

Interim Report of the Expert Committee constituted by Madurai Bench of Madras High Court, Madurai [in the matter of WP(MD) No. 3633/2014, 13763/2016 & 7606/2017] on the Action Plan for the management of invasive alien species and exotics and development of Forests as suggested by the Hon'ble Court

Background

The Court order dated 11 January 2019 in the matter of WP(MD) No. 3633/2014, 13763/2016 & 7606/2017 has particularly outlined the extent of distributaries of invasive alien species and exotics including plantation of exotics and their impacts on forest ecosystems including grasslands and shoal forests; the estimated loss of native grasslands was upto 66% in the Nilgiris and 31% of shoals due to lenient plantations (a copy of the order is annexed). The order listed plantations of Wattle (*Acacia mearnsii*) which has become a major invasive tree species in hills covering about 12170 ha land in Nilgiris. The other plantation like Blue Gum (*Eucalyptus*) and tropical pines are also widespread. Most of the exotic tree species have commercial value but have adverse impacts on the ecology of the area, particularly in terms of changes in hydrology, forest/grassland community, wildlife, and man-wildlife conflict. In fact, wattle colonization of new sediments and washing of these sediments during high flows of streams have disastrous impacts on downstream bridges and ecology. The other invasive alien species (shrubs and herbs) that have become menace in Western Ghats and as well as in India include *Lantana camara*, *Prosopis juliflora*, *Parthenium hysterophorus*, *Argemone mexicana*, *Eupatorium adenophorum*, *E. odoratum*, *Mimosa* Spp., *Ageratum conyzoides* and other spp., *Mikania micrantha*, *Galinsoga parviflora*, *Chromolaena odorata*, *Cytisus scoparius* and *Cuscuta* spp. The Court order extensively covered the adverse impacts of *Lantana* and termed it as obnoxious weed threatening dry and moist deciduous forests and grasslands. This species alone bringing changes in forest communities, and failure of regeneration of forests. The order provides a detailed account of adverse impacts of invasive species on forest ecosystems and expressed that invasive species may convert forests into relics and finally make them extinct and also adversely impacting the hydro geological cycles which may ultimately make the State dry. It also highlighted the loss of biodiversity due to invasive alien species and altering the role of

Keystone species like elephant and also leading to reduction in animal populations, alteration in soil characteristics and creating ecological imbalance.

The order states that the seriousness of the situation requires attention of not only the State Government, the efforts of which did not halt the growth of exotics but continuing by galloping speed, but also requires all stakeholders. The Court order also states that “we are inclined to appoint a Committee consisting of Experts in various fields to address the larger issues such as:

- (i) banning plastics in forest zone
- (ii) prohibiting the polluted vehicles to ply in forests
- (iii) employing the local population in forest development
- (iv) increasing the strength of staff
- (v) creating a strong seed bank
- (vi) evolving measures to be adopted in removal and rehabilitation of invasive alien species and exotics
- (vii) mapping of the area
- (viii) generate funds by utilizing the removed plants and trees to achieve the objectives
- (ix) creating a specific cell by the Government to manage the activities
- (x) disposal of the removed species and strengthening of the indigenous species.
- (xi) prevention of deaths of elephants and tigers by electrocution
- (xii) incorporation of the issues of biological invasions and the need to nurture the forests in curriculum of schools

The Court order also clearly stated, that permission of the National Wildlife Board as per Section 29 of the Wildlife (Protection) Act 1972, is not required for the approval of commercial allotment of the surplus materials of the exotic species, as the permission has got no application for the steps taken in protecting the forest by removing the alien species. Consequently, once a species is termed as invasive species it has to be necessarily removed and commercial usage is only secondary. By a successively process of elimination of invasive

species, one can augment income, reduce transport cost from efficient utilization, create/generate employment opportunities. The Counsel appearing for National Board for Wildlife has no objection for utilizing the species. Further, the Apex Court order [in the T.N. Godavarman Thirumulpad (89) Vs Union of India and others (2006) 10 Supreme Court Cases 480] states a number of activities including removal of weeds in protected areas are permissible under the provisions of Section 29 of the Wildlife (Protection) Act 1972. However, certain conditions have to be fulfilled if eradication of weeds, maintenance and development of meadows/grasslands, digging and maintenance of small waterholes and small anicuts, earthen tanks, impoundment of rainwater, relocation of villages outside the protected areas and habitat improvement of areas so vacated in Protected Areas.

The Court order also states that the Committee should also make suggestions on the above matter. The Court order also noted the views of Dr. Parthiban about the value of exotic species.

The Court constituted an Expert Committee with the following members:

- (i) Dr. V. V. Robin
- (ii) Dr. Priya Davidar
- (iii) Shri. Godwin Vasanth Bosco
- (iv) Dr. T. V. Sajeev
- (v) Dr. N. M. Ganesh Babu
- (vi) Shri. T. R. Sankar Raman
- (vii) Dr. K. T. Parthiban
- (viii) Shri. Santhanaraman
- (ix) Shri. T. Mohan
- (x) Prof. Cherukuri Raghavendra Babu

The Committee shall be presided by Professor C. R. Babu who shall be the Chairman. The meetings shall be facilitated by the Secretary to Government, Forest Department, Fort St. George, Chennai – 600009, with one meeting within four weeks of the date of issue of the

order. The Committee shall submit its Reports on the Action Plan within two months from the date of meeting. Shri. T. Mohan and Shri. M. Santhanaraman as amicus curae for the Committee to represent before the Court.

Discussions held in the First meeting of the Committee

The first meeting of the Expert Committee was held on 10 April 2019 at 11:00 A. M. at the Conference Room, State Government Secretariat, Fort St. George, Chennai – 600009. All the members of the Expert Committee, except Shri T. Mohan were present. The salient aspects of the discussion are summarised below.

A. CONTROLLING FRESH INVASION BY EXOTIC INVASIVE SPECIES

a. Mapping of invaded areas

- Identifying invaded and uninvaded areas and preventing invasion in uninvaded areas should be a top priority. This would require using mapping techniques to identify the invaded areas (classified as heavy/moderate/low invasion) and uninvaded areas clearly.
- Mapping will also help to establish a baseline for future management and monitoring.

b. Controlling further spread by existing invasive species

- Preventing further spread of invasive alien species and thereby safeguarding uninvaded areas and keeping them intact must be a top priority. Once mapping is completed, periodic monitoring has to be ensured to ensure invasions, if any, are identified early and alert raised so that the invasion can be arrested and reversed at the early stages.
- Prevention of spread of invasion needs close co-ordination between the Forest Department and other departments like Irrigation, Agriculture, Horticulture, etc.
- Quite a few of the invasive species are used in landscaping in public areas in towns (e.g. *Senna spectabilis* as avenue trees) as well as in private areas (e.g. *Lantana camara* for landscaping in gardens). This has to be banned.
- Seeds and saplings of these invasive plants are also being sold commercially in India and also needs to be banned.
- The invasion in designated forest areas can be controlled only if the surrounding non-forest areas are also free of these weeds. Therefore the focus of management of these invasive plants has to include such peripheral areas as well in order for the efforts to be successful.
- Linear intrusions like roads and power lines are major factors favoring invasion by many exotic species. These have to be strictly minimized if further spread of invasive species is to be avoided. Native vegetation below power lines should not be cleared.
- Use of bio-control agents to prevent spread of exotic invasive species may also be assessed.

c. Preventing entry of new invasive species

- Preventing the entry of new invasive alien species should also be a top priority. This may need clear policies at a national level to prevent entry of new invasive species into the country. An example given of recent invasions was *Senna spectabilis* (which started in Kerala and has now spread to areas like Mudumalai Tiger Reserve and Sathyamangalam Tiger Reserve in Tamil Nadu apart from many areas in Karnataka). Another example given was that of *Conocarpus lancifolius* (of African origin) which is being in large numbers planted as an avenue trees in Andhra Pradesh. The Court may consider issuing necessary directions to the MOEF&CC in this regard so that a national-level policy is issued.
- Many of these exotic species are brought into India also because of their fuelwood and fodder benefits (e.g. *Gliricidia*). There are many native species that can provide the same benefits and there is no need to use exotic and invasive species for this purpose.

B. RESTORATION OF AREAS AFFECTED BY INVASIVE SPECIES

a. Removal of invasive plants

- The methods of removal of invasive plants have to be least intrusive with minimal collateral damage.
- As an example, it was discussed how the removal of *Lantana camara* using JCBs was causing extensive damage to ecosystems by destroying pre-existing native vegetation on the removal plots. In addition, the use of heavy machinery leads to unearthing of dormant sub-soil seeds which in turn leads to aggressive re-invasion by the weed. The unanimous view of Committee members was that the use of heavy machinery like JCBs should not be allowed. The Tamil Nadu Forest department stated that they were using the same method for removing *Lantana camara* as was used in Corbett Tiger Reserve and Rajaji NP (Cut Rootstock method).
- A view was expressed that there is a risk of different wildlife divisions using different removal methods of various invasive species and hence standard protocols for tackling different invasive species should be in place. The Forest Department stated that they have standard protocols in place and would share them with the Committee members.

b. Selection of sites for restoration

- Careful selection of invaded areas for restoration is crucial for success. It was unanimously felt that that restoration should be planned first in the low and medium-density invaded areas. This is also in line with the UN guidelines for management of invasive species.
- These areas also normally have reasonable remnants of native vegetation which makes revival relatively easier. It is therefore better to start here and work outwards from there.
- This approach will facilitate the faster increase of area that is invasion-free and biodiverse and also help prevent these areas from progressing to high-density invasion. These areas can become repositories of native biodiversity which can act as catalysts for nearby areas and also act an effective biological defense against re-invasion by invasive species.

- High-density invasion areas are normally difficult to restore and pose a high risk of secondary invasion. Hence these areas could be taken up at a later stage after addressing the low and medium-density plots.
- Selection of plots that are contiguous to each other is recommended instead of selecting sporadic plots. This helps in creating a continuous stretch of invasion-free area. This also helps increase the distance between restored plots and the nearest invaded areas.
- Sites with lower linear intrusions like roads may be selected first since these have a higher risk of re-invasion as well as invasion by secondary invasives.

c. Restoration of sites post removal

- Restoration of removed plots should be given high importance as otherwise they are likely to be invaded by secondary invasive species. It has to be borne in mind that removal of invasive plants is only 50% of the task, and the remaining 50% is restoration.
- A bottom-up approach to restoration is recommended, focusing initially on factors like soil alleviation, increasing water holding capacity and improving ecological resilience. This will help in establishing pioneer plant species that in turn help faster recovery.
- A balanced perspective is needed for native plant species propagation, by focusing on a holistic mix of grasses, herbs, shrubs and trees that are representative of the ecosystem type. Restoration using only tree species is unlikely to succeed as a restoration strategy.
- Assisted natural regeneration is now globally recognized as a good option for restoration. It works well in plots with reasonable presence of remnants of native plants in the form of seed-bearing plants, root fragments, etc. These naturally recruited plants (often pioneer species) are generally more resilient than introduced plants and tend to establish and grow faster. Assisted natural regeneration is also a lower-cost restoration methodology.
- Watershed management has to be given due attention in the restoration plans.
- Native plant species that can counter re-invasion should be identified and used to build a biological defense, particularly in heavily invaded plots. For instance, grass has been seen to be a good inhibitor of Lantana re-invasion.
- Ecological integrity has to be maintained while planning restoration of sites. Sites have to be brought back to their earlier state prior to the disturbance by invasive species. For example, grasslands that have been invaded should be restored back as grasslands and not as woody forests. Large scale planting of shola trees in open areas that were earlier grasslands or wetlands should be stopped.
- A list of native species specific to different region-ecosystem combinations should be prepared, along with species specific guidelines and best practices.
- Restoration strategies have to be flexible to be site specific. For example, in some locations in the high altitude plateaus, mature exotic trees are nursing shola trees in the undergrowth. In such situations, instead of removing the exotic trees altogether we could focus on planting shola tree saplings.
- Adequate preparedness with native plant material is a must for successful restoration. Seed collection, setting up of nurseries, etc. should be given high focus. These should be available as soon as the invasive species are removed, since otherwise we could have secondary invasions or re-invasion.

- Restoration is a difficult and long-term activity and may take over 5 years in some sites. There has to be continuous funding for this as well as continued management attention.
- In areas with presence of herbivores, re-introducing browsing plant species is a challenging task as these tend to get browsed quickly. Options like temporary solar fencing of plots may have to be considered.

C. MAKING BRIQUETTES FROM *LANTANA CAMARA*

- The Forest Department presented a proposal for making briquettes from *Lantana camara*. It was being evaluated as a means of raising funds for the restoration activities.
- The Committee members unanimously felt that while such activities could give some short-term fringe benefits they could have serious ecological consequences and hence are avoidable. In particular, the creation of an economic value could lead to the active cultivation of these invasive plants in villages and other private lands, resulting in their spreading aggressively.
- It was felt that other funding options for restoration like CAMPA and MNREGA could be looked at instead.

D. EUCALYPTUS

Some preliminary discussions were held on Eucalyptus that were decided to be followed up in subsequent meetings. Views expressed were as below:

- Eucalyptus should be avoided in watershed areas.
- Eucalyptus cultivation may be banned in hill areas but allowed in the plains due to the economic benefits to people.
- Removal should be site specific and alternate species may be identified. Bamboo may be an alternative.
- Planting of native species may be done in mature Eucalyptus plantations where some natural regeneration is already happening.
- Cestrum is a bigger problem than Wattle and Eucalyptus in the shola forests.
- The Forest Department stated that while existing Eucalyptus plantations are being managed scientifically, no new plantations were being created.
- Are there any commitments to industry regarding Eucalyptus? Are these agreements viable and feasible?
- Water table impact of Eucalyptus may be assessed based on scientific evidence.
- The question of whether Eucalyptus is invasive or not needs to be assessed, since in Kodaikanal it is seen invading into grasslands.

E. OTHER ASPECTS DISCUSSED

- The UN has recently declared the decade of 2020-2030 as the 'Decade of Ecological restoration'. This is an opportunity for the Tamil Nadu Forest department to demonstrate their commitment to ecological restoration by becoming the first State in the country to adopt the UN declaration.

- Cattle and goat grazing is a major cause of degradation of forests and need to be controlled.
- There should be a ban on use of plastics in forest areas and also a mechanism for collection of any plastics in such areas.
- Exact data on electrocution of elephants should be made available.
- Details of seed bank available with the Forest Department may be shared.
- Reserve forest areas that comprise 60-65% of forest lands in the State have high anthropogenic pressures resulting in degradation. Restoring these should be given attention in addition to Protected Areas to minimize human-wildlife conflict.
- *Senna spectabilis* poses a very big threat to the forests in Tamilnadu and needs to be tackled in the early stages of its invasion.
- Ecological restoration provides a significant opportunity to create rural livelihoods. This in turn can help foster improved relationship between forest-abutting communities and the forest department. Student and volunteer involvement can also be effective.
- The Forest Department can consider involving local NGOs and groups in partnering and carrying forward the restoration projects.
- Training of forest department staff on restoration is important.
- Creation of an “Invasive Species Cell” at the Forest Department headquarter-level is necessary to manage the project.
- *A number of shoal tree* have been dead and the reasons for their death is not known. There have been reports that CO₂ levels high in some of the areas. These aspects need to be examined.

F. FURTHER STEPS

- Details are awaited from Forest Department on various schemes and projects implemented by them.
- The Directorate of School Education will be making a presentation at the next meeting on the “Eco-club” program.
- Field trips to relevant sites are planned.

G. At the end of discussion, it was pointed that the Report should contain answer to the following questions:

- a. How to restore grasslands, sholas and other ecosystems, including Protected Areas, that are facing degradation because of invasive alien species commercial exotic tree plantations?
- b. How to conserve/restore grasslands which are like reservoirs and are critical for the water flow into streams and rivers?
- c. How to prevent degradation of forests which is one of the main reasons for invasion by alien species?
- d. Allow to manage invasive alien species.
- e. How to enrich biodiversity of forest areas to improve ecosystem services?
- f. How to reduce human pressure on forests?
- g. How to mitigate the adverse effects of development on biodiversity?

- h. How to restore and protect elephant corridors which are critical to minimize human-elephant conflict?
- i. How to identify funding sources for restoration?
- j. How to promote nature education among schools and college students?

To sum up, the Committee was serious about the rapid loss of grasslands and shoal vegetation due to invasion of alien species and indiscriminate planting of exotics, high incidence of avian malaria among birds inhabiting commercial plantations, death of shoal trees, increased incidence of Man- wildlife conflicts, loss of wildlife and changes in hydrological cycles.

The committee is of the opinion that ecological restoration, eradication and effective management of invasive alien species, controlled plantations of exotic trees of commercial value and policy options for commercial plantations of exotic trees and infrastructure development in forest areas have been emphasized as solutions to the problems.

Prayer for extending the tenure of the Committee.

Since it is necessary to make two/three site visits to assess the status of forests and to prepare a detailed action plans and strategies for effective implementation and monitoring, the Expert Committee may take a minimum of 6 months to submit the Final Report; and Interim Reports after every 2 months will be submitted on the progress achieved. The prayer is to extend the tenure of Expert Committee by another 6 months after 10 June 2019.