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# AGRICULTURE WORLD

ISSN  
2488-  
8184

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VOLUME 2 ISSUE 06 JUNE 2017 ₹70

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## ENGINEERING INTERVENTIONS IN AQUATIC WEED CONTROL

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Aquatic weeds have emerged as a potential threat to the water resources in the country today. The growth rate of these weeds is so fast that they develop a dense mat over water bodies. The risks associated includes enormous water loss through evapotranspiration, clogging of rivers and canals, hampering of navigation and the most important of all—displacing of the native fish species due to depletion in oxygen levels. About 20-40% of the water loss in India is caused by the menace of aquatic weeds. Dense growth of aquatic weeds may provide ideal habitat for the development of mosquitoes causing malaria, encephalitis and filariasis; thereby affecting human health as well. These weeds may also serve as vectors for disease

causing organisms and can greatly reduce the aesthetic value of water bodies from a recreational point of view. Commonly identified aquatic weeds can be emergent (Eg. Cattail/Water lily, Water primrose, Alligator bulrushes, Spike rushes, Typha, Phragmites, etc.), submersed (Eg. Hydrilla brittle, Pond weeds, Coontail, Vallisneria, etc.) or floating (Eg. Duckweeds, Azolla, Water hyacinth, etc.) types.

### Aquatic weed menace

Rapidly growing aquatic weeds should be controlled through effective, economic and environment friendly methods. Engineering interventions for control of aquatic weeds employs mechanical equipment's and methods for cutting as well as weed removal. Some of the

methods are discussed below

### Mechanical harvesting:

Mechanical harvesting is a common form of mechanical control. The harvester cuts the vegetation below the water's surface. This tool is primarily used on large lakes to control submersed aquatic vegetation. Most harvesters have the capacity to cut down to a 5 or 6 foot depth. The weeds collected by the harvester can then be transferred to an upland disposal site. Due to the size of the machines, only larger areas with a sufficient depth are suitable for this treatment. The price per acre of mechanical harvesting may range from 20,000-32,000, excluding mobilization, and the cost for equipment purchase ranges from Rs.1, 400,000 to 4,400,000.

### Weed cutters and harvesters

#### Rotovation:

Rotovation is a method for chopping up and disturbing plants, focusing on the base of the plant, including submersed portions. A rotovator is a barge mounted rototilling machine that lowers a tiller head about eight to ten inches into the sediment to dislodge plant root crowns. Unlike harvesters, rotovators do not have the capability to collect the uprooted plant material and the buoyant root masses float to the surface. The plant material may then be removed by a harvester following the rotovator, manually collecting plant material from the water surface,

or raking along the beaches. Costs for rotovation vary according to treatment scale, density of plants, machinery used, and other site constraints. Contract costs for rotovation range from Rs.48,000 – 68,000 per acre.

### Chaining:

Chaining consists of a heavy iron drag chain attached between two tractors, which is dragged down a densely weed infested ditch or medium canal. The chain tears the rooted weeds and loosens them from the bottom. This method has been found effective where there is dominance of emergent and submersed weeds. The practice of chaining should be followed when new shoots of weed are around 30-50 cm above water level. Dragging the chain up and down the stream may be effective in dislodging most of the weeds. For effective weed control the practice should be repeated at frequent intervals if found successful.

### Dredging:

Dredging is one of the techniques by which the weed vegetation along with excess silt is removed from drains and ditches. A Dredger is a machine equipped with a forked bucket which can be opened and closed on command. The machine could operate from the ground or from a boat in water. Dredging is done in large water bodies, canals and drains. It is a common method of cleaning ditches but slow, time consuming and is a costly operation. Small lakes, water reservoirs etc. get silted if area surrounding





them is under cultivation or surrounded by erodible lands with poor afforestation. When silts get sedimented at bottom the water retention gets decreased and emergent weeds establish. Such a situation demands the use of dredging facilities to remove silt and increase the water capacity of lakes. This also reduces the problem of emergent weeds. Results of dredging can be very long term.

## Dredging

### Mowing:

This process consists of cutting the weeds close to the ground with the help of manual or power operated mowing machines. Mowing is effective on tall growing plants. Repeated mowing not only prevents seed production of emergent weeds but may also starve the underground parts which store carbohydrate reserves and provides energy to vegetative reproductive organs. The best time to mow is when carbohydrate reserves are low. Repeated mowing hastens carbohydrate depletion and slow death of plants. Generally, this practice effectively controls emergent weeds on canals, water reservoirs etc. The effect of mowing is short lived.

### Weed rollers:

Weed rollers and sweepers are relatively new methods to control nuisance weed infestations in small locations. Weed rollers include a long metal cylinder (up to 30') attached to a dock or piling on one end. A motor drives the cylinder forward and backwards in a 270-degree

arc from the attachment point. The cylinder compresses young plants and soil in the area. Fin-like blades on the roller remove taller plants from sediment and may remove roots. For weed control, use once per week should be sufficient.

### Barriers:

Bamboo or inflatable rubber boom fencing is used to restrain the drift of free floating aquatic weeds. The barriers are made to allow water to pass through them and to sustain the wave and wind action. The use of floating booms can be useful in a floating plant control program. They can be deployed to prevent floating plants from clogging water intakes, marinas, swimming areas, or other susceptible sites. Floating booms can also be used to collect floating plants being moved by currents within a water body, or prevent plants from entering the main course of the reservoir from feeder embayment. Plants collected in such manner can be more efficiently removed with other control methods.

### Barriers for weed control

The growing demand for water resources for recreation, agriculture and industry propels to resort on weed control techniques. Engineering intervened methods are found to be quick, target specific, environment friendly and provides fewer chances of permitting ecological shifts in aquatic flora. Also these are more reliable compared to biological and physical methods of weed removal. Hence, this area of weed harvesting is gaining popularity and momentum in the present scenario.



## ANDHRA'S BANGANAPALLE MANGO GETS GI TAG

**A**s widely accepted for its unique aroma and sweetness, Andhra Pradesh's popular variety Banganapalle mango has got Geographical Indication tag. Now the State has become the registered proprietor of this fruit.

Primarily originating in Kumool district it has been grown for over 100 years in the state. It is also known as Bonoshan, Baneshan, Chappatal and Safeda in various parts. The prominent characteristic of 'Banganapalle mangoes' is that its skin has very light spots, having very thin seed with sparse and soft fibre all over and having forked veins, which are prominently

raised over the surface of the seed.

The life of the Banganapalle mango after it fully ripens is about 10 to 12 days and more than a month in cold storage. Rayalaseema region, Coastal region and Telangana are the secondary regions of its origin.

In Andhra Pradesh an estimated 24.35 lakh metric tonnes of mangoes were grown every year and approximately 7, 68,250 families of farmers and traders were engaged in its production and market. India exports about 5,500 tonnes of Banganapalle mangoes annually to countries like the US and UK and Gulf nations.