

International Day for Biological Diversity 22 May, 2014

Uttar Pradesh State Biodiversity Board celebrated the International Day for Biological Diversity (IBD-2014) on 22nd May 2014 at Dr. Ram Manohar Lohia National Law University Campus, Lucknow. On this occasion, a National Conference on "Island Biodiversity" was also organized in which more than 400 delegates including various research organizations/ institutes, universities, officers from U.P. Forest Department and other states as well as NGO's etc participated. The conference was inaugurated by chief guest Dr. S.W.A. Naqvi, Director, Indian Institute of Oceanography from Goa. He spoke on the various types of Coral reefs in India.



J.S. Asthana

Shri J.S. Asthana, Principal Chief Conservator of Forests, Govt. of U.P. welcomed the gathering including the Chief Guest, all dignitaries at the Dias and delegates of the National Conference and delivered the welcome speech. He said that United Nations Organizations declared the year 2014 as International year of small islands states and theme of International Biodiversity Day 'Islands Biodiversity' is very relevant for inhabitants of Uttar Pradesh. He said that activities like domestic sewage and sewage of other industrial units use of chemicals and insecticides in agricultural field mix with sea water through rivers. This leads threat of biodiversity of islands. In addition to this, our actions are responsible to raise green house gases in atmosphere causing melting of glaciers. This leads raise of sea level and due to this lives and Biodiversity of islands is adversely affected. In spite of 2 percent of land of world, about 9% biodiversity, 18% population, 14% cattle population, developing nation India is one of the mega diversity country among 12 countries of the world. Out of 15, 00,000 species 1, 28,000 species of flora and fauna i.e. 9% of total species lie in our country. Two hotspots of the world are in our country.

The Principal Secretary Forests, **Shri V.N. Garg** and Chairman U.P. State Biodiversity Board spoke on the relation between health and poor environment. He emphasized that issues related to ecology, environment, health and climate change are becoming really urgent as each day passes. He gave the example of a large number of TB cases reported in Sonbhadra district of U.P. due to contamination and pollution of drinking water supply, caused by the effluents discharged by thermal power plants, coal mines, cement and other large industries in Sonbhadra district. The National Green Tribunal has passed orders for supply of pure drinking water through tankers and also installation of reverse osmosis plants at the source of drinking water. This situation shows the need for taking urgent action on the model of development that we must choose. Any development model must take ecology and environment into account otherwise the health of citizens will be compromised. This was also emphasized by Al Gore in "The Inconvenient Truth".



V.N. Garg

He said that conservation, preservation and governance of biodiversity is very important. While the BD Act 2002 is over 11 years old, the awareness of its importance is yet to reach in all over a lakh villages of U.P. Local BMCs have to be set up in all 53,000 Gram Sabhas, also PBR's are to be made in each gram sabha. This is an enormous task. Thirdly, commercial exploitation of natural resources requires regulation, which is currently lacking.

For good biodiversity governance we must involve:

- 1- Government department and agencies.
- 2- Local communities.
- 3- Local governance institutions and local bodies like municipal corporations and district panchayats etc.
- 4- Government supported institutions such as JFM committees and EDCs.
- 5- Companies and businesses.

He emphasized on the need to manage our protected areas.

He finally announced that with the partnership of Centre for Environment and Education (CEE), U.P. Pollution Control Board and U.P. State Biodiversity Board there will be 3 main initiatives this year:

- 1- Running of the Biodiversity Bus in Lucknow district.
- 2- Environment Youth Leadership Awards.
- 3- Setting up a state of the Art, Interpretation Centre in Lucknow Zoo.



Pawan Kumar

Shri Pawan Kumar, Secretary, Uttar Pradesh State Biodiversity Board, Lucknow, in his presentation narrated the origin of International Biodiversity Day and reason for selecting current year theme as 'Island Biodiversity'. Shri Pawan Kumar through his beautiful slides defined what is biodiversity and their levels. Darwin's Fiches were given as an example for Genetic Diversity, Blue Toothed Boobies and Great Frigate Bird as examples for Species Diversity, while cliff, rocky out crop and island forest as example for Ecosystem Diversity. He also gave the highlights of Convention on Biological Diversity held at Rio in 1992, emphasizing the conservation of biodiversity, sustainable use of its components and the equitable sharing of the benefits arising out of the utilization of biodiversity. He also presented the statistics of biodiversity wealth in India and gave more emphasis on island and its biodiversity. He is of the opinion that earth is home to over 100,000 islands and there are about 150 islands have a landmass equal to the size of Europe. Further, one in every ten people on Earth is an islander while more than 600 million people live on islands.

It is an interesting fact that Hallig Oland is a small island and about 30 people live close together. Out of 36 biodiversity hotspots in the world six are islands. It is alarming that 64% of all recorded extinctions in recent history on island; for example the Dodo bird of Mauritius was extinct in 1681, Moa from Cook Island extinct in 1769, *Nesiota elliptica* from St Helena went extinct in 1994. Shri. Pawan Kumar also presented various threats the island biodiversity such as tourism, waste management, pollution, over exploitation, natural disaster etc., however climate change is observed as a major issue. To combat the changing scenario

of islands he also suggests some challenges and also reminded the audience about the ecosystem services of islands.

Keeping in view of contributions that island nations made to the world year 2014 is celebrated as 'The International Year of Small Island Developing States'. Further, the Small Island Developing States are home to vibrant and distinct cultures, diversity and heritage. People of Small Island Developing States are also at the forefront of efforts to addressing pressing global issues through ingenuity, innovation and use of traditional knowledge. The challenges facing the small island developing states are challenges that confront us all, and they are determined to work with all countries to find solutions that will ensure a brighter future for generations to come. The year will also help raise awareness of the UN Conference on Small Island Developing States, which will be held in September in Apia, Samoa, and will focus on building partnerships for sustainable development.



Dr. Gurdip Singh spoke on the international obligations of India. He said that rules were required under the Environment Protection Act in India. We have heard enough about the islands and their surrounding near shore marine areas which constitute unique ecosystem often comprising many plant and animal species that are endemic found nowhere else on Earth. Over the past century, island biodiversity has been subject to intense pressure from invasive alien species, over exploitation and climate change and pollution. The island biodiversity is not only degraded due to these factors but also due to eutrophication and acid rain etc. The main cause of marine pollution is air pollution and acid rain. We completely forget the process of ozone depletion. Ozone depletion is not only harmful for mankind but all the chloro fluoro carbon (CFC) makes deadly combination with water of ocean.

He further said that the process of sustainable development is being derailed due to environmental problems. Among the most vulnerable of the developing countries, small island developing State (SIDS) depend on the conservation and sustainable use of island biodiversity for their sustainable development. We have as many as 52 Small Island Developing States. All of them are gathering at one platform in Sept. 2014 at Samoa. The United Nations Climate Change conference, COP 20 will be held in Peru in Dec. 2014, he added. The conference delegates will continue the negotiations towards a global climate agreement. He also threw some light on Nagoya Protocol and Clean Development Mechanism (CDM).

Dr. S.W.A. Naqvi, Director, National Institute of Oceanography, Goa presented his lecture entitled "Marine biodiversity with special reference to coral reefs". He started his presentation explaining the uniqueness of planet Earth in having high percentage of oxygen and less percentage of carbon dioxide in comparison to other planets in the universe. However, the early Earth consisted high percentage of carbon which are now stored in



Dr. S.W.A. Naqvi

fossil fuels, organic soil, ocean and carbonate sediments. Further evolution of life on earth helped in formation of biogenic carbon. Being of the right size and located at the right distance from the Sun, our Earth is the only known celestial body to contain LIQUID H₂O in a large quantity. It is considered as ocean is the cradle of life as the life first originated here. However, information on marine biodiversity still severely inadequate e.g. hydrother - mal vent ecosystems where primary production occurs through chemosynthesis by microorganisms.

Animal life in the sea is much more diverse (not so for plants!) than on land because of a large variety of physico- chemical environments. The benthic life is far more diverse than pelagic life with 200,000 species. So far about 230,000 species of plants and animals described from sea which consists of 14 endemic animal phyla, compared to 1 on land. Dr. Naqvi explained in detail the benefits of coral reef and its ecology. He provided a classification of various coral reefs. He also provided a statistics of faunal diversity in coral reef of India in which Mollusca has a major share. In India Lakshadweep coral has highest diversity with 158 coral species, >600 fish species, 4 turtles, and 278 Mollusc species. Based on the biodiversity of corals Dr. Naqvi provided a coral status matrix for different islands where in Agati scored 3+. He also discussed about natural and anthropogenic threats to the diversity of fragile coral ecosystem. In the recent days ocean acidification is observed as major threat to the corals. The ocean absorbing about a quarter of CO₂ released to atmosphere due to human activities (2.5 Gt per year) making seawater acidic. Surface pH already decreased by 0.1, expected to fall further by 0.3 by 2100. Large changes in calcification expected, leading to large scale biodiversity loss, threats to stability of islands with huge socio-economic impact.

Dr. Naqvi illustrated the attempt of his organization in restoring the bleached corals through reef restoration research. It is observed that survival after 18 months was >90% and the mortality observed was due to human interference (fishing activities) rather than natural causes. Dr. Naqvi also recommended several measures for sustainable utilization of coral resources. He was of the opinion that effective management requires good scientific understanding of coral reef ecology. Little control on global change (acidification and warming), but local perturbations (pollution including eutropication) must be controlled. Fishing must be strictly regulated while Eco-tourism must be encouraged. Finally, threatened ecosystems must be declared as Marine Protected Areas.



Prof. B.C. Choudhury

Prof. B.C. Choudhury (Retd), Wildlife Institute of India, Dehradun presented his lecture on Island Biodiversity giving history for the concept starting from Wallace-Darwin to E.O. Willson. He also defined what islands are and how they originate. The tectonic movements, volcanoes and other natural phenomenon give rise to islands. Prof. Choudhury also classified islands in to several categories. The island biodiversity is vulnerable and alien species are one of the major threats. Prof. Choudhury gave an example of Brown Tree Snake which is a dangerous predator in Solomon Island which became the cause for extinction of birds, bats and lizards. The island give rise to unique biodiversity and

endemism, Prof. Choudhury took up the examples of Galapagos Islands to further explain the uniqueness of island biodiversity. Giant sized tortoise (*Geochelone elephantopus*) is available in the island of Aldabara, while heavy sized lizard *Varanus komodoensis* is occur in islands of South Asia. Also islands represents some of the dwarf animals in the world, for example, *Elephas falconeri* – small elephant and *Brokesia sp.* - world's smallest chameleons in Mediterranean Islands; Dwarf woolly mammoth (*Mammuthus primigenius*) in Wrangel Island. The islands also represent the relics of biodiversity. Prof. Choudhury is of the opinion that if the giant tortoise is the symbol of the Galapagos Islands, then Darwin's finches must be the symbol of evolution in the Galapagos. There are presently 14 species of birds recognized as Darwin's finches - 13 in the Galapagos, and one on Cocos Island. While mentioning various theories governing island biodiversity he said that the number of species increases with increase in island area while the number of species decreases with isolation. Extinction and immigration probabilities related to island area and distance from source.

He explained these theories with the help of Krakatau islands. In Indian context Prof. Choudhury gave an overview of Andaman Nicobar Islands and their importance with the example of tribal communities in the island. Here he gave more emphasis to endemic fauna of Andaman Nicobar islands with examples such as Forest lizard, Nicobar Tree Frog, Andaman Cobra, Narcondam Hornbill, Nicobar Megapode, the Giant Crabs and several marine life. He also gave a list of anthropogenic threats to biodiversity of this fragile ecosystem of Andaman. Among the natural threats Tsunami is a best example. In continuation of his presentation Prof. Choudhury also presented an overview of biodiversity in Lakshadweep Islands with several examples. However, he showed his concern over anthropogenic contribution to deterioration of island biodiversity. He concluded his presentation with beautiful pictures of island.

Dr. Deepak Apte, Chief Operating Officer, BNHS, Bombay, in his lecture presented an overview of marine and coastal biodiversity. It is important to note that India is one of the peninsular countries with Indian Ocean, Arabian Sea and Bay of Bengal as main sea boundaries with a coastline of approximately 8000 km distributed among 9 coastal states and 4 union territories. Further more than 20% of the total coastline of the country is shared alone by two islands - Andaman-Nicobar and Lakshadweep. The coastline also makes the Exclusive Economic Zones (EEZs) with a cover area of about 2.02 million km² enclosed within 2000 nautical miles (370.4 km) from the land, which are basically the areas of the continental shelves and are now under national sovereignty.



Dr. Deepak Apte

Dr. Apte presented a brief statistics of marine biodiversity in India where in fishes, Mollusca and Crustacean has maximum diversity. Also he showed various interesting ecosystems within coastal area which included coral reefs, mangroves, mudflats, sea grass beds, inter-tidal areas, estuaries, coastal lagoons, islands and atolls. Islands boast a truly unique assemblage of life with high endemism. For example, over 90% of Hawaiian island species are endemic. In Mauritius, some 50% of all higher plants, mammals, birds, reptiles and amphibians are endemic, and the Seychelles has the highest level of amphibian

endemism in the world. The island of Cuba is home to 18 endemic mammals, while mainland Guatemala and Honduras, both nearby, have only three each. Madagascar is home to more than 8000 endemic species, making it the nation with the highest number of endemic species in sub-Saharan Africa. However, island biodiversity is in threat. Some 20% of amphibians, 25% of mammals and 33% of birds considered to be threatened with extinction are restricted to islands. As per recent record 88% of birds, 86% of reptiles and 54% of amphibian extinctions have been occurred on islands. Therefore, several prioritization programmes such as the Global 200 eco regions (25% of which are islands), Endemic Bird Areas (48% insular), biodiversity hotspots (29% exclusively made up of islands), Alliance for Zero Extinction sites (39%) have been recognized in the world. For India is concern based on threat to biodiversity he identified 9 sites in the coastal area as 'Critical Habitats' for conservation.

He focused more on the developmental activities along the coastal line of India becoming threat to the biodiversity. For example 15 coal-fired power projects equalling 25 GW of power are set to be built on a narrow strip of coastal Konkan 50 to 90 km wide and 200 km long. The proposed Sethusamudram Ship Canal between India and Sri Lanka is going to be harmful for migratory Olive Ridley Turtle. The refineries and ports in Gulf of Kuchh are becoming a great threat for Marine National Park. The oil spills and climate change are other existing problems. Over 60% decline in nesting of Green and Hawksbill Turtles due to tetrapods in Lakshadweep. Also, illegal trade and over exploitation of fishes, sea shells have become major threat. Dr. Apte criticized the Indian policy and law that are inefficient and ignorant about development activities creating havoc to the biodiversity in fragile coastal and island biodiversity.

Mrs. Mitali Kakkar, Founder, Reef Watch Marine Conservation presented her views on Island Biodiversity through her movie "Troubled Water". The movie was based on



Mrs. Mitali Kakkar

the rise in sea water temperature that caused wide-spread bleaching of coral reefs in the Lakshadweep Islands in 1998. The temperature rise was mainly due to the adverse effects of the El Nino on the reef eco-systems. The corals reefs are sensitive ecosystems that are vulnerable to an increase in sea surface temperature. The El-Nino current -a natural current occurring every 6-7 years was unnaturally high in 1998, believed to be a direct offshoot of global warming, affected the Lakshadweep Islands. This resulted in widespread bleaching of the corals and the consequent death of many of the reefs. Over time, the destruction of these corals along with the unsustainable local practice of collecting coral shingles for building material made the islands vulnerable to disaster. Mrs. Kakkar who is continuously filming the coral reef since 1995 could nicely capture the difference of healthy and bleached corals in her film.



Mr. Rauf Ali

Mr. Rauf Ali of FERAL, Pondicherry presented an illustrative lecture entitled 'Invasive alien species on Islands- a quick look'. He defined invasive species as 'species moved from one part of the world to another through human intervention are introduced'. When they spread and cause economic or environmental damage they are termed invasive

alien species. With the flow diagram Mr. Ali showed the pathway of alien species introduction. The characteristics of alien species that help to flourish in new region are high tolerance, high genetic variability, short generation time & rapid growth, small seed mass, early sexual maturity, broad diet and rapid dispersal and commensally behaviour, but he opined that change in disturbance regime seems to be single most important factor. Mammal are better than birds as alien species to survive in new locality with success rate of >50%.

Mr. Rauf presented a statistics of alien species in the world and the damage they cause to native biodiversity. In United States of America invasive species are the second only to habitat destruction as threat to endangered spp. Invasive species are greater threat to biological diversity than pollution, harvest and disease combined. Mr. Rauf discussed in detail the damage caused by invasive species in Andaman Islands. For example, Chital a herbivores that damage native vegetation, myna birds that affect other resident endemics, water hyacinth plants that alter lake characteristics, crows and insect pests that attack agricultural crops. The Common Mynah (*Acridotheres tristis*) a pest in Andaman Islands is listed as “100 worst invasive” by IUCN as it competes with other species for nesting holes, cause damage to agriculture and horticulture. Because of Mynah species such as Glossy Stare reduced in numbers. Similarly, House Crow (*Corvus splendens*) is a dangerous invasive species in Andaman Islands. It is seen for the first time in Port Blair in 2003 and only 7 birds were counted in Gandhi Park and Forest Dept. failed to take immediate action then. The bird is established by now and over 1000 in number in year 2008. The crow destroys eggs, nests of other birds, spreads disease, contaminates drinking water, damages agriculture. Among birds House sparrow (*Passer domesticus*) is another destructive invasive bird but still restricted to South Andaman. There are several mammals within Andaman Islands that are considered as invasive; Chital (*Axis axis*), Elephant (*Elephas maximus*), Five striped palm squirrel (*Funambulus pennanti*), Barking deer (*Muntiacus muntjac*), Brown rat (*Rattus norvegicus*), Black rat (*Rattus rattus*), and House Mouse (*Mus musculus*). The not only cause damage to native vegetation but also to the agriculture and other wild animals, however the exact data on such damage is unavailable. Apart from the wild invasive species domestic animals like dogs, cattle, goats and cows are also creating havoc in Andaman Islands. In most of the areas these domestic animals have gone feral.

Mr. Ali also presented a lengthy list of invasive plants in Andaman with the titled Page 3 plants. Mr. Ali further suggested several ways of irradiating or controlling the invasive species. The invasive animals can be sterilized, translocated, culled or bio controlled using other organism. The egg parasites and larval parasites are few such bio control measures. Mr. Ali also showed his concern over lack of efficient policy to control invasive species. India is one of the few countries in the world without an invasive species policy.

Dr. A.R.T. Arasu of Central Institute of Brackish water Aquaculture, Chennai, presented his lecture on the topic 'Biodiversity in island ecosystem of India'. Dr. Arasu started his lecture with the definition of biodiversity and its conservation importance. In his opinion removing a species from eco system means removal of the functions of that species disturbing the ecological balance and sustainability becomes vulnerable. He explained the importance



Dr. A.R.T. Arasu

of island at the same time the threat. He presented an overview of biodiversity in Andaman Nicobar and Lakshadweep Islands, also provided a list of new species discovered by Annamalai University from Lakshadweep Islands.

Simultaneously Dr. Arasu showed the picture of bleaching corals and deteriorating biodiversity in Lakshadweep. However, these are great attempt to rejuvenate the dead corals by transplantation by National Institute of Oceanography. Transplantation study is 90% successful in Lakshadweep area. There is also other programme like hatchery for ornamental fishes in Lakshadweep. Training and orientation programmes are being regularly conducted to the villagers and local people for sustainable harvesting the marine resources, also Dr. Arasu suggested several recommendations. To avoid over-exploitation of reef fishes and other associated organisms, alternate livelihood option for the island people should be provided. To establish a marine ornamental aqua park for the sustainable utilization of marine ornamentals for aquarium trade more R & D facilities should be created. To develop sustainable harvest technology there is a need for creating easy transport facility to export the ornamentals from the islands to International markets. Island community should be educated through continuous awareness programmes about the value and importance of coral reefs and its associated resources. Coral reef conservation and management programs should be implemented in collaboration with local people participation. There is a need to formulate certain policies and laws for the establishment of Marine Protected Areas in order to protect and replenish the coral reef ecosystems and minimizing anthropogenic activities. Also, continuous monitoring is required for reef watching. In order to replenish the coral biodiversity there is a need for active science in finding out optimal symbiotic anemones and corals that will felicitate fast growth and maximum reproduction of Clown fish, anesthetization of marine ornamentals for stress free transportation, selective breeding of genetically superior marine ornamental fishes using molecular markers, technology development for the hatchery production of marine ornamental invertebrates (Sea-anemones and ornamental shrimps), and coral propagation for sustainable marine aquarium trade.

Dr. Dhruv Sen Singh of University of Lucknow presented his lecture on Climate Change and Island Biodiversity. Dr. Singh is of the opinion that 'as environmental conditions change, the balance between formation of new species and extinction of existing species determines the earth's biodiversity'. He gave an overview of biodiversity and its benefits. India occupies only 2.4% of the world's land area but its contribution to the world's biodiversity is approximately 8% of the total number of species. While discussing the natural causes for changes in biodiversity he opined that 'tectonic plate movements, volcanic eruptions, earthquakes, and climate change have shifted wildlife habitats, wiped out large numbers of species, and created opportunities for the evolution of new species'.



Dr. Dhruv Sen Singh

Dr. Singh agreed that pollution and climate changes are becoming the major reason for extinction of species. He showed the pictures of melting glaciers and icebergs as indicators of climate change. However, he wondered where all the water from melting glacier are going. With the example of Kedarnath area satellite imagery he opined that actually

water is not reducing in the Mandakini River. If that is so the river should have flown below the temple. Along with the anthropogenic reason for climate change the natural causes are earth rotation around the sun. At the same time he opined that climate change is good for evolution of new species. He said 'it shows that increase and decrease in the percentage of carbon dioxide, rise and fall of global temperature, retreat and advancement of glaciers, extinction and evolution of fauna and flora, (Dry and humid, cold and warm climatic stages) are natural cycles. Therefore, all the global climatic and environmental changes are natural, not anthropogenic'. Natural resources are finite. The environment gives us all the basic services free of charge, without which our species cannot survive. We Homo sapiens degrade and continue to degrade our environment with the over exploitation of nature. Massive deforestation and uncontrolled urbanization have led to environmental degradation never witnessed so far. The aim of Science is to provide a balance between development and nature in the society. Ignorance of Scientific facts and natural law due to anthropogenic activity leads to disasters. Therefore our development should be sustainable to avoid/mitigate such disasters. It is our fundamental duty to preserve it so that we can hand over our generation a green and clean earth. With this Dr. Singh requested everyone that comes forward to save this planet earth and to develop the society and mankind in a sustainable way.

Photography Contest:

On this occasion, a photography contest was also organized for the public by U.P. State Biodiversity Board, Lucknow on the theme “*Biodiversity of Uttar Pradesh*”, in which only photos from Uttar Pradesh were invited. Overall, 60 photographs related to the theme were received. The photography contest was evaluated by *Shri Anil Risal Singh*, President, Lucknow Camera Club, Lucknow and the following were adjudged as First, Second and Third prize winners of the photography contest:

Sl No.	Name of the Participants	Title of the picture	Result
1	Shri Neeraj Mishra	Great White Pelicans at Soorsarovar Lake	First
2	Shri K. Praveen Rao	Every Drop of Water is Precious	Second
3	Shri Sanjay Tiwari	Lesser Whistling Teal and Gharial	Third



1st prize Shri Neeraj Mishra



2nd prize Shri K. Praveen Rao



3rd prize Shri Sanjay Tiwari

Books Released:

A Souvenir on ***“Island Biodiversity”*** was released on this occasion. Besides, a book entitled ***“Inventory of Faunal Diversity of Uttar Pradesh”*** prepared by Dr. V.D. Hegde and Dr. K. Venkatraman of Zoological Survey of India, Kolkata was also released. This book includes listing of fauna of Uttar Pradesh. Apart from this, a book entitled ***“Cucurbits: Biodiversity, Breeding and Production in Uttar Pradesh”*** by Dr. Sheo Pujan Singh from Narendra Dev Agricultural University, Faizabad was also released.



Release of Souvenir on ***“Island Biodiversity”***



Release of book on ***“Inventory of Faunal Diversity of Uttar Pradesh”***



Release of book on ***“Cucurbits: Biodiversity, Breeding and Production in Uttar Pradesh”***