Technology Fact Sheet for Adaptation

Culture-based fisheries[i]

1. ***Sector:*** *To be written by sector expert.*	Food
2. ***Technology Characteristics:***	Adaptation
2.1Technology Name:	9. Culture-based fisheries
2.2 Introduction: *low/high Brief introduction to the technology*	Reservoir fisheries provide significant contribution to food and nutritional security of the rural areas in the interior regions of the country. Government statistics indicated that per-capita fish consumption in Anuradhapura and Polonnaruwa districts, where reservoir fisheries activities are successfully established are above the national per-capita fish consumption. Reservoir fisheries, especially culture-based fisheries (CBF) in medium size perennial reservoirs and small village reservoirs are highly vulnerable to the climate change impacts. Unexpected rainfall changes and changes in annual rainfall pattern in recent past have significant impacts on the water retention of the reservoirs. As CBF activities are depend on the two monsoons, changes in rainfall pattern creates uncertainty of maintaining required amount of water for the aquaculture. Hence, an effective methodology is needed to predict water availability in seasonal reservoirs enabling CBF farmers to adapt to changes in monsoonal rainfall pattern. Fish species that are used for the CBF is exotic and fish seed have to produce in hatcheries through artificial breeding. Fingerling availability for stocking at correct time of reservoir filling cannot be assured as induced breeding of major carps community-based fingerling rearing procedure are dependent on gonadal maturity cycles of fish, which are usually related to monsoonal rainfall. This will create fingerling scarcity in the correct time of stocking. Also it caused difficulties in stocking required combination of fish species at correct time period. The rural farmers should therefore develop a resilience capacity to climate change. As such, alternative means of stocking of fish

	fingerlings reared by rural communities should be sought. As climate changes has direct influences on artificial breeding of fish, alternative techniques and/or improvement of existing technologies is needed. Study of different techniques for successful breeding of introduced and local fish species suitable for aquaculture is a major requirement in the finfish aquaculture in the country under the scenario of climate change.
2.3 Technology Characteristics/Highlights: *Few bullet points, ie. low/high cost; advance technology; low technology.*	A combination of hard and soft technologies would be appropriate depending on location features. • Prediction of water availability in reservoirs with climate change impacts. • Identify alternative means of fingerling stocking. • Develop techniques to identify climate change impacts on fish breeding. • Improve breeding techniques to overcome climate change influences. • Effective knowledge dissemination and capacity building
2.4 Institutional and Organizational Requirements: *How much additional capacity building and knowledge transfer is required for the adaptation option to be implemented.*	Two-way communication between farmers and other stakeholders should be improved. Good management practices on irrigation and other water uses in reservoirs should be adapted. Capacity building on relevant institutions to forecast future climate change incidences and identify strategies and improve resilience capacities in vulnerable communities is needed. Identify new techniques to overcome fingerling scarcity due to climate change and disseminate knowledge through effective knowledge transfer strategy.
3. Operations and maintenance	
3.1 Endorsement by Experts:	The approach suggested to implement adaptation to threats to coastal fishery resources relies on protecting and nurturing the resilience of the natural ecosystem and lessening the pressure on the natural system by adopting commercial aquaculture operations. The coastal ecosystem, being a biological system, will invent its own adaptation mechanisms and creating a foundation for long-term resilience and continuity of ecosystem services. Measures aimed at protecting or minimizing external climate change impacts on the coastal ecosystem thus assure some services in the short term, but more importantly a basis

	for continuation of them to the future as well. Aquaculture on the other hand by lowering the pressure on the coastal habitats to respond to market demands for valuable fishery products leaves more breathing space for the system to recover by allowing the harvesting effort to be kept under natural limits for renewal.
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 are no significant negative impacts associated with the technology if the best management practices are adopted. Serious environmental issues have been reported with aquaculture under poor management including severe economic damage from failure to adopt good hygiene, for example. An effective system of monitoring and regulation can overcome such situations.
3.3 Size of beneficiaries group: *Technology that provides small benefits to larger number of people will often be favored over those that provide larger benefits, but to fewer people.*	• Majority of rural people will benefit trough sustainable CBF, and it ensure the nutritional security as well as food security. • Aquaculture farming communities in rural communities and paddy farming communities • People involving in community based fry to fingerling rearing activities. • Government fish hatcheries and extension arm of the Ministry of Fisheries (i.e. National Aquaculture Development Authority)
4. *Costs*	Prediction of water availability and developing a model • Data collection (available climate data, fish production in reservoirs, satellite images, and other related information from farmer communities) **3 million SL rupees** • Developing a model **2 million SL rupees** • Develop breeding techniques for Climate change influences **5 million SL rupees** • Knowledge dissemination and capacity building **2.5 million SL rupees** • Miscellaneous **1 million SL rupees**
4.1 Cost to implement adaptation options: *Cost measures*	Costs will be estimated for different individual or packages of technological interventions. Measures adopted will vary by location and the economic value of resource to be protected at each location.
4.2 Additional costs to implement	As the CBF is to be developed as a new initiative the full cost

adaptation option, compared to "business as usual":	of implementation would be required.
5. ***Development Impacts, indirect benefits***	
5.1 Economic benefits: **Employment -** *Jobs* **Investment -** *Capital requirements*	Create new job opportunities: identification of suitable technologies to overcome climate change induced impacts will ensure the sustainability of CBF in reservoirs. It will create new job opportunities for rural communities. (i.e. Doing CBF, Fingerling production, product development, marketing etc.)
5.2 Social benefits: **Income -** *Income generation and distribution* **Education -** *Time available for education* **Health -** *Number of people with different diseases.*	• Additional income for paddy farming communities in rural areas. • Make available low cost protein source for rural communities in affordable price. • Secure the food security and nutritional security of rural communities • Use of available resource for additional income generation. • Effective use of new technologies developed for sustainable CBF. • Capacity building in government and community level. • Reduce the uncertainty of CBF due to climate change impacts.
5.3 Environmental benefits: *Reductions in GHG emissions,* *Local pollutants,* *Ecosystem degradation etc*	• No formulated food or other inputs are used in CBF therefore available natural food items are used by the stocked fish species. • No GHG emission in CBF. • No local pollutants and ecosystem degradation. • Minimum use of power. • Zero impacts on indigenous/endemic aquatic fauna
6. ***Local context***	
6.1 Opportunities and Barriers: *Barriers to implementation and issues such as the need to adjust other policies.*	There are no serious policy barriers to the introduction of the technology in the country. The technology has acceptance as a means to increase production from reservoirs. However, given the multi-functional nature of irrigation reservoirs, some protocols will have to be developed on adjudicate water allocation priorities.
6.2 Status: *Status of technology in the country*	Basic knowhow about the technology is available in the country. However, the challenge to develop systems that can

	meet the evolving nature of CC adaptation would require continuous research and development.
6.3 Timeframe: *Specify timeframe for implementation.*	The project will require 5 year implementation period for completion.
6.4 Acceptability to local stakeholders: *Whether the technology will be attractive to stakeholders*	The technology will be attractive to all categories of stakeholders as it creates new opportunities for income generation, reduces stress on the natural resources that are heavily exploited and allow greater integration of resource use at the production level.

[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/**