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- $\frac{1}{m} \sum_{i=1}^m \frac{1}{n} \sum_{j=1}^n \frac{1}{m} \sum_{k=1}^m \frac{1}{n} \sum_{l=1}^n \dots$
- $\frac{1}{m} \sum_{i=1}^m \frac{1}{n} \sum_{j=1}^n \frac{1}{m} \sum_{k=1}^m \frac{1}{n} \sum_{l=1}^n \dots$

INTRODUCTION

Observations of increase in global temperature and rising global sea level in the recent decades, show that warming of the Earth's climate is undeniable. Bangladesh is one of the countries expected to be worst affected by climate change. The combination of frequent natural disasters, high population density and low resilience to economic shocks, make Bangladesh very vulnerable to climatic risks.

Human health in tropical developing countries will be affected by climate change. Drainage congestion and standing water will increase the potential for outbreaks of cholera and other waterborne and diarrheal diseases. The pressure on the availability and access to safe water, in particular during the dry period is an additional threat. Additionally, natural disasters threaten people and their belongings and cause stress. Finally the pressure on agricultural production may result in under nutrition which affects the overall health.

According to the National Adaptation Programme of Action (2005), "High summer temperatures could result in enhanced deaths due to heat stress, but the extent of such impacts has not been quantitatively assessed yet. However, the combination of higher temperatures and potential increases in summer precipitation could create favorable conditions for greater intensity or spread of many infectious diseases."

The impact of climate change on human health depends critically on the success to adapt to climate change in the other sectors. Improved health

diarrhoea, cholera, etc. *Vibrio cholerae* is the causing microbe of cholera that survive longer with salinity level ranging from 2.5 ppt to 30 ppt and need Sodium ion (Na+) for growth.

Water salinity and its distribution in the coastal area are increasing with the increase of sea level rise. With the increased density and distribution of salinity, cholera germs are getting favourable habitat and spreading in the coastal area. This hypothesis is also supported by Colwell and Huq (2001) that states, most major epidemics [of Cholera] that have occurred during the last 50 years originated in coastal region.

So, coastal water and its saline environment have close association with cholera disease. Outbreaks of cholera often occur after flooding, because the water supply becomes contaminated (Eco-health Glossary, 2005). Thus, sea level rise, by increasing flood risk, increase the risk of cholera outbreak too.

Increasing salinity levels also lead to increased incidences of hypertension in the coastal areas. This is a major problem for expecting women can even cause involuntary foetus abortion (MoEF, 2009).

RESULTANT IMPACTS AND ECONOMIC

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- S Devising a national program to reduce the burden of diseases due to climate change;
- S Mainstreaming adaptation to climate change as central part of public health services;
- S Short, medium, and long research on the adverse effect of climate change on health;
- S Public awareness programme on climate change impacts on health;
- S Development of an advanced preparedness plan;
- S Partnership across the society and with global community in order to safeguard and enhance national as well as global public health security issues.

The National Health Policy (MOH&FW 2011) in Context and Trend section mentions that Bangladesh has demonstrated remarkable achievement in natural disaster/emergency response through better preparedness and proper management. However climate change, salinity intrusion, drought have been slowed down the progress made. The health policy identifies respiratory diseases, heat strokes, cold wave related illness, vector borne diseases like malaria, dengue, water borne diseases like cholera, and increased malnutrition due to reduced food production due to climate change and natural disasters.

Therefore, the policy aims to monitor disease and health disaster and find out ways to reduce adverse effects due to climate change. Further the policy principally agreed to adopt a health safety net comprising of health services, emergency relief, medicine, and instruments for people affected by natural disasters and climate change.

In order to achieve the aim and towards the fulfilment of its principal related to climate change, the policy took the following strategy:

“A concerted effort will have to be made to protect health from adverse effects of climate change. To this end, a national program outline will be

developed in order to reduce the burden of diseases due to climate change. Strengthening of public health services needs to be a central component of adaptation to climate change. The existing health research agenda will include the adverse effect of climate change on health, and field surveys and studies will be conducted to identify the short, medium, and long term effects of climate change on health.”

The Health Population and Nutrition Sector Strategic Plan⁷ (HPNSSP) identifies the key interventions required to accelerate the pace of the Health, Population and Nutrition sector in Bangladesh. The HPNSSP sets out what the sector’s strategic priorities are and explains to a certain extent how these will be addressed. The Strategic Plan 2011-2016 is more elaborate to meet the challenges of climate change.

The strategic plan acknowledges increasing incidence of common and non-conventional diseases some of which due to climate change and natural disasters. It proposes establishment of an autonomous institute namely ‘Environmental and Occupational Safety and Health’ manned by relevant multidisciplinary personnel for protecting not only the safety, health and welfare of people engaged in work or employment, but also with the environment and the community. The strategic plan feels that the issues of environmental degradation, climate change and environmental pollutions are resultant effect of anthropogenic activities being domestic or occupational. The goal of all environmental / occupational health and safety programs is to foster a safe environment everywhere.

The strategic plan is in agreement with the National Health Policy on health concerns due to climate change and has further identified that – “the initial health risks will be on the groups bearing most of the resulting disease burden, i.e., poor children, women and elderly people”. In this context, creating a well coordinated approach for protecting health from climate change remains a great challenge for the government that can only be achieved by effective surveillance system and increased institutional capacity to manage these problems including of health professionals.

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Planning Commission. (2011a). Sixth Five Year Plan (FY 2011-2015), Accelerating Growth and Reducing Poverty, Part – 1: Strategic Direction and Policy Framework. Planning Commission, Ministry of Planning, Government of the People’s Republic of Bangladesh.

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Planning Commission. (2011b). Sixth Five Year Plan (FY 2011-2015), Accelerating Growth and Reducing Poverty, Part – 2: Sectoral Strategies, Programs and Policies. Planning Commission, Ministry of Planning, Government of the People’s Republic of Bangladesh.

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The water supply and sanitation coverage, inequalities, arsenic problem have been given due importance which will support adaptation against climate change. Also concern is showed for The Government of Bangladesh has initiated a multi-year program on total sanitation starting in October 2003. Water quality surveillance in some 120 towns re-started. Together with continued laboratory strengthening, an overall surveillance system, covering bacteriological and chemical parameters needs to be developed. With frequent natural disasters, collaboration between water supply, health and disaster preparedness sectors should lead to a greater response capacity.

Institutional Arrangements

Response of the health sector will need to be undertaken in wide collaboration with many other sectors of

government and social action. The health sector, in general, has been slow to perceive the enormous significance of global climate change, as a threat to Earth's life-support systems, including the provision of water, food, clean air, and stable ecosystems-and, therefore, to human wellbeing, health, and survival. Medium to long term adaptation plans are expected to be carried out by the Ministry of Health and Family Welfare (MoHFW), in association with research centers (ICDDR,B) and others. To build capacity and strengthen health systems to combat the health impact of climate change and to protect human health from current and projected risks due to climate change, MOHFW has formed a Climate Change and Health Promotion Unit (CCHPU).



