Annexure 21

Other Suitable Technologies for Removal Water Hyacinth

The South American floating aquatic plant water hyacinth (*Eichhonia crassipes*) has a history of being a worldwide invasive plant. Water hyacinth was first introduced to the Sacramento River in California by ornamental enthusiasts in 1904. Water hyacinth's ability to flourish in various ecosystems and environmental ranges has been one of the main reasons why water hyacinth has been so successful in infesting new habitat. Its ability to cope with varying temperatures, lighting conditions, pH levels, drought resistance, and salinity has made water hyacinth ideal for almost any environment. In addition to its ability to tolerate a wide range of environmental conditions, water hyacinth is also capable of rapid reproduction. Water hyacinth can reproduce vegetatively and sexually. A study in Louisiana in 1948 showed that ten plants were able to vegetatively reproduce 1610 plants in three months (Penfound, 1948). In the study conducted by Tag El Seed in 1973, hyacinth managed to cover an area of one thousand kilometers in two years.

The high productivity and absorption capacity of the hyacinth creates a big problem for freshwater lakes and rivers. Water hyacinth causes damage by: obstructing navigation, impeding drainage, destroying wildlife resources, reducing outdoor recreation, and constituting a hazard to life. The choking of streams and the obstruction of run-off increases backwater and flood conditions in many areas which affects water transportation and navigation Under the surface, decomposing organic matter can cover the benthic zone which leads to low dissolved oxygen levels (Toft, 2003). The low dissolved oxygen level eliminates all fishes and eliminates many of the food plants for wildlife (Penfound, 1948). However, hyacinth has also been shown to have some positive effects on water quality. *E. crassipes* has been known to assist in the purification of water because of its settlement action and absorption capacity.

Water hyacinth is an immense problem to any freshwater or brackish water ecosystem. Some attempts have been taken to control the growth of hyacinth. Some of the methods used to control the hyacinth include mechanical shredding, biological treatments, and chemicals (Penfound, 1948). The use of chemical 2,4-dichlorophenoxyacetic acid (2,4-D) was found to be useful for controlling growth but failed in inhibiting seed germination (Tag El Seed, 1975). Studies conducted by Penfound (1948) and De Casabianca and Laugier (1995) show that salinity does have an effect on water hyacinth yield. Water hyacinth is sensitive to salinity; however, very limited research has been done on this topic (De Casabianca and Laugier, 1995).

Research conducted on water hyacinth collected from Louisiana found that water hyacinth could not tolerate salinity levels higher than one percent salt (Penfound, 1948). Hyacinth is only able to survive in salinity ranges between freshwater and oligosaline conditions (0-5 ppt). Necrosis and death was observed in mesosaline and polysaline conditions (5 ppt-18 ppt). Similar research conducted in France confirms the results of the experiment carried out in Louisiana. Hyacinth collected in Southern France revealed that hyacinth grown in a salinity of 9.2 g/l and 13.7 g/l resulted in necrosis (De Casabianca and Laugier, 1995).

Water Hyacinth
Prior to Chemical Spray

Water Hyacinth
After chemical Spray