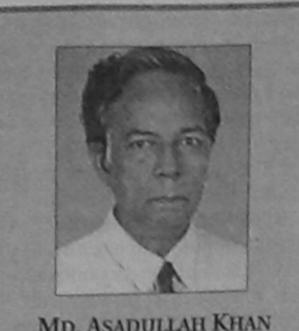
How Bangladesh can avert the crisis?



MD. ASADULLAH KHAN

home to roost. The U.S. in the last

comprising three large river systems FTER the US President with consequent heavy rainfall and George Bush had refused to annual flooding is perhaps the worst victim of global warming. A sign the "biodiversity" treaty in 1992, the last effort to save the planet from environmental the Himalayan glaciers and huge sediments carried by the rivers disasters seemed to be on the verge of failure. For the affluent countries coupled with restricted drainage like the U.S. the chickens have come has affected food production causing food in security for at least 30

one decade suffered several weather million people in the country. related catastrophes like severe In the symposium some proposflooding, hurricanes and prolonged als were adopted that emphasized the need for stimulating multihot summer days in some states. After Hurricane Katrina ravaged New Orleans in 2005 and flooded ing issue and identifying effective mitigation and adaptation options, the city for days, Hurricane Gustav including carbon sequestration in with a surge as high as 14 ft accompanied by torrential rain is speeded different ecosystems. Believably up to hit Louisiana forcing two these strategies are no different million people to flee to safety the from what were recommended earlier like switching from coal and Bangladesh now feels the full oil to natural gas, turning to nuclear brunt of impact for human actions and solar energy, altering land-use, curbing automobile use, changing far away from the borders of the country. While speaking as a chief life styles and employment pat-

guest at the International terns. Symposium on Climate Change Much to our comfort, visiting and Food Security at Dhaka on Iceland President Grimsson suggested the creation of a Himalaya August 30 last, Chief Adviser Fakhruddin Ahmed laid bare the Council modeled after the Arctic severe problem Bangladesh has council for countries surrounding been facing for the last two decades the Himalayas, including because of climate change brought Bangladesh, Nepal and India to upon mostly by human induced conduct research and cooperate on combating the accelerating effects activities in the industrialized countries of the West. Iceland President of climate change in this region. Olafur Ragnar Grimsson now in Taking note of Iceland President's Dhaka to address the Symposium warning that environmental chalissued a call for actions at national, lenges such as water shortages and regional and global levels to face the soil erosion might spawn the seeds impacts of Climate Change that of future conflict, Bangladesh poses threat to food security and could possibly tap its abundant livelihoods of millions of people in water resources, preserve it through adoption of scientific The UN sponsored IPCC panel means to augment food produccomposed of 1500 leading climate tion. The grim warning that came experts cautioned the leaders of the from Grimsson was that global world as early as in 1995 that unless warming is now several decades ahead of schedule because the the world had taken immediate and melting of ice-sheets in the Arctic and Greenland region, projected to

drastic steps to reduce the emissions of heat trapping gases, the green house effect, as they preferred occur in the middle of this century. to call it at that time could drive hasalfeadybegun global temperatures as much as 4 degree Centigrade up by the year possibly serve as an inspiration for 2100. The disasters they predicted at switching to clean energy resources, that time, have come true. The IPCC with 100 per cent of the country's prediction in 1995 about climate electricity now produced by clean change triggering increase in temenergy sources compared to 80 per cent of it produced from coal and oil perature, decrease in the availability of fresh water, drought in some half a century ago. In Bangladesh areas and flooding in other areas, context, in our search for clean river like the Buriganga or sea level rise due to glacial melting energy, solar power features promi- Shitalakhya or a waste dump at ane chlorofluorocarbons (CFCs) accompanied by cyclones and nently and the visions of 1970s can hurricanes too often ravaging the be realized if manufacturers could coastal areas of Bangladesh, India, find a way to produce silicon-based the U.S. and the Caribbean islands photovoltaic cells more efficiently are experiences now. And and thus drive down their high cost.

BITTER TRUTH

To preserve an environment, there must be an acceptable and rising level of economic wellbeing for the humans who live in and around it. Environmentalism requires restraint. Poor people in Bangladesh who lack enough food to eat or enough fuel to burn lack restraint as well. So economic progress or sustainable development in countries like Bangladesh may no longer be an option we can postpone.

In an effort to translate those

On the other hand because a given Bangladesh, a low lying mega delta solar cell is sensitive to just a few colours of the many that make up sun light, researchers are working on multi-layered cells, which will Most ominously, the melting of trap most of the colours of the rain-

policies into action, people in the developed world have to completely transform their societies, and rich countries like the US would have to subsidize poor but developing nations like Bangladesh, now the worst victim of global warming. disciplinary research on such burn- That means governments in the developing countries should shift more of their spending on energy research to renewable source of energy. Ironically true, in the US research on renewable sources has climbed up from \$784m to \$878m in a year but research on nuclear power swallows \$5b a year. Nuclear power gives off no greenhouse gases, yet few apart from bosses of

days will require a national and international effort. At such a point of regional calamity, cooperation, as Grimsson and Chief Adviser Fakhruddin Ahmed have emphasized, is called for more urgently than ever before and the sharing of knowledge, expertise and experience is absolutely necessary.

Undeniably true, the greatest challenge that Bangladesh faces today, as Chief Adviser Fakhruddin Ahmed has said in the symposium, is lifting some 50 million people out of poverty, a challenge made all the more difficult for Bangladesh because global warming has started to affect food production causing an increase in food deficit for the last one decade. The greenhouse effect is

expected to bring out more changes more quickly than any other climatic event in the earth's history. Scientists state that the changes cannot be stopped, though they can

must preserve the forests that still stand and restore those that have been destroyed.

Each year 28 million acres of tropical forests are cleared, producing one-quarter of the carbon dioxide burden through combustion, erasing species of plants, and animals, and allowing rains to sweep across smooth ground into floods like that in Bangladesh. Trees, the lungs of the planet are being cut 30 times as fast as they are being replaced. The U.S. should encourage a scheme, to be administered by the U.N. in which the foreign debt of Third World countries would be swapped for tropical forests as well as planting trees in Bangladesh, India and Nepal region.

It is no surprise that trees and forest lands are being destroyed. Most human beings who live in and around them are poor, and their population growth continues. To preserve an environment, whether it be wetland or forest, there must be an acceptable and rising level of economic wellbeing for the humans who live in and around it. Environmentalism requires restraint. Poor people in Bangladesh who lack enough food to eat or enough fuel to burn lack restraint as well

So economic progress or sustainable development in countries like Bangladesh, Nepal, India, Indonesia and the Philippines may postpone. The masses here have Global warming, local impact

MUHAMMAD SELIM HOSSAIN

LOBAL warning is bearing a global warning for the lowlying sea-facing over populated countries like Bangladesh. This perhaps has made the world community more concerned about than other environmental issue. But it is man who has made it so alarming through his unbridled onesided development activities without taking the environmental aspects into account over time.

The connotation of global warming first provided by a famous Swedish chemist named S.R. Helis in 1896 became a widely known global issue after 1920s experiencing a continuous increase in atmospheric temperature and consequently a bit of irony in behaviour of the nature. On February 2 in 2007 in Paris IPCC (Inter-governmental panel for climate change) disclosed that global warming was the increase in the average temperature of the earth's near-surface air and oceans in recent decades and projected its continuation (Daily Star, June 22, 2007).

Contribution of Bangladesh and developed world: The developed countries contribute to global warming the most. In contrast, the least contributing low lying poor and over populated tropical countries like Bangladesh are the most vulnerable to the impact. The United States of America is the largest contributor with about 25 per cent of greenhouse gas emissions, but it is a home of a population lesser than 5 per cent of the world's total. US government has done virtually nothing, even has not signed the Kyoto protocol till now. In terms of per capita greenhouse gas emission, the contribution of Bangladesh to global warming is negligible -- 0.13 percent.

Impact on Bangladesh

The poorest countries have always been predicted to be worst hit by this human-induced global warming. According to the Third Assessment Report of IPCC, Bangladesh ranks high in the list of most vulnerable countries. High vulnerability of the country to global warming is due to a number of hydro-geological and socioeconomic factors that include geographical location, flat deltaic topography with sea-facing low elevation, extreme tropical climate variability, high population density and poverty incidence, dependency of majority of population on crop agriculture. However, two major impacts of global warming on Bangladesh may be categorized as that of sea level change and climate change

Sea level change: Global warming will cause a thermal expansion of the sea water. A rise in atmospheric temperature will also melt the polar and Alpine ice sheets. Besides, the sea floor is also being Aman production. Global warning raised by the deposition of the will make tropical cyclones and sediments brought down by the tornadoes in Bangladesh bigger and rivers. These three processes more frequent. The super cyclone together are giving rise to sea level. World Bank reported in 2001 that already drawn attention to the

sea level was rising by about 3mm per year in the Bay of Bengal. The impacts are stated below:-

A taskforce report predicts a one meter rise in the sea level will inundate a greater portion of southern region which is about 15.8 per cent of the total area of Bangladesh (Taskforce report, 1991). The predicted one meter sea level rise will lead to the loss of about 22,889 square kilometers of agriland which will cause a 30 per cent decline of rice crop. It will also cause decline in production of other crops. It will permanently inundate the Sundarbans, a world heritage site, with the loss of Bengal tigers (world Bank Report, 2001). Sea level rise will also increase the frequency of coastal flooding that will threaten animals, plants and fresh water supplies in the coastal plain of Bangladesh.

A rise in sea water level will

enable saline water to intrude further inland during high tides, coastal flooding and storm surge. As a result, extended salinity will deteriorate soil quality and cause loss of sweet water fauna and flora. It will also destruct sweet water sources including ponds and lakes etc. Sea level rise will cause shoreline retreat, resulting in increase of basin area, which contributes to increasing the cyclone path length that will allow the cyclone to remain more time in the water, acquire and release more latent heat, intensity and wide speed. The projected sea level rise along the coastal areas of Bangladesh will be about 88cm by the year 2100 (Khan et al. 2007)

Climate change: Climate change is likely to heavily hit Bangladesh because global warming is causing increase in temperature affecting precipitation intensity, pattern and distribution. Bangladesh will receive a heavier rainfall during the monsoon because the rate of evaporation is expected to increase by up to 12 per cent. Mean monthly rainfall may significantly change over current variability. Monsoon rainfall may increase by 11 per cent by 2030 and 27per cent by 2070 (Khan et. Al. 2007). Due to global warming, over the past 100 years temperature has increased by 0.5?C but in the next 50 years that is, by 2050, the temperature in Bangladesh is projected to rise by 1.5 to 2.00C.

A number of studies found that high temperature would reduce the yields of HYVs of Aus, Aman and Boro rice during all the seasons throughout Bangladesh. An important study reveals that a 60 per cent moisture stress on top of other effects might cause as high as 32 per cent decline in Boro yield. A quarter of the country's landmass is currently flood prone in a normal hydrological year, which may increase to 39 per cent and prolonged flooding can effectively reduce overall potential for HYV Sidr on 15 November, 2007 has

devastation that may yet be caused

Water related impacts due to climate change and sea level rise are likely to be some of the most critical issues for Bangladesh, not only in relation to coastal and reverine flooding but also in relation to enhanced possibility of winter drought in certain areas. In the dry season, river flow will be reduced. Consequently, salinity will penetrate along the coastal rivers. It will cause increase in evapotranspiration that is detrimental to crop growth. It will also result in more release of carbon from the topsoil. Increased water withdrawal by India will also lead to further decrease in lean season flow in the

Rise in temperature will favour pest and pathogen activities and human health will be at higher risk, i.e. increased risk of some infectious diseases like malaria, diarrhoea, dengue etc. Rising temperature may jeopardise the forest succession processes. It may result in low productivity and poor vegetative cover of the forest and affect its rich biodiversity. Quarter of a million hectare land will become affected by salinity, on top of the 3.05 million hectares already affected (Khan et.al.2007). Farmers will be forced to grow crops of economically lesser returns.

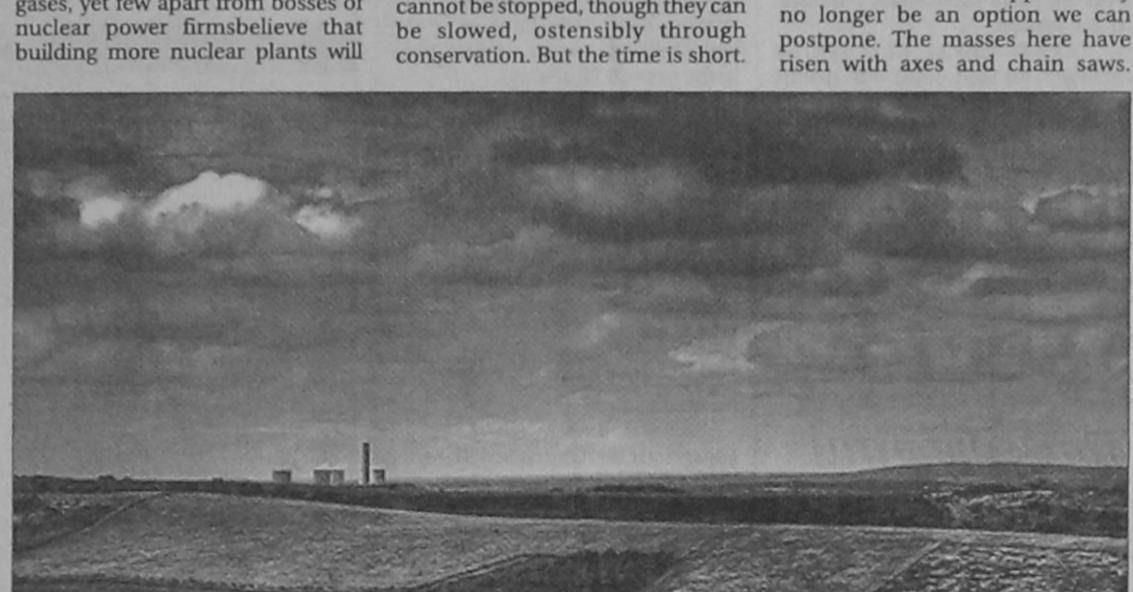
Concludingremarks However, to sum up, we can say

that global warming is a global issue; so, it should be treated globally. It will have its impact felt throughout the whole world; for geographical settings and some socio-economic conditions, Bangladesh will be affected the most. It is a matter of hope that world leaders at the UN climate conference in December, 2007 in Bali, Indonesia, agreed to reach a new deal on fighting global warming by 2009. It simply sets an agenda and schedule for negotiations to find ways to reduce pollution and help poor countries adapt to environmental changes by speeding up the transfer of technology and financial assis-

A technology based, efficient system to deal with natural disasters and other global warming impacts to be put in place is an urgent need. Setting up of a strongly funded international adaptation centre, here in Bangladesh, for undertaking research on the effects of global warming as well as suggesting measures toward preparedness in the face of coming challenges will is reflect a seriousness of approach to the issue on the part of the world community.

If the world dwellers do their duties accordingly following the rule "think globally, act locally", it will ensure both the conservation of the environment and sustainable development and will particularly save countries like Bangladesh from catastrophe induced by 'global warming'.

Muhammad Selim Hossain is studying geography and environment at the University of Dhaka.



ever be a politically plausible solution. Rightly or wrongly people are As Grimsson said, 'Iceland could more frightened of nuclear accidents than of hot weather.

> The environmental problems at the present moment are very complex because they are caused by substances that are necessary to fuel the economies of the industrialized nations. Cleaning up a polluted Matuail in the city is often a mam- and other harmful trace gases. And moth task. But it requires that a trees are the carbon dumps : trees community decide it is worth the cost and effort. Stemming the disaster in any part of the world these store the carbon in their wood. We

Says Robert Dickinson, a senior Quietly, persistently, they are scientist at the National Centre for atmospheric research, "We don't have 100 years. We have 10 or 20 at

For such a complex problem the basic facts seem widely accepted. The rich and developed countries are adding a net 3 billion tons a year of carbon to the atmosphere in the form of carbon dioxide, plus methextract carbon dioxide from the atmosphere, emit the oxygen and

slowly destroying the earth's carbon installations.

In the present context, however much Bangladeshi leaders or environmentalists pin hope to avert the crisis, the situation is least likely to change for the better unless the US takes a bold initiative to curtail its production of greenhouse gas. With only 4 per cent of the world's population, America produces 25 per cent of its greenhouse gases.

Md. Asadullah Khan is a former teacher of physics and Controller of Examinations, BUET.

Conservation engineering: Saving marine turtles

S M A RASHID

Bangladesh alone.

oceans since before the dinosaurs roamed the earth, more than 110 million years ago. Turtles are an important component of the African and in the Indian Ocean marine ecosystem and serve as region. Co-operative efforts to indicators of the health of the conserve globally threatened environment in which they live. marine turtles received a boost in for fun. All these contribute to the Their aesthetic appeal draws con- June 2001 with the completion of servationists and tourists from the Memorandum of lation. around the world to nesting Understanding on the beaches throughout the region, Conservation and Management of generating income for local com- Marine Turtles and their Habitats munities. In many countries, of the Indian Ocean and Southmarine turtles are used for their East Asia (IOSEA). meat, egg and shell, representing a traditional source of food for ond of its kind to be concluded human populations. However, under the auspices of the these treasures of ancient times are Convention on Migratory Species. now on the brink of extinction. All Bangladesh is a signatory to the seven sea turtle species are globally Memorandum too. The Martin's Island if survives and endangered including the five Memorandum of Understanding species that swim in Bangladesh puts in place a framework through territorial waters and are listed as which States of the region -- as well "threatened" or "endangered" in as other concerned States -- can instinct and bio-navigational the IUCN Red Data Book. The work together to conserve and memory. For this reason it swims proposed revision of Bangladesh replenish depleted marine turtle vast distances to come to the Wildlife Preservation (Amendment) Act 1974 has also included responsibility. It acknowledges a beaches where it was born. It is the marine turtles in the list of wide range of threats to marine during this migration and their protected species. The species are: turtles, including habitat destruc- brief stay (mainly for reproductive Dermochelys coraicea tion, direct harvesting and trade, activities) in the coastal offshore (Leatherback), Chelonia mydas fisheries by-catch, pollution and waters that many of the turtles get (Green Turtle), Lepidochelys other man-induced sources of entangled in fishing nets and either olivacea (Olive Ridley), mortality. Eretmochelys imbricata (Hawksbill) and Caretta caretta (Loggerhead).

global marine turtle populations to dangerously low levels. Dirty fishing by commercial fishing operations is one of the greatest threats to marine turtle survival. Commercial fishing gear, including Understanding on the dredges, gillnets, long-lines and trawls is the greatest threat to marine turtles. The seven species of the Indian Ocean and Southremaining today have become seriously depleted due to excessive harvesting, destruction of nesting and feeding habitats, and accidental taking in fisheries operations. torystates. Actions need to be taken now before we lose these majestic marine turtles forever.

group of species which deserves ing getting entangled in the fishing

priority action. The Secretariat, nets or hit by the mechanised assisted by the experts of the

The Memorandum is the sec- MATURITY. populations for which they share shores and nest on the same sandy

Memorandum meet every two turtles wash ashore on the mainyears to discuss issues and progress Human activities have driven made in terms of policy, legislation, programmes related to the conservation and management of marine turtles by the respective states. The Fifth Meeting of the Signatory States to the Memorandum of Conservation and Management of Marine Turtles and their Habitats East Asia was held in Bali, Indonesia, from 20 to 23 August 2008 and Bangladesh participated as one of the twenty-seven signa-

Every year hundreds and thousands of dead marine turtles wash ashore on the beaches of The CMS Conference of Parties Bangladesh (Fig. 1). Many of these (COP) has identified them as a marine turtles die by either drown-

fishing trawlers or killed by fisher-ARINE turtles have been Scientific Council and in coopera- men to free their nets. The turtles swimming the world's tion with the Marine Turtle breathe air and when entangled in Specialist Group of the IUCN the nets cannot come up to the Species Survival Commission, has surface to breathe and drown. On taken steps towards this aim in the several occasions the nesting female turtle is killed by the stray dogs or other predator animals on land and sometimes by the urchins decline of the marine turtle popu-

It is important to know that one in ten thousand hatchlings survive and one of the surviving thousand reach maturity and IT TAKES 25-30 YEARS FOR A TURTLE TO REACH

Marine turtles are migratory in nature and show a great degree of nesting site fidelity which means that a female hatchling born in St. reaches adulthood will come to nest in St. Martin's Island. Praise the Lord for the marine turtle's drown or are killed by the fisher-The signatory States of the men to free their nets. These dead land and island beaches.

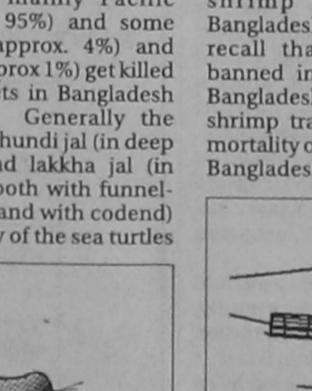
The exact numbers are not known for the whole of the 710 km Bangladesh coastline; however for

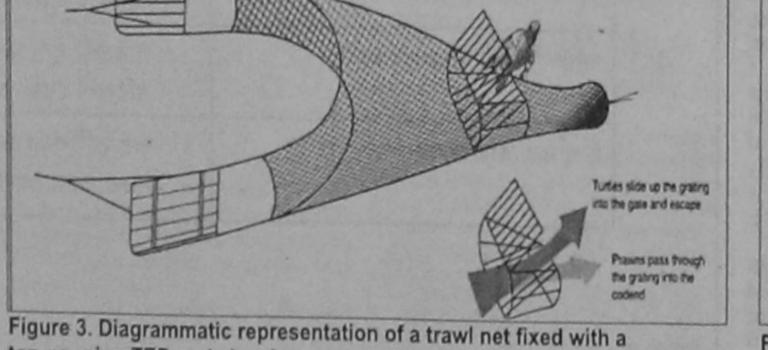


Figure 1. Dead marine turtles on the beaches is a common sight.

the last several years' information from St. Martin's Island, Teknaf Peninsula, Sonadia Island, Sandweep, Kutubdia, Nijhum dweep, Hatiya, Kuakata and Sunderbans beaches indicated that the number of dead turtles that washed ashore was more than a thousand on average per annum. The number increases during the winter months that coincide with the increased frequency of nesting females and increased intensity of fishing activities. Considering the comparatively low species diversity and numbers of female marine turtles successfully nesting in Bangladesh than the neighbouring India and Myanmar this is alarming for the marine turtle populations in the Bay of Bengal and the Indian Ocean.

other species (approx 1%) get killed in the fishing nets in Bangladesh fishermen use behundi jal (in deep water trawls) and lakkha jal (in shallow waters, both with funnelshaped bag nets and with codend) for fishing. Many of the sea turtles





top-opening TED and showing an escaping turtle.

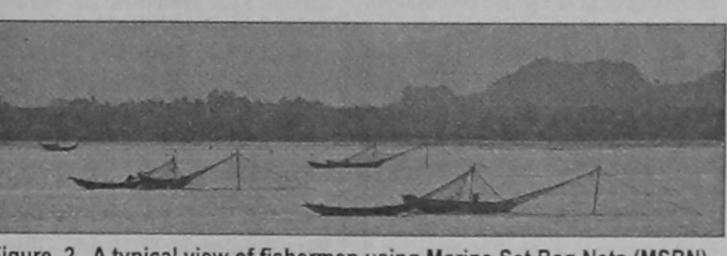


Figure. 2. A typical view of fishermen using Marine Set Bag Nets (MSBN) and/or Estuarine Set Bag Nets (ESBN) in Bangladesh coastal areas.

Bag Nets (MSBN) and Estuarine Set Bag Nets (ESBN) (similar to behundi jal except that it is fixed and used in coastal areas affected may suffer as Bangladesh is not on by tide) (Fig. 2).

this case is the integration and application of standard engineering principles for biology and conservation. For example, conserving endangered species like marine turtles by either reducing the capture of the target species or by-catch or allowing escape of unwanted or endangered species from the fishing nets. Turtle Excluder Device (TED) is one such example applicable to the marine turtles and the commercial fishing industry. The use of TEDs has a lot of implications in the economy and Green Turtles (approx. 4%) and recall that back in 1997 USA banned importing shrimps from Bangladesh due to the fact that coastal waters. Generally the shrimp trawls contributed to the mortality of marine turtles and that Bangladesh was not using any

also get entangled in the Marine Set TEDs, for which the shrimp producers and exporters made huge uproar. This non-compliance may have a backlash and the industry the recently published list of US Conservation engineering in State Department certified TED users (US State Dept., 2008/350, May 2, 2008). European and other CMS signatory countries are also planning to use the TEDs as a

means of compliance indicator. The use of TEDs is to be made mandatory for fishing nets used by fishermen in the Bay of Bengal and in the coastal areas has been suggested by many of the conservationists. The truth however is that most of the campaigners in Bangladesh have no clear idea about the TEDs. It may sound depressing but most if not all, have Sea turtles, mainly Pacific shrimp export industry of not seen a TED let apart its use and Ridleys (approx 95%) and some Bangladesh. If the readers may benefits. The fishermen are further down the line to know about it. Not only the nets used in shrimp trawls but other fishing nets are also equally detrimental to the sea turtle populations.

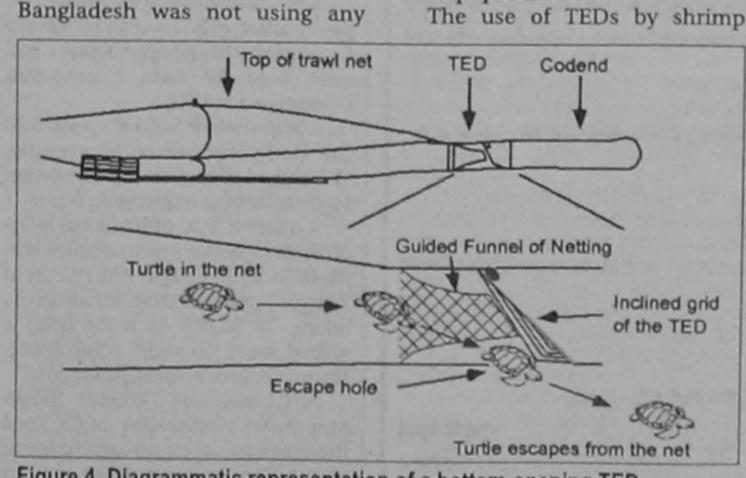


Figure 4. Diagrammatic representation of a bottom-opening TED fitted to a trawl net

trawlers in many countries have sharks, dolphins. shown that it has reduced the number of turtles killed by approximately 50 percent. Trawl nets (Figure 3) are used to catch some species of fish, prawns and scallops. Unfortunately, trawl nets also catch a wide variety and sometimes large quantity of unwanted species. Sea turtles, sting rays and sharks can also be incidentally caught in the trawl net. Turtle Excluder Devices have been developed to reduce the capture of turtles and other large non-target species in commercial trawl nets.

What are TEDs? TEDs usually include a metal grid, much like a storm-water-drain grate (hard TEDs) or a panel of large mesh webbing (soft TEDs) that is installed at an angle between 40° and 60°. This creates a physical barrier that allows shrimps and other animals smaller than the bar spacing of a hard TED or mesh webbing of a soft TED to pass through the TED and into the codend. Sea turtles, other large animals and debris slide along the TED to an exit hole cut in the top (top opening TED) or bottom of the TED (bottom opening TED). The exit hole may be partially covered by a flap of webbing to reduce the possibility of losing shrimps or other target fish species.

TEDs come in many designs and like other fishing gear; no single design of TED is suitable for all fishing conditions. Catch loss associated with these devices should be minimal, with indications that they may improve the quality or the quantity of the

shrimp catch.

How TEDs work in a trawl net: TEDs are a modification to the trawl net that allow larger animals to escape after being taken into the net, as it is difficult to prevent or reduce the number of unwanted bycatch animals that enter the trawl net in the first instance.

* TEDs are usually fitted into a trawl net at the beginning of the codend (Figure 4). At this point in the net, water-flow is fastest and maximises the ability of a TED to separate target animals, such as shrimps and scallops, from nontarget animals, such as sea turtles, So much of money is earned by

the government and the private sector from the resources harvested from the marine environment, however, little is paid back for the conservation and management of these resources and the ecosystems that support these virtually bountiful resources. The relevant government agencies particularly the Ministry of Environment and Forest, Ministry of Fisheries and Livestock, Coast Guard (under the Ministry of Defence) and the fishing and boat-owners associations should open dialogues to convince the commercial fishing enterprises to use TEDs in their trawl nets. NGOs may be engaged to do the groundwork for motivating the fishing communities and associations.

NGOs may organize workshops designed to have hands-on demonstration of the TEDs and its use in the actual fishing so that the participants, including policy makers and the users -- the fishermen -- get practical experience and see for themselves the amount of bycatch and other non-target species that get trapped and thrown overboard as waste. Moreover the fisher communities would know the technicalities of constructing appropriate TEDs using locally available materials and are convinced and mandated to make and use it in their fishing nets. The fishers also need to be educated and made aware through organizing repeated sessions about the benefits of using TEDs and responsible fishing. The Department of Fisheries (DOF), Department of Environment (DOE) and the Coast Guard may monitor the fishing vessels on the use of TEDs and data collected on the catch and by-catch may allow the fishers and concerned government agencies to see for themselves the benefits of using TEDs thus reducing marine turtle mortality due to fishing.

S M A Rashid PhD, is Member, IUCN/SSC/Marine Turtle Specialist Group: Vice Chair, IUCN/SSC/Crocodile Specialist Group (South Asia-Iran) and Director, Reptiles Farm Limited. (e-mail: rashidsma@yahoo.co.uk)