

Aspiring for a clean and green city

"If future generations are to remember us with gratitude rather than contempt, we must leave them something more than the miracles of our technology. We must leave them a glimpse of the world as it was in the beginning, not just after we got through with it."

-- Lyndon B. Johnson

ZUBAIDA AKHTAR CHOUDHURY

STANDING on the 19th floor of IDB Bhaban all I could see was a pure, concentrated urban landscape. From north to south, east to west, the entire horizon was captivated by intense urbanization, in other words -- I was looking at the mushrooming Dhaka metropolis, which is to become the second largest city in the world by 2015.

The vastly expanding urban areas are giving rise to enormous socio economic and environmental issues, which are becoming quite a tedious matter for many countries to deal with. To bring this matter into the limelight the theme for the World Environment Day this year is: "Green Cities -- Plan for the Planet". The agenda is to give a human face to environmental issues and empower people to become active agents of sustainable and equitable development. It aims to promote an understanding that communities are pivotal to changing attitudes towards environmental issues and advocate partnership for a more prosperous future (UNEP, 2005).

The 30 million urban people of Bangladesh live in the country's 522 urban centers of which Dhaka is a mega city with a population of 13.2 million. 50 percent of the total urban population is concentrated in only four large cities (Dhaka, Chittagong, Khulna and Rajshahi) and over 30 percent in Dhaka city alone. Every year Dhaka receives more than 400,000 new migrants (Islam, 2005). Fulfilling the needs and providing shelter and utility services to such a vast number of new citizens besides the already existing large population of the city, is a massive task and this results in environmental degradation.

Having the largest urban population in Bangladesh, Dhaka has approximately 40 percent of its

We need to plan for our city and make it a better environment to live in. Whatever determines the fortune of our environment determines also the fortune of our people. Saving the environment is a vital task for all of us.



Although some parts of Dhaka have started to look clean but unclean slums also abound there (below)



population living in temporary shelters. A major problem has been the increase of slums and squatter settlements amidst mass poverty and inequity regarding basic amenities provisions. As the centre of

power and control Dhaka is also important for financial investment and profit. The resulting pressure has contributed to an exorbitant growth in land values and induces investors to use different means,

legal and illegal, to acquire land and to invest in development. In such a situation the urban poor bear burnt of insufficient resources, unemployment, and substandard housing. There remains many other prob-

lems such as traffic congestion and construction of roads round the year, poor garbage disposal mechanism, air pollution, inadequate supply of clean water, noise pollution, electric load shedding, poor drainage system and water logging, pesticide pollution, loss of urban greenery, parks and gardens.

The social and environmental conditions in Dhaka is declining at an astronomically fast pace. But the optimism in many of us to aspire for a cleaner and greener city is very strong. Our determination can help us plan for a better life in this mega city and for this matter we need to solve problems collectively and take initiatives. There should be formulation of long-term urban policy that will encompass urban transport action plan, strict land and housing regulations, and establish urban forestry strategies. National policy makers, city level authorities and formal private sectors should plan in such a manner that the urban poor are accommodated in the urban economy.

Several projects by the Government, Multilateral Agencies and NGO's have brought about some changes in the urban environment. The removal of the two-stroke engines and the introduction of the CNG automobiles, the ban of polythene and beautification of various parks and locations of Dhaka are some initiatives. These could serve as a foundation for the further enhancement and implementation of appropriate planning for our city. One very crucial scheme could be raising social movement against environmental degradation and dissemination of local level environmental information in the educational institutions.

We need to plan for our city and make it a better environment to live in. Whatever determines the fortune of our environment determines also the fortune of our people. We have the power to change our world and everything we do, say and think shapes our reality. Saving the environment is a vital task for all of us. We should treat the earth well, it was not given to us by our parents, it was loaned to us by our children.

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Women also need a safer environment

PARVEZ BABUL

IT is World Environment Day today. Government and non-government organizations in our country as well as worldwide have taken initiatives to celebrate the day. To ensure environmental sustainability is one of the Millennium Development Goals. The 189 member states of the United Nations have committed to:

- Integrate the principles of sustainable development in to country policies and programmes, and reverse loss of environmental resources;
- Reduce by half the proportion of people who are without sustainable access to safe drinking water; and
- Achieve significant improvement in lives of at least 100 million slum dwellers by 2020.

In developing countries like Bangladesh, most women are not allowed to shape policy or make decision about the environment even though such decisions often affect them in disproportionate and negative ways. But if women took part in decision-making, our lives would improve. In urban slums and rural areas, women are responsible for collecting water, fuel, fishing, home gardening, planting, feeding, etc. But yet their destiny does not allow them to get the chance to make decisions! This is why we cannot expect a safer environment for all without women's active and necessary participation in planning and decision-making to implement the projects by 2015 or after.

We need to bring women into decision-making on the environment. Their participation is crucial, especially in the developing world. Here women are not entitled to say anything, but they are measurably effected frequently by environmental policy changes, deforestation, water scarcity, soil degradation, exposure to agricultural and industrial chemicals, organic pollutants, etc. which impact on women's workloads, nutrition, nutrition and health, etc.

Impacts of environmental degradation on women

In most developing countries, women participate in economic activities like farming, fishing, producing fruits, selling, etc. Additionally, they are responsible for domestic tasks like cooking, gathering wood for fuel, hauling water, nurturing and caring for children, tending to elderly members of the household, etc. The wide range of women's daily interactions with the environment to meet household needs means they are often affected by its degradation.

The amount of time and energy women spend on household duties can dramatically increase as resources are depleted. Deforestation makes collecting wild herbs, fruits, natural medicines, fuel wood for cooking, boiling water, etc more difficult. When women need to travel further distance, take more time to collect fuel wood and water, girl children are often taken out of school to assist their mothers.

The energy which is used to carry water may consume one third of a woman's daily calorie intake. In areas where water is in particularly short supply, women use even more energy, putting them at risk of malnutrition and reducing their economic productivity. Women and girls suffer most in places where they eat last and least. Exposure to certain agricultural and industrial chemicals and organic pollutants increases women's vulnerability in pregnancy and childbirth. Stillbirths are linked to expectant mothers' pesticide exposure.

Women's voices are essential

Around the world, lack of women's representation in government limits their influence over governance and public policy. Worldwide, women held only 14 percent of seats in parliaments. Though women are keenly affected by environmental degradation, but yet they are scarcely involved in environmental policy at local and national levels. Women's limited participation means their perspectives, needs, knowledge and proposed solutions are directly and indirectly ignored.

Women need official channels to reflect their needs and to give them a voice in environmental decision-making. To bring the women into the mainstream, the government as well as NGOs, scientists, environmental experts, civil society, and every concerned individual should work on their behalf. Helping women will be helpful for us to conserve natural resources, protect biodiversity, and promote equitable and sustainable development.

Though Bangladesh has attempted to bring more women in to the decision making process by setting aside seats specially for them within national and local

government. But side-by-side, the women need better training, better education, and greater power and authority to be involved from the outset in planning, implementing, and evaluating policies and programmes. On the other hand, gender equality reduces poverty, supports economic growth, encourages good governance and promotes better quality of life.

Nobel laureate Amartya Sen has said, "advancing gender equality, through reversing the various social and economic handicaps that make women voiceless and powerless, may also be one of the best ways of saving the environment." So, to develop sustainable solutions of environmental problems, the voice of women must be heard. In the World Summit on Sustainable Development in South Africa (2002), world leaders drafted a declaration highlighting women's participation in decision-making for a safer and healthy environment. The active and effective participation of women should be elaborated and emphasized in the PRSP (poverty reduction strategy paper).

Women's role in food security

Women play a vital role in food security. That's why:

- Agricultural productivity increases dramatically when women get the same amount of inputs as men get;
- Gender differences in property rights hinder management of natural resources;
- Increasing women's human capital is one of the most effective ways to reduce poverty;
- Increasing women's assets raises investments in education and girls' health;
- Women's education and status within the household contribute more than 50 percent to the reduction of child malnutrition; and
- Good care practices can mitigate the effects of poverty and low maternal schooling on children's nutrition.

But the fact is that women are not counted in the household to provide them nutritious foods they need. In patriarchal societies, husbands control most of the resources and women's in-laws decide what is to be cooked or eaten even at the time of women's pregnancy and lactation. Also preference for sons is greater and girl children are neglected always. As a result women are being habituated to say less, get less, eat less, learn less, and above all to expect less.

So, to turn the negative into positive for women, we should:

- Reform and monitor legal, social, and cultural institutions to improve the status of women;
- Be innovative in the design of agricultural, food, and nutrition programmes; and
- Design projects to be more sensitive to the livelihoods of women.

Legal, social, and cultural institutions need to be changed to create an environment as women can realize their full potential.

Women in PRSP

The environmental aspects of health and vulnerability due to climate change and natural resources need more attention in the PRSP. The additional cost of improved environmental management should be included in the budget. The PRSP should make clear what the environmental strategy actually is. It should also outline how women will get their fair share and how the women-friendly environment will be created.

The WHO estimates that one third of all diseases in Bangladesh are environmentally attributable, including 90 percent of diarrhoea and 60 percent of acute respiratory infection cases. The challenge for the final PRSP will be to refine the health strategy so that it also addresses the underlying environmental causes of ill health of Bangladesh and also to come up with solutions.

Improved environmental management skills are needed in both government and the private sector. The importance of women and community participation in both the design and implementation of the PRSP should be emphasized. Also further attention should be given to involving women in environmental management of the rural industrialization and privatization of state enterprises.

As part of celebrating World Environment Day, let us come forward to save our world by ensuring a safer and better environment for women.

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The climate change threat to development

MD. SAEEDUR RAHMAN

ACCORDING to media reports, the highest ever recorded temperature in the country was 45.1 degrees Celsius in 1972. The nation is now passing through another long dry spell with temperatures reaching 43 degrees. We should be aware of the threat posed to Bangladesh by climate change and rising temperatures.

The universe from time unknown is in a continuous state of adjustment for attaining a condition of dynamic equilibrium by balancing the unknown variables of the space system. Climate is one such variable which influences life on this planet. The concern is the vulnerabilities of these living beings to the accelerated change process of the climate arising out of increasing temperature.

The Kyoto Protocol to the United Nations Framework Convention on Climate Change drafted and signed back in 1997 came into force on February 16, 2005 following ratification by the Russian Federation. Under this protocol, thirty-five industrialized countries and the European Community have become legally time bound and target oriented to reduce their combined emissions of six major greenhouse gases.

Over the last century, the global sea-level rose by 10 to 20 centimetres according to the 2001 estimate of the Inter-governmental Panel on Climate Change (IPCC). More recent studies by Australian scientists reconfirm that atmospheric temperatures are increasing, oceans are becoming warmer, sea levels are rising, and rainfall patterns are changing. The amount of sunlight reaching the Earth's surface directly is falling. The World Health Organization estimates that climate change is responsible for killing 150,000 people every year across the world.

Further, the ice-cap will be free by the end of this century. Rising sea levels will rise further. Dwindling flow will reduce hydro-electric power generation and disable irrigation, impacting world food production. The changes in the pattern of precipitation rates will also result in more frequent droughts and floods that would impact adversely on poverty reduction efforts. The low-lying deltaic regions will immediately face two consequences: first, structures located unprotected will permanently be inundated, and second, the rise in sea-levels will intensify the erosion rates risking further the foreshore and back shore structures. The withdrawal of freshwater upstream and reduction of flow may flatten the supply amplitude during the dry seasons.

In Bangladesh, the question is more what can happen rather than what can be done, because in terms of total emissions, we are not a big polluter. But Bangladesh is already experiencing the climate change impacts. The nation's coast is frequented by storm surges, and as such, the climate change impacts are neither unknown nor unthinkable. The recent tsunami was not linked to climate change, but its impacts on the coastal communities registered the

visibly measurable vulnerabilities of the hard-core poor to the potential adverse impacts.

The government is yet to portray adequately its initiatives in the climate issue except establishment of a cell. Nevertheless the people are experiencing nature's strange behaviour. Research carried out by the Meteorological Department revealed that from 1961 to 1990 the annual average increase in temperature is 0.0037 degrees Celsius. During these 30 years, increase in annual average rainfall has been 4.9323 mm. From 1990 to 2000, the rate of increase in temperature is comparatively higher, i.e. 0.0072 degree Celsius, while the average annual rainfall during this decade has decreased remarkably. Rise in sea level by 7.8 mm per year on the south-eastern coast has also been evidenced in the study. The Bruun rule says a sandy shoreline retreats about 100 metres for every metre rise in sea-level, which clearly signals huge loss of country's land mass. The loss of non-mangrove forestry in Kuakata on the south-west to the bay is one example. The landward expansion of sea water irrigation in the salt farms and shrimp fields in Teknaf in recent times is another indicator of sea level rise.

The National Water Management Plan, using climate change models, assessed that by 2050 the progressive changes in rainfall and evapotranspiration will result in increased crop water requirement, as much as 25 percent above the current demand. The predicted increase in peak season period rainfall will be about 28.6 percent higher, causing increased flooding. Sea level has been projected at 44 cm rise by 2050 resulting in continued sedimentation of the river beds and flood plains, obstructing the upland drainage. The impact analysis of severe cyclone events on the coastal population demonstrates that at 100-year return period about 4 million people will be at high risk of devastation from saline flooding arising out of extreme hydraulic events. The analysis further indicates increased surge height of between 5 and 20 percent. In developing the water plan, the potential impacts of climate change from global warming has been labelled as knowledge gap.

The coastal lands of Bangladesh are delineated at 47,000 sq.km. The population is 36.8 million with density about the same as compared to the rest of the country. With 24 percent extreme, the poverty rate is 52 percent, as against 49 percent for the whole of the nation. About one-sixth of the tropical storms generating in the Bay of Bengal hit the coast. The backshore is currently protected from minus-climate hydraulic events by 654-km of sea-facing embankments beached between the high and the low tide lines. The coastal community is protected by a cluster of 123 polders and nearly 2000 shelters flanked by a proven effective system of disaster management under limiting conditions.

It is apparent that adaptations to climate change are focused on mitigation. Water resources professionals in many parts of the world are

considering how to adapt to the threats posed by climate change. A broader view of the multiple stresses on water resources shows that there is a need and an opportunity to address simultaneously the current adaptation deficit and to incorporate adaptation to reduce future stresses due to climate change. Imaginative adaptive measures for Bangladesh are sea walls, water drainage, relocation, afforestation and, overhauling of the existing coastal infrastructures, albeit not all of them are within affordable means. There are many other climate change dimensions. Despite inadequacy of understanding, awareness, realisation, capacity and, largely the limitation of resources, the government may start with instant-multiplication of its ongoing efforts mentioned below what may eventually partially circumvent the future impacts of the climate change:

- Sustainably developed and managed foreshore forestry, farms, and grasslands over a period of time will primarily reduce the increased surge heights, foreshore erosions and damages by cataclysms resulting from sea level rise. The ribbon forestry will have the capacity to ameliorate climate change by storing more carbon in soils, plant material, and wood products, effectively removing significant amounts of the major greenhouse gas carbon dioxide from the atmosphere.
- The renovation of existing coastal infrastructures, in particular the sea-defence embankment by blanket cover of low cost octagonal hollow concrete units (for example at Chokoria-Cox's Bazar) that has already proven to be an effective measure for long term sustainability against increased coastal erosions. Such strengthening will reduce the annual operation and maintenance cost by its distribution over a period of at least 20 years. The design of the embankment is also flexible and compatible to resultant hydraulic events from the rising sea levels.
- The cluster of the polders gradually developed over the century in succession shall require to be integrated and harmonised in a manner under composite planning to function in sequence with respect to its structural stability, salt and freshwater blending and, upland drainage in particular. The innovative local agro-economic practices adaptive to the change process shall have to be tapped in facing the vulnerabilities and harnessing the opportunities.

The core of development programmes should as such be built on integrating and mainstreaming the climate change issues into good practices. If the impact of climate change is not addressed, Bangladesh will be disproportionately affected in agriculture, health, and water. Agriculture being the largest sector for rural labour employment, its impacts on food security will be a threat to the nation's existence. The FAO has recently warned that climate change will increase world hunger. Climate change together with withdrawal of water upstream in tandem with the increased sedimentation downstream may lock up Bangladesh in a year-round water-trap, turning it even into a life-free land mass. The struggle to fight

against poverty and mandate to manage natural resources will be lost unless climate change response strategies are developed and implemented at local, regional, and continental levels.

The vision statement of the draft Poverty Reduction Strategy Paper (PRSP) recognizes that regional variation in poverty is influenced by the incidence of natural hazards and tends to be higher in disaster-prone areas, and as such, it includes ensuring disaster management and preventing environmental degradation for overcoming the persistence of deprivation. It is unfortunately evident that climate change issues in practical terms have not been given much

thought in the national strategy for poverty reduction. Climate change impacts may continue to be a concomitant threat to the government's PRSP by further widening the gap between the rich and the poor, and eventually, the developed and the developing globally. Therefore, without climate change issues in the forefront, the PRSP may not be as efficacious as designed.

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How likely is flood this year?

The El Nino-Southern Oscillation (ENSO) and seasonal climate connection

DR. MD. RASHED CHOWDHURY

THERE is evidence of teleconnections between the strength of El Nino and climate anomalies in Bangladesh. Although the El Nino-Southern Oscillation (ENSO) affects one-quarter of the globe to a significant extent, the scientific research in Bangladesh relating to ENSO is just beginning. The prime objective of this article is to provide an improved description of the ENSO-related flooding picture for the coming monsoon in Bangladesh.

Previous observations in 1982/83, 1987/88, and 1997/98, revealed that Bangladesh rainfall maintains strong relation when SOI (Southern Oscillation Index) extremes, and indicated negative values of SOI (-0.8 or lower) to dry extremes (less rainfall and basin-wide dry condition) and positive value of SOI (+0.8 and higher) to wet ones (more rainfall and basin-wide wet condition). Major El Nino years like 1951, 1958, 1972 recorded significant deficits in monsoon seasonal-average (Jul-Aug-Sep) rainfall: -38 per cent in 1951, -48 per cent in 1958, and -10 per cent in 1972. Similarly, all the major (strong) La Nina years (1964, 1973, 1988 and 1998) recorded excessive rainfall - the increase was: +4 per cent in 1964, +8 per cent in 1973, +30 per cent in 1988, and +10 per cent in 1998.

In case of moderate anomaly in the SOI (-0.4 to -0.8 and +0.4 to +0.8), the index-climate relation appeared to be contradictory - any definitive conclusion on climate forecast is difficult from this moderate index values. For example, while the moderate La Nina years (1956, 1970, 1971, 1984, and 1999) recorded excessive seasonal rainfall: +1.7 per cent in 1956, +11 per cent in 1970, +5 per cent in 1971, +18 per cent in 1984, and +12 per cent in 1999, the moderate El Nino years (1963, 1965, 1969, 1974, and 1987), instead of rainfall deficit displayed a tendency of excessive seasonal-average (Jul-Aug-Sep) rainfall: +18 per cent in 1965, +16 per cent in 1969, +7 per cent in 1974, and +34 per cent in 1987. In particular, Bangladesh is always found to be wetter than normal during the moderate La Nina years, however, Bangladesh is not always drier than average during the moderate El Nino years (for example, 1987). Instead, moderate El Nino years provided a wetter climate during the onset of El Nino event (in June-July-August) and a drier climate during the full maturity cycle of El Nino event (in October to June of the following year).



Monsoon flooding: Typical of Bangladesh

It has to be remembered that we need to monitor the full climate cycle of ENSO (usually 1-year) not the period of onset (usually 3-months only). Just for information to the readers, ENSO usually starts to develop in summer (May-June-July), reaches its peak phase in the following winter (October-November-December), and gradually loses its punch through the spring (April-May-June) of the next year. Therefore, to observe the impact of ENSO, it is essential to monitor the ENSO phenomena from the year of onset of event to the full maturity cycle of ENSO (usually the monitoring process starts in July and continues up to June of the following year, i.e., July/2004 to June/2005).

Consistent with the previous findings, Bangladesh displayed a wetter climate (more rainfall and basin-wide flooding) during the summer of 2004. However, as the year advanced, drier climate (less rainfall than the long-term mean average) became very distinct. Because of negative SOI from November to February (the SOI was exceptionally negative (-4.1) in February) particularly the months from December 2004 to February in 2005 was extremely dry. One study of the same author found that the Ganges basin is more sensitive to ENSO signal and, therefore, the north to north-western part of Bangladesh was severely affected by drought.

ENSO and seasonal flooding: Causal connection

When SOI is negative (i.e. strong El Nino years), the whole Ganges-Brahmaputra-Meghna (GBM) basin experiences less rainfall. The deficiency of rainfall causes Bangladesh rivers to be drying because of low-flow and, as a result, the country faces severe drought. On the other hand, when SOI is positive (both in strong and moderate La Nina years) there is significant increase of rainfall along the greater GBM basins causing flooding along the whole catchments. This, in turn, severely floods Bangladesh, as it is the lowest riparian country in these basins. However, in case of moderate SOI-rainfall relationship (moderate El Nino years), the basin-wide rainfall picture in downstream Bangladesh is relatively different from upstream India. During the onset (Jul-Aug-Sep) of moderate El Nino years (1963, 1965, 1969, 1974, and 1987), previous findings show that, other than slight rainfall deficit in the Meghna basin (-4%), Bangladesh experiences higher than average rainfall in the Ganges (+13.6%) and Brahmaputra (+20.4%) basins. Observation also revealed that, in most of the moderate El Nino years, the basin-wide upstream rainfall (Jul-Aug-Sep) is less dominant (marginally above/below from the long-term mean average) for flooding in the downstream Bangladesh; it is the exceptionally high and prolonged local rainfall mainly contributing to flooding in the downstream Bangladesh.

ENSO-2004/05 and Bangladesh flood

According to Climate Prediction Center (CPC), based on the recent evolution of SST anomalies and on a majority of the statistical and coupled model forecasts, it seemed most likely that weak warm episode (El Niño) conditions would continue to weaken during April-June and that ENSO-neutral conditions prevail during the summer of 2005 (web page at <http://www.cpc.ncep.noaa.gov>). Some lingering effects of the weak warm episode, such as drier-than-average conditions might continue to be experienced for a month or two. According to the International Research Institute for Climate Prediction (web page at <http://iri.columbia.edu/climate/ENSO/>), sea surface temperatures in the east-central equatorial Pacific have returned to near-normal or ENSO-neutral conditions, although they remain above-average throughout much of the equatorial Pacific. Based on the latest observations and forecasts, it is 70 per cent likely that neutral conditions will prevail over the May-Jun-Jul 2005 season. Out of a large set of dynamical and statistical forecast models, approximately 30 per cent predict sea surface temperatures at weak El Niño levels for the May to July period in the central Pacific. Overall, based on model forecasts and current observations of the ocean surface and subsurface, the chances for returning to El Nino conditions are approximately 30 per cent through July 2005, increasing very slightly thereafter. The likelihood of maintaining neutral conditions is approximately 70 per cent through July 2005, and neutrality remains the most likely scenario through the end of 2005. The probability of a La Nina developing between now and July 2005 is near zero, rising to 5 per cent thereafter. (Only models that produce a new ENSO forecast every month are included in the above statement). So, based on these above findings, any unusual and exceptionally high rainfall is unlikely to occur in the greater GBM basin system during the month of June-July-August of 2005. Bangladesh is, therefore, unlikely to face any severe flooding this year. This is a probabilistic forecast that is based on monitoring of the ocean and knowledge of how the atmosphere has responded in the past to similar SSTs in Bangladesh, with a variety of lag times.

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