

Consultative Group on International Agricultural Research

**Annual General Meeting
Stakeholder Meeting: Science Forum
December 3-4, 2007
Beijing, China**

Summary Record of Proceedings



*CGIAR Secretariat
(A CGIAR System Office Unit)
The World Bank
Washington, DC
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Acronyms Used

AARINENA	Association of Agricultural Research Institutions in the Near East and North Africa
AE	Alliance Executives
AGM	Annual General Meeting
AKST	Agricultural Knowledge, Science and Technology
APAARI	Asia Pacific Association of Agricultural Research Institutions
ARC	Agricultural Research Center
CAAS	Chinese Academy of Agricultural Sciences
CAC	Central Asia and the Caucasus
CAS-IP	Central Advisory Service on Intellectual Property
CIRAD	Centre de cooperation internationale en recherche agronomique pour le développement
CP	Challenge Program
CPWF	Challenge Program on Water and Food
CWANA	Central and West Asia and North Africa
DFID	Department for International Development (UK)
ExCo	CGIAR Executive Council
FAO	Food and Agriculture Organization
FASID	Foundation for Advanced Studies on International Development
FARA	Forum for Agricultural Research in Africa
FONTAGRO	Fondo Regional de Tecnología Agropecuaria (Regional Technology Fund)
GFAR	Global Forum for Agricultural Research
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
ICBA	International Center for Biosaline Agriculture
ICT-KM	Information and Communications Technology and Knowledge Management
IDRC	International Development Research Centre
INIFAP	Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias
INRA	Institut National de la Recherche Agronomique
INRAT	Institut National de la Recherche Agronomique de Tunisia
IUCN	International Union for the Conservation of Nature and Natural Resources
NARO	National Agricultural Research Organization (Uganda)
NARS	National Agricultural Research Systems
PCARRD	Philippine Council for Agriculture, Forestry and Natural Resources Research and Development
SPIA	Science Council Standing Panel on Impact Assessment

USAID
WDR

United States Agency for International Development
World Development Report

International Agricultural Research Centers Supported by the CGIAR

Centro Internacional de Agricultura Tropical (CIAT)

Center for International Forestry Research (CIFOR)

Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT)

Centro Internacional de la Papa (CIP)

International Center for Agricultural Research in the Dry Areas (ICARDA)

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

International Food Policy Research Institute (IFPRI)

International Institute of Tropical Agriculture (IITA)

International Livestock Research Institute (ILRI)

Bioversity International (Bioversity)

International Rice Research Institute (IRRI)

International Water Management Institute (IWMI)

The Africa Rice Center (WARDA)

World Agroforestry Centre (ICRAF)

WorldFish Center (WorldFish)

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**CGIAR Annual General Meeting
Monday, December 3, 2007**

**OPENING CEREMONY
Beijing International Convention Center (BICC)
Convention Hall 2**

16:30 Welcoming remarks, Katherine Sierra, CGIAR Chair

Letter from Hui Liangyu, Vice Premier of China
- Read by Niu Dun, Vice Minister of Agriculture, China

Opening Speech, Katherine Sierra, CGIAR Chair

Director's Update, Ren Wang, CGIAR Director

Announcement of the African Women in Agriculture Research and
Development Program

17:15 Ceremony Closes
Participants invited to view Exhibition

18:00-20:00 **Host Country Banquet**
Convention Hall 1

**CGIAR Annual General Meeting
Tuesday, December 4, 2007**

**STAKEHOLDER MEETING: SCIENCE FORUM
HARNESSING ADVANCES IN SCIENCE
FOR SUSTAINABLE AGRICULTURE
Beijing International Convention Center (BICC)
Level 2, Convention Hall 2**

Objectives of the forum:

1. Reflect on major scientific achievements in fostering sustainable agriculture.
2. Examine recent developments and advances in science that hold significant promise for enhancing the effectiveness of agricultural research.
3. Explore strategies by which CGIAR researchers can incorporate the concepts, tools, and methods of new science into their research while offering opportunities to colleagues from the scientific community-at-large to contribute to sustainable agriculture and its multiple roles.

Opening Plenary

0830 Opening Remarks - Rudy Rabbinge, CGIAR Science Council Chair

0835 Welcome – Katherine Sierra, CGIAR Chair

Presentations:

0845 Overview of the World Food Situation, Joachim von Braun, Director General, IFPRI

0920 World Development Report 2008: Agriculture for Development, Derek Byerlee, Sr. Adviser, World Bank

0945 Agricultural Research in China and Its Impact, Zhai Huqu, President, CAAS

1010 New Science for Agriculture: Challenges and Opportunities, Hans Herren, Member, CGIAR Science Council

1030 Coffee

1100 **Parallel Session Theme 1: Science at Work for Sustainable Agriculture with its Multiple Roles.**

This set of parallel sessions addresses the following question: *What have been the major scientific achievements in and beyond the CGIAR, and what lessons have been learned from these in the agricultural development of countries in the developing regions of world?*

Session 1A. Asia and the Pacific

Moderator: Steve Hall (Dir. General, WorldFish Center)

Presentation: Danilo C. Cardenas (Dep. Exec. Director, PCARRD)
Comments: Raj Paroda (Exec. Secretary, APAARI)
Achim Dobermann (Program Leader, IRRI)
Open Discussion

Session 1B. Central and West Asia and North Africa

Moderator: Shawki Barghouti (Dir. General, ICBA)
Presentation: Kawther Latiri (Dir. of Research, INRAT, Tunisia)
Comments: Mahmoud Solh (Dir. General, ICARDA)
Ahmed Nasser Al-Bakry (President, AARINENA)
Open Discussion

Session 1C. Latin America and the Caribbean

Moderator: Pamela Anderson (Dir. General, CIP)
Presentation: Jesus Moncada (Former Dir. INIFAP, Mexico)
Comments: Eliseo Contini (Head, Office of Int. Affairs, Embrapa)
Rodomiro Ortiz (Dir. Resources Mobilization, CIMMYT)
Nicolas Mateo (Exec. Sec. FONTAGRO)
Open Discussion

Session 1D. Sub-Saharan Africa

Moderator: Kwesi Atta-Krah (Dep. Dir. General, Bioversity)
Presentation: Ida Sithole-Niang (Prof. University of Zimbabwe)
Comments: P. Hartmann (IITA) (Dir. General, IITA)
Monty Jones (Exec. Dir., FARA)
Open Discussion

1230 **Lunchtime Presentations**

1400 **Parallel Session Theme 2: Advanced Science to Enhance Research Effectiveness**

This set of parallel sessions addresses the following question: *What developments in various fields of science are needed to better address challenges to achieving sustainable agriculture with its multiple roles?*

Session 2A. Molecular Biology

Moderator: Jean Marcel Ribaut (Director, Generation CP)
Presentation: Hei Leung (Program Leader and Sr. Scientist, IRRI)
Scott Miller (Office of the Under-Secretary for Science, Smithsonian Institution)
Comments: Mike Gale (Member, Science Council)
Michael Baum (Biotechnologist, ICARDA)
Open Discussion

Session 2B. Agroecology

Moderator: Dennis Garrity (Dir. General, World Agroforestry Center)
Presentation: Jeff McNeely (Chief Scientist, IUCN)
Comments: Bernard Hubert (Dir., GIP/IFRAI CIRAD-INRA, France)
Richard Thomas (Sr. Scientist, ICARDA)
Open Discussion

Session 2C. Spatial Information Technology

Moderator: Colin Chartres (Dir. General, IWMI)
Presentation: Robert Zomer (Landscape Ecologist, WAC)
Comments: Weili Zhang (Inst. of Natural Resources Management, CAAS)
Andrew Jarvis (Sr. Scientist, Bioversity and CIAT)
Open Discussion

Session 2D. Social Sciences/Economics

Moderator: Jim Ryan (Member, Science Council and Chair, SPIA)
Presentation: Ruth Haug (Dir./Prof. Noragric, Norway)
Robert Zeigler (Dir. General, IRRI) on behalf of Keijiro Otsuka
(Professorial Fellow, FASID, Japan)
Comments: Gopal K. Chadha (Member, Prime Minister's Economic
Advisory Council, India)
Brent Swallow (Global Proj. Leader, World Agroforestry
Center)
Open Discussion

1530

Parallel Session Theme 3: Strategies for Harnessing Advanced Science

This set of parallel sessions addresses the following question: *What are the strategies by which CGIAR researchers can incorporate the concepts, tools, and methods of new science into their research while offering opportunities to colleagues from the scientific community-at-large to contribute to sustainable agriculture?*

Session 3A. Knowledge Systems and Innovation for Agricultural and Rural Development

Moderator: Enrica Porcari (Chief Info Officer, ICT-KM)
Comments: Jean Lebel (Director, Environment and Natural Resource
Management, IDRC)
William Clark (Professor, Harvard Univ)(Audio)
Bill Neibur (Chair, Private Sector Committee)
Carlos Sere (Dir. General, ILRI)
Antón Mangstl (Director, KECBD, FAO)
Inquisitor: Bob Day
Open Discussion

Session 3B. Making IPRs work for Pro-poor Agricultural Innovation

Moderator: Kenneth Fischer (Member, Science Council)
Presentation: Niels Louwaars (CGIAR Liaison, Wageningen University)
Comments: Carl-Gustaf Thornstrom (Asst. Prof. Swedish Univ. Agric Sciences)
Victoria Henson-Apollonio (Sr. Scientist, CAS-IP)
Open Discussion

Session 3C. Research Management Strategies

Moderator: Rodney Cooke (Dir. Tech Adv. Div., IFAD)
Presentation: Michel Dodet (Vice-President International, INRA, France)
Comments: William Dar (Dir. General, ICRISAT)
Masa Iwanaga (Dir. General, CIMMYT)
Frances Seymour (Dir. General, CIFOR)
Open Discussion

Session 3D. Resource Mobilization

Moderator: Mark Cackler (Dir. ARD, World Bank)
Presentation: Jonathan Wadsworth (Sr. Rural Livelihoods Adviser, DFID)
Comments: Franklin Moore (Director, USAID)
Ayman Abou Hadid (President, ARC, Egypt)
Emile Frison (Dir. Bioversity and Chair, AE)
Open Discussion

Session 3E. Mobilizing Partners and Promoting More Inclusive Research Partnerships

Moderator: Marlene Diekmann (Research Advisor, GTZ)
Presentation: Jonathan Woolley (Program Coordinator, CPWF)
Adel El-Beltagy (Chair, GFAR)
Open Discussion

1630 Coffee

1700 **Closing Plenary**
Chair: Katherine Sierra
Remarks: Denis Kyetere (Director General, NARO, Uganda)
Rudy Rabbinge (Science Council Chair)
Ren Wang (CGIAR Director)

1730 Closing: Katherine Sierra

CGIAR Annual General Meeting
Tuesday, December 4, 2007

1930

Crawford Lecture (Venue: Great Hall of the People)

The Great Use-it-or-lose-it Intelligence Test

Dr. William Calvin, Affiliate Professor Emeritus

University of Washington, USA

CGIAR Science Awards Ceremony 2007

- The CAAS-CGIAR Award for Excellence in Journalism
- COM PLUS Communications Award
- Outstanding Scientific Support Team Award
- Outstanding Partnership Award
- Outstanding Scientific Article
- A Regional Award for Outstanding Agricultural Technology in the Asia-Pacific Region
- CGIAR Award to Outstanding Promising Young Scientist
- CGIAR Award to Outstanding Scientist

CGIAR AGM 2007—Stakeholder Meeting

Official Opening of AGM07

(a) Welcoming remarks by the CGIAR Chair

The CGIAR Annual General Meeting opened on Monday afternoon, December 3, 2007 at the Beijing International Convention Center with approximately 800 participants attending.

CGIAR Chair Kathy Sierra welcomed the meeting participants. She acknowledged the presence in the opening session of the following distinguished individuals: Mr. Niu Dun, Vice Minister of Agriculture of China and Mr. Zhai Huqu, President of CAAS. Joining them at the head table were Rudy Rabbinge, Chair of the Science Council; Ren Wang, CGIAR Director; Jim Godfrey, Chair of CGIAR Centers Alliance Board; and Emile Frison, Chair of the CGIAR Centers Alliance Executives. She also acknowledged the presence of Mr. Song Jiang, former Vice Chairman of China's People's Political Consultative Conference, and Mr. He Kang, former Minister of Agriculture of China and World Food Prize Laureate in 1993.

(b) Letter from Vice Premier of China

On behalf of Mr. Sun Zhengcai, Minister of Agriculture of China, Vice Minister Dun read a letter from Mr. Hui Liangyu, Vice Premier of China. The Vice Premier's message gave a brief description of agricultural development in China and how it contributed to the reduction of poverty and improved economic well-being in the country's vast rural communities. The modernization of agriculture, which enabled China to become the world's biggest producer of food grains and many important agricultural commodities, was attributed to a great extent to the country's achievements in agricultural science and technology. The letter recognized the partnership between China and CGIAR in agricultural research and expressed willingness to further enhance that partnership. It also indicated China's willingness to work together with other countries to deepen international cooperation and promote scientific and technological advancement in agriculture to address global challenges of meeting food demand and sustainable management of natural resources.

(c) Opening Speech by the CGIAR Chair

In her opening speech, Kathy Sierra thanked China for hosting AGM07. She underlined the value of the Centers' research partnerships with China and welcomed the opportunity to review with Chinese colleagues and other stakeholders shared progress and achievements in agricultural development.

The CGIAR Chair made reference to the issues raised in the 2008 World Development Report. Among the new important challenges facing the world today, she mentioned rising food prices attributed to increasing food demand due to rapid economic growth, and competing food, feed, and biofuel uses for crops. Harnessing advanced science becomes even

more critical to help address this challenge. She also raised the need to respond urgently and decisively to the challenge of climate change, and to agree on a strategic course of action.

She emphasized the need to move the CGIAR forward, to undergo changes through a facilitated process to ensure that it is well-positioned to address the challenges. She briefly described the progress that has been made in the change management process that was launched earlier in the year.

In closing, the CGIAR Chair outlined three concrete measures that she would like the CGIAR to pursue at AGM07 and in the following weeks, namely: a) move quickly ahead with the proposals of the new Challenge Programs; b) identify practical ways to mobilize advance science and the new tools it offers in the service of research for development; and c) examine and discuss a feasible course of action for funding priorities research in the CGIAR.

(d) Update by the CGIAR Director

Ren Wang joined the CGIAR Chair in thanking the government of China for hosting AGM07. Addressing the AGM participants for the first time in his capacity as CGIAR Director, he gave an update on the developments in the CGIAR since the last AGM. He focused his presentation on the CGIAR's efforts to better position itself to address new challenges that were highlighted by the CGIAR Chair in her remarks.

He began by mentioning some recent highlights from research in the CGIAR's priority areas. They were as follows: submergence tolerant rice that can help small farmers better manage the risks associated with prolonged flooding, drought tolerant varieties of maize and beans, improvement of crops that already possess an evolutionary advantage of stress, such as barley, ground nut, sorghum, and pigeon pea. These constitute some of the technologies already available to help farmers adapt to climate change. Efforts are also underway to stop the spread of a new and a highly virulent strain of wheat stem rust to which many of the current wheat varieties in the world are susceptible.

He also mentioned integrated production systems that show promise in combating desertification and enhancing the livelihoods of small-holder farmers through agricultural diversification. He also pointed out the importance of appropriate policies in moving resource management in the right direction, mentioning as a recent example the collaborative research dealing with the use of groundwater for irrigation in India.

On the financial side, he pointed out the steady rise of funding for problem-solving research in the Centers and Challenge Programs, noting that total funding for 2007 is estimated at \$510 million, up sharply from \$470 million realized in 2006. However, he added that the CGIAR should do its best in reversing the unfavorable trend of decreasing unrestricted funding.

In echoing what the CGIAR Chair has mentioned regarding the items that the CGIAR should focus on at AGM07, he posed the question of what kind of CGIAR should be built for the

21st century. He expressed confidence that the facilitated change-management process will help to better position the CGIAR.

He concluded his remarks by saying that the new CGIAR that he envisions “would require some essential features that include stronger donor coordination for ensuring secure, stable, and adequate funding; an alliance of Centers focused sharply on their core business of scientific innovation and delivery for impact; and an effective, efficient, and professionally operated support system.

Announcement of the African Women in Agriculture Research and Development Program

Acknowledging the work of CGIAR Centers and Programs in building partnerships with innovators in the agricultural sector, the CGIAR Chair announced the African Women in Agriculture Research & Development Program (AWARD), a new program in partnership with the Bill and Melinda Gates Foundation designed to further strengthen the role of women in science in Africa. She welcomed the contribution of the Gates Foundation which is providing a grant of US\$20 million to the program. AWARD will support 360 research fellowships for African women scientists in nine countries over six years.

Science Forum: Harnessing Advances in Science for Sustainable Agriculture

Opening Plenary

The opening plenary session of the Science Forum was chaired by Rudy Rabbinge, Science Council Chair. In his opening remarks, he pointed out the CGIAR's business is science for development. In pursuing research for development, the CGIAR's agenda has changed not only because of changes in the demand for its products but also because of the rapid scientific developments that enabled the CGIAR Centers to carry out research activities more effectively and efficiently. He briefly described what he considered as the seven steps in the evolution of the CGIAR agenda over the past several decades, i.e. 1) plant breeding activities leading to improved crop varieties; 2) development of other agro-technologies (plant nutrition, irrigation, crop protection); 3) economics and farming systems; 4) natural resource management research; 5) integration to higher level i.e. introduction of the ecoregional concept and programs; 6) addressing global challenges through systemwide collaboration, and 7) working more intensively with partners. He then outlined the objectives of the Forum and gave an overview of its component sessions.

In her welcoming remarks, Kathy Sierra was pleased that the participants would be talking about substance in the Science Forum. She noted that the other major part of AGM would be talking about how to make the CGIAR more effective and productive. But she emphasized that it should be grounded in why the CGIAR exists, which is to advance science for development.

Overview of the World Food Situation

This biannual presentation was given by the Director General of IFPRI. Joachim von Braun began his presentation by pointing out that the "world food system is in trouble and that the productivity and sustainability issues are serious, especially from the poor people perspective." He said that the world food equation is significantly changing, and the forces that are driving the changes are rapid income growth, globalization and urbanization effects that drive consumption, climate change, and the energy scarcity with the impacts on biofuels.

Von Braun noted that the world food equation balances supply and demand at a different level at much higher prices. Because of increasing demand and competing feed, food and fuel uses, prices of basic cereals have increased in recent years. Also, disruptions in production in large food producing countries, and the risks to producers posed by climate change especially in low-income countries all add up to production not being able to keep pace with the rising food demand.

He pointed out that the volatility in food prices has negative impacts on both farmers and consumers. Growing demand for high-value commodities, such as vegetables, fruits and dairy products, offers farmers in the developing countries new opportunities to boost

incomes if barriers to market entry are removed. Although there is lack of progress in the global trade negotiation, regional trade has increased and has benefited a number of developing countries, including some in Africa. On the consumer side, he noted that higher prices of cereals will force poor consumers to shift to poorer quality diets, with adverse health implications.

In addressing the current challenges, he emphasized the importance of appropriate policy responses by individual countries and the global community. He recommended the following courses of action for policy makers:

- Elimination of trade barriers in developed countries to facilitate more flexible responses to price volatility;
- Greater investment in rural infrastructure and agricultural input supply, so markets and producers can respond more easily to price signals;
- Acceleration of international agricultural research to strengthen farmers capacity to respond to higher food demand;
- Strengthening social safety nets where people are at risk because not enough food is available and their access to food is limited;
- Strong emphasis on coping with the impacts of climate change on national and international policy agendas;
- Greater private and public investments that contribute to pro-poor economic growth.

World Development Report 2008: Agriculture for Development

Derek Byerlee, Senior Adviser and Director of WDR 2008, gave a presentation on the World Development Report 2008, a flagship report of the World Bank published annually. The 2008 report deals with agriculture, the first time in the past 25 years that it has covered agriculture as the subject of its analysis.

In presenting the highlights of the report, Byerlee focused on the key messages being conveyed by the report and the issues associated with each. These messages are: 1) agriculture must be given a much greater role in the development agenda; 2) there are better opportunities to use agriculture for development today than 20 years ago; and 3) today's agriculture is faced with a number of major challenges. The report looks at three major functions of agriculture, namely, as lead sector for growth particularly for countries in early stages of development; as a source of livelihood for food security and poverty reduction; and a way of managing natural resources and the environment.

One of the major WDR findings that Byerlee highlighted is that agricultural growth is particularly effective in reducing poverty. GDP growth originating in agriculture is about four times more effective in reducing poverty than GDP growth originating outside the sector. The report is optimistic about the use of agriculture for development. The opportunities to use it relate to better incentives (e.g. reduced rate of taxation), markets (new markets and high-value products), and innovations (both technological and institutional).

On challenges to today's agriculture, Byerlee talked about resource constraints to growth (i.e. land and water resources constraints), challenges in securing more and higher-quality public investments in agriculture public goods (research and development, infrastructure, education, institutions, etc), and the challenges in terms of the enabling global environment for agriculture for development agenda (e.g. increasing ODA to agriculture).

He concluded his presentation by citing some implications of the WDR for the CGIAR in three areas: global public good priorities (higher productivity growth, addressing critical resource constraints, adaptation to climate change and reduction of greenhouse gases from agriculture, diversification to high-value agriculture, and institutional innovations). A key recommendation of the report is to increase the core budget share of the CGIAR to enable it to address the aforementioned priorities. Finally, the CGIAR and others in the agricultural research community need to think about research processes that meet the needs of an increasingly heterogeneous world.

Agricultural Research in China and its Impact

Zhai Huqu, President of CAAS, gave a presentation on the advances in and strategies for agriculture research in China. Giving a historical background of agricultural production in China, he said that over the past 30 years China has achieved favorable balance for supply and demand of agricultural products. He pointed out the leading role that agricultural science and technology has played in rural economic development. This was reflected in the high and steady rate of increase in total grain, meat, dairy, and poultry production. The increase in grain production was to a large extent due to significant increases in yield per hectare (currently about 7 tons /ha), which also translated to increases in farm income.

Huqu summarized the key achievements of the Chinese agricultural scientific community as follows: 1) collection and conservation of crop germplasm resources, with about 400,000 accessions conserved in the country's genebanks; 2) establishment and implementation of an integrated breeding system that led to the development of new and improved crop varieties (e.g. hybrid rice and super rice, transgenic Bt cotton, high-yield and quality canola, dwarf male-sterile wheat, Chinese cabbage and other vegetables); 3) establishment of technical system for major animal disease control and prevention (e.g. development of avian flu vaccine, foot and mouth disease vaccine); 4) establishment of quality standard system and quality control system for agricultural products; 5) efficient utilization of agricultural resources, environment control and ecological restoration; and digital agriculture and agricultural information technology.

The key challenge faced by Chinese agriculture is how to continuously meet the demand for agricultural products by the ever-growing population (which will reach 1.6 billion in 2030) under constraints of land and water resources limitation. Huqu cited the following as specific challenges: farmland degradation (about 40%); pollution (pesticides, heavy metal, and fertilizer) and antibiotics/ hormones residues problems; invasive species and natural disaster; improving farmers' livelihood/income relative to urban residents; and lack of comparative advantage of land-intensive products in international markets.

In addressing the abovementioned challenges, China has set a national agricultural development objective and strategy focused on security (e.g. research on germplasm resources for gene discovery), safety (prevention and control of diseases and pests; food safety), and sustainability (control and rehabilitation of agro-environmental pollution), with support of enabling policies and initiatives.

New Science for Agriculture: Challenges and Opportunities

Hans Herren, a member of the Science Council, provided an overview of the themes of the Science Forum parallel sessions. A synopsis of his presentation is given below.

Agriculture and its supporting science will be facing a number of challenges in the decades ahead, new and old, for which there is a need to learn from the experiences of past practices and identify new opportunities to push the boundaries in science, technology and knowledge for agricultural development. New challenges are posed with addressing climate change and sustainability needs; older challenges that are as relevant as ever relate to feeding growing populations, while ensuring equity and food security.

Which new realms of knowledge, science and technology (KST) can be brought to bear on these challenges? From the latest assessment of the impact of agricultural KST up to the present, it is clear that major increases in terms of agricultural productivity have been achieved. It is however also clear that these achievements have been attained with a lack of evenness in respect of geographical distribution. Some regions of the world have been more or less bypassed by the progress and continue to suffer poverty and malnutrition, while others are suffering from production stresses, such as land degradation, pollution of waterways and loss of biodiversity. Others still find themselves facing both stresses of production and increasing levels of inequity.

In this Science Forum 07 (SF 07), the impact of the AKST from within and outside the CGIAR over the past 50 years on the present state of agriculture is being presented with a regional angle. Given the many challenges that remain, four areas where KSTs can be expected to provide new opportunities to tackle the above-mentioned challenges in a sustainable manner are being elaborated upon. These are molecular biology, an area of science that has raised very high expectations and where there are interesting new development beyond the now already more traditional genetic engineering. When it comes to sustainable increases of productivity, agro-ecology has an inherent potential that is in need of more research and much wider application. From agro-ecology to the next SF 07 topic of spatial information and climate risk, there is a natural link that presents a good number of opportunities to deal with the expected issues linked to adaptation and mitigation to climate change. Lastly, the social sciences address major issues that provide the context for effective agricultural science and technology: the future of small farmers in an increasingly globalizing world, market access and value chains, access to production capital, child labor, enabling environments for more equitable and sustainable production systems, amongst others.

A more effective interaction of the CGIAR with the rest of the world's agricultural scientific community can benefit from both a careful stocktaking and strategic thinking. The scientific community outside the CGIAR has a huge potential to contribute to the challenges ahead. The CGIAR, on the other hand has a unique offer to make to that community by offering its partnership, facilities, scientific know-how and unique geographical position in the heart of the problem areas. With strategic mobilization, present challenges can be turned into opportunities for the many talents within and outside the CGIAR to have the impressive impacts on the perennial issues of hunger, poverty, food security, health, sustainable development and human livelihoods

Closing Plenary

After a series of parallel sessions, Kathy Sierra reconvened the stakeholder meeting in a closing plenary to hear summary reports from the parallel sessions on three themes. Highlights of the presentations and discussions are summarized in the individual session reports given in **Annexes 1-3**.

Denis Kyetere, Director of NARO, Uganda presented the key messages from Parallel Session Theme 1 as follows:

Asia and the Pacific

- Agriculture and rural development issues need to be better linked and addressed in a more integrated way with the development agenda as a focus for such action
- For science and technology to make a positive difference in people's lives, gaps in infrastructure, seed, and input markets, extension of credit systems, and market access need to be addressed
- Beneficiaries of research need to be considered vital partners in rural development, and the issue of scaling up needs to be confronted more explicitly.
- Biotechnology, bio-energy, supply chain management, indigenous knowledge systems, and information and communication technologies are greatly influencing how agricultural research is being conducted.

Central and West Asia and North Africa

- Holistic approaches are needed to improve income generation, food security, human condition, land and water use efficiency, and the productivity of livestock while also preserving the environment.
- Policies that improve access to global markets, address trade issues, and encourage investment in infrastructure and capacity development are also needed.
- A second generation of plant breeders is needed to respond to climate change, food safety issues, and biofuels demand.
- To be effective, research must be regional in scope.

Latin America and the Caribbean

- Science has contributed to important advances in the region's agriculture, but some parts of regions have been left behind.

- CGIAR and its partners need to create a new vision and develop a strategy that addresses the needs of extremely poor people in rural areas within a broader robust agenda for the region as a whole.
- CGIAR must foster not only development in agriculture, but innovation in the institutions that serve agriculture.

Sub-Saharan Africa

- Achievements in agricultural research in Sub-Saharan Africa clearly result from marked institutional cooperation between international and national scientific and technological communities.
- CGIAR has significantly contributed to the development of African agricultural research. But partnership needs to be strengthened. More emphasis is needed to align regional and sub-regional priorities and equitable sharing of resources.
- There should be solid national government investment in agricultural research.
- In addition to science and technology, there is a need to consider agricultural policies, markets, soil fertility, land tenure, access credit for small-scale farmers
- Capacity building is implicit in all the success stories; it is critical to sustainability.

Rudy Rabbinge presented the main points that came out from Parallel Session Theme 2, which focused on developments in various fields of science that are needed to better address challenges to achieve sustainable agriculture.

Molecular Biology

- There is a need to invest in a public genetic research platform that consists of three main elements for success in crop improvement: genetic stocks of international value, such as mapping populations; effective biological evaluation of phenotypes; and comparative biology between species.
- DNA bar coding offers a quick and efficient new means to directly read genotypes, that is, to link genotype with phenotype through functional genomics.
- An important challenge is how to better share knowledge emerging from molecular biology, create better understanding of its benefits, and make evolving technologies more accessible.

Agro-ecology

- Nature should be considered as the infrastructure that supports agriculture; the basic processes which occur in agro-ecosystems and nature ecosystems are more or less the same.
- CGIAR research should be more systematic, more transversal, and more participatory between the different disciplines.

Spatial Information Technology

- Geospatial science is central to science for sustainable development; geospatial information systems and their datasets have evolved significantly in recent years and have become a valuable tool for research and development

- With geo-information heterogeneity is no longer a liability and can become an asset because specific interventions can be fine tuned to the needs of the heterogeneous world.
- The CGIAR network on geosciences provides a platform for data and information exchange among CGIAR Centers and other international organizations.
- The potential for farmers to benefit from such technologies is increasing as information, and thus solutions, can be tailored to meet their needs

Social Sciences/Economics

- Research effectiveness requires multi-disciplinary approaches. By conducting gender analysis, power relations analysis, governance, decentralization and institutional analyses, research projects are more likely to capture the specific features of the communities and therefore can have higher potential to succeed.
- CGIAR is working with the global public goods, but we should also note that there are domestic or local policies which are crucial in endorsing or adopting the results of research.
- Social sciences are important to achieve a common understanding of sustainable development
- A review of social science research in the CGIAR is being commissioned by the Science Council.

Ren Wang summarized the main points that came out from Parallel Session Theme 3, i.e. strategies for harnessing advanced science.

Knowledge and Innovation for Agriculture and Rural Development

- As a knowledge generator, it is necessary that CGIAR should engage in partnership with other institutions. There is a need for transformation into a more interactive, knowledge-oriented approach. A key question is: Does the CGIAR have a mechanism to support innovation and a knowledge- oriented approach?
- Another question that needs to be tackled is: Will the CGIAR simply be responsive to change going on in knowledge and innovation system and be a follower of trends or will it be proactive and take the lead in this area?

Making IPRs work for Pro-Poor Agricultural Innovation

- There is a need to strengthen NARS capacity to evaluate the costs and benefits of proprietary technology and the importance of national systems to have in place a strategic plan in this area.
- Centers should carefully consider the question of whether it should generate income from some of the products of its mandated research.
- There was a sense that in granting humanitarian access to genetic resources, the Generation Challenge Program offers a good example that could be used to build upon in the future.

Research Management Strategies

- Research management strategies must confront a complex agenda and unprecedented challenges.

- CGIAR research is an interface which has integrated research for development paradigm and has to balance between short and the long-term partnerships.
- Human resources issue is a key element of research management at the Centers. The challenge is how to recruit, retain, and develop human resource capacity in the context of the complex agenda of the CGIAR.

Resource Mobilization

- A key challenge is to encourage the more developed countries which are benefiting from CGIAR research to contribute more, not in the context of overseas development aid, but in exchange for the benefit they are getting.
- CGIAR should explore the model that the health sector is using to calculate the return on investment in health research, i.e. calculate tangible proof of social benefits derived from agricultural research.
- Partnering with NARS does not only increase and develop capacity but a way of increasing the contribution from the developing countries.

Mobilizing Partners and Promoting More Inclusive Research Partnerships

- There should be a greater appreciation of the need for a long-term collaboration of the CGIAR with partners in order to achieve the impact that the CGIAR research is mandated for.
- Partnerships and networks can create effective and sustainable research communities in developing countries and international public goods can also be generated by local research.
- Investment in partnerships should be considered as investment in social capital and not as a transaction cost.

In closing, the CGIAR Chair noted the very rich and exciting set of discussions, both looking at not only research challenges and accomplishments, but also how the CGIAR as a System is trying to always think ahead and reflect on future strategies and opportunities going forward.

Sir John Crawford Memorial Lecture 2007

The 2007 Sir John Crawford Memorial Lecture, *The Great Use-it-or-lose-it Intelligence Test*, was delivered by Dr. William Calvin, Affiliate Professor Emeritus, University of Washington, USA.

The Crawford Memorial Lecture is a highlight of the CGIAR's Annual General Meeting. It is named in honor of Sir John Crawford, who was a passionate supporter of international agricultural research for development, a founding father of the CGIAR and the first Chair of its Technical Advisory Committee. The lecture, sponsored by the Australian Government, seeks to challenge those involved in agricultural research and development to consider the broader issues and trends that influence their work.

This year's presentation, provided plenty of food for thought as the CGIAR, its members and partners seek more effective ways to confront major global challenges, such as climate change, biodiversity loss and rural poverty.

Calvin explained humanity's tardiness in taking climate change seriously as "the status quo bias." Part of the problem is that most climate scientists are trained to think in terms of certainty and understatement, not in terms of risk and its management. Another is that politicians remain unwilling to make hard decisions.

These factors, he believes, have left us with a very conservative explanation of what humanity is now facing and what must be done to reduce the impacts of climate instability.

Following a sobering description of what may well be in store without brave action on climate change, Calvin's optimistic conclusion was that humanity may, in fact, find the intellectual depth and leadership to make the changes now needed. After all, he pointed out, within the 50,000-year timeframe of the modern mind, periods of enlightenment have been linked to periods of severe climate change or instability.

Calvin highlighted a number of suggestions for both the agricultural and energy sectors in fighting the climate change battle.

"Certainly, many of the opportunities to fix our global climate lie in the agricultural sector, because there is so much 'low-hanging fruit' there: irrigation, tillage and fertilizer practices being what they currently are," he said.

On the energy side, some of Calvin's suggestions included support for a carbon tax balanced by tax relief to reward those who carpool, insulate their homes and buy clean-fuel vehicles; plug-in hybrid cars; banning new coal plants; cloning nuclear and geothermal power plants; and helping developing countries with solar thermal or geothermal installations, which run steam plants, in return for binding agreements not to add fossil carbon to the air.

"Thanks to our accumulated intellectual achievements, a Third Industrial Revolution is likely coming, one that will replace fossil fuels and create nonpolluting agriculture. The problem, however, is time."

"Our present civilization is like a magnificent cathedral, back before flying buttresses were retrofitted to stabilize the walls. Civilization now needs such a retrofit and the agricultural research community has a significant role to play," he concluded.

2007 CGIAR Awards

The CGIAR Science Awards bring international recognition to research that illustrates particularly well how science can help poor farmers and consumers and meet global challenges

Winners of six Science Awards as well as two Communications Awards, a CAAS-CGIAR Award for Excellence in Agricultural Journalism in China, and an award from the Alliance of Communicators for Sustainable Development, known as COM PLUS were presented at the ceremony held at the Great Hall of the People.

The 2007 CGIAR award nominations were evaluated by two distinguished groups. The science awards were evaluated by Rudy Rabbinge (SC Chair), Lindsay Falvey (University of Melbourne), and Sudha Nair (M S Swaminathan Research and Development Foundation). The panel for the communication awards was composed of Robert Lamb, One Planet Pictures; Michael Shanahan, Institute of International Environment and Development; and Tom Cohen, Conservation International.

A combination of slides and short video clips was used to bring to the stakeholders a glimpse of the award-winning research and research-related activities.

The following were the recipients of the 2007 awards:

Special Joint CAAS-CGIAR Award for Excellence in Journalism in China: Mr. Jiang Jianke, a Senior Journalist at the People's Daily, in recognition of his dedication and achievements in reporting agriculture research and technology.

COM PLUS Communications Award: International Rice Research Institute, IRRI, and Partners for their environmental soap opera in rural Vietnam. Through a radio soap opera, ten million rural households were reached with information about how to make more efficient use of fertilizers, pesticides, and water to mitigate environmental pollution and degradation. Results included a 31 percent decrease in insecticide sprays. **Kong Luen Heong** received the award on behalf of the communications campaign partners.

Outstanding Scientific Support Team: Staff of ReefBase, Worldfish Center, for creating and managing Worldfish Center's online ReefBase, the largest repository of information on coral reef. A six-person team that has assembled data from 120 countries, compiled more than 25 000 publications and the contact details of nearly 3 500 coral reef experts, and to has set up a system that allows the creation of custom map; A global public good being used by over 10,000 users. **Jamie Oliver and Moi Kim Tan** of WorldFish received the award on behalf of the team.

Outstanding Partnership: CLAYUCA, Latin American and Caribbean Consortium to Support Cassava Research and Development, a strategic alliance of 33 public and private institutions in 13 countries in LAC and Africa that was established by CIAT in 1999. Its mission is to help improve living standards in areas where Cassava plays an important role in agricultural production systems. CLAYUCA's agenda emphasizes the improvement of the crop's competitiveness along its value chain and CIAT complements this approach through its own

research outputs (improved germplasm, biotechnology etc). One of the partnership recent initiatives is the development on an alternative approach for producing ethanol from Cassava with the active participation of small farmers. **Bernardo Ospina**, Coordinator of CLAYUCA, received the award on behalf of the partnership.

Outstanding Scientific Article: *Sub 1A is an ethylene response factor-like gene that confers submergence tolerance to rice*, by a team of 10 co-authors led by **Xu Kenong**. Published in 2006 in Nature, this contribution from IRRI and University of California reports on the Sub1A, a gene discovered 10 years ago by Kenong Xu and David Mackill that allows a plant of rice to survive complete submergence for more than 2 weeks. This discovery provided the foundation for marker-assisted backcrossing to develop submergence-tolerance versions of mega varieties. The article describes how the introgression on the Sub1A gene in the rice variety Swarna – grown in 6 millions hectares in India in Bangladesh- doubles or triples the yield of submerged Swarna-Sub1 compared to its non-tolerant original. **David Mackill** joined Xu Kenong in receiving the award.

Regional Award for Outstanding Agricultural Technology Asia-Pacific Region: Joint Wheat Quality Team at Shandong Academy of Agricultural Science (AAS) and Chinese Academy of Agricultural Science (CAAS), for developing three high quality wheat cultivars and setting up a testing methodology for Chinese noodle quality along with the application of related molecular markers. The joint wheat team has made significant contributions to increase grain productivity adding 2.4 millions tons of wheat for five years. The cumulative economic returns from the three new varieties for Chinese farmers are estimated at US\$411 million. **Zhao Zhengdong** from Shandong Academy of Agricultural Sciences and **He Zhonghu** from CAAS received the award on behalf of the joint wheat team

Promising Young Scientist: Natalia Palacios, CIMMYT, an Associate Scientist at CIMMYT and co-leader of CIMMYT's maize biofortification research project within HarvestPlus Challenge Program, for developing and implementing technologies of quick and inexpensive diagnosis of key nutritional traits in Maize, thus enabling large-scale screening. Among other things, her work has placed maize in the forefront of HarvestPlus work and accelerated maize breeding at CIMMYT. In addition, Palacios has shown exceptional dedication to strengthening the capacity of National Grain Quality Laboratories in Africa and Latin America.

Outstanding Scientist: Darshan S. Brar, a senior scientist and head of IRRI's plant breeding, genetics and biotechnology division, for his significant contributions in broadening the gene pool of cultivated rice through wide crossing, enabling the transfer of durable resistance to numerous pest and tolerance for abiotic stresses in rice growing countries. Dr. Brar and his team have successfully used tissues culture, molecular markers and genomic in situ hybridization to overcome troublesome reproductive barriers and hence develop introgression lines of which 7 have been released to farmers. One of the introgression lines is resistant to the bacterial blight, one of the most serious diseases of rice in Asia and Africa.

Parallel Session Theme 1: Science at Work for Sustainable Agriculture with its Multiple Roles

Session 1A. Asia and the Pacific

Moderator: Stephen Hall (Dir. General, WorldFish Center)
Presentation: Danilo Cardenas (Dep. Exec. Dir., PCARRD)
Comments: Achim Doberman (Program Leader, IRRI)
Raj Paroda (Exec. Secretary, APAARI)

Rapporteur: Josephine Hernandez (CGIAR Secretariat)

This session sought to draw lessons for the CGIAR from a presentation on the major scientific achievements in agriculture over the last 20 years in the Asia-Pacific Region.

The annual agricultural growth rate of the ESAP Region¹ from 1992 to 2003 was 3.1% while the world average was 2.4%. This impressive achievement in the Region's agricultural production could be attributed to the development of agricultural technologies which enabled farmers to feed twice as many people from a virtually declining agricultural landbase. Among these technologies are:

- **New Varieties (HYVs and hybrids)** resulting in increased yields, declining real prices of food grains, organization of seed supply systems of new varieties, and the growth of allied agro-industries.
- **Biotechnology** which hastened the development of new varieties with desired traits and increased the resilience of crops to pests, diseases and extreme weather.
- **Irrigation** which offered a buffer against the vagaries of climate thus helping avert crop failures, improving crop yields to 2 – 5 times that of rainfed areas, and enabling intensive use of limited arable land.
- **Crop Protection technologies** which greatly reduced pest and disease outbreaks.
- **Aquaculture technologies** that made possible commercial production of quality fish and crustaceans in artificial environments, with ESAP's contribution to global supply rising to 90% in 2004 from 54% in 1950.
- **Modern fishing technologies** that made possible dramatic increases in marine production although the unscrupulous use of these technologies led to overfishing and

¹ The ESAP Region consists of 33 countries and covers about 20% of the world's land mass. It is home to 3.36B people, about 53% of the world's current population, with China, India and Indonesia accounting for 75%. Majority (55%) of this population is still engaged in agriculture-related activities. ESAP countries provide 90% of global aquaculture production; >80% of the world's supply of vegetables, jute, sweet potato and rice; >50% of the world's supply of tea, tobacco and peanut; and >25% of the global supply of melons, sugarcane, white potato, cassava, millet, maize and wheat. The Region also accounts for 55% of the world's forest resources, has the world's greatest concentration of mangroves, and is home to 30% of the world's livestock species.

fish stock depletion where ESAP's marine fisheries are 8% depleted and only 3% remains underexploited.

- **Indigenous knowledge and active CSO participation** which contributed significantly to *in-situ* genetic crop conservation, crop diversification, regenerative soil and water conservation, organic agriculture, ecological pest management, and participatory research schemes, among others.

Despite this strong growth, however, the agricultural sector's importance in the ESAP Region has been declining in its contribution to the GDP and its share of the labor force. The face of poverty is the face of agriculture-based rural Asia. Some 70% of the poor in developing countries live in rural areas deriving their income, directly or indirectly, from agriculture. Improving agricultural productivity and increasing farm income are key interventions to address poverty and hunger.

Lessons drawn from the presentation and the ensuing discussion on how the CGIAR needs to change include:

- Agriculture and rural development issues need to be better linked and addressed together in a more integrated way, with the development agenda as a focus for research action.
- R&D beneficiaries need to be considered vital partners in rural development and the issue of scaling-up needs to be confronted more explicitly as information and technology are increasingly generated, disseminated and transferred via pluralistic and decentralized extension systems.
- The right conditions need to exist if S&T are to make a positive difference in peoples' lives. The CGIAR needs to rethink its role in advocating, facilitating, and supporting processes to ensure these wider conditions are in place.
- New emerging fields such as biotechnology, bioenergy, and ICT are greatly influencing how agricultural RDE is being conducted. Global processes (climate change, globalization, etc) are also key drivers we must now understand and accommodate.
- The average ROI in agricultural R&D² at 40% is higher than from other forms of public investment. To better deliver on its mission of poverty alleviation, the CGIAR needs to strengthen its focus on scientific research including policy and institutions.
- Strong and substantive partnerships with NARS and the private sector are needed for greater impact.
- There is an increasing demand for R&D human capital. A strategy for ensuring well qualified scientists are attracted to agriculture R&D needs to be developed.

² In China, India, and Thailand increased public expenditure on agricultural RDE improved agricultural productivity the most. In low-income countries, a 1% increase in agricultural yield leads to a 0.8% reduction in the number of people living below the poverty line.

Session 1B: Central and West Asia and North Africa

Moderator: **Shawki Barghouti (Dir. General, ICBA)**
Presentation: **Kawther Latiri (Dir.r of Research, INRAT, Tunisia)**
Comments: **Mahmoud Solh (Dir. General, ICARDA)**
Ahmed Nasser Al-Bakry (President, AARINENA)

Rapporteur: **Simone Staiger (ICT-KM)**

Kawther Latiri, Director of Research, INRAT, presented the results of The International Assessment of Agricultural Science and Technology for Development (IAASTD) that evaluated the relevance, quality and effectiveness of agricultural knowledge, science, and technology (AKST); and effectiveness of public and private sector policies as well as institutional arrangements in relation to AKST.

The CWANA region comprises an area that goes from the Atlantic Ocean from Turkey to Somalia and occupies 18 square km with 10% of the world population, and only 2% of the world water resources. The region is characterized by the high risk of drought, low and irregular rainfall. Cereals and fruit vegetables rely on irrigation, and during last 15 years yields and production increased mainly in irrigated regions. Less progress has been achieved in rain fed sectors. Food production per capita didn't increase and this trend expected to continue. Food consumption rose since the 60s, dominated by cereals, and the increase is mainly due to high level imports. The global Agriculture trade balance is negative. Water is over utilized, water resources are suffering from pollution, and water quality will continue to decline, also the instauration of water policies and new water-saving technologies helped. The continuous urbanization process, and the lack of regulation do not protect farmland. The rural population increased dramatically which generates pressure on labor market and natural resources. Agrobiodiversity is rich but because of its heavy expansion, in danger. Mono cropping systems are reducing species, which means a loss of diversity, and less stability of farmer systems. Recent changes in policies affected negatively small and mid size farms. The farm structure follows 2 major trends: Concentration of farmland in a minority of private farmers, and farm fragmentation. The private sector contribution and the investment in agricultural research in CWANA is limited: 6% of world agricultural research and development, and 3.8% of public and private ARD which means 2% of the world level. Farmers have weak associations, insufficient policies, no broad participation. Traditional knowledge is rich in many aspects, animal breeding for ex. but there is a risk of loss. Priority areas: Income generation, food security, reducing malnutrition; Increase land and water use efficiency, productivity of livestock; Consider policies (little access to global market. Trade issues, risk management, increase ARD). The challenge of agricultural knowledge, science, and technology (AKST) is to address a more comprehensive picture of the situation, and to create new approaches and techniques.

Ahmed Nasser (AARINENA), in his intervention highlighted some additional points: There is a need to address issues related to seawater pollution, climate change, food safety, and bio fuels. ICTs have began to play an essential role in the region, thus there is

a need to invest in infrastructure and capacity development in that domain. If we want to improve the effectiveness of research, we need (1) to make use of latest technologies developed by partners; (2) to enhance the exchange of information; (3) thus build and expand networks around crops and water use for collaboration, knowledge sharing and communication; (4) a second generation of breeders; (5) to capture new from the private sector.

Mahmoud Solh, DG at ICARDA, highlights in his comments as a discussant the challenges of desertification, land degradation, and climate change. National agricultural research systems address differently those challenges, specifically the little investment in agricultural research. However, while some countries like Egypt invested with success in capacity building on biotechnology issues, a young generation is coming up in central Asia. Iran reached self-sufficiency of wheat last year with bigger institutions than ICARDA, they have lots of know-how For ICARDA the new strategic focus on improving livelihood is extremely important, including the enhancement of productivity through improved yield potential as well as improving quality of production, and price multiplication of added value crops,

Natural Resource management is key in this part of world with its inherent water problems. Some ideas to move forward are (1) policy packages, code of ethics and community approaches on collective properties (2) further development of strategic partnerships; (3) further collaboration with other CGIAR centers.

During the discussion, several needs and ideas emerged:

- (1) Need of a legal framework to encourage the development of farmer associations. Need to look beyond research into development perspective, and into the institutional and policy frameworks to get higher rates of adoption.
- (2) The need of an additional study that looks forward into the future and into the needs of the region, like capacity building and so forth.
- (3) Consider hydroponics systems as an alternative nutrient solution.
- (4) Need of collaboration among countries and partnerships to address challenges with holistic solutions. Create hubs of expertise for the whole CIWANA region, and coordinate action in the areas of policies, NRM and biological science.
- (5) Address GMOs as an option (Iran is having work on transgenic, private sector is coming with lots of active with BMOs)

Session 1C. Latin America and the Caribbean

Moderator: Pamela Anderson (Dir. General, CIP)
Presentation: Jesus Moncada (Former Dir., INIFAP, Mexico)
Comments: Eliseo Contini (Head, Office of Int. Affairs,
Embrapa)
Rodomiro Ortiz (Dir. Resources Mobilization,
CIMMYT)
Nicolas Mateo (Exec. Sec., FONTAGRO)

Rapporteur: Nathan Russell (CGIAR Secretariat)

In his overview presentation, Jesus Moncada noted that LAC was the cradle of collaborative international agricultural research. Early initiatives in the region, starting in the 1940s, led to the establishment of national agricultural research institutes and inspired the creation of the international centers and CGIAR.

Among the important early scientific achievements in LAC were widely adapted wheat varieties, developed through “shuttle breeding,” which provided the basis for the Green Revolution in wheat. Others included genetic tolerance in maize to acid soil conditions and effective strategies for integrated pest management. Beyond the CGIAR, public and private organizations applied science successfully to major commercial crops, such as coffee, cacao, cotton, sugarcane and tropical fruits. Production of temperate zone crops, such as soybean, in the Southern Cone benefited from technological spillovers. The impacts of science-based technological innovation have been mixed, with marked regional differences, significant environmental costs and uneven distribution of benefits.

Today, society is placing new demands on research, specifically for a more competitive yet sustainable agriculture with emphasis on social inclusion. Emerging challenges, such as global climate change, further complicate the research agenda, heightening the need for a more holistic approach.

Agricultural research institutions and policies in LAC have evolved, giving rise to regional networks and institutional models that feature strong stakeholder participation. Today’s more complex research agenda requires better coordination of research initiatives and greater institutional synergies within networks, including strong interaction between the public and private sectors. To meet society’s new demands, research must give rise to innovations that are environmentally sensitive and pro-poor. Examples are drought-tolerant varieties that help stabilize production. Such innovations should draw on recent advances in areas such as biotechnology, nanotechnology and bioinformatics. Innovative approaches must be found to deal with the high costs of this research and barriers related to intellectual property.

In concluding, Moncada called for a reevaluation of agriculture and the rural space in LAC, which recognizes their role as engines for economic development and their contribution to social stability.

The session's three commentators emphasized institutional issues, including the importance of maintaining strong national research systems (as Brazil has done), the need for more innovative forms of interaction between CGIAR Centers and national partners and the urgency of increased investment in research generally to accelerate progress, particularly in providing benefits for the poor, and to meet new challenges, such as adapting agriculture to climate change.

In addition to drawing lessons from experience in LAC, the session's moderator proposed the further step of asking what these lessons imply for the way forward, as indicated below:

- Science has contributed to important advances in the region's agriculture, but some regions and people have been left behind. The CGIAR and its partners need to articulate a new vision and research strategy for the region that addresses the needs of extremely poor people in rural areas, within a broader robust agenda for the region as whole.
- The CGIAR must foster, not only development in agriculture, but innovation in the institutions that serve agriculture. For this purpose, we need to revisit our partnership arrangements and consider how to better organize ourselves for new forms of alignment with a wider range of actors.
- The CGIAR Centers and their partners need to articulate more clearly the contributions of research in the region (resulting in regional public goods) to the community.

Session 1D. Sub-Saharan Africa

Moderator: Kwesi Atta-Krah (Dep. Dir. General, Bioversity)
Presentation: Ida Sithole-Niang (Prof., University of Zimbabwe)
Comments: P. Hartmann (Dir. General, IITA)
Monty Jones (Exec. Dir., FARA)

Rapporteur: Harry Palmier (CGIAR Secretariat)

Scientific achievements in Agricultural research in SSA clearly result from multi-institutional cooperation between international and national scientific and technological communities

Recent breakthroughs exemplify this:

- NERICAs (New Rice for Africa)
 - combine high quality productivity traits of Asian rice and ruggedness of native Africa rice varieties. Higher yielding (between 25-250%) /African Rice
 - Labor saving for women farmers; Increased tolerance to droughts, pests and weeds.
- Cassava mealybug
 - release of exotic parasitoids in Nigeria and neighboring countries helped to control then bring down dramatically Populations of CM which constituted a major in SSA
- Quality Protein Maize
 - planted on over 600,000 hectares in 25 countries, boosting food, nutrition, health and income security
 - In Ghana, record yields of 7 tons per hectare achieved
- “Strigaway”
 - Unique technique for controlling (i) lepidopterous stemborers the #1 field pest , (ii) the parasitic weed Striga and (iii) to improve soil fertility & increase maize yields
- Push & pull : Chemical Ecology :intercropping maize with the legume Desmodium and a border row of Napier grass around the plot
 - Greatly reduce losses due to stemborer + suppress Striga, and Improve soil nutrients
 - Increase yields (up to 3-fold)
 - Provide fodder grasses & legumes (fuel animal husbandry)
 - So far ~ 13,000 farmers adopted technology in the Lake Victoria region

Discussion

- Most of the scientific advances presented were in crop improvement and pest management but there are other important accomplishments in Livestock (Rinderpest vaccine, trypanotolerance etc.), forestry/agroforestry (alley cropping) and fisheries.
- They were significant enough to award Africa the World Food Price in 2004 (Dr. Monty Jones)

- CGIAR has immensely contributed to the development of African Agriculture research but more emphasis need to be put on adaptation to NARS conditions, respect African leadership and unleash “Snow balling effect” to get technologies to farmers fields.
- Yes, Science works for SSA BUT science alone will not solve the problem. Need to consider: agricultural policies, markets, soil fertility, land tenure, access to credit for small farmers.
- Most of the outstanding results have proceeded from a somewhat top-down non-participatory research approach. Call for a pluralistic approach empowering NARS and end users which additionally will provide greater sustainability.
- Need to adopt Comprehensive Innovation System approaches like IAR4D advocated by SROs and FARA.
- Capacity building was implicit in all of the success stories and Countries/NARS are explicitly calling for the CGIAR to remain active in this essential domain. This is also Key for sustainability.
- Public/Private Partnerships can boost Technology Development and Transfer as in the case of the “Strigaway”
- Solid National Government investment in Agricultural research a prerequisite for equal partnerships (NEPAD/CADP + Maputo Declaration)

Parallel Session Theme 2: Advanced Science to Enhance Research Effectiveness

Session 2A. Molecular Biology

Moderator:	Jean Marcel Ribaut (Director, Generation CP)
Presentation:	Hei Leung (Prog.Leader and Sr. Scientist, IRRI) Scott Miller (Office of the Under-Secretary for Science, Smithsonian Institution)
Comments:	Mike Gale (Member, Science Council) Michael Baum (Biotechnologist, ICARDA)
Rapporteur:	Nathan Russell (CGIAR Secretariat)

The two presentations given in this session covered advances in two areas of molecular biology that offer powerful new tools for combating biotic and abiotic stresses.

Hei Lung shared a series of examples from genomics and molecular biology on rice, which demonstrate the kinds of useful products emerging from this work. He stressed that there is much potential for development of tolerance to environmental stresses, which are likely to worsen as a result of climate change.

An instructive example is marker-assisted breeding to develop rice varieties with tolerance to submergence. The same rice gene responsible for submergence tolerance is now being used in breeding for tolerance to salinity.

Other valuable lessons come from research on drought tolerance in rice. One is that molecular genetics research must be tightly linked with conventional breeding to enhance its efficiency and effectiveness. Also promising are efforts to improve water-use efficiency in rice through expression of HARDY, a gene for drought and salt tolerance.

This presenter identified three elements of success in molecular biology research for crop improvement: (1) availability of genetic stocks, (2) effective biological evaluation or phenotyping of plant materials and (3) comparative biology between species. He also emphasized the need for increased investment in the public-sector genetic research platform, equating this in importance to the establishment of CGIAR genebanks during the 1970s. Finally, he cited the potential of the rice mutant collection for crop improvement and suggested that making new mutants receive higher priority.

In the second presentation, Scott Miller explained recent advances in DNA barcoding as an example of useful application of molecular biology. The truly revolutionary contribution of this field is the ability to directly read genotypes, that is, to link genotype with phenotype through functional genomics, which links function with genetics.

Miller explained two views of genomics: a vertical one centering on deep but narrow knowledge of a few complete genomes and a horizontal one dealing with short, targeted gene sequences from a wide range of species and individuals. DNA barcoding corresponds to the latter.

A DNA barcode is a short gene sequence taken from a standardized position in the genome that can be used to identify species. Accurate identification of insect species, for example, is essential for designing effective strategies for management of pests and beneficial insects. Barcoding makes this quicker and more efficient. Libraries of sequences for pest complexes are being compiled, contributing to the development of a global database. In the future, easy access to databases will be possible with hand-held devices.

In closing, this presenter made reference to a CGIAR survey of non-plant gene collections and the Consortium for the Barcode of Life.

The various commentators stressed the international value of genetic stocks, assigning particular importance to mapping populations. They also noted that, as new gene sequences associated with agronomically useful traits become available, marker-assisted selection is important for advancing crop improvement.

Questions from participants covered diverse topics, including the following: the application of molecular diagnostics in plant pathology; the degree to which DNA patterns actually indicate function; the issue of keeping products of genomics and molecular biology research in the public domain versus protective patenting may sometimes be necessary; the degree to which one must understand the genetic basis of key traits in order to achieve genetic gains; the importance of emphasizing potentially high-impact genes; and the challenge of achieving stable resistance, despite genotype-environment interaction.

In his concluding remarks, the moderator underlined the large range of tools available from molecular biology and stressed the need for creative approaches to utilizing CGIAR biotechnology laboratories more fully. Future options in crop improvement depend on biodiversity collections, which new techniques are making more valuable, particularly in the face of climate change and other challenges.

The technologies continue to evolve, as illustrated by DNA barcoding. A major challenge is to prioritize the use of these techniques, given that funding is limited. The CGIAR genebanks are a fantastic legacy. We must find better ways to share knowledge about this resource, better understand its benefits and widen access to technologies for exploiting useful genes. In closing, the moderator stressed that without effective phenotyping of plants, whatever we do in genotyping is irrelevant. Hence the importance of the CGIAR's unique network of facilities for phenotyping plants.

Session 2B. Agroecology

Moderator:	Dennis Garrity (Dir. General, World Agroforestry Center)
Presentation:	Jeff McNeely (Chief Scientist, IUCN)
Comments:	Bernard Hubert (Dir, GIP/IFRAI CIRAD-INRA, France) Richard Thomas (Sr. Scientist, ICARDA)
Rapporteur:	Simone Staiger (ICT-KM)

Jeff McNeely's presentation assessed the potentials and limitations for successful conservation of ecosystem services in productive agricultural landscapes, and identified priority research gaps to enable multifunctional landscapes, as well as the implications for the CGIAR. Ecoagriculture is presented as a concept for research to explore alternative visions.

Jeff McNeely highlights that 50% of the people still live in rural areas and live directly from wild relatives. Farmers are key players to maintain ecosystems. We should look at nature as the infrastructure that supports agriculture, a perspective that gives different ways of thinking about nature. Needs and opportunities are identified in areas like: Building of institutions for landscape coordination & management, set-up of multi stakeholder platforms, policy development, payment for ecosystem services, participatory methods to get communities involved, and technology innovations.

Bernard Hubert focused his intervention on the need for a paradigm shift to a more systems-based approach as an alternative to conventional agriculture. There is a clear need to embrace the complexity of agricultural systems to allow an integrated perspective. Hubert sees several areas of required change: work at multiple levels (territorial, sectoral), take into account landscape mosaics, generate economies of diversity, work towards environmental justice, be more participatory, enable us to model complex systems, development of new concepts for long-term food security.

Richard Thomas highlighted the huge potential of progress in science related to soils. Resources in the soil – i.e. bacteria with genes for stresses like heat - are directly available to farmers and can help improve agricultural systems effectively. Yet, we still know very little about below ground biodiversity, but techniques are available to “fish” for those organisms. A lot of work needs to be done also in the area of water production. Finally, we need to learn how to scale up knowledge intensive systems.

The discussion with session participants touched upon the following areas:

- Relationship between landscape approach to promote biodiversity and policy making
- Organization of research to address the identified needs
- Are we addressing enough the diversity of livelihoods, non-agricultural resources, urbanization of rural areas, and ruralization of urban areas?
- Relationship of eco-agriculture, and added value and products of different production patterns

Session 2C. Spatial Information Technology

Moderator: Colin Chartres (Dir. General, IWMI)
Presentation: Robert Zomer (Landscape Ecologist, WAC)
Comments: Weili Zhang (Inst. of Natural Resources Management, CAAS)
Andrew Jarvis (Sr. Scientist, Bioversity and CIAT)

Rapporteur: Laura Ivers (CGIAR Secretariat)

Robert Zomer, Landscape Ecologist at the World Agroforestry Center and Coordinator of the CGIAR Consortium for Spatial Information (CSI) delivered an overview presentation on advancements in spatial information technology. Zomer highlighted the role GIS can play in tracking wheat stem rust, calculating changes in land use, such as deforestation, and projecting changes in crop yields as a result of climate change. Such information can be helpful for various groups, such as plant breeders as they decide what kind of breeding strategies to pursue or to policy makers as monitoring tool in the effort to mitigate global climate change.

Geospatial data is becoming more accessible to many users and can be a powerful source of information for people who manage natural resources directly. Geospatial science is increasingly central to science for sustainable development. Priority areas for further development of this field include platforms for data and information exchange and dissemination of results to farmers and other stakeholders.

Zomer gave an overview of how the CGIAR-CSI links all of the Centers' GIS/RS laboratories and scientists to share and disseminate data, methods, tools and experiences amongst themselves as well as with other scientists and institutions throughout the world. The CGIAR-CSI provides a geospatial data sharing platform (<http://www.csi.cgiar.org/index.asp>) that provides a primary way of accessing CGIAR Geo-Spatial Science information. A CGIAR-CSI data sharing platform for information exchange related to Tsunami rehabilitation and reconstruction efforts. It provides easy access to a variety of geospatial data for the affected regions. The CGIAR-CSI GeoNetwork is an online metadata resource center that is synchronized with UNEP, FAO, WHO and other organizations and institutions to deliver a seamless search and discover network. <http://geonetwork.cgiar.org>

Zhang Weili, Institute of Natural Resource Management, CAAS, described how GPS is helping China to address problems with non-point source pollution from agriculture by providing data to identify main sources and places for control. Digital soil mapping also promises benefits for farmers as they can use such information for nutrient management and can access the information via internet and mobile phones.

Weili raised questions around how China will increase crop yields in the future, remarking that in many places fertile land is being lost to urbanization and in other places the fertility of the arable land is decreasing. A new challenge for researchers is to develop and revise spatial database for agriculture.

Andrew Jarvis, Bioversity and CIAT, commented on the massive results the GIS has offered in recent years. The result is more data that is a global public good that can stimulate agriculture growth. He identified as challenges the need to fill holes in data and to create consistent global datasets for poverty as well as social, natural, political and human capital. He indicated that while data on soil is decent at the national level, global data remains inadequate. In closing, he summarized that GIS is now ready to fulfill its promises of supporting R&D for agriculture. Advancements in the last decade now allow data to be tailored to provide information to a heterogeneous world. This data will help to define and target solutions on a specific scale.

Key Points

- Geospatial science increasingly central to science for sustainable development. Geospatial information systems (GIS) and their data sets have evolved significantly in recent years and have become a valuable tool for research and development. It can provide information to a heterogeneous world.
- Such information systems provide a global public good that has proven valuable for tracking wheat stem rust, monitoring changes in land use, such as deforestation, and in modeling projected changes in crop yields such as maize in Africa as a result of climate change.
- The CGIAR-GeoNetwork provides a platform for data and information exchange among international organizations and CG Centers.
- Spatial information technology is only as good as the data it is built and the data needs to be constantly maintained and improved as new data is available.
- Holes in data and challenges remain, notably in creating consistent global datasets for poverty and soil.

The potential for farmers to benefit from such technologies is increasing as information and thus solutions can be tailored to meet their needs. They also increasingly have access to such information through new means of outreach such as the internet and mobile phones.

Session 2D: Social Sciences/Economics

Moderator: Jim Ryan (Science Council)
Presentation: Ruth Haug (Dir./Prof., Noragric, Norway)
Robert Ziegler (Director General, IRRI) on behalf of
Keijiro Otsuka (Professor, Tokyo Metropolitan Univ)
Comments: Gopal K. Chadha (Member, Prime Minister's Economic
Advisory Council, India)
Brent Swallow (Glo.Proj. Leader, World Agroforestry
Center)

Rapporteur: Maria Eugenia Herrera Lara (CGIAR Secretariat)

Jim Ryan welcomed the presenters and emphasized the importance of considering a social science approach on the CGIAR. He mentioned that particularly this type of approach is useful for the next Centers' Governance Stripe Review and for the ongoing Change Management Process.

Ruth Haug's presentation on "Social Sciences and Sustainable Agricultural Development" pointed out that for the CGIAR to have a larger impact with its ongoing research projects; it should approach to the Social Sciences methods. The wider the understanding of local politics, gender issues, social policy, local human capital and power relations, the better suited and more sustainable research result. She also stressed the importance of quantitative and qualitative analyses, particularly to conduct evaluation and impact assessments.

Bob Ziegler, presented the "Climate Change and the Role of Science in Promoting Sustainable Agriculture" on behalf of Keijiro Otsuka. He mentioned that there is a need for a more inter-sectoral research. The CGIAR needs to model new approaches to understand the interactions among agriculture and health, education, and the social mobilization from a farming economic activity to a non-farm economic activity. Social sciences can help the Centers to understand the different impacts of the technological advances and therefore to try the resulting hypotheses in different contexts. He also stressed that another Green Revolution is needed not only to reduce food insecurity and poverty but also to achieve sustainable global climate-agricultural systems. This revolution must have a "strong science" which should include a social science approach.

The panelist comments' and further discussion raised the following messages.

- Even when the CGIAR works with GPG, we must acknowledge that domestic policies are crucial to endorse or reject the results of our research. Therefore, Social Sciences are useful for us to understand the domestic processes of policy making and policy reform.
- Some centers have started to broaden their approaches and to include social sciences in their analyses; however there is a lot of work to be done. It is very

- important for the CGIAR System to have a clear picture of how many social scientists work in the System.
- CGIAR needs to look for more multidisciplinary approaches to better understand the context and have a higher impact on the living conditions of the people it is working for. By conducting gender analysis, power relations analysis, governance, decentralization and institutional analyses the research projects will capture the specific features of the communities and therefore can have more potential to succeed. We also need to learn more from the communities we work in.
 - We need a common understanding of the notion of Sustainable Development. Social Sciences are essential to achieve this understanding.

Jim Ryan thanked the presenters and invited to follow up the discussions of how to best include social sciences approaches in the CGIAR research projects.

Parallel Session Theme 3: Strategies for Harnessing Advanced Science**Session 3A. Knowledge Systems and Innovation for Agricultural and Rural Development**

Moderator:	Enrica Porcari (Chief Info Officer, ICT-KM)
Comments:	Jean Lebel (Director, Environment and Natural Resource Management, IDRC) William Clark (Professor, Harvard Univ)(Audio) Bill Neibur (Chair, Private Sector Committee) Carlos Sere (Dir. General, ILRI) Anton Mangstl (Director, KCED, FAO)
Inquisitor:	Bob Day
Rapporteur:	Nadia Manning (IWMI/ ICT-KM)

The session was opened by the Chair- Enrica Porcari, CIO of the CGIAR and Leader of the ICT-KM . She welcomed everyone and gave a brief introduction to the ICT-KM program, which is part of the CGIAR's system office. She outlined the rationale behind the session and explained that the ICT-KM program is involved in this arena of knowledge and innovation and the approach the CGIAR adopts for its research as an agent of change for the CGIAR. She explained the process for the session, noting that it adopted a different approach in keeping with its topic area, highlighted the Inquisitor- Bob Day- and his role in making a dynamic discussion, as well as introduced the panelists: Bill Niebur, Carlos Sere, Jean Lebel, Anton Mangstl (plus William Clark via audio recording).

Message from William C. Clark

The session started with an audio recording and slideshow from William Clark, Professor at Harvard. The presentation opened by outlining that the challenge we currently face is built on a growing recognition that development "is built not merely through the accumulation of physical capital and human skill, but on a foundation of information, learning and adaptation" (World Bank); and that we face a multitude of barriers to mobilization of knowledge. What is needed to address today's problems, he proposed, is a knowledge system which involves networks of actors and organizations that perform a number of knowledge-related functions that link knowledge and know-how with action, and including the incentives, financial resources, institutions, and human capital that give such systems capacity to do their work, and the intention to focus such work in some arenas rather than others. He suggested that there is a need to reject the pipeline model and instead promote collaborative production of knowledge and innovation as a joint product. But how is this to be done? There is a need for a systems approach which fosters boundary-spanning capacity, supports integration, linkages and incentives. We need to move away from a supply chain oriented perspective to solving problems and static

systems which try to confront dynamic problems. What needs to change? We need to make the move from knowledge production to mutual learning systems, where researchers learn about ultimate constraints, needs and uses of people, while they learn what we can do to address the problems encountered. What is required is an adaptive management orientation which supports the space and capacity for reflection on own and others, metrics which reward improvement and institutions which create safe spaces for experimentation and learning.

Key topics from the Panel and audience discussion:

Change

The inquisitor reiterated that the hot topic of the AGM and CGIAR seems to be on change. Bill Niebur responded that the need for change is greater now than ever, pointing out that the challenges for all research to think about the role research plays going forward relative to the last century is necessary given that research itself has rarely made change, only in the hands of creative people who make it useful. One major area of change is the role of the research agenda in driving meaningful impact. There is, in his mind, particularly a need to change the perception of and ways of working between the CGIAR and the private sector. It is not helpful to see one as bad and one as good, but rather pursue linkages at certain levels which can contribute to greater productivity.

Past approaches

Another interesting topic which emerged from the session was the question of how these new thoughts and approaches on knowledge and innovation relate to participatory processes and how this new theme of knowledge and innovation differs from what we have already seen from past approaches. Carlos Sere put forward that unlike participatory processes, which have mostly been focused on engaging with farmers, innovation systems look at engaging with more diverse groups of people. The key in this new, more holistic approach is that more people are involved to provide the insights which are needed. We need to learn important lessons from the many past approaches which have tried to include actors, improve research appropriateness and enhance impact and why they haven't taken off.

Changing our attitude

Thus if we are to adopt such a new knowledge and innovation paradigm the question is how the CGIAR can realistically undertake the change from primary knowledge creator to being one actor out of a multitude of important actors in the process. This is a hard process. We can also see other organizations such as FAO trying to change to being a knowledge and learning organization, according to Anton Mangstl. What is required, he suggests, is the adoption of a new mentality of being one partner in larger system of knowledge exchange.

Supporting the change

During the discussion, a number of important factors were identified as necessary to support the change to knowledge and innovation systems. These included the need for new and revised reward systems, changes in the skill-sets of personnel and profiles of

teams in our System and Centres, and important shifts in thinking, especially of the managers. Carlos Sere also put forward that we need to undergo a change in structure from the pyramid format in which the NARS sit at the bottom, to a more cobweb-like format in which there are multiple relationships in all different directions between various stakeholders.

Who needs to make the change?

An interesting comment from the audience challenged the notion that people are daunted by this new paradigm, and put forward that in actual fact many of the Centres and projects are already moving away from a linear model towards adopting this new approach. The question that needs to be asked is rather where the bottleneck is in the system for adoption and wide spread use of this new approach.

Role of donor community

Jean Lebel(IDRC) stated that moving from knowledge to learning is key, and to do this it is necessary to provide a safe space for experimentation. This is what IDRC is trying to do with their recipient organizations so that they reward improvement over success and learn just as much from failure as from success. He suggested that while we do need short-term deliverables, these need to be anchored into long term goals. He sees the donor community as opening up to these new ideas despite it being frightening for them.

Global Public Goods

On the topic of Global Public Goods, it was pointed out that that there is a contradiction between basic and applied research. The way in we perceive science needs to be altered towards the idea of application. Some tension clearly exists between achieving research which is generic and broad that it covers a range of territories and the risk of doing 'blue sky research' which invariably takes energy away from solving real problems on the ground.

Output- vs outcome-oriented research

Another key point that was raised during the session was the need to re-orient our research in order to successfully adopt new and better approaches to knowledge and innovation that have increased impact. The need to move away from a strictly output-oriented style of research to an outcome-oriented style is vital for unlocking greater impact potential. However this will take time and continued recognition that publications are still an important indicator of quality and driver of research processes, and that people require them for their career. However, gradual changes need to be made to accommodate a more outcome-oriented way of thinking and undertaking our research if we are trying to have greater impact. The challenge is to consider how the outputs can be moved or translated to outcomes, and how high quality work being done can be more directly linked to impacts.

Operationalising the approach

Ade Freeman (ILRI) provided some insights from his experience in trying to use an innovation systems approach. He highlighted some frustrations with the approach,

especially linked to the lack of clarity of what an agricultural innovation system is and how it adds value. What is being delivered by undertaking this new approach? It was strongly stated that we need to demonstrate that an agricultural innovation systems approach does add value compared to something else. One problem is that many people, including those using the approach, don't truly understand what it is. What is needed is to get down to basics, to demonstrate some practical examples, and to show how this type of framework really adds value to the work we are doing. This is necessary to avoid this approach being just a new fad or even facing some of the pitfalls that past approaches have had. Jean Lebel also supported this by pointing out that saying all of this is easy-what is missing are examples of how this works in reality. He suggested that if the discourse could move from theoretical to applied, providing examples of an innovation system in operation, this would be a more positive step towards greater adoption of this approach. This was supported by others in the audience who suggested that many were on board in terms of the principles behind the approach and were ready to engage in new approaches, but were not equipped with enough information on how to do it.

Enrica closed the session by expressing her hope that this dialogue doesn't stop and invited everyone present and others to engage further in this debate. She indicated that the ICT-KM website would have the presentations from the session, a report summing up the discussion as well as a space for continuing the discussion through the blog available. She thanked the panelists and all participants in the session for attending and actively participating in this valuable discussion.

Session 3B. Making IPRs work for Pro-poor Agricultural Innovation

Moderator:	Kenneth Fischer (Member, Science Council)
Presentation:	Niels Louwaars (CGIAR Liaison, Wageningen University)
Comments:	Carl-Gustaf Thornstrom (Asst. Prof., Swedish Univ. Agric Sciences) Victoria Henson-Apollonio (Sr. Scientist, CAS-IP)
Rapporteur:	Jason Yauney (CGIAR Secretariat)

IPR for Poverty Reduction?—Harnessing Public Ownership over Knowledge

Niels Louwaars presented on the importance intellectual property rights (IPR) has become in agricultural research for development as IPR systems have spread and the legal frameworks to support them. He argued that public research institutions need to develop clear policies on IPRs because the issue has important policy ramifications, including on public-private partnerships, generation of revenue for research institutes, breeders' rights, and the long term focus of NARS in developing countries. The long term focus of NARS is particularly important for the CGIAR if they move away from the primary task of poverty reduction. He concluded by posing questions for the CGIAR to consider:

1. Are NARS that 'go commercial' still good partners?
2. Could Centers fall in the revenue trap themselves?
3. Should (could) CGIAR be a forerunner in extending the development license to a more generic level?
4. Should (could) CGIAR further suggest such humanitarian access to genetic resources?
5. Should CGIAR run the risk of becoming too political?

Panelists Victoria Henson-Apollonio (CAS-IP) and Carl-Gustaf Thornstrom (Sweden and GRPC) responded to some of the issues raised.

Victoria Henson-Apollonio noted that there are few patented products in the CGIAR System, but that the System does receive some patented technology. The important thing to note is the contractual agreements involved in IPRs and it is often an issue of raising awareness of such agreements, and the rights and responsibilities that come with them. Patience to learn about the process and follow through is also necessary. CGIAR should use its relationships with NARS to do more pro-poor work. It is not a question of whether a particular NARS goes commercial or not to raise revenue, but more of exclusivity and this is why it is important to be familiar with IPR agreements and transactions. On Centers themselves raising income by falling into the revenue trap, she noted that if this were to happen donors would likely withdraw some funding in response. It's a risk that Centers should not undertake. However, CGIAR does need to find way to

make hybrid technologies available, but in the context of proper agreements that maintain appropriate boundaries. This is why more familiarity with IPR processes and agreements is essential.

Carl-Gustaf Thornstrom agreed that donor funding would be reduced if Centers received income from their agricultural research products. On questions 3 and 4 (above) posed during the presentation, he stated that the CGIAR should play the role of extending development licenses and humanitarian access to genetic resources. The details are plenty and will need to be worked through, but the CGIAR should essentially risk 'going political' to achieve these important ends. To help undertake this task, the CGIAR needs to more actively engage with the private sector. The private sector has sent strong signals for many years on its wish to collaborate with the CGIAR. It's time for the CGIAR to clearly articulate the rules under which it would like this collaboration to take place in order to benefit from the advantages the relationship offers.

The main discussion points centered around whether it should be the role of CGIAR Centers to contest patents. Another view was that Centers have the obligation to challenge patents that violate agreements and genebanks. It is important for CGIAR Centers to be proactive in these matters to help deal with future situations more efficiently and effectively. For example, it was pointed out that ICRISAT has started a relationship with the European patent office so that patent examiners are able to examine all publications and have current patent information catalogued. It is time consuming but a necessary part of doing business.

The issue of revenue generation from IP was also discussed, particularly the risk of such activity diverting research activities away from benefiting the poor at the Center level, and the risk of NARS not focusing on the poor.

The main conclusions from the session were as follows:

- The question was posed on whether NARS that 'go commercial' are good partners for the CGIAR. Discussed how to strengthen NARS capacity to evaluate the costs and benefits to proprietary technology and the importance of national systems to have in place a strategic plan in this area.
- There was a general feeling that Centers should be very cautious about revenue generation.
- There was a sense that in granting humanitarian access to genetic resources that the Generation Challenge Program offers a good example that could be used to build upon in the future.

Session 3C. Research Management Strategies

- Moderator:** Rodney Cooke (Dir., Tech Adv. Div., IFAD)
Presentation: Michel Dodet (Vice-President International, INRA, France)
Comments: William Dar (Dir. General, ICRISAT)
Masa Iwanaga (Dir. General, CIMMYT)
Frances Seymour (Dir. General, CIFOR)
Rapporteur: Daniel Rocchi (CGIAR Secretariat)

The presenter highlighted unprecedented challenges facing agriculture in terms of population increase, urbanization, migration, diet change as well climate change, land degradation, water scarcity, emerging and disseminating diseases, energy and natural resources management.

To help cope with these challenges, agricultural research must assume a new role, implying many changes in its mission. These would enhance both the quality and relevance of research and would involve its scale and scope (with emphasis on holistic and interdisciplinary approaches), new areas (environment, food safety, the social sciences, etc.) as well as new partnerships and stakeholders (e.g., consumers and CSOs).

To be relevant, agricultural research has to establish procedures for involving partners and stakeholders in the design of programs, priority setting and evaluation of research. The presenter mentioned several developments that take into account these complex agendas.

The CGIAR Centers are at the interface between development issues and agricultural science and technology. From that position, the Centers are better able than others to translate development issues into questions of research, drawing on the best science available to NARS and ARIs.

In this context, the Centers, to achieve their objectives, need to develop jointly a greater internal capacity and stronger external partnership for mobilizing the best science available and for participating more fully in scientific development.

The discussants made comments aimed at enriching the presentation. They stressed that the process of broadening partnerships must be selective and that the quality and relevance of research must be balanced against time and other trade-offs. Ongoing approaches that include many partners confirm the new role of the Centers as brokers, who “conduct” research with partners like an orchestra, delivering together the best results within a specific context. In addition, efforts to minimize transaction costs in collaborative programs must be renewed, preferably with emphasis on existing mechanisms.

The research-for-development paradigm embedded in the work of the Centers means working closely with partners. If Centers are to improve their role as brokers in working with partners, including the private sector, significant results will be gained on the behalf of both the CGIAR Centers and their partners.

Internal enhancement and external openness are critical principles in the current context and depend on competent staff. It was strongly emphasized how difficult it is for a Center today to recruit and retain strong scientists. Recruitment is also a critical issue in balancing short- and long-term goals. Due to competition with others (humanitarian organizations, for example), CGIAR Centers have to take stronger steps to encourage young scientists to get involved in international agricultural research.

Participants posed some questions, particularly stressing how research conducted on the ground with real partners could differ from the theoretical framework. In some aspects, good feedback on research result is obtained when stakeholders become research partners. Colleagues confirm that recruitment is not easy but is key for excellent and relevant research. The positive role of the CGIAR Centers in assisting NARS was mentioned with respect to West and Southern Africa as well as the critical role of competitive grants for driving research programs.

The moderator asked discussants to summarize their comments on management strategies. They underlined the critical role of working closely with partners as well improving human resources. The moderator concluded with these points:

- Research management strategies must confront a complex agenda and unprecedented challenges: population, health, environment and so forth.
- A new equation of agricultural research is needed to be relevant, including minimizing transaction costs.
- CGIAR research serves as an interface, based on an integrated research-for-development paradigm, and has to balance short- and long-term goals in partnerships.
- Human resources are a key element: how to recruit, retain and develop capacity in the context of a complex agenda.

Session 3D. Resource Mobilization

Moderator:	Mark Cackler (Acting Dir., ARD, World Bank)
Presentation:	Jonathan Wadsworth (Sr. Rural Livelihoods Adviser,DFID)
Comments:	Franklin Moore (Director, USAID) Ayman Abou Hadid (President, ARC, Egypt) Emile Frison (Dir. Bioversity and Chair, AE)
Rapporteur:	Loriza Dagdag (CGIAR Secretariat)

Jonathan Wadsworth made a presentation about mobilizing financial resources for science. His presentation emphasized that effective resource mobilization is two fold. First is a good fund raising campaign, i.e. defining a sound and convincing strategy and communicate it well. The second being the efficient use of the resources entrusted to the System by the Members. He further expounded that efficient use of funds through productive and impact-producing research is just as important as keeping the “overheads” low.

Another aspect of his presentation highlighted the CGIAR as a main producer of global public goods (GPG). We produce goods for global public consumption/use but unfortunately funding for the GPG is not very popular at all from decision makers. With Overseas Development Aid stagnating, donors still have to prioritize between global, regional and national efforts. He made an analogy of benefits derived from the GPGs and noted the huge benefit that USA, Australia, and Canada enjoyed from the CIMMYT wheat research. He made a case of tapping into the national budget of the developed countries to contribute to the GPG research in lieu of the national benefits derived therefrom. And that perhaps, funding the GPG may come from ODA from the south and from national budget from the north.

Finally, Jonathan tried to make a last analogy of the resource mobilization case by citing lessons from the competition. The health sector are very good at presenting benefit : cost ratio for each object of research. Calculating tangible proof of social benefits derived from medical research. We recognize that financing GPG research is not based only on cost-benefit estimates, however, this type of analysis can certainly be helpful in establishing priorities and mobilizing resources both domestic and international.

Franklin Moore from USAID contributed to the discussion by analyzing some donor behaviors and making a word of caution with regards to the cited behavior. He said that donors are bound to make restricted contribution because it is this type that produce results for them in 2 to 3 years. However, as a word of caution, he emphasized that it is the unrestricted contribution that produce the long-term results of 15 years or so, that gets the job done. In other words, it is this type of funding that produces the type of results that will address the problems we identified today.

Ayman Hadid from Egypt on the other hand emphasized the value of partnership. That partnering with NARS does not only increase and develop capacity but a way of increasing the contribution from the developing countries.

Anne-Marie Izac made a case of the cost of not investing in agricultural research. About meeting the critical needs and avoiding the global bads.

In closing, Mark Cackler from the World Bank left some thoughts for Members to continue to brain storm. These are the idea of perhaps asking the develop countries to contribute to the research of GPG on the basis of the extent of benefits they derived from it and not in the context of ODA. And second, learning from the health sector experience, he reiterated that marketing may sound bad in the context of funding agricultural research but we do need to give information to the decision maker to help them prioritize funding decisions.

Session 3E. Mobilizing Partners and Promoting More Inclusive Research Partnerships

Moderator: Marlene Diekmann (Research Advisor, GTZ)
Presentation: Jonathan Woolley (Program Coordinator, CPWF)
Adel El-Beltagy (Chair, GFAR)

Rapporteur: Harry Palmier (CGIAR Secretariat)

Context :

- New phase of more rapid change globally, evidenced in water and food systems by direct impact of climate change, biofuels issues and their effect on trade and food prices.
- Long-term solutions to ending poverty and hunger requiring innovative research approaches capable of embracing complexity and change

Two major issues:

- How can the CGIAR more effectively mobilize partners in the global research community?
- How can the CGIAR promote effective and more inclusive partnerships to generate better action-oriented research?

New Approaches:

- Engaging in genuine partnerships with a broader spectrum of partners and stakeholders than traditional IARCs partnerships → more effective and sustainable solutions.
- CPWF Research approaches deal with complex systems through partnerships that include NARES, CBOs, NGOs – both local and international-, ARIs, universities and communities, thus directly linking CG centers to a wider range of partners.
- This type of partnerships have improved science done under CPWF umbrella (aerobic rice, small reservoir planning, rural African adaptation to climate change, “conversatorios” in Colombia around upstream-downstream conflicts over water etc...)

Findings

Two major findings :

1. Partnerships and networks can create effective and sustainable research communities in developing countries that cross boundaries and disciplines and create new communities of practice.
2. Partnerships can more effectively lead to impact particularly with respect to policy-making, through the use of innovative tools like Impact Pathways.

This should lead to:

- Consider investment in partnerships as investment in social capital, not as transaction costs.
- realize that IPGs also grow from local research

Lessons learnt/ Best practices:

CPWF:

- grapples with complex issues : Past success is no guarantee of future success; Uncertainty of outcome remains; Expertise helps but is not sufficient; relationships are key
- Complex Challenges → Multiple Organizations → Action research → Social learning. Involvement of nontraditional CGIAR partners:
- Partnership investments was required: 165 organizations received funding in first call projects. Twenty percent of 200+ project partners are NGOs, ARIs, CBOs; 75% are NARES :
 - Water institutions (Mekong River Commission & Yellow River Conservancy Commission) coordinate research
 - An NGO association of universities (WaterNet) leads a project in southern Africa and focuses on MSc and PhD research
 - 16 institutions from 6 countries work on participatory river basin governance in the Mekong
 - Eight Consortium members are NGOs, ARIs and a river basin organisation rather than CGs and NARES alone
- Time lag in results : Allow time for development of social capital (*social capital = trust + common language*). Results more difficult to predict a priori:(planning implications)

→ Partnership is not a luxury nor a 'fad'.

→ Innovation without partnership is likely to fail when it comes to Research for

Development

→ Need to foster more effective and inclusive partnerships and networking CGIAR with the rest of the international agricultural community

→ Giving more leadership responsibility to non-CG partners often changes the way the science questions are handled and create sustainable research communities in developing countries, that cross boundaries and disciplines (new communities of practice).

→ Achieving impact from research is more likely when projects/program make explicit impact pathways and monitor progress along them [CPWF developing Participatory Impact Pathways Analysis (PIPA)]: better attention to integration; attention to scale issues; connection to policy makers; and impact objectives.

→ Science Council can help adopting these new approaches by allowing greater flexibility in the design and outputs of network-executed projects in Medium Term Plans: Logframes/logic model approaches to be compatible with emergent learning processes.