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Point for discussion this month
Should Sewage water flowthrough rivers?

(For private circulation only)

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Dear Readers,

Can you hear the whistle? This bird is merrily mingling in pond where the fresh water and ample food cherishes the Life!

I am having immense pleasure while handing over this issue to you. SERInews has successfully completed two years in the field of communication of science and technology through modern devices - Internet. You all are integrated part of this amazing journey with nature.

SERI's team has done Detailed Project Report of Environment Management and Ecorestoration of about 25 lakes in India. And also started implementing the same for some lakes. It's really encouraging that people are coming forward to restore and take care of our finite water resources. Ecotechnology also has vast impact on the mind set of industrial as well as common people. Fed up by machinery maintenance and requirement of skilled man power, people are now willing to take the ecotechnology treatment systems to treat industrial as well as domestic effluent.

Since we are celebrating Ecology Day this month, we have included experts of one of the articles by Francesco di Castri, in this issue. It appeared in the UNESCO Journal in 1982.

In this issue we have also included one article on Maharashtra Environment Issues. SERI's team has taken good efforts in compilation of the present situation and finding out basic reasons behind present unwanted scenario.

Thank you,
Chief Editor

Article**ECOLOGY – THE GENESIS OF A SCIENCE OF MAN AND NATURE**

Francesco di Castri
Director, UNESCO's Division of Ecological Sciences,
Paris – France.

During the last ten years (1971 to 1981) ecology has become a fashionable word. It is used frequently on radio and daily conversation and everybody thinks they know what it means.

What exactly is ecology? A moral philosophy and a form of action for the protection of plants and animals? A political party? A protest movement against nuclear energy and pollution? A neo-Romantic yearning for a return to nature? A scientific discipline derived from biology? Or something of all these things? Is it a Philosophy, a message, a myth or a science? The word ecology itself (**Greek word *oikos*, meaning home, habitat**) was coined in **1869** by the **German scientist Ernst Haeckel** who used it to define the **science which studies the relationship between an organism and its environment**. Haeckel, a far-sighted biologist and supporter of Darwin's theories, peppered his writings with new and often harmonious-sounding words most of which are forgotten today. "Ecology" was his most successful creation judging by its popularity and the scientific achievement it has encouraged.

Ecology, on the other hand, would be shown as a mass of roots, all converging to form a common trunk: first botany, zoology, climatology, the soil sciences and physical geography; then biochemistry and microbiology (for model construction) and, finally, sociology, human geography, psychology and even economics.

This broad convergence of disciplines gives ecology its strength, equipping it to face increasingly complex environmental problems and to deal with the multiple facets of social and natural systems.

At the beginning of the present century, ecology was still a descriptive study of nature, a sort of natural history which drew inspiration from the works of great 19th century explorers and naturalists. Among these was the Frenchman Jean-Henri Fabre who's *Souvenirs Entomologiques*, written

between 1870 and 1889, still impress the readers with their lyrical descriptions of natural phenomena. Before long, however, more detailed studies were to be made of the environment in which given species live, and of their symbolic and antagonistic relationships with other species. This **auto-ecology or ecology centred on a single species, had and still has important applications, in particular in the biological control of plant pests, research on disease carriers and the prevention of parasites-borne infections**

But each species, even when studied in conjunction with those that influence it directly, is only a tiny instance among the thousands of plants, animal and microbial species which inhabit a given area – a forest, a pond or beach. This realization led to the development in the mid-1920s of *Synecology*, that is to say the ecology of communities of species. (In this connexion special mention should be made of the names of August Thienemann, J. BraunBlanquet and Charles Elton.)

Basic concepts began to be applied, such as the "food chain" and the "pyramid of numbers", in which the number of individuals decreases progressively from plants at the base to herbivorous and predatory animals at the summit. Vito Volterra, G.F. Gause and Umberto D'Ancona put forward mathematical laws governing the population dynamics of interacting groups of species. These studies proved especially useful in aquatic ecology where they helped to solve problems related to sea fishing and to promote understanding of phenomena such as insect invasions.

The basic study unit of Ecology is the *ecosystem*. **It can be described as an entity precisely defined in space and time which includes not only all the organisms inhabiting it, but also physical conditions of climate and soil, as well as all interactions between the different organisms and between these organisms and physical conditions.**

An example of an ecosystem would be a tropical forest, at a given place and time, with thousands of plant, animal and microbial species living in its soil and air space with millions of specific interactions taking place between them, the various influences exercised on the life of these innumerable beings by climate and soil, and

the changes the latter undergo as a result of the organisms' activities and of the very existence of the forest.

The study of the interactions between ecosystems was just as important as study of those taking place within a given ecosystem. In fact, the most ecologically critical areas are those where two zones meet. The interfaces between different ecosystems, such as, for examples, the coastal fringe where land meets sea along the coast and, in tropical regions, the border areas between forest and savannah. Similarly, economic land exploitation systems are not based on a single ecosystem but on exchanges of energy, materials and people between different and complimentary ecosystems. Ecology has become increasingly complex, focusing on the study of interfaces (or zones of ecological and cultural interpenetration) and of the various gradation of effects to which ecosystems are subjected by man.

The ecology has passed through various phases from its beginnings to the present day. Descriptive natural history, study of the environment of a single species, study of ecosystems, study of the interactions between ecosystems, study of the biosphere & study of man in the biosphere. The last phase, "man in the biosphere", is the most "natural" since it completes the evolutionary cycle, reproducing in terms of science what has been man's situation from the very beginning, i.e. an integral part of the biosphere, evolving along with all its other components.

What does the future hold in store for ecology? There is every reason for confidence provided ecology can rid itself of certain weaknesses, it must abandon its jargon without giving way to generalities & over simplification of departing from scientific rigour, it must prefer action to preaching & learn through action, **above all it must cease to be a negative science { no to population, no to deforestation, no to industrial development, no to intensive agriculture} & become a science which provides realistic & specific alternative solutions to the problems of development.**

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From SERI's DESK

MAHARASHTRA'S ENVIRONMENTAL ISSUES

1. Pollution of Water Resources :

As per the scientific surveys by the institutions like IIT, Pune University, BAMU, SERI, Research Scholars and MPCB as well it has been established that most of the rivers and lakes in the urbanized area are more or less polluted and need a comprehensive action plan to restore their quality.

To name a few, Ulhasnagar's Waldhuni, Mumbai's Mithi, Pune's Mula-Mutha, Kolhapur's Panchganga, Aurangabad's Kham, Dhule's Panzara, Nagpur's Nag are heavily laden with wastes. These wastes originate from residential areas and industrial activities. The inadequate efforts and measures by concerned agencies have contributed to huge socio-economic impacts and losses due to pollution of water resources.

The issues can be listed as below-

- a. Neglect and failure by urban local bodies- corporations and municipal councils in providing clean water supplies.
- b. Failure of urban local bodies in collection, conveyance, treatment of wastewaters generated in their notified areas.
- c. Poor implementation of pollution control laws in urban and industrial sectors.
- d. Not only wastewaters but solid wastes are also disposed off near or in the water bodies.
- e. Encroachment on flood plains of streams and rivers and basins of ponds and lakes by developers, massive changes in cities watershed.
- f. Severe pollution of ground water near polluted rivers and lakes.
- g. No support to development and implementation of indigenously developed technologies and honest efforts to curb the pollution.
- h. Poor communities are exposed to various diseases to chemical and biological pollution especially the down stream of cities.

What is needed?

- A. Compilation, verification, documentation of huge information about quality and quantity of maharashtra's surface fresh water and ground water from water resources department, Pollution Control Board, Universities, Environmental Laboratories and Research Institutes.
- B. Re-engineering of Development Plans in every sector like urban, industrial, agricultural, etc based on local and regional availability of water resources.
- C. Massive support by the major stakeholders i.e.. Government in developing indigenous water and wastewater technologies.
- D. Initiatives by state and local self governments in maintaining the quality of rivers and lakes of which constitutional responsibility lies on them.
- E. Strengthening of auditing system in water use and wastewater treatment sectors.

2. Changes in Land use pattern:

Intra-territorial or extra-territorial influx of population in the Maharashtra's cities like Mumbai, Pune, Nashik, Aurangabad, Nagpur, Kolhapur, has lead to accelerated infrastructural development which in turn putting immense pressure on land resources in the urban sector. Though there are certain rules and regulations of town planning, industrial siting criteria etc. But they are found to be futile because of developmental and economic activities. There is need to provide good housing and healthy environment for the poor communities also. The issues of land-use in already urbanized and developing areas are as given below-

- a) Migration of population to cities in search of livelihood, education, facilities and glorified services and amenities.
- b) Poor implementation of town planning guidelines and rules; and inadequate monitoring and auditing of permissions granted under various rules and categories.
- c) Lack of coordination between various government departments

and local self government agencies in allocation of land resources reservation of plots for community amenities and secretion including waste treatment and management facilities.

- d) Encroachment and disregard to watershed of the region which leads to flash floods, ponding and economical losses.
- e) Artificial and uncontrolled escalation of land costs so that poor people are deprived off good housing and social amenities.

What is needed?

- A. Reworking on town planning and regional planning considering the changing civilization patterns and compulsions.
- B. Effective measures to control migration by decentralizing the basic quality educational and health amenities.
- C. Transparency in implementation of rules and regulations by local self governments.
- D. Avoidance of encroachment on natural forest and water resources.

3. Air Quality Status in the Cities:

Ever expanding metropolitan cities like Mumbai, Pune, Nagpur, and Class I cities are facing acute problems air pollution due to various emissions from the vehicular exhausts, construction activities and industrial chimneys. In addition to that present load shedding problems are leading to emission of toxic gases in the city's air due to sustained use of D.G. sets. Improper use of solid, hazardous and bio-medical wastes are also contributing to vitiate air with toxic chemicals and pathogens, stationary and mobile sources of air pollution are cause of concern for the health of city dwellers because they are exposed to various air-borne toxicants and harmful micro-organisms. The air quality status issues are given as following-

- a) Poor regulatory control and monitoring of the stationary and mobile sources of air pollutants in the urban and industrial areas.
- b) Lack of cost effective technologies to control air pollution from point, line, area and mobile sources of air

pollution.

- c) Gross failure of pollution control authorities to monitor and to implement effective measures of air pollution control for stationary and mobile sources.
- d) Congestion, traffic jams and increases in vehicular population but in adequate road development.

4. Solid and Hazardous Waste Management:

- a) Failure in planning for municipal solid waste management.
- b) Gross violation of MSW rules, 2000 by Corporations and Municipal Councils in Maharashtra.
- c) Lack of initiatives and resistance to support and implement cost-effective technologies for solid waste management.
- d) Poor pre-feasibility and feasibility studies lead to failure of MSW projects.
- e) Lack of will, attitude, vision and energy (wave) in administrative and political city managers to make MSW project success.
- f) Rigid frame work in PPP (Public Private Partnership) projects.
- g) Consumerism and increase in types and quantity of wastes.
- h) Resistance of residents near the selected sites for municipal solid waste dumping.

5. Noise Pollution:

- 1) High volume speaker for ceremonies, functions, rallies, religious activities.
- 2) Sustained use of crackers for any moment.
- 3) Congestion, traffic jams due to inadequate roads in the cities.

6) Biomedical Wastes:

- 1) Hospitals, dispensaries and Clinics throw their waste indiscriminately in public waste dumping places or near water bodies.
- 2) Poor implementation and monitoring of biomedical rules by Pollution Control Board, recently Member Secretary of Maharashtra Pollution Control Board was punished by High Court in regard to the waste management under biomedical rules.
- 3) Most of the doctors and hospitals

have not complied with Biomedical Waste Rules.

Battles on:

- 1) Biomedical Waste Rules, medical fraternity not ready to register themselves under these rules from seven years very poor registration.
- 2) Municipal Solid Waste Rules; dumping sites and ground water pollution.
- 3) Hazardous Waste Rules; sites and pollution of surrounding areas .
- 4) Industrial Siting Criteria; minimum distance from river should be 3 km but DOW Chemicals being in notified Chakan Industrial Area has distance less than 1 km from indrayani river.

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Eternal Words

Francesco di Castri
(Director, UNESCO's Division of Ecological Sciences, Paris – France.) says,

Is ecology a natural science or a human science? The answer is that it is both, but not a human science isolated from nature. It is a science, but one that can only fulfil its role if those who are engaged in it are deeply aware of the responsibility in the evolution of the human condition.

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