

Aquatic plants and freshwater crisis- Published in TerraGreen, April 2013

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What comes to our mind when we say ‘conservation’? Tiger, large mammals, birds?

How about ‘Save the plants’ campaign for a change? Though conservation efforts have taken a serious pace in India, are we thinking about saving our aquatic plants?

We are losing many endangered plant species today due to habitat destruction, tourism, mining to name some.

When we take the specific case of tourism and habitat destruction, a study shows that in Kodaikanal, a tourist place in Tamilnadu, the number of tourists increased from 2 million in 1999 to 3.2 million, a decade later.

According to this study, there are 23 tourist spots in the Western Ghats of Tamilnadu, 41 in Kerala, 37 in Karnataka, 22 in Maharashtra and 25 in Goa. Experts believe that high flow of tourists in such sensitive areas have led to the trampling and disturbance of rare and threatened species of plants and their habitat.

Many aquatic plant populations are under severe threat in the Western Ghats. For instance, *Isoetes panchganiensis* is an endangered plant located in temporary ponds and pools on high altitude plateaus of Panchgani tablelands in Maharashtra and Kemmangudi in Karnataka. Experts say that the threat to this plant is tourism, where tourists drop litter, trample, ride racehorses, drive cars, and end up affecting the ecosystem of ponds.

The Western Ghats with 27% of the total plant species in India houses about 4000 species. Of these 4000 species, 1600 are endemic (native only to this region).

Sadly, there is specific survey study to know or understand the species richness and diversity of aquatic plants across the Western Ghats apart from a few restricted regions.

Given below is the number and percentage of aquatic plant species in each IUCN Red List category in the Western Ghats assessment region.

Global Red List category	No	Percentage
Extinct	0	0.0
Extinct in the wild	0	0.0
Critically Endangered	12	2.1
Endangered	21	3.6

Vulnerable	21	3.6
Near Threatened	8	1.4
Least Concern	517	89.3
Data Deficient	29	N/A
Total	608	

Of these 608 assessed species, 148 (24%) are endemic to Western Ghats. Out of the 608 assessed species, 29 are data deficient. Experts opine that more exploratory studies should be done on plants that are data deficient.

It does bring out a pertinent question. How are aquatic plants important to our ecosystem and why do we need to protect them? One, plants in every ecosystem are producers. They trap sun's energy and manufacture food and this in turn, is used by all the other organisms. In addition to food, submerged aquatic plants also maintain the oxygen levels inside water, and aerate it for other organisms. In the absence of plants, other life forms will be unable to survive due to lack of food and lack of oxygen in water.

Take the case of fishes. Aquatic plants are a major source of oxygen for fishes. Fishes take oxygen in dissolved form when aquatic plants release them into water. If aquatic plants are not present, fishes will die.

One of the key habitats of freshwater aquatic plants is swamp area. A swamp is a wetland permanently saturated with water and dominated by trees. Water-tolerant plants, like lotus grow in the swamp's wet soil. It is crucial to maintain the habitat of these plants.

There is no significant knowledge about inter linkage in the species, like other species which are dependent on plants for survival. Globally, though, according a report published by the Department of Ecology, Washington State, freshwater plants are keystone areas for aquatic birds. Aquatic plants provide important living space for aquatic insects, snails, and crustaceans, which in turn supply food for fish and waterfowl. Many studies have shown that vegetated areas support many times more of these tiny creatures than unvegetated areas.

Also, reptiles and amphibians thrive in freshwater swamps because they are adapted to the fluctuating water levels.

The breeding cycles of many animals are tied to the regular, natural flooding of wetlands. Colonial nesting waterbirds require large floods to support regular breeding. Migratory waterbirds use a range of wetlands to rest, feed and breed during their annual long journeys. Snails lay eggs on the leaves of these plants.

Large aquatic plants growing in water are indispensable and presence or absence of it, are used to define if the area is a wetland.

The Concerns

The IUCN assessment on freshwater points out that many of the watercourses originating from the Western Ghats are now polluted with untreated waste from expanding urban areas, agricultural pesticides and fertilisers and toxic and organic pollutants from growing industries.

Also, many Western Ghats aquatic plant species are being severely impacted by habitat degradation due to industrial effluents and large scale use of pesticides and insecticides. For instance, *Isachne meeboldii*, a critically endangered grass species and *Isachne Swaminathanii*, an endangered grass species found in marshy grasslands of Karnataka and Maharashtra with highly restricted ranges, face serious risk due to urban pollution.

Also, *Lindera minima*, an endangered species, which is endemic to Chengalpattu and Tirunelveli on the Eastern coast of TamilNadu is threatened by habitat conversion due to urbanisation and development of Special Economic Zone (SEZ). Widening of the roads and construction of IT parks are posing a threat to the marshy areas and temporary pools, which are a habitat to these species.

Mining is also a huge threat and has led to loss of primary habitats of species. For instance, *Rotala malabarica* is a plant that is critically endangered or possibly extinct. It was described in 1990 and has not been found again in the same type of locality in Kannur, Kerala. It occupies a very less space and is threatened by mining and extensive use of herbicides in the adjoining cashew plantations.

Forests experience large-scale conversion into various plantations like coffee, rubber etc. High altitude grasslands face a problem because of this. For instance, *Bolbitis appendiculata*, a native species, is under severe threat due to conversion of forests into plantations like rubber in Kanyakumari and tea in upper Kodayar, Tirunelveli.

Also Black Wattle and Eucalyptus, which are not native to India, pose a threat to local species.

Like the freshwater fishes are being traded for aquariums, plant species from Western Ghats are also traded or exported for aquariums. Says Aparna Watve, who has been a part of the Western Ghats assessment programme, “Freshwater plants, such as *Aponogeton* and *Cryptocoryne* are used in aquariums. There is some information that in south India they are grown and traded too. But there is no consolidated information about actual trade of the species within or outside the country.”

Plant Conservation Policies?

When we look at laws governing the protection of plant species, it is more generic. For instance, there is Forest Conservation Act, Biodiversity Law and Wildlife Protection Act, to name some. Experts opine that these laws are weak when it comes to protection of plant diversity

specifically. Biodiversity law tries to regulate and prevent large scale commercial exploitation, like retaining the traditional knowledge and use of plants.

Says Watve, “Wildlife law has a few plant species in Schedule 6 which are legally protected. However, none of these laws are very stringently implemented. Very often people travelling abroad take seeds or propagation material of Indian plants for growing abroad. Although this is not allowed, they are hardly ever questioned or stopped. It is only if very large quantities are being exported (like in many tonnes) and if some vigilant individuals notice it, then action is taken.”

Though the focus of our discussion is aquatic plant species, it is highly important to even indicate about commercial exploitation of plants in the light of this context.

Plant trading

Commercial exploitation of plants has been happening since ancient times, however, in recent times, overexploitation of medicinal plants has become a threat to many species.

Nothapodytes nimmoniana is an example of tree from Western Ghats which has been exported in large quantity to Japan, thus causing serious loss of populations, according to experts.

There are many pharmaceutical companies which depend on medicinal plant to run their business. In this scenario, it becomes vital to look at laws which regulate these. Says Watve, “The Biodiversity Law does talk about commercial exploitation of plants and traditional knowledge. The Forest Conservation Act does try to ensure that forest resources are not overexploited. But implementation of these laws varies from region to region and may not always be that stringent.”

Adds Watve, “Himalayan medicinal plants and some plant resources from Central India are heavily exploited by such companies. However, state government of Sikkim, Uttaranchal, Kerala, are quite vigilant in protection of plant resources and prevent exploitation of forests.”

Though there are many initiatives and policies for saving sparrow or tigers, there are hardly any measures to protect plants. Also, most of the time when plants are being discussed, it is about medicinal plants and their value or charismatic plants.

It is important to understand that humans bear the brunt of disappearance of plant species, both directly and indirectly. Says Watve, “In a natural area, if we are tourists, it is best to ensure that we are not leading to irreversible changes in the area, like urbanisation, land use change, etc. Trampling, plucking, collection of plants or any other animals or resources (mushrooms, twigs, rocks) should be strictly avoided. Also, littering, spitting, garbage disposal should be avoided to reduce footprint.”

Encouraging conservation-oriented, nature-centric tourism rather than purely recreational tourism, supporting community-based tourism, (supporting local initiatives, using home stays, local tourism, following local restrictions, taking help of local guides) adds to ensuring long-term survival of the natural areas.

Crowding should be avoided as carrying capacity of most natural areas is very small. If we follow these basic principles, we also can contribute to saving the plant species.

Habitat loss, changing land use for urban setup is the most serious threat for plants. Each species will be affected separately by threats like habitat degradation, cattle grazing, mining, to name some.

We are becoming aware of such threats only in recent times. Lot of ecological studies need to be done to look at the functioning in maintaining ecosystems. Hence, survey and data on plant species is crucial.

Irreversible changes in habitat will damage all plants and ecosystem linkages with them. Says Watve, "It is urgent to identify natural habitats, their role in providing ecosystem services and then identify areas which should be protected from changing land use. For Western Ghats, controlling urbanisation and pollution related to it, identification of inviolate areas of high biodiversity value and identifying development pattern which is friendly to wilderness should be included in the policies."

With concerted efforts of people, tourists, experts and policy makers, we must protect these plant species as they play an important role in ecological balance.