contracting parties to "...establish or maintain means to regulate, manage or control the risks associated with the use and release of living modified organisms resulting from biotechnology which are likely to have adverse environmental impacts that could affect the conservation and sustainable use of biological diversity, taking also into account the risks to human health". The text proposes to operationalise this article together with Article 19 and 17 of the Convention through the development of a Protocol, i.e. the Cartagena Protocol.

Bangladesh signed and ratified the Cartagena Protocol on Biosafety on May 24, 2000 and February 4, 2004. The main objective of this Protocol is to ensure an adequate level of protection in the field of the safe transfer, handling and use of living modified organisms resulting from modern biotechnology. Each signatory is thus obligated to take necessary and appropriate legal and regulatory measures to implement its obligations. As a party to this Protocol, Bangladesh has to follow the clauses before



introducing GMOs in the country. Article 19 of the protocol deals with the regulatory framework and institutional provisions for using GMOs. Besides, Article 16 quotes: each Party shall take appropriate measures to prevent unintentional transboundary movements of living modified organisms, including such measures as requiring a risk assessment to be carried out prior to the first release of a living modified organism. The implication for Bangladesh is that there is a need for a Biosafety Clearing House (BCH) and to develop and follow strict procedures and standards for risk assessment.

For developing countries, the pressure to accept GM crops and open their market to biotech companies is becoming increasingly intense. In Bangladesh, biotechnology research is still at a primary stage and so far, no transgenic plant, fish or animal is reported to have been cultivated. Research institutions, NGOs and universities are conducting research on specific cereal crops, plant species, fisheries and livestock with aid from the donors, which are not available to farmers yet. The Government of Bangladesh has taken some measures to promote biotechnology in the country and also to regulate its application. In April 1999, the government approved the National Agricultural Policy (NAP), including some specific objectives, which stressed the need of introduction, utilization and extension of biotechnology. The other acts and guidelines related to biosafety and biotechnology include Quarantine Acts, Plant Variety and Farmers' Rights Protection Act, Biodiversity and Community Knowledge Protection Act, Seed Policy, Seed Act and Biosafety Guidelines of Bangladesh. The Ministry of Environment and Forests has recently revised the Biosafety Guidelines in line with the Cartagena Protocol.

Currently, a number of developments have taken place in terms of the formation of a National Task Force, A National Executive Committee and 5 National Technical Committees. They are namely:

- National Task Force of Biotechnology, headed by the Prime Minister
- National Executive Committee on Biotechnology, headed by the Principal Secretary to the Prime Minister
- National Technical Committee on Biodiversity, with the Ministry of Environment and Forests as the focal ministry
- National Technical Committee on Crop Biotechnology, with the Ministry of Agriculture as the focal ministry
- National Technical Committee on Animal and Fish Biotechnology, with the Ministry of Fisheries and Livestock as the focal ministry
- National Technical Committee on Biosafety, with the Ministry of Science, Information and Communication Technology as the focal ministry
- National Technical Committee on Medical Biotechnology, with the Ministry of Health and Family Welfare as the focal ministry.

The National Biosafety Framework (NBF) project is also being formulated, under the aegis of the Department of Environment, the national executing

authority. A National Coordination Committee composed of 30 members and chaired by the Secretary, MoEF, oversees the implementation of the project and meets every quarter to make realistic suggestions. The major objective of the NBF project is to develop the National Biosafety Framework document that will describe the methods of safe use, transfer, assessment and management of genetically engineered products. It will also define enabling mechanisms for safe introduction of products developed through the application of biotechnology. The South Asia Biosafety Program (SABP), working in Bangladesh since February 2005 is maintaining close contact with the NBF project activities.

Apart from the Government, the Collaborative Biotechnology (CABIO) initiative of USAID is also operating in Bangladesh to address the global issues of food security. It provides a comprehensive strategy for technology transfer, development, management and decision-making through a variety of programmes, namely Agricultural Biotechnology Support Project (ABSP). On the basis of socio-economic needs and potential marketability, four crops have been selected for research work through ABSP in Bangladesh: late blight resistant potatoes, drought and salinity tolerant rice, pod borer resistant chickpeas and fruit and shoot borer resistant eggplants. They are under laboratory trial but not yet ready for marketing. Bangladesh Agriculture Research Institute (BARI) greenhouse was renovated and on-the-job training was provided to 26 Bangladeshi scientists to conduct greenhouse based and field based trial of transgenic crop varieties. As a result of the above, private-public partnerships were developed and visits by international experts, training, seminars and workshops sensitized policy makers and science administrators.

South Asia Biosafety Program (SABP II) is yet another USAID funded project, which compliments ABSP in the development of a public infrastructure to manage the use of biotechnology and biosafety. As a part of this project, Bangladeshi scientists and policy makers have participated in meetings, workshops and conferences and a monthly newsletter is published from this project for disseminating crop biotech updates. Finally, the virus resistant transgenic papaya development programme is another area, which is being explored by the CIMMYT programme of USAID. The application for field testing is currently deposited to the Ministry of Agriculture and five transgenic varieties are being tested at Cornell University for their resistance to Bangladeshi viral strains.

Bangladesh is a signatory to the Cartagena Protocol since May 2000. A range of committees on biosafety has been established and the Ministry of Environment and Forestry has been designated as the national authority and focal point for implementing the Cartagena Protocol on Biosafety. However, Bangladesh is still at an early stage regarding actual implementation of the GMO legislation and regarding procedures and criteria for applications and approvals of GMOs.



This is related to the fact that knowledge and awareness on GMOs and the importance of biosafety legislation is only in place among a limited number of persons. However, at the same time GMO is an emerging issue as international supported research, seed supply companies and general GM products are active in Bangladesh.

On this background regarding biotechnology and biosafety, the "Regional Public Hearing Workshop on GMOs" was planned to take place in Dhaka, Bangladesh in order to support information sharing and stimulate dialogues amongst the stakeholders.

### 3. OPENING SESSION

#### 3.1. Opening Address by the Workshop Chairman Dr. Ainun Nishat

Dr. Ainun Nishat, Country Representative of IUCN Bangladesh welcomed all the participants to the workshop, saying that the country is rather late in organizing public hearings on GMOs. He informed the audience about the seven national committees, headed by the different ministries and established by the government to oversee biotechnological activities and biosafety issues in the country. Dr. Nishat added that in Bangladesh there is a lack of coordination at the inter-ministerial as well as at the policy and implementation levels.

Mentioning that the population of Bangladesh increased from 40 million to 140 million over the last 50 years, Dr. Nishat recalled the frequenting natural hazards like floods, cyclones and droughts, pollution, impacts of climate change etc. which are compounding the problems of limited land resources in the country. He said that technologies for increasing yield should be adopted, keeping in mind their appropriateness and through a precautionary approach. He also added that biotechnology research should be country driven, for which capacity development was necessary. He put emphasis on consumer's choice and disclosure through proper labelling of product contents before marketing any products.

Regarding GMO research, Dr. Nishat stressed on the formulation of biosafety rules and guidelines, especially to sensitize the civil societies lobbying both for and against GMOs. He mentioned the role of IUCN, who work for sustainable development and balanced development – where both the nature and environment and human beings are in harmony.

Dr. Nishat quoted Article 8(g) of the Convention on Biological Diversity, which encouraged the development of Cartagena Protocol on Biosafety, mainly dealing with transboundary issues. He mentioned that in Bangladesh import of GM rice seeds was initiated by two of the largest national NGOs, namely Grameen and BRAC. Grameen has already withdrawn from



authority. A National Coordination Committee composed of 30 members and chaired by the Secretary, MoEF, oversees the implementation of the project and meets every quarter to make realistic suggestions. The major objective of the NBF project is to develop the National Biosafety Framework document that will describe the methods of safe use, transfer, assessment and management of genetically engineered products. It will also define enabling mechanisms for safe introduction of products developed through the application of biotechnology. The South Asia Biosafety Program (SABP), working in Bangladesh since February 2005 is maintaining close contact with the NBF project activities.

Apart from the Government, the Collaborative Biotechnology (CABIO) initiative of USAID is also operating in Bangladesh to address the global issues of food security. It provides a comprehensive strategy for technology transfer, development, management and decision-making through a variety of programmes, namely Agricultural Biotechnology Support Project (ABSP). On the basis of socio-economic needs and potential marketability, four crops have been selected for research work through ABSP in Bangladesh: late blight resistant potatoes, drought and salinity tolerant rice, pod borer resistant chickpeas and fruit and shoot borer resistant eggplants. They are under laboratory trial but not yet ready for marketing. Bangladesh Agriculture Research Institute (BARI) greenhouse was renovated and on-the-job training was provided to 26 Bangladeshi scientists to conduct greenhouse based and field based trial of transgenic crop varieties. As a result of the above, private-public partnerships were developed and visits by international experts, training, seminars and workshops sensitized policy makers and science administrators.

South Asia Biosafety Program (SABP II) is yet another USAID funded project, which compliments ABSP in the development of a public infrastructure to manage the use of biotechnology and biosafety. As a part of this project, Bangladeshi scientists and policy makers have participated in meetings, workshops and conferences and a monthly newsletter is published from this project for disseminating crop biotech updates. Finally, the virus resistant transgenic papaya development programme is another area, which is being explored by the CIMMYT programme of USAID. The application for field testing is currently deposited to the Ministry of Agriculture and five transgenic varieties are being tested at Cornell University for their resistance to Bangladeshi viral strains.

Bangladesh is a signatory to the Cartagena Protocol since May 2000. A range of committees on biosafety has been established and the Ministry of Environment and Forestry has been designated as the national authority and focal point for implementing the Cartagena Protocol on Biosafety. However, Bangladesh is still at an early stage regarding actual implementation of the GMO legislation and regarding procedures and criteria for applications and approvals of GMOs.

This is related to the fact that knowledge and awareness on GMOs and the importance of biosafety legislation is only in place among a limited number of persons. However, at the same time GMO is an emerging issue as international supported research, seed supply companies and general GM products are active in Bangladesh.

On this background regarding biotechnology and biosafety, the "Regional Public Hearing Workshop on GMOs" was planned to take place in Dhaka, Bangladesh in order to support information sharing and stimulate dialogues amongst the stakeholders.

### 3. OPENING SESSION

#### 3.1. Opening Address by the Workshop Chairman Dr. Ainun Nishat

Dr. Ainun Nishat, Country Representative of IUCN Bangladesh welcomed all the participants to the workshop, saying that the country is rather late in organizing public hearings on GMOs. He informed the audience about the seven national committees, headed by the different ministries and established by the government to oversee biotechnological activities and biosafety issues in the country. Dr. Nishat added that in Bangladesh there is a lack of coordination at the inter-ministerial as well as at the policy and implementation levels.

Mentioning that the population of Bangladesh increased from 40 million to 140 million over the last 50 years, Dr. Nishat recalled the frequenting natural hazards like floods, cyclones and droughts, pollution, impacts of climate change etc, which are compounding the problems of limited land resources in the country. He said that technologies for increasing yield should be adopted, keeping in mind their appropriateness and through a precautionary approach. He also added that biotechnology research should be country driven, for which capacity development was necessary. He put emphasis on consumer's choice and disclosure through proper labelling of product contents before marketing any products.

Regarding GMO research, Dr. Nishat stressed on the formulation of biosafety rules and guidelines, especially to sensitize the civil societies lobbying both for and against GMOs. He mentioned the role of IUCN, who work for sustainable development and balanced development – where both the nature and environment and human beings are in harmony.

Dr. Nishat quoted Article 8(g) of the Convention on Biological Diversity, which encouraged the development of Cartagena Protocol on Biosafety, mainly dealing with transboundary issues. He mentioned that in Bangladesh import of GM rice seeds was initiated by two of the largest national NGOs, namely Grameen and BRAC. Grameen has already withdrawn from



marketing of any GMO products. BRAC has taken a policy decision not to involve in GMO seed distribution till all concerns are met.

Finally, Dr. Nishat requested the various stakeholders who were invited to the GMO workshop to engage in fruitful debates regarding the use of GMOs in the country. He concluded by saying that the public hearing was neither to support nor to oppose GMOs, rather to extract the right approach for the application of best technological practice for the benefit of the people and the country.

### **3.2. Speech of the Chief Guest**

**Kazi Abul Kashem. Honourable Secretary, Ministry of Agriculture**

Honourable guests, respected national and international presenters and participants, colleagues from IUCN, IPSU – MoEF and DANIDA, ladies and gentlemen...

Assalamu Alaikum...

It is an honour to be able to be present at this workshop attended by regional and international experts. I hope you will have good debate and discussion on the issue of Cartagena and GMOs and come up with recommendation on what is the best way of approaching the new technology while keeping in mind the precautionary measures recommended in the Cartagena Protocol.

Bangladesh signed the Cartagena Protocol on Biosafety on May 24, 2000 and consequently ratified it on February 4, 2004, with the objectives of ensuring safe transfer and handling of modified organisms and minimizing the risks associated with them. In Bangladesh, biotechnological research is still at a limited stage. Because of the apparent promises of high production and other qualities, GM crops are becoming increasingly popular amongst the scientific community and policy makers of the country. But it should also be kept in mind that, as a signatory of this Protocol, Bangladesh has to follow the clause before introducing GMOs in the country. Article 19 of the protocol deals with the regulatory framework and institutional provision for using GMOs. Besides Article 16 quotes: each Party shall take appropriate measures to prevent unintentional transboundary movements of living modified organisms, including such measures as requiring a risk assessment to be carried out prior to the first release of a living modified organism.

There is a tremendous pressure on developing country like Bangladesh to introduce Genetically Modified Organism (GMO) because of the perceived benefits. On the other hand, many researchers and policy makers of developed countries such as European Union have expressed reservation about GMOs for their possible adverse affects on human health and nature. They are also recommending disclosure of the origin or labelling especially



for GM foods. Debate now surrounds on safety measures in experimentation with modern biotechnology as well as protection of consumer's right thorough disclosure of origin.

There is considerable amount of interest as well as concern among the policy makers and civil society regarding biotechnology and use of bio-engineered products. At present GM food and crop are still in the very early stages of experimentation and effects are not fully known and tested yet. There is a need for develop a clear understanding about the various issues that have been debated globally on GMOs as well as interpretation of the provisions of Cartagena Protocol on Biosafety. Against this backdrop I welcome this initiative of IUCN Bangladesh, IPSU and DANIDA that they have organized this workshop to bring together major stakeholders such as policy makers, scientists, researchers, anti GMO activists and donors.

Globally, it is predicted that by the year 2050, over 90% of the population will be concentrated in the developing world and now is the opportune moment to fight for our rights and choices for the development of our country, its economy and its environment. The agricultural sector needs to respond in non-traditional ways more than ever before, to avoid biopiracy and protect the environmental goods, which are in fact a common property of not only the present but also future generations. We do not have a comprehensive inventory of our genetic wealth and run the risk of patenting of the genes of our plant and animals. One of the major pitfalls of modern biotechnology is that it is financed mainly by the private sector, which sets out a range of problems in terms of intellectual property rights, transfer of knowledge and the lack welfare objectives. Thus, there should be more research opportunity from the public sector.

Very recently, Bangladesh has initiated the development of a National Biosafety Framework funded by UNEP. I am hopeful that if implemented for the greater common good of poor farmers, this framework can be a sustainable way forward for our country. The National Agriculture Policy, 1999, National Biosafety Guidelines, 1999 and National Biotechnology Policy, 2004 of the Government of Bangladesh share the common objectives of ensuring sustainable development, biosafety and bioethics for the judicious use of this modern tool and socioeconomic development of our country. The recent initiatives taken by the Government include the formation of 7 national committees, namely:

- National Task Force of Biotechnology, headed by the Prime Minister
- National Executive Committee on Biotechnology, headed by the Principal Secretary to the Prime Minister
- National Technical Committee on Biodiversity, with the Ministry of Environment and Forests as the focal ministry
- National Technical Committee on Crop Biotechnology, with the Ministry of Agriculture as the focal ministry
- National Technical Committee on Animal and Fish Biotechnology, with the Ministry of Fisheries and Livestock as the focal ministry

- National Technical Committee on Biosafety, with the Ministry of Science, Information and Communication Technology as the focal ministry
- National Technical Committee on Medical Biotechnology, with the Ministry of Health and Family Welfare as the focal ministry

In conclusion I would like to say that there is still a need to develop a clear understanding of the various issues and debates centering GMOs and the interpretation of the Cartagena Protocol on Biosafety. I am grateful to the organisers of today's workshop for creating a neutral platform for sharing knowledge and experience amongst the various stakeholders involved in the use of GMOs. I wish you all much success and especially thank the international participants who have travelled long distances to make this workshop a success.

*Allah Hafez*

*Bangladesh Zindabad*

### **3.3. Welcome and introduction**

**By Michael Andersen, Counsellor**

Honourable Secretary and honourable guests,

Welcome to the workshop on GMOs in agriculture and poverty reduction. It is a pleasure to see so many interested stakeholders. First of all thank you so much to the ministries involved as well as to IUCN here in Bangladesh for together with Danida to arrange this hearing and to all the international participants from India, Thailand and Denmark who have come here to contribute to the debate today.

In 2004 the Danish Technology Council contacted the Embassy with an inquiry on whether Bangladesh might be interested to cooperate on GMOs. I thought it was interesting and thus contacted IUCN here in Dhaka.

From the very beginning IUCN and Danida agreed in planning this hearing. The purpose of the gathering here today is not to confront pro against contra. Let's realize that we have technologies available that can be used for good and the bad purposes. We will never be able to forbid or stop the progress of research and the technologies emerging. It is here and we will have to deal with GMOs one way or the other. As with other great scientific advances, progress comes with some perils. However, we can control the use and limit the misuse within our national borders as well as between national borders.

### **Issues**



As with many new technologies there are fears and uncertainty from the users and producers. The GMO opponents do not refrain themselves to warn the public and do even create fears. The private sector who sees this as new opportunity do not stop at warning people that economies will crash if we do not use GMOs. Best of all is of course to have an open debate where all that have a stake gets an opportunity to take part in the discussion not at least the farmers and the consumers. It is easy to hold a couple of workshops or hearings and claim that a hearing has taken place or that a debate has been created, but it is not enough.

There has been a great deal of debate on the use of GMOs since the first products came on the shelves in the supermarkets. There are biodiversity issues arisen from the problems by placing new species in nature. There are the copyright issues where the species become corporate property. Furthermore some people are allergic to GMO products raising the labelling of consumers products as an issue of concern. Finally, will GMO plants grown in the poorest countries really benefit the poorest? Will the European market be ready to import GMO products from e.g. Bangladesh? This brings us to world trade and WTO issues. Other questions in relation to WTO are whether a WTO ruling can supersede the Cartagena protocol?

#### **What is the scope for support?**

In the coming phase of the Agriculture Sector Programme Support it will be possible to support biotechnology research but there are certain criteria to be fulfilled in order to provide assistance. For instance it would not have been possible for Danida to support this workshop without Bangladesh signing the Cartagena Protocol on Biosafety, which was done in May 2000.

A number of premises constitute an important framework for aid organisations when or if a developing country needs assistance in dealing with genetically modified crops.

#### **Junk Genome**

Finally, I would like to share some simple scientific viewpoints with you. From the discovery of the DNA structure in 1953 progress went on very fast. This combined with the discovery of heat tolerant bacteria discovered by a deep-sea expedition, made it possible to mass-produce DNA through the 1980ties and 1990ties by using PCR techniques.

What do we actually know about the genome and the link to protein production etc.? It sound simple – one gene to one protein. In humans there are between 20.000 to 40.000 protein coding genes. It is interesting to note that the rice plant have more protein coding genes than humans! And yet this part only constitutes two percent of the total genome. The rest 98 percent is so called dark matter still to be researched. This relationship holds for most species both plants and animals. A few years ago the 98 percent were believed to be genetic junk of no importance. It has now been established that these 98 percent constitutes a large collection of



functionally introns and intergenic stretches of DNA that do not codes for any proteins.

The failure to recognize the full implications of this – particularly the possibility of RNA coding molecules may play a much larger role. That may well be one of the biggest mistakes in the history of molecular biology! It has turned out from experiments with mice that some of these pseudo genes actually control the real gene that produces the proteins (and thereby the chemicals, pesticides etc.) even if they are located on different chromosomes. This complexity explains partly why so many GMO do fail to survive in real life.

We should be humble about what we know. We are far from the whole picture: actually only between 2 and 5 percent in all living organism are known. Most research in genetics has been run in reverse genetics, hereunder GMO research – that is starting with a particular known gene and fiddle with that gene in a culture or in a living organism (GMO) and see what's happening. This is a classical reductionist approach.

However, the recent realization that the chromosomes include vast hidden gene-functional sequences misclassified as junk DNA showed us the danger of this approach leading to a tunnel-vision of the truth. The GMOs that we are dealing with today are a product created based on this tunnel vision. The right way might be to look at both protein coding genes as well as the junk genes that control the proper protein coding DNA.

This is why much more research is needed in this area of genetics but also a warning about scientific arrogance leading to the belief that we know everything. The positive side of it is that we are going into a whole new era of genetics that eventually will change GMOs and the international laws that should rule the application of them.

### **3.4. Introduction to the Cartagena Protocol on Biosafety By Professor Banpot Napompeth of Kesetsart University**

Article 8 (g) of the Convention on Biological Diversity (CBD) emphasizes on *in situ* conservation, specifically to 'establish or maintain means to regulate, manage and control the risks associated with the use and release of living modified organisms (GMOs or LMOs) resulting from the biotechnology which are likely to have adverse environmental impacts that could affect the conservation and sustainable use of biological diversity, taking also into account the risks to human health'. The major objective of the Cartagena Protocol on Biosafety is to contribute to ensuring an adequate level of protection in the field of safe transfer, handling and use of LMOs resulting from modern biotechnology (or genetic engineering). The Cartagena Protocol entered into force on September 11, 2003, almost a decade after the CBD came into force on December 29, 1993.

Important features of the Cartagena Protocol are the establishment of a Biosafety Clearing House (BCH) to facilitate the exchange of information in addition to establishing Advance Informed Agreement (AIA) procedures for ensuring that countries are provided with the information necessary to make informed decisions before agreeing to the import of LMOs into their territories. The role of AIA is also to cooperate in capacity building, human resources and infrastructure.

### **3.5. Policy and legal regime of biotechnology in Bangladesh**

**By Dr. Abdur Razzaque, BARC and Md. Qamar Munir, IPSU**

Biotechnology is an effective tool that has opened up prospects for poverty alleviation and food security in Bangladesh. The goal of 'Biotechnology Policy' in Bangladesh is to 'ensure sustainable development of agriculture, food and other crops; nutrition, health, environment and livelihood of people and enhance agricultural competitiveness in relation to global standards'. The other important goal is 'strengthening of the national capacities in modern biotechnology, biosafety and bioethics in order to ensure judicious use of this modern tool for socio-economic development of the country. The specific objectives of the Biotechnology Policy are to: harness the opportunities of biotechnological applications to increase productivity and the sustained food security, poverty alleviation and health and livelihood improvement; create a congenial environment for encouraging research and development and address the issues such as IPR, bioethics, biodiversity and public awareness.

The opportunities of biotechnology in Bangladesh are manifold, including agriculture – food and other crops, fisheries and livestock, forestry and environment, health care and nutrition, biotech products and process and biodiversity conservation. Another area of crucial importance is human resource development, through academic programs at the graduate and undergraduate levels, short and long term training programs for researchers, orientation for policy makers and training of relevant stakeholders on IPR issues. One of the priority areas of plant biotechnology has been marked as the generation of transgenic crops and agro-forestry with improved traits such as stress tolerance or enhanced nutritional value.

Biotechnology while having great promises for human welfare also possesses potential risks to human and animal health, which calls for biosafety measures. The acts and guidelines related to biosafety and biotechnology embrace the policies and procedures to ensure environmentally safe application of biotechnology and include Quarantine Acts, Plant Variety and Farmers' Rights Protection Act, Biodiversity and Community Knowledge Protection Act, Seed Policy and Seed Act and Biosafety Guidelines for Bangladesh. The National Biotechnology Framework is thus an integrated regulatory, administrative, decision making and public participation system in the country.



Risk assessment is a process consisting of three components: risk assessment itself, risk management and risk communication. Till date, a national Task Force (headed by the Prime Minister) has been formed, along with a national Executive Committee (chaired by the Principal Secretary to the Prime Minister) and 5 national technical committees to deal with biosafety, biodiversity, crop biotechnology, fisheries and livestock and medical biotechnology.

The National Biosafety Guidelines are applicable for all research works conducted in laboratories, universities, and private companies as well as field trial, trans-boundary movement, transit, handling and use of biotechnology. The major objectives are to provide basis for biosafety developers and end- users of products and enforce the regulations in harmony with national priorities and international approaches. The Ministry of Environment and Forests is the designated national authority and focal point for implementing the Cartagena Protocol on Biosafety. A National Technical Committee on Biosafety (NTCB) of 32 members is functional to oversee the safe management of biotechnology in the country, under which several other committees operate to ensure safe management in the field and laboratories. The Biosafety Core Committee (BCC) is a scientific body of the NTCB and this committee grants all applications for contained use or field trials.

The general objective of the National Biosafety Guideline is to protect human health and environment through establishing relevant policy and regulatory system, mechanism, technological criterion and supervisory system for environmental impact assessment. In essence, it should encourage sound, safe and orderly research, development and commercialization of biotechnology.

### **3.6. Questions and discussion after the opening session**

Subsequent to the presentations of the inaugural session, an open discussion took place facilitated by the Chair, Dr. Ainun Nishat. Following is a synopsis of the issues that emerged:

Often policies are in place but not implemented in the country. Researcher group opined that research and development should not be hindered, even if proper policies/guidelines are not in place yet. However, it was strongly recommended that 'Precautionary Approach' should be followed in terms of dealing with GMO related issues.

The issue of consumer awareness was flagged by some of the participants. Consumer right for proper information and dissemination of proper information was the major focus of the discourse. It was recommended that the medium of disclosure should be Bangla instead of English and it should be understandable to consumers from all walks of life. Concern was expressed over aggressive marketing strategies, which tend to shape

consumers' attitude. Aggressive marketing often makes it difficult for people to take informed decision. In case of GMO products, if after marketing a product is found to be bad for the environment or human health, it could be very difficult to remove GMOs from the environment and the market.

A debate over farmer's right in seed conservation for use in the following season vis-à-vis dependence on seed vendors for supply of seed also came into the discussion. One group of participants strongly recommended for protection of marginal farmers from dependency on GMO seeds by imposing stricter regulations and standards to regulate profit-seeking motives of the multi-national companies.

Clarifying the concepts of plant breeding and genetic improvement through biotechnology, one of the scientists present at the workshop informed that biotechnology supports plant breeding in improving crops. But it is not an alternative to plant breeding.

It was opined that biotechnology cannot be the only solution for the perceived food shortage in the country. Other possibilities like the on-going plant breeding programmes and crop diversification should also be explored for meeting the challenges.

Some of the participants raised the risk assessment issue and questioned who would define 'safe gene'. The concept of 'safe gene' was clarified by a scientist. The definition of 'safe' is globally considered as the 'substantial equivalent' to the original plant or the parent. All genetic characteristics have to be the same in that GMO compared to its parent, except the specific introduced gene expressing a desired character. The Thai participant cited the concept of Generally Recognized Safe (GRS) can be applied to select a species for developing a GMO.

Strengthening the committees working on the biotechnological research, especially the National Technical Committee on Crop Biotechnology was identified as one of the important aspects. Suggestion came up from the floor that such committee should be headed by a full-time and dedicated technical person who has thorough knowledge on the subject to ensure proper functioning of the committee.

Concerns were expressed that GM products were already entered in Bangladesh market in many forms. Therefore, proper monitoring and surveillance of GM products was also recommended by the participants.

#### **4. REGIONAL EXPERIENCE ON IMPLEMENTATION OF THE CARTAGENA PROTOCL AND THE USE OF GMO IN ASIA AND CURRENT ACTIVITIES IN BANGLADESH**



#### 4.1. Implementation of the Cartagena Protocol and the use of GMOs in Thailand

By Prof. Banpot Napompeth of Kesetsart University

Thailand became parties to the Convention on Biological Diversity and the Cartagena Protocol on Biosafety very late on 29 January 2004 and 8 February 2006, respectively. However, the national policy was that no matter when the country would become parties, the country shall be obliged and comply itself with all the convention's and protocol's mandates, wherever appropriate.

An *ad hoc* biosafety committee was appointed in 1990 to develop guidelines in genetic engineering and biotechnology. The National Biosafety Committee (NBC) was appointed in 1993 to oversee biosafety issues and under which the NBC Subcommittees on Plants, Micro-organisms, Foods and Socioeconomics were established in 1993 as well as 27 institutional biosafety committees (IBCs) were established from 1993-2004 in various governmental agencies, research institutes, universities and private industry. With the latest government ministries reform, from 19 July 2005 the Division of Biodiversity, Office of Natural Resources and Environmental Policy & Planning (ONEP) under the Ministry of Natural Resources and Environment (MONRE) has been designated as the Cartagena Protocol national focal points and serves as a national Biosafety Clearing-House (BCH), and all national, regional and international biosafety matters was transferred from the National Center for Genetic Engineering and Biotechnology (BIOTEC), National Science and Technology Development Agency (NSTDA) under the then Ministry of Science, Technology & Environment to MONRE including the National Biosafety Committee yet to be appointed.

Regulations of genetically modified organisms (GMOs) or living modified organisms (LMOs) and other biosafety issues in the country have been dealt with and based on the existing laws. Genetically modified plants have been regulated under the Plant Quarantine Act and its amendments since 1994 by Department of Agriculture, Ministry of Agriculture & Cooperatives (MOAC), and labelling of GM soybean in foods and food products regulated by the Food and Drug Administration (FDA), Ministry of Public Health (MOPH). A biosafety law has been in the process of being drafted before and since April 2003 but no completion could be seen in the near future.

A number of GMOs, mainly GM crops such as Bt and R&R corn, Bt and R&R cotton, transgenic papaya, pineapple, rice and tomato have been approved for risk assessment and field trials, and many of which are locally developed. Other GMOs approved for research in containment and other contained used included few micro-organisms for food industry and transgenic inflorescent zebra fish for science fair exhibition.

Due to the pressure from some NGOs, all field trials of GM crops were banned and put under the moratorium until a biosafety law will be enacted. Transgenic papaya field trials were raided and destroyed by Greenpeace Southeast Asia in 2004 and on 2 August 2005 the same pressure group petitioned to the cabinet to formulate biosafety measures and demanded that all transgenic papaya laboratory and in containment trials in the government research and experiment station and universities be destroyed.

The questions remain as what to be adopted: organic farming, conventional agriculture, biotech crops, or coexistence of whatever appropriate?

#### **4.2. India's experience with the implementation of Cartagena Protocol and the use of GMOs**

**By Dr. Veena Chhotray, TERI, India**

The presentation is divided into three broad segments. (1) The commitment of India to biosafety; the existing regulatory framework and recent improvement initiatives, (2) The salient implementation measures of the Protocol and the thrust areas for future action and (3) India's experience of release of BT cotton.

The GMOs and products thereof are regulated in India in view of potential risks to human health and environment by indiscriminate use. India had played a lead role in adoption of the Protocol in the year 2000. However, much before that India had framed rules for regulation of GMOs. The Policy of Government of India has been to harness the maximum potential of modern biotechnology to address the problems relevant to the country. While doing so, there should be due sensitivity to biosafety concerns.

There have been no approvals regarding GM foods in India. In GM crops, only one crop, BT cotton was approved for commercial release in the year 2002. The area under cultivation of this crop has shown incremental increase, though problems have been experienced because of spread of illegal cotton. In the health sector, 20 recombinant DNA products have been approved for marketing; out of these 9 are by indigenous manufacture. The acceptance of these products has been more universal than of the transgenic GM crops.

The Cartagena Protocol was ratified by India in January 2003. India has already in place the basic legislations and administrative mechanisms to enable the country to implement its obligations under the Protocol. Government of India is currently taking initiatives to streamline the existing framework. Harmonization of domestic framework with the obligations under the Protocol is under review.

The major initiative for implementation of the Protocol has been taken under the GEF-World Bank Capacity Building Project. This relates to



making the National Biosafety Clearing House (BCH) operational. Besides several other capacity building measures have been taken: (1) Institutional strengthening of four key laboratories in the country; (2) release of a quarterly biosafety newsletter; (3) organisation of a series of events for awareness raising and capacity building of various stakeholders. India is also participating in the FAO Regional Capacity Building Project of Biosafety of GM crops. This involves among others regional consultation for standardization of procedures for risk assessment and management; and methodologies for effective outreach and establishment of Asian Bionet. However, India being a vast and diverse country, additional cooperation and financial resources are required for institutional and human capacity building.

India has neither been a party of import nor of export of living modified organisms (LMO) except imports for the purpose of research. India has also not approved any transgenic food or food products for use in the country. Therefore, its experience in implementation of the Protocol has been limited. However, India is continuing to play an active part in the international forums for implementation of the protocol.

The key thrust areas identified for future action are:

- (1) Harmonization of domestic legislations and guidelines with the Protocol,
- (2) Further strengthening of risk assessment and risk management capacities,
- (3) Development of biosafety guidelines for GM foods and
- (4) Human resource capacity building.

#### **4.3. Presentation on UNEP-GEF Bio-safety project in Bangladesh By Dr. Nilufer Hye Karim, National Project Coordinator, MoEF and Mr. Mahmood Hasan Khan, National Project Director, MoEF**

The Department of Environment (DoE) of the Ministry of Environment and Forestry (MoEF) is the national executing authority for the National Biosafety Framework (NBF) project, which is being funded by UNEP. The project was initiated in October 2005 and is expected to be completed in December 2006, with the overall objective of preparing the country for a safe entry into force of the Cartagena Protocol in the use, development and adoption of GMOs and LMOs. A National Coordination Committee composed of 30 members and chaired by the Secretary, MoEF oversees the implementation of the project and meets every quarter to make realistic suggestions.

The major objective of the NBF project is to develop the National Biosafety Framework document that will describe the methods of safe use, transfer, assessment and management of genetically engineered products. It will also define enabling mechanisms (laws and regulations for trans-boundary

movement) for safe introduction of species or products developed through the application of 'modern biotechnology' ensuring that none such products released for the public will be hazardous to human and the environment.

The NBF framework document shall explain the safe procedures for handling, transferring and adoption of the products of genetically engineered species and organisms that is not possible by conventional methods of breeding. The framework will define safety measures, policies in the use of GMOs, assess and state management guidelines and regulations to address the potential risks of modern biotechnology.

Through teamwork of the Project Coordinator, Project Director, expatriate consultants and national experts and sub-contracts to government and private agencies the NBF for Bangladesh is being formulated. The expected outputs are: inventory from survey data, national database of existing capacity, need for capacity building and suggestions for enacting laws and regulations. A number of workshops and training will also be held with stakeholders of all strata beginning from policy makers to the grassroots to assess the level of understanding, capacity building and awareness levels. The NBF will be carried out in three phases, with follow up activities to be implemented from the experience gained. The South Asia Biosafety Program (SABP) has been working in Bangladesh since February 2005 and is maintaining close cooperation with the NBF project and its activities.

#### **4.4. Highlights of the USAID Supported Biotech and GMO Activities in Bangladesh**

**By Shahidur Rahman Bhuiyan, USAID**

The Collaborative Biotechnology (CABIO) initiative of USAID is an umbrella biotech framework to address the global issues of food security. Currently the CABIO activities are present in Bangladesh, India, Philippines, Indonesia, East and West Africa, investing in NGOs, research institutes and universities. It provides a comprehensive strategy for technology transfer, development, management and decision-making through a variety of programmes, namely Agricultural Biotechnology Support Project (ABSP).

The second phase or ABSP II supports technology development through public and private sector collaboration and creates an enabling policy environment, particularly for biotechnology product development and use. On the basis of socio-economic needs and potential marketability, four crops have been selected for transgenic research work: late blight resistant potatoes, drought and salinity tolerant rice, pod borer resistant chickpeas and fruit and shoot borer resistant eggplants. The Government of Bangladesh paid for the renovation of the Bangladesh Agriculture Research Institute (BARI) greenhouse and on-the-job training was provided to 26 Bangladeshi scientists to conduct greenhouse based and field based trial of



transgenic crop varieties. As a result of the above, private and public partnerships were developed and visits by international experts, training, seminars and workshops sensitized policy makers and science administrators.

Research on eggplants is most advanced compared to the other identified crops and this variety will be imported from India in March 2006 for field trial. The suggested timeline would allow sufficient time to carry out environmental review, before the transgenic varieties are registered and released for multiplication.

One of the other USAID supported programmes is the South Asia Biosafety Program (SABP II), which compliments ABSP II in the development of a public infrastructure to manage the use of biotechnology and biosafety. As a part of this project, 14 Bangladeshi scientists and policy regulators have participated in regional exposition meetings, workshops and conferences and a series of multi-stakeholder awareness raising workshops have also been conducted. A monthly newsletter is published from this project along with the distribution of a Bangla electronic 'weekly crop biotech updates' to almost 800 recipients.

Finally, the virus resistant transgenic papaya development programme is another area, which is being explored by the CIMMYT programme of USAID. The application for field testing is currently deposited to the Ministry of Agriculture and 5 transgenic varieties are being tested at Cornell University for their resistance to Bangladeshi viral strains.

#### **4.5. Questions and discussion after the second session**

Recalling the success of GM cotton cultivated and marketed in India and Pakistan, the possibility of introduction of GM cotton in Bangladesh was inquired by a number of participants. In response to this, it was also expressed that since cotton is a minor crop compared to jute, research should be targeted to jute rather than cotton in Bangladesh.

Responding to the question on Bt cotton trial in India, Dr. Chhotray informed that only three zones were suitable for growing Bt cotton as demonstrated by their growth performances. She also responded to the question on seed residual effect that in India extensive research for 7–8 years also included the residual effects of Bt cotton.

GM crop was a form of monoculture, one of the participants commented. She further elaborated that it would threaten the biodiversity of the country. If at all GMOs were grown, suggestion was made to opt only for cash crops rather than food grains.

Disclosure issue was raised again in this session. It was informed that vendors do not alert farmers about the effects of dealing with harmful agro-

products. Questions were raised how to improve the communication and level of awareness if GM products are marketed.

It was also raised by the participants that farmers were becoming totally depended on seed vendors at the field level, giving up the traditional practices of seed preservation.

A noteworthy suggestion put forth by one of the participants was that Bangla should be the medium of language for all the rules and regulations, to ensure maximum outreach even to the common people.

The participant from India informed the audience that research on GMO in India is only conducted with prior approval of the Government.

The requirement of an approval process or a clearing house mechanism was reiterated. It was concluded that the provision of Cartagena Protocol should be the basis for all research relating to GMO.

## **5. KNOWLEDGE ABOUT GMO AND POTENTIAL IMPLICATIONS**

### **5.1. Biotechnology and genetic modification for crop improvement for Bangladesh**

**By Dr. Zeba I Siraj, Dhaka University**

An integrated, well-planned and coordinated approach is needed to ensure food-security for populated and land-strapped Bangladesh. These include appropriate policies at the upper tiers of society as well as training and knowledge dissemination about efficient cultivation practices at the grassroots level. High quality seeds and superior crop varieties can however go a long way in providing adequate livelihoods for our agrarian country. A multitude of problems threaten crop yields in addition to pests and disease. These include drought in the north, salinity in the south and flash floods in the middle plains.

Bangladeshi plant breeders have been doing an excellent job in providing improved varieties and will continue to do so. Biotechnology can help in providing more efficient and quick breeding practices in particular instances for example, DNA marker-aided selection and breeding has resulted in the commercial release of the first bacterial blight-resistant rice crop in a short span of time in Indonesia, Philippines and India. DNA marker-based efficient breeding and production of flood tolerant rice is nearly a reality.

Similarly, markers for efficient breeding of drought and salt tolerant rice may be released very soon. Genetically modified crops may only be needed to fill the gap where specific problems exist. For example, commercial production of eggplant in Bangladesh requires extensive pesticide use and



produces a crop, which is prone to induce allergic reactions in a large percent of our population. Transgenic Bt eggplant promises a pesticide-free safer vegetable than the one we have at present. Bt-eggplant has undergone rigorous testing and found to be safe for human consumption and has been commercially released in other countries. There is also no danger of being dependent on multinationals for provision of GM-eggplant seeds because current programmes are incorporating the useful tolerance into our local varieties. Similarly it is essential that we continue to research for varieties with tolerance to drought and salinity, where both marker-based approaches as well as genetic modification have the potential of producing suitable crops.

## **5.2. Issues and concerns on GMOs often raised in the public debate in Bangladesh and elsewhere**

**By Dr. Ferdousi Begum, DEBTEC**

Article 8 (g) of CBD provides for a provision on biosafety that deals with the adverse effects of organisms derived from biotechnological innovation on man and animal health and also its impact on the environment. There are risks involved in these processes, which call for safety testing of GM foods. The usual rationale cited for the safety issues encompass possibility of consequence for human or animal health (antibiotic resistant marker genes), horizontal gene transfer (aggressive weeds, resistance to disease, displacement of traditional cultivars), potential allergens or food safety hazards etc. Other concern usually expressed, besides the environmental and food safety issues, is the potential impact on local farmers as large farmers and multinational companies are being favoured.

With regards to GMOs and LMOs, their use or utilization possess a number of fundamental questions:

- What are economic, social and ethical benefits and costs associated with GMO products?
- Are the regulatory frame works in place appropriate, and is it appropriate?
- Are the national and international risk analysis systems in place and adequate for assessing the safety and nutrition of foods derived from biotechnology?
- Are the systems in place adequate for communicating the results of risks assessment and risk management decision to the public?
- What is the concentration of ownership (legal and effective) in genetic material?

Currently in Bangladesh, research is on-going for developing GM rice and eggplant and four GM crops are supposed to be imported for commercial purposes. This is a stark contrast with the international community such as the EU, which has put a halt to the import of GM food from the US. Almost 80% of Bangladeshi economy is based on agriculture. Therefore, the

proposed policy framework for LMO and GMO should not favour the corporate sector only. Farmers will bear the price of promoting a risky and environment unfriendly technology. Another key issue will be to protect farmers' right as mentioned in the CBD.

The hazards and risks should be assessed based on the up-to-date knowledge. Even a pro-GM country such as the US deals with GMOs on a case-by-case basis and has a three tier clearing system. As a precautionary measure, the monitoring system and human resources have to be strengthened, so that the people of Bangladesh can make informed decisions in this regard.

### **5.3. Questions and discussion after the third session**

A good amount of time was spent on debating on issues and concerns raised by both the presenters. It was emphasised to bring distinction between science and myths. It was emphasised that whether the country would take a traditional or a modern technological path would depend on the policy decision. The participant from India reported that Bt cotton was not approved in Andhra Pradesh because of an Act to regulate the price and protect the farmers. High price of seeds was the major issue, rather than the problems of productivity or suitability of the GM seeds.

Participatory research, focusing on the farmers' needs should be a priority for the country. For example, in the West the GMO research has been on the herbicides resistant crops due to the zero tillage practices, which encourage weed growth.

In case of 'golden rice', it was emphasised to take informed decision by disseminating proper information and breaking the myths around it. Since the base of golden rice is BR29, it would not increase the yield. The perceived benefit of supply of vitamin A can also be questionable as alternate source can be supplied in a cheaper way. Citing this example, the need for linking research thrust with the social and local demand was reiterated.

Proper communication and disclosure of correct information was emphasised again. Example was cited from India where farmers cultivating Bt cotton for the first time were under the misconception that the variety was safe from all kind of pests and so they did not use any pesticides. It was a fault in the information sharing that created the crop failure. Communication materials in simple language and content should be developed for general information.

The need for consultations and public dialogues was emphasised for taking an informed decision.



## 6. EXAMPLES OF IMPLEMENTATION PROCEDURES AND THE USE OF GMOs IN DENMARK

### 6.1. The Danish Cartagena implementation procedures and the use of GMOs in Denmark

By Bettina Helle Jensen, the Danish Forest and Nature Agency

EU legislation on GMOs has been in place since the early 1990s. This specific legislation has two main objectives:

- To protect health and the environment and
- To ensure the free movement of safe and healthy genetically modified products in the European Union (EU).

The entire corpus of the EU GMO legislation has recently been amended, leading to the creation of a new legal framework. Its main legal instruments are as follows:

- Directive 90/219/EEC on the contained use of genetically modified micro-organisms (GMMs).
- Directive 2001/18/EC on the deliberate release into the environment (covers both experimental release of GMOs into the environment and placing on the market of GMOs)
- Regulation (EC) No 1829/2003 on genetically modified food and feed.
- Regulation (EC) No 1946/2003 on trans-boundary movements of genetically modified organisms, with the exception of intentional movements within the Community.
- Regulation (EC) No 1829/2003 and Regulation (EC) No 1830/2003 concerning the traceability and labelling of genetically modified organisms and the traceability of food and feed products produced from genetically modified organisms and amending Directive 2001/18/EC.

As Denmark is a member of the EU it has to comply with all the legislation adopted within the EU. On this background all directives and regulations on GMOs are transposed into national legislation - in a number of Acts and statutory orders.

The decision to approve - or reject - the release of the GMOs for experimental purposes are purely a national one. This corresponds to a feature of the authorisation of release for experimental purposes: the authorisation to proceed with this release applies only in the Member State in which the notification has been submitted.

The authorisation procedure for placing the GMO on the market is not a purely national one, but instead it involves all Member States. This can be explained by the fact that the authorisation of the placing on the market of a GMO implies the free movement of the authorised products throughout the territory of the EU. Hence all Member States are concerned.

The national part of this authorisation procedure for placing on the market - where the Danish Forest and Nature Agency (DFNA) are the Competent Authority - includes public consultation, stakeholder consultation, and consultation of experts for environmental risk assessment, drafting and approval in Parliament of the Danish position.

Under the legislation governing the deliberate release of GMOs into the environment numerous GMOs have been approved for different uses, some for cultivation, some for import and processing, some as feed and food. As regards varieties of agricultural products, these GMOs include maize, oil seed rape, soybean and chicory. Numerous applications for the placing on the market of GMOs for authorisation under Directive 2001/18/EC are pending, e.g. maize, oil seed rape and cotton. To date there has been no commercial cultivation of GMOs in Denmark.

## **6.2. Genetically modified crops in developing countries – challenges for the development aid**

**By Bjørn Bedsted, Danish Board of Technology**

The Danish Board of Technology (DBT) is an independent institution with long experience with creating debate and giving advice to politicians about the use of new technology. DBT has made several GMO assessments over the years, including a task force study of GM-crops for developing countries (2003). A summary of the conclusions and recommendations reached by the DBT task force is available on [www.tekno.dk](http://www.tekno.dk) and in the annexes of this report.

The task force concludes that GM-crops may contribute positively to the improvement of living conditions for poor population groups in developing countries, but only under a number of conditions, the most important of which are a proper legal and institutional framework and the country's own capacity to assess the possible impact on environment, health, safety, market and local sustainability. Furthermore, focus should be on the problem at hand and not the technology as such since other solutions than GM-technology may very well prove to be better.

The effect of patents on local market structures and farmers access to seeds need also to be considered carefully when considering the introduction of GM-crops in developing countries, and introduction should not be made without farmers informed consent. The current development of GM-crops is



driven by the needs of farmers in the rich part of the world and should only be introduced to third world farmers if based on *their* needs.

To enable third world countries to make their own assessments of GM-crops it is essential to include farmers, consumers, retailers, NGOs as well as scientists from the fields of economy, sociology and genetics in a debate of pros and cons. Without this debate, the legal framework required by the Cartagena Protocol will neither be understood nor enforced by the relevant stakeholders, and the GM-technology is unlikely to be put to the use of farmers and consumers. Facilitating such debates should therefore be of central concern to development aid organisations as an integrated part of and prerequisite for capacity building. Supporting such debate is not equal to supporting GM-crops but if development aid organisations fail to engage in this debate, they will be failing in their responsibility to developing countries.

### 6.3. Questions and discussion after session 4

A question was raised to Mr. Bedsted on which among the GMO activities presented at the workshop will be approved according to the criteria set up by the Danish Board of Technology. Mr. Bedsted stated that he was not in a position to make such a judgement as that required a detailed analysis of the Bangladesh situation and was a judgement to be made by Bangladeshi decision-makers according to the policies of Bangladesh.

Bettina Helle Jensen was asked how the use of genetically modified micro-organisms (GMM) been dealt with in Denmark? Jensen answered that if the GMMs are in the final product then it has to be labelled, but if the GMM only has been used in the production process and does not exist in the final product, then there is no need for labelling the product.

It was also questioned why Denmark and EU had rejected all the GMO applications during the last several years? Bettina Helle Jensen answered that the main reasons were that the technical issues of the applications were not clarified, EU guidelines were not in place and the GMO detection methods were not validated. However, the reasons also relate to the moratorium Denmark and other EU countries have joined regarding traceability and gene-marking. This moratorium has now expired and it is foreseen that now Denmark will start approving GMOs.

From the workshop participants there were also comments on the Danish comprehensive processing procedure. The applications often includes 3,000 pages which has to be processed by the DFNA and submitted through a hearing process among expert panels and a large number of stakeholder and with the time limits of 60 days until the applicant must have an answer.

## 7. CLOSING SESSION

### 7.1. Closing questions and discussion

The discussion at the end of the day was made short as detailed debate had already taken place in earlier sessions and a few issues were being repeated from the debates. It was among others pointed out that the GMO issue shall not be driven by outside companies or outside interests, but by Bangladesh itself. This was agreed to, but in addition it was responded that there is very much to gain through cooperation with other companies from other countries, which already have passed many years of research.

A general comment was also made that: GMOs should not be approved until the government has the regulation and procedures in position. People should not opposing the techniques but emphasize bio safety.

### 7.2. Summing up on the presentations and discussions

By Workshop Chairman Dr. Ainun Nishat

- The overall impression of the workshop was that there are significant potentials of the technological options offered by GMOs, that may be maximized but at the same time one should take into account all the causes of concern. Furthermore, all research projects should comply, with due diligence to the provisions of the biosafety rules and the recommendations of the Cartagena Protocol.
- GMOs have come into Bangladesh so where are we viz. a viz. GMOs? A status report should be prepared on what type of research is on going and whether the research being conducted following the safety measures.
- It was noted from the presentations made by representatives from India, Thailand and Denmark that they are signatories to both CBD and Cartagena Protocol and are trying to operationalise the provisions of Cartagena Protocol by developing appropriate regulatory frameworks. In countries where the legal framework is not in place, current activities are limited to laboratory and confined field level trials. Field trials would be allowed only after the law is in place.
- What would be the goal of GMO crops? It could be increase in yield (the meeting noted that golden rice would not increase any yield, nutritional value, resistance to disease and insects or improvement in quality). The meeting concluded that weed control should not be the goal of such research in Bangladesh.
- It was argued that prioritisation and selection of research agenda should be on the basis of the needs of the country, which must be established through detailed consultation with farmers.



- It was stated that national priorities possibly are not reflected adequately in the on going research topics. For example, research on jute or mango needs immediate attention.
- It was presented that each of the GMO varieties must be evaluated on a 'case by case' or individual basis. Also, location specific situations must be evaluated in assessing the effectiveness of GM crops.
- It was argued that proper labelling and disclosure of information, avoidance of gimmicks and misinformation ensured through proper screening methods.
- All research should be done with safety issues in mind and 'precautionary approach', not 'precautionary principle'.
- The meeting called for capacity building in the country for carrying out research on biotechnology as well as for capacity building in maintaining the safety requirements. Capacity to assess impacts must also be built and towards this educational institutions may offer diploma level programmes.
- During the dialogue it was noted that in Bangladesh appropriate institutional framework has been recommended in the biosafety guidelines. It is important that the committees start working immediately and their Terms of Reference are effectively followed.
- It was stated in workshop presentations that all the countries are not yet ready to release GM food and feed and Bangladesh should take note of this precautionary approach
- The meeting called for more consultations for putting all the views into perspective and to facilitate further debate so that informed decisions can be taken. In the process all stakeholders should be involved, especially the farmers,
- Concerns were expressed that the overall control of GMOs should be managed by national institutions and not driven by Trans - national corporations.
- Finally the meeting called for promotion of similar debates and neutral platforms for discourses.

### 7.3. Vote of Thanks by Dr. Ainun Nishat

Dr. Ainun Nishat, Country Representative of IUCN Bangladesh thanked all the participants for their time and efforts in making the workshop a success. He conveyed special thanks to the participants who had travelled from outside Dhaka from the various institutions.

Last but not the least, Dr. Nishat expressed his gratitude to IPSU – MoEF for extending their cooperation and support for organizing the workshop and to DANIDA/Royal Danish Embassy for funding the workshop and making it a success.

## 8. FOLLOW-UP WORKSHOP

### 8.1. Participants at follow-up workshop

Dr. Zeba I Siraj, Dhaka University	Dr. Haseena Khan, Dhaka University
Nilufer Hye Karim, NBF Project, DoE	Shahriar Kabir, AIUB, Bangladesh
Mr. Kamruzzaman, BARCIK	Veena Chhotray, TERI, India
Kaumal Kumar Ghosh, IPSU, Ministry of Environment and Forest	Bettina Helle Jensen, Danish Nature and Forest Agency,
Banpot Napompeth, Kasetsart University, Thailand	Bjørn Bedsted, Danish Board of Technology
Ainun Nishat, IUCN-B	Remeen Firoz, IUCN-B
Farida Shahnaz, IUCN-B	Raquiul Amin, IUCN-B
Haseeb Md. Irfanullah, IUCN-B	Frede Danborg, DDC Consulting,
Michael Andersen, Counsellor, Danida	Anne Jensen, JPO, Danida,

### 8.2. Concept of Follow-up workshop

The Follow-up Workshop was aiming at further discussing, condensing and prioritising the information, opinion and recommendations presented by the many participants of the day 1 workshop. For this purpose 25 participants from the day-1 workshop were invited for the follow-up discussions. Only 18 persons arrived of which workshop organisers, IUCN-B and international experts were the majority (see list of participants above).

Main statements and opinions from day 1 regarding the future process of working with GMOs and the Cartagena Protocol was summarised and presented

After a common summary session, participants continued discussions in three groups with the task of answering five questions:

Questions:

1. What are the next steps needed regarding the GMO legislative framework to be in place in Bangladesh?
2. How can Danida support Bangladesh with this process? If at all?
3. How can Bangladeshi farmers be able to make free choices on GMO and benefit from GMO utilisation?
4. How can education and training support this process?
5. How can Danida (as well as other agencies) support Bangladeshi farmers' involvement in GMO and in benefiting from utilising GMOs?



Group discussions went well regarding what was needed for the GMO situation in Bangladesh and how donor agencies could support development of GMO legislative framework and support that farmers would be able to make own choices regarding a possible future utilisation of GMOs.

The results of group work (see boxes below) were presented and discussed.

### 8.3. Results from group work

#### Group 1

Questions	Answer
1	<ul style="list-style-type: none"> <li>• Approve the revised Bio-safety Guidelines immediately</li> <li>• Set up the procedures in compliance with the Cartagena Protocol and regulate: <ul style="list-style-type: none"> <li>• the import of GMOs</li> <li>• the import of food / feed or processing</li> <li>• environmental release</li> </ul> </li> </ul>
2	<ul style="list-style-type: none"> <li>• DANIDA could assist in developing the models of the above mentioned "procedures"</li> </ul>
3 and 4	<ul style="list-style-type: none"> <li>• Public education and information from all sectors/stakeholders should be incorporated</li> <li>• There has to be transparency in the information provided</li> </ul>
5	<ul style="list-style-type: none"> <li>• DANIDA could organize local level workshops and local level public hearing as well as study tours-visiting other countries.</li> </ul>

#### Group 2

Questions	Answer
1	<ul style="list-style-type: none"> <li>• There is a need for legislation (- it is in pipeline in Bangladesh)</li> <li>• The scope of the legislation needs to be reviewed - to identify the gaps if any</li> <li>• Assessment of risk needs to be looked into: <ul style="list-style-type: none"> <li>• How to make appropriate assessment</li> <li>• What kind of data and criteria is allowed for assessment</li> </ul> </li> <li>• Cartagena Protocol is focused on bio-safety issues and environmental concerns but it is also important to look into aspects related to: <ul style="list-style-type: none"> <li>• IPR (intellectual property rights)</li> <li>• Economics</li> <li>• Social aspects</li> <li>• Farmers' traditional practices</li> <li>• Ethics</li> </ul> </li> <li>• Legislation regarding import of foodstuff needs to be developed in relation to GMO.</li> <li>• Administration of the laws that will be enacted and effective. Capacity</li> </ul>

	<p>for litigation is needed.</p> <ul style="list-style-type: none"> <li>• The Bio-safety legislation should be able to account for "material transfer agreements" and its consequences.</li> <li>• Research on how the law will be operational and effective: Data and evidence recording procedure needs to be in place.</li> <li>• Stakeholders need to be involved in actual drafting of the law.</li> <li>• Make provisions for the law to be practical in nature for effective compliance.</li> <li>• Legislation for monitoring of GMOs in imported food stuff and building capacity for risk assessment</li> <li>• Intellectual Property Rights issues of native species should be reserved before outsiders are allowed to use them.</li> </ul>
2	<ul style="list-style-type: none"> <li>• Support capacity building for monitoring the impacts of GMOs that are being imported through: <ul style="list-style-type: none"> <li>• Detection centres.</li> <li>• Impact assessment.</li> </ul> </li> <li>• Support establishment of labs for recording the genetic compositions.</li> <li>• Support development of a protocol for assessment of safety levels of any crop/food whether imported or developed in Bangladesh and this could be linked up with law.</li> <li>• Training on safety assessment.</li> <li>• Support development of communication materials in Bangla and in simple terms and demystifying all technical terms.</li> <li>• Support dissemination of these communication materials, including all stakeholders and also the farmers.</li> <li>• Take the above down to the school level.</li> <li>• Support visits to other countries to develop proper appreciations of field level experiences of those countries.</li> <li>• Promote multi-stakeholders platforms (MSPs) to encourage and ensure knowledge-based debates on a continued basis. The MSPs can address myths and "ghosts" and exaggerated claims.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Development of awareness materials using media – both print and electronic such as posters and popular communication methods</li> <li>• Dissemination of the communication materials</li> <li>• Engage farmers in effective, natural and 'informed' farming methods, enabling them to make up their own minds</li> </ul>
4	<ul style="list-style-type: none"> <li>• Private companies may get involved in development of seeds for crops that have been privatized by farmers in Bangladesh</li> <li>• Support jute sectors</li> <li>• Develop partnership with public sector and support work of public sector research e.g. import of chemicals, etc.</li> <li>• The TNCs should be involved in partnership with local organizations for ensuring continuity in research</li> <li>• The private sector should be fully responsive to their Corporate Environmental and Social Responsibility</li> <li>• Undertake participatory research involving the education practitioners.</li> </ul>



	private sector and farmers
5	<ul style="list-style-type: none"> <li>• Support recommendations related to above question 3.</li> <li>• Address youth and gender issues.</li> <li>• Support processing and marketing of GMO products outside Bangladesh.</li> <li>• Facilitate visits to other countries and support participatory research.</li> <li>• Address ethical issues with farmers and build capacity on safety procedures.</li> <li>• Offer diploma courses and undertake multi – disciplinary projects such as biologists, sociologists, economists etc.</li> </ul>

### Group 3

Questions	Answers
1	<ul style="list-style-type: none"> <li>• The Bio-safety Guidelines in Bangladesh are at the final draft stage.</li> <li>• Existing information or experiences of some important countries should be relevant at this stage to make it more effective.</li> <li>• Harmonization of the existing related legislation in agriculture, health care, food and commerce, patent rights and bio-piracy are urgent issues.</li> </ul>
2	<ul style="list-style-type: none"> <li>• National level legal review of existing legislation related to agriculture, food and health care sectors for harmonization of bio-safety guidelines and the Cartagena Protocol.</li> <li>• A review of the national obligations under WTO and the IPR regime.</li> <li>• Strengthening the institutional biosafety committees through: <ul style="list-style-type: none"> <li>• Monitoring the constitution.</li> <li>• Preparation of biosafety information material and</li> <li>• Sensitization and capacity building.</li> </ul> </li> <li>• Assessment of existing capacities of the designated agencies to implement NBF and capacity building and training of various stakeholders.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Grass root - level workshops (area specific) to assess the farmers' needs and linking it up with the research priorities and options.</li> <li>• Sensitization of the farmers on the best practices of GMOs.</li> <li>• Sensitization of consumers.</li> <li>• Involving local research institutions and NGOs, local bodies in workshops.</li> <li>• Making public consultations statutory liable.</li> <li>• Training of the Trainers (ToT).</li> </ul>
4	<ul style="list-style-type: none"> <li>• Institutional and human resources development for risk assessment and management.</li> </ul>
5	<ul style="list-style-type: none"> <li>• Research Institutes and capacity building, upgrading laboratory equipment.</li> <li>• Set-up national biosafety clearing house (BCH).</li> </ul>

	<ul style="list-style-type: none"> <li>• Commence Bio-safety newsletter.</li> <li>• Capacity building (long-term) of in-service personnel and graduates on biosafety issues.</li> <li>• Involvement of private sector in GMO research.</li> <li>• Sensitize the chambers of commerce and industries.</li> <li>• Implementation of integrated farmer oriented projects on pilot basis.</li> <li>• Assessment and inventorying of available GMO products in markets.</li> <li>• Sectorial dialogues among agriculture, fisheries and livestock, health, environment etc sectors on GMO issues.</li> </ul>
--	---

#### 8.4. Recommendations to Bangladeshi authorities and donor agencies

Based on the above results of the group work and plenary discussions a number of recommendations for the Royal Danish Embassy have been developed. The recommendations relate particular to the agricultural sector.

The Danish Embassy will be able to support Bangladesh government and Bangladeshi farmers in several ways regarding GMO. The recommendations all have the aim of developing Bangladeshi capacities so that they will be able to make own choices following own priorities regarding GMO.

Thus, the activities recommended in the following are not aiming at supporting the introduction of GMOS into Bangladesh agriculture and consumers' market, and just as well it is not aiming at "keeping Bangladesh free of GMO and GMO products". GMOs are part of the globalised world and a reality, which all countries, including Bangladesh, have to be able to handle.

#### Recommendations

Four types of support activities are identified and prioritised. (I) Awareness raising activities, (II) Capacity building at selected institutions and levels, (III): Technical assistance to implementing the Cartagena Protocol and (IV) Information dissemination among Bangladeshi farmers.

##### (I) Awareness raising activities

These activities have the aim of raising awareness among stakeholders and decision-makers that GMO legislation (Biodiversity convention and Cartagena Protocol) is crucial and needs attention and activities will as well support the formulation of opinions and stakeholders' interests.

Two main types of activities are proposed:

(a) Scenario workshop among stakeholders, e.g.: lawmakers, central authorities, researchers (including economists and social science), NGOs, farmers (-representatives), seed supply companies and retailers. The



workshop is a structured discussion of future scenarios prepared before the workshop based on different developments regarding GMO utilisation.

(b) Citizens-jury. This activity would include mainly farmers and extension personnel and possibly a few central level decision-makers. Farmers are seen as the key stakeholders in utilising GMOs. Participants of the citizens-jury activity will discuss future scenarios with the aim of supporting the farmers expressing their opinions and interests and provide input to preparation of GMO legislation.

## **(II) Capacity building at selected institutions and levels**

There is a need among the government authorities, public administration and institutions of expertise (e.g. research institutions) for understanding and handling GMO issues.

It is proposed to provide support through study tours to e.g. Denmark for visits to Danish focal point and Biosafety Clearing House.

It is proposed to provide support through fellowships regarding GMO. In this respect it would not necessarily cover GMO research, but just as well GMO legislation, biodiversity conservation, Cartagena Protocol administration and international trade and law.

Support could also be provided to assist Bangladesh making a road map towards final implementation of the Cartagena Protocol. This would review - and build on - the various activities already completed or on-going regarding GMOs.

It is proposed to support a multi-stakeholder platform as an "open-forum" with the involvement of international experts from e.g. Denmark, which can be a national forum for debate and expertise on GMOs research, utilisation and legislation.

## **(III) Technical assistance to implementing the Cartagena Protocol**

Bangladesh is already a signatory to the Cartagena Protocol, but the legislation and institutions are not in place to implement and administrate the Cartagena Protocol. The technical assistance would include support to establish the focal point, the Biosafety Clearing House, develop application and approval procedures for GMOs, development of criteria for decision-making as well as the role of approving institutions. Such technical assistance will include legislation development, institutional building and in-service training.

## **(IV) Awareness raising among Bangladeshi farmers**

This is a further stage of support after Cartagena Protocol actually has been implemented and when GMOs might be an option for the farmers. The support will be provided through the regular extension service informing farmers about the characteristics of GMOs and on possible benefits and

possible risks. This activity will need to start with training of the Extension Technicians (training of trainers) before the farmers can be reached through e.g. farmers' meetings, leaflets and training.

The four types of support (I – IV) can partly be implemented parallel, but still with (I) as the first and (IV) as the last.