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ICID 2010 Bulletin



A Daily Report of the Second International Conference on Climate, Sustainability and Sustainable Development in Semi-arid Regions
Published by the International Institute for Sustainable Development (IISD)

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ICID+18
2010

ICID 2010 HIGHLIGHTS: MONDAY, 16 AUGUST 2010

The Second International Conference on Climate, Sustainability and Development in Semi-arid Regions (ICID 2010) opened on Monday, 16 August 2010 in Fortaleza, Brazil and will continue until 20 August. Participants convened in the morning for an introductory session, opening ceremony and the launch of the UN Decade on Deserts and the Fight Against Desertification. In the afternoon, participants attended thematic panel sessions.



Members of a Samba exhibition group.

ICID 2010 seeks to bring together participants to identify and focus on the challenges and opportunities facing the arid and semi-arid regions of the planet. Over 70 panel sessions are scheduled and participants from 100 countries are expected to attend, representing governments, UN agencies, intergovernmental and non-governmental organizations (NGOs), academia, the media and other civil society groups. ICID 2010's main theme "climate, sustainability and development in semi-arid regions," will be addressed through four sub-themes, including: climate information; climate and sustainable development; climate governance, representation, rights, equity and justice; and climate policy processes.

OPENING OF ICID 2010

INTRODUCTORY SESSION: Director of ICID 2010 Antônio Magalhães opened the Conference by stressing that it is not just about climate change or desertification, but rather examining the combined challenges facing semi-arid regions and identifying opportunities and ways forward. He was followed by words of welcome from a 10-year old representing the youth of Brazil's semi-arid regions and a presentation of the conference's certificate of carbon-neutrality.

Several ICID 2010 partner organizations presented reports from preparatory meetings. Ambassador Alan Charlton, UK, described the UK Department for International Development (DFID) meetings in Africa on protecting agriculture from climate uncertainties. Michel Laurent, Director-General, Institut



Dais during the official opening of the meeting

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Antônio Magalhães, Director, ICID 2010

de Recherche pour le Développement (IRD), highlighted north-south research partnerships generating knowledge on sustainable development of arid regions. Jesse Ribot, University of Illinois, said that learning and discussion on climate change, extreme weather events and their effects must continue.

José Sydrião de Alencar Júnior, Banco do Nordeste, stressed increased awareness of desertification across all sectors because of ICID 2010. Eduardo Sávio Martins, Ceará Foundation of Meteorology and Water Resources, Brazil, highlighted that knowledge on adaptation is important and structure is needed to internalize this knowledge. Luiz Antonio Elias, Ministry of Science and Technology, highlighted preparatory meetings discussing strategies for education, planning, public management and zoning control to ensure effective water management.

Dalton Melo Macambire, Department of the Environment and Water Resources, Piauí, described previous partnerships to reclaim degraded lands and appreciated the provision of financial resources and sharing best practices. José Almir Cirilo, Secretariat of Water Resources, Pernambuco, Brazil, underscored the importance of regional cooperation on issues of climate change adaptation and mitigation, but lamented the existing gap between political will and scientific discussions.

In closing, Hervé Théry, University of Campinas, Brazil, gave a detailed global presentation on deserts and desertification, noting that the most pressing concern is the rapid rate of desertification.

ICID 2010 OPENING CEREMONY & LAUNCH OF THE UN DECADE ON DESERTS AND THE FIGHT AGAINST DESERTIFICATION: Antônio Magalhães, outlined the week's plenary sessions, stressing that the conference outcome, the Declaration of Fortaleza, will fulfill the conference's top objective of influencing the agenda of the UN Conference on Sustainable Development 2012 (Rio+20 Earth Summit). UN Convention to Combat Desertification (UNCCD) Executive Secretary Luc Gnacadja read the statement of UN Secretary-General Ban Ki-moon declaring the UN Decade on Deserts and the Fight Against Desertification. A 13-year old youth representative urged Conference participants to say "no to desertification and yes to life" for his kids. Gnacadja expressed the hope that just as ICID I had helped spur Rio Earth Summit negotiations in 1992 on the UNCCD, ICID 2010 would provide key input on dryland issues to the Rio+20 Earth Summit. He said the legacy of ICID 2010 should be a paradigm shift affecting the hearts and minds of policymakers and dispelling ignorance and common

misperceptions about degradation and desertification, especially the misconception that "it is just a local, rather than a global concern."

Federal Deputy Eduardo Vieira Ribeiro, Chamber of Representatives, Brazil, noted that ICID 2010 is a collaborative forum between policymakers and scientists allowing important discussions to take place. He noted that northeast Brazil relies on agriculture, which is causing deforestation and land degradation. He stressed the importance of implementing structures and plans to counter this.

José Machado, Executive Secretary, Ministry of Environment, Brazil, highlighted the importance of science for conserving and improving environmental resources. Cid Ferreira Gomes, Governor, Ceará, Brazil, underscored the importance of continued efforts in adapting to and combating climate change.

THEMATIC SESSIONS

SESSION 1.3.2 DESERTIFICATION – THE CHALLENGE OF DESERTIFICATION AND SUSTAINABLE DEVELOPMENT IN SEMI-ARID REGIONS:

The session on the challenge of desertification and sustainable development in semi-arid regions was chaired by Luc Gnacadja, Executive Secretary, UNCCD.

On land degradation and desertification in the Arab region, Wadid Erian, Arab Center for Studies of Arid Zones and Dry Lands, stressed that much of the population is affected, highlighting that droughts are increasing. He noted ongoing adaptation work, including planting drought-resistant crop varieties and flash flood management.

Sahibzada Kahn, North-West Frontier Province Planning & Development Department, Pakistan, presenting on the management of scarce water resources in the drylands of Pakistan, outlined efforts to reclaim degraded land using hillside ditches, sand dune stabilization and conservation contour trenches. He noted challenges include free-grazing systems, high incentive-based interventions, used social mobilization strategies, community consensus and regional versus local approaches.

Ricardo Marques, Hydro-Environmental Development Project (PRODHAM), on the development of a hydro-environmental project in Canindé municipality, Ceará, Brazil, noted that the area suffered from water deficits during dry seasons and relied on agriculture and livestock for income. He highlighted techniques used in the project including dams,



Dalton Macambira, Governor, Piauí

stepped walls and terraces, as well as incentives to switch to more sustainable agriculture, reforestation efforts in secondary forests and mini-barrages.

He noted that this had resulted in improvement of road infrastructure and the development of a tree nursery.

SESSION 1.3.3 ADAPTATION WITH A LONG VIEW – PROMOTING RESILIENCE: Session Chair Don Nelson, University of Georgia, opened the session, emphasizing the need to view resilience through a development-trajectory lens.

Carol Roncoli, Emory University, presented on climate change, rural poverty and the politics of resilience in Kenya. She noted various factors needed to restore memory and trust, and thus generate adaptive capacity. She described the study, which focused on five districts in the country, and concluded that a long view on adaptation requires “understanding vulnerability as an entangled crisis.”

Line Gordon, Stockholm Resilience Center, discussed building resilience through water system innovations in drylands, noting that undernourished or malnourished populations live in most of the world’s drylands. She stressed that water system innovations are valuable in all future modeled projections, especially in sub-Saharan Africa, but suitable technologies and “relevant collaborators” vary.

On the future of maize in Mexico, Hallie Eakin, University of Arizona, reiterated the need to pay attention to future trajectories of change in terms of adaptation in order to best influence types of future adaptive capacities. She noted changing trends in the range of production mode choices,

which have been favorable to commercial maize farmers but have caused sometimes unfavorable lifestyle changes for small-scale maize farmers.



Youth Mayor

SESSION 1.3.6 CLIMATE, DESERTIFICATION AND SUSTAINABLE DEVELOPMENT: This session was chaired by José Geraldo Souza Sobrinho, University of Brasilia. Maria Manuela Morais, University of Évora, Portugal, discussed the issue of water availability. She said that the lack of water is already a reality in some regions, constituting a menace for both humanity and the biosphere, posing health risks and impeding economic and social development. Maria do Carmo Sobral, Federal University of Pernambuco, Brazil, discussed a study on the protection of the micro-basins of the Borborema Plateau, birthplace of six important rivers. She suggested that by using Units of Sustainable Use (APAs), instead of Areas of Permanent Protection (APPs), all the key micro-basins could be protected while allowing for human occupation and use. Manoel Serrano Pinto, University of Aveiro, Portugal, argued that policymakers and decision-makers should take into account the contributions of geoscientists when developing public policies regarding geo-resources (minerals, water, soil and physical landscape).



Antônio Rocha Magalhães, Director of ICID 2010, Luc Gnacadja, Executive Secretary, UNCCD, and Cid Gomez, Governor, Ceará, Brazil, and Cid Ferreira Gomes, Governor, Ceará, Brazil

SESSION 1.4.1 LESSONS FROM THE BRAZILIAN EXPERIENCE: This session was chaired by Egon Krakhecke, Ministry of Environment (MMA), Brazil. José Machado, Executive Secretary, MMA, outlined his Ministry’s efforts to combat deforestation, monitor the Caatinga Biome of northeast Brazil by satellite, promote access to water and sustainable water resource development, and implement the National Plan of Action on Desertification. He also argued for creating a new national commission, chaired by the MMA, to coordinate the many ministries and agencies dealing with semi-arid regions at the federal and state levels.

Adoniram Sanches Peraci, Ministry of Agricultural Development, discussed his Ministry’s efforts to promote family farming in the semi-arid regions through special financing and credits, agricultural insurance, technical assistance and providing markets for produce as through the National School Food Program. He said that there was more work to do in amplifying coverage and improving mechanisms of environmental compensation.

Athadeu Ferreira da Silva, Company for the Development of the San Francisco and Paraíba Rivers (CODEVASF), highlighted his firm’s efforts to recover degraded lands and contain erosion.

Igor Arsky, Ministry of Social Development, discussed programmes to build cisterns in schools and rural portions of semi-arid areas, provide access to water for family farms to grow food, and promote water catchment, small dam systems and subterranean dams.

José Luiz de Souza, Ministry of National Integration, underscored his Ministry’s efforts to: create geographical information sets for municipalities in the semi-arid western portion of Bahia; push for regularizing registration of rural properties in the semi-arid regions, in part to determine



Marcelo Poppe, CGEE, Brazil and Emilio Rovere, Federal University of Rio de Janeiro



Carla Roncolini, Emory University

who has what environmental liabilities; and to promote water projects across northeastern Brazil that would ensure regularized access to water.

SESSION 1.4.2 SUSTAINABLE ENERGY FOR THE DEVELOPMENT OF DRYLANDS: Larry Simpson, World Bank, noted that many consider renewable energy unreliable. He noted that for wide-scale use of renewable energy, the energy must be stored and recovered with reasonable energy losses, stressing that batteries are not feasible. He emphasized the possible suitability of renewable energy for rural dryland areas as they can be low maintenance.

Renato Rolim, Infrastructure Secretariat, Ceará, Brazil, outlined the history of renewable energy in the electricity mix of Ceará State. Noting that incentives are needed to adopt renewable technologies, he said that wave energy could be used for desalinization of sea water, which is useful for the semi-arid regions of Ceará. He highlighted the interlinkages of renewable energy production with consumers and the environment. Emilio Rovere, Federal University of Rio de Janeiro, reporting on a pilot programme to combat desertification and land degradation in northeast Brazil, outlined the objectives of the project including modernization of production systems, applied research on potential adaptation strategies and the creation of commercialization channels for agricultural inputs and technical assistance. He said that next steps in the project include increasing adaptive capacity, monitoring and evaluation of current projects, and the consolidation of previously used methods.

SESSION 1.4.3 CLIMATE CHANGE, ADAPTATION AND GOVERNANCE IN THE WATER SECTOR: Jamie McEvoy, Arizona University, chaired the session on climate change adaptation and governance in the water sector.

Maria Carmen Lemos, University of Michigan, explained the role of development and risk management in disaster response, agricultural planning and water management in response to drought in Ceará, Brazil. She underscored the need to move from a “vicious cycle” of ineffective adaptation and toward a “virtuous cycle” of effective adaptation.

Addressing desalinization as an adaptive or maladaptive response to climate change, Jamie McEvoy underscored indirect impacts of desalinization, *inter alia*: tightening the water-energy nexus; increased development; and increased centralization of policy processes. She said that by first ensuring implementation of conservation measures, solar desalinization and development of best management practices could reduce risks.

Barbara Lynch, Georgia Institute of Technology, discussed the challenges of glacial retreat, increased pollution and increased demand in the Puna and Quebrada Hondo River Basin, Peru. She emphasized that water demand and quality must be addressed in addition to the current singular focus on



Barbara Lynch, Georgia Institute of Technology

supply. Lynch said that water governance will become more equitable if the most vulnerable “speak very loudly.”

On vulnerability, adaptation and competing access to resources in Bolivia, Julia McDowell, Agua Sustentable, described the multiple stresses faced by agricultural communities in the Bolivian Choquecota River Basin and their various adaptation strategies. She cautioned that a strategy that is adaptive to one stressor may not be adaptive to a future stressor.



The panel during the session on lessons from the Brazilian Experience



**ICID 2010 HIGHLIGHTS:
TUESDAY, 17 AUGUST 2010**

On Tuesday, participants at ICID 2010 convened in a plenary on synergies among the UN Conventions, as well as panel sessions organized around the four sub-themes of the conference: climate information; climate and sustainable development; climate governance, representation, rights, equity and justice; and climate policy processes. During lunch, poster sessions and a World Bank film on “Hope for a Changing Climate” were presented.



PLENARY SESSION

SYNERGIES AMONG THE UN CONVENTIONS: On Tuesday morning, a plenary session convened, chaired by Luis Alberto Figueiredo Machado, Ministry of Foreign Affairs, Brazil. Expressing hope that this meeting would help set the agenda at the Rio+20 Earth Summit in 2012, he reminded participants that the Rio Conventions (UN Convention on Biological Diversity, UN Convention to Combat Desertification and UN Framework Convention on Climate Change) all stem from the root concept of sustainable development.

Via video message, Christiana Figueres, UNFCCC Executive Secretary, lauded the discussion of synergies between the Rio Conventions and suggested better water management practices at the local level as one way to bring the Conventions closer together.

Antônio Magalhães, Director ICID 2010, read a message from Ahmed Djoghlaif, CBD Executive Secretary, who traced the inter-linkages between the three Rio Conventions, noting that the impacts of climate change affect both sustainable land management and biodiversity. Djoghlaif called for the inclusion of indigenous peoples and local communities in the ongoing talks on creating synergies between the Conventions.

Margarita Astrálaga, UN Environment Programme (UNEP), described the evolution of the synergies debate within international environmental governance, highlighting that the Rio Conventions can draw from other processes where the synergistic approach is already being implemented, specifically the chemicals conventions and those within the CBD.

Sergio Zelaya, UNCCD, on behalf of Jaime Webbe, CBD, presented on biodiversity, noting calls for enhanced cooperation among the Conventions at their respective Conferences of the Parties (COPs) and described future initiatives including a



Luc Gnacadja, UNCCD Executive Secretary, Luis Alberto Figueiredo Machado, Ministry of Foreign Affairs, Brazil, Margarita Astrálaga, UNEP, and Walter Vergara, World Bank



Margarita Astrálaga, UNEP

proposed joint liaison group, joint expert group and joint scientific body, as well as a joint extraordinary session of the Rio Convention COPs at the upcoming Rio+20 Earth Summit.

Nora Berrahmouni, Food and Agriculture Organization, addressed synergies between the Rio Conventions in the case of dryland forests. Warning against parallel national action plans on individual sectors, she called for integrated action plans to secure resource bases, conserve and preserve livelihoods, and to mitigate and adapt to climate change. She recommended collaboration at the national and regional levels, sustainable land management schemes at the landscape level (such as at the watershed level), scaling up successful projects and common integrated monitoring systems between the Conventions, as well as sustainable financing.

On the responses to climate change in Latin America, Walter Vergara, World Bank, noted three particularly vulnerable climate “hotspots” currently facing challenges: the Amazon; the Andes; and the coral biome in the Caribbean. He emphasized the importance of better understanding the costs and benefits of various adaptation approaches and noted that current funding for adaptation is limited in scope.

Luc Gnacadja, UNCCD Executive Secretary, said the issue of synergies “seems to be like a ghost – we all sense its need but we have never really seen it,” and called for “pulling down the ivory towers” that surround implementation processes within the individual conventions. He called for greater investment in sustainable land and water management to ensure food security, decrease the rate of climate change, alleviate drought and avert further biodiversity loss.

In the ensuing discussion, participants discussed, *inter alia*: the potential of food security in drylands; issues faced in the Caatinga Biome in Brazil; the need to increase the involvement of civil society in the synergies discussion; the importance of greater information sharing on the work of the Rio Conventions; and inclusion of human rights in the synergies discussion.

THEMATIC PANEL SESSIONS

In the morning and afternoon, 18 thematic panel sessions convened to address issues related to climate change adaptation, vulnerability and sustainable development. In addition to these broad themes, panels addressed specific case studies and some focused on elements such as genetic

resources, the health sector, poverty indices, remote sensing, the role of culture and education. A selection of panel sessions is presented below.

SESSION 2.1.3 VULNERABILITY, IMPACTS AND ADAPTATION TO CLIMATE CHANGE IN SEMI-ARID REGIONS: In a morning session, Jürgen Kropp, Postdam Institute for Climate Impact Research, Germany, argued that there is a knowledge management problem regarding climate change, namely, data collection alone does not suffice, experiences must be shared and complex knowledge interpreted for decision-makers’ use.

Paulo Nobre, National Space Research Institute, Brazil, said studies suggest that climate change will make northeast Brazil hotter and more arid, with irregular rainfall, loss of agricultural production and negative employment impacts. He suggested responses such as creating employment programmes to recover the natural landscape of the Caatinga Biome, reforestation of riverbanks and promoting solar-powered irrigation of cash crops.

Otamar de Carvalho, economist, Brazil, discussed the disproportionate effect of droughts, floods and climate variations on poor farmers in the semi-arid northeast. He also explained how much of the northeastern economic production and population is affected by desertification.

Using examples from Brazil, China, Haiti and sub-Saharan Africa, Johann Gnadlinger, Regional Institute for Appropriate Small-scale Agriculture (IRPAA), Brazil, discussed the scope for using various forms of rainwater harvesting in adapting to climate change.

Jagdish Baral, Ministry of Forests and Soil Conservation, Nepal, discussed the positive and negative impacts of climate change on the semi-arid Mustang plain in Nepal.

SESSION 2.1.4 THE IMPORTANCE OF COMMUNITY, CULTURE, IDENTITY AND EQUITY IN CLIMATE CHANGE ADAPTATION STRATEGIES: Carol Farbotko, University of Wollongong, Australia, on climate refugee narratives, noted that the warming planet would increase the migration of climate refugees. She lamented “reactionary” policies toward climate refugees in the face of natural disasters, especially those that reduce cross-border movement. She noted the need for equitable tools to assess climate migration processes. Julian Rebotier, University of Québec, Canada, presenting on justice and climate change in Latin American cities, noted that belief in climate change does not rely on “faith,” as climate change is a measurable occurrence. He



Luis Alberto Figueiredo Machado, Ministry of Foreign Affairs, Brazil

lamented the lack of detailed climate knowledge at local levels to ensure effective adaptation.

Jonathan Ensor, Practical Action, UK, on community-based adaptation and culture, highlighted that social norms and culture can constrain adaptation processes.

Stressing that culture can define opportunities for change, he said adaptation can become part of the local cultural context. Renata Marson Teixeira de Andrade, Catholic University of Brasília, Brazil, presenting with Andrew Miccolis, ComSensos Consultoria,

Brazil, on climate change vulnerability in Brazil, noted the Brazilian climate change plan emphasizes use of renewable fuels and increasing biofuel use. She bemoaned the lack of studies measuring the impacts and vulnerabilities in local communities, and the lack of recommendations on good adaptation strategies.

SESSION 2.3.1 DEVELOPMENT OF SEMI-ARID REGIONS: Anthony Galvão, Center for Strategic Management and Studies (CGEE), Brazil, chaired the session on the development of semi-arid regions. Reading a message from Ignacy Sachs, Research Center for Contemporary Brazil, France, Galvão stressed that mankind has two great challenges: poverty and climate change. He said that scientific and ecological cooperation is important, and remarked that ideas and coping strategies should continue to be shared between cultures and regions. He suggested challenging architects and urban planners to rethink cities and housing in the context of the new paradigm of climate consciousness.

Ivan Silva Lire, UN Economic Commission for Latin America and the Caribbean (ECLAC), on the semi-arid regions of Latin America, noted that 11% of the economically active regions generate 55% of gross domestic product, stressing that these regions are characterized by inequality. He said that the regions with high growth exploit natural resources that are linked to the world economy. Tania Bacelar, Federal University of Pernambuco, Brazil, said that there are more opportunities than threats when dealing with climate change. She noted that semi-arid regions in Brazil face decreasing crop yields and increasing urbanization. José Eli da Veiga, University of Campinas, Brazil, called for effective knowledge exchange, incentives and technology transfer in the region in order to increase communities' economic activity. He stressed, however, that the price of technologies must decrease in order to increase acceptance and use of new technologies.

SESSION 2.3.5 WATER GOVERNANCE IN DRYLANDS: During the session chaired by Paulo Varella, National Water Agency (ANA), Brazil, panelists discussed policy measures to address the challenges of water governance in drylands.

Ricardo Andrade, ANA, Brazil, described the PROÁGUA programme in Brazil, which has created information sharing and monitoring systems, built capacity, and strengthened and empowered regulations and institutions in the water management field. Discussing lessons from US-Mexico



Paulo Varella, National Water Agency (ANA), and Carlos Fernandez, WASA-GN

cooperation on joint river management in the Rio Grande basin, Jurgen Schmandt, University of Texas, US, said that, except during droughts, cooperation has worked well, but worried that it may become ineffective as climate impacts worsen. He said that joint river management regimes do not commonly address groundwater or headwaters management, but should.

Benjamin Ngounou Ngatcha, University of Ngaoundere, Cameroon, discussed the many challenges to sustainable water resource management in the Lake Chad Basin, including large research gaps, demographic pressures, and lack of planning and transboundary cooperation. Oscar Buitrago Bermúdez, University of Valle, Colombia, stressed the role of territory, territorial zoning and governance in water resources management, underscoring the need to assure the active participation of autonomous communities in water and territorial governance.

Otamar Carvalho, economist, Brazil, discussed water governance as a question of balancing water supply and demand. He said analysis of population changes of semi-arid northeastern Brazil showed a drop in rural zones and substantial growth in peri-urban areas, raising questions about the effectiveness of policies aimed at keeping rural farmers in the semi-arid areas.



Otamar de Carvalho, Brazil



Tania Bacelar, Federal University of Pernambuco, Brazil

SESSION 2.4.2 VULNERABILITY AND ADAPTATION IN AFRICA AND LATIN AMERICA:

On Tuesday afternoon, a panel chaired by David Miano Mwangi, Kenya Arid and Semi-arid Lands Research Programme (KASAL), was convened. Maria Carmen Beltrano, Italian Agricultural Research Council, Italy, presented on livestock innovation in an Italian heat-warning forecast system and described an effective temperature humidity index, which has been used to forecast extreme heat events, saving farmers a loss of dairy cattle.

David Barkin, Metropolitan Autonomous University, Mexico, gave a presentation on new strategies for building sustainability, stressing the need to shift from traditional science to a “new communitarian rurality,” which requires greater community involvement and encourages wealth creation and environmental conservation.

Presenting on the role of markets in addressing climate change in the arid and semi-arid lands of Kenya, David Miano Mwangi, KASAL, emphasized the need for “sustainable commercialization” within the sustainable development agenda.

Frederick Kahimba, Sokoine University of Agriculture, Tanzania, highlighted viable traditional and conventional adaptive responses to drought, and concluded that during times of extreme climate events, conventional agronomic practices should be maintained.



A display about a programme to exchange recyclables for discounts on power bills.

Stephen Mureithi, University of Nairobi, Kenya, described a participatory project to train communities in northwestern Kenya on better resource-use planning techniques. He called for the localization of drought cycle management and a regional approach to management of shared resources.

SESSION 2.4.6 IMPACTS AND ADAPTATION IN AGRICULTURE: Justine Ngoma, ZBU, Zambia, highlighted adaptation measures implemented in the agriculture sector to address climate change in Zambia. She said the primary policy responses to adaptation include crop diversification, use of drought tolerant crops, conservation farming techniques and improved farm extension services.

Christina Rosera, Ministry of Agriculture, Livestock, Aquaculture and Fisheries, Ecuador, underscored the challenges presented by ecosystems affected by unplanned agriculture and limited access to water, among others. She stressed the importance to democratizing access to productive



Justine Ngoma, ZBU, Zambia

resources (land, water and credit) and participatory processes that are culturally acceptable.

On community farming, Ganesh Parida, Centre for Youth and Social Development, India, explained that it is an eco-friendly sustainable agriculture practice that promotes proper use of land, ensures food security for poor families and creates space for technological adaptation.

Steven Nagume, Action Coalition on Climate Change, Uganda, underscored challenges facing agricultural adaptation to climate change, including the latent and slow nature of observed impacts, lack of baseline data, competing land use and lack of comprehensive area-specific management plans. He noted adaptation strategies including herd management practices.

José Lemos, Federal University of Ceará, Brazil, discussed the effects of changing rainfall patterns on agricultural production in the state of Ceará. Peter Odjugo, University of Benin, highlighted West African agricultural challenges, noting that current changes are overwhelming existing adaptive capacity. He called for investment in irrigation, use of drought resistant crops, development of national climate change policies and adequate information for farmers on climate and adaptation strategies.



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ICID+18
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ICID 2010 HIGHLIGHTS:

WEDNESDAY, 18 AUGUST 2010

On Wednesday, participants at ICID convened throughout the day in thematic panel sessions and roundtables organized around the four sub-themes of the conference: climate information; climate and sustainable development; climate governance, representation, rights, equity and justice; and climate policy processes. During the morning and lunch period, poster sessions were presented. The day concluded with a keynote speech by Jeffrey Sachs, Director, Earth Institute, Columbia University, US.



KEYNOTE SPEECH

Jeffrey Sachs, Director, Earth Institute, Columbia University, US, warned that “we may be losing the battle” on anthropogenic climate change and the state of the drylands, underscoring the many climate-linked catastrophes in the past year, accompanied by “miserable outcomes” on the political front.

Noting the focus of ICID 2010 on producing a message for Rio+20, he suggested the outcomes should also be taken to regional meetings on drylands and the UN High-level Summit on Progress on the Millennium Development Goals (MDGs), to be held from 20 – 22 September 2010.

He recommended the ICID 2010 final declaration: declare the climate crisis in semi-arid lands a growing global security threat and a direct threat to the fulfillment of the MDGs; call for a UN Security Council special session on violence, security and semi-arid lands; and advocate the formation of a new political Alliance of Semi-Arid Countries (ASAC) at the MDG Summit to speak in a unified voice at the UNFCCC COP 16 in Cancún, Mexico. He suggested that the ASAC should call for the: timely disbursement of adaptation funding, with the priority being hard-hit ASAC countries; faster progress in global mitigation efforts; the implementation of a global carbon tax to finance adaptation and mitigation efforts; large-scale solar power programmes in ASAC countries where appropriate, focusing on regions trapped in energy poverty and where large-scale solar power has obvious commercial feasibility.

In the morning and afternoon, 24 thematic panel sessions and roundtables convened to address issues related to climate change adaptation, vulnerability and sustainable development. In addition to these broad themes, panels addressed specific case studies and some focused on elements such as carbon

sequestration, finance, conservation of native species and inter-basin water transfers. A selection of panel sessions is presented below.

THEMATIC PANEL SESSIONS

SESSION 3.1.1 FINANCING STRATEGIES FOR SUSTAINABLE DEVELOPMENT IN ARID AND SEMI-ARID REGIONS: In the morning, Chair José Sydrião de Alencar Junior, President, Banco do Nordeste (BNB), Brazil, opened the session noting the importance of financing for development in semi-arid regions.

Jaime Mano, Inter-American Development Bank (IDB), Brazil, emphasized five key areas for investment in semi-arid regions, including: infrastructure; poverty reduction and social inclusion; improved living conditions in cities; water; and



Jeffrey Sachs, Director, Earth Institute, Columbia University, US

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Mark Lundell, World Bank

competitiveness. Rommel Acevedo, Secretary General, Latin American Association of Financing Institutions for Development, Peru, underscored the emergence of innovative programmes in Latin American countries to provide financing for underserved rural areas to support development of rural enterprises. Mark Lundell, World Bank, described the Bank's activities in the semi-arid regions of Brazil. He noted that the projects supported sustainable economic activities, natural resource management, rural poverty reduction, and development of legal frameworks and management to improve water efficiency.

Branca Americano, Ministry of Environment (MMA), Brazil, highlighted the new Brazilian National Fund on Climate Change, saying R\$200 million will be invested in mitigation and adaptation in the coming year. She explained that the fund was created from existing funds under the Oil Act, originally intended to mitigate disasters caused by the oil industry, by redefining the impacts that these funds could address. Chair Alencar highlighted the ongoing process to establish the Caatinga Fund to provide investment in northeast Brazil.

SESSION 3.2.1 FOOD SECURITY, CLIMATE CHANGE AND DEVELOPMENT IN SEMI-ARID REGIONS:

In the morning, Chair Abdou Kaza, Minister of Water, Environment and the Fight Against Desertification, Niger, opened the session, noting that food security is a major concern of our time and that lack of food will compromise development in developing regions.

Ghani Chehbouni, French Institute for Research and Development (IRD), Egypt, said that food security is a basic right and need of all humans. He noted the uncertainty in climate change forecasts and rainfall predictions, and called for the exchange of knowledge, research and ideas. Eduardo Delgado Assad, Brazilian Agricultural Research Corporation (Embrapa), Brazil, highlighted examples of Brazilian projects to reduce crop losses with model forecasts and noted that some municipalities have land-use projections specifying which crops can be planted successfully in their areas.



Abdou Kaza, Minister of Water, Environment and the Fight Against Desertification, Niger and Amadou Tidiane Ba, Minister of Higher Education and Scientific Research, Senegal

Cheikh Oumar Ba, Initiative Prospective Agricole et Rurale (IPAR), Senegal, underscored the importance of agriculture for food production, job creation and increasing economic activity. He noted that the Senegalese government must reinforce socioeconomic investments as well as enable access to foreign markets to counteract decreasing food production. Patrick Caron, Agricultural Research for Development (CIRAD), France, stressed that while agricultural production need not increase, access to food and other basic necessities must increase. He called for effective market governance and underscored the need to produce better quality food more efficiently, with more diversity.

Senegal's Minister of Higher Education and Scientific Research, Amadou Tidiane Ba, said that no single solution to the issue of food security exists and suggested that the problem be solved taking into account local conditions. He emphasized the importance of water availability for food security and called for technical assistance from other countries, such as Brazil.

SESSION 3.2.4 BIODIVERSITY, CLIMATE CHANGE AND DEVELOPMENT IN DRY AND SUB-HUMID LANDS:

At this morning session chaired by Sergio Zelaya, UNCCD, Aderbal Corrêa, International Center for Arid and Semi-arid Land Studies (ICASALS), US, discussed methods of teaching the values of developing biodiversity-based livelihoods. He compared and contrasted histories of rubber and the açai palm cultivation in Brazil.

Ana Maria Guacho Orozco, Guaman Poma Ayala, Ecuador, discussed her personal journey in becoming involved in and recovering semi-arid land in Ecuador known as "Loma Mama Doña," largely without outside assistance using traditional knowledge and native plant species. She urged everyone to work together to take direct action to protect biodiversity and recover degraded areas, and not wait for international negotiations to produce concrete results.

Chair Zelaya delivered a presentation on behalf of Jaime Webbe, CBD, on addressing linkages between biodiversity loss, climate change and land degradation using three basic approaches: ecosystem restoration; improved protected-areas management; and an ecosystem-based approach for adaptation. He said that maximizing co-benefits requires establishing baselines, using existing tools, conducting economic valuations, prioritizing actions and practicing adaptive management.

Zelaya also made a brief presentation explaining the "UN Land" initiative on global drylands to be formally launched with a report targeted at the UNFCCC COP 16, taking place in Cancún, Mexico, in December 2010.

SESSION 3.2.5 VULNERABILITY AND ADAPTATION – IMPLICATIONS OF CLIMATE CHANGE AT MACRO AND MICRO LEVELS IN CHINA:

In the morning session, Nengzhi Qian, State Forestry Administration, China, presented on key measures and achievements in China's forestry sector for combating climate change. He said China hopes to have afforested 47 million hectares of land by 2050, and noted the

increased awareness of the importance of forests to climate change mitigation at the local level.

Zhang Yue, China Agricultural University, presented on the vulnerability of farmers to climate change in semi-arid regions in China, outlined some local adaptive strategies, including

“anti-vulnerability development,” and lauded the government for stepping in to support local adaptation measures.

Lamenting the lack of effective communication between climate scientists and local communities, Xu Xiuli, Agricultural University of Beijing, China, asked “what climate change means to local people,” noting that the theory within the climate change discourse is not easily translated to communities on the ground. She stressed the inclusion of local farmers’ narratives on climate change in the broader climate change discourse, noting that many adaptive measures are carried out “unconsciously,” as people adapt to changes as a matter of course.

Lu Caizhen, Chinese Academy of Science, presented on coping, adaptation and vulnerability to drought in southwest China, describing the impact of water shortages and increased food prices, and called for the involvement of locals in national decision-making processes.

On decentralization and local adaptation to climate change in Yunnan Province in southwest China, He Jun, World Agroforestry Center (ICRAF), China, noted that policy gaps hinder local adaptation measures. He called for the institutionalization and scaling-up of local participation coupled with effective power-transfer from the national level to the local level.

SESSION 3.3.5 VULNERABILITY AND COPING IN RURAL AREAS: Angela Küster, Konrad Adenauer Foundation, Brazil, discussed efforts to promote “agro-ecology” in northeastern Brazil to help semi-arid ecosystems and small-scale farmers. She explained agro-ecology emphasizes certain social-ecological values, reducing external inputs, using alternative farming practices and designing agro-ecosystems. She warned that there is an urgent need to develop a set of indicators defining agro-ecology before the term is co-opted and misused.

Joy Obando, Kenyatta University, Kenya, presented the results of a study reducing the vulnerability of pastoralist communities to climate change and variability in northern Kenya. She said its findings indicate that the increase in droughts and floods will negatively affect pastoral livelihoods both directly and indirectly through the loss of livestock, and that national climate change policies must include guidelines on adaptation within pastoral systems, addressing both livestock issues and alternative livelihood options.



Lu Caizhen, Chinese Academy of Science and Xu Xiuli, Agricultural University of Beijing, China

Woldetinsac Tewolde, Asmara University, Eritrea, discussed climate variability reduction measures in semi-arid lands in Eritrea, including: local community empowerment through “environmental management cells”; new forms of symbiotic cooperation between pastoralists and commercial farmers; community forestry schemes; school-based afforestation programmes; and the establishment of an early warning system for semi-arid lands capable of predicting climate impacts on forage supplies and crop production.

SESSION 3.4.2 CLIMATE EVOLUTION IN WEST AFRICA – TRADITIONAL AND FORMAL GOVERNANCE: Chair Peter Hochet, IRD, Burkina Faso, introduced the session and gave a brief description of ongoing research on natural resource management in the Sahelian countries of Senegal, Burkina Faso and Mali.

Cheick Oumar Ba, IPAR, Senegal, presented on the governance of natural resources, describing state-initiated strategies to reduce resource degradation, but warned that these strategies will be unsuccessful without community involvement.

Moussa Djiré, University of Bamako, Mali, presented a case study on participatory sustainable natural resource management, calling for direct community involvement and stressing that all policies should account for realities on the ground.

On the management of natural resources and land rights, Luigi Arnaldi, Laboratoire-Citoyennetés, Burkina Faso, highlighted the degradation of natural resources due to influxes



The dais during the session on social learning and human capacity



Ana Maria Gaucho Orozco, Ecuador

in migrant communities in the Sahel. He called for states and development partners to help regulate natural resources in areas with large migrant populations.

Chair Hochet spoke about policies in Burkina Faso favoring agriculturalists over pastoralists in a traditionally pastoral region of Burkina Faso, noting that the administration was unable to carry out a proper investigation and had thus made an uniformed decision. He lamented that implementation of this policy exacerbates conflict between the agriculturalists and the pastoralists.

SESSION 3.4.4 SOCIAL LEARNING AND HUMAN CAPACITY – HIGHER EDUCATION CAPACITY DEVELOPMENT PROCESSES FOR CLIMATE CHANGE IN AFRICA: In the afternoon John Colvin, Open University, UK, chaired the session. Sheona Shackleton, Rhodes University, South Africa, on a conceptual framework for integrating social learning into higher education and research, stressed that climate change adaptation education must be focused on problem solving, be interdisciplinary, involve social studies and the arts, and look at integrated solutions.

Mphemelang Ketholiwe, University of Botswana, and Tichaono Pasanyi, Southern African Development Community, presented on the Mainstreaming Environment and Sustainability in Africa Universities Partnership Project. They highlighted outcomes of the programme, including: conceptualizing the relevance of education for sustainable development; designing and applying innovative approaches to teaching, research and community services; and developing and applying innovative strategies to strengthen institutional capacity.

Carolyn Palmer, National Research Foundation (NRF), South Africa, presented on research and social learning in policy and practice for sustainability. She noted that the NRF has created a new

directorate on applied research to increase innovation within the value chain, focus on public good issues and natural resources, and broker relationships.

Mphemelang Kethilowe, University of Gaborone, Botswana, on issues to consider when integrating education into sustainable development in the context of climate change, noted that the research was in the semi-arid region of Botswana, examined gender aspects of climate change. He said that communities had developed new knowledge, in addition to traditional knowledge. He noted an emphasis on cooperation within and between communities to sustain resources and increase resilience to climate change, largely influenced by social learning.

SESSION 3.4.5 GLOBAL NETWORK OF DRYLAND RESEARCH INSTITUTES: In the afternoon, this session, chaired by Roberto Germano, National Institute of the Semi-Arid (INSA), Brazil, addressed the importance of research into the challenges faced by drylands.

Uriel Safriel, Jacob Blaustein Institutes of Desert Research (BIDR), Israel, discussed the Global Network of Dryland Research Institutes (GNDRI), noting its objectives to exchange information and ideas, reduce duplication, as well as pursue joint research and funding opportunities.

Elena Abraham, Argentine Institute for Research on Arid Lands (IADIZA), Argentina, noted that the network is relatively young and that capacity building should be prioritized. Sergio Roig, IADIZA, Argentina, highlighted the objectives of his institute, including increasing knowledge of dryland ecosystems and improving sustainable use of natural and cultural resources.

Ahmed Amri, International Center for Agricultural Research in the Dry Areas (ICARDA), Syria, noted that food security, poverty alleviation and protecting natural resource bases are addressed by ICARDA through: research on water management; agricultural systems for the vulnerable poor; economic and social policies; biodiversity; and crop diversification.

Hari Upadhyaya, International Crops Research for the Semi-Arid Tropics (ICRISAT), India, underscored ICRISAT's "mini core collection," which provides a gateway to genetic resources to identify traits for creating climate ready crops.

Aderbal Correa, ICASALS, US, emphasized that the interdisciplinary nature of dryland challenges requires interdisciplinary education to address those challenges.





ICID 2010 HIGHLIGHTS: THURSDAY, 19 AUGUST 2010

On Thursday, ICID 2010 convened in thematic panel sessions and roundtables organized around the four sub-themes of the conference: climate information; climate and sustainable development; climate governance, representation, rights, equity and justice; and climate policy processes. During the morning and evening, poster sessions were presented.



THEMATIC PANEL SESSIONS

In the morning and afternoon, 18 thematic panel sessions and roundtables convened to address issues related to climate change adaptation, vulnerability and sustainable development. In addition to these broad themes, panels addressed specific case studies and some focused on elements such as rainwater harvesting, technologies for development and impacts on oceans. A selection of panel sessions is presented below.

SESSION 4.1.1 LESSONS LEARNED ABOUT

LESSONS LEARNED: Chair Michael Glantz, Consortium for Capacity Building, US, opened the morning session, observing that the “lessons learned” listed in post-disaster assessments are rarely implemented. He urged that such recommendations should always discuss increased risk from not heeding lessons.

S. H. M. Fakhrunddin, Regional Integrated Multi-Hazard Early Warning System, Thailand, discussed three key problems with early warning systems: warnings not understood; warnings understood but ignored; and warnings understood and not ignored, but no response made.

Fernando Briones, Center for Research and Higher Studies in Social Anthropology (CIESAS), Mexico, discussed the problems of communicating modern climate forecasts to subsistence farmers in Chiapas state, where traditional signals are becoming unreliable and reliance on traditional knowledge can therefore lead to maladaptation.

Tsegay Wolde-Georgis, Consortium for Capacity Building, US, discussed biofuel promotion in Africa, warning of consequences for land use, land ownership, nomadic communities and food security.

Peter Usher, consultant, UK, outlined lessons for the UNFCCC that must be learned from the Montreal Protocol process, namely that: cooperation among relevant stakeholders promotes efficiency and effectiveness; science and politics cannot be compartmentalized when assessing global issues; scientific research and assessment must inspire confidence; environmental integrity must not be sacrificed for economic and political advantage; and solutions must be mindful of those most vulnerable.

Marcos Filardi, University of Buenos Aires, Argentina, discussed the struggle for the human right to food. Leah Orlovsky, Jacob Blaustein Institute for Desert Research, Israel, discussed unlearned lessons from drylands development in the Aral Sea Basin, noting unheeded lessons because of



Antonio Magalhães, Director ICID 2010



Coumba Ndoffène Diouf, Cheikh Anta Diop University, Senegal

bureaucratic inertia and strict top-down control, as well as an absence of market economies allowing farmers to take independent decisions.

SESSION 4.1.4 FROM IMPACTS TO VULNERABILITY – LOCATING CLIMATE CHANGE ADAPTATION IN THE DEVELOPMENT AGENDA:

The morning's session Chair Lisa Schipper, Stockholm Environment Institute (SEI), Thailand, hoped that the session would show why adaptation is not development, and how adaptation cannot be implemented without development.

Netra Chhetri, Arizona State University, US, discussed smallholder agriculturalists' approaches to increasing system resiliency. Noting outcomes of a case study in Nepal, he emphasized that adaptation programmes should: incorporate local knowledge; innovate location-specific technologies accompanied by policy changes; and use local initiatives for biodiversity and technology development.

John Morton, University of Greenwich, UK, on pastoralism and climate change, stressed the need to move beyond categorizing pastoralists as either victims or adaptors to climate change. He called for: a broader view of impacts; the promotion of nuanced discussions relating to present drought cycles; and an increased understanding of the complexity of real-world pastoral production systems.

Purabi Bose, Wageningen University, the Netherlands, presented on community-based adaptation of tribal women in semi-arid India to climate change. She noted that governments need to: recognize historical dispossession through forest

tenure rights; allow access rights for vulnerable communities; and allow forest people's decisions and participation in policymaking, design and implementation.

Dawit Abebe, University of Greenwich, UK, on climate variability and building pastoral socio-ecological adaptive capacity in Ethiopia, said that increased climate variability, in addition to mobility restriction, loss of pastoral resources, settlement policies, access to markets and conflict in the region, has meant pastoralists cannot implement their adaptive strategies.

Chair Schipper, on why examples of adaptation are so elusive, noted that practitioners need to: consider what they are trying to achieve with adaptation actions; use adaptation only when referring to climate change; and stop equating development with adaptation.

SESSION 4.2.3 ADAPTATION STRATEGIES IN DRYLANDS: In this session, Coumba Ndoffène Diouf, Cheikh Anta Diop University, Senegal, discussed local forest management in river basins as a means of addressing climate risk. Olurunfemi Felix, Nigerian Institute of Social and Economic Research, Nigeria, on vulnerability and adaptation to extreme weather events, noted that successful programmes: improve understanding of the context of vulnerability and its stressors; recognize and mediate different adaptation interests; and invest in local knowledge and capacity.

Shailendra Kumar Mandal, National Institute of Technology Patna, India, said that projects require local collective action as well as an integrated effort by governments, civil society and the private sector. He said decision-making should be inclusive and mindful.

Mogodisheng Sekhwela, University of Botswana, underscored that modern agricultural techniques increase climate risk and emphasized solutions, such as diversification, reducing harvesting pressure by creating value added products and understanding interactions between ecosystem services.

José Luis Gonzalez Barrios, National Center for Research on Water, Soil, Plants and Atmosphere (CENID-RASPA), Mexico, described a Mexican case study, which conserved soil, controlled erosion and helped capture rainfall.

SESSION 4.2.5 VULNERABILITY, IMPACTS AND ADAPTATION IN DRYLANDS: In the morning session chaired by Renato Ferreira, Ministry of Environment (MMA), Brazil, Esther Dungumaro, University of Dar es Salaam, Tanzania, gave a presentation on the challenges and



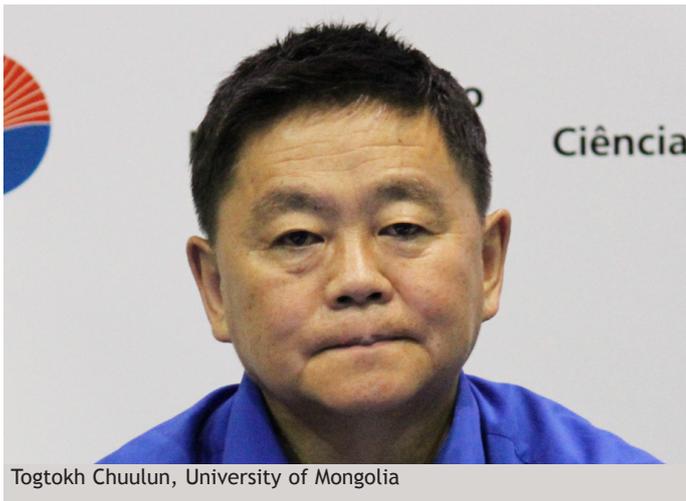
Participants listening to during the session

opportunities of climate change and urged decision-makers to support local-level action instead of creating new “top-down” policies.

Andrei Marin, University of Bergen, Norway, presented on building development under climate change in arid Mongolia and stressed the need to frame adaptation within the economic and political circumstances in each region. Chair Ferreira then spoke on the Brazilian policy on semi-arid areas with respect to water, describing a desalinization project called *Água Doce*. He described the training of communities in maintaining the desalinization equipment, but noted that the process will be threatened in future years due to increased temperatures and thus increased evaporation rates.

Tcharbuahbokengo Nfinn, Federation of Environment and Ecological Diversity for Agricultural Revampment, Cameroon, presented on climate change and the cocoa sector, noting that the adaptive capacity of rural communities farming cocoa is threatened by poverty, lack of knowledge and information, and poor governance.

Nicolino Trompieri Neto, Institute of Research and Economic Strategy (IPECE), Brazil, made a technical presentation on the impact of precipitation on the economy of Ceará, comparing rain-fed agricultural production to that from irrigated lands, and contrasting the gross domestic product of



Togtokh Chuulun, University of Mongolia

the region with that of the country, concluding that irrigated lands are more profitable for the region but not necessarily for the country due to increased production costs.

SESSION 4.3.1 EARLY WARNING SYSTEMS FOR DROUGHTS: The afternoon’s session on early warning systems for droughts was chaired by Don Wilhite, University of Nebraska-Lincoln, US. He noted essential components of early warning systems include monitoring networks, data retrieval systems, data quality control and data analysis.

Mike Hayes, National Drought Mitigation Center, US, noted that understanding the impacts of droughts is essential for understanding the components of drought early warning systems.

Paulo Cesar Sentelhas, University of São Paulo, Brazil, on drought monitoring systems in South America, noted that in addition to atmospheric conditions, soil moisture and rainfall are considered when assessing drought conditions.



Renato Ferreira, Ministry of Environment (MMA), Brazil

Bob Stefanski, World Meteorological Organization, noted that the Nebraska-Lincoln workshop on indices and indicators for monitoring and assessing drought conditions worldwide called for: national meteorological and hydrological services to use the standardized precipitation index in addition to current tools; development of a user manual; and implementation of indices and early warning systems with the end user in mind.

Richard Heim, National Oceanic and Atmospheric Agency, US, presented on the development of an international drought clearinghouse. He said that the global drought monitoring web portal would be the basis of the clearinghouse, with continental, regional and national portals layered on top. He stressed that the clearinghouse will: support drought mitigation preparedness and response, as well as water management decisions; provide a tool for drought education; and have a tool for the display and analysis of climatic and hydrologic data.

SESSION 4.3.4 ROUNDTABLE – SOCIAL SCIENCE RESEARCH AGENDA IN CLIMATE CHANGE

RESPONSE: Chair Jesse Ribot, University of Illinois, US, questioned the panel about a greater and more productive role for social scientists in climate debates.

Monica Amorim, Federal University of Ceará (UFC), Brazil, proposed new approaches to adaptation and diversification that combine local wisdom with scientific knowledge. Togtokh Chuluun, University of Mongolia, noted the need for greater coordination among researchers to produce higher resolution climate change scenarios that are more useful for planning.



Lisa Schipper, SEI, Thailand



Ramon Rodrigues, Ceará State Water Resources Secretariat (SRH), Brazil

Hallie Eakin, University of Arizona, US, emphasized the need for more systematic analyses of adaptation needs and studies on mechanisms of risk transfer and response. Papa Faye, Superior Institute of Management (ISM), Senegal, called for studying the relationship between adaptation and democracy. He said adaptation policy tends not to involve truly collective decisions, making average people doubt democracy.

Michael Glantz, University of Colorado, US, argued that the Nobel Prize award to the Intergovernmental Panel on Climate Change (IPCC) represented a shift in the debate to impacts, meaning a greater role for social sciences.

Renzo Taddei, Federal University of Rio de Janeiro, Brazil, analyzed the sociocultural dimensions of persuading populations that understand that climate change is real to actually undertake serious responses. Zuo Ting, China Agricultural University, discussed how to account for the challenges and implications of climate change in rural development studies.

Moussa Djire, University of Bamako, Mali, discussed analyzing governance, specifically rules and institutions, and their adequacy to address climate change. Lisa Schipper, SEI, Thailand, wondered whether social scientists can work closely together with natural scientists in a truly trans-disciplinary manner.

SESSION 4.3.5 INTERNATIONAL GOVERNANCE OF ENVIRONMENTAL INSTITUTIONS: Max Falque, France, discussed governance of water and agriculture in France, noting changes over time in land and water use, the

evolution of irrigation systems and the legal frameworks governing them. João Luis Nogueira Matias, UFC, Brazil, on governance of agriculture in his country, said that sustainable agriculture requires revolutionizing production technologically, economically and institutionally.

Maria Teresa Farias, COMPAM, Brazil, described the Mata Branca project for the sustainable development of the Caatinga Biome, saying it includes capacity building in the areas of environmental education, appropriate institutions for integrated management, use of native species, controlling forest fires and forestry management. She highlighted strategies to protect biodiversity such as the creation of protected areas, monitoring and the establishment of ecological corridors.

SESSION 4.3.6 LESSONS FROM THE ARIDAS INITIATIVE: Chair Henrique Vila, Ministry of National Integration, Brazil, introduced the session and briefed participants on the Aridas project, which deals with sustainable development in the semi-arid regions in Brazil.

Antonio Magalhães, Director ICID 2010, spoke on the methodology driving the Aridas project, noting that the committee creating the project first defined future development in the semi-arid regions in terms of economic, environmental and social sustainability. He emphasized that the Aridas project seeks to eradicate poverty and inequalities in northeast Brazil.

Maria Irles Mayorga, UFC, Brazil, presented the history of the Aridas project, tracing its roots to the first ICID meeting in 1992. She lauded the project for being socially progressive, economically viable and environmentally sustainable, and appreciated the efforts of various partners and stakeholders.

Leonel Leite, Inter-American Institute for Agricultural Cooperation (IICA), Brazil, presented on planning for sustainable development at the regional level, based on lessons learnt from the Rio Grande State. He stressed the need for legal instruments to institutionalize sustainable development in arid regions at the national and local levels.

Ramon Rodrigues, Ceará State Water Resources Secretariat (SRH), Brazil, discussed a report on water resources in semi-arid regions, concluding that water resources are in a critical state in northeast Brazil, and measures such as building additional dams to ensure sustainability in the future need to be considered, especially as there will be an increase in water stress due to population growth.

IISD SUMMARY: The IISD summary of ICID 2010 will be available on Monday, 23 August 2010 online at: <http://www.iisd.ca/yimb/climate/icid2010>





SUMMARY OF THE SECOND INTERNATIONAL CONFERENCE ON CLIMATE, SUSTAINABILITY AND DEVELOPMENT IN SEMI-ARID REGIONS: 16-20 AUGUST 2010

The Second International Conference on Climate, Sustainability and Development in Semi-arid Regions (ICID 2010) convened in Fortaleza, Brazil, from Monday, 16 August to Friday, 20 August 2010. The Conference brought together participants to discuss climate change and sustainable development in arid and semi-arid regions and sought to raise the priority of these issues in the agenda of the 2012 UN Conference on Sustainable Development (Rio+20 Earth Summit), in Rio de Janeiro, Brazil. ICID 2010 began with the launching of the UN Decade on Deserts and the Fight Against Desertification.

The main theme of ICID 2010, “climate, sustainability and development,” was addressed in four sub-themes, namely: climate information; climate and sustainable development; climate governance, representation, rights, equity and justice; and climate policy processes.

These themes were explored in four plenary sessions, over 70 panel sessions, poster and multimedia presentations. Nearly 1,700 participants from over 100 countries attended, representing governments, UN agencies, intergovernmental organizations, non-governmental organizations (NGOs), academia, business and industry, indigenous groups, youth and the media.

ICID 2010 concluded on 20 August with discussion of the primary conference output, the Fortaleza Declaration, which will serve to raise the profile of issues facing semi-arid regions at the Rio+20 Earth Summit and during its preparatory processes.

A BRIEF HISTORY OF ICID

Arid and semi-arid regions cover over 40% of the terrestrial area of the earth and are home to nearly 35% of the global population. These regions face multiple challenges including land degradation and desertification, loss of biodiversity and livelihoods, all of which are exacerbated by climate change.

In response to these challenges, the International Conference on Climate, Sustainability and Development in Semi-arid Regions was initiated to influence the UN Conference on Environment and Development (UNCED or Rio Earth Summit) by raising issues facing arid and semi-arid regions to the forefront of the international development agenda. Convened in 1992, the first ICID took place within the context of the Rio Conventions – the UN Convention on Biological Diversity



(CBD), the UN Convention to Combat Desertification (UNCCD) and the UN Framework Convention on Climate Change (UNFCCC) – in addition to the UNCED meetings and preparatory processes. This brief history contains an outline of the first ICID and the Rio Conventions.

ICID I

ICID I, held from 28 January to 1 February 1992, in Fortaleza, Brazil, aimed to raise the profile of the challenges faced in semi-arid regions in the lead up to the Rio Earth Summit held from 3-14 June 1992, in Rio de Janeiro, Brazil. The Fortaleza Declaration that emerged from the conference called for policymakers to promote sustainable development

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The dais during the official opening of the meeting

of arid and semi-arid regions to make them less vulnerable to present and future disasters. The Declaration and the material outcomes helped foster debate about semi-arid regions at the Rio Earth Summit and contributed to the decision by UNCED to establish the negotiating committee that led to the creation of UNCCD.

THE RIO CONVENTIONS

CBD: The CBD, negotiated under the auspices of the UN Environment Programme, was opened for signature on 5 June 1992, and entered into force on 29 December 1993. There are currently 193 parties to the Convention, which aims to promote the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the use of genetic resources.

UNCCD: The UNCCD was adopted on 17 June 1994 and entered into force on 26 December 1996. Currently, it has 193 parties. The UNCCD recognizes the physical, biological and socioeconomic aspects of desertification, the importance of redirecting technology transfer so that it is demand-driven, and the involvement of local communities in combating desertification and land degradation. The core of the UNCCD is the development of national, subregional and regional action programmes by national governments, in cooperation with UN agencies, donors, local communities and NGOs.

UNFCCC: The international political response to climate change began with the adoption of the UNFCCC in 1992, which sets out a framework for action aimed at stabilizing atmospheric concentrations of greenhouse gases to avoid “dangerous anthropogenic interference” with the climate system. The UNFCCC entered into force on 21 March 1994 and now has 194 parties.

In December 1997, delegates at the third Conference of the Parties (COP 3) in Kyoto, Japan, agreed to a Protocol to the UNFCCC that commits industrialized countries and countries in transition to a market economy to achieve emission reduction targets. The Kyoto Protocol entered into force on 16 February 2005 and now has 190 parties.

In December 2009, delegates to COP 15 in Copenhagen, Denmark, agreed to “take note” of the Copenhagen Accord. Parties also established a process for indicating their support for the Copenhagen Accord and by 29 July 2010, 137 countries had indicated their support. More than 80 have also provided information on their emissions reduction targets and other mitigation actions, as agreed under the Accord.

ICID 2010 REPORT

ICID 2010 HIGH LEVEL PLENARIES

OPENING CEREMONY AND THE LAUNCHING OF THE UN DECADE ON DESERTS AND THE FIGHT AGAINST DESERTIFICATION:

In an introductory session on Monday morning, International Conference on Climate, Sustainability and Development in Semi-arid Regions (ICID 2010) Director Antônio Magalhães stressed that the Conference is not just about climate change or desertification, but rather about examining the combined challenges facing semi-arid regions and identifying opportunities and ways forward.



Antônio Magalhães, Director, ICID 2010

Several ICID 2010 partner organizations presented reports from preparatory meetings. Ambassador Alan Charlton, UK, described UK Department for International Development (DFID) meetings in Africa on protecting agriculture from climate uncertainties. Michel Laurent, Director-General, Institut de Recherche pour le Développement (IRD), reported on north-south research partnerships on sustainable development in arid regions. Luiz Antonio Elias, Ministry of Science and Technology, Brazil, highlighted meetings discussing strategies for education, planning, public management and zoning control to ensure effective water management. Dalton Melo Macambire, Department of the Environment and Water Resources, Piauí, Brazil, described partnerships to reclaim degraded lands. José Almir Cirilo, Secretariat of Water Resources, Pernambuco, Brazil, discussed regional cooperation on issues of climate change adaptation and mitigation.



Michel Laurent, Director-General, IRD

Also providing brief statements in the introductory session were: Jesse Ribot, University of Illinois, US; José Sydrião de Alencar Júnior, Banco do Nordeste, Brazil; and Eduardo Sávio Martins, Ceará Foundation of Meteorology and Water Resources (FUNCEME), Brazil.



L-R: Eduardo Sávio Martins, FUNCEME, Brazil; José Almir Cirilo, Secretariat of Water Resources, Pernambuco, Brazil; Dalton Melo Macambire, Department of the Environment and Water Resources, Piauí, Brazil; José Sydrião de Alencar Júnior, Banco do Nordeste, Brazil; Jesse Ribot, University of Illinois, US; and Antônio Magalhães, Director, ICID 2010



Hervé Théry, University of Campinas, Brazil

In closing, Hervé Théry, University of Campinas, Brazil, gave a detailed presentation on the state of deserts and desertification around the world.

In the formal opening ceremony, Director Magalhães introduced representatives of the many sponsors and supporters of ICID 2010. He stressed that the conference outcome, the Fortaleza Declaration, will fulfill the

conference's top objective of influencing the agenda of the UN Conference on Sustainable Development 2012 (Rio+20 Earth Summit).

The UN Decade on Deserts and the Fight Against Desertification was launched by the UN Convention to Combat Desertification (UNCCD) Executive Secretary Luc Gnacadja who read the statement of UN Secretary-General Ban Ki-moon officially launching the Decade. Gnacadja expressed hope that ICID 2010 would provide key input on dryland issues to the Rio+20 Earth Summit.

Gnacadja's statement was followed by brief statements from Federal Deputy Eduardo Vieira Ribeiro, Chamber of Representatives, Brazil, José Machado, Executive Secretary, Ministry of Environment, Brazil, and Cid Ferreira Gomes, Governor of the host state, Ceará.



L-R: Antônio Magalhães, Director, ICID 2010, and Luc Gnacadja, UNCCD Executive Secretary, during the launch of the UN Decade on Deserts and the Fight Against Desertification

CONFERENCE KEYNOTE SPEECH

On Wednesday, Jeffrey Sachs, Director, Earth Institute, Columbia University, US, gave a keynote speech in which he warned that "we may be losing the battle" on anthropogenic climate change, underscoring the many climate-linked disasters in the past year, accompanied by "miserable outcomes" on the political front.



Jeffrey Sachs, Director, Earth Institute, Columbia University, US

He recommended the ICID 2010 final declaration: declare the climate crisis in semi-arid lands a growing global security threat and a direct threat to the fulfillment of the Millennium Development Goals (MDGs); call for a UN Security Council special session on violence, security and semi-arid lands; and advocate the formation of a new political Alliance of Semi-Arid Countries (ASAC) to speak in a unified voice at the sixteenth Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC COP 16) to be held in Cancún, Mexico, in December 2010. He suggested that the ASAC call for: timely disbursement of adaptation funding, with the priority being hard-hit ASAC countries; the implementation of a global carbon tax to finance adaptation and mitigation efforts; large-scale solar power programmes in ASAC countries where appropriate, focusing on regions trapped in energy poverty.

SYNERGIES AMONG THE UN CONVENTIONS: On Tuesday morning, a plenary session convened, chaired by



Luis Alberto Figueiredo Machado, Ministry of Foreign Affairs, Brazil

Luis Alberto Figueiredo Machado, Ministry of Foreign Affairs, Brazil.

Via video message, Christiana Figueres, UNFCCC Executive Secretary, suggested better water management practices at the local level to bring the relevant UN Conventions closer together. Director Magalhães called for including indigenous peoples and local communities in the talks on creating synergies. Sergio Zelaya, UNCCD,

on behalf of Jaime Webbe, CBD, described future initiatives including a proposed joint liaison group, joint expert group and scientific body, as well as a joint extraordinary session of the Rio Convention COPs at the upcoming Rio+20 Earth



Margarita Astráraga, UNEP

Summit. Margarita Astráraga, UN Environment Programme (UNEP), highlighted that the Rio Conventions can draw from other processes where the synergistic approach is already being implemented.

Nora Berrahmouni, UN Food and Agriculture Organization (FAO), called for integrated action plans to secure resource bases,

conserve and preserve livelihoods, and to mitigate and adapt to climate change.

Walter Vergara, World Bank, emphasized the importance of understanding the costs and benefits of various adaptation approaches.

Luc Gnacadja, UNCCD Executive Secretary, called for greater investment in sustainable land and water management to ensure food security, decrease the rate of climate change, alleviate drought and avert further biodiversity loss.

In the ensuing discussion, participants discussed, *inter alia*: increased civil society involvement; greater information sharing on the Rio Conventions; and the inclusion of human rights in the synergies discussion.

THEMATIC PROCESS

From Monday to Thursday, over 70 thematic panel sessions and roundtables convened to address issues related to climate change adaptation, vulnerability and sustainable development. Panels were organized around the four sub-themes of the conference: climate information; climate and sustainable development; climate governance, representation, rights, equity and justice; and climate policy processes. A selection of panel sessions is presented below.

THEME 1: CLIMATE INFORMATION: On Tuesday, Wednesday and Thursday, participants attended sessions addressing the state of knowledge and research on vulnerabilities and adaptation to climate change and variability in semi-arid regions, including discussions and presentations on existing and potential knowledge on: impacts and adaptation in semi-arid regions; vulnerabilities in rural areas, and communities' response to climate change; developing early warning systems; and heeding and implementing recommendations from past lessons learned.

Vulnerability, impacts and adaptation to climate change in semi-arid regions: In this session on Tuesday, participants heard presentations on: managing existing complex data on climate impacts and presenting them in a manner decision-

makers can act upon; the impacts of climate change on Brazil's semi-arid northeast; country case studies on using rainwater harvesting; and climate change impacts on the semi-arid Mustang plains of Nepal.

Among the suggestions discussed were employment programmes to recover natural landscapes in drylands, reforesting riverbanks, and promoting solar-powered irrigation of cash crops.

Vulnerability and coping in rural areas: In this session on Wednesday, participants discussed: the role of "agro-ecology" promotion to help small-scale farmers in the semi-arid northeast of Brazil; the vulnerability of pastoralist communities to climate change and variability in northern Kenya; and climate variability reduction measures being undertaken in the semi-arid lands of Eritrea.

Among the recommendations presented were: developing a set of indicators defining "agro-ecology" before the term is co-opted and misused; incorporating guidelines into climate change policies on adaptation within pastoral systems that address both livestock issues and alternative livelihood options; fostering new forms of symbiotic cooperation between pastoralists and commercial farmers; and developing early warning systems for semi-arid lands that can predict climate impacts on forage supply and crop production.

Social learning and human capacity – higher education capacity development processes for climate change in

Africa: In this session on Wednesday, participants discussed conceptual frameworks for integrating social learning into higher education and research, the Mainstreaming Environment and Sustainability in Africa (MESA) Universities Project and issues to consider when integrating education into sustainable development in the context of climate change.

Among the ideas discussed were: focusing climate change adaptation education on problem solving; developing and applying innovative strategies to strengthen institutional capacity; and fostering cooperation between universities and communities.

Global Network of Dryland Research Institutes

(GNDRI): In this session on Wednesday, participants were briefed about the GNDRI. National institutes from Argentina, Brazil, India, Israel, Syria and the US discussed their institutions' work and research priorities, including sustainable use of cultural resources, food security, water management, alternative agricultural systems, biodiversity and the creation of "climate ready" crops.

Lessons learned about lessons learned: In this session on Thursday, participants examined how lessons and recommendations developed from past crisis assessments and



The dais during the session on "social learning and human capacity - higher education capacity development processes for climate change in Africa"

negotiating processes have not been heeded or implemented, including post-event assessments of natural disasters, problems faced in getting responses from hazard early warning systems, the lessons from the process leading to the Montreal Protocol, and lessons from the disappearance of the Aral Sea.

It was generally agreed that policy recommendations in “lessons learned” reports should always discuss increased risks from not heeding lessons.

Early warning systems for droughts: During this session on Thursday, participants heard presentations on essential components of early warning systems, the South American drought monitoring systems, indices and indicators for monitoring and assessing drought conditions worldwide, and the development of an international drought clearinghouse.

Among the recommendations discussed were the need for fuller understanding of drought impacts; use of a standardized precipitation index in addition to current tools; the development of a user manual on indicators and indices; and the implementation of indices and early warning systems with the end user in mind.

THEME 2: CLIMATE AND SUSTAINABLE DEVELOPMENT: Participants attended sessions relating to this theme from Monday to Thursday. The theme broadly dealt with climate and sustainable development, with a specific focus on arid and semi-arid lands.

Desertification – the challenge of desertification and sustainable development in semi-arid regions: Participants attended this session on Monday and heard presentations on, *inter alia*, land degradation and desertification in the Arab region, and the management of scarce water resources in the drylands of Pakistan. They also discussed a case study on the development of a hydro-environmental project in Canindé municipality, Ceará, Brazil, and noted ongoing adaptation work, including planting drought-resistant crop varieties.

Speakers outlined the need, *inter alia*, to: reclaim degraded lands; switch to more sustainable agriculture and agricultural practices; and better manage flash floods.

Adaptation with a long view: promoting resilience: In this session on Monday, participants heard presentations on: climate change, rural poverty and the politics of resilience in Kenya; building resilience through water system innovations in drylands; and the future of maize in Mexico. Participants noted that a long view on adaptation requires “understanding vulnerability as an entangled crisis,” and that undernourished or malnourished populations live in most of the world’s drylands.

Participants recommended viewing resilience through a development-trajectory lens and looking at adaptation from a holistic perspective.

Climate, desertification and sustainable development: In this session held on Monday, participants discussed social, health and economic risks posed by lack of water and sustainable use, and the protection of micro-basins.

Participants also addressed water availability and argued that policymakers should take into account the contributions of geoscientists when developing public policies regarding geo-resources.

Sustainable energy for the development of drylands: In this session on Monday, speakers highlighted Brazilian case studies, including the history of renewable energy in the range of electricity provided in Ceará State and a report on a pilot programme to combat desertification and land degradation



Participants listening to during the session on “climate, desertification and sustainable development”

in northeast Brazil. Participants stressed the need to: utilize renewable energy in rural drylands; create incentives for local communities to adopt renewable technologies; use wave energy for desalinization of water in drylands; and increase adaptive capacity for communities living in the drylands.

Development of semi-arid regions: On Tuesday, in this session, participants discussed the semi-arid regions of Latin America and the opportunities presented by climate change. Participants emphasized the need to: share ideas and coping strategies between different cultures and regions; maximize the opportunities presented by climate change; and effectively exchange knowledge and transfer technology.

They recommended challenging architects and urban planners to rethink cities and housing in the context of the new paradigm of climate consciousness, and reducing the price of technologies in order to increase acceptance and use of new technologies.

Food security, climate change and development in semi-arid regions: On Wednesday, during this session, participants heard presentations and case studies from Niger, Egypt, and Senegal. Participants called for: the exchange of knowledge, research and ideas; the reinforcement of socioeconomic investments by governments to increase food production; effective market governance; and technical assistance for less developed nations.

Speakers highlighted examples of projects to reduce crop losses with model forecasts; underscored the importance of agriculture for food production, job creation and increasing economic activity; and underlined the need to efficiently produce increased quality and quantity of food.

Adaptation strategies in dryland areas: In this session on Thursday, participants discussed local forest management in river basins as a means of addressing climate risk and vulnerability and adaptation to extreme weather events. Participants noted that adaptation projects require local collective action as well as an integrated effort by governments, civil society and the private sector. They emphasized solutions, such as diversification, reducing harvesting pressure by creating value-added products and understanding interactions between ecosystem services.

Vulnerability, impacts and adaptation in drylands: In this session on Thursday, participants discussed, *inter alia*: building development under climate change in arid Mongolia; climate change and the cocoa sector; and the impact of precipitation on the economy of Ceará, Brazil.

Participants then urged decision-makers to support local-level action instead of creating new “top-down” policies and stressed the need to frame adaptation within the economic and political circumstances in each region.



Participants during the session on “vulnerability, impacts and adaptation in drylands”

THEME 3: CLIMATE GOVERNANCE, REPRESENTATION, RIGHTS, EQUITY AND JUSTICE:

Participants met from Monday to Thursday to hear and discuss presentations on climate governance, representation, rights, equity and justice.

Climate change, adaptation and governance in the water sector: On Monday, participants heard presentations on several aspects of climate change, adaptation and governance in the water sector. They noted the need to implement effective adaptation to move out of the “vicious cycle” of ineffective adaptation, and discussed whether current adaptive strategies remain suitable for future climate stressors.

Some participants questioned whether desalinization is a maladaptive response to climate change and noted other challenges including “giving a voice” to vulnerable populations.

Other participants discussed implementing conservation measures in addition to the development of best management practices to reduce risks. They also highlighted the need to address water demand and quality, in addition to the current focus on supply.

The importance of community, culture, identity and equity in climate change adaptation strategies: In this session on Tuesday, participants lamented the increased migration of climate refugees, noting the possibility of “reactionary” policies to reduce cross-border movement of these refugees. They also noted the lack of detailed climate knowledge at the local level, which could ensure effective adaptation.

Some participants highlighted that social norms and culture constrain the adaptation process, but that in other cases these can present opportunities for adaptation. Participants also discussed the lack of studies measuring the impacts and vulnerabilities of local communities and the need for recommendations on good adaptation strategies.



L-R: Andrew Miccolis, ComSensos, Brazil, and Renata Marson Teixeira de Andrade, Catholic University of Brasilia, Brazil, during the session on “the importance of community, culture, identity and equity in climate change adaptation strategies”

Water governance in drylands: In this session on Tuesday, participants heard presentations on projects to increase water governance in dryland areas. They discussed challenges, including: lack of planning and transboundary cooperation; joint river management regimes not addressing groundwater or headwaters; research gaps; and demographic pressures.

Some participants noted the need to build capacity, share information, implement monitoring systems, and ensure the active participation of communities in governance.

Vulnerability and adaptation in Africa and Latin America: On Tuesday, participants in this session heard presentations on strategies and systems for increasing resilience and building sustainability within vulnerable communities. Participants noted the effectiveness of heat-warning systems and humidity indices to protect against the loss of livestock.

Some participants stressed the need to increase community involvement to encourage wealth creation and environmental conservation, and allow greater access to markets. Other participants discussed the use of conventional agronomic practices during extreme climate events, and the need for localizing drought management cycles and using regional approaches for shared resources.

Biodiversity, climate change and development in dry and sub-humid lands: During this session on Wednesday, participants highlighted approaches to addressing the interlinkages of biodiversity, climate change and development, including ecosystem restoration, improved protected-areas management, and ecosystem-based approaches. Noting examples from South America, they also discussed the use of traditional knowledge and indigenous plant species to protect biodiversity and recover degraded lands.

To maximize co-benefits, they called for: establishing baselines; using existing tools; conducting economic valuations; prioritizing actions; and practising adaptive management.

Climate evolution in West Africa – Traditional and Formal Governance: On Wednesday, participants in this session discussed the need for community involvement in state-initiated strategies and participatory natural resource management to enhance their success. Some participants noted the need for state assistance in regulating natural resources in areas with large migrant populations. Other participants highlighted conflict between pastoralists and agriculturalists due to misguided policy implementation.

Roundtable – social sciences research agenda in climate change responses: In this session on Thursday, participants questioned the role of social scientists within the climate debate, with some highlighting that the shift in debate to impacts has created a larger role for social sciences. Others queried if collaboration between natural and social scientists could ever be truly trans-disciplinary, with some calling for greater analysis in governance and rules to properly address the challenges.

One participant noted that new adaptation approaches should combine local knowledge with the sciences, and another stressed the need for greater coordination among researchers to provide more useful information for planning. Participants also discussed the extent to which adaptation policy informs collective decision-making.

THEME 4: CLIMATE POLICY PROCESSES: Participants attended sessions under this theme from Monday to Thursday, addressing four topics. On “policy processes and the institutions they rely on,” participants discussed policies undertaken at various scales ranging from the local to the



The dais during the session on “lessons from the Brazilian experience.”

national and international levels. Case studies were also presented on policy processes related to the management of the Caatinga Biome, Brazil, as well as diverse examples from Asia, Latin America and sub-Saharan Africa.

Lessons from the Brazilian experience: On Monday, this session addressed policy processes to combat deforestation, prevent desertification, promote sustainable agriculture, increase access to water and manage and disseminate information on climate.

Participants highlighted programmes to monitor the Caatinga Biome by satellite, sustainably manage water resources, promote family farming through financing and credits, encourage agricultural insurance and technical assistance, regularize access to water and create geographical information sets.

As solutions to bolster policy processes in Brazil, participants discussed: creating a new national commission in Brazil to coordinate the many ministries and agencies dealing with semi-arid regions at the federal and state levels; and improving environmental compensation mechanisms.

Participants also discussed efforts to recover degraded lands and control erosion, build cisterns in schools, and promote water catchment and small dam systems.

Impacts and Adaptation in Agriculture: In this session on Tuesday, participants discussed the effects of changing rainfall patterns on agricultural production and policy measures in the agricultural sector to reduce climate risk. Discussion included case studies from Zambia, Ecuador, India, Uganda, Brazil and Benin.

Participants highlighted challenges presented by ecosystems affected by unplanned agriculture and limited access to water, the latent and slow nature of observed climate change impacts, lack of baseline data, competing land use and lack of comprehensive area-specific management plans.

In response to these challenges, participants discussed policy responses including: crop diversification and the use of drought-tolerant crops; conservation farming techniques; improved farm extension services; investment in irrigation; democratizing access to productive resources (land, water and credit); herd management practices; culturally acceptable participatory processes; and adequate information for farmers on climate and adaptation strategies.

One participant called for development of national climate change policies with others discussing community farming as a means of promoting sustainable agriculture and food security.



Participants during the session on “impacts and adaptation in agriculture”

Financing strategies for sustainable development in arid and semi-arid regions: On Thursday, participants in this discussion addressed key areas for investment, financial mechanisms and programmes in the Latin American region.

On key areas for investment, participants identified as priorities: infrastructure; poverty reduction and social inclusion; improved living conditions in cities; water; and competitiveness. Current areas of investment highlighted were projects supporting sustainable economic activities, natural resource management, rural poverty reduction, and development of legal frameworks and management to improve water efficiency.

Participants also identified areas of financial innovation to support semi-arid regions, including programmes to provide financing for underserved rural areas to support development of rural enterprises, and creation of the new Brazilian National Fund on Climate Change, using existing funds under the Oil Act, originally intended to mitigate disasters caused by the oil industry, by redefining the impacts that these funds could address to include climate change.

Vulnerability and adaptation – implications of climate change at macro and micro levels in China: In this session on Thursday, speakers presented the policy experiences of China in the areas of forestry, agriculture, water management and local-level adaptation. On policy objectives participants noted that China hopes to have afforested 47 million hectares of land by 2050.

Participants discussed successes, including increased awareness of the importance of forests to climate change mitigation at the local level and the government stepping in to support local adaptation measures to reduce the vulnerability of farmers to climate change.

Participants also discussed local participation, including the lack of effective communication between climate scientists and local communities, the need for local participation in climate change discourses and national policy processes, and effective power-transfer from the national level to the local level.

From impacts to vulnerability – locating climate change adaptation in the development agenda: On Thursday, this session addressed the place of adaptation policies within the development agenda. Participants focused on local-level effects of policies processes.

Participants identified negative effects of policy processes on the ability of local communities to adapt, which include mobility restriction, loss of pastoral resources, settlement policies, access to markets, and conflict in the region.

Participants discussed elements that should be accounted for in government adaptation policy processes, including: recognizing historical dispossession through forest tenure rights; allowing access rights for vulnerable communities;

allowing local participation in policymaking, design and implementation; incorporating local knowledge; and innovating location-specific technologies accompanied by policy changes.

On policy processes, participants proposed taking a broader view of impacts, promoting nuanced discussions relating to present drought cycles, and increasing understanding of the complexity of real-world pastoral production systems.

International governance of environmental institutions: During this session on Thursday, participants discussed national and sub-national governance in France and Brazil.

Participants highlighted the evolution of legal frameworks governing land and water use and governance projects for sustainable development in Brazil, including the Mata Branca project for the sustainable development of the Caatinga Biome of northeast Brazil.

On recommendations for governance of sustainable development, participants addressed the need to revolutionize production technologically, economically and institutionally in the agriculture sector, and build local and regional capacity to sustainably manage resources.

Lessons from the Aridas Initiative: In this session on Thursday, participants reflected on the successes of the Aridas Initiative, founded in response to the first ICID meeting in 1992, and highlighted areas for further work.

Participants discussed the positive aspects of the Aridas Initiative, including that it helps eradicate poverty and inequalities in northeast Brazil, and is socially progressive, economically viable and environmentally sustainable.

Participants highlighted lessons from Rio Grande State and northeast Brazil, using them to draw out recommendations for further action, including creating legal instruments to institutionalize sustainable development in arid regions at the national and local levels and building additional dams to ensure sustainability of water access into the future.

DISCUSSIONS ON THE FORTELEZA DECLARATION AND CLOSING PLENARY

LESSONS AND RECOMMENDATIONS FROM THE SESSION: Antônio Magalhães, Director ICID 2010, opened the plenary session on Friday by inviting the panel to reflect on the key recommendations emerging from the Conference.

Octavio Pérez Prado, UNCCD Bureau, on recommendations from discussions between participants from Latin America and the Caribbean, emphasized that sustainable development policies should recognize that land is a bio-productive unit that is important for alleviating poverty and of critical importance to the issue of food sovereignty (the right to produce food). He stressed the need for synergies between

national- and local-level projects to harmonize public policy and promote unified management programmes at the local level.

Christian Leduc, IRD, France, proposed observation systems to better characterize climate change and to provide the necessary data to create development policies, creating a database of dryland environmental conditions, and using the term “global change” rather than climate change to embrace a holistic view that considers all elements of environment and society.

Peter Roche, IRD, Burkina Faso, presented the recommendations from discussions on climate evolution in West Africa. He called for: equal rights and resource distribution at the local level; better-formulated policies to represent all groups in the drylands, including the most vulnerable; implementation of policies on social justice and land rights; and the translation of global policies to implementable actions at the local level.

Egon Krakhecke, Ministry of Environment (MMA), Brazil, noted proposals on the need for solidarity among dryland countries, use of effective monitoring and control systems in the Caatinga Biome, knowledge sharing and information sharing, and stronger implementation policies. He also called for stronger political will and financial support in the fight against desertification.

Renata Marson Teixeira de Andrade, Catholic University of Brasília, Brazil, emphasized recommendations on using social sciences to: address climate change-created vulnerability, as well as build capacity and strengthen institutions for adaptation; conduct vulnerability assessments in adaptation and mitigation project sites; create effective mitigation and adaptation policies; and draw attention to the complex nature of socioeconomic systems and the communities within them, and their role in promoting resilience and improving adaptation strategies.

Togtokh Chuluun, University of Mongolia, recommended: merging community- and ecosystem-based adaptation to address sustainability effectively; technological transfer to people in remote areas within drylands; and the inclusion of an environment dimension to the human development index, based on *per capita* emissions.

Xu Xiuli, China Agricultural University, emphasized that climate change must be examined at both the micro and macro levels and called for: safeguarding community rights; fostering local collective community action through policy; mainstreaming social protections for vulnerable groups in environmental policies; and fostering innovation in social science research methodology with the aim of aiding collective action at the local, government and regional levels.



L-R: Xu Xiuli, China Agricultural University; Michael Hall, NOAA, US; Peter Hochet, IRD, France; Octavio Pérez Prado, UNCCD Bureau; Antônio Magalhães, Director, ICID 2010; Christian Leduc, IRD, France; Renata Marson Teixeira de Andrade, Catholic University of Brasília, Brazil; Togtokh Chuluun, University of Mongolia; Mutizwa Mukute, Rhodes University, South Africa; Egon Krakhecke, MMA, Brazil; and Eduardo Sávio Martins, FUNCEME, Brazil

Mutizwa Mukute, Rhodes University, South Africa, stressed that social ecology needs to be given greater attention, be better-understood and fitted into climate change adaptation. He noted recommendations including focusing climate change work on changing behaviors *vis-à-vis* the environment and listening to communities through stronger practice-oriented ways of learning in higher education, as well as the promotion of trans-disciplinary learning.

Eduardo Martins, FUNCEME, Brazil, called for: focusing on local adaptation; recognizing the broad knowledge base in non-governmental organizations and communities; strengthening or rethinking institutions related to semi-arid areas; producing scientific information on the scale needed to make informed regional and local decisions; generating lessons learned from successful experiments; and promoting stronger cooperation between arid regions around the world.

Michael Hall, National Oceanic and Atmospheric Association (NOAA), US, called for: revisiting the research agenda, seeking truly integrated cross-disciplinary research aimed at providing useful information to decision-makers; greatly increasing the time-scale focus and spatial resolution of model projections; and understanding the human dimensions in climate change research and decision-making.

Analysis of the Meeting: Jesse Ribot, University of Illinois, US, noting the emergence of the term “adaptation to climate change” over the last 18 years, observed that while this brings attention to development, it might be at the cost of mitigating the vulnerability and risk of communities. On the outcomes of the conference, he noted three key themes: unequal power balances that still exist within countries and regions, with drylands receiving little economic or political support; the marginal focus



Jesse Ribot, University of Illinois, US

on drylands within the context of the global climate debate; and that traditionally drylands are poor producers and hard to govern, with little investment from central governments.

FORTALEZA DECLARATION: This session began with a brief speech by Celso Jaque, Governor, Mendoza, Argentina, who emphasized the extreme importance of linking scientific knowledge and decision-making and called for holding “ICID 2011” in Mendoza, Argentina.

John Redwood, World Bank read out the Fortaleza Declaration to plenary. In the ensuing discussion, participants requested the Fortaleza Declaration include: an increased focus on different energy sources; a greater emphasis on the sustainable use of resources; reference to strategies for using biomass, particularly in the Brazilian northeast; provision for regulations, limits and governance for payments for ecosystem services; and a stronger emphasis on cooperation amongst communities.

Participants noted that the Declaration did not include explicit reference to adaptation in semi-arid areas, general notes on education and capacity building, or examples of how urgent food security is in drylands.

Among the ideas and concerns raised by participants were: exercising caution in adaptation efforts to ensure they do not create unintended adverse consequences; considering the role

of markets in responding to climate variability; including communities in policy formation, as well as in implementation and monitoring; and valuing the role of women, workers and local agricultural knowledge in semi-arid lands.

Redwood explained that ICID 2010 organizers would review the draft Declaration and the suggestions offered, and “probably incorporate some.” He suggested some of the issues raised, such as gender and generational dimensions, could be topics for panels to explore more fully at the ICID 2011 conference being planned. He explained that the Declaration, along with the record of the suggestions offered and all the rapporteur reports from thematic panels and roundtables, will be posted on the ICID 2010 website.

The Fortaleza Declaration: On the challenges and opportunities of sustainable development and climate change, the Declaration calls for:

- better governance of the drylands, representation of their populations and enhanced livelihoods;
 - the enhancement of climate-sensitive sustainable development interventions in drylands;
 - recognition of potential synergies to reduce vulnerability and increase resilience for the poor;
 - the creation of favorable conditions for sustainable development in drylands through integrated actions to fight land degradation, mitigate drought effects, conserve biodiversity and adapt to climate change; and
 - investment opportunities to exploit the comparative advantage of drylands in renewable energy production.
- On political representation on multiple scales, the Declaration urges:
- enhanced representation of dryland populations in local, national and international policymaking and in the implementation of development activities;
 - strengthening the capacity of dryland nations to influence the global environment and development agenda;
 - the UN to consider the plight of dryland nations;
 - preparatory meetings of Rio+20 be organized on a global ecosystem basis, to highlight issues pertaining to communities living in, *inter alia*, the drylands and tropical forests; and
 - development and implementation of community-level information strategies to educate people on the implications of climate change.

On synergies among global environmental and development initiatives, the Declaration emphasizes:

- prioritizing sustainable use and conservation of biodiversity; and
- creation of synergies between local, national and global interventions to mitigate and adapt to climate change, conserve biodiversity and curb desertification.

On financing climate-sensitive sustainable development, it calls for:

- absorption of costs related to sustainable development by national economies;
- honoring previous financial obligations to support sustainable development by industrialized countries, the expansion of existing financial instruments, and acceleration of the disbursement of the Climate Investment and Adaptation Funds to local and national capacities; and
- including dryland regions in financial innovations to advance sustainable development under climate change conditions.



John Redwood, World Bank



The dais during the closing ceremony

On education for sustainable development, the Declaration calls for the prioritization of education for communities in dryland areas.

On knowledge and information exchange, it recommends:

- the design and implementation of an integrated climate research, observation, modeling and applications programme to inform the policy process;
- greater inputs from the social sciences on the causes and effects of climate change and variability;
- bridging the gap between scientific information and political action; and
- expansion and strengthening of knowledge networks.

On integrated planning and implementation of development strategies and programmes, the Declaration calls for increased convergence in development strategies and programmes, especially relating to land and water resource management, forestry and the fight against desertification.

Finally, on responding to urgency, the Declaration calls for decisive action from the international community on climate, development and sustainability challenges.

CLOSING CEREMONY: ICID 2010 Director Antônio Magalhães convened the closing plenary session. A 16-year old environmentalist, João Pedro Gurgel, urged participants to focus on teaching the young proper practices in their home and personal lives to make a difference in environmental protection in the future. Maria Theresa Farias, COMPAM, emphasized that the environment is a public good and stressed that actions undertaken to protect it need to be done daily.

René Barreira, Secretary for Science, Technology and Higher Education, Ceará State, Brazil, stressed the importance of involving government and mobilizing civil society to act in preserving the environment, especially in implementing the Fortaleza Declaration.

ICID 2010 Director Magalhães, with Jean Loup Guyot, IRD, thanked organizers and participants for their support of the conference. He closed the conference at 5:38pm.



L-R: Maria Theresa Farias, COMPAM, and Antônio Magalhães, Director, ICID 2010

UPCOMING MEETINGS

XXIII IUFRO World Congress: The theme for the 23rd World Congress of the International Union of Forest Research Organizations (IUFRO) is “Forests for the Future: Sustaining Society and the Environment.” **dates:** 23-28 August 2010 **location:** Seoul, Republic of Korea **contact:** Korea Forest Research Institute **phone:** +82-2-961-2591 **fax:** +82-2-961-2599 **e-mail:** iufrococ@forest.go.kr **internet:** <http://www.iufro2010.com/>

Workshop on Forest Governance, Decentralization and REDD in Latin America: This country-led initiative in support of the UN Forum on Forests (UNFF) by Mexico and Switzerland, is expected to discuss how decentralization and forest governance contribute to sustainable management of forests. **dates:** 31 August - 3 September 2010 **location:** Oaxaca, Mexico **internet:** <http://www.cifor.cgiar.org/Events/Oaxaca/decentralisation-redd.htm>

Sustainable Land Management Enhances Water Availability and Quality: The UNCCD Secretariat is organizing this Seminar at the 2010 Stockholm International Water Week. **date:** 5 September 2010 **location:** Stockholm, Sweden **contact:** Emmanuel Chinyamakobvu, UNCCD Secretariat **phone:** +49-228-815-2819 **fax:** +49-228-815-2898/9 **e-mail:** echinyamakobvu@unccd.int **internet:** http://www.unccd.int/publicinfo/announce/seminar_water_desertification.php

UNFF Ad Hoc Expert Group on Forest Financing: This meeting will be the first open-ended intergovernmental *ad hoc* expert group on financing for sustainable forest management, as part of the UN Forum on Forests’ strategic plan on forest financing. **dates:** 13-17 September 2010 **location:** Nairobi, Kenya **contact:** UNFF Secretariat **phone:** +1-212-963-3401 **fax:** +1-917-367-3186 **e-mail:** unff@un.org **internet:** <http://www.un.org/esa/forests/>

Global Expert Workshop on Biodiversity Benefits of Reducing Emissions from Deforestation and Forest Degradation in Developing Countries: This workshop is to support the efforts of parties in addressing reducing emissions from deforestation and forest degradation in developing countries (REDD) in the framework of the UN Framework Convention on Climate Change (UNFCCC) in a way that contributes to the implementation of the CBD programme of work on forest biodiversity. **dates:** 20-23 September 2010 **location:** Nairobi, Kenya **contact:** CBD Secretariat **phone:** +1-514-288-2220 **fax:** +1-514-288-6588 **e-mail:** secretariat@cbd.int **internet:** <http://www.cbd.int/>

International Scientific Conference on Advanced Scientific Tools for Desertification Policy: This conference aims to “set up a discussion on the scientific research

tools and results, recently achieved at the European and international levels addressing desertification assessment and mitigation.” **dates:** 28-29 September 2010 **location:** Rome, Italy **contact:** Maurizio Sciortini **phone:** +39-06- 8535- 5590 **fax:** +39-06-8535-6060 **e-mail:** desurvey@enea.it **internet:** <http://www.noveltis.net/desurvey/conference/>

20th Session of the FAO Committee on Forestry (COFO)/ 2nd World Forest Week: The biennial sessions of COFO bring together heads of forest services and other senior government officials to identify emerging policy and technical issues, to seek solutions and to advise FAO and others on appropriate action. **dates:** 4-8 October 2010 **location:** Rome, Italy **contact:** FAO Forestry Department **phone:** 39-06-5705-3925 **fax:** 39-06-5705-31 52 **e-mail:** COFO-2010@fao.org **internet:** <http://www.fao.org/forestry/cofo/en/>

Convention on Biological Diversity (CBD) COP 10: The tenth Conference of the Parties to the Convention on Biological Diversity is expected to, *inter alia*, assess the achievement of the 2010 target to reduce significantly the rate of biodiversity loss. **dates:** 18-29 October 2010 **location:** Nagoya, Japan **contact:** CBD Secretariat **phone:** +1-514-288-2220 **fax:** +1-514-288-6588 **email:** secretariat@cbd.int **internet:** <http://www.cbd.int/cop10/>

Land Day 3: Land Day 3 is to meet in parallel with the 10th session of the Conference of the Parties to the Convention on Biological Diversity (CBD COP 10). **date:** 23 October 2010 **location:** Nagoya, Japan **contact:** UNCCD Secretariat **phone:** +49-22-8815-2800 **fax:** +49-22-8815-2898 **e-mail:** secretariat@unccd.int **internet:** <http://www.unccd.int/secretariat/docs/workplan/workplan2010eng.pdf>

Global Forum on Salinization and Climate Change: The Global Forum on Salinization and Climate Change will be an opportunity to discuss the problems associated with salinization and climate change. **dates:** 25-29 October 2010 **location:** Valencia, Spain **contact:** Jorge Battle-Sales, University of Valencia **phone:** +34-96-354-4289 **e-mail:** Jorge.Battle@uv.es **internet:** <http://www.uv.es/jorba/GFSCC2010>

Third International Conference on Drylands, Deserts and Desertification: The theme for the third International Conference on Drylands, Deserts and Desertification is “The Route to Restoration.” **dates:** 8-11 November 2010 **location:** Israel **contact:** Dorit Korine **phone:** +97-28-659-6781 **fax:** +97-28-659-6722 **e-mail:** desertification@bgu.ac.il **internet:** <http://cmsprod.bgu.ac.il/Eng/Units/bidr/desertification2008/>

Sixteenth Conference of the Parties to the UNFCCC and Sixth Meeting of the Parties to the Kyoto Protocol: The 33rd meetings of the Subsidiary Body for Implementation (SBI) and the Subsidiary Body for Scientific and Technological Advice (SBSTA) will also take place concurrently. **dates:** 29 November to 10 December 2010 **location:** Cancún, Mexico **contact:** UNFCCC Secretariat **phone:** +49-228-815-1000 **fax:** +49-228-815-1999 **email:** secretariat@unfccc.int **internet:** <http://unfccc.int/>

Ninth Session of the UN Forum on Forests (UNFF 9): The theme for UNFF 9 is “forests for people, livelihoods and poverty eradication.” **dates:** 24 January - 4 February 2011

location: New York, US **contact:** UNFF Secretariat **phone:** +1-212-963-3401 **fax:** +1-917-367-3186 **e-mail:** unff@un.org **internet:** <http://www.un.org/esa/forests/>

UNCCD COP 10: The tenth session of the Conference of the Parties (COP 10) to the UN Convention to Combat Desertification (UNCCD) is expected to take place in October 2011. **dates:** 10-21 October 2011 **location:** Changwon City, Republic of Korea **contact:** UNCCD Secretariat **phone:** +49-228-815-2800 **fax:** +49-228-815-2898 **e-mail:** secretariat@unccd.int **internet:** <http://www.unccd.int/>

GLOSSARY

ASAC	Alliance of Semi-Arid Countries
CBD	Convention on Biological Diversity
DFID	UK Department for International Development
FUNCEME	Ceará Foundation of Meteorology and Water Resources
GNDRI	Global Network of Dryland Research Institutes
ICID	International Conference on Climate, Sustainability and Development in Semi-arid Regions
IRD	Institut de Recherche pour le Développement
MDG	Millennium Development Goals
MESA	Mainstreaming Environment and Sustainability in Africa
MMA	Ministry of Environment
NOAA	National Oceanic and Atmospheric Association
Rio+20	2012 UN Conference on Sustainable Development
UNCCD	UN Convention to Combat Desertification
UNEP	UN Environment Programme
UNFCCC	UN Framework Convention on Climate Change

