Green Treatment of Wastewater Management in Jharkhand

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Abstract— The term, wetland which comprise of various types of ground water ranging from ponds, river mouth area and beaches, flood to tidal mud-flats, contribute an imperative function to insure quality of water for human beings and the full range of flora and fauna .Wetlands endow with fresh water for agriculture, farm animals and domestic consumption, and enhance the ground water levels which are under massive strain of over-exploitation. It should be preserved so that it may capitulate the furthermost uninterrupted benefit to present generations while maintaining its potential to meet the desires of the future generations. The near cost zones and fresh water lakes, swamps and rivers are main sources of fish production for the developing world, and fish also keep ecosystems running, as it's not just people who like them as food, but also for many itinerant birds which eat the fish which nourish and procreate in wetlands. Artificial Constructed wetlands are mostly used in location with warm environmental condition, while in cold environmental condition conditions, low-level temperatures effect in reduced treatment efficiency.

Keywords: Fresh Water, Pollution, Environment Singhi Fish, Eco Technology

I. INTRODUCTION

Wetland is found in all the continent of the world. In India there are a total of 67,430(approx.) wetlands, which covers 4.1 million hectare area. Total number of wetland is 2437(approx.), which covers 1568.30(approx.) km in Jharkhand. Wetland is area which is covered with either water or saltwater, fresh water or somewhere between both of them. These are better source of water. There are two types of wetlands those are pre monsoon and post monsoon. Pre monsoon are those wetland which becomes dry after few months of monsoon. Post monsoon wetlands stores water throughout the whole year. Main type of wetland is fen, swamp, bog, and marsh. In wetland we consider swamp, ponds, edge of ocean, lake, delta, mouth of river, lying area. It's also called earth's kidney.

Environmental condition of the Jharkhand state is generally a tropical climate having hot summers and cold winters. Some part of the Jharkhand state like Neterhat, Parasnath, and Ranchi has pleasant climate even in the season of summer. Maximal rain fall takes place in the month of rainy seasons i.e. in the month of July to September. The foremost west-flowing rivers that increase the province are: Ganga, Subernarekha, Damodar, Barakar, Son, Sankh, Mayurakshi, North Koel, South Koel, Ajay, Gumani, Kharkai etc. The rivers of Jharkhand like Damodar, Barakar, Koel and Subarnarekha play a crucial role in the socio-economic aspect of the civilization. Dams named as Konar, Maithon, Panchet and Tilaiya have been constructed, to administer the water of the rivers. Udhwa lake bird sanctuary, Getalsud dam, Kansjor dam, Konar dam, Tilaiya dam, Massanjore dam, Maithon dam and Tenughat dam are the principal wetlands of Jharkhand.

Waste water management by using affordable cost ecotechnology has increase value in modern years. Lots of alternate are easily available for the handling of water polluted by different usage. The treatment with artificially constructed wetlands which are known as a natural and environmentally friendly system, applied using materials such as singhi fish, soil, plants, and gravels. Because of, there is no use of energy, it is also referred as green treatment of Wastewater management.

Waste water discharge from domestic, industrial, and agricultural drainage water into the lakes, rivers, streams, and seas without appropriate treatment poses a threat to the nature and people in developing countries. Discharge of waste water into water resources sfter suitable treatment to take down this threat. Due to the isolation economy for the waste water management system is difficult in the underdeveloped countries, the treatment benefits value in artificial constructed wetlands.

II. SIGNIFICANCE OF WETLAND

Wetlands are very significant to our natural environment. Its supports various types of ecosystem. Also helps in maintaining water level, pollution, carbon dioxide sequestration etc.

A. Water Storage & Maintaining Water Level

Wetland can help sudden damaging flood downstream. It stores excess flood water .They protect water and improve water quality by which society is directly benefited. Also helpful in maintaining water level during summer season.

B. Water Cycle

Wetland can help in maintaining the water cycle. It stores water throughout the year and maintain water level of the earth.

C. Biodiversity

Lots of birds and mammals are dependent on fresh water wetland for their feeding and breeding. Wetlands are most productive ecosystem.

D. Carbon Restoration

Carbon restoration is the process to store atmospheric carbon dioxide in plant and soil for long term. Wetland helps largely in carbon restoration.

E. Contamination Control

Wetlands have cleansing property which provides natural contamination control by filtering and sedimentation from runoff water. It helps in slow water flow which control in soil erosion.

F. Fish Production

Wetland is the main source for fish production. Fish is a rich source of protein, so its demand is growing day by day. In near future fish production is becoming a primary source of earning for farmers.

III. WETLAND CONSERVATION

Wetlands help in hindering pollution, carbon-dioxide, water level, and flood stream and also help in maintaining the diverseness and ecosystem. An international pact was formed in the year of 1971 called Ramsar congress for secure and sustainable use of wetlands. City of Iran called Ramsar, Ramsar congress named after that city. Ramsar congress has two purposes i.e. to stop encroachment and loss of wetland, protect and sustainability deployment of wetland. Protection of wetland provides a habitat for water birds. Wetland ecosystem helps in biodiversity protection. It also helps in holding water level and supply, fisheries, agriculture, forestry, and tourism.

A. Wetland Threats

Due to commercial expansion, drainage system, pulling out of natural resources, over fishing, siltation, pesticide discharge, poisonous pollutants, industrial desecrate, are major threats for wetlands.

B. Industrial Threats

Draining of wetlands for commercial expansion, tourism services or farming land are the major threats for wetlands. Imprudent use of fresh water: Water is taken out from the natures subversive aquifer is far outstripping its capacity to replenish itself. Water level drops, Trees and plants are dying due to shortage of ground water.

C. Insidious Species

Insidious species have severed impacts on vegetation and disturbs the normal balance of an ecosystem.

D. Contamination

Contamination effects on potable water source and natural diversity. Drainage and runoff water from fertilized plants and pesticides used in plants introduced nitrogen, phosphorous and sulfur nutrients and toxins like mercury to water resources. Chemicals added in the water resources affect the health and reproduction of the species.

E. Climate Change

Some species of mangrove trees are submerged and drowned due to increasing the sea level. Due to drought condition Estuaries, floodplains, and marshes are ruined.

F. Dams

Construction of dams in the natural flow of water has immense impact on existing ecosystem. So the construction of dam should be as sustainable as possible to make sure minimum negative impact on diversity.
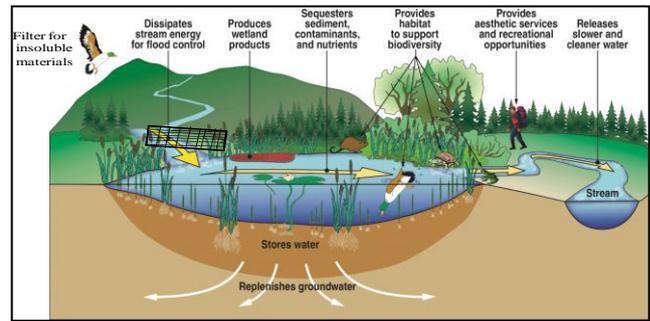

Fig. 1: Artificial Constructed Wetlands

IV. ARTIFICIAL WETLAND DESIGNING FOR WASTEWATER MANAGEMENT

Artificial Constructed wetlands are used to treat wastewater in many regions of the world since the 1950s and these methods are natural and cheaper choice in place of the available and expensive wastewater treatment methods. Due to easy installation and procedure, artificial constructed wetlands provide a financial advantage to developing countries. Waste water management with artificial constructed wetlands is more favorable and applicable than the classic methods of wastewater management (treatment plants) considering the necessity for electric energy in the operation, the high costs of maintenance and repair, and the need for well-qualified personnel in the operation of the treatment plants.

Surface flowing systems and subsurface flowing systems are widely used among the artificial constructed wetland systems. Surface flow in artificial constructed wetlands, the waste water passing through with the primary treatment part integrate with the control grid to filter the insoluble material and reaches to the wastewater pond covered with floating plants and plants at the bottom and fish named singhi fish (found in jharkhand) of the pond and hence, the treatment is transfer in presence of oxygen (aerobic) conditions. In the subsurface flow systems in artificial constructed wetland carry out treatment under without presence of oxygen (anaerobic) conditions. Fish present in the pond helps to remove bacteria and mosquito larva and alge and make water usable. Now wastewater is passing through a strainer and directly fed to the plant roots below a gravel bed. The subsurface-flowing with artificial constructed wetlands are separated into two groups as horizontal and vertical flow systems.

V. ADVANTAGES OF ARTIFICIAL CONSTRUCTED WETLANDS

The effectual use of wastewater in irrigation in dry and semidry areas, golf ground, ornamental plants in garden, and parks are preferable to the low cost of artificial constructed wetland development when compared to other treatment method of waste water, no need of skilled personnel to operate this system, and their output and fast maintenance and repair. The waste water treated with artificial constructed wetlands bring down the inputs and increases the yield which is applied.

VI. DISADVANTAGES OF ARTIFICIAL CONSTRUCTED WETLANDS

Artificial constructed wetlands commonly have an economic life of fifteen years and have a lower treatment potentiality than that of treatment facility. The quality of the treatment is affected by different factors, which include the climate especially the temperature, chemical pollutants, industrial activities, and the socioeconomic features of the location. Furthermore, in cold-climate area, the alteration in the treatment capability in winter and the situation in finding an appropriate land for development are also among the disadvantages of artificial constructed wetlands.

VII. PLANT SPECIES & FISH USED IN ARTIFICIAL CONSTRUCTED WETLANDS

The plants used in artificial constructed wetlands function as a repository of phosphorus, shuphur, nitrogen, metals, and other materials. The vegetation commonly utilized in the handling with artificial constructed wetlands are same as natural wetlands like water hyacinth plant, duckweed, submerged plants, bulrush, reeds, and cattail (Typha latifolia) and the trees usually utilized in the handling with artificial constructed wetlands are alders (Alnus glutinosa), false indigo (Amorpha fruticosa), Aralia (Aralia sieboldi), and eucalyptus.

Singhi fish (mangoor fish) used for the handling of the artificial constructed wetland because these fish eats different types of larva, bacteria and other insoluble materials.

VIII. CONCLUSION

Society is highly reliant on wetlands and its deprived quality calls for instantaneous reinstatement of ponds, lakes. Suitable measures should be taken for protection and supervision in order to maintain ecological balance in the county. For traditional wastewater treatment system wetlands constructions are viable option.

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