Technology Fact Sheet for Adaptation

Adaptive management and monitoring programs of species and ecosystems [i]

1. SECTOR: *To be written by sector expert*	Biodiversity
TECHNOLOGY CHARACTERISTICS	
2.1 Technology name:	Adaptive management and monitoring programs of species and ecosystems
2.2 Introduction: *Low/high, Brief introduction to the technology*	Adaptive management and monitoring is essential to monitor climate change impacts and associated ecosystem responses and adjust management strategies accordingly. In order to be effective during the uncertainties of climate change – partnership based adaptive management is important as it will allow field managers help to test and refine ideas progressively[1]. Conservationists have suggested dynamic landscape conservation plans, which include information on fixed and dynamic spatial elements. Unlike traditional management plans, these dynamic plans explicitly address the climate adaptation needs of wildlife and biodiversity at a landscape scale[2]. *Reference in existing policies, strategies and action plans:* The Biodiversity Conservation - Framework for Action recommends to 'establish biodiversity monitoring indicators within a common, flexible and transparent framework, and periodically review indicators'[3]. The Climate Change Adaptation Strategy[4] for Sri Lanka and the Sector Vulnerability Profile for Biodiversity and Ecosystem Services[5] has identified to 'Research and monitoring programs to strengthen

[1] Hannah, L., G. F. Midgley, and D. Millar. 2002. Climate change-integrated conservation strategies. Global Ecology and Biogeography 11:485–495.

[2] Hannah, L., and Hansen. L. 2005. Designing landscapes and seascapes for change. Pages 329–341 in T. E. Lovejoy and L. Hannah, editors. Climate change and biodiversity. Yale University Press, New Haven, Connecticut.

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

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

[5]Ministry of Environment. 2010. Sector Vulnerability Profile: Biodiversity and Ecosystem Services.

	knowledge base on CC and terrestrial and aquatic biodiversity' - (F i and Fii).
2.3 Technology characteristics/highlights: *Few bullet points, ie. Low/high cost, advance technology; low technology*	This can be considered to be a low to medium technology – as it is a simple technology which will require some research to identify changes and on the ground monitoring for observation of changes. It will include constant monitoring and responding to changes and conservation needs. It would involve revising of management plans and action plans.
2.4 Institutional and organizational requirements: *How much additional capacity building and knowledge transfer is required for the adaptation option to be implemented.*	Extra capacity will be necessary to increase monitoring which is essential for adaptive management, and there will be cost of monitoring resources such as vehicles, equipment and field studies. There will be additional capacity building and knowledge transfer on how to cope with change and manage accordingly.
3. OPERATIONS AND MAINTENANCE	
3.1 Endorsement by experts:	For details of endorsement by local experts and relevant agencies see section on *'Reference in existing policies, strategies and action plans'* in Section 2.1. Adaptive management is recognized both in the country and globally, and favored for biodiversity conservation in general. Peer reviewed journals also recommend it as being important for climate change related impacts. A study, which did a comprehensive review of climate change adaptation strategies has ranked adaptive management as the 7th most cited strategy[6]. The Ad Hoc Technical Expert Group on Biodiversity and Climate Change under the CBD has also identified that adaptive management is important for reducing the impacts of climate change on biodiversity[7].

[6] Heller, N.E. & Zavaleta, E.S. (2009) Biodiversity management in the face of climate change: a review of 22 years of recommendations. *Biological Conservation*, 142, 14.

[7] Secretariat of the Convention on Biological Diversity. 2009. Connecting Biodiversity And Climate Change Mitigation and Adaptation: Key Messages from the Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change.

3.2 Adequacy for current climate: *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.*	There will be no negative consequences of this adaptation option as its basis is to respond to change – if and when it occurs so that biodiversity can be conserved accordingly. Adaptive management is also suitable to address other threats in the current climate, and considered to be an effective mechanism for biodiversity conservation.
3.3 Size of beneficiaries group: *Technology that provides small benefits to large number of people will be favored over those that provide larger benefits, but to fewer people.*	Adaptive management would minimize impacts of climate change and would increase resilience, which will be important for maintaining ecosystem services. This would benefit a large group of people. Additionally there will be increased job opportunities for conservation activities, while local communities could benefit from community conservation, payment for ecosystem services, ecotourism etc.
4. COSTS	
4.1 Cost to implement adaptation options: *Cost measures*	There will be some additional cost as it will require additional monitoring which will require both personnel and equipment, while there will be a cost for new conservation initiatives. It is estimated that this activity will cost Rs. 90 million annually. This is based on the assumption that a budget increase of 4.5% 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 continuously, and will have to be an annual budget. Cost will be for site selection (with use of models and available information), prioritization, identifying changes through research and observation, revising management activities, identifying appropriate conservation activities, implementation and monitoring.
4.2 Additional costs to implement adaptation option, compared to "business as usual"	There would be an increase in monitoring and conservation activities and these will require additional costs compared to business as usual.
5. DEVELOPMENT IMPACTS,	

INDIRECT BENEFITS	
5.1 Economic benefits: **Employment** - *Jobs* **Investment** - *Capital requirements*	**Employment:** • Job opportunities in conservation and ecotourism related activities. • Jobs relating to ecosystem services such as the sustainable collection of non-timer forest products. **Investment:** • Investment will be required for more frequent monitoring and field research. • Additional conservation activities may be necessary for management under a changing climate.
5.2 Social benefits: **Income** – *Income generation and distribution* **Education** – *Time available for education* **Health** – *Number of people with different diseases*	**Income:** • There will be additional job opportunities as there will need to be additional monitoring, field studies and conservation activities. • Possibility of community conservation, payments for ecosystem services, REDD, increased ecotourism opportunities etc. **Education:** • An opportunity for students to observe and learn about how to carry out conservation in a changing climate, and appreciate the importance of biodiversity and ecosystem services. **Health:** • Improved environmental quality will contribute to the well being of local communities through ecosystem services.
5.3 Environmental benefits: *Reductions in GHG emissions, local pollutants, ecosystem degradation etc.*	• Increase the resilience and viability of biodiversity as conservation target activities taking to account impacts of climatic changes. • Improvement of ecosystem services such as sequestration, watershed functions etc.
6. LOCAL CONTEXT	
6.1 Opportunities and barriers: *Barriers too implementation and issues such as the need to adjust other policies*	**Opportunities:** • Constant monitoring and adaptive management will ensure that impacts to climate change can be addressed quickly. • It would also minimize irreversible damage when possible as it will not wait till the impacts become severe. • Such preventative and early action will cost less than intervening

	when considerable impact has occurred. **Barriers:** • Constant monitoring and field studies will require additional staff, while conservation activities based on results will require additional investment. • Some changes to species and ecosystems will be very difficult to detect at early stages.
6.2 Status: *Status of technology in the country*	Adaptive management as a tool is recognized in the country but currently its implementation is limited. It requires frequent monitoring and research, which is not a new technology for the country. However certain climate change related indicators and field studies might be new.
6.3 Timeframe: *Specify timeframe for implementation*	Adaptive management needs to be done continuously, throughout the year.
6.4 Acceptability to local stakeholders: *Whether the technology will be attractive to stakeholders*	• It is likely that adaptive management will gain the support of local stakeholders as it will bring in job and income opportunities. • It will also be favored as an improved ecosystem and a more resilient one will ensure that communities will benefit from ecosystem services. • It may not be acceptable to some stakeholders if adaptive management and subsequent conservation activities prevent certain uses of the ecosystem (eg: no fishing zones, no extraction of forest products etc).

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