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**Point for discussion this month** Potential of Ecotechnology in Control of Climate Change

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**Eternal Words**

Barack Obama [2008 Democratic Compassion Forum at Messiah College](#) Apr 13, 2008

One of the things I draw from the Genesis story is the importance of us being good stewards of the land, of this incredible gift. And I think there have been times where we haven't been [good stewards], and this is one of those times where we've got to take the warning seriously [about climate change]. And part of what my religious faith teaches me is to take an intergenerational view, to recognize that we are borrowing this planet from our children and our grandchildren. And this is where religious faith and the science of global warming converge: We have to find resources in ourselves to make sacrifices so we don't leave it to the next generation. We've got to be less wasteful, both as a society and in our own individual lives. I think religion can actually bolster our desire to make those sacrifices now. As president, I hope to rally the entire world around the importance of us being good stewards of the land.



Dear Readers,

In 1938, Seifert from Germany opened up concept of using ecological processes for man's benefit. It was expected that river remediation could be undertaken in a way that was close to nature and an economical way that maintained the beautiful natural scenery at the same time. H. T. Odum of the U.S.A. stated that minimal labor should be put into changing the natural environment, so the self-renew ability of the habitat system could be preserved. Until 1989, the American ecologist Mitsch more clearly defined the concepts and applications of ecotechnology. He pointed out that ecotechnology should emphasize the interactions between the man-made and natural environments so that it could achieve the goal of a win-win situation for both man and natural ecology.

Now, ecotechnology formally became a subject of study enriched with the successful applications for the treatment of sewage and industrial wastes by Sandeep Joshi and SERI. Recently, it has drawn more and more attention internationally. Architectural colleges in Pune have included ecotechnology as a planner's tool in the syllabus where Sandeep Joshi is invited to teach ecoplanning in urban systems for ecological security.

Now, the boat of ecotechnology is sailing through the stream of applications for the control of climate change safely like the boat in the waters shown in cover photo. More and more enthusiasts are looking at it as one of the prime solutions being economical and effective in rejuvenating the self – purification natural processes of polluted water bodies.

International Conference on Integrated Lake Basin Management for Ujjani Reservoir is being organised in Pune on 14/15<sup>th</sup> Aug. 2009. The main focus of present International Conference will be on Upper Bhima Basin (UBB) and Ujjani reservoir and as an out come Ujjani ILBM document shall be submitted to concerned authorities as a stake holder initiative for further action. Basin management is accepted as a approach for long term sustainability of lakes all over the world. We request the readers to participate in the conference and support it wholeheartedly.

Thank you,  
Chief Editor

### **ThemeArticle**

## **Ecological Engineering and Ecotechnology to Save the Economy, Market, Human Life and Ecosystems from the Impacts of Climate Change**

- Sandeep Joshi

### **Introduction**

Rapid urbanization – can't be called as civilization where sense of civility is nearing zero gradually – has emerged as blackhole of resources. Fuelled with economy and polity it has surmounted the semiurban, urban and rural areas. Use of energy, water has reached its peak in the cities and waste streams are just being thrown unscrupulously keeping GREEN image intact but it plays havoc in the environment when taken over by mighty environmental factors for correction. This urban induced devastation is boomeranging in the form of climate change. Alvin Toffler warns humanity in his "Future Shock" about the alarmingly accelerated consumption of resources in last century leading to changes in environment quality contemplating adverse effects on human life and economy.

Any city in the world is yet to be stabilized, equilibrated as far as influx of essential materials, energies and wasting, reuse and recycling of the same is concerned. Economy cannot be in favour of stability, equality and equity as it has got inherent limitations, constraints and conflicts though it is 100% dependent on environment and ecosystems for its growth. Polity and markets are drivers of economic processes which may exploit the ecological processes for maximization of benefits. Therefore there is need of Invocation of Inexorable Healthy Environment for Living Planet (I & I for HELP) through sustainable Urban Systems with Ecological Security (USES). This can be achieved through proper understanding of ecology in the modern engineered world.

### **History of Urban Ecosystem**

Ecosystems in urban systems were first discussed in the modern world by Seifert and H. T. Odum in 1930s latter on by Mitsch and Eugene Odum in detail. Indian Civilist (having knowledge of civic processes) Chanakya understood the impacts of civilization on the surrounding environment and tried to develop rules to protect ecosystems from the negative impacts of human activities. Even then understanding the ecological processes is



relatively new branch of knowledge which has culminated into ecological engineering and ecotechnology.

### **Ecological Engineering and Ecotechnology**

Ecological engineering has emerged as an integration of ecology and engineering concerned with the design, monitoring and construction of human relationship with ecosystem for exchange of energy, food and waste. Sustainable engineering that can reduce damage to ecosystems, should adopt urban ecology as a functional basis, and ensure an orientation in the implementation of the conservation of biodiversity and sustainable development which may be considered as forms of ecotechnology.

Other definition of ecological engineering is given in Wikipedia is as the design of sustainable ecosystems intends to integrate human society with its natural environment. Ecotechnology is an applied knowledge and skill that searches for satiating human needs with minimal ecological disturbances and disruptions, by binding and subtly maneuvering natural forces to influence their beneficial effects. It is the 'ecology of techniques' and the 'techniques of ecology,' requiring a substantial understanding of the structures and processes of ecosystems and societies.

Ecotechnology is the discipline of sustainable development. Ecological engineering can facilitate restoration and preservation of the environment health for the survival, development and economy of society. An ecologically sound approach to engineering considers that nature responds thoroughly, constantly and cumulatively. Ecotechnology operates within the borders of ecosystem rather than infringing on or contravening or overcoming it.

Ecotechnology has the essence of progression of collective intelligence from the beginning of life on the earth from about 3.5 billion years ago to the present with proven expression of multi-species ecological intelligence. Solutions should be supple and magnanimous as far as possible, thus keeping away drastic and irreversible consequences when something wrong, unexpected happens. It is imperative to obtain knowledge and understanding about the structure and functioning of ecosystems and their particular susceptibilities. Ecological engineering and eco-technologies are dependent on the self-designing abilities of ecosystems and natural forces. When changes occur in the natural systems due to external inputs, biogeochemical cycles and food chains are balanced. Certain species are preferred to adapt to the changes. New dynamic order eventually is emerged suitable to the environmental changes superimposed on it.

### **Living Systems for the Treatment and assimilation of Pollution**

It's a two way action – detritus feeding organisms consume the pollutants and wastes generated from this bioprocess are useful for green plants and secondly, the green plants absorb carbon dioxide from the atmosphere. Thus, the pollutants get transferred to natural cycles i. e. biogeochemical cycles of carbon and other elements. Atmospheric carbon gets transformed into vegetation and subsequently in the soil. Plants store carbon in the forms of live biomass. Once they die, the biomass becomes a part of the food chain again and eventually enters the lithosphere as soil carbon. This is natural process which doesn't need electricity at all. Hence, the ecotechnologies – using ecological engineering principles to treat pollution – have immaculate advantage on energy intensive technologies.

### **Ecotechnological Systems for Waste Management**

SERI's Ecotechnological systems have been developed 15 – 16 years ago through scientific rigorous lab scale, pilot studies, and field trials to evolve process and design parameters considering the biochemical kinetics and confirming the applicability for domestic as well as industrial wastewaters. These applications involved vertical eco-filtration (Soil Scape Filter) with surface – subsurface application, overland – subsurface flow (Green Channel), lentic community succession (Hydrasch Succession Pond), horizontal eco-filtration (Green Bridge), aquatic ecological principles (Green Lake System), phytofiltration, biox (biological oxygenation) and entire ecosystem approach (Brown Biodiversity Park). Mechanization and operational costs of the wastewater treatment systems can be reduced substantially by incorporating and implementing the ecological waste treatment systems in the USES.

World's development economy must progress in 21<sup>st</sup> millennium towards the sustainable development while coping with climate change impacts, having objectives of pure water supply for everybody and complete sanitation to protect environment from pollution. The corporations, municipal councils of cities and towns, panchayats and local administration of villages with co-operative societies of farmers can be updated, trained and educated for using ecofriendly techniques for their effective waste management – including liquid and solid wastes. This will be right approach to use and recycle wastewaters as a nutritional resource for farming as a component of total integrated water resources management programme.

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## International Conference on ILBM for Ujjani Reservoir on 14<sup>th</sup>/15<sup>th</sup> Aug. 2009

- Dr. M. S. Kodarkar, Member Sci-comm, ILEC and Secretary General of IAAB, Hyderabad

We are happy to inform you that a 2day International conference on Integrated Lake Basin Management (ILBM) is being organized on 14-15<sup>th</sup> August 2009 in Pune, Maharashtra. Basin management is internationally accepted as a strategy for long term sustainability of lakes all over the world. It is being promoted globally by International Lake Environment Committee (ILEC), Japan and has a great potential for application on many basins in Indian sub-continent.

On this occasion a comprehensive publication on ILBM containing National and International case studies will be released. The main focus of present International Conference will be on Upper Bhima Basin (UBB) and Ujjani reservoir and as an out come we would like to finalize Ujjani ILBM document and submit the same to concerned authorities as a stake holder initiative for further action. The Ujjani reservoir and its basin have potential for implementation of most of the principles of ILBM as envisioned by ILEC and UNEP. The Ujjani case study is already presented by Dr M S Kodarkar at Global ILBM meet in 2009 held in Japan and has attracted a great deal of International attention. Its Jal Dindi component is included as the module in the International Training programme conducted by Japan International Cooperation Agency (JICA).

Experts from Japan, USA and Nepal will be addressing the delegates during two day deliberations. Dr M A Chitale, Secretary General, Hon., International Commission on Irrigation and Drainage (ICID) and recipient of Stockholm Water Prize, Dr. M. S. Kodarkar, member of ILEC, Scientific Committee (Sci-Com) and National Secretary, IAAB, and Er Vidyanand Ranade, Chairman, Upper Bhima Partnership (UBWP) will be some of the key participants from India. About 100 delegates from GO, NGO and professional organizations from all over the country are likely to participate in the Conference.

Other collaborating institutions in the proposed conference include Upper Bhima Water Partnership; Indian Environment Association, Pune; Shrishti Eco-Research Institute, Pune; Maharashtra Pollution Control Board (MPCB),

Mumbai; Maharashtra Industrial Development Corporation (MIDC), Pune and Green Infrastructure, Pune.

Photographs of Workshop on ILBM for Ujjani 2008.

