

Technology Fact Sheet for Adaptation

Managing and monitoring invasive alien species (IAS) ⁱ

1. SECTOR: <i>To be written by sector expert</i>	Biodiversity
TECHNOLOGY CHARACTERISTICS	
2.1 Technology name:	Managing and monitoring invasive alien species (IAS)
2.2 Introduction: <i>Low/high, Brief introduction to the technology</i>	Invasive Alien Species (IAS) is one of the main threats to biodiversity conservation, and recent research has shown that it is an increasing threat to biodiversity.¹ Climate change is already impacting biodiversity due to increased spread of invasive or non-native species, which include plants, animals, and pathogens.² In Sri Lanka IAS is a major issue affecting both agriculture and affecting biodiversity loss. Some of the main IAS include affecting forests include grasses such as <i>Imperata cylindrical</i>, <i>Lantana camera</i>, <i>Panicum maximum</i>; and <i>Myroxylonbalsamum</i>, a shrub.³ Climate change will only exacerbate this issue, as conditions could open new opportunities for invasive species⁴. Thus the control of IAS is of utmost importance for conserving biodiversity in a changing climate. Most invasive species are costly, difficult to eradicate and can often have unexpected negative effects on biodiversity and ecosystem services⁵. Monitoring, removal, eradication and preventing IAS is not a new technology, and has been carried out in Sri Lanka. Some mechanisms identified as being important to control IAS include identification,

¹ S. H. M. Butchart et al., Global Biodiversity: Indicators of Recent Declines. *Science* 328, 1164-1168 (2010).

²Mawdsley, J.R., O'Malley, R., Ojima, D.S., 2009. A review of climate-change adaptation strategies for wildlife management and biodiversity conservation. *Conservation Biology* 23, 1080–1089.

³Weerawardane, N.D. R. Status of Forest Invasive Species in Sri Lanka.

http://lakdasun.com/forum/doc_base/Status_of%20Forest_Invasive_Species_in_SriLanka.pdf

⁴Lovejoy, T. E. 2005. Chapter 19 - Conservation with a Changing Climate. In: Lovejoy T, Hannah L, eds. 2005. In Climate Change and Biodiversity. New Haven, CT: Yale Univ. Press

⁵Leadley, P., Pereira, H.M., Alkemade, R., Fernandez-Manjarrés, J.F., Proença, V., Scharlemann, J.P.W., Walpole, M.J. (2010) Biodiversity Scenarios: Projections of 21st century change in biodiversity and associated ecosystem services. Secretariat of the Convention on Biological Diversity, Montreal.

	monitoring or controlling/eradicating for which training on identification, awareness and research facilities and funding are necessary.⁶ <i>Reference in existing policies, strategies and action plans:</i> The Biodiversity Conservation - Framework for Action has recommended that establishing an Invasive Species Specialist Group, prioritizing IAS including GM, terrestrial and aquatic species, preparing a national database on IAS and providing funding for research on methods to control the spread of IAS is necessary to address this issue.⁷ According the National Action Plan for Haritha Lanka Strategy 8.2 recommends to 'Ensure management and control of invasive alien species' and Strategy 8.4 to 'Promote research on invasive alien species, with particular focus on documenting their impacts and determining efficient methods for their management'⁸. The Climate Change Adaptation Strategy⁹ for Sri Lanka and the Sector Vulnerability Profile for Biodiversity and Ecosystem Services¹⁰ has identified to 'Minimize entry, establishment and spread of IAS' - (F iii).
2.3 Technology characteristics/highlights: <i>Few bullet points, ie. Low/high cost, advance technology; low technology</i>	This technology is not new and can be considered to be a low to medium level technology. Legislation and policy is already in place in the country for the prevention and removal of IAS. Eg: Plant Protection Ordinance and Plant Quarantine Ordinance, etc¹¹ and the Biodiversity Conservation - Framework for Action¹² which have provisions for and endorse the control of IAS. However this issue has not been adequately controlled¹³ and will need more resources and enforcement to be successful.
2.4 Institutional and organizational requirements:	There are policies and laws already in place for this technology. However knowledge transfer and some capacity will be necessary on

⁶Weerawardane, N.D. R. Op. Cit.

⁷Ministry of Environment and Natural Resources. 2007. Biodiversity Conservation in Sri Lanka: A Framework for Action – Addendum.

⁸ National Council for Sustainable Development . 2009. National Action Plan for Haritha Lanka Programme

⁹Ministry of Environment. 2010. National Climate Change Adaptation Strategy for Sri Lanka 2011 to 2016.

¹⁰Ministry of Environment. 2010. Sector Vulnerability Profile: Biodiversity and Ecosystem Services.

¹¹Weerawardane, N.D. R. Op. Cit.

¹²Ministry of Environment and Natural Resources. 2007. Op. Cit.

¹³Weerawardane, N.D. R. Op. Cit.

<i>How much additional capacity building and knowledge transfer is required for the adaptation option to be implemented.</i>	how to effectively minimize IAS with changing climate as conditions are unlikely to be stable.
3. OPERATIONS AND MAINTENANCE	
3.1 Endorsement by experts:	For details of endorsement by local experts and relevant agencies see section on '<i>Reference in existing policies, strategies and action plans</i>' in Section 2.1. Control of IAS is one of the biggest threats to biodiversity both in Sri Lanka and globally – thus controlling this issue is considered to be a main conservation method to sustain biodiversity and thus endorsed by experts in the country and globally. Globally many books¹⁴ and peer reviewed journals¹⁵ on biodiversity and climate change issues have included this as an important issue that needs to be addressed.
3.2 Adequacy for current climate: <i>Are there negative consequences of the adaptation option in the current climate? Some adaptation may be targeted at the future climate but may have costs and consequences under the current climate.</i>	As the control of IAS is vital for conserving biodiversity currently as well, preventing, monitoring and removal of IAS will be very favorable for biodiversity of conservation even under present conditions.
3.3 Size of beneficiaries group: <i>Technology that provides small benefits to large number of people will be favoured over those that provide larger benefits, but to fewer people.</i>	There will be many indirect benefits of controlling IAS to a large group of people, although its benefits are unlikely to be visible or felt directly. IAS have the potential to destroy biodiversity, especially native species and can also impact agriculture¹⁶ thus controlling will also be beneficial to the agricultural sector. Additionally if an ecosystem is invaded by invasive species its

¹⁴ 2005. Lovejoy, T. E. Op. Cit.

¹⁵ Mawdsley, et al. 2009. Op. Cit.

¹⁶ Weerawardane, N.D. R. Op. Cit.

	ecosystem services it will face unexpected negative impacts ¹⁷ . This will indirectly affect many beneficiaries.
4. COSTS	
4.1 Cost to implement adaptation options: <i>Cost measures</i>	It is estimated that this activity will cost Rs. 85 million annually. This is based on the assumption that a budget increase of 4.25% of current conservation budgets will be necessary for this activity (based on total Forest Department and Wildlife Department annual budgets). It is estimated that 25% of this will be borne by the public sector. This activity will need to be carried out until IAS are controlled, and will have to be an annual budget. Cost will be for site selection (with use available information, supported by modeling – if necessary), prioritization, and management (eradication, control etc) and monitoring.
4.2 Additional costs to implement adaptation option, compared to “business as usual”	There will be costs in terms of prevention, personnel to monitor and enforce, plus investment for IAS control programs. It will require more funds than currently allocated for this activity.
5. DEVELOPMENT IMPACTS, INDIRECT BENEFITS	
5.1 Economic benefits: Employment - <i>Jobs</i> Investment - <i>Capital requirements</i>	Employment: There will be some job creation for increasing personnel for monitoring, enforcement and removal of IAS. Investment: Investment will be required for removal technologies and monitoring.
5.2 Social benefits: Income – <i>Income generation and distribution</i> Education – <i>Time available for education</i> Health – <i>Number of people with different diseases</i>	Income: • There will be some income generation from employment in removal and monitoring of IAS. • Indirect benefits to income from ecosystem services. • Possible income from community conservation, payments for ecosystem services, REDD etc.

¹⁷Leadley, P. et al, 2010. Op. Cit.

	Education: • An opportunity for students to learn about IAS and be involved in monitoring and removal programs through schools. Health: • IAS themselves could be pathogens that can cause health issues, and their control is vital. • IAS will degrade the environment and compromise ecosystem services. Thus microclimate, watershed services etc could get affected impacting human health indirectly.
5.3 Environmental benefits:<i>Reductions in GHG emissions, local pollutants, ecosystem degradation etc.</i>	It will ensure sustainability of biodiversity and minimize degradation from IAS. Ecosystem services such as carbon sequestration, watershed services etc will be restored.
6. LOCAL CONTEXT	
6.1 Opportunities and barriers:<i>Barriers too implementation and issues such as the need to adjust other policies</i>	Opportunities: • Controlling IAS has already been identified as a priority in the Sri Lanka Biodiversity Conservation - Framework for Action¹⁸. • Income from employment and possibility from community conservation, payments for ecosystem services and REDD. Barriers: • It will require additional funding¹⁹. • Difficulties in predicting how climate change will affect IAS.
6.2 Status:<i>Status of technology in the country</i>	This is not a new technology and policies and programs are already in place. Sri Lanka also has several laws in place, of which include Plant Protection Ordinance and Plant Quarantine Ordinance, Flora and Fauna Ordinance, Forest Ordinance and others²⁰. The Biodiversity Conservation - Framework for Action²¹ (addendum) has identified the issues that impact of IAS has not been reviewed. It recommends that IAS are managed and controlled.

¹⁸Ministry of Environment and Natural Resources. 2007. Op. Cit.

¹⁹Weerawardane, N.D. R. Op. Cit.

²⁰Weerawardane, N.D. R. Op. Cit.

²¹Ministry of Environment and Natural Resources. 2007. Op. Cit.

	However the program would need to be expanded plus, climate change models will need to be used for predictions although they may not be totally accurate.
6.3 Timeframe: <i>Specify timeframe for implementation</i>	Removal of invasive species will have to be a continuous program, included in the annual conservation budgets.
6.4 Acceptability to local stakeholders: <i>Whether the technology will be attractive to stakeholders</i>	This technology should be acceptable to all local stakeholders as it is a strategy already accepted by government departments as an important conservation issue, and is specifically stated in the Biodiversity Conservation - Framework for Action²². It will be favorable as it will prevent ecosystem degradation and associated loss of services and can also affect agriculture and have serious economic implications.

ⁱ This fact sheet has been extracted from TNA Report – Technology Needs Assessment Reports For Climate Change Adaptation – Sri Lanka. You can access the complete report from the TNA project website <http://tech-action.org/>

²²Ministry of Environment and Natural Resources. 2007. Op. Cit.