Cost Optimization in Wastewater Treatment by Aquaculture

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ABSTRACT

The overall aquatic environmental is degrading both qualitatively and quantitatively owing to rapid urbanization, industrialization and growing population. Billions of liters of water converted into wastewater due to everyday from various sources such as domestic sewage, industrial wastes, and agricultural discharges containing detergents, toxic metals, thermal pollutants and radioactive materials in water. With the current scenario on environmental health and water pollution issues, there is an increasing awareness of the need to dispose of these wastewaters safely. In the absence of suitable technology and facilities for treatment, they are inevitably discharged into fresh and &waters.

Keyword- Waste stabilization pond, Cost economics, algae pond, duckweed pond.

I.INTRODUCTION

An energy and construction costs have increased, new methods of wastewater treatment with potentially lower energy and capital costs have become increasingly attractive. Relatively simple wastewater technologies can be designed to provide low cost sanitation and environmental protection while providing additional benefits from the reuse of water. Effluents from conventional treatment facility not only contain some unstable organic matter but also nutrients, which represent potential energy. It is therefore illogical to utilize external energy sources to dissipate energy stored within the wastewater. A natural treatment system makes use of aquatic animals and plants to improve he water quality and reclaim nutrients. In addition, persistent toxic environmental contaminants such as pesticides, aromatic hydrocarbons and metal scan be removed from wastewater through biological treatment process. Natural wastewater treatment systems include algal mass culture, macrophyte treatment systems (including constructed wetlands) and aquaculture. Natural systems may be utilized to treat agricultural, domestic and industrial wastewater. Climate, soil conditions, space, waste characteristics and other factors relate to its applicability.

II.MATERIAL AND METHODOLOGY

Stabilization ponds are an important part of the natural treatment ways. The desired treatment effect is achieved by physical, chemical and biological processes, taking place in the aquatic environment with the participation of aquatic and wetland biocenosis (bacteria, phytoplankton, and zooplankton), higher vegetation and organisms. Their task is to regulate and stabilize the physical, chemical and biological properties of treated wastewater. They are divided into low- and high loaded ponds. Waste stabilization ponds are three types first is aerobic type pond, second is anaerobic type pond and third is facultative type pond.Model of wastewater treatment .The model of the proposed sewage treatment aquaculture farm is shown in Figure-1.
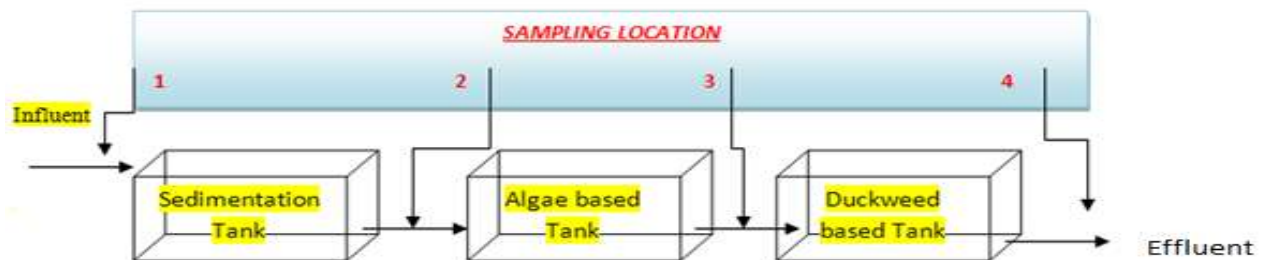

Fig 1. Layout of Pond Model

III.CONCLUSION

Economic analysis of the proposed model of sewage treatment aquaculture farm and the proposed cultural practices, shows that there will be an annual profit of Rs. 7084/- on an annual investment of Rs 392916/-. The farm would produce nutrient waste water for farming purpose or any other industry purpose and would generate employment of 1095 men-days per year.

REFERENCES

[1.] Arceivala, S.J. 1981. Wastewater treatment and disposal. Pollution Engineering and Technology, Marcel Dekker, Inc. NY.

[2.] CIFA. 1998. Sewage treatment through aquaculture. Central Institute of Freshwater Aquaculture, Hubaneswar, India. p. 8.

[3.] Edwards, P. and R.S.V. Pullin. 1990. Wastewater-fed aquaculture. Proceedings of the International Seminar on Wastewater Reclamation and Reuse for Aquaculture, Calcutta, India, 6-9 December, 1988, Environmental

[4.] Sanitation Information Center, Asian Institute of Technology, Bangkok.

[5.] Easa, M. El-S., M.M. Shereif, A.I. Shaaban and K.H. Mancey. 1995. Public health implications of wastewater reuse for fish production. Wat. Sci. Tech. Vol. 32(11): 145-52.

[6.] Ghosh, D. 1995. Integrated wetland system (IWS) for wastewater treatment and recycling, for the poorer parts of the world with ample sunshine. Basic Manual, PN-ABU593, Office of Environment and Urban Programs, Center for Environment, USAID, Arlington, VA.

[7.] Pal, D. and C. Das Gupta. 1992. Microbial pollution in water and its effect on fish. Journal of Aquatic Animal Health. 4: 32-9.

[8.] Pullin, R.S.V., H. Rosenthal and J.L. Maclean. 1992. Environment and aquaculture in developing countries.

[9.] Summary report of the Bellagio conference on environment and aquaculture in developing countries. ICLARM Conf. Proc. ICLARM, Manila. 16-20..

[10.] Strauss, M. 1996. Health (pathogen) considerations regarding the use of human waste in aquaculture. In: J. Staudenmann, A. Schönborn and C. Etnier (Eds.),

[11.] Recycling the Resource, Proceedings of the 2nd international conference on ecological engineering for wastewater treatment. School of Engineering WädenswilZürich, September 18-22, 1995, Transtec Publications, Zurich. PP. 83-98.

[12.] WHO. 1989. Health guideline for use of wastewater in agriculture and aquaculture. WHO Tech. Rep. Ser., No. 778, WHO, Geneva.