

# Feature EnvironmentWetland Resources and the Ecology of Bangladesh

**B**ANGLADESH possesses enormous areas of wetland. These are mainly rivers and streams, freshwater lakes and marshes including haors, baors and beels, water storage reservoirs, fish ponds, flooded cultivated fields and estuarine systems with extensive mangrove swamps. There are about 700 rivers and their tributaries in Bangladesh, the estimated total length of which is 24,140 km. An international convention adopted at Ramsar in Iran in 1971 defined wetlands as areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.

Wetlands are invaluable components of the environment ecology, resource potential and biodiversity in Bangladesh. The important coastal and inland wetlands encompass the vast floodplain and delta system of the Ganges, Meghna and Brahmaputra rivers. The total area of wetlands in Bangladesh has been variously estimated at seven to eight million hectares or about 50 per cent of the total land surface. But these resources have suffered considerably from the impacts of a burgeoning human population. Bangladesh has demonstrated its concern for wetlands through the National Environmental Policy, convening a workshop on Wetlands and in signing the Ramsar Convention in May, 1992. The broad objectives of the Ramsar Convention are to stem the loss of wetlands and to ensure their conservation in view of their importance for ecological processes as well as for their rich flora and fauna.

**Wetland ecosystem**  
Globally, wetlands are amongst the most fertile and productive ecosystems and important breeding grounds for fisheries. They serve as a filtering system to clean up polluted water, protect coastlines from erosion and act as barriers against storm surges besides providing people with a wide range of staple food plants, grazing land and fuel. It is the dynamic interaction of the terrestrial and aquatic systems with people that make wetlands so environmentally valuable. Wetlands also provide

habitat for a rich variety of resident and migratory waterfowl. Their scenic beauty can support the development of tourism. Their resources play a significant role in other economic activities like extraction of reeds and harvesting of food plants and those of medicinal importance. Wetlands in Bangladesh have great ecological, economic, commercial and socio-economic importance. They contain very rich components of biodiversity of local, national and regional significance. Among the estimated 5,000 species of flowering plants and 1,500 of vertebrates in the country, up to 300 plant species and some 400 vertebrate species are judged to be dependent on wetlands for all or a part of their life span. Wetlands also provide habitat for a variety of resident and

*The important coastal and inland wetlands encompass the vast floodplain and delta system of the Ganges, Meghna and Brahmaputra rivers. The total area of wetlands in Bangladesh has been variously estimated at seven to eight million hectares or about 50 per cent of the total land surface. But these resources have suffered considerably from the impacts of a burgeoning human population.*

migratory waterfowl, a significant member of endangered species of international interest, and a large number of commercially important ones. The inland capture fishery is based on the vast freshwater resources with some 270 species of fish and shellfish.

There is substantial basis for the view that the country's natural resources, especially the Sundarbans could support the development of richer tourism. Wetlands also support a significant range of other activities such as extraction of reed, harvesting of edible aquatic vegetation and their products, medicinal herbs, shells etc. Cultivation of rice is a major activity in and around the wetlands of Ganges-Brahmaputra floodplain and haor basin. During the dry season, domestic livestock are allowed to graze in the marshes and turfs. Of late, wetlands are also used as duckery.

**Geomorphological importance**  
Each year about 2.5 billion tons of sediment are transported by the major rivers of Bangladesh having a profound effect on the geomorphology of the floodplain and the coastal region. Most of the silt, carried by the three mighty rivers, Ganges, Brahmaputra and Meghna is lost in deep sea in

**by Helal Ahmed**  
the Bay of Bengal. Some of this huge amount of silt is deposited on the shore in the Meghna estuary causing land accretion particularly in the southeast region of the country and forwarding of coastline towards the sea. The environment and ecology of the coastal region is characterized by the unique geophysical phenomena, such as surges and waves, upland discharge and sedimentation, erosion and accretion and storms and cyclones. The high sediment load exerts basic influence on the coastline and helped by circulation systems results in a net accretion of 35 km of land per year and erosion of the north-western part.

**Forest status**  
The construction of flood control embankments, dams

and barrages upstream may alter the geomorphological setting of the coastal delta with consequent changes in the process of both coastal accretion and erosion.

The forest resources have suffered the most cruel onslaught by man throughout the centuries but it is only the last half a century which saw the disastrous effect on the mangrove forest. The coastal area is extensively affected by salinity intrusion into the rice growing area even to the extent of eliminating rice production. The affected areas include major urban and industrial centres of Khulna, Chittagong, Satkhira, Jessore, Narail, Bagerhat and Gopalganj.

The flow of major rivers maintains the balance between the fresh water supply and the salt water intrusion from the sea. The outward flow of freshwater from rivers usually limits the entry of sea water into the water courses. Because of the interventions of the Ganges flow in the upstream, the major distributary, Goral gets completely dry during winter leaving the southwest region with little potential of freshwater flows to check the salinity intrusion adversely affecting agriculture, forestry, fishery industry and freshwater supply. High salin-

ity also affects the growth of mangrove vegetation bringing about changes in species composition. The recent increase in water and soil salinity has upset the natural equilibrium of the delicate ecological balance required for the healthy growth and existence of the rich flora and fauna. Grazing by livestock retards new growth and can lead to significant depletion of coastal plant community in the newly accreted mangrove forest area. Rapid conversion of dry season pasture land into shrimp farming and overexploitation of forest produce further contribute to the adverse effect on the coastal ecosystem.

**Haor basin**  
In its original form, the haor basin comprising of floodplain of the Meghna tribu-

taries would have consisted of a rich mosaic of permanent and seasonal lakes and ponds with abundant aquatic vegetation.

But through gradual sedimentation, the basin became shallower leading to the formation of reeds and sedges. This resulted in providing enough food and shelter for fish and other aquatic fauna and attracted the migratory birds which, in their turn, added to the fertility of the waterbodies by their excreta promoting rich growth of phytoplankton and macrophytes thus partly contributing to the process of eutrophication.

**Habitat of the migratory birds**  
The haor basin remains an internationally important wintering area for migratory waterfowl, principally ducks and shorebirds. Coastal wetlands support even larger number of migratory birds including some highly endangered species. There is an abundance of waterfowl and wetland-dependent birds occurring in the wetlands of haor basin. A total of 125 species of waterfowl are known to have occurred in the basin of which 53 are resident breeding species or breeding summer visitors. Birds largely or wholly

dependent on wetland ecosystems are 30 species whereas other birds observed in wetlands or adjacent floodplain and dry land are 42 and 123 species respectively.

**Wetlands as fisheries**  
The rivers of Bangladesh are estimated to have 6,300,723 ha of floodplain. Out of this the actual area recorded at the end of June 1985 was only 5,486,609 ha due to the drying up of a considerable area of seasonally inundated plains by flood protection measures.

The role of the inundated floodplain can be termed as central to the sustenance and continuation of the openwater fishery production system. Elimination and reduction of the functioning of these would naturally lead to the proportionate reduction in openwater fishery production as well as elimination of many species. Besides, the floodplain that remain inundated during the monsoon season, there are also beels which either retain water all the year or dry up fully during the peak of the dry season.

Another set of large waterbodies known as baors or oxbow lakes occur in the district of Jessore, Jhenaidah, Faridpur and Kushtia. A large man-made reservoir was created in Chittagong Hill Tracts known as Kaptai Lake, which covers an area of 68,800 ha. In addition, the country has nearly 1.3 million man-made ponds and reservoirs providing a total water area of 146,890 ha.

The coastline of the country bounded by the Bay of Bengal is approximately 480 km in length. The trawler fleet operating in the deep sea concentrates mainly on catching marine shrimps.

A total of 260 species of freshwater fish belonging to 55 families have been recorded in Bangladesh. About 56 species of prawns occur in fresh, estuarine and marine waters. The number of species of tortoises and turtles is about 25. In the marine water 475 species of fin fish are recorded. About 10 species of exotic fishes were introduced into Bangladesh until 1985.

Human action is constantly contributing to the decrease of wetland resources and affecting the ecology. The problem of degradation of wetlands need to be addressed urgently for the sake of sustainable development. — *BCAS Feature*

## On the Horns of a Dilemma

by Leopold Hatugari

**Rhinos have existed on Earth for more than 40 million years, but in less than a century its only predator — humankind — has reduced its worldwide population to 10,500 animals. President Bill Clinton is trying to coerce Taiwan, a major buyer of rhino horn, to stop the trade, reports Gemini News Service, but in Zimbabwe the policy is to discourage the slaughter by getting to the horns before the poachers.**

**E**CONOMIC sanctions to punish Taiwan for its failure to control the trade in rhino and tiger parts have been described by the London-based Environment Investigation Agency as "the last chance" to save the two species from extinction. The Agency was commenting on United States President Bill Clinton's decision to prohibit imports of wildlife specimens and products from Taiwan. It appealed for other

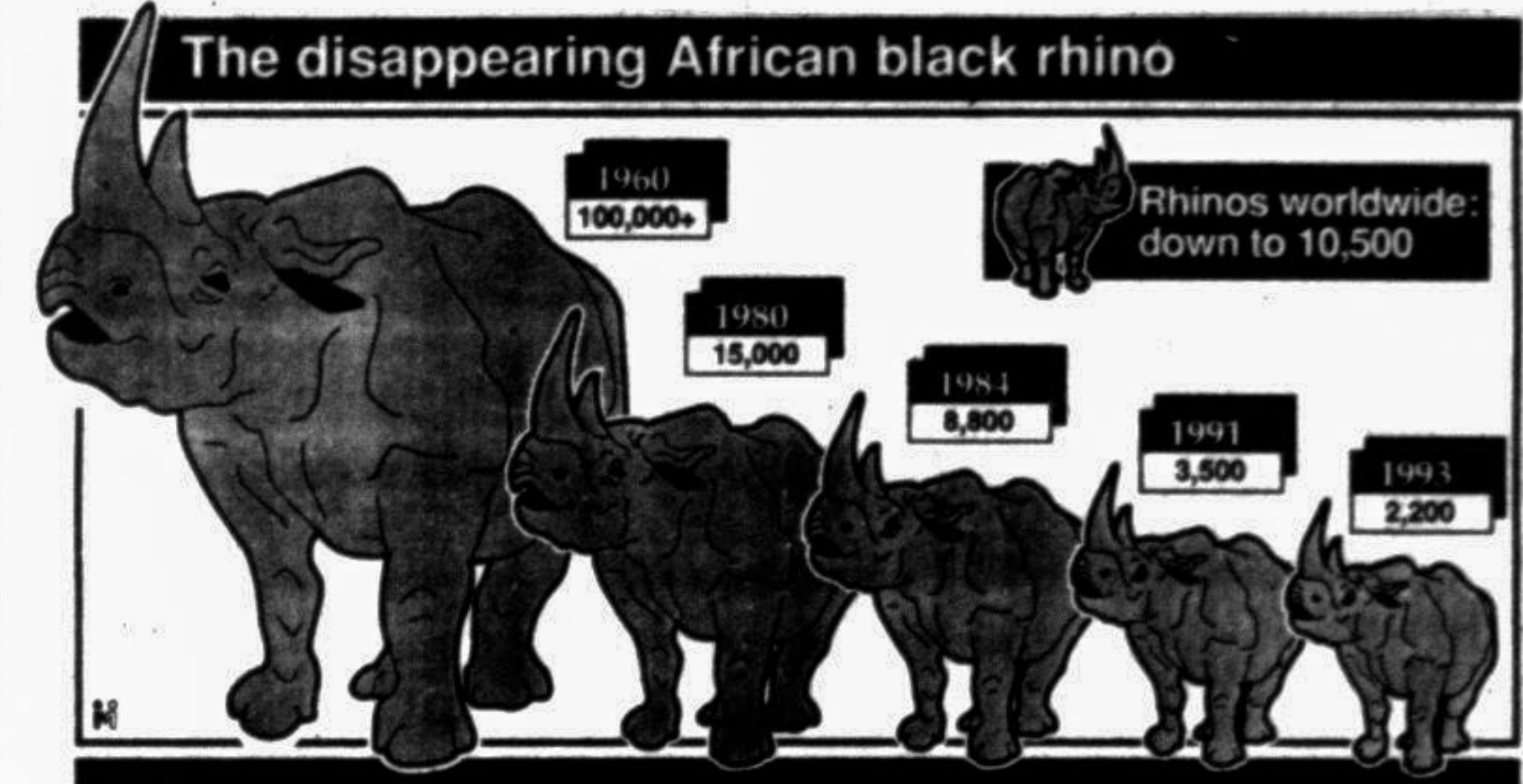
poachers crossed into the country from Zambia. It was a high risk business, because in the same period 158 poachers were killed. But lured by the money to be made, the poachers were not deterred.

With rhino numbers down to little more than 500 — compared with 2,000 in 1989 — de-horning was adopted. Naturalists and tour operators opposed the policy, arguing that it was cruel and would

base and the stumps neatly trimmed before being painted with a tar disinfectant to prevent infection.

An antidote to the drug is injected and within minutes the animals wake up and lurch to their feet.

The long-term effects of the operation — one of the naturalists' fears — are not known, but officials here say studies show that removal of the horns does not affect behaviour. Researchers monitoring the



countries to follow Washington's lead: "The US cannot do it alone."

Action is needed because rhino numbers worldwide are down to under 10,500. The African black rhino fell from 100,000 in the 1960s to barely 2,200 today.

Rhinos are killed mainly because of a belief in parts of Asia of the aphrodisiac and healing powers of their horns. Horns are also in demand in Yemen for dagger handles.

In an effort to make rhinos unattractive to poachers — who can earn up to \$100 per kilo — several countries have been experimenting with a policy of cutting off the horn.

Between 1984 and 1992, poachers killed 1,017 black rhinos in Zimbabwe. The government said most of the

deprive the animals of their tourists appeal.

The exercise began in 1992 and went into top gear last year. A helicopter herds animals into an open section of park. It hovers low, and a veterinarian, leaning out of the copter, fires drugged darts. The animals quickly sink to the ground.

The helicopter lands and the de-horning team measure the horns, take blood samples and check pulse and temperature.

They blindfold the rhinos and, constantly monitoring the animals' condition, start up the chainsaws. For ten minutes or so on each animal the nearby hills echo to the sound of the saw while horn shaving fall silently to the ground.

The horns are cut at the

exercise in Hwange National Park last year reported that the animals recovered well.

The Environmental Investigation Agency (EIA) describes the policy as "laudable and well-intentioned" — but says "it can only work in the short term and is not the answer."

Steve Trent of the EIA says the horns grow again, at about six centimetres a year, and that poachers who have tracked a rhino only on find it has no horn will probably kill it anyway to avoid tracking it again.

"The only way to stop this trade is to kill the demand in consumer countries," says Trent.

LEOPOLD HATUGARI is Assistant Editor of The Chronicle, in Bulawayo.

## ECOLOGICAL CONSCIOUSNESS

### A Tale of Two Cities

**N**AIROBI: Joseph Mukinda and his wife live with their six children in a suburb of north Nairobi called Milimani, which means 'hills' in Swahili. Thirty years of independence has seen the emergence of a middle class among the indigenous Kenyans and today many residents of Milimani are from the educated, middle-income groups like the Mukindas.

The family rents a three-bedroom apartment in a block of flats in a compound protected by fences and security guards. The household enjoys amenities Kenyans associate with good living, such as an air conditioner, electric and gas cooker, refrigerator, washing machine, colour television set and video. With the combined incomes of Mr Mukinda and his wife, Ellah Munibe, the family can afford to drive two cars.

Of course, the Mukindas' and their neighbours' standard of living exceeds by far the level of more than half of the two million people resident in Nairobi, who live, according to recent studies, below the poverty line.

A 1993 Kenyan Government economic survey showed that more than 60% of the people in Nairobi make less than \$50 a month and eke out a living in shanty districts such as the In-

famous Mathare Valley. Considered one of the largest slums in Africa, Mathare's residents often live without running water, electricity or access to health care or education. Further pinching the living standards of not only Mathare residents but all Kenyans, was an inflation rate of 27.5% in 1993. On top of all that, crime is at record levels.

As is the case in many other

**by Moussa Awuonda**

parts of the world, the environment and the pursuit of sustainable development has suffered in the face of such difficult economic circumstances. "In the 1960s our cities in Africa were clean and healthy," says Awori Achoka, Director of the Kenya Energy and Environment Organization (KENGO), which is the nation's leading non-governmental organization. "Today it's the opposite. Many urban centres are even more polluted, dirtier and unhealthier than the western cities during the Industrial Revolution."

As the KENGO chief points out, the gains of the environmental movement in Kenya in the last decade tended to concentrate upon the rural areas where desertification and soil erosion problems were acute.

\*\*\*\*\*

away American society. In New York most garbage was either incinerated or deposited in landfills until the city council passed a mandatory recycling policy in 1989. That law required a steady increase in the amount of resi-

With increased industrialization and influx of people into the cities, he says, "the attention must now be balanced". But that is not so easy.

"When we launched programmes to educate the public under slogans like Garbage is Money or Lead is Dangerous, the response was appalling," he says. "In some cases people actually dropped paper wrappers right underneath the posters! But environmental self-awareness geared toward changing individual lifestyles, will be a gradual experience."

Thanks to KENGO and other Government and NGO work there is some recycling of paper and glass in Nairobi but the amount is limited. In fact, in recent months even garbage collection has been limited because of budgetary constraints in the Nairobi City Council. Another problem is the lack of technical skills to service new garbage collection trucks donated by the French Government.

For the Mukindas' part in helping the environment in Kenya, energy conservation is now a household practice.

Ellah Munibe, who works as an executive at a Nairobi hospital, says conservation in the kitchen involves some improvisation.

Rarely does the family use

\*\*\*\*\*

dential and commercial waste that is recycled.

**Pollution Concern**  
One reason for the court case against the city is the concern about pollution from incinerators, reluctance from out of state landfills to take



Nairobi: Where the distribution of urban facilities are unequal.

the washing machine, she says, preferring to do most of their washing manually to save fuel. Also, water is short in Nairobi and the family restricts the amount of water allowed in the tub.

Although environmental consciousness is not always apparent in Kenyan society, Mr

Mukinda emphasizes that his concerns for the environment trace back much further than the trends of the past decade.

And Mr Mukinda points out that this consciousness is needed not only among all Kenyans but all Africans and others, if environmental disasters are to be avoided.

city government officials estimate that for every 100 tonnes of garbage collected, only 15 tonnes are recyclable.

**Violation of Laws**

The New York City Council passed recycling laws in 1989 that the city has been struggling to obey. But a state court recently ruled that the city had violated these laws by not keeping to the recycling schedule they mandated. By April, the city should have been collecting 4,250 tonnes of recyclables a day instead of 2,526 — or 15% of the city's total waste.

By contrast, the Theriaults estimate that in their own home they recycle between a half and a third of the materials they use.

Like many Americans, they use a lot. In fact the European Union survey indicated that the average American generates 717 kilograms of garbage per person annually, while the Japanese average 475 a year and Europeans 360 kilograms a year. — *UNEP*

**by Mary Pat Dunleavy**

are focused on reducing the amount of garbage by recycling 25% of the city's waste stream. The Theriaults live in a small, six-story building typical of lower Manhattan. As superintendents, the family not only helps maintain three buildings on a daily basis — and their own rather hectic household — but when Thursday approaches, everyone does his or her part in helping the city recycle.

After school on Wednesdays, Mike Jr, 8, and his older sisters Susan, 15, Michelle, 11, and Jamie, 10, help out with the recycling tasks. But it is a chore they don't always relish — because of many tenants who disregard the separation regulations. In fact,



Susan, 15 (left), Mike Jr, 8 (center), and Michelle, 11 (right) haul newspapers for recycling from one of the buildings from which they collect refuse.

**N**EW YORK: The clear blue plastic bags containing cans, bottles and other refuse lined the curb on a Manhattan street. They were placed there in anticipation of a recycling day pick-up that never came. For the Theriault family, who bag those recyclables each week for three apartment buildings on their block here in the East Village, it was a typical what-can-you-do? moment. In the year since New York began requiring residents to separate garbage for recycling, the Theriaults say they have encountered a myriad of problems with the system. Like many Americans, Mike (who is of French-Canadian extraction) and Susan (who is Cuban-American) and their seven children are doing their best to comply with the haphazard demands of environmental laws being enacted at the federal, state and local levels in the United States. Many of those laws are the result of dwindling landfills and other side effects of the throw-