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The Social Challenges of Global Change

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Food Security and Climate Change

Location: World Conference Center Bonn, Room 2.07

Convenor: John Ingram, Environmental Change Institute, University of Oxford, United Kingdom

Climate Change is expected to have extensive effects on a number of environmental, social and economic issues, including agricultural production and food security. Food security in many countries is under threat from unpredictable changes in rainfall and more frequent extreme weather. This session will focus on adapting food system institutions and businesses to manage food security and global environmental change, the uncertainties and threats facing the farming communities in developing countries as well as various initiatives taken to combat food insecurities caused by Climate Change.

Global Governance and Adaptation to Climate Change for Food Security

Presenter: Eric Massey, Vrije Universiteit Amsterdam, Netherlands

Authors: Eric Massey (1)

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Food insecurity is never the result of agricultural or climatic conditions alone but by a combination of various environmental, social and economic factors. In the past these have led to millions of people worldwide living in a food insecure environment. The climate is also changing and global mean temperatures have increased and are projected to continue to do so. This is expected to have profound effects on food security. IPCC food production models show that at higher latitudes food production will increase, conversely in countries at lower latitudes, mostly developing nations, will become more vulnerable to decreased crop yields and crop failure. Given this, some form of adaptation must occur. The questions are what type of adaptation would be most appropriate and how can it be facilitated? In this paper we attempt to accomplish three things. First, to highlight that food security, especially within the climate change debate, is an issue of equity. Second, we sketch the institutional architecture governing food security exploring how it is equipped to adapt to climate change given these issues of equity. And third, we explore the role global agro-business can play in the institutional global governance architecture of food security. We conclude that adaptation for food security is two-fold. It requires adaptation at the institutional level within the UN and other world body actors, including greater private actor involvement of agro-business. Moreover, it also requires planned physical adaptive farming practices in communities and regions that are expected to become more stressed.



Adapting food system institutions to manage for food security and global environmental change

Presenter: Polly Ericksen, University of Oxford, United Kingdom

Authors: Polly Ericksen (1)

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The question of how to adapt institutions to better manage global environmental change is important for food systems. Food systems will become constrained by the limited availability of ecosystem services. Previous efforts to adapt food systems to buffer against environmental disturbance have in many cases narrowed their long term resilience. It will be difficult to reverse the current trend in food systems of substituting social and economic capital for natural capital. Food systems have historically been characterized by inequity, and food security diverges sharply across geographic locations and socio-economic classes. Achieving social cohesion for adaptation will be a significant challenge, especially as food systems operate across scales from local to global. Although these scales are increasingly linked with globalization, they are not necessarily linked in ways that make governing them through institutions easier.

A polycentric institutional arrangement is suggested as suitable for governing adaptation of social-ecological systems that span multiple levels. Although desirable, implementing such an arrangement in food systems will face considerable challenges. First, the chief actors in food systems often have conflicting objectives which cannot be easily reconciled, for example making profits and ensuring children's food security. Second, the relevant institutions, such as international trade regimes, early warning systems, local staple food markets, and national regulatory frameworks span diverse spheres and realms of governance, among which it will be very difficult to coordinate and build trust. Third, there has to date been little investment in building the capacity for adaptive management in food system institutions.

Tailoring Food Science and Technology to endogenous patterns of Food Supply - A case study in Northern Ghana

Presenter: Wilhemina Quaye, Food Research Institute, Ghana

Authors: Wilhemina Quaye (1)

Food Research Institute, Accra, Ghana (1)

An on-going interdisciplinary PhD interdisciplinary research aimed at tailoring Food Science and Technology to endogenous patterns of Food Supply is being implemented in Ghana, India and Ecuador. The interdisciplinary team comprised of plant breeder, food technologist, nutritionist and social scientist. The research hypothesis is that conventional technology practices, developed from the idea of global chains, are not necessarily appropriate for local food networks. Therefore there is the need to re-design or tailor applied sciences and technologies to the needs of these networks. This abstract presents findings from a network survey conducted by the interdisciplinary research team in Ghana aimed at bringing indigenous knowledge to bear on technology development and to demonstrate the significance of strengthening local food networks to enhance food sovereignty. A Stratified random sampling technique was used to provide appropriate representation of subgroups of farmers, processors and consumers for one-on-one interviews as well as focus group discussions. Survey findings revealed that small scale farmers who



sometimes find themselves on marginalized lands build resilience to food insecurity through local food sovereignty strategies and naturally shy away from varieties that rely heavily on external inputs. Using cowpea as a reference crop, the varietal needs of farmers and their social relevance were explored for breeding considerations. Traditional knowledge concerning cowpea processing was identified and consumer preference and perceptions investigated for further technology redesign to suit the local context. This will go a long way to improve rural livelihoods and their adaptive capacities to global environmental change hazards.

Adapting small-scale and subsistence farmers to climate change impacts: Lessons learnt on the role of technological innovations, institutions and social entrepreneurship

Presenter: Daniele Cesano, Harvard University, United States

Authors: Daniele Cesano (1), Thais Corral (2), Thais Corral (3)

Center for International Development, Harvard University, Cambridge, MA, United States (1), REDEH, Rio de Janeiro, Brazil (2), SouthSouthNorth, Rio de Janeiro, Brazil (3)

The semi-arid region of North-eastern Brazil (sertão) is the poorest of Latin America. It has social and economic characteristics similar to many parts of Asia (i.e. Tamil Nadu and Andhra Pradesh, India) and Africa: under-served communities, low per capita income and a rural economy based on pasture and subsistence agriculture. The wide array of inter-connected social problems make the elaboration and implementation of poverty reduction policies quite challenging. This situation is likely to be aggravated by climate change as rainfall patterns and droughts will become more unpredictable, affecting even more the water supplies for domestic and agricultural uses.

However, today there are several small-scale clean technologies that can improve agricultural yields and adapt poor communities to climate change impacts. The real challenge is to disseminate them effectively and sustainably.

A water efficient irrigation project has been developed in Pintadas, a small community of about 15,000 people in the Brazilian sertão. The project managed to launch an agricultural program based on small-scale technologies to increase the production of family farmers. The project has been running for about 4 years and is on its way to become a self-replicable program. A structured partnership between local leaders and the local micro-credit scheme, technological providers and policy makers has been the core element for such a program. This presentation will discuss the processes and the roles that the different private, public and non-governmental institutions had for its effective deployment.



Climate Change And the Uncertainties Facing Farming Communities In The Middle Belt Region Of Nigeria

Presenter: Hyacinth Nnamchi, University of Nigeria, Nigeria

Authors: Hyacinth Nnamchi (1), Raymond Anyadike (1)

Department of Geography, University of Nigeria, Nsukka, Enugu State, Nigeria (1)

The economy of the Middle Belt Region (MBR) of Nigeria is based on agriculture, which holds the prospects for the economic development across the area in all terms, including reduction in of poverty level. It is the most productive agricultural part of the country, partly because of the inherent high fertility of the soils, the moderate and variable climate. Also, the region is an ecological transition between the Sahel and the southern forest region. This endows the area with huge agricultural potentials; crops characteristic of the two surrounding regions are also cultivated in the MBR. However, a major consequence of Global Environmental Change (GEC) is vagaries of the climatic elements and other changes in the socio-economic/political structures of societies. Against this background, this paper examines the relative importance of the variations/change in climatic parameters vis-à-vis other uncertainties that confront the farming communities of MBR. Data were assembled on agricultural productivity, and supplemented with data from in-depth field survey, in which questionnaire was administered to the farmers in three (3) communities. These communities were selected from the southern, central and northern parts to cover the major ecological variations in the region. The questionnaire (in form of a checklist) was administered to 200 randomly selected farmers in each community. Data analysis involved Principal Components Analysis (PCA), and Multiple Analysis of Variance (MANOVA). The implications of intensified climate change is highlighted in view of the large-scale agricultural development projects planned for the MBR region of Nigeria.

Strengthening Institutional Capacity and Framework for Sustainable Development in Africa: What will it take?

Presenter: Marie Rarieya, Rensselaer Polytechnic Institute, United States

Authors: Marie Rarieya (1)

Rensselaer Polytechnic Institute, Troy, New York, United Kingdom (1), United Nations University -Institute of Advanced Studies, Yokohama, Tokyo, Japan (2)

This paper examines climate variability and its impact in Kenya, identifying the different types of institutions shaping natural resources use, the driving forces that foster or hinder the emergence of institutions favourable to sustainable development and the various ways that they can be designed. There is a growing international consensus that good governance is fundamental for achieving sustainable development. What does this mean in policymaking? Good governance in the context of climate change here calls for the design and implementation of sound and coherent approaches that promote sustainable development and socioeconomic progress. Decisions of what should be done to address climate change goes beyond the reach of individual, and requires developing governance mechanisms and institutional capacity to support sustainable development. The article draws on ethnographic fieldwork material collected in two villages in Western Kenya, the Suari Millennium Village and the World Agroforestry Centre site in Nyando District, which examined challenges to food security in areas especially vulnerable to the effects of climate variability. In these cases, it was evident that building local institutional capacity is key to facilitating the



achievement of the Millennium Development Goals and fostering society's sustainability through empowerment of the local community and actors. The paper concludes that there is an urgent need to promote sustainable development at multiple sites with a focus on strengthening institutional capacity and inter-linkages, fostering coordination between local and global forms of institutions, including sharing of good practices and facilitation of knowledge sharing at local, national, regional and global levels.

A Methodology To Identify Food Insecurity Profiles Of Farming Livelihoods

Presenter: R.W. de Man, Wageningen University/ Netherlands Environmental Assessment Agency, Netherlands

Authors: R.W. de Man (2), M.T.J. Kok (1), P.L. Lucas (1)

Netherlands Environmental Assessment Agency (MNP), Bilthoven, Netherlands (1), Wageningen University Research (WUR), Wageningen, Netherlands (2)

This paper presents a methodology to identify food insecurity profiles of dryland farmers in India. This methodology is developed to answer the question how food insecure farmers in a certain ecological and institutional environment use the resources accessible to them in an attempt to create a stable livelihood. This question is relevant as current institutional responses are seemingly inadequate in establishing an enabling environment for the most vulnerable. The imminent global change only adds to the need to create sustainable institutional transitions.

First, based upon literature study and fieldwork storylines of how certain conditions create pathways to food insecurity, are elaborated. This is done on the basis of a framework that places the vulnerability and coping capacity of smallholders in the context of multiple interacting socio-economic, environmental and institutional stressors positioned at different spatial, functional and temporal scales. Furthermore, possible livelihood strategies are seen as path dependent due to the consequences of previous decisions taken.

Next, underlying hazards and corresponding vulnerabilities are formalised and indicators identified, thus constituting food insecurity profiles of the different types of livelihood. The indicators are then used in a cluster analysis to quantitatively describe and further validate these profiles.

This paper concludes with discussing the usefulness of this methodology as a way to represent the different dynamics that determine food insecurity. The identification of these profiles provides a method to extract decisive factors determining the malnutrition of smallholders and will thereby impel the analysis of the impacts of food security policies.



Climate Change Agricultural Initiative: A Model for Developing Countries

Presenter: Josephine Migalbin, University of Southern Mindanao, Philippines

Authors: JOSEPHINE MIGALBIN (1)

University of Southern Mindanao, Kabacan, Cotabato, Philippines (1), Hubert H.Humphrey Program, University of California, Davis, Davis, California, United States (2)

Global climate change is now the most discussed issue in developed countries. Agriculture, the growing and harvesting of crops, raising livestock, and producing other agricultural products accounts for a high percentage of greenhouse gas emissions which contribute to global climate change. A Climate Change Agricultural Initiative from a developed country has been evaluated to see the possibility of using it as a model in Southeast Asia to mitigate the impact of climate change to agriculture and vice versa. Climate change will surely affect the basic elements of life for people - access to water, food production, health and the environment. It is urgent to confront global climate change and its impact to vulnerable communities.

Field and dairy farm visits were conducted to observe agricultural activities. Documents on the Climate Change Agricultural Initiative were perused and secondary data were also gathered to generate information.

The Initiative establishes a comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions in greenhouse gas emissions. It has established partners with business, agriculture and government to find practical ways that the private sector can protect clean air, clean water and healthy ecosystems. The regulatory mechanisms in terms of water use, manure management, rice straw management are fully implemented. The study found out that awareness campaigns are very important to educate people about global climate change. Such initiatives to mitigate the impacts of climate change to agriculture can also be done in developing countries who are bearing the brunt of climate change.