

AGRICULTURAL BIOTECHNOLOGY SUPPORT PROJECT



ANNUAL IMPACT REPORT

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Introduction

This report outlines the accomplishments and impacts of the Agricultural Biotechnology Support Project (ABSP) [DAN-A-00-00126-00 and 263-0240-G-00-6014-00] for the period from July 31 2001 through July 31 2002.

The primary goal of ABSP is:

To improve the capacity and policy environment for the use, management, and commercialization of agricultural biotechnology in developing countries and transition economies.

This goal is to be achieved by meeting the following two objectives:

- 1) *Establishment of a policy framework in developing countries and transition economies that promotes the use, management and commercialization of biotechnology by both host country and multinational agribusiness and research institutions.*

- 2) *Improvement of marketed crops through strategic research partnerships between the US and developing country public and private sectors.*

Objective 1

Establishment of a policy framework in developing countries and transition economies that promotes the use, management and commercialization of biotechnology by both host country and multinational agribusiness and research institutions.

Southern Africa Regional Biosafety (SARB) Program

The purpose of this program is to: (1) build regional policy and technical capacity to support science-based regulation of the development, commercial application and trade in agricultural products derived from modern biotechnology; and (2) to lay the regulatory foundation that will support the field-testing of genetically engineered products in four of six target countries in the SADC region by 2003. By taking a regional approach, the program will provide a foundation for later discussions of regulatory harmonization within SADC. SARB will promote science-based regulatory implementation and market access for biotechnology applications from both the public and private sectors. The program focuses on seven SADC countries: Zambia, Zimbabwe, Mozambique, Mauritius, Namibia, South Africa and Malawi. The Vegetable and Ornamental Plant Institute (VOPI) of the Agricultural Research Council in South Africa is the lead contractor on the program. Innovation Biotechnology, a private consulting firm, is also involved in the development of the program as a sub-contract to VOPI.

◆ Impacts on public awareness/acceptance.

Following the successful workshop for journalists from the region held in May 2001 in Pretoria, two one-day workshops have been held in Malawi and Zambia for local journalists.

- ◆ Local journalists have received accurate information on biotechnology and biosafety.
- ◆ Positive articles and interviews were included in the local press, radio and television. Comments on these were that they were well informed, balanced and captivating.
- ◆ Public awareness and understanding of biotechnology within the region has increased due to the workshops and subsequent media coverage.

◆ Impacts on policy.

The early activities of the SARB project have initiated discussion on biosafety policy in Mozambique and Botswana and have given impetus to regulation development in Malawi, Mauritius, Zambia and Namibia.

- ◆ A framework for inter-departmental biosafety discussions in South Africa has been established.
- ◆ Priority setting on biosafety implementation in Zimbabwe has begun.
- ◆ Consensus on development of a regional biosafety initiative that could minimize duplication, allow capacity sharing and build confidence in decision making in the region has come out of the March 2002 regional meeting.

One-day workshops for policy and decision makers were held in Malawi and Zambia.

- ◆ Important policy and decision makers in Malawi and Zambia are better informed about biotechnology and biosafety.

A two-day workshop was held in Mozambique for 56 representatives from 10 provinces for decision-makers, government officials, scientists and members of civil society.

- ◆ Legislation currently being developed for the safe implementation of GM products will be informed through the general introduction to biotechnology and biosafety presented at this two-day workshop.

- ◆ Decision-makers and government officials have been aided in establishing the roles each has to play in ensuring legislation is developed for the safe implementation of GM products.
- ◆ **Impacts on risk assessment.**

The number of scientists within the region with knowledge of how to assess the risks of GMOs has greatly been increased through the training provided by SARB. A six-day regional training workshop was held in South Africa in November 2001 when the ABSP biosafety training workbook was used for the first time with great success. This was followed up with a 2-day workshop in Malawi and a 3-day event in Zambia. Experience has now shown that a 3-day workshop is the best option.

 - ◆ More than 50 scientists now have experience in risk assessment.
 - ◆ 56 participants in Maputo, Mozambique have been informed about the role of risk assessment in regulatory legislation.
 - ◆ The ABSP biosafety training workbook has been successfully piloted with developing country audiences and revisions have been implemented to reflect feedback from the participants.

Bread for the World Institute Workshop

ABSP was a co-sponsor for the Bread for the World Institute (BFWI) Conference on *Agricultural Biotechnology - Can it help reduce Hunger in Africa*, held in Washington DC from March 5-7, 2002. The conference was organized by BFWI through a grant from the Rockefeller Foundation and with support from ABSP. ABSP funding covered the travel and expenses of 10 African delegates. The conference explored the question "*Can agricultural biotechnology address hunger concerns in Africa?*" Over 100 participants attended from local and international NGOs, universities, government and international agencies and institutions in Africa. Case studies from Africa were presented and provided an opportunity to discuss important issues raised by the speakers and panels. Among the 23 conference presentations were luncheon speeches by Ambassador Edith Ssempala of Uganda and Peter McPherson, President of Michigan State University, and a closing session speech by U.S. Undersecretary of State Alan Larson.

ABSP worked closely with the BFWI to develop the program for the meeting, to select speakers, and in the identification of the appropriate African participants to invite. The presence of the African delegates was a vital factor in the success of the meeting as it provided a much-needed opportunity for the voices of Africans to be heard in the biotechnology debate. African delegates were able to network extensively with US policy makers, leaders from the donor community, NGOs and scientists.

Evaluation reports, both verbal and written, indicate that the conference met its objectives, assembled diverse voices and allowed discussion on biotechnology as it relates to hunger in Africa, as well as helped attendees establish new contacts and share their concerns about biotechnology. Many of the respondents expressed the need for similar meetings in the future.

- ◆ African delegates were provided a much-needed opportunity for their own voices to be heard in the biotechnology debate. They networked extensively with US policy makers, leaders from the donor community, NGOs and scientists.
- ◆ A publication of the proceedings will be available in December 2002.
- ◆ The conference was used as a springboard for a draft biotech policy for BFW. This will be shared with BFW's Board Members, faith-based organizational partner institutions and will be voted on at the BFW Board's November meeting.

For further information, please contact the conference coordinator and BFWI's International Agriculture and Development Policy Analyst, Daniel D. Karanja, at 202.639.9400 x 215.

AID Biotechnology Program Development in Africa

In 2001/2002 USAID commissioned ABSP to manage Biotechnology Assessments in South Africa, Uganda and Kenya. A summary of these assessments is given below.

◆ Biotechnology Assessment in Kenya

The purpose of the mission in Kenya was to design a three-five year bilateral biotechnology program to support the vision and strategy of the Nairobi Mission, to address national agricultural development priorities and to clearly spell out the process of how to manage the program. The assessment was intended to determine several key issues that will allow the Mission to assist Kenya in adopting the safe use of biotechnology, thus providing an opportunity to increase rural incomes by selecting agri-business sub-sectors that are in the rural areas or have strong links to rural sector enterprises and promote biotechnology trade.

The assessment was undertaken by Dr. Hector Quemada (Crop Technology Consulting, Inc.), and Dr. Patricia Traynor (Virginia Polytechnic Institute and State University), with the assistance in-country of Professor James Ochanda (Department of Biochemistry, University of Nairobi). The final consultant's report was submitted to USAID in May 2002.

◆ Biotechnology Assessment in South Africa

The purpose of the biotechnology assessment in South Africa was to assist the USAID Mission in South Africa to design a three-year bilateral biotechnology program. The biotechnology program will support the Mission strategy, address national agricultural development priorities, and take advantage of ongoing biotechnology research in the international community. The assessment was undertaken by Dr. Jonathan Crouch (International Crops Research Institute for the Semi-Arid Tropics), Dr. Hector Quemada (Crop Technology Consulting Inc.), and Prof. Jocelyn Webster (AfricaBio). The final consultant's report is expected to be submitted to USAID in August/September 2002.

◆ Biotechnology Assessment in Uganda

The purpose of the Biotechnology Assessment in Uganda was to establish priorities and programmatic options for implementation of 3-5 year integrated bilateral biotechnology programs. The biotechnology program is part of a broader goal of the Kampala Mission that intends to develop a strategy to address Uganda national agricultural development priorities, and utilize some of the ongoing biotechnology research in the international community.

The assessment was undertaken by Dr. Hector Quemada (Crop Technology Consulting, Inc.), and Dr. Patricia Traynor (Virginia Polytechnic Institute and State University), with the assistance and in-country support of Mr. Charles Mugoya (Uganda National Council for Science and Technology). The final consultant's report was submitted to USAID in May 2002.

Impacts of the biotechnology assessments:

- ◆ Assessment reports will be used by the relevant USAID Mission and USAID/Washington personnel to help frame their decisions for continuing support to the utilization and implementation of biotechnology as a tool in the fight to cut hunger in Africa.

Commercialization Study of AGERI, Egypt: Haas Business School

In 2001 ABSP continued to work closely with the International Business Development Program at the Haas School of Business at the University of California at Berkeley in identifying the assessment team members and outlining the assignment for the final AGERI business management report.

This report on the development of improved organizational structures and management strategies for AGERI, *AGERI: Strategic Marketing Plan*, represents the final assessment for AGERI, and concludes ABSP's contract with UC-Berkeley's Business School. In developing the 2001 report

the team engaged in both quantitative and qualitative research. Prior to the visit to Egypt the team conducted secondary research on AGERI, the various players in agricultural biotechnology, and general issues regarding genetic engineering of food crops. They made initial contacts with agricultural industry specialists, and also conducted some quantitative research using data from a wide variety of sources.

In the report the team applied a model of market-based criteria against product profitability to enable AGERI to evaluate its research projects, and their recommendation was for AGERI to focus primarily on maize and fruits and vegetables. In addition, they recommended that AGERI should focus domestically on input traits, i.e. those that benefit yield in relation to the agricultural constraints in Egypt, primarily disease and insect resistance.

Dr. Catherine Ives traveled to Berkeley, California for the presentation of the final report in October 2001. AGERI and USAID/Cairo are expected to use this and the previous two reports produced by the Haas Business School in formulating future support and instituting management changes.

Impacts of HAAS Business School research and reports

- ◆ The AGERI leadership team has assessed the line of succession in light of recent changes and Dr. Hanaiya El-Itriby has been appointed Director of AGERI.
- ◆ Dr. Magdy Madkour has moved up into the leadership ranks of the Agricultural Research Center management structure. Dr. Madkour's knowledge and expertise with AGERI will not be lost as he continues to play a role in oversight of AGERI's research and development.

Development of Biotechnology Initiative with ASARECA

ABSP has continued its close collaboration with the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA). As part of the process to develop a regional initiative in biotechnology and biosafety, ABSP assisted ASARECA in established a working group to examine issues and pragmatic approaches for integration of biotechnology through the existing regional networks and for the expansion of regional biosafety regulatory policy development. ABSP has provided technical support to the Biotechnology WG throughout the planning process.

◆ Commissioned Papers on Biotechnology and Biosafety

In 2001 ABSP assisted ASARECA both in the development of the terms of reference for two commissioned papers, one on biotechnology in the region, and one on biosafety, and subsequently in recommending appropriate consultants to develop the papers.

Ms Muffy Koch (Innovation Biotechnologies, South Africa) was selected by the WG to write the background paper on biosafety (*Regulatory Status And Regional Biosafety Regulatory Mechanism And Administration Under ASARECA*).

Dr. Andrea Johanson (ABSP, Michigan State University) was selected to develop the paper to assist the Working Group in identifying priority opportunities for research, adaptation of existing technology, and technology transfer (*Agricultural Biotechnology in the ASARECA Region: Priorities for Research*).

- ◆ These commissioned papers provided a valuable basis for discussion of the important issues in the Biotechnology working group meetings described below.

◆ ASARECA Working Group Meeting On Agricultural Biotechnology: Priorities for Agricultural Research

The meeting was held from April 15-17 2002, in Nairobi, Kenya. Dr. Johan Brink and Dr. Joel Cohen (ISNAR consultant) attended the meeting on behalf of ABSP. The overall purpose of the meeting was to discuss the findings of the consultant's report on "*Agricultural Biotechnology in the ASARECA Region: Priorities for Research*" (see above).

The consultant's report focused on the development of transgenic crop applications. It recognized that other applications of biotechnology could be extremely valuable, especially in the African environment and also in the ASARECA region. However, they may not add value to what already falls within programs of some ASARECA member countries. The consultant therefore recommended that ASARECA should examine transgenic technologies that can offer immediate potential for substantial crop and yield improvement in the region. The most obvious of the available transgenic technologies would be insect resistance, virus resistance, fungal disease resistance and improved nutritional quality of foods. The report also stressed that any technology development must be linked to effective policy regimes and in this case intellectual property rights and biosafety from the outset of each project. The report identified priorities and opportunities, which could be adopted, existing research in the international community, and strategic partnerships with advanced research institutions.

Outcomes :

- ◆ In addition to transgenics, the WG identified other important applications ranging from tissue culture, planting materials, molecular markers, diagnostics and livestock vaccines.
- ◆ The WG stressed the importance of the livestock sector in the region, particularly in terms of the development of vaccines and disease diagnostics.
- ◆ The main priority for crops in the region is input traits such as insect, viral and fungal diseases resistance as these relate to basic food security.
- ◆ The WG recommended that the ASARECA Committee of Directors consider and approve developing the Biotechnology Initiative into an ASARECA program, similar to ECAPAPA.
- ◆ An important output of the WG discussions at the meeting was a table including additional agricultural constraints in member countries.

◆ **ASARECA Biosafety Working Group Meeting**

A meeting of the ASARECA Biosafety Working Group was called to receive the consultant's report on biosafety and to formulate the framework for a biosafety activity within ASARECA. The meeting was held from June 14-16 2002 at the Hilton Hotel, Nairobi, Kenya. The main objective of the meeting was to receive and consider the consultant's report on regulatory status and regional biosafety regulatory mechanisms and administration under ASARECA.

Dr. Donald Mackenzie (AgBios) presented the ISNAR paper on "*Developing Biosafety Systems: A conceptual framework, critical decision points and required information.*" Mrs. Muffy Koch (Innovation Biotechnologies) presented the commissioned report on "*Regulatory status and regional biosafety regulatory mechanisms and administration under ASARECA*", which was accepted by the WG. Dr. Adiel Mbabu, ASARECA planning officer, presented the consultative framework being formulated for ASARECA.

Outcomes:

- ◆ It was agreed that ASARECA could and should play a significant role in sub-regional biosafety development and implementation.
 - ◆ The WG formulated a framework for presentation to biosafety and biotechnology stakeholders in member countries.
 - ◆ This proposed framework was presented to the ASARECA biotechnology and biosafety stakeholders for their consideration and recommendations (see below).
- ◆ **Meeting of the ASARECA Biotechnology and Biosafety Stakeholders**
- The meeting of the ASARECA Biotechnology and Biosafety Stakeholders was held from June 17–19, 2002, at the Hilton Hotel, Nairobi, Kenya. Participants included members of the ASARECA Biotechnology Initiative Working Group, ASARECA Network Coordinators, Scientists from CGIAR Centers backstopping networks, private sector and NGO representatives from ASARECA member countries and partners.

The purpose of the meeting was to establish a list of priorities for the use and development of

plant biotechnology in the countries of ASARECA, and to define the role that the network will play in this development. The ultimate goal being to come up with a proposal to donors for the extension of support for the network and also for the development of pilot projects in the region.

Biosafety Strategy

Mrs. Muffy Koch (Innovation Biotechnologies), biosafety consultant, presented the background to discussions on biosafety, and summarized the main findings of her report on biosafety. The discussion following Mrs. Koch's presentation confirmed the need to adopt a sub-regional approach to biosafety capacity building.

Outcomes:

- ◆ Discussions resulted in a suggested framework of outputs, activities and indicators of success for ASARECA's biosafety agenda, including the setting up of a sub-regional biosafety service center, to conduct reviews and provide advice, training etc. Recommendations will be discussed in the near future through a broader meeting of biosafety stakeholders.

Biotechnology Strategy

Dr. Christopher Ngichabe, ASARECA coordinator for biotechnology and biosafety, summarized progress on designing the future biotechnology program. The meeting discussed the policy environment for biotechnology, which members agreed appeared to focus on biosafety and IPR, but also needs to be linked to overall national development objectives.

Outcomes:

- ◆ It was agreed that ASARECA should be a driving force for biotechnology and biotechnology policy in the region.
- ◆ Possible options for ASARECA would be to establish a short-term project addressing 2-3 priority constraints, applying available technology, or a longer-term program to develop new technologies.

General Impacts:

- ◆ The ASARECA Biotechnology and Biosafety Working Group convened for the first time since 2000 and participated in 2 working group meetings and in 2 Stakeholder workshops during the past 5 months
 - ◆ Valuable information was extracted from the respective Consultants reports on biotechnology and biosafety which enabled the Working Group to prioritize potential biotechnology interventions applicable to the ASARECA region and to gain insight on potential regional biosafety frameworks.
 - ◆ Stakeholders from 10 ASARECA countries participated in 2 meetings and assisted ASARECA in the dialogue and development of a strategy for biotechnology and biosafety in the region.
 - ◆ A Biotechnology and Biosafety proposal, to be submitted to major donor organizations, is currently being developed
- ◆ **ASARECA Biotechnology Inventory**
 The *Inventory of Agricultural Biotechnology for the Eastern and Central Africa Region*, prepared for ASARECA in 2000 continues to be highly referenced document. In addition to being available for download from the ABSP website (<http://www.iaa.msu.edu/absp/inventory1.html>), the report was also published in 2001 as part of the USAID Africa Bureau's SD Publication Series. Over 1,100 copies of the report have been downloaded from the website. This report has been widely praised by public and private sector organizations within Africa.

ABSP Training and Support to Egypt

◆ Support to Technology Transfer Office, ARC Egypt

Dr. Fred Erbisch, MSU adjunct professor and ABSP consultant, spent 3 weeks in Egypt during the summer 2001 assisting the Agricultural Research Center (ARC) in developing basic materials and policy for its planned technology transfer office.

◆ IPR and PVP Training, at MSU September 2001

As a result of the above consultation in Egypt for the ARC (Ministry of Agriculture), Drs. Erbisch and Karim Maredia, with ABSP staff support, developed and participated in two additional short-term training programs at Michigan State University in September 2001. One program was on intellectual property management and was presented to 9 representatives from the Egyptian ARC. The second training program dealt with plant variety protection (PVP) and was attended by 8 senior representatives from the ARC. Participants of this workshop will be staffing the Egyptian PVP Office.

- ◆ The ARC is now in the process of establishing a technology transfer office in Egypt that will be operated by participants in the September workshop.

ABSP Biosafety Workbook

ABSP has continued working with Dr. Pat Traynor in the development of a “*Technical Workbook on Risk Assessment and Risk Management for Agricultural Biotechnology.*” The workbook is designed to complement technical training for developing country scientists, Institutional Biosafety Committee (IBC) members, and members of the National Biosafety Committees. It will provide supporting information for government biotechnology regulators and monitors. Additionally, it can serve as guidance for IBC members at U.S. academic and public sector institutions as well as reviewers on U.S. government agency biotechnology committees.

The team of authors, included Dr. Pat Traynor (Virginia Tech) Dr. Bob Frederick (Environmental Protection Agency), and Ms. Muffy Koch (Innovation Biotechnology, South Africa), prepared a first draft of the workbook, which was successfully beta-tested at the Regional Biosafety Risk Assessment Workshop held by the Southern Africa Regional Biosafety (SARB) Program in November 2001 in South Africa. Some significant changes and additions were made on the basis of feedback from course participants, and the new draft was made available to a team of six international reviewers early in 2002. The manuscript was edited taking into account many of the reviewers' comments, and the final draft submitted to a technical editor in June 2002.

- ◆ The biosafety workbook will be available on the ABSP website by the fall of 2002, and printed in hard copy by December 2002

IPR/Legal Clearances for Potatoes

During 2001, Dr. Fred Erbisch completed an Intellectual Property ‘audit’ of MSU’s potato tuber moth resistant Bt potatoes. This is another step in the process of obtaining legal clearances to commercialize MSU’s transgenic potatoes in Egypt, South Africa, and/or other developing countries. ABSP recently engaged in discussions with Syngenta Company representatives to obtain a broad humanitarian license for the dissemination of insect resistant potatoes in Egypt and South Africa. In order to develop a road map for commercialization a full regulatory package for the potato product is currently under development through the assistance of a consultant, Dr Hector Quemada. Discussions on dissemination issues and management of a humanitarian license, was also held with the International Potato Center, USAID and the MSU Office of Intellectual Property (OIP).

Grades & Standards Assessments

In 2000/2001 ABSP sponsored four assessments on the need for and importance of grades and standards (G&S) for select commodities and countries in Africa. In 2000 the first assessment was focused on fruits and vegetables in Kenya and the second assessment focused on a number of commodities in Malawi. In 2001 similar assessments were carried out in Mozambique and Zambia.

Zambia: The Zambia study assessed whether more effective and efficient systems of Grades and Standards (G&S) could improve Zambia's agricultural sector and expand its trade and development opportunities. Overall the study concluded that G&S is a necessary but not sufficient factor to dramatically improve Zambia's competitive position. However, the report suggested that if Zambia undertakes to better understand and make use of G&S, it could utilize these strategic tools for product differentiation, market penetration, and system coordination, as well as quality and safety assurance.

Mozambique: The Mozambique assessment team found that G&S are not generally perceived to be a high priority in Mozambique in the face of other constraints to production and marketing of agricultural commodities such as physical infrastructure, institutional infrastructure and low productivity. In spite of the current lack of a significant national/regional momentum on G&S issues in Mozambique, the team revealed the strategic significance of G&S within specific sub sectors in promoting agricultural/fishery export growth. The prawn, cotton and cashew sub sectors are particular prominent in this regard as all three contribute significantly to the current export profile of Mozambique. A range of G&S issues impact significantly on these sub sectors as they are predicted to with non-traditional commodities such as pigeon pea, sesame, banana, citrus, and paprika, which are all regarded as having export potential in the country.

- ◆ These assessments are now being used to direct the research and development work of the USAID funded *Partnerships for Food Industry Development (PFID)* program based at Michigan State University (Director Lawrence Busch, email pfid@msu.edu).

Socioeconomic Analyses

◆ *Ex Ante* Assessment of New Cucurbit Seed Varieties in Indonesia and South Africa

Dr. Molly Jahn, ABSP collaborator since 1996 and plant breeder at Cornell University, has developed multiple virus resistant cucurbit germplasm. She has also been very successful in building linkages with private seed companies, in the U.S. and in several developing countries, for field-testing and commercialization of the resistant germplasm.

The ABSP supported socioeconomic assessments of virus-resistant cucurbits in Indonesia and South Africa in 2001. The Indonesia assessment was carried out by David Mather, Dr. Richard Bernsten, and Dr. Mywish Maredia, from the Department of Agricultural Economics at Michigan State University, in collaboration with Mark Henning and George Moriarty, Cornell University and Dr. Karim Maredia, ABSP Technology Transfer Coordinator at MSU.

The purpose of these assessments was to determine the potential benefit of virus disease resistant cultivars to farmers, consumers and seed companies in these two developing countries. Private seed companies in Indonesia and South Africa had already received multiple virus resistant cucurbit germplasm from Cornell prior to the socioeconomic assessment. This material was evaluated in the field for disease resistance and, concurrently, preliminary data was gathered to begin an assessment of the potential impact of the material on cucurbit yield, farmer income and consumers. The potential farm and market-level impacts were used in an *ex ante* cost-benefit assessment of the investment by ABSP and seed companies in the development of these virus resistant cultivars.

In each country the assessment was carried out by a multidisciplinary team, which included a socio-economist, a cucurbit breeder and the ABSP technology transfer coordinator. These assessments provided several key insights with respect to the characteristics of the cucurbit sub sector in Indonesia and South Africa. Recent field tests of the Cornell materials demonstrate that

their sources of resistance appear to be valuable in the Indonesian and South African growing environments. Under various cost-benefit analysis scenarios--each with strong assumptions (*i.e.*, minimal empirical data are available to estimate potential farm level benefits) regarding actual farm-level benefits as well as adoption rates--the rate of return to ABSP investment in the Cornell cucurbits program is positive.

- ◆ The studies concluded that keys to increasing future ABSP impact in cucurbits include: performing socioeconomic assessment of cucurbit sub sectors in target countries to help set collaborative breeding priorities; encouraging Cornell to collaborate with multiple firms in each country, in order to avoid monopoly pricing of new technologies.

◆ Economic Analysis Of Genetically Modified Potatoes in South Africa and Egypt

Dr. Joseph F. Guenther, and Ms Laura Louise Atchley, Department of Agricultural Economics and Rural Sociology, University of Idaho, carried out an economic analysis of the planned commercial release in South Africa of the potato cultivars developed at MSU to be resistant to the potato tuber moth (PTM). A similar assessment in Egypt was carried out by Dr Guenther and Dr Jim Araji (University of Idaho)

The objectives of this project were to describe the potato industries, to estimate the economic value of PTM-resistance and to analyze pertinent biotechnology issues in both countries. Currently the potato industries in both countries are expanding, with *per capita* consumption expected to reach about 35 kg in both countries in 2020, but PTM is a serious problem. An *ex-ante* impact assessment was used to first evaluate the potential impact on the individual farm level, followed by an analysis of the market level effects. Categories of on-farm value included increased yield, reduced PTM control costs, improved quality and reduced post-harvest losses.

The PTM-resistant technology was found to contribute significant benefits at the farm level in terms of reduced insecticide costs, increased yields, improved quality and reduced post-harvest losses. The model used also indicated that consumer benefits—including larger supplies, lower prices and better quality potatoes—would be larger than producer benefits. Results were sensitive to grower adoption rates and government approval delays, but less sensitive to introduction costs. Spillover effects were not quantified but would be expected to dramatically increase the value of the technology. According to the study, consumer acceptance is not expected to be a major barrier to development in either country.

The PTM-resistant technology that benefits producers and consumers in South Africa could also be beneficial in other countries in the region. Egyptian potato experts familiar with PTM spread suggest that the technology would be beneficial to all Middle East countries and the African countries on the Mediterranean Sea. In addition, many Sub-Saharan African countries, including Uganda and Kenya also have PTM problems. This analysis based on only two countries could therefore be a very conservative estimate of total benefits that would accrue in the region.

If the PTM-technology does not become available in other countries this study may have underestimated total benefits because international trade was not included in the analysis. Both Egypt and South Africa are players in the global potato market, and this technology has the ability to significantly increase potato exports. As the marketable yield and quality increase, the price of the product will fall, providing incentive to export to other countries at a competitive price, and South Africa already has a competitive advantage in its ability to harvest potatoes year round. Egypt already has established markets for potato exports in the EU, Eastern Europe, the Middle East and Northern Africa, and it is likely that the competitive position of both countries could be enhanced with GM technology.

- ◆ The South African study was successfully presented in 2002 as a thesis for the Degree of Master of Agricultural Economics in the College of Graduate Studies, University of Idaho by Laura Atchley.
- ◆ Valuable information was collected in Egypt and South Africa that will assist the development of a roadmap for commercialization and dissemination of the tuber moth resistant potatoes during the next few years.

ABSP Participates in the AUTM Annual Meeting in San Diego, California

As a part of technology transfer capacity building efforts, the ABSP sponsored participation of Dr. Eid Megeed (Egypt), Dr. Toto Sutater (Indonesia), and Dr Leon J. von Mollendorff (South Africa) to attend the Annual Meeting and Technology Transfer Fair of the Association of University Technology Managers (AUTM). The AUTM meeting was held in San Diego in February 2002. Dr. Karim Maredia and Dr. Fred Erbisch, ABSP IPR Consultant, also attended the meeting..

- ◆ ABSP Partner country participants were exposed to the larger US University community and technology transfer practices and could actively network with meeting participants. .
- ◆ The ABSP sponsored booth at the Technology Transfer (TT) and Networking Fair held during the meeting provided the opportunity for ABSP partner countries to display information about their TT offices and technologies that are available for licensing.
- ◆ The TT Fair gave an opportunity for the ABSP partner countries to learn different ways of marketing of intellectual properties

Technology Transfer Workbook

ABSP's IP Consultant, Dr. Fred Erbisch, has taken the lead on the development of a training manual based on the experience gained during the six years of running the IP and Technology Transfer Course at MSU. The workbook will be a ready source for continued training and reference for participants on the MSU course. It will contain chapters on basic intellectual property and/or technology transfer management. Each chapter begins with a concise overview/definition of the topic, followed with a listing of key points or terms and an explanation for each point or term. A second section will include a basic document or legal paper incorporating these points and terms. Case history examples and recommendations for avoiding problems will follow. The next to the last section will contain examples of good, poor and unacceptable points and terms which the reader will be asked to comment on, make suggestions for improvements, etc. An appendix to the workbook will contain answers and statements relating to these examples. A final draft of the workbook was completed in July 2002 and will be sent out to reviewers shortly.

Food Safety Consultancy in Egypt

ABSP recruited Dr. Hector Quemada, Crop Technology Inc., as a special consultant to assist the government of Egypt in the development of food safety guidelines and regulations for foods derived from GMOs. ABSP also assisted in the development of the scope of work for this assessment. USAID/Cairo supported this activity through the DAI/APRP policy project.

- ◆ The report of the consultant provided important information to the Egyptian National Biosafety Committee (NBC) to consider amendments to the Biosafety Regulations and Guidelines and to submit these for official approval. This will enable the NBC to assess the food safety status of GM products proposed for commercial release in Egypt.

Policy Impacts in ABSP Target Countries

◆ Indonesia

From 1993 till 2000, Indonesia has sent several scientists to Michigan State University, for the biosafety and food safety internship program through ABSP. ABSP research partner Dr. Muhammad Herman has been very active in the country, organizing several workshops, seminars and activities with the objective of improving public awareness on agricultural biotechnology, particularly the benefits and possible risks of utilizing GMOs. The target audience for these events has included policy makers, research scientists, non-government organizations, journalists, and students.

Dr Herman organized a four-day workshop on the biosafety and food safety regulation of Genetically Engineered Agricultural Products (GEAP) and IPR, in Bogor, with lecture topics including genetic and plant breeding, genetic engineering technology, biosafety and food safety regulation, risk assessment and risk management of GMO, IPR in general, and plant variety protection. Forty participants attended, from various research institutes, farmers associations, NGOs, journalists, and seed producers.

Seminars on GMOs, biosafety and food safety regulation of GMOs, and IPR have also been conducted in various University and Agricultural Technology Assessment Institutes in different provinces and attended by policy makers, scientists, students, journalists, and non-government organizations.

In 1997, ABSP assisted Indonesia in initiating and facilitating the early development of the Plant Variety Protection Law, which became Law No 29, on Plant Variety Protection in 2000. In order to implement the law it is expected that the Government of Indonesia will establish both a Regulation and PVP office in 2002.

ABSP also trained several key Indonesian researchers and policy makers from the Agency for the Agricultural Research and Development (AARD) in IPR management. In 1999 AARD established an office called KIAT (Intellectual Property and Technology Transfer Office), responsible for IP management and commercialization of research results from AARD. Several KIAT officers received training in IP Management conducted by Office of Intellectual Property, Michigan State University. Also, several AARD and KIAT officers gained an experience in technology marketing by attending Association of University Technology Managers (AUTM) Annual Meeting in 2001 and 2002 sponsored by ABSP.

Objective 2

Improvement of marketed crops through strategic research partnerships between the US and developing country public and private sectors.

Potato Tuber Moth Resistant Potatoes

◆ Research Progress

A 2002 field trial was conducted in Egypt at CIP-Egypt, results showing excellent control of potato tuber moth (PTM) from MSU's Spunta G2 and Spunta G3 transgenic lines. Storage experiments are underway with the harvested potatoes and results of these tests are pending.

A field trial was also conducted in South Africa at ARC-Roodeplaat. The MSU transgenic Spunta lines provided excellent control of potato tuber moths compared to the non-transformed lines. Results of ambient air storage studies are also pending.

Greenhouse plantlets of transgenic Atlantic, Lady Rosetta and Spunta lines were produced for leaf bioassays. Results of these tests indicate that most of the transformed plantlets provide excellent control of potato tuber moth. Molecular analysis was conducted on these lines to verify the number of genes inserted and amount of protein expressed.

◆ Training

Francisco Santos, Department of Entomology graduate student, MSU, visited AGERI and CIP-Egypt for 3 weeks in May 2002. Francisco collected ecological data regarding the potato tuber moth's host plant preference and abundance on cultivated *solanaceous* crops. He also collected data on potato tuber moth damage at the field trial harvest and established the nawalla storage trial. His extended visit allowed him (representing the ABSP potato team) to build ties with counterparts in Egypt.

- ◆ Important biosafety data was collected from the field trials.
- ◆ **Southern Africa collaborations**

Mr. Diedrich Visser, entomologist at ARC-Roodeplaat South Africa, attended the MSU International Integrated Plant Management Course in July 2002 and then visited the ABSP potato project for 2 weeks. During his stay Mr. Visser visited the potato-breeding laboratory and helped in collecting data at field trials at the MSU Potato Research Center in Montcalm CO., MI.

 - ◆ Mr. Visser's visit to MSU helped establish efficient collaboration between the ABSP potato team and ARC-Roodeplaat that allowed for the first MSU/South African field trial and the collection of valuable data from that test.
- ◆ **Other contacts and linkages**

The ABSP potato project has established a linkage with Syngenta, USAID, and CIP-Peru to conduct the necessary research that would allow for a humanitarian release of our Bt-transformed Spunta lines to resource poor farmers in Egypt, South Africa and perhaps India. This process is underway and communication is continuing (see page 8 of this report).
- ◆ **Leveraged funding**

Additional grants supporting potato research include \$88,000 in Federal grants, and \$62,000 in NPC-ARS funding.

Virus Resistance in Cucurbits

- ◆ **Michigan State University**
 - ◆ An effective cucumber transformation system has been established, and transgenic cucumber plants have been produced with genes for water and salt stress resistance. Preliminary results show that the transgenic plants exhibit traits associated with physiological adjustments to dehydration stress, and further testing of these is underway. A graduate student from AGERI, Egypt (Mohamed Tawfik) is assisting in this project.
 - ◆ A visiting scientist from Turkey (Yessim Yelcin-Mendi) has recently received a Fulbright fellowship to learn melon transformation in Dr. Grumet's lab, and is working on introducing the zucchini yellow mosaic virus (ZYMV) coat protein (CP) gene into a melon variety of importance in Turkey.
 - ◆ The ZYMV-CP gene (CT strain) was provided to AGERI, Egypt for transformation efforts. The 2001 progress report from AGERI shows that AGERI has used this gene to produce squash and melons that are resistant to the ZYMV-Egypt (E) strain, confirmed in greenhouse and field trials.
- ◆ **Cornell University**

In 2001 Dr. Molly Jahn's research team at Cornell continued to run large greenhouse and field-based screens of advanced cucumber, melon and squash varieties with multiple resistance to virus and other diseases in order to identify the lines that are closest to commercial type and contain the broadest spectrum of disease resistance.

 - ◆ The group hosted a major field day in Ithaca attended by 11 seed companies from around the world, including ABSP cooperators from South Africa and Indonesia and Dr. Johan Brink and Dr. Karim Maredia of ABSP.
 - ◆ Seed from this program has been sent to many companies around the world that request it. At this time, over 1700 Material Transfer Agreements (MTAs) are listed for distribution of our breeding material on 6 continents.

- ◆ Trials conducted in cooperation with East West Seeds—Indonesia and Alpha Seeds in South Africa have gone well, and the research team has continued to work with each of these companies.
- ◆ **Egypt**
 - ◆ In 2001 field trials were conducted at different locations, Giza (AGERI), Beni Suef (Sids), and Kalubia (El-Qanter) and verified that the transgenic squash line Eskandarani is highly tolerant to Zucchini Yellows Mosaic Virus (ZYMV-E) while maintaining high yield and superior marketable fruit quality.
 - ◆ Greenhouse trials conducted for melon were completed and the obtained lines will be subjected to field evaluation as carried out for squash.
 - ◆ In the case of watermelon, the introduction of the *cp* gene of ZYMV-E strain into the cv. Giza 1 of watermelon was successful.

High Beta-Carotene Mustard Oil

The golden mustard project entails the development of several local varieties of Indian mustard with enhanced beta-carotene levels and good agronomic characteristics (to promote adoption by Indian farmers) that potentially could function in a food based intervention approach to alleviation of Vitamin A deficiency in India. This project functions as an effective R&D collaboration between ABSP, Monsanto, the Tata Energy Research Institute (TERI), and other well-reputed public sector research institutions in India. The golden mustard project continues to have significant impacts in the areas of research, training, and public/private sector linkages.

- ◆ **Beta-carotene enhanced Indian mustard varieties**

The critical step in the golden mustard project is the successful transformation of Indian mustard varieties using the carotene-enhancing genes. To date, three popular Indian mustard varieties (Varuna, Pusa Bold and RH 30) were successfully transformed with carotene enhancing genes. These high beta-carotene expressing plants will soon be field tested for agronomic performance. The mustard transformation work and the technical challenges involved in the project are giving Indian scientists a great deal of 'hands-on' scientific training and experience in modern plant biotechnology techniques.
- ◆ **Public/private sector linkages**
 - ◆ Two years of energetic efforts have brought several public and private sector institutions to support this project. Many of these institutions are now stakeholders in this project and each play a key role in the overall success of the project. In addition to Monsanto, some of these stakeholders are: the Tata Energy Research Institute (TERI), New Delhi; the National Institute of Nutrition, Hyderabad; the Department of Biotechnology (DBT), New Delhi; and an advisory committee comprising prominent Indian scientists from academia, industry, medicine and government formed to set direction and priorities for the project.
- ◆ **Training related impacts**
 - ◆ An Indian scientist, Dr. Ashok Chaudhury of TERI, was trained in the latest techniques of mustard transformation. Dr. Chaudhury is using this knowledge and training in transforming other varieties of Indian mustard.
 - ◆ A regulatory system/process for the regulatory approval of nutritionally enhanced biotech crops in India currently does not exist. TERI is spearheading the effort to create a regulatory paradigm for the evaluation and approval of nutritionally enhanced biotech crops in India. TERI's contribution in this area will be helpful in gaining regulatory approvals for other important nutritionally enhanced crops in India and elsewhere.

◆ Impact of awareness activities

Scientists from TERI have been involved in several awareness-building activities:

- ◆ TERI organized a one-day workshop on "*Nutritional Security in the 21st Century*". In this workshop, Dr Malathi Lakshmikumaran of TERI highlighted the strategies for improvement of the nutritional quality of crop plants using 'golden mustard' as an example. In her presentation, Dr. Lakshmikumaran drew attention to the nutritional status of India and elaborated on the role of biotechnology in its amelioration.
- ◆ At the Delhi Sustainable Development Summit 2002, TERI reiterated the importance of nutritionally enhanced biotech crops to developing countries. At BIO 2002, (an International Biotechnology Convention and Exhibition held in June in Toronto, Canada), Dr Vibha Dhawan of TERI served on an international panel discussion on "*Biotechnology for Developing Countries: An Important Tool in Sustainable Development*".
- ◆ In June 2002, Dr. Dhawan participated in an FAO Experts' Workshop on "*Public Agricultural Research: The Impact of IPRs on Biotechnology in Developing Countries*," again contributing TERI's experience to international decision-makers.

Maize Transformation for Stem Borer Resistance, AGERI

Work has continued at AGERI, Egypt during 2001 and 2002 on the development of Egyptian maize lines with resistance to the corn borers *Sesamia cretica*, *Ostrinia nubilalis* and *Chilo agamnon*.

The main objectives have been to i) establish an efficient regeneration and transformation system(s) for Egyptian elite maize germplasm; ii) to introduce AGERI owned Bt gene(s) to confer resistance to stem borers; and iii) to evaluate the four novel constitutive maize promoters (an outcome of the Pioneer/AGERI collaboration) in driving the expression of the GUS reporter gene in commercial maize hybrids.

- ◆ The highly recalcitrant elite maize line Sd7 has been crossed with the American line A188, which is known to produce embryogenic calli, resulting in an improved regeneration frequency.
- ◆ Transformation experiments were carried out in the maize inbred line Giza 643 to evaluate the novel maize promoters for the stable expression of the GUS gene.
- ◆ Synthesis of the modified AGERI proprietary Bt gene to match the codon usage of maize is still under construction.

Developing Drought And Salinity Tolerant Wheat For Egyptian Agriculture

Research continued at AGERI, Egypt to enhance osmotic stress tolerance in Egyptian wheat crop through genetic transformation. The project aims to directly determine whether elevated levels of proline and active sulfur confer drought and salinity tolerance in wheat. Several genes conferring putative stress tolerance have been isolated and characterized by Prof. Desh Pal S. Verma's (Ohio State University) group for their role in conferring abiotic stress tolerance.

The team at AGERI has been successful in increasing regeneration and transformation efficiencies for Egyptian as well as American bread wheats.. The Egyptian wheats (Giza 163 and Giza 164) have been transformed with salt-related genes and promising results were obtained regarding tolerance against abiotic stresses.

Tomato transformation for Development of Geminivirus Resistance

The research team at AGERI, Egypt have continued to make progress with transgenic strategies to control tomato yellow leaf curl virus (TYLCV), a member of whitefly transmitted geminiviruses, one of the most devastating viral diseases of cultivated tomato, and vectored by the whitefly *Bemisia tabaci*.

Molecular Characterization of Insect Midgut Toxin Receptors

Transgenic plants carrying the toxin genes of Bt have now been released commercially in many countries around the world and efforts are underway to utilize such plants in Egypt and the Middle East. The overall objective of the research projects at the University of Texas at Dallas in collaboration with AGERI, Egypt, is to determine the molecular mechanism(s) of insect resistance to the insecticidal toxins (Cry toxins) of *Bacillus thuringiensis*.

At AGERI selection for resistant cotton leaf worm by exposing larvae to Cry1C toxin for 25 generations has given rise to resistant strains showing an increased 10-fold tolerance to Bt toxin compared to the susceptible strain. The protein and DNA profiles of these resistant strains are currently being analyzed. .

◆ Significance of Insect Resistance Studies

The results indicate that resistance by the CPB to the Cry3Aa toxin correlates with specific alterations in protease activity in the midgut as well as with decreased toxin binding. These features reflect adaptive responses that render the insect refractory to toxin action, making this insect an ideal model to study host innate responses and adaptive changes brought on by bacterial toxin interaction.

◆ Impact of Training

Drs. M. Ibrahim and W. S. A. Maaty received their PhD's under Dr. Lee Bulla's direction at the University of Wyoming and, since, have returned to Egypt where they hold important research positions in the Agricultural Genetic Engineering Institute (AGERI). Dr. Ibrahim is in charge of a research program on microbial insecticides at AGERI and Dr. Maaty is leading investigations in proteomics.

Much of the technology for characterizing Cry toxin binding receptors in insects for studying resistance to *B. thuringiensis* has been transferred to AGERI and is being applied to the cotton leafworm and the potato tuber moth, both serious agricultural pests in Egypt. Because many of the results gained in this program are first-time discoveries, these two Egyptian agricultural scientists along with their colleagues at AGERI (Drs. Salah Moustoufa and Gamel Osman who also studied with Dr. Bulla) will have a head start, both scientifically and practically, to address some critical problems related to insect resistance to *B. thuringiensis*. AGERI now has a team of scientists, all of which were trained in Dr. Bulla's laboratory and under the sponsorship of this CUB program, who will be addressing these concerns, among others.

Technology Transfer

◆ Technology transfer in Southern Africa (SARB)

This project has only one research component, a gene flow study on Sorghum. However, no GMO sorghum variety has been located and this has delayed the on-set of this research trial until the spring of 2002. Similar trials will be planted in both South Africa and Zimbabwe. Conventional sorghum varieties will be used and certain genetic and phenotypic traits monitored. This biosafety data collection project will provide target countries with a biosafety decision tool to use that is purely designed to enable protection of the environment.

◆ Transfer of Bt potatoes to South Africa

Due to a delay in obtaining the required permit for a contained field trial, the trial was planted in September 2001. The field trial using six transgenic lines was highly successful showing the following:

- ◆ The foliage of all lines of the transformed Bt Spunta were resistant to potato tuber moth.
- ◆ The tubers were not attacked either in the field or in a store test.

- ♦ Analysis is still being conducted on the seed collected from non-transgenic Spunta and BP1 plants to demonstrate gene flow.

Other Achievements and Impacts

LINKAGES Newsletter

The first electronic ABSP *LINKAGES* newsletter was distributed in April of 1999 to about 350 contacts. The newsletter and other special announcements, is sent quarterly by electronic mail and includes commentary from the ABSP Director, a feature article, and reports from ABSP domestic and international sources on current events and travel in the past quarter. ABSP now sends the electronic newsletter via a Yahoo Groups listserv. By using the listserv, it is now easier for people to subscribe and unsubscribe to the newsletter. *LINKAGES* is also posted to the ABSP web site under the ABSP News section (<http://www.iaa.msu.edu/absp/news.html>).

- ♦ *LINKAGES* was distributed quarterly in 2001 and 2002 to over 800 individuals and institutions worldwide. Feedback and responses from the newsletter have been very positive.

ABSP's World Wide Web pages

The ABSP Website continued to receive an increasing amount of traffic 2001. There have been over 22,000 visitors to the Website since August of 1999, with the average monthly number rising to a high of over 1,000 in November 2001 and March 2002. This coincides with a significant updating of the web pages, and the addition of a 'Links' page, giving links to other web sites on agricultural biotechnology and developing country issues. The most requested pages (not including the home page) were the News (28%) pages where ABSP's newsletter *Linkages* is posted, followed by the Research pages (24%), Links (17%), Technology Transfer (11%), background (10%) and Policy Issues (9%).

Information on MSU's summer short courses in Intellectual Property Rights, Food Safety and Integrated Pest Management were also placed on the web site, with a new online registration enquiry form (<http://www.iaa.msu.edu/absp/msucourses02.html>). This method of advertising the courses proved very effective, with over 60 applications to the courses being submitted directly from the website.

- ♦ ABSP's website won a further award in 2001 – it was selected in Lightspan's StudyWeb® (<http://studyweb.com/>) as one of the best educational resources on the Web.

CABI's AgbiotechNet

In 2001 AgBiotechNet continued to deliver current information about biotechnology and biosafety for researchers, scientists and policy-makers worldwide, in both developed and developing countries. In 2001 AgBiotechNet had 447 subscriber registrations from institutions and individuals, over 1,600,759 successful hits on the site, approximately 2,800 per day. There have been 2,984 direct *click-throughs* from the AgBiotechNet site to ABSP, since the site's launch, according to the hit counter on the AgBiotechNet site. User statistics have continued to show an extensive and increasing interest from users throughout the world.

AgBiotechNet has increased the information available on its site on biotech and developing countries. A hot topic on the subject, incorporating news, reviews, abstracts, and structured links is one of the most frequently visited pages on AgBiotechNet. This service is currently free, and highlights key issues relating to biotech and developing countries in an objective and informed way. It contains around 80 recent news stories, around 50 representative abstracts, links to

around 20 reviews, around 100 key organizations, and 35 important external literature sources on agricultural biotechnology in developing countries. This is now automatically updated with the news, carrying around 10 stories a month, and has accumulated 15,562 visitor sessions in 2001. The page includes links to many key papers on developing country material.

User statistics from the year show that papers on developing country biotechnology were some of the most frequently downloaded.

Note: In 2001 ABSP completed its contractual commitment to CABI for AgBiotechNet and closed out this subaccount.

MSU Training Courses

◆ Intellectual Property Rights (IPR) and Technology Transfer Internship Program (July 8 - 13, 2001)

The Institute of International Agriculture (IIA) and ABSP Project organized an Intellectual Property internship program from July 8 - 13, 2001 which was attended by 19 international participants from 10 countries including Costa Rica, Colombia, India, Kenya, Pakistan, Philippines, South Africa, Vietnam, Zimbabwe, and USA. The IPR and TT internship program provided hand-on experience to international participants in day-to-day handling and management of intellectual properties in various settings.

ABSP Participation in Conferences & Workshops

◆ Testimony before the U.S. House of Representatives

In September 2001, Dr. Catherine Ives testified before the U.S. House of Representatives in a Congressional Committee hearing. The Science Committee's Subcommittee on Research held a hearing on two pieces of proposed legislation, H.R. 2051 (Strengthening National Science Foundation Sponsored Agricultural Biotechnology Research) and H.R. 2912 (Establishing a Grant Program for Partnerships between US Research Organizations and those in Developing Countries).

The purpose of the hearing was to receive testimony regarding the legislation, which aims to expand the National Science Foundation's (NSF) investment in research related to plant genomics. H.R. 2051 authorized the NSF to establish regional plant genome and gene expression research and development centers. H.R. 2912 authorized the NSF to establish research partnerships for supporting the development of plant research targeted to the needs of the developing world.

◆ AfricaBio Conference, South Africa

Dr. Johan Brink attended the AfricaBio *Biotechnology in Africa* Conference and present a paper on ABSP's Program in Africa titled: *ABSP: Building Capacity In Biotechnology And Biosafety In Africa*. The Conference, held in Johannesburg in September 2001, was attended by 192 delegates and about 15 media representatives of whom over 100 delegates represented 12 African countries. The ABSP presentation was very well received and stimulated numerous discussions. Nearly all of ABSP's partners in Africa attended this session. Dr. John Wafula and Dr. Christopher Ngichabe presented papers that included information on ABSP's programs in Kenya and East Africa (ASARECA).

◆ 10th IAPTC & B Congress, Florida

Dr Johan Brink attended the 10th Congress of the International Association of Plant Tissue Culture and Biotechnology (IAPTC&B) held during June 2002 at Orlando, Florida. The Congress was attended by 1,100 delegates from fifty countries and 84 fellowships were awarded to young scientists from developing countries. The Congress provided a unique opportunity to "showcase

and celebrate" impressive achievements of plant biotechnology and also to provide a glimpse of many promising applications and concepts in this study field. The Congress entailed 14 plenary lectures, 109 oral presentations in 18 different symposia as well as more than 1500 poster presentations. The activities of ABSP were highlighted in a poster presentation entitled "*The Agricultural Biotechnology Support Project (ABSP): Building capacity in Biotechnology Research and Policy.*"