

KFRI Research Report No. 447

**NEEDS ASSESSMENT AND FORMULATION OF TECHNICAL CO-
OPERATION PROGRAMME (TCP) PROJECT FOR FOREST INVASIVE
SPECIES (FIS) IN SOUTH INDIA, SRI LANKA AND MALDIVES**

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**REPORT ON PRE-PROJECT WORKSHOPS ON INVASIVE ALIEN SPECIES
IN INDIA, SRI LANKA & MALDIVES**

The series of three workshops envisaged as pre-project activity of the TCP programme is over. The workshops at Sri Lanka and Maldives were organized on 29 April 2010 and the workshop in India was organized on 25 May 2010. All the workshops primarily aimed at answering five key questions on the alien invasive species of the respective countries. A total of 191 experts participated in the process, 107 of them by attending the workshops and the other 84 by filling the questionnaire.

The workshops aimed at a) listing the currently outbreaking invasive species, b) identifying probable immediate invasive species threat to forests, c) identifying model sites, d) identifying training requirements, and e) listing of stakeholders in the respective countries. Twenty nine species of alien invasives were listed in both South India and Sri Lanka and 23 species were listed for Maldives. In all the three countries critical gaps in expertise to manage invasives were identified along with the listing of major stakeholders in the context of biological invasion. The respective country reports with the details are attached herewith.

Workshop held in South India

The Workshop on Alien Invasive Species Invasions into Forests of South India was organized at Kerala Forest Research Institute, Peechi on 25th May 2010. The workshop was attended by 35 participants representing the South Indian States of Kerala, Tamil Nadu and Karnataka. They included Forest officials including Wildlife Wardens, researchers, representatives of NGOs and students of invasive biology.

The Workshop started at 10.00 am with welcome address by Dr.K.V.Sankaran, Director, KFRI Coordinator, APFISN. He explained the background and objectives of the workshop in his introductory remarks.

The first technical session was started by a presentation on Alien Invasives in Forestry by Dr.K.V.Sankaran. He presented an overview of the major invasive species threat to forests in India. The second technical session had the presentation on alien invasives in agriculture by Dr. C.T. Abraham, Dean, Faculty of Agronomy, Kerala Agricultural University. He reviewed the status of invasives in agriculture in India with special emphasis on probable incursion of them in forests. The technical sessions were followed by the presentations of alien invasive status reports in the States of Kerala, Tamil Nadu and Karnataka. Dr. T.V.Ramachandra Prasad, Professor, University of Agricultural Sciences, Bangalore reviewed the status of forest invasive species in Karnataka, Dr. C.Chinnusamy, Professor, Tamil Nadu Agricultural University, Coimbatore reviewed the Tamil Nadu scenario and Dr. T.V.Sajeev, Scientist, Kerala Forest Research Institute presented the status of FIS in Kerala.

The review of FIS scenario in the three states was followed by discussion on the topic aimed at a) identifying the current FIS outbreaks, b) identifying potential invasive threat to forests, c) identify

model sites for undertaking and research and management of FIS, d) identify training requirements, and e) listing of stakeholders in the country.

The workshop came up with the following conclusions:

1. Current FIS outbreaks

The workshop identified the following alien invasive species as the current major outbreaks in the forests of South India.

<i>Mimosa diplotricha</i>	Herb/Shrub
<i>Mikania micrantha</i>	Climber
<i>Lantana camara</i>	Shrub
<i>Chromolaena odorata</i>	Herb/Shrub
<i>Tilapia</i>	Fish
<i>Parthenium hysterophorus</i>	Herb
<i>Clarias gaeripinus</i>	Fish
<i>Prosopis juliflora</i>	Tree
<i>Acacia maeansi</i>	Tree
<i>Maesopsis emini</i>	Tree
<i>Caesalpinia mimosoides</i>	Climber

2. Potential invasive species threat to forests

The following invasive species which have already arrived in South were decided to be of potential threat to the forest in the immediate future: *Croton* sp., *Asclepia curasavica*, *Meremia vitifolia*, *Cytisus scoparius*, *Ipomoea cairica*, *Ulex europeus* and *Ipomoea purpurea*.

3. Model sites

The following forest areas were identified as prospective sites where research and management protocols can be implemented in each of the three States in South India.

Kerala: Vazhachal / Nilambur / Ranni / Wayanad / Silent Valley

Karnataka: BR Hills Wild Life Sanctuary

TamilNadu: Muthumalai Tiger Reserve

4. Training requirements

Training in the following topics are needed to build up the capacity of various stakeholders to be able to implement FIS management protocols:

1. Monitoring of FIS / Surveillance protocols – forest staff
2. Early warning – forest field staff, NGOs

3. Awareness raising at different levels- forest officials
4. Risk assessment protocols- research staff

5. Stakeholders

The workshop identified that the major stakeholders in invasive species management in the country are Forest staff at various levels, Members of the local community, Quarantine officials, farmers, local self government institutions and NGOs.

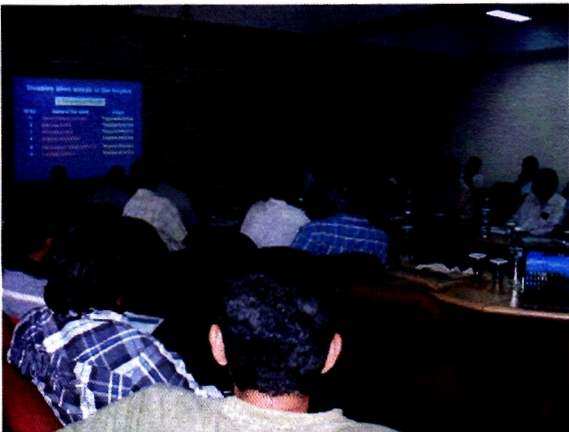
The workshop came to a close at 2.30 pm



2 Dr. Chinnusamy



1 Discussion in progress



4 Presentation on forest invasives in South India



3 Audience

Workshop held in Sri Lanka

The Workshop on Alien Invasive Species Invasions into Forests of South India was organized at Kandyan Reach Hotel, Kurunegala, Sri Lanka on 29th April 2010. The workshop was attended by 30 participants representing the Forest and Wildlife departments, Univeristy of Peradeniya and the Royal Botanic Gardens.

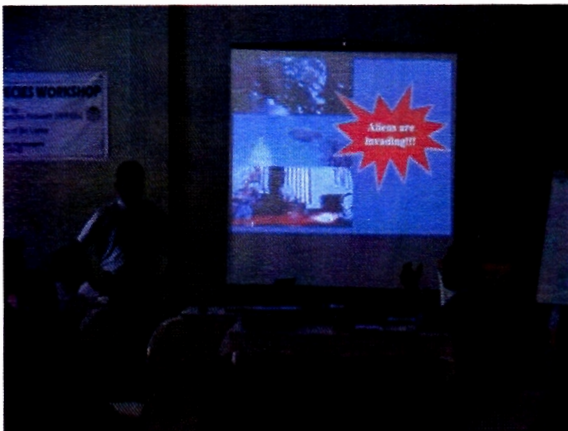
The Workshop started at 10.00 am with the lighting of the traditional oil lamp by the dignitaries. Dr. NDA Weerawardane welcomed the gathering. Mr. Sarath Fernando, Conservator General of Forests delivered the special address in which he drew attention to the threat caused by the invasive species in both the agriculture and forestry sectors. He commented that low public awareness, absence of prioritized action plans, inadequate quarantine measures, lack of emergency response measures and poor coordination between government agencies as the constraints in combating invasive species in Sri Lanka. Dr. T.V.Sajeev, representing the APFISN explained the background and objectives of the workshop.



5. Lighting of the traditional oil lamp



6. Inaugural session



6 Discussion session



8 Dr. Buddhi Marambe



7 Dr. T.V.Sajeev



10 Mr. S Fernando



8 Discussion in progress

The technical presentations were followed by discussion on the topic aimed at a) identifying the current FIS outbreaks, b) identifying potential invasive threat to forests, c) identify model sites for undertaking and research and management of FIS, d) identify training requirements, and e) listing of stakeholders in the country.

The workshop came up with the following conclusions:

6. Current FIS outbreaks

The workshop identified the following alien invasive species as the current major outbreaks in the forests of South India.

Panicum maximum

Alstonia macrophylla (Wetzone low lands)

Clusia rosea (Kandy district, Lower montane zone)

Lantana camera

Prosopis (in coastal area)

Acacia caesia

Opuntia

Bambusa bamboos

Ulex europeaus

Liana sp (Kandy) Phylodendron?

Imperata cylindrica (Not a serious threat in the grasslands of Uda Walawe NP)

Anona glabra (wetlands)

Acacia nilotica (Thabbowa)

Strobilanthus sp (Adam's peak)

Clidemia hirta (Adam's peak)

Dillenia suffruticosa (being used as firewood)

Eupatorium odoratum

Streblus taxoides (in Mahogany forests)

Myroxylon balsamum

7. Potential invasive species threat to forests

The following plants were identified as those which pose potential threat to the forest in the immediate future:

Miconia calvescens

Mimosa pigra

Parthenium hysterophorus (in Savanna grasslands)

Fungus disease in Eucalyptus (Eucalyptus rust)

Mikania micrantha

Prosopis (in drylands)

Ochlandra stridula

8. Model sites

The following forest areas were identified as prospective sites where research and management protocols can be implemented in Sri Lanka.

Udawatta kele (Kandy)

Kanneliya forest

Bundala National Park

Training requirements

Training in the following topics are needed to build up the capacity of various stakeholders to be able to implement FIS management protocols:

1. Identification of FIS (forest field staff, forest fringe communities)
2. Methods of controlling FIS (forest staff, local community)
3. Rapid assessment methodology for
 - a. Economic impact (researchers)
 - b. Ecological impact (researchers)
4. Ecology of potential threat species (researchers)
5. Commercial uses of FIS (Entrepreneurs, local community)

9. Stakeholders

The workshop identified that the major stakeholders in invasive species management in the country are Forest Department

1. Wildlife Department
2. Universities (Botany, Zoology, Crop Sciences, Economics,
3. NGOs
4. Department of Botanical Gardens
5. Dept. Of Agriculture (Quarantine)
6. Dept. Of Zoological gardens
7. Private sector aquarium traders
8. NARA, NAQDA (National Aquarium Development Agency)
9. Customs
10. Ministry of Environment
11. Department of Education
12. Department of Irrigation

The workshop came to a close at 2.30 pm

Workshop in Maldives

The APFISN Coordinator had a preliminary discussion on arrangements for the workshop and overall aim with Dr. Aminath Shafia, Minister for Fisheries and Agriculture and her colleagues on 28 April at 2 pm in the Ministry of Fisheries and Agriculture, Maldives.

The workshop began at 9 am on 29 April 2010 with introductory remarks from Dr. Mohamed Ali, Minister of State for Fisheries and Agriculture, Maldives. He outlined the context of the workshop and Maldives' interest in participating in the program. Following this, Dr. Sankaran, the APFISN Coordinator, discussed the objectives of the workshop. In his opening remarks, Mr. Ibrahim Didi, Minister for Fisheries and Agriculture, Maldives gave an overview of the status of forest invasive species in Maldives and emphasized the necessity of collaborative efforts to tackle the issue. A total of 21 participants including Officers from the Depts of Agriculture, Quarantine and Customs and Environment analysts, NGO's and Ministers took part in the workshop.

The technical session started at 11.30 am with a presentation from Dr. Sankaran on 'Current Knowledge of Forest Invasive Species in the region'. He discussed the threats posed by forest invasive species on ecology, economy and biodiversity citing examples from the Asia-pacific region. Dr. Aminath Shafia, Minister for Fisheries and Agriculture, Maldives spoke on quarantine measures and policies adopted by the Govt. of Maldives to prevent incursions. She presented the major concerns due to FIS in Maldives citing examples of invasive species like Gypsy moth, Coconut leaf beetle, Rhinoceros beetle, Citrus canker bacterium, Banana leaf borer, Spiraling white fly, Giant African snail and invasive weeds such as lantana. Dr. Shafia also discussed how the issue of FIS is addressed in Maldives through strengthening plant quarantine and inspection and developing strategic action plans. She emphasized the need for monitoring, surveillance, training and raising awareness.

The talks were followed by compilation of the responses received through the questionnaire and further discussions were based on the responses and suggestions from the participants. The discussions were moderated by Aishath Shimla, Aishath Najath, Ali Nishman and the APFISN Coordinator. The workshop identified *Parthenium*, *Syzigium mellanaceae*, coconut hispid beetle and mealy bugs as the most important FIS Challenges in Maldives. The actions proposed to deal with these species are 1) improving quarantine facilities, 2) monitoring ports for FIS, 3) create awareness using media, 4) frame suitable and clear rules and regulations to stop incursions, 5) create a database on FIS in Maldives, 6) develop action plan to combat FIS (by gathering information on ecology and biology of important FIS) and 7) developing a mechanism to monitor the spread of FIS.

The training requirements identified by the participants included 1) quarantine methods, 2) training in basic techniques used in Botany, Entomology, Plant Pathology and in identification of plants and insects, 3) lab techniques in Soil Science, 4) remote sensing and GIS (for early warning and rapid detection), 5) development of environmental and agricultural policy and 6) assessing economic impact of FIS.

The model sites identified in Maldives to conduct the studies on management of FIS were 1) Laamu Gan (biodiversity rich agricultural island), 2) agricultural islands of Kaafu Kaashidhoo, Gn. Fuvahmullah and Sh. Feevah. An uninhabited forested island namely Gdh. Gan and an inhabited island viz., Laamu Isdhoo-Kalaidhoo (largely agricultural with forested areas) were also suggested as model sites.

To raise awareness on FIS among the main stakeholders, the following programs were proposed. 1) Conduct a workshop to identify the role of different stakeholders in managing FIS, 2) include FIS in school curriculum (esp., agriculture and forestry), 3) exhibit posters of potential threats in air and sea ports, 4) produce and disseminate leaflets and other extension materials on FIS and 5) host a website on FIS.

The main stakeholders for FIS management in Maldives are 1) pest and disease unit and quarantine facility, 2) customs and port authority, 3) island aviation, 4) food and drug authority, 5) Ministries of Fisheries and Agriculture, Housing, Transport and Environment, 6) NGO's, Co-operatives and associations, 7) community based producer organizations, 8) farmers and other local people.

The meeting came to a close at 3 pm.

Based on the discussions and the questionnaire survey, the following major invasive species were identified as currently causing major adverse on the island biota:

Maldives

1. *Lymantria dispar*
2. *Brontispa longissima*
3. *Leucaena leucocephala*
4. *Lantana camara*
5. White fly
6. *Columba livia*
7. *Parthenium hysterophorus*

8. *Rhinoceros*
9. *Achatina fulica*
10. *Mimosa diplotricha*
11. *Diamond back moth*
12. *Citrus bacterial canker*
13. *Mango stem borer*
14. *Breadfruit and mango stem borer*
15. *valumirihi*
16. *Tilapia sp.*
17. *Sea cucumber*
18. *Rats and bats*
19. *Xanthomonas campestris*
20. *Oryctes rhinoceros*
21. *Batocera rufomaculata*
22. *Mimosa pudica*
23. *Paracoccus marginatus*



9 Participants



10 Dr. K.V. Sankaran, Coordinator APFISN



13 Inaugural Session



12 Technical session



11 Discussion