



THE GOBESHONA

CONFERENCE FOR RESEARCH ON CLIMATE CHANGE IN BANGLADESH

08-11 January 2017

Dhaka, Bangladesh

3rd CONFERENCE PROCEEDINGS



Supported by



This publication is based upon the outcomes of the Gobeshona 3 conference and has been compiled from the notes taken by respective rapporteurs. The publication is a summary from the organizers' point of view, and does not necessarily express the views of each individual participant.

All presentations of the conference are available at www.gobeshona.net/event/gobeshona-3/

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Background on Gobeshona

Gobeshona was launched as a knowledge-sharing platform in June 2014 to connect people and institutions doing research on climate change in Bangladesh. Members contribute their results, ideas, and questions to address the quality of climate research being produced in Bangladesh and putting findings into practice through policy. 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 who now form the Gobeshona Steering Committee. The 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 include: ICCCAD, BCAS, IUB, IIED, NSU, BRAC University, DUET, Shahjalal University, Chittagong University, East West University, UIU, ULAB, WAGENINGEN, WorldFish, Islamic Relief, Save the Children, Waste Concern, Christian Aid, CCJ-B, BRAC, BBC Media Action, icddr,b, AIBS, OXFAM, Practical Action, WaterAid, CKB, VSO, CCDB, IOM, Khan Foundation, BEDS, RAJUK and Bangladesh Government.

The Gobeshona Initiative includes an annual conference and monthly seminar series, both of which have had impressive participation and contribution from the community, as well as a webportal for resources (www.gobeshona.net), and the Gobeshona Young Researchers Programme, which works to support young academics in conducting quality research and publishing in international peer-reviewed journals.

The Gobeshona 3 conference took place from 8-11 January 2017 at the Independent University, Bangladesh, and was the third annual conference through this initiative. An additional day on Inspiring Resilience was held on 12 January with BBC Media Action and ICCCAD, and focused on effective engagement with media and finding creative ways to communicate climate change knowledge to the public.

The conference brought together practitioners, researchers, 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, shared their latest research on diverse topics, ranging from urban resilience, to natural resource management, to local and national adaptation planning. The final day of the conference on 11 January was Science Policy Dialogue Day, conducted with the goal of engaging the knowledge and ideas produced through the Gobeshona network with policymakers. The concluding session was graced by the Honorable Minister from the Ministry of Environment and Forest, demonstrating the interest of the government of Bangladesh in making progress on climate change.

The Gobeshona conference also brought in a number of nationally and internationally renowned special guests who gave their insight throughout a series of keynote presentations. Additionally, an impressive range of researchers, from students to early career professionals and senior researchers, gave presentations on their latest findings. The conference is now an annual event and will be held next in January 2018.

The next conference will build upon the strengths of the first three conferences, engaging researchers alongside policy makers, implementing agencies and supporting organizations. It will 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 Conference for Research on Climate Change in Bangladesh, 2017. It also provides food for thought for future research objectives and areas of focus for next year's conference and beyond.

Progress and Commitments

The Gobeshona conference is not an isolated event – it links different components of the Gobeshona programme and communicates its learnings and outputs. To emphasize the long-term capacity building process and the continuity of the Gobeshona programme, achievements since the last Gobeshona conference and commitments till the next are announced at the end of each conference.

Achievements and progress since the 2nd Gobeshona Conference 2016 were:

- Bangladesh hosted the 10th International Conference on Community-Based Adaptation with a focus on urban resilience.
- There has been significant progress with international collaborative research and new projects have been initiated.
- Cornerstones for two international university collaboration projects have been laid by ICCCAD and its partners during the COP22 in Marrakech:

(1) Universities Network on Climate Capacity (UNCC)

The UNCC was launched during the Gobeshona Conference. The network will provide a long-term and institutionalized collaboration between academic universities of the global South and the global North, offering research partnerships and student exchange programmes. The aim of the network is to promote international exchange on climate capacity at eye level. Both sides will provide their particular knowledge and learn from each other, thereby transforming the traditional imbalance between producers of knowledge based in the Global North and its recipients in the Global South.

(2) Least Developed Countries Universities Consortium for Climate Change (LUCCC)

LUCCC will work with the most vulnerable countries for the most vulnerable communities on capacity building in accordance with implementing article 11 of the Paris Agreement. The focus of the consortium is on community-based adaptation. The consortium is led and managed by ICCCAD and Makerere University from Uganda. During the Gobeshona Conference, progress has been made with LUCCC. Representatives of 10 universities from 10 different countries came together and developed a plan of action.

- In this year's conference, 26 sessions have been held and a total number of 69 papers was presented.
- A total of 348 participants have attended the conference. Out of these, 40 % were academics, 31 % NGO's, 3 % government officials, 1 % media, 9 % international participants and 16 % others.
- Keynotes of the conference were delivered by the internationally well recognized Prof. Dr. Myles R. Allen from the Environmental Change Institute School of Geography and the Environment and Department of Physics from the University of Oxford, UK as well as by Prof. Dr. Gregg B. Walker from the Department of Speech Communication of Oregon State University, USA. Outputs of the conference were delivered in the form of proceedings, PowerPoint presentations, photos and videos, all of which are accessible at the Gobeshona website.

The following commitments and projects to be initiated by the 4th Gobeshona Conference 2018 were announced:

- **Launch the LDC Universities Consortium on Climate Change (LUCCC)**

LUCCC will be launched at the 11th International Conference on Community-Based Adaptation in June 2017 in Kampala, led by the Makarere University of Uganda.

- **Research Master Plan for Climate Change, Environment and Forests**

Based on stakeholder implementation, ICCCAD developed a research master plan for climate change, environment and forests which has been submitted and is currently being reviewed by the government of Bangladesh.

- **National Mechanism on Loss and Damage**

ICCCAD has suggested the creation of a National Mechanism on Loss and Damage. This mechanism is currently being reviewed by the government of Bangladesh.

- **Climate Finance Transparency Initiative**

ICCCAD, together with BCAS and C3ER are supporting the Economic Relations Divison of Bangladesh (ERD) with the creation of a reliable transparent system to track climate change finance.

- **Research Project on Climate Change and the Disabled in Bangladesh and Kenya**

The project, led by the University of London, will be focusing on the effect of climate change on people with disability in Bangladesh and Kenya. The international research collaboration has been launched at the Gobeshona conference and results will be delivered in the next year.

Key Learnings of the Conference

The Gobeshona conference covers a wide variety of climate change-related topics presented by a diverse range of stakeholders, including academics, development practitioners and policymakers. More details of the knowledge shared at the conference can be found in the rest of the proceedings. Here are just some of the key learnings worth noting:

- Professor Myles R. Allen from Oxford University presented a keynote lecture on “Attribution Sciences”. This is a fairly new field for climate change researchers which focuses on attributing environmental phenomena to climate change. Professor Allen suggested that attribution is difficult particularly in the case of sudden climatic events, such as cyclones, because these have always occurred. He also stressed that climate change may exacerbate natural disasters in non-linear ways: for instance, cyclones could become both more intense and less frequent. He suggested the need for Bangladesh to invest in creating an attribution science centre which will be central to seeking loss and damage assistance in the future.
- In light of the slow international process on loss and damage, the government of Bangladesh has chosen to take a more active approach and develop a National Mechanism on Loss and Damage. Presented by Ms. Naznin Nasir, this mechanism would explore different options the country has for addressing climate change loss and damage: from pro-poor weather-based index insurance to new social protection programmes.

- There is much international interest in ‘climate migrants’ compounded by the recent migrant crisis in Europe. At this year’s migration session, however, the International Organization for Migration (IOM) in Bangladesh emphasized that since it is hard to attribute climate change as the driving factor behind migration, the term ‘environmental migrant’ should be used instead. The session also looked at those who become unable to move because of climate change, otherwise known as ‘trapped populations’. Research in Bangladesh suggests that, for a variety of social, cultural and economic reasons, women are often the ones forced to stay behind as climate change related disasters take their toll.
- While the quality and quantity of climate change research in Bangladesh has certainly improved over the last decade, more needs to be done to make it on par with international standards. Dr. Haseeb Md. Irfanullah pointed out that of the 140 academic journals in Bangladesh, only four have an impact factor offered by the journal citation report, a number that has not increased in the last six years. He stressed the importance of improving the quality of academic journals available in Bangladesh. Dr. Feisal Rahman also remarked that most of the authors cited in the 5th IPCC Assessment Report for Bangladesh were foreigners; and the Bangladeshi who were cited worked abroad in foreign institutions. He hoped in the next IPCC report, more Bangladeshi researchers working in Bangladesh would be cited.
- Thus far, climate resilient projects have mostly taken into account social systems, but more work needs to be done in incorporating ecosystems and the role they have to play in climate change adaptation. Many people in developing countries, in particular, rely on ecosystem services to meet their basic needs, and while climate change poses threats to these services, these services could also be used in the name of adaptation. This will be the focus of the 11th Community-Based Adaptation Conference occurring in Uganda later this year.

A key component for successfully tackling climate change in Bangladesh and elsewhere will be the quality of climate change knowledge available and the degree to which it is disseminated. Hopefully these conference proceedings make progress on both these aims. Enjoy reading!



CONFERENCE FOR RESEARCH ON
CLIMATE CHANGE IN BANGLADESH

Programme

DAY 1 - SUNDAY, 08 JANUARY 2017 - RESEARCH INTO USE		
09:30-11:00	SESSION 1: INAUGURAL; LOCATION: AUDITORIUM	
11:00-11:20	Inaugural Group Photo; Location: In front the Auditorium	
11:20-11:50	TEA BREAK	REGISTRATION for the participants of GOBESHONA 3
11:50-13:00	Session 2: Plenary: Gobeshona Experience by ICCCAD; Location: Multipurpose Hall	
13:00-14:00	LUNCH BREAK	
14:00-15:30	Session 3: Parallel: Agriculture and Food Security by CCDB; Location: Multipurpose Hall	Session 4: Parallel: Climate Change & Gender by Oxfam and Christian Aid; Location: Gallery 5002
15:30-16:00		Session 5: Parallel: Climate Change And Modelling By Wageningen University and BUET; Location: Gallery 7002
16:30-17:30	Session 6: Plenary: Loss & Damage by ICCCAD; Location: Multipurpose Hall	
18:30-21:30	OPENING DINNER, CERTIFICATE AWARD & BOOK LAUNCHING CEREMONY by ICCCAD; Location: Food Court, IUB	
DAY 2 - MONDAY, 09 JANUARY 2017 - RESEARCH INTO USE		
9:00 - 9:30	REGISTRATION	
9:30-10:00	Session 7: International Keynote; Location: Multipurpose Hall	
10:10-11:30	Session 8: Plenary Adaptation Technology by CCDB & BCAS; Location: Multipurpose Hall	
11:30-12:00		TEA BREAK
12:00-13:20	Session 9: Parallel: National Adaptation Planning by BCAS; Location: Multipurpose Hall	Session 10: Parallel: Disaster Management by UIU & Practical Action; Location: Gallery 5002
13:20-14:20		Session 11: Parallel: Eco-System Resilience & Biodiversity by Christian Aid; Location: Gallery 7002
14:20-15:40	Session 12: Parallel: Local Adaptation Planning by Islamic Relief & BCAS; Location: Multipurpose Hall	Session 13: Parallel: Climate Change & Migration by IOM; Location: Gallery 5002
15:40-16:10		Session 14: Parallel: Climate Change & Mitigation by SESM, IUB; Location: Gallery 7002
16:10-17:30	Session 15: Plenary: Climate Change & Livelihood by Islamic Relief & Livelihood Subgroup; Location: Multipurpose Hall	
DAY 3 - TUESDAY, 10 JANUARY 2017 - RESEARCH INTO USE		
9:00 - 9:30	REGISTRATION	
9:30-11:00	Session 16: Plenary: Urbanisation & Development Control by RAJUK & ACCRN, ICCCAD; Location: Multipurpose Hall	
11:00-11:30		TEA BREAK
11:30-13:00	Session 17: Parallel: Coastal Zone Management by ULAB; Location: Multipurpose Hall	Session 18: Parallel: Natural Resource Management by CREL & BCAS; Location: Gallery 5002
13:00-14:00		Session 19: Parallel: Political Economy & Climate Finance by ICCCAD & BCAS; Location: Gallery 7002
14:00-15:30	Session 20: Parallel: Renewable Energy by SECS OF IUB And Christian Aid; Location: Multipurpose Hall	Session 21: Parallel: Water Resource Management by DUET; Location: Gallery 5002
15:30-16:00		TEA BREAK
16:00-17:30	Session 22: Plenary: Health And Wellbeing (Climate Change Context) by ICDDR,B; Location: Multipurpose Hall	
DAY 4 - WEDNESDAY, 11 JANUARY 2017-SCIENCE POLICY DIALOGUE DAY		
9:00 - 9:30	REGISTRATION	
9:30-10:50	Session 23: National Adaptation Planning (Naps) & International Collaboration; Location: Multipurpose Hall	
10:50-11:10	GROUP PHOTO SESSION; Location: IUB Courtyard	
11:10- 11:40		TEA BREAK
11:40-13:00	Session 24: Loss And Damage; Location: Multipurpose Hall	
13:00-14:00		LUNCH BREAK
14:00-15:15	Session 25: Climate Change Research; Location: Multipurpose Hall	
15:30-17:00	Session 26: Concluding Session; Location: auditorium	
17:00-18:00	SNACKS; Location: Multipurpose Hall	

Session Summaries

Session 1: Inaugural

Chair	Dr. Atiq Rahman, Executive Director of the Bangladesh Centre for Advanced Studies (BCAS)
Welcome	Prof. Omar Rahman, Honorable Vice Chancellor and, Independent University of Bangladesh
Opening	Dr. Saleemul Huq, Director of ICCCAD
Keynote	Dr. Gregg B. Walker, Professor, Oregon State University, USA
Special Guests	Mr. Nathan Sage, Director of the Economic Growth, USAID Mr. Sarat Dash, Chief of Mission, IOM Dhaka



The panel and the audience of the inaugural session of Gobeshona3

The inaugural session of the third annual Gobeshona conference started at IUB on the 8th of January 2017 and brought together researchers, academics, and scientists from all over Bangladesh and the world to congregate under one roof and exchange knowledge on climate change.

The Honorable Vice Chancellor Prof. Omar Rahman from the Independent University of Bangladesh began by welcoming the guests and highlighting the importance of research in a country like Bangladesh where access to resources is hard, and it is even harder to get something fruitful out of it. He highlighted that, although it is difficult for students to get into research, a culture where it is easier for young upcoming researchers should be established, and Gobeshona as a platform has rightly done so. He went on to state that students and academics should not be disheartened by this mammoth task and instead should focus on how to overcome obstacles and how to make the most out of it. He finished his speech by mentioning that climate change research has come a long way and Bangladesh has learned a great deal on how to adapt and deliver proper and useful solutions to this sector.

Following, Dr. Saleemul Huq, Director of ICCCAD, took the stage and gave the audience a brief summary of what ICCCAD and Gobeshona are doing as a platform for young researchers working on climate change. He stated that there are more than 1500 publications on climate change in Bangladesh and that this is an astounding achievement. Dr. Huq highlighted that the Gobeshona platform has helped create a society of researchers, scientists and academics where they can come



Dr. Saleemul Huq, director of ICCCAD was opening Gobeshona3 conference

Dr. Gregg B. Walker, Professor, Oregon State University USA was the keynote of the inaugural session.

together, share, and take away new ideas. In his eyes it has become a tradition. He mentioned "We don't disappear; we try to build on what we have done correctly or failed in and try to take things forward". He also emphasized the key areas ICCCAD have been and will be working on. One project is to kickstart the outcomes of the Paris Agreement and move forward in the next phase on "Loss and Damage". This includes South-South Adaptation technology where technologies currently being used in Bangladesh have been identified, and the next step would be to work with the broader Asia region under UNDP. Finally, he mentioned ICCCAD's vision on building bridges through international collaboration networks with Oregon State University and ten other universities including those in Uganda, Tanzania, Bhutan, Cambodia, and Ethiopia.

The Keynote speech of the opening ceremony was given by Dr. Gregg B. Walker, Professor of Oregon State University in the United States. He began by insisting that it is important to connect universities with the policy makers. He emphasized the importance of the goals of LUCCC and UNCC and stated that an array of networks is a necessity to fill in the gaps of North and South collaboration to move forward with greater capacity building within this field. He finished off by saying that, through partnering with IUB, Oregon State University will not only connect two sides of the world facing the same problems but it will also help facilitate idea-sharing between these two countries to enhance much needed development.

Mr. Nathan Sage, Director of the Economic Growth office at USAID, spoke next, drawing on Dr. Walker's discussion to emphasize the importance of youth involvement in climate change research. He highlighted the current refugee crisis and pointed out that, though climate change denial is a big obstacle in this area, there are positives things occurring as well. For example, countries such as Germany in the EU are producing surplus energy from the renewable energy sources. Finally, Mr. Sage stated that this phenomenon of having both good and bad can be like a roller coaster ride and encouraged young researchers to not lose hope.

Next, Mr. Sarat Dash Chief of Mission, IOM Dhaka took the podium to highlight that young researchers need a platform. He explained that climate-induced migration is an alarming issue that should be taken seriously, and encouraged researchers to work on this field to develop and solve problems through Bangladesh's 7th 5 year plan. He also applauded foreigners taking part in this conference and encouraged ICCCAD to keep up their good work.

Finally, Dr. Atiq Rahman, Executive Director of the Bangladesh Center for Advanced Studies (BCAS), concluded the opening ceremony by emphasizing the other speakers' discussions on capacity building and the need for community involvement, and how these two are interconnected. He highlighted the importance of why two-way communication between researchers and policymakers

is important to fill in the existing gaps. He also urged the audience to integrate development goals into their research as a way forward. Dr. Rahman finished off by saying that the researchers are the key to educating on what is right, especially those from the scientific community.

Session 2: Gobeshona Experience

- Host: International Centre for Climate Change and Development (ICCCAD)
- Chair: Dr. Saleemul Huq, Director, ICCCAD
- Moderator: Ms. Ina Islam, Deputy Director, ICCCAD
- Presenters:
1. Mr. Mohammad Nazmul Chowdhury, Content Manager, Gobeshona, ICCCAD
 2. Ms. Zinat Fatima Papia, Project Officer, Gobeshona, ICCCAD
 3. Ms. Tamanna Haque, Coordinator, Knowledge Management Programme, Gobeshona, ICCCAD

The objective of the first plenary session was to contextualize the conference for the participants. The core Gobeshona team members provided a brief overview of the overall Gobeshona programme and the progress made so far.

Ms. Ina Islam in her keynote speech set the floor for the session by illustrating the rationale behind Gobeshona and its objectives going forward. Gobeshona began as a collaborative effort of several organizations in Bangladesh coming together with the sole purpose of sharing knowledge on climate change. Academia in the country as well as abroad had been generating volumes of research on the issue. However, most of these were scattered and a consolidated platform was absent. This gap birthed the idea to create Gobeshona. Gobeshona now serves as a flagship knowledge sharing platform for climate change research on Bangladesh and aims to bring together the national and international research community to encourage sharing of research and enhancing its quality. In doing so, Gobeshona makes research on climate change in Bangladesh more effective.

Mr. Mohammad Nazmul Chowdhury provided a walkthrough of the programme and other facets of this year's conference. The theme for this year's conference has been set as 'Building a Climate Resilient Bangladesh'. He also introduced the Gobeshona web portal which shares information on completed publications, ongoing research, upcoming events and researcher opportunities relevant to climate change in Bangladesh. To date, the web portal hosts more than 1700 publications.

Ms. Zinat Fatima Papia spoke about the Gobeshona Young Researcher Programme (GYRP) which was initiated at the first conference to promote the quality of research among young Bangladeshis studying or working on climate change. The programme consists of a series of workshops held each year to train and guide a batch of young researchers on various facets of producing quality research, ranging from identifying problems and writing proposals to getting published in scientific journals. Each young researcher is tagged with a mentor with expertise in their field of interest. Despite some of the challenges faced during the first year, the programme has largely been a success. Currently, 4 articles from these researchers are in the process of being published in well



The core team of Gobeshona was presenting their experience at the conference

reputed, peer-reviewed journals. Gobeshona also organizes monthly seminars, hosted in turn by different members of the steering committee. These seminars disseminate latest research findings on climate change in the country and at the same time facilitate network building and partnerships among participating institutions. To date, 17 such seminars have been held.

Ms. Tamanna Haque further elucidated on the progress of the Gobeshona programme. New partners have been added to the consortium since its inception. Three sub-groups have also been formed on – Adaptation Technology led by CCDB, Livelihood Resilience led by Islamic Relief and ICT led by Oxfam and Practical Action. Gobeshona has also very recently expanded its portfolio of activities and now has a component on Learning Hub Event (LHE), Youth and Urban Resilience. The Youth Programme held an essay competition recently which was won by an 8th grader. Following the Gobeshona model, ICCCAD also organized a national conference on urban resilience which aims to become a flagship annual event. The “Science and Policy Dialogue” day held at the first conference aimed to facilitate a two-way learning between researchers and policymakers in the country and led to the inception of the LHE platform with the Planning Commission of the Economics Relation Division. LHEs were aimed to build the capacity of policymakers in the country on the topic of climate change. Under the Gobeshona umbrella, the LHE program will now expand to other ministries such as the Ministry of Foreign Affairs and so on. The discussion session that followed saw a number of participants lauding the initiative for its innovative approaches. Suggestions were made to connect local researchers to the international research community as well as to build the capacity of young individuals on areas beyond research such as proposal writing, project preparation and so forth.

The chair in his closing remarks commented that Gobeshona will strive to be a capacity building initiative as well as a knowledge management platform in the coming years. He also emphasized the need for researchers to move on from identifying problems and building awareness on the issues to devising practical solutions for them. Solutions so far have been disaggregated and Gobeshona can help consolidate them for effective implementation. Going forward, the platform intends to serve as a model for knowledge management and capacity building that other developing countries can learn from and replicate to guide climate action in their respective countries.

Session 3: Agriculture and Food Security

Host	Christian Commission for Development in Bangladesh (CCDB)
Chair	Mr. Joyanta Adhikari, Executive Director, CCD
Moderator	Dr. Md. Asaduzzaman, Former Research Director, BIDS
Guest of Honor	Dr. Akram H. Chowdhury, Chairman, Barind Multipurpose Development Authority (BMDA)
Discussants	1. Dr. Abu Wali Raghib Hassan, Director, DAE 2. Ms. Farida Akhtar, Executive Director, UBINIG
Presentations	1. Vertical agriculture options to address impacts of climate change in coastal regions of Bangladesh; Mr. Md. Emdad Hossain 2. Suitability of indigenous rice varieties to withstand drought condition in High Barind Tract of Bangladesh: An adaptive research; Mr. Md. Kamruzzaman (CCDB) 3. Climate adaptation through small holder climate smart agriculture: a focus on vulnerabilities & empowerment; Ms. Vositha Wijenayake (SLYCAN Trust)

Addressing the importance of food security under climate change, this session introduced two agricultural adaptation technologies: towers for vertical agriculture and the use of drought resistant, indigenous crops. The session's keynote explained that effective implementation of such technologies requires a deep understanding of both the local and systemic context. Dr. Abu Wali Raghib Hassan emphasized the importance of understanding how farmers make choices in terms of using a particular crop or technology. In terms of linking initiatives upwards and connecting the local with the national level, Dr. Akram H. Chowdhury emphasized the importance of political leadership and the inclusion of all stakeholders in a co-creational approach. Ms. Farida Akhtar then argued farmers have already built up knowledge on how to adapt to climate change and this needs to be captured and disseminated.



The panel of the session 3 Agriculture and Food Security

Mr. Md. Emdad Hossain in his presentation compared various technologies for vertical agriculture in the coastal area of Bangladesh. He concluded that vertical agriculture can address climate change related salinity issues, waterlogging, and the seasonal availability of fresh water. His project experimented with different technologies in four districts, and compared their performance. Technologies tested include hanging bamboo baskets, earthen pots, raised beds and plastic bottles. However, the research found that the vertical vegetable tower, which raises plants above waterlogged or saline towers, costing between 300 and 1000 taka, were the most effective tool.

Mr. Md. Kamruzzaman also presented a comparative assessment between different indigenous, and modified rice varieties and their ability to withstand the intensified drought conditions in the northeast. The research was conducted in Saroil village in Godagari upazila under Rajshahi district. The area experiences extreme hot weather and frequent droughts, causing low soil moisture as well as high bulk density. A total sample of ten rice varieties, both indigenous and newly developed, were tested for the northeast region using a Randomized Complete Block Design (RCBD) with three replications (plot size was 4mx5m). Out of the tested rice varieties, four indigenous Aus types provided the highest yield. As opposed to the newly developed Boro types which require the extraction of groundwater for irrigation, Aus rice varieties grow rain-fed and are therefore most suitable in the region. The study recommends the identified rice varieties should be used by local farmers, however efforts to distribute these varieties need to be increased. The presentation ended with a call to policymakers to consider the "Voluntary Guidelines to support the Integration of Genetic Diversity into National Climate Change Adaptation Planning" developed by FAO.

A compelling report on the successful implementation of small holder climate smart agriculture in Sri Lanka was then presented by Ms. Vositha Wijenayake. The aim of the project, conducted in the northeast of Sri Lanka, a place not only vulnerable to climate change but still facing the ramifications of the 30-year civil war, was to introduce organic agriculture as a form of agriculture that is both climate smart as well as responding to the increasing demand on the market for organic products

Ms. Wijenayake explained that, to build the capacity of farmers, first it had been necessary to gain the farmer's trust and demonstrate that climate smart agriculture was efficient. The project was supported by the Toxin Free agriculture policy, Sri Lanka's Nationally Determined Contribution,

and the country's National Adaptation Plan. However, once this government project ended, there was no additional funding. Thus the project team, after gaining the trust of communities, proactively helped them create their own fertilizer and set up a community seed bank backed by a local governance structure. Ms. Wijenayake's key learning point was that in order to address food security, initiatives need to be localized. Addressing climate vulnerabilities go hand in hand with community empowerment and stakeholder involvement.

Session 4: Climate Change and Gender

Host Oxfam Bangladesh and Christian Aid Bangladesh

Co-Host Christian Aid Bangladesh

Chair Dr. Mahbuba Nasreen, Professor & Director, Dhaka University

Moderator Mr. Sanjib Biswas, Programme Manager, Christian Aid

Keynote Ms. Zakia Naznin, Senior Researcher, BCAS

Discussants 1. Mr. M. B. Akhter, Programme Director, Oxfam Bangladesh

2. Mr. Sakib Nabi, Country Director, Christian Aid Bangladesh

Presentations 1. Gender and climate change: Power, place and space in climate change impact and adaptation; Mr. Mohammad Musfequs Salehin.

2. Problematizing climate adaption: Querying intersectionality, power and social justice; Ms. Farhana Sultana.

3. Untold stories: Women's resiliency and climate change adaptation in Bangladesh; Ms. Mumita Tanjeela.

This session focused on differentiated vulnerabilities to climate change, particularly differences by gender. The speakers emphasized that gender in climate research should not only mean gender discrimination and that the focus cannot only be on women. Intersectionality, in this sense, is critical.

Ms. Zakia Naznin, senior researcher at BCAS, was the first speaker of the session. Climate change, she explained, has different impacts on men and women. Women are deprived from equal rights, access to, and control over resources and decision making. Women, however, are not a



The panel of session 4 Climate Change and Gender



The discussion session during the session

homogenous group and play a key role in climate change adaptation despite their constrained capacity. Using a qualitative and participatory approach, Ms. Naznin looked at six ecosystems in six districts in Bangladesh. She found that, in those areas, livelihood activity was interrupted and changed due to climate change impacts. Women lack ownership of property due to the inheritance law and cultural practices; meaning that women's livelihood vulnerability due to climate change is not isolated from their socio-economic background. Greater gender equity and increased education of women are important ways to address these issues.

The second presenter was Dr. Farhana Sultana of the Maxwell School at Syracuse University. She focused on the issue of intersectionality, asserting that research on the gendered impacts of climate change should not only be about women, and that climate justice cannot be addressed if the issue of gender has not been addressed. Using qualitative methods, Dr. Sultana analyzed two case studies where communities are experiencing the effects of climate change. She concluded that researchers should pay attention to social structures in their work and should collect data that can be disaggregated by gender to assess differences in impact.

The last presentation was given by Mr. Sajal Roy of Begum Rokeya University. He focused on Cyclone Aila's long-term impacts on livelihood in the Sundarbans forest. Regarding gender, he found that marital status plays an important role in the impacts felt by the communities. Ultimately, he concluded that it is necessary to include gender justice in order to achieve climate justice.

The session concluded with comments from the discussants and chair. They emphasized the impacts of social structure and cultural expectation on the differences in climate impact by gender, noting that both women and men feel the effect of climate change in devastating ways. Women, in particular, often bear the burden of coping with changes, but face constraints on their ability to move and adapt, not only for themselves but for their families. In moving forward we must build policies that acknowledge and address gender differences and it will take research advocating for and utilizing a gender approach to studying climate change to get us there.

Session 5: Climate Change and Modelling

Host Wageningen University and Research

Co-Host Bangladesh University of Engineering and Technology (BUET)

Chair Ms. Catharien Terwisscha van Scheltinga, Director, Project Officer, Wageningen University and Research

Moderator Mr. Mashfiqus Salehin, Professor, BUET

Presentations 1. Model impact of climate change on the groundwater flow and salinity encroachment in the coastal areas of Bangladesh, Mr. Anwar Zahid.

2. End-century multi-hazard maps for Bangladesh coast, Ms. Momtaz Jahan.

3. Gain of land by siltation unlikely to be reversed by sea level rise, Mr. Shahriar Khan.

The presentations in this session projected the potential future impacts of climate change. The first presentation explored the extent to which salinity intrusion would increase as a result of climate change, primarily in the groundwater supply. The second presentation tried to map the various hazards the country would face by the end of the century; while the final presentation looked at the combined processes of siltration and sea level rise. The chair, Ms. Catharien Terwisscha van Scheltinga, emphasized the importance of not taking the projection to literally, and more of a guide as to what may occur in the future.



Wageningen University and Research hosted the Climate Change Modelling session

Mr. Anwar Zahid gave his talk on salinity intrusion in Bangladesh, explaining the country was already suffering from increased levels of salinity in the last couple of decades. This is causing major problems in terms of the availability of fresh water supply, which in turn is already limited due to high arsenic levels in the water. Mr. Zahid then presented two case studies: the first looked at groundwater flow paths and travel time; and the second on groundwater salinity. He concluded through the long term simulation for climate change that salinity movement from the surface to the aquifer would not be significant due to the high velocity of river water, the groundwater flow direction and the seasonal variation of salinity concentration of rivers. However, he argued due to the tidal effect of major rivers, there is still major interaction between groundwater and surface water.

The next presentation began with an overview of the main environmental hazards on the coast of Bangladesh – cyclonic storm surges, fluvio-tidal floods, salinization and river bank erosion – and emphasized climate change will exacerbate most of these. Ms. Momtaz Jahan's study produced four end-of-the-century scenario maps on storm surges, floods, erosion and salinity, and then combined these into a single multi-hazard map of Bangladesh. Her main takeaways were that the top-ranked hazard prone areas would be Manpura, Ramgati and Khulna Sadar; that erosion will be most dominant along the Lower Meghna and Baleshwar-Burishwar estuarine systems; and tidal flooding in areas close to the Sundarbans will increase due to sea level rise.

The final presentation was somewhat controversial in that it challenged commonly held beliefs about sea level rise drowning out the southern coast of Bangladesh. Mr. Shahriar Khan explained that while the sea level would continue to rise, he also stated sediment from upstream would continue to flow downstream and accrete new land. The purpose of his study was raising the question how these two processes would interact, and whether or not there would be a net gain or loss of land. He concluded contrary to many people's fears, the Ganges delta will not lose but continue to gain land in the coming decades, despite rising sea levels. He also explained that because the sea level is rising at a relatively slow rate, Bangladesh could easily take proactive action to ensure that the country is not affected by the rise. For instance, Mr. Khan emphasized the positive role trees could play in binding the soil together, making the land less vulnerable to erosion. Although, he mentioned that dams in neighboring countries would decrease the sediment flow into the Bengal delta that may affect the rate of land accretion.

By modelling the future impacts of climate change, policymakers and development practitioners can start making more effective plans for the future, granted that the models are rarely perfect. Ms. Terwisscha van Scheltinga closed the session by thanking the presenters for the illuminating models.

Session 6: Plenary - Loss and Damage

Host	International Centre for Climate Change and Development (ICCCAD)
Chair	Mr. Md. Reaz Ahmed, Director General, Department of Disaster Management, Ministry of Disaster Management and Relief
Moderator	Mr. S. M. Munjurul Hannan Khan, Deputy Secretary, Ministry of Environment and Forests
Keynote	Mr. M. Hafijul Islam Khan, Executive Director, Centre for Climate Justice Bangladesh (CCJ-B)
Presentations	<ol style="list-style-type: none">1. Measures to address loss and damage including insurance for coastal fisher folk of Bangladesh, Mr. Md. Habib Torikul.2. Sustainable policy for the flood flow zone and effective development control mechanisms: Dhaka City, Mr. Syed Nazmul Husain.3. Non economic loss and damage caused by tropical storm Roanu, Mr. Md. Golam Mahabub Sarwar.

The session on Loss and Damage gave important insights on the background and process of the formulation of a National Mechanism of Loss and Damage that is currently underway in Bangladesh. Furthermore the session drew attention to the fact that Non-Economic Loss and Damage (NELD) is under researched in Bangladesh and should receive more attention.

The session started off with the keynote by Mr. Md. Hafijul Islam Khan, who introduced a model for policy formulation that can be used for the establishment of a National Mechanism of Loss and Damage. The model suggests four stages: conceptualizing the nature of Loss and Damage; developing tools and methodologies for assessment; identifying the right approaches; and formulating robust legal policy framework for Loss and Damage.

Following the keynote, Mr. Md. Habib Torikul outlined the use of risk retention (social safety nets and contingency funds) and risk transfer (insurance) as effective tools to address Loss and Damage for coastal fishermen of Bangladesh. His presentation emphasized the needs to establish a comprehensive database linked with index based insurance to address Loss and Damage in coastal Bangladesh.

In his study on sustainable policy for the flood flow zone and effective development control mechanisms for Dhaka city, Mr. Syed Nazmul Husain strongly recommended that the city responds to its growing population by providing settlements. This is very important in order to avoid further encroachment of wetlands and agricultural land all around the city that already has negative consequences for the cities' climate change resilience.

The session was wrapped up with a study on Non-Economic Loss and Damage (NELD) presented by Mr. Md. Golam Mahabub Sarwar. Mr. Md. Sarwar presented a joint study conducted by him,



The panel of session 6 Loss and Damage

Md. Shakeb Nabi and Md. Marzia Shafin of creating an inventory of NELD. For the purposes of the study, they looked at tropical storm Roanu that took place in Bangladesh last year. For assessing NELD, they quantified the total loss of human lives in dollars. In order to measure death in monetary figures, they considered a lump-sum for life insurance and total lifetime earning of each individual holding workable age group from 18-60 years. The study measured six broad categories of NELD from the tropical storm Roanu for this research: human death, health, human mobility, cultural heritage, loss of biodiversity and ecosystem services. This evidence based research concluded with the recommendation to prioritize NELD in the context of Bangladesh.

Mr. Md. Reaz Ahmed chaired the open discussion following the presentation. The first question dealt with how human suffering could be measured. Mr. Golab Mahbub Sarwar answered with an anecdote on human suffering from lack of access to water in cyclone prone areas, pointing out the incapability of NELD to date to assess such mental suffering. Ms. Vositha Wijenayake from Sri Lanka asked Mr. Md. Hafijul Islam Khan about the National Mechanism of Loss and Damage and recommended a proposal for collaboration between the two countries to develop the National Mechanism of Loss and Damage. Mr. Md. Hafijul Islam Khan appreciated the proposal and acquainted the audiences with the scoping paper in 2016 on National Mechanism of Loss and Damage that has been prepared for the Government of Bangladesh. It is currently being reviewed and waiting for government approval. Another question critically looked at the feasibility of having an insurance policy to address Loss and Damage for coastal fishermen considering that they are not economically solvent. Mr. Torikul responded that the field survey conducted so far ensured positive outcome with regards to insurance payment even for people with very low income.

Session 7: International Keynote

Keynote Professor Dr. Myles R Allen, Oxford University

Climate change and extreme weather events: Attribution and implications for Loss and Damage and the 1.5°C goal.



Professor Dr. Myles R Allen, Oxford University in the international keynote session 7

In his international keynote, the well-recognized Professor Dr. Myles Allen from Oxford University addressed the issue of attributing climate-related events to human influence. In order to leverage claims for Loss and Damage compensation, it is crucial to find ways to identify to what degree harmful weather events have been a result of human influence. Professor Dr. Allen demonstrated that computer-based modelling provides a viable way to create a probability analysis for the occurrence of harmful weather events. Based on these models, he found that harmful weather events can be attributed to human induced climate change probabilistically.

National-level contributions to that elevated risk can be quantified as well. This is a breakthrough finding which has the potential to provide a powerful tool to leverage Loss and Damage compensation claims.

Regarding next steps, Dr. Allen emphasized the pioneering role of Bangladesh in Loss and Damage in the international arena as it is the first country to develop a national Loss and Damage mechanism. He suggests that, in order to effectively implement the mechanism, they should

establish an inventory of Loss and Damage in Bangladesh. Commenting on the global scientific debate, Dr. Allen criticized that inventory has focused too much on the contributor's side with efforts to quantify CO₂ emissions. Expanding the focus, establishing methods for quantification of Loss and Damage due to climate change in the most affected countries needs to receive more scientific attention - probability analysis provides a viable way to do this. Furthermore, Dr. Allen claimed that there is a need for a shift of focus away from the cost of achieving the 1.5°C goal, and towards a quantification of avoided impacts that can be achieved if the global average rise in temperature stays below 1.5° C. Relatively subtle changes in risk translate into very substantial impacts. Therefore, as climate change continues, particularly if the Paris aspiration to limit warming to 1.5°C is unsuccessful, the issue of compensation cannot be avoided.

Session 8: Adaptation Technology

Host	Christian Commission for Development in Bangladesh (CCDB)
Co-Host	Bangladesh Centre for Advanced Studies (BCAS)
Chair	Dr. Atiq Rahman, Executive Director, BCAS
Moderator	Mr. Md. Kamruzzaman, Coordinator – Research, CCU, CCDB
Guest of Honor	Dr. Nurul Quadir, Additional Secretary, MoEF
Discussants	<ol style="list-style-type: none">1. Ms. Hasin Jahan, Country Director, Practical Action Bangladesh2. Mr. Mokhlesur Rahman, Executive Director, CNRS
Presentations	<ol style="list-style-type: none">1. Potential of mobile phone in extension of adaptive agriculture for community resilience, Mr. Tapas Ranjan Chakraborty2. Rooftop gardening in Dhaka: An adaptation measure of the commoners, Ms. Naeema Jihan Zinia3. Pico hydropower generation: An overview of geographic presentation in Bangladesh, Mr. Md. Ashfaq Uddin



The panel of the session 8 Adaptation Technology



Professor Dr. Myles R Allen, Oxford University in the audience of session 8 Adaptation Technology

This session focussed on three different climate technologies (mobile phones, rooftop gardening, and small-scale hydropower) with the underlying theme being "what is climate technology" and "how can we build Bangladesh's capacity to use such technology?". Most of the discussion in the

session looked at the pros and cons of each technology, while the discussants answered the bigger thematic questions of climate technology in Bangladesh.

The first presentation, given by Mr. Tapas Ranjan Chakraborty, focused on a study he conducted with Oxfam that provided a community in the north of Bangladesh with 200 android phones, mostly to female farmers, to see how they would use their phone to receive climate knowledge and act on that knowledge. Climate knowledge could include weather forecasts, adaptation tips and best sustainable agriculture practices. The study then conducted an ethnography, as well as focus-group discussions, to see the extent in which the phones worked in improving adaptive capacity. Based on their findings, Oxfam found that farmers were most interested in learning about which seeds would be most productive in light of changing climate conditions. The second piece of information they wanted to know was what fertilizers to use, and then about market places they could sell their produce. Mr. Chakraborty concluded that by using cell phones as a means to communicate climate knowledge, farmers' adaptive capacity would increase as they would be able to adapt their agricultural practices to the consequences of climate change. His takeaway message: the use of information communications technologies can make a community more resilient if it is incorporated in a comprehensive approach.

The next presentation focussed on ecosystem management in Dhaka city, focussing primarily on rooftop gardening as an effective adaptation strategy. Ms. Zinia Jihan pointed out the fact that, as Dhaka continues to urbanize and expand its borders, managing ecosystems is becoming increasingly difficult. Furthermore, there is a lack of environmental awareness in the city as residents often dump their waste into canals and partake in other environmentally hazardous activities. By surveying residents in Mirpur, she wanted to learn what everyday people thought was the best way to improve the management of ecosystem services in the city, and then make recommendations to policy makers. She found that most of her respondents felt that rooftop gardening was both an affordable and achievable adaptation strategy to improve ecosystem services in the city, noting that rooftop gardening already exists in Dhaka but is done mostly for aesthetic reasons. There are also considerable social and economic benefits to rooftop gardening, as well as environmental, including improving the air quality, increasing social interaction and mitigating climate change. Her conclusion was that residents will play a crucial role in making Dhaka city climate resilient, and rooftop gardening is one strategy that everyday people could undertake.

Ms. Syeda Nishat Naila's presentation looked at the potential of using pico-hydro power as means of electricity generation in rural Bangladesh. Pico-hydro power is essentially small scale hydropower. While the technology has been developed, it is yet to be implemented in Bangladesh. Ms. Naila explained that, as the country continues to develop, it will require energy and the current plan is to source most of this energy from burning fossil fuels, which emits CO₂ and contributes to climate change. She suggested pico-hydro is one alternative to relying so much on fossil fuels because it is a proven, renewable energy that is both predictable and has a high energy conversion efficiency, and is more cost effective than competitive renewable energy technology (it costs USD 3000 for one pico hydro system with an efficiency at 2.5 kW with the water level 7m high). Pico-hydro could supply electricity for a few families, and would contribute to the off-grid electrification system. However, to see its feasibility in Bangladesh, she explained it would first have to be tested in suitable locations in the country.

The discussants ended the session with Ms. Hasin Jahan defining adaptation technology as tools and knowledge that people use for a living in response to climate change, and Mr Mokhlesur Rahman emphasizing that,, for technology to function, the wider infrastructure is necessary to support it. The final word was given by Dr Atiq Rahman explaining that technologies did not need to only address climate change, but also poverty, and food and livelihood security.

Session 9: National Adaptation Planning

Host	Bangladesh Centre for Advanced Studies (BCAS)
Chair	Dr. Atiq Rahman, Executive Director, BCAS
Moderator	Mr. Golam Rabbani, Fellow, BCAS
Presenters	<ol style="list-style-type: none">1. Scenario guided strategic planning for a climate resilient Bangladesh, Ms. Maliha Muzammil, Scenarios and Policy Researcher, CGIAR programme on Climate Change, Agriculture and Food Security (CCAFS), Environmental Change Institute, University of Oxford2. Managed aquifer recharge for artificial storage (MARAS) of water to improve groundwater conditions in vulnerable climatic areas of Bangladesh, Mr. Anwar Zahid, Deputy Director, Bangladesh Water Development Board3. How sustainable are alternative income generating activities? A case study of mega adaptation projects from Bangladesh, Ms. Remeen Firoz, Freelance Consultant.

The chair opened the session with an overview of the national response to climate change in Bangladesh so far. Bangladesh was one of the first LDCs to develop its National Adaptation Program of Action (NAPA) in 2005. Subsequently, the Government of Bangladesh (GoB) prepared the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2009, which, to this date, serves as the primary guiding document for all climate change initiatives in the country. Several government ministries, departments and agencies have also been designated to tackle the issue at the national policy level. The GoB, with support from UNDP and funding from GCF is currently in the process of developing its National Adaptation Plan (NAP). Lastly, the chair pointed out that inadequate adaptation to climate change would bring forth an array of sociopolitical implications and development challenges for the country. A robust and effectual national plan for adaptation is therefore imperative.



Dr. Atiq Rahman was speaking on National Adaptation Planning

Ms. Maliha Muzammil began her presentation by introducing the CCAFS Scenarios Program. Implemented across six global regions and, with support from 240 partner organizations, this stakeholder driven program works on developing combined socio-economic and climate scenarios to help decision-makers devise better national and regional policies, investments and institutional structures. Scenarios are useful as they help policy makers visualize a range of plausible futures and explore different directions of change. The CCAFS program has been put to action and is already guiding policymaking in a number of countries in Africa, Asia and the Americas. The program's activity in Bangladesh began in 2014. The CCAFS Scenarios team held a two day workshop with the General Economics Division of the Planning Commission to support scenario guided strategic planning for the country's 7th Five Year Plan (7FYP). Four scenarios were created for Bangladesh and then impact pathways to achieve key objectives and strengthen

desirable drivers from the four scenarios were discussed and planned. Some of the systemic interventions suggested include the development of resilience-based technical skills, decentralization of authorities, strengthening of local government institutions as well as the development of multi-dimensional M&E tools. These outputs have now been integrated into chapters of the 7FYP.

Overexploitation of aquifers by human activities has led to depleting groundwater levels across the country, resulting in poor water quality and supply. Impacts of climate change such as changing precipitation patterns and rising sea levels are likely to worsen this issue. There is, however, a potential for recharge enhancement to store excess water runoff and reduce salinity. Mr. Anwar Zahid's study titled MARAS aimed to identify suitable and prospective aquifer recharge technologies for different climatological and physiographical areas of Bangladesh. To understand appropriateness, a suitability score was attached to a range of physical and socioeconomic variables such as precipitation intensity and duration, thickness of the aquitard as well as population density and poverty levels. The final output was a country-wide map demonstrating suitable technologies for different areas in Bangladesh. Prospective technologies proposed by the study include infiltration wells and ponds sourced from rain or river water, recharge basins and artificial subsurface reservoirs. Mr. Zahid shed light on some of the advantages and disadvantages associated with each of them. For instance, infiltration wells are fairly simple and economical to install, operate and maintain. However, the absence of proper quality control runs the risk of further degrading the aquifer. Mr. Zahid concluded his presentation by stressing the need for thorough consideration of relevant hydrogeological and physical variables to ensure proper selection of site-specific recharge technologies.

Ms. Remeen Firoz presented a small-scale, desk-based study conducted to understand how adaptation projects, if not implemented properly, can lead to 'maladaptation'. A common element of adaptation projects in Bangladesh has been the provision for Alternative Income Generating Activities (AIGA) to affected population. The study aimed to identify how sustainable these AIGAs have been. Five major adaptation projects, implemented by different government and international agencies, were selected as cases. To examine sustainability, AIGAs were categorized as on-farm, off-farm and non-farm activities, wherein non-farm activities are least affected by climate change. The study found some of the projects to be more favorable than the others. For example, CREL identified forward linkages to AIGAs and also provided training to local people so that they are able to sustain their AIGAs beyond completion of the project. The CLAP project, on the other hand, engaged a substantial number of women. Conversely, AIGAs have been found to be dismissive of the local context and contributive to social exclusion in some cases. AIGAs help empower vulnerable communities against climatic impacts and can become a transformational adaptation activity. It is therefore important to have proper guidelines and principles for implementation. Skills development of beneficiaries as well as an enabling environment that creates market linkages, are also crucial for ensuring sustainability

During the discussion sessions, one of the participants was curious to learn whether social exclusion in adaptation projects was a result of flawed project design or existing socio-political conditions. The presenter responded by saying that projects often do so by setting an age limit. Also, limited resources tend to inhibit the scope of work. Therefore some degree of social exclusion is inevitable. In his concluding remark, the chair referred to the significant progress that has been made over the years in national policy processes. More and more institutions are becoming actively engaged in tackling climate change in the country. A thorough national adaptation plan will help Bangladesh achieve its SDGs as well as the targets set in GoB's Perspective 2021 document.

Session 10: Disaster Management and Disaster Risk Reduction

Host	United International University (UIU)
Co-Host	Practical Action Bangladesh
Chair	Dr. Hamidul Huq, Professor, UIU
Moderator	Ms. Hasin Jahan, Country Director, Practical Action
Presentations	<ol style="list-style-type: none">1. Is groundwater table depleting in Barind tracts over times?, Mr. Md. Shafiqul Islam.2. Coping with natural disaster impacts: an example from a highly disaster prone coastal village of Bangladesh, Mr. Md. Humayain Kabir.3. Coupled human-landscape interactions in coastal Bangladesh, Mr. Bishawjit Mallick.

Disaster management and risk reduction is a critical issue in Bangladesh, particularly along the coast. Increasingly frequent and intense storms brought on by climate change are already creating difficulties for farmers, and leading to both migration and entrapment of people around the country. The speakers in this session focused on the impacts of disasters on the people of Bangladesh, and made suggestions for measures that might be taken in policy and research to address them.

The first presentation was by Md. Shafiqul Islam, Assistant Professor from the University of Liberal Arts Bangladesh, on groundwater depletion in Barind Tracts over the years. Bangladesh's agriculture is heavily reliant on surface water and monsoon rainfall for irrigation and 79.1% of agricultural lands are irrigated using groundwater. Professor Shafiqul Islam's study concentrates on the rapid depletion rate of groundwater tables observed in the northwest Barind Tracts of Bangladesh. The Rajshahi, Chapai Nawabganj, and Naogaon districts are currently experiencing a paucity in agriculture and other livelihood activities. The study found that there is a marked depletion in the groundwater tables in the surveyed areas, the cause of which is attributed to climate change impacts, huge withdrawal of ground and surface water over time, and poor infiltration capacity of the soil in the Barind Tract resulting in quick runoff and discharge of rainwater in the monsoon season. Professor Islam recommended that, to mediate the current drought situation faced in the surveyed area, farmers should shift from more water consuming crops to less water consuming and drought-resistant crops (vegetables, fruits, etc), and should excavated and re-excavate canals, ponds, khal, and beel. Drought related policies must also be formulated, especially drought insurance, and water related policies must be implemented.

Dr. Nurun Nahar, Deputy Chief of the planning commission in the ministry of planning, spoke about trends of disaster-related public fund allocation in Bangladesh. The study objective was to assess the extent of integration of disaster risk reduction (DRR) and disaster preparedness (DP) in the annual development program (ADP) and to determine the allocation of public funds for DRR and DP. Technical support and funding for the research came from the programming division of the



The panel of session 10

planning commission, the People's Republic of Bangladesh, and the NARRI consortium. The study was conducted by the Department of Disaster Science and Management at the University of Dhaka. Dr. Nahar outlined the level of resources being allocated to six ministries and 164 projects, which were selected based on their DRR sensitivity, using statistical data and graphs that showcased the impact of the projects compared to how much aid is being provided. This study requires further data collection to come to an exact figure of expenditures in these disaster-related projects at both the ministry and sector level. Dr. Nahar also commented on the issue of the time gap that exists between the approval of a project and its implementation.

Last, Dr. Bishawjit Mallick, visiting research fellow from the International Migration Institute, University of Oxford, presented on the topic of coupled human-landscape interactions in coastal Bangladesh. His study was conducted under the Integrated Social Environmental and Engineered (ISEE) project in Bangladesh and funded by the United States Office of Naval Research. Dr. Mallick's presentation of coupled human-landscape interactions concentrated on the polder areas in the southwest region of Bangladesh, which have been most affected by Cyclone Aila, and the level of sedimentation and socio-economic impact that poldering has had on the area. His study found that most environmental change in southwest Bangladesh has been due to direct modification of the natural environment by humans, and that community structure and livelihoods are built around the ecosystem services provided by the natural and the built environment. Dr. Mallick ended stating that, although the poldering initiative taken by the government back in the 1960s and 70s was meant for the good of the people, they did not foresee the negative impacts that poldering would have on the landscape and the community in the future.

Session 11: Ecosystem Resilience and Biodiversity

Host	Christian Aid Bangladesh
Chair	Dr. Ainun Nishat, Professor Emeritus, BRAC
Moderator	Mr. Sanjib Biswas Sanjay, Programme Manager, Christian Aid
Discussants	<ol style="list-style-type: none">1. Dr. Istiak Sobhan, Environment Specialist, World Bank Dhaka Office2. Dr. Mokhlesur Rahman, Executive Director, Center for Natural Resource Studies (CNRs)
Presentations	<ol style="list-style-type: none">1. Vulnerability of coastal resources to climate change and sea level rise in sub-tropical coast, Indian Ocean: A case study; Mr. Abu Hena M. K.2. Determination of optimal spatial arrangement component crops in jhum; Mr. Md. Kamrul Islam3. Estimating the economic benefits of an improved aquatic ecosystem and watershed management in the Tanguar Haor wetland: An application of choice modeling; Md. Hafiz Iqbal.



Mr. Md. Kamrul Islam presenting at session 11 Ecosystem Resilience and Biodiversity

The chair began by explaining that climate change is a political issue and that the root causes of climate change related problems are complex. For instance while salinity is a climate change issue, it is also caused by the Farakka barrage. It is for this reason that building ecosystem resilience to climate change and other developmental processes needs to take into account all the factors involved.

The first presenter was Mr. Abu Hena M. K. who focused on the importance

of intertidal macrophytes (a type of aquatic plant). These macrophytes are important in maintaining the groundwater quality. However, their effectiveness is being hampered by climate change. He explained the climate impact on breeding crab fish. For instance, if the Sundarbans are lost, the habitat for several valuable species would also be lost. A 45 cm sea level rise would inundate 75% of the Sundarbans, and 67 cm sea level rise could inundate all of the system. From his study, he showed the likely impact of sea level rise on seagrass and salt marsh zone in the Bakkhali estuary, Cox's Bazar, Bay of Bengal. He also mentioned some of limitations of the IPCC report. He concluded by saying that the accumulation of peat and sediment in salt marshes and seagrass bed may help prevent sea-level rise. When asked whether or not there was any hope to protect sea grass and macrophytes, Mr. Hena replied that we have the resources to do so, there simply needs to be the awareness to act.

The second presenter was Mr. Md. Kamrul Islam, who looked at the optimal spatial arrangement for component crops in jhum production. In the beginning of his presentation, he mentioned that his experiment was conducted through the cotton development board and funded by Krishi Gobeshona Parishad. In his situation analysis, he showed that more than 400 million people are dependent on jhum cultivation but the yield of the crop is very low. His research attempted different crop combinations through a participatory approach to improve the yield. The study was conducted in farms in Bandarban and Khagrachari. The study found that by intercropping one row of rice with two rows of cotton, the yield would double. He recommended intercropping, but emphasized that a feasibility and environmental impact study were needed for this kind of initiative. Responding to the question on whether or not there are any new technologies that could improve jhum cultivation, Mr. Islam replied that there is no technology gap but the tribal farmers are very conservative and thus need to be made aware of the potential.

Mr. Md. Hafiz Iqbal, the third presenter, then talked about the economic benefits of an improved aquatic ecosystem and watershed management in the Tanguar haor wetland. This haor is very important to Bangladesh due to the ecological services and economic opportunities it provides. However, the wetland is under threat which in turn threatens rural livelihoods that depend upon it. This in-balance in the ecosystem is because of a variety of human induced factors and absence of R&D strategy. His study aimed to explore the preferences of fisher folks to improve the situation

at Tanguar Haor. The study found that fisher folks were more likely to pay more for an improved aquatic ecosystem since it supported their livelihoods. He concluded by saying that the, ‘wise use of resources and preference-based choice can ensure sustainable development and environmental protection.’ An audience member asked Mr. Iqbal what the economic value of the wetlands and the fish were, to which he replied saying that economic valuation was difficult since there was a tendency among people to convert wetlands into land for boro cultivation. However, if wetlands are kept intact, the value would be triple that of paddy farms.

Session 12: Local Adaptation Planning

Host	Islamic Relief, Bangladesh
Cohost	Bangladesh Centre for Advanced Studies (BCAS)
Chair	Dr. Atiq Rahman, Executive Director, BCAS
Moderator	Mr. Shabel Firuz, Country Director, Islamic Relief Bangladesh
Presentations	<ol style="list-style-type: none">1. Tidal river management in Kalicharanpur, Jessore: Assessment from cradle to grave, Mr. Tahmid Huq Easher2. Local adaptation plan for action: A tool for climate resilience, Mr. Munirul Islam3. The problems of governance of climate change adaptation in coastal GBM-delta Bangladesh, Mr. Mohammad Rashed Alam Bhuiyan



Dr. Atiq Rahman speaking on local adaptation planning at session 12

This session provided valuable insights by introducing Local Adaptation Planning as a tool for bottom-up planning, as well as emphasizing how governance issues negatively affect the success of adaptation projects, running the risk of maladaptation. The keynote of this session explained that participation and community consultation should not be treated as a way of just “ticking a box”. Implementers, planners and policy makers need to incorporate what they have heard into their plans. Local knowledge and science need to be integrated to achieve sustainable adaptation action. Additionally, the governance of adaptation projects needs to be greatly improved for more successful adaptation.

Mr. Tahmid Huq Easher gave a compelling presentation on problems caused by a lack of participation during a Tidal River Management (TRM) project in Kalicharanpur, Jessore. The TRM project was introduced with the objective of maintaining river drainage and reducing water logging. However, during the conceptualization and implementation of TRM, there has been an absence of adaptive management planning and local consultation. Faults in planning as well as pressure from neighboring areas led to TRM not shifting the area and moving upstream as planned. Instead, TRM exceeded its capacity and induced permanent waterlogging in some regions, resulting in increased vulnerability for the affected communities. In conclusion, Mr. Tahmid Huq

Easher pointed to several learnings from his study: incorporating local knowledge into structural and non-structural measurements is a must, capacity building for local inhabitants is very important for successful implementation of local adaptation planning and local adaptation planning case studies should be highlighted and considered for future operations.

Mr. Munirul Islam proposed to mainstream Local Adaptation Plans for Action (LAPAs) into the national adaptation process. Since climate risks are identified at the local level, adaptation planning also needs to occur on the local level. Islamic Relief Bangladesh (IRB), with the technical support of Bangladesh Center for Advanced Studies (BCAS), has piloted LAPAs in four rural areas and one urban area. During the pilot, each area has identified strategies that were particularly appropriate for their local context, such as specific kinds of saline tolerant crops, harvesting and fishery methods and the use of renewable energy sources. LAPAs can operationalize the policy objectives outlined in the National Adaptation Programs of Action (NAPA) and Bangladesh Climate Change Strategy and Action Plan (BCCSAP). The next steps for mainstreaming LAPAs are leveraging funding, scaling up LAPAs in other geographical areas involving local, national, international NGOs and supporting LAPAs in the future national Climate Change Policy.

An account of the complex governance challenges that surround climate change adaptation projects was discussed by Mr. Mohammad Rashed Alam Bhuiyan. Using a stakeholder analysis to look at the governance of climate change adaptation in coastal GBM-delta Bangladesh, the study found that a crisis of governance poses a barrier to successful adaptation action. The low-lying southern coastal districts are heavily vulnerable to climate change. Asset loss, resource constraints and lack of adaptation finance pose the major stumbling blocks for adaptation. The research finds that, though there are some examples for successful models of government-led adaptation projects, many large scale adaptation activities such as river management and installation of PSF face governance challenges. At the government side, common problems consist of lack of proper planning, inadequate research, lack of coordination within various departments of government, inappropriate and untimely implementation, non-involvement of local people in planning and implementation and lack of funding and delayed budget disbursement. NGO-projects on the other hand often suffer from short-termism` and lack of wider coverage, tending to showcase best-practices rather than finding appropriate solutions. The capacity of people to adapt autonomously is hindered by lack of resources, lack of coordination and stimulating leadership and diminishing social bonding.

Session 13: Climate Change and Migration

Host	International Organization for Migration (IOM), Dhaka
Chair	Mr. Abdusattor Esoev, Deputy Chief of Mission, IOM, Dhaka
Moderator	Mr. Golam Rabbani, Fellow, BCAS
Presentations	<ol style="list-style-type: none">1. Migration, immobility and climate change: gender dimensions of poverty in coastal Bangladesh, Ms. Basundhara Tripathy, Dr. Samiya Selim.2. Climate induced migration: A South Asian perspective, Ms. Vositha Wijenayake.3. Challenges of governance for reducing climatic concerns in perspective of migration in Bangladesh, Mr. Md. Arif Chowdhury.

While climate change is a globally understood issue, it is only recently that migration has been playing a larger part of the conversation. Currently, there are 75 million people on the planet who live just one meter above sea level, meaning they will likely be in danger of climate



The panel with the presenters of Climate Change and Migration session

change-induced sea level rise. The host, Mr. Abdusattor Esoev, argued this is why policymakers, particularly those addressing climate change, need to become more attentive to migration as a major climate change issue.

Dr. Samiya Selim gave the first presentation on women's immobility and climate change. While much of the climate change and migration literature focuses on mobility, research in Bangladesh suggests that men often migrate to the cities looking for better livelihood opportunities, and women tend to stay behind and are "stuck" in their houses. Dr. Selim presented her student's study that looked at the

trapped population in Khulna, referring to the women who are unable to move due to cultural norms and climatic factors, often being rendered the poorest of the poor. "Trapped" referred to the ability to move, the desire to move and the need to move. The study conducted in 2016 used six focus group discussions looking at how immobility occurred in response to climate-related disasters. The key finding of the study was that immobility can reduce both the adaptive capacity of people in the region and put an end to livelihoods whereby women could no longer work on farms due to a lack of human support and financial capital. Dr. Selim emphasized that more research should look at immobility, not just migration, when it comes to climate change.

On the other hand, Ms. Vositha Wijenayake's presentation looked at climate-induced migration from a South Asian perspective, arguing that more of a human rights perspective is required. She explained that while the term "climate refugee" is used a lot, from a legal perspective not everyone is a refugee. She then gave several examples of migration that have occurred in South Asia. For instance, in 2013, tropical cyclone Phailin prompted the Indian government to evacuate over one million people prior to a landfall. She talked about how 40 years of coastal erosion on Bhola Island in Bangladesh has prompted the movement of about half a million people, and how a drought in Afghanistan, also in 2013, led to the displacement of the Kuchi nomadic people who not only lost their livestock, but their access to drinking water and pasture lands. However, in looking at the various policies that exist for South Asia to address climate migration, Dr. Wijenayake stressed that a human rights lens is lacking.

Mr. Md. Arif Chowdhury's presentation focused on his study in which he reviewed 30 policies and laws in Bangladesh to determine the effectiveness of the country's governance in addressing climate change-induced migration. He explained that while there are many rights outlined, there are also some significant gaps; for instance, the right to know the fate and whereabouts of missing relatives, protection of professions and possessions left behind by internally displaced people, as well as the need for mental health services for migrants. He argued more needed to be done to ensure safe migration for the people of Bangladesh.

Questions raised in the discussion included to what extent migration can be attributed to climate change, given there are plethora of factors that drive migration, and whether people really felt "trapped" or if the term was one applied by academics and development practitioners. To the first question, the panelists agreed that migration is a complex phenomena and even the data collected on migration was not usually aggregated into the different causes for migration. On the second question, Dr. Selim explained that it was hard to answer the question since many women did not even consider moving as an option, and it is difficult to asses a choice that someone does not understand as a choice.

Session 14: Climate Change and Mitigation

Host School of Environmental Science and Management (SESM), Independent University, Bangladesh (IUB)

Chair Dr. Abdul Khaleque, Dean, SESM, IUB

Moderator Dr. Hafizur Rahman, Assistant Professor, IUB

- Presentations**
1. Forest carbon estimate and REDD+ implications in Bangladesh, Mr. Sharif Ahmed Mukul
 2. Facilitating renewable energy in urban planning and its implication in climate change mitigation: Scope and opportunities in megacity Dhaka, Mr. Kamrul Hasan Sohag

On Bangladesh's potential in meeting the challenge of climate change, this session reminded participants that the country must not resign itself to the adaptation assistance from the developed world, and instead must actively pursue mitigation strategies. Though Bangladesh's carbon dioxide emissions are negligible compared to the rest of the world, as noted by Dr. Abdul Khaleque, there is still much potential to lead by example and set effective precedents in mitigating emissions. As the presenters in this session made clear, forestry research and urban planning are two key areas for investment with this goal in mind.



Mr. Sharif Ahmed Mukul showing how to estimate forest carbon for REDD+ implications in Bangladesh

In the field of forestry research, Mr. Sharif Ahmed Mukul demonstrated the need for more work on carbon estimates in forests, particularly in order to take advantage of the REDD+ program. The REDD+ program creates a market around forest carbon mitigation by comparing avoided emissions through forest maintenance to predicted emissions in business as usual scenarios involving deforestation. In Bangladesh, however, there is little literature on forestry and, as made evident in Mr. Mukul's systematic review of the literature, there is much variation in measurements of carbon density across forest types. Therefore, forestry research is crucial for outlining best practices for mitigation through maintaining forests with high carbon densities, and allowing Bangladesh to implement those practices while benefiting through REDD+.

On urban planning, there is huge potential for improving the planning of Bangladeshi cities, especially Dhaka, to reduce emissions. Mr. Kamrul Hasan Sohag argued that renewable energy must be made central to urban master plans. Though solar is often costly and requires significant space, cities can build their solar capacity through zoning and building construction rules. For example, density zoning to designate specific heights for buildings can make more rooftops solar-friendly. Mr. Sohag pointed to the Bangladeshi government to encourage the growth of solar energy in its cities by establishing national renewable energy policies in urban areas, by incorporating solar into the Bangladesh National Building Code (BNBC), and by supporting research in universities on low cost renewable technologies. Though much of this work would be easier if it had begun many decades ago, it is imperative to begin now to pursue mitigation.

One message from the presentations on climate change and mitigation was that Bangladesh can be made more resilient through mitigation. Two critical mitigation efforts that should be undertaken in Bangladesh are increasing forest conservation and expanding renewable energy in cities. Both efforts require research, and such work is urgent as the country has arrived at a point where it cannot stop industrializing and thus must find ways to develop sustainably. Mitigation solutions are also central to a resilient Bangladesh.

Session 15: Climate Change and Livelihood

Host	Islamic Relief Bangladesh
Cohost	Gobeshona Livelihood Subgroup
Chair	Mr. Shabel Firuz, Country Director, Islamic Relief Bangladesh
Moderator	Dr. Ekramul Ahsan, Former Chair, Bangladesh Agriculture Research Council
Discussants	<ol style="list-style-type: none">1. Dr. Akram Hossain Chowdhury, Chairman, Barind Multipurpose Development Authority2. Professor Dr. Mahbubur Rahman, Sher-e-Banglanagar Agriculture University
Presentations	<ol style="list-style-type: none">1. Exploring uncertainties in community livelihood adaptation for adaptive delta management in Bangladesh: Tapping community adaptation decision for climate resilient Bangladesh, Ms. Umme Kulsum2. Enhancing climate resilient livelihood, Mr. Munirul Islam



Ms. Umme Kulsum is presenting in session
15 Climate Change and Livelihood

This session pointed to the difficulty to grasp local complexity in national top-down planning and recommended adaptive planning as an approach that takes local level perceptions and strategies into account. Salt tolerant crop varieties have the potential increase cropping intensity under climate stress and improve the livelihood of poor people living in the coastal area.

First to present was Ms. Umme Kulsum, who gave a compelling presentation on the role of uncertainty in community livelihood adaptation. Ms. Kulsum's research explores the concept of Deep Uncertainty which is defined as a class of uncertainty due to plurality in

framing the same decision problem by multiple stakeholders of heterogeneous backgrounds. The concept explains that the difference of actors' values, perceptions, opinions, experiences and forms of knowledge create the uncertainty of the outcome of processes. For example water scarcity is experienced differently by a farmer, a fisherman and a local government official and each would react differently to it. Interventions often do not work in practice because they fail to link to local perceptions and experiences. Currently, when a community faces a problem in a certain area, the government does not address the affected area immediately but takes the decision on their own and sometimes ends up setting up corrective measures in the wrong area. To illustrate the concept of Deep Uncertainty Ms. Kulsum showcased a cognitive map of farmers' adaptation decisions that

is based on her research in a coastal polder area of Bangladesh. According to Ms. Kulsum, a climate resilient Bangladesh requires an adaptive policy decision practice that overcomes Deep Uncertainty. Ms. Kulsum recommended a theory motivated (meta)model as contribution to adaptive planning for resilient development.

The final presenter of the session, Mr. Munirul Islam, shared the experiences he made with Farmers Field Laboratory (FFL), a project to introduce salt tolerant crop varieties in order to increase cropping intensity and improve the livelihood of poor people living in coastal area. The project took place in the Ramjannagar, Shyamanagar and Maheshwaripur, Koyra district. The present situation of Koyra and Shyamanagar in terms of agriculture is difficult due to high salinity of the soil. The shrimp cultivation culture further contributes to the salinity. Crops for the study were selected based on their growth rate, yield and tolerance to drought and saline. Farmers were selected based on their education and interest in adaptive technologies. Under Farmers Field Laboratory several climate adaptive crops were trialed by 101 farmers. The change has been successful for 82% of them. After involvement with FFL about 70% of the beneficiaries, 53.4% of them female, have taken family farming as their major occupation. Cropping intensity increased from single to monocropping due to cultivation of successful kharif 1 and Rabi crops (Swamp cabbage, Indian spinach, Mungbean, Pumpkin, Barley, Potato) trialed under FFL. The increased cropping intensity improved the livelihood of the participating farmers.

Session 16: Urbanisation and Development Control

Host	Rajdhani Unnayan Kartripakkha (RAJUK)
Cohost	Asian Cities Climate Change Resilience Network (ACCCRN), ICCCAD
Chair	Mr. Sarder Shafiqul Alam, Coordinator – Urban Climate Change, ICCCAD
Moderator	Mr. Kamrul Hasan Sohag, Town Planner, RAJUK
Presentations	<ol style="list-style-type: none">1. Urbanisation and climate change: Urbanisation Strategies of Baluchar induced climate change, Ms. Mst. Gulajannath Prianka Choudhury2. Building climate resilience to Noapara town: A coastal urban centre of Bangladesh, Mr. Neaz Rasel Bappy, Project Researcher

Ms. Gulajannath Prianka Chowdhury presented her study on urbanisation strategies of Sylhet's Baluchar area in the face of climate change. Baluchar has experienced rapid and unplanned urbanization in recent years, largely attributable to the location of Sylhet University within the area. High rates of population growth have led to indiscriminate hill cutting and forest clearing practices, resulting in ecological imbalance, increased siltation in rivers and heightened risk of soil erosion and landslides. BMD data reveals that average temperatures in the area have increased in the last 30 years, which can be partially attributed to deforestation. Biodiversity is also under threat. Several local species of flora and fauna have become endangered in recent years. Furthermore, ponds and canals which serve as drainage channels for the area, have been



The panel of session 16 – Urbanisation and Development Control

filled for residential and commercial purposes. This leads to drainage congestion and waterlogging, particularly during the rainy season. Poor practices of solid waste disposal further append to this problem, increasing the risk of air and water pollution. The study found that massive disregard and inadequate enforcement of rules and regulations by responsible administrative authorities are a key reason behind unplanned urbanization and environmental degradation in Baluchar. Impacts of climate change are expected to further exacerbate these problems. The study recommended increased focus on rural development, strong enforcement of laws and regulations and increased engagement of relevant authorities as some of the solutions to tackle the issue.

Mr. Neaz Rasel presented on a study undertaken by ICCCAD and ACCCRN to understand the impacts of climate-induced hazards on water and sanitation supply systems of a coastal urban center in Bangladesh and to subsequently propose a resilience plan for the center. The study also set out to explore the measures that need to be taken to attract climate migrants to coastal towns. Noapara in Jessore district was selected as the study site. This industrial town suffers from inadequate water supply and poor sanitation facilities. Salinity intrusion, rising temperatures and increased incidences of floods due to climate change will further threaten these systems. The presence of industries already attracts a large number of migrants to the area. As the impacts of climate change become increasingly pronounced, more and more people are expected to migrate to Noapara from rural areas closer to the coast. Therefore it is important to have a robust climate resilience action plan in place. The study proposes an action plan that includes improvement of the drainage system, construction of climate-proof sewerage and sanitation facilities and awareness raising of local population. There need to be adequate employment opportunities, better housing facilities as well as better access to water supply. Effective implementation will also require multi-stakeholder collaboration and increased engagement from concerned authorities both at the national and local level. The chair, Mr. Sarder Alam, who was also involved with the study added that the rationale for the study was to identify the gaps that drive people to move to Dhaka as opposed to other urban centers in the country. He finds that livelihood opportunities tend to be the determining factor when it comes to migration, rather than the availability of urban services or social networks. Infrastructure facilities should therefore follow economic development in coastal towns.

During the discussion session that ensued, one of the participants expressed his dismay at the lack of open green space in major cities such as Dhaka and proposed the possibility of allocating and limiting a certain area of land to a certain number of individuals. He also expressed dissatisfaction at the lack of coordination among responsible urban authorities, which has led to issues like traffic congestion and substandard urban facilities. The moderator drew from his experiences and referred to bureaucratic structures as well lack of capacity and resources, particularly at the city government level, as key reasons for these problems.

In his closing remarks, the chair commented on the dearth of research on the interrelationship between urban development and climate change in the country. To promote knowledge generation and sharing on the topic, ICCCAD with support from partners, plans to hold a conference on urban resilience every year, which marks a step in the right direction.

Session 17: Coastal Zone Management

Host	University of Liberal Arts Bangladesh (ULAB)
Chair	Dr. Samiya Selim, Director, CSD, ULAB
Moderator	Dr. Santanu Kumar Saha, Senior Lecturer-cum- Research Associate, CSD, ULAB
Presentations	<ol style="list-style-type: none">1. Spatiotemporal changes of water logged area in South-Western Bangladesh, Mr. Hasan M Abdullah:2. River deltas like Ganges delta started by deforestation by early hominids? Mr. Shahriar Khan3. Dynamic deltas: developing new knowledge for science policy interaction in Bangladesh, Ms. Catharien Terwisscha van Scheltinga



The panel of session 17 – Coastal Zone Management



Prof. Pius Z Yanda, Director Institute of Resource Assessment, University of Dar Es Salaam Tanzania in the discussion session of Coastal Zone Management.

"How do we integrate the science behind climate change and policy? How do we communicate and translate our research to make better, more efficient policies?" These two questions, posed by Dr. Samiya Selim of ULAB, drove the Coastal Zone Management session. With 710 kilometers of coastline and almost 50 million people living in the coastal region, reducing the impact of coastal zone disasters brought on by climate change is of critical importance for Bangladesh. Doing this will require the joint effort of different sectors – namely researchers, NGOs, the private sector and the government – working toward sustainability and reducing vulnerability. This session's presentations focused on introducing such research.

Mr. Hasan Abdullah raised the issue of water logging, which has become a major environmental issue in southwestern Bangladesh. Though the region was previously optimal for agriculture, salt water intrusion has led farmers to adopt adaptive practices such as shrimp farming, although this began in the early 1990s. Through a cycle of cause and effect, shrimp farming has led to increased saline water intrusion, which leads to waterlogging and more saline buildup, which creates further crop damage. Therefore, though adaptive, shrimp farming can also be unsustainable, especially because it becomes impossible with drastic changes in salinity due to cyclonic events. Mr. Abdullah attributes the decrease in shrimp farming between 2010 and 2015 to such cyclonic events, which importantly has also decreased waterlogging. Tracking these changes is an important route for understanding the resilience of these coastal systems and implementing appropriate policies.

There is also much to be learned between countries facing similar coastal zone threats from climate change. Ms. Catharien Terwisscha van Scheltinga presented the mutually beneficial work that her research team is doing through the Delta Alliance, connecting the experiences and knowledge of Bangladesh and the Netherlands. The team aims to reduce the impact of flooding for individuals and communities and to develop strategies to reduce flood exposure and vulnerability. Their research focuses on four areas: knowledge agendas in flood risk management, urban flood risk management, rural flooding and climate change, and new flood and disaster management arrangements. Ms. van Scheltinga emphasized that policymakers think long-term, so research must be conducted with the goal of assisting such long-term decision-making. This integration of research and policy is crucial to building a resilient Bangladesh.

Finally, Mr. Shariar Khan demonstrated the need to investigate, question, and establish historical baselines for environmental change. Mr. Khan proposed the theory that the Ganges River Delta was actually formed by deforestation activities of early hominids. Though calculations based on the length and the volume of the delta concluded that the delta emerged about 40,000 years ago, the delta potentially developed millions of years ago. This may be explained by human settlements who had the ability to cut down trees at a large scale during this time. Therefore, Mr. Khan argued, the present changes in the Ganges River Delta are just a continuation of changes that have been ongoing for millions of years, and so adaptation and resilience are part of this process.

Most important for building resilience in coastal zones is learning more about these regions and how they change over time. By connecting this knowledge to policy in ways that were provided during this session Bangladesh can make strides in minimizing the impacts of climate change. Bangladesh has much at stake in the development of climate-focused coastal zone management strategies, and resilience can be built through the joint effort of researchers, funders, and policymakers.

Session 18: Natural Resource Management

Host	Shahjalal University of Science and Technology, Sylhet
Chair	Professor Dr. A.Z.M. Manzoor Rashid, Dean, SUST
Moderator	Mohammed Abu Sayed Arfin Khan, Asst Prof, SUST
Presentations	<ol style="list-style-type: none">1. Assessment of Eco-tourism Impacts Towards Sustainable Forest Management: A Case Study at Satchari National Park, Bangladesh, Ms. Mehzabin Rupa2. Living With Environmental Change: Perception of Environmental Quality Among Coastal People of Bangladesh, Mr. Sate Ahmad and Mr. Abdullah Al Mamun3. Payment for Ecosystem Services for Natural Resources Management in Bangladesh: The Potential of Ecotourism, Mr. Shams Uddin

Prof. Dr. Manzoor Rashid opened the session by discussing how climate change would affect on-going natural resource management efforts. He suggested that impacts of climate change on natural resource management may not all be negative since ecosystems are complex and in certain cases climate change could have positive impacts. However, he emphasized for ecosystem management to be effective, management needs to effectively involve all people in the community and not de facto the local elite.

Following this, Ms. Mehzabin Rupa made the argument that ecotourism could be a major opportunity for the country to generate revenue while at the same time conserve natural ecosystems. Her study explored how co-management structures could govern ecotourism and looked into ecotourism that is already occurring at Satchari National Park. The study found that the local communities were relatively satisfied by the ecotourism, although they felt mostly neutral about the co-management model. On the other hand, local officials were far more pleased in having a co-management model. Positive impacts of ecotourism in the area was an increased literacy rate, enhanced employment and income generating activities, improved environmental awareness and increasing access to decision making processes. Negative consequences of ecotourism include increased deaths of wildlife, inequality within the co-management model, social instability and the fading of traditional culture. However, she concluded by discussing the negative impacts that climate change could have on ecosystem services and tourism. Her presentation recommended an approved forest policy to be implemented in Satchari National Park that takes climate change into consideration.



Ms. Mehzabin Rupa presenting the assessment of tourism impacts on Natural Resource

The second presentation was delivered by Mr. Sate Ahmad and Mr. Abdullah Al Mamun, focusing on local perceptions of environmental quality among coastal people in Bangladesh. The study sought to analyze the association between economic well-being and perception of local environmental quality, and to cross-validate perceived groundwater salinity with measured data. Their findings suggested that the wealthier the people the more positive were the perceptions on local environmental quality. However, the perception among people varied because poor people are more likely to be exposed to worse environmental quality whereas wealthier people within the community have higher adaptive capacity, as acknowledged by IPCC. Mr. Ahmad also mentioned that the highest variation of measured salinity was found for households reporting bad quality. Finally, presenters highlighted that although there is a positive association between perceived groundwater salinity and measured groundwater salinity, policy formulation or intervention should not solely rely on perceived environmental quality - but on the actual quality itself. Thus, to build resilience environmental perceptions should be cross-validated with actual data.

Md. Shams Uddin was up next who spoke on Payment for Ecosystem Services (PES) can be a suitable management option for the institutional and financial sustainability of Protected Areas (PAs). The objective of the study was to evaluate the opportunities and challenges of ecotourism as a source of Payment for Ecosystem Services (PES) in Protected Areas (PAs) of Bangladesh. Md. Shams emphasized that sustainable financing of biodiversity conservation is directly linked to PES and that's linked to availability of ecosystem services, which can be affected by climate change. He also stressed that a strong government, private sector and community support is important to mainstream PES in forest management.

During the open discussion, there was general consensus that valid database linking to scenario of protected areas is needed, which helps to devise the planning in long run. In concluding the chair wrapped up all presentations and urged that a Mapping and Assessment of Ecosystems and their Services (MAES) study can be used as basis for ecosystem management in the future.

Session 19: Political Economy and Climate Finance

Host	International Centre for Climate Change and Development (ICCCAD)
Cohost	Bangladesh Centre for Advanced Studies (BCAS)
Chair	Dr. Saleemul Huq, Director, ICCCAD
Moderator	Dr. Atiq Rahman, Executive Director, BCAS
Chief Guest	Ms. Shamima Nargis, Additional Secretary, ERD
Presentations	<ol style="list-style-type: none">1. Do existing social protection programs address the emerging socioecological vulnerability of coastal households in Bangladesh? Mr. Iftekharul Haque, PhD Candidate, School of International Development and Global Studies, University of Ottawa, Canada2. Mutual accountability in support and utilization of adaptation finance, Dr. Mizan R. Khan, Environmental Science and Management, North South University3. Climbing an oily bamboo: accessibility and additionality issues of global climate finance for Bangladesh, Mr. Mohammed Abdul Baten Senior Lecturer, SESM Independent University Bangladesh

Mr. Iftekharul Haque presented on a study that aimed to explore the influence of political economy in the allocation of social protection programs in Bangladesh. Livelihood Vulnerability Index (LVI) for each district in the country was constructed. The map produced found some of the most vulnerable areas in the country to have received little allocation of social protection and vice versa. Political, socioeconomic and geographic variables such as number of ministers, years of experience of government officials, population size, size of the district etc. were further incorporated into the model. Results found insignificant correlation between political factors and allocation of support. Rather, population and size of the district had a more significant influence. Having spoken to authorities in charge of social protection program in the country, Mr. Iftekhar found that, since the program was designed more than a couple of decades ago when poverty levels were high at most parts of the country, population was the defining criteria. The country has developed substantially since, although it has happened in a haphazard, unequal fashion. A change in allocation criteria is thus imperative. Mr. Iftekhar concluded that since the problem of misallocation is not political as initially assumed, but rather a consequence of poor program design, it would be relatively easy to solve.

Dr. Mizan Khan drew from his years of experience as an international negotiator to speak about the issue of mutual accountability in the global climate finance arena. Stipulations made by the UNFCCC and the recent Paris Agreement place a strong emphasis on transparency and accountability and dictate both donor/developed and recipient/developing countries to report on climate finance flows. However, he finds the level of sincerity on donors' part in this regard to be unsatisfactory. Lack of a commonly agreed upon definition of climate finance as well as the lack of uniform accounting modalities were cited as some of the reasons for this. Furthermore, ODA is often repackaged as climate finance, leading to issues of double counting. Only a minuscule proportion of pledged support is channelled through regime funds such as the GCF. Accessibility to these funds also continues to be extremely complex. On the contrary, he feels that recipient



Ms. Shamima Nargis
Additional Secretary, ERD



The panel for session 19 named political economy and climate finance



The audience for the session 19 political economy and climate finance

countries have demonstrated somewhat better practices in this regard. However, accountability has largely been directed at donors as part of due diligence rather than to beneficiaries of the fund. Governance issues are also pervasive. As ways forward, he suggests that first and foremost there needs to be a clear distinction between additional climate finance and ODA. Developing countries will need to better implement their Right to Information Acts (RTI). Long term capacity building of recipient agencies is also essential for limiting shortcomings in governance.

Building on the above, Mr. Abdul Baten presented on some of the issues associated with the accessibility and additionality of global climate finance, particularly for Bangladesh, and how they relate to achieving SDGs. A large number of international mechanisms are in place for financing climate action. An equal balance in financing mitigation and adaptation activities, both important prerequisites for achieving SDGs, are expected of these funds. However, an examination of key international climate funds shows that the majority of climate finance to date has been directed towards mitigation activities, particularly in fast growing emerging economies. Developing countries have received little support on mitigation, which they could potentially use to pursue low-carbon pathways. Even less support has been provided on adaptation. Access to these funds also remains challenging. More than half of the accredited entities for direct access are international/multilateral with only a small number of them being national. This limits national ownership of funds. On the issue of additionality, he suggested that designating ODA for adaptation and mitigation activities runs the risk of shifting resources away from other sectors important for achieving the SDGs, such as education and health. The need to establish new and additional finance for climate action is therefore undebatable.

A major concern raised during the discussion session was the difficulty in distinguishing between finance for development and finance for climate action. All the members of the panel acknowledged that they are interlinked and often inseparable. One of the ways of doing so would be to have two separate pots at the mobilization level. When it comes to implementation, a series of criteria can be used to allocate funds from both the pots to a particular project.

The chief guest reiterated the importance of establishing specific criteria for distinguishing new and additional climate finance. She also briefly spoke about the GCF and illustrated the many challenges associated with direct access and due diligence to the fund. In their closing remarks, the chair and the moderator both advocated that, despite growing frustrations with the global climate finance landscape, we must remain optimistic. The issue of climate change and political economy will continue to exist. In addition to identifying problems, researchers need to also think of solutions. Going forward, Bangladesh must improve transparency practices, not for the donors but rather in its own self interest.

Session 20: Renewable Energy

Host	School of Engineering and Computer Science, IUB and Christian Aid
Chair	Dr. Mizan R Khan, Environmental Science and Management, North South University
Moderator	Dr. Khosru M. Salim, Prof. IUB
Presentations	<ol style="list-style-type: none">1. Beyond Coal - Scaling up the Clean Energy, Mr. Samshuddoha2. Solar Power Integrated Farming System: Irrigation, Rice Husking and Fishing, Mr. Mohammed Rejwan Uddin3. Global Warming Minimisation Through Solar Power: Challenges for Bangladesh, Mr. Fahad Haider



The panel of the session 20 Renewable Energy

The renewable energy session focused on three main points regarding the renewable energy sector: the need to invest in renewable energy in Bangladesh, ways to maximize solar energy usage, and the gaps and barriers for renewable energy implementation. Mr. Samshuddoha, Mr. Mohammed Rejwan Uddin, and Mr. Farhad Haider spoke on this important topic.

Mr. Samshudoha began with the facts and figures about the Energy Sector in Bangladesh. In Bangladesh the government has set a renewable energy target of 23000 MW by 2020, and has projected that coal usage in Bangladesh by 2050 will be 30% from domestic coal and 20% imported. He then highlighted the need to

phase out fossil fuel and dependency on coal in order to meet the targets of the Paris Agreement and SDGs. In addition, there is a need to reduce natural gas usage and to invest more in renewable energy sources, as Bangladesh shifts from agriculture based economy to urban infrastructural development. The private sector can play a crucial role in this, though at present it is not contributing as much as required within the renewable energy sector in Bangladesh.

The second presentation by Mr. Rejwanuddin focused on the technical aspects of his project plan for maximizing solar irrigation all year round. The plan uses a singular system and solar energy for three purposes: irrigation, husking and fishing, and conducting these activities simultaneously. Through this process it will be possible to generate extra income from solar energy, which will incentivize more people to make the initial high cost investment of a solar irrigation system. According to the cost profit analysis conducted in Mr. Rejwanuddin's study, through this system there is a possibility of breaking even on costs even within 2-3 years, without accounting for fishing.

The final presentation by Mr. Fahad Haider depicted some of the challenges faced by the renewable energy sector in Bangladesh. He emphasized the need for monitoring policy

implementation to create a focused policy for solar energy in Bangladesh. Mr. Haider also discussed the lack of technical knowledge in the area, and the overlap between the areas that have grid connection and solar home systems.

Bangladesh has great potential for investing in renewable energy. While solar is an important component of this investment, exploring all renewable energy options, including wind energy can help Bangladesh meet the goals set by the government. Ensuring that renewable energy policies are not only developed but actually implemented and monitored through an evaluation framework is crucial. Finally, the country must simultaneously commit to divesting from coal and other fossil fuels as it develops, as this will also help meet the mitigation goals and standards set by the Paris Agreement.

Session 21: Water Resource Management

Host	Dhaka University of Engineering and Technology (DUET)
Chair	Prof. Dr. Md. Showkat Osman, director, DUET
Moderator	Prof. Dr. Ganesh Chandra Saha, Head, DUET
Presentations	<ol style="list-style-type: none">1. Converting Local Conflicts Over Water to Cooperation in a Changing Climate, Ms. Parvin Sultana2. Optimum Solution for Safe Drinking Water in Tala Upazila, Mr. Sajidur Rahman3. Conflicts and Cooperation Around Water Management Infrastructure in a Hydro-Social System in Peri-Urban Khulna, Ms. Israt Jahan

The session gave important insights into the conflicts surrounding Water Resource Management, particularly on the dynamics of power and cooperation during water-related conflicts. The session provided several important lessons learned. Policy gaps and implementation mistakes can lead to negative outcomes for the most vulnerable, both in small and in large water infrastructure projects. Stakeholder-analysis can be a tool to understand conflicts better and develop strategies for cooperation. Including disadvantaged groups in the planning and management of water infrastructure is essential for its sustainability and inclusiveness. To a certain degree, cooperation can enable a solution that is feasible for all even in a situation of water scarcity. To ensure safe water sources, the introduction of Pond Sand Filters, Rainwater Harvesting and shallow tubes should be promoted in the government planning process. Furthermore a sluice treatment plan and a waste treatment plan should be considered to ensure sustainable water management.

In the first presentation Ms. Parvin Sultana argued that policy application gaps are a source of



The panel of the session 21 Water Resource Management

conflict, because they allow local elites to get special access to infrastructure like sluice gates. She presented the results of her study on the conversion of local conflicts over water into cooperation in two cases of water-related local conflicts. In conflicts around sluice gate management a solution emerged when the disadvantaged group was invited to participate in the sluice committee and adjusted sluice operation to their needs as well. Prior to this, local elites, big farmers and enclosure owners had controlled the sluice gate to improve their productivity whereas small farmers had no right to speak up. In a second conflict between two villages around water scarcity, cooperation enabled them to create a small seasonal reservoir as a solution that equally provided water for all.

Mr. Sajidur Rahman showed that in Tala upazila ground water is the preferred and most used source for drinking water, but the sources are no longer safe and sustainable. The study was based on a robust mix of methods, with indicator based analysis questionnaire survey, GPS location survey, Key Informant Interview (KII) and Focus Group Discussion (FGD) used as data collection tool. Based on the research Dr. Rahman concluded that alternative water sources such as small scale WTP (shallow aquifer based), solar cell operated Pond Sand Filter (Advanced PSF) and water treatment plant etc. should be used. To facilitate their sustainable implementation Dr. Rahman suggested that community people should own and manage these water technologies.

Ms. Israt Jahan introduced stakeholder analysis as the first step to transform conflicts into cooperation and promote inclusive water management. She presented her stakeholder analysis on the conflicts and cooperation around water management infrastructure in peri urban area. In peri urban Khulna the socio economy is water oriented and people are no longer cultivating rice but winter crops. Conflicts have emerged on the sluice gate operation during dry season and the role of Mayur River.

Following the presentation a robust discussion emerged. Ms. Jahan clarified that during the FGD project the inclusion of women has been ensured. Regarding the responsibility for sluice gate operation in Khulna she pointed out that whereas Khulna Development Authority does the overall water management plan, Khulna City Corporation maintains the operation system. Dr. Ganesh Chandra concluded the session and stated that for safe water sources, along with PSF, Rainwater Harvesting and shallow tube well need to be integrated into plans. He also highlighted the importance of a sluice treatment plan and a waste treatment plan for sustainable water management.

Session 22: Health and Well-Being (Climate Change Context)

Host	International Centre for Diarrheal Disease Research, Bangladesh (icddr,b)
Chair	Dr. Quamrun Nahar, Head, Initiative for Climate Change and Health
Moderator	Ms. Sifat S Yusuf, Research Investigator, icddr,b
Presentations	<ol style="list-style-type: none">Exploring mental health services among climate victims in a cyclone affected area of coastal Bangladesh, Mr M. Tasdik HasanImpact of climatic variables on cholera outbreaks in Dhaka, Ms. Salima Sultana DaisyEconomic benefits of universal health coverage for the climate induced disease in southwest coastal region of Bangladesh: An empirical study, Mr. Md. Hafiz Iqbal.



The panel of the session 22 Health and Well Being (climate change context)



Visiting researcher Danielle Falzon

The presentations in this section focused on the impacts of climate change on health and wellbeing in Bangladesh. Presenters emphasized the risk that climate change poses for residents' health and wellbeing, especially those in vulnerable coastal areas. They explored this issue both qualitatively and quantitatively, exploring a range of physical and mental health effects.

The first presentation was given by Mr. M. Tasdik Hasan and analyzed the effects of climate change on mental health. He collected qualitative data by recording people's stories and experiences after disasters. Mr. Hasan highlighted one case of a woman who lost her sanity after a cyclone that snatched away three of her sons. He also discussed the lack of funding for mental health research in Bangladesh, mainly due to its taboo status in society. Though policymakers usually regard mental health as unimportant when compared to other forms of losses that are more visible and measurable, it is a significant issue that should be taken seriously in policymaking. Mental health services can be one effective measure in alleviating losses due to suffering during and after climate disasters.

The next two speakers presented projects that were conducted using a quantitative approach. Ms. Salima Sultana Daisy discussed her project on the impacts of climate variables on cholera outbreaks in Dhaka. She used observed cholera data from icddr,b and used climate variables such as rainfall and temperature to assess the impacts of climate on cholera outbreaks. The results from her study indicated that cholera outbreaks are indeed affected by climatic variables. The third presentation by Mr. Md. Hafiz Iqbal described the economic benefits of universal health coverage for climate-induced diseases. He presented an empirical study which was carried out in Southwest Coastal Bangladesh and informed by focus group discussions. His study concluded that preference-based attributes of universal health coverage can ensure good health and human well-being and protect coastal people from climate-induced diseases.

The chair, Dr. Quamrun Nahar, concluded by reflecting on all presentations and acknowledged the diverse research methodology applied in each case. It is difficult to quantify the effects of climate change on health and well-being since the direct and indirect impacts of climate change in these areas are difficult to track and measure. For this reason, he appreciated the varying techniques being applied for health and wellbeing research, an important and new focus area in the study of climate change.



Kett Maria from Leonard Cheshire Disability and Inclusive Development Centre

Session 23: National Adaptation Planning and International Collaboration

Chair

Dr. Saleemul Huq, Director, ICCCAD

International Participants

1. Mr. Tim Ash-Vie, Head of Climate Change, Adam Smith International

2. Mr. David Mfitumukiza, Makerere University Centre for Climate Change Research & Innovations (MUCCRI), Uganda

3. Prof. Pius Z. Yanda, Director Institute of Resource Assessment, University of Dar Es Salaam, Tanzania

4. Mr. Revocatus Twinomuhangi, Makerere University, Uganda

5. Ms. Jacqueline Philibert, Ministry of Environment, Tanzania

6. Prof. Dr. Emdad Haque, University of Manitoba, Canada

7. Ms. Vositha Wijenayake, Executive Director of SLYCAN Trust, Sri Lanka

8. Ms. Catharien Terwisscha van Scheltinga, Director, Project Officer, Wageningen University and Research



Mr. Revocatus Twinomuhangi, Makerere University, Uganda, Prof. Pius Z Yanda, Director Institute of Resource Assessment, University of Dar Es Salaam, Tanzania and Ms. Jacqueline Philibert, Ministry of Environment, Tanzania

This session involved numerous international participants sharing their experiences on national adaptation planning from their different countries.

Mr. Tim Ash-Vie gave a brief presentation on lessons learned from implementing green growth strategies across a variety of developed and developing countries. Arguing that green growth should not be viewed differently from national adaptation planning, he listed some takeaways from various country experiences. These include the need for strong leadership for green growth and investing into institutions that can withstand political upheavals.

From Tanzania, Professor Pius Z. Yanda spoke about the need to involve universities in national adaptation planning, especially when it came to producing quality research. He stressed that the country would have to develop a comprehensive national research agenda plan which encompassed a wide range of issues and can be incorporated by students. Part of the success of this model would be including multiple stakeholders in the development of the research agenda in order to increase outputs.



Ms. Catharien Terwisscha van Scheltinga, Director, Project Officer, Wageningen University and Research, Mr. David Mfitumukiza, Makerere University Centre for Climate Change Research & Innovations (MUCCRI), Uganda and Mr. Tim Ash-Vie the Head of Climate Change of Adam Smith International participating NAPs and International Collation session.

Mr. Revocatus Twinomuhangi, who is from Uganda, gave an outline of the different national policies in Uganda that deal with adaptation: the NAP 2007, Uganda Vision 2040 and the National Climate Change Policy. The country is now in the process of developing a climate change law that will provide a legal framework for climate change strategies and develop a green growth pathway. He also stressed that some sectors have created their own NAPs, which will contribute to the national NAP through a highly consultative process.

Also from Tanzania, Ms. Jacqueline Philibert stressed that adaptation planning in her country began in 2007 when the National Adaptation Plan of Action (NAPA) was launched. So far, the NAPA has been used to implement several projects worth USD 8 million. Her takeaway lesson was that adaptation planning has to go together with development planning; and that indigenous knowledge is equally important to incorporate into the planning process, particularly through a participatory approach so that existing adaptation knowledge is integrated in policies that are relevant to the end user.

From her experiences in Sri Lanka, Ms. Vositha Wijenayake emphasized the importance of ensuring that national adaptation planning included the needs of the poorest communities. She spoke about her work with the Southern Voices organization that supports capacity building in several developing country regions in the world. Her learning from this experience was that planning a NAP requires a multi-stakeholder process and that the capacity of key stakeholders would need to be built.

Speaking from a developed country's point of view, Ms. Catharien Terwisscha van Scheltinga discussed how the Netherlands government had accepted strategy documents for adaptation in 2015. After giving an overview of the climate change impacts that her country is likely to experience, she stressed that adaptation should not only be seen as a reaction to vulnerability, but an opportunity to innovate. She pointed out that the Netherlands is the first country in the world to produce a national attribution service providing rapid climate information.

Mr. David Mfitumukiza, also hailing from Uganda, stressed the importance of including ecosystems in national adaptation planning. Given that the majority of Ugandans rely on

ecosystem services, it is important to include them in climate change planning. He also spoke about the need to have a robust MEL framework so that lessons learnt could be captured for future success.

Dr. Saleemul Huq wrapped up this session by pointing out that for once LDCs have an advantage in national adaptation planning, because developed countries are only now realizing that they will also face the impacts of climate change, whether or not they deny it. He stressed that adaptation is as much about organizing people and institutions as it is about data collection, and that the developed world could learn from knowledge from the South.

Session 24: Loss and Damage

Chair Dr. Saleemul Huq, Director, ICCCAD

Discussant Ms. Farah Kabir, Country Director, Action Aid Bangladesh

Keynote Proposed National Mechanism on Loss and Damage, Ms. Naznin Nasir



Ms. Naznin Nasir presenting the proposed national mechanism on loss and damage



Ms. Farah Kabir, Country Director, Action Aid Bangladesh was a discussant at Loss and Damage session.

The session on Loss and Damage on the last day of the Gobeshona conference started with an attention-grabbing presentation by Ms. Naznin Nasir of ICCCAD. Her presentation on the scoping study for the National Mechanism on Loss and Damage began with the story of Ms. Senora Begum who suffered from a natural disaster in Bangladesh. Although Bangladesh is making progress in adaptive measures, such as early awareness systems, vulnerable people still lose their lives to disasters. According to projections, Loss and Damage could cost the country up to USD 121 billion or 5% of Bangladesh's national GDP from 2005-2050. Ms. Nasir stated that a guiding document to administer loss and damage is crucial. In pursuit of this, the Department of Disaster Management Ministry of Disaster Management and Relief commissioned the scoping study for a National Mechanism on Loss and Damage with ICCCAD, ActionAid Bangladesh, Care Bangladesh and Nature Conservation Management as working groups.

Action Aid Bangladesh and Care Bangladesh jointly organized field-level consultation in Rangpur, Sylhet, Khulna and Chittagong. From the field consultancy, it was found that the government of Bangladesh is well-equipped to reduce the impact of sudden-onset disasters with a focus on pre-disaster awareness as part of a risk management mechanism. However, the current mechanism mostly concentrates on reducing death tolls, and has very little funding and poorly trained local staff. The scoping study identifies gaps in the current policies in addressing slow-onset Loss and Damage, lack of coordination between ministries, institutional barriers in responding to Loss and Damage, unavailability of data on potential Loss and Damage in Bangladesh, and poor technical capacities and skills.

Ms. Nasir concluded her presentation with recommendations to develop a methodology for assessing Loss and Damage due to climate change, to begin setting up a National Mechanism on Loss and Damage through a technical team. She also emphasized preparing the national mechanism in accordance with the Warsaw International Mechanism for Loss and Damage, and noted that proper financial instruments are required to ensure just distribution of funds among the most vulnerable people.

Dr. Saleemul Huq, the session moderator and chair, then shared that Bangladesh can start the pilot phase of the National Mechanism on Loss and Damage with domestic funding. He noted that to implement the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009, the government of Bangladesh constituted the Bangladesh Climate Change Trust Fund (BCCTF) under the Climate Change Trust Act, 2010. Each year two-thirds of the fund is disbursed for projects and the rest is kept in a fund for emergency purposes. Over the last seven years roughly USD 200 million has been deposited into the fund. So, with this money as seed funding, Bangladesh can take the lead in implementing a national mechanism on Loss and Damage and also work to attract future funding from abroad by setting-up this self-sufficient model for the initial phase.

This scoping study conducted by local consultants and researchers has already set an example of a national-driven exercise. Following the Marrakech decision on Loss and Damage at COP 22, Bangladesh is at the cutting edge of developing a national mechanism with its own technical team and to explore a number of avenues in the future through both national and international collaboration.

Ms. Farah Kabir, from ActionAid Bangladesh, concluded the session, imparting her experience at the COP meetings over the years and how Loss and Damage has evolved as an important pillar for climate change policy. She explained that the development agenda may fall weak, irrelevant and unsustainable if climate change is not mainstreamed. To address loss and damage, USD 100 billion in funding should be allocated. Additionally, a national mechanism and widely used index-based insurance will help address and finance Loss and Damage. Finally, Ms. Kabir noted that Annex I countries should come forward to support countries vulnerable to disasters.

Session 25: Climate Change Research

Chair Mr. Marco Boscolo, Forestry Officer, Food and Agriculture Organization (FAO)

Moderator Dr. Saleemul Huq, Director, ICCCAD

Discussant Dr. Haseeb Md. Irfanullah, International Union for Conservation of Nature (IUCN)

Keynote Research master plan FAO country investment plan for supporting the Ministry of Environment and Forest, Dr. Md. Feisal Rahman

While the Gobeshona conference covers research on climate change in Bangladesh, the Climate Change Research session focused on much needed support for researchers in Bangladesh and their outputs; including strategies for ensuring effective knowledge generation. There is enormous potential in the research being done on climate change in Bangladesh, and networks like Gobeshona must devote effort to improve the quality of both the work and the outlets for distributing that work. This session raised several issues regarding climate change research in Bangladesh, and highlighted a project on creating a Research Master Plan for the Environment Forestry and Climate Change (EFCC) sector.

Dr. Feisal Rahman of ICCCAD and IUB presented the work being done at the request of the FAO to outline a research master plan. The goal of this effort under the country investment plan (CIP) is



The panel of the session 25: Climate Change and Research



Mr. Marco Boscolo, from Food and Agriculture Organization (FAO) attended the conference on the Science-policy dialogue day.

to incorporate a research agenda while increasing the contribution of the environmental forestry and climate change sector to sustainable development of the country through enhanced provision of ecosystem services. There are four pillars under this goal:

Pillar 1: Sustainable development and management of natural resources

Pillar 2: Environmental pollution prevention and control

Pillar 3: Adaptation, mitigation, and resilience to climate change

Pillar 4: Environmental governance, gender, human and institutional capacity development

After surveying stakeholders about potential research topics in EFCC, Dr. Rahman and his team collected 388 suggestions. Suggested key interventions included establishing a research council, improving the quality of research in Bangladesh including raising the quality of academic journals, and increasing knowledge sharing and dissemination through the creation of a science-policy-practice dialogue. Establishing this master plan through the identification of funding sources and the prioritization of research topics is the critical next step of this project.

The discussants then emphasized the importance of optimizing research being done on climate change in Bangladesh. Md. Marco Boscolo of the FAO pointed to the gap he sees between what is actually done and what could be done. Getting the best research out there, in his view, will require significant effort prioritizing the 388 research topics generated in Dr. Rahman's survey and then translating the results of this research into something that can be implemented such as policies. Research should then be forward-looking and should use the environment as a tool for growth and development.

Dr. Haseeb Md. Irfanullah also underscored the importance of effectively communicating research on climate change in Bangladesh in order to put it into practice. His focus was in ensuring that the work is shared, especially in peer reviewed journals as they are considered the most acceptable outlet. Out of 140 journals in Bangladesh, only four have an impact factor offered by journal citation report, a number that has not increased in six years. Improving journal quality is therefore essential and a dialogue that Dr. Irfanullah organized – Banglajol – worked on establishing a 5-year plan to do just that. Finally, the point was made that, while academic outlets are important for credibility, reaching people outside the academic community would give research its true impact.

As presenters at many other sessions at Gobeshona 3 consistently articulated the need for more research on climate change, it is also critical that the research is being disseminated and put into

practice. This session on climate change research highlighted many of the necessary avenues in order to allow conducted research to have an impact. One critical route is presenting the knowledge gained through research to policymakers. Dr. Saleemul Huq, however, pointed out that sometimes it is necessary for researchers to accommodate policymakers by travelling to them, and presenting the information in a form (such as a policy brief) that they find most palatable. This will also require moving beyond only analyzing the problems of climate change in a way that is forward-looking. It is thus time for research on climate change in Bangladesh to turn to solutions.

Session 26: Concluding Session

Chair	Prof. M. Omar Rahman, Vice-Chancellor, IUB
Keynote	Dr. Saleemul Huq, Director, ICCCAD
Chief Guest	Mr. Anwar Hossain Manju, Honourable Minister, Ministry of Environment and Forest, Government of the People's Republic of Bangladesh
Special Guest	Mr. Saber Hossain Chowdhury, President, Inter-Parliamentary Union, Government of the People's Republic of Bangladesh
Vote of Thanks	Mr. Rashed Chowdhury, Chairman, Board of Trustees, IUB



Ms. Ina F. Islam is introducing the panel of the concluding session to the audience.



Prof. M. Omar Rahman, Vice-Chancellor, IUB chaired the concluding session



Dr. Atiq Rahman was the special guest at the concluding session

Dr. Saleemul Huq opened the concluding session by describing the key achievements of Gobeshona. He summarized that there were 26 sessions in which a total of 69 papers were presented, and that Gobeshona overall has published a total of 1748 papers till now. He felt that conferences should include sessions where the youth could present, emphasizing ICCCAD's Youth programme's session during the conference. He recommended that the network should build stronger connections, and that it should come together to plan and create such platform where this is achievable. He also highlighted the commitments during this year's conference, among which there was the launching of LDC Universities Consortium in June, the NUCC Universities Network on Climate Change at Oregon and IUB, a risk management plan for Climate Change for the Ministry of Environment and Forests, a national mechanism on L&D scoping and pilot phase of climate finance transparency initiative, and the prospective research project on climate change in Bangladesh and Kenya to only name a few.

Dr. Atiq Rahman focused on Sustainable Development Goals in his presentation, with the idea of leaving no one behind and minimizing climate change as well as hunger and poverty. He was concerned that financially disadvantaged communities would be especially vulnerable to extreme calamities, and hoped that researchers would come forward to try and find a solution to this



Mr. Saber Hossain Chowdhury, president of the Inter-Parliamentary Union, Government of the People's Republic of Bangladesh was the special guest at the concluding session.

Mr. Anwar Hossain Manju, Honourable Mr. Rashed Chowdhury, Chairman, Minister, Ministry of Environment and Board of Trustees, IUB gave the vote of Forest, Government of the People's Republic of Bangladesh was the chief guest at the concluding session.

problem since environmental issues have now become major development issues. He hoped that science and policy would create a dialogue and bring people together and improve the quality and quantity of research and the overall development sector.

Mr. Saber Hossain Chowdhury praised the efforts of Gobeshona. He said that it has broken new grounds on L&D and given a space for international actors to act. He urged everyone to work on climate change issues, and said that events such as this one is a wonderful initiative, however, that greater vigilance is needed along with solidarity in terms of the Paris Agreement. He pointed out the necessity for research and raised the fundamental questions of budget allocation, fixing gaps in our knowledge and implementation, and making conducive decisions. He lamented the publish or perish culture that is now pervasive in the world of research, but hoped that the same will not be the case with Bangladesh, where quality will be ensured over quantity. He spoke about convergence in terms of institution and the importance of providing a platform like Gobeshona to researchers all over the world. He ended his speech by promising to include Gobeshona as one of the outreach in his webpage so that it is accessible to MPs all over the world.

Mr. Anwarul Hossain Manju, Honourable Minister, Ministry of Environment and Forest, Government of People's Republic of Bangladesh, spoke about the importance of having a proper budget when it comes to working on climate change issues. However, fortunately, he assured the audience that funds are not a problem, but rather what we use them for. He said that climate change is a problem that we are all facing and that we should come together to solve it, and Gobeshona is a platform where it is possible to do so. He praised Gobeshona and IUB for undertaking this great endeavour.

Professor Omar Rahman, Vice Chancellor of IUB praised the contribution of Gobeshona toward dealing with climate change issues. He urged everyone to come forward and build capacities for long term solutions, because sustainability is the key. He said that research needs collaboration and effort from people in all sectors. He stated that this is not a race, but a marathon that it is achievable. He said we need a lot of luck for climate change resilience, and he thanked the government for being in the visionary role.

Mr. Rashed Chowdhury concluded the session by thanking the organizers, participants and volunteers and said that even though the world is at peril, in our own humble way, we are trying to help and that we have and will continue to support this. He also suggested that the general public should be more aware of these issues and how to help find a solution.

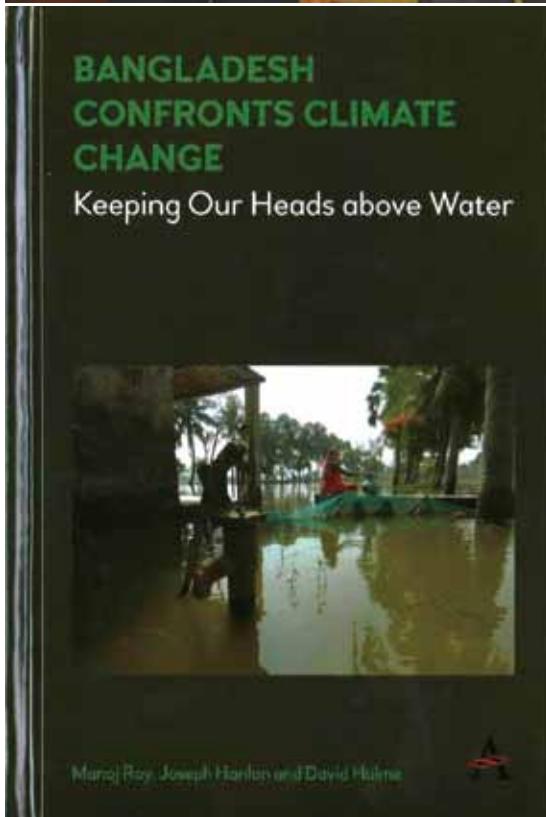
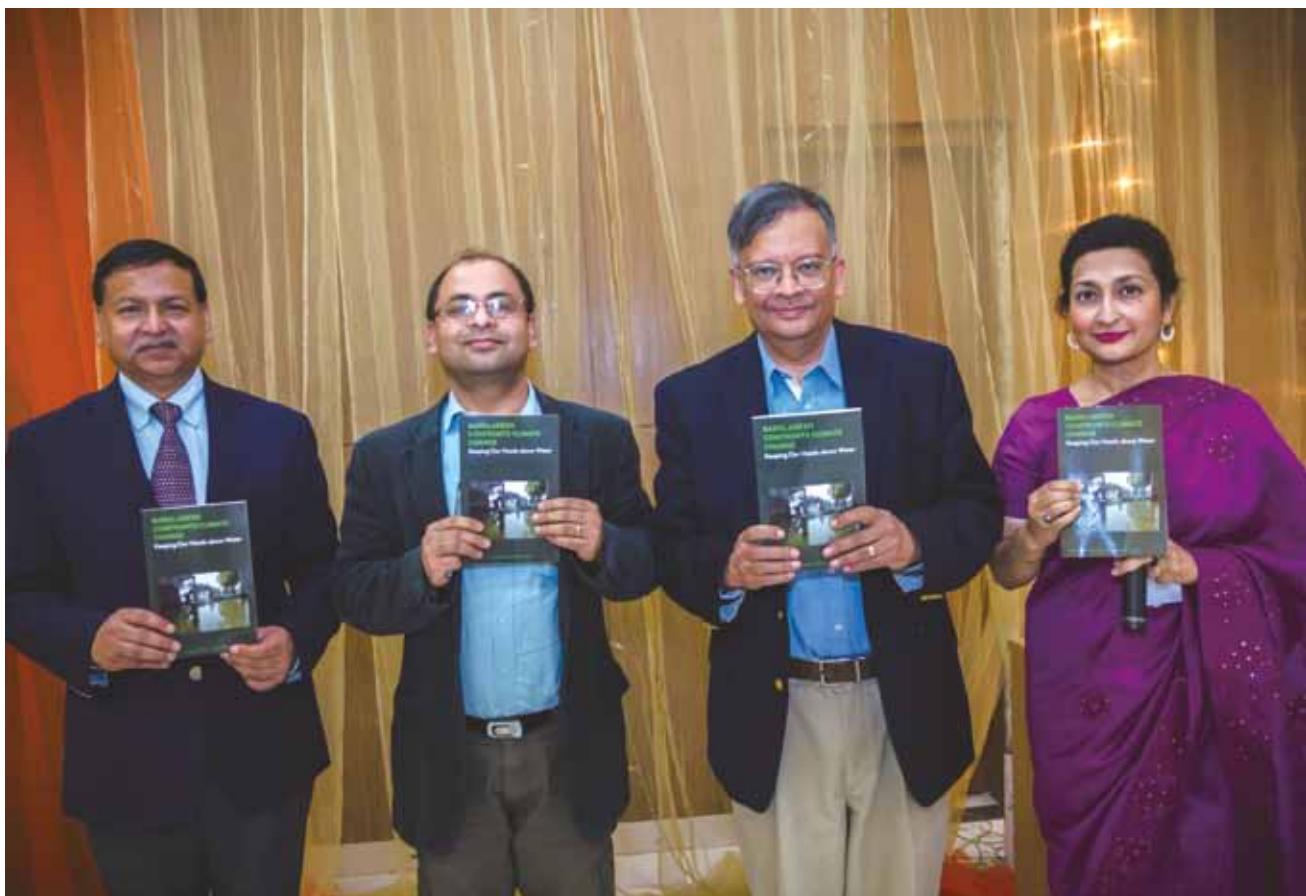
Certificate Award Ceremony for the Young Researchers Programme



During the Conference following young researchers have received an award for successfully submitting an academic paper on their research to an international journal:

Name	Title of paper	Journal
Ms. Natasha Israt Kabir	Policies of Inclusion and Exclusion for the Persons with Disabilities (PWDs) interlinked with The Climate Change Adaptation: Case Study of Bangladesh.	International Journal of Socio-legal Analysis and Rural Development (IJSARD)
Md. Towhidul Islam	Impact of climate change on safe water and sanitation in the southwest coastal region of Bangladesh	Sage Publication
Md. Tasdik Hasan	Exploring mental health services among climate victims in a cyclone affected area of coastal Bangladesh	International Journal of Disaster Risk Reduction – Elsevier
Md. Habibur Rahman	Forest Governance Analysis for the REDD+ Implementation in Protected Areas of Bangladesh: A Means of Potential of Forestry Sector for Climate Change Mitigation	Geoforum
Md. Mohammad Ibrahim	Assessing life and challenges of environmental migrants in slums of Dhaka, Bangladesh	Environmental Development
Ms. Farhana Khan Pushpa	Way out of natural forest reliance: Adoption of AIGAs A case study of 'Kapru para' in Chimbuk Hill Forest, Bandarban Hill District, CHT	Ecosystem Services
Md. Mostarin Begum	Sea Level Rise and its Impact on Coastal Livelihood in Bangladesh	International Journal for Humanity and Social Science
Md. Tahmid Huq Easher	When Adaptation Goes Wrong: A Case Study of Tidal River Management in Kalicharanpur, Jessore	International Journal of Climate Change Strategies and Management

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During the conference a book titled "Bangladesh Confronts Climate Change: Keeping Our Heads Above Water" was launched.

Authored by :

Manoj Roy is a lecturer in sustainability at Lancaster Environment Centre, Lancaster University, UK.

Joseph Hanlon is a visiting senior fellow at the London School of Economics and a visiting senior research fellow at the Open University, Milton Keynes, UK.

David Hulme is a professor of development studies and executive director of the Global Development Institute, University of Manchester, UK.

Inspiring Resilience

The day 5 was an additional day at Gobesona3 conference hosted by BBC media Action and ICCCAD known as Inspiring Resilience. The event explored how communications can be used to help communities adapt to and prepare for natural hazards.



ICCCAD's collaboration with BBC Media Action and Dhaka Tribune to communicate research



Participants group photo at Inspiring Resilience



Participants at Inspiring Resilience



Presenters at the sessions of Inspiring Resilience

Participants Feedback



The conference had a wide participation of the audience who contributed with critical and inspiring questions and provided valuable feedback.



Personal impression of participant Zewdu Eshetu: "My impression is that the approach that is exercised in Gobeshona to enhance the capacity of young scientists is new and has not been applied elsewhere. [...] The mechanism for increasing the contribution of Bangladesh scientists to the IPCC report is encouraging. In the conference I learned more about capacity building via the ICCCAD young scientist capacity building program, the wide network ICCCAD has established and is working with, the presentation of results of demand-driven research activities in the country, the establishment of LUCC and experiences on developing a national mechanisms on loss and damage."

Asked on their experience in the conference and what further actions should be done, participants gave the following recommendations:

Build stronger connections between researchers and government/policymakers

Create opportunities and training for effectively communicating knowledge and research

Learn and disseminate knowledge of existing adaptation strategies

Plan long-term strategies for climate change in development efforts

Create a loss and damage inventory/database & devise methodologies to identify/define loss and damage

Create discussions around not achieving 1.5 C

Increase urban (Dhaka) research on climate change and resilience

Build government support for mental health, esp. post-disaster

Gobeshona3 in the Media

Dhaka Tribune



'Capacity building pivotal to combat climate change'



Conference on climate change research starts today



Less water consuming crops are vital to sustainable development



Research, capacity building must to tackle climate change

Climate Tribune

Climate

3

Gobeshona conference for research on climate change in Bangladesh

INTERNATIONAL PARTICIPANTS



Vulnerable nations victim of false pledges by emitters



≡ #gobeshona3 in the Social Media

Saleemul Huq
@SaleemulHuq

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Planning future cooperation with Oxford University at @ICCCAD #gobeshona3

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Sadman K Monsur with Tamanna Disha and 3 others at Independent University, Bangladesh - IUB. January 12 - Dhaka

The Gang of Gobeshona Conference for Research on Climate Change #gobeshona3.

You, Tamanna Disha, Laisa Ahmed and 20 others

Wow Comment Share

You Tube gobeshona3



Gobeshona3 International participants' feedback:
Ms Catharina Terwisscha van Scheltinga



Gobeshona3 Concluding Session
Dr Saleemul Huq Summary



Dr. Saleemul Huq's briefing on Gobeshona3



Gobeshona3 international participants' feedback: Mr. David Mfitumukiza



Gobeshona3 international participants' feedback: Prof Dr. Gregg Walker



Prof Dr. Myles Allen at Gobeshona3 conference

❖ Photo Gallery



The core Gobeshona team



The conference booth

Conference comms team #gobeshona3



Gobeshona for climate change: the volunteer team



volunteers Selfie



Gobeshona3

Global Networking





Hourable guests are entering the auditorium for the concluding session



ICCCAD Collaboration with Dhaka Tribune



Networking during the tea break



Dr. Haseeb M. Irfanullah speaking as a panelist at Climate Change and Research session on the Science-Policy Dialogue Day



Saqib Huq, coordinator of Climate Finance is discussing with the director and deputy director of ICCCAD



Mr. Nathan Sage, Director, Economic Growth Office, USAID the special guest at the inaugural session



The chief guest Ms shamima Nargis, additional secretary, ERD with Dr. Saleemul Huq and Dr. Atiq Rahman at Political Economy and Climate Finance session



The Youth team organised a booth named Urban Resilience Photo Voice



The honourable panel of the concluding session at Gobeshona3



Gobeshona3 international participants group photo



The concluding session of Gobeshona3

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8-11 January 2018

Gobeshona steering committee members



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