

Tiger conservation in Bangladesh

Importance and challenges

Good news is that our government also acknowledges the importance of tiger and has prepared Bangladesh Tiger Action Plan 2009-2017 to conserve this national pride. However, the real challenge is to implement the action plan by reconciling the competing interests of the multiple stakeholders while making a safe and healthy habitat for tigers.

MOHAMMED ABDUL BATEN

TIGER, symbol of the beast and beauty, is a threatened species worldwide. Recent estimate shows that tigers only occupy 7% of their historic Asian range and about 4000 are left in the wild (Dinerstein et al. 2007). Aside from this alarming tiger status worldwide, Bangladesh possesses a relatively good number of them, mostly concentrated in the Sundarbans. Joint India and Bangladesh tiger census-2004 (using pugmark counting) estimated that there are 419 (121 male and 298 female) tigers in Bangladesh Sundarbans. The number may vary, as many scientists are sceptical about the accuracy of pugmark counting. However, it is beyond doubt

deeply embedded in our society and culture, which is pronouncedly manifested by its being the national animal of Bangladesh. In our society tiger is seen as a symbol of courage and power to confront all odds. Any work in favour of humanity and justice is acknowledged as 'Tigers' Work' and the person behind such works is designated as 'Son of Tiger' in our conventional way of expression.

For centuries tiger has been playing an important role in enriching our literature and remain a central character in many folk tales like Gazir gan, Bonbibir kotha etc. Tiger's presence in our political culture is also evident. Great politician A.K Fuzlul Huq is called the 'Tiger of Bengal' for his outstanding contribution in favour of humanity. Other than abstract pres-

from high rate of human killing, livestock depredation and ultimately the killing in retribution of tigers by affected local communities. In addition, prey poaching, unsustainable forest management and climate change induced natural calamities also affect tiger population.

Several million people directly depend on the Sundarbans for their subsistence living. They collect wood, honey, gol-pata and other forest products from the Sundarbans. There is a common perception among policy makers that those forest dependent people are responsible for the Sundarbans' degradation. Obviously their activities are causing harm to the forest, but researches explore that commercial extraction by outside people through managing corrupted forest officials is mainly responsible for the Sundarbans' degradation.

The outsider commercial extractors collect forest resources beyond sustainable limit by violating resource collection rules. Hence, the balance of the forest ecosystem has been dwindling. In contrast, the forest dependent communities are living in the Sundarbans area for centuries by collecting forest resources more or less sustainably using their traditional knowledge. Thus, the most evident threat to tiger habitat is unsustainable commercial extraction of the forest resources that degrades the habitat quality.

In addition, overexploitation of fishery resources, pollution from fishing and cargo boats, waste spillage from Mongla sea port and indiscriminate harvesting of crabs and snails are responsible for degradation of marine environment and thereby the whole ecosystem. Reduction of freshwater supply and distribution is another important issue that affects habitat quality. In the Sundarbans fresh water supply has been decreasing since the commissioning of Farakka barrage in 1975. Decreased fresh water supply in the western part is evident (about 60% in the Sibsra river) and therefore increased siltation and disconnection of several southern distributaries are contributing to increased salinity.

Climate change is another important attribute of salinity increase and sea level rise. Using most conservative rate of 4cm per decade Sea Level Rise (consistent with IPCC 4AR) it is observed that the Sundarbans will realise a 28cm sea level rise by the year 2070 and therefore 50% area of the Sundarbans will be lost. Climate change is also disrupting the rainfall pattern which in turn unfavourably regulating the salinity regime in the Sundarbans. The combined impact of increased inundation by the sea and increased salinity levels, particularly in the dry season, could affect structure and composition of the forest and thus the distribution of the prey and tigers.

Climate change induced cyclones might be the most destructive for the Sundarbans. Two consecutive cyclones (Sidr in 2007 and Aila in 2009) caused huge damage to the forest. Still there is no estimate on how much area and resources were affected by Sidr and Aila but Forest Department claims that two

thirds of the Sundarbans (mostly in the western part) was more or less affected by the Sidr. There is no statistics on how many tigers died in these cyclones but it would be quite a few in number. Yet, food shortage and habitat destruction are significant that forced tigers to stray in nearby villages.

Tiger straying has been increased after Aila due to shortage of fresh water and food, many experts argue. Moreover, Sidr and Aila damaged huge tree and a substantial portion of the forest became tree cover less. Hence, in the hot weather tiger suffers from lack of cool shade. Recent tiger straying trend implies that highest number of straying occurred during warm season (after April), and in the west part of the Sundarbans, which is indicative of having a close relation to loss of tree cover, shortage of fresh water and overall habitat degradation.

Even though tiger poaching and associated trade are still not at an alarming stage in Bangladesh, but the geographical position of Bangladesh between India and Myanmar, where tiger poaching is a common phenomenon, increases the threat to the tiger population. There is a huge demand of tiger parts in China for medicine along with skin and teeth that allure the poachers to kill tigers and sell in the black market. Little is known about the market size of tiger products, but the market volume would be of several million dollars, although trade on tiger parts is prohibited under Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Bangladesh approved CITES in 1982.

Prey depletion has become a serious threat to the tiger population in recent times. The size of the tiger population largely depends on size and suitability of the prey population. The main prey for tiger in the Sundarbans is spotted deer (Axis axis) and to some extent wild boar (Sus scrofa). Snaring is a common practice in Sundarbans to catch spotted deer. Even though Bangladesh wildlife preservation act 1973 (amended in 1974) has declared snaring of spotted deer as illegal and fixed some penalties, but it is trifling compared to the market price of a deer.

Newspapers frequently publish report about illegal deer meat market in the Sundarbans' adjacent areas and according to report it is quite easy to collect deer meat due to weakness and non-implementation of law. A poacher can easily earn 20000 taka (1 kilo deer meat is sold at 200-300 taka plus the price of skin and horns) from a deer; on the contrary, he has to pay at best 2000 taka or has to suffer 6 months to 2 years imprisonment according to the law. It is therefore clear that the economic incentives from a poaching outweigh the deterrents that a poacher faces.

In spite of some inconsistencies it is learnt that Bangladesh Government has reviewed the wildlife act and prepared a new act in 2010 (it will be submitted to the parliament soon for approval as a law) keeping provision of higher penalties for intentional wildlife killing (if any one kill any tiger intentionally or for commercial



The endangered species.

purpose he has to pay highest half million taka with subject to imprisonment of 12 years) or trading.

On the other hand, government has enacted new 'Spotted Deer Farming Policy' in 2009. Experts claim that this policy will eventually increase spotted deer poaching. Since the policy has allowed farming and trading of farmed deer, the poacher will take advantage of the policy and catch spotted deer from the Sundarbans and market those in the name of farmed deer.

A tiger may also die from diseases, even though in Bangladesh there has been no research in this area. We did not hear about tiger diseases until the death of 'Jamtolar Rani' (tiger that lived at Jamtola in Kotka). However, many claim that the tiger died because of radio-collar experiment. Drawing examples from many countries it is found that wild tigers have died from Canine Distemper (Appel and Summers 1995). Feline Immunodeficiency Virus is also widespread amongst wild felids and has been found present in tigers (Olmsted et al. 1992). Prey diseases are also another cause of tiger diseases. Sometimes cattle diseases may disseminate to tiger through its straying to the village. Another potential threat to tiger is inbreeding depression.

Some of the above-mentioned causes results into invading (straying) by tigers of Sundarban adjacent villages and kill humans and livestock and eventually face death at the hands of the villagers. Probably tiger-human conflict and associated retribution killing in Sundarbans is the highest in number among the entire tiger habitat in the world. Forest Department records show that up to three tigers are eliminated each year by retribution killing. Yet, tiger straying has increased recently and consequently

tiger death has also increased. Noticeably, livestock depredation and human killing is the strongest argument for retribution killing.

However, most of the human-killing by tigers occur when people enter into the forest for collecting forest resources. On average 20-30 people are killed each year by tigers according to FD records. Such human killing affects many families by losing only earning member, but it is undeniable that the Sundarbans is still well stocked due to the presence of tiger. There is a common perception among the local people that tiger is playing more important role than forest department to protect the Sundarbans.

World heritage site, the Sundarbans provides a number of ecological services such as (1) trapping of sediment and land formation, (2) protection of human lives and habitation from regular cyclones, (3) acting as a nursery for fish and other aquatic life, (4) oxygen production, (5) waste recycling, (6) timber production, (7) supply of food and building materials, and (8) carbon cycling (Biswas et al. 2007; Islam and Peterson 2008). Evidently, tiger is the principal protector of the Sundarbans. We have to save the tigers just not only for the biodiversity protection but also to safeguard our national identity. Good news is that our government also acknowledges the importance of tiger and has prepared Bangladesh Tiger Action Plan 2009-2017 to conserve this national pride. However, the real challenge is to implement the action plan by reconciling the competing interests of the multiple stakeholders while making a safe and healthy habitat for tigers.

The writer is a researcher at Unnayan Onneshan (a progressive policy research organisation based in Dhaka). E-mail: a.baten@unnayan.org



The dwindling prey.

that the size of the tiger population in the Bangladesh Sundarbans would be between 300-500. Being the biggest member of the cat family the Bengal tiger is popularly known as Royal Bengal Tiger (Panthera tigris tigris) for its unique hunting behaviour and spectacular physical appearance.

Tiger stands at the top of the food pyramid and thus requires large areas to support its viable populations which in turn help to protect wide array of biodiversity that share their habitat. Loss of tiger, therefore, may reduce ecosystem integrity through disrupting food web and consequently erode ecosystems' natural ability to adapt to changing environmental conditions. Besides its vigorous presence in the nature, tiger is also

ence in our life and culture, tiger symbol also appears inspirational by decorating many of our national agencies. The emblem of the East Bengal Regiment, which fought for country's liberation, the logo of the national cricket team, the hologram in national currency are some of the examples of using tiger symbol for its uniqueness. But in spite of such ecological and social services tigers are threatened in Bangladesh by direct loss, prey depletion and habitat degradation.

Both anthropogenic and natural causes are responsible for tiger loss in Bangladesh. The most significant cause of tiger loss is direct poaching to supply the increasing demand for tiger products. Moreover, Tiger-Human Conflict (THC) is very high in Bangladesh, which is evident

CLIMATE CHANGE

Is only greenhouse gas emission responsible?

Geological changes on the earth's surface can also affect global climate. The distribution of continental landmasses and ocean basins affects the pattern of global atmospheric and oceanographic circulation. The collision of the Indian subcontinent with Asia, and formation of the Himalayan mountain range about 40 million years ago is an example of a plate tectonic event that caused significant climate change.

MD. MAMUNUR RASHID

THE mean temperature of the world has been rising, snow in the hemisphere and even on mount Everest is melting, sea level is rising, salt water intrusion is reducing the availability of fresh water, coastal region is facing more and frequent cyclones and storm surges. The main cause of these changes is the increase in global temperature due to increased use of fossil fuel throughout the world especially in the developed countries.

It is a very simple equation that we, the human beings are using more and more fossil fuel, emitting huge amount of greenhouse gases that trap the sun's temperature in the earth atmosphere and consequently global temperature is rising and causing climate change which will cause a devastating situation for mankind in the early future.

The earth's position with respect to the sun over time affects its climate. During its annual circuit around the sun, the earth's present elliptical orbit brings it closest to the sun in January (perihelion), and carries it farthest away in July (aphelion). The planet receives about 6% more solar energy in January than in July. The Earth's axis, a line through the poles, is

tilted 23.5° with respect to the sun. Consequently, the sun's rays strike on the northern hemisphere most directly on June 21st (the summer solstice) and the southern hemisphere most directly on December 21st (the winter solstice). The equinoxes, on April 21st and September 21st, mark the dates when the sun shines directly on the equator, and day and night are of the same length around the globe. Orbital geometry and axial tilt together determine the earth's pattern of seasons. Variations in this astronomical geometry would cause climatic variations.

The Earth's axial tilt varies between 21.5° and 24.5° with a 41,000 year periodicity (currently decreasing: 24.049 in 3300 BC, 23.443 in 1973, 23.439 in 2000), while the direction of the tilt gradually undergoes precession, moving in a slow circle over a period of about 25,800 years. However, other factors may change the axial tilt of earth (and of other planets).

Recent study concludes that the known wobbles in earth's rotation caused global ice levels to reach their peak about 26,000 years ago, stabilize for 7,000 years and then begin melting 19,000 years ago, eventually bringing to an end the last ice age. The melting was first caused by more solar radiation, not changes in carbon

dioxide levels or ocean temperatures. Solar radiation triggered it. There were also changes in atmospheric carbon dioxide levels and ocean circulation, but those happened later and amplified a process that had already begun. The researchers used an analysis of 6,000 dates and locations of ice sheets to define, with a high level of accuracy, when ice started to melt. In doing this, they confirmed a theory that was first developed more than 50 years ago that pointed to small but definable changes in earth's rotation as the trigger for ice age.

The Sahara and Arabia were transformed abruptly from fertile land covered with shrubs and grasses into a parched desert in a "brutal" period of climatic change lasting 400 years, scientists have found. For once, humans were not to blame: the cause was not farming or overgrazing, as is usually thought. Scientists reckon that the Sahara began to turn into a desert after the earth underwent one of its periodic changes in orientation, starting 9,000 and finishing about 6,000 years ago. Its tilt lessened from 23.14 degrees off vertical to its present 23.45 degrees, while the time when the planet is closest to the sun shifted gradually from July to January.

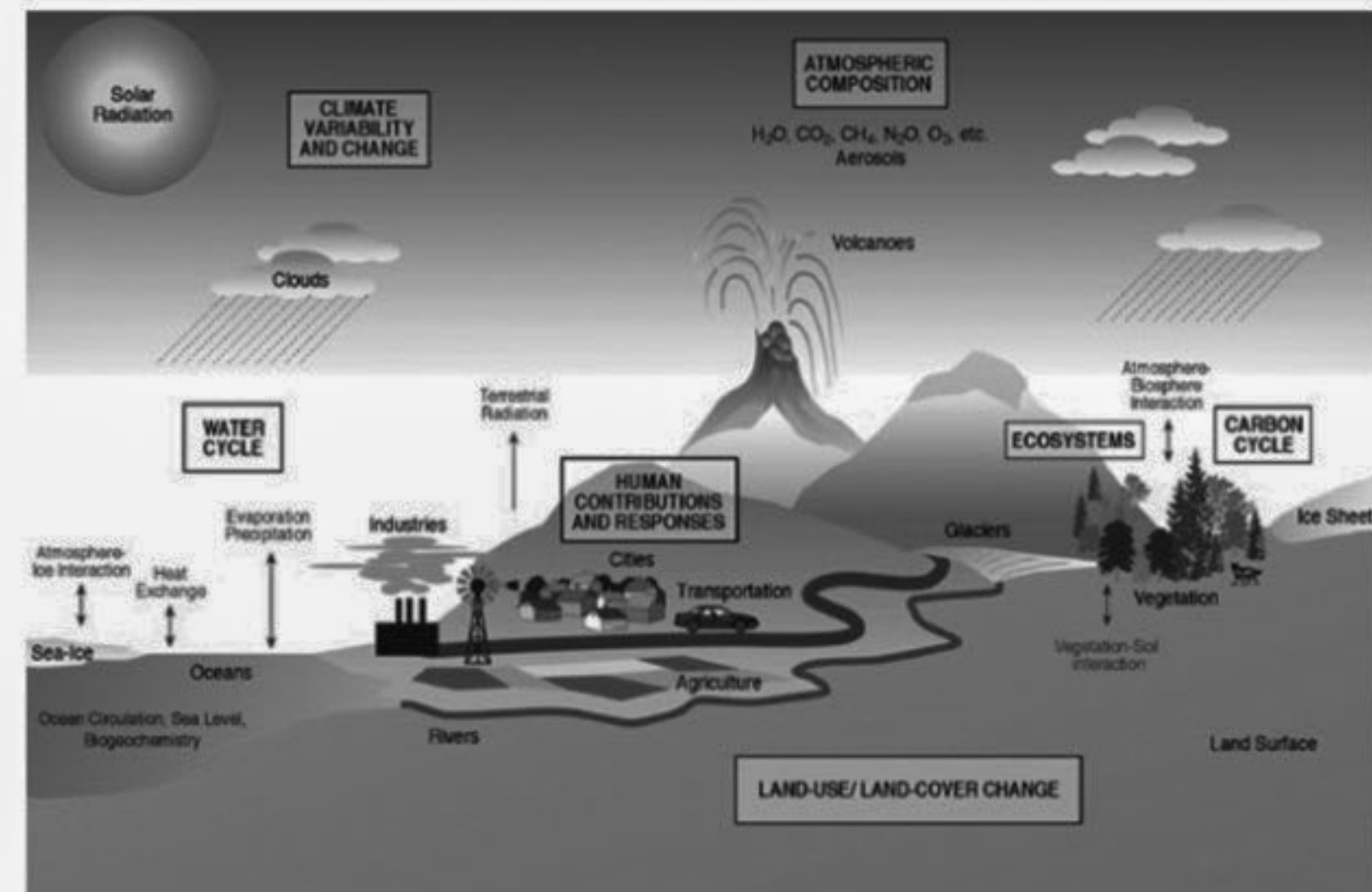
Geological changes on the earth's surface can also affect global climate. The distribution of continental landmasses and ocean basins affects the pattern of global atmospheric and oceanographic circulation. The collision of the Indian subcontinent with Asia, and formation of the Himalayan mountain range about 40 million years ago is an example of a plate tectonic event that caused significant climate change. The Himalayas obstruct equatorial winds and ocean currents, and contribute to major climatic phenomena,

namely the monsoon seasons of southern Asia and the Indian Ocean.

Quakes can shift the orientation of earth's axis because they move large sections of the crust and subsequently unbalance the planet. Over the course of millions of years, the motion of tectonic plates reconfigures global land and ocean areas. This can affect both global and local patterns of climate and atmosphere-ocean circulation. A recent example of tectonic control on ocean circulation is the formation of the Isthmus of Panama about 5 million years ago, which shut off direct mixing of the Atlantic and the Pacific oceans.

The magnitude 9.1 Sumatran Earthquake in 2004 that generated an Indian Ocean tsunami shortened the day by 6.8 microseconds and shifted the axis by about 2.3 millisecondseconds. Initial U.S. Geological Survey data from the quake and its dozens of powerful aftershocks indicate that some 740 miles of the boundary between the India plate and the Burma plate slipped an average of 15 meters and that the sea floor thrust up several meters. It is difficult to determine the total mass of the crust that shifted because the movement was irregular, but when so much of the earth moves so far, the wobble of its axis will jog slightly, too.

In a demonstration of the satellites' sensitivity to minute changes in earth's mass, the science team reported that the satellites were able to measure the deformation of the earth's crust caused by the December 2004 Sumatra earthquake. That quake changed earth's gravity by one part in a billion. The Richter scale 9.0 magnitude temblor that struck 250 kilometers (155 miles) southeast of Sumatra Island may have moved small islands as much as 20 meters (66 feet). Based on



seismic modeling, some of the smaller islands off the southwest coast of Sumatra may have moved to the southwest by about 20 meters. That is a lot of slip. The northwestern tip of the Indonesian territory of Sumatra may also have shifted to the southwest by around 36 meters (120 feet). In addition, the energy released as the two sides of the undersea fault slipped against each other made the earth wobble on its axis).

The magnitude-8.8 earthquake that rocked the west coast of Chile was violent enough to move the city of Concepcion at least 10 feet to the west and the capital, Santiago, about 11 inches to the west-southwest, researchers said. Santa Maria Island off the coast near Concepcion, Chile's second-largest city, may have been raised 2 meters (6 feet) as a result of the quake. The rocks there show evidence pointing to past earthquakes shifting the island upward in the past. The quake also shifted other parts of South America, as

far apart as the Falkland Islands and Fortaleza, Brazil.

The Haitian earthquake may have originated from movement along the fault between the North American and Caribbean tectonic plates. When the movement of earth caused by the earthquake changed the distribution of mass, this may have affected the magnitude of force that affects the earth's angular velocity which caused a change in precession.

So, it is really very difficult to say that only emission of greenhouse gas is causing global temperature changes. But it's obvious that it has contribution in the global climate change. But there must be other astronomical, physical and chemical factors behind the global climate change as well. Earth is going through major changes, indeed.

MD. Mamunur Rashid is an engineer and environmental expert.