



# SERI news

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*With you in Pursuit of Sustainable  
Management of Finite Water Resources*

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**Point for discussion this month** **Means of Conservation of Natural Heritage**

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## Eternal Words

Something will have gone out of us as a people if we ever let the remaining wilderness be destroyed; if we permit the last virgin forests to be turned into comic books and plastic cigarette cases; if we drive the few remaining members of the wild species into zoos or to extinction; if we pollute the last clear air and dirty the last clean streams and push our paved roads through the last of the silence, so that never again will Americans be free in their own country from the noise, the exhausts, the stinks of human and automotive waste.

*~Wallace Stegner, letter to David E. Pesonen of the Wildland Research Center,  
3 December 1960 (Thanks, Bekah)*

Drive Nature forth by force, she'll turn and rout  
The false refinements that would keep her out.

*~Horace, Odes*

Dear Readers,

Western Ghats (WG), the ecological hot spot is becoming vibrant with economical development like mining, thermal power stations and nuclear power stations. The natural landscape of this region is going to change a lot in near future.

The cover photo is of a beautiful mountain range near Konkan region of Maharashtra state from where the rivers originate.

A report generated by Western Ghats Ecological Expert Panel (WGEEP) has generated a lot of curiosity when it was objected that this report may affect state's economy severely. The WG area economy is mostly dependent on mining activity. These are scalping biodiversity from this beautiful hot spot. Therefore there is a need to draw a sustainable plan for development while protecting environment.

The article on 'biodiversity- rational for living' discusses the biodiversity of Western Ghats.

Examples of Udaipur, Allahabad and Ludhiana have given entirely new dimensions of ecological economics of pollution treatment. Ecotechnology can be a buzz word, diz word of the Green Economy in near future.

Ecotechnology uses ecosystem approaches and processes therefore it reduces demand for manmade energy while serving to large populations at affordable price.

Thank you,  
Chief Editor

## Biodiversity - Rationale of Living

- SERI Team

### Introduction

India is one of the most biodiversity-rich countries in the world. This natural richness was also reflected in the sustainable demographical life of the land till it was exposed to belligerent exploiters in its long history of civilization. Human population of the land was dependent on biodiversity in many ways for its livelihood for a long time. Today, the ever-increasing population of India is putting survival pressure on the biodiversity. Thus, it is important to know and appreciate the diversity in both - human population and flora and fauna.

Demographic diversity of India pressurizes the natural resources enormously. But on the other hand, Indian culture is enriched with superfluity of social conventions, customs, traditions and rituals in the context of conservation, preservation and protection of native floral and faunal species. Plants like *Oscimum* or *Ficus* species and animals like elephant, cow, snakes, and turtles are considered sacred and worshipped. This deep association between biodiversity and culture presents a distinctive prospect for the sustainable conservation of living species.

### Concept of Biodiversity Hotspot

Life on Earth is facing an unprecedented crisis of planetary proportion due to population, market, infrastructure, and economy. Unsustainable consumption and exploitation economy in many developed countries and crushing poverty and imitative economy in the developing countries are obliterating biodiversity with an alarming rate. According to the IUCN in 1994, India has 172, or 2.9% of the world, of designated threatened species, inclusive of Asiatic lion, Bengal tiger, Indian vulture etc. Exploitation of land, water and forest resources by humans for activities other than livelihood has led to the extinction of many species all over the world. Some of the large mammal species are confirmed extinct, and the status of many smaller animal and plant species is difficult to determine. Many species have not been recorded in the scientific literature.

There are four major reasons of species face extinction -

- Habitat devastation
- Mismanagement resource
- Annihilation and poaching of some species
- Climate change

Extermination of species is the serious facet of the biodiversity crisis. It is irreparable. Extinction is a natural process, but it has increased multi-fold due to human interference and exploitation of resources. Conservation budgets and technologies are insufficient to protect endangered species from extinction. British ecologist Norman Myers defined the biodiversity hotspot concept in 1988 to address the dilemma that conservationists face. Concept of biodiversity hotspots was evolved through two articles of Norman Myers in "The Environmentalist" (1988 & 1990). After thorough analysis by Myers and others was culminated in "Hotspots: Earth's Biologically Richest and Most Endangered Terrestrial Eco-regions".

Each hotspot faces extreme threats and has already lost at least 70 percent of its original natural vegetation. Over 50 percent of the world's plant species and 42 percent of all terrestrial vertebrate species are endemic to the 34 biodiversity hotspots. Biodiversity hotspot is a bio-geographic region with a remarkable pool of biodiversity that is under threat from human pressure.

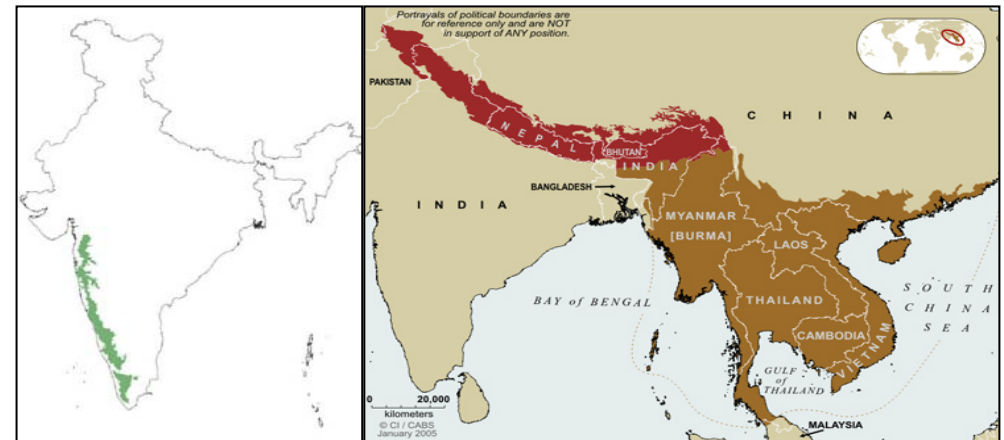
Biodiversity hotspots of the world are inhabited by high numbers of endemic species; hitherto their combined area as compared to remaining habitat covers only 2.3 percent of the Earth's land surface. Around the world, about 25 areas qualify under the definition of biodiversity hotspot definition, with nine others possible candidates. These sites are home to nearly 60% of the world's different endemic species of plants, amphibians, reptiles, birds, and mammals etc. Three regions that satisfy these criteria exist in India and are described below. To qualify as a biodiversity hotspot on Myers 2000 edition of the hotspot-map, a region must meet two strict criteria:

1. It must contain at least 0.5% or 1,500 species of vascular plants as endemic, and
2. It has to have lost at least 70% of its primary vegetation.

India is a unique country rich in biological diversity, spread within the Indomalaya ecozone housing two – Western Ghats and Himalayan hotspots of the identified 34 biodiversity hotspots in the world. The third - Indo-Burma - lies partially within the Indian North-East. Many Indian species are lineage of species originating in Gondwana. Among Indian species, only 12.6% of mammals and 4.5% of birds are endemic, while 45.8% of reptiles and 55.8% of amphibians are predominant species in the sub-continent. Notable endemics are the Nilgiri leaf monkey and Beddome toad of the Western Ghats.

### The Western Ghats: Peninsular India's Biodiversity Hotspot

Western Ghats are a chain of mountains (mostly more than 1000 m high) that run along the western edge of peninsular India receiving high rainfall through orographic effect. These ranges have moist deciduous forest and rain forest. Western Ghats has high species diversity and endemism. About 77% of the amphibians and 62% of the reptile species found here are found nowhere else. There are over 6000 vascular plants belonging to over 2500 genera in this hotspot, of which over 3000 are endemic such as black pepper, cardamom - world's much of spices have their origins in the Western Ghats. The region also harbors over 450 bird species, 140 mammals, 260 reptiles and 175 amphibians. Vegetation remained in 43,000 sq. km only from originally extended over 190,000 sq. Km.



### Himalayan Biodiversity Hotspot

This hotspot encompasses Bhutan, northeastern India, and southern, central, and eastern Nepal. The region is comparatively geologically young. It has high altitudinal variations, having number of world's highest peaks more than 8000 m. Eastern Himalayan hotspot has nearly 163 globally threatened species including the 45 mammals (out of 300 species), 50 birds, 17 reptiles, 12 amphibians, 3 invertebrate and 36 plant species (out of 10000 endemic species).

### Indo-Burma Biodiversity Hotspot

The Indo-Burma region encompasses several countries such as Bangladesh to Malaysia including North-Eastern India (south of Brahmaputra river), Myanmar, Lao People's Democratic Republic, southern part of China's Yunnan province, Thailand, Cambodia and Vietnam. Most of this region has been deteriorating



rapidly from past few decades. Almost 1,300 bird species exist in this region. It is estimated that there are about 13,500 plant species in this hotspot, with over half of them endemic.

### Conservation of Biodiversity Hotspots

Report of the Western Ghats Ecology Expert Panel (WGEEP) recently came to forefront due to the issue of putting it into public domain. It was confronted that it might affect the economy of concerned states as it has comments on the mining activities. All the observations are meticulously cited in the report and the sensitive areas have been documented. This report shall be a stepping stone for the proposed development in the region.

In recent decades, human intrusions have posed threat to India's wilderness. The system of national sanctuaries, parks, and protected areas established from 1935 in addition to community and temple forests, and expanded in 1972 by enacting the Wildlife Protection Act. Protection of biodiversity can be an integral part of poverty eradication for sustainable livelihood. Article 48 of the Constitution of India stipulates that, "The state shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country" while Article 51-A reinforces the responsibility and initiatives of citizen of India stating that "it shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers, and wildlife and to have compassion for living creatures". So, it is a responsibility of every citizen either sitting in decision-makers chair or not, he must take rationale decisions for livelihood through conservation of biodiversity.



Shrishti Eco-Research Institute, Pune

## Ecotechnology - Green Economy of Waste Management

- Sandeep Joshi

### Introduction

Zero draft documents prepared for the Rio+20 UN Conference on Sustainable Development is called "The future we want." Core of this text is "The green economy in the context of sustainable development and poverty eradication."

Ecotechnological application for the treatment of pollution in lentic (hydrostatic - lakes) / lotic (hydrodynamic - streams) from non-point sources is an ideal case study for the "Green Economy". Different capitals of livelihood and sustainability of human life on earth are - ecological, social, human, physical (infrastructure) and financial are the pillars of green economy. Ecological and social capitals are non - monetary outlays which are built on the existing living components of the niche. Human capital is built up on the basis of intellectual and labour contributions to some extent not paid of legitimately. But the modern world's physical and financial capitals are overriding all other capitals. Hence, the wealth pyramid of these different capitals has been twisted and made it suitable for economic supremacy and not for sustainability.

Integrated Water Resources Management (IWRM), Integrated River Basin Management (IRBM) and Integrated Lentic and Lotic Basin Management (ILLBM) are different concepts of water resources management actually can assist green economy to lead to sustainability. ILLBM is based on strengthening of six pillars of development - policy, institutions, knowledge, participation, technology and finances through consultative processes in time and space in the catchment of water bodies. IWRM and IRBM are more of project specific concepts rather than livelihood supporting cultural reforms. Ecotechnological solutions for quality and quantity of water resources are applicable for all three concepts thereby reducing the need for infrastructure and financial capitals.

### Economic valuation

Economic value is measured by the willingness of someone to give up some goods and services in order to obtain a good, service, or state of the world. This is often referred to as "willingness to pay". Economic value is one of many possible ways to define and measure value of goods or services or status. Economic values are useful to consider when making economic choices - choices that involve tradeoffs in allocating resources. In a market economy, currency is a universally accepted measure of economic value. Market price defines the minimum currency that

people who buy the good or service are willing to pay for it. Economic values are also affected by the changes in price or quality of substitute or complementary goods.

There is more complexity in ecosystem valuation due to environmental ethics in business i.e. *ECOSENSE* and environmental philosophy - *ENVIROSOPHY* - deep ecology. Many economists and ecologists give attention to assigning of values to ecosystem services which nature offers "for humans". Ecologist Robert Costanza, in the 1990s estimated the combined value of ecosystems of the earth considering most basic seventeen services, as US\$ 33 Trillion each year in comparison with human economy US\$ 25 Trillion while other studies focused on the marginal values as payment of ecosystem services, which are being used in cost-benefit analysis of environmental policies and projects.

### Ecosystem valuation

Ecosystem valuation is considered a (insignificant, mistreated) part of economics as the resources were thought to be infinite and would be always available for exploitation. Actually, the infinity of resources is dependent on their "utilization value (suitability of quality)". Valuation of ecosystem services is more convincing than financial valuation, as the ecosystem would continue even after the collapse of market economy, while the inverse does not applicable at all. An economic system is needed that respects the integrity of ecosystems and resilience of life supporting systems.

Market and project economies are yet to be matured by integrating ecological accounting with financial accounting. Urban systems shall have ecological sanctioning parallel to financial sanctioning audits prior to implementation.

Several types of values can be assigned to ecosystems:

- Direct Use (DU) value credited to direct utilisation of ecosystem services - supply of water, crops, fish, wood, fibre, fuel etc.
- Indirect Use (IDU) value credited to indirect utilisation of ecosystem services - climate mediation, diverse food chains, flood attenuation, drought alleviation etc.
- Survival (existence) value attributed to the pure existence of an ecosystem -
- Philanthropic (altruistic) value based on the welfare the ecosystem may give other people
- Inheritance (bequest) value based on the welfare the ecosystem may give future generations

- Futuristic value attributed to preserving to utilise ecosystem services in future

The challenges that exist for the public-policy community to create a framework for financial services and investment to deliver a true Green Economy are of size, speed, consistency, commitment and constancy. An articulate reform policy based on suitably applicable and affordable technologies in water sector shall be ideally designed with support from a broad range of stakeholders in the catchment of lentic-lotic systems. It will develop a communicative timeframe for implementation, including matching balancing complementary policies that offset any undesired secondary impacts (such as storm water management, drainage, industrial pollution management, water rights allocations, health issues etc.).

Reform is not easy and may require several attempts because of axioms of green economy are yet validated and time-tested. Therefore, implementation may sometimes be postponed, or successful reforms reversed, due to dramatic changes in the objectives, policies and desired outcomes. There can be some encumbrance from market economy as it has to give some space for green economy and scepticism about market economy, may spill over on green economy also and subsequently on the patterns of sustainable development.

Examples of river restoration of Udaipur, Allahabad and Ludhiana are setting the SOPs for estimating the accruing of ecological and social capital spending less of human, infrastructure and financial capitals. The green economy with ecotechnologies based on ecosystem approach for catchment area development for lentic-lotic systems can result in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. The transition to a Green Economy has a long way to go, but by adopting national "green growth" or "low carbon" economic and technologies strategies help institutions get cultural transformation of participation with sustainable finances.

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