

IPCC SREX Regional Outreach Meeting Central and South America August 16th-17th 2012 São Paulo, Brazil



Meeting Report

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September 2012



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Meeting Report 1. Introduction

A global series of outreach events explore the possible impacts of weather and climate extremes and disasters by region, featuring findings contained in the IPCC Special Report for Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX). The events are designed for policymakers, business leaders, academics, and civil society organizations whose policies and programs are or may be affected, and are open to the media. Previous events took place in Dakar (Senegal), Addis Ababa (Ethiopia), Bangkok (Thailand), Delhi (India), Beijing (China) and Havana (Cuba), between April and June 2012, and now we have the outreach event in São Paulo (Brazil) during August 16-17, 2012.

This event in São Paulo, Brazil was the last in a series of regional outreach events for the IPCC SREX Report, which was published in March 2012. The event sought to inform stakeholders, decision makers, and the scientific community in Central and South America about the possible impacts of climate extremes and about options for managing and assessing risk patterns of climate extremes and natural disasters for the present and the future, as assessed in the IPCC SREX Report. It was organised by the Intergovernmental Panel on Climate Change (IPCC), the Overseas Development Institute (ODI), the Norwegian Climate and Pollution Agency, the Norwegian Ministry of Foreign Affairs and the Climate and Development Knowledge Network (CDKN), as well as by the State of São Paulo Research Funding Agency (FAPESP) and the Earth System Science Center (CCST) of the National Institute for Space Research (INPE).

Held at Moise Safra Convention Center of the Albert Einstein Hospital in São Paulo, the event's official language was Portuguese, with simultaneous translation to Spanish and English. The event attracted 414 registered participants. This included representation from universities, research state and federal institutes from Brazil, international bodies, private and public companies, state and federal secretariats of Civil Defence and natural disasters, meteorological institutions, private consultants, including participants from Brazil, Chile, El Salvador, Honduras, Guatemala, Costa Rica, Peru, Colombia, Panama, Ecuador, Paraguay, Uruguay, Argentina and Mexico. During the press conference we have 28 journalists from various TV and radio networks, as well as from journals and magazines and News Networks. 84 journalists, 68 of them from various Brazilian states, 8 from English speaking countries and 8 from Spanish speaking countries, followed the Internet transmission.



The event opened with key speeches by Dr. Celso Lafer, President of FAPESP; Dr Vicente Barros, co-Chair of IPCC WG2; Dr. Ursula Oswald-Spring from the National Autonomous University of Mexico; Madam Turid Bertelsen Rodrigues Eusebio, Ambassador of Norway in Brazil; Dr. Carlos Nobre, Secretary of Brazil's Ministry of Science, Technology and Innovation of Brazil MCTI; Dr. Carlos Klink, Secretary of Brazil's Ministry of Environment of Brazil MMA; and Carlos Brito Cruz, President and Scientific Director of FAPESP IPCC; Dr. Marco Chamon, INPE's Vice-director; and Dr. Jose Marengo, chair of CCST INPE and Chair of the Scientific organizing committee of the event.

The sessions that followed were organized in blocks: Results of the IPCC SREX for Central and South America, a press conference (for registered press only), Science and Policy Forum, and SREX Hard Talk, two Poster Sessions and three working groups were also organized. During the event, speakers and participants discussed the main aspects of scientific studies on extremes and trends of extremes in the present, linked to natural disasters, and also experiences on risk management of natural disasters, and how to cope with disaster risk and climate change from a variety of backgrounds, from scientific, academic, policy and decision making sectors, from the perspectives from speakers across the Central and South America region. During the Q&A sections and also during the working group meetings (BOGs) challenging questions were discussed, and a stimulating debate took place during all blocks and sessions.

This short meeting report provides a summary of the presentations and discussions at the sessions throughout the event.

2. Key messages

2.1 Day 1, Thursday 16th August

2.1.1 Welcome Session, 9:00 – 10:00

Dr. Celso Lafer, President of FAPESP, opened the IPCC SREX Outreach Event for Central and South America. He highlighted the role that the IPCC has played in the formulation of global policies to mitigate the impact of global climate change. The IPCC is a platform for knowledge that was decisive for the signature of the Convention on Climate Change at RIO92, when at the time he was Minister of Foreign Affairs at that time and precisely because he followed these negotiations in the diplomatic field. He is convinced that the climate negotiations can only be appropriately conducted if they are rooted in quality knowledge, such as that provided by the IPCC.

Dr. Vicente Barros, co-Chair IPCC WG2 started with a reflection that the size and diversity of the audience present is a sign that climate change is of concern to all societies and countries in the region. One of the main aspects of the IPCC SREX report is the impacts of extreme climate events depend not only from climate but also from the exposure of communities and human systems, making them vulnerable. The impacts of extreme weather events depend not only on nature but the level of vulnerability and exposure of people or groups of people in places where they can be affected. "Disasters are not 'natural' but are conjunctions of natural weather or climate events with vulnerability and exposure to them by a company or group of people," said Vicente Barros. If the problem of climate risks is a combination of these three factors, of course, we must develop strategies to mitigate them. One of the key actions outlined in the report to

reduce the risks of climate events is to reduce emissions of greenhouse gases, which are the main cause of climate change. Have to reduce the level of exposure of populations to extreme weather events, scientists say is necessary to improve warning systems and, in some cases, relocate people. If climate risk represents a combination of three factors: weather/climate phenomena, exposure and vulnerability of populations, there is a need to develop strategies to cope with those events and to reduce the risks. One of the main aspects of the SREX report are the strategies directed to reduce the emission of greenhouse gases that is the main cause of global warming and climate change. In order to reduce exposure of populations to climate and weather extremes, there is need for alert systems and also relocation of people to safer areas.

Dr. Ursula Oswald-Spring suggested that to reduce vulnerability to risk disasters of meteorological origin, it is necessary to implement poverty reduction policies and to improve the educational level of the population, so they can better understand the risks of weather and climate extremes. From the SREX Report, 95% of disasters from climatic origin during 1970-2008 occurred in developing countries, while only 5% occurred in developed countries. An important message of the report is that the most effective way to increase resiliency of population in front on climate extremes is to improve socio economic conditions of the populations. She also reminded the important role of native communities and women in the process of adaptation to climate change, and the fact that women and children in the poor parts of the countries in the region are the most vulnerable to weather and climate extremes and disasters,

Madame Turid Bertelsen Rodrigues Eusebio acknowledged the role of the Norwegian government, throughout the Norwegian Climate and Pollution Agency and the Norwegian Ministry of Foreign Affairs sponsoring this and previous IPCC SREX Outreach events, and also on the creation of the Amazon Fund, to protect the forest in Brazil. The support of the government of Norway was key on the initiative that later on ended on the organization preparation of the IPCC SREX since 2009 that was later published in 2011.

In the assessment of Dr. Carlos Nobre, Secretary of Policy and Research and Development Programs at the Brazilian Ministry of Science, Technology and Innovation and member of the coordination committee for FAPESP-FPGCC (FAPESP Program on Global Climate Change), the publication of the fourth IPCC report in 2007 helped discussions of the impact of global change to gain popularity worldwide. But, according to Nobre, in 2005, FAPESP's scientific council was already discussing the need to create a research program on the topic. FAPESP's scientific leadership had a strategic and pioneering vision in creating the PFPMCG. Through the program, the federal government has formulated a series of programs focused on the area – particularly the Brazilian Network on Climate and Climate Change – interacting solely with the PFPMCG. Other actions mentioned by Dr. Nobre were the implementation of an observational network for the detection of impacts of climate change in various regions and ecosystems of Brazil. The MCTI and the Rede-Clima are working on the initial plans for the implementation of this detection network.

Dr. Carlos Klink introduced the Brazilian National Climate Change Plan, a document that was prepared almost 2 years ago, with contributions of the academic sectors, the government and the civil society. The document is undergoing a reviewed to include actions on vulnerability and adaptation, as an initiative from the MMA. He reported that there was a public consultation project about the Sectorial Plans of Mitigation and Adaptation to Climate Change, directed to 4 sectors: industry, mining, health and transportation. Contributions came from the public and private initiatives, academy and scientific community. The

objective of these plans is to contribute to reach the national goal of reducing the emission of greenhouse gases between 36.1 % and 38.9 % by 2020.

Dr. Carlos Brito Cruz, FAPESP's Scientific Director, noted during the workshop that when they began discussing the creation of FAPESP-FPGCC, one of the objectives set for the research program was to stimulate research on climate change by researchers in São Paulo and, by doing so, to put Brazil in a more prominent and protagonistic position in the international debate on global climate change. This event and others of the type held over the past few years show that the expectations for the program are being met, based on the existence of coordinated incentives for scientific and technological research on topics related to global climate change, says Brito Cruz.

Dr. Jose Marengo highlighted the importance of looking more closely at extreme events, and the experience of IPCC SREX by Working Groups 1 and 2 working in partnership have proven that physical and social scientists can work together successfully in analysing extremes from various points of view, directed to meet the needs of decision makers and stake holders for designing policies to cope with extremes and their impacts. They have made clear that governments and institutions need to be prepared for increased intensity and frequency of extreme events; according to the report, increases in the frequency and intensity of warm nights, extreme precipitation events and tropical cyclones will have significant impacts of climate change in Central and South America. He also thanked the organizers FAPESP and INPE, and the sponsors: CDKN, IPCC, ODI and the Government of Norway.

Lastly, Dr. Marco Chamon from INPE highlighted the research done at INPE by the CCST on global change issues, and many results from studies developed at INPE are already being used on public environmental policies. One example is the creation of the CEMADEN (National Center for Monitoring and Alert to Natural Disasters), as a consequence of the landslides that killed almost 1000 people in the highlands of the State of Rio de Janeiro in 2011. Intense rains as those that triggered this disaster are increasing in intensity and frequency since the last 50 years in all South-eastern South America region, as shown by studies done at the CCST INPE, and projections show an increase of those extremes until the end of the XXI Century, suggestion that natural disasters triggered by intense rainfall may increase in the future.

2.1.2 Panel Discussion of Major Findings, 10:00 – 12:00

Dr. Vicente Barros, who introduced the IPCC SREX Report findings on climate change specific to the Central and South American region, initiated the panel discussion. Dr. Barros also described how, under IPCC guidelines, confidence levels attributed to predictions and specific words used have been chosen with care and precision. Presenting results on climate changes observed in recent decades, Dr. Barros said that a changing climate leads to changes in extreme weather and climate events, and that the impacts from weather and climate events depend on nature and severity of event, vulnerability and exposure. He discussed the two definitions that guide discussions on this report: **Disaster Risk**: the likelihood of severe alterations in the normal functioning of a community or society due to weather or climate events interacting with vulnerable social conditions, and **Vulnerability**: the predisposition of a person or group to be adversely affected. Socioeconomic development interacts with natural climate variations and human-caused climate change to influence disaster risk, and disaster risk management and climate change adaptation can influence the degree to which extreme events translate into impacts and disasters.

Dr. Barros said it was very likely that extreme warm nights and heavy precipitation days have become more common in South-eastern South America, while in some regions of Central America and tropical South America, dry spells have become more frequent, as well as tropical cyclones have changed on time, and that there is medium confidence that human activities have been a key factor in this change. Economic losses from climate-related disasters have increased, with large spatial and inter annual variations. There is thought to have been an increase in the occurrence of some changes in extremes in regions such as Amazonia and Northeast Brazil, but due to a weaker published evidence base there is lower confidence in this assessment.

Dr. Barros described that the predictions for the coming decades present a mixed picture depending on the scenario used; however, greenhouse gas (GHG) emissions in the last 20-30 years indicate a trend towards the A2 and A1B scenarios. Climate models project more frequent hot days and heavy rain events throughout the 21st century, and in regions of Central and South America the time between “20-year” (unusually) warm days will decrease, as well as the time between “20-year” (unusually intense) rainstorms will decrease. He also discussed that Information on vulnerability, exposure, and changing climate extremes can together inform adaptation and disaster risk management, and this information should include: poverty reduction, better education, awareness and sustainable development for understanding the nature of climate risks; improved forecasting for warning systems and reduction of greenhouse gas emissions for mitigation options; and asset relocation, weather-proofing assets and early warning systems as adaptation options.

Dr. Vicuña discussed the importance of SREX with regards to the physical aspects of extreme events (extreme events and climate change), with regards to the occurrence of disasters (disasters, disaster risk, exposure and vulnerability) and with regards to ways to reduce the impacts of disasters (disaster risk management and adaptation), as well as the development of a framework on how these concepts are interrelated. He also explains that a changing climate leads to changes in the frequency, intensity, spatial extent, duration, and timing of extreme weather and climate events, and can result in unprecedented extreme weather and climate events. Extreme and non-extreme weather or climate events affect vulnerability and exposure to future extreme events. Disaster risk management and climate change adaptation can influence the degree to which extreme events translate into impacts and disasters. The most effective adaptation and disaster risk reduction actions are those that offer development benefits in the relatively near term, as well as reductions in vulnerability over the longer term. In Central and South America, as in any other region of the world, social vulnerability and exposure are key determinants of disaster risk, and exposure is a necessary, but not sufficient, determinant of risk. Vulnerability and exposure are dynamic; varying across temporal and spatial scales, and depend on many factors. High vulnerability and exposure are mainly an outcome of skewed development processes. A very important message from the report is that the most effective way to increase the resilience of populations to extreme climate events is to improve the socio-economic development, he said.

Vicuña shows a regional context on exposure and vulnerability, which in turn depends on the countries income per capita. Most of Central and South American countries exhibit upper level income, with the exception of Paraguay, Bolivia, Guatemala, Honduras, Nicaragua and El Salvador that exhibits lower levels of income. Countries with middle level income exhibit HDI (Human Development Index) varying between

0.7 and 0.8, while low level income countries exhibit HDI varying between 0.6 and 0.8, and high level income countries shows HDI between 0.8 and 0.9. Central American countries HDI varies between 0.6 and 0.8. At the same time, HDI have increase on the region during the last 20 years, vulnerability trends show improvements over time. Vicuña also shows that economic exposure shows relatively high dependence on agriculture, while human exposure is higher with higher rates of urban population that in Central America reached 79%. In sum, SREX provides new concepts and new frameworks to explain the drivers of disaster, the relation between disaster risk management and climate change adaptation, the vulnerability and exposure are critical drivers of disasters, they vary in temporal and spatial scales and depend on many factors. Vulnerability in Central and South America in general is comparable to middle income countries with few exceptions. Although there have been some improvements over time there are high disparities among and within countries, and a distinct factor for the region is the high level of urban exposure.

Dr. Marengo showed that the observational evidences in the region since 1950 suggest change in some extremes: very likely increase in warm days and nights & decrease in cold days and nights on the entire region; likely that more regions have experienced increases than decreases in heavy precipitation events as in Southeastern South America, and some sectors of Central America; likely that there has been an increase in extreme coastal high water related to increases in mean sea level; and medium confidence that some regions of the world have experienced more intense and longer droughts, but in some regions droughts have become less frequent, less intense, or shorter, as in Northeast Brazil and eastern Amazonia. Due to fewer studies published on this makes that the confidence on these changes is lower and there is insufficient evidence in changes in temperature extremes, precipitation extremes and dryness on those regions. In Central America, there is a low confidence in any observed long-term (i.e., 40 years or more) increases in tropical cyclone activity. The uncertainties in the historical tropical cyclone records are still high and there is low confidence for the attribution of any detectable observed change in tropical cyclone activity to anthropogenic influences.

Dr. Marengo also shows projections for GHG scenarios in which human activities continue to emit relatively high levels of GHGs, and therefore result in higher levels of climate change. It is predicted with high confidence that temperature extremes will increase, as temperatures and occurrences of warm days and warm nights will increase and cold days and cold nights will decrease. It is likely that warm nights/cold nights would increase/decrease in the entire region, while there is medium confidence on changes in extreme precipitation in subtropical South America and inconsistent trends in Central America. Moreover, there is low confidence in predictions relating to dryness and the monsoons in the Americas, tropical cyclones and El Niño, due to inconsistencies in the results of climate models; it is therefore not clear how rainfall volumes and patterns will change as a result of climate change in the coming decades. On impacts on the physical environment, there is medium-low confidence on changes in drought and floods on the region, and low confidence on the attribution of those changes to human activities. There is medium confidence on the projected increase in duration and intensity of droughts in Central America, Mexico and Northeast Brazil, while confidence is low in projected changes in floods in the region due to insufficient data.

On changes in impacts of climate extremes on human systems and ecosystems, Dr. Carlos Nobre started by showing an increase of reconstruction costs associated to natural disasters in Brazil in 2004-2010, from US \$ 65 million in 2004 to US \$ 1.5 billion in 2010, and that the most important costly extremes were water

related (floods) during the last 20 years. In 2008, the Americas suffered the most economic loss, accounting for the highest proportion (54.6%) of total loss due to weather- and climate-related disasters. On wildfires, more frequent wildfires are probable (an increase in frequency of 60% for a temperature increase of 3°C) in much of South America. In most of central and northern Mexico, the vegetation of arid regions could replace the current semi-arid vegetation. Due to the interrelated nature of forest fires, deforestation, drought, and climate change, isolating one of the processes fails to describe the complexity of the whole picture. Even though it was included on the SREX report, Nobre presented some impacts of climate extremes in the megacity of São Paulo, showing that events of intensive rainfall in the city of São Paulo are becoming more frequent during the last 70 years, together with a reduction of light precipitation. Projected changes in rainfall extremes suggest an increase in the frequency and intensity of heavy precipitation and on warm nights and days. These changes together with urban expansion may be the cause of a projected increase in the risk of landslides and flood-related leptospirosis in the city.

Nobre also explains that climatic disasters account for the majority of natural disasters in Central America, with most of its territory located in tropical and equatorial areas. Low-lying states are especially vulnerable to hurricanes and tropical storms. In October 1998, Hurricane Mitch, one of the most powerful hurricanes of the tropical Atlantic Basin of the 20th century, caused direct and indirect damages to Honduras of US\$ 5 billion, equivalent to 95% of Honduras' 1998 GDP. Some literature indicates that hurricane losses, when corrected for population and wealth in Latin America and the Caribbean, have not increased since the 1940s; and that increasing population and assets at risk are the main reason for increasing impacts.

Dr. Ursula Oswald-Spring discuss disaster risk management in Latin America, and explains that increasing exposure of people and assets is the major cause of changes in disaster losses, especially when people lack insurance and governmental support, and effective risk management and adaptation are tailored to regional and local needs and circumstances. Economic losses from climate-related disasters have increased, with large spatial and interannual variation, but are higher in industrialized countries, while fatalities are higher in developing countries. Examples on managing the risks in Central America are the hurricanes in Mexico, Central America and the Caribbean. On those regions, while risk factors are population growth and increasing property value, as well as higher storm surge with sea level rise. Risk management for adaptation include better forecasting, warning systems, stricter building codes and regional risk pooling. This is important, considering that it is likely an increase in average wind speed and associated heavy rainfall in Central America, but the uncertainties are still high on what would happen with tropical cyclone trends in the future on the region.

Other important aspect raised by Dr. Oswald-Spring is the gender vulnerability and women's discrimination increase vulnerability of exposed communities: even non-extreme events can have extreme impacts in loss of lives and livelihood. For instance considering drought in the context of food security in the dry lands, risk factors include more variable rain, ecosystem degradation, hotter days, discrimination of women and poor health and education conditions. Risk management options include improved water management, sustainable farming practice, drought-resistance crops and drought forecasting. In addition, indigenous people are highly vulnerable and at risks during extreme events. In Central America, social and environmental vulnerability assessments include a linking local to global actors and responsibilities using both top-down and bottom-up approaches. She also mentions the need for information and training on vulnerability, exposure, climate extremes, disaster risk management, and resilience-building help people

reducing risks, and get prepared to unknown risks. At the ends, se also explained that there are strategies that can help manage disaster risk now and also help improve people's livelihood and well-being, and that the most effective strategies offer development benefits in the relatively near term and reduce vulnerability over the longer term.

Lastly, Dr. Mario Nuñez discussed some case studies from the SREX report: European heat waves of 2003 and 2006, Response to disaster induced by hot weather and wildfires (i.e. Australia 2009), Management the adverse consequences of drought (i.e. Syria), Management the adverse consequences of floods (i.e. Mozambique), Disastrous epidemic diseases: The case of Cholera in Zimbabwe. There was no case study specific for Central and South America. However, some of the lesson learned from those case studies are still relevant for the region, such as: early warning systems; adapting to reduce impacts and vulnerability and exposure can never be reduced to zero but risk can be reduced by effective system for early warning of extreme events that may occur in the near-through to longer term future. On risk transfer, it is important to discuss the role of insurance and other instrument in disaster risk management and climate change adaptation in developing countries. The human and economic toll from disasters can be greatly amplified by the long-term loss in incomes, health, education, and other forms of capital resulting from the inability of communities to restore infrastructure, housing, sanitary conditions, and livelihoods in a timely way. Education, training, and public awareness are initiatives for disaster risk reduction and adaptation. Disasters can be substantially reduced if people are well informed and motivated to prevent risk and to build their own resilience. Disaster risk reduction education is broad in scope, it encompasses primary and secondary schooling, training courses, academic programs, and professional trades and skills training, community based assessment discourse involving the media, awareness campaigns, exhibits, memorials and special events.

Nunez also showed that the case studies highlight several recurrent themes and lessons. A common factor was the need for greater amounts of useful information on risk before the events occur, including early warnings, a further common factor identified overall was that it is better to invest in preventive -based disaster risk reduction plans- strategies, and tools for adaptation than in response to extreme events; it was also identified disaster risk management and preventive public health are closely linked and largely synonymous. Strengthening and integrating these measures, along with economic development, should increase resilience against the health effects of extreme weather and facilitate adaptation to climate change. A lesson identified by many case studies was that effective DDR education contributes to reduce risks and losses, and is most effective when it is not done in isolation, but concurs with other policies. Investing in knowledge at primary to higher education levels produces significant disaster risk reduction and disaster risk management benefits. The case studies highlight several recurrent themes and lessons (follows). Research improves our knowledge, especially when it includes integration of natural, social, health, and engineering sciences and their applications. In all cases, the point was made that with greater information available it would be possible to better understand the risks and to ensure that response strategies were adequate to face the risks. The case studies have reviewed past events and identified lessons that could be considered in the future. Preparedness through disaster risk reduction and management can help to adapt to climate change and these case studies offer examples of measures that could be taken to reduce the damage that is inflicted as a result of extreme events.

Questions were raised from the audience about regional climate change scenarios availability for applications on vulnerability and risk assessments, uncertainties on climate change projections, confidence levels on the projections and observed long term trends. In the coming years, due to global climate change, extreme weather events such as heat waves, record high temperatures and heavy rainfall precipitation, occurring every 20 years, should occur with greater frequency, intensity and duration than five decades ago. But what will determine the risk of disasters, leading to the loss of human lives and economic losses, such as those caused by landslides triggered by heavy rains that plagued Rio de Janeiro in early 2011?, what will be the level of vulnerability and exposure of people to these extreme weather and climate events?.

Other questions were related to vulnerable sector such as gender and indigenous communities, about the proposed network on detection of impacts of climate change to be deployed by Brazil, the lack of studies on trends and climate projections in some regions of tropical South America and Central America makes hard to assign more confidence to observed trends and projected climate trends on those regions, especially rainfall extremes.

Some questions directed to Dr. Oswald-Spring drew attention to the lack of child and gender centred case studies in the SREX Report. It was the feeling from the speakers that there are other specific groups and issues that have not been dealt with specifically in the report, such as gender and indigenous communities, which need further investigation. The scope of this IPCC SREX Report did not extend to looking at specific impacts of each individual group in detail. There is also a lack of detailed case studies on the region, even though various cases, such as the 2005 drought in Amazonia were proposed as case studies at the time the SREX report was under preparation.

2.1.3 Policy and Practice Forum, 14:00 – 16:30

On this session we had a presentation on major science initiatives, key government sector initiatives, key private sector initiatives, regional policy framework, and major NGO programmes. The moderator and commentator was Dr. Freddy Picado from the Centro CATHALAC-Panama.

Dr. Javier Tomasella made a presentation about the Centro Nacional de Monitoramento e Alertas de Desastres Naturais CEMADEN from Brazil. Based on the knowledge that rainfall extremes have significantly increased during the last 50 years, and the fact exposure and vulnerability of local communities has also increase, with several people dying as a consequence of floods and landslides generated by those intense rainfall, and also on the projected increase of rainfall extremes for the future. At the same time the demographic trends in Brazil show increase in population and a significant increase of the risk. In view of this situation, the government created CEMADEN with the goal of having a national plan for the reduction of Natural Disasters, to reduce the impacts of climate extremes on subsistence agriculture and to reduce the number of fatalities in 50 % in the next 4 year and in 80% in the next 8 years. A Monitoring and Early Warning National Program covers more than 700 districts. Natural disasters in Brazil are mainly floods and landslides (69% of total occurrences), with the highest number of fatalities due to landslides. Operational difficulties for monitoring and issuing early warnings in Brazil are related to the large areas, with many slopes of the geological and geomorphological nature extremely varied.

Dr. Ana Deysi Lopez from the Ministry of Natural Resources of El Salvador discussed on the basis for resilient development in this country, that is affected regularly by extreme rainfall and floods due to hurricanes from the Pacific side. Some examples of extremes occurred in November 2009–Hurricane Ida with 350mm/6 hours nearby the San Vicente volcano, and in May 2010 with Hurricane Agatha with 483mm/24 hours in La Hachadura. Those two events caused more than 200 deaths and damages of the order of US \$ 400 million. To cope with such disasters El Salvador has strengthened the observation and monitoring of natural hazards, and the civil defence system has improved, with early alerts and mobilization of the population, improvement of monitoring with more meteorological stations in the country, and has created a Center for Monitoring of Natural Disasters that works continuously integrating weather and climate forecasts, landslides, earthquakes, oceanic conditions and air quality. Six meteorological radars are now in operation. The government established 8 milestones to deal with resilient development: resilient agriculture, ecosystems restoration, water management, infrastructure protection, human settlements and health, renewable energy, education-capacity building-research and territorial management.

Dr. Alberto Maturana, from Universidad de Chile, discussed on extreme events and changes on environmental policies in Latin America. One case study was the snowstorm of southern Chile in August 1995, with record low temperatures of -14C and snow accumulations that isolated hundreds of communities in this part of the country. Almost 12,000 families were affected and more about 80% of the sheep herd died due to cold temperatures. Chile has been affected for several extremes (4 years of drought: 1993, 1994, 1995, 1996), storms in 1997, El Niño in 1997-98 and landslides in 1997), and this has determined the implementation of early landslides alert systems, and a national plan for civil defence. This new scenario with intense extremes not just in Chile but also in all Latin America made that the BID (Banco Interamericano de Desarrollo) experienced a situation in which 11 countries from Central America and the Caribbean failed to make their payments. So the BID created a task force of Latin American experts to study changes in policy, and to create a Natural Disaster Network to advise the Bank on future policies on natural disasters, considering changes in extremes in future climates.

Dr. Ricardo Peñaherrera from the Municipality of the City of Quito, Ecuador presented experiences on policy and practices in managing risk of extremes and disasters in Quito, mainly floods, landslides and wild fires. The Municipality of Quito has identified and assessed the risks of natural hazards, vulnerability of population and capacity to cope with those disasters and by creating a reactive management, in such a way that sustainable development in the city does not depend only in reducing existing vulnerabilities, but also on the preparation and response to disasters, and also on the reconstruction of the damages due the disasters. The disaster risk management strategy was defined and considered as the most important for adaptation actions to confront with climate change. Some of the experiences in Quito include generation of a culture of prevention and preparation for natural and anthropic risks, protection of population from climate hazards, and to create the Quito's Metropolitan System of Risk Management, with human, technical and financial capacities allocated for it.

Dr. Pablo Pastor, from CEPREDENAC, Guatemala, discussed the regional context on the natural disasters risk in Central America, in such a way that impacts and vulnerability reduction and is considered as integral part of the transformation process and sustainable development in the region. Central America is exposed to various levels of natural disasters including those of climatic origin, such as hurricanes, floods,

landslides, droughts and wild fires. The main focus of it is to lower the loss of lives throughout policies, strategies and plans for reduction and prevention of disaster risks. One of these initiatives is the PDGIR-Política Centroamericana de Gestión Integral de Riesgo de Desastres, with the goal of responding to the needs to update regional agreements oriented to reduce and to prevent the risk of disasters, so to contribute to a safer and integrative regional development. This also includes social development to reduce vulnerability, the inclusion on risk of climate change in risk management, governance and urban risk, disaster risk and recovery.

Dr. Felipe Yupa from the La Positiva Insurance Company from Peru discussed on the insurance on climate risk management in Peru. The El Niño events have affected Peru, and the event in 1982-83 produced losses of the order of US \$ 450 million. This made that La Positiva started to implement insurance against damages due to El Niño, as well as for agricultural losses, forestry and cattle ranching. The insurance for El Niño is linked to the indices of sea surface temperature in the coast of Peru, and covers for damages due to this phenomenon (intense rain, floods or droughts) for small and large-scale farmers and industries. The agricultural insurance is directed to poor small-scale farmers for damages due to drought, flood, hail, strong winds, high or low temperatures, and landslides. Other insurance types includes flood in the Amazon that affect small producers on the banks of the Amazon Rivers, forestry insurance against fires, landslides, droughts and frost. All of those insurance types are innovative since they consider climate risks and extremes, reduce economic losses of poor farmers, improve poverty alleviation, and keep the economy running.

Dr. Jose Aravequia from the Center for Weather Forecasts and Climate Studies CPTEC INPE in Brazil explained the research and development in the forecasts of extreme events in Brazil and South America. CPTEC works since 1994 on operational activities for weather and climate forecasts and on the development of numerical models, directed to the improvement on the forecasts, including forecasts of extremes, using a variety of global and regional models. He also mentioned that the knowledge and experience of the meteorologists are extremely important on the elaboration of weather forecasts and also on the forecasts of extremes and emission of alerts for intense rains that may produce floods and landslides. He also analysed some case studies of intense rainfall events, such as the intense rain episode in Angra dos Reis, Rio de Janeiro in New Year's eve in 2010, that generated an avalanche killing more than 60 people, and for this event the best forecast came from a regional model runs with a spatial resolution of 5 km latitude-longitude, as compared to the model runs with 40 km spatial resolution. Other examples on past intense rains that produced avalanches were also presented, as in Blumenau, Santa Catarina in November 2008, or in the highlands of Rio de Janeiro, that killed 1000 people in January 2012. These forecasts are used for the CEMADEN for the monitoring and forecasts of floods and landslides in Brazil.

Dr. Melva Gonzales from the Centro Nacional de Estimación, Prevención y Reducción del Riesgo de Desastres - CENEPRED from Peru introduced the el Sistema Nacional de Gestión del Riesgo de Desastres-SINAGERD as a new strategic decision model to reduce the vulnerability to natural disasters. SINAGERD has as objectives: Hazard identification, analysis of vulnerabilities and establishing risk levels for making decisions; the Articulation of the components and processes on disaster risk management into the development planning and land use planning; and prevention and risk reduction, gradually avoiding the generation of new risks and limiting the adverse impact of hazards, in order to achieve sustainable development of the country. This includes: the participation of different local actors of civil society and

private sector in general, identifying priorities and developing actions relevant subsidiaries; the coordination of the National Policy on Disaster Risk Management with other development policies. This is directed towards a timely care of the population in emergency and social recovery, economic recovery and reconstruction, under the development planning process. The SINAGERD strategic tools are: National Policy on Disaster Risk Management; National Plan for Disaster Risk Management; Financial Strategy for Disaster Risk by the Ministry of Economy and Finance; Mechanisms of coordination, communication and information management in disaster situations; The National Information System for Disaster Risk Management and the Policy for strengthening capacities in public sector. As that, SINAGERD supports the design and implementation of agreed development plans based on zoning and territorial order, along with social participatory processes.

Dr. Olga Penalba from the Universidad de Buenos Aires, Argentina, presented an analysis of extreme climatic events in Southern South America, with emphasis on risk and impacts. Climate variability and extremes on the region shows that the most important variables on climate impacts are maximum and minimum temperatures and rainfall, and of course any analysis of the data will depend on the quality of the data and length of the time series. Trend analyses in Southeastern South America have shown negative trends in minimum temperatures and positive trends in maximum temperatures during 1959-1998. This implies negative trends in cold nights and positive trends in warm nights. In Buenos Aires, and based on temperature records it was concluded that the mortality rates are higher when temperatures are below 8C and above 35C. These results were presented from the academic point of view, and Dr. Penalba did not mention on how the city of Buenos Aires is prepared to manage the risks of these extreme temperatures, or if the city has a plan for monitoring of extreme temperatures and if they have alert systems for the occurrence of extreme temperatures so population is alerted about these extremes. Most of the fatalities are among risk groups (small children and elderly).

Lastly, Dr. Carlos Rittl from WWF Brazil discussed on extreme events in Brazil and impacts, science and public policy. He mentioned some of the recent climatic extremes in Brazil: the droughts in 2005 and 2010 and the floods in 2009 and 2012 in Amazonia, the drought in Northeast Brazil in 2012 and their impacts on the local population on the agriculture, food supply, health and transportation, and also on the social side, since they produced migration to other regions. The results of the study on Economy of Climate Change in Brazil suggest estimates losses estimated between US\$ 380 billion to US\$ 7.9 trillion by 2050, with Amazonia and Northeast Brazil as the most affected regions. He also introduced an historic of climate public policies in Brazil: in 1999 was created the Interministerial Commission on Climate Change, in 2000 the Brazilian Forum on Climate Change was created, in 2007 the Rede-Clima was created, and in 2008 the National Climate Change Plan was implemented. In 2009 the Brazilian Panel on Climate Change was created, and in 2010 the various sectorial plans on climate change appeared (agriculture, Amazonia, mining). In 2011 CEMADEN started operations and in 2012 the National Climate Change Program was updated and also the government implemented the National Plan on Risk Management and Response to natural Disasters. In general, the science communities in Brazil together with the civil society and NOGs have provided strong contributions to the climate change debate, and for the development of adaptation measures and mitigation options. In sum the occurrence of extreme events in Brazil have left many lessons learned, that later were translated on public policies, always with a strong support of the science community.

2.1.4 SREX Hard Talk, 16:00 – 17:30

Ms. Ana Lucia Azevedo, science editor from the Journal O Globo, who asked panellists to reflect on the central messages they take from the report, introduced the speakers.

Some of the issues discussed on this session was the level of perception of how serious is climate change as a threat on the region, the way how major science findings on climate change are presented to the public and decision makers, and the impact of climate change sceptics on this communication. The researchers also commented the recent controversy involving the "Wall Street Journal", which published an editorial signed by scientists who did not work in the area, being skeptical of global warming. The running mate by the Republican Party in the US, Paul Ryan, also said to be skeptical about climate change and is against investments in the sector.

According to Dr. Vicente Barros, since 2009, the IPCC has become violently attacked and we were not prepared for this, because IPCC's was to disseminate the knowledge gained, but not translate it to the press. IPCC now has a group of journalists who try to do this mediation, but the information cannot dilute too much information. Language is a big problem, according to Barros. If too complex, does not reach the public. If too simplified, tends to distort the findings and disseminate views that do not correspond to reality.

Dr. Fabio Feldman, the São Paulo Forum on Climate Change, expressed concern about the difficulties of communication with the audience of scientists, who, he said, allow researchers to skeptics - i.e., that deny human influence on climate change events - gain more space in the media and in public debate. In his view, he is concerned on the advancement of space given to deniers in public debate. According to Feldman, the scientists - especially those linked to the IPCC - should have a more proactive towards counteract the "skeptics" in the public debate.

Dr. Reynaldo Luiz Victoria, Coordinator of FAPESP Research Program on Global Climate Change (replacing Dr. Carlos Nobre on this session), said that it is important that the press treats the different positions more equitably. There are specific cases where the media treats issues of little fair way - and sometimes sensationalist - but he thinks that we, as researchers, we have no obligation to respond. The press should we seek to clarify the counterpoint and the public. Victoria, however, stressed the importance of the skeptics are also heard. Some scientists are serious and deserve fair treatment. In general, the media coverage of climate change is satisfactory, according to Victoria.

For Dr. Luci Hidalgo Nunes, professor in the Department of Geography at the State University of Campinas (Unicamp), the deniers are gaining ground because often controversial speech has more media appeal than the complexity of scientific knowledge. The scientist can have a well-reasoned discourse, but that is considered boring by the public. Meanwhile, a researcher with poorly structured arguments can make a speech Simplified therefore appealing to the public, and controversial, which yields headlines. Although good sciences have, in relation to public debate, a disadvantage inherent complexity, Nunes believes it is important that the press continues pluralistic. Nunes also believes that the media coverage of climate change in general, has been satisfactory, although irregular. In 2007, coverage was intense, but the popularity of the subject also gave rise to distortions and exaggerations. Sensationalism is bad for science

because it makes the subject quickly gain headlines for some time, but in the medium term the effect is reversed: people perceive the hype and are looking to discredit the scientific results in general.

Shorter interventions from Dr. Virginia Fernandez from Uruguay and Carlos Klink and André Có Silva from Brazil suggested the importance of the government action to cope with the risk of climate change, with examples of actions by the Civil Defence in case of natural disasters. Those disasters have strong impacts on poor communities that are the most exposed and vulnerable to the extremes of climate and temperature, and have shown that in those countries as in other regions of Central and South America, risk reduction is in fact part of national and economic policies. In Costa Rica, Dr. Eric Alfaro have shown the importance of extremes predictions on weather and climate forecasts, in interaction between universities and the national meteorological service, that is then sent to the civil defence of that and other countries in Central America.

Dr. Steven Price from CDKN-Colombia explains on the important role of CDKN in the region, supporting decision-makers in designing and delivering climate compatible development. CDKN does this by combining research, advisory services and knowledge management in support of locally owned and managed policy processes, and by working in partnership with decision-makers in the public, private and non-governmental sectors nationally, regionally and globally.

The main conclusions and discussion points of this lively session were summarised by Ana Lucia Azevedo. These included questions about the extent to which the IPCC SREX Report supports greater investment in disaster risk reduction and adaptation, the economic implications of disaster risk reduction, and the need for further research to make explicit those conclusions which are implicit in the report. There is also a need for more research the human imprint on natural disasters. In fact, there may be a human imprint on the exposure and vulnerability of population but in the climate signal; it is still hard to attribute climate extremes to human cause. May be global warming induces an acceleration of the hydrological cycle and this has an impact on rainfall extremes. However, isolated extremes cannot be attributed to anthropogenic climate change. At the end, the impacts of the sceptics of climate change were also discussed, in terms of denying the existence of global warming and also as “noise makers” in the already delicate communication between the science community and decision makers.

2.1.5 SREX Poster Sessions (12:00-14:00)

A total of 19 posters were presented at the event and they were posted during both days. Many of them were dealing with natural disasters, extremes, and social indicators of extremes, adaptation strategies, megacities and others aspects relevant to the objectives of the IPCC SREX outreach event. All of them were prepared and presented by young scientists from universities and research institutes from Brazil.

Author	Coauthors	Title of the poster
Aline Gomes Zaffani	Eduardo Mario Mendiondo	Adapting long-term scenarios for the risks of extreme urban diffuse pollution compared to flood vulnerability criteria
Cleber Nascimento do Carmo	Fernando Morais Paulo Artaxo e Sandra de Souza Hacon	Effects of exposure to particulate matter on human health in Western Amazon: comparison of in situ and modeled data
Danielle de Almeida Bressiani	Eduardo Mario Mendiondo	Proposal of a Decision Support System with short and long-term adaptation strategies for flood resilient cities
Fabiana Barbi	Ferreira, Leila da Costa	Climate change in Brazilian coastal cities: risks and political strategies in the State of Sao Paulo
Giovana Luz	Victor Marchezini, Daniel Santana Lanza, Daniel Henrique Candido	Early warning and monitoring natural disasters in Brazil: the case of Rio Branco, Acre State (AC), 2012
Gisleine da Silva Cunha Zeri	Erico Soriano, Leandro Torres di Gregorio, Luciana de Resende Londe, Sílvia Midori Saito, Carlos Frederico de Angelis	The brazilian centre for monitoring and warnings of natural disasters
Guilherme Laurentis	Eduardo Mario Mendiondo	Hydrologic risks transfer models as a strategy for adaptation to global change under scenarios of vulnerability to extreme events and water scarcity
Guillermo Oswaldo Obregón Párrag	José A Marengo e Carlos A Nobre	Risk of occurrence of extreme rainfall event in the São Paulo metropolitan area (SPMA)
Ian Marins Seixas	Maria Rita Souza Fonseca, Andreza Costa, Paulo Leal	GIS application to evaluate the debris flow event on posse watershed in Teresópolis - RJ
Leandro Torres Di Gregorio	Érico Soriano, Luciana de Resende Londe, Sílvia Midori Saito	Knowledge management to prevent natural disasters caused by extreme events
Lincoln Muniz Alves	Jose A. Marengo, Iracema F.A. Cavalcanti, Guillermo O. Obregón	Statistical analysis of extreme events in long-time series from Amazon basin
Lorena Avelina Rojas Gutierrez	Eduardo Mario Mendiondo, Javier Tomasella	Adaptation strategies for prediction of hydrological risks related to flood extremes in ungauged basins
Lucas Garofolo Lopes	Daniela Andres Gonçalves, Anderson Golçalves, José Lazaro Siqueira	Estudos dos efeitos das mudanças globais na bacia do Rio Madeira
Lutiane Queiroz de Almeida	-	Natural hazards and social vulnerability in brazilian urban rivers - case study
Manuel Cesario	Mateus D.Ribeiro, Antonio S. Ferraudo, Raquel R. Cesario, Mônica Andrade Morraye	Correlations between climate, deforestation and a hyper-endemic neglected tropical disease in southwestern amazonia
Maria Cecília Vecchiato Saenz Carne	Farid Nourani, Frank José Afonso, José Silvio Govone, Danilo Almeida, Pedro Bittencourt, José Gustavo Viégas Carneiro	TI na Elaboração de Plano Municipal de Defesa Civil
Sílvia Midori Saito	Joel Robert Georges Marcel Pellerin	Social indicators to assess vulnerability
Sonia Maria Viggiani Coutinho	Arlindo Philippi Jr, Leandro Luiz Giatti, Wanda Risso Günther, Silvana Audrá Cutolo	Sustainable cities and climate change: vulnerability and adaptation in the environmental health

2.2 Day 2, Thursday 3rd May

2.2.1 Recap of Day 1 and Introduction to Break-Out Sessions BOGs, 9:30 – 12:00

A recap of the previous day's discussion was given by Dr. Jose A. Marengo, who outlined the key points from each session, as well as from the press conference.

-Main results of SREX:

- Extremes, vulnerability, exposure, natural disasters, risk management, case studies

- Regional impacts in CSA: uncertainties, levels of confidence, long term observed trends and climate change projections
- Major uncertainties→tropical cyclones, El Niño, monsoons
- Problems: data, models, grey literature, funding

-Press Conference

- Adaptation options, mitigation options (CDM, REDD), regional examples of extremes, links between observed extremes and climate change, insurance.
- What was different in IPCC SREX as compared to IPCC AR4?
- Perception of climate change and risk among population and governments in the region
- Skeptics of climate change, do they affect scientist's work and funding?
- Need for more studies on the region

-Policy and Practice Forum

- Presentations on scientific initiatives, NOGs, government initiatives on natural disasters, adaptation options, mitigation options (CDM, REDD), regional examples of extremes, links between observed extremes and climate change, insurance-climate hazards (e. El Niño).
- Climate triggers and non-climate tensors→natural disasters
- Mapping of risk-vulnerability for adaptation→common methodologies at regional level for intercomparison purposes

-SREX Hard talk

- Technical language barrier→scientific community/non scientific population/government
- Transparency, scientific knowledge, superb science
- Skeptics of climate change→bad?, good?, is there a need from the science community to strike back?, how?,
- Role of the press and media→listen to both sides

Several speakers and participants on the sessions said that there is a need to publish more research on extreme events in Central and South America, improve cooperation on research and disaster risk management in the region, and ensure some level of training and education on disaster risk reduction. As discussed in previous IPCC SREX outreach events in Asia, Africa and the Caribbean, the report spotlight on and supports greater funding of disaster risk management activities, but the report is lacking in some areas including in gender and indigenous communities. The role of climate skeptics and their action in the region was also discussed in detail, which brings to the role of the press that sometimes give more attention to one side of the debate.

Dr. Marengo, introduced the structure and expectations of the Day 2 Break-Out Groups BOGs. There are complexities around actions required to adapt to extreme events, which need to be considered at all scales (from regional to national and to community level). Each Break-Out Group should begin by considering the implications of extreme events at community, national and regional levels, and should also discuss what is

needed to bridge the gaps between scales. Discussions should also consider that we are not starting from a vacuum, as a complex policy landscape already exists; understanding the political landscape is crucial in order to take the right actions to cope with extreme events.

The BOGs were:

BOG1: Regional Action: Responding to the SREX Report Findings

BOG2: National Action: Responding to the SREX Report Findings

BOG3: Community Action: Responding to the SREX Report Findings

As starting points, Dr. Marengo encouraged the Break-Out Groups to consider:

Topic 1: Characteristics of disaster impacts in developing countries and challenges

Topic 2: Disaster risk reduction must be a cornerstone of national economic and social policy

Topic 3: What does it mean for Central and South America? is there is a human imprint on some disasters?

2.2.2 Report of Break-Out Sessions, 14:00 – 16:30

2.2.2a. BOG 1-Regional Action

Chairman of the Regional Break-Out Group Dr. Tercio Ambrizzi of the University of São Paulo, and the rapporteur was Dr. Iracema Cavalcanti from CPTEC INPE. The guiding questions were answered by the participants that were from different institutions and from different fields of expertise.

Are regional institutions and policy frameworks adequate for dealing with the challenges set out in SREX? If not, what needs to change?

- They are working to achieve the challenges;
- Some institutions are more prepared than others. However, there is a consensus that much still need to be done;
- There is lack of coordination and knowledge about the existing actions.
- Need to integrate local- states- government actions;
- Need of communication between the scientific community and the local authorities;
- Need more collaboration among different centers;
- Local authorities need to have easier access to the climate information;
- Increase the financial support to regional climate studies from different institutions;
- Need of strengthening of local institutions who manage the risks;
- Need to improve the education system and the general professionals related to climate change;

Are these incremental or transformative?

- Incremental- intensifying the existing actions.

Is the use of science and social science in guiding policy and decision- making sufficient?

- There is a need of interaction among sciences- Recommendation of studies of social science related to climate change.

How can action become more evidence based?

- The information of regions subject to risks based on the knowledge of past events and future projections needs to be converted into actions.

How can uncertainty in projections be dealt with regionally?

- There is a need to improve the communication of uncertainties in climate projections to the local community.

2.2.2b. BOG 2-National Action

Chairman of the Regional Break-Out Group Dr. Mario Nuñez of CIMA-Universidad de Buenos Aires, and the rapporteur was Dr. Gilvan Sampaio from CCST INPE. The guiding questions were answered by the participants that were from different institutions and from different fields of expertise.

Are national institutions and policy frameworks adequate for dealing with the challenges set out in SREX? If not, what needs to change? Are these incremental or transformative?

- In general no. The National Systems are not integrated in adequate way yet. There is a necessity to establish directions at different government levels.
- Problems are linked mainly to political decision than political skill. There are no actions to establish policies, budget and long term plans. These plans do not be interrupted and should be part of the government long term plans.
- In some countries of South America there are organizations facing this subject but there is no an adequate articulation among institutions.
- There is necessity of an adequate legal and regulatory framework in each sector (health, agriculture, energy, etc.) and a clear role of each institution to be established. This measure in insuring direction, coordination, and effective use of funds.
- Data banks need to be implemented and accessible. Recommended an integration of different data banks.

Is the use of science and social science in guiding policy and decision-making sufficient? How can action become more evidence based?

- There are many information, but it is necessary a link between Science and police makers.
 - It is necessary a better institutional linkage to produce knowledge to help political decision.
 - The long-term plans are necessary including adequate budgets and free of political interferences.
 - It is necessary to establish publics organizations integrated with stable and capacity people
- In social and scientific meetings politicians and stakeholders should be invited to participate.

How can uncertainty in projections be dealt with regionally?

- The stakeholders should taking consideration of caution principles.
- It is necessary education polities to better understand of risks and uncertainties. The same for politicians and stakeholders.
- It is recommended a permanent dialogue among politicians and scientific institutions.
- Research and education improve knowledge, especially when it includes integration of natural, social, health, and physical sciences and their applications. In all cases, greater information available will allow possible to better understand the risks and to ensure that response strategies adequate to face the risks.

2.2.2c. BOG3-Community Action

Chairman of the Regional Break-Out Group Dr. Mario Mendiondo from University of São Paulo-São Carlos, and the rapporteur was Dr. Patricia Pinho from CCST INPE. The guiding questions were answered by the participants that were from different institutions and from different fields of expertise.

How suited are community-based approaches to future changes in extremes events, vulnerability and exposure?

- Decentralization allowing autonomy and voice at the local level – -> to be effective in collaborating decision making process.
- Researchers face problems dealing with local governments -> governments only work with emergency situations and not on prevention of risk and vulnerability
- Governance Mismatches across scales (local, regional and national) -> with the way the resources is allocated: for instance, investing in supercomputers, towers for measures but at the bottom level, where the events really happen has no action or finance resources.
- Lack of appropriated urban planning!
- Mismatches between political agenda and community's needs - >One suggestion is to create an management instrument for local management in coastal zones;
- Public Policy exist at the State Level trough the Environmental agency but haven't been implemented -should be articulated to existing local organizations, civil society and NGOs
- Need to work with local perceptions and needs -> Local communities and organizations are able to detect and define risk areas and major threats and hazards.
- Regional council for environmental issues at the municipal level needs to be integrated to civil defense, heath system, engineer and academy. Actors and government administration and ecosystems - > integrated to delivery governance to reduce conflicts.
- In Disasters situation, is important that the local community are able to respond and act during extreme events and disasters - > local organization, financial resources and capacity building at the local level for appropriate response during, after and preventing future extremes.
- Small amount of money available to planning and action of the civil defense. Need to institutionalize NGO projects at the municipal level.
- Scientific and Policy Information needs to be available to the local communities

- Prevention Programme needs to be longer term and not respond to short political term.
- Use technology information (mobile phones) to prevent and respond to events extremes.
- Media role in promoting preventive actions in extreme events.

What changes are needed at community level to reduce impacts?

- Extremes events might open a window of opportunity for urban planning and remodeling.
- Recent Federal Legislation for Risk Reduction and Disasters: has changed the civil defense operationalization: all municipals need to present a geotechnical and climate risk info urban planning / the down side is that it eliminates the civil defense organization at the local level which have been operating for more than 20 years in a participatory community- based management in urban planning.
- Needs to give integrated information about risk and vulnerability: less fragmented information
- Social scientists need to be engaged with practical actions to inform local actions and collaborate to decision-making process.
- Lack of local knowledge of political board about local conditions – which creates a gap to delivery good/ appropriate and effective policy.

The three BOGs felt that the SREX had not sufficiently emphasised the inequalities of disaster risk and vulnerability found at various level. In particular, the report does not detail on how the roles of women and children and indigenous communities play a part in determining their increased vulnerability to disaster risk, and therefore misses an opportunity to create awareness of these issues.

One important gap at the three levels is a lack of data and studies in some regions, especially in tropical South America and Central America. There is a need for environmental and social data to be downscaled so it becomes locally relevant and local knowledge and practices need to be better documented. As in other outreach events in Asia and Africa, there is a need to document local knowledge is pertinent to effective climate change adaptation and disaster risk management. In addition, whether due to socio-economic pressures or induced by climate change or disaster events, migration leads to a loss in traditional knowledge and therefore makes the need to document this knowledge particularly urgent. Local knowledge and practices also need to be reflected in State and National level policy documents.

2.3 Closing Remarks, 16:30 – 17:00

2.3.1 Closing Remarks

Representing the IPCC, Dr. Vicente Barros highlighted the value of the report and also some actions that already have been taken as a result of the report. He reminded the audience that the issues outlined in the report could be addressed; that it is not impossible to mitigate and to adapt to these risks and governments should take the actions so the scientific results would be translated in environmental policies to deal with impacts of extremes. This event has opened up the findings of the report to a large and diverse group of people from central and South America.

In his closing remarks, Dr. Jose Marengo said the event had been very useful for promoting the scientific and political implications of the SREX Report, and also provided a bridge between global level, theoretical

research and regional level policy and practice; it has reduced the 'distance' between the research and its users. Madame Turid Eusebio reiterated Norway's support for action on climate change and disaster risk in and on the development of the IPCC SREXIPCC. Norway has allocated significant financial resources and supported many initiatives in collaboration with the Brazilian Government, such as the Amazon Fund in reducing deforestation in the Brazilian Amazon. Dr. Tercio Ambrizzi mentioned the important role of basic and applied research to identify climate trends in the region and to the assessments of uncertainties in climate change projections.

The final speaker of this SREX Outreach event was Dr. Steven Price, representative of CDKN in Colombia. He mentioned the effort put into the SREX Report and the regional summary for Central and South America produced by CDKN, in Spanish, English and Portuguese. The CDKN summary versions are much shorter and specifically relevant to Central and South America, while the IPCC SREX Report itself is global in scope. However, we must remember that these publications are not IPCC approved, and the CDKN regional summary should not be confused with the IPCC SREX Report itself or the IPCC SREX Summary for policy makers.

3 . Main conclusions of the meeting

In the next few years, due to global climate change, extreme climate events such as heat waves, record high temperatures and strong precipitation, which normally occur in 20-year intervals, should occur with greater frequency, intensity and duration than five decades ago. However, the factors that will determine the risk of disasters causing loss of human life and economic damage, such as the landslides following heavy rains in Rio de Janeiro at the beginning of 2011, will be the level of vulnerability and the population's exposure to these extreme climate events. These conclusions are from the IPCC SREX.

The presentations and discussions at this IPCC SREX Outreach Event in São Paulo have raised many issues relating to disaster risk management in the Central and South American region, as well as on the structure of the IPCC SREX report.

In response to a several comments regarding the cautiousness of the IPCC SREX Report and the usefulness of findings given uncertainty surrounding the long-term implications of climate change on disaster events, Dr. Barros and Dr. Marengo explained that the level of certainty of projections depends on the performance of models and relevant, peer-reviewed literature. Dr Barros outlined the process through which given levels of certainty are decided – low confidence, medium confidence and high confidence – to help the audience to understand why the statements are on the cautious side.

One of the main conclusions of the IPCC SREX is the increased frequency of extreme weather events in the world recent decades due to climate change. Consequently, also increased the socioeconomic impacts of these phenomena in recent years due to increased vulnerability and exposure of the human population to them, due to factors such as increasing urbanization in the disordered regions such as South America. However, according to the researchers, there is uncertainty as to whether some extreme weather events tend to occur on a global scale due to lack of data. The report states, for example, which is very likely an increase in the frequency of hot days and nights in the coming years in different regions of the world, a

trend already observed in meteorological observations made largely from South and Southeast regions of Brazil and Southeast South America.

Moreover, the document questions about the increasing frequency of heavy rainfall throughout the world, indicating regions that exhibit increased and others where there was a reduction of weather event - which makes it impossible to generalize the finding that the phenomenon should occur more often across the planet. However, heavy rains in Southeastern South America have increased in frequency and intensity during the last 50 years. Today we have three times more intense rains, causing floods and disasters in São Paulo than 70 years ago. And the evidence that this kind of extreme weather event occurs more frequently in the state capital are well documented. We can conclude that in some regions that the socioeconomic impacts caused by the intensification of extreme weather events, are associated with increased vulnerability of populations due to the increasing urbanization of the world and in particular the cities of Latin America, where this process has occurred in recent decades so chaotic.

The drought that is currently affecting the United States and the 2012 drought in Northeast Brazil and flooding in Amazonia have not been documented in SREX, but should be included in the next IPCC report (AR5), that should be published in 2013. In fact, much of the information published on SREX will be updated on the IPCC AR5 report, and by then we hope to have a better understanding of extreme weather events.

After two days of discussions, the participants were divided into working groups that summarized the conclusions of the discussions. A major consensus among the groups was the urgent need to bring climate information to decision makers and the public. The participants concluded that it was clear that the interface with managers and local communities is critical. There is so much noise in this communication. Discussions appeared, for example, about terms like 'uncertainty', which is derived from the area of climate modeling and whose concept we scientists understand, but that was not translated properly to the public. The need for more active participation in government decision-making related to issues such as vulnerability and adaptation was also highlighted by the participants. The role of the IPCC is to produce scientific support, but the Panel cannot interfere in national reality, it lies with governments. However, governments are ill prepared and continue to be taken by surprise by that weather events are increasing in frequency and intensity, as shown by the reports, and are expected to increase further in the future. It is no secret that the climate is changing and every year people die because of disasters that could be avoided if early alerts were implemented and adaptation measures be implemented. The best results of the IPCC SREX is the fact that scientists from fields such as physics and meteorology and social sciences can work very satisfactorily in collaboration with social scientists. Social scientists are better able to convey the scientific and technical language, understandably, for decision makers and communities. We have to make better use that power.

The working groups concluded that it is necessary to integrate the actions of states and local, regional and national governments by improving communication between the scientific community and the local authorities, giving more access to climate information. Local communities often need information and do not know where to look. The researchers also detected the need to increase funding for research on climate change, with support from government and non-governmental organizations. The groups also

recommended the strengthening of local institutions risk management. There is no need to create new institutions, but to strengthen existing ones.

Improving the educational system and training of professionals dedicated to issues related to climate change was another recommendation. Another aspect that is diagnosed national systems able to cope with the challenges of extreme events is not integrated properly: there is need to establish guidelines at different levels of government. The groups also detected that there is no action to establish policies, budgets and long term plans. The recommendation is that budgets for dealing with natural disasters should be disconnected from electoral mandates that are short, in order to establish long-term state policies.

Local governments often, according to experts, works only with emergencies rather than preventing risks and vulnerabilities. There is a lack of integration of institutions at different levels of government. Lack of urban planning was also highlighted as a critical issue for disaster management. The groups also have detected the need to provide information to communities more integrated - and less fragmented - on risks and vulnerabilities. It was also suggested that civil defense systems discard the existing paradigm reactive and act on prevention of emergency situations.

In order to improve risk management of climate extremes and disasters, there is need to enhance the dialogue between scientists and decision makers - particularly with local authorities - and get more active participation of governments in assessing vulnerabilities and initiatives adaptation. Perhaps this is the best recommendation from the diagnosis made by scientists and managers during the event. While it was clear from the discussions that policy makers and practitioners are keen to see more practical guidance of appropriate action to be taken, several participants found the examples given by speakers and others present to be of value.

On risk transfer, it is important to discuss the role of insurance and other instrument in disaster risk management and climate change adaptation in developing countries. The examples of insurance for damages due to El Niño in poor communities of Peru are a good example that could be done in regions such the poor semiarid lands of Northeast Brazil.

Another aspect discussed on the meeting was the fact that women and small children are the main victims of hurricanes, earthquakes, tsunamis, floods and other extreme events. They represent 68% to 89% of deaths in these phenomena worldwide. Women are 72% of people living in extreme poverty which makes them more vulnerable in disaster situations. Dr. Ursula Oswald Spring explained that there are several reasons - from the abandonment of the use of companion clothes long as burqas, which restrict his movement at times urgent. The role of women is to care, then save children, parents and pets and do not see their risk, she said.

Regarding opinion on the IPCC SREX Report, participants have found this to be useful, usable and timely, and judge the predictions to be slightly cautious. Participants have reported that the report provides a strong justification for increasing the funding and resources available for disaster risk management practices. However, participants would like to see more practical advice and examples of how to go about dealing with increasing disaster risk.

One of the weaknesses identified by scientists in the report was the need for more research on climate extremes in Central and South America. It was detected an absence of studies published in indexed journals on climate extremes in the regions of Brazil. Only now Amazon has begun to appear in studies of climate extremes, and there are few papers on other regions of the country. In the SREX report, the analyzes of the Northeast Brazil and Amazon regions were based also on articles published in Brazilian scientific journals in the area, as the Brazilian Journal of Meteorology and the Brazilian Journal of Agrometeorology, which are indexed in SciELO (Bireme / FAPESP), which represented an achievement of Brazilian scientists in the IPCC. The authors were able to make references to articles published in Brazilian scientific journals, which are indexed and have a committee of reviewers in an IPCC report.

A number of speakers and participants commented that the event was valuable for improving the accessibility and profile of the IPCC SREX Report findings. The event has helped to reduce the 'distance' between theory and practice, and between the global and the local. Participants commented that the event was very effective in mobilising an informed discussion on critical issues of climate extremes, and in communicating the findings to a diverse group of stakeholders including the media. Others valued the opportunity to meet with IPCC SREX authors to discuss aspects of the report and other issues not included, such as the link between disasters and social conflicts, gender, indigenous communities. The audience was very active and broadly representative, both geographical and sectorial.

The science community in Central and South America indicated that the event had helped to raise awareness of the existing knowledge gaps in the region, both on data coverage and model development. In some sense, one of the results of the workshop is the identification of subjects and new knowledge and needs that will be considered in the upcoming IPCC AR5 reports, particularly in WG2.

Press, radio, TV and online media in Brazil and the broader region covered the event. This included a Press Conference moderated by journalist Carlos Lins, and coverage in the newspapers from Brazil, Ecuador, Peru and Colombia, and the FAPESP Agencia Newsletter as well as official news agencies from the Brazilian Government. These were some of the news agencies, newspapers, radio stations, online newspapers and magazines that covered the event: El Comercio from Peru, El Comercio from Ecuador, El Espectador from Colombia and from Brazil we have these newspapers: A Tribuna de Santos, Diário de Pernambuco, Diário da Grande ABC, O Estado de São Paulo, Valor Econômico, Folha de Dourados, Folha de Pernambuco, Imprensa Livre, InfoExame, Diário de Maringa, O Globo, O Liberal, O Vale; Radio CBN; Magazines Epoca, Isto é, and online publications from the government and other agencies, including NOGs: Agencies C&T, Agrosoft, Ambiente Brasil, Ambiente Energia, Araraquara.com, Brasil on Line BOL, Brasil Agro, Carbono Brasil, Clica Brasil, Clipping Ministério de Planejamento, Centro de Qualificação de Corretor de Seguros, Eco Agência, Envolveverde, Esteta, Intelog, Itu, Jornal da Ciencia, Meio Filtrante on lone, NE10, MSN Estadão, Plurale, POP, Portal Exame, Revista PIB On line, responsabilidade social, Terra, UOL, skweb, Viver Seguro and Yahoo. Annex 4 shows a list of articles and reports published in various media and web sites. Annex 5 shows a sample of some of the media press articles relevant to the IPCC SREX event in Sao Paulo.

Acknowledgements

On behalf of the international organizing committee, I would like to thank Drs. Celso Lafer and Carlos Brito Cruz, President and Scientific Director of FAPESP, respectively, and to Dr. Reynaldo Victoria, coordinator of the FAPESP Program on Research on Global Change for all the help provided by FAPESP for the organization and implementation of the meeting. Special thanks to Ms. Vera Sirin, Maria da Graça S. Mascarenhas and Marina Loureiro Madeira Porto from FAPESP for their help on the organization and logistics of the event, to Samuel Antenor and Marcelo Meletti from FAPESP for organizing the press conference and taking care of the press coverage of the event.

IPCC Working Groups I and II, the IPCC, the Overseas Development Institute (ODI) and the Climate and Development Knowledge Network (CDKN), supported by Norway's Climate and Pollution Agency and Ministry of Foreign Affairs, organized a series of IPCC SREX Outreach events around the world as a means to inform about the possible impacts of and options for managing the risks of climate extremes and disasters. We thank Kris Ebi and Vicente Barros from IPCC WG2 for supporting the realization of the IPCC SREX Outreach meeting in Brazil. We acknowledge the support from Laura Biagioni from WMO for sending the pen drives with the digital versions of the IPCC SREX report, Sue Martin for taking care of the communication for the event in UK, Tom Mitchell from ODI for his support on the organization of the meeting, and from Emma Lovell and Shirley Matheson also from ODI for taking care of the logistics of flights. Thanks are due to the IPCC Trust Fund for providing travel support for some participants, and adding thanks to Working Group I and to the Norwegians for providing funding for the event.

Additional thanks go to Vanessa Morales from CDKN for her help in the organization of the meeting, and to Yara Ferreira and Alessandra Lobão from APLBA for taking care of the management of the funds from CDKN to cover participation of several national and international participants, and for sending the CDKN regional reports. Lastly, I thank my institution INPE for supporting the realization of the IPCC SREX Outreach event in São Paulo, Brazil.