

5.7 Project Idea for Multiple Technologies.

Project Idea:

'Climate change adaptation for biodiversity: a ridge to reef approach in building climate resilience along the Mahaweli River'

5.7.1 Introduction/Background

General sector information:

Sri Lanka is one of the most biologically diverse countries in Asia, with its biodiversity considered to be the richest per unit area in the region with regard to mammals, reptiles, amphibians, fish and flowering plants. However, the country's biodiversity is facing many threats, with areas both inside and outside protected areas having many issues. These threats will be no doubt be compounded with the changing climate. Research around the world has shown that current observations provide a clear signal that change is already underway.

Biodiversity will be impacted by climate change as there will be shifts in species distributions, often along elevational gradients. The changing climate will impact the timing of life-history events or phenology, decoupling coevolved interactions. It can affect demographic rates (survival and fecundity) and reduce population size. Extinction of range-restricted or isolated species and direct loss of habitat due to sea-level rise, fire frequency, altered weather patterns and direct warming of habitats will occur; while there will also be increased spread of wildlife diseases, parasites and increased spread of invasive and non-native species. Thus, the ability for conserving biodiversity with changing climate will be increasingly tied to the ability to manage climate change, and to manage the biotic changes associated with it. Therefore it is vital that the government, conservation organizations and other agencies develop adaptation strategies and technologies to facilitate the adaptation of ecological systems to altered climate regimes. Models of future climate and biological systems provide additional insights, while research into the current changes also provides vital information.

Climate change will no doubt be a threat to Sri Lanka's biodiversity as well. Although it is unlikely that all impacts of climate change on biodiversity are preventable, it is recognized that genetically diverse populations of species, and species rich ecosystems, have much greater potential to adapt to climate change. Conservation of biodiversity and maintenance of ecosystem structure and function may, therefore, be one of the most practical climate change adaptation strategies that Sri Lanka can adopt to conserve the country's natural heritage.

The Sector Vulnerability Profile (SVP) for the biodiversity sector (which is a supplementary document to Sri Lanka's National Climate Change Adaptation Policy) has looked at the impact of climate change on this sector. It states that, as an island nation, Sri Lanka is vulnerable to the risk of sea level rise and increased

frequency of storms that can bring major impacts on coastal biodiversity. Additionally, analysis of climate data indicate a change in rainfall regimes, and a trend for increasing air temperature, which can also have impacts on the country's biodiversity.

According to the review, some of the impacts relating to possible impacts include salinization of low lying areas, loss of coastal land, increased coastal erosion and loss of ecosystems, and impacts to marine species due to warming and acidification. Rising temperature, elevated carbon dioxide concentrations and changes in rainfall regimes will also impact forests and terrestrial species. It is expected to cause changes in onset of flowering and fruiting, breeding and reproduction, with implications for species survival and ecosystems. Forest ecosystems and species in fringe areas between the major climatic zones are expected to be most vulnerable to impacts of climate change. Additionally elevated carbon dioxide levels can cause changes in forest structure, while species loss can occur due to structural and compositional changes in habitats, leading to the deterioration of ecosystem services. Variability of rainfall regimes that cause changes in hydrological cycles will affect wetlands and associated species, while degraded watersheds due to the degradation of Wet Zone forests in the past, will be more vulnerable to climate change.

Specific problem to be overcome:

Climate change will no doubt affect Sri Lanka's biodiversity. Around the globe scientists accept that climate change is already having an impact on biodiversity. In Sri Lanka too this is likely to be the case. However, research, studies and projects have been limited on the subject. The Technology Needs Assessment Project in Sri Lanka has identified biodiversity as one of the priority sectors for adaptation. Under this several consultation workshops were held with stakeholders engaged in the biodiversity conservation sector. Stakeholders participated in identifying and eleven (11) technologies to conserve biodiversity with changing climate. The methodology used to prioritize the technologies was the Multi Criteria Decision Analysis (MCDA) Approach.

The prioritized technologies in order are: (1) restoration of degraded areas inside and outside the protected area network to enhance resilience; (2) increasing connectivity through corridors, landscape/matrix improvement and management; (3) improve management, and possibly increase extent of protected areas, buffer zones and create new areas in vulnerable zones; (4) focus conservation resources and carryout special management for restricted range, highly threatened species and ecosystems and (5) ex-situ conservation for highly threatened species and possible reintroduction.

Thus there is an urgent need to carry out the above interventions if climate change impacts on biodiversity are to be minimized, and for biodiversity to adapt accordingly.

Project location:

The project will be implemented at a number of sites - Knuckles Conservation Forest, Wasgamuwa National Park, Somawathiya Sanctuary, Flood Plains National Park and Pigeon Islands National Park – spanning four districts in three provinces.

5.7.2 Objectives

To increase the resilience of biodiversity for climate change adaptation, by taking a ridge to reef approach in building resilience. This will be done through localised climate change modeling, biodiversity surveys, restoration, improving connectivity and by conserving highly threatened restricted range species.

5.7.3 Outputs of the Proposed Project

Phase 1

- i. Results of the climate change modeling for a pilot area in the Knuckles Conservation Forest – including the identification of the most vulnerable ecosystems and species.
- ii. Preliminary activities necessary for restoration and conservation of the most vital ecosystems and species carried out.

Phase 2

- iii. Detailed climate change modeling along the ecosystems adjacent to the Mahaweli River – which will include various forest types, wetlands, coastal and marine ecosystems.
- iv. Selected vital ecosystems restored.
- v. Selected highly vulnerable species are conserved.
- vi. Connectivity improved by working with local communities, landowners and plantations.
- vii. Training and capacity building carried out on climate change adaptation strategies for those working in the biodiversity sector.
- viii. Results shared and publicized to enable replication.

5.7.4 Relationship to the country's sustainable development priorities

This project is directly in line with the Climate Change Policy of 2012. Additionally, the Sri Lanka country project of the above-mentioned Technology Need Assessment of UNEP/UNFCCC has also identified biodiversity adaptation as a prioritised sector. The ADP funded Sector Vulnerability Profile (SVP) for the biodiversity sector (which is a supplementary document to Sri Lanka's National Climate Change Adaptation Strategy) has also identified biodiversity adaptation as a national priority.

The Action Plan for Haritha Lanka Programme has identified its Mission 2 to be 'Saving the Fauna, Flora

and Ecosystems' and Mission 3 to be 'Meeting the Challenges of Climate Change'. The Mahinda Chintana: Vision for the Future, which is the Development Policy Framework of the Government of Sri Lanka has identified that the conservation of fauna and flora is important in Chapter 7. The environmental priorities and targets mentioned in this chapter include:

- Forest Targets
 - Forest coverage is at least 30 percent
 - 1.9 million ha planned by 2016
- Reforestation and rehabilitation Targets
 - 50 percent reduction in barren and degraded land
 - 90-100 percent regeneration of depleted upland forest
- Protected Areas and Wildlife Conservation Targets
 - 25 percent of total land area protected
- Coastal and Marine Protection Targets
 - National system of marine protected areas to be established
 - Wetland areas to be protected
 - Rate of mangrove and wetland loss to be reduced by 10 percent and 90 percent, respectively

5.7.5 Project Deliverables

- A detailed report encompassing the research, modeling and restoration work carried out, as well as the outputs of the study.
- Training for local scientists and key stakeholders.

5.7.6 Project Scope and Possible Implementation

The project and its findings, once publicized, can aid the implementation of similar projects in the future, as well as inform policy makers and key stakeholders involved in the management of these areas.

5.7.7 Project activities

The project will use the 'ridge to reef' approach to conservation by selecting the Mahaweli River. It will select the section of the main river spanning from the highlands of Knuckles to the sea in Trincomalee. This area spans several districts, ecosystems and will include protected and other areas as well.

The project will be carried out in two Phases. Phase 1 will include a pilot detailed study on climate change impact modeling to identify impacts on biodiversity conservation in the Knuckles region. This modeling exercise will require specialist technical input for which external support will be sought for training of local

scientists. Highland areas are especially sensitive to climate change, and are also important to facilitate elevational migration of biodiversity which is vital for adaptation. This phase will also include preliminary activities relating to restoration of vital ecosystems and highly threatened species, as identified by the modeling exercise.

Phase 2 will feature expanding the exercise from the 'ridge' of Knuckles to the 'reef' of Pigeon Islands, which will include several ecosystem types. Interventions will include restoration, facilitating connectivity, conservation of highly threatened species, all based on the results of climate change modeling. It would also include training and capacity building on climate change adaptation strategies for those working in the biodiversity sector, and sharing and publicizing results to enable replication.

This would probably be the first comprehensive intervention to conserve biodiversity from the intended impacts of climate change, which will be done based on appropriate scientific studies and model.

List of project activities

1. Detailed pilot climate change modeling in the Knuckles area (external technical input will be necessary)
2. Preliminary activities for pilot restoration of selected ecosystems
3. Preliminary activities for pilot conservation of highly threatened/vulnerable species
4. Expanding climate change modeling using the ridge to reef approach
5. Restoration of vital ecosystems
6. Conservation of highly threatened species
7. Facilitating connectivity between different types of land use
8. Training and capacity building
9. Sharing and publicizing results

5.7.8 Timelines for the Proposed Activities – See table 5.12

Table 5.12: Timelines for the Proposed Activities of the Project 6

Activity	Year 1				Year 2				Year 3			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Phase I												
1. Detailed pilot climate change modeling in the Knuckles area (external technical input will be necessary)												
2. Preliminary activities for pilot restoration of selected ecosystems												
3. Preliminary activities for pilot conservation of highly threatened/vulnerable species												
Phase 2												
1. Expanding climate change modeling using the ridge to reef approach												
2. Restoration of vital ecosystems												
3. Conservation of highly threatened species												
4. Facilitating connectivity between different types of land use												
5. Training and capacity building												
6. Sharing and publicizing results												

5.7.9 Budget/Resource requirements

Table 5.13: Approximate Cost for Implementation of the Proposed Activities of Project 6

Activity	Cost (US\$)
Phase 1	
i. Detailed pilot climate change modeling in the Knuckles area (external technical input will be necessary)	46,000
ii. Preliminary activities for pilot restoration of selected ecosystems	23,000
iii. Preliminary activities for pilot conservation of highly threatened/vulnerable species	23,000
Phase 2	
iv. Expanding climate change modeling using the ridge to reef approach	115,000
v. Restoration of vital ecosystems	77,000
vi. Conservation of highly threatened species	77,000
vii. Facilitating connectivity between different types of landuse	77,000
viii. Training and capacity building	19,000
ix. Sharing and publicizing results	18,000
Total	US\$ 475, 000

Total activity cost 403,750

Project Management Cost (15%) 71,250

Total cost of the project would be USD 475,000

Source of funding: 80% Donor and 10% Local

Co-financing: 10% to be explored

All staff and administration costs have been incorporated into the activities.

The government sector institutions will utilize most of its current staff for the implementation of this project. It will assign a few staff on a full or part time basis depending on the requirement of the project. If necessary, technical specialists will be recruited, although it is expected that IUCN and universities will provide this specialist input.

5.7.10 Measurement/Evaluation

Climate Change Secretariat in partnership with Biodiversity Secretariat of the Ministry of Environment will develop a monitoring and evaluation framework and appoint a suitable entity to do the periodic monitoring and evaluation to be used in learning and sharing.

5.7.11 Possible Complications/Challenges

- In accuracies in climate change modeling.
- Barriers to the implementation of conservations activities.

5.7.12 Responsibilities and Coordination

The project will primarily be a conservation intervention, which will include components where the project will work closely with local communities and landowners. The main stakeholders will include the implementing partners such as the Climate Change Secretariat, Ministry of Environment, Forest Department, Department of Wildlife Conservation, Coast Conservation and Coastal Resource Management Department, National Aquatic Resources Research and Development Agency, Ministry of Fisheries and Aquatic Resources Development and Central Environmental Authority; while technical input will be given by environmental organizations and universities. It will work with local communities and landowners in the area, who along with the general public will be beneficiaries, as they will all benefit from conserved biodiversity and its ecosystem services.

Forest Department, Mahaweli Authority of Sri Lanka, Department of Wildlife Conservation and NARA will be the key implementing agencies with technical support from universities and conservation agencies. Biodiversity Secretariat of the Ministry of Environment will be the Project Execution Agency.

5.7.13 List of References

1. Biodiversity Conservation in Sri Lanka: A Framework for Action (1999)
<http://www.cbd.int/doc/world/lk/lk-nbsap-01-en.pdf> (Last accessed: 16/10/2012)
2. Biodiversity Conservation in Sri Lanka: A Framework for Action: Addendum (2007)
<http://www.cbd.int/doc/world/lk/lk-nbsap-oth-en.pdf> (Last accessed: 16/10/2012)
3. Frankham, R., Ballou, J. and Briscoe, D (2010) Introduction to Conservation Genetics: Second Edition. Cambridge University Press, New York.