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Lusaka, 26-28 February 2007
Item 4.1 of the provisional agenda*

CAPACITY-BUILDING PROJECTS/INITIATIVES

Update on the Ongoing Biosafety Capacity-Building Projects and Other Initiatives: A compilation of submissions from Governments and Organizations

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BRAZILIAN AGRICULTURAL RESEARCH CORPORATION

[12 FEBRUARY 2007]
[SUBMISSION: ENGLISH]

BioSeg – Embrapa´s Network Project on Biosafety

1. BioSeg is an initiative of researchers from the Brazilian Agricultural Research Corporation – Embrapa – on environmental and food safety assessment of genetically modified organisms (GMOs). It has been driven by the urgency of having in-country generated biosafety results and the importance of carefully designed research protocols that can meet the confidence standards by decision makers and the general public.

2. The BioSeg initiative aimed at building up on the existing capacity within Embrapa research centers in collaboration with well-known national and international experts from Universities and other Research Institutes, resulting in a network of laboratories and a multidisciplinary team.

3. The environmental risk assessment team dedicates to research and training on the impact of GM plants on organisms (target and non-target, crop-associated biodiversity), above and below ground effects, considering the production system in use and the specific characteristics of agro-ecosystems. The food safety team develops research on topics such as substantial equivalence, composition, effects of processing, protein expression product of the novel DNA (effects on function, potential toxicity and potential allergenicity), and other aspects. Laboratory and field tests are being conducted under the Brazilian regulatory system.

4. The network project, approved in September 2002, proposes to generate scientific information and protocols through the analysis of Embrapa's developed GM plants, aiming among other goals, to form capacity and expertise that will be available for further research, expert consultation, and training on risk assessment of GMO. The food and environmental safety of the following products are currently under evaluation: virus resistant bean, papaya and potato; herbicide tolerant soybean and insect resistant cotton.

Latest developments / main results referring to capacity-building

5. Three courses – already applied (two in 2005, one in 2006) – number of professionals attending: circa 70 people involving regulators, Ph. D. students, Embrapa Researchers, decision makers from Embrapa, extension service personal and one journalist.

Practical experiences

6. Development of curricula and establishment of a multidisciplinary group of teachers. Additionally, The BioSeg Project developed a strong collaboration with the GMO ERA Project and participated in the development of the GMO Risk Assessment Teaching Tools and the formation of the Brazil Expert Teaching Team.

"Good practices"

7. Good practices in coordination – organization of a Steering Committee which involves one expert acting in each of the key issues to be developed within the curricula or the capacity building courses;

8. Good practices in collaboration – To involve in the core group, teachers and researchers in such a balance that they could improve the teaching tools (pedagogical issues) and at the same time to include experimental results of local interest.

9. The training programs should involve Universities and teachers that will carry on and insert biosafety issues/ knowledge into regular long-term courses and curricula. Priority should be given in expanding the capacity in risk assessment research and capacity building to other Latin American countries, with an emphasis on training the trainers.

10. BioSeg had the opportunity to assist a broad collaboration with other international projects, thus being able to leverage the allocated funds by collaboration which resulted in a substantial contribution to biosafety capacity building in Brazil and generating scientific knowledge and information that supports the country's regulatory framework.

Biosafety Lessons learned

11. The courses offered by local experts and focused on regional experience and needs attained confidence by participants from different public institutions, regulatory bodies and students. For sustainability of the capacity building network, like the one being developed by BioSeg at Embrapa, can strengthen the consideration of critical problems, addressing them with greater confidence, to predict potential positive and negative environmental and food safety impacts.

Ongoing collaboration

- GMO-ERA project
- LAC Biosafety – World Bank funded project "multilateral" – Brasil, Colombia, Costa Rica and Peru
- Agrofuturo Project (funded by IADB)
- University of Viçosa
- University of São Paulo – ESALQ
- University of Minas Gerais
- Rural University of Rio de Janeiro

General recommendations for enhancing biosafety capacity building efforts

- Projects on capacity building in other subjects related to some extent to biosafety should use the expertise to integrate their curricula

- Creation of a core expert group for a long term training project as a tool to ensure the sustainability of training programs

12. BioSeg is supported by Embrapa - Brazilian Agricultural Research Corporation (linked to the Ministry of Agriculture) and FINEP / Biotechnology Fund (financial agency linked to the Ministry of Science and Technology)

13. PROJECT Executive Committee: Deise M. F. Capalbo, Marília R. Nutti, Mônica C. Amâncio, Edson Watanabe, Eliana M.G. Fontes, Edison Sujii, André N. Dusi, Paulo E. de Melo, Josias C. Faria, Murillo Lobo Jr., Paulo E. Meissner, Jorge L. Loyola Dantas, Mariângela Hungria, Iêda C. Mendes

AFRICAN UNION

[04 FEBRUARY 2007]
[SUBMISSION: ENGLISH]

AU Africa-Wide Biosafety Capacity-Building Project

Case study on the African Union Commission-German Technical Cooperation (AUC-GTZ) Biosafety Capacity-Building Project: "Support to the African Union in the Matters of Biosafety"

Department of Human Resources, Science and Technology
Biosafety Unit, African Union Commission

1- BACKGROUND

14. Following the adoption of the Cartagena Protocol on Biosafety in January 2000, the African Union Commission (formerly called Organization of African Unity) developed the African Model Law on Safety in Biotechnology (AMLSB), which was adopted by the Council of Ministers in July 2001, in order to address the challenges of implementing the Protocol and dealing with its weaknesses. The aim of the model law was to assist the Member States in developing comprehensive national biosafety frameworks.

15. At its third ordinary session, held 4-8 July 2003 in Maputo, the Executive Council of the African Union adopted Decision EX/CL/Dec.26(III), which *inter alia* stressed the need for Member States to equip themselves with human and institutional capacities to deal with biosafety issues within the framework for the implementation of the Biosafety Protocol. The decision also endorsed steps taken by the AU Commission to put in place an Africa-wide Biosafety System as well as an Africa-wide Capacity Building Programme in Biosafety to strengthen the abilities of Member States to deal with biosafety issues. The Chairperson of the AUC was also requested to convene a meeting and come out with proposals for an African common position, and ensure sustainability of capacity building and keep the Council informed on annual basis.

16. The AUC-GTZ Biosafety Project was initiated within the above context to provide the African Union (AU) with the necessary capacities and effective instruments to support its Member States in implementing the Cartagena Protocol on Biosafety and the African Model Law on Safety in Biotechnology. Implementation of the first substantive activities of the project started in January 2006.

2- OBJECTIVES, STRATEGIES, TOOLS AND APPROACHES

17. The objectives of the project include the following:

1. Development of an AU Strategy to implement the provisions of the Cartagena Protocol on Biosafety and the African Model Law on Safety in Biotechnology and its application on national and regional levels;

2. Maintenance of a network of continuous information exchange between the AU Biosafety Unit and the National Focal Points of the Cartagena Protocol on Biosafety will be maintained;

3. Provision of strategic options to strengthen the existing technical and laboratory capacities at regional, sub-regional and national levels to identify GMOs and products thereof.

18. The planning workshop held in December 2005, to discuss the action plan of 2006 adopted the following as **key performance areas of activities** for the project:

- Establishment of the Biosafety Unit and its staff empowerment,
- Organization of a preparatory meeting for African Delegates on international negotiations (the COP-MOP 3),
- Establishment of the Technical Advisors Committee on Biosafety,
- Development of an African Strategy in Biosafety and the revision of the African Model Law on Safety in Biotechnology to be discussed at regional meetings

19. The **activities** implemented and achievements made so far are:

- The establishment of the Biosafety Unit within the AUC Department of Human Resources, Science and Technology (HRST),
- The Preparatory Meeting of African Delegates held from 11-12 March 2006 in Curitiba, Brazil, for the Conference of the Parties serving as Third Meeting of Parties (COP-MOP 3) to the Cartagena Protocol on Biosafety,
- The Technical Advisors Committee (TAC) on Biosafety has been established and held two meetings,
- A regional experts meeting held to discuss the African Strategy on Biosafety and the African Position on GMOs for Food and Agriculture,
- The African Strategy on Biosafety, which has been developed and adopted by the Extraordinary Conference of African Ministers Council on Science and Technology,
- The revision of the African Model Law on Safety in Biotechnology is still on process.

3- PRACTICAL EXPERIENCES, BEST PRACTICES AND LESSONS LEARNED

20. The Project is operating within the AUC-HRST Department and the funds are managed through the AUC global account. This has some impact on the project implementation because all the procedures are done through the AUC system this caused some delay in project staff completion, consultant recruitment, equipment purchase and financial reporting.

21. The regional approach would have been the best way to deal with biosafety issues in Africa but it needs time and very adequate preparation.

22. Communications within Africa through telephone, fax and email still needs a lot of improvement.

23. The problem faced in the Technical Advisors Committee and the Experts meetings is the lack of attendance of all members and all countries.

4- ADVANTAGES/BENEFITS

24. The regional approach is the most reasonable for the African region due to the porous nature of borders between the countries. This approach also helps to maximize the use of resources and to make more efficient the biosafety measures within the continent.

5- COMMUNICATION, COORDINATION, NETWORKING AND COLLABORATION

25. The project had utilized two approaches for communications with the National Focal Points of the CPB:

- The first one was through the use of the AUC formal procedure i.e. through sending Note Verbal the Embassies of Member States in Addis Ababa, to the Ministries of Foreign Affairs of the States and to the Ministries in Charge of Biosafety,

- The second one was direct contact from the HRST-Biosafety Unit to the NFPs-CPB by telephone, fax and email.

26. For more efficiency using both methods of communication has proved to be beneficial.

27. The Project had a joint departmental Experts Meeting (the Rural Economy and Agriculture and the Department of HRST) to discuss two documents: the "African Biosafety Strategy" from the HRST Department and the "African Position on GMOs for Food and Agriculture" from REA Department. The underlying challenge faced in this regard was the extreme position held by participants on the issues of biosafety and biotechnology. This difficulty however helped in development of balanced documents as concerns from both angles were duly reflected.

6- GENERAL VIEWS AND RECOMMENDATIONS

28. Common positions on biosafety and biotechnology could be a big challenge to attain within the continent. The best that could be done would be to have some general guidelines on biosafety and biotechnology and put strong emphasis on information sharing. The two issues definitely have to deal with together.

FOOD AND AGRICULTURE ORGANIZATION	[04 FEBRUARY 2007] [SUBMISSION: ENGLISH]

Regional Project "Capacity Building in Biosafety of GM Crops in Asia (Asian Bio-Net)"

29. The 25th FAO Regional Conference for Asia and the Pacific, held in Yokohama, Japan, in 2000, noted that countries were encouraged under the Cartagena Protocol on Biosafety to the Convention on Biological Diversity to establish mechanisms for assessing and managing the potential environmental risks associated with genetically modified organisms (GMOs). It recommended that "FAO provide capacity building support to developing countries in this endeavor. International donors were invited to provide the necessary financial support for this work". Considering the importance and urgency of the implementation of the recommendations, the Japanese Government pledged to provide financial support to FAO for the execution of a regional project on biosafety capacity building.

30. The donor input was equivalent to 1,234,701 US$. Ten countries participated in the project: Bangladesh, China, India, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam. The desire to become a member of the project, expressed in a second moment by non-participating countries in the region, such as Lao PDR, Cambodia, Myanmar and Nepal, could not be accommodated because of funding restrictions.

31. The overall goal of the project was to generally enhance food and livelihood security in Asia through sustainable and environment-friendly increases in the yield and quality of agricultural products, including, where appropriate, the safe and judicious harnessing of modern technology. The following three specific objectives were designed to significantly contribute to this overall goal:

1. To build national capacities: human resources, research and technology development, infrastructures, regulations and policies for assessing and managing biosafety risks of GM crops;
2. To establish an Asian Network on biosafety for legislations and policies;
3. To assist and promote research and technology development for assessment and management of biosafety risks of GM crops.

32. The Project started in May 2002 and had duration of three years. Progress of the project was initially delayed due to some difficulties in obtaining nominations of national focal points from participating countries, a situation that was exacerbated by the occurrence of SARS. Its duration was thus extended up to December 2005 to compensate for the delayed beginning.

33. The major activities regarding the national capacity building (objective 1) included the publication of a "Benchmark Document" and the hosting of a series of national stakeholder workshops. The draft of the Benchmark Document was first presented at the Second Focal Points Meeting in March 2004, revised in consultation with participating countries and published in October 2004 after receiving the endorsement from participating countries. The document indicates that the participating countries vary greatly in their biosafety capacities, but suggests that most of the countries still require considerable efforts to build up their biosafety system. Some countries in the region made some progress in this direction and can offer assistance to the other participating countries. The document outlines the following areas as needing strengthening: 1) human resources, 2) infrastructures (e.g. detection and monitoring of GMOs, biosafety clearing house), 3) regulatory mechanisms (biosafety guidelines, biosafety acts, enhancement of inter-ministry coordination, establishment of national biosafety committees and institutional biosafety committees, and harmonization of regulatory mechanisms), 4) policies and programmes (accountability for international negotiations, policies for undertaking risk assessment and risk management, and commitment to raise institutional and public awareness), 5) financial requirements (provide adequate funding for training, workshops, seminars, infrastructures for biosafety research), 6) regional collaboration (capacity building, consultations, training, collaborative research, harmonization of risk assessment and management protocols and strengthening of quarantine systems). Nine national workshops were held in collaboration with participating countries on specific themes matching identified national training needs. The workshops were attended by a total of 431 members of regulatory bodies, NGOs and the private sector, as well as decision makers and scientists.

34. The major activities regarding the establishment of the Asian network on biosafety (objective 2) included the organization of three focal points meetings, two regional consultations and the establishment of the Asian Bio-Net website. The meetings and workshops enhanced the solidarity and friendship between participating countries and other stakeholders and produced a positive atmosphere for promoting regional harmonization of biosafety measures. The project website was launched in November 2003. It contains information related to the project, to the status of biosafety in the participating countries, photo gallery, resource documents and useful links. It was continuously improved and updated based on suggestions and recommendations of the national focal points.

35. The major activities regarding the supporting research and technology development (objective 3) included the organization of three regional training workshops on the following topics: DNA detection of GM crops (in Thailand), public awareness and participation (in Philippines), and risk assessment and management (in Japan); and the publication of: a training manual on GMO detection, a training manual on Public Awareness and Participation concerning GM crops with emphasis on risk communication, and the proceedings of the *Regional Training Workshop on Risk Assessment and Risk Management of GM Crops,* in collaboration with the Ministry of Agriculture, Forestry and Fisheries of Japan.

36. The activities of the project were implemented in coordination and, whenever possible, collaboration with other existing projects on biosafety capacity building both at national or sub-regional

level. The project has been widely recognized as a model of regional collaboration in the field of biotechnology and biosafety.

37. The final regional consultation concluded that the project effectively assisted the participating countries to promote national capacity building on biosafety of GM crops; emphasized that the new phase of implementation of the so far developed National Biosafety Frameworks generates new challenges and therefore requires renewed efforts and endeavours; recognized that the responsibility of biosafety-related decision making rests on the respective national authorities and that it is therefore essential to strengthen the national biosafety capacity of each country; underlined that regional collaboration and harmonization, where appropriate and to the extent possible, on biosafety can offer important opportunities of mutual benefit for the countries in the region; and requested FAO to formulate a project and to seek funding opportunities to continue of the Asian Bio-Net activities.

SWISS FEDERAL INSTITUTE OF TECHNOLOGY (ETHZ)	[12 FEBRUARY 2007] [SUBMISSION: ENGLISH]

International Project on GMO Environmental Risk Assessment Methodologies (GMO ERA) Project

Main achievements 2006 – 2007

38. *ETT workshops:* The project carried out capacity building activities to create Expert Training Teams (ETT) in the focal regions of the project to develop and validate teaching tools that use the methodologies for environmental risk assessment from the first phase of the project. The first Vietnam ETT workshop was held in May 2006, and Brazil ETT workshops have been held in June 2006, and February 2007, with further workshops planned for 2007. In East Africa, the project is contributing to the development of expertise and training capacity in the BiosafeTrain project, which included contributing to a workshop in Nairobi in September 2006.

39. *Outreach meetings:* Led by the Brazil group, the project held meetings with representatives of Brazilian non-governmental organisations and with representatives of international biotechnology companies.

40. *External review:* During 2006 the project was reviewed by an external team on behalf of the funding agency (Swiss Agency for Development Cooperation). The review report highlighted amongst other points the contributions of the project to a South-South dialogue, the contribution to capacity building, the development of scientifically sound environmental risk assessment methodologies, and the building of a wide network of scientists from the public sector. Recommendations included seeking greater involvement of representatives of Ministries of Environment, Health etc., as well as Agriculture, in advisory positions, making greater efforts to inform and train scientist regulators, initiating the more systematic use of the teaching materials in academic curricula, and strengthening collaboration and/or partnerships with similar projects implemented at the regional level. The project is acting on these in current planning (see below).

Lessons learned

1. *Joint development of teaching material:*

41. ETT members are developing the teaching tools in collaboration with other project experts, and validating them by training other scientists involved in the GMO regulatory process, thus current project activities are building teams of experts in the focal countries who have a solid grasp of the ERA approach such that they can effectively teach it to others, expanding the base of experts. The development of the teaching material and the teaching is being led by local experts and leading national training institutions. This process has been important for clarifying the key uncertainties, and consolidating joint understanding, because you can only teach material well that is thoroughly designed and applicable. The project methodologies on which the tools are based have themselves been developed jointly by groups of scientists from northern and southern countries in the first phase of the project, and ETT members are applying their own expertise to further adapt the methodologies to their regional situation.

42. The joint work on the teaching tools has been facilitated by the use of a group shareware software called Basic Support for Shared Work (www.bscw.de/english/), which enables group members to jointly work on (large) documents via a protected environment on the Internet. We are using this to counteract the restrictions of limited funding available to organise meetings for joint work. However, the limited time availability of public sector scientists in research institutes is still a constraint.

2. *Teaching by local experts, with long term training perspective, and integration of biosafety /ERA teaching into academic curricula:*

43. The project has already stimulated use of the teaching materials in academic courses, notably the intensive post-graduate training course taught by the Brazil team at the University of Viçosa. This course will be expanded next year, and another project member is developing a course at the University of São Paulo (ESALQ). A Vietnamese project member has used the project material to teach at Ho Chi Minh University. BiosafeTrain project members used the teaching materials in a course in Niger. An important factor is that the finished teaching tools will be in local languages. The finished teaching materials will be published on the internet as pdf files.

3. *South-South dialogue:*

44. Scientists from each of the three regions have contributed to activities of the other regions, building confidence and networking, which is already contributing to more formal agreements for collaboration (see below). We strongly urge that funding and support is maintained nationally and internationally for South-South exchange between scientists with expertise in biosafety.

4. *Building confidence and knowledge to carry out environmental risk assessment of transgenic crops:*

45. Strengths of the project teaching approach are that it is based on participatory and experiential learning, involving small group activities dealing with concrete, applied scientific problems. In Vietnam the scientists were able to draft resistance management plans for some key transgenic crops for Vietnam as a result of the training. Joint writing of the Vietnam book, to be published soon in the CABI series, is also significantly increasing confidence and knowledge of Vietnamese co-authors. In Brazil, project activities have strengthened biosafety initiatives particularly in gene flow risk management and resistance management.

Collaborations with other projects and current plans:

46. *Collaboration with* BiosafeTrain *project in East Africa*: Building on the successful partnership, the BiosafeTrain project is discussing future collaborations with the Brazil team.

47. *Collaboration with two projects in South America* (World Bank funded project “Multilateral “ and IAB funded project “Agrofuturo”): Both these projects include funding for training and other capacity

building initiatives that will be coordinated by project members, and that will use the project teaching materials.

48. Collaboration *with UNEP GEF Implementation project in Vietnam / South East Asia:* The project is working on a collaboration with the project for the second workshop in Vietnam in 2007.

49. *Problem Formulation and Options Assessment (PFOA) handbook and training:* PFOA was developed by the project and provides a framework for identifying the crucial societal need that could be satisfied by introducing a GM crop into an agricultural system, comparing the GM crop to other possible alternatives for meeting that critical societal need, and ensures that public debate informs scientific risk assessment and vice versa. It is a methodology that both strengthens the science of risk assessment while strengthening deliberative democracy in risk decision-making and policy formation.

50. The project is developing a PFOA Handbook which will:

- Introduce and explain the substance, theory, and practice of the PFOA methodology;
- Provide guidance about the integration of a PFOA into a country's environmental risk assessment (ERA) procedures for genetically modified organisms (GMO);
- Examine considerations, techniques, and resources that can assist in designing, implementing, and conducting a country-specific PFOA.

51. The PFOA Handbook is written for an international audience of the principal parties to be involved in the ERA of GMOs at a national level. It is designed to accommodate users in different countries having unique needs and facing distinct challenges in trying to customize the PFOA process to particular cultural, political and environmental contexts. It will be peer reviewed and used for training during 2007. The project has funding to distribute a number of free copies of the handbook on CD, and is looking for opportunities to offer training in its use.

ORGANISATION OF AMERICAN STATES (OAS)	
	[04 FEBRUARY 2007] [SUBMISSION: ENGLISH]

The Organisation of American States (OAS) Initiatives in Biotechnology and Biosafety

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52. The products of modern biotechnology, most notably genetically engineered agricultural crops and foods derived from them, are becoming increasingly common in Latin America and the Caribbean. Brazil and Argentina are among the world's five leading developing countries that have approved and adopted biotech crops. Capacity building initiatives in Biosafety and Biotechnology have been supported by the Organisation of American States in two projects initiated in 2002 and in 2004 respectively. These have been oriented to reinforce the national and regional capacities in Biosafety and Biotechnology in the Region specially in : the evaluation and handling of GMOs risks, the management and innovation of the

agri-food biotechnology industry, public awareness about GMOs and the generation of information for national and international networks in Biosafety that include the public and private sector and universities. The participants countries are: Argentina, Brazil, Colombia, Chile, Costa Rica, Ecuador, El Salvador, Grenada, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, and Trinidad & Tobago. Venezuela and Uruguay although not formally participating in the Project have also joined in some activities.

53. The project's activities are: organization of training courses and seminars; publication of reports, papers and books on the topics covered by the project; implementation of a web page; as well as advising to parliaments in the discussion of Biotechnology and Biosafety laws. During 2004-2005, five Regional Courses and six International Seminars were organized in biotechnology fields such as: risk assessment and risk management of GMO food and plants with novel traits; DNA analysis and traceability in GMOs and derived food; innovation and management in biotechnology. These activities held in Panama, Argentina, Venezuela, Brazil, Colombia and Chile were lectured by internationally recognized experts, thus ensuring a high quality standard training. A total of 74 training fellowships were awarded to 17 countries, 181 professionals were trained in courses (42 in experimental and 139 in theoretical courses), representing over 100 institutions To the seminars attended 790 professionals. During 2006 the activities were centred on Biotechnology Public Awareness.

54. Project activities have been disseminated by 5 papers in peer review journals and 2 books. The project activities are a good example of practical synergies and complementary between Biosafety capacity building initiatives at the country and at the regional level. The project has strengthened North-South cooperation in biosafety training through the collaboration with institutions recognized world wide, such as: CFIA and Health Canada from Canada, USDA-APHIS and ILSI USA, Institute Pasteur, France, University of Leipzig, Germany, University of British Columbia, Canada. Similarly the South-South interactions have been strengthened through working with institutions from different countries such as: Argentina (SAGPyA, SENASA, INIA and CONABIA), Brazil(EMBRAPA); Colombia(ICA), Venezuela(IDEA), Chile(CONICYT, CORFO, Ministries of Health and Economy and University of Chile). In addition regional synergies have also been implemented with UNU-BIOLAC Program as well as with GEF.

55. A low level of awareness and understanding about biotechnology is characteristic of Latin American and the Caribbean countries, as elsewhere, efforts to remedy poor public perception often seem inadequate and do not reflect a well-designed strategy.

56. In order to improve the understanding of the Biotechnology and their applications, a strategic plan for public communications in the region has been proposed as one of the project objectives. Specific objectives for this initiative, include: (1) to make evident to decision makers that modern biotechnology can be an effective tool for increasing agricultural productivity, and thereby economic growth, without imposing unacceptable risk to the environment or human and animal health; (2) to enable members of the public to make informed decisions about appropriate uses of biotechnology by providing accurate information about benefits, risks and impacts; (3) to incorporate modern biotechnology into science curricula for secondary schools, university and college students, and agriculture extension officers.

57. These actions need a variety of specialized expertise, including communication specialists, technical writers, graphic artists and illustrators to design information materials and conduct training. Ideally, members should provide expertise in biotechnology and biosafety, public communications and project management. The plan will need to identify scientists and technical experts who can provide expertise in science writing for general audiences, advertising, graphic arts, public opinion polling and media communications. These professionals can provide basic information about the techniques of modern biotechnology; the products now available and those being developed; what is known about the nature, probably and consequences of potential risks. Governments, industry, universities and media must

play an important role to improve public perception about biotechnology, this is an urgent requirement to help to develop biotechnology in Latin-America and Caribbean Region.

58. In this project some strategies to promote effective regional cooperation included the following:

1) The trainees were selected according to quality of their curriculum as well as the country and institutions training priorities. A selecting committee for each activity included, the general coordinator project and the coordinators in each country, which were professionals well recognized for their knowledge about biotechnology in his own country.

2) Support from OAS was only seed money, about 36 % of the project budget was provide for OAS, the rest came from contributions of the countries that host the activities as well as from contributions of the private sector or international institutions or agencies.

3) Differences in the level of Biotechnology and Biosafety development were observed within different countries. Thus, institutions, professors and specialist from the most advances regional countries were used for capacity building oriented to the less developed.

4) Government officials, authorities, decision makers, producers association, universities, member of the parliaments or parliamentary advisers were formally invited to joint project activities.

5) A network of specialist in different areas of biotechnology has been built.

6) Paper published in peer review journals and books published disseminated regionally the project activities.

7) Cooperation with other financial agencies was stimulated.

THE WORLD BANK	[12 FEBRUARY 2007] [SUBMISSION: ENGLISH]

Summary of World Bank Biosafety Activities

The World Bank is working with Colombia and India on GEF biosafety demonstration projects which are nearing completion. The Bank is broadening its assistance to countries in biosafety with two new regional/multi-country GEF biosafety project proposals for nine countries in Latin America and in West Africa. Concurrently, the Bank is undertaking internal learning activities to strengthen awareness among its staff about biosafety and its relevance to other Bank interventions. This includes the initiation of an internal discussion paper on approaches and programs of the World Bank and other multilateral and bilateral aid agencies on biosafety and related issues in developing countries.

Colombia – Capacity Building for Implementation of the Cartagena Protocol on Biosafety (CPB)

59. The project aims to provide Colombia with capacity to assess and manage risks associated with the transboundary movement of LMOs and thus meet the basic obligations of the Cartagena Protocol.

Main Results in 2006

60. By the end of 2006, the project advanced in all four main components and is scheduled to complete in mid-2007. Because of full Government support for the objectives of the project, a considerable amount of public funds were leveraged through the GEF funding. This enabled training and capacity building activities to be scaled up. Three more training activities are underway for 2007 including the certification of officials in a biosafety postgraduate program. The BCH component is completed with the exception of the revision of the operation manual and training of national authorities in relevant uses of the BCH. (See www.bch.org.co/). Efforts to harmonize a national law on biosafety under the regulatory component continue with working groups having revisited respective sectoral regulations which will then be compiled and distributed for further discussion. The location of the inter-institutional central laboratory under the centers of excellence component has been agreed upon and equipment procurement is almost completed. Remaining tasks will include finalization of the pilot research on gene flow on potato, corn and rice (expected in January 2007).

Ongoing Collaboration

61. South-south collaboration has been seen in the training component of the project where government officials have been trained in or exchanged knowledge with neighboring LAC countries, including Mexico, Cuba and Argentina. A certificate program that a group of officials are participating in is offered through the UNIDO/BINAS-Universidad Concepción Biosafety Diploma Program in Chile. BCH project management is entering into an agreement with UNEP for technical cooperation on the BCH and is negotiating a cooperation agreement with the University of Uruguay. The BCH coordinator also participated in the 2nd BCH Informal Advisory Committee meeting in Geneva in November 2006.

Lessons Learnt

1) The need for strengthening inter-institutional coordination at the highest level in order to allow key components to a biosafety framework to be prioritized such as inter-institutional political agreements is the major lesson learned in this project. Utilizing technical working groups promotes inter-institutional cooperation from the bottom-up and facilitates, over time, high level coordination.

2) Civil society should be included in capacity building components of NBF implementation projects in order to enrich the debate and extend the social base of the national biosafety strategy. Capacity building training should include customs and port authorities, judges and other legal personnel.

India – Capacity Building for Implementation of the Cartagena Protocol

62. The main objective of the India biosafety capacity building project is to develop national capacity to implement the Cartagena Protocol on Biosafety.

Main Results in 2006

63. Implementation of all five components is nearly completed. The main accomplishments in 2006 include the launching of the India Biosafety Clearing House (see www.indbch.nic.in); the publication of the "Rice Biology" document on the taxonomy, genetics, reproductive biology, cultivation, genetic diversity, and pests of rice for use as a tool in risk assessment; and, advancing the training component which was the largest outstanding activity. For the latter achievement, eleven training programs were organized including three LMO detection training seminars as well as a "sensitizing" session for customs

officers and a study tour to Mexico and the USA. A risk assessment consultancy was awarded to ICGEB and a report is expected in early 2007. A compilation of LMO detection results from the four laboratories is also planned. The main focus in the final phase of the project will be on implementing the remaining activities in the training plan derived from the training needs assessment done in 2005. The project is scheduled to be completed in 2007. (See http://www.envfor.nic.in/divisions/csurv/biosafety/default.htm for detailed project information and outputs.)

Ongoing Collaboration

64. The Ministry of Environment and Forests (MoEF) co-hosted an international conference on capacity building in November 2006. This event drew participants from all over the world and aimed to promote information exchange and South-South cooperation, an area that the Government of India is actively pursuing given its share of expertise and experience in biosafety and biotechnology. In addition, the capacity building project is part of a biotechnology/biosafety communication network in India.

Lessons Learnt

1) A training needs assessment helped address the challenge of linking human capacity with organizations and institutions affected by or overseeing the meeting of the obligations under the CPB.

2) Awareness and holistic understanding of issues and policies related to LMOs is specific to concerned personnel in line ministries and needs to be strengthened on an institutional level.

3) Coordination between the different line ministries and between central and state level administrations needs to be strengthened to work towards alignment of different policy and institutional solutions proposed by different ministries.

Latin America Multi-country Capacity-building for Compliance with the Cartagena Protocol

65. The proposed GEF biosafety project for building capacity for the safe transfer, handling and use of transgenic crops and for the effective implementation of the CPB has recently completed its appraisal stage and is expected to be submitted for GEF CEO endorsement in the first half of 2007.

66. The project, estimated to cost US$14 million (including US$5 million in GEF financing) covers Brazil, Colombia, Costa Rica, and Peru. It builds upon the Colombia demonstration project and stems from concerns in the region over the increasing adoption of GM crops without sufficient, scientifically-sound, biosafety assessment, management or decision-making instruments in place. Other reasons for adopting a multi-country approach include the extremely important centers of biodiversity in particular in relation to important crops and wild/weedy relatives; the complexity of the biosafety issue and the urgent need to address it by exploiting the complementary expertise across the participating countries; and the need for efficiencies through, the enhanced use of scarce resources while avoiding duplication.

67. The project approach relies on centers of excellence in the four countries and their complementary skills to accomplish project objectives as well as to sustain collaboration on biosafety and adherence to CPB obligations post-project implementation. The project will be accordingly executed by one such center, the International Center for Tropical Agriculture (CIAT) which comes under the aegis of the Consultative Group on International Agricultural Research (CGIAR). Harmonization, in the case of this project will be on the *technical* level, in particular in risk assessment and management.

68. The project consists of the following: (a) the strengthening of technical capacity in knowledge generation for biosafety risk assessment and management using selected, target non-GM crops, as well as strengthening capacity for socio-economic and cost-benefit assessment; (b) strengthening of biosafety decision-making capacity through the training of competent authorities and practitioners; and, (c) training in biosafety for communicators, opinion-makers and the general public to improve public awareness. Development and implementation of a communication plan will be part of this component.

West Africa Regional Biosafety Project

69. The overall objective of the GEF West Africa Regional Biosafety Project is to protect biodiversity from the potential risks associated with LMOs within the West African Economic and Monetary Union (WAEMU) through the cooperation of its member states, of which Benin, Burkina Faso, Mali, Senegal, and Togo will receive GEF financing. The project is estimated to cost US$23.4 million (including US$5.4 million in GEF funding and US$5.3 million in IDA funding).

70. The project will enable the countries to collectively assess and manage potential environmental risks of agricultural biotechnology and ensure adequate levels of protection in the transfer, handling, and use of transgenic crops – thereby facilitating individual countries to meet CPB obligations. The countries agree on the urgent need for an operational biosafety framework, given that field trials of transgenic cotton have already begun in one country and are being considered in others, and also given the geographic reality that farmers are likely to share seeds across national boundaries. The project design consists of three components that aim to (a) produce operational, regionally harmonized methodologies for risk assessment and management of LMOs and LMO products; (b) strengthen national biosafety frameworks to enable their implementation; and (c) set up a regional legal framework for biosafety as well as strengthen policies on intellectual property rights pertaining to transgenic plants and establish a regional observatory to monitor possible environmental and health impacts and socioeconomic issues.

71. Communication and dialogue from all perspectives are crucial aspects of the project's development and implementation, and information dissemination about the project has begun in the region in 2006 through extensive consultations with all stakeholder groups. A stocktaking assessment has also been conducted. It is hoped that the development of a common biosafety regulatory framework through WAEMU will bring significant cost reductions and coordination benefits for the individual nations who share an interest in not only protecting the environment, but also in sustaining an important source of their livelihood (cotton). The proposal is slated for submission for CEO endorsement (subject to meeting specific Council-member conditions) in 2007.

RAEIN-AFRICA	[15 FEBRUARY 2007] [SUBMISSION: ENGLISH]

The Southern African Biosafety and Environment Programme

Preamble

The Regional Agricultural and Environmental Initiatives Network (RAEIN-Africa) was formed in 2002, after a regional biosafety and biotechnology needs assessment carried out in Eastern and Southern African regions in 2001 and 2002. After realising that that there was need for a SADC regional coordinating body on emerging technologies and policies that govern their safe use participants of this exercise endorsed the formation of RAEIN-Africa.

RAEIN-Africa will be established as a leading organisation in facilitation of an innovative systems approach in technology and policy development for sustainable development. RAEIN-Africa will thrive to enhance the livelihood of the marginalized citizens in the region through their participation in technology development and policy formulation for sustainable development.

The RAEIN-Africa secretariat is in Namibia where it works in collaboration with the Ministry of Education, Directorate of Science and Technology, University of Namibia and the Namibian Biotechnology Alliance (NABA)

The regional Board of Trustees is composed of eminent professionals from the region who are leaders in research and development, technology development and promotion, capacity building, rural development and agricultural research and economics, policy development, sustainable development and project management. The network is therefore well governed.

The Biosafety and Environment Programme

72. The RAEIN-Africa has been implementing "Southern African Biosafety and Environment Programme" (BEP) funded by the DGIS of the Netherlands. The programme started in October 2004 and is ending in June 2007. The focus of the programme is biosafety and the environment. The broad objective of the programme is to promote and foster good governance through public involvement in decision making on biosafety and the environment. The specific objectives are to facilitate development and implementation of biosafety systems and harmonise them with environmental laws; build legal, technical, and socio-economic expertise for development of biosafety systems; initiate research on biosafety data generation for backstopping decision making processes; create a database on science and non-science biosafety issues and link with other regional and international databases; and to promote and foster networking, cooperation and collaboration. Programme activities include policy support, networking and capacity building. Capacity building is implemented in a three pronged approach which includes public education, awareness and participation, data generation and short courses.

73. In implementing its activities the network enjoyed a lot of support in form of both technical and other contributions from government institutions, NGOs and other stakeholder groupings in the region including NEPAD, the SADC Biodiversity support Programme and the AU other International organisations such as the UNEP/GEF Biosafety programme.

74. Below are some of the programme achievements to date:

- The BEP's work plan was drawn by representatives of eleven SADC countries, in a consultative planning workshop in Lusaka, Zambia in 2004.

- Taking into account the fact that capacity building activities have to clearly link with policy process if biosafety is to become an integrated part of science and technology and innovation policy, RAEIN-Africa, under the BEP, carried out a study on "Capacity Building for the Sustainable Management of Legal and Policy Aspects Related to Biotechnology and Biosafety in the SADC Region". The study confirmed the limited human and infrastructural capacities in the region and highlighted that South Africa had the most human and infrastructural capacity endowment, which could be instrumental in facilitating capacity building in other countries in SADC. The study also recommended a number of short courses that the network could embark on to compliment the limited capacity in the region. Some of these courses were implemented in 2006 as highlighted in this report.

- The programme supported public awareness activities in Botswana, Namibia, Mozambique, Swaziland, Tanzania and Zimbabwe. Activities carried out in these countries range from national consultations on biosafety frameworks, national public awareness surveys, Public awareness workshops and production of public awareness materials.

- Supported three research projects in – The distribution, molecular variation and assessment of gene flow between wild varieties of sorghum; a study on the distribution of GMOs in selected SADC countries; and genetic diversity of pearl millet and cowpeas in Namibia. Three MSc students were funded through these research works – all of whom have finalised their thesis and are graduating in 2007.

- Implemented a regional workshop on "Public Education, Awareness, and Participation in Biosafety" in collaboration with the Department of Agricultural Research in Botswana, 35 participants from 9 SADC countries participated. These were representatives of the media both electronic and print, scientists, civil organisations (NGOs) and policy makers (including Members of Parliament). The workshop attempted to bring these various stakeholders to educate each other on issues of biotechnology, biodiversity and biosafety areas of consensus were noted and so were concerns from each of the stakeholder groups. Implementers of public awareness activities could use the issues raised by each of the stakeholder group as priority information gaps.

- Other training workshop held were:

  - Training on Negotiation Skills – Thirty-Five participants were present which covered Biosafety Focal Points representatives, Scientists, legal and policy makers nominated by the focal points from the following SADC countries; Botswana, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe. There were also invited speakers from the UNEP/GEF, NEPAD, SADC and experts in Liability and redress, Risk assessment and risk management and handling, packaging , transportation and identification which came from Kenya, South Africa and Switzerland. This training workshop was held in readiness for the COP/MOP3 meeting held in Brazil in March 2006. The workshop aimed at developing common understanding on the main issues on the COP/MOP agenda. It thus discussed the following key issues; Liability and Redress; Handling, transportation, packaging, and identification; and Risk Assessment and Risk Management. Day 2 and 3 were reserved for training on negotiation skills by a South African Advocate – Henk Botha. Sixteen out of the 35 trained participated at the COP/MOP meeting in Brazil.

  - Training on identification of GMOs was hosted by the Tobacco Research Board and the University of Zimbabwe – Twenty-Six scientists, lecturers and technicians, from Botswana, Lesotho, Mozambique, Malawi, Namibia, Swaziland, Zambia and Zimbabwe were exposed to the theory and practice on GMO testing. The course covered topics on: Overview of Biotechnology and Issues/Concerns, Introduction to plant transformation techniques, Isolation of Genomic DNA from plants, Principles of the polymerase chain reaction (PCR), Qualitative and quantitative GMO analyses using both PCR and ELISA techniques, The Cartagena Protocol on Biosafety and Status of Biotechnology in selected SADC countries, Food Safety evaluation and case studies MON810

  - A workshop on "Biodiversity, Biotechnology, Biosafety and Law" was held in collaboration with the Swaziland Environment Authority and University of Swaziland. It attempted to educate the participants on the interface between science and Law. The workshop was attended by twenty-eight scientists, policy makers and environmental lawyers from 8 SADC countries. The major recommendations were the need for a manual on Biotechnology,

Biosafety and Law to be built into a three to four week staggered on site and on line course; and a network of legal experts on biosafety to be established at regional level.

- A National Biosafety workshop was held in collaboration with the South African Department of Agriculture, with thirty-three participants from all the SADC countries except Tanzania and Angola attending. The major focus of the workshop was role of biosafety committees in the development and implementation of NBFs. Among the major issues discussed was the need for a coordinated biotechnology and biosafety activities including capacity building in the region.

Lessons Learnt and Recommended Way Forward

75. The need to involve stakeholders in all stages of development of capacity building initiatives, from needs assessment to designing the interventions and implementing them was noted. Transparency is important to build trust and true participation by stakeholders in this process. A holistic approach for sustainable capacity to be achieved should be considered. Training human capacity alone without equipping the individual institution to be able to use the skills imparted to them, is not sustainable. The multi-stakeholder approach enhances sustainability and ensures that the efforts at national level are harmonised. Sustainability should therefore be an issue in building capacity for developing countries.

76. The issue of Institutional- capacity building remains a priority in the region. Most countries highlighted that they lack comprehensive national policies and legal frameworks on biosafety. Were these are available countries highlighted lack of capacities to implement and enforce them, lack of infrastructural and administrative capacities. Some of the already existing international and regional programmes are aiming at addressing this priority need.

77. There is need to work with established capacity building institutions and influence the inclusion of the designed short courses into their institutional programme of work. This can substantial increase the chances of sustainable provision of the relevant skills on a cost recovery basis. Short courses should be very focused and targeted to the relevant institutions that will use the learnt skills in their day to day activities. There is need to develop a pool of trainers at regional level on specific needy areas as identified by the needs assessment carried out in the region. Linkages to other regional and international institutions working in Biosafety are a must.

78. The issue of capacity building in regulatory aspects of systems of innovation of emerging technologies such as biotechnologies need a more coordinated effort at national, regional and international levels. This will not only reduce duplication of efforts but will also enable interventions to plan from a holistic point of view i.e. capacity building that feeds into each other. e.g. technical capacity to link up with infrastructural capacity building and be supported by a coherent policy system.

79. As an initiation phase the BEP has a short programme life span hence most activities were to initiate the network's future programmes and give basis for the focus of the network. The BEP's major achievement was the establishment of a good networking relationship among the various stakeholders across SADC that include government departments, parastatal organisations, NGOs, consumer and farmer organisations, academic institutions and private companies. Currently the initiative is seeking for strategic partnership in addressing some of the identified priority constraints in the development and implementation of biosafety systems.

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE	[19 FEBRUARY 2007] [SUBMISSION: ENGLISH]

The Program for Biosafety Systems (PBS)

John Komen,
Program for Biosafety Systems (PBS)
URL: http://www.ifpri.org/themes/pbs/pbs.htm

1. The Program for Biosafety Systems (PBS) contributes to the implementation of the Cartagena Protocol by supporting partner countries as they develop the policy and legal framework, administrative procedures, technically qualified personnel and outreach mechanisms integral to their national biosafety systems. PBS work emphasizes sound science-based decision making and research, while also addressing socioeconomic considerations. PBS works with partner countries in Africa (Ghana, Mali, Nigeria, Kenya, Uganda, Malawi, Mozambique, South Africa) and Asia (the Philippines, Indonesia) to develop and implement a program of activities tailored to biosafety needs identified by local collaborators. In addition, PBS works with regional policy-making bodies on subjects of common interest, such as GM commodity trade and the development of regional technical guidelines.

Project activities

The scope of activities includes the following:

2. *Policy and regulatory development through stakeholder participation:* The PBS policy component analyzes the implications of different country and regional regulatory approaches for genetically modified organisms and develops new decision models to assist regulatory agencies. Choices regarding biosafety policies and objectives are evaluated for their implications for agricultural growth, trade, and food security.

3. *Technical training in environmental and food risk assessment*: PBS maintains an active program of training and outreach activities. The overall aim of such activities is to ensure that the people involved in biosafety decision-making are competent and confident to assess planned releases of GMOs and GM food products using the best available science.

4. *Strategic planning for communications and outreach*: Clear and consistent communications about biotechnology and biosafety are key to the success of biosafety capacity development in partner countries. Improving the understanding of biotechnology and biosafety in a wide array of audiences is essential to achieving this goal.

5. *Grants for scientific research on environmental risk issues*: The focus of the Biotechnology-Biodiversity Interface (BBI) grant program, managed by PBS, is on the need to better understand the interaction between genetically engineered crops, agriculture, and the environment. Environmental risks and benefits, and their applicability to the agricultural realities of different ecological regions, must be assessed on a case-by-case basis. Through BBI, competitive grants fund biosafety research aimed at addressing the effects of agricultural biotechnology, particularly genetically engineered crops, on natural biodiversity as it occurs in developing countries.

6. *Assistance with regulatory documentation for proposed field testing:* For the benefits of agricultural biotechnology to reach farmers and consumers in developing countries, specific agricultural products must be developed, tested, and deployed. Each step along this process must be carried out following good biosafety practices and in conformity with national biosafety regulations. This component

of PBS aims to help public sector R&D institutions to incorporate biosafety into their product development efforts and to comply with regulatory requirements. It also aims to help regulatory agencies to carry out their roles effectively in the review, approval, and inspection processes.

Main achievements

7. Selected PBS achievements include:

8. *Contributing to (regional) policy making:* A number of African governments are in the process of drafting, or revising overall guiding policies on biotechnology and biosafety, usually backed by laws or decrees stipulating the specific procedures for GM applications and products. PBS supports national policy development where needed, notably in countries who are in the process of defining their national biosafety systems, e.g., in Malawi, Ghana and Uganda. In Malawi, PBS has supported a process of grassroots consultations in key agricultural zones, providing inputs into a draft policy on biotechnology and biosafety developed by a multi-stakeholder Biotechnology Policy Taskforce. The final policy document will be submitted to Cabinet in early March 2007. In the meantime, work has started to revise the Biosafety Act (2002) to better define regulatory roles and responsibilities among relevant government agencies.

9. Regional policy research projects in collaboration with ECAPAPA[1], ACTS[2] and FANRPAN [3] aim to inform the policy process in sub-Sahara Africa. For example, the Regional Approach to Biotechnology and Biosafety Policy in Eastern and Southern Africa (RABESA) initiative, supported by the COMESA Secretariat, in its first phase analyzed the likely trade implications of planting GM crops for selected countries in East and Southern Africa. Based on the outcomes of the study (available at: http://www.acts.or.ke/pubs/monographs/index.html), the COMESA Secretariat drafted a set of guidelines on regional trade flows of GM commodities, which will be elaborated in a follow-up phase of the initiative.

10. In addition, detailed legal analysis and review has been done on (drafts of) laws and regulations, and recommendations made to ensure such documents establish workable, understandable and transparent regulatory systems that are consistent with international obligations. In Eastern Africa, this work has been review through regional policy seminars organized by the East African Community (EAC).

11. *Establishing the BBI* competitive *grants program*: Scientific data are essential for assessing environmental risks and benefits of transgenic organisms, particularly in centers of diversity. Impacts will differ from one ecological region to another and should be evaluated on a case-by-case basis, in and by developing countries. The focus of the Biotechnology Biodiversity Interface (BBI) grants mechanism, managed by PBS since 2003, is on the need to better understand the interaction among transgenic crops and animals, agriculture, and biodiversity. To date, 11 project proposals (see Table 1 below) have been awarded, with scientific leadership by developing-country research institutes. PBS regional coordinators and advisory groups are instrumental in identifying BBI priorities, launching calls for proposals and supporting potential grantees. Findings from the BBI projects are being reviewed through regional technical review meetings and international conferences.

12. *Integrated Confinement System for GM plants*: Confined field trials (CFTs) play a critical role in the evaluation and development of new technologies intended to improve agricultural productivity. General guidelines for assessing and deciding on CFTs have been adopted in most partner countries. However, their implementation must be carefully managed in order to assure that the experimental material remains confined, so that no effect on the environment and human or animal health is allowed.

1 ECAPAPA: Eastern and Central Africa Programme for Agricultural Policy Analysis

2 ACTS: African Centre for Technology Studies

3 FANRPAN: Food, Agriculture and Natural Resources Policy Analysis Network

Aware of the need for a comprehensive and encompassing approach —comprising the development of detailed guidelines, tailored training and technical assistance— in the critical area of biosafety for confined field trials, PBS and partners in developing countries have developed an 'Integrated Confinement System' applicable to confined field trials as well as contained glasshouse experiments. The system has been developed through collaborative work in East Africa, and has the following elements: (a) CFT Guideline; (b) Containment Manual; (c) Confinement Manual; (d) Regulatory Procedures; (e) Trial Managers handbook; and, (f) Inspectors' handbook. These materials are now available in English and French at: http://www.danforthcenter.org/International/4_Program%20for%20Biosafety%20Systems.htm

13. *Towards an integrated approach to biosafety training*: So far, PBS training and education events have been primarily organized in response to needs and challenges expressed by partners in Asia and Africa. This has been a valid approach in order to establish a strong training component, and to develop and test training materials and methods. This approach ensures the relevance of PBS-supported activities, but does not necessarily lead to immediate impact towards achieving PBS outcomes and milestones. PBS agreed on a set of common principles to be followed in the design, implementation and evaluation of training and education activities. They were derived from a review of past events in partner countries, drawing lessons from successful approaches. As a result, PBS continues to move toward targeted training interventions supporting a clearly defined goal, with less emphasis on introductory, generic training activities (however recognizing these are still needed for most partner countries). As a result, recent training events focused on, for example, reviewing actual field trial applications; developing GM food safety regulations in line with international (Codex) standards; developing training curriculum and materials by African universities. These activities will be complemented by a PBS "train the trainers" initiative, the first of which will take place during the summer of 2007.

14. **Table 1. Projects supported by the** Biotechnology**-Biodiversity Interface (BBI) competitive grants mechanism under the Program for Biosafety Systems (PBS)**

Project title (year awarded)	Objectives	Investigators
Investigation of Secondary Ecological Effects of Bt Corn in the Philippines (2004)	▪ To study the direct effect on indicator species using the maximum hazard dose approach ▪ To study the long term effect on indicator species using exposure characterization in the greenhouse ▪ To conduct on-farm studies of indicator species abundance and species composition ▪ To study the use of riparian areas by indicator species	**E. Alcantara**, Nat. Inst. of Mol. Bio. and Biotech., University of the Philippines **B. Lavina-Caoili**, Dept. of Entomology, University of the Philippines **P.A. Javier**, National Crop Protection Center, University of the Philippines **M. Dulce J. Mostoles**, Camarines Sur State Agricultural College, The Philippines
Baseline Susceptibility and Genetic Diversity among Eggplant Shoot and Fruit Borer (ESFB) Populations in India (2004)	From sites throughout India: ▪ To study baseline susceptibility of ESFB using laboratory selections of ESFB on a Bt diet ▪ To study baseline genetic diversity and population structure of ESFB using DNA fingerprinting techniques ▪ To conduct observations/survey on alternate/wild hosts and parasites found on ESFB larvae.	**S. Parimi and U.B. Zehr**, MAHYCO Ltd, India **B.D. Siegfried**, University of Nebraska, Lincoln, NE, USA
Risk Assessment and Management Options for Stacked-Gene Transgenic Crucifers in India and Indonesia (2004)	▪ To test the efficacy of this dual gene system in delaying the development of resistance to Bt in Diamond Back Moth (DBM), using the Bt plants and/or simulated Bt spray formulations ▪ To compare the relative impact on selected target and non-target arthropods of Bt transgenic crucifers, foliar Bt products, and the most commonly used synthetic insecticide	**G.T. Gujar**, Indian Agricultural Research Institute, New Delhi, India **A. Rauf**, Institut Pertanian Bogor (IPB), Bogor Agricultural University Bogor, Indonesia **A.M. Shelton**, Cornell University, Ithaca, NY USA **R.T. Roush**, UC Davis, Davis, CA USA **D.A. Russell**, LaTrobe University, Vic Australia
Environmental Risk Assessment of Genetically Engineered Sorghums in Mali and Kenya	▪ To identify and characterize a number of wild sorghum populations in Mali and Kenya ▪ To estimate crop-to-wild gene flow parameters and introgression rates at different distances and successional stages, using	**F. Sagnard and E. Weltzien-Rattunde**, ICRISAT-Mali **A. Toure and M. Karembe**, Institut d'Economie Rurale du Mali, Mali

Project title (year awarded)	Objectives	Investigators
(2004)	microsatellite DNA markers ▪ To characterize the habitats/ecological requirements and the demographic processes that control the dynamics of wild populations ▪ To test the fitness of F1 and BC progeny from crosses between wild sorghums and disease or insect resistant landraces	**O. Koita**, Faculte des Sciences et Techniques, Universite de Bamako, Mali **R. Folkertsma**, ICRISAT-University of Hohenheim and ICRISAT-Nairobi, Kenya **B. Kanyenji**, Kenya Agricultural Research Institute (KARI), Embu Station, Kenya
Post Commercialization Monitoring of Asian Corn Borer *Ostrinia furnacalis* Resistance to Bt Corn in the Philippines and the Impact of Pollen Dispersal on Non-target Lepidoptera (2005)	▪ To determine the initial frequency of Cry1Ab resistance alleles in ACB ▪ To determine the number of receptor classes in different populations of ACB ▪ To clone the ACB receptor and study its Cry1Ab binding kinetics ▪ To measure the extent of dispersal and density of Bt corn pollen deposition on the host plant of the nontarget lepidopteran *H. bolina* ▪ To determine the susceptibility of the nontarget lepidopteran *H. bolina* to Cry1Ab protein	**B.F. Cayabyab,** College of Agriculture, University of the Philippines, Los Banos **E.P. Alcantara,** BIOTECH, University of the Philippines, Los Banos **A.C. Sumalde,** Dept. of Entomology, University of the Philippines, Los Banos **W.R. Cuaterno**, Crop Protection Division, Bureau of Plant Industry, San Andres, Manila **B.D. Siegfried**, University of Nebraska, Lincoln, NE, USA **Ma. Charisma T. Malenab**, College of Agriculture, Univ. of the Philippines, Los Baños
Ecosystems Approach in the Assessment of the Environmental Impacts of Herbicide-tolerant (Ht) Corn on Wild Biodiversity in Corn Production Systems in Luzon, Philippines (2005)	▪ To assess and compare the dynamics of plant succession in HT corn fields, conventional farm areas, and adjacent marginal areas or forest edge taking into consideration the type of corn production system ▪ To assess and monitor spatial and temporal changes in avifauna associated with corn ▪ To assess the effect on arthropods of HT corn in relation to the changes in plant species composition ▪ To assess and compare the soil characteristics associated with the use of conventional and HT corn	**C.I. Villamor** and **V.O. Sinohin** Ecosystem Research and Development Bureau (ERDB), Department of Environment and Natural Resources (DENR) College, Laguna, Philippines
Gene Flow from Cultivated Rice (Oryza sativa) to its AA Genome Wild Relatives in the East African Region: Key Research for Transgene Risk Assessment (2005)	▪ To investigate eco-geographic areas with the potential for gene flow from cultivated rice to wild rice in Tanzania, Ethiopia, and Kenya ▪ To investigate the frequency of crop-to-wild hybridization in experimental plots and the relative fitness of hybrid progeny from these crosses ▪ To investigate whether the genetic diversity of wild populations has been reduced by crop-wild hybridization and, if so, whether novel transgenes might exacerbate this problem	**S. Kiboi**, Dept. of Botany, University of Nairobi, Kenya **M. Nkya**, National Plant Genetic Resources Centre, Arusha, Tanzania **T. Haileselassie**, Dept. of Biology, Addis Ababa University, Ethiopia **A. Snow**, Ohio State University, Columbus, OH, USA **D. Kiambi**, Plant Science Dept. McGill University, Quebec, Canada
Can Bt-Cowpea be Deployed in Africa without Incidence on Wild Cowpea Biodiversity and Demography? (2005)	▪ To assess the diversity of wild cowpea in the Eastern part of its range as well as the genetic structure of its populations and assess the current genetic swamping of wild/weedy cowpea in West Africa by gene flow from domesticated types ▪ To identify and assess the importance of cowpea predators ▪ To assess whether wild cowpea populations are currently seed limited	**R.S. Pasquet**, ICIPE, Nairobi, Kenya **J.T. Ouedraogo**, CREAF de Kamboinse, INERA, Burkina Faso **S. Demissew**, Addis Ababa University, Ethiopia **P. Gepts**, University of California, Davis, CA, USA
Baseline Biodiversity Impact Studies of Transgenic Bt Cotton on Wild Ecosystems in the East African Region (2006)	▪ To study and evaluate the ecological consequences of gene flow between transgenic Bt cotton and feral cotton populations and wild cotton relatives in Kenya, Uganda, and Tanzania ▪ To assess the impact of transgenic Bt cotton on arthropod diversity in Kenya, Uganda, and Tanzania	**W.C. Hamisy**, Tropical Pesticides Research Institute (TPRI), Arusha, Tanzania **C.N. Watura**, Kenya Agricultural Research Institute (KARI), Thika, Kenya **S. Byabagambi**, District Agricultural Officer, Kiboga Uganda **R. Abdallah**, Tropical Pesticides Research Institute (TPRI), Arusha, Tanzania **J.M. Pleasants** and **J.F. Wendel**, Iowa State University, Ames, IA, USA **N.C. Stewart**, University of Tennessee, Knoxville, TN, USA
Modeling the Impacts of Bt Transgene Flow on Lepidopteran Food Web Structure and Stability on Wild Rice in Vietnam (2006)	▪ To document the diversity and abundance of nontarget Lepidoptera and their natural enemies in wild rice ecosystems ▪ To assess variation in nontarget lepidopteran susceptibility to Bt crop/wild hybrids ▪ To determine the structure of a model lepidopteran-based food web ▪ To characterize lepidopteran-based food webs to predict how the	**N.L. Cuong**, Cuu Long Rice Research Institute, Can Tho, Vietnam **Y.H. Chen**, International Rice Research Institutue, Manila, Philippines **A.T. Barrion**, PhilRice Los Banos, College, Laguna, Philippines

Project title (year awarded)	Objectives	Investigators
	Bt gene may impact arthropod food webs	**G. Langellotto**, Fordham University, Armonk, NY, USA **B. Lu**, Fudan University, Shanghai, China **N.V. Tuat**, Food Crops Research Institute, Vietnam
Continued US-Africa Research and Capacity Building on Risk Assessment of Crop-Wild Gene Flow in Sorghum (2006)	▪ Determine the potential for co-occurrence of wild and cultivated sorghum in major sorghum growing regions of Ethiopia, Niger, and South Africa, and provide information on the wider distribution of wild sorghum species in these countries. ▪ Study the population ecology of wild sorghum species to determine their potential to occur as weeds in agricultural and natural habitats, and predict whether specific transgenic traits are likely to exacerbate any existing weed problems.	**Dr. Allison A. Snow**, Ohio State University, Columbus, OH, USA **Dr. Tesfaye Tesso**, Ethiopian Institute of Agricultural Research, Nazareth, Ethiopia **Dr. Issoufrou Kapran**, Institut National de la Recherche Agronomique du Niger(INRAN), Niamey, République du Niger **Mr. Gurling Bothma**, ARC-Roodeplaat, Pretoria, South Africa **Dr. Gebisa Ejeta** and **Dr. Cécile Grenier**, Dept. of Agronomy, Purdue University, West Lafayette, IN , USA **Dr. Jeffrey F. Pedersen,** USDA, ARS, University of Nebraska, Lincoln, NE, USA