

GOBESHONA5

8 - 11 January 2019

International Conference on Climate Knowledge



Conference Proceedings

Organized by:



Hosted by:



<http://gobeshona.net/gobeshona5>



IUB
Dhaka, Bangladesh

#gobeshona5

Table of Contents

| | |
|---|----|
| Table of Contents | i |
| Acronyms | ii |
| Introduction | 1 |
| Program Overview | 2 |
| Updates from Last Year’s Conference..... | 3 |
| Gobeshona5 New Commitments | 4 |
| Inaugural Session | 5 |
| Keynotes | 8 |
| Natural Resource Management..... | 12 |
| Adaptation Technologies | 16 |
| Mitigation..... | 20 |
| Renewable Energy | 23 |
| Loss and Damage..... | 26 |
| Wetlands (Flood, River and Haors) | 29 |
| Hydrology and Societal Processes: Is Migration an Opportunity?..... | 33 |
| Food Security | 38 |
| Forest, Hills, and Ecosystem Resilience | 42 |
| Resilience Livelihood | 44 |
| Solar Geo-Engineering and the Global South..... | 48 |
| Climate Finance | 50 |
| Gender..... | 54 |
| Disaster Management..... | 58 |
| Coastal Zones..... | 61 |
| Integrating Climate Services into Decision Making Processes | 65 |
| Cities | 70 |
| Outcomes of COP24 and NDC Implementation in Bangladesh..... | 74 |
| Scaling Climate Change Adaptation Knowledge and Technologies for Empowering Women and to Enhance Social Equity and Disaster Resilience in Bangladesh..... | 77 |
| Water Security to Achieve SDG 6 in Context of the Changing Climate in Coastal South West . | 81 |
| International Experience | 84 |
| Concluding Session..... | 87 |
| International Participants | 91 |
| List of Contributing Members | 92 |
| Volunteers | 93 |
| Photo Gallery | 94 |

Acronyms

| | |
|---------------|--|
| AAU | Addis Ababa University |
| ASSAR | Adaptation at Scale in Semi-Arid Regions project |
| AUST | Ahsanullah University of Science and Technologies |
| AWD | Alternate Wetting and Drying |
| BACS | Bangladesh Academy for Climate Services |
| BARI | Bangladesh Agricultural Research Institute |
| BCAS | Bangladesh Centre for Advanced Studies |
| BCCSAP | Bangladesh Climate Change Strategy and Action Plan |
| BIDS | Bangladesh Institute of Development Studies |
| BLI | Bangla Language Institute |
| BMD | Bangladesh Meteorological Department |
| BMDA | Barind Multipurpose Development Authority |
| BRRRI | Bangladesh Rice Research Institute |
| BWDB | Bangladesh Water Development Board |
| CCDB | Christian Commission for Development |
| CDKN | Climate and Development Knowledge Network |
| CF | Climate Finance |
| CFTM | Climate Finance Transparency Mechanism |
| CGE | Consultative Group of Experts |
| CIMMYT | International Maize and Wheat Improvement Center |
| COP | Conference of Parties |
| CPRD | Center for Participatory Research and Development |
| CSRL | Campaign for Sustainable Rural Livelihoods |
| CSW | Continuous Standing Water |
| DAC | Development Assistance Committee |
| DEM | Digital Elevation Model |
| DFID | Department for International Development |
| DIB | Digital Information Board |
| DRR | Disaster Risk Reduction |
| EFCCC | Environment, Forest and Climate Change Commission |
| FGD | Focus Group Discussion |
| GAP | Gender Action Plan |
| GCA | Global Commission on Adaptation |
| GCF | Green Climate Fund |
| GEOINT | Geospatial Intelligent |
| GGGI | Global Green Growth Initiative |

| | |
|----------------|---|
| GHG | Greenhouse Gas |
| GIS | Geographic Information System |
| GMO | Genetically Modified Organism |
| GWP | Global Warming Potential |
| IASS | Institute for Advanced Sustainability Studies |
| IBFCR | Inclusive Budgeting and Financing for Climate Resilience |
| ICCCAD | International Center for Climate Change and Development |
| ICDDR | International Centre for Diarrhoeal Disease Research, Bangladesh |
| ICT | Information and Communications Technology |
| IDCOL | Infrastructure Development Company Limited |
| iDE | International Development Enterprises |
| IDRC | The International Development Research Centre |
| IDSS | Intelligent Decision Support Systems |
| IFDC | International Fertilizer Development Center |
| IPCC | Intergovernmental Panel on Climate Change |
| IR | Islamic Relief |
| IRI | International Research Institute for Climate and Society |
| IRRI | International Rice Research Institute |
| ITT | Institute for Technology and Resources Management in the Tropics and Subtropics |
| IUB | Independent University, Bangladesh |
| KGF | Krishi Gobeshona Foundation |
| KPMG | Klynveld Peat Marwick Goerdeler |
| LDC | Least Developed Country |
| LGED | Local Government Engineering Department |
| LHE | Learning Hub Events |
| LIFE-AR | The LDC Initiative for Effective Adaptation and Resilience |
| LUCCC | Least Developed Countries Universities Consortium on Climate Change |
| MDG | Millennium Development Goals |
| MIC | Middle Income Country |
| MOEFCC | Ministry of Environment, Forest, and Climate Change |
| MRV | Measurable, Reportable, Verifiable |
| NAPA | National Adaptation Program Action |
| NDC | Nationally Determined Contribution |
| NGO | Non-Governmental Organization |
| NPK | Nitrogen Phosphorus Potassium |
| NSU | North South University |
| NUE | Nitrogen Use Efficiency |
| ODA | Overseas Development Assistance |

| | |
|---------------|---|
| PGPR | Plant Growth Promoting Rhizobacteria |
| PPCCTF | Bangladesh Climate Change Trust Fund |
| PROKAS | Promoting Knowledge for Accountable System |
| PROTIC | Participatory Research and Ownership with Technology, Information and Change |
| PU | Prill Urea |
| RTCI | Rapid Transmission of Critical Information |
| SAKTEE | Scaling climate change adaptation knowledge and technologies for empowering women |
| SAR | Synthetic-Aperture Radar |
| SDG | Sustainable Development Goal |
| SES | Socio-Ecological System |
| SLF | Sustainable Livelihood Framework |
| SREDA | Sustainable and Renewable Energy Authority |
| SRM | Solar Radiation Management |
| SRMGI | SRM Governance Initiative |
| UDP | Urea Deep Placement |
| UDP | Urban Development Programme |
| UIU | United International University |
| ULAB | University of Liberal Arts Bangladesh |
| UN | United Nations |
| UNDP | United Nations Development Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| USAID | United States Agency for International Development |
| USG | Urea Super Granule |
| VSO | Voluntary Service Overseas |

Introduction

The 5th annual Gobeshona Conference for Climate Change Research in Bangladesh was held from 8-11 January, 2019 in Dhaka at Independent University, Bangladesh. The conference was a platform for researchers, policymakers, non-government representatives, and donor agencies from around the world to come together and share knowledge on climate change issues and solutions in Bangladesh. This year's conference brought together 735 attendees from Bangladesh and abroad, including participants from universities of least developed countries. The 25 sessions, hosted by partner organizations of the Gobeshona Steering Committee, presented 69 research papers.

The conference was divided into three sections: 1) Youth Day; (2) Science Conference; and (3) Science Policy Dialogues. Youth were actively involved, with at least one on each panel. The sessions covered research on topics ranging from disaster management to gender and health, ending with Science Policy Dialogue Day.

Host organizations supported the parallel and plenary sessions, and IUB provided space free of charge.

To access the presented research papers, official photo album, videos, and media, please visit www.gobeshona.net/gobeshona5.

Program Overview

| DAY 01: Tuesday - January 08 | | | |
|---|--|---|---|
| 9.30-11.00 | Session 01; Inaugural Session; Location: IUB Auditorium | | |
| 11.00-11.10 | Inaugural Group Photo | | |
| 11.10-11.40 | Tea Break and Registration | | |
| 11.40-13.00 | Session 02: Plenary; Natural Resource Management (NRM) by IRRI; Location: Multipurpose Hall | | |
| 13.00-14.00 | Lunch Break | | |
| 14.00-15.20 | Session 03: Parallel; Adaptation Technologies by CCDB and IDE; Location: Room No. 3002 | Session 04: Parallel; Mitigation by KGF; Location: Room No. 5002 | Session 05: Parallel, Renewable Energy by ICCCAD; Location: Multipurpose Hall |
| 15.20-15.40 | Tea Break | | |
| 15.40-17.00 | Session 06: Plenary; Loss and Damage by ICCCAD; Location: Multipurpose Hall | | |
| DAY 02 : Wednesday - January 09 | | | |
| 9.00-9.30 | On Spot Registration | | |
| 9.30-10.00 | Session 07: Keynote; Dr. Syed Sajjadur Rahman; Location: Multipurpose Hall | | |
| 10.00-11.20 | Session 08: Plenary; Wetlands (Flood, River and Haors) by BRAC; Location: Multipurpose Hall | | |
| 11.20-11.40 | Tea Break | | |
| 11.40-13.00 | Session 09: Parallel; Hydrology and Societal Processes: Is Migration An Opportunity? by BCAS; Location: Room No. 3002 | Session 10: Parallel; Health and Well Being by ICDDR,B Session Abandoned | |
| 13.00-14.00 | Lunch Break | | |
| 14.00-15.20 | Session 11: Parallel; Food Security by Oxfam; Location: Room No. 3002 | Session 12: Parallel; Forest, Hills and Ecosystem Resilience by Friendship; Location: Room No. 5002 | |
| 15.20-15.40 | Tea Break | | |
| 15.40-17.00 | Session 13: Plenary; Resilience Livelihood by Islamic Relief and VSO; Location: Multipurpose Hall | | |
| DAY 03 : Thursday - January 10 | | | |
| 9.00-9.30 | On Spot Registration | | |
| 9.30-10.00 | Session 14: Keynote; Mr. Lars Ribbe and Mr. A. B. M Firoz; Location: Multipurpose Hall | | |
| 10.00-11.20 | Session 15: Plenary; Solar Geo-Engineering and The Global South by BCAS and SMRGI; Location: Multipurpose Hall | | |
| 11.20-11.40 | Tea Break (Food Court) | | |
| 11.40-13.00 | Session 16: Parallel; Climate Finance by ICCCAD Location: Room No. 3002 | Session 17: Parallel; Gender by ICCCAD; Location: Room No.: 5002 | |
| 13.00-14.00 | Lunch Break | | |
| 14.00-15.20 | Session 18: Parallel; Disaster Management by UIU and IUB; Location: Room No. 3002 | Session 19: Parallel; Coastal Zones by Friendship and ULAB; Location: Room No. 5002 | Session 20: Parallel; BACS by ICCCAD, BMD, IRI, CIMMYT; Location: Multipurpose Hall |
| 15.20-15.40 | Tea Break | | |
| 15.40-17.00 | Session 21: Plenary; Cities by Urban Development Program – BRAC; Location: Multipurpose Hall | | |
| DAY 04 : Friday - January 11 : SCIENCE POLICY DIALOGUE DAY | | | |
| 9.00-9.30 | On Spot Registration | | |
| 9.30-10.20 | Session 22: Plenary; Outcomes of CoP24 and NDC Implementation in Bangladesh; byRio Project; DoE; NCC,B; CCJ,B; ICCCAD; Location: Multipurpose Hall | | |
| 10.20-10.50 | Tea Break (Food Court) | | |
| 10.50-11.40 | Session 23: Plenary; Scaling Climate Change Adaptation Knowledge and Technologies for Empowering Women and to Enhance Social Equity and Disaster Resilience in Bangladesh by IDRC; Location: Multipurpose Hall | | |
| 11.40-12.30 | Session 24: Plenary; Water Security to Achieve SDG 6 in Content of the Changing Climate in Coastal South Westby WaterAid; Location: Multipurpose Hall | | |
| 12.30-14.30 | Lunch Break | | |
| 14.30-15.20 | Session 25: Plenary; International Experience Sharing by ICCCAD; Location: Multipurpose Hall | | |
| 15.20-15.40 | Tea Break | | |
| 15.40-17.00 | Session 26; Concluding Session; Location: IUB Auditorium | | |
| 17.00-17.30 | Tea Break and Networking | | |

Updates from Last Year's Conference

Commitment 1: Set up Gobeshona groups in different climate change zones in the country.

Three groups have been formed since Gobeshona4: i) Barind (drought prone) region with Rajshahi University and Barind Multipurpose Authority (BMDA); ii) Haor Basin (flash flood prone) region with Shahjalal University of Science and Technology; and iii) South-west (salinity prone) region with Khulna University.

Commitment 2: Promote knowledge sharing on green growth in Bangladesh.

With the support of Adam Smith International, over twelve research papers have been published on green growth and ten workshops have been held with different stakeholders.

Commitment 3: Set up a dedicated academy for climate science.

The Bangladesh Academy for Climate Services (BACS) has been established in collaboration with Columbia University, the International Maize and Wheat Improvement Center (CIMMYT) and the Bangladesh Meteorological Department (BMD). BACS also successfully delivered its first short course in October 2018.

Commitment 4: Develop a youth leadership programme.

Four workshops targeted at university students in Bangladesh have been organized. Furthermore, a youth programme under the Least Developed Countries Universities Consortium on Climate Change (LUCCC) has been established. The programme held its first international leadership workshop last year.

Gobeshona5 New Commitments

During the Concluding Session, Dr. Saleemul Huq stated the new commitments made during Gobeshona5. Over the next year, he would like to accomplish the following:

- Award a Gobeshona prize for the best scientific paper published on climate change in Bangladesh during 2019. The prize will be awarded at Gobeshona6.
- Develop a new program on climate change, migration, and urbanization with partners.
- Make gender a cross-cutting issue across disciplines and to promote the view of women not as victims but as proactive agents of change.
- Learn more about solar geoengineering and its impacts on health. It is necessary to assess whether it is a good strategy to deploy or not. Bangladesh is already at the forefront of this research among Least Developed Countries (LDCs).
- Establish an international youth leadership program as part of the LUCCC initiative.
- Expand Gobeshona to regions in Bangladesh outside of Dhaka, especially climatically vulnerable areas. There are groups in the Barind and salinity-prone areas already; the plan is to add three more regional specific partners, including groups in the *haor* and Cox's Bazaar areas.

Gobeshona6 will have two major innovations:

1. It will be a major global event with researchers who do work on adaptation outside of Bangladesh. The first five conferences covered research mostly on Bangladesh.
2. A one or two day field visit will be included. The Christian Commission for Development (CCDB) in Bangladesh has developed a Climate Technical Park that displays different climatic vulnerabilities in regions of Bangladesh and is a good platform to learn, especially for international participants.

Inaugural Session



Dr. Md. Abdul Khaleque addressing the audience during the inaugural session.

Host: International Centre for Climate Change and Development (ICCCAD)

Chair: Dr. Md. Abdul Khaleque, Dean, School of Environmental Science and Management, Independent University, Bangladesh (IUB)

Keynote: Andrew Parker, Honorary Research Fellow, University of Bristol, UK

Special Guests:

- Dr. A. Atiq Rahman, Executive Director, Bangladesh Center for Advanced Studies (BCAS)
- Dr. Saleemul Huq, Director, ICCCAD
- Edith Ofwana, Senior Programme Specialist, The International Development Research Centre (IDRC), Canada

Dr. Saleemul Huq started the session by providing background information on the Gobeshona platform. Gobeshona was initiated in January 2014 with the aim of effectively sharing research findings on climate change in Bangladesh. More than 50 organizations in the country collaborate through the platform, including universities, research institutes, NGOs, CSOs, media, and more.

Gobeshona's key activities include managing a web portal which currently has 2500 publications archived in its database. Gobeshona also organizes monthly seminars on various climate change related topics, hosted in turn by different members of the steering committee. Furthermore, Gobeshona runs a tailor-made mentorship programme for young researchers and other youth members. Gobeshona also regularly organizes science-policy dialogues titled Learning Hub Events (LHE) targeted at different government agencies.

Dr. Huq then shared the progress on the commitments that were made during last year's conference, which were outlined in the *Update from Last Year's Commitments* section on page 3 of these proceedings.



Andrew Parker presented his keynote.

Keynote speaker Andrew Parker then introduced the concept of Solar Radiation Management (SRM) Geoengineering. Proceedings from his presentation are on page 8.

Edith Ofwona Adera began by commending the substantial efforts undertaken by Bangladesh in promoting adaptation and resilience of vulnerable populations in the country. She then described the International Development Research Center's (IDRC) portfolio on climate change. IDRC has invested nearly 200 million Canadian dollars in climate change research across more than 165 institutions in over 75 countries.



Edith Ofwona Adera introduced IDRC.

IDRC's programmatic focus includes empowerment of women and girls, linking climate change adaptation to mitigation research, responding to context-specific capacity needs, as well as unlocking opportunities for mobilizing public and private climate finance. IDRC mainly works in 3 climate hotspots – deltas, semi-arid lands and glacier and snowpack dependent river basins in Africa and Asia.

Ms. Adera then shared some of the key learnings from recent projects undertaken by IDRC. The first is that even 1.5 degree Celsius warming can prove too hot for hotspots such as Botswana. Second, there are many layers of vulnerability; gender is one of several factors that influence how people are affected by climate change. Third, there is now significant evidence that

migration can serve as an effective adaptation strategy - this needs further recognition. IDRC's experience demonstrates that there needs to be a 'policy first' approach wherein demands of decision-makers should be the primary driver in identifying knowledge gaps and developing research agendas. 'Research for Impact' which informs and assists communities, businesses and governments should then be prioritized. She closed her presentation expressing her excitement regarding the different innovative ideas that are emerging across the climate change foray.

Dr. A. Atiq Rahman highlighted why research on climate change, particularly in Bangladesh, is crucial. Bangladesh is widely considered to be highly susceptible to the impacts of climate change and extensive research on the issue has been ongoing for more than a decade now. The country has made phenomenal strides in terms of promoting adaptation for vulnerable communities. It is now time to invest in the younger generation, so that today's youth can become climate change champions in the future. He suggested that participating youth representatives identify novel and innovative ideas that research organizations can then take forward.

He ended his remark by iterating three broad ideas to ponder. The first would be how to develop a climate resilient Bangladesh in the face of governance issues, limited economic endowment, lack of skilled human resources as well as an ever-depleting stock of natural resources. Second, he recognized that science and policy interaction is still quite restricted in the country and difficult to achieve. There needs to be more work in that area. Finally, rapid urbanization in Bangladesh over the years is bound to have significant implications in regard to climate change. Therefore, there needs to be concerted efforts to ensure planned urbanization in the years to come. He ended hoping that the conference would provide a strong platform to better understand each of these issues.

Dr. Abdul Khaleque highlighted that while there will always be strong deniers as well as proponents of climate change, the scientific community must remain careful to not attribute everything to climate change, as this gives deniers the scope to argue against the issue. Therefore, importance of quality research on climate change, both in Bangladesh and globally, is paramount. The Gobeshona platform is a step in the right direction in this regard.

Keynotes

Solar Radiation Management (SRM) Geoengineering

Presented by Andrew Parker



Andrew Parker is a Senior Research Fellow at University of Bristol. He has over a decade of experience in solar radiation management (SRM) geoengineering, initially as a Senior Policy Adviser at the Royal Society, then as a Research Fellow at the Harvard Kennedy School and the Institute for Advanced Sustainability Studies (IASS) Potsdam.

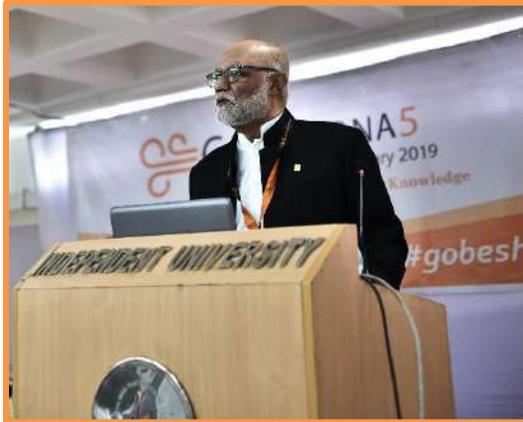
Solar radiation management (SRM) geoengineering is a deeply controversial way of reducing the effects of climate change. The process replicates the rapid natural cooling effect of volcanic eruptions by filtering out the amount of sunlight that reaches the earth. After the eruption of Mount Pinatubo in June 1991, global temperatures decreased after millions of tons of sulfur dioxide were released into the atmosphere. Scientists asked if they could mimic this effect. Spraying sulphur dioxide in the clouds using jets is one way of doing so.

The question is no longer whether it is scientifically feasible, but rather whether it should be deployed. It is the only known way to quickly slow down rising temperatures, which cannot be offered by mitigation, adaptation, nor carbon removal. The Intergovernmental Panel on Climate Change (IPCC) Assessment Report 5 stated that moderate solar geoengineering would reduce the impacts of climate change significantly, but it would be much safer to use regular mitigation strategies before resorting to solar geoengineering. There are significant socio-political considerations and unknown unknowns that may arise. For instance, the recognition of this alternative to tackling global temperature rise might lead political leaders to feel safe and allow their nations to produce higher greenhouse gas (GHG) emissions. Small scale research may rapidly scale up leading to extensive deployment of SRM initiatives without considering all of its implications.

The SRM Governance Initiative (SRMGI) is an international NGO-driven project that seeks to build developing countries' capacity in SRM geoengineering. Their DECIMALS fund currently supports projects in Argentina, Bangladesh, Benin, Indonesia, Iran, Ivory Coast, Jamaica, and South Africa to research the risks and benefits of SRM in their local regions, considering ethics, policy, and science. According to Parker, developing countries should lead geo-engineering research, discussion, and evaluation.

The New International Development Enterprise

Presented by Dr. Syed Sajjadur Rahman



Dr. Syed Sajjadur Rahman is a Senior Fellow at the School of International Development and Global Studies, University of Ottawa. He is also a Senior Associate Consultant at Universal Management Group, Montreal: The New International Development Enterprise. He is currently a member of the Leadership Council of the Institute for the Study of International Development at McGill University.

Dr. Syed focused his keynote on how the development business has changed over the years. Earlier it was the low-income countries that needed development, but now there are more middle-income countries (MICs) where about 72% of the world's poor live. MICs have fallen into middle income trap because they are not being able to transition from a labor-driven economy to a more capital- and knowledge-based economy.

With globalization, several new actors and groups are becoming engaged in international development activities, bringing about broader and deeper business interactions. New philanthropies are increasing in the developing world as their income is growing. As new donor groups emerge, traditional Development Assistance Committee (DAC) donors are outplayed. The concept of international development has become more about creating a package to serve a common development goal.

In this multi-polar world, the state, civil society, and private sector are all going to play fundamental roles. As the aid dependency of MICs is decreasing, funding is no longer an issue. The concern for MICs is instead forming new and innovative forms of partnerships to develop knowledge and skills.

Universities as Development Agents

Presented Dr. Lars Ribbe



Dr. Lars Ribbe is the Director of The Institute for Technology and Resources Management in the Tropics and Subtropics (ITT) at the TH Koln (University of Applied Sciences) and Professor for Integrated Land and Water Resources Management in the Tropics and Subtropics.

Universities are development agents for climate knowledge and can play a unique role in spreading information. It is important to engage them in the development process with interdisciplinary education, combining knowledge from experts located in different countries to create a dynamic environment of networking, cooperation and exchange.

While engaging universities in the development process can be an advantage, it can also be considered a disadvantage as the development sector may not always consider them to be ideal partners. The main challenge is their dynamism, including economic and developmental issues. To counteract this, experts who can network, research and cooperate internationally are needed. This network can support the exchange of art, experience, students, lecturers, experts, research, knowledge and more. These stakeholders can help identify the main challenges and areas of knowledge demand for curriculum development. A system in which each university within the network has the same structure and curriculum but with certain major differences allows them to focus on the issues that are prevalent in their areas of expertise that will foster rich student exchange programs and assessments. Looking ahead, universities must break their boundaries to enable further cooperation.

ITT Smart Sense:Low-cost environmental monitoring solution

Presented by A.B.M. Firoz

A.B.M. Firoz is a researcher of GIS & Hydrological Modeling at the Institute for Technology and Resources Management in the Tropics and Subtropics (ITT) at the TH Koln (University of Applied Sciences).

ITT Smart Sense supports a network of information. The device would be useful not only for students but also for stakeholders and people in the environmental field. The low-cost device was innovative because expensive devices are hard to obtain and integrate in the field. The three objectives that were in mind were affordability, efficiency and adaptability. The first steps of implementing the device included contacting stakeholders and asking about the demands that were required to put the device in place. At the beginning of the project in 2011, it was important to make sure that the device worked. Despite many challenges and obstacles along the way, ITT Smart Sense made its first field test in 2018. Currently it is used in field sites of Sudan, Pakistan, Bangladesh, Brazil and Germany. The main features is its large battery life that is designed to consumes less energy. Its interface allows easy storage and transfer of information and can be customized easily. There are three variants of the ITT Smart Sense: agriculture, water and weather. It can be used by anyone working in the environmental monitoring field. In collaboration with United Nations Development Programme (UNDP), ITT has already provided two ITT Smart Sense devices, and they plan to give five more for information exchange. With ITT Smart Sense, there is an opportunity to make networking and data collection within the field much more simple and effective.

Natural Resource Management



The panelists of the natural resource management session.

Host: International Rice Research Institute (IRRI)

Chair: Dr. Humnath Bhandari, Country Representative, IRRI

Moderator: Dr. Ahmad Salahuddin, Consultant, IRRI

Presenters:

- Alemayehu Zewdie Asrat, Research into Use and Capacity, Building Coordinator, Oxfam
- Dr. Md. Rafiqul Islam, Scientist, IRRI
- Dr. Manoranjan Mondal, Scientist, IRRI
- Dr. Lutful Hassan, Scientist, IRRI

The session opened with a welcoming prayer and song by Mostafa Kamal Abbasi from the Bangla Language Institute (BLI).

The objective of this session was to improve the understanding of climate vulnerabilities, assess the barriers/enablers and best options for adaptation, and discuss how to communicate information on vulnerability and adaptation.

Participatory scenario-based research for climate change adaptation in East Africa, Experience from the Adaptation at Scale in Semi-Arid Regions project (ASSAR).

Presented by Alemayehu Zewdie Asrat



Alemayehu Zewdie Asrat presenting his work on ASSAR.

The objective of this project was to improve the best option for adaptation in four regions of Africa and Asia. It identified effective measures of informative communication on vulnerability.

The research incorporated knowledge systems, ecosystem services, governance, social differences and gender. The research was set into action through dialogue, trainings, and advocacy at the local, regional, national levels, which led to change in the policy for and practices of existing adaptive measures. Research tools, such as participatory scenario analysis, stakeholder mapping, and power-

mapping were useful in comprehending the flow of information, services, and advice. Outcomes of this project are:

- Integrating existing local knowledge with science-backed knowledge to solve problems
- Including all relevant stakeholders in enhancing the objective of the research
- Developing policybased on evidence

Cutting edge breeding techniques to enhance genetic gain in rice

Presented by Dr. Md. Rafiqul Islam

Saline intrusion, drought, flood, and cold are major problems of rice cultivation. The seed supply from the public sector (~35%) is limited and does not reflect farmers' demand, creating an opportunity for the private sector. Future rice yields need to increase at least to 1 ton/ha to feed 200 million people by 2050. IRRI is working on minimizing the impact of this situation through new and innovative breeding strategies. Breeding the best rice varieties with each other will produce desired results. The following areas were identified for improvement:

- High breeding value through parental selection
- Technology support
- On-farm testing options on an extensive level
- Digitizing data collection and decisions
- Shorter cycle for breeding
- Training, incentivizing, and supporting breeders for optimized pipelines

An innovative water management approach for increasing land productivity in the polders of the coastal zone of Bangladesh

Presented by Dr. Manoranjan Mondal

The water resources in the coastal regions are under-maintained but have the potential for handling future food security through SDG 1 (no poverty) and 2 (zero hunger). These goals will be achieved if there are appropriate measures taken in the water and agricultural sector. Coastal agricultural practices of Bangladesh are still primitive. The presenter pointed out that high and low tides could be used for irrigation. If the local people were included in the hydrological practices, the intended output would be maximised. As most people in the coastal zone are poor, a triple beneficial economic approach of fish, shrimp *gher*, and agriculture could be used to boost livelihood options. At the same time, the lack of coordination between agriculture managed by Department of Environment (DoE) and the sluice gate managed by the Bangladesh Water Development Board (BWDB) should be minimised to get maximum benefit from the government. Community coordination with the local hydrological unit to create a synchronised cropping system could be helpful in wide-scale production of crops.

Development and dissemination of climate resilient rice varieties in Bangladesh

Presented by Dr. Lutful Hassan

This presentation also pointed out the need to include SDG 1 (no poverty) and 2 (zero hunger) in terms of future food security and improved agriculture. Drought, flood and salinity are the main problems in stress prone areas of Bangladesh. A detailed description of rice varieties under these three threats pointed out how yields can be different due to the severity of the specific stress. The main point of the presentation was to show the various ways of disseminating climate resilient rice varieties. It was indicated that IRRI wants to strengthen the formal and informal seed systems along with the support of all stockholders. It was also emphasized that private seed producers are multiplying quality seeds for farmers and developing the value chain as their business prospect. The seed dealers work as the intermediaries in disseminating information and promoting different stress tolerant rice varieties among the farmers. It is a good business approach, where seed dealers play a vital role in connecting the seed users and suppliers.

Another dissemination approach is the crop cafeteria approach, which is used to identify the efficient rice varieties in an agro-meteorological region. This offers an opportunity to the farmer to choose a suitable variety and transfer the technology among the farmer's communities. It also provides a practical experience of "seeing and believing" along with the technical know-how for all relevant stakeholders.

Innovation in extension for large-scale dissemination & impact: The case of alternate wetting and drying (AWD) technology in NW Bangladesh

Presented by Dr. Ahmad Salahuddin

Alternate Wetting and Drying (AWD) is a beneficial technique to use during floods. It is mostly used for Boro cultivation, which helps in high Boro yield. Major benefits of this technique include up to 30% reduction of water usage and reduction of CH₄ emissions by approximately 50% compared to continuous flooding. This technique also increases cost returns compared to continuous flooding. Therefore, farmers are able to save money on irrigation. It is not a new technology but all stakeholders including government, policy makers, farmers and researchers in this field have recently agreed on its effectiveness and better technological output.

Discussion

One participant asked if African nations are changing their land use practices. Now people are shifting from grazing practices and diversifying their livelihoods. Because of conflict among many communities, one specific livelihood option is not preferable.

Another participant asked how the predicted sea level rise in the coastal region of Bangladesh can be mitigated. During low tide, the water level is more than 1 metre below sea level in Khulna and Barisal, which provides the opportunity to drain out saline water. This method will reduce saline water intrusion in the coming decades.

Another participant asked about the costs and benefits of the AWD method. Reduction of methane gas emission from agricultural sites is a major benefit, as it is one of the main issues of climate change. Furthermore, the machine cost of the method is low, which makes it affordable for farmers.

A commenter shared that it is necessary for farmers to know why they should have more livelihood options and to train them on new methods of farming. Furthermore, water logging causes salinity problems in the coastal areas and should be managed. There is a need to identify how to properly drain out the salt water. At the moment the drainage system is not working properly in Satkhira but that is not the case for Khulna.

Adaptation Technologies



Mr. Mirza Shawkat Ali sharing his thoughts as chair of the session.

Host: Christian Commission for Development in Bangladesh (CCDB)

Co-Host: International Development Enterprises (iDE)

Chair: Mr. Mirza Shawkat Ali, Director, Climate Change and International Convention, DoE

Moderators:

- Mohammed Atikul Haque, Coordinator, Capacity Building Research and Advocacy, Climate Change Program, CCDB
- Ms. Raisa Chowdhury, iDE

Presenters:

- Prof. Muhammad Manjurul Karim, Department of Microbiology, University of Dhaka
- Dr. Md. Kamrul Islam, Cotton Development Board
- Mr. MaidulAlamChaklader, Lecturer in Anthropology, IUB
- Madan Pariyar, PhD, Deputy Team Leader – Anukulan/BRACED Project ProgrammeDevelopment and M&E Director – iDE Nepal

Mr. Mohammed Atikul Haque initiated a round of introductions among the presenters.

Ms. Raisa Chowdhury then introduced the host organization, International Development Enterprises (iDE). iDE works on market systems development programs, and has recently embarked on a journey to bring clean energy to smallholder farmers and households. iDE is a global initiative that liaises with entrepreneurs, the government, and the private sector to contextualize technologies, making them effective and affordable for farmers.

Mr. Palash Sarkar then introduced the co-host organization, Christian Commission for Development in Bangladesh (CCDB). Since 2012, CCDB has been working in the coastal areas of Bangladesh to build community resilience in the face of climate change. The organization has introduced adaptation technologies in these areas using four approaches: 1) technology distribution and skill enhancement, 2) indigenous technology scale-up, 3) technology innovation, and 4) technology evaluations.

Salinity intrusion and coastal agriculture: Adaptation strategies using salt-tolerant plant-growth promoting rhizobacteria for sustainable food security

Presented by Mr. Md. Manjurul Karim

Due to rising sea levels, soil salinity is increasing rapidly, hampering coastal agriculture. High salinity prevents plants from uptaking iron, which is essential to their growth. The purpose of this study was to determine how to increase rice survival in high soil salinity using rhizobacteria, a natural symbiont of plants.

Mr. Karim applied salt-tolerant Plant Growth Promoting Rhizobacteria (PGPR) as a fertilizer to non-genetically modified organism (GMO) rice cultivated in normal salinity for 45 days. He then applied salt to the soil and measured plant survival and growth after 25 days. He found that 46% of plants with the applied rhizobacteria *Bacillus aryabhatai MS3* survived in comparison to only 8% of plants in the control group. He also studied three salt-responsive plant genes and found that *BZ8* was expressed under salt stress with the presence of *MS3*. This suggests that the rhizobacteria promotes expression of genes in the plant that increase its tolerance to salinity. Overall, Mr. Karim's findings show that suitable application of PGPR can improve the sustainability of crop production in coastal areas.

Adaptation of mutation breeding for enhancing cotton resilience to climate change in Bangladesh

Presented by Mr. Md. Kamrul Islam

Currently Bangladesh produces more cotton than India and Pakistan, at 1079kg/ha versus 483kg/ha and 671kg/ha respectively. However cotton in Bangladesh lacks climate resilience. In order to increase its resilience, Mr. Islam and his colleagues at the Cotton Development Board

have introduced new variants of cotton by artificially producing mutants using gamma radiation. He then grew these mutants in the field and hybridized them to find variant strains that were adaptive. The variants that were more stable across locations and able to withstand excess rainfall were considered climate resilient.

Audience members asked 1) how Bangladesh produces so much more cotton per hectare than India and Pakistan, and 2) whether the genomes of these climate resilient variants were sequenced. In response to the first question, Mr. Islam responded that The Cotton Development Board immediately disseminates its research findings to farmers, which reduces lag time in acquiring knowledge and increases production. In response to the second, he informed that the genomes of mutants have not been sequenced yet, as research on climate resilient cotton varieties started only in 2016.

From anthropology in climate change to anthropology of climate change: an epistemological shift

Presented by Mr. Maidul Alam Chaklader

In order to understand climate change, it is necessary for both the natural and social sciences to contribute to research. Currently the natural sciences overshadow the social sciences in understanding the human dimensions of climate change.

Anthropology in climate change has largely been interventionist, with most anthropologists focusing on local social, cultural, political, and economic factors where adaptive and mitigation related technologies are applied. Anthropological researchers are qualitative data collectors under the direct supervision of policy makers, natural scientists, and economists, playing a subsidiary role. They do not define the research questions, design the project, or categorize priorities.

Going forward, there is a need for theoretically grounded research that analyzes power dynamics during negotiation and decision-making processes and how groups of people respond to climate change. It is essential that climate change research deals with complexities of humans in addition to the science of the phenomena. Anthropology can contribute much more to the climate change debate through analytical rigor and methodologies in research and intervention. Anthropologists need to lead research projects and ask pressing relevant questions. Mr. Chaklader expressed the view that currently anthropology is not utilized to its optimal level and needs an epistemological shift.

Localizing Climate Actions through Climate Smart Adaptation Technologies: Experiences from Anukulan/BRACED in Nepal

Presented by Dr. Madan

Since January 2015, Anukulan (Nepali for adaptation) has localized climate change actions to bring rapid small scale solutions to communities. Private sector supported technologies, such as the multiple-use water system and micro-irrigation, have increased the efficiency of water usage and increased yields of crops. As a result, the resilience of communities has increased and local governments and people have been empowered. This effective project needs to be promoted and modeled in other developing countries.



The panelists and presenters of the adaptation technologies session.

Mitigation



Dr. Wais Kabir inaugurated the session by commenting on the necessity of mitigation in combating climate change.

Host: Krishi Gobeshona Foundation (KGF)

Chair and Moderator: Dr. Wais Kabir, Executive Director, KGF

Panelists:

- Dr. M. Rafiqul Islam, Professor, Department of Soil Science, Bangladesh Agriculture University, Mymensingh
- Dr. G. M. Monirul Alam, Department of Agribusiness, Bangabandhu Sheikh Mujibur Rahman Agriculture University, Gazipur
- Dr. Abdul Hamid, Former Professor, Department of Agronomy, Bangabandhu Sheikh Mujibur Rahman Agriculture University, Gazipur
- Dr. Yam Gaihre, International Fertilizer Development Center (IFDC), Dhaka Office

Keynote Presenter: Dr. Jatish Chandra Biswas, Coordinator, Krishi Gobeshona Foundation

Presenters:

- Dr. Md. Mozammel Haque, Bangladesh Rice Research Institute (BRRI)
- Mr. S. M. Mofijul Islam, BRRI
- Mr. Md. Hafiz Iqbal, Assistant Professor of Economics at Government Edward College - Pabna, Bangladesh

Climate change and Bangladesh agriculture: Selected options for adaptation and mitigation

Presented by Dr. Jatish Chandra Biswas

Climate change impacts are visible in Bangladesh already. Coastal flooding, changing rainfall patterns, waterlogging, drought, warm winters, and increasing soil salinity are some of these impacts, and mitigation strategies are not enough to manage them. The country needs the development and dissemination of climate smart agriculture, which can be achieved through investment in hard and soft engineering and human capacity development. The government spends less than 1% of its budget on researching these solutions, which is not enough.

The Krishi Gobeshona Foundation (KGF) fills this gap by conducting the research Bangladesh needs. So far it has trained one hundred scientists and professionals to study issues such as water stagnation, bioorganic fertilizers, drought tolerant varieties of crops, solar energy, and reduction of nitrous oxide and other greenhouse gas emissions. Further international collaboration and effective policies are needed to accelerate the application of research findings.

Influence of nitrogen sources on nitrous oxide emission during maize, wheat and potato cultivation in Bangladesh

Presented by Dr. Md. Mozammel Haque

Climate change is threatening the food security of developing countries. At the current rate of change, the average yields of major cereals such as rice, wheat, and maize are expected to decrease by 50, 17, and 6 percent respectively by 2050. The objectives of this study were to measure CO₂ and N₂O emissions, total CO₂ and N₂O flux, and total global warming potential (GWP) of major crops treated with different fertilizers in order to determine which method produced the least greenhouse gases while maximizing production.

At the Bangladesh Agricultural Research Institute (BARI) farm in Gazipur, Dr. Haque cultivated potato, wheat, and maize under four different treatments: native nutrients (control), prilled urea, Nitrogen Phosphorus Potassium (NPK) briquette, and urea super granule (USG). He sampled CO₂ and N₂O emissions using the closed chamber method one time per week and analyzed the levels using gas chromatography. He was then able to calculate the GWP using the data on gas levels. From his results, he concluded that USG usage can reduce about 2-36% of N₂O fluxes, 10-24% of GWP with about a 4-17% yield improvement compared to other N sources.

Impacts of fertilizer and water management on greenhouse gas emissions and nitrogen use efficiency from lowland rice cultivation

Presented by Mr. S. M. Mofijul Islam

Rice is the staple food of nearly 50% of the world's population and about 90% of that is produced in South Asia. World demand of rice will only increase; therefore it is important to know the levels of greenhouse gases emitted from rice fields. Mr. Mofijul Islam's study had three objectives: 1) to determine the effects of prill urea (PU) versus urea deep placement (UDP) on floodwater NH_4^{+-}N , NH_3 volatilization, greenhouse gas emission, grain yield, and nitrogen use efficiency (NUE); 2) to compare the effects of water management on global warming potential (GWP) during the dry season; and 3) to find an efficient N and water management option for increased crop productivity with reduced negative environmental impacts.

Mr. Islam sampled N_2O , NO , and CH_4 emissions of rice fields using the closed chamber technique and then analyzed the levels through gas chromatography. He found that 1) UDP significantly increased rice yield compared to PU and that it could save N by 20-30% without any yield penalty; 2) UDP significantly reduced floodwater NH_4^{+-}N and NH_3 volatilization compared to that of PU; and 3) UDP and PU showed similar N_2O fluxes in alternate wetting and drying (AWD) conditions, while UDP significantly reduced N_2O fluxes over PU in the continuous standing water (CSW) practice.

Climate change and risk preference: Linking between migration and household behavior in coastal Bangladesh

Presented by Mr. Md. Hafiz Iqbal

One third of the land in Bangladesh is coastal, and one quarter of the total population lives in these areas. In order to determine the risk preferences of households in coastal Bangladesh, Mr. Iqbal set out to 1) identify income variation of households, and 2) explain these variations and risk preferences.

Mr. Iqbal found that people are more risk averse when there are gains and losses involved rather than when there are only gains and that women are more risk averse than men. He also found that domestic remittance and access to credit were statistically significant for recovery after hazards. He suggested implementing policies that diversify income sources, such as domestic remittance sharing.

Renewable Energy



Ms. Maliha Muzammel discussing climate change, food, and energy security.

Host: International Center for Climate Change and Development (ICCCAD)

Chair: Mr. Md. Helal Uddin, Chairman, Sustainable and Renewable Energy Authority (SREDA)

Panelists:

- Mr. Siddique Zobair, Member, Energy and Efficiency Conservation, SREDA
- Mrs. Salima Jahan, Member, Renewable Energy, SREDA
- Dr. Taibur Rahman, Project Manager, SREDA/SREPGen

Moderator: Dr. Saleemul Huq, Director, ICCCAD

Presenters:

- Mr. Mark Jones, University College London
- Ms. Maliha Muzammil, PhD candidate, Environmental Change Institute, University of Oxford
- Mr. IrabanTurjo, student of Electrical and Electronics Engineering at the Ahsanullah University of Science and Technologies (AUST)

A case of climate justice and energy justice: Solar energy for the urban poor of Dhaka

Presented by Mr. Mark Jones

Bangladesh contributes minimally to greenhouse gas emissions but is one of the most vulnerable countries to climate change. Furthermore Bangladesh relies heavily on natural gas for energy, which is predicted to expire between 2025 and 2030. On top of that, a 400% increase in energy use is expected between 2015 and 2030. Therefore sources of renewable energy, such as solar, are important to use across the country, including slums.

Currently 90% of slum households have one light and one fan, each costing \$2.00 per month. This rate is substantial but cannot be avoided because *mastaans*, or slum lords, buy electricity from authorities and sell it at three times the cost. Non-payment results in disconnection and eviction with the ever present threat of violence from the *mastaan*.

On the other hand, the rural electrification programme by Solar Home Systems managed by the Infrastructure Development Company Limited (IDCOL) in Bangladesh has a structured model with multiple stakeholders on board. The programme not only provides electricity through solar home systems to almost 5 million people across the country but also uplifts the social conditions of communities. Participants of the programme strongly agreed on the benefits they received through electrification, with 100% of survey participants agreeing that their children have more study hours. Barriers to expanding solar programmes in the slums include resistance from *mastaans*, the inability of the government and NGOs to penetrate the slums, absence of land tenure, lack of government resources, and need for ongoing management and maintenance.

Mr. Jones propositioned a pilot programme to establish solar home systems in 500-1000 households in one slum with an investor commitment of US\$0.5 million. The pilot would consult with the community, government, and *mastaans*, with a review after one year.

Zero hunger, zero emissions: Climate change, food, and energy security in Bangladesh

Presented by Ms. Maliha Muzammel

Food systems are a key area where multiple Sustainable Development Goals (SDGs) interact, such as zero hunger (2), affordable and clean energy (7), and climate action (13). Ms. Muzammel and her collaborators asked the following questions:

- If the current food system continues with business as usual, can it maintain high food security levels for Bangladesh?
- What will be the major challenges for the Bangladeshi food system in 30 to 50 years from now?

The objectives of the project supervised by ICCCAD, University of Oxford, and Oxfam Bangladesh were to 1) identify possible pathways for Bangladesh that consider the zero hunger goal and low carbon growth futures and 2) guide an inclusive process that brings together different voices (policy, industry, and civil society) to discuss implications of these different futures, particularly for those living in poverty.

Ms. Muzammel and her team created four possible futures for Bangladesh and developed and debated the scenarios by consulting rural communities and students. Rural communities viewed education and innovation in the rural context as key; for students, the key drivers were governance, education, and technology. They were also more critical about the future than the rural communities.

Dr. Feisal Rahman of ICCCAD elaborated on Ms. Muzammel's presentation. To feed 200 million by 2050, the country needs proper mechanization and a large renewable energy supply. Bangladesh's Nationally Determined Contribution (NDC) to the Paris Agreement suggests reducing emissions from agriculture, as it is one of the most carbon emitting sectors. However food security is the highest concern in Bangladesh and must be done sustainably.

Long term wind energy prospects in Bangladesh

Presented by Mr. IrabanTurjo

Countries are building diversified energy portfolios to become completely fossil fuel independent as part of their mission to achieve the UNFCCC's SDGs by 2030. Bangladesh set a goal of producing 3.17 gigawatts from renewable energy by 2021, which is 12.5% of total domestic power production. Bangladesh produced only 3% from renewable energy sources in 2018 and must close the gap towards its goal. Wind energy is one option for the country to harness.

The three objectives of Mr. Turjo's paper were to: 1) examine the technological feasibility of large-scale offshore wind-power generation within the sovereign maritime boundary of Bangladesh; 2) find out the whether the unique topography of the sea-bed of the Bay of Bengal is suitable for wind farms; 3) map out an area of the Bay of Bengal which will be best suited for generating wind energy per annum.

Mr. Turjo found that wind speeds are much higher offshore (up to 35 meters/second) than that of onshore farms (5-6 meters/second) and can thus produce much more energy. The shallow coastline of Bangladesh consists of mostly mud and sand and is not suitable for wind farms; however the Chittagong sea bed has a solid seabed that is ideal. Nevertheless, the technology of offshore wind farms needs development before it can be deployed. The long-term effects are still unknown.

Loss and Damage



Dr. Saleemul Huq discussing loss and damage from the perspective of Bangladesh.

Host: International Center for Climate Change and Development (ICCCAD)

Co-Host: Friendship

Moderator: Dr. Saleemul Huq, Director, ICCCAD

Discussant: Kazi Amdadul Hoque, Director, Strategic Planning and Head of Climate Change Adaptation and Disaster Management, Friendship

Presenters:

- Mr. Md. A. Halim Miah, Social Management Specialist at Export Competitiveness
- Mr. Hafijul Islam Khan, Executive Director, Center for Climate Justice-Bangladesh
- Ms. Mousumi Halder

Perceived loss and damages of crops: Narrative of smallholders in the southwest districts in Bangladesh

Presented by Md. A. Halim Miah and Dr. Md. Muzaffar Ahmed

The southwest regions of Bangladesh are most vulnerable to climate change, especially the poor and landless. In the recent past, this region experienced cyclones Sidr and Aila, two severe

cyclones that caused significant loss and damages of permanent assets. The area was left with prolonged slow onset disasters, such as water logging and salinity intrusion. Salinity increased 0.74% over the course of nine years (2000-2009), affecting 3.5% of coastal land (Soil Resource Development Institute, 2010).

With the financial support of Klynveld Peat Marwick Goerdeler (KPMG) under the Global Resilience Partnership, Practical Action measured the efficacy of waterlogging and saline adaptive agricultural technologies in Khulna, Satkhira and Jessore from 2017-2018. A total of 12 focus group discussions (FGDs) were conducted. Both men and women were selected purposely considering their socio-demographics and typical engagements. Individual interviews were also conducted as triangulation for obtaining reliable data.

They found that increased salinity, flooding, pest attacks, unpredictability of rainfall, and diseases as well as shorter winters and longer, warmer summers led to significant loss and damage to crops, as much as 20,000 taka in one season for one farmer.

Most smallholders produce for the market and their returns fund their children's education. However no one among the participants, irrespective of their sex, education, farm size, and region consulted with the Agriculture Officer or visited the nearest union or upazila Agriculture Officer for consultation on agro-meteorological information. They were not informed of weather forecasts either. Recurrent loss and damage of crops can push these smallholders into the trap of poverty, slowing down the achievement of SDG1 (no poverty).

Investing in research and development on adaptive technologies, improvement of agro-meteorological services at the reach of smallholders, and access to agricultural financial services, including crop insurance, are three preventative solutions to loss and damages of smallholders in the southwest regions of Bangladesh.

Non-economic multiplicity of loss and damage: Whispers of coastal women in Bangladesh

Presented by Ms. Mousumi Halder

The objective of the study was to explore the ground facts and realities of coastal women in the context of non-economic loss and damage associated with climate change in Bangladesh. In two villages of PatharghataUpazila, Mousumi and her team conducted exploratory research, focusing on early marriage, women's hardships, and women's health. They found the threat of climate change related disasters and land erosion led families to feel insecure, pressuring their daughters into early marriages. Poverty and lack of access to education were exacerbated, and increased salt consumption, stress, and temperature were all factors that led to early puberty. Women have to spend more time collecting drinking water and taking care of homes and their families in the wake of disaster. Reduction in food, consumption of impure water, and increased water loads

impact women's health. They are more prone to skin diseases, for example, when they drink saline water.

Mousumi recommends making the language of the law for early marriage under "special circumstances" more specific and introducing income generating options for young girls, incentives for boys' education on early marriage, and sustainable technology (i.e. rain water harvesting). Women's health impacts should be incorporated into the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) as well.

A legal appraisal on liability and compensation logic to address the impact of climate change

Presented by Mr. Hafijul Islam Khan

"Loss" is when reparation or restoration is impossible, while "damage" is when it is possible. When climate change impacts can no longer be avoided through mitigation or adaptation, loss and damage occur.

The "No Harm Principle" is when a state does not cause transboundary pollution and environmental harm to its citizens nor those of other nations. When it fails to do so, the state must give full reparation as compensation or restitution under international law. The United Nations Framework Convention on Climate Change (UNFCCC) has two provisions that are specifically applicable to the issue of liability, but the articles are too vague to make the state responsible. The Paris Agreement also has unclear redress statements. Therefore compensation needs to rely more on customary international law than the climate governing regime.



Mr. Khan presenting on loss and damage.

After the IPCC first assessment report, the global community knew that GHG emissions may cause climate change. Now the key task is to assess when the adverse impacts of climate change were foreseeable. Historical emissions are relevant in assessing the proportional contribution of damage. Industrialized states' contributions will be larger than those of developing countries who recently started to emit, such as China and India, though both are held liable.

Even though there is a lack of conclusive scientific evidence and legal reasoning, that should not wipe out the claim for state liability and compensation to redress climate victims. Science and technology are developing each day and scholarly articles provide new interpretations of existing rules to support liability claims. Legal questions and uncertainties can be resolved by judicial precedent, customary international law, and the climate governing regime.

Wetlands (Flood, River and Haors)



The panelists of the wetlands session.

Host: BRAC

Chair and Moderator: Mr. K.A.M. Morshed, Director, Advocacy for Social Change, Technology and Partnership Strengthening Unit, BRAC

Presenters:

- Ms. Afsari Begum, Programme Manager, Agriculture for Resilience, Practical Action, Bangladesh
- Professor Jonathan M. Gilligan, Associate Director for Research, Vanderbilt Climate Change Research Network, Vanderbilt University
- Mr. Shishir Reza, Associate Member, Bangladesh Economic Association

Raised Riverbeds: A Blessing in Disguise

Presented by Ms. Afsari Begum

The session began with the presentation of Ms. Afsari Begum, Programme Manager of Practical Action. She explained the various challenges and potentials of raised riverbeds in different parts of Bangladesh. She mentioned that Bangladesh is one of the largest deltas in the world and likely to suffer due to rising and unpredictable temperatures, salinity intrusion, and more, like many

other vulnerable islands. Practical Action is currently working in several areas, such as Gaibandha and Kurigram, to build resilience against climatic changes.

The sandbar technique is one of those tools which help to transform unproductive infertile silted land into cultivable ones where many cash crops are grown, such as pumpkin, strawberry, and more. This study's main aims are to reduce the vulnerability of men, women and children to the physical, social and economic effects of climate change causing river erosion, flooding and other natural disasters.

Sandbar cropping remains available for 5-6 months and by 4 months people can harvest the produce. This is a low-risk technique that has a high return. A total of 22,131 farmers--mostly women--have used it since 2005-2017, increasing their socio-economic resilience along the way. The technique helps them understand how to utilize these temporary raised riverbanks for production purposes. This income generation will help to reduce migration and also helps them attain a better livelihood.



Ms. Afsari Begum presenting on raised riverbeds.

Another study conducted on the Padma, Tista and Yamuna rivers identified the number of “Char Lands” by using remote sensing technique. In the dry season (November-March), when the water is low, satellite images helped locate chars, and pixel differentiation helped determine their potential for applying the Sandbar technique. The main idea was to determine the total amount of land available for food production through the sandbar technique. So far, it has been proved to be a socially and economically beneficial approach.

Sediment management and sea-level rise

Presented by Professor Jonathan M. Gilligan

The second presenter, Prof. Jonathan M. Gilligan has been working with sediments as an adaptation tool for climate change and sea level rise. Yearly, 1 billion tons of sediments flow into our rivers and the nature of this sediment transport effectively impacts the sea level rise. He studied the Dacope Upazilla, Khulna division in order to find an effective approach for sediment management. The breaching of Polder 32 in Khulna had a catastrophic effect on the livelihood of 4,000 people for two years after the cyclone Aila hit the land in 2009.



*Professor Jonathan M. Gilligan
presenting on sediment management
and SLR.*

As a result of the coastal embankment project the riverbeds became higher due to sediment concentration while the land inside the polder sank down. This caused the breaching of the polder during the cyclone. The phenomenon was similar to the tidal river management in Tala, Satkhira. Another study found that polders cause inland tidal channels to fill in, creating *khas* land. Sediments have increased the land near the mouth of Meghna River whereas there is a loss of land near the coast of Sundarbans. Numerical models of sediment management reveal that land inside the polder can keep up with the sea level rise with the help of proper tidal management by periodic breaching of embankments and controlled flooding. On the other hand, Professor Gilligan discussed the limitation of sediment management if the sea

level keeps rising at a higher pace than previously estimated. Loss of sediments due to an Indian river diversion project would be a serious threat to the adaptation process.

He mentioned various socio-economic problems that will come into play, as not everyone will equally benefit from the project. The major challenge will be governance. He concluded saying that sediment management is a great way to deal with climate change, but it is important to include local communities in the process to ensure sustainability. For future research he pointed to the necessity of developing a coupled model of sediment transport integrating crop yield and its effect on economy income. It will give a picture of how different people living within the polder region might be affected by tidal river management and sea level rise.

Livelihood challenges in Haor regions: A case study of Maulvibazar District

Presented by Mr. Shishir Reza

Mr. Shishir Reza presented a case study on *haor* areas of the Maulvi bazar district, Sylhet. Ecologically *haor* areas are known as biodiversity hotspot zones because of their ecological dynamism and complex integration of flora and fauna. The objective of the study was to explore several challenges faced by the local community due to man-made and natural disasters. An average 50 percent of rice production was destroyed in the flash floods. Hence, people in this area suffer severely from shortage of food as they are extremely marginalized and vulnerable.

According to the fisheries office of Sunamganj, fish of 20 *haors* from 11 *Upazilas* suffered from murrain. Among the *Upazilas* are Sadar, South Sunamganj, Jagannathpur, Dharmapasha, Dirai, Tahirpur, and Jamalganj. Among the *haors* are Dekhar, Dharam, Dhankuniya, CheptirHaor, ChayarHaor.

He mentioned that *haor* flood not only damaged human food, it also drowned animal food. It further means a loss of fodder (straw) which in total is estimated to be 452,189 MT for all 7 affected districts. This made the natural biodiversity of the region vulnerable to an extreme food crisis, and also farmers and local cattle industry not only suffered from shortage of their own food but also fodder for their cattle.

Apart from that, that underdeveloped state of communication infrastructure leads to the various challenges such as insufficient private sector investment and small-scale entrepreneurship in these areas. In Mr. Reza's context, proper adaptation strategies, combined with climate tolerant crops, financial incentives to farmers and public participation are essential in Maulvibazar district to communicate livelihood challenges solution.

Discussion

Mr. Asad mentioned that in the *haor*, communication and regular livelihood activities including fishing and agriculture of Boro crops are disrupted by floods.

Mr. Morshed further added that they needed a package of services rather than a single aid programme to promote more private sector investment and small-scale entrepreneurship. He mentioned the necessity of proper adaptation strategies involving public participation to cope with the challenges of Maulvibazar district.

In the end, there was a presentation on the role of the Climate Change Programme of BRAC and their major strategies on adaptation, mitigation, collaboration and networking. The presenter spoke about the necessity to develop a holistic and progressive development process for capacity building. Innovative projects of BRAC like the introduction of mobile-money through Bkash were highlighted. The role of BRAC to support adaptation after the floods of 2017 was also put forward to the audience.



Participants involved in the discussion on wetlands.

Climate change issues are challenging. Remote areas are difficult to cover and lack of housing for staff is an ongoing problem. Compensation, incentives, and funding are a challenge, as are a lack of follow-ups on many projects. Sustainability of interventions remains questionable.

Hydrology and Societal Processes: Is Migration an Opportunity?



Dr. Saleemul Huq discussing hydrology and societal processes.

Host: Bangladesh Centre for Advanced Studies (BCAS) (Hydro Social Project)

Chair: Dr. Atiq Rahman, Executive Director, BCAS

Moderator: Dr. Abu Syed, Fellow, BCAS

Panelist: Dr. Saleemul Huq, Director, ICCCAD

Presenters:

- Ms. Basundhara Tripathy Furlong, PhD Candidate, Wageningen University
- Professor Amanda Carrico, University of Colorado
- Dr. Bishawjit Mallick, Technische Universität Dresden
- Mr. Hasan Ashraf, Lecturer, Jahangirnagar University

Dr. Abu Syed stated that the overarching objective of the session would be to shed light on how hydrological processes influence societal processes and human mobility, particularly in the context of climate change.

Social remittance in environmentally-related migration: A review

Presented by Ms. Basundhara Tripathy Furlong

Bashundhara Tripathy Furlong's PhD research aims to understand how circulation of social remittances in Bangladesh affects local communities, particularly in a climate sensitive context. Social remittances refer to flows of knowledge, idea, values and practices that are transferred from migrants' places of destination. She briefly introduced the three different categories in which social remittances can be grouped. These are norms shaping practices, identity formation and social capital. Ethnographic, field-based research is being employed to undertake the study and a number of innovative mobile methods have been used. Selected study sites include three villages in the south-west coastal region and a number of common migrant destinations – Mymensingh, Khulna, Barisal and Ashuliya. So far, the study has found that seasonal labour migration, generally for 6 months, is a fairly common phenomenon in the south. Existence of social networks in migrant destinations helps facilitate seasonal employment. While away, migrants acquire new knowledge and skills that can be transferred back to their origins. The study also set out to explore the impact of migration on non-movers, which are generally women. They found that the seasonal labour migration of male-earning members contributes to women's empowerment and adaptive capacity.

The effects of social networks on environmentally-induced migration in Bangladesh

Presented by Professor Amanda R. Carrico



Professor Carrico speaking about environmentally induced migration.

Professor Carrico presented on a study that aimed to understand the correlation between extreme temperature and precipitation on the one hand and migration decisions on the other, as well as the role of social ties and networks in facilitating environmentally-induced migration. Nine districts in the South-West region of Bangladesh that are subject to high salinity levels and poverty were selected for the study. An ethno-survey was employed to collect quantitative data through qualitative interviews and retrospective data about migrant trips, livelihoods and other socio-demographic information. The study looked at historical migration across male household members' lifetimes and four

measures of extreme temperature and precipitation – warm spells, dry spells, wet spells and intense precipitation. Using event history analysis, the study found that warm spells to be generally associated with an increase in domestic migration and temperature to be a stronger driver for migration than intense precipitation. Heat spells were found to reduce international

migration for people with social ties abroad. Social ties have significant influence on migration decisions for people and having migrant relatives increases the probability of domestic migration during drought years. Therefore, access to migrant networks can be considered an important source of resilience for climate vulnerable populations in the region.

Environmental non-migration: Empirical contextualization of socio-ecological system approach

Presented by Dr. Bishwajit Mallick



Dr. Mallick presenting on the socio-ecological system approach.

Dr. Mallick presented on a conceptual framework for contextualizing livelihood resilience and migration based on a socio-ecological system (SES) approach. The study set to explore the extent to which livelihood resilience influences migration decisions of people living in vulnerable socio-ecological systems. He began by highlighting that human migration is a rather complex phenomenon. There are several drivers, including economic, social, political, demographic as well as environmental, all of which are influenced by human-induced climate change. To understand migration decisions, other factors such as household characteristics, access to institutions, facilities, and governance structures need to be taken into account. The usefulness of the

framework is that elements of SES have impacts on livelihood opportunities in vulnerable areas. First, seasonal migration is common in each community and is a part of long-term non-migration. However a lower number of people have migrated in the last 5 years. Production of rice has been increased but only in a small number of places. The growing shrimp farm industry is a source of social conflicts. Also, the lower number of poor people in the community indicates diversified livelihood options. Resilient people tend to have less desire to migrate. Mr. Mallick highlighted that research, policies and programs should ensure future development so that the people can sustain their livelihoods at their own places.

Hydro social overview

Presented by Mr. Hasan Ashraf

Hasan Ashraf presented on findings from a project titled ‘Hydrosocial Deltas’, which is a collaborative effort between the Netherlands and Bangladesh. Both these countries share similar deltaic characteristics and are subject to flood-related issues. However, the socioeconomic drivers in these two countries are significantly different from one another.

The project constituted four separate research studies. The first focused on understanding how socio-hydrological relationships can be conceptualized. Socio-hydrology and hydrosocial research are two different areas with differing as well as overlapping characteristics. The second study aimed to understand human-river interactions in the Jamuna floodplain of Bangladesh. The results suggest that different socio-hydrological spaces exist along the Jamuna floodplain and investment is relative higher in the protected areas demonstrating the levee effect. Despite annual occurrence of floods in the unprotected areas, people are somewhat unwilling to move out as a result, whereas riverbank erosion appeared to be more of a driver for migration. The third study focused on analyzing the different views existing regarding the migration dynamics in Bangladesh in context of climate change. The study found that migration is widely considered to be multi-causal. While climate change does have an indirect impact in the sense that it influences existing drivers, framing migration as a climate-induced issue risks depoliticizing it and underlying governance issues are not targeted as a result. Also, flows of climate finance for migration can be manipulated for vested interest.



Mr. Ashraf presenting on the hydro-social relations of Bangladesh.

The fourth study looked at the water crisis facing Dhaka as well as undertaking ethnography to understand migration practices employed by rickshaw drivers in the city. Dhaka's water crisis stems from a number of issues including depleted canals and other water bodies, over pumping of groundwater, groundwater contamination as well as political mobilizations to access groundwater. This water crisis persists because technocratic solutions ignore social factors. There is an increasingly widening water inequality in the city as a result of neighborhood politics, especially in slums and other squatter settlements. Furthermore, interdisciplinary interaction is limited. He also shed light on the country's new urban transport plans that mention ousting rickshaws from the city, which is likely to leave many unemployed.

In the discussion session that ensued, a recommendation was made to look into international migration and border laws, in addition to internal displacement as a result of climate change impacts. Another participant noted that studies on the issue so far have mainly focused on climate induced displacement from the salinity prone coastal regions in the country; it is also important to look at migration from drought prone areas in the Barind tract. Questions were also raised regarding the difficulties of attributing climate change to environmental migration in Bangladesh.

Dr. Atiq Rahman, in his closing remarks, noted that the issue of migration has been gaining significant momentum in the climate change discourse and lot of conceptual and theoretical frameworks are being developed to better understand and address the issue.

Dr. Saleemul Huq concluded by highlighting a few key points to note when thinking about climate change induced migration. First is to be cognizant about the accurate use of terminologies. There are distinctions to be made between ‘climate migrants’, ‘climate change displacement’ and ‘climate change induced migration’. The notion of ‘climate change induced migration’ entails anticipatory elements. As the impacts of human induced climate change become increasingly noticeable in the coming decades, swaths of the population will be displaced as a result. The issue therefore needs to be addressed with a forward-looking lens. As well, he highlighted critical need to invest in skills and capacity development of the younger generation among climate migrants. Furthermore, the potential for developing secondary towns in the country into ‘climate-resilient, migrant-friendly towns’ by investing in infrastructure, facilities as well sensitization of host communities in these town needs to be explored. The session concluded with the chair proposing the possibility of hosting a national conference on the issue in the next two years.

Food Security



Dr. Khalid Hossain introducing the food security session.

Host: Oxfam

Chair: Dr. Khalid Hossain, Economic Justice Resilience Program Manager, Oxfam

Moderator: Mr. Tapas Ranjan Chakraborty, Information and Communications Technology (ICT) and Development Co-coordinator, Oxfam

Presenters:

- Mr. Uzzal Kumar Karmaker
- Ms. Whomaira Faarhin Durdana, Dept. of Electrical and Electronic Engineering, IUB
- Mr. Tarak Aziz, Institute of Disaster Management and Vulnerability Studies, University of Dhaka

The impact of value chain management on increasing food security: A study on livelihood promotion of ethnic minority communities of Naogaon District

Presented by Mr. Uzzal Kumar Karmaker

Mr. Kumar found that the major indicators of food security in the Naogaon district were income sources, standard of living, livelihood patterns, health facilities, and social inclusions. Notably, sources of income have increased from 2013 to 2018. In his studies, he showed that the pattern

of income source is increasing and also the monthly household income has increased by 25% than average. Living conditions, health and sanitation also improved from 2016 to 2018. The two contributing factors for his research results were risk mitigation and value addition activity.

Risk Mitigation:

- Disaster Risk Reduction (DRR) plan and implementation by monitoring and follow-up
- Seasonal calendars
- Vaccination calendar
- High temperature and cool wave protection
- Risks mitigation training for producers and vaccinators

Value Addition Activity:

- Linkage with Banking sectors for savings and access to finance
- Motivation for Maringa Trees
- Grass culture
- Collective interventions
- Vermi compost introduced
- Homestead gardening
- Market information
- Motivation to set up bio-gas plants
- Integrated agriculture of bull fattening, vermi-compost production, kitchen gardening,
- Chicks producer development with incubator setup
- Linkage with multiple market actors
- Integration of DRR measures with bull fattening and chickens production to mitigate the risks

Risk reduction strategy is the most important contributing factor of the significant progress, which needs to be integrated as well as mainstreamed.

Challenges observed are related to climatic factors, lack of access to advanced technologies, government's extension services, access to land, and social security schemes which need to address immediate for sustainable and inclusive development.

Finding the Presence of Chemicals Concentration in Food Items using Android Application Presented by Ms. Whomaira Faarhin Durdana

The prime objective of this study was to develop a mobile app that can determine the amount of chemical residues in daily food items and predict possible health difficulties. An additional



Ms. Durdana sharing her research.

feature is weather information, which helps farmers determine their cropping seasons. The benefits include reduced resource consumption, better preparedness for unforeseen situations, good yield, and easy access to marketplaces.

Ms. Durdana has found ways to make the app more useful, such as interfacing it with a mobile sensor that can collect and display the chemical information of a food item. Another improvement is expanding the app's food item list. However, there is a need for more research on the types and amount of chemicals present in the food we consume.

Food security and livelihood: An exploratory study on the cyclone affected people in the selected coastal regions of Bangladesh

Presented by Mr. Aziz

The study has been conducted using a multi-dimensional approach which in this piece of work gives importance to the sociological method. The study used both qualitative and quantitative methods to collect data on the condition of food security and livelihoods of the people living in coastal regions. The study area, Barguna Sadar, is one of the severely cyclone-affected areas of the coastal zone which makes it insecure in terms of food and livelihoods. 52% of the respondents' children were malnourished and 67.4% confirmed that their livelihoods are affected by cyclones. 75.1% suffered from agricultural product damages. He showed that the increase of food price and unemployment are two major causes behind food insecurity and disturbed livelihoods. Because developing countries depend on small-scale and household goods production in terms of agriculture, it is crucial to follow good models for a prosperous economy and livelihood system which will ensure food security.



Mr. Aziz presenting on food security and livelihoods.

In his studies, he indicates that though their literacy rate is high, their employment rate is very low. Because of disaster, 43.9% of respondents suffered a lot for unemployment problem, 64.6% of respondents faced trouble due to lack of job opportunity and 50.5% respondents remained below the poverty line.

On the survey comprising of 89 respondents, he found out that 18% of them store food in normal days whereas only 14.7% are informed about hazard surviving crops. 5% of them have

awareness of disaster risk reduction. Recuperation of soil and using salinity resistant seeds (3.20%) are two of the prime adaptive measures initiated by the local people.

In his research he found that the problem of food insecurity and livelihoods can be observed all over Bangladesh. Although the study was conducted in a selected area of the districts of Barguna, it can be replicated all over the country. He once again mentioned that it is not only disasters that create the problem of livelihood and food insecurity, rather there are many other reasons behind these problems. In order to eradicate these problems the condition of other districts should be considered by the researchers.

Discussion

Discussion continued with an enquiry of study findings in terms of income generation, production management cycle, and risks associated with saving income. The amount of money each household earns was average but linked with business. Mr. Karmaker mentioned that they were monitoring on this area 2014 to 2018.

One participant wanted to know how Ms. Durdana's mobile application was built and if it was possible to show how the app works on the spot. At the moment, the device is expensive but the developers are working towards reducing the cost. However, the application is built in a way so people from the rural areas can use the device easily.

One suggestion about the first presentation was to scale up the research.

Dr. Khalid Hossain thanked all of the presenters and participants for collaboration. He once again mentioned that although attendees already know about climate change knowledge, if we found new knowledge from coastal areas or interlinked with different topics, this discussion will have made us more knowledgeable. From an academic and climate knowledge perspective those are the things we are looking at under of Gobeshona Platform; we are more interested to gain new climate knowledge.

Forest, Hills, and Ecosystem Resilience



The panelists of the forest, hills, and ecosystem resilience session.

Host: Friendship

Chair: Mr. Ariful Huq Bilal, Assistant Chief Conservator of Forest, Department of Forest

Moderator: Mr. KaziAmdadul Hoque, Director of Strategic Planning and Head of Climate Change, Adaptation and Disaster Management, Friendship

Presenters:

- Ms. Fatema Jannat, Oxfam
- Dr. Rumana Sultana, Assistant Professor, Center for Sustainable Development, University of Liberal Arts Bangladesh (ULAB)

Adopting with technology for adaptation in agrarian livelihoods

Presented by Ms. Fatema Jannat

This study was in collaboration with Oxfam and Monash University, Australia. Farmers' livelihoods have been shifting from mainstream agriculture to fishing and other activities. The intervention by Participatory Research and Ownership with Technology, Information and Change (PROTIC) focuses on women empowerment to provide communities a key role in

project design, implementation and decision-making. Three areas in Bangladesh were targeted: Dimla (Charland), Shyamnagar (coastal area), and Tahirpur (*Haor*/wetland).

PROTIC provides agro-meteorological advice, weather predictions, and standing crop phenology through technological services. Digital usage has brought significant changes amongst the communities, such as new tools for knowledge management, social media platforms, and upgraded traditional knowledge. However, there is a need to understand local knowledge that will focus on the end of user, upgrade the tools that already exist, enhance policy development and research publication in that area. In the state of current climatechangescenarios, local level cooperation and continuous research on existing practices are an important factor. To ensure effective knowledge management of adaptation in agriculture, the use of technology can be an efficient tool.



Ms. Fatema Jannat speaking about Oxfam's PROTIC project.

Response of subtropical coastal sediment systems of Okinawa, Japan to Experimental Warming and High pCO₂

Presented by Dr. Sultan

The study aimed to understand the influence of elevated temperatures on the coastal sediment ecosystem of different habitats. Three different locations in Okinawa Island were selected: a seagrass area at Bise, a coral reef area at Sesoko, a mangrove area at Yagachi Island and another mangrove area at Yagachi Island. The findings showed that shallow marine ecosystems are subjected to multiple stressors, such as elevated ocean acidification, increased temperature, and nutrient enrichment. The impact of several stressors differs from the impact of a single stressor resulting in nonlinear effects and ecological surprises. Greater carbon fixation by mangrove sediments and accumulation of organic carbon in incubations implied a high resilience of mangrove sediments. Similar analysis is necessary to determine the potential carbon sink capacity in coastal sediments in Bangladesh under future climate scenario.



Dr. Sultan presenting her research on coastal sediment systems.

Resilience Livelihood



The panelists of the resilience livelihood session.

Hosts: Islamic Relief (IR), Voluntary Service Overseas (VSO)

Chair: Dr. Md. Akram Hossain Chowdhury, Chairman, Barind Multipurpose Development Authority (BMDA)

Moderator: Golam MotasimBillah, Acting Country Director, Islamic Relief

Keynote Presenter: Dr. Mohammad Mahbub Islam, Sher-e-Bangla Agricultural University

Guest of Honor: Mr. Md. Forkhan Uddin, Country Director, VSO

Presenters:

- Sajal Roy, Assistant Professor, Rangpur University
- Jochen Schanze, Professor, Technische University Dresden, Germany
- Ms. Swarnali Mahmood, Barishal University

Golam Motasim Billah started the session by welcoming audience and introducing panelists. Understanding whether we are re-organizing ourselves to become more resilient would be very interesting to learn from the panelists.

Mr. Forkan emphasized the definition of resilience as it is not well understood by countrymen. People understand rather different wording as “Bent but not broken” --what he believes as the very important narrative of resilience in Bangla. He expressed gratitude to the Government and the stakeholders for their hard work to execute the SDGs in their own fields. As a representative

of VSO, he noted that they work against poverty by providing resilient livelihood practices and creating the platform to share knowledge and skills among people in need. He mentioned about their priority to ensure social accountability while working with civil society organizations, root level communities, private and public sectors. He expressed his great interest that that session would enrich their knowledge on research in different regions of Bangladesh. He thanked the Gobeshona Conference for arranging such a valuable session to capacitate professionals working in this field.

Effects of rooftop gardening in urban surrounding of Dhaka City with changing environment

Presented by Dr. Mahbub Islam

Professor Dr. Mahbub Islam presented his keynote paper on *Effects of Rooftop Gardening in Urban Surrounding of Dhaka City with Changing Environment*. He shared the common concern that urbanization leads to problems of increasing temperature and low vegetation coverage in urban areas. The objective of his research was to understand the effects of rooftop gardening on changes to urban surroundings as well as to increase awareness of urban dwellers by showing their success stories. The research shows clearly that CO₂ concentration is lower whereas O₂ concentration is higher in gardening areas. In urban gardens, it is possible to produce high yielding, economically high values of drought-tolerant crops and vegetables. He shared some of the training services and eco-friendly practices on roof gardening that are in place for the community. He concluded that rooftop gardening is not only improving urban micro-climates, it can also be an opportunity for resilient livelihood options for many urban dwellers.

Livelihood resilience of the indigenous Munda community in the Bangladesh Sundarbans forest

Presented by Mr. Sajal Roy

Mr. Roy showed the audience how a disaster like Aila destroyed completely the livelihood of the Munda community living in Kalinchi village, located 75 km away from Satkhira. After Aila, many NGOs went there to raise awareness and train people about eco-tourism and sustainable practices of honey collection and fishing. The cyclone Aila opened up different capacities of community resilience, the local people opted for alternative livelihood options. Through eco-tourism and modifying their traditional practices in fishing and collecting honey, the community is now resilient to livelihood disturbances as well as conserving mother nature. Mr. Roy concluded that disaster does not only close opportunity, but also opens it up.

Climate change adaptation and non-migration: Exploiting the debates on risk, crisis and resilience

Presented by Professor Jochen Schanze

Professor Schanze described migration's push/pull and micro/macro factors, categorizing these as:

1. Environmental (natural resources availability/extinction; hazards)
2. Socio-cultural (network, power, local identity)
3. Institutional (political empowerment)
4. Historical (settlement history)

He also mentioned that theories and analytical framework on migration do not include non-migration. Non-migration takes place under the circumstances of failed procedures of risk reduction (capacity to tackle the risk), crisis management (capacity to tackle the crisis); and resilience (capacity to regain after the disturbance/change).



Professor Jochen Schanze presenting on the push/pull factors of migration.

Impact of agriculture on livelihood of the farmers in a polder: A case study

Presented by Ms. Swarnali Mahmood

Ms. Swarnali talked about a case study conducted in Batiaghata Upazilla of Khulna District. She showed from her study how polder played a positive role in shaping the farmers livelihood by providing better water management and flood protection, particularly for Aman.

Discussion

In the open discussion session, positive engagement of youth regarding roof top gardening and including the load of roof-top gardens in the structural design of buildings were discussed. Participants recommended that the catastrophic impacts of failure of polder dykes should be taken into consideration before adapting such a measure. Discussions were had about the post-Atia livelihood options of the local people.



Participant engaging in discussion.

Dr. Akram concluded the session by thanking the panelists and audience. He also noted the issue of groundwater decline that could be huge threat for agriculture practices in Barind Areas. And the farmers are still not well trained to cope with future challenges and their attitude to natural resources. Therefore, there is necessity to reorganize the livelihood options for the farmers.

Dr. Huq rethanked all the participants and mentioned the essence of collaborative research is sharing the knowledge, this needs to be scaled up for the benefits of all.

Solar Geo-Engineering and the Global South

Keynote: Mr. Andrew Parker, Project Director, Solar Radiation Management Governance Initiative (SRMGI)

Additional speaker: Mr. Mofizur Rahman

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

Moderator: Dr. Saleemul Huq, Director, ICCCAD

Dr. Huq began by explaining the extent to which geoengineering science had emerged and developed in the last year since the Solar Radiation Management (SRM) project was presented at Gobeshona 4.

Introduction to Solar Geoengineering: Science, Governance, and Uncertainty

Presented by Mr. Andrew Parker



Mr. Andrew Parker presenting on solar geoengineering.

Mr. Parker began by addressing the controversy regarding SRM and said that it is not the alternative to global warming. Rather, mitigation is most important for combating temperature increase. The global cooling effect of the Mount Pinatubo eruption was the inspiration behind SRM. After the eruption, millions of tons of sulfur dioxide were released into the atmosphere which caused a natural cooling effect by filtering the amount of sunlight that reaches the earth. The models predicted that by mimicking this effect, sea levels would rise relatively slower and that the climatic and regional differences in temperature would be significantly reduced. The IPCC AR5 has stated that moderate solar geoengineering would reduce the impacts of climate change significantly, but it would be much safer to use regular mitigation strategies before resorting to solar geoengineering as many uncertainties still remain in this regard.

A Bangladeshi team of researchers plan to investigate the health impacts of SRM, which are still not clear. SRM has the risk of termination shock and therefore a moral liability. Mr. Parker emphasized the need for building capacity in nations so that they are more informed when global actors decide on deploying SRM. The question behind SRM is not of physics but that of power and politics amidst an increasingly intense debate. He introduced the Decimals Project, which

was launched by the Royal Society and included eight of the most vulnerable countries in the Global South.

Mr. Rahmanspoke about his team and their participation in the project, sharing about the difficulties of attributing climate change consequences on health and ways different international collaboration can be put in place for further research. Mr. Rahman agreed with Mr. Parker that health issues are the first concern for SRM deployment. He introduced the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR) and the success they had in dealing with cholera in the country. He explained that his multidisciplinary team of researchers from Bangladesh and America would evaluate the effects of SRM on malaria and cholera. ICDDR has the lab facilities and a data bank on these diseases and would be pioneering this research in Bangladesh. The two-year project would build the capacity of Bangladesh in time for global decisions while assisting countries in the global south with their own findings.

Mr. Atiqjoined, saying SRM is an engaging scientific concept that like other scientific discoveries, starts small and may lead to something bigger. He said that the world needed to unite and do something about global warming. The plethora of geo-engineering was growing fast and technologies like this had been researched and discussed across academic institutes. The process of science should not be stopped; rather it should be given due diligence. Rapid implementation of the new findings should be avoided. Complexities of the future scenario should be taken under consideration. The stratosphere has an unknown sovereign boundary for any country and therefore informed decisions are needed to be made. In the context of Bangladesh, solar panels on houses have a marvelous story and need to be on the front of global discussions. He ended by saying that solar energy can never be an alternative to mitigation. All the processes like mitigation, adaptation should be carried out more strongly than ever before such technologies can be run down in the sideline in the following decades to come.

Discussion

Mr. Andy and Dr. Atiq clarified questions by elaborating that SRM was in the modeling phase and that the facts were being gathered regarding its safety. The query regarding the role of countries like India was clarified by explaining that India in fact had been very responsible in its data collection and was arranging outreach workshops. The entire concept of SRM involves a lot of controversy and many conspiracy theories have been coming forward. Researchers, at Harvard for instance, are keen on knowing more, and there needs to be a lot of cautionary development in this area.

Climate Finance



Dr. Mizan R. Khan sharing his knowledge on climate finance at COP24.

Host: International Center for Climate Change and Development (ICCCAD)

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

Keynote Presenter: Dr. Mizan R. Khan, North South University

Presenters:

- Ms. SirazoomMunira, Research Officer, BCAS
- Mr. Golam Rabbani, Fellow, BCAS
- Mr. Ranjit Kumar Chakraborty, Project Manager, Inclusive Budgeting and Financing for Climate Resilience (IBFCR) Project
- Mr. Prodip K. Roy, Campaign for Sustainable Rural Livelihoods (CSRL)

The chair inaugurated the session by putting light on the Climate Finance Transparency Mechanism (CFTM) programme funded by Promoting Knowledge for Accountable System (PROKAS) and the Department for International Development (DFID). In the climate change sector, finance is linked to global emissions. The first world conference on climate finance took

place in 2018; the second one will be held from 8-10 March, 2019. Besides discussing global climate finance, this conference aims to encourage young scientists.

Keynote- Climate Finance at COP24

Presented by Dr. Mizan R. Khan

The keynote spoke about COP24 climate finance, specifically long-term financing, articles 9.5 and 9.7 of the Paris Agreement, the Green Climate Fund (GCF) and Adaptation Fund. Long-term financing has three elements: a bi-annual report, an inception workshop, and a bi-annual high-level ministerial meeting. Earlier workshops did not focus on mobilization of money and effectiveness. There is a huge overlapping climate finance bureaucracy and at the end the target beneficiaries get less money. The next workshop will focus on effectiveness of climate finance to find out the impact on the ground level.

Both articles 9.5 and 9.7 of the Paris Agreement provide information on climate finance but there is no provision for accountability and transparency. A decision had been made that the developed countries shall submit reports on climate finance but there is still no common methodology in place. At Conference of Parties (COP) 18 a common methodology was formed, but that gave the chance for subjective interpretation. The current decision is that the developed countries will provide information on new and additional climate finance.

On the issue of the GCF, the speaker mentioned that in GCF there is no agreed criteria on establishing the climate rationale of projects. This is significant given that the LDC group argues that although adaptation is different from development, in the implementation level, both can be mixed. In the case of the Adaptation Fund, Bangladesh will be more active in pursuing funds.

Understanding the difference between climate finance and overseas development assistance: The case of Bangladesh

Presented by Ms. Sirazoom Munira and Ms. Raisa Bashar

The second presentation of the session was on qualitative research that showed the difference between Climate Finance (CF) and Overseas Development Assistance (ODA), using the case of Bangladesh. According to the speakers, the difference between CF and ODA is blurred. As a result, CF is regarded as repackaged ODA (70-80%).

While analyzing the trend of ODA and CF in the past decades, the researchers have identified that the inflow of ODA is on the rise in Bangladesh whereas the inflow of CF has gone down during the year 2015-16. Going forward, CF is more important for realizing national objectives since the dependence on foreign aid is decreasing. Ms. Munira presented some basic similarities and differences between the CF projects and the CF-ODA funded projects.

In the second half of the presentation, Ms. Bashar mentioned that there is a need for mutual understanding among donors and recipients. Bhutan gets more funding than Bangladesh since the donors follow three major criteria for granting CF, 1) merit of the recipient country, 2) donor/development partner's interest, and 3) vulnerability of the recipient country. Historically, the first two criteria are more dominant than the third. She recommended training for capacity building for project proposals and all the officials that are involved in the UNFCCC negotiation process. Moreover, academics, researchers and practitioners must work more closely so that better results both in mobilization and utilization of CF can be achieved. She concluded by saying that Climate Finance is no longer just a fund, it is the food for humankind's continued existence.

Bangladesh climate change budget report

Presented by Mr. Ranjit Kumar Chakraborty

In order to share more insight on the country perspective, the presenter shared the experience of the climate budget report in Bangladesh. The climate budget report informs the wider audience about government's commitment towards climate resilience. Currently, it identifies climate-related allocation using more refined climate finance tracking methodology in 20 ministries. In terms of the total budget of the 20 ministries/divisions, 8.82% is climate relevant. Among these ministries, Ministry of Environment, Forest and Climate Change has the highest share (53%). While talking about the Green Climate Fund (GCF), the speaker explained that Bangladesh faces challenges because of having limited knowledge on climate finance both on policy level and operation level. Improved climate finance tracking methodology and capacity building across ministries is needed.

Developing a climate finance transparency mechanism: Experiences from Bangladesh

Presented by Mr. Golam Rabbani

The third presentation shared the experience of Bangladesh in developing the Climate Finance Transparency Mechanism (CFTM). The CFTM project is implemented by a consortium of five organizations that have five domains: 1) strengthening the measurable, reportable, verifiable (MRV) mechanism, 2) sharing of climate finance mechanism, 3) capacity building on accessing and utilization of fund, 4) hearing people's voices on climate change finance, and 5) policy practice and reform. The research focused on the national and local levels that will be carried out by exchange of experiences, networking and carrying out awareness trainings.

Role and importance of local voice to increase transparency and effectiveness of climate projects

Presented by Mr. Prodig Roy

The last presentation focused on the role and importance of local voices to increase transparency and effectiveness of climate change related projects. It is important to identify the gaps between the policies formulated and the needs of local people. The CFTM project works in three upazilas where they have formed a local network called “Jalabayo Parisad” which collects evidence from the local people to do policy advocacy. He concluded by stating that transparency comes from strengthening the voice of the people.

Gender



The panelists and presenters of the gender session.

Host: International Center for Climate Change and Development (ICCCAD)

Chair: Professor Mahbuba Nasreen, PhD, Director, Institute of Disaster Management and Vulnerability Studies, University of Dhaka

Moderator: Ms. Shaila Shahid, Senior Advisor – Climate Change, Disaster Risk Reduction and Gender, ICCCAD

Keynote: Dr. Mumita Tanjeela, Chairperson, Department of Sociology, East West University

Panelist: Dr. Edith Ofwana, International Development Research Centre (IDRC): Gender Responsive Framework for implementing The Paris Agreement in Africa

Presenters:

Mr. Sajal Roy, Assistant Professor, Begum Rokeya University, Rangpur

Ms. Papia Sultana, Assistant Director, Department of Environment (DoE)

Keynote - Gender Consideration in Climate Change Adaptation

Presented by Dr. Mumita Tanjeela

Dr. Mumita Tanjeela presented on how climate change and socio-economic vulnerability affects women from indigenous communities in the area of health, agriculture, safety and gender division of labor. Bangladeshi women are socially disadvantaged and are facing the consequences of climate change. On the other hand, the migration of men to cities has reshaped

the role of women, as women play an increasingly crucial role in disaster management activities at the household level. These activities then transcend to the community level. However, traditional views do not consider women as important part in the climate change adaptation process.

Bangladesh has prepared National Adaptation Program Action (NAPA, 2005) in response to the recommendation of United Nations Framework Convention on Climate Change (UNFCCC); following in 2009, Bangladesh developed the Climate Change Strategy and Action Plan (BCCSAP). Interestingly, the plans do not cover all of the needs of women. The gender dynamics at the community, institutional and household levels are important for the full participation of women. Gender mainstreaming is important and gender equality is critical for empowerment of women. Therefore, implementation of the policies and effective implementation of programs is necessary to increase the adaptive capacity of women.

Gender responsive framework for implementing The Paris Agreement in Africa

Presented by Edith Ofwona

Edith Ofwona gave an overview of gender importance, how the gender component is included in Paris agreement, and an elaboration of a framework to ensure gender-responsive implementation of Paris Agreement, consistent with Gender Action Plan (GAP) (developed for the African Working Group on Gender and Climate Change).

The term ‘gender’ includes both men and women. Men and women have different assets and resources in response to climate change; therefore, the impact is also different. The role of women in participation and decision-making in governance is not the same as that of men. The Paris Agreement mentions gender in the preamble, articles 7 (Adaptation) and 11 (Capacity Building), but gender is absent in mitigation and finance and technology. For the framework in Africa, the implementation team started with understanding the issue that drives the agenda. Thereafter, they considered gender analysis to observe how to include/collect the data on gender responsiveness and work towards interventions on adaptation and mitigation. International opportunities for gender-responsive adaptation require participation of both women and men, and gender budgeting is equally important. To summarize, global mechanism needs to be gender responsive and national policies and strategies should align with Paris Agreement.

Transforming gendered lives and livelihoods in post-disaster settings in the Bangladesh Sundarbans forest

Presented by Mr. Sajal Roy

The research studied the impacts of cyclone Aila on gendered livelihoods in the Sundarbans forest communities of southwest Bangladesh. He found that women have proactively worked toward disaster resilience. In terms of understanding their mobility particular to cyclones, Aila has opened the door for women to go from their households into the community, the forest, and elsewhere for work opportunities. Furthermore, they have been agents for protecting the environment. He found that women do work hard, more than men. We need to produce programmes and activities which are gender sensitive and that use both male and female inputs for local livelihood processes. As a researcher, he would like to say particularly that for COP parties, national, and local governments, there are gender issues.



Mr. Sajal Roy sharing the effects of cyclone Aila on gendered livelihoods.

He uses intersectionality as a theoretical framing to understand the following:

- Construction of socio-environmental identities
- Gendered socio-environmental identities
- Markers of differences: Gender, Marital status, Religion, Mobility
- Intersected dimensions of gendered relations associated with livelihood seeking behaviours in pre-Aila: Shora and Munda
- Intersected dimensions of gendered relations associated with livelihood seeking behaviours in post-Aila: Shora and Munda
- Post-Aila transformation of gendered lives and livelihoods
- Political intersectionality and structural intersectionality

COP 24: Overview of key issues on gender

Presented by Ms. Papia Sultana

Gender analysis differentiates the roles of women and men in the society, including reproductive roles, productive roles, community managing roles and political roles. Gender integration into the Paris Agreement is mentioned in adaptation and capacity building. The aim is to enhance gender equality via policy and practice and also, encourage gender balance in decision making. Ms. Sultana then provided background on COP 19 to COP 23 and identified progress on gender

in the Paris Agreement's provisions on capacity building and adaptation, and the UNFCCC Lima work program on gender. Gender is mostly integrated in adaptation and least incorporated in mitigation. Parties to the Paris Agreement will report on gender equality and development in COP25. Consequently, Bangladesh could implement the Gender Action Plan, according to the Rulebook of the Paris Agreement. Further, her recommendations included capacity building activities on gender and climate change to be enhanced at local and national level and for gender disaggregated data to be followed in monitoring implementation of the Gender Action Plan and capacity building activities.

Professor Mahbuba Nasreen concluded the session, emphasizing key points from the presentations. The essential fact to remember is that gender includes both men and women, not only women. Vulnerabilities need to be identified to increase participation of women. Small scale changes at the community level should transform policies. Bangladesh is doing well in progressing with gender equality. The country needs more socio-environmental studies with the incorporation of eco-feminism.

Disaster Management



Dr. Hamidul Haque moderating the session.

Host: United International University (UIU)

Co-Host: Independent University, Bangladesh (IUB)

Moderator: Dr. Hamidul Haque, Intelligent Decision Support Systems (IDSS), UIU

Presenters:

- Dr. S.N.M. Azizul Hoque, Principal Investigator, Assistant Professor, Department of Physical Sciences, IUB
- Dr. Md. Abdul Awal Khan, Associate Professor, Department of Law, IUB

Flood monitoring and forecasting using Synthetic-Aperture Radar(SAR) and meteorological data: A case study

Presented by Dr. S. N. M. Azizul Hoque

Bangladesh is a developing country where the largest employment sector is agriculture. As of 2016, 47% of its total labor force was involved in farming (Central Intelligence Agency, 2017). The country is predominantly a rich fertile flat land where most parts are less than 12m above sea level. Its ecology includes a long sea coastline, numerous rivers and tributaries, lakes, different types of forests, and flat land with tall grass. Most rural areas are affected by natural

and human-made calamities such as floods, riverbank and embankment erosion, and deforestation. Every year natural disasters cause havoc where thousands of people die. Millions become homeless, and lands and roads become damaged.

The aim of the research was to develop a geospatial intelligent (GEOINT) system using synthetic-aperture radar(SAR) imageries and machine learning methods. The aim was to protect the people of rural and coastal areas by mitigating the devastation of natural and man-made calamities. This system would monitor flooded areas and estimate the surface areas of the inundated zones. This would help policy makers identify severely affected areas where relief operations for flood victims need boosting.

Results of this study indicated that temporal flood prediction errors can be minimized, especially for shorter lead times. In combination with images from SAR, digital elevation model (DEM) and meteorological data can be exploited to monitor flooded areas and provide better forecasts.

The projects set out the three outputs: 1) to monitor the flooded and deforested areas; 2) predict the critical segments of riverbank/embankment; 3) create a software package and web portal to share all the information. A statistical method to forecast flash and fluvial floods was developed using DEM and meteorological data.

Forecasting of the flood was retrospective rather than real forecasting, which is a drawback. By obtaining images with 6-day or 4-day intervals from any commercial satellite company, the monitoring system will be more effective.

Law and policy framework for the protection of the ‘Victims of Disaster’ in Bangladesh: A study on Fulchori Union of Gaibandha District

Presented by Dr. Md. Abdul Awal Khan

The Fulchori population stands at 21,38,181. The main rivers are Brahmaputra, Jamuna, Tista, Karatoya, Bangali, Ghaghat. The research found that in 2017, a total of 567 villages were affected by floods. 612 people were displaced while 13 people died as a result.

There are a number of law and policy frameworks that address disasters in Bangladesh:

- Disaster Management Act 2012
- National Disaster Management Policy
- Disaster Management Plans
- Standing Orders on Disaster
- Guidelines for Government at all Levels (Best Practice Models)
- Social Safety Net Program
- Humanitarian Assistance

Due to several disasters, women, children, persons with disabilities suffer the most. Victims of disaster are not aware of their constitutional and legal rights. Local people believe that excess water from transboundary rivers intensify floods, which in turn affects them. There is lack of coordination among various bodies responding to floods.

The researchers proposed that the following is needed to address the problem

- Long term flood action plan
- Capacity building in remote areas
- Legal and policy reform to ensure extra support for the vulnerable groups
- Coordination among relevant government and non-government bodies
- Effective mechanism to ensure transparency and accountability of the duty bearers
- Awareness building regarding statutory rights and human rights of the rights holders
- People's participation in decision making processes
- Moving people to less affected areas, i.e Chittagong hill tracts
- Protocol to ensure transboundary water sharing treaties

There is a need for legal and policy reform to ensure extra support for vulnerable groups and to bring about effective mechanisms that ensure transparency and accountability of the duty bearers.

Coastal Zones



The panelists of the coastal zones session.

Host: Friendship

Chair: Dr. Samiya Selim, Director and Associate Professor, Center for Sustainable Development, University of Liberal Arts Bangladesh

Moderator: Kazi Amdadul Hoque, Director of Strategic Planning and Head of Climate Change, Adaptation and Disaster Management

Presenters:

- Md. Emdad Hossain, Project Leader, WorldFish
- Shahriar Khan, Professor of Department of Electrical and Electronic Engineering, IUB
- Sadhon Chandra Swarnokar, Environmental Science Discipline, Khulna University, Khulna

Mr. Hoque inaugurated the session with his welcome speech and discussed the necessity of taking several adaptive approaches in the coastal zone of Bangladesh to combat climate change.

Effects of fish composition on production of underutilized homestead ponds in salinity challenged areas of southern Bangladesh

Presented by Mr. Md. Emdad Hossain

The objective of Mr. Hossain's study was on how to enhance fish production in homestead ponds, which are challenged with salinity. With traditional methods of fish farming becoming inadequate, he looked into 12 different fish species and how they are impacted with changes in exposure to fertilizers and water parameters (month wise temperature, pH level, dissolved oxygen and salinity). "Survival rate" and "growth rate" were important indicators for profitable fish production.

Mr. Hossain's study identified that *Tilapia* and *Pangash* are more suitable to the conditions created in the ponds, where as Catfish (*Shing*) and White-carp (*Mrigel*) fish show low possibilities of surviving in these ponds.

The annual productivity of aquaculture ponds are less than 1.5MT/ha as identified by Department of Fisheries, thus these ponds, in a saline zone may not be so profitable commercially although they have high potential at the homestead level. They study found that if salinity increases by 700 kl/hctr, these ponds will decrease production by 32%. However, saline ponds do have the potential for specific aquaculture or prawn cultivation. This can boost production from homestead ponds and can contribute to increased household fish consumption.

Mr. Hossain concluded his presentation on the importance of homestead ponds in the saline prone areas, he added that these ponds can play an important role in increase of fish production, income and consumption in the context of climate change events.

Gain and loss of land at Bangladesh coast from publicly available satellite imagery

Presented by Professor Shahriar Khan

Prof. Khan presented on how the coastline of Bangladesh has been changing its course since 1984; analysis of satellite images has identified the shrinking river channels of our country. The images have laid evidence on loss of land being significantly higher than the gain, especially along the coastal line. There is a decreasing trend of water volume as well as siltation in the river channels. For example, lands are rising near the Meghna river but disappearing in Barishal, which means that decades from today, Meghna may shift Westwards and flow through Barisal.



Mr. Hossain presenting on the effects of fish composition on production.

Prof. Khan recommended the following to maintain the river channels and to ensure new land accretion: that trees be removed from the area where land is unwanted and vice-versa; dams be established in the coastal belt to increase the sea level and enhance the river bed. He emphasized that siltation is one of our great resources, and he proposed to plan accordingly in order to maintain the water channels.

Understanding environmental conflicts: Key to climate change adaptation policy planning for southwest coastal region of Bangladesh

Presented by Mr. Sadhon Chandra Swarnokar



Mr. Swarnokar presenting on suitable policies for the southern coastal region of Bangladesh.

Mr. Swarnokar presented on the necessity of adopting suitable policies in the southern coastal region of Bangladesh. Coastal areas are packed with 24 million people that are extremely exposed to vulnerable climatic events, such as tidal surges and cyclones. In 2009, Alia devastated most of the coastal regions and left people with severe socio-economic challenges.

His study focused on the Brahmaputra region. This region suffers from land use conflict for crop production and shrimp cultivation. The polder system increases the salinity in crop lands and makes them unproductive for agriculture. Water conflict created due to shrimp cultivation hampers biodiversity. Hence, people are suffering with limited livelihood options. They either move to shrimp cultivation or migrate to other places.

Mr. Swarnokar stated that a huge number of the coastal population is suffering from these socio-economic vulnerabilities and proper policy is needed to address these issues sustainably. He added that rethinking alternative livelihood farming at the community level can minimize conflicts by bringing all actors together from the start. A bottom-up approach should be integrated to offer effective policies in affected areas. Mr. Swarnokor concluded by stating how human induced-interruption is creating a larger environmental conflict, subsequently interrupting the natural coastal ecosystems.

There was some positive feedback from the audience after the session, a few questions also came up during the discussion session, mainly on the cost-effectiveness of homestead pond fish production, the significance of considering nutrition levels and its effect on the total food chain if we incorporate different production systems.



Panelists and participants engaging in discussion.

Mr. Hossain responded positively towards the concerns and mentioned that through this aquaculture methods nutrition level will be maintained, moreover this is a very cost-effective procedures of fish cultivation.

Ms. Samiya concluded the session by highlighting the importance of data transparency, she mentioned that much research has been done but is not accessible, she also added that to achieve SDG 14, we need to consider all different sectors and encourage a holistic step.

Integrating Climate Services into Decision Making Processes



Dr. Timothy J. Krupnik sharing his experience on the BACS training dialogue in Bangladesh.

Hosts: ICCCAD, Bangladesh Meteorological Department (BMD), International Research Institute for Climate and Society (IRI) at the Earth Institute of Columbia University, International Wheat and Maize Improvement Center (CIMMYT)

Chair: Mr. Shamsuddin Ahmed, Director, BMD

Moderator: Dr. Saleemul Huq, Director, ICCCAD

Panelists:

- Ms. Melody Braun, Research Staff Associate, Project Lead of ACToday Bangladesh, IRI, The Earth Institute at Columbia University
- Dr. Timothy J. Krupnik, Senior Scientist and Systems Agronomist, CIMMYT

Presentation: Experience Sharing on Climate Services by BACS Alumni

Presenters:

- Mr. Hossain I. Adib, Head of Programme Implementation, Practical Action, Bangladesh Country Programme
- Mr. M. H. M. Mostafa Rahman, Environment Specialist from WorldFish
- Ms. Smriti TagdiraNaznin, Syngenta Foundation for Sustainable Agriculture, Bangladesh
- Mr. Sayed Monjurul Hoque, Regional Environmental Specialist from the Local Government Engineering Department (LGED)
- Mr. Md. Imran Nizami, Manager-Marketing and Research, SanMarkS, iDE Bangladesh
- Dr. Md. Kamrul Islam, Senior Scientific Officer from Cotton Development Board, Ministry of Agriculture

The Bangladesh Academy for Climate Services (BACS) was co-founded by the International Center for Climate Change and Development (ICCCAD) at Independent University, Bangladesh (IUB), the International Research Institute for Climate and Society (IRI) at Columbia University, the International Maize and Wheat Improvement Center (CIMMYT), and the Bangladesh Meteorological Department (BMD). After the idea was pitched at Gobeshona4, the academy was born from the need for a trans-sectoral dialogue on the use and understanding of weather and climate information in Bangladesh. BACS aims to respond to that need by facilitating trans-sectoral and multi-stakeholder dialogue on climate services, developing tailored certification short courses and creating graduate level curricula to train the new generation of weather, climate and sector experts. To do this, the team organized a training on “Introduction to Climate Services” in October 2018 for young and mid-career professionals from different agencies. This was the first of a series organized by BACS. The goal of the training was to work with a group of decision makers from a range of sectors related to food security, through the identification of relevant climate information that has the potential to improve their decision-making processes and address some of their climate challenges. The course aimed to engage with the four pillars of climate services: production, translation, dissemination, and use.

Mr. Shamsuddin Ahmed shared that the meteorological department has been serving climate information to the public for a long time. However, now there is a significant improvement across many socio-economic sectors by making information more accessible to a wider range of people. Bangladesh needs to try many services to meet this demand and BACS has been an



Ms. Braun presented the four major pillars of climate services.

influential part of starting this process. Now climate information is also being used in productive sectors, including livestock, farming, and transport, along with many other socio-economic sectors. This academy has the potential to grow and serve society and the economy.



Mr. Shamsuddin Ahmed sharing his thoughts on BACS.

Ms. Méloody Braun stated that there are four major pillars of climate services: production of information, translation of information, dissemination of information, and practical use. BACS is providing a platform for making information more accessible and clearer for a wide variety of people so that those who are outside of the science community can integrate this information into usable knowledge. During the training, participants were asked to focus on the use within their own jobs on a daily basis.

Application of climate services for minimizing potential damages from adverse weather parameters

Presented by Mr. Hossain I. Adib

Practical Action's programme objective is to take knowledge into practice and to incorporate feedback. The available information has been used in the production of an Agro-Meteorological Advisory Service that focuses on weather forecasts, disaster warnings, market prices, agricultural services, and more. They are providing weather information and the impacts on market prices to vulnerable communities through text and voice calls. They are also working on the humanitarian responses in Cox's Bazar in which much of the population is at the risk of being affected directly from floods and/or landslides during the monsoon season. Their approach to disaster risk reduction (DRR) is Rapid Transmission of Critical Information (RTCI) and Digital Information Board (DIB), both of which can disseminate information to a mass population within a short period of time.

Mr. M.H.M. Mostafa Rahman added that the information received through the BACS training dialogue has helped integrate the dissemination of information into the "feeding the future" project and market approach programme.

Ms. Smriti Tagdira Naznin also shared that weather service data is essential for providing information to insured farmers.

Mr. Sayed Monjurul Hoque stated that using climate information is important for cost-effective planning, decision-making and implementation of projects (i.e. transportation and construction) by the Local Government Engineering Department (LGED).

iDE Experience Sharing and Future Plan on Climate Services

Presented by Mr. Md. Imran Nizami

iDE's projects Water and Sanitation Hygiene "SanMarkS", Solar Microgrids "Powering Aquaculture", Mechanization and Irrigation, and Nutrition-Sensitive Agriculture "Suchana" integrate learnings from the BACS training dialogue. Their potential sectors are billboards, limited partnership business plans, raw materials procurement, production plans, transportation, installation, solar energy generation and consumption management, agriculture, and nutrition. They use trend analyses and forecasts on different climate variables and integrate those results in various business plans. Moving forward, a call center will be developed for people to receive this information.

Integration of climate information in cotton research and development

Presented by Dr. Md. Kamrul Islam

The main challenge in optimizing cotton yield is farmers' adaptation capacity. Yield is based on the interaction between the genotype and the environment. The environment cannot be controlled, but genotypes can be manipulated. Through adaptive based research, cotton production in multiple countries can be improved. Bangladesh Climate Change Trust Fund (PPCCTF) is a proposed project that links the gaps between science and local knowledge in order to enhance farmers' abilities to adapt to climate change.

Discussion

An audience member asked if Practical Action's app is running or a prototype. One is running, while the other one is in trial stage. The weather information is taken from the meteorological department.

Another person asked why the presenters called Cox's Bazar climate sensitive. The landscape has changed so dramatically that it could impact weather forecasting, especially for disaster risk management.

Another asked if insurance services are free for members. For now, the main target is to promote insurance for crops, which is why more services for farmers are being added. There was also a question on the scale of provided information. Currently it is at the sub-district level.

One person asked the whole panel how they make information translatable and useable. They disseminate relevant information, but a follow-up service that gives advice on how to move forward after dissemination of climate information is needed.

Several audience members wanted to know how to join the BACS academy. Any organization may join as a member. The governance of running the academy is still in its draft stage; the founders will develop a common procedure for membership.

Ms. Mélody Braun shared that most people are not climate experts, which is why climate information dissemination is important. For example, everyone needed climate information during the Rohingya influx in Cox's Bazar. If an agency wanted to distribute food or install a latrine, day to day weather management was necessary. Furthermore, the organizations working there needed to know the monsoon pattern so that they could better prepare for the next rainy season. For this reason, we all need to work with climate scientists and meteorological departments to better understand climate contexts and integrate the information in our decision-making processes.

Lastly, BACS is now expanding into other countries in their own forms.

Dr. Krupnik thanked all the participants and shared the BMD website, which has useful resources available. BACS will undertake another training course building on the previous one. The next step is to finalize the BACS governance structure. The long-term goal is to work with university systems to include climate services in courses within Bangladesh.



The panelists and presenters of the BACS session.

Cities



The panelists of the cities session.

Host: Urban Development Programme, BRAC

Chair and Moderator: Dr. Saleemul Huq, Director, International Centre for Climate Change and Development (ICCCAD)

Presenters:

- Mr. Md. Kamruzzaman, Plan International
- Ms. Karisma Amjad, PhD Fellow, Institute of Social Welfare and Research, Dhaka University
- S. M. Mehedi Ahsan, Sector Specialist for Resilient Cities, KfW Bangladesh
- Md. Washim Akhter, BRAC

Children and youth contributing to build resilience against climate change and adaptation

Presented by Mr. Md. Kamruzzaman

PLAN works with communities, government, and schools to empower children and youths. Mr. Kamruzzaman presented on the success of PLAN's youth capacity building interventions. PLAN has observed several improvements amongst the local youths, with 85% of the children involved in their projects prepared for disasters with emergency tools.



Mr. Kamruzzaman presenting on PLAN's disaster preparedness interventions.

PLAN identified that upon their interventions, households are more aware of disaster preparedness measures, this includes safety measures when cooking with fire (e.g. putting fire out with water or sandbagging in case of fire outbreak). Almost 63% of households are more aware of safe waste disposal, 49% of the households under PLAN's project have access to contact numbers of the relevant service providers. Mr. Kamruzzaman also pointed out some structural and educational institutional level changes that PLAN has found during their project, namely; installation and increased use of sanitary latrines, repairing drains and sewage lines, presence of an active 'Disaster Management Committee' in schools, and schools carrying out practice sessions on disaster and mock drills on a regular basis.

Mr. Kamruzzaman concluded that children living in informal settlements should not be seen as vulnerable, they have the potential to contribute in developing community resilience. With proper care, the potential of these youth can be tapped into. Research organizations should initiate new researches to explore children and youths' potential in development of resilient cities. When youth are trained on policy negotiations, they can contribute to policy decision-making in the future.

Impact of Climate Change on Urban Poor: A Study in Dhaka City

Presented by Ms. Amjad

Dhaka is one of the fastest growing megacities as well as most unplanned urban centers in the world, as per UN-HABITAT, 2009. The objective of Ms. Amjad's study was to determine the impact of climate change on the health, income, and livelihoods of the urban poor. Her study areas were Korail Slum, Beltola Slum, Uttara Slum, Abdullahpur, and Chairman Bari Slum. Through her study she had identified that increased rainfall and temperature negatively impacts the livelihoods and health of these communities. Water logging, improper waste disposal, and sanitation issues increases instances of diseases among slum dwellers.



Ms. Amjad sharing the key problems faced by respondents.

Key problems identified by respondents were: water logging (98%), mosquito infestation (92%), other bugs (90%), as well as load shedding (63%), and sleeping problems (80%). Extreme summer hot weather makes it difficult for slum dwellers to stay at home during the day time, load shedding at night also

creates sleeping difficulties. During the rainy season, the slums are water logged and cooking becomes difficult, they tend to use clay burners on top of beds.

Ms. Amjad suggested that squatter settlements should be abolished and the slum dwellers should be relocated to better infrastructural housing. She added that skill development of the migrants along with awareness programs for the poor slum dwellers regarding diseases from extreme events should be prioritized. Urban government and institutions should collaborate to develop a legal framework and strategic plan to provide a secure and healthy urban living environment in the Dhaka.

Enhancing Resilience of Urban Poor

Presented by S. M. Ahsan

Mr. Ahsan's study area was Naria, Shariatpur near the river Padma. Due to river erosion, more than 6,000 people lost their belongings in the Padma. The objective of his study was to determine where these people migrate after river erosion.



Mr. Ahsan presenting on the resilience of the urban poor.

Most move to a nearby upazila, Dhaka, or Chittagong to work in garments or other informal sectors. Their living conditions are severely hampered as they have to settle in unhygienic slum areas.

Urban slums are the center of the study because by 2040, 50% of the country's population will migrate to urban areas. Even if many facilities are provided in rural areas, people will migrate to cities. He added that migration patterns are hard to stop, thus strategies have to be developed to better facilitate these affected peoples.

Mr. Ahsan briefed the audience on DFID's Sustainable Livelihood Framework (SLF) with focus on urban development at individual, community land, and city level. He concluded his presentation with success stories from their projects in Khulna, Jessore and Barisal Division. In Rupsha Ferry Ghat of Khulna, people used to cross the river by ferry ghat and it used to be submerged under water by either tidal waves or river erosion. Now, people can easily transport with the help of proper infrastructural facilities.

BRAC on inclusive and resilient urban development in Bangladesh

Presented by Md. Akhter

BRAC has been addressing the challenges of housing, livelihood and empowerment of migrants. Mr. Akhter discussed BRAC's significant role in re-shaping Korail slum after the fire accident in 2017 which had destroyed 8,000 households. As a response to the hazard BRAC initiated the Build Back Better-process under which they had held a convention on housing finance for people living in urban poverty.

Mr. Akhter recommends a participatory master plan for urban migrants and long-term provision of low-interest housing loans for these climate migrants. Collaboration with funding agencies as well as improving saving strategies is important. He added that at the National Convention, the mayor of Dhaka City Corporation declared a budget for developing the capacity of this vulnerable group.

Mr. Akhter suggested the BRAC-Urban Development Programme (UDP) as a way forward to address the challenges of urban slums. BRAC-UDP is working with eight vulnerable cities in Khulna and Satkhira, focusing on developing skills and different livelihood models. Under this program small grants are provided for access to safe water supply. However, UDP has their strategic priority in urban development; they envision running urban resilience studies and improving the lives of marginalized and vulnerable citizens. BRAC has identified community-involved processes as a faster means of implementation.



Mr. Akhter sharing BRAC's work on inclusive housing development.

Outcomes of COP24 and NDC Implementation in Bangladesh



The panelists of the COP24 and NDC Implementation in Bangladesh session.

Chair: Dr. Saleemul Huq, Director, International Centre for Climate Change and Development (ICCCAD)

Keynote: Mr. Ziaul Huq, Director, Department of Environment

Discussants:

- Ms. SharabanTahura Zaman, Lecturer, North South University
- Siddique Zobair, Member (Additional Secretary), Energy Efficiency and Conservation, SREDA
- Dr. Shamsuddoha, Chief Executive, Center for Participatory Research and Development (CPRD)
- Dr. S. M. Munjurul Hannan Khan, Additional Secretary of the Ministry of Environment, Forest and Climate Change

Dr. Saleemul Huq stated that the purpose of COP24 was to agree on the rulebook for the Paris Agreement. At COP21, there was no time to measure, report, and verify progress on everything, therefore three years were given to do so.

Another important and controversial element discussed at COP24 was loss and damage. We tried to insert loss and damage into the agreement rulebook so that it was part of mitigation,

adaptation, and finance language. On behalf of LDC groups, we invited the African, Small Island, and Latin American groups to explain why they needed to push for loss and damage in all the action tracks. All four groups felt strongly about the issue and decided to do it together. For the two weeks of the conference, every delegation pushed for loss and damage. We won some while others were lost, but it would not have happened unless we pushed for it together. COP25 will have a clear decision on loss and damage.

Katowice COP24 and NDCs

Presented by Mr. Ziaul Haque

Nationally Determined Contributions (NDCs) accounting mainly provides an explanation of why any category of emissions or removals are excluded. There are some new transparency-related decisions that have been made and specific methodologies that need to be considered by all parties. The biennial report will not be considered from 2020 onwards. From 2019, the Consultative Group of Experts (CGE) started supporting technical inputs to all the developed and developing countries on implementing the enhanced transparency framework. This is fundamental for Bangladesh in establishing MRV at a national level. The Paris Agreement rulebook requires all the countries to demonstrate effective MRV frameworks.

Exploring the current context for the implementation of Nationally Determined Contributions (NDCs) in Bangladesh

Presented by Ms. Zaman

The NDC is one of the most important tools of the Paris Agreement's mitigation umbrella. The steps of analyzing, designing and implementing policies are required for GHG reduction. The NDC mitigation action plan is for the power, transport and industry sectors. The Bangladesh government can consider adopting some policies to implement the NDC by identifying and prioritizing additional mitigation policies, actions, and capacity building within government agencies, promoting transparency, developing detailed monitoring plans and policy landscape, and increasing private sector investment.

Mr. Zobair shared that for NDC implementation, SREDA is responsible for coordinating with the renewable energy sector and partly the industry sector. The government has set a target that by 2020, 10% of electricity will come from renewable energy. Offshore wind potential is better than onshore wind potential. For biogas, the national development committee has submitted a report to SREDA. The committee wants to develop a business model that can utilize biogas productively. Waste to energy is an important sector to explore further.

Dr. Shamsuddoha added that so far, efforts have not been enough to limit the global temperature rise to 1.5 degrees. Global political leaders are not listening to the science, but the beauty of the UNFCCC is that the IPCC is still doing research. Country preparation and capacity building are important for NDCs.

Dr. Hannan Khan also added that Bangladesh is not only adapting but also thinking progressively about mitigation. In the NDC, we have 5% voluntary contribution, with no good commitment from international partners. Hence, everyone needs to work together to achieve the broader goal.

Scaling Climate Change Adaptation Knowledge and Technologies for Empowering Women and to Enhance Social Equity and Disaster Resilience in Bangladesh



The panelists of this session on Science Policy Dialogue day.

Host: International Development Research Centre (IDRC)

Chair and Moderator: Dr. Atiq Rahman, Executive Director, BCAS

Panel Members:

- Dr. Saleemul Huq, Director, ICCCAD
- Dr. Emdad Haque, University of Manitoba
- Dr. Edith Ofwana, IDRC

Keynote: Ms. Sharmin Neelormi, Principle Investigator/Mr. Golam Rabbani, Co-PI, BCAS

Dr. Atiq Rahman began by sharing that out of 500 proposals that IDRC received globally, SAKTEE is one of the top two out of seven accepted. SAKTEE, meaning power, works to empower women in the face of climate change in Bangladesh.

Keynote - Scaling climate change adaptation knowledge and technologies for empowering women, and to enhance social equity and disaster resilience in Bangladesh (SAKTEE)

Presented by Mr. Golam Rabbani

SAKTEE is a three-year project awarded to BCAS, ICCCAD, the Department of Women Affairs, and the University of Manitoba, Canada that begins on April 1, 2019. The objective of the project is to scale appropriate, socially-transformative climate change adaptation technologies, enhance development planning capacity and policy sensitivity at multiple institutional levels, and to support empowerment of women and other disadvantaged segments of the population in Bangladesh. More specifically, SAKTEE aims to:

1. Improve understanding of the dynamics of various factors
2. Identify and evaluate innovative adaptation technologies
3. Integrate by enhancing local, regional, and national level stakeholders' awareness and capacity
4. Facilitate policy deliberations and coordination.

The research project intends to:

1. Explore and understand the interrelationships of various environmental, socioeconomic, political, and cultural factors that may exacerbate social and gender equity (exploratory research component)
2. Scale-up innovative, locally-tested adaptation technologies to address worsening climate change impacts, particularly on water and agriculture, through promoting "best practices" in disaster and climate resilience and multi-level institutional coordination and integration (capacity building component)
3. Support empowering women, students, and poverty-stricken disadvantaged households in climate-vulnerable regions (participatory action research component)
4. Engage and inform policy and decision makers about transformative climate change adaptation technologies and the potential for their integration with social and gender equity programs (policy-institute-practice integration component).

The conceptual framework includes elements of feminist principles, exploratory research, the capability approach, scaling of adaptation technologies, and co-generation of integrated, transdisciplinary knowledge. The project will develop a comprehensive result framework to track outcomes and milestones by the National Intersectoral Steering Committee.

Ms. Sharmind Neelormi shared that Bangladesh is a forerunner of climate change and gender research, as it was the first country to publish a journal article on the subject in 2007. There is a general consensus that there is enough research, so the question remains: what value will SAKTEE add to the existing knowledge base?

SAKTEE emphasizes adaptation, vulnerabilities across gender, and hard and soft technologies. It does not reinvent the wheel - rather it compiles all technologies, identifies the gaps, and explores how to reach women and men so that they can use those technologies in an improved manner. Women's agency and capacity will be enhanced by coordinating with institutions, such as the Water Development Board, the Department of Women Affairs, and the Ministry of Women and Children Affairs. From them, SAKTEE will learn how they have been integrating women. For example, flood warning systems do not reach the women of extremely poor communities. The project aims to bridge that gap by working with these institutions and communities over the three years and beyond.

Dr. Saleemul Huq had two points to share on this:

1. The Bangladesh Climate Change Strategy Action Plan (BCCSAP) is in the process of being revised by its six member co-author team including he and Dr. Atiq Rahman. The main difference with the updated BCCSAP is that climate change will be mainstreamed within every stakeholder group to be part of business as usual. Furthermore, now there is a budget in the government of Bangladesh for climate finance.
2. SAKTEE will empower the Ministry of Women and Children affairs to incorporate better adaptation policies. The three years of action research will change the narrative of women as vulnerable to active agents of change.



Dr. Huq reflecting on the session.

Dr. Emdad Haque had four points to share:

1. This project will attempt to integrate science with social science
2. Moral and ethical compasses will guide the discourse
3. Innovative partners will make it happen
4. The scope will go beyond national boundaries.

Dr. Haque shared that they plan to work with the Ministry of Women and other NGOs to fill in regional and local level gaps with the intention to improve social, environmental, and political conditions for women.

Ms. Edith Ofwana introduced IDRC as a Canadian institution that builds the capacity of southern researchers to find solutions to problems they face. They have been funding research and development projects for over fifty years and in the last thirteen years, ones pertaining to climate change. What they noticed is that there is not much in-depth analysis on gender and social equity. The questions remain: Why are there disparities when it comes to addressing gender? What are the underlying vulnerabilities?

They put out a global call for proposals with a budget of 4 million dollars and received 500. What stood out for SAKTEE was its extent of in-depth thinking, ambition, and systems perspective on gender and social equity. With the next round of climate change strategy in Bangladesh, this project can test out how to provide support and get key stakeholders on board in sustaining the action.

This project is a sister to six other projects, including two others in Asia (Vietnam and Nepal), three in Africa (DRC, Benin, Nigeria), and one in Latin America (Argentina). IDRC hopes to put together a network to ensure that the seven projects can learn from each other and contribute significantly to the knowledge base. Right now there is not much collective knowledge, especially when it comes to in-depth analysis of climate change and gender issues.



Ms. Edith Ofwana explaining how the SAKTEE proposal stood out among the 500 received.

Water Security to Achieve SDG 6 in Context of the Changing Climate in Coastal South West



The panelists of the water security session on Science-Policy Dialogue Day.

Host: WaterAid

Chair and Keynote Speaker: Dr. Ainun Nishat, Professor Emeritus, BRAC University

Panelists:

- Dr. Liakath Ali, Director: Programme and Policy Advocacy, WaterAid
- Dr. Sultan Ahmed, Director General, Department of Environment

Keynote - Water security and achievement of SDG6 in context of the changing climate in coastal southwest

Presented by Dr. Ainun Nishat

The objective of Dr. Nishat's project was to recommend water governance structures that are inclusive and sustainable in local contexts. The Bangladesh component of the international project was in Shyamnagar, Satkhira. Floods, waterlogging, reduction in water availability, water contamination, and over-extraction of groundwater resulting in saline tubewell water are the major problems there, accentuated by erratic climatic conditions and poor water governance systems. According to locals, seasonal patterns as well as traditional cropping patterns are

changing. Drinking water is a scarce commodity and migration is on the rise. Although the main cause of the salinity in that region is sea level rise, it was triggered by the reduction of Ganges water by India in 1975.

Polders are an important feature of the region. Their construction resulted in higher rice yields. However, rivers destroy the embankments of polders, allowing tidal water in and subsequently causing yields to fall and local road networks to waterlog. Locals want stable polders.

One of the major limitations of national level policies is that they do not take into account local issues. Like many other centralized organizations in the country, the Bangladesh Water Development Board follows a top-down approach in all water management related planning or implementation. There is almost no involvement of the communities in any stage of water management.



Dr. Ainun Nishat speaking about the limitations of national level policies.

Now the Water Development Board is introducing a participatory approach in collaboration with the Dutch government, alongside an existing Bangladeshi law on practicing participatory water management. As part of the project, local communities were involved in all aspects of water management, including conducting a Climate Vulnerability Assessment. Local elected representatives should be involved in the consultation of water management planning.

Furthermore, the recommendations from the community align with SDG 6 targets. The local people have sufficient knowledge and understanding about the problems, and comparing and synthesizing that with national level knowledge will produce excellent water management plans. Engagement of the local people and the local government institutions during the implementation of the plans is crucial.

Dr. Liakat Ali then shared that Bangladesh's progress on the Millennium Development Goals (MDGs) was commendable, especially in achieving access to water and sanitation. Achieving SDGs is more challenging however because the MDG goals are 'access to water' and 'access to sanitation' while SDG 6 targets 'access to *safewater*' and



Dr. Liakat Ali comparing MDGs to SDGs.

‘access to *safely managed* sanitation’. If sanitation systems are not safely managed, water quality is affected. The timeframe for MDGs is also longer compared to that of SDGs.



Dr. Sultan Ahmed emphasizing the need for a bottom-up approach in water management.

In order to achieve SDG 6, it is vital to integrate the water sector with health, education, and climate action, while building capacity and channeling sufficient resources.

Dr. Sultan Ahmed added that there is a need for a bottom-up approach in water management. The disconnection between rivers and floodplains is an issue that has led to changes in the ecosystem and livelihood patterns of people within the polders. Excavation of canals within the polders and rationalizing their operational policies for freshwater systems are possible solutions.

SDG 6 targets have been integrated within the Seventh Five Year Plan, and the same will be done in the Eighth Five Year Plan of the Bangladesh Government. Participation of the local people in water management is imperative, as they know their context well.

International Experience



Ms. Hermela Lakew presenting on LUCCC in Ethiopia.

Host: International Center for Climate Change and Development

Chair: Dr. Saleemul Huq, Director, ICCCAD

Presenters:

- Ms. Hermela Lakew
- Mr. David Mfitumukiza
- Mr. Revocatus Twinomuhangi
- Mr. Robi Redda
- Mr. Dave Steinbach
- Dr. Elizabeth English
- Ms. Catherine

Amphibious Architecture

Presented by Dr. Elizabeth English

By fitting buoyancy systems to existing house structures, houses can float during floods. This flood risk control method can enhance the skills of local carpenters in building life-saving houses while enabling communities to adapt.

Ethiopian LUCCC

Presented by Ms. HermelaLakew

Ethiopia has over 40 government universities, including Addis Ababa University (AAU), which is a member of the Least Developed Countries Consortium on Climate Change (LUCCC). The Global Green Growth Initiative (GGGI) in collaboration with AAU and Ethiopia's Environment, Forest and Climate Change Commission (EFCCC) organized their first planning committee with the objectives of creating awareness about the LUCCC initiative, developing a shared understanding of what the participating universities consortium needs to build their capacity, developing a mutual understanding of the current state of research on climate change and policy, and developing a self-assessing and step-by-step framework for action. Out of the meeting, three main bodies were established in order to further collaborative work among universities, research institutes, developmental organizations, and government institutes: 1) a high level advisory panel, 2) a technical working team, and 3) a youth club. The technical team will collaborate with the youth team in Bangladesh.



Mr. David Mfitumukiza sharing about the need to create knowledge capacity linkages through youth.

Mr. David Mfitumukiza added that there is a need to create knowledge capacity linkages. The key resource is the youth, who should be trained through education, research, and knowledge translation subsequently. South-to-south links should be fostered by having common networking projects, drawing examples from vulnerable countries, and sharing and building sustainable capacity.

Mr. Revocatus Twinomuhangi then added that Uganda has been reporting on climate change at the global level and has a national climate change policy. A performance measurement mechanism is in place but there are still many challenges.

CDKN (Climate and Development Knowledge Network) Phase II

Presented by Mr. Robi Redda

CDKN's mission during its first phase (2010-2017) was to support decision makers in delivering 'climate compatible development' through a demand-led approach to research, technical assistance, knowledge management, and support to negotiators. Its four strategic outcomes are 1) policies and planning, 2) climate finance, 3) climate resilience, and 4) climate negotiators through knowledge, engagement, and peer learning.

In its second phase (2018-2021), CDKN will further develop its knowledge-sharing and learning programme, with a focus on making information and learning on climate compatible development easier to access and use, in support of ambitious climate action. The programme works in three areas: 1) producing highly targeted knowledge in response to developing country needs, 2) in-depth engagement with countries in Africa, Asia, and Latin America to ensure this knowledge is impactful, and 3) peer learning among professionals in developing countries who face similar climate and development challenges.

LIFE-AR: The LDC Initiative for Effective Adaptation and Resilience

Presented by Mr. Dave Stienbach

The objectives of LIFE-AR are to 1) develop LDCs' own long term vision for adapting to a climate resilient future by 2050, 2) outline an "Ask and Offer" to donors, climate funds, and investors on what is needed to achieve the LDC vision, and 3) identify practical mechanisms to implement the LDC vision.

LIFE-AR was looking for high potential interventions that were far-reaching, long-term, and socially just and gender responsive while addressing climate vulnerability. They already had around eighty submissions at the time of the conference and called for more.

Delta Gap

Presented by Ms. Catharine

The future is uncertain and requires window based planning. The Delta Gap does that by planning for Bangladesh until 2100. Innovation is required on both national and local levels, and the young generation needs to be involved.

Concluding Session



Dr. Saleemul Huq summarizing the Gobeshona5 conference.

Chair: Professor M. Omar Rahman, Vice Chancellor, IUB

Special Guests:

- Mr. Barnabas Dickson, Director of Strategy and Policy at Global Commission on Adaptation (GCA)
- Dr. A. Atiq Rahman, Executive Director, BCAS
- Dr. Saleemul Huq, Director, ICCCAD
- Dr. S. M. Munjurul Hannan Khan, Additional Secretary, Ministry of Environment, Forest, and Climate Change (MOEFCC)
- Ms. Runa Khan, Founder and Executive Director, Friendship

Chief Guest: Dr. Shamsul Alam, Member (Senior Secretary), General Economics Division, Ministry of Planning, Government of the People's Republic of Bangladesh

MC: Anne Laure-Pilat, Visiting Researcher, ICCCAD

Gobeshona5 covered 25 different sessions, each one hosted by partner organizations. A total of 69 papers were presented, along with 14 keynote presentations and 4 videos. 395 people registered online and 340 additional people joined over the four days, summing up to 735 attendees, double the number of last year's conference.

The parallel youth program held from 7-12 January brought together twenty participants mostly from Bangladesh, with one participant from Nepal and Bhutan each. During the conference, they participated, asked questions, and identified issues on which they could collaborate and problem solve.

The conference activities were updated on social media platforms with international feedback, and the Dhaka Tribune covered the event. The Gobeshona webpage was uploaded with all the presentations, videos, and research papers from the conference. There are 2,500 publications from over the last year on the site.

The Gobeshona platform has been key for collaboration beyond networking. SAKTEE is a collaborative research project that has come out of the conference, as well as ICDDRB's project to study global radiation management's impact on health. At the fourth Gobeshona conference, Columbia University, CIMMYT, and the Bangladesh Meteorological Department partnered up to have a short course on delivering climate information to local people (BACS); now it has progressed to become an annual course.

Major developments at this year's conference include plans to create an annual Gobeshona prize for scientific papers published on climate change in Bangladesh, to mainstream migration and gender solutions, to continue the solar geoengineering project, to engage more national and international participants in the youth program, and to expand the conference from Dhaka to climate vulnerable zones across the country.

Next year, the plan is to make Gobeshona a major international event to share experiences on adaptation work, including a one or two day field visit to Climate Technical Park, organized by CCDB.

For the first time this year, the Gobeshona conference was independently organised, without USAID funding. Host organizations supported the parallel and plenary sessions and Independent University of Bangladesh (IUB) provided space free of charge. In the future, organizers hope to make Gobeshona a self-sustaining event, without the support of international funds.



Dr. Huq sharing plans for the Gobeshona6 conference for the following year.

From the youth program, Mim Sara and Tashrif Mahmud shared their experiences from the conference. Mim Sara from the Bangladesh University of Professionals expressed that the conference exposed her to international participants and climate experts of different backgrounds. She had the opportunity to collaborate with her peers on a one year action program. Tashrif Mahmud from Jahangirnagar University was grateful that he had the opportunity to learn from such knowledgeable people. He learned about climate change and found it helpful for young people to make a one year action plan.

Guest Remarks

In a video presentation, Ban Ki-Moon, Eighth Secretary-General of the United Nations, shared that he was grateful to the Bangladeshi government and Prime Minister Sheikh Hasina for her endorsement of the Global Commission on Adaptation (GCA), whose mission is to accelerate adaptation action and support. The Commission will deliver a flagship report on adaptation at the UN Climate Summit in September.

Mr. Barnabas Dickson provided more details on the GCA. Seventeen countries endorse it, including Bangladesh. The commission has three leaders: Ban Ki-Moon, Bill Gates, and Kristalina Georgieva, CEO of the World Bank. There are another 23 commissioners from the government, private sector, and civil society with geographical balance across the world. The executive director of BRAC, Muhammad Musa, is one of them. At the Gobeshona conference, GCA aspires to raise awareness about its organization and learn from the academic expertise in Bangladesh.



Mrs. Runa Khan sharing on Friendship's work in Bangladesh.

Mrs. Runa Khan introduced Friendship, an organization that started working on adaptation solutions in Bangladesh eighteen years ago. They developed an integrated model to resolve migratory communities' needs and livelihood challenges, including providing high quality healthcare and schools that are just as mobile as the communities they serve.

Dr. S. M. Munjurul Hannan Khan shared that the Ministry of Environment and Policy in Climate Change updated the Bangladesh Climate Change Strategy and Action Plan, published a climate vulnerable index on its website to identify hotspots for prioritized action, and implemented the Clean Air Act to address pollution in big cities this year. They started the Centre for Climate Change and Environmental Research with the objectives of being a central depository on climate change data and providing a platform for researchers and policymakers to collaborate.

Dr. Atiq Rahman stated that BCAS will support ICCCAD and focus on youth empowerment to make Bangladesh climate resilient and poverty free.

Dr. Shamsul Alam added that the ambitious 100 Year Delta Plan calls for technological solutions in adaptation through trans-disciplinary research and management of natural resources in Bangladesh. The country needs capacity building, a technology bank, and a journal for climate change research.

Prof. M. Omar Rahman further added that since Gobeshona has been established as an annual event, it is important to have more young people and strong networks with international and national participants.

International Participants

| No. | Name | Country |
|-----|------------------------|-----------------|
| 1 | Ms. Harmela Wondwossen | Ethiopia |
| 2 | David Mfitumukiza | Uganda |
| 3 | Revocatus Twinomuhangi | Uganda |
| 4 | Ugyen Penjor | Bhutan |
| 5 | Dr. Elizabeth English | Canada |
| 6 | Mr. Manjeet Dhakal | Nepal |
| 7 | Ms. Lata Neupane | Nepal |
| 8 | Dr. Jonathan Giligan | USA |
| 9 | Jochen Schanze | Germany |
| 10 | Edith Ofwana Adera | Kenya |
| 11 | Alemayehu Zewdie Asrat | Ethiopia |
| 12 | Mark Jones | Australia |
| 13 | Syed Sajjadur Rahman | Canada |
| 14 | Barnabas Dickson | UK |
| 15 | Robi Redda | Canada/Ethiopia |
| 16 | Dave Steinbach | Netherlands |
| 17 | Andrew Parker | Canada |
| 18 | Dr. Madan Pariyar | Nepal |
| 19 | Prof. C. Emdad Haque | Canada |
| 20 | Lars Ribbe | Germany |
| 21 | Lucy Scott | UK |
| 22 | Anne Laure | Poland |
| 23 | Sherpard Zivigadza | Zimbabwe |
| 24 | Anna Plowman | USA |
| 25 | Ambalika Singh | India |
| 26 | Bishwajit Mallick | Germany |
| 27 | Sarah Sharma | Canada |
| 28 | Melody Braun | France |
| 29 | Ashley Curtis | USA |
| 30 | Dr. Tufa Dinku | USA |
| 31 | Ms. Amaka Ogunleye | Nigeria |
| 32 | Maliha Muzammel | UK |
| 33 | Prof. Amanda Carrico | USA |
| 34 | AMB Firoz | Germany |

List of Contributing Members

| Session | Institution |
|--|--|
| Inaugural | International Centre for Climate Change and Development |
| Session 02: Plenary; Natural Resource Management | International Rice Research Institute |
| Session 03: Parallel; Adaptation Technologies | Christian Commission for the Development of Bangladesh& iDE |
| Session 04: Parallel; Mitigation | Krishi Gobeshona Foundation |
| Session 05: Parallel, Renewable Energy | International Centre for Climate Change and Development |
| Session 06: Plenary; Loss and Damage | Friendship & ICCCAD |
| Session 07: Keynote | International Centre for Climate Change and Development |
| Session 08: Plenary; Wetlands (Flood, River and Haors) | BRAC |
| Session 09: Parallel; Hydrology and Societal Processes: Is Migration An Opportunity? | BCAS |
| Session 10: Parallel; Health and Well Being | The International Centre for Diarrhoeal Disease Research, Bangladesh |
| Session 11: Parallel; Food Security | Oxfam |
| Session 12: Parallel; Forest, Hills and Ecosystem Resilience | Friendship |
| Session 13: Plenary; Resilience Livelihood | Islamic Relief& Voluntary Service Overseas |
| Session 14: Keynote | International Centre for Climate Change and Development |
| Session 15: Plenary; Solar Geo-Engineering and The Global South | BCAS & SMRGI |
| Session 16: Parallel; Climate Finance | International Centre for Climate Change and Development |
| Session 17: Parallel; Gender | International Centre for Climate Change and Development |
| Session 18: Parallel; Disaster Management | United International University& Independent University, Bangladesh |
| Session 19: Parallel; Coastal Zones | Friendship & University of Liberal Arts Bangladesh |
| Session 20: Parallel; Bangladesh Academy for Climate Service (BACS): Integrating Climate Service into Decision Making | ICCCAD/BMD/IRI/CIMMYT |
| Session 21: Plenary; Cities | Urban Development Program – BRAC |
| Session 22: Plenary; Outcomes of CoP24 and NDC Implementation in Bangladesh | Rio Project/DoE/NCC,B/CCJ,B/ICCCAD |
| Session 23: Plenary; Scaling Climate Change Adaptation Knowledge and Technologies for Empowering Women and to Enhance Social Equity and Disaster Resilience in Bangladesh | International Development Research Centre |
| Session 24: Plenary; Water Security to Achieve SDG 6 in Content of the Changing Climate in Coastal South West | WaterAid |
| Session 25: Plenary; International Experience Sharing | International Centre for Climate Change and Development |
| Concluding Session | International Centre for Climate Change and Development |

Volunteers

| Name | Affiliation | Institution |
|--|--------------------|---|
| Nahid Sultana | Student | Independent University, Bangladesh |
| Madbor Mohammad Farhan Ishraq | Student | Independent University, Bangladesh |
| Madbor Mohammad Farhatul Basher | Student | Independent University, Bangladesh |
| Nahian Muhtasim Farhan | Student | Independent University, Bangladesh |
| Md. Rubel Hossain | Student | Dhaka University |
| Md. Shafiqul Islam | Student | Independent University, Bangladesh |
| Khandaker Soumik Sadman | Student | Independent University, Bangladesh |
| Md. Hamidur Rahman | Student | Bangladesh University of Engineering and Technology |
| Md. Zihadul Abedin | Student | Independent University, Bangladesh |
| Rafi Ali | Intern | Independent University, Bangladesh |
| S. M. Tanveer Ahmad | Intern | ICCCAD |
| Sobiya Aziz Badat | Intern | ICCCAD |
| Faizaa Fariya Hridi | Student | Independent University, Bangladesh |
| Farjana Pervin Sweety | Student | Independent University, Bangladesh |
| Farah Anzum | Intern | ICCCAD |
| Md. Fahad Elahi Mohian | Student | Eastern University, Dhaka |
| Jafrin Mouli | Student | Bangladesh University of Engineering and Technology |
| Anika Sarder | Student | Independent University, Bangladesh |
| Ariful Islam | Student | Independent University, Bangladesh |
| Afifa Tajrimin Inna | Student | Independent University, Bangladesh |
| Afsana Jahan Luna | Student | Independent University, Bangladesh |
| Nahil Iqbal | Student | Independent University, Bangladesh |
| K. A. Javed Hassan Bishwas | Student | South East University |
| Md. Tanvir Ahmmed | Student | South East University |
| Sanlap Biswas | Student | North South University |

Photo Gallery



Photo Gallery



Photo Gallery





Session's Host and Gobeshona steering committee members



Media Partner

Dhaka Tribune

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