

MANGROVE FOREST

Bio-shield to natural disasters

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MANGROVES are the salt-tolerant forest ecosystems that evolve in the transition zones between terrestrial and marine environments of tropical and sub-tropical areas of the world. Mangrove forests currently occupy 14,650,000 ha of coastline globally. The Bangladesh coast supports about 587,380 ha of natural mangroves and a further 100,000 ha of planted mangroves, locally known as Perabon, and mostly distributed in the intertidal zone.

There are numerous ecological and economic benefits of the mangrove ecosystem. The fringe-like root system of mangroves act as a coastal soil stabilizer and binder of sediment and so aid in preventing erosion in the coastal areas. Moreover, mangroves provide goods and services among the local community, viz., household necessities (firewood, housing materials, and boat making materials), herbal plants for traditional medicines, honey and also protect lives and property from cyclonic storms.

From Sundarban mangrove forest, an average of 6000 ton/ha mangrove litter is released per year. After decomposition of this huge quantity of litter through mineralization process, enormous amount of organic nutrients are released in coastal ecosystem. This is a great source of natural food for aquatic organisms.

According to United Nations Environmental Programme

The mangrove forest has been subjected to heavy human interference. A recent survey by the Institute of Marine Sciences and Fisheries indicates that mangrove areas are becoming smaller or fragmented and their long-term survival is at risk.

(UNFP), the annual economic value of mangroves, estimated by the cost of products and services they provide, has been estimated to be US\$200,000-9000,000 per ha. Another economic survey by World Conservation Union (IUCN) indicates that intact and healthy mangroves can have an overall yearly use value of as much as US\$14,000/ha/household. The yearly protection value of mangroves is estimated at around US\$2,000 per household.

On 26 December 2004 the largest earthquake in 40 yrs (seismic magnitude MW=9.0) produced the most devastating tsunami in recorded history, killing more than 283,000 people throughout the Indian Ocean region. The earthquake was so powerful it wobbled the Earth's rotation. The tsunami triggered by seismic event swept across the Indian Ocean at speeds upto 800 km/hr, with succeeding waves reaching heights of upto 30 m. Along with vast numbers of people, man-made and natural structures and habitats were destroyed or damaged, including coral reefs, mangroves, beaches, seagrass beds, and other coastal vegetation.

Several reports based on initial

post-impact surveys in southeastern India, the Andaman Islands, and Sri Lanka indicated that mangroves offered a significant defence against the full impact of the tsunami. The presence of mangroves saved lives along the Tamil Nadu coast of southeast India. Measurement of wave forces and modeling of fluid dynamics suggested that mangrove vegetation may shield coastlines from cyclone, storm surge and tsunami damage by dissipating incoming wave energy and reducing the erosion rates. Besides, the wave-driven, wind-driven, and tidal currents also reduce due to the dense network of trunks, branches and above ground roots of the mangroves.

Analytical models show that 3000 trees/ha in a 100 m wide mangrove belt may reduce the maximum tsunami flow pressure by more than 90 percent. These benefits are not found in artificial coastal protection structures. The artificial sea defences were not only expensive to build and repair, but they were also, in many cases, ineffective.

But the mangrove forest has been subjected to heavy human

interference. A recent survey by the Institute of Marine Sciences and Fisheries indicates that mangrove areas are becoming smaller or fragmented and their long-term survival is at risk. Their satellite image and Geographical Information System (GIS) based research revealed the spatial distribution of only about 37,600 ha mangrove forest in lower Meghna islands, Noakhali, Feni, Chittagong and Cox's Bazar coast. The factors responsible for the destruction of mangrove forest are unplanned shrimp farming, salt production, removal of forest produces for fuel wood, grazing pressure, and human settlement.

In addition to these, the fishermen build dams in the mouth of the creeks, thereby disrupting tidal inundation and causing water stagnation. For this change in hydrology, the seedlings in stagnant water fail to survive, which seriously affect natural regeneration of mangrove forest.

Given the backdrop of increasing natural disaster around the globe it is imperative to fully enhance conservation of its coastal belts of shelter woods so as to improve protection against typhoons, storm tides, tsunami and other catastrophic consequences. Action has to be taken for plantation, restoration and development of mangroves in the required coastal areas.

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The elite's failure

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OVER the past decade the Kyoto Protocol has shown us just how difficult it is for countries to make real and deep cuts in their carbon emissions. During this time, emissions have soared by over one percent a year, and are projected to begin rising soon by up to 2.5 percent a year. Emissions are growing beyond imagination and way faster than even worst case scenarios. Every year the science becomes more dire -- abrupt climate change of horrific speed and consequences looms. The Earth System needs cuts of emissions of at least 3 percent a year, and almost undoubtedly more, to avoid civilization ending abrupt and runaway climate change.

Sadly, the truth is simply that the cuts in emissions of greenhouse gases necessary to halt climate change below a dangerous level are now almost certainly beyond what human society can achieve in the timescale required while maintaining the status quo political consensus and economic growth.

Faced with overwhelming science and democratic expressions of public concern, the ruling elite have squandered decades, showing clearly they are incapable of taking the measures necessary to protect the Earth System. At the first sign of ecologically mediated economic downturn, they have jettisoned international political cooperation and urgent domestic measures. Because it would threaten their privileges, the elite have virtually assured destruction of the Earth and doomed the majority of people to hopelessness as we descend into chaos.

It is grotesque that the world's governments have spent tens of trillions of dollars to bail out a failed system that turns rainforests into cheap consumer items, shifts carbon into our only atmosphere, and views beautiful life-giving creation only in terms of money for its destruction. This willy-nilly effort to continue a deeply unsustainable economic system amounts essentially to governments directly paying people to consume. These funds could easily have solved every environmental crisis -- climate, forests, water and oceans -- and many other social problems, but instead were unquestioningly given to prop up criminal bankers and the corrupt system which exists to liquidate ecosystems. We can only hope the economic downturn will mean less consumerism and environmental destruction.

Governments are miserably failing to lead. From Australia's 5 per cent carbon reduction target, to Europe's rainforest based biofuel aspirations, to the U.S.'s endless dithering -- the global growth machine has proven unwilling to release its death grip upon power. And while Obama's rhetoric is welcome, in all likelihood the magnitude of ecological change required is beyond what can occur within a majority rule democracy firmly in control of the polluting elite.

Obama is a great man, and appears concerned about climate change, but he is unlikely to overcome the economic and political system's utter suicidal dependence upon growth at all costs in a finite world. We all hope Obama can overcome oil oligarchy rule, and in a time of recession, get the right wing wackos to realize we need to cut carbon emissions by 80 per cent as soon as possible, and put in place a sizable carbon tax. But realistically, it is not going to happen. Obama is certainly better than war and eco-criminal Bush, yet just how much transformational change can a President be expected to make goes right at the privileges of the elite.

One person cannot bring about the transformative changes necessary from within a system whose whole purpose is to destroy ecosystems for increased consumption. He cannot do it alone, but a protest movement and credible revolutionary threat can give him and others in power more room to advance the ball. That is, a credible radical revolutionary threat can increase the political space to carry out difficult policies. Social change has always primarily come about only when the elites are faced with losing their positions of privilege, and must capitulate to avoid destruction.

Industrial, speculative capitalism based upon growth is going to end, along with the over-consumption, one way or another. The only question is whether after there will be habitat and ecosystems for continued human survival. This economic downturn will not be solved through greater liquidation of ecosystems for their resources. We need to return to the land and equitably meeting human needs, as we power down the Earth eating growth machine and begin an era of stewardship and ecological restoration.

It is ludicrous to despair over reductions in economic growth and money for consumption when these are precisely the measures required to bring humanity back into balance with the Earth System. It is difficult to not meet all of the "needs" marketers have hammered into our heads, particularly when our children feel it is their birthright. Yet it is time as parents to steel our will and cut back on consumption so that our children can survive.

The mainstream environmental movement has become an industry that profits from the existence of this myriad of ecological problems. They are fatally compromised and deeply in denial, failing to realize their efforts; even if fully realized, are insufficient by many orders of magnitude. Even the radical groups are confusing being well funded and on TV, with actually being effective at creating sufficient large-scale ecological social change. They completely fail to grasp the enormity of the global environmental challenges, the momentum behind population, consumption and ecosystem loss trends, and the magnitude of action required to save.

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PLASTIC POLLUTION

Emergent threat to health and environment

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SINCE the development of plastic in the fifties of the past century by German scientist, it has become a popular material used in a wide variety of ways. Of late, it is used even for producing boxes, utensils, doors and other commercial items. But unfortunately, because of the same useful qualities, it poses a serious and huge pollution problem. It can do great harm to environment as it doesn't decompose and requires high energy ultra-violet light to break down. In addition to using up fossil fuels and other resources, plastic products create litter and threaten the basis of life on earth.

According to an estimate, more than 100 million tones of plastic products are used every year all over the world. United States alone is producing over 25 million tons per year. In India, per capita plastic use is 2 kg per year while in the European countries it is 60 kg and in US 80 kg per year. Again, use of plastic materials and goods is more in urban area than in rural. Plastics thrown on land can enter into drainage lines and choke them resulting into floods in local areas in cities as experienced in Mumbai, India in 1998.

Human health: Many chemical ingredients used in manufacturing plastic goods including benzene, vinyl chloride, ethylene oxides, xylems and bisphenol A are linked with numerous health hazards and reproductive problems. For instance, bisphenol A, found in water bottles, has shown in lab test to disrupt hormones and is associated with obesity and diabetes. Besides, when the toxic chemicals contained in plastic products leach from packaging into food and thus enter people's bodies, they cause many tribulations including cancer, birth defects, hormone changes, respiratory problems, gastric ulcers, and eye and liver problems. In research, the Korean Institute of Health Research found that when meat, fish and vegetables are stored in plastic products, a heat is generated. This heat causes a chemical reaction and anaerobic bacteria are created, which speed the rate at which meat and fish spoil. Drinking lemon tea from a plastic or styrofoam cup can cause a dangerous chemical reaction

when the acid in tea and lemon mixes with the plastic or styrofoam. This causes an increase in the risk of ulcer and cancer.

Pollution of air: The manufacturing process of plastic products in plastic industries releases huge quantity of dangerous gaseous chemicals into the air including carbon monoxide, dioxin and hydrogen cyanide. These gases pollute air seriously. The presence of these gases in air at high proportion is detrimental to both human and animal health. They may cause respiratory diseases, nervous system disorders and reduction in immunity to diseases.

Pollution of soil: Soil, one of the most valuable natural resources, is also badly affected by plastic pollution. Many times both consciously and surreptitiously we dispose of plastic products on land. As plastic goods never biodegrade completely, remnants remain in the soil, disrupting the process of water and oxygen absorption. Besides, plastic remnants also block sunlight. So the sun cannot warm the soil properly. As a result, the helpful bacteria die and the soil's fertility reduce. Ultimately it results in declining crop yield.

Pollution of water: Apart from the scarcity of drinkable water, we are facing a serious problem of water pollution by plastic waste. Very often we dispose of discarded plastic products in different water bodies including lakes, rivers, ponds, etc. The lakes in the mega city of Dhaka may be the best example of pollution by plastic bottles, canes, bags and other plastic products frequently thrown by the visitors. The presence of plastic wastes in water bodies disturbs the natural flow, limits the ability of fish to reproduce and destroys helpful organisms.

Marine biodiversity: By discarding plastic thoughtlessly especially fishing gear and packaging, people are accidentally causing the death of millions of mammals, birds, reptiles and fish every year. Plastic can affect marine wildlife in two important ways: by entangling creatures, and by being eaten. Turtles are particularly badly affected by plastic pollution. Turtle gets entangled in fishing nets and many sea turtles have been found dead

The problem of plastic pollution is serious and requires further urgent study. Yet, we should not go without realizing the truth that plastic is not itself a problem. Rather it is more useful, popular and really fantastic because of its appealing qualities. Truly the problems are with us; problems are improper production process, uses and careless and thoughtless disposal.

with plastic bags in their stomachs. It is believed that they mistake these floating semi-transparent bags for jelly fish and eat them. One dead turtle found off Hawaii in the Pacific was found to have more than 1000 pieces of plastic in its stomach including part of a comb, a toy truck wheel and nylon rope. A recent US report concluded that 100,000 marine mammals die each year in the world's oceans by eating or becoming entangled in plastic rubbish. Besides, a large number of marine creatures become trapped and killed in 'Ghost nets'. These are pieces of gill nets which have been lost by fishing vessels. Commercial fishing fleets are estimated to have lost nearly 300 million pounds of plastic fishing gear in one year alone. World wide 75 marine bird species are known to eat discarded plastic particles to their peril. South African seabirds of about 36 species are among the worst affected in the world. Plastics may remain in the stomachs, blocking digestion and possibly causing starvation. It can choke, block the intestines of, or cause infection in those animals that consume it. Lost or discarded monofilament fishing lines can foul propellers, destroying oil seals or it can become an entangling web for fish, sea birds and marine mammals. Fifty five of sixty chicks that were subsequently examined on Hawaii Island had died with their stomachs full of plastic trash.

Global warming: Apart from the above impacts, some scientists believe that the bobbing bits of polymer in the oceans could contribute to global warming by creating a shaded canopy that makes it harder for plankton to grow. It

needs no telling that the plant kingdom is the universal carbon sink.

Bangladesh perspective: Quite a few decades ago, Bangladesh was not familiar with the multiple uses of plastics. But in recent years, particularly its large cities, have experienced a widespread and growing use of plastic products. As a result, Bangladesh is also facing all of the environmental, economic and health problems caused by plastic pollution. Taking the environmental issue into account, Bangladesh government imposed a ban on polybags on 1st March 2002. But, unfortunately, of late polybag and other poly products are gradually coming backing in business (The Daily Star, September 13, 2008). Notwithstanding the current relatively low use of plastic products this is an opportune time for policy makers to formulate measures and for general users to change their habit and choice to environment-friendly natural fiber products as practical alternatives. Otherwise, the longer we shall wait, the more difficult it will be to change people's habit.

Reduction strategies: Reducing plastic pollution is a bit complicated job. However, here are suggested some control strategies that we can take to reverse the tide of toxic, non-biodegradable pollution.

- At personal level, buy no plastic bags, use water purifying device rather than using plastic water bottle, look for Earth-friendly packaging choices, do not dispose of plastic in the sewerage system and water ways, dispose of plastic and other litter in the bins provided at the beach.
- At organizational level, do not produce the plastic that can't be recycled.

Plastic wrappings and bags should carry a warning label stating the dangers of pollution.

At national level, adopt a "zero plastic waste" policy, accelerate research into alternatives, subsidize producers of bio-plastics, support and promote recycling schemes, draft a law to control the use of plastic products, raise tax on plastic products, reduce tax on environment-friendly alternatives and raise public awareness about harmful effects of plastic products and benefits of their alternatives through TV, radio and newspapers.

Concluding remarks: The problem of plastic pollution is serious and requires

further urgent study. Yet, we should not go without realizing the truth that plastic is not itself a problem. Rather it is more useful, popular and really fantastic because of its appealing qualities. Truly the problems are with us; problems are improper production process, uses and careless and thoughtless disposal. Now, we all should build up a habit of reduction, reuse and recycling of plastic products for conscious consumption. Let us brood over the issue do the duties and discharge responsibilities, normally and ethically bestowed on us, towards a plastic pollution-free environment.

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