

# Leveraging Partnerships Between the Public and Private Sector – Experience of USAID’s Agricultural Biotechnology Program

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When the U.S. Agency for International Development (USAID) was designing a new program in agricultural biotechnology in 1990, a number of factors framed the Agency’s thinking about involvement of the private sector in collaboration with U.S., international, and developing country public research institutions. Primary among these was, and still is, the predominant role of the private sector in biotechnology research. By 1990, private sector investment in agricultural biotechnology research exceeded public research through universities and government research laboratories. Considering this large private investment and commercial interest in biotechnology, collaboration with the private sector suggested a means of accessing both research tools developed by the private sector and of accessing specific technical expertise. Additionally, as part of its planning process, USAID called upon the National Research Council of the U.S. National Academy of Sciences for assistance in identifying broad priorities for consideration in an international biotechnology development program. Among the recommendations, the NRC panel placed equal weight on addressing institutional management issues, particularly the capacity to address issues of intellectual property rights (IPRs) and biosafety, as on research and technology development. Building on this recommendation, USAID designed a program that integrated aspects associated with the dissemination and application of biotechnology, particularly management and technology transfer issues, with biotechnology research and

training. Partnership with the private sector, which approaches research management with a commercial or application orientation, could contribute to achieving this goal of closing the gap between research and technology application. Finally, at this time USAID had already gained experience in public-private sector collaboration through its support of the Monsanto-Kenyan Agricultural Research Institute (KARI) program for development of disease-resistant sweet potato. This program illustrated the value of such partnerships in gaining access to technical expertise, as well as to proprietary technologies.

Despite the potential benefits of involving the private sector in international development, it is important to clarify that the private sector will not replace the role of the public sector in research generally, nor in facilitating broad application of biotechnology in developing countries in particular. Further, the goal of such partnerships is not to remake fully public sector research institutions in the mold of the private sector. USAID continues to recognize the strong record and primary objective of public universities in the area of research and training. USAID also recognizes that the private sector will not deliver biotechnology applications for many crops, such as some minor or food security crops, will not address all biotic and abiotic production constraints important in developing countries, nor will it realize commercial markets in all developing countries. The role of public sector research to filling these gaps remains vital. The goal of USAID in supporting collaborations with the private sector is to lever-

age additional funding and expertise to complement the role of the public sector.

Finally, in discussing the rationale for public-private sector collaboration, one should consider the private sector perspective on partnership with USAID and developing countries. In many cases, philanthropy and good public relations is a factor. In one instance USAID has funded a partnership that holds potential commercial value to the company, involving the characterization of potentially novel Bt strains from Egypt. But generally, short-term commercial benefit is not the principal factor. Companies may, however, have longer-term interests in developing a market relationship with a particular country for other biotechnology-based products. Collaborative research partnerships may assist the private sector in building relationships or an understanding of pathways for market access. Another potential motivation for the private sector is access to genetic resources such as in the aforementioned collaboration in Egypt to characterize potentially novel strains of Bt. This particular collaboration was significant in that the ownership of IPR-related to these Bt strains belonged to the Egyptian partner, and were made available to the company under the terms of a contractual agreement. Whatever the motivation behind private sector participation in such research partnerships, the role of seed funding from USAID appears significant to defraying some of the financial risk for the private sector partner, and encouraging their involvement in the development of biotechnology applications for developing countries.

### **Examples of Direct Public-Private Collaboration**

During the 1990s, USAID has directly supported several public-private sector collaborative research programs, largely through the Agricultural Biotechnology Support Program (ABSP). Led by Michigan State University (MSU), ABSP represents partnerships between a number of U.S. universities, U.S. and developing country companies, the international agricultural research centers (IARCs), and developing country public research institutions (NARS or national agricultural research systems). The project is described in detail by Ives, Mareid, and Erbis (1999).

The public-private sector partnerships USAID has supported include:

#### *Monsanto Company and the Kenyan Agricultural Research Institute (KARI)*

- This was the first USAID biotechnology-related public-private partnership
- Research aimed at development of virus-resistant sweet potato
- Monsanto donated (through a royalty-free license) virus-resistance technology to Kenya and other African countries for application in sweet potato
- Monsanto provided training to several KARI scientists in their laboratories for one to two years
- KARI-Monsanto partnership has continued long beyond direct USAID support or funding.

#### *DNA Plant Technologies and Costa Rican and Indonesian-Owned Tissue Culture Companies*

- A private sector-led research project was part of the original USAID program design, and this grant to DNAP was co-awarded and integrated into ABSP along with the Michigan State University-led program
- Research on development of commercial-scale micropropagation systems for tropical crops (banana, pineapple, coffee)
- Costa Rican company and DNA Plant Technologies have continued to work as business partners though USAID funding ended several years ago.

#### *ICI Seeds and Central Research Institute for Food Crops (CRIFC)/Indonesia*

- Focused on development of insect-resistant (Bt) tropical corn
- Included training of CRIFC scientists at ICI Seeds (that later became Zeneca) in use of proprietary transformation technologies
- Ultimately faced difficulty in negotiating technology transfer agreements for proprietary technologies.

#### *Pioneer Hi-Bred and Egyptian Agricultural Genetic Engineering Research Institute (AGERI)*

- Characterization of potentially novel strains of Bt isolated by AGERI in Egypt
- Application of Bt technology to development of insect-resistant corn

- Training of AGERI scientists in characterization of Bt and corn transformation technologies
- U.S. and Egyptian patents on strains are owned by AGERI; AGERI pursuing commercialization in Egypt and Pioneer has license in the United States.

### **Institutional Capacity Building**

Complementing these examples of research collaboration has been ABSP's institutional capacity-building activities in the areas of IPR, technology transfer, and biosafety. Biosafety regulatory and management capacity has been conducted primarily in support of the application of public sector biotechnology research in developing countries. This will not be discussed further here. IPR issues, however, remain associated with the private sector for most developing countries, particularly the private sector in the United States and Europe. Developing awareness and understanding of IPR plays an increasingly important part to facilitating collaborations with the private sector where proprietary research materials or germplasm is involved.

ABSP's efforts in IPR have covered both plant variety protection and patent forms of IPR, with the principal aim of increased understanding of and capacity to manage the exchange of proprietary materials, in the context of collaboration with biotechnology or seed companies. This has been approached through workshops, courses, and internships with offices of technology transfer at two ABSP partner universities. To date under the ABSP program, MSU has served as the contractual intermediate on most research agreements between companies and public research institutions in developing countries. In this role, MSU assists both parties in establishing mutually beneficial research terms. However, the long-term goal is to develop the capacity among developing country institutions to negotiate and manage the terms of research agreements independently with the private sector. The role of MSU as an intermediate in the short term, and capacity building efforts in the area of IPR and technology transfer in the longer-term have helped increase the confidence of companies to engage in collaborative research that will involve the exchange of proprietary materials with de-

veloping countries. It has also helped developing countries protect their own interests when they contribute germplasm to the collaboration, such as in the Bt work between Egypt and Pioneer Hi-Bred.

Taking a step beyond an understanding of IPR, some of ABSP's public sector partners are pursuing an institutional model for technology transfer similar to that used by U.S. universities to promote a range of relationships with the private sector. Particularly notable is the interest in transfer of technologies to the local private sector, including seed companies and growers. Both Ministries of Agriculture in Egypt and Indonesia are developing offices of technology transfer to serve as the focal point for handling collaborative research agreements, licensing, and dissemination of technologies for large-scale testing or commercialization. These offices will serve as a means of strengthening the institutional capacity of the ministries' agricultural research system to manage IPR associated with collaboration with the private sector. It will also broaden avenues for dissemination of technologies, beginning to close the gap between research and technology application. ABSP has provided support to development of such offices through training programs, workshops, and the sharing of sample documents and agreements used by MSU's Office of Intellectual Property.

### **Constraints to Implementing Public-Private Partnerships**

Although research collaboration with the private sector has been a valuable complement to USAID's public sector research and training in biotechnology, these new partnerships present challenges to all parties: USAID, NARS, and private sector partners in the United States. The most significant constraint surrounds IPR, due both to the lack of awareness and management capacity among public institutions as well as dissimilarities in the extent of protection afforded by national laws. ABSP's capacity-building efforts to address the former constraint have improved the level of confidence among all parties in the exchange of proprietary materials. However, the absence of patent protection does mean that some companies will not transfer certain technologies or certain crop applications, which might compromise

significant commercial interests. This was the case, for example, with an ABSP collaboration between CRIFC in Indonesia and ICI Seeds (Zeneca). Ultimately, an agreement with ICI Seeds (Zeneca) for transfer of the Bt genes or maize transformation technology to CRIFC, for use in Indonesia, could not be reached due to the lack of patent protection and the level of proprietary interest by the company in those technologies. Based on that early experience, ABSP and USAID have taken steps to address IPR concerns up front, and use the resolution of IPR issues as criterion for establishment of such public-private sector collaborations.

Beyond IPR constraints, the three partners - USAID, developing countries, and companies - come together with different cultural perspectives and unfamiliarity with differing institutional approaches. Public research institutions in developing countries may be unaccustomed to negotiating with the private sector, and companies are unfamiliar with the bureaucratic processes and government contractual requirements associated with USAID funding. USAID must also recognize that the goals of the private sector differ from its traditional development partners in the university and nonprofit community. An important factor in resolving some of these differences and in building confidence has been the role of MSU in management of ABSP's public-private sector partnerships. MSU assists in bridging the three cultures. The university has had long experience in dealing both with USAID and with developing country partners. Since U.S. government policy changes in the mid 1980s, MSU, like most U.S. universities, has also worked with the private sector through their domestic technology transfer activities. For the private sector, MSU's management and experience defrays some of the risk associated with the unfamiliar partnership. For both USAID and the developing country partners, MSU maintains development objectives and interests at the forefront.

### **Benefits from the ABSP Experience**

The rapid scientific and commercial development of biotechnology poses new challenges to international development organizations. Not only did biotechnology come along at a time of shrink-

ing international agricultural research budgets, providing the challenge of expanding the research agenda without reducing existing priorities, but it also presents new policy challenges and a reflection on the role of the public sector. USAID has approached these challenges in part through pursuit of partnerships between developing countries and the private sector. Although the role of the private sector will not replace that of the public sector in realizing the benefits of biotechnology to developing countries, partnerships between the public and private sectors bring broader resources to bear on this goal. Under the ABSP program, developing country scientists have gained access to short- and long-term technical training in company laboratories. It is this access to technical expertise and biotechnology tools that has been the primary benefit of such partnerships. Not inconsequential, however, has been the financial support with which the private sector has matched USAID seed funding. In most cases, USAID funding has gone exclusively to support the expenses of travel and the costs of developing country scientists and not for research costs of the company. While no USAID collaborative projects have been a fully philanthropic exercise for the private sector, as for-profit institutions, they have deeper pockets from which they continue support of research which USAID helped initiate.

Finally, an indirect benefit of public-private sector partnership has been the introduction of a new management and institutional culture to public sector research (NARS) in developing countries. This is a new culture with greater focus on the outcome of research, on technology dissemination, and on working through a diverse set of partners, including the private sector, to extend the application of new technologies to farmers.

### **Reference**

- Ives, C., Maredia, K.M. and Erbisch, F.H. 1999. "International Collaboration: Intellectual property Management and Partner Country Perspectives." In: *Managing Agricultural Biotechnology: Addressing Research Program Needs and Policy Implications* (J. I. Cohen ed.). Wallingford, Oxon. U.K. CAB International, pp 261-271.