

## Climate change

# Thinking beyond source and sink

SARWAT CHOWDHURY

WHILE some scientific uncertainties exist, a vast majority of scientists believe that human-induced climate change is already occurring and future changes are inevitable. The Intergovernmental Panel on Climate Change (IPCC)'s Third Assessment Report 2001 has generated interest in both developed and developing countries on the long-term implications of climate change. Scientists claim that the last two decades have been the warmest this century - in fact, the warmest for the last 1000 years. There is widespread evidence that sea level is rising, precipitation patterns are changing, and the Arctic Sea ice is thinning. The frequency and intensity of El-Nino Southern Oscillation (ENSO) events are increasing as well. Global media more frequently reports major heat waves, floods, droughts and extreme weather events leading to significant loss of life and economic costs in various parts of the earth. At a more local level, incidences of parasitic diseases like dengue and malaria are higher than ever.

At this point, it is not a question of whether the earth's climate will change, but rather by how much, how quickly, and where. These questions have serious implications for developing countries like Bangladesh. It is also important that we pay more attention to the energy sources, land-use policy and status of forestry resources in the country.

In terms of human influence, fossil fuels play a significant role in the current climate crisis. Burning of fossil fuels such as coal, oil, gas release

carbon dioxide into the atmosphere, creating a sort of blanket of gases around the earth and trapping the sun's heat (commonly known as the greenhouse effect). With increase in global temperatures, the planet's climate system is gradually becoming more unpredictable.

In theory, the solution to the crisis seems simple - substantially reduce use of fossil fuels and consequent greenhouse gas emissions by replacing them with clean renewable energy sources. However, this straightforward solution becomes much more difficult in terms of implementation, especially when dealing with various countries with varied stages of development (for example, the sources of greenhouse gas emissions and their most direct victims i.e. those at the receiving end are not always the same). Additionally, there are other greenhouse gases such as methane which is produced when bacteria decomposes organic matter (such as animal manure) in both developed and developing countries.

While looking into the impact of greenhouse gas emissions, experts often point out the effect of deforestation in compounding climate change impacts. This leads to the idea of "source" versus "sink". Growing trees can be thought of as a carbon sink as they remove carbon dioxide from the atmosphere through photosynthesis. In the difficult global negotiations on climate change, the idea of using forests as sink instead of the more difficult option of moving away from fossil fuel burning sometimes appear to be a preferable alternative. Following this rationale, countries that are heavily dependent on fossil fuels for

energy would prefer to account the amount of carbon dioxide stored in carbon sinks (such as forests in other countries) against their fossil fuel emissions. Some experts find this approach contentious because such arrangements could effectively allow countries to carry on emitting greenhouse gases as usual, while the proposed additional sink (such as forestry development) initiatives may remain far from operational.

There is a risk inherent in the sink approach: forests and other vegetation store carbon dioxide only temporarily, which can be released back into the atmosphere later. Through photosynthesis, trees take carbon dioxide out of the atmosphere and store it as wood carbon. Carbon is also stored in plants on the forest floor, in leaves, forest debris, and forest soils. However, like everything else in a vibrant ecosystem, much of this carbon is in a constant state of flux. Young trees absorb large amounts of carbon dioxide as they grow, but a mature forest can reach equilibrium where it emits as much as it takes in. Branches and leaves fall to the forest floor and release carbon dioxide as they decay.

Again, drought and wildfires can cause a forest to die and release carbon dioxide back into the atmosphere to such an extent that, in reality, it becomes a source rather than a sink. To make the situation worse, drought and wildfires are expected to increase as a result of climate change. Therefore, according to some critics, accounting for the amount of carbon stored in forests is tricky, and at best imprecise. In contrast, subterranean carbon (such as coal) buried underground in the form of fossil fuels is locked

out of the atmosphere. Leaving this carbon underground guarantees that: it will not be a burden on the atmosphere. The one way that a ton of carbon stored in forests could have the same impact on the atmosphere as a ton of avoided fossil fuel carbon is: if the forest carbon remains in a permanent state. This assumes that none of the stored carbon could be allowed back into the atmosphere, and the forest would not decay, burn down, or be harvested. If the tree are harvested (a more likely outcome), the resulting paper or wood products would have to be tracked in perpetuity to make sure they were never destroyed.

There would also need to be certainty that the carbon dioxide stored in the forest is additional to everyday practice. Sustainable forest management practices are undertaken without the goal of greenhouse gas reduction in mind. However, when these forests are considered eligible for emissions credits, there seems to be a chance of double-counting in the process (it will be difficult to differentiate between what would have happened anyway as regular forest management practice, and what is an additional climate change mitigation initiative).

Given the difficulties of calculating the exact uptake of carbon dioxide by forests, and the impermanent nature of the storage, some claim that the proposals that aim at carbon trading could potentially result in increased level of emissions to the atmosphere rather than reducing the level. The Clean Development Mechanism (CDM) was conceived as a way of transferring clean technology to developing countries.

Following CDM, industrialised countries could invest in developing country projects that reduce greenhouse gas emissions and in return earn emissions credits that would be them towards achieving their Kyoto Protocol targets (developed at the December 1997 Third Convention of Parties to the UN Framework Convention on Climate Change). Obviously, the CDM has the potential to assist in the transition towards sustainable energy in developing countries and, in the long-term, benefit the climate.

However, as discussed above, it seems very important that: for climate protection, greenhouse gas concentrations are reduced in the long term towards safer levels. Only forestry and land use change projects cannot possibly guarantee to store carbon in the long term (that is, for decades and centuries). The carbon dioxide could eventually be released back into the atmosphere adding to higher greenhouse gas concentrations. Future generations would then have to undertake increased climate change mitigation, or endure the consequences of increased climate change. Again, incentives to maximise the rate of storage of carbon in trees may result in a "perverse" incentive for old growth forests to be cut down, and be replaced by fast growing plantations that absorb carbon dioxide faster (and ignore the much larger emissions from the destruction of the old growth forests). These new plantations could be single species (mono-cultures), often non-native ones in the host country. The rich biodiversity of old growth forests could be lost in the process.

Considering the ever-growing reality of cli-

mate change and the high stakes for developing countries like Bangladesh, greater awareness of mechanisms such as CDM is vital so that they can be utilised at their fullest scope. In addition to the "certified Project Activities" of CDM, it is also important that CDM details are utilised to the benefit of the cause of climate change (for example, Article 12 states that proceeds from the certified projects is to be used in assisting developing countries Parties to the Kyoto Protocol that are particularly vulnerable to the adverse effects of climate change).

While the intricacies of the Kyoto Protocol, and innovative mechanisms such as CDM are worked out at global negotiations, the marked signs of climate change continues to alert us the gravity of the situation.

It would be prudent to remember that in the long run there may be no alternative to *developing clean, safe and renewable energy technologies (including solar and wind power), and advanced end-use energy efficiency technologies/practices*. The sooner we move in that direction, the better and, therefore, renewable energy and energy efficiency efforts need greater and more immediate support both locally, and globally. After all, as the IPCC states: if actions are not taken to reduce the projected increase in greenhouse gas emissions, the earth's climate is likely to change at a rate unprecedented in the last 10,000 years with adverse consequences for society, undermining the very foundation of sustainable development.

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## Eco-parks in the north-eastern hills

# Indigenous communities at risk

After scrutinising the documents, it was evident that the Forest Department had acquired the land in 1956. The department neither claimed it, nor brought the area under any development plan. Incorporating the punjis within the project area was an arbitrary decision and the community claimed to have the right to be consulted. Which was denied in this case. Forest dwellers had the defacto right over the panpunjis, which was usurped by the de jure right of the state.

DR MAHFUZUL HAQUE

IT was a bumpy road from Kulaura railway station to Barolekha upazila headquarters. The narrow winding road through the Hakaluki haor took around an hour to reach the Upazila headquarters. Hakaluki looked like a vast green field, a flat land with occasional depression. Water buffaloes were seen grazing lazily. Its incredible to believe that the haor could turn into a vast sea with splashing waves in the monsoon, when the only mode of transport in the area would be engine boats.

In the afternoon, we headed for Madhabkunda to see the waterfalls and the adjacent area. A Forest official was accompanying us. The area is hilly with thick bamboo forests within the range of Patharia hills. The beauty of the area is a waterfall falling straight from a 200 feet height touching a rocky wall. Continuous fall has formed a deep ditch in the ground, called *Kundu*. The stone walls surrounding the *kundu* are carved in- also pose a spectacular sight for the visitors.

The Forest Department has declared an area of 626 acres surrounding Madhabkunda as eco-park. It was stated in the Forest Ministry's position paper that the Eco-parks were expected to be preserved and developed for the visitors and tourists; flora and fauna will be preserved; wildlife to be preserved; and infrastructure for eco-tourism to be set up. In Madhabkunda, most of the 626 acres of land was under Reserved and Acquired Forests on the Patharia Hills. There are a good number of *Khasia* tribal people living there. *Khasia* people came mostly from the *Jaintia* hills of India and engaged primarily in *pan* (betel leaf) leaf cultivation. They call their betel leaf fields as *Pan punji*. We found a *Khasia* *Panpunji* (village) of 13 families within the Eco-Park demarcated area. There is also an ancient Hindu temple (*Kundu Mandir* or *Shiva Mandir*), established there more than hundred years ago. The annual fair named *Baruni Mela* held in the first week of April every year attracts large number devotees from Hindu community all over the country and also from India. *Mela* continues for couple of days as the devotees visit the temple and bath in the waterfalls.

During our visit, we found a good number of tourists and picnic parties swarming the narrow, winding, dusty roads of the Kundu area. Visitors attracted vendors, makeshift tea-stalls all around littering the whole area with polythene bags, food wastes, plastic bottles and what not. The most terrible thing was the use of loud speakers by the picnickers. Incredibly, 10 to 20 buses park on a narrow patch of land everyday and the ever enthusiastic visitors bustle the area with stoves, loudspeakers and photo sessions. Although, there is a restaurant set up by the Parjatan Corporation, picnickers have their own arrangements. No body is there to discipline or police the crowd. During the weekends, the number of visitors ranges between 2500 and 3000 taking toll on the already stretched facilities of the area.

The neighbouring population of Madhab Kundu comprises 85 *Khasia* families living in a 500-acre of *Khasia panpunji*. Although the area is out side the eco-park, their *panpunji* is often invaded by the ever enthusiastic visitors. We were talking to Ilin, a *Khasia Mantri* (Headmen) of the area. *Mantri* Ilin expressed his ignorance about the meaning of eco-park. Nobody did discuss with them prior to planning of the project. *Mantri* Orin Khisa said, "We are born here and probable will die here. Trees are like our parents and our children grow along with the trees. Our *pan* creepers go up circling round the trees. Often the *Bengalee* people cut our trees and we are left barren". They didn't know what the eco-park would bring for them, wealth, employment and development or more miseries and sufferings, cultural invasion, sound pollution, social insecurity and eventual eviction. The unfortunate thing was that the people of the area were not consulted prior to planning of the project.

On the next day, we left for a longer route to Murarichhara waterfalls, which fell under the Kulaura Upazila in Moulazibazar district. The proposed eco-park here would cover an area of



Waterfalls at Madhabkunda

830 acres of land within Raja Prithimpasha Estate acquired by the Forest Department since 1942. Unlike the Madhabkunda one, this area falls within four *Khasia punjis* of Murarichhara, Aeolachhara, Lutjihuri and Kukijhuri covering an area of 1632 acres. The *Fanai* river borders them with India. More than 150 *Khasia* families live in these *punjis*. Anil Yang, *Mantri* of Murarichhara, protested setting up of the eco-park in the *punjis*. "This is our land. We have been living here for generations. We were never consulted prior to planning of the project. We won't accept any eviction, compensation or resettlement," he said. There is a Catholic church in the vicinity. Father Joseph Gomez was not available for comment.

*Bengalee* people led by the local MP were in favour of setting up of the Eco-park, as they believed that the proposed project would bring development and create employment for them. They alleged that the *Khasia* people traditionally chop off tree heads and keep them dwarfed and less shady in order to get betel leaf creepers climb up the trees and grow well. The local *Bengalee* people also alleged that the *Khasias* are continuously extending their territory and are rich. Abdur Rashid, Deputy Ranger and Delwar Hossain Khan, Range Officer of the local Forest office claimed that the area is under acquired forest declared by Forest Department long back. Moreover, setting up of the eco-parks won't evict the *Khasia* people from their *punjis*. *Khasia* people didn't accept this argument. While travelling in and around the *Punjis*, the tribal people were suggesting that the proposed project could be set up somewhere else. Agitation continues.

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land in 1956. The department neither claimed it, nor brought the area under any development plan. Incorporating the *punjis* within the project area was an arbitrary decision and the community claimed to have the right to be consulted. Which was denied in this case. Forest dwellers had the *defacto* right over the *panpunjis*, which was usurped by the *de jure* right of the state.

From the project document, it was interesting to note that out of Tk 10 crore budget estimate, nearly 70 per cent would be spent after infrastructure development, salaries for staffs, purchase of equipment and transport etc. If that be so, little fund would be left for nursery development and bio-diversity conservation in the eco-park areas. Started last year, the project is expected to be completed in 2004. Project document also made provision for charging a token fee for the devotees visiting the temple. Our experience from other projects shows that the commercial lessor never maintains or conserves the area from the fund thus generated. Moreover, who would be monitoring the development work of the eco-parks. Whether the local community, peoples' representatives and the *Khasia Mantri* would have a role to play in it. These issues are to be addressed.

It was time for us to say goodbye to Murarichhara. On our way back to Kulaura station, we saw the river *Fanai* meandering its way around the proposed eco-park site. As the water of the *Fanai* continues to flow, the children of Murarichhara with interest and enthusiasm hope that the proposed park would be shifted to some where else and not in their ancestral place.

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# World Bank's grim reminder

QUAMRUL ISLAM CHOWDHURY

IN its just released country assistance strategy (CAS), the World Bank for Bangladesh has highlighted some of the country's major environmental problem and its support to the nation's effort to combat those problems. Though, the CAS has a number of limitations, flows and methodological errors in its consultation process and has urban and elite biases, but it has rightly identified the major environmental problems.

Environmental problems in Bangladesh, the CAS said, range from widespread resource depletion and ecological degradation, to urban and industrial pollution and natural disasters. These environmental problems are linked to poverty in three distinct ways: by reducing people's livelihood, by affecting their health, and by increasing their vulnerability to the destructive impact of natural disasters.

Natural resource degradation affects the livelihood of nearly half the rural poor by reducing yields of agricultural, fisheries, and timber and non-timber forestry products. The public health impacts of pollution - including dirty and arsenic-laced water, lack of sanitation, and urban and indoor air pollution - account for nearly 20 per cent of all illness and death. Over the past 30 years, Bangladesh has suffered 25 per cent of all disaster-related damages in South Asia, the most disaster-prone region in the world, the CAS pointed out. The country is also particularly vulnerable to the projected impact of flooding increased cyclones, and sea level rise being brought about by global climate change. Progress in addressing these environment-related issues has been generally slow. Some successful steps have, however, been taken with regard to air pollution in Dhaka, industrial standards, cyclone early warning systems, and localised ecosystem management where there is both adequate research and local participation.

Nonetheless, the CAS said, addressing environmental concerns is essentially a governance issue - not a financial one - and Bangladesh's environmental problems are likely to worsen without improved information, policy reform and public sector accountability.

The CAS also focused on addressing social and environmental issues in partnership with other donors, IDA, the soft-lending arm of the World Bank, will support implementation of the Bangladesh's social development agenda, the Bank made the pledge in CAS. These activities include identification of performance indicators for gender outcomes and capacity building of project staff to undertake gender analysis, incorporation of gender and social inclusion concerns into the Group's assistance program, and knowledge sharing and capacity building for research and policy formulation related to social develop-

ment and advocacy on the importance of achieving national targets for elimination of child labour.

According to the CAS, the IDA would continue to ensure effective implementation of safeguard policies and address environmental concerns during project preparation. In addition, IDA has assumed chairmanship of the local consultative group on environment and is endeavouring to focus donor and government priorities on those environmental problems with the greatest poverty impacts.

The IDA will:

λ Support alleviation of air pollution through the recently approved Air Quality Management Programme.

λ Execute a UNDP-funded component of the Sustainable Environmental Management Programme (SEMP), emphasising improved information, legal systems, monitoring and compliance, and public disclosure in pollution control and environmental management.

λ Promote better environmental assessment procedures across all Government line agencies for donor as well as private sector-financed investments.

λ Implement the Energy Sector Management Assistance Programme (ESMAP) - funded advocacy programme for reducing vehicle emissions.

Bangladesh's economy, the CAS observed is also vulnerable to natural disasters of catastrophic proportions. In recognition of this, IDA must be prepared to consider additional assistance for post-disaster recovery through operations, similar to those provided in the aftermath of

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# Catalytic converters for clean air

DR M A HOSSAIN

THE air quality in the towns and cities are deteriorating day by day due to emission of black smokes and toxic gases by the automobiles, trucks, buses and lorries. In order to control the air pollution for the protection of public health, the government is thinking of imposing regulatory environmental laws for installing catalytic converters to the vehicles by the respective owners. This article is to give general information and create environmental awareness for the owners and users of vehicles and of general public about the catalytic converters.

A poor quality engine or an old engine in a transportation vehicle emits to the air unconverted hydrocarbons of the fuel and toxic gases such as carbon monoxide and NOx (pronounced nox) as combustion gases. NOx is a general symbol to represent together nitric oxide and nitrogen dioxide gas. When inhaled, nitric oxide, nitrogen dioxide and carbon monoxide, all of these gases produce breathing problems to humans and lead to cumulative health effects. As a result, these gases are known as human health hazards, toxic gases or carcinogens. Limitation of emissions or elimination of emission of these gases is a necessity for the protection of public health. A catalytic converter in a vehicle is a system in which the NOx, carbon monoxide and unconverted hydrocarbons of the fuel are converted into non-toxic gases. Generally, an effi-

cient catalyst converts NOx into nitrogen gas, carbon monoxide and unconverted hydrocarbons of the fuel into carbon dioxide and water. The carbon dioxide, though non-toxic is a powerful greenhouse gas and is responsible for climatic changes. The catalyst used in the converter is a finely divided platinum metal in very small proportion deposited over a carrier known as catalyst carrier. The whole mass is converted into a paste and coated over the inside surface of a stainless steel box with inlet and outlet. The box is generally fitted in between the outlet of the engine and of the inlet of the exhaust gas pipe. The combustion gaseous mixture containing nitric oxide, nitrogen dioxide, carbon monoxide and unconverted hydrocarbons of the fuel coming out of the engine passes through the box where in contact with the catalyst they rapidly converted into non-toxic gases and emitted through the exhaust pipe to the air. Platinum is highly active for the conversion and is resistant to oxidation. The catalyst must be free of impurities like lead, cadmium, zinc, nickel, chromium, mercury or rhodium. These metals undergo oxidation and emitted from the box to the air as metal oxides and remain suspended as fine particulate matter. When the polluted air is inhaled, these particulate matters penetrate deep into the respiratory track and remain adhered there. Human body cannot reject them. They damage the cells leading to serious diseases like cancer, problems of central nervous system.

In order that the system is effective and economically sustainable, the catalyst might guarantee a minimum active life for eight years with four to six running hours per day on average and six days and a half a week for a car for example. The coating and the catalyst itself must be resistant to high temperature, frictional forces due to collision by the gas molecules on the surface and inert to water vapor. Any erosion and rupture of the catalyst surface will lead to emission of very fine metal particles as well as catalyst carrier particles to the air. These particles are equally toxic to humans, cause pulmonary problems. If the catalyst is eroded or its surface is ruptured or the catalyst is deactivated, the catalytic converter have to be replaced by a new one in order to maintain regulatory air quality. While thinking of introducing catalytic converter in transportation vehicles to control air pollution by NOx, carbon monoxide and unconverted hydrocarbon of the fuel, utmost care should be given to guarantee the nature, composition, activity and texture of the catalyst. Otherwise, the problem of air pollution and public health effect will remain the same (if not deteriorated), only one will replace emission of some of the toxic gases by toxic suspended particulate matters.

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