



## **Economic Approaches to Climate Change and Poverty: a workshop for economic policy makers and researchers in Bangladesh**

**13-14 October 2009, Dhaka, Bangladesh**

### **MINUTES OF THE WORKSHOP**

#### **I. Background**

1. Climate change presents great challenges to the future development of Bangladesh. Consequently, the Government of Bangladesh is in the process of integrating climate change adaptation into Bangladesh's development agenda, including the Second Poverty Reduction Strategy and the Sixth Five-Year National Plan. This process stands to benefit from a greater understanding of the economics of climate change in the Bangladesh context.

#### **II. Workshop Rationale and Objectives**

2. The workshop aimed to inform the government's integration of climate change adaptation into Bangladesh's development agenda. The workshop was structured around a number of climate change-related themes, including climate change (CC) and poverty, CC and economics of agriculture, CC and economics of disaster management, and CC and economics of health. By reviewing and analysing existing research on these themes, the workshop aimed to inform future plans and strategies for CC adaptation in Bangladesh.

#### **III. Participants and Organisers**

3. Participants included representatives of various Bangladesh government departments, including the Planning Commission, Department of Environment, Ministry of Finance and Water Resources Planning Organization (WARPO).
4. The workshop included participants from a number of local and foreign research institutions, including South Asian Network for Development and Environmental Economics (SANDEE), Madras School of Economics, Center for Agriresearch and Sustainable Environment & Entrepreneurship Development (CASEED), United International University, Bangladesh Institute of Development Studies (BIDS), Institute of Water Modelling, University of Dhaka, Bangladesh University of Engineering and Technology (BUET), Bangladesh Agricultural Research Institute,

Delhi University, Bangladesh Centre for Advanced Studies (BCAS) and BRAC University. Media participation included Radio Today and Channel One.

5. Altogether, 42 participants attended the workshop. The names and contact details of the participants are provided in Annex I.
6. The workshop was jointly organised by the Planning Commission, United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP) and SANDEE.

#### **IV. Agenda**

7. The workshop consisted of the following sessions:
  - *Session 1: Why does the economics of climate change and adaptation matter?*
  - *Session 2: Climate change economics: national and international policy contexts – panel discussion*
  - *Session 3: Economics of climate change adaptation*
  - *Session 4: Climate change, poverty and growth*
  - *Session 5: Climate change and economics of agriculture*
  - *Session 6: Climate change and economics of disaster management*
  - *Session 7: Climate change and economics of health*
  - *Session 8: Review of responses to the climate change survey*
  - *Session 9: Conclusion and next steps*

#### **V. Workshop Proceedings**

##### **Session 1: Why does the economics of climate change and adaptation matter?**

8. Following a welcome speech by Aminul Islam (UNDP) and introductions by participants, Priya Shyamsundar (SANDEE) provided the background to and rationale for the workshop. Overall, there is a need for a stronger dialogue and analysis in Bangladesh on the economic issues in adapting to climate change. For Bangladesh, there is a need to sort out CC adaptation financing, and develop the right incentives for the government and the general population. The impact of Hurricane Katrina in New Orleans exemplifies the importance of economic planning and investment in disaster management.
9. Robert Juhkam (UNDP) stated the need for the workshop to focus on the impact of climate change on the poor of Bangladesh. For Bangladesh, the costs of climate change will outweigh the benefits; the workshop should therefore contribute to the development of a CC adaptation policy by the Bangladesh government, which in turn should be reflected in the Second Poverty Reduction Strategy and the Sixth Five-Year National Plan (both currently under development). Bangladesh can also benefit from a better understanding of a green economy, which would allow it to benefit from adaptation and promote mitigation-focused economic growth. Planting of mangroves

is an example of an economic activity which contributes to CC adaptation and mitigation, whilst also sustaining the livelihoods of the poor.

10. Shamsul Alam (Planning Commission) stated that the workshop is important because CC will have a dramatic impact on Bangladesh. Therefore, there is a need for government planners to get a better understanding of CC adaptation, so that it can be incorporated into Bangladesh's poverty reduction strategies. Shamsul Alam expressed hope that the workshop will result in practical action plans and strategies for CC adaptation in Bangladesh.

## **Session 2: Climate change economics: national and international policy contexts – panel discussion**

11. Nilufa Islam (WARPO) outlined the impact of CC on water resources in Bangladesh. Due to Bangladesh's geographical location, the country is losing land to floods, which are increasing in intensity and frequency due to CC. CC is also causing increases in droughts, river erosion and soil salinity. The Ministry of Water resources is addressing these impacts through its National Water Management Plan. However, more assistance is required from developed countries and international organisation.
12. Jiangfeng Zhang (ADB) outlined ADB's strategy in dealing with CC. ADB targets both CC adaptation and mitigation. CC has been streamlined into ADB's portfolio, meaning that all ADB projects must now take into account their impact on CC. ADB has recently released a study which estimates the cost of CC adaptation in South-East Asia, and is conducting studies in other Asian countries. Jiangfeng Zhang provided details on ADB's existent CC adaptation projects in Bangladesh, as well as an upcoming workshop on the Clean Development Mechanism (CDM).

Jiangfeng Zhang urged the government of Bangladesh to approve the Bangladesh Climate Change Strategy and Action Plan, which will be co-funded by ADB. Bangladesh is also likely to be eligible for funding (grant or loan) under the Pilate Programme for Climate Resilience, which is run jointly by ADB and the World Bank; a joint feasibility mission will be held in early December.

13. Fakrul Ahsan (Planning Commission) reiterated the importance of CC adaptation for Bangladesh. Planning Commission is currently integrating CC into the national planning processes; the discussions of this workshop will be useful to that extent. Planning Commission and UNDP are on the verge of commencing a project which will provide capacity building for the Planning Commission on poverty, environment and climate mainstreaming.

## **Session 3: Economics of climate change adaptation**

### ***Presentations***

14. A.K.E. Haque (United International University, Bangladesh) delivered a presentation "Cost of adaptation – emerging issues in Bangladesh". The presentation outlined the projected CC impacts on Bangladesh in terms of sea level rises, temperature rises, the shifting of the salinity frontier, and the frequency and intensity of cyclones and rainfall. CC adaptation in Bangladesh will result in added costs for governments, communities and private individuals alike; however, the benefits of investment in CC adaptation (by reducing risk and lowering cost) will outweigh the costs. Therefore,

economic studies should focus on developing strategies for the most efficient level of intervention.

15. Aminul Islam (UNDP) delivered a presentation “Issues and concerns on economics of adaptation to climate change: Bangladesh context”. He argued that while the cost of CC adaptation in Bangladesh will be huge, it remains largely uncounted. Bangladesh’s National Adaptation Programme of Action (NAPA) contains US\$77.4 million worth of CC adaptation projects; however, this is a “wish-list”, and it remains to be seen which of these will come to fruition. He noted the increasing trend of disasters in Bangladesh, and the close correlation between poverty and vulnerability to disasters. He concluded by stressing that the economic evaluation of CC adaptation is still evolving, and emphasised the need for supplementary funds to update cost estimates.

### *Discussion*

16. The importance of studies which measure costs and benefits of “soft infrastructure” (such as early meteorological warnings to farmers) was highlighted. It was generally agreed that farmers respond quickly to this type of information by altering their choice of crops planted.

## **Session 4: Climate change, poverty and growth**

### *Presentations*

17. Muhammad G. Sarwar (Planning Commission) presented a Planning Commission study “Probable impacts of climate change on poverty reduction, MDGs attainment and economic growth”. The study analysed how the effects of CC are likely to impact on Bangladesh’s achievement of Millennium Development Goals. The study incorporated the likely impact on flood-prone, drought-prone and coastal areas, as well as the impact on various economic sectors. In summing up the findings, Muhammad G. Sarwar stated that the CC vulnerability of Bangladesh’s poor is well recognised, with 70 million people likely to be affected. CC will decelerate poverty reduction in Bangladesh, or even increase poverty; however, there is a need for further quantitative studies on the costs for the poor. There is also a need for further integration CC into national planning and subsequent implementation.
18. Atiq Rahman (BCAS) gave a speech in which he argued that CC adaptation should focus on the poor, as ‘the rich will adapt’. He highlighted the current lack of knowledge of future CC impact, and argued that Bangladesh should focus on CC adaptation and development rather than CC mitigation, as the latter ‘is for the rich’. He stressed the importance of deciding which Bangladesh ministry will lead on CC adaptation, and urged the donors and the government to stop “keeping the money close to the chest”. He argued that agricultural self-sufficiency, food security and integration of CC into the education system should be the main priorities for Bangladesh.
19. M. Asaduzzaman (BIDS) delivered a presentation “The economics of REDD and its relevance for Bangladesh”. He outlined the origins of the REDD (Reduced Emissions from Deforestation and Forest Degradation) concept, its non-inclusion in the original Kyoto protocol, and its role in current CC negotiations. He argued that there is a general agreement among negotiating parties that any REDD agreement must focus on preservation of existing natural forest (rather than reforestation), and include protection of the rights of forest dwellers.

20. M. Asaduzzaman also presented findings of a study on Brazil which estimated the economic benefits of preserving forests and selling credits into the carbon market. He suggested that Bangladesh is in a good position to benefit from REDD, which is addressed in Bangladesh Climate Change Strategy and Action Plan (BCCSAP).

### *Discussion*

21. In response to a query on whether or not Bangladesh's CC fund overlaps with its poverty reduction fund, Muhammad G. Sarwar noted that the 300 million taka CC fund will be used for CC purposes only (primarily mainstreaming CC into national planning).
22. In response to a comment that the Five-Year Plan is perhaps unsuitable in dealing with CC due to the long-term nature of the problem, Muhammad G. Sarwar stated that Planning Commission is currently preparing the Perspective Plan.
23. In response to a suggestion that Planning Commission studies should be expanded to include impacts on other economic sectors (telecommunications, roads, etc), Muhammad G. Sarwar noted that the recent establishment of the CC fund will result in more studies.
24. A question was raised on why the Planning Commission study chose fruit trees rather than mangroves in its modelling of CC adaptation measures. Muhammad G. Sarwar stated that fruit trees were chosen because of their food value and salinity resistance.
25. A question was raised on how different Bangladesh ministries should go about obtaining access to the CC fund. Fakrul Ahsan explained that it has not yet been decided on which party will be in charge of the fund; once the decision is made, it will be publicised to other ministries.
26. A question was raised to M. Asaduzzaman about his assessment that Bangladesh will benefit from participating in a REDD carbon market, given the fact that the market does not yet exist. M. Asaduzzaman responded that Bangladesh is in a good position to benefit because of its large areas of forest and clear land tenure.

## **Session 5: Climate change and economics of agriculture**

### *Presentations*

27. Prior to delivering his presentation on the impact of CC on agriculture in India, Kavi Kumar (Madras School of Economics) stressed that, while dealing with CC, it was important not to lose track of other threats to developing countries.

Dr Kumar compared results of a number studies which used either the Ricardian approach or the agronomic-economic approach in assessing the impact of CC for agriculture in India. The results were as follows:

- The Ricardian approach predicted that farmers will experience a 9 percent loss in farm-level revenue.
- The agronomic-economic approach predicted lower costs, because it took into account spatial effects of adaptation (in particular, information flows between farmers, i.e. "learning from your neighbour").

- The vulnerability analysis showed that districts that are presently poor do not necessarily become more vulnerable.
  - Because the discussed CC adaptation strategies present a “win-win” situation, i.e. beneficial from an economic and an environmental perspective, they should be implemented even without taking climate change into account (“no regret” strategies).
28. Zahurul Karim (CASEED) delivered a presentation titled “Climate Change Impacts on Bangladesh: Agriculture and Food Security – Policy, Strategy and Management interventions”. After outlining various threats of CC to Bangladesh (including cyclones, floods, droughts, salinity, and loss of natural resources and ecosystems), he stated that CC also presents a strong potential for increasing productivity of crops, fisheries and livestock. He stressed the importance of using correct scientific assumptions when modelling economic impacts of CC, and lamented the fact that politicians generally favour the views of economists over agronomists. Agronomists consider the change of climate structure as the biggest threat to agriculture (for example, the loss of an 80-day period of less-than-20-degree-weather for wheat production). Zahurul Karim concluded his presentation by proposing a number of CC adaptation measures, including restoration of wetlands, improvement of information and knowledge management, and the need to address the limitations of CC data in developing countries.

### *Discussion*

29. The examples of possible perceived benefits of CC were discussed; the increased availability of ground water was mentioned as one of them.

## **Session 6: Climate change and economics of disaster management**

### *Presentations*

30. S.M. Mahbubur Rahman (Institute of Water Modelling) delivered a presentation “Water infrastructure responses to climate change”. The presentation focused on the impacts of CC-induced sea level rises and river floods in Bangladesh. In terms of sea-level rises, it is envisaged that 4 percent of Bangladesh’s land area will become inundated by 2030, with 7 percent inundated by 2050. This inundation will also lead to more significant damage being caused by cyclones to coastal areas, as risk areas are moving further inland. Cyclones themselves are increasing in frequency and intensity; the latter is a major problem because current embankments are not designed to deal with 50- and 100-year storms. In terms of adaptation measures, S.M. Mahbubur Rahman highlighted the importance of coastal afforestation (with mangroves or other tree species) in reducing the height of storm surges, and pointed to the need to redesign cyclone shelters. He also noted that the future cost of transporting drinking water to areas affected by salinity intrusion is likely to be huge.
31. In terms of CC effect on river floods, he stated that the floods in Bangladesh will become more severe; the increased inundation will be caused by the melting of ice caps in the Himalayas. The statistics also show that the flood frequency has also increased since 1950s. In terms of adaptation measures to rising sea levels and floods, he suggested the urgent need to redefine flood zones and adopt appropriate flood managements strategies.
32. Nabiul Islam (BIDS) delivered a presentation “Urban and non-agricultural impacts of flooding – methods of assessments and vulnerability analysis”. He presented evidence

of the rising trend of economic losses in Bangladesh associated with floods, and figures showing increasing urbanisation of the population. The growing urbanisation will compound of the effects of CC-induced increases in flood severity (such as drainage congestion); this issue is of a great concern. Despite the fact that non-agricultural sector accounted for 74 percent of total economic loss of the latest (2004) flood, Bangladesh lacks damage data and methodology for urban flood loss assessment.

33. Nabiul Islam outlined different approaches to modelling flood impacts in urban Bangladesh at the micro level (direct loss vs. primary indirect loss vs. multiplier effects), and assessing the vulnerability analysis of urban sectors (unit loss model vs. land use and height survey). He also discussed the interface between flooding and poverty, arguing that low-income earners are relatively more vulnerable to floods: poor households experience a higher percentage of damages to their total asset values, whilst land-poor households suffer higher levels of inundation.
34. In terms of urban adaptation options to CC, Nabiul Islam suggested the following measures:
  - Protecting nearly 21,000 km of Bangladesh's roads and highways;
  - Flood-proofing individual homesteads by means of constructing raised platforms;
  - Improved spatial planning; and
  - Enforcement of land development regulations.
35. Saudamini Das (Delhi University) delivered a presentation "Natural barriers and storm protection", which focused on her 2007 study on the economic impact of the Orissa Cyclone (October 1999). The study tackled a question of whether or not there is economic justice in preserving mangroves to mitigate the effects of cyclones, by analysing the impact of the Orissa Cyclone on areas with and without mangroves in the Kendrapada District, India. The study showed, among other things, that the presence of mangroves reduced human deaths by over 50 percent, and that no deaths would have occurred if the mangrove cover was at the 1950s level. Overall, the cost-benefit analysis of human casualties, damages to houses and livestock losses showed that there is an economic case for preservation of mangroves, at least in terms of reducing the cost of dealing with cyclones.

### ***Discussion***

36. Fakrul Ahsan noted that the development of flood- and salinity-resistant rice species is an effective measure in reducing flood- and salinity-induced relocation; however, the research has been quite slow to date.
37. In response to a query about possible negative effects of embankments, S.M. Mahbubur Rahman noted that embankments are an example of a trade-off between economic (agricultural) growth and environmental consideration. In addition, while environmental regulations aimed at reducing the environmental impact of embankments exist, they are not being implemented or monitored.
38. A question was raised about why the presence of embankments is sometimes associated with higher death tolls. S.M. Mahbubur Rahman responded that embankments can give people a false sense of security, as they are often not high enough to stop storm surges; measures such as afforestation could be more effective (whilst also being more environmentally friendly).

39. It was noted that cyclone shelters are multi-purpose buildings, and are often used as schools and community halls. However, maintenance is an issue.
40. It was suggested that the impact of river erosions should be taken into account when estimating urban economic losses caused by climate change. Nabiul Islam suggested that this topic should be covered in future studies.
41. It was noted that it is possible to cultivate mangroves in Bangladesh, and that large-scale mangrove plantations are currently being developed. Saudamini Das emphasised that the preservation of existing mangrove tracks should be a higher priority.

## **Session 7: Climate change and economics of health**

### ***Presentations***

42. Minhaj Mahmud (BRAC University) delivered a presentation “The economics of health and climate change in Bangladesh”. He outlined the difference between direct and indirect effects of CC on health (e.g. death or injury in major weather events vs. CC-induced nutritional changes). In Bangladesh, CC is expected to cause increased frequency and altered distribution of existing diseases (such as malaria, dengue fever and diarrhoea), rather than introduction of new ones. Current literature suggests that CC will have the most severe impact on the incidence of diarrhoeal diseases. CC could also potentially worsen air pollution (which is already a major problem in Dhaka), causing severe health problems.
43. Minhaj Mahmud contrasted the normative and the cost-benefit approaches to health economics (i.e. “how much would it cost to keep things the same?” vs. “what level of expenditure is economically rational?”). He provided an overview of methodologies in conducting health impact assessments – in particular, the use of Disability Adjusted Life Years (DALYs). In terms of health adaptation measures to CC, Minhaj Mahmud suggested the following (among others):
  - Food security to ensure that most vulnerable in society are protected from climate change;
  - Awareness building;
  - Adequate functioning of public health system; and
  - Provision of safe drinking water.
44. Priya Shyamsundar (SANDEE) delivered a presentation “Climate, water and air pollution – examining costs and uncertainties”. She noted that linking CC to health is a complicated exercise, due to contamination pathways and transmission dynamics between human exposure to climate variations and health outcomes.
45. In terms of water pollution, Priya Shyamnsundar argued that CC will affect water quantity and quality in Bangladesh; this in turn will have an impact on incidence of diarrhoea. A 2009 study found that the average annual cost of diarrhoea per household in Dhaka slums is around 1 percent of household income; whether or not these costs will increase depends on a number of factors, including human response.
46. In terms of air pollution, Priya Shyamsundar discussed an OECD study which found that the reduction of green house gases to 50 percent of 2005 levels will lead to 20-40 percent reduction in pre-mature mortality globally. Also, a 2009 study on the

vehicular pollution in Dhaka found the estimated health benefits of reducing air pollution to the national standard to be around US\$59 million. Consequently, there is evidence that integrating climate and air pollution policies has potential win-win possibilities.

### ***Discussion***

47. The participants agreed that it is important to understand the complexity of the relationship between climate change, in order to come up with responses that are proportional to the extent of the problem.

### **Session 8: Review of responses to the climate change survey**

48. The results of the survey “Climate Change and Bangladesh – A Brief Survey on Perceptions, Knowledge and Beliefs” were presented. The survey was completed by the majority of the workshop’s participants.
49. The results showed that all of the participants thought climate change was occurring, and over 70 percent believed that people were already being harmed. At the same time, most participants rated themselves as only “fairly well informed” about the causes, consequences, and ways to adapt to global warming. Most participants thought that addressing global warming was the responsibility of all countries (not just the West); however, almost half of the participants did not believe that people will alter their behaviour enough to address the problem. The participants used a wide array of sources for information about climate change, including scientific publications, the internet, newspapers, television, and non-government and intergovernmental organisations.
50. In regards to CC vulnerability in Bangladesh, participants considered coastal zones, lowlands and agricultural areas as most vulnerable, whilst being much less concerned with mountainous areas, industrial areas and military areas. The most popular CC adaptation measures included early warning systems for floods and cyclones (e.g. mobile-to-mobile messaging), conducting health baseline and vulnerability assessments, awareness-raising and information campaigns, and development of saline- and drought-resilient agricultural species. Restriction of water use was by far the least popular CC adaptation measure among the participants.

### **Session 9: Conclusion and next steps**

51. Priya Shyamsundar thanked all of the participants and organisers, and noted the high quality of the presentations and discussions that took place. It was agreed that the draft minutes of the workshop will be circulated among the participants for comment, along with the presentations.

***This marked the conclusion of the workshop.***

## Annex I: List of Participants

Name	Job Title	Agency / Organisation	Email address
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## **Annex II: Workshop Agenda**

### **Tuesday 13 October**

- 9:00 Guest registration
- 9:30 Why does the economics of climate change and adaptation matter?
- Speakers:
- Priya Shyamsundar (SANDEE)
  - Robert Juhkam (UNDP)
  - Shamsul Alam (Planning Commission)
- 9:45 Climate change economics: national and international policy contexts – panel discussion
- Speakers:
- Nilufa Islam (WARPO)
  - Jiangfeng Zhang (Asian Development Bank)
  - Fakrul Ahsan (Planning Commission)
- 10:25 A.K.E. Haque (United International University) - “Cost of adaptation – emerging issues in Bangladesh”
- 10:45 Tea and coffee
- 11:10 Muhammad G. Sarwar (Planning Commission) – “Probable impacts of climate change on poverty reduction, MDGs attainment and economic growth”
- 11:45 Kavi Kumar (Madras School of Economics) – “Climate change impacts on Indian agriculture”
- 12:25 Atiq Rahman (BCAS)
- 1:00 Lunch
- 2:00 Aminul Islam (UNDP Bangladesh) – “Issues and concerns on economics of adaptation to climate change: Bangladesh context”
- 2:45 Zahurul Karim (Bangladesh Tropical Forest Conservation Foundation) – “Climate Change Impacts on Bangladesh: Agriculture and Food Security – Policy, Strategy and Management interventions”
- 4:00 Close

### **Wednesday 14 October**

- 9:00 Guest registration
- 9:30 S.M. Mahbubur Rahman (Institute of Water Modelling) – “Water infrastructure responses to climate change”

- 10:45 Nabiul Islam (BIDS) - “Urban and non-agricultural impacts of flooding – methods of assessments and vulnerability analysis”
- 11:20 Tea and coffee
- 11:40 Saudamini Das (Delhi University) – “Natural barriers and storm protection”
- 12:30 Minhaj Mahmud (BRAC University) – “The economics of health and climate change in Bangladesh”
- 12:45 Priya Shyamsundar (SANDEE) – “Climate, water and air pollution – examining costs and uncertainties”
- 1:30 Lunch
- 2:00 M. Asaduzzaman (BIDS) – “The economics of REDD and its relevance for Bangladesh”
- 3:00 Review of responses to the climate change survey
- 3:20 Conclusions and next steps
- 4:00 Close

### **Annex III: Acronyms**

ADB	Asian Development Bank
BCAS	Bangladesh Centre for Advanced Studies
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BIDS	Bangladesh Institute of Development Studies
BUET	Bangladesh University of Engineering and Technology
CC	Climate change
CDM	Clean Development Mechanism
DALY	Disability Adjusted Life Year
NAPA	National Adaptation Programme of Action
OECD	Organisation for Economic Cooperation and Development
REDD	Reduced Emissions from Deforestation and Forest Degradation
SANDEE	South Asian Network for Development and Environmental Economics
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WARPO	Water Resources Planning Organization, Bangladesh