

*Baikunth Baishya, 43,  
walking through his dry  
paddy field in Jamtola  
village, west of Guwahati,  
Assam during a drought-like  
period in 2006.*

# Preparing for New Challenges

Photographs courtesy of SATHIGURU MANAGEMENT CONSULTANTS



## A key feature of the U.S.-India Agricultural Knowledge Initiative that takes it beyond the American-Indian cooperation of the Green Revolution is public-private partnership. Industry and business can help commercialize new technologies, reshape curricula to suit today's needs and identify necessary research areas.

**A**griculture in India is facing several challenges. Productivity of principal food crops has reached a plateau. Agricultural education is stagnating. The farm business has become global. Issues such as global warming and climate change, new pests and diseases, nutrition security, food safety and agricultural trade regimes have emerged. Agricultural practice is becoming technologically challenging and trade in agricultural commodities has become complex.

The need to reorient agricultural education to meet these new challenges is being felt in India as well as in the United States. Of late, policy makers have realized that these issues can be addressed only through a paradigm shift in human resource development, research, technolo-

gy generation and dissemination.

This was the backdrop in which President George W. Bush and Prime Minister Manmohan Singh spoke about enhanced cooperation in agricultural education and research in the joint declaration they signed in March 2006. This cooperation is based on the U.S.-India Knowledge Initiative on Agricultural Education, Research, Service and Commercial Linkages—known as Agricultural Knowledge Initiative or AKI. The idea was to revive the two countries' historical ties in agriculture, in the context of contemporary challenges. A key feature of this initiative is public-private partnership, so that private industry can be involved in all spheres of activity, from education and research to commercialization of new

technologies. Industry could help reshape curricula to suit its requirements and identify research areas that have the potential for rapid commercialization.

The initiative is being implemented through the AKI Board, co-chaired by Ellen Terpstra, U.S. Deputy Under Secretary for Farm and Foreign

---

*Below left: Students from Cornell University and three Indian agriculture universities visit a corn field to learn about manual harvesting in Kothapally village in the Ranga Reddy district of Andhra Pradesh in January 2007.*

*Below: Calum Turvey, professor of agriculture finance at Cornell University in Ithaca, New York, explains to Indian students the characteristics of a medicinal plant during field visits in January 2007.*

By DINESH C. SHARMA



## Progress on the U.S.- India Agricultural Knowledge Initiative

Recognizing agriculture as an area of critical importance for bilateral cooperation where U.S. and Indian interests converge, President George W. Bush and Prime Minister Manmohan Singh announced the Agricultural Knowledge Initiative during the Prime Minister's visit to Washington, D.C. in July 2005. Building on a long, successful history of cooperation in agriculture, the Agricultural Knowledge Initiative is intended to help India modernize its agriculture sector.

The Initiative, reinforced in a joint statement during Bush's visit to India in March 2006, supports India's efforts to build a market-oriented agriculture that is conducive to research, technology transfer, trade and investment. It focuses its activities on food processing and marketing, biotechnology, water management, and university capacity building. In addition, the joint work of the initiative emphasizes the development of effective policy, regulatory and institutional frameworks to increase Indian agricultural productivity, help Indian farmers prosper, and

strengthen agricultural trade between India and the United States.

Significant progress has already been achieved in each of the initiative's focus areas. In biotechnology, USAID's program to develop and commercialize the first biotech food crops are in the final stages of development and regulatory approval. This biotechnology activity has already established strong partnerships among U.S. and Indian seed companies, universities and research institutes.

On water management, more than 50 universities in the United States and India are now engaged in joint water resource projects that are developing new irrigation technologies and water conservation practices. University partnership grants have stimulated market-oriented initiatives in Indian state agricultural universities, such as the new agri-business supported Food Industry Center at Punjab Agricultural University in Ludhiana. Fellowships have allowed Indian scientists and U.S. university students to visit each other's countries.



*President George W. Bush greets a student in the middle of a field during his visit on March 3, 2006, to the Acharya N.G. Ranga Agricultural University in Hyderabad.*

Agricultural Services, and Mangala Rai, Secretary of the Indian Department of Agricultural Research and Education. The board has representatives of private companies such as Wal-Mart, Monsanto, ITC Limited and Venkateshwara Hatcheries. Eminent agricultural scientists who ushered in the Green Revolution—Norman Borlaug and M.S. Swaminathan—are honorary advisers. “The modus operandi for this is partnership. It is not as if one is giving and the other is taking,” explains Rai.

Though the area of cooperation and collaboration is wide ranging, it was decided to focus on four core areas initially—agricultural education, food processing and marketing, biotechnology and water management. Joint working groups have been formed for each of these and detailed work plans are being implemented. The idea is to take up projects that focus on knowledge generation, sharing

and exchange. The thinking is to let this initiative retain an identity that is distinct from other ongoing research programs.

The work plans are being supported by a grant of Rs. 3.5 billion (about \$80 million) from the Indian Government over a period of three years. The American side has secured funding of \$8 million in fiscal year 2006, with a total of \$24 million pledged through 2008. “Through this initiative, we have the opportunity to facilitate technology transfer, trade, and investment and bolster agricultural research, education, and extension between our two countries,” noted Ambassador David C. Mulford at the end of the fourth meeting of the AKI Board in New Delhi last November. “Part of our joint work is to develop effective policy, regulatory, and institutional frameworks, which will increase Indian agricultural productivity, help Indian farmers prosper, and strengthen trade.”

### All stakeholders involved

Indian agricultural universities are in the midst of a major exercise to revise their curricula. For the first time, all stakeholders, including private industry, have been involved in order to improve the design and delivery of course content. This exercise has now been thrown open to faculty from the U.S. land-grant universities as well as industry representatives, under the AKI. Their involvement is being sought to upgrade undergraduate and post graduate courses at agricultural universities so that they are able to meet the demands of farmers and industry.

India has 40 state agriculture universities, five deemed universities (institutes and departments that have been granted autonomy regarding coursework, admissions, fees, etc. by the University Grants Commission), one central agricultural university and more than 200 agricultural colleges. They churn out close to 14,000

graduates and 7,800 postgraduate and doctoral degree holders every year. But there are 25,000 professors. Clearly the student to faculty ratio is highly skewed due to a declining interest from students.

“The situation can be corrected only through wide ranging reforms in our education system, making it relevant to all the stakeholders,” says S.L. Mehta, vice chancellor of Maharana Pratap University of Agriculture and Technology in Udaipur. He was speaking at the AKI Curriculum Development Workshop held in New Delhi on January 22-23, 2007. “The focus should shift to learning from teaching,” says Mehta, who heads a committee whose recommendations on agricultural education are at the core of the review process.

The panel has suggested increasing practical content in all courses, from the present 36 percent to 50 percent, besides introducing new courses in entrepreneurship development, agribusiness, biotechnology, international trade, patent regimes and environmental science in various disciplines. In order to develop a cadre of skilled professionals, one to two years of experiential learning has been recommended. Measures for faculty improvement include mandatory training in national and international institutes, rotation within the state agriculture university system and exposure to industry. There should be movement of students and faculty across states and freedom for students to select course modules of their choice.

One key way agricultural education can be made interesting as well as relevant is to make classroom teaching interactive through the use of new media techniques. These can also be used to promote non-formal education and distance learning. Under AKI, this is being done through



*Left: Indian and American university students learn about organic farming from research head N. Selvaraj at the Horticultural Research Station in Odhagamandalam, Tamil Nadu in January 2007.*

*Below: U.S. Agriculture Secretary Mike Johanns, right, inspects wheat produced by farmers in Badshapur, Haryana, in November 2006.*



sharing the American experience in curriculum development, training and faculty exchange programs, endowment of industry-sponsored chairs in Indian universities and workshops for specific review and planning. “It is not that our curriculum is the answer. But our system could offer India some help in terms of course development, teaching methodologies, systems and procedures, faculty training, etc.,” said Ronnie Coffman, international professor

of plant breeding and director of international programs at the College of Agriculture and Life Sciences at Cornell University in Ithaca, New York.

In 2006, 15 Indian scientists and researchers completed fellowships at American universities on distance learning, bio-fuels, animal and plant diseases, and biotechnology, under the U.S. Department of Agriculture’s (USDA’s) Norman E. Borlaug International Agricultural Science and Technology Fellows Program. Another 12 Borlaug fellowships are being given during 2007. Also, under the Cochran Fellowship Program, 12 Indian experts will spend two weeks in the United States to work in food processing and marketing.

Also, the USDA’s National Agricultural Library and U.S. land-grant universities have begun working with their Indian counterparts to develop a plan to strengthen India’s library and information systems. Faculty and scientists will be trained to

## Buildup to the Green Revolution

India followed a path of science-led growth in agriculture after independence in 1947, with a view to attaining self-sufficiency in food production. A comprehensive educational system was developed to take up location- and situation-specific research. The knowledge thus generated in agricultural colleges and laboratories was transferred to farmers, enabling them to improve productivity and profitability. With funding from the U.S. Agency for International Development (USAID), a system of state agricultural universities was developed in the 1960s, patterned on the U.S. land-grant system. Indian students, researchers and teachers studied at American universities. They played a key role in events leading to the Green Revolution in the 1960s and subsequent improvements for dairies, fish farming and oilseed production.

develop teaching resources, using multimedia, Web-based technologies and training in the transmission and retrieval of digital resources.

The U.S. National Association of State Universities and Land-Grant Colleges has awarded five grants to American universities to work with Indian partners on projects that focus on university curriculum development, animal diseases, and trade.

Examples of joint initiatives focusing on experiential learning in agricultural education already exist. Cornell University runs a course on international agriculture development, in which students of three Indian agricultural universities participate through a virtual classroom. Lectures delivered in Cornell classrooms are video streamed to students at Tamil Nadu Agricultural University, Coimbatore; Acharya N.G. Ranga Agricultural University, Hyderabad; and

management in rural America,” says K. Vijayaraghavan, founder director of Sathguru Management Consultants in Hyderabad, which coordinates the exchange program. “On the other hand, the visit of the Cornell students to India allows them to understand...complex dimensions of improving the livelihood of rural communities, the potential of integrating the food chain from farm to market and the use of information and communication technologies.”

“And an American student would not be considered educated if he or she has no understanding of what is happening here,” says Coffman, of Cornell. Most agro-business companies that recruit from land-grant colleges ask students if they have any experience of emerging economies like India and China.

### Long-term spinoffs

The Agricultural Knowledge Initiative has approval to run for three years, but senior officials connected with it feel that it will lay the foundation for several long-term joint projects that may have spin-offs for other countries. The pigeon pea genomics project is one example. In this project, the Hyderabad-based International Crop Research Institute for Semi-arid Tropics is also participating, besides several Indian agricultural research institutions and universities, and the University of California-Davis. The pigeon pea is one of the most important pulse crops in India, but is marked by poor productivity due to lack of improved varieties, poor crop management, pest attacks and disease prevalence. Deciphering the genome of this crop holds the key to solving many of these problems.

Mangala Rai says more areas of cooperation will be included in the initiative in future. “For example, nanotechnology has been flagged, but we have not taken it up right away. We want to move step by step. The focus is on four areas now.” Under the biotechnology component, a strategic alliance has been envisaged for training and research on development of transgenic crops with resistance to economically important viruses, tolerance to drought, heat and salinity and micro-nutrient utilization efficiency. Rai feels that the initiative has even greater significance for the future of Indian agriculture than the Indo-U.S. partnership had in the Green Revolution era. 

*Dinesh C. Sharma is a New Delhi-based writer who was selected by the Indian Ministry of Science and Technology for the National Award for Outstanding Effort in Science and Technology Communication in Print Medium for 2006. The award was presented March 1, 2007, in New Delhi, on National Science Day. [www.dinesh.net.in](http://www.dinesh.net.in)*

*Please share your views on this article. Write to [editorspan@state.gov](mailto:editorspan@state.gov)*



*Robin Bellinder, professor of horticulture at Cornell University and K. Mahendran, professor of agribusiness management at Tamil Nadu Agricultural University, both members of the Indo-American study group, at the tea processing plant of Beeyu Overseas Limited in Odhagamandalam, Tamil Nadu.*

the University of Agriculture Sciences, Dharwad. The second module of this course takes Indian students to the Cornell campus in Ithaca, New York for two weeks. There they are exposed to farming practices in rural America, functioning of community markets and rural supply chains.

The third module brings American students on a three-week trip to rural India, during which 20 Indian and 35 American students visit farms, markets and food processing centers. American students, along with 11 faculty and staff from Cornell, came to India in January 2007 as part of this course, while Indian students were in Cornell for two weeks in October 2006.

“Visits to retail centers, post-harvest technology centers and research farms expose Indian students to innovations that have taken place in...food chain