THE GOBESHONA CONFERENCE FOR RESEARCH ON CLIMATE CHANGE IN BANGLADESH

08-11 January 2016

DHAKA, BANGLADESH

CONFERENCE PROCEEDINGS

Editors: Masroora Haque, Mohammad Nazmul Chowdhury, Zinat Fatima, Iffat Korobi, Tamanna Disha

Contributors: Akif Khan, Ishrat Binte Mahmud, Jennifer Khadim, Luthfun Nahar, Meraz Mostafa, Muniyat Haque, Riadadh Hossain, Sharmin Ahmed, Uwe Roth, Zinia Jahan

Designer: Masroora Haque

Photographers: Syed Tasfiq Mahmood, Istiakh Ahmed, Tanzinia Khanom, Meraz Mosta

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ICCCAD
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at
Independent University, Bangladesh
In partnership with BCAS and IIED

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This publication is based upon the outcomes of the conference and has been compiled from the notes taken by the session chairs and respective rapporteurs. The publication is a summary from the organizers' point of view, and does not necessarily express the views of each individual participant. Presentations made during the sessions of the conference are available at http://gobeshona.net/event/gobeshona-conference-2016

International Centre for Climate Change and Development (ICCCAD)
at
Independent University, Bangladesh (IUB)

Venue: Plot 16, Block B, Aftabuddin Ahmed Rd, Bashundhara R/A, Dhaka, Bangladesh
Phone: +88-02-8431645 - 53, +88-02-8432065 - 76
Fax: +88-02-8431991
Email: gobeshona.bd@gmail.com
Web: http://www.gobeshona.net/
http://www.icccad.net/
http://www.iub.edu.bd/

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1. BACKGROUND

'Gobeshona' was launched in June 2014 as a knowledge platform for people and institutes doing research on climate change in Bangladesh to share their findings, ideas and to address the quality of related research produced in Bangladesh. Gobeshona aims to make research on climate change more effective in informing policy and practice. The initiative was developed through a series of discussions, hosted by the International Centre for Climate Change and Development (ICCCAD) at the Independent University, Bangladesh (IUB) and organizations from across sectors those who now are the Gobeshona Steering Committee. The Gobeshona Steering Committee guides and governs the initiative and remains committed to the production and effective use of quality research on climate change in Bangladesh. Members of the Steering Committee include: BRAC, IUB, ICCCAD, IIED, Practical Action, World Fish, Waste Concern, Islamic Relief Bangladesh, BRAC University, WaterAid, Centre for Climate Justice, ULAB CSD, NSU, DUET, BCAS, Shahjalal University, VSO, RAJUK, Wageningen UR, Christian Aid, Khan Foundation, Save the Children, BBC Media Action, CCDB, icddr,b, CKB, and Government of Bangladesh.

The initiative includes: an annual conference and monthly seminar series, which have had impressive contributions and participation from this valuable and thriving community; the Gobeshona web portal - www.gobeshona.net and the Gobeshona Young Researchers Programme.
The second Gobeshona Annual Conference for Research on Climate Change in Bangladesh was held at the Independent University, Bangladesh, from 8-11 January 2016. The conference was preceded by the first Gobeshona Young Researcher Programme's last workshop, on 6 January 2016. The workshop reflects the last in a series of activities intended to engage young researchers, and enhance the quality of the research they are undertaking. Furthermore 7 January was the first workshop for the second batch of Gobeshona Young Researcher Programme.

The conference brought together practitioners, researchers, academia, government and media to connect share and provide critical reflections and discussion around topical research issues. From 8-10 January, individual thematic sessions, hosted by institutes conducting research on climate change in Bangladesh, updated participants on the current state of knowledge on a diverse range of interrelated topics. 11 January 2016 was Science Policy Dialogue Day, conducted by the government. This provided different departments of the Ministry of Environment and Forests with the opportunity to present their latest research. Each host took responsibility for the co-ordination of their session, enabling ownership and deep engagement in the conference. The conference was graced by the presence of a number of nationally and internationally renowned special guests, who gave their insights throughout a series of keynote presentations. Alongside this, an impressive range of researchers, from students to early career professionals and senior researchers gave presentations on their latest research findings. The conference is being an annual event with the next one to be held on 8-11 January 2017 at the Independent University, Bangladesh.

The next conference will build upon the strengths of the last conference, engaging researchers alongside policy makers, implementing agencies and support organizations. It will also aim to evaluate research and address policy needs and gaps to find effective ways to move forward in tackling climate change. This publication provides a summary of the proceedings of the Gobeshona 2nd Annual Conference for Research on Climate Change in Bangladesh, 2016. It also provides food for thought for future research objectives and areas of focus for next year's conference and beyond.

2. PROGRAMME SUMMARY

DAY 1 – FRIDAY, 08 JANUARY 2016 - RESEARCH ON CLIMATE CHANGE IN BANGLADESH			
09:30-10:45	**INAUGURAL SESSION** Location: Auditorium		
10:45-11:15	TEA BREAK	**REGISTRATION** FOR THE PARTICIPANTS OF GOBESHONA CONFERENCE 2016	
11:15-12:45	PLENARY SESSION 1: NATIONAL ADAPTATION PLANNING Location: Multipurpose Hall by **ICCCAD AND BCAS**		
12:45-14:15	LUNCH AND PRAYERS		
14:15-15:45	PARALLEL SESSION 1: **LIVELIHOODS** Location: 5002, Level 4 by ISLAMIC RELIEF	PARALLEL SESSION 2: **GENDER** Location: Room 7002, Level 6 by **BCAS AND UN WOMEN**	PARALLEL SESSION 3: **MODELLING** Location: Multipurpose Hall by **RAJUK**
15:45-16:00	TEA BREAK		
16:00-17:30	PLENARY SESSION 2: **COASTAL ZONE** Location: Multipurpose Hall by **CCDB**		
19:00-21:00	**RECEPTION AND DINNER:** Venue: Hotel ASCOTT Palace, H#14, R#6, Block K, Bandhara by **ICCCAD**		
DAY 2 – SATURDAY, 09 JANUARY 2016 - RESEARCH ON CLIMATE CHANGE IN BANGLADESH			
9:00 – 9:30	**REGISTRATION**		
9:30-11:00	PLENARY SESSION 3: **MIGRATION** Location: Multipurpose Hall by **BCAS AND IOM**		
11:00-11:30	TEA BREAK		
11:30-13:00	PARALLEL SESSION 5: **DRR** Location: 5002, Level 4 by **CSD-ULAB**	PARALLEL SESSION 6: **HEALTH** Location: Room 7002, Level 6 by **ICDDR,B**	PARALLEL SESSION 4: **LOCAL ADAPTATION** Location: Multipurpose Hall by **BCAS**
13:00-14:00	LUNCH		
14:00-15:30	PARALLEL SESSION 7: **WATSAN** Location: 5002 Level 4 by **WaterAid**	PARALLEL SESSION 8: **Waste MANAGEMENT** Location: Room 7002, Level 6 by **IUB**	
15:30-16:00	TEA BREAK		
16:00-17:30	PLENARY SESSION 4: **Loss and Damage** Location: Multipurpose Hall by **ICCCAD AND NSU**		
DAY 3 – SUNDDAY, 10 JANUARY 2016 - RESEARCH ON CLIMATE CHANGE IN BANGLADESH			
9:00 – 9:30	**REGISTRATION**		
9:30-11:00	PLENARY SESSION 5: **POLITICAL ECONOMY AND CLIMATE FINANCE** Location: Multipurpose Hall by **International Institute for Environment and Development (IIED)**		
11:00-11:30	TEA BREAK		
11:30-13:00	PARALLEL SESSION 10: **RENEWABLE ENERGY** Location: 5002 Level 4 by **IUB**	PARALLEL SESSION 11: **ECOSYSTEM** Location: Room 7002, Level 6 by **CRELL AND BCAS**	PARALLEL SESSION 9: **NRM** Location: Multipurpose Hall by **SUST**
13:00-14:00	LUNCH		
14:00-15:30	PARALLEL SESSION 12: **ADAPTATION TECHNOLOGY** Location: 5002, Level 4 by **CCDB**	PARALLEL SESSION 13: **MITIGATION** Location: Room 7002, Level 6 by **IUB**	
15:30-16:00	TEA BREAK		
16:00-17:30	PLENARY SESSION 6: **URBANIZATION** Location: Multipurpose Hall by **ACCCRN**		
DAY 4 – MONDAY, 11 JANUARY 2016–SCIENCE POLICY DIALOGUE DAY			
9:00 – 9:30	**REGISTRATION**		
9:30-10:30	SESSION 1: **INTERNATIONAL EXPERIENCES**, Location: Multipurpose Hall		
10:30-11:00	TEA BREAK AND GROUP PHOTO SESSION		
11:00-12:00	SESSION 2: **NATIONAL CLIMATE PLANNING**, Location: Multipurpose Hall		
12:00-13:00	SESSION 3: AFTER PARIS, Location: Multipurpose Hall		
13:00-14:00	LUNCH		
14:00-15:30	SESSION 4: CLIMATE FINANCE, Location: Multipurpose Hall		
15:30-16:00	TEA BREAK		
16:00-17:30	CLOSING SESSION: Location: Auditorium		
18:30-21:00	CERTIFICATE AWARD CEREMONY AND DINNER, Venue: IUB , by ICCCAD		

3. SESSION SUMMARIES

Day 1 - Friday, January 8, 2016

3.1 INAUGURAL SESSION

Chair: **Dr. Ainun Nishat**, Professor Emeritus, BRAC University

Welcome: **Dr. Saleemul Huq**, Director, ICCCAD
Prof. M. Omar Rahman, Vice Chancellor, IUB

Special Guest: **Dr. Karl Wurster**, Deputy Director Economic Growth, Environment and Climate Change Team Leader, USAID, Bangladesh

Chief Guest: **H.E. Mrs. Sophie Aubert**, Ambassador, Embassy of France, Dhaka

Dr. Saleemul Huq ceremonially inaugurated the Second Annual Gobeshona Conference for Research on Climate Change in Bangladesh. The first and most important goal of the conference is to improve research done by Bangladeshi researchers in the field of climate change. Gobeshona tries to help young researchers of the country to publish their research in peer-reviewed journals.

The panel at the inaugural ceremony

Dr. Huq emphasised that it is already the 3rd day of this year's Gobeshona Conference, since the Young Researchers' Workshops took place the last two days. The first batch finished the 2015 workshop two days ago and the second batch started the new workshop the day before the main part of the Conference started. These workshops help the participants publish, and enhance the quality of their papers. Sharing knowledge and experience were the second goal of the Gobeshona articulated by Dr. Huq. The Gobeshona web portal - www.gobeshona.net is a database of over 1000 publications of researcher concerning climate change in Bangladesh. Additionally, the portal offers the possibility for young researchers in Bangladesh to share information about their ongoing research activities, and therefore stay up-to-date as well as to share information and knowledge regarding their research.

The following three days remain the core of the Gobeshona Conference, ending with a policy dialogue where the findings will be presented to decision makers. Dr. Huq spoke about COP 21 in Paris, which he summarized as being very successful. He praised France's role in the negotiations, particularly the French President and thanked the French Ambassador in Dhaka for organizing in country events. Bangladesh was able to represent its position regarding climate change. According to Dr. Huq, the latter was possible because the community in Bangladesh organized itself over the last year regarding climate change. So the Gobeshona Conference is a very important part of that and should also improve throughout the years. Climate change is very much in the minds of Bangladeshi as revealed by media coverage. With the regular issue on climate change in the Dhaka Tribune, produced by ICCCAD, and with 20 Bangladeshi journalists being at COP, Dr. Huq highlighted why the Bangladeshi audience is

more aware of climate change than any other country in the world.

Prof. M. Omar Rahman explained why the Gobeshona Conference is perfectly situated at IUB. Gobeshona corresponds to the spirit of the university by promoting two main concepts: research and global partnership. Prof. Rahman is very happy that the focus is on young researchers, since this is an example of long term commitment and makes the Gobeshona programme very sustainable. Gobeshona manages to move away from ivory tower research by drawing in policymakers and development practitioners into the conversation. Research is only about asking the right questions and in the second step mobilizing facts to be able to answer the questions. Climate change, one of the greatest global threats, is definitely an issue which needs to be researched. Prof. Rahman stated: "We don't have a choice anymore".

Dr. Karl Wurster, Deputy Director Economic Growth, Environment and Climate Change Team Leader at USAID congratulated the organizers of the conference and started by repeating the key object of Gobeshona: to get quality research in Bangladesh regarding climate change. He shared his experiences as a researcher and linked this to the spirit of Gobeshona.

Mrs. Sophie Aubert, Ambassador for the Embassy of France in Dhaka, presented an analysis of the Paris agreement. In her view, the 21st Conference of Parties (COP21) was a momentous event where global partners recognized there is the need for a global effort to change the world. Having an agreement through this recognition is the biggest success of COP21. COP21 saw willingness of policymakers not only to concentrate on financial issues, but also to involve the private sector and NGOs. Nevertheless, according to Mrs. Aubert, the Paris Agreement is the most balanced agreement that we could have.

H.E. Mrs. Sophie Aubert, Ambassador of France to Bangladesh

Dr. Nishat stated that research in Bangladesh is more difficult than in Europe or the USA. He suggested academic supervisors are often at fault. They usually give the students too broad a field of study to concentrate on and do not guide adequately through the research process. He also advised students to avoid plagiarism. He stressed the importance of a thorough literature review. Gobeshona already offers help through its online database of climate change literature. Dr. Nishat wished a fruitful discussion over the next days, and hopes some of the papers resulting from Gobeshona will find their way into the reference list of the IPCC 6th assessment report.

Dr. Ainun Nishat delivering his remarks at the inaugural ceremony

Dr. Karl Wurster addressing the participants at the inaugural ceremony

3.2 PLENARY SESSION 1: NATIONAL ADAPTATION PLANNING

Hosts: International Centre for Climate Change and Development (ICCCAD)
Bangladesh Centre for Advanced Studies (BCAS)

Eliza Drury from Brown University explaining the GVA model

Chair: Dr. Atiq Rahman, Executive Director, BCAS
Presenters:

- **Eliza Drury:** Leveraging geographic vulnerability analysis for national adaptation planning
- **Mohammed Faruque Uddin:** Community Based Organizations (CBOs) and community adaptation under catastrophic events: A study from northeastern Bangladesh.

The Chair, Dr. Atiq Rahman started with stating the stark reality of climate change: that if global mitigation efforts are inadequate, a much higher level of adaptation will be required across the world. A strong national plan of adaptation is therefore critical for every country as it provides a means for ensuring adaptation measures are implemented, monitored and effective. Successful adaptation will require strong structures and systems be established. National planning should strive to reduce the stress of climatic impacts while enhancing the capabilities of the various elements of society and at all levels .

Eliza Drury from Brown University presented on Geographic Vulnerability Analysis (GVA), a tool developed by researchers at her university which can be used for vulnerability mapping in Least Developed Countries (LDCs). Vulnerability - as defined by the IPCC- is a function of exposure, sensitivity and adaptive capacity. The third factor is crucial for future planning, yet is often overlooked. She then briefly delineated on the workflow of the National Adaptation Plan (NAP) process, highlighting that it generally adopts a sectoral approach, failing to account for the multidimensional and interconnected components of vulnerability, and also ignores local geographic context. To address these issues, GVA was developed as a tool that uses location as a unit of vulnerability and attempts to synthesize all three components of vulnerability into a single geographic map. She briefly explained the four steps of GVA, starting from data collection and conversion to producing a vulnerability map. She stated that the strength of GVA lies in the fact that is highly flexible and can be applied at all geographic scales. GVA also allows one to determine the interrelationships between different indicators and also helps understand unique country requirements. She referred to the context of Bangladesh where vulnerability varies from region to region. Therefore, a tool such as GVA can help provide policymakers, planners and implementers with a sound understanding of vulnerability in a particular geographic location, and can hence be a highly beneficial instrument for composing an effective national adaptation plan.

Mohammad Faruque Uddin delivered the findings from a study he conducted in the Haor areas of South Sunamganj and Hakaluki, where he focused on the participatory management of common pool resources. The aim of the study was to understand the influence of local institutions such as CBOs and the associated power relations in community adaptation. His argument was that, in any area, CBOs should include relevant stakeholders and failing to do so can lead to marginalization and exclusion. By conducting simple surveys, FGDs and KIIs, he discovered that a significant percentage of the population were fishermen in these areas. However, only a very small proportion of them were included in the CBOs. He also observed a prevalence of elite capture. Although, conservation

and productivity of common resources have improved due to the establishment of CBOs, it has also perpetuated inclusion and exclusion errors, resulting in successful adaptation for certain groups, especially those who were part of the CBOs, while causing maladaptation for others. He concluded his presentation by suggesting inclusionary practices should be adopted at all levels to ensure successful adaptation.

The panel discussing tools for National Adaptation plans

Following the presentations, a robust discussion ensued, largely on the pervasiveness of elitism and exclusionary power structures in the country. The chair remarked that this issue very much mirrors the global scenario of climate change, wherein the actions of the rich and powerful affect the poor and vulnerable. The chair then wrapped up the session by acknowledging strong methodologies are vital for national adaptation planning and that assessment of vulnerability should be participatory, inclusive and gender sensitive. Referring to the challenge of insufficient data on Bangladesh, he recommended that the focus should be on the quality of data rather than the quantity. Finally he believes, as climate change continues to exacerbate and its impacts become increasingly global, it is imperative that every country, irrespective of rich or poor, develops their own NAPs.

3.3 Parallel Session 1: CLIMATE CHANGE AND LIVELIHOODS

Hosts: **Christian Aid and Islamic Relief, Bangladesh**
Gibika, ICCCAD

Chair: **Shabel Firuz**, Country Director, Islamic Relief, Bangladesh

Moderator: **Dr. Abu M. Ekramul Ahsan**, Former Executive Chairman, Bangladesh Agricultural Research Council (BARC)

Presenters:

Sonia Ferdous Hoque, PhD Student, School of Earth and Environment, Poverty and 'Double Vulnerability': Understanding Livelihood Strategies Across Socioeconomic Groups in Southwestern Bangladesh.

Munirul Islam, Programme Manager, Climate Change and Disaster Resilience Program, Livelihood Security in a Changing Climate: Insights from Farmers' Field Laboratories.

Ms. Farzana Rahman, Lecturer, Centre for Climate Change and Environmental Research, BRAC University, Climatic Shocks on Local Market Systems: Experience of Northern 'Char' Areas in Bangladesh.

Sonia Ferdous Hoque presented the findings from her PhD study, titled "Understanding Livelihood Strategies Across Socio-Economic Groups in South-Western Coastal Bangladesh." The study analysed how livelihood strategies adopted by one socio-economic group impinges on the adaptive capacity of another group. This research was carried out in two selected unions of coastal Bangladesh- Mithakhali and Kamarkhola. The study showed that increased climate variability affects existing farming systems as well as livelihood strategies. The asymmetric resource ownership and power imbalances suffocate the agency of the poor people to pursue their desired livelihood strategies. Good leadership and

institutional support is needed to prevent powerful farmers from pursuing their vested interests and support transformational adaptation that is desirable for the majority of households. Technical support and knowledge dissemination is highly necessary to enable farmers to make successful transitions to new livelihoods.

The panel at the livelihoods and climate change session

Munirul Islam presented the paper titled, "Livelihood Security in Changing Climate: Insights from Farmers' Field Laboratories". This study uncovers climate-induced natural hazards are emerging as a major concern, particularly in the coastal and Haor areas of Bangladesh. There is growing evidence that these hazards are appearing more frequently, and are expected to be detrimental for agriculture. Given the threat to livelihoods, Farmer Field Laboratory (FFL) approach was launched by Islamic Relief, Bangladesh. FFL is an extension approach, which provides opportunities to farmers for improving their skills through practicing various techniques by themselves. The presentation highlighted socio-economic impacts of Farmers' Field Laboratory, contrasting FFL beneficiary group and non-beneficiary groups. Employment activity, crop production, food security with nutritional requirements ameliorate along with income increasing, after adopting this new coping mechanism. Other farmers in the locality have started to adapt with FFL as a regional culture or sustainable coping strategy; that need stronger collaboration and harmonization with extension service interventions if sustainability is expected to be achieved.

Farzana Rahman's presentation titled, "Climatic Shocks on Local Market Systems: Experience of Northern 'Char' Areas in Bangladesh". Rangpur, Shirajgonj and Gaibandha from northern part of Bangladesh were selected for agricultural value chain analysis. Farzana stated that diversified climatic shocks such as floods, erratic rainfall hamper agricultural production, deteriorate production quality, damage market infrastructure such as road networks, and inundate market places. To continue their business with all of these climatic shocks both local farmers and forward market actors get involved in temporary businesses to reduce costs as well as to offset the loss. Sometimes they change the market place and even use savings or take loans for an immediate solution. There is no policy insurance currently for Char market settlements as a coping strategy for victims. To reduce shocks in local markets in the Char areas, Emerging Market Mapping Analysis (EMMA), private- community based product storage, Char specific planning were recommended by the presenter.

The audience watching the video from the Gibika project

Following the sessions, ICCCAD's Gibika project showed a video documentary based on their research on the livelihoods of coastal people in Bangladesh.

The chair Mr. Shabel Firuz summarized the session and explained that partnership or linkage between local farmers and extension service providers will improve the long term sustainability of climate adaptive livelihood options. A stronger collaboration and harmonization with private sectors, extension service providers and local farmers should be explored.

3.4 PARALLEL SESSION 2: GENDER

Hosts: **Bangladesh Centre for Advanced Studies (BCAS)**
UN Women Bangladesh (UNWB)

Chairs: **Dr Atiq Rahman,** Executive Director, Bangladesh Centre for Advanced Studies (BCAS)
Dilruba Haider, Coordinator, Gender and Climate Change, UN Women Bangladesh

Presenters:

- **Nazzina Mohsin:** Senior Research Officer, Bangladesh Centre for Advance Studies (BCAS), Union Disaster Management Committees (UDMCs): Understanding the roles of women members of the UDMC

- **Amy MacMahon:** PhD candidate, University of Queensland, Gender relations and climate change adaptation in Bagerhat

- **Eshrat Sharmen Akand:** Senior Programme Officer, Christian Aid, Climate change impacts on women and gender responsive adaptation in Bangladesh

Amy MacMahon presenting at the gender and climate change session

Nazzina Mohsin's highlighted gender gaps in addressing climate change challenges in rural communities of Bangladesh. The Union Disaster Management Committee (UDMC) under the Standing Orders on Disasters (SOD) consists of both male and female members where women's participation has been considered a crucial element for the impacts of natural disasters. Less rights for women mean less participation and decision making capacity in the disaster risk reduction process. Another factor that influences and establishes women's role in the community is the existing patriarchal family system. A study shows that the number of deaths during 171 natural disasters between the years 1978 and 2005 in Bangladesh consisted of mostly women. Another finding was that men and women have different perceptions regarding women's condition. Women are considered the natural caregivers and this holds true during natural disasters. Limited or no access to financial capital usually leads women to more vulnerable situations. A change in the men's perceptions of women's roles will make things a lot difference both in the UDMC and in the society.

Amy MacMahon's presentation was a sociological analysis of how women are involved in the adaptation initiative in four villages in Bagerhat. Using a neoliberalism approach, it emphasized the importance of combining climate change research with gender concern for swift development opportunities. Using a qualitative research method, it was proven that women in general are facing 'double burdens' in regards to a lack of knowledge during extreme events while also experiencing violence during natural disasters. Men face a limited number of finance-related challenges such as the cost of water for irrigation, or cost of food or livestock. On the other hand, women face a number of problems which are directly related to their survival, for example the lack of land ownership or decision making power makes women the prime victims during natural disaster. Adaptation measures such as growing sunflowers, raising poultry over fish ponds, making handicrafts were recognized as key components in solving the gender sensitive aspect of climate change. But the decision-making

process still lies with the male members of the family.

The third presentation focused on exploring the risk, vulnerability and adaptive capacity of women in different flood prone and drought prone areas. At the same time, it stressed the potential role women might play in the local adaptation planning. The Participatory Vulnerability Capacity Assessment (PVCA) tool was used to assess the climate change impact on women, which would further help develop the gender responsive adaption action plan. Women's role in the rural society is quite diverse. They are the main caretaker of their family members as well as providers of food. But at the same time, women have limited power in decision making and no land rights. Poverty lies at the centre of vulnerability that makes women susceptible. Women face challenges such as shortage of drinking water, food and fuel, poor health due to using saline water during menstruation and sanitation remains a big problem during the disasters. A combination of gender sensitive adaptation and mitigation measures from both the governmental and the non-governmental organisations are necessary for improving women's situation.

The discussion and Q & A session brought out some important elements. One was the gap in perceiving women's condition during disasters. There is a lack of respect and support for women with respect in Bangladesh's social system. It was also pointed out that the mortality rate of women during natural disasters is higher than the males. A suggestion brought about the issue of equal participation of men beside women in advancing gender equality in Disaster Risk Reduction. The moderator Dilruba Haider stressed the issue of changing the outlook of both parents and the society when they have a daughter since half of the total population in Bangladesh consists of women. Women should voice their issues which will ultimately feed into the development process hence the climate change issues.

3.5 PARALLEL SESSION 3: CLIMATE MODELLING

Hosts: **Rajdhani Unnayan Kartripakkha (RAJUK)**

Chair: **Mr. Kamrul Hasan Sohag**, Deputy Town Planner, RAJUK

Moderator: **Ms. Tamanna Mishu**, Assistant Authorized Officer, RAJUK

Presenters:

Animesh Kumar Gain: Impact of climate change and upstream development on water security in Bangladesh

Shammi Haque: Future changes of flash floods in the northeast region of Bangladesh using HEC-HMS Modeling

Ali Shafqat Akanda: Understanding hydroclimatic extremes over Bangladesh with new gridded products and daily bias correction of CMIP5 regional climate projections

Dewan Abdul Quadir: Recent changes in temperature and rainfall trends and variability in Bangladesh.

The Chair, Mr. Kamrul Hasan Sohag in his opening remarks highlighted the importance of climate change modelling work and discussed how modelling can be useful in planning future activities. The first presentation of the session was "Impact of climate change and upstream development on water security in Bangladesh" by Dr. Animesh K. Gain. His work intended to assess the current water security situation in Bangladesh. Water security in the context of his work was defined as "the

availability of sufficient quantity of safe and quality water resources." An aggregated global water security index developed during the study was presented. The index showed that Bangladesh has a low water security. The index also represented integrated strategies to increase water security and to achieve water related targets of SDGs that are required in Bangladesh.

Ms. Shammi Hoque during her presentation discussed future changes of flash flood in the North East region of Bangladesh. The study used HEC-HMS Model-a semi-distributed hydrological model used to simulate precipitation-runoff process. Using the HEC-HMS a hydrological model for the Upper Meghna river basin was developed to understand the consequences of flash flood. Ms. Hoque mentioned that using real time precipitation data the developed model can be used as a tool for forecasting flash flood. Understanding of hydroclimatic extremes over Bangladesh with new gridded products and daily bias correction of the Coupled Model Intercomparison Project Phase 5 (CMIP5) regional climate projections was the focus of Dr. Ali Shafqat Akanda's presentation. The study involved dynamic down scaling of global climate change model data to regional climate model data and involved daily bias correction and validation using temperature, dry and wet weather extremes. Observed results indicate that spring (March-May) period is becoming increasingly warmer and drier in Dhaka and southwestern regions of Bangladesh. The study also found that the intensity and frequency of extreme rainfall events are also on the rise.

The final presentation of the session was by Dr. Dewan Abdul Quadir who shared results of trend analysis of maximum and mean temperature and rainfall in Bangladesh. Analysis of the study data revealed that the annual mean temperature has increased by around 0.64 ^{o}C during the past 64 years (1948-2011). The increase in annual and seasonal rainfall over the last 50 years was attributed to increase in number of rain days depicts that the increase of rainfall is caused mainly by the increase of the number of rain days. The spatial distribution of trends of temperature and rainfall indicated that the variation trends are uniform neither for temperature nor for rainfall. The study produced temperature and rainfall variation maps which can be useful in providing local level information of climate change.

Following the presentation the floor was opened for questions and an engaging discussion ensued on the usefulness of climatic models. The presenters highlighted that while models can be useful in presenting future trends, should be carefully validated with observed data as to ensure quality of the generated trends. The session ended with a note of thanks from the chair.

3.6 PLENARY SESSION 2: COASTAL ZONE

Host: **Christian Commission for Development in Bangladesh (CCDB)**

Chair: **Md. Kamruzzaman,** Coordinator, Research, Climate Change Unit, CCDB

Presenters:

Syed Hafizur Rahman: Stocktaking and assessment of adapted technologies related to water use in coastal areas of Bangladesh

Pronab Kumar Halder: Implication of water resources for seasonal shifting of livelihoods of the southeastern coastal island population in Bangladesh.

Syed Hafizul Rahman presented a stock of adapted technologies in the water sector in Shatkira, a coastal district in Bangladesh. The lack of drinking water is one of the major issues in the coastal areas and cyclones, storm surges, salinity intrusion, etc increase this problem. The technologies used in the coastal region are managed aquifer recharge, artificial aquifer, pond sand filter, modified pond,

shallow and deep tube-well, modified dug-well, rainwater harvesting system and desalination plant. The research led to the mapping of areas appropriate for specific types of water technologies and despite the technologies available rain water harvesting was seen as one of the few long term solutions. Furthermore, other alternative sources of potable water needs to be identified and community based management need to be tackled.

Presenter at the coastal zone session

Pronab Kumar Halder presented on what happens to water resources when livelihoods shift every season in the south-eastern coastal islands. This study assessed the livelihoods and how water resources change seasonally as livelihoods change. During the dry season salt farming and capture fishing are the dominant livelihoods options and agricultural practices reduce for lack of fresh water. In the wet season, agricultural activities increase because of fresh water availability and salt producing fields become agricultural fields. In conclusion water is the most important factor in changing land use patterns resulting in a seasonal livelihood change.

3.7 PLENARY SESSION 3: MIGRATION

Host: **Bangladesh Centre for Advance Studies (BCAS)**
International Organization for Migration (IOM)

Chair: **Dr. Atiq Rahman,** Executive Director, BCAS

Moderator: **Abdusattor Esoev**, Senior Programme Manager, IOM

Presenters:

Zakia Naznin, "Climate Change and Migration in Bangladesh: A Gender Perspective."

Khan Ashfaqur Rahman, " "Assessing the Climate Change, Environment Degradation and Migration in South Asia."

Dr Atiq Rahman and Mr Abdusattor Esoev facilitating panel discussion on migration and climate change

The session began with Dr. Atiq Rahman, describing the growing interest in migration issues within the climate change discourse. He cited the fourth IPCC Assessment report that suggests up to 300 million people will be forced to migrate due to climate change world-wide, although added the caveat migration is a complex phenomena.

Ms. Zakia Naznin argued in her presentation that climate change induced migration has a gender component that is often overlooked in the development discourse. While many men often migrate in response to environmental stressors, more often than not their wives remain behind to take care of the household and family. Naznin used participatory research methods, such as focus group discussions, to learn more about these women's experiences. Her study found that these women are generally forced to take on more of a burden in managing their households without their male partners. Although a beneficial outcome of this pattern is that women often felt more empowered, Naznin's study found that if men return - they often reclaim their role as head of the household. Audience members were keen to learn about the percentage of women who stay behind, and Naznin conceded that more intensive research is needed to more fully understand the gendered aspects of who stays and who goes.

The second presenter was Mr. Khan Ashfaqur Rahman, who focussed on the various policy frameworks present in South Asia to deal with migration caused by climate change, and then put forward some recommendations. He analyzed two policies present in South Asia - the South Asian Association for Regional Cooperation (SAARC) Kathmandu Declaration and the Bangladesh Climate Change Strategy Action Plan (BCCSAP). While not enough action was taken by SAARC to fulfill the declaration it made, the BCCSAP attached a negative connotation to migration. Rahman then suggested that policy makers need to take a stance on migration in regards to whether migration is seen as a failure of adaptation or a form of adaptation since this drastically affects a government's approach. He also proposed that it would be importance to create a quantification mechanism for climate migrants to better aid policy makers in their decisions, and officials in Bangladesh in particular needed to be better

From L-R: Khan Ashfaqur Rahman, Abdusattor Esoev, Atiq Rahman and Zakia Naznin on the panel

informed about this issue. When asked how such a quantification mechanism would work, particularly given that migration is a complex phenomena, he proposed that data could be collected from various local institutions and unions since most climate change migration occurs within short distances.

Following these presentations, the moderator Mr. Esoev, from the International Organization for Migration (IOM), gave his institution's perspective on migration. He explained IOM views migration as an adaptation strategy, and at the same time encourages policy makers to make every effort possible to ensure involuntary migration does not occur. He also promoted the use of the term "environmental migrant" as oppose to "climate change migrant" as it is often hard to directly link climate change to specific environmental stressors that cause migration.

An ensuing discussion broke down many of the nuances of migration. There was a general consensus that more data needed to be collected on migrants of climate change: even if such a task was difficult. Discussion also focussed on the differences between economic and climate change migrants, particularly in cases when such categories blurred. Dr. Atiq Rahman ended by commenting that concept of nation-states would be challenged in the coming years if climate migration was not adequately addressed.

3.8 PARALLEL SESSION 4: LOCAL ADAPTATION PLANNING

Host: **Bangladesh Centre for Advance Studies (BCAS)**

Chair: **Dr. Atiq Rahman,** Executive Director, BCAS

Moderator: **Dr. Dwijen Mallick,** Fellow, BCAS

Presenters:

Timothy J. Finan, "The effective use of climate services in building local level resilience: The IRAP project in Bangladesh"

Nabir Mamnun, "Exploring the knowledge systems that support adaptive governance in northeast Bangladesh."

Shekhar Kanti Ray, " "Local Adaptation Plan: Perspectives and ownership of the community."

Dr. Atiq Rahman introduced the session by explaining the importance of climate knowledge in local adaptation efforts - a theme addressed by each speaker in different ways.

Timothy Finan's presentation focused on his project proposal about a new knowledge network where gaps in climate science would be identified by those on the ground; these gaps would then be addressed by researchers both nationally and internationally, and then communicated in a way

accessible to development practitioners and target communities. This network will be called the International Research Applications Program (IRAP). Climate knowledge has always played an important role in the decisions making capacities of humans throughout history. Mr. Finan argued for expert climate knowledge to be effective, it needs to complement indigenous knowledge and not supplant it. Mr. Finan listed various climatic changes that would occur in Bangladesh in the coming years, stressing the importance of creating a database that could be utilized on the ground by vulnerable communities. He hoped that in the next 12 months, he could get IRAP operational in Bangladesh.

Mr. Nabir Mamnun's presentation explained climate knowledge was most effective when it was co-produced by experts and local communities. He presented a "post-normal science" which is an approach inclusive of all knowledge holders and requires an extended peer review that goes beyond those in scholarship to the actual communities impacted. Mamnun argued that without such an approach, adaptation technologies would not actually be utilized on the ground by local communities. He cited his own project where experts and community members worked together to create a weather forecast system that was helpful to locals and therefore utilized effectively. Post-normal science is an evolving approach and will need more evidence before it can be mainstreamed.

Mr. Shekhar Kanti Ray also argued for the importance of co-producing knowledge as a means to improve local ownership of development projects. His presentation explained in detail his 5-year project called Climate-Resilient Ecosystems and Livelihoods (CREL), where forest ecosystems are co-managed by experts and community members. By involving locals in the conservation efforts - both through improving their knowledge-capacity of the forest and drawing on their own indigenous knowledge - local community members were more likely to continue forest management efforts after the project ended. CREL also aimed at improving local governance and enhancing the capacity of stakeholders, including Community-Based Organizations (CBOs), in order to better improve peer forest management.

The discussion that followed focused on the difficulty of creating real community ownership of a project, particularly after funding had dried up; and mainstreaming local adaptation efforts into national level planning. There was general consensus in the room that projects often did not continue after development practitioners left. While some audience members raised CARE Bangladesh's efforts to increase the capacity of CBOs to implement their own adaptation projects, the speakers maintained the co-production of knowledge - or a post-normal science - would foster a sense of ownership needed for project maintenance. Mainstreaming local adaptation also proved to be a challenging topic to discuss, and panelists suggested that integrating CBOs and local NGOs would be one way to make local adaptation efforts more efficient at the national level. Furthermore, Mr. Timothy Finan argued that national adaptation plans need to be required reading for all NGOs and CBOs working in the area.

Dr. Atiq Rahman ended the session, commenting on the discrepancy between international negotiations and the suffering of the most vulnerable on the ground.

3.9 PARALLEL SESSION 5: DISASTER RISK REDUCTION

Host: **Center for Sustainable Development (CSD), The University of Liberal Arts Bangladesh (ULAB)**

Chair: **Dr. Hamidul Huq**, Professor and Director, Centre for Sustainable Development, ULAB

Moderator: **Ms. Basundhara Tripathy**, Assistant Professor, Centre for Sustainable Development, ULAB

Discussions at the session on disaster risk reduction

Presenters:

Junanjina Ahmed, Research and Learning Group, BBC Media Action, Investigating Barriers to Community Involvement in DRR

Ishrar Tabassum, Student, Department of Environmental Science & Management, North South University, Vulnerabilities and Coping Mechanisms.

Md. Shafiqul Islam, Assistant Professor, Center for Sustainable Development, University of Liberal Arts Bangladesh, Use of Local Knowledge Systems in Drought Prediction and Weather Extreme Management

Bayes Ahmed, PhD candidate, Institute for Risk and Disaster Reduction, University College London (UCL), United Kingdom, Landslide Hazard Mapping: A Case Study of Chittagong Metropolitan Area, Bangladesh

Junanjina Ahmed presented a paper titled "Barriers to Community Involvement in Disaster Risk Reduction Planning and Activities". The study was carried out at Lalmonirhat, Khulna and Barguna regions using tools such as informal group discussion, focus group discussion and key informant interviews with community people and local government officials.

Lack of motivation and knowledge makes community people reluctant to get involved with risk reduction activities. People perceive that preparing for disaster is the responsibility of local government. Even though the risks facing vulnerable people have not been raised proactively, local government remains aware about the shocks and stressors facing the community. Due to capacity and resource insufficiency, preparedness measures for DRR slow down. To make local residents respond to risk reduction action, five drivers were recommended by presenter:

- as perceived hazard
- willingness
- capacity to act
- seek help from local government
- response.

Along with these five drivers, media can motivate community people and local Disaster Management Committees (DMCs) in holding their actions through providing information, knowledge.

The second presentation, titled "Vulnerabilities and Coping Mechanisms", was presented by Ishrar Tabassum. Most of the inhabitants live on fisheries and crop lands at Gangamatir Char in Patuakhali the study area. Means of livelihood here become more vulnerable during tidal surges, cyclone, wind storms and their vulnerabilities increase with low preparedness and lack of awareness. In lower

Presenter at session on DRR

geographic belts, risks become more severe during tidal surges, water enters into crop land and destroying crops and no control measures have been followed. Securing further livelihood options is dependent on taking loans which eventually leads more loans piling up, as more than 30 percent of profit goes to vendor as loan interest. The burden of debt results in more uncertainty in livelihood security. To cope with the vulnerabilities in a changing climate, new climate adaptive crops and village community fund as support in disaster period were recommended.

Md. Shafiqul Islam, also studying coping mechanisms in drought prone areas of Bangladesh, examined how local knowledge systems have been used for extreme weather management. The study was conducted at six Upazilas under northwest Barind region of Bangladesh. Participatory Rural Appraisal (PRA) was used as data collection tool. The study revealed that for local level decisions, indigenous knowledge is a fundamental tool. The local knowledge found in rural communities in Barind is a combination of skills and techniques gained through experiences to live and survive in their own way of life. For predicting and protecting from drought diversified indigenous knowledge are widely used in Barind rural areas. Integration of local knowledge systems with modern technologies can contribute a lot in managing natural disasters of Bangladesh. Perceiving local knowledge significance in predicting and managing disaster, audience recommended for these practices validation through scientific solution.

Presenter at session on DRR

Bayes Ahmed presented his examined work on landslides in Chittagong Metropolitan Area (CMA). He found that landslide disasters are becoming a potential threat in coming years. Extreme rainfall intensities during a short period of time are causing major landslide events frequently. Along with high precipitation, hill cutting for constructing roads, infrastructure as well as urbanization are triggering landslide occurrence. Existing early warning system are not capable enough to warn communities living in hill stations about landslide vulnerability. Against this backdrop, to warn local communities and to develop an early-warning system for the hilly communities of CMA, incorporating their local knowledge are recommended by presenter as a mandate.

Dr. Hamidul Huq concluded the session by emphasizing the importance of coordination between researchers and local people, so that research findings can be applied as good practices. Policy makers as well as other local development actors can use these findings in their activities.

3.10 PARALLEL SESSION 6: HEALTH

Host: **International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b)**

Chair: **Dr. Peter Kim Streatfield,** Director, Centre for Population, Urbanization and Climate Change, icddr,b

Dr Streatfield chairing the sesssion on climate change and health

Presenters:

Khurshid Jahan: Junior Hydrogeologist, Institute of Water Modelling, Impact of climate change on suitable aquifers for drinking water supply and agricultural water use in southwest coastal areas.

Salima Sultana Daisy: PhD Research Fellow,Institute of Water and Flood Management (IWFM), Bangladesh University of Engineering and Technology (BUET), A review of cholera dynamics due to climatic variables and modelling.

Gourab Adhikary: Research Investigator, ICDDR, B, Impacts of saline water on reproductive health in coastal Bangladesh.

Dr. Peter Kim Streatfield discussed the salinity intrusion problem in the coastal areas of Bangladesh in his opening speech. He pointed out that salinity intrusion is a pressing issue in the southern areas of the country, having adverse impacts on human health due to the regular intake of salt water in coastal people's everyday diet.

The first presentation highlighted the challenges and opportunities in groundwater management for the Water Resources Planning Organization(WARPO) in agriculture and urban areas. The study mapped salinity distribution at different depths of the study area and identified aquifer layers with acceptable limits of salinity in Khulna and Satkhira. A lithological analysis was conducted using 276 borelog data collected from Satkhira and Khulna districts; as was an analysis for electrical conductivity to classify the salinity level. The results show that saline intrusion is much higher in groundwater aquifers after 50m depth in different places. In some places, the salinity level at 80 – 100m depth is only suitable for irrigation. But it was deemed unsuitable for drinking and irrigation at 200m depth onwards in both study areas. Regular monitoring of the groundwater aquifers was recommended.

The second presentation discussed the increased spread of cholera under climate change. While cholera has spread rapidly since the 1990s, extreme temperate and other changing climatic conditions will cause further spread of the disease in developing countries. Bangladesh will face more challenges due to the dual peak nature of this disease. This biannual peak in Dhaka was shown through a historical record from year 1893 to 1940. At the same time, another chart of the year 1920 to 1939 demonstrated that higher mortality due to cholera was associated with higher rainfall. A series of charts portrayed parallel data of cholera outbreaks in Dhaka, Matlab and Bakerganj in Bangladesh and Kolkata in India in low and high flood scenario. It showed that cholera outbreak occurred biannually in all 3 areas of Bangladesh. Cholera outbreak in the southern region of Bangladesh is linked to salinity intrusion and the flood induced cholera outbreak is highest in the central region. It had been suggested at the end that, more research is needed to link extreme climatic variables and the cholera

outbreaks in different parts of the world.

The presenters and participants at the health and climate change session

The focus of the third presentation was to find a connection between the increased level of salinity in the drinking water to the health of women of reproductive age in two villages in Paikgacha union in Khulna district. The study revealed that saline intrusion is not only causing this health problem, but so is the food habit of people in the study area. The salt taken through the saline drinking water (5-16 g/day) was much higher than the recommended amount. At the same time, people use extra salt during cooking and having meals. Common diseases, such as diarrhea, heart diseases, hypertension and skin problems, prevail. But women face health issues like itching or pain around the genitalia and vaginal discharges as well as increase number of C Section deliveries. In conclusion, it was pointed out that lack of awareness is the root cause of this problem.

The Q & A session brought out the recent and future challenges of salinity intrusion and its impact on health during the discussion part. Rainwater harvesting was recommended as an alternative source of fresh water but it would not be sufficient on a year-long basis. But according to the IPCC data, increased amount of rainfall and drought can give rise to cholera globally. To the question of a possible relation between reduced reproductive health - hence reduced population growth - and salinity increase in Khulna, it was clarified that no existing study can support such connection. It was suggested that more evidence is needed to connect climate change with the health problems in the southern part of Bangladesh. Dr. Streatfield concluded the session about his comments on the future impacts of climate change on human health. The projected scenarios under high temperature will contribute to water and vector borne diseases such as malaria, kal azar, dengue and cholera which are theoretically expected to get worse. Effective monitoring is needed to conduct research on the dengue and malaria cases to see the changes and find the connections with climate change.

3.11 PARALLEL SESSION 7: WATER, SANITATION AND HEALTH

Host: **WaterAid Bangladesh (WAB)**

Chair: **Dr. Md. Liakath Ali, Director,** Programmes and Policy Advocacy (PPA), WAB

Presenters:

Mohammad Mahbubur Rahman: Potential impacts of climate variability and change on waterborne and airborne diseases in Bangladesh

Anwar Zahid: Prospects of low-cost recharge tanks to augment safe water availability by very shallow hand tubewells in the arsenic and saline-prone coastal delta of Bangladesh

Arif M. Faisal: Channeling climate change funds to local government institutions of Bangladesh: Existing mechanisms, challenges and recommendations

Dr. Mohammod Lutful Kabir: Climate financing for WASH resilience in Bangladesh: Harnessing opportunities through mitigation

Mohammad Mahbubur Rahman started off the session with looking at how climate changes impact water borne diseases. The linkages show regional weather changes due to climate change leads to extreme weather events with microbial changes, contamination path being created which in turn leads to higher incidences of diarrhoea, dysentery and cholera. The deterioration surface and ground water, poor drinking water, malnutrition, and sanitation and hygiene problems caused by climate change lead to diarrhoea.

Arif M. Faisal looked at how to channel central government's climate fund to local government institutions (LGIs) in Bangladesh. LGIs play a vital role in implementing climate change adaptations and mitigation projects/programmes. The study found several challenges in developing a climate change funds flow. The challenges include social and anthropological, challenges with regard to local bureaucratic pressure, mainstreaming of local level fund transfer, the need for unified National Climate Fund, assigning appropriate roles to CSOs/CBOs & NGOs, capacity building in all relevant organizations, capacity of LGIs, CSOs & NGOs on project management (e.g. procurement, consultant recruitment, disbursement, etc.), and the need to develop efficient mechanisms for close coordination, monitoring and reporting. The study concluded the need for one funding mechanism even if there were disputes regarding that, capacity building and simplified implementation process.

Lastly, Dr. Mohammod Kabir presented on harnessing climate finance for WASH resilience through mitigation. The presentation focused on the Clean Development Mechanism as an investment and project mechanism. There is investment in bio-gas plants and LGI led plant to treat waste occurring in Bangladesh. Despite this, the declining carbon price and inability to sustain technology is a threat to the investments. There are still opportunities like rainwater harvesting, increasing the share of organic manure and fertilizer and increasing composting as mentioned in the Intended Nationally Determined Contributions.

3.12 PARALLEL SESSION 8: WASTE MANAGEMENT

Host: **School of Environmental Science and Management (SESM), IUB**

Chair: **Dr. Md. Abdul Khaleque,** Dean, School of Environmental Science and Management (SESM), IUB

Presenters:

Dr. Hasin Jahan, Faecal sludge management – a second generation sanitation problem.

Md. Arif Chowdhury, A solid waste management scenario and people's perceptions of environmental and health impacts: A case study on Raipura, Narsingdi.

Dr. Md. Abdul Khaleque began the session by giving an overview of waste generation and management in Dhaka. Municipal solid waste is used for producing electricity and biogas in developed countries which can be replicated in Bangladesh. Environmental pollution caused by untreated release of industrial liquid waste in rivers can be controlled by utilising pollution abatement technology that most of the industries possess. Effective measures need to be taken for gaseous waste mitigation. Human waste management is a challenge as a significant percentage of households are not covered by the sewerage network and the faecal sludge is mostly dumped in open drains.

Dr. Hasin Jahan mentioned that open defecation rate in Bangladesh is 1% as of 2015 which was 19% in 2000. This is not the ultimate solution to the sanitation problem rather it is high time for taking effective steps to deal with second generation sanitation problem of faecal sludge management (FSM). Less than one fourth of Dhaka is covered by the sewage system and people are not aware of the destination of the faecal sludge and its impacts. Unfortunately, there is no city/municipality-wide full service value chain of FSM in the country. Institutional and regulatory framework for FSM is under approval process. Bangladesh imports huge quantity of fertilizer every year and the government provides remarkable subsidy for chemical fertilizer. Conversion of faecal sludge to compost/organic fertilizer can not only reduce the burden of import, but also improve soil health by decreasing the usage of chemical fertilizer and save the environment. For this, simultaneous prioritisation of the advocacy agenda in relation to FSM and promotion of organic fertilizer in cooperation with the government and the private sector is required.

Md. Arif Chowdhury described solid waste management (SWM) scenario in a sub-district of Narsingdi with a focus on people's perceptions of environmental and health impacts. Almost 80% of total generated waste in the study area originates from vegetables and food waste. Interestingly, around 47% households suggest to burn waste as a measure of SWM. It has been found that about 32% households out of 1200 households consider the absence of SWM as the reason for Dengue fever. Raising awareness regarding SWM, improving legislation at sub-district (Upazila) level and introducing systematic SWM approach are necessary.

The chair concluded the session by pressing the need for in-depth research on organic fertilizer as a measure of faecal sludge management, solid waste in relation to climate change and inclusion of these issues in university curriculum.

3.13 PLENARY SESSION 4: LOSS AND DAMAGE

Host:	**International Centre for Climate Change and Development (ICCCAD)** **North South University (NSU)**
Chair:	**Dr. Saleemul Haque,** Director, ICCCAD
Keynote Speaker:	**Dr. Mizan R. Khan,** Professor, North South University
Special Guest:	**Mr. Manjeet Dhakal,** Clean Energy Nepal
Presenter:	**M. Hafijul Islam Khan,** Centre for Climate Justice-Bangladesh (CCJ-B)

Dr. Saleemul Huq introduced himself and the panel where everyone was either a negotiator or a delegate in the Conference of the Parties (COP) held in Paris. Loss and Damage is recognized as a separate article in the United Nations Framework Convention on Climate Change (UNFCCC) and an executive committee of 20 representatives from both Annex 1 and non-Annex 1 countries are working to develop the new issues under the Warsaw International Mechanism (WIM). Loss and Damage will be prioritised in the agenda of the next COP which will be held in Marrakesh, Morocco. Already several researches have been started to set mechanism, tools and indicators for quantifying loss and damage. Additional information is added to the concept of Loss and Damage. The old concept dealt with natural calamities, however, the new concept of Loss and Damage deals with human intervention accelerating loss and damage.

Dr. Mizan Khan presenting on the outcome of loss and damage in the Paris negotiations

Dr. Mizan R. Khan presented the outcome of COP21 on Loss and Damage. He initiated his presentation by mentioning that Loss and Damage has been covered separately in Article 8 and not in the article dealing with adaptation. According to the Paris Agreement, WIM on Loss and Damage has been enhanced, strengthened and made into a permanent institution. It also states that a task force will address the issue of displacement related to the adverse impact of climate change. The agreement further states that liability and compensation for Loss and Damage cannot be claimed – a demand made by the United States. He stressed on the fact that the removal of liability and compensation from the agenda of Loss and Damage is a serious concern for the future.

Mr. Hafijul Islam Khan discussed the non-economic aspects of loss and damage which is not measured by economic denominators. He is developing a comanagement approach - "Community Monitoring Mechanism" to manage the freshwater wetlands in Bangladesh. He is exploring policy to address non-economic loss and damage and institutionalize the mechanism where the perception and experience of the community will be utilized to comprehend the ecology, biology and biodiversity of the wetlands. The collected information from the mechanism can be used to amend necessary policy approaches dealing with such noneconomic losses and assist in the UNFCCC processes by providing necessary guidance.

Mr. Manjeet Dhakal shared his experiences and said that it is strenuous to argue in the negotiations on

Loss and Damage. The linkage between the financial institutions and loss and damage mechanism will be established in the coming days. Countries should highly prioritise to prove the impacts of climate change. He concluded by pointing that loss and damage is the consequence of insufficient funding for mitigation and adaptation.

Mr. Hafij Islam Khan presenting on non-economic loss and damage

The presentations were followed by a long discussion and Q&A session. In response to a question from the audience, the panel clarified noneconomic loss and damage with an example of wetlands. Climate change is disrupting the ecosystem and causing loss of species of fishes resulting harm in nutrition sector which will impact the health of the future generation along with ecosystem services.

In response to a question about the weakness of the text on loss and damage, the panel explained that four things are significant in the Paris Agreement:

1. Getting a separate Article after Lima itself is a strong achievement
2. WIM a permanent body under the Convention
3. Special placed on displacement and
4. Inserting 'innovative finance' instead of totally escaping from the issue of compensation and liability

Moreover, supporting the evolving mechanisms and tools are important approaches; the panel distinguished between a 'rights-based' approach where it is a state's responsibility to avoid harm by implementing mitigation and adaptation policies, and a 'needs-based' approach as the last resort at which point compensation is required.

To conclude, Dr. Saleemul Huq said that in negotiations there are constructive ambiguities to reach agreements among 197 countries. Present priorities include conducting research as well as informing our negotiators five of whom are from Least Developed Countries (LDCs) including Dr. Nurul Quadir from Bangladesh and we have less than 12 months to influence loss and damage negotiation in the next COP22.

3.14 PLENARY SESSION 5: POLITICAL ECONOMY AND CLIMATE FINANCE

Host: **International Institute for Environment and Development**

Chair: **Dr. Saleemul Huq,** Senior Fellow, IIED, Director, ICCCAD.

Keynote Speaker: **Mr. Md. Shamsudoha,** Chief Executive, Center for Participatory Research and Development (CPRD)

Presenters:

Mir Rabiul Islam, Valerie Ingham, John Hicks, Ian Manock, Richard Sappey and Sultana Dilara: A 'production model' of community disaster resilience and psycho-social recovery: Application to flooding in rural Bangladesh

Dr. Nazneen Islam Khan: Climate finance at the local government level in Bangladesh.

Presenters at the session

Mr. Shamsuddoha from CPRD spoke about the political economy of climate finance in Bangladesh, drawing on the country's experiences with Pilot Project on Climate Resilience (PPCR). PPCR is a global funding window which has disbursed a total of $100 million in Bangladesh, with $60 million in grants and $50 million in loans, to promote climate resilience in the country. Political economy is the interactions among the actors, the ideologies and knowledge and the underlying drivers. Political economy is constantly evolving its discourse which is crucial to understand as it determines planning processes in a country. He then briefly explained the major steps in understanding political economy and outlined how climate finance is mobilized in Bangladesh.

There are two actor coalitions involved with undertaking PPCR decisions in the country. The first coalition is the dominant one, composed of technical departments of the government and multilateral development banks. They adopt a market liberalism ideology, reliant on infrastructure development and the economic growth pathway to provoke transformational change. This coalition believes in taking loans and recognizes the role of the private sector in this regard. However, despite having more resources and incentives available, they are not always the most effective implementers of plans. They generally fail to find synergies between global agenda and local context. The second coalition is comprised of donors, civil society actors, other multilateral agencies and government departments. They consider social development and community based responses as vital for transformational change and resilience building. However, this coalition is not as organized and has limited influence in PPCR decisions. He concluded that ideological coalitions in Bangladesh with dispersed resources, knowledge and incentives are less able to influence decisions at the policy level. In order to successfully translate global agenda into local context in planning phases, it is necessary for both set of actors to play a substantial role. Although infrastructure development is economically profitable, social development is vital for carving the country's path towards sustainable development.

Mir Rabiul Islam presented on a study conducted by a group in Australia named Bangladesh Australia

Climate Change and Disaster Research Group (BADRG), which he is a part of. The study sought to explore the relationship and coordination between different actors in Bangladesh in response to flooding during the different phases of disaster management, and in turn introduce a production model of community resilience. According to the literature, disaster management is generally comprised of four phases: mitigation of risk, preparation, response, and recovery with the latter three being more prevalent. In terms of actors in disaster management, there are direct ones such as the national defence and the government as well as indirect ones such as the general population, private sector, civil society, NGOs, media etc. The relationship between these actors can be complementary, substitutional or conflictual. Data collection for the study occurred in three phases – 2010, 2012 and 2015, across three study sites – Sunamganj, Sirajganj and Satkhira, and consisted of semi-structured interviews with villagers, NGO workers, local elites and government officials. The study found that in terms of preparation, community people receive warnings from state authorities and sometimes NGOs. But indigenous and local knowledge act as the most effective form of warning. The response phase is highly lacking in institutional support. There is limited assistance during the crucial recovery phase, mostly from NGOs and occasionally from the government. They contribute by providing rebuilding materials, food, medicines etc but there is zero formal support for mental and psychological recovery. Actions during both these phases were largely people generated. Therefore he concluded that in Bangladesh, social capital serves as the strongest asset for vulnerable communities and NGOs play a complementary role. In light of these findings, he recommended that in order to scale up community resilience, there is a need for greater government action and the integration of different actors should be complementary to local resilience.

Nazneen Islam spoke about the overall scenario of climate finance at the local government level in Bangladesh, drawing from a research study she conducted between 2012 and 2013. Through the Bangladesh Climate Change Trust Fund(BCCTF) and Bangladesh Climate Change Resilience Fund (BCCRF), a total of more than $500 million is available for funding climate change projects. She briefly outlined how this money is allocated for different projects outlined in the Bangladesh Climate Change Strategy and Action Plan (BCCSAP). From her research, she found that there is a significant discrepancy between the amount of climate finance allocated at the local level and the amount approved for action. Use of political power often leads to misallocation of resources and bureaucratic inefficiencies causes delays in implementation. She also uncovered insufficiencies in transparency and accountability as well as in the monitoring and evaluation of projects. She ended her presentation by making recommendations for strengthening the capacity of local government and improving the coordination between different relevant agencies. She also suggested that funds should be allocated to different localities on the basis of their vulnerability.

Dr. Nazneen Islam presenting on the political economy of climate finance in Bangladesh

After the presentation, discussions centered on the inadequacies of governance in the country. The chair remarked that underdevelopment of most countries in the world is primarily a result of poor governance. He also added that in Bangladesh, and many other LDCs, there is a high degree of social cohesion especially among vulnerable communities. Social capital plays a vital role in climate change adaption and also helps combat the shortcomings of ineffectual governance in these countries. As the problems caused by climate change will become more and more universal over the coming years, Bangladesh and other LDCs have the potential to share their expertise in this area with developed nations. With climate change being recognized by people from all walks of life, more and more actors are coming together to collaboratively tackle this issue and consequentially, the situation will improve.

3.15 Parallel Session 9: NATURAL RESOURCE MANAGEMENT

Host: **Shahjalal University of Science and Technology (SUST)**

Chair: **Dr. A. Z. M. Manzoor Rashid,** Professor, Department of Forestry and Environmental Science, (SUST)

Moderator: **Mr. Sourav Das,** Lecturer, Department of Forestry and Environmental Science, SUST

Presenters:

Hasan M. Abdullah: Natural Salforest covering monitor in Modhupur, Bangladesh by using Temporal Landsat Imagery during 1972- 2015

Md. Emdad Hossain: Exploring a traditional farming approach for climate resilient production in southern Bangladesh.

T. A. Robin: Mega water development projects and their impact on crop productivity in southwest Bangladesh

According to Dr. Rashid, Natural Resource Management (NRM) is a critical discipline for the life and the community of Bangladeshi people. Forestry, fisheries, livestock and agriculture are the life blood in the economy. Creating synergies between livelihood and conservation is increasingly becoming a challenging task. Climate change is impeding on fulfilling the goals and objectives of sustainable development. In this era, natural resource management and its governance demands specific importance to create a win-win scenario.

Mr. Abdullah presented a low cost but effective monitoring system for forest resources in the last patch of Sal forest in the Aronkhola union of Madhupur upazila. This largest Sal forest in Bangladesh is rich in biodiversity. The study successfully uses Landsat Multi Spectral Scanner (MSS), Thematic Mapper (TM) and Operational Land Imager (OLI) data to monitor the forest cover changes, which could be used in forest management in Bangladesh.

Mr. Hossain presented a smart cropping system named 'Sorjans'. Sorjans is an intercropped system of alternating parallel raised beds and canals. From Sorjans there are various range of product and services (e.g. fishes, vegetables, timber, fruits, income, nutrition, water management, reduced soil erosion). This system has been piloted in four districts of Southern Bangladesh. The study recommends the Sorjans system needs to be adapted in flood prone coastal areas in Bangladesh because the system performs better than an equivalent flat field system for nutrition, income and productivity.

Mr. Robbin in his research argued that flood control development projects have neglected crucial aspects of ecosystems, sedimentation processes, salinity distribution and biodiversity which resulted in a decrease in Aman production. The presentation dealt with the areal and temporal coverage of flood control projects and compared transplanted Aman rice production in the Southwest region of Bangladesh. In the pre-development period, the average Aman production in Khulna districts was 413.755 thousand tons but in the post development period the average annual production declined to 210.569 thousand tons. FCD projects contribution are being questioned as their impacts are negative rather than being positive, because changing the water course often leads to disruption in lives and livelihood of the general people of Bangladesh.

The Chair wrapped up the session concluding the three presentations. The first presenter tried

to instigate the extent of forest damage using the Temporal Landsat cover which is a GIS tool. He managed to depict a kind of loss and damage scenario and ended up concluding the major inclusive factor are human beings, so Dr. Rashid suggested social research and GIS can be blended together to monitor forest which will give us qualitative and quantitative data and we can know better the reasons for deforestation. Next, Sorjans paired with the traditional system can be a new approach in Bangladesh that will contribute to food production and income generation because it has got multiplicity and it can embrace different components like fisheries agriculture and vegetables at the same time provide ecosystem services in the drought prone areas where people are starving, it could be a climate resilient technique, and also contribute to livelihood and ecosystem services that will add value to conservation.

Lastly he talked about how unplanned physical structures can lead to decline of Aman production. This mechanism of ecology, environment and livelihood are actually interlinked. The role of the formal and informal institutions, resource governance, adaptation mechanism of the local community in extreme climatic events finally the policy support are very much connected if we want to make this natural resource sustainable to address the ecological, environmental and at the same time economical problem of the agrarian society of Bangladesh.

3.16 PARALLEL SESSION 10: RENEWABLE ENERGY

Host: **School of Engineering and Computer Science (SECS), Independent University Bangladesh (IUB)**

Chair: **Dr. M. Abdur Razzak**, Associate Professor, Department of Electrical & Electronic Engineering, IUB

Moderator: **Md. Rejwan Uddin**, Research Assistant, SECS, IUB

Presenters:

- **Dhiman Sen**, The University of Chittagong: Household energy consumption patterns in Hathazari, Chittagong
- **Muhammad Abdur Rahaman**, ADAMS, Khulna: Biogas and bio-fertilizer as effective means of renewable energy, GHG reduction, food security and women empowerment.
- **Saila Ishrat Annie**, IUB: Design and implementation of solar powered induction cooking systems to reduce carbon emissions and health hazards
- **Sajib Chakraborty**, IUB: Design and Implementation of solar power system in fishing trawlers

The chair opened the session remarking about the continually increasing global demand for energy. Bangladesh, in particular, is subject to a looming energy crisis where rising demand, depleting sources of energy and climate change are all working together in nexus to make this a complex challenge. Hence, it is imperative that renewable energy options in the country are identified and capitalized upon.

Dhiman Sen presented his research findings on household energy consumption patterns in the Hathazari upazila of Chittagong. The key objectives of his study were to understand the relationship between different socio-economic factors of a household and its energy use and also to identify the acceptance of Improved Cooking Stoves (ICS) in his study area. By conducting a series of surveys and leveraging the OLS and Logit model, he found that men tended to consume more energy than women.

Also energy consumption appeared to increase with increased education, family size and income. At the same time, the awareness and uptake of renewable energy also increased with higher education and higher income. Surprisingly, concerns about energy saving appeared to reduce with increasing number of children in the household. He also found that despite the high awareness about ICS, a very small proportion used it. The consensus on the cost saving, time saving and fuel saving features of ICS were almost equally divided. Majority, however, agreed that it is healthy and less polluting. He ended his presentation, suggesting that in order to successfully promote renewable energy, education levels will need to be increased. Following his presentation, recommendations were made by the audience to elaborate more on his methodology as well as to put all the different information depicted into one single diagram as it will allow easy comparisons of energy consumption patterns.

Abdur Rahaman was up next, who spoke on the prospective uses of biogas and biofertilizer in Bangladesh, using the results from a research he conducted. He began by stating that most of the biogas in the country is produced from cowdung and is used for cooking purposes only. Citing literature, he presented the different consumption rates of biogas for different appliances. He mentioned that biogas plants in the country generally consist of 3 cows that produce about 5535.21 liters of biogas per day, out of which, between 1200-2700 liters are required for cooking. Therefore, a significant amount of biogas remains un-utilized, which can be used for other purposes. He spoke about bioslurry, a byproduct of biogas which can serve as a high-grade fertilizer and is more sustainable than chemical fertilizers. The many benefits of using biogas include reduction of pollution and health hazards. Biogas can also significantly contribute to mitigating GHG emissions in the country. Lastly, he found that biogas utilization in his study area reduced women's time in collecting firewood, twigs, leaves etc. allowing them to pursue other income generating activities such as sewing, small businesses etc., thereby contributing to their economic empowerment. Following his presentation, suggestions were made by the audience to gather primary data on the different consumption rates of biogas in the country, as well as on the resulting reduction of carbon emissions.

The third presentation was delivered by Saila Ishrat Annie, who presented on a solar powered induction cooking system, developed by her team. She began by pointing out that the geographic location of Bangladesh makes it an ideal location for solar energy utilization. Conventional cooking systems in the country reliant on natural gas and firewood have detrimental effect on people's health and the environment. Therefore, the objective was to introduce a cost effective and environment friendly solution to this at the domestic level, both in rural and urban areas. The technical details of the cooking system were briefly explained to the audience. During her two trials with the system, she found that the power output remained fairly consistent throughout, with slight fluctuations at times due to hazy weather conditions, and the cooking time was more or less average. Cost analysis revealed that although the initial cost of installing such a system is quite high, users will be able to save more in the long run. There are several other benefits of switching to solar cooking systems, which include reduction of health hazards, environmental pollution, and deforestation for firewood as well as the potential of attracting foreign investors and carbon credits for cultivating green energy. Some limitations of the system are that it can only be used during the daytime and its effectiveness will depend on weather conditions. This problem can be mitigated by using batteries. After the presentation, referring to the high initial cost, a member of the audience suggested that costs are likely to decrease over time with growing demand and supply.

Sajib Chakraborty delivered the results from a study he conducted to understand the potential of introducing solar panels to fishing trawlers in the country. This was guided by the notion that since Bangladesh has a large population of fishermen, contributing to their socio-economic development is bound to promote the country's overall socio-economic standing. He presented the current electrical system of the trawlers, which is quite inefficient. The proposed system would replace the incandescent bulbs in the trawlers with LED bulbs which uses almost ten times as less power. A series of calculations revealed that the fishermen were presently incurring a total power cost of 76,650 taka over a period of five years. The proposed system would reduce the cost to an estimated 34,500

taka. After computing Net Present Value (NPV) and Savings to Investment Ratio (SIR), he concluded that fishermen would be saving 2000 taka per month per trawler. With more than 50,000 trawlers operating in the country, this is likely to bring significant economic benefits for the country. However, he acknowledged the existing challenges of unpredictable weather, breaking the barriers of market syndicate as well as lack of established supply chains. After the presentation, a recommendation was made to take the study further to calculate the reduction of carbon emissions as a result of this shift.

Following a round of thanks, the chair concluded the session by making an optimistic remark about the possibility of having fossil fuels being displayed as museum artifacts in the future.

3.17 Parallel Session 11: ECOSYSTEM RESILIENCE

Host: Climate Resilient Ecosystems Livelihoods (CREL)
Bangladesh Centre for Advanced Studies (BCAS)

Chair: Dr Saleemul Huq, Director, ICCCAD

Presenters:

Shahzia M Khan and Md Shams Uddin, Building ecosystem resilience to climate change
Ajwad Alam, Ecosystem resilience from deforestation and climate change

The Chair stressed the necessity for better understanding of ecosystems functionality, vulnerability and ways to make them resilient to climate change in Bangladesh.

Ms Shahzia M Khan and Mr Md Shams Uddin described the Climate-Resilient Ecosystems and Livelihoods (CREL) project which focuses on reducing ecosystem vulnerability and building resilience to climate change through co-management organizations (CMOs) in biodiversity rich forest and wetland protected areas of Bangladesh. Ecosystem management approaches of CREL include: initiation of payments for ecosystem services, revenue sharing and promotion of non-agricultural income opportunities to reduce pressure on ecosystems. Local level planning is necessary taking into account climate change information in relation to ecosystems in order to enhance resilience.

Mr Ajwad Alam presented the Madhupur forest ecosystem resilience from deforestation. Deforestation occurred mostly through anthropogenic pressure that perpetuates the problem of climate change. Planned revegetation under a project brought the forest back to its original form. Lumberjacks were provided with alternative livelihoods, and advised to plant trees for future gain as well as asked to monitor illegal tree cutting activities. Positive changes in mental health were been observed among the community forest workers afterwards. Unity of governing authorities (institutions/individuals) along with right incentives and right management approaches are necessary for sustainable ecosystem resilience.

Some important issues were discussed at the end of the session, such as whether paid awareness instead of self-awareness makes ecosystem management practices sustainable as it apparently seems to protect the ecosystem only for a while; how to harmonize similar sorts of ecosystem related research activities conducted by diverse govt. and non-govt. institutions in Bangladesh; the need for incorporating climatic factors with deforestation and the ecosystem based adaptation as the **future** global agenda.

The chair concluded the session, advocating for long term sustainable investment by establishing collaboration among universities and research organizations during project periods, especially in case of monitoring and evaluation.

3.18 PARALLEL SESSION 12: ADAPTATION TECHNOLOGY

Host: **Christian Commission for Development in Bangladesh (CCDB)**

Chair: **Dr. Md. Khalid Hossain,** Head of Climate Change Programmes, CCDB

Moderator: **Mr. Md. Kamruzzaman,** Coordinator – Research, Climate Change Unit, CCDB

Presenters:

Muhammad Manjurul Karim: Adaptation through application of potential Azotobacter spp. as biofertilizer in coastal agriculture in Bangladesh under changing climate conditions.

Dr. Mohammad Mahfujul Haque: Integrated Floating Cage Aquageoponics Systems (IFCAS): Technological potential for adaptation to flooding in climate change.

Md. Jaman Sharif: A new effective model of rainwater harvesting systems.

Participants engaged in discussion

Nuzhat Imam: Potentials and challenges of using ICTs for climate change adaptation: A study of vulnerable communities in 'Char' lands.

The session began with introduction of new technologies arising from the need address a changing climate by Dr. Manjurul Karim. Importance was placed on adaptation technology for coastal agriculture such as the application of potential Azotobacter spp as bio fertilizer. Azotobacter is free living bacteria which has nitrogen fixing microorganisms and has an aerobic mode of life having the capability to produce growth hormones, amino acid and solubilize mineral nutrients as phosphorus, Zinc Iron etc. Through screening by an electron microscope, the presence of extracellular polymeric substance (EPS) and biofilm can isolate salinity. In saline prone areas, if genotypically diverse groups of Azotobactor species are distributed in the soil, it will resist the higher salt tolerance. This will promote plant growth and increase the productivity of land at coastal areas. Soil management by balancing micronutrients, PH and moisture of soil through the rally round of Azotobactor bacteria are helpful for crop productivity.

The second presentation was delivered by Dr. Mohammad Mahfujul Haque. It outlined the findings of a project that IFCAS (Integrated Floating Cage Aquageoponics System) developed with the participation of farmers, which has replicable potential to produce fish and vegetables in flood vulnerable people. The project has the scientific measurements for making this floating cage, while also ensuring high productivity and meeting the nutritional demand of climate vulnerable people, which is also cost effective.

Md. Jaman Sharif presented a new effective model of rainwater harvesting by using a layer of gravel and sand, a micro fiber filtrate sheet, porous hard sheet, bricks and a connection pipe. This adaptation technology is experimented for collecting water which can be used in drinking, gardening and small scale irrigation purposes. This new effective model has catchment, gutter, collection pipe, and filtration

tank, storage tank, for drinking purpose and first flash water collection pipe for agricultural purpose. The findings of the study are that increased salinity intrusion and sea level rise are big challenges for coastal regions of Bangladesh where potable water scarcity becomes even more severe. Md. Jaman Sharif argued that the rain water harvesting is a low cost alternative solution for climate vulnerable people of coastal region of Bangladesh.

The last presentation was given by Nuzhat Imam, capacity building and advocacy coordinator at CCDB. The objective of his study was to explore the potential opportunities and challenges of using ICT for climate vulnerable people in Char areas of Bangladesh. This study was conducted in Belkuchi Upazilla & Rajapur Union where there is a high density of fog, cold waves, heat waves, and increased frequency and magnitude of floods and riverbank erosion. He outlined the findings that ICT can play as a source of information for DRR in pre-disaster preparedness, early warning, and weather forecast, information of shelters, and relief and rehabilitation. Rather, agricultural information could be disseminated by using ICT as crop-related news, agricultural input and market value of crop and agricultural loan, etc. The place of concern has limited organizational and human capacity, which remain a key obstacle for more frequent use of ICT as a tool to promote adaptation and DRR.

3.19 PARALLEL SESSION13: MITIGATION

Host: **School of Engineering and Computer Science (SECS), IUB**

Chair: **Prof. Lutfor Rahman,** School of Environmental Science and Management, IUB

Presenters:

Faisal Ahmed: Visiting Researcher, International Centre for Climate Change and Development (ICCCAD), Empirical study on the relationship between human development and carbonization of economies.

Shanjida Easmin Nupur, Sudipto Bosu and Sami Towsif Khan: Bangladesh University of Engineering & Technology, (BUET), Impacts of climate change on groundwater depletion and mitigation options

The session chair provided an outline of climate change and its global impact. The two main aspects of climate change, mitigation and adaptation, were explained along with a description of the Conference of the Parties (COP) and the mitigation options available. He finished his introduction with a thought – mitigation is the prevention and adaptation is the cure to climate change.

Mr. Faisal Ahmed presented an empirical study that investigated the relationship between human development and carbonization of economies from a macroeconomic perspective. The hypothesis states that the relationship is not exclusive and varies according to income, region and the traditional model of growth, which includes only monetary values that cannot sufficiently explain the Kuznets hypothesis. Similar studies based on GDP and environmental degradation were mostly done on developed countries with Kuznets hypothesis of inverted U model being the mathematical foundation. Those studies, however, overlooked the key elements of human progress and mostly ignore the relationship between energy consumption and carbon emission. The presenter applied the concept of Human Development Index (HDI) using values of income index (GDP-PPP), education index and health index (proposed originally by Amartya Sen, and now maintained by UNDP). This model was then applied to all country groups, income and region groups and the relationship statistically analysed

in terms of statistical significance, turning point, range of values and finally graphical representation of the relationship. 148 countries were chosen using data of 34 years (1980-2013) collected from the UNDP, World Bank, International Energy Agency and Freedomhouse database. The study shows that each country group (based on income and region settings) have their own nature of relationship of human progress and carbonization. It was found that, the process of carbonization cannot be explained by only using different income levels. In the end, the researcher concluded that growth should be directed towards a low carbon emission path, with consideration of movements in carbonization ratio and emphasize on 'human factors' of development. At the same time, national mitigation strategies and existing policies for a sustainable development goal should take into account other elements of human and social development.

Faisal Ahmed presenting at the session on mitigation

The second presentation emphasized the impacts of climate change on groundwater in Bangladesh. As a deltaic region of the Himalayas, Bangladesh is highly at risk from the glacier melt and from the rising sea level. The heavy seasonal monsoon rain and the dense population renders this region more vulnerable to climate change than other regions. One of the impacts of climate change is groundwater depletion. In recent years, Dhaka City has gone through fresh water shortage and the demand for drinking water has been on the rise. One of the main sources of fresh water is the groundwater reservoirs. However, the built environments in urban areas pose a threat to the groundwater recharge process. This has led to a significant decline in the groundwater level. A projected path of the depletion trend shows that with the ongoing rate, the groundwater will reach 140 metre depth by the year 2050. As mitigation options, Bangladesh should adopt artificial groundwater recharge measures such as paving road with permeable concrete, rainwater harvesting and building proper storm sewerage system.

Prof Luthfor Rahman chairing session on mitigation

In the Q&A session, an observation on the first presentation from a participant mentioned that working on a cross national issue on mitigation is quite risky. According to him, the use of freedom-house index seemed biased from the neoconservative point of view. Mr. Ahmed accepted the bias which may be existent from neoconservative point of view, but at the same time argued that not many studies similar to freedom-house has been conducted, other works are not so comprehensive. A Carbon Efficiency Index by UK based researcher Mr. R. Ramanathan and other studies by Ang Alacantara suggested carbonization to be a better indicator than emission intensity of GDP or carbon intensity of GDP and also answered that the study is an empirical exploration with broader macroeconomic implications.

Another discussion centered around the environmental Kuznets curve model - the U shaped curve does not always mean that countries move from being poor to rich. It was clarified by the first presenter that the whole concept would depend on the number of observations being made and varies according to the selection of observations. In the end, the researcher concluded that the study is an attempt to extend the traditional Kuznets hypothesis and combine the essential indicators of

environmental degradation and human development in a holistic and nobel way.

It was also stressed that there should be a clear understanding about mitigation and adaptation with distinctions made between mitigation and climate change mitigation. A discussion on mitigation in the Paris Agreement followed stressing the evidence based arguements could make to the international community to lower carbon emissions. The discussion concluded with hopes on a clean world in the future.

3.20 PLENARY SESSION 5: URBAN CLIMATE RESILIENCE, WATER AND SANITATION

Host: **Asian Cities Climate Change Resilience Network (ACCCRN)**

Chair: **Mr. Mohammad Qayyum**, Additional Secretary and National Project Director of the Comprehensive Disaster Management Programme (CDMP)

Moderator: **Mr. Mostafa Quaium Khan,** Adviser, Bangladesh National Urban Forum (BUF)

Presenters:

- **Sarder Shafiqul Alam, A. T. M. Jahangir Alam and Sowmen Rahman:** Urban climate resilience, water and sanitation: Improving multi-stakeholder collaboration in Dhaka, Bangladesh.

Presenters at the panel on urbanization and climate change

- **M. Aminul Islam:** Prospects and problems of promoting low carbon urban development in Bangladesh.

- **Michael Chew:** Images of hope and change: Participatory visual approaches to North-South dialogue in urban climate resilience.

Mr. Sarder Shafiqul Alam began by explaining that heavy rainfall, flooding, water logging and heat waves are the major climatic impacts that affect the water supply, sanitation and health of slum dwellers. According to the analysis, emphasis needs to be on identifying a strategy for improving collaboration between stakeholders working in Dhaka city to improve climate resilience of the urban water and sanitation (WATSAN) sector. In this study, he recommended that government should play the lead role in devising different action plans: one that is knowledge-based, and another for NGOs and CBOs to develop effective partnerships.

As Mr. M. Aminul Islam was not able to be attend the conference in person, his presentation was delivered by Sarder Shafiqul Alam. The presentation highlighted the various low carbon policies and insitutions of Bangladesh such as the Vision and Policy Statement on Power Sector Reforms, National Energy Policy, Sustainable Renewable Energy Development Authority (SREDA). To fully realize the

potential of these policies and institutions, awareness campaigns, the gradual implementation of low carbon programs, capacity building and institutional strengthening are needed.

Barriers to low carbon development include an absence of regulatory framework and policies for utilization of public urban open spaces, waste minimization, energy efficiency in public lighting and buildings. Poor coordination between the agencies in-charge of the implementation of the Bangladesh National Building Code (BNBC) and city corporation by laws for promoting energy efficiency in buildings and public lighting are also hindrances.

Michael Chew presenting at the session

The author recommends that low carbon options must be present in planning and budgeting processes in both local and national governments. Resource guides and training to city planners, government officials and researchers are also a way forward to low carbon urban development.

The last presentation was given by Michael Chew, titled "Images of hope and change: Participatory visual approaches to North-South dialogue in urban climate resilience". The objective of this study is participatory image-making and creating an online platform that supports international dialogue between these climate vulnerable communities with the intent of promoting mutual learning and enhancing the effectiveness of local project activities. As a climate vulnerable country, participatory visual methods such as photo voice can be a powerful way to access global media countering the natural disaster imagery which tends to show communities as victims rather than agents. Local responses, while differing culturally, economically and technically, is often informed by shared social and environmental values as a basis for community resilience.

3.21 DIALOGUE SESSION 1: INTERNATIONAL EXPERIENCES

Chair: **Catharien Terwisscha van Scheltinga,** Director Wageningen UR, Project Office Dhaka

Chief Guest: **Mike Robson,** Representative, Food and Agriculture Organization (FAO)

Discussants:

- **Mchilo Mizambwa,** Institute for Environment, Climate and Development Sustainability (Tanzania)
- **Susan Nanduddu,** African Centre for Trade and Development (Uganda)
- **Manjeet Dhakal**, Clean Energy Nepal, (Nepal)
- **Eliza Drury**, Researcher, Brown University, (USA)

The chair welcomed everyone and opened the session by discussing the dilemma of the science-policy interface. This gap between the scientific community and the policy makers can be attributed to a large extent to the fact that the scientists deal with complex issues involving uncertainties and often delay in developing knowledge, whereas the policy makers need a solid base for decision making within the shortest possible time. However, there are numerous examples where both parties have worked side by side and developed policies utilizing scientific findings, especially in the field of climate change.

Mchilo Mizambwa stated that Tanzania has taken significant steps to utilize scientific research in creating better adaptation and mitigation policies. This includes creating several climate-related training and research institutes at the national level, which have been involved in the country's decision making regarding climate change issues (e.g. preparation of NAPA); the government's focus to move from surface water, which is increasingly becoming scarce due to climate change, to ground water as the researchers have discovered huge ground water reservoir throughout the country; and changes in the policy related to energy efficiency have been brought with a focus usage of renewable energy such as reuse of methane gas produced from solid waste in electricity production.

Susan Nanduddu mentioned more researchers and NGOs are coming on board to look into climate change policies at national level in Uganda. Research driven policies are increasingly being formulated. Nonetheless, it is a challenge to disseminate research findings to a larger audience. Research on climate change forecasting needs proper dissemination.

Environmental education, including climate change, is quite new in Nepal as mentioned by Manjeet Dhakal. Numerous research studies are occurring, but in a scattered way. It is necessary to bring all researchers under one umbrella. A gap remains between the policy makers

Manjeet Dakhal sharing experiences from Nepal

and the researchers. The National Adaptation Plan of Action (NAPA) is an exemplary work where university students were involved along with researchers and policy makers. There are scopes for research in the fields of loss and damage, mountain resources, increase resilience to climate change.

Eliza Drury shared personal experiences on science and policy bridge in Rhode Island, USA. Policy makers and researchers work together to identify what needs to be done and how to do that. For instance, together they have formulated the Resilient Rhode Island Act of 2014 as a step towards the island's preparations for climate change. University students were involved in preparing the act as well.

Mike Robson, the chief guest of the session summarized the discussions and talked about the science-policy interface in relation to food security. The policy makers are more concerned about improving food solvency and agricultural livelihoods rather focusing on climate change. Therefore, it is necessary to translate climate change knowledge to that arena.

Finally, the chair concluded the session urging the science-policy interface as a topic in itself which needs more attention. Research can be conducted on how to improve the science and policy gap.

3.22 DIALOGUE SESSION 2: NATIONAL CLIMATE PLANNING

Chair: **Mr. Robert Watkins,** Resident Coordinator, UNDP, Bangladesh

Keynote Speech: **Dr. Debapriya Bhattacharya,** Distinguished Fellow, Centre for Policy Dialogue (CPD)

Chief Guest: **Dr. Shamsul Alam**, Member Planning Commission, Economic Relations Division

Dr. Debapriya Bhattacharya presenting on climate and the SDGs

Discussants:

Paul Eastwood, Team Leader - Climate and Disaster Resilience, DFID

Taibur Rahman, Senior Assistant Chief, General Economic Division, Planning Commission

This high-level science policy dialogue looked at considerations for climate in the national policies and planning.

Dr. Debapriya Bhattacharya presented on climate in the Sustainable Development Goals (SDGs) and provided insights on how climate can be included in the national planning process. Climate change features heavily in Agenda 2030 with an SDG marked specifically for the issue and five other goals that are linked with climate change and conservation of nature. Bangladesh has a good strategic framework for tackling climate change such as the National Adaptation Programme of Action (NAPA), Bangladesh Climate Change Strategy and Action Plan (BCCSAP) with the Seventh five year plan declaring environmental sustainability as one of its core target areas.

Presenting strategic considerations for Bangladesh on climate, Dr. Bhattacharya stated that national contributions that will influence global efforts and emphasis needs to be placed on sectors where Bangladesh performed poorly; e.g. Industrial and vehicular pollution and deforestation. There is also a crucial need to balance higher economic growth and long term environmental sustainability. He concluded by stating that an ambitious global development partnership has been launched where political will and stronger accountability and legitimacy is critical to realize national and global climate goals.

Dr. Shamsul Alam on the Seventh Five Year Plan

Dr. Shamsul Alam who has been the main architect of the Seventh Five Year Plan stated that the Planning Commission has integrated the five year planning with long term goals of the country. The 17 SDGs are already reflected into the different sections of the Plan.

Paul Eastwood distilled four major recommendations for national climate planning:

1. Embed climate into national development systems, including environment and climate in all parts of government.
2. Mobilize all finance opportunities - engage with both private and public sectors. There are huge opportunities from creating right and enabling environment for private investment
3. Be good environmental stewards here and now
4. Internalize externalities - fostering ways on how to use the market to deal with climate change/pollution. This is big challenge, but one we need to own up to

Taibur Rahman talking about the importance of economic growth and environment

Taibur Rahman stressed that economic growth and environment is not a trade-off and we need to integrate and mainstream climate into development planning. Bangladesh is formulating a 100 year plan called the Delta Plan with a very long range view of where we need to go. One issue faced in Bangladesh by planners is the availability of reliable data and here is perhaps where we need to pay more attention.

3.23 DIALOGUE SESSION 3: AFTER PARIS

Qazi Kholiquzzaman Ahmad chairing the session

Chair: **Qazi Kholiquzzaman Ahmad**, Chairman, Palli Karma-Sahayak Foundation

Presenter:
Dr. Nurul Quadir, Joint Secretary, Ministry of Environment and Forest (MOEF), Government of the People's Republic of Bangladesh

Dr. Nurul Quadir presented what has happened in Bangladesh since the signing of the Paris Agreement (PA). The PA solidified the environmental multilateralism among countries. There is an Ad Hoc working group under the PA to facilitate the implementation of the "nationally determined contributions". Support will be provided for adaptation and the National Adaptation Plan (NAP) will be created and implemented.

Addressing loss and damage has become crucial with need for more knowledge on the subject. Developed countries will be providing $100 billion a year to developing countries for mitigation and adaptation. In Bangladesh, the MOEF is starting to make a climate change wing to support the PA implementation, the Third National Communication is under way, and a road map for the National Adaptation Plan is being made with furthering inter-ministerial communications and capacity building.

Dr. Quadir stressed that more dialogue sharing among stakeholders and researchers is needed. In order to strengthen the PA, strengths and weaknesses of Paris need to be identified with displacement of people being a bigger part of CoP discussions.

3.24 DIALOGUE SESSION 4: CLIMATE FINANCE

Chair: **Ms. Farah Kabir,** Country Director, Action Aid

Keynote Speech: **Prof. John Timmons Roberts,** Brown University

Chief Guest **Mr. Ashad Islam,** Economic Relations Division (ERD), Ministry of Finance, Government of the People's Republic of Bangladesh

Discussants: **Dr. Karl Wurster,** Deputy Director Economic Growth, Environment and Climate Change Team Leader, USAID, Bangladesh
Arif M. Faisal, Environment Specialist, Asian Development Bank
Liaquat Rashid Chandan, Mercantile Bank Limited

Professor Timmons Roberts delivering his keynote speech at the session

This high level panel on climate finance brought together a range of information from Bangladesh's banking sector, national designated authority of the Green Climate Fund to the state of global climate adaptation finance.

Professor Timmons Roberts presented on monitoring and reporting finance for adaptation at the global level stating that adaptation funding available is fairly low for the national climate plans. At the global level, six elements hinder a successful climate funding mechanism and these include:

1. Fragmented channels; contributors use different definitions and count different flows.
2. No geographical mapping, no tracking of progress, no consistent evaluation of projects.
3. There is ambiguity that the GCF $10 billion pledge might be one-time only.
4. Stable "innovative" sources off the table.
5. The UNFCCC's Standing Committee on Finance without authority.
6. OECD Rio Marker not consistently applied.

There is a lack of accurate categorization, which makes it hard to know how much money is in fact contributing to adaptation. We also lack a system for independently verifying finance claims, potentially undermining trust in negotiations. Therefore, to build a system of transparency and accountability in global finance, we need to:

1. Agree and enforce consistent definitions and valid flows, including private flows
2. Improve OECD Rio Markers
3. Require geo referencing of activities, track progress through crowdsourcing and require consistent evaluation of projects
4. Advance stable "innovative" sources
5. Empower the Standing Committee

It is possible to track nearly all climate finance in one place using existing technology and leverage open data, linkages, current standards and partnerships. By doing so, we would create a quantum leap in transparency and increased participation in monitoring, improve targeting and effectiveness of climate finance through mapping and evaluation. AidData - open data for international development

is one such platform that does this.

Arif M Faisal presented on the mechanisms, challenges and recommendations of channelling climate change funding to local government institutions (LGIs) of Bangladesh. LGIs in Bangladesh are the primary democratic institutions and offer a great opportunity for efficient and effective delivery of climate services at local level. Despite bureaucratic pressure, lack of capacity and social challenges, recommendations emerged from the study which will pave the way for a system of channelling central government's climate fund to LGIs in Bangladesh. These include:

Mr Ashad Islam and Dr Karl Wurster on the panel on climate finance

- Addressing the political influence and biases in the system;
- Funding mechanism should be built on current developments in the field, involving local NGOs and community organizations that have a comparative advantage in the field;
- Building a funding mechanism where allocation is performance based with a standard ratio of allocation of fund across public, private and NGO/Community Based Organizations, with a fiduciary and governance standards;
- Simplifying planning process, implementation arrangement, procurement, and fund disbursement modalities could speed up mainstreaming process.

Mr. Ashad Islam shared his experience as part of the secretariat of the National Designated Authority (NDA) to the Green Climate Fund (GCF). The efforts of the NDA have centred around short listing and selecting National Implementing Entities (NIE) suitable for GCF accreditation. The NDA has completed capacity building initiatives with short listed entities, selected six entities suitable for GCF accreditation and is facilitating the process. Of the six entities, three have launched applications to that the main challenge faced by NIEs from developing countries is the stringent criteria for accreditation.

Dr. Karl Wurster shared that when it comes to tracking aid money, USAID has a system that does that.

Mr. Liaquat Rashid Chandan shared the perspective of a private bank stating that the mandate they have received from the central bank to draft a green banking policy has been fulfilled.

3.25 CONCLUDING SESSION

Dr Huq presenting the new findings and recommendations at the closing ceremony of the Gobeshona conference

Chair: Prof. M. Omar Rahman, Vice Chancellor, Independent University, Bangladesh

Summary of Conference: Dr. Saleemul Huq, Director, ICCCAD

Keynote Speech: Prof. John Timmons Roberts, Brown University

Special Guests:
Dr. Karl Wurster, Deputy Director – Economic Growth Environment, USAID, Bangladesh

Mr. Christian Tardif, Charge d' Affaires, High Commission of Canada to Bangladesh

Mr. Saber Hossain Chowdhury, Member of Parliament, Government of the People's Republic of Bangladesh

Chief Guest: Mr. Anwar Hossain Monju, Minister, Ministry of Environment and Forests (MOEF), Government of the People's Republic of Bangladesh

Concluding Remarks: Dr. Atiq Rahman, Executive Director, Bangladesh Centre for Advanced Studies (BCAS)

Dr. Saleemul Huq, Director of ICCCAD, began by thanking all participants for fruitful conversations and discussions over the past four days. He pointed out the three main differences compared to the conference last year. There were more attendees this year, the conference this time is inaugurated and concluded in the beautiful university auditorium, and the quality of the presented work improved considerably. Dr. Huq stated the main objectives of the Gobeshona program were enhancing quality of research and, enhance sharing of findings and to feed this research into policy on climate change in Bangladesh. One way to reach these objectives is the Young Researchers Workshop. This program aims to help 10 students publish in international peer-reviewed journals increasing the capacity and quality of researchers and research work being produced in bangladesh.

Research focus has shifted from the problems to the solutions, from awareness and knowledge to taking action. The main themes presented during the conference were: adaptation, migration, mitigation and loss and damage.

Prof. John Timmons Roberts from Brown University, keynote speaker stated that his visit to Southern Bangladesh was an eye-opening experience. He urged the research community in Bangladesh to have "dream teams" like ICCCAD or BCAS, which help young people improve their research skills.

Prof Timmons Roberts delivering his keynote address

This young country seems to be able to cooperate in away other countries are not able to.

Continuing on, Prof Timmons then delivered his keynote on the history and current state of climate finance globally. The Copenhagen Summit lead to "environmental neoliberalism" resulting in inadequate funding needed for developing countries to tackle climate change. To get the trillions additionally needed, developing countries need to address the private sector. The financing issue in the Paris Agreement saw no "innovative" finance sources, such as taxes on aviation or international shipping fuels (bunker fuels), a tiny levy on international currency transactions, or a global carbon tax. Positively, he mentioned the emergence of new contributors like China. He concluded by emphasizing that trillions more will be needed to reach the 1.5 °C goal as well as a "burden sharing formula".

Mr. Christian Tardif, Charge d' Affaires, High Commission of Canada to Bangladesh stated that Bangladesh already spends a significant proportion of its GDP on climate change. It needs additional funds by the international community. This could be strengthened if financial and audit systems are put in place along with a robust funding system. Mr. Tardiff finally called the COP and the Gobeshona Conference a historic moment to overcome the adversities of climate change.

MP Saber Hosain Chowdhury offers some guidance to researchers

Mr. Saber Hossain Chowdhury, Member of Parliament of Bangladesh, continued to praise the Conference and congratulated all participants. In his eyes, the challenge is to put research into action and therefore to mainstream the discourse on an international level. Sustainable development is not possible if it does not consider climate change, he argued. Synergies have to be found between three parallel global agreements in which international agreements were signed in the last few years: risk reduction (UNISDR, Sendai Framework), sustainable development goals (SDGs, New York) and climate change (COP21, Paris). According to Mr. Chowdhury, only way to overcome the mismatch between policy and research is to extend and improve communication between the two. Bangladesh provides a good opportunity to enhance knowledge and research on climate change, making its mark in the international arena.

Dr Karl Wurster delivering his speech

According to Dr. Wurster the people living in this country are not only surviving, they are even flourishing, thus exemplify their resilience and showing how to move towards solutions. This is an ideal start for science, and Gobeshona undertook the task of helping to translate this knowledge into research and finally into policy.

The Minister of Environment and Forests of Bangladesh, Mr. Anwar Hossain Monju, shared his insights during the COP21. He reiterated that internationally and nationally we need to accept the challenge of climate change and work together towards solutions, especially since it affects every nation, unlike poverty. On the issue of finance after COP21, people asked the Minister for the money or individuals, but they also have to understand that is not only about the money it is about sharing knowledge and technology and the need to help each other. He ended asserting that everybody wants to help the Bangladeshi people.

Dr Atiq Rahman at the closing ceremony

Dr. Atiq Rahman, Executive Director of BCAS ascribed the tremendous progress of the 2nd Gobeshona conference. 30 years ago people were telling Dr. Saleemul Huq and him that the issue of poverty is much important that climate change. Seen from today's perspective, climate change is integrating many issues including poverty. Like MP Chowdhury, he emphasised the three key forces debated recently on the international stage: risk reduction, sustainability and climate change. He also agreed with Minister Monju that we only have one planet, so the interests of the USA and Bangladesh are not that different in the context of climate change.

He addressed the students of Bangladesh, who nowadays have great opportunities to study abroad, but this can only happen with good supervisors and if the scientific community in Bangladesh meets the international standards for research. In this way Bangladesh will be able to stay the capital of adaptation.

Prof. M. Omar Rahman, Vice Chancellor of IUB emphasised how Gobeshona exemplifies the fundamentals of the university. Researchers and policymakers find it difficult to communicate due to differences in thinking and language.
He appealed to the policymakers to accept ambiguities, and assured them that good policy can be made with some uncertainties. Scientists have to improve their communication as well. He then moved to climate change and posited that historically, research was never as important as it is today. ICCCAD demonstrated that Bangladesh can do science right, especially in terms of climate change.

Professor Omar Rahman at the closing ceremony

4. CERTIFICATE CEREMONY - GOBESHONA YOUNG RESEARCHER PROGRAMME

Graduates of the first batch of the Gobeshona Young Researcher Programme posing with their certificates. The program aims to build the capacity of young researchers in Bangladesh to publish in international peer-reviewed journals.

Graduates of the first batch of the Gobeshona Young Researcher Programme receiving their certificates at the Gobeshona Conference closing dinner

5. PARTICIPANTS' FEEDBACK

Mchilo Mizambwa

" I would like to thank UNDP for financing my whole journey from Tanzania to Bangladesh also Dr. Saleeemul Huq and the whole team of Gobeshona organizers for inviting us to this important conference. The conference was surely an exposure to me for meeting many researchers. The whole idea of having researchers to meet and share their research was brilliant.

The Gobeshona conference was good and I enjoyed it because many researchers were gathered in one place and shared their research ideas and findings. I think this is an opportunity for researchers to start publishing their work so that their research findings can be put into action for the development our developing countries. Participation in this conference has facilitated more knowledge on climate change issues through various parallel sessions I attended, also has helped to improve my exposure especially in international climate change and improved my network. I think Tanzania can use this example to plan for conference like this one because many research findings are kept under desks, research works should be exposed so as the country can benefit from them. Thank you Once again."

- Mchilo Mizambwa, Institute for Environment, Climate and Development Sustainability (Tanzania)

The objectives of Gobeshona are valid for Uganda. For instance for the fifth Assessment Report of the Intergovernmental Panel on Climate Change, Uganda was represented by only one author – Dr. Shuaib Lwasa. In-country, there are various policy making processes which are always spearheaded by international consultants, such as the Uganda National Climate Change Policy; the Intended Nationally Determined Contributions; the Uganda Green Growth Development Strategy etc. While the international consultants work with local consultants, it is not clear how much longer the country will have to continue with this model. Yet many researchers exist and are doing a lot of work, most of which do not get published in peer-reviewed journals.

Susan Nanduddu

This is a very good innovation that ought to be replicated in Uganda. While Bangladesh may have set the bar very high, I wish to start conversations with some stakeholders to create buy-in and encourage a model that can meet such objectives. Specifically, I will follow up on the National Adaptation Programs process and engage with the knowledge management team on the same.

I wish to thank the ICCCAD team for making my participation possible, and offering to give support where necessary, for my country.

- Susan Nanduddu, African Centre for Trade and Development (Uganda)

6. GOBESHONA IN THE MEDIA

14 Climate Change

Prospects and problems of promoting low carbon urban development

10 Feature

'Lack of directives on financing weakened Paris Agreement'

Bangladesh moves up the climate change knowledge ladder

Created on January 14, 2016 at 16:29

Gobeshona sheds light on climate finance

Sonara Mahnoor Shachi

Gobeshona Annual Conference concludes at IUB - CHannel 71

or fighting climate change was in focus at the closing of Gobeshona – an annual Conference for Research on Change in Bangladesh. The conference provided the ity for international and multi-stakeholder participants to with a wide range of Bangladesh-specific climate change

rmons Roberts, Ittleson Professor of Sociology and ental Studies at Brown University and an internationally d expert on climate finance, delivered the keynote speech, his Insights on the recently conducted 21st International

SHARING








Clockwise from top-left: Group photo of Gobeshona participants and organizers, participants catchup during tea break, participants engaged in Q&A during various sessions, international participants, two young participants discussing their researc, Dr Huq and other presenters discussing their session at the tea break

Gobeshona Steering Committee

Additional Hosts

UN Women, Bangladesh

International Organization for Migration (IOM)

Asian Cities Climate Change Resilience Network (ACCCRN)

Climate-Resilient Ecosystems and Livelihoods (CREL)

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