UF/IFAS – BRIEF
FOR
UNITED STATES - INDIA KNOWLEDGE INITIATIVE ON AGRICULTURAL EDUCATION, RESEARCH, SERVICE AND COMMERCIAL LINKAGES

UF/IFAS has several well established Cooperative Agreements with institutions in India, including University of Agricultural Sciences (UAS) Bangalore, Bangalore University, Indian Council of Forestry Research and Education (ICFRE), Institute of Microbial Technology (IMTECH; Council of Scientific and Industrial Research), Sri Venkateswara University (SVU), and ICRISAT *(pending*). These six cooperative agreements, centered on topics such as alternative energy, forestry, and molecular biology and genetics, and plant and crop production, broaden UF/IFAS linkages with India, and involve activities in teaching, research service and commercial linkages.

A.1 Education Technology for Teaching and Learning Enhancement

Graduate and certificate programs using state-of-the-art distance education technology. Proposed current activities in India include: graduate program in Soil and Water Science, with Environmental Science Track, Pest Management, and Agro-ecology. Program will be initiated at ICRISAT and will be made available to all Indian Universities, with graduate students working jointly with both Indian and American scientists. Certificate programs include: Watershed management, GIS and Landscape Analysis, Nutrient management, Remediation of contaminated soils, Constructed wetlands, Waste management, Soil-Environmental Services.

Practical workshops: Andrew Ogram (Soil and Water Science) has conducted workshops in Bangalore (2003) and Chandigarh (2005; supported by Indo-US S&T Forum) on molecular environmental microbiology, which included participants from most states in India. Workshop is planned for Gainesville (2006), and will include faculty from JIIT, New Delhi. The goal of these workshops is to train participants in key geographical regions and positions to transfer technology to colleagues.

B.2 Weather Based Forecasting of Pests and Diseases of Crops, Livestock and Fish

Jim Jones (Agricultural and Biological Engineering) and Ken Boote (Agronomy) are involved in an array of projects, including: 1) Response of crops and forests to increases in temperature, atmospheric CO_2 and water availability; 2) Development of crop and forest models that simulate changes in productivity in response to climate; 3) Climate change impact assessment at local, regional, national, and global scales; 4) Analysis of potential for adaptation to climate change through management options; 5) Evaluation of land management aimed at mitigating global warming; and 6) Climate forecast use for reducing risks of drought, forest fires, and economic losses. Training on crop modeling was delivered in ICRISAT and is now used in many locations.

Ken Boote is developer of the CROPGRO-peanut model and linked leafspot epidemic model, and will work with collaborators to test the leafspot epidemic model on peanut yield. Indian collaborators include National Centre for Medium Range Weather Forecasting, ICRISAT, Central Research Institute for Dryland Agriculture, National Res Centre on Rapeseed-Mustard, and Tamil Nadu Agricultural University. Boote is a collaborator (among others from India, Bangladesh, Thailand, Australia and USA) on a project submitted in Oct 2005 by S. K. Huda, Univ. of Western Sydney, Australia, to an Australian agency program. The goal of this proposal is to use current weather information plus 7-day forecast to predict disease risk from Cercospora leafspot on peanut and Alternaria blight on mustard.

B.3 Development of Bio-based Products

Biopesticides - Raghavan Charudattan (Plant Pathology) is a leader in the field of biopesticides. He has specialized in development, registration, and use of microbial biopesticides with emphasis on bioherbicides, and has developed bioherbicides for weeds of global importance such as water hyacinth, pigweeds, nutsedges, grasses, and others. He teaches a course on biological control of weeds and plant diseases. He is the coordinating editor for Biolgocial Control: Theory and Application of Pest Management, a multidisciplinary journal published by Elsevier. His interest in this US-India Knowledge Initiative is to promote research, scientific exchange, and entrepreneurial ventures (see comments in F.2).

B.4 Recycling Waste Water and Solid Wastes in Agriculture

Andrew Ogram (Soil and Water Science); areas of specialization are microbial ecology and environmental microbiology, with experience in linking land use practices to changes in microbial community structure and biogeochemical cycling on landscape scales, and monitoring bioremediation. He is project manager for active UF

Cooperative Agreements with Bangalore University and IMTECH. He has visited and maintains contacts with other universities around the country, including UAS Bangalore, IIT Madras, BHU, MS Graduate University (Vadodara), and AAU (Jorhat).

A conference sponsored by UF, Florida Atlantic University, SVU and Bangalore University addressed latest techniques in environmental remediation (July 24-26, 2002). Topics included heavy metals in aquifers and soils, and phytoremediation of soil, wastewater, hydrocarbons, and heavy metals. Training sessions included introductions to a range of remediation applications and regulatory issues.

B.6 Power Generation through Gasification of Crop Residues

Since 1995, UF, Bangalore University and SVU have exchanged research findings about biomass under a cooperative agreement that has led to multiple international conferences (See B4 above).

Biomethanation training course (1998) Six scientists from India attended a offered by UF. The program was sponsored by the Indian Ministry of Non-Conventional Energy Sources and the United Nations Development Programme/Global Environment Facility.

Forest Resources and Conservation

Indian researchers visited UF's School of Forest Resources and Conservation in October 2001 to enhance reforestation efforts. The three month training included tree improvement, nursery management and production, breeding, seed orchard management, and computer software. UF's work in eucalyptus, pine, cotton and popular trees is applicable to India. Training was funded by the Indian Council of Forestry Research and Education.

Two scientists from the Indian Council of Agricultural Research visited UF on a study tour focused on fruit and vegetable production. Both researchers explored UF's interactive educational programs and learned about developing curricula for undergraduate and graduate education (May 2001).UF/IFAS hosted (CSTAF in collaboration with UF Wildlife Ecology and Conservation) a short-term visit of two high-level officials of Tamil Nadu State Forestry Department.

P.K. Nair (Distinguished Professor of Forestry) visited the ICFRE centers in Dehra Dun and Coimbatore, India and gave three presentations (July 2001)

Shibu Jose (Associate Prof.) works with Ashoka Trust for Research in Ecology and the Environment (ATREE) in Bangalore on the ecology and conservation of a high altitude tropical forest system in Inida.

C. Biotechnology

Cooperative research is planned in environmental science, microbiology and cell-science with IMTECH; Andrew Ogram is program manager. Seven workshops/conferences focusing on biotechnology have been held in India or Florida. UF, SVU, and Bangalore University have a sustained interest in, and active programs addressing biotechnology for clean environment and energy.

C.3 Molecular Breeding for Stress Tolerance (water, salinity, heat stress) in Crops and Diseases in Animals using Biodiversity

Bala Rathinasabapathi is leading a research program at the Horticultural Sciences Department, University of Florida to improve crops for salinity, drought and heat stress using functional genomics and metabolic engineering technologies. He has been visiting India every two years and has lectured on developments on improving crops for stress tolerance. Crop improvement using metabolic engineering has excellent potential to solve some of the greatest problems in both the US and India.

C.5 Identification for Nutrient Use Efficient Genotypes from Germplasm and Allele Mining of Identified Genes in the Wild Relatives of Major Crops

Lawrence Datnoff (Plant Pathology) is program manager for a cooperative agreement with UAS Bangalore regarding the importance of silicon in crop physiology and production. There is no national database on silicon availability in Indian soils. Under the cooperative agreement, faculty will seek joint funding for research and establishment of a joint specialized "referral laboratory" on silicon in agriculture with a vision to recognize the importance of silicon across numerous plant species. An international workshop of scientific experts, policy makers, extension workers and industrialists from key institutions and agencies has been proposed.

E.4 Enhancing Biosecurity Capabilities for Diagnostics, Risk Assessment and Risk Mitigation of India in relation to International Standards of Phytosanitation

UF is regional coordinator for the Southern Plant Diagnostic Network http://spdn.ifas.ufl.edu/ The mission of the network is to enhance national agricultural security by quickly detecting introduced pests and pathogens. The goal is to (i) establish a secure, regional network for the detection and diagnosis of plant health problems, (ii) extend and support sound public policies, implement rapid and accurate diagnoses, and response strategies, and (iii) provide leadership and training.

F.1 Evolving Agricultural Markets, Trade and Outlook

The International Agricultural Trade and Policy Center (est. 1990) in the UF Food and Resource Economics Depart. Its mission is to provide information, education, and research directed to immediate and long-term enhancement and sustainability of international trade and natural resource use. Its scope includes agricultural, rural, resource, environmental, food, state, national and international policies, regulations, and issues that influence trade and development

F.2 Commercialization and Impacts of Agricultural Biotechnology in India

R. Charudattan is interested in promoting linkages between US and Indian biotechnology companies. He is President & CEO of a UF-affiliated biotech company in Gainesville that is developing microbial bioherbicide agents. He is interested in establishing R&D efforts in the areas of microbial pesticides, screening of microbial metabolites for development as reduced-risk pesticides, developing specialty chemicals for niche agricultural markets, and product manufacturing in India.

F3. Strengthening Information and Communication Technology (ICT) for Growth and Efficiency of Indian Agriculture

1) Process/systems/decision aids - GIS applications, Systems modeling and simulation, Geomatics – integrated approach of measurement, analysis, and management of the descriptions and locations of Earth-based data, Remote Sensing; 2) On-line e-learning --distance education Degree and Certificate Programs (see A.1.), and 3) On-line educational and research resources:***EDIS*** ***http://edis.ifas.ufl.edu/*** **EDIS is the Florida Cooperative Extension's** Electronic Data Information Source and ***DDIS*** is the web-based Distance Diagnostic and Identification System ***http://ddis.ifas.ufl.edu/*** (DDIS).