

AQUATIC PLANT SYSTEMS

Aquatic Plant Systems

Aquatic systems in waste treatment are either free floating growths harnessed in the form of built-up ponds for waste treatment such as *duckweed and hyacinth ponds* or rooted vegetations (reeds) which emerge out of shallow waters cultivated in *constructed wetlands*.

- ④ Natural Wetland exists all over the world. They generally have saturated soil conditions and abound in rooted vegetation which emerges out of shallow waters in the *euphotic* zone. They may also have phytoplankton. Natural wetlands can be integrated with wastewater treatment systems.
- ④ Constructed Wetlands are man-made for treatment of wastewater, mine drainage, storm drainage, etc. They have rooted vegetation.

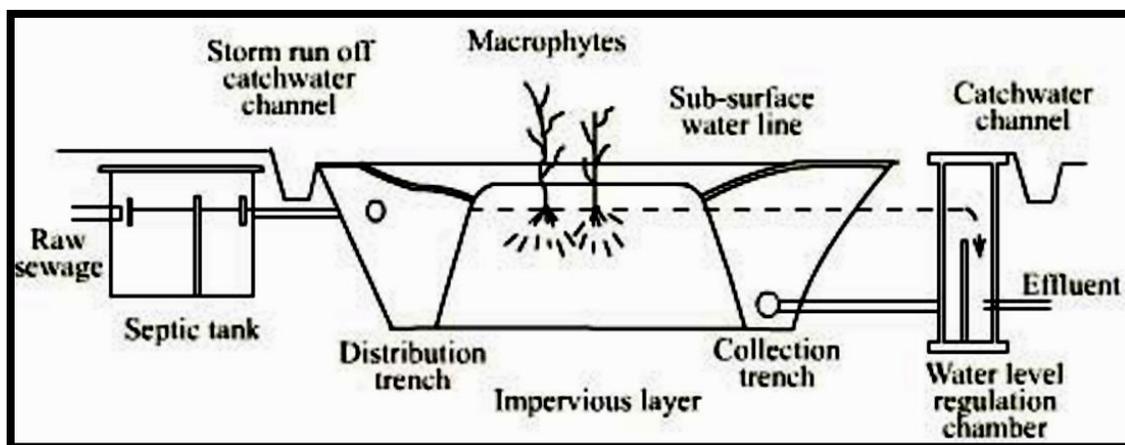


Fig.1: Longitudinal Section through a Typical Reed Bed with Gravel, Sand or Selected Soil with Horizontal Flow of Wastewater

- ④ Aquatic Plant Ponds consisting of free floating *macrophytes*, such as water hyacinths, duckweeds, etc. have been cultured in ponds either for their ability to remove heavy metals, phenols, nutrients, etc. from wastewaters or to assist in giving further treatment to pretreated wastewaters to meet stringent discharge standards while at the same time producing new plant growths for their gas production or food value.

Conceptual Flow chart Showing Waste Treatment Using an Aquatic Plant Pond

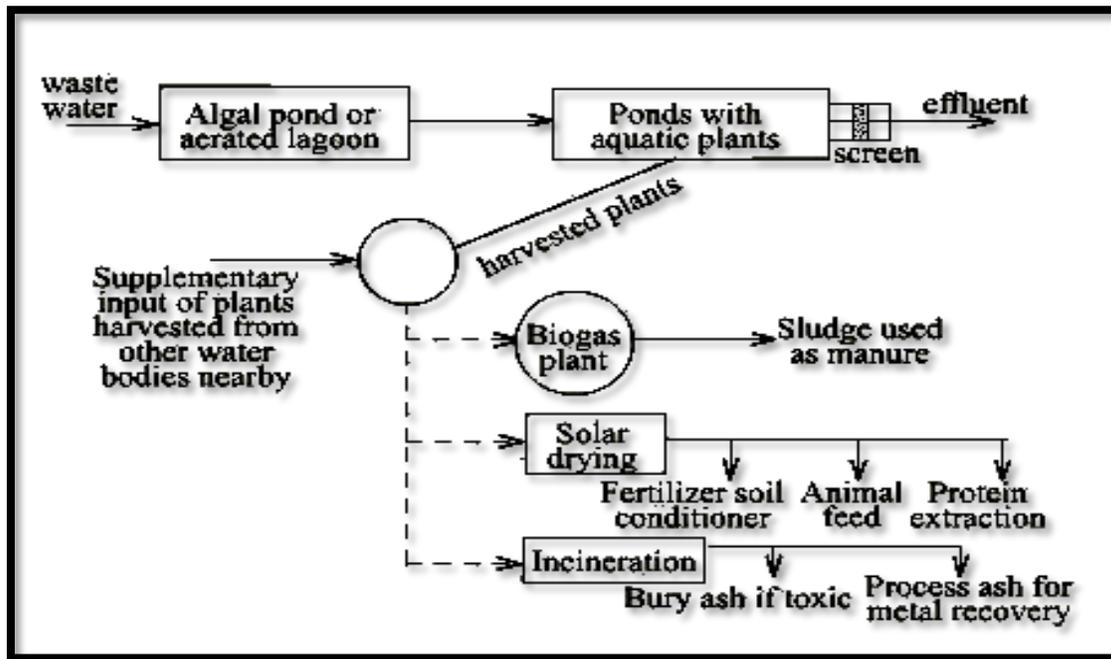


Fig. 2: Flow chart of Waste Treatment Using an Aquatic Plant Pond

Advantages of Constructed Wetlands

The advantages of *Constructed wetlands* are

- 0 Relatively inexpensive to construct and operate,
- 1 Easy to maintain,
- 2 Provide effective and reliable wastewater treatment,
- 3 Relatively tolerant of fluctuating hydrologic and contaminant loading rates (optimal size for anticipated waste load), and
- 4 Provide indirect benefits such as green space, wildlife habitats and recreational and educational areas.

Disadvantages of Constructed Wetlands

The disadvantages of *Constructed Wetlands* are

- 0 the land requirements (cost and availability of suitable land),
- 1 current imprecise design and operation criteria,
- 2 biological and hydrological complexity and our lack of understanding of important process dynamics,

- 3 the costs of gravel or other fills, and site grading during the construction period, and
- 4 Possible problems with pests. Mosquitoes and other pests could be a problem for an improperly designed and managed SSF. The system may be used for small communities and, therefore, may be located close to the users. The dependence of wetland community on hydrologic patterns is most obvious in the change in species composition resulting from alterations in water depths and flows.