

Biodiversity and conservation of Marine Bioresources inaugural address delivered during the Seminar on conservation of Marine bioresources organized by CAS in Marine Biology, Annamalai University and National Biodiversity Authority at Annamalainagar, Tamil Nadu held on 14-06-05.

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Introduction:

The Biological Diversity Act of India 2002 and the Biological Diversity Rules, 2004 will be implemented by the National Biodiversity Authority established by the Government of India. The main functions of the National biodiversity Authority is to advice the government on matters relating to the conservation of biodiversity, sustainable use of its components and equitable sharing of benefits arising out of the utilization of biological resources, select and notify the areas of biodiversity importance as biodiversity heritage sites under this act, perform other functions as may be necessary to carry out the provisions of the act. The National biodiversity Authority on behalf of the Central Government may take measures necessary to protect the biological diversity of the country as well as oppose the grant of Intellectual Property Rights (IPR) in any country outside India on any biological resource obtained from India or knowledge associated with such biological resource which is derived from India.

Biodiversity:

Biodiversity encompasses the variety of all life on earth. India has rich Biological diversity and one of the 12 diverse countries of the world. With only 2.5% of land area, India accounts for 7.8% of the recorded species at global level. India is also rich in traditional and indigenous knowledge both coded as well as informal.

Biological diversity means the variability among living organisms from all sources, including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part, this includes diversity within species, between species and of ecosystems.

Biological Resources:

Bioresources are important components for progress and economic activities of a nation. But bioresources management and utilization for human welfare is very important and critical components of the optimum utilization of the bioresources Awareness of the importance and implications of bioresources among common people as well as elite educated citizens for safeguarding and protecting the optimum and balance way of using the bioresources needs critical studies to focus the natural bioresources wealth for the benefit of not only the present generation of our people but also to our future generations for their better,

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healthy and peaceful living on the earth. The problems facing at present is the over exploitation of bioresources/natural resources which would not only have negative impact on the environment but also sometimes totally destroy and erode the important bioresources which are available at local level, regional level and national levels. Therefore, handling Bioresources in a proper manner in an appropriate way is important for the optimum use without over exploitation of our bioresources wealth.

Biological resources includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity.

Ecosystem management in a particular location is important and integral part for the conservation and protection of biological diversity of India. Ecosystem is a dynamic complex of plant, animal and microorganism communities and their non-living environment interacting as a functional unit and habitat is the place or type of site where an organism or population naturally occurs.

Significant losses to Biodiversity:

Biodiversity is being lost as on today more rapidly than at any time in the past several million years. Some Biologist believe that about 60,000 of the world's 2,40,000 plant species perhaps even higher proportions of vertebrate and insect species could become extinct within the next thirty years if the same trends continue. But even a species at no risk of extinction can lose much of its potential through the loss of genetic material by reduction in range, numbers and varieties. The current losses to biodiversity can be attributed to direct causes including habitat loss and fragmentation, invasion of introduced species, over exploitation of living resources and modern agriculture and forestry practices. The basic problems of losses to biodiversity includes:

- The unsustainably high rate of human population growth and natural resources consumption.
- The steadily narrowing selection of traded products from agriculture, forestry and fisheries.
- Economic systems that fail to value economic resources.
- Inequity in ownership, management and flow of benefits from both the use and conservation of Biodiversity.
- Deficiencies in knowledge and application
- Legal and institutional systems that promote unsustainable exploitation.

Loss of species and genetic diversity presents a serious threat to the goal of sustainable agriculture. Species and genetic diversity provide sources of pest resistance and control, new domesticates and the genetic raw material for plant breeding and genetic engineering. However, beginning with the development of modern crop varieties in the later half of this century accelerating with the spread of green revolution varieties in 1960s, genetic diversity in agricultural systems has been eroded rapidly. Typically, a few high yielding varieties of a crop, which require high inputs of water, pesticides and fertilizers have replaced the

tremendous diversity of landraces maintained by farmers. Gene banks can slow this loss of genetic diversity but they are not a perfect solution. It has been reported that even in developed countries between one half and two thirds of the seeds collected in the past decade have been lost. Wild relatives of the major and minor crop species are an important source of genetic material that is lost. Wild relatives of grains have the potential to confer important benefits as in the case when Turkish wild wheat bred with American strains conferred resistance to bunts, a serious wheat disease. The centers of greatest diversity for the world's major crop species are primarily in developing countries in areas where habitat alteration and destruction are at work. Modern intensive agricultural production practices have resulted in unsustainable losses of top soil, soil fertility, genetic resources, natural predators and parasites. Biodiversity is an important resources needed to develop sustainable agriculture. Genetic diversity can be used to increase as well as sustain productivity.

Unprecedented crisis of Nature:

The international conference on "An agenda of science for environment and development into the 21st century (ASCEND-21) which was sponsored by ICSU and held at Vienna during 1991. The conference concluded that unprecedented crises are likely to occur within the lifetime of a half of the worlds population.

The changes likely to occur in Nature are:

- World population is likely to double the billion in about 40 years from now.
- Migration and urbanization assuming dramatic proportions with notable consequences on coastal zones.
- Continuing rise of energy consumption exerting increasing pressures on the global ecosystem.
- Climate change, sea level rise and associated impacts on the biosphere.
- Irreversible loss of substantial part of the total number of living species.
- Continued reduction and deterioration of quality of the natural resource base including the exhaustion, degradation, salinisation and loss of a major proportion of the world's soil.
- Growing and widespread water scarcity.

India is one among 12 mega-biodiversity countries and 25 hotspots of the richest and highly endangered eco-regions of the world. Among the Asian countries, India is perhaps the only one that has a long record of inventories of coastal and marine biodiversity dating back to at least two centuries. In terms of marine environment, India has a coastline of about 8000 km, an Exclusive Economic Zone of 2.02 million km² adjoining the continental regions and the offshore islands and a very wide range of coastal ecosystems such as estuaries, lagoons, mangroves, backwaters, salt marshes, rocky coasts, sandy stretches and coral reefs, which are characterized by unique biotic and abiotic properties and processes. A network of 14 major, 44 medium and numerous minor rivers together with their tributaries cover practically the entire country except for the western arid region of Rajasthan Desert. The total length of the rivers is estimated at over 40,000 km. The dissimilarities of marine biodiversity between the west and east coasts are remarkable. The west coast is generally exposed with heavy surf and rocky shores and headlands whereas the east coast is generally shelving with beaches,

lagoons, deltas and marshes. The west coast is a region of intense upwelling associated with southwest monsoon (May -Sep) whereas the east coast experiences only a weak upwelling associated with the northeast monsoon (Oct- Jan), resulting in marked differences in hydrographic regimes, productivity patterns and qualitative and qualitative composition of fisheries. All islands on the east coast are continental islands whereas the major island formations in the west coast are oceanic atolls.

In India the accelerated loss of coastal and marine biodiversity components over the last few decades has been of great concern. Environmental changes, overexploitation and habitat loss are among the major causes of species loss that, according to certain estimates, is of the order of a species per day. It is not known what fraction of this loss is from marine environment, a situation owing to a lack of systematic coverage of all faunal and floral classes with the prominence placed often on economically important groups, or on habitats of deep-sea where one out of two species collected could be new to science.

Probable estimates of species diversity have been variously arrived at, by extrapolation of known number of species from a section of the habitat to others. With microbes, such estimates are even less certain. It is likely that more than 99% of the potentially existing microbes are not amenable for detection with the conventional methods and even the number of the known ones has been on the increase. In all probability, the number of species from all groups and all habitats of seas could be of the order of several million but we know only a fraction of that for certain. Even the most recent and most global inventory, the Ocean Biogeographical Information System (OBIS), has no more than 40,000 species listed. What is unknown of the diversity, thus, far exceeds what is known.

Equally important as knowledge of what lives in the seas, is a prediction of what would live there in the future. This is especially true for India, where rapid loss of habitats and decline in water quality could be drastically altering the species diversity. Sea regions around India are particularly vulnerable to this, a situation the gravity of which is compounded by the less documentation. This seminar will address, therefore, the issue of the status of coastal and marine bioresources, the threats, conservation and sustainable utilization in the context of Biodiversity Act 2002.

Conservation of Biodiversity for Sustainable Agriculture:

The wide spread loss of the global biological wealth is one of the most serious crises today at International level. As many of the World's diverse life forms from microbes to higher animals and plants have a direct or indirect influence on agricultural conservation of these organisms is essential for sustainable agriculture. To feed growing population, agriculture must be intensified to provide more food. It will also be essential to increase the resilience of agriculture by maintaining a wide array of life forms with unique traits, such as trees that survive drought conditions and cattle that reproduce in harsh conditions. Sustainable agricultural practices can both feed people and protect oceans, forests and other ecosystems that harbour biological diversity.