How are indigenous forest-dependent communities in Bangladesh drawing on local knowledge to adapt to climate change?

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The effects of climate change are increasingly being felt by indigenous communities living in the forests of Bangladesh. ***Md. Habibur Rahman*** *and* ***Khurshed Alam*** *recently conducted a study to explore perceptions of climate change and how communities are adapting to changing weather patterns. They write that although impressive range of strategies were observed, efforts were inadequate to ensure sustainable livelihoods and greater technical support and awareness raising programs are therefore urgently needed.*

Indigenous communities worldwide are particularly vulnerable to the impacts of climate change due to the close connection between natural resources, their livelihoods, culture, spiritual lives and socio-ecological systems and environment. Climate change is negatively impacting their farming systems and this is likely to worsen in near future. Yet their local knowledge, resource management practices and adaptation strategies are all important for both mitigating and adapting to climate change.

Bangladesh has 2.53 million hectors of forests representing about 17.5% of the country's area. Almost all of Bangladesh's indigenous communities live within the forest boundaries and depend heavily on the natural resources. Communities have managed the agrisilvicultural and woodlot plantation agroforestry systems for decades. However, for the last decade they have faced challenges to their traditional agroforestry management systems due to climate variability.

The Bangladesh Institute of Social Research Trust (BISRT) therefore conducted a study in Lawachara National Park (LNP), a protected forest in northeastern Bangladesh, to identify the impacts of climate change on forest-dependent indigenous communities (*Khasia*, *Tripura* and *Garo*). It looked at livelihoods; community perceptions and knowledge of climate change; and adaptation strategies. Data were obtained through field visits and using participatory approaches including household surveys, group discussions, experts and public opinion. For generations these communities have been engaged in betel leaf, lemon and pineapple production, as well as mixed-culture agroforestry systems.

Lawachara Forest. Credit: Hasib Wahab CC BY-NC-ND 2.0

The survey found that the indigenous communities were not familiar with the term ‘climate change’ and less than half of the respondents had knowledge about the issue. Nevertheless, they had noticed changes in weather patterns (temperature and rainfall) and knock-on effects based on their own long-term observations. Annual weather data records show that the temperature has been rising and rainfall has become increasingly erratic since 1982, thus supporting the community’s perceptions.

The study reveals that due to climate change, agroforestry crops have been damaged, and growth and yields are down. The dry forest stream and community well has resulted in a scarcity of water for working, drinking and irrigation, reducing soil moisture and fertility. Dieback and failing seedlings have become commonplace in LNP and persistent cold accompanied by dense fog affects the crops badly during winter. For example, these conditions cause betel leaves and lemons to discolour and drop prematurely, and pineapple roots to rot. They also create serious problems with pests and disease in agroforestry farms.

Communities are also observing changes in the behavioural patterns of wild animals. Monkeys and snakes now enter residences and farms in search of food and shelter, which was unheard of 5-10 years ago. In addition, changing natural wind patterns and excessive rainfall have led to an increase in landslides and damage to roads and culverts. Furthermore, mosquito-borne diseases (malaria, dengue fever, etc.), water-borne diseases (diarrhoea, dysentery and skin diseases) and mental stress are more prevalent.

There have been moves to adopt community-based water management adaptation strategies. Common approaches include storing household water in a reservoir, digging ponds and deeper wells to harvest rainwater, digging reservoirs at the top of hills for irrigation, and improving drainage. Crop management adaptation strategies such as the introduction of new crop varieties, crop diversification, new planting techniques, and changes to planting and harvesting cycles are also being used to increase the overall crop yield, improve economic returns and diversify local diets. To protect the soil, communities have introduced mulching (covering soil with litter and leaves), terracing, and protective brick walls/shelter belts created with trees.

The government has contributed to the construction/re-construction of roads and culverts damaged by heavy rains and flash floods, frequently involving communities as paid workers or volunteers. Additionally, to protect the tea estate labourers (*Garo*) and passers-by from extreme heat, the Jerin Tea Estate, a private company, built several permanent shades alongside the road inside the tea estate boundary. These shades are also used to temporarily protect tealeaves from being squeezed and discoloured immediately after picking.

In order to conserve energy, communities have adopted environment-friendly improved cooking stoves (ICS) designed to make communities less dependent on forest woods. The stoves claim to use 50-70% less fuel and emit less carbon. Moreover, communities have got into the habit of storing more firewood to protect themselves from problems created by irregular rainfall and other natural disasters which can strike at any time of the year.

Communities have also become involved in different activities in order to diversify their incomes. These range from poultry and livestock rearing, fish farming, manufacturing and selling ICS, eco-tourism, producing tribal cloths, and bamboo and rattan-based handicrafts, producing firewood, cultivating medicinal plants, sewing, and establishing grocery and tourist shops.

Although an impressive range of adaption strategies were observed, the study found that they were inadequate to ensure sustainable livelihoods. Technical support and awareness raising programs are urgently needed and must be sector-specific, considering issues such as gender, ethnicity and economic conditions. Finally, programmes like the United Nations' REDD+ should in the future weigh up the concerns and interests of indigenous communities and their current and potential contributions to the conservation and sustainable management of forests.

Note: This is an abridged and revised version of a research article originally published in the Climate 4(2016): 12; doi:10.3390/cli4010012.This article gives the views of the author, and not the position of the South Asia @ LSE blog, nor of the London School of Economics.

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