THE CRAWFORD FUND
An Initiative of the Australian Academy of Technological Sciences and Engineering

2008 ANNUAL CONFERENCE:

AGRICULTURE IN A CHANGING CLIMATE

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Parliament House, Canberra

INTERNATIONAL SPEAKERS, BIO NOTES AND SHORT ABSTRACTS

The full program, bios and abstracts at www.crawfordfund.org

Ms Katherine Sierra, Vice President for Sustainable Development at the World Bank, has overall responsibility for strategies and work in agriculture and rural development, energy, the environment and natural resource management, social development, transport, urban policies, and water. She also chairs several international consultative groups, including the Consultative Group on International Agricultural Research (CGIAR). Ms Sierra, an urban planning specialist, joined the World Bank in 1978 and has worked principally in Latin America and East Asia, holding increasingly senior positions in operational units. She served as Vice President, Human Resources (2000-2004) and Vice President, Infrastructure (2004-2006) before assuming her current position.

Her address at the "Agriculture in a Changing Climate" conference is on
"Climate Change, Sustainable Agriculture and the Research Road Ahead"

A short abstract follows:
Climate change is more than an environmental threat; it raises the most difficult issues of economic disparity, political power, and social justice. For less-developed nations and their hundreds of millions of citizens who will be directly impacted by climate change, it is a critical development issue. The poorest countries and communities will suffer the earliest and the most; climate change has the potential to reverse the hard-earned gains of developing countries over the past decades and thwart progress towards achieving the Millennium Development Goals (MDGs). Perhaps nowhere is this as evident as it is in agriculture, the leading sector in many developing country economies where multiple interconnections between food security, energy, security, and climate change have become increasingly evident. New agricultural technologies and practices to counter increased risks of climate change impacts are urgently needed. Scientists around the world, many of whom are associated with the Consultative Group on International Agricultural Research (CGIAR), have taken up the challenge of responding to the threats from climate change. Overall, what is needed is a new revolution in agricultural research, built upon the successes of the "Green Revolution" that helped so many hundreds of millions of people to escape hunger and poverty, and paved the way for economic growth in their countries. This presentation will outline recent achievements on this agenda, as well as highlight, in six key areas, the huge potential to push the frontiers of agricultural research to respond to climate change: the challenges that threaten and the opportunities that beckon.

Dr Cary Fowler is Executive Director of the Global Crop Diversity Trust, the organization responsible for the ongoing activities of the arctic 'doomsday' seed vault. In 1985 he was awarded the Right Livelihood Award (the ŒAlternative Nobel Prize). In the 1990s, at FAO, he headed the production of the UN's first global assessment of the world's plant genetic resources; he drafted and supervised negotiations of FAO's Global Plan of Action, adopted by 150 countries, and served as Special Assistant to the Secretary General of the World Food Summit. He represented the CGIAR in negotiations on the International Treaty. He is currently Chair of the International Advisory Council of the Svalbard Global Seed Vault.

His address at the "Agriculture in a Changing Climate" conference is on:

"*CONSERVING CROP DIVERSITY: NAVIGATING POLITICS AND CLIMATE CHANGE TO CREATE A GLOBAL SYSTEM*

A short abstract follows:

Agriculture faces an unprecedented array of serious challenges that promise to threaten food security, undercut development efforts, and even undermine peace and stability. Those challenges include climate change, energy and water constraints, in addition to the "normal" difficulties posed by pests and diseases and chronic underinvestment in agricultural research. Agriculture is not yet prepared for this juggernaut. Short-term thinking has led to long-term problems that will not be corrected by more short-term thinking and approaches. Investments in conserving, managing, and developing crop diversity will provide an early indication of how serious and sustainable new initiatives to strengthen food security will be, as crop diversity is the biological prerequisite for crop adaptation and improvement. Viewed from a global perspective, the current "system" for conserving crop diversity and providing it to plant breeders and researchers is not a system at all, but an ad hoc and increasingly antiquated, costly, and ineffective collection of programs. Additional indiscriminately made investments made in this will not tangibly help agriculture "get ready" to be more productive in the face of climate change. A new, slimmer, more effective and sustainable model is emerging – one that focuses on conserving unique diversity, increasing our knowledge about it particularly in relation to future needs that can now be modeled and anticipated, and making certain that the diversity is legally and practically available to all. The Global Crop Diversity Trust is partnering with others to develop a rational global system. This challenge can be met. We can "get agriculture ready."

Dr Segenet Kelemu is the Research Director at the Biosciences Eastern and Central Africa (BecA) Hub. She is a molecular plant pathologist with emphasis on elucidation of molecular determinants of host-pathogen interactions, development of novel plant disease control strategies including transgenics, biopesticides, pathogen population genetics and dynamics, endophytic microbes and their role in plant development. Graduating at the top of her class with great distinction in Plant Sciences in 1979, she took on teaching responsibilities in Plant Protection and conducted research on cereal disease resistance until 1982. She subsequently won a scholarship to earn a M.Sc. degree in Plant Pathology/Genetics at Montana State University and a Ph.D. in Molecular Plant Pathology at Kansas State University. From 1989 to 1992 she did her postdoctoral research in molecular bacteriology at Cornell University and joined the International Center for Tropical Agriculture (CIAT, its Spanish acronym) as Senior Scientist in charge of tropical forage pathology in 1992. She was later appointed Leader, Crop and Agroecosystem Health Management at CIAT till her departure in August 2007 to take up the position as Research Director at the BecA Hub.

Her address at the “Agriculture in a Changing Climate” conference is on:
HELPING SMALHOLDER FARMERS DEAL WITH CLIMATE CHANGE

A short abstract follows:
Agriculture is a major activity and land use across the developing world; it is vulnerable to changes in climatic conditions. Climate change impacts agricultural systems and production in various ways such as introduction of changes in agro-ecological conditions. Changes in precipitation pattern and amount as well as temperature can directly affect agricultural production, suitability of cultivable land, food supplies and food utilization. Climate change can affect food security depending on the region and the socio-economic status of the country involved. The poorest and food insecure regions such as sub-Saharan Africa are expected to be most vulnerable to climate change. Overall, the adversities of climate change will disproportionately affect the small-holder poor who largely depend on agriculture and who have limited resources to cope with or adapt to climate change. More than 85% of the world’s land-users are classified as small-holders with farm sizes of less than 2 ha. The impacts of high temperature, variability in precipitation patterns, and events such as severe and frequent drought and floods will most likely enhance production risks for these farm holders, further widening the gap between the rich and the poor. Adverse impacts of climate change on the poor may be reduced through appropriate policies such as investments in infrastructure, adoption of sustainable agricultural and natural resource management practices, and advanced technologies that can generate climate-resilient crop varieties and better adapted livestock breeds. Examples of some of these advanced technologies will be presented.

Frances Seymour is the Director General of the Center for International Forestry Research (CIFOR) with headquarters in Bogor, Indonesia. Prior to CIFOR, Ms. Seymour founded and directed the Institutions and Governance Program at the World Resources Institute (WRI) in Washington, DC. At WRI, she guided the launch of The Access Initiative, a global civil society coalition promoting citizen involvement in environment-related decisions. She previously served as Director of Development Assistance Policy at World Wildlife Fund, and spent five years in Indonesia with the Ford Foundation. She has served on numerous boards and advisory committees, including those of World Neighbors, the International NGO Forum on Indonesian Development, and the African Centre for Technology Studies. She is a member of the Council on Foreign Relations. She holds a masters degree from the Woodrow Wilson School at Princeton University, and a B.S. in Zoology from the University of North Carolina at Chapel Hill.

Her address at the “Agriculture in a Changing Climate” conference is on:

FORESTS AND CLIMATE CHANGE:
CAUSE, CASUALTY AND THE OPPORTUNITY TO CAPTURE CO-BENEFITS

A short abstract follows:

The relationships between forests and climate change are complex and multidimensional. Deforestation and forest degradation are now recognized to be a globally significant source of greenhouse gas emissions, and it is asserted that reduction of forest-based emissions may be among the least expensive mitigation options. However, decades of unsuccessful efforts to reverse high rates of deforestation and degradation in the tropics have revealed the fundamental failures of markets, governance, and policy that drive forest loss. New initiatives toward Reducing Emissions from Deforestation and forest Degradation (REDD) will face similar challenges, but bring could bring to bear new sources of finance and political will. Forests are also vulnerable the direct impacts of climate change. Warming temperatures, increased variability of rainfall patterns, and increased frequency and severity of extreme weather events will all affect the ability of forests to continue providing goods and services to local communities and to society at large. Because healthy forests are more resilient to climate change, sustainable forest management must be given more emphasis in national adaptation strategies. Forest-related mitigation and adaptation strategies are also inter-linked: the permanence of carbon currently stored in forests is at risk from climate change, with some models predicting significant loss of forests due to climate change impacts. Improved forest management in the interest of climate change mitigation and adaptation offers significant potential for co-benefits. The wealth of biodiversity harbored by tropical forests currently being eroded by deforestation and forest degradation can be conserved through management strategies that include biodiversity as well as carbon storage and adaptation objectives. While there will certainly be trade-offs between efficiency and equity, REDD initiatives provide a potential new source of income for rural communities. Finally, the newly-felt urgency of harnessing forests for climate change mitigation and adaptation could accelerate long-overdue reforms in the institutions and governance mechanisms necessary for sustainable forest management

Trevor Nicholls joined CABI in 2005 and has restructured the organisation to deliver clearer strategic focus and customer orientation, resulting in 3 consecutive years of operating profits and the elimination of a £7 million debt burden. Prior to joining CABI, his career covered 25 years experience of building international businesses in the life science industry, with a focus on genomics, in major pharma, biotech and academic clients. He has broad experience of initiating change and restructuring organisations, ranging from start-ups to FTSE 100/Nasdaq quoted companies. Trevor holds a BA and D.Phil in Biochemistry from the University of York and Diploma qualifications in Marketing (CIM) and Company Directorship (IoD).

His address at the “Agriculture in a Changing Climate” conference is on:

INNOVATIVE SOLUTIONS TO NEW INVADERS: AGRICULTURAL PESTS, DISEASES AND WEEDS

A short abstract follows:

Global agriculture is struggling to keep pace with increasing demands for food as human population increases and food preferences alter. Changes in temperature, greenhouse gas concentrations, precipitation patterns, and radiation further challenge farmers. Insect and nematode pests, plant diseases and weeds are major constraints to crop production. Developing models to predict the potential distribution and abundance of a pest species under various climate change scenarios is essential and the Australian scientific community has been at the forefront with the development of CLIMEX and its application to modelling some of the world’s worst weed species, such as the pan-tropical Asteraceae, *Chromolaena odorata.* CABI is developing tools to assist farmers in coping with these challenges. In West Africa, *C. odorata* promotes other crop pests, such as *Zonocerus variegatus* grasshoppers*.* CABI has developed an efficacious mycopesticide, a formulation of *Metarhizium flavoviride*, to control grasshoppers and locusts. In Tanzania, CABI, with partners, is developing a community-based “early warning system” combined with the application of a natural baculovirus for the early control of armyworm outbreaks, which have devastated this year’s maize harvest in neighbouring Kenya. Climate models predict increased precipitation in parts of the humid tropics. In Central Africa, “blackpod disease” reduces cocoa yields are this will be exacerbated by higher humidity. Farmers currently use contact fungicides but this strategy will become less efficacious with increasing rainfall. CABI is working with partners to identify endophytes, such as *Trichoderma*, as potential biocontrol agents to deal with this challenge. These and other examples of CABI’s work will be described in more detail.