

CONTROL OF POLLUTION

INTRODUCTION :-

In antiquity man lived in harmony with the biosphere. The self purification capacity of biosphere took care of whatever little adverse effects human activity had on it. However, the increase in the population and accelerating frenzy of industrialization to meet the demands for comfort has over stretched the self purification capacity of biosphere to a point where its delicate self purification capacity of biosphere to a point where its delicate equilibrium is threatened.

The number of pollutants which are non-entering environment is very long. Environmental pollution has changed as a serious problem for developed and developing countries. Broadly speaking pollution of environment may be classified as physical, chemical or biological in nature. The pollution problem is two fold :- firstly it is in the external environment and secondly as a result of consumption of contaminated food it is then transferred down the food chain. People living in big industrial town breathe discharged noxious gases and exhaust emission of motor vehicles. For successful environment management efficient monitoring system is need of the hour.

CONTROL - MEASURES :-

How to face the problem of pollution?

The problem could be faced in two broad ways :-

- [1] By educating the people at all levels for conservation of natural resources - Man pollute the environment by using it too much and then throwing off too much the unused matters. This disturbs the balance of nature. The environmental balance could be maintained only if the inflow and outflow are uniformly maintained by proper use of resources.
- [2] The resources management education

It should be imported at all levels and to all sectors of human beings. Proper readable and environmental data should be made available. Conservation clubs, anti-pollution weeks and demonstration against pollution at pollution sources should be done. The youth should be geared up to disseminate the information on resource management at school and college levels.

To find ways and means to reduce the already existing hazards of pollution, the methods must be evolved for minimizing the pollutants at source. A chain of maintaining monitoring stations and equipments around the source of pollutants should be established. There should be, for instance, a massive drive to pressurise industrial units to establish treatment plants to handle their effluents. Provision of this facility at the time of licensing should be made obligatory and absolutely essential. Techniques of recycling of sewage and industrial effluents must be developed.

AIR - POLLUTION

As an example of first type of monitoring air pollution over the large California cities is now monitored by detectors mounted on an airplane which daily measure and plot the concentration of SO_2 , NO_2 , CO and other pollutants, over a large regional area. Air pollution indices have become a part of weather reports in many cities. The need for world wide monitoring of CO_2 has already been noted. Biological indices are widely used in monitoring water pollution. In addition to diversity indices and general species indicators there are numerous indices of community function that can be useful for example, the P/R Ratio, the ratio of chlorophyll to bacterial biomass, the mean size of organisms over large ones; Ogilby (1967) & Menhinick (1964).

the amount of haemoglobin in animal biomass as an index of low oxygen, the amount of blue green algae pigment as an index to carbohydrate pollution, and many other indices that need to be carefully studied. Very often the Community will contain more information about total effects of pollution, that can be deduced from the measurement of individual factors. The challenge to ecological research is to find quick ways to need this information.

WATER - POLLUTION:-

Water one of the integral component of biosphere is severely threatened by the heavy demands of modern civilization. Human activities on domestic, agricultural or industrial front causes what may be called induced and hence preventable pollution of water and this has to be differentiated from natural pollution of water caused by rain water drainage.

A simple and elegant method of measuring phytoplankton pollution of a water reservoir is based on the use of C-14 as a radio-isotopic tracer. A sample is taken and brought into contact with CO_2 containing C-14. Phytoplankton in water takes up the radioactive CO_2 for use in photosynthesis. The greater amount of phytoplankton present, the more CO_2 is up. The amount taken up can be easily measured. A similar method was used in the Viking probes to test for life on planet Mars. The Govt. of India has formulated the water act 1974 (Prevention and Control of pollution) and practically all states in India with the exception of a few have established boards to look after the pollution abatement.

SEWAGE - POLLUTION:-

Disposal of Sewage in big cities is a major problem as it contains pathogenic microorganism that must be rendered harmless. This is often done by adding chlorine to sewage, but chlorine can itself become a

pollutants. It is also possible to sterilize sewage by treating it with gamma or electron beam radiation. Several studies have shown that this is feasible and now much of the sewage in the USA & W. Germany is disposed by radiation treatment. The treatment of industrial wastes by radiation is also under investigation.

INSECTICIDES → The excessive use of pesticides particularly insecticides has produced pollution problems. These pesticides/insecticides can be controlled in the following manner: →

1. Predators → Such as the highly effective use of lady beetles and lace wings against agricultural pests or beetles to control major pests.
2. Parasites → Such as carid wasps which successfully control a no. of major pests.
3. Pathogens → Such as viruses and bacterial infections that are specific for a pest.
4. Decay plants → Cultivation of low value crops to attract pests away from high value crops. ⑤ Rotation and diversification of crops.
6. Chemical or radiation sterilization.
7. Hormonal stimulants → Such as juvenile hormones that prevent insects from completing their life cycle.
8. Pheromones → Sex attractants and other bio-chemical that regulate pest behaviour.
9. Degradable chemical insecticides organic phosphates and others.
10. Artificial selection for disease and pest resistance rather than for short term yield as such.

RECENT DEVELOPMENTS IN POLLUTION CONTROL →

CSIR PROGRAMMES → The CSIR being a premier scientific organization has been seriously working on the control of water pollution due to industrial wastes. The R & D

programmes for the development of industrial waste waters are being actively pursued in its various constituent laboratories/institutes. Some salient achievements can be illustrated by taking few examples.

- (i) Ammonia removal from the waste water of fertilizer industry.
- (ii) chloroalkali industry.
- (iii) Phenolics from the waste waters.
- (iv) Removal of dyes from the waste waters of textile industry.
- (v) Processing of the Rayon mill effluent.
- (vi) Pulp & Paper industry - This wastes can be processed by reverse osmosis technique after suitable pretreatment to recover water for reuse and the concentrated portion resulting in this treatment may be used for the recovery of chemicals like Caustic Soda or Sodium Sulphate.

Dairy Industry :→

By ultrafiltration the problem of pollution in dairy industry can be solved, but valuable proteins, lactase and water can also be recovered by ultra-filtration and reverse osmosis processes developed by CSMCRI.

The Ganga Project :→

Of all the environmental protection measures India has taken the Ganga project is biggest and boldest. The Rs. - 292 crore project is planned to be carried out in different phases. In first phase treatment of Sewage from big cities on the bank of the river is planned before it discharged into the river. A proposal is also in the planning stage to control the discharge of industrial effluents, which are the major sources of pollution besides sewage. A survey has located 4159 large and medium size industrial units responsible for causing pollution. Many of these industrial effluent treatment problems can be solved by the processes/products developed in CSMCRI.