

# RDD

Regional Development Dialogue

Vol. 32, No. 2, Autumn 2011

## Climate Change and Poverty in Asia: Challenges and Prospects

**M. A. Zaman**

Current Issues on Climate Change and Poverty  
in Bangladesh

**Mya Mya Oo**

Current Status of Adaptation Strategies for Climate  
Change and Reduction of Poverty in Myanmar

**Bui Trong Vinh, Dong Uyen Thanh, and  
Nguyen Viet Ky**

Impacts of Climate Change and Risks in Viet Nam

**Lee Lik Meng**

Poverty and Climate Change in Malaysia

**Ho Chin Siong, Ibrahim Ngah, and  
Abdul-Azeez Isiaka Adeyemi**

Climate Change and Poverty in Malaysia

**Belinda Yuen and Leon Kong**

Singapore's Eco-Development in a Changing  
Climate



United Nations Centre for  
Regional Development  
Nagoya, Japan



# RDD

Regional Development Dialogue

Vol. 32, No. 2, Autumn 2011

## CLIMATE CHANGE AND POVERTY IN ASIA: CHALLENGES AND PROSPECTS

### EDITORIAL INTRODUCTION

Ismunandar and Yuli S. Indartono iii

### ARTICLES

#### **M. A. Zaman**

Current Issues on Climate Change and Poverty in Bangladesh 1

Comment: Md. Rashadul Islam 18

#### **Mya Mya Oo**

Current Status of Adaptation Strategies for Climate Change and  
Reduction of Poverty in Myanmar 20

Comment: Armi Susandi 31

#### **Bui Trong Vinh, Dong Uyen Thanh, and Nguyen Viet Ky**

Impacts of Climate Change and Risks in Viet Nam 33

Comment: Tri Wahyu Hadi 42

#### **Lee Lik Meng**

Poverty and Climate Change in Malaysia: Expect Surprises in  
the Next Hundred Years 45

Comment: Saut M. Lubis 63

---

<b>Ho Chin Siong, Ibrahim Ngah, and Abdul-Azeez Isiaka Adeyemi</b> Climate Change and Poverty in Malaysia: Challenges and Prospects	66
Comment: Chamhuri Siwar	81
<b>Belinda Yuen and Leon Kong</b> Singapore's Eco-Development in a Changing Climate	85
Comment: A. C. Moshia	99
<b>Contributors</b>	103

## Editorial Introduction

Ismunandar and Yuli S. Indartono

This issue of *Regional Development Dialogue (RDD)*, continuing from the Spring 2011 edition, is devoted to climate change and poverty. While the last issue focused on Africa, this issue discussed challenges and initiatives related to climate change and poverty in Asia. The discussion originated from the ITB-UNCRD Senior Policy Seminar on Climate Change and Poverty in Africa-Asia: Challenges and Initiatives held at the Bandung Institute of Technology on 3-4 August 2010.

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change reported that warming of the climate system, caused mostly due to man-made emissions of greenhouse gases (GHGs), is now unequivocal.<sup>1</sup> Over the century, the atmospheric concentration of carbon dioxide has exceeded that of pre-industrial levels and it has caused the rise of average global temperature. The GHG increase and warming trend has been the largest they have been able to discern in the history of the Earth. Climate change will have wide-ranging effects on the environment, and on socioeconomic and related sectors, including water resources, agriculture and food security, human health, terrestrial ecosystems and biodiversity, and coastal zones.

Developing as well as poor countries are the most vulnerable to climate change impacts as they have fewer resources to adapt socially, technologically, and financially. Climate change is anticipated to have far-reaching effects on the sustainable development of developing countries, including their ability to attain the United Nations Millennium Development Goals (MDGs) by 2015. Climate change and poverty are interconnected. As change in temperature increases the frequency and intensity of severe weather events around the world, poor countries, which lack infrastructure, will have to divert resources away from fighting poverty in order to respond to disasters. Warmer climates will also increase the spread of diseases such as malaria and make it more difficult for poor countries to respond adequately and quickly. Perhaps most severely, changed rain patterns will increase the prevalence of droughts and floods and leave populations without food or enough food. Just as climate change will contribute to worsening poverty conditions, in contrast poverty also contributes to climate change. Most poor people around the world lack access to reliable energy

sources and through necessity are forced to use mainly oil, coal, and wood. These significantly increase the world's GHG emissions. The link between climate change and poverty effectively means that solutions to address them both can be the same.

The Asian continent is particularly susceptible to climate change due to its geography, compounded by high levels of poverty and population density. Asian countries are spread over four climatic zones (boreal, arid and semi-arid, tropical, and temperate) and have a long coastline. It is also the most populous continent, with a total population of 3,902 million in 2002, of which almost 61 per cent lived in rural areas and 38.5 per cent within 100 km of the coast. At the same time, much of the Asian countries register some of the most rapid economic growth rates in the world. This expansion is also fueling unprecedented demand for more energy and natural resources. The International Energy Agency (IEA) estimates that under the current business-as-usual scenario, energy use in Asia will increase 112 per cent by 2030.<sup>2</sup> Asia would then represent 36 per cent of the world's energy consumption and 42 per cent of global energy-related CO<sub>2</sub> emissions, as compared with only 26 per cent and 29 per cent in 2005, respectively. By comparison, during this same period, the share of demand of Organization for Economic Co-operation and Development (OECD) countries will have fallen from 48 per cent to 38 per cent. Major shifts in social, environmental, and economic patterns as a result of growth in these countries are putting upward pressure on GHG emissions that are causing climate change. Thus, through its impacts on economic growth, livelihood assets, and health, climate change increases risk and reduces the likelihood of eradicating poverty. Climate change could seriously limit the capability of achieving the MDGs. Meeting global targets on reducing hunger, providing safe drinking water, and reducing the incidence of disease is increasingly difficult in the face of unprecedented climate change. Climate change could also reverse decades of investment in development and make it harder to meet the MDGs. Thus, low carbon development should become an integral part of economic development in the Asian region.

The water and agricultural sectors are likely to be the most sensitive to climate change since surface water and ground water resources play a vital role in Asian economies. Fresh water availability is expected to be highly vulnerable to the anticipated climate change. Frequency and intensity of floods would eventually increase in many countries of Asia, and arid and semi-arid regions could experience severe water stress. Agricultural productivity is likely to suffer severely due to high temperatures, severe drought and flood conditions, and soil degradation. As a result, the food security of many countries in the region would be under threat. Aquaculture productivity is also likely to undergo dramatic changes as a result of temperature changes in water. The rise in sea level would cause submergence of large tracts of the vast Asian coastline, leading to a recession of flat sandy beaches. Global warming is causing the melting of glaciers in the Himalayas, which in the short term means increased risk of flooding, erosion, mudslides in Nepal, Bangladesh, Pakistan, and north India during the wet season. The ecology of mangroves and coral reefs around Asia is likely to suffer severely, too. In warmer climates, the El Niño-Southern Oscillation (ENSO) events will become stronger and more frequent. Therefore, their impact on the Asian monsoon could lead to high inter-annual variation in rainfall characteristics. The countries in temperate and tropical Asia are likely to have increased exposure to extreme events. The frequency of forest fires is expected to increase, particularly in the Boreal Asia region. Tropical cyclones could become more intense. When combined with sea-level rise, this would result in an en-

hanced risk of loss of life and property in the coastal low-lying areas in cyclone-prone regions. Warmer and wetter conditions would increase the potential for a higher incidence of heat-related and infectious vector-borne diseases such as malaria and dengue. Climate change would also exacerbate the threat to biodiversity due to changes in land use and land cover and population pressure.

Kim<sup>3</sup> explained that the impacts of climate change on fisheries in northeastern Asia could be severe since the main fishery products are small pelagic fish whose biomass fluctuations are sensitive to climate changes. The global scenario of water availability, which was calculated by Arnell,<sup>4</sup> stated that the number of population influenced by water stress will increase. Agricultural production is highly sensitive to temperature. Temperature increasing up to 2°C will cause major implications for rural poverty and for both rural and urban food security.<sup>5</sup> Warming and drying may reduce crop yields by 10 per cent to 20 per cent by 2050.<sup>6</sup> The Food and Agriculture Organization of the United Nations (FAO) reported that 925 million people in the world are undernourished; 578 million of these undernourished people live in the Asian-Pacific region.<sup>7</sup> Since most of the world's hungry are in Asia and Africa, it can be predicted that both continents will deeply suffer from the impact of climate change. IPCC also reported that the increase in temperature will temporarily raise agriculture production in lower-temperature countries, but reduce those with higher temperatures.<sup>8</sup>

The United Nations Framework Convention on Climate Change (UNFCCC) recommends important policy measures to address climate change. Firstly, mitigation of climate change by reducing GHG emissions; and, secondly, increase the adaptation to the impacts of climate change. Both efforts are equally important. Mitigation can be divided in some sectors, such as energy, land use and land-use change, forestry, waste, and agriculture. It has been argued by many of the need to mainstream not only climate change mitigation, but also climate change adaptation into developmental planning. Mainstreaming is seen as making more efficient and effective use of financial and human resources in implementing and managing climate change policy holistically with sustained development than undertaking piecemeal activities. This involves building mitigation and adaptation capacity at both the micro and macroeconomic development level. This implies that climate change mitigation and adaptation need to be tailored and managed through coordination and cooperation across the three pillars of the economic system — different levels of governments, private sector, and community. It is important to ensure that developing countries are financially and technologically supported in their mitigation effort, since the countries are pursuing economic development to improve their people's welfare. On the other hand, adaptation strategy is very important for developing countries. Without a proper adaptation strategy, the result of economic development in these countries can be easily wiped out by extreme climate events.

The Copenhagen Accord recognizes the results of the IPCC study that global temperature increases should be limited to below 2°C.<sup>9</sup> Temperature increases above that limit will cause dangerous anthropogenic interference with the climate system.<sup>10</sup> Assessment Report (AR) 4 of IPCC shows that GHG concentration should be below 440 CO<sub>2</sub>-eq in order to limit a temperature increase below 2°C.<sup>11</sup> In the same report, IPCC stated that such GHG stabilization requires a global GHG emission reduction of 50 per cent to 85 per cent (based on global emissions in 2000) by 2050.<sup>12</sup> Based on the IPCC report, den Elzen *et al.* calculated that GHG emission reduction should be undertaken by developed and developing countries to reach a certain GHG stabilization level. Their

study suggests that for GHG stabilization of 450 CO<sub>2</sub>-eq ppm by 2020, developed countries should reduce their emissions by 25 per cent to 40 per cent (based on GHG emissions in 1990), while developing countries should substantially deviate from their baseline (business-as-usual scenario) of -15 per cent to -30 per cent.<sup>13</sup> By looking at this “gigantic” emission reduction target, climate change mitigation must become the first agenda for mankind.

Based on the principle of “different responsibility and respected capability,” developed and developing countries each have a role in the climate change mitigation effort. Developed countries must lead the mitigation effort and, at the same time, support developing countries in reducing GHG emissions. However, it should be noted that all countries have the responsibility to ensure that a stabilization level of 450 CO<sub>2</sub>-eq ppm can be reached at the appropriate time. If this level cannot be achieved in time, all countries in this one and only Earth will face the dangerous and irreversible adverse effects of climate change. Therefore, all countries must have the political willingness to cooperate in dealing with this challenging environmental issue.

The articles in this *RDD* issue raise specific situations faced by selected Asian countries: Bangladesh, Malaysia, Myanmar, Singapore, and Viet Nam. There is a common red line among these countries: they are affected, and are preparing to cope with, the worse climate change impacts. M. A. Zaman of Bangladesh reports on the vulnerability of the country in terms of climate change. Flooding, frequent cyclones, storms, and drought are some examples of extreme weather events severely faced by Bangladesh. Those challenges are aggravated by poverty and population growth. One of scenarios developed by Hertel *et al.* showed that Bangladesh’s welfare will be reduced by around 30 per cent as a result of climate change.<sup>14</sup> The Government of Bangladesh launched a National Adaptation Programme of Action as a response to climate change. Besides the government’s plan, the author also emphasizes the importance of international support for Bangladesh to overcome the worse impacts of climate change.

As a neighbouring country of Bangladesh, Myanmar is also struggling with the severe impacts of climate change. Mya Mya Oo explains calamities such as tropical cyclones, floods, and drought which occurred in recent years. In response to the increasing number of disasters rooted in the impacts of climate change, the Government of Myanmar undertook some important national-level programmes, such as the National Disaster Preparedness Central Committee (NDPCC) with its Myanmar Action Plan on Disaster Risk Management (MAPDRR), and Greening the Dry Zone, and also turned its attention to renewable energy.

Far from Myanmar, Viet Nam, a fast-growing economy in the Southeast Asian region, is also unable to escape from a similar situation faced by Myanmar and Bangladesh. According to Bui Trong Vinh, Dong Uyen Thanh, and Nguyen Viet Ky, in recent years, Viet Nam has suffered from severe natural disasters, ranging from typhoon, flood, drought, sea-level rise, and high tide in the delta and coastal regions. National and local governments in Viet Nam have taken note of these disasters and responded with programmes and actions, such as the “Ho Chi Minh City Moving towards the Sea with Climate Change Adaptation Program,” and indigenous knowledge of “Living with the Floods” developed in the Mekong Delta area.

Slightly different from the above-mentioned articles, two articles from Malaysia and one from Singapore elaborate from a different angle in their interaction with climate change. Lee Lik Meng, and Ho Chin Shiong, Ibrahim Ngah, and Abdul-Azeez Isiaka



Adeyemi from Malaysia agree that poverty, nowadays, is not the main challenge in Malaysia. With a poverty rate of 3.8 per cent and gross national per capita income of US\$8,260 (2010), as a country, Malaysia is in a better position compared to other developing and least-developed countries in dealing with climate change. However, Lee warns that a newly emerging group of poor can surprise Malaysia in the next century. This poverty can be caused by the accumulated adverse effects of climate change. Ho, Ngah, and Abdul-Azeez emphasize the importance of improving existing structures to further cope with the anticipated impacts of future climate change. The authors consider Malaysian Government policies such as the National Policy on Climate Change (2009) and National Green Technology Policy announced in 2009 to be important measures for mitigating CO<sub>2</sub> emissions in the country. The government's focus on climate change is also evident in the establishment of the National Green Technology and Climate Change Council chaired by the Prime Minister.

Belinda Yuen and Leon Kong present a problem specific to Singapore as a rapidly developing economy and its relation to climate change. In order to minimize the adverse effects of urban growth, Singapore is developing eco-precincts and eco-towns as a model for its future urban development. The authors explore the characteristics of an eco-city, which has already been implemented by a major housing development in the country. Less energy, fresh water consumption, building material, and increasing greenery are some important aspects of eco-building. Singapore is in the process of moving from its current highly energy-intensive urban economic system into one that is much less energy and carbon intensive. Mainstreaming climate change mitigation into national development, such as Singapore's eco-city development, can be a model for other developing countries. Kok and Coninck pointed out that one of the advantages of a mainstreaming strategy is that it can be implemented immediately, without a formal connection to an international agreement such as UNFCCC.<sup>15</sup>

Overall, each of the articles in this *RDD* issue is accompanied by the informed comment of a scholar and/or practitioner, which brings various angles as to how climate change influences countries and what programmes are being implemented by governments to cope with the adverse effect of climate change. Our hope and expectations, programmes, and strategies implemented by the countries outlined here can become important lessons for us to move forward in these important efforts.

## NOTES

- <sup>1</sup> Intergovernmental Panel on Climate Change (IPCC), "Summary for Policymakers" in *Climate Change 2007: The Physical Science Basis* (Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change) (Cambridge, UK and New York: Published for IPCC for Cambridge University Press, 2007), p. 5.
- <sup>2</sup> International Energy Agency (IEA), *World Energy Outlook* (Paris: IEA, 2007).
- <sup>3</sup> S. Kim, "Fisheries Development in Northeastern Asia in Conjunction with Changes in Climate and Social System," *Marine Policy* 34 (2010):803-9.
- <sup>4</sup> N. W. Arnell, "Climate Change and Global Water Resources: SRES Emissions and Socio-economic Scenarios," *Global Environmental Change* 14 (2004):31-52
- <sup>5</sup> S. J. Vermeulen *et al.*, "Options for Support to Agriculture and Food Security under Climate Change," *Environmental Science & Policy* 15 (2012):136-44.
- <sup>6</sup> P. G. Jones and P. K. Thornton, "Croppers to Livestock Keepers: Livelihood Transition to 2050 in Africa due to Climate Change," *Environmental Science & Policy* 12 (2009):427-37.
- <sup>7</sup> Food and Agriculture Organization of the United Nations (FAO), *The State of Food Insecurity in the World* (Rome: FAO, 2010), pp. 9-10.

- <sup>8</sup> T. K. Mideksa, "Economic and Distributional Impacts of Climate Change: The Case of Ethiopia," *Global Environment Change* 20 (2010):278-86.
- <sup>9</sup> FCCC/CP/2009/11/Add.1. Report of the Conference of the Parties on its fifteenth session, held in Copenhagen from 7 to 19 December 2009. Addendum Part Two: Action taken by the Conference of the Parties at its fifteenth session (UNFCCC, 2010), p. 15.
- <sup>10</sup> *Ibid.*
- <sup>11</sup> IPCC, "Summary for Policymakers," *Climate Change 2007: Mitigation* (Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change) (Cambridge, UK and New York: Published for IPCC by Cambridge University Press, 2007), p. 15.
- <sup>12</sup> *Ibid.*
- <sup>13</sup> M. den Elzen *et al.*, "Reductions of Greenhouse Gas Emissions in Annex I and Non-Annex I Countries for Meeting Concentration Stabilisation Targets. An Editorial Comment," *Climatic Change* 91 (2008):249-74.
- <sup>14</sup> T. W. Hertel, M. B. Burke, and D. B. Lobell, "The Poverty Implications of Climate-induced Crop Yield Changes by 2030," *Global Environment Change* 20 (2010):577-85.
- <sup>15</sup> M. T. J. Kok and H. C. de Coninck, "Widening the Scope of Policies to Address Climate Change: Directions for Mainstreaming," *Environmental Science & Policy* 10 (2007):587-99; and IPCC, "Summary for Policymakers," p. 5.