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PROCEEDINGS



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PROCEEDINGS EDITING

Kamani Wijesuriya

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ORAL PRESENTATION



Paper Session 01

28th November 2012

1045 - 1200

Climate Change and Gender Issues

Session Chair - Tahseen Jafry

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Conserving Indian Sundarban: An Alternative Approach Through Economic Incentive Model for Conservation

Sourav Paul¹

¹ *PhD scholar at Department of Zoology, University of Otago, New Zealand.
Ex- Environmental Manager, Nature Environment Wildlife Society, Kolkata, India.*

Sundarban is both the largest deltaic mangrove forests, and home for the largest tiger population on earth. It is a land where people, tradition, culture are inseparably interwoven with nature. Today Indian Sundarban is facing a complex conservation challenge. A conservation policy based on economic incentive models could solve problems such as habitat destruction, and man-animal conflicts and take care of socio-economic needs of the region. We have succeeded in tying CDM (Carbon Sequestration) and CSR with general conservation efforts under a single umbrella. Our work at Sundarban based on micro-credit and inclusive growth measures such as community (native people, intellectuals, and corporate) participation, is attempting to do this. Preliminary results, such as restoration of 875 ha of mangroves (around 5.6 millions of seedlings were planted to obtain the standard density of plants per hectare.), reductions in man-animal conflicts, and local economic advancement (576 women were employed in raising 1.2 millions of saplings in nurseries) are inspiring us to continue our efforts.

Key Words: Micro-credit, Carbon sequestration, Community participation

Building Climate-Risk Resiliency through a Gender Sensitive Comprehensive Land Use Plan

Mark Anthony M. Gamboa¹

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There is an increasing demand from international institutions to consider gender in all the decision- and policy-making processes in both state and non-state institutions. The same tone is observed in current laws and policy pronouncements in the Philippines (e.g. the Philippine Climate Change Act of 2009) meant to address environmental concerns. These pronouncements mandate the incorporation of gender-sensitive perspective in all climate change efforts, plans and programs. In the past, the Philippine Government has issued guidelines that aimed to facilitate the mainstreaming of gender in various development planning activities. However, with recent climate change challenges, these existing guidelines are inadequate to fully address gender issues and concerns resulting from various disasters attributable to climate change. The comprehensive land use plan (CLUP) can be a potent tool to address the potential adverse impacts of climate change but it has traditionally been considered as a neutral undertaking. The policy statement in the Philippine Climate Change Act of 2009 presented a noteworthy research opportunity to carefully understand how a CLUP can be made gender-sensitive towards increasing climate-risk resiliency of the local government units in the country. Hence, this paper will explore how climate change and gender can be mainstreamed in the comprehensive land use planning process by using a case study approach.

Keywords: Gender, Climate Change, Land use

Impacts of Climate-smart Integrated Farming Systems on Women's Nutrition and Health

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Being one of the most vulnerable countries to climate change due to its geomorphology, high population density and extreme poverty, Bangladesh is experiencing increasingly irregular and intense precipitation, rising average temperatures, increased salinity, and more frequent cyclones, which greatly decrease livelihood opportunities, food security nutrition security of rural communities, especially in the South-West. Through participatory vulnerability and needs assessment, resilient integrated farming strategies for vegetables and fish, the most common foods after rice, were identified. At homestead level, pond polyculture of carps and nutrient-rich small fish technologies, as well as, vertical horticulture systems which overcome space, soil and water stresses are being practised. In ghers (modified rice fields with high dykes), better resilience to variations of water levels is being achieved through establishing fish sanctuaries to increase the diversity and quantity of local species, improving canal systems for fisheries and water management, and using raised beds for horticulture. These strategies which combine greater production of and access to common fish and vegetables for both women and men, and increased flexibility to climate variability, should contribute to improved resilience and diversity of livelihood options, as well as, better nutrition and health of women. Results on the impacts will be published later.

Keywords: Climate Change, Resilience, Agriculture And Aquaculture Systems

Impacts of Climate Change on Food Security of Rural Poor Women in Bangladesh

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² *Associate Professor, Urban and Regional Planning Department, Khulna University, Bangladesh.*

Due to the impact of climate change on agriculture, introduction of bio-fuel and rapid increase of food price the world is pacing toward a severe food crisis (World Bank, 2011). The poor who are already vulnerable and food insecure are likely to be more first affected (FAO, 2008). In Bangladesh, half of the population is women and about 80% of them live in rural areas. Most of these women are poor and highly vulnerable to climate change impacts (WEDO, 2008). It is claimed that social, economic and political context for women in Bangladesh makes them more vulnerable to climate change and food security. Furthermore, they suffer more than men during and after climatic disasters (FAO, 2008). Through empirical studies among the rural poor women in south-western coastal areas of Bangladesh, this study explores their perceptions about climate change impacts. It also scrutinizes the impact of climate change on the food security of rural poor women through examining the changes in food availability, consumption pattern and women daily labor and life style to ensure household food security. This study would help the development workers to realize the nature and extent of the problems and thus facilitate to undertake effective policies and actions.

Keywords: Climate Change, Food Security, Women

Gender and Climate Justice

Dr. Tahseen Jafry¹

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Climate variability is predicted to bring about significant changes in agricultural production and production systems. This will have enormous implications for the poorest and most marginalised communities and especially women. Many consider that there is now a moral responsibility by the developed nations to assist emerging nations on tackling and addressing climate change now and in the future. In this context climate justice debates call for a human rights based approach to safeguarding the rights of the most vulnerable affected by climate change and to share the burden of climate change. In particular, the need to provide more gender focussed initiatives and innovative methods has been highlighted as part of a package of Innovative Approaches to Climate Smart Agriculture as a priority area for intervention to enhance gender equity and equal opportunities for women and men to benefit from new technologies and farming techniques. This paper brings together current research and scholarly thinking on how rural women are being supported in the context of climate variability and calls for re-thinking both politically and practically on how we can better target and shape future initiative to be more gender inclusive.

Keywords: gender, climate justice, human rights, agriculture



Paper Session 02

28th November 2012

1000 - 1300

Climate Change & Health Issues

Session Chair - Brent Simpson

1.	Socio-demographic predictors of heat- health adaptive behaviour among a cohort of residents in Adelaide, Australia	Derick A. Akompab
2.	Temperature - related mortality in Hong Kong between 1999 and 2009	Cho Kwong Charlie Lam
3.	Mapping the social and environmental dimensions of climate related natural hazards	Margaret Loughnan
4.	The effect of high temperatures on cardiovascular, respiratory and endocrine disease in Melbourne, Australia	Kay Tze Ng
5.	A pilot study to evaluate the impacts of occupational heat stress on health and social lives of transport workers in Chennai, India in the context of climate change	Jeremiah Chinnadurai

Socio-demographic Predictors of Heat-health Adaptive Behaviour Among a Cohort of Residents in Adelaide, Australia.

**Derick A. Akompab¹; Peng Bi²; Susan Williams³; Iain A. Walker⁴; Martha Augoutinos⁵;
Janet Grant⁶**

^{1,2,3}*Discipline of Public Health, University of Adelaide, Australia.*

⁴*Climate Adaptation Flagship, Common wealth Industrial and Scientific Research Organisation, Australia.*

⁵*Discipline of Psychology, University of Adelaide, Australia.*

⁶*Discipline of General Practice, University of Adelaide, Australia.*

Climate change would likely increase the frequency and severity of heat waves which is considered a public health problem in Australia and other temperate regions of the world. Heat waves are quite common in Adelaide and record-breaking heat waves have been recorded in recent years. The purpose of this study was to determine the socio-demographic variables that would predict the adoption of heat-adaptive behaviour during a heat wave. A cross-sectional study was conducted between January and February 2012. Questionnaires were mailed out to eligible participants and 267 self-completed questionnaires were considered for analysis. Data on participants' socio-demographic characteristics and adaptive behaviour were collected and scores for adaptive behaviour were computed. Logistic regression analysis performed to determine the predictors of adaptive behaviour at a significance level of 0.25. In univariate models, gender, marital status, level of education and household annual income were statistically significant with adaptive behaviour. After controlling for confounders in a multivariate model, marital status, level of education, employment status, house annual income and fan ownership were statistically significant with adaptive behaviour. These predictor variables should be taken into account when authorities and health promotion professional are designing programmes to reduce heat-related morbidity and mortality.

Keywords: climate Change, Heat Waves, Adaptive Behaviour

Temperature-related Mortality in Hong Kong Between 1999 and 2009

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The aim of this study is to determine how extreme temperature affects mortality in Hong Kong, which can provide the means to improve the current weather warning system. In this ecological study, the daily weather data were subdivided into seven temperature metrics. The daily detrended mortality data were stratified by disease group, gender, age, and marital status and box plots were produced. Odds ratio for each social group was calculated to identify vulnerable populations. Diurnal temperature range (DTR) ($\geq 8^\circ\text{C}$) and mean temperature change between neighbouring days ($\geq 4^\circ\text{C}$) were the critical thresholds for excess mortality in Hong Kong, among other temperature metrics. In all-cause death occurring below 12°C , females appear to be more vulnerable than males. In response to rising temperature from winter to summer, domestic electricity consumption increased sharply. The study shows an inverse relationship between electricity consumption and mortality. This study demonstrates that air conditioning and heating are likely to affect seasonal mortality in Hong Kong. Furthermore, this study reveals that mean net effective temperature, DTR, and temperature change between neighbouring days are effective to predict excess mortality in Hong Kong. In contrast, demography has minimal impact on heat- and cold-related mortality in Hong Kong.

Keywords: Hong Kong, Human Health, Mortality

Mapping the Social and Environmental Dimensions of Climate Related Natural Hazards

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Responding to and preparing for natural hazards is an important aspect of emergency management. The predicted changes to the frequency, duration and intensity of climatic hazards in the coming decades will put considerable strain on emergency response and recovery teams. We have developed a 'tool' to describe the spatial distribution of climate related risks in urban areas. The 'tool' was designed to be used by health care managers and local government to inform immediate, short-to-medium term and longer-term approaches to services and communities. The index was initially developed to describe spatial differences in population vulnerability to heat events in Australian capital cities. Administrative data sets and geographic information systems were primarily used for assembling the index. High-risk clusters were identified and considered in relation to their immediate neighbours. The index was validated using retrospective data for heat related morbidity. The example provided here is for heatwaves but the tool itself can be adapted to describe flood risk or infectious disease risks.

Keywords: Natural Hazards, Population Vulnerability, Spatial Analysis

The effects of high temperatures on cardiovascular, respiratory and endocrine diseases in Melbourne, Australia

Kay Tze Ng¹; Margaret Loughnan²; Nigel Tapper³

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The occurrence of climate change has led to increasing temperatures around the globe and more extreme weather events. This has implications for human health as increased morbidity and mortality has been observed and recorded during periods of extreme heat. This study now focuses on disease-specific morbidity which allows more targeted intervention and preventive measures to be taken in the future in conjunction to projected climate change. The study identified the effects of heat on cardiovascular, endocrine and respiratory disease admissions to hospital in Melbourne, Australia. This study found increases in excess morbidity for all disease categories. Increases in endocrine-related disease during hot weather were larger than those found for cardiovascular and respiratory-related diseases. The degree of increase differed between age groups and disease categories. Females showed increased risks to heat-related morbidity compared to males. The increases in morbidity seen were related to a sudden increase in temperature as compared to the previous week's average temperature. With judicious planning, heat-related illnesses can be reduced and the social and economic implications of ill-health curtailed. The results of this study allow adaptation to be directed at specific sub-groups within the community, and minimize heat exposure in the most vulnerable groups.

Keywords: High Temperatures, Human Health, Morbidity

A pilot study to evaluate the impacts of occupational heat stress on health and social lives of transport workers in Chennai, India in the context of climate change

**Jeremiah Chinnadurai¹; Vidhya Venugopal²; Venkatesh Dasu³; Madan Chakravarthy⁴;
Sankar Sambandam⁵**

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In tropical countries, morbidity and mortality caused by heat stress due to high temperatures, humidity & physical workload remains unreported in occupational settings. Transport Industry workers are vulnerable population exposed to frank heat-stress in their jobs that potentially tips their thermal equilibrium causing health decrements. Since the transport sector forms the very foundation of economic growth of any country, the authors found the need to document the impacts of heat stress in transport sector. A cross-sectional study was undertaken to quantify the heat-stress exposures and qualitatively assess the perceptions of 25 transport workers on impacts of heat-stress on their health and social lives. Exposures were quantified as WBGT using heat stress monitor & data-logger. The perceptual study was conducted by administering an internationally validated questionnaire. During summer of 2012, measured WBGTs were as high as 33.9°C (at average ambient temperatures of 40°C) and exceeded the recommended TLV limits. Upto 76% percent of the workers reported a range of heat-related illnesses and ergonomic issues, with higher frequencies in summer months. Irritation (89%), interpersonal issues with co-workers (42%) and disruption in family life (33%) were also reported. This result of this pilot exercise emphasizes the need for further research, regulatory intervention in setting heat stress standards and work rest regimen for transport workers in India.

Key words: Occupational Heat Stress, Transport Industry, Health Risks



Paper Session 03

28th November 2012

1415 - 1545

Climate Change & Adaptation

Session Chair - Sean Granville Ross

1.	A participatory approach for determining adaptation actions and considerations for their implementation	Sarah Park
2.	Assessing the environmental and ecosystem service implications of climate change adaptation strategies in Timor Leste	Simon Attwood
3.	Climate Change Adaptation and Local Institutional Capacity	Prof. Mayo Grace C. Amit
4.	Strategies for adaptation to climate change in Timor Leste: The importance of rainfall thresholds	Doug Beare

A Participatory Approach for Determining Adaptation Actions and Considerations for Their Implementation

**Sarah Park¹; Kirsten Abernethy²; Simon Attwood³; Doug Beare⁴; Hugh Govan⁵;
Jennifer King⁶; David Mills⁷**

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Climate change projections suggest that current levels of food security in farming and fishing communities in Timor-Leste are likely to be impacted by future changes in rainfall and temperature. In participation with stakeholders from communities located on Atauro Island and in Batugade, we consider the implications of changes in climate using an adaptations framework to identify stakeholders' thresholds of tolerance. Once thresholds and the most promising adaptation strategies were identified by community members, a multi-disciplinary project team conducted evaluations of the chosen actions from social, economic and environmental perspectives. This was done to help community members decide on their ongoing response to changes in climate as the identified thresholds are progressively breached. Importantly, the approach explicitly considered the development of those factors likely to inhibit and facilitate the implementation of adaptation options. These factors included formal and informal governance organisations and structures, gender relations, financial costs and benefits, and landscape-scale impacts. By undertaking a monitoring and evaluation activity within the project, we are able to report on the community participants' views on the efficacy of the approach to enhancing their capacity to determine appropriate response actions, and plan for their implementation.

Key words: Climate Change, Decision-Making, Implementation, Aquatic Agricultural Systems

Assessing the Environmental and Ecosystem Service Implications of Climate Change Adaptation Strategies in Timor-Leste

Simon Attwood¹; Doug Beare²; Shwu Jiau Teow³; Sarah Park⁴

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Strategies and associated actions adopted by communities to adapt to climate change may result in intended and unintended environmental outcomes. These, in turn, may influence the delivery of ecosystem goods and services upon which these communities depend. Understanding these environmental responses and their implications for ecological function are vital where communities i) share a common resource and ii) are highly dependent upon continued ecosystem service delivery. One means to inform community-level climate change adaptation decision-making is to combine: i) stakeholder participatory methods, ii) remote sensed assessments of natural capital, and iii) on-ground rapid assessments of soil condition and function. This enables: a) the identification and prioritisation of environmental assets and associated services, b) the establishment of baselines of landscape and land use function, and c) an appraisal of how assets, services and landscape function may change in relation to climate change adaptation strategies. We outline the approaches taken in participation with fishing and farming communities in Timor-Leste, presenting here results for landscape/land use condition. In particular, we focus on the tropical home garden and how simple changes to management might improve soil function from the perspectives of soil stability, nutrient cycling and water infiltration.

Key words: Climate Change, Ecosystem Services, Aquatic Agricultural Systems

Climate Change Adaptation and Local Institutional Capacity

Prof. Mayo Grace C. Amit¹; Dr. Linda M. Peñalba²

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College, Philippines*

Many global challenges like climate change are urgent and demand affirmative local action with expediency. However, there is very little understanding and empirical evidence on the readiness of local institutions in responding to these challenges. The paper is an attempt to systematically organize information that will contextualize the local institutional capacity, particularly local government units, for climate change adaptation. Using the planning process as anchor, it examines local institutional capacity for climate change adaptation from two angles: (1) an organizational and institutional view which looks at internal and external resource availability for mobilization; and (2) staff view which examines key individuals in frontline services for climate change adaptation. The analysis is based on a self-assessment survey of key local government offices, one-on-one and focused group discussion, and secondary data collection in four (4) project sites in the Provinces of Pangasinan and Tarlac, Philippines. It recommends policy actions on how to better equip local institutions into responding more effectively and efficiently to climate change adaptation actions through the planning process.

Keywords – climate change adaptation, local institutions, capacity development

Strategies for Adaptation to Climate Change in Timor Leste: The Importance of Rainfall Thresholds

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Timor Leste is a small developing country located in South-East Asia. Despite its location in the tropics, the climate of Timor Leste is relatively arid, with around 75% of rainfall (75 mm/year annually at Dili airport) occurring during the wet season (typically October to April). Retention of water in the soil is generally poor and there is limited infrastructure for rainwater storage and distribution. These factors have particular implications for the production of subsistence crops (e.g. maize) around the time of the dry season. We consider past strategies used by subsistence farmers and fishers to address historic annual variation in rainfall using: (a) observed data from 1952 to date and time-series techniques, and (b) knowledge of seasonal calendars and associated livelihood activities produced in participation with members of two communities. Climate change projections suggest an increase in the amount of rainfall received in Timor-Leste during the wet season and an increase in the intensity of rainfall events. Understanding the present connection between rainfall patterns and food production activities enabled further consideration with community members of the implications of any future changes in rainfall on the production of food. We identify a number of thresholds related to changes in rainfall that are likely to impact the ability of farmers and fishers to undertake present livelihood activities. From this we consider those activities that may need to be adapted, and options for changing current food production practices to enhance food security.

Keywords: Climate Change, Rainfall, Adaptation.



Paper Session
04

29th November 2012

1030 - 1200

Impacts of Climate Change on Agriculture and Food Security

Session Chair - Brent Simpson

1.	Agricultural adaptation to climate change: Preparing extension and advisory services for the New Normal	Brent M. Simpson
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6.	Review study of climate change and food security: Adaptation & Mitigation	B. Khan

Agricultural Adaptation to Climate Change: Preparing extension and advisory services for the *New Normal*

Brent M. Simpson¹

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Since the domestication of crops and emergence of sedentary societies, our species has never faced a more serious challenge than that which we will confront in adapting to climate change. The scale is global, potential magnitude of impacts catastrophic, time frame unknown, uncertainty high and the threat of delayed action real. In the years to come our continued ability to feed the human population will increasingly be challenged. Problem recognition, response formulation and proactive preparation are the first steps, and will be iterative as our knowledge expands and new interactions and effects manifest themselves. Extension and advisory service (EAS) providers in particular will play vital roles as both the critical link between farmers and sources of new information and tools, and as the facilitators of social processes necessary for widespread adaptive behavioral change. As we move forward, persistent problems, past failures and new challenges within EAS provisioning have the potential to converge in a perfect storm as the scramble to adapt to the *new normal* of life under climate change intensifies. This paper outlines the nature of the challenges, identifies past and present points of successful EAS engagement and outlines necessary preparations.

Keywords: Adaptation, Extension, Food Security

Agriculture Security in India: Analyzing the Impact of Climate Change in Ensuring Food Security

Anbumani Arumugam¹

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Agriculture security encompasses three key areas namely food security, farmers' security and rural sector security. In India, there are three reasons why we need to study these areas under the umbrella that is Agriculture Security. Firstly, chemical fertilizers and pesticides do not come free and are a major reason for indebtedness, which itself leads to loss of farms, land and entitlement to food. Secondly, chemical or industrial, agriculture is hugely water demanding, and we cannot afford it in terms of the water crisis we face. Two key issues here are monsoon management in the era of climate change and growing crops organically without that level of water wastage. Thirdly, the increasingly compelling reason is the role of chemical agriculture – Green Revolution agriculture – in propagating climate change. Climate change has to be addressed, bearing in mind the fact that a one-degree rise of temperature can bring down the production of wheat by 5 million tonnes. So climate change is very much a domestic threat to the poor, whose very survival is threatened by these events.

Keywords: Agriculture, Climate Change, Food Security

Spatio-temporal Estimation of LAI in Heterogeneous Forests Using Satellite Remote Sensing

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Leaf Area index (LAI) is widely used in global environmental and climatic change research. The Moderate Resolution Imaging Spectroradiometer (MODIS) satellite imagery provide LAI product with high temporal resolution. However, the coarse spatial support of this data limited the application, e.g. the spatial heterogeneity of land cover. In this study, we proposed an approach to decompose MODIS LAI for a heterogeneous forest using the Linear Mixture Model (LMM) and the information of the class fraction from an aerial image. Results showed that the decomposed MODIS LAI values were estimated well with maximum and minimum RMSE of 0.37, and 0.17, respectively. We concluded that our approach can be used to decompose MODIS LAI successfully for any heterogeneous forest.

Keywords: Leaf area index (LAI), mixed pixels, Moderate Resolution Imaging Spectroradiometer (MODIS) satellite imagery

Seed conservation as a strategy for climate change adaptation in semi arid areas of Malawi

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²*Natural Resources Department, University Malawi, Bunda College of Agriculture, Malawi.*

Smallholder agriculture remains an important source of livelihoods for a majority of the rural population in Malawi with few or no external inputs used. Seeds are the most important input in agriculture production and hence they are key elements in achieving food security. In the recent past, climate change has affected seed viability in the entire world making it difficult for smallholder farmers to conserve their own seeds. This study was conducted in Chikhwawa district to examine factors that influence seed conservation among smallholder farmers in semi-arid areas of Malawi. A semi structured questionnaire and focus group discussions were used in which 200 households were interviewed. The results revealed evidence on the practice, importance, and future potential of seed conservation as a strategy for climate change adaptation. The study shows that 89% of the respondents use traditional seed conservation methods. These methods however, depend heavily on the local available materials which make them cost effective and hence positively contributing to food security. On the other hand the study observed that the local institutions are not engaged effectively in promotion of traditional seed conservation which might undermine their ability to address climate change effects. The study also showed that there is a link among poverty, gender and seed conservation as most poor female headed households were involved. Therefore the study recommended that more effort should be put in place to promote traditional seeds conservation methods. In addition, to improve the resilience of the local communities more emphasis should be put in empowering female headed households in seed conservation.

Key words: Seed conservation, Chinkwawa, Climate change

Changing Rice-based Farming Along With Labor Use Pattern: A Case From Climatically Vulnerable South-Western of Bangladesh

**M. Harunur Rashid¹; M. Khairul Islam Rony²; Debabrata Mahalder³; Shama Nasrin⁴;
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The affects of the climate change in the changing rice-based farming system and it's implication into the gender labour use pattern is an important component to explore for the improvement of the agricultural system in coastal ecosystem. A study was conducted in four villages of the south-western region of Bangladesh since this region is as usual and affected by the extreme climatic hazard like Aila and or Sidr on the productivity of rice-based farming and other agricultural products through focus group discussions followed by sample survey. The findings revealed that changes in climate affect the productivity of rice-based cropping systems and thus food provisioning goes down to 3-6 months. The influence of the society forced the poor farmers to cultivate shrimp with the intrusion of salt water which is further affected by Aila and Sidr. Therefore, the local people have adapted with the situation by adopting diversified farming and also various off-farm and non-farm activities. This has led men are migrating to other places for weeks to months which lead to women to cope with diversified workload. Meanwhile, this also created the social conflict on shrimp farming vs. crop or poultry farming as a secondary effect.

Key Words: Climate change, agricultural productivity, men and women labour

“Review Study of Climate Change and Food Security: Adaptation and Mitigation”

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This paper concern about the relationship between human environments and bio-geophysical, which lead to the production, processing, distribution, and marketing, resulting in food system that make food security. Climate change will affect all four dimensions of food security: food availability, food accessibility, food utilization and food systems stability. It will have an impact on human health, livelihood assets, food production and distribution channels, as well as changing purchasing power and market flows, its impacts will be both short term, resulting from more frequent and more intense extreme weather events, and long term, caused by unchanging temperatures and precipitation patterns. People who are already vulnerable and food insecure are likely to be the first affected. Agriculture-based livelihood systems that are already vulnerable to food insecurity face immediate risk of increased crop failure, new patterns of pests and disease, lack of appropriate seeds and planting material, and loss of livestock. Agriculture, forestry and fisheries will not only affected by climate change, but also contribute to it through emitting greenhouse gases. They also hold part of remedy, however; they can contribute to climate change mitigation through reducing greenhouse gas emissions by changing agricultural practices. So that it is necessary to strengthen the resilience of rural people and to help them cope with this additional threat to food security.

Keywords: Adaptation, Climate Change, Food Security, Food Systems, Vulnerability



Paper Session
05

29th November 2012

1300 - 1415

Climate Change and the Natural Environment

Session Chair - Pramod Gopinathan

1.	Ozone layer depletion and it's natural environment: a review	Pramod Gopinathan
2.	Relationship between monsoon cycle and particulate matter concentration in Kota Baharu, Kelantan.	Nik Norlizaini Mat Husin
3.	Changes of night time temperature over Iran	Hosein Asakereh
4.	Investigation of drought prone areas using TOPSIS method (A case study of Mazandaran province, Iran)	Shiva Mirdar
5.	Earth changes	Tarek Niazi

Ozone Layer Depletion and It's Natural Environment: A Review

Pramod Gopinathan¹

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Ozone depletion describes two distinct but related phenomena observed since the late 1970s: a steady decline of about 4% per decade in the total volume of ozone in Earth's stratosphere (the ozone layer), and a much larger springtime decrease in stratospheric ozone over Earth's polar regions. The latter phenomenon is referred to as the ozone hole. In addition to these well-known stratospheric phenomena, there are also springtime polar tropospheric ozone depletion events. Chlorofluorocarbons (CFCs) and other contributory substances are referred to as ozone-depleting substances (ODS). Since the ozone layer prevents most harmful ultraviolet-B (UV-B) wavelengths (280–315 nm) of ultraviolet light (UV light) from passing through the Earth's atmosphere, observed and projected decreases in ozone have generated worldwide concern leading to adoption of the Montreal Protocol that bans the production of CFCs. Ozone in the stratosphere is destroyed when it combines with chlorine, forming oxygen and chlorine monoxide. Most chlorine comes from CFCs came into use in 1930s as refrigerants, later as blowing agents for creating foam insulation, and as industrial cleaning agents. The loss of stratospheric ozone means that more solar UV radiation reaches the Earth's surface. Since UV radiation has been linked to skin cancer, there is a human health risk posed by ozone depletion. Long-term record keeping has shown a rise in the average global temperature over recent decades while other observations show an increase in greenhouse gases and thinning of the stratospheric ozone layer. Model predictions would say that within the next few years we should definitely see a slowdown in the thinning of the ozone layer.

Keywords: Chlorofluorocarbons [CFC's], Dobson, Ozone-Depleting, Spectrophotometer

Relationship Between Monsoon Cycle and Particulate Matter Concentration in Kota Baharu, Kelantan

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To address the strength of the relationships between monsoon cycle with PM-10 (particulate matter), Malaysia was categorized according to four different seasons namely Northeast monsoon (November-Mac), Intermonsoon (April), Southeast monsoon (May-September) and Second Intermonsoon (October). The average of micro-climate and PM-10 data set were carried out since 1997 until 2009 to investigate seasonal trend of PM-10 concentrations in each season. The micro-climate parameters including maximum temperature, minimum temperature, mean temperature, air pressure, humidity, precipitation, wind speed, maximum wind speed were correlated with PM-10. By using the IBM SPSS statistics 19 software, the correlation Pearson shows the monsoon cycle played a significant role as a factor causing the increase and decrease of the PM-10 concentrations. The most significant relationship was found during the Intermonsoon (April) by maximum wind speed parameters with 99% confidence level and contributed 49% reduction of PM10 concentrations in the atmosphere. The result suggested that PM10 concentrations was changeable caused by Northeast, Intermonsoon and Southeast monsoon.

Keywords : Monsoon Cycle, Micro Climate, PM-10 (particulate matter)

Changes of Night Time Temperature Over Iran

Hosein Asakereh¹ ; Ali Bayat²

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Global climate change has become one of the most visible environmental concerns of the 21st century. based on a variety of evidence, most scientists believe that the earth's climate is changing and is in fact heating up. However, there are considerable differences among the views with regard to the rate of change, the impact on our environment, and what can or should be done about it. There is now widespread agreement that the earth is warming, due to emissions of greenhouse gases caused by human activity. It is also clear that current trends in energy use development and population growth will lead to continuing – and more severe – climate change. In this study, night time temperature changes were studied over Iran. To investigate the night time temperature changes (least temperature) about 40 years over Iran, linear methods such as parametric and nonparametric methods were used. For this purpose, first using kriging method, annual 40-year night time temperature over Iran was interpolated. Then, by converting the interpolated map to the grid data, night time temperature changes were studied using the above mentioned methods.

Key words: Climate change, Night time temperature, Iran

Investigation of Drought Prone Areas Using TOPSIS Method (A Case Study of Mazandaran Province, Iran)

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^{2,3}*Department of Irrigation and Reclamation, University of Tehran, Iran.*

The sustainable management of drought requires identifying the drought prone areas by several drought characteristics. In this paper, drought prone areas were identified at 53 selective rain-gauge sites at Mazandaran province. For this purpose, at first, the Standardized Precipitation Index (*SPI*) was computed in different time scales, i.e., 3-, 6- and 12-month, for all studied sites during 30-years period (1979-2008). Secondly, the truncation level -0.5 was applied to the *SPI* time series to separate drought periods. Then four drought characteristics: duration, severity, magnitude, and peak were calculated to each drought period. From these data, the drought prone areas were identified using a technique for order preference by similarity to ideal solution, which is called TOPSIS, a multiple criteria method. According to the results of TOPSIS ranking, in spite of increasing drought duration and magnitude by increasing the *SPI* time scales, drought frequencies were decreased. Additionally, all drought characteristics increased in movement from east (regions with less precipitation) towards west (regions with more precipitation). Also the most prone areas were identified at the west of province based on average of drought characteristics but in using of three most severe droughts characteristics the most prone ones were identified at the east.

Keywords: Drought Prone Areas, Drought Characteristics, TOPSIS Algorithm

Earth Changes

Tarek Niazi¹

¹*Contegra, Dubai*

The full research is published in 2009 in a book titled “More Than 60 Minutes- When Earth Stands Still”. It addresses the chain of events leading to increased quakes, global warming, climate change and tilting of the temperature belts. It reaches conclusive evidence of the geophysics that govern our planet and make it spin, form the temperature belts and practice global warming and climate change. <http://www.planet-earth-2017.com> . It explains: Why Earthquakes above 6 Richter increased 25 fold in ten years, How the Temperature Belts of homogenous climates are formed, Why North America is getting warmer while Siberia is getting colder, The relation between the weakening of Earth Magnetic Field and Global Warming, That the Earth’s Inner Core is a dipole magnet and that the Earth’s Outer Core induces 2 south magnets, What makes Earth to spin about its axis, speed up at times and slow down at times, What is the cycle of “climate exchange”, How ancient text, in holy books, spoke of several Climate Changes, What wrong did the scientists do when deciphering the Mayan Calendar.

Keywords: Climate Change, Earth Sciences, Earth Spin, Earthquakes, Global Warming



Paper Session
06

Climate Change and Built Environments

29th November 2012

1415 - 1515

Session Chair - Prof. Paul Hoole

1.	The use of synthesised indicator sets to understand climate justice impacts in an intra national context: Methodological perspectives	Poshendra Satyal
2.	Climate change and city development: the role of local government to build a resilient city	Ratri Sutarto
3.	Sustainability in the building industry: A review on the implementation of life cycle assessment	Ahmad Faiz ABD Rashid
4.	Impact of climate change on right to housing: An approach on minimum core obligation and progressive realization	Md Abdul Awal Khan

The Use of synthesised Indicator Sets to Understand Climate Justice Impacts in An Intra-National Context: Methodological Perspectives

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^{1,2,3} *Crichton Carbon Centre, Maxwell House, Crichton University Campus, Scotland.*

^{1,2,3} *ClimateXChange – Scotland’s Centre of Expertise on Climate Change, Scotland.*

In an effort to develop a climate justice frame to help understand how equity and justice considerations relate to the performance of climate change mitigation policies, plans and proposals in an *intra*-national context of Scotland, we carried out an exercise to identify relevant indicators that can be used to characterise and manage the nature and degree of differential impacts. For this purpose, we have reviewed a large number of earlier *inter*-national studies, short listing those indicators that remain relevant in the *intra*-national context. These have been used to assess policy impacts on two climate justice target groups: a) Communities of Living - homes and communities - and b) Communities of Working – private and public sectors. In this paper, we discuss the rationale and approach behind selecting and adapting these indicators for our work. In so doing, we argue that it is possible to develop a comprehensive Climate Justice Index to understand the cumulative impacts of climate change mitigation policies across various scales, sectors and target groups. The methodological perspectives discussed in this paper can be useful in studies of climate change and social issues elsewhere, particularly in assessing the likely ‘winners’ and ‘losers’ of policy implementations.

Key words: Household indicators, Business indicators, Climate justice impacts

Climate Change and City Development: The Role of Local Government to Build Resilient City

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Local governments play a prominent role in building city resiliency. Their power in developing cities’ plans, policies, and programs (PPP) will affect the future of the city. Asian Cities Climate Change Resilience Network (ACCCRN) program sees this as a potential that needs to be captured in order to mainstream Urban Climate Change Resilience (UCCR) concept into cities’ planning outcomes. The engagement processes a key aspect of program inception because government commitment became the primary filter for city selection. Successful engagement should lead to budget allocation for climate change programs and integration of UCCR into city planning. Furthermore, an expanding awareness of climate change can also touch external parties to local government networks, which then contributes in shaping the city’s future. This network’s effect can also induce external funding for climate change issues, for example from the central government or international donors. Ensuing policies and funds then support UCCR concept implementation by providing opportunity to conduct diverse projects such as building rainwater harvesting system, developing flood early warning systems, and strengthening community adaptive capacity. Without government support, the implementation of adaptation actions and its sustainability will be harder, if not impossible, to achieve.

Key words: Government, Adaptation action, Climate Resilience Strategy

Sustainability in the Building Industry: A Review on the Implementation of Life Cycle Assessment

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^{1,2} *Department of Civil Engineering, Faculty of Engineering, University of Malaya, Malaysia.*

A recent study suggested that buildings globally consume up to 40% of energy and responsible for half of world greenhouse gas emission. The introduction of life cycle assessment (LCA) to the building industry is important due to its ability to systematically quantify every environmental impact involved in every process from cradle to grave. Within the last decade, research on LCA has increased considerably covering from manufacturing of building materials and construction processes. Currently, the implementations of LCA are diverse and fragmented due to unspecific methodologies used for different type of buildings and locations. The aim of this paper is to review selected journal articles from the year 2000 in order to identify LCA methodologies used and to distinguish which phases and materials that affect significantly to the environment. The result shows that most LCA research basic methodology is based on International Organization of Standardization (ISO) 14040 series with variation. It is found that operational phase consume highest energy and concrete responsible for the highest total embodied energy and environmental impact. Therefore, the implementation of LCA can help to identify areas that need improvement thus can lead to sustainability in the building industry in the future.

Keywords: Life Cycle Assessment, Building Industry, Sustainability

Impact of Climate Change on Right to Housing: An Approach on Minimum Core Obligation and Progressive Realization

Md Abdul Awal Khan¹

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To expect a decent, standard and adequate living space for oneself and the future generation is a part of human instinct. Housing rights do not refer to mere shelter rather than the terms security, privacy, peace and dignity are interconnected to it. Climate change affects directly the right to adequate housing in several ways. International legal and human rights provisions in regard to housing rights are too general and not specifically focused on climate change related aspects. This paper argues that there should be a minimum standard before the state party which could be followed as principle for ensuring housing rights for the citizens to formulate their national housing plan, legislation and strategy. Thus, this paper will investigate the gaps of existing international provisions on housing rights in regard to climate change. The paper will further aim to focus on minimum core obligation and progressive realization theory to ensure sustainable development in right to housing.

Key words: Climate Change, Right to Housing, Minimum Core Obligation.

VIRTUAL PRESENTATION



Virtual Session

<http://www.youtube.com/user/ICRDSRILANKA>

1.	Gender Sensitivity of Government and Households' Response to a Typhoon Event in the Philippines	Dr. Linda M. Peñalba
2.	Climate Change and Livelihood Patterns of Rice Farmers	Dr. Linda M. Peñalba
3.	Tendencies in Precipitation and Snow Cover change across Southwestern Islamic Republic of Iran	Mohammad Zarenistanak

Gender Sensitivity of Government and Households' Response to a Typhoon Event in the Philippines

Dr. Linda M. Peñalba¹

¹*College of Public Affairs and Development, University of the Philippines Los Baños.*

Climate change poses serious challenges to government and households in the Philippines. Thus, it is important to determine its impacts on households and the corresponding adaptation actions of government, men and women to determine gender-sensitive measures that can enhance resilience and adaptive capacity of affected sectors. Gender-disaggregated data that were collected through interview with husbands and wives were used to determine the impact of Typhoon Nock-ten, the household's response strategies and the willingness of men and women to pay for different adaptation options. Data on government response actions were gathered through key informant interviews. Gender lens was used in the analysis in order to elicit the difference between their household decision making patterns, the activities that the husbands and wives undertook, their perception about preparedness and adaptive capacity, and their willingness-to-pay for three different adaptation options that could help them prepare for future hazards. The assistance available to households from various sources was also analyzed to determine its sensitivity to address the different needs of men, women and children. It also discusses the magnitude of damage and income loss to households. Gender-sensitive recommendations were provided to ensure that the government response strategies take into consideration the need, particularly of women.

Keywords: Gender, Adaptive Capacity, Philippines, Adaptation

Climate Change and Livelihood Patterns of Rice Farmers

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The Philippines is among the Asian countries whose exposure to climate risks seriously threatens the agricultural sector, particularly production of rice, the country's staple food. The paper generally presents information on the impacts of climate change related-events not only on rice production but also on other livelihood sources. Livelihood opportunities ideally should shield the farmers from climate related risks but this depends on the households' resource endowment or capacity. Vulnerability may differ seasonally or at different times across groups or individuals owing to their livelihood activities or social standing as well. Risks also differ spatially such that impacts on lowland irrigated farms will differ from those in rainfed and upland farms. The paper also discusses household adaptation options and access to external support. It examines the social, economic and political factors that affect households' access to climate change adaptation options. The analysis is based on a survey of rice farmers in three rice production environment, i.e., irrigated lowland, rainfed lowland, and rainfed upland in two major rice producing provinces in Luzon region. It recommends policy actions that could enhance adaptive capacity and access to livelihood opportunities to mitigate climate change impacts.

Keywords: Food Security, Livelihood And Climate Change

Tendencies in Precipitation and Snow Cover change across Southwestern Islamic Republic of Iran

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Trends in precipitation and snow cover were evaluated for southwestern part of Iran, particularly the states of Isfahan, Charmahal-va-Bakhtiary, Kohkilooye-va-Boierahmad, Lordestan and Khozestan. These areas contribute significant amount of the fresh water supply in Iran. Any negative change in climate, particularly precipitation and snow cover would affect this precious source of water in the area. Statistical techniques which were applied included Mann-Kendall rank test, sequential Mann-Kendall test, linear regression and t-test for evaluating trends. Satellite imageries and GIS were utilized to analyze change in snow cover. The results indicated that precipitation trends were positive but were not significant statistically. Analysis of snow cover change indicated negative insignificant trend for March and April, and positive insignificant trend for January, February and December. Projections were attempted using Centre National de Recherches Meteorologiques (Cnrm), European Center Hamburg Model (Echam), Model for Interdisciplinary Research on Climate (Miroch) and United Kingdom Meteorological Organization (Ukmoc) models under B1 and A1B scenarios. The result shows that precipitation and snow cover will decrease at the end of this century.

Keywords: Climate change, Precipitation, Snow cover