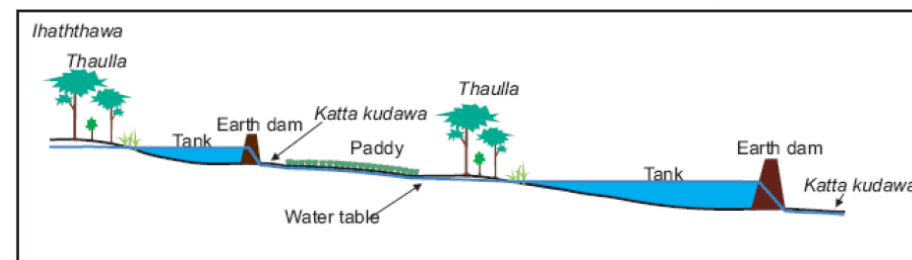
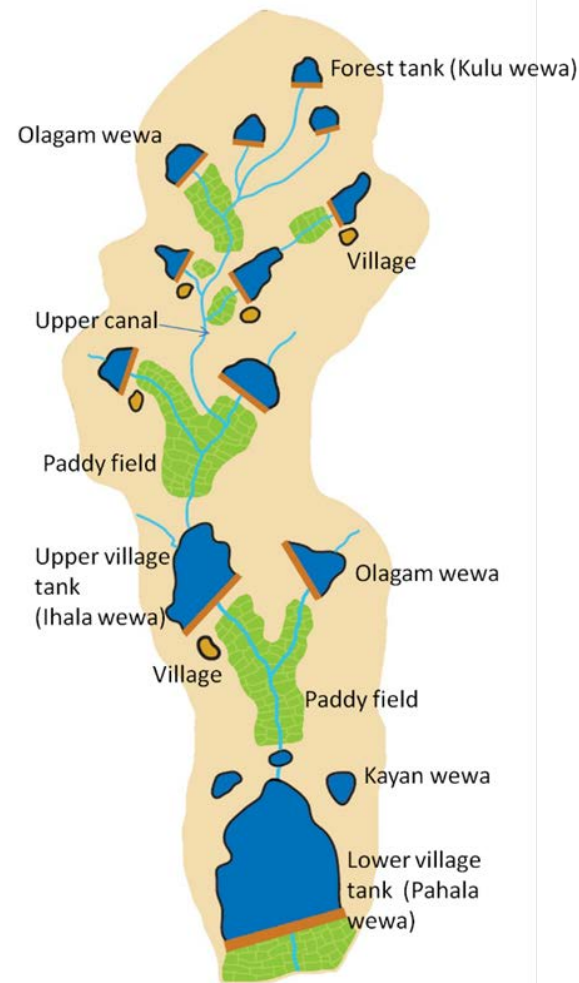


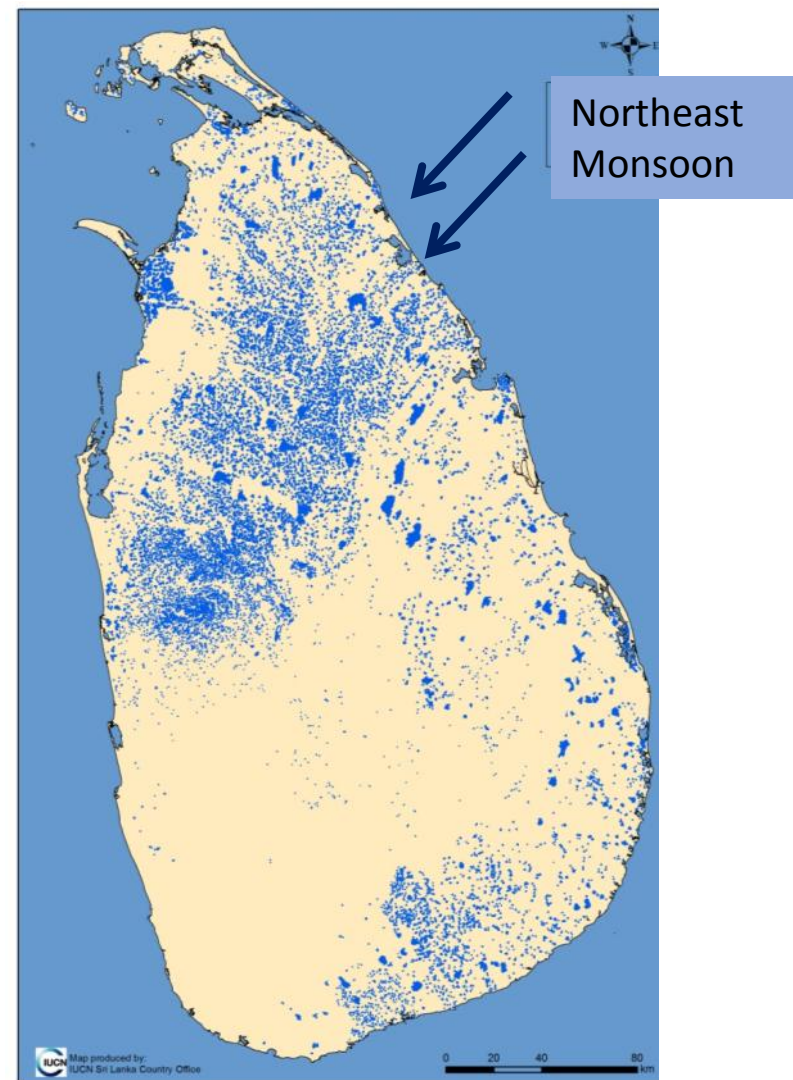
Ecological Restoration of Small Tank Cascade Systems: approach for meeting Bonn Challenge Targets for Sri Lanka using FLR principles

Recent experiences from Kapiriggama and Pihimbiyagollewa cascades



Ancient technology of cascade tank systems

- Ancient irrigation systems in Sri Lanka believed to have started over 2,500 years ago
- Most tanks are located in the North Central and Northwestern parts of the country
- Tank (small reservoirs - ටැංඳි) cascade systems are 'human adaptation to rainfall patterns'
- These are also remarkable ancient adaptation and mitigation strategy to extreme climatic conditions
- Approximately 1,160 small tank cascade systems in Sri Lanka
- 457 cascades in NCP

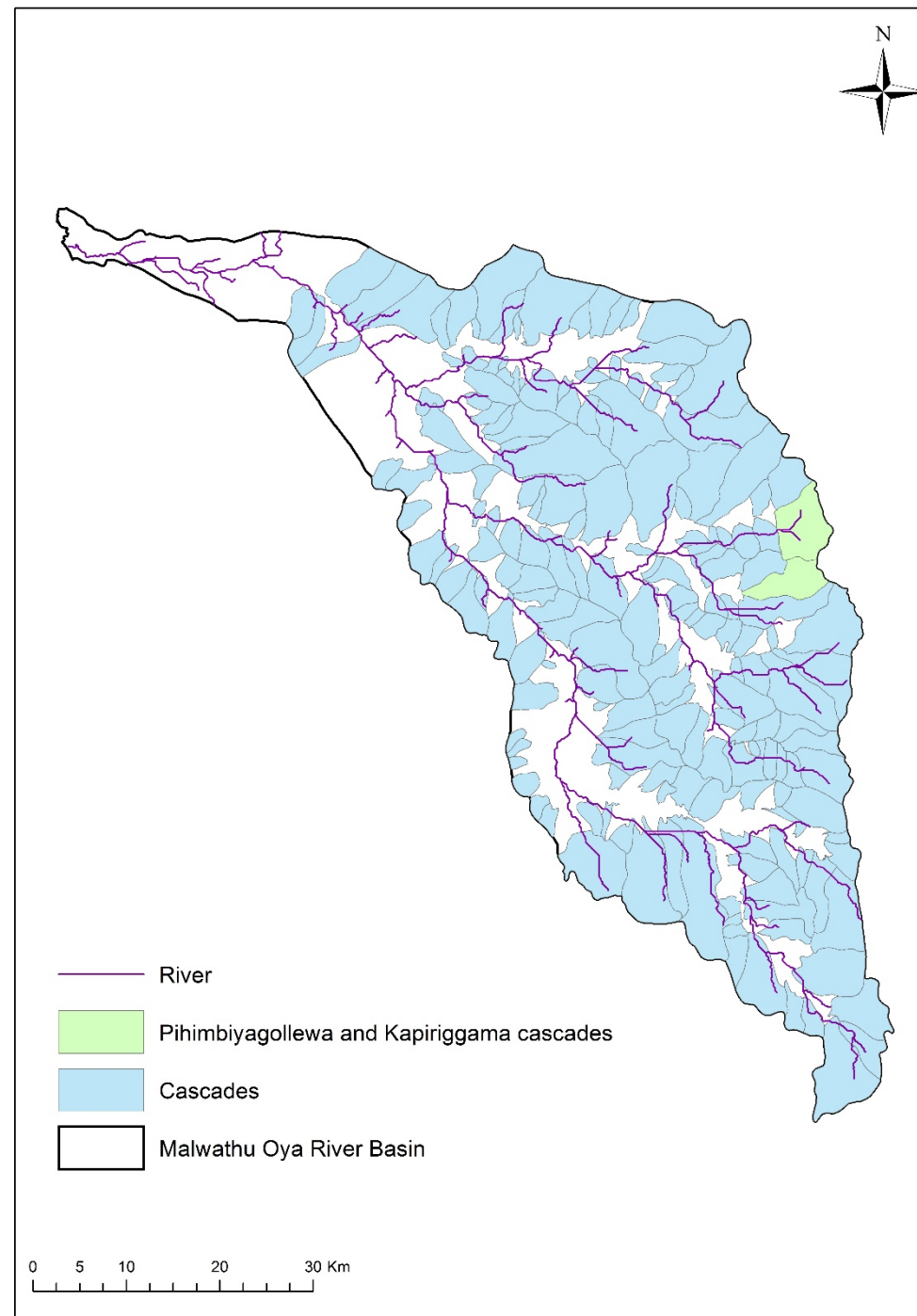
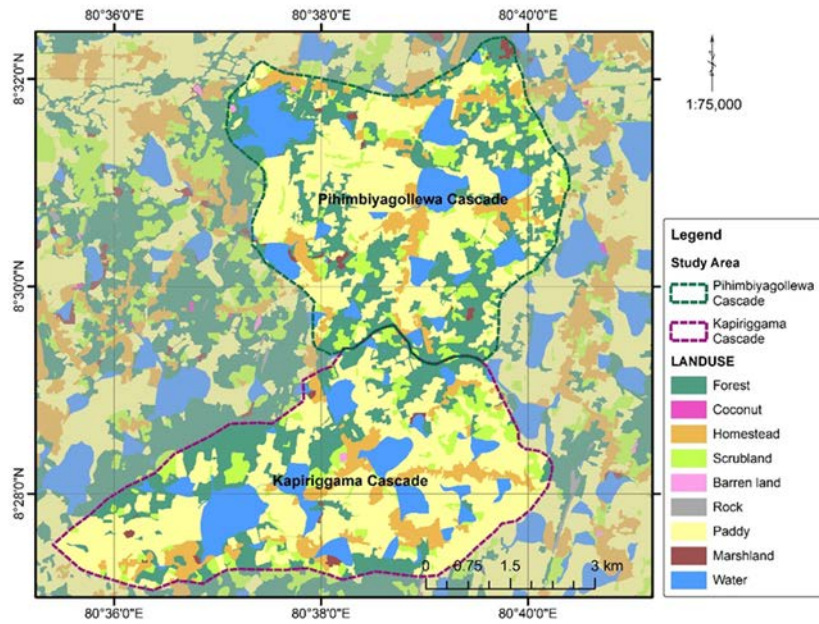


STCS is an 'ancient' socio-ecological system

- Cascade systems are hydrologically interconnected series of tanks organized within the micro (or meso) catchments in the dry zone landscape
- Usually associated with non-perennial streams
- Store, convey, use and reuse rainwater
- Consist of physical, ecological, and social features - each feature has specific function in the cascade
- Today most of these systems are not functional to their potential due to poor maintenance



Cascades in Malwathu Oya



Kapiriggama and Pihimbiyagollewa cascades



The floral diversity in the Kapiriggama Cascade tank associated habitats

	Immediate tank associated habitats					Cultivation lands			Natural	
Different Habitat types	Gasgommana	Kattakaduwa	Littoral zone vegetation	Open water zone	Tank bund vegetation	Chena	Home gardens	Paddy fields	Forests	Scrublands
Number of Flora species recorded	201	153	68	40	153	55	42	17	123	32

The faunal diversity in the Kapiriggama Cascade tank associated habitats

Animal Group	Gasgommana	Tank	Kattakaduava	Paddy	Home garden
Land snails	7	0	3	1	4
Dragonflies	9	16	6	7	8
Butterflies	40	8	41	41	38
Crabs	0	1	1	1	0
Fishes	0	25	4	0	0
Amphibians	10	6	8	17	5
Reptiles	20	7	24	21	31
Birds	73	65	79	70	50
Mammals	28	13	27	23	18
Total	187	141	193	181	154

Approach followed in Kapiriggama

- Landscape scale planning taking the cascade as the unit
 - 2,366 ha with 27% forest, home stead 10%, paddy 40%, scrub 10% and water surface 13%
- Multi-stakeholder approach – production, conservation, cultural
 - TAC, LCCs, village level committees
 - Government agencies, Private sector, community and International Organisations



Project activities completed in Kapiriggama

- Rehabilitation of tanks and related infrastructure, partial desiltation of tanks and thereby
 - increase efficiency of storage and conveyance of water
 - increase water holding capacity
 - increase the resilience of the system for prolonged droughts and flash floods
 - improve ecosystem services of traditional tank system



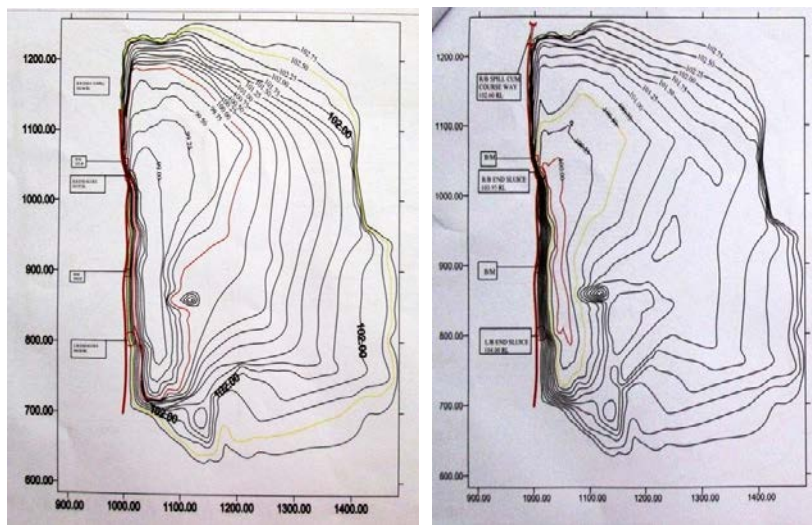
Project activities completed in Kapiriggama

- Homegarden development
 - control upland erosion and tank siltation
 - soil and water conservation in agricultural lands
 - promote chemical free farming
 - increase the land productivity



Project activities completed in Kapiriggama

- Capacity development and awareness raising
 - gathering information and using it for water management decision making
 - conducting technical assessments and providing necessary infrastructure
 - capacity development of farmers and officers



Project activities completed in Kapiriggama

- Harnessing traditional knowledge
 - gathering and systematically documenting traditional/ethnobiological knowledge
 - promote low input traditional varieties of rice which are nutritionally rich and resistant to climate anomalies



Biodiversity and Ethnobiology

of the Kapiriggama Small Tank Cascade System



Background

The cascade landscape consists of a mosaic of agro-ecosystems and natural systems. It is rich in natural resources, harbouring many economically and ecologically high-value species and habitats. The local community depends on these resources for the tangible and intangible needs of their daily lives. Continual overexploitation of cascade ecosystem components has resulted in the accelerated decline in the abundance of a wide range of species and habitats. Better understanding of human interactions with biodiversity is fundamental to the management and decision-making process in the rehabilitation of cascade landscapes.

A study was carried out to assess species diversity and ethno-biology (the interdisciplinary study of how human cultures interact with and use their native plants and animals), with the following objectives:

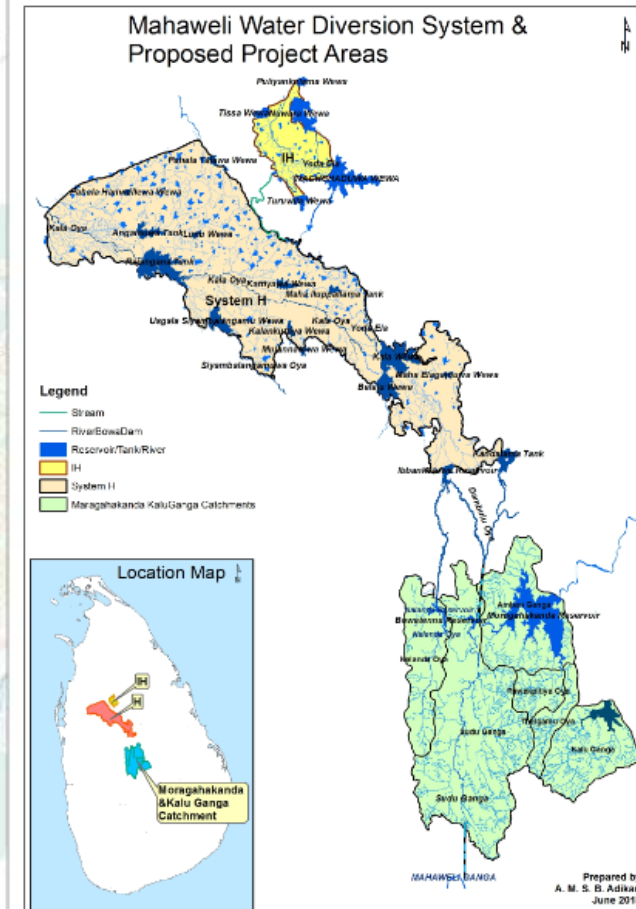
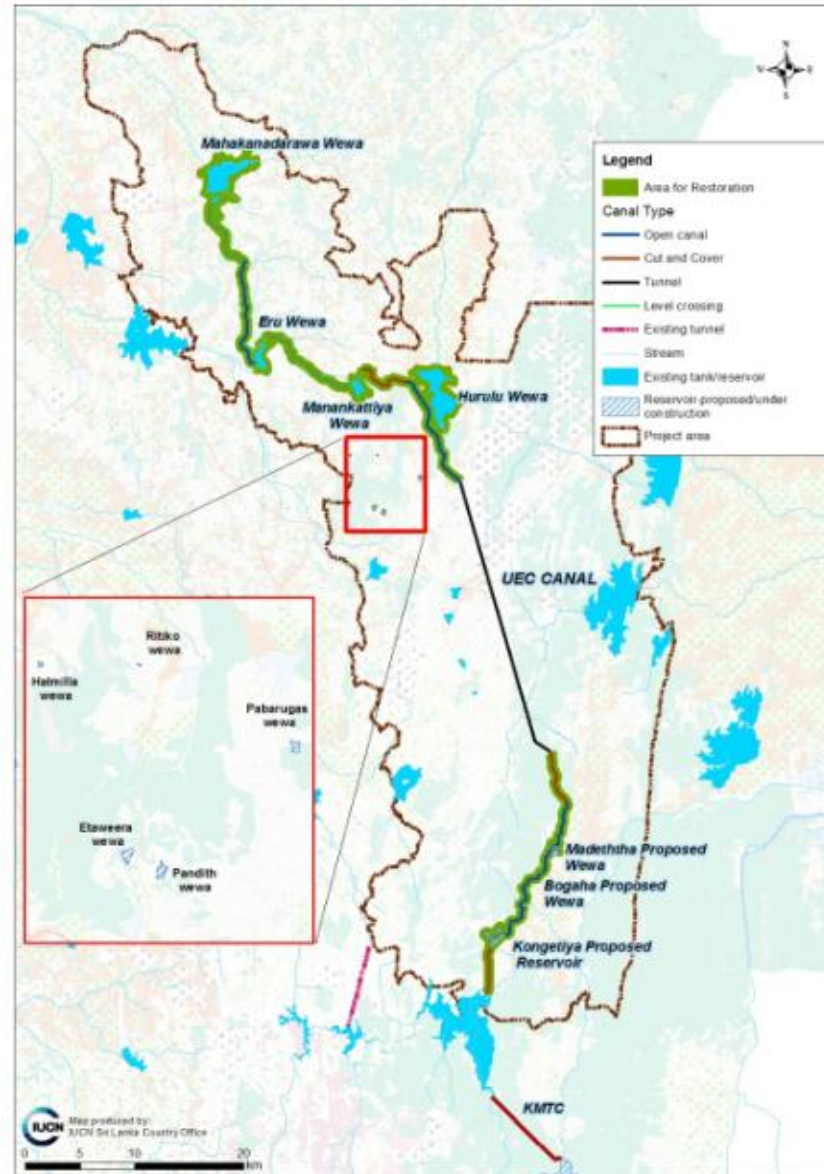
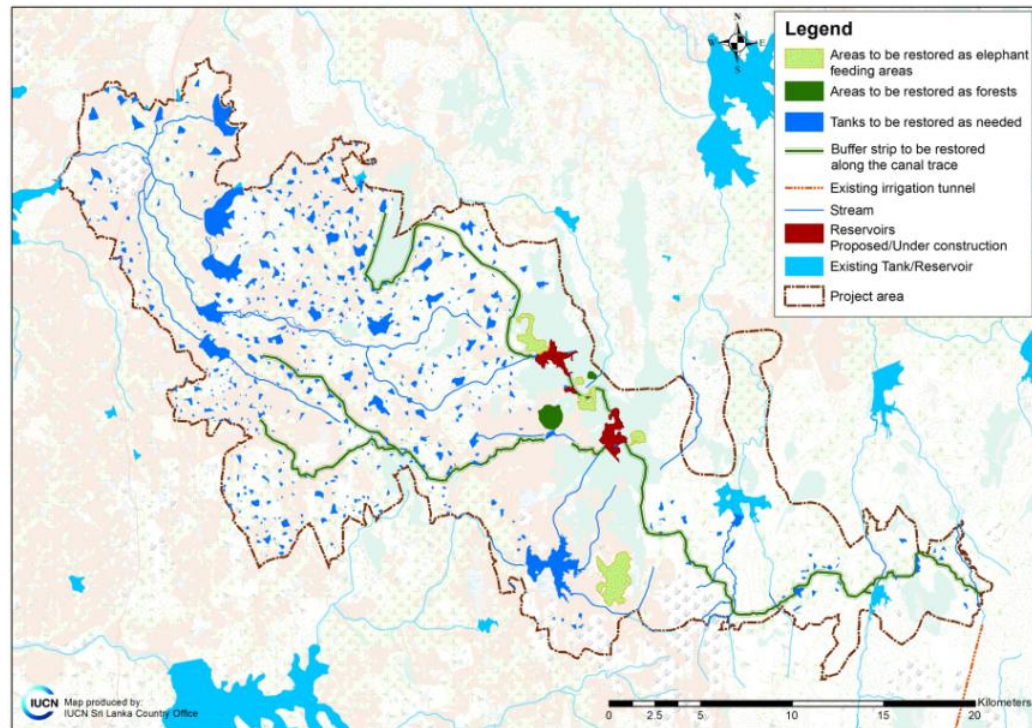
- To document ecological features of the cascade ecosystem and the species therein, as a part of understanding species requirements and ecological services provided; also to evaluate habitat degradation and recommend remedial actions.
- To document species of ethno-biological value that improves the understanding of the interaction between humans and biodiversity in a cascade ecosystem. This will open avenues for more socially relevant on-site and off-site ecosystem restoration actions.
- To make recommendations to enhance ecological sustainability of the cascade, while developing the well-being of local communities.

IUCN Cascade Development Project Information Brief No. 2

Extended BCA for Pihimbiyagollewa STCS

Sensitivity Analysis for the Pihimbiyagollewa cascade EBCA (values in LKR millions)												
	Base Case			Costs Increased by 40%			Benefits Decreased by 40%			Costs increased by 40% & Benefits Decrease 40%		
	BC Ratio	IRR	NPV	BC Ratio	IRR	NPV	BC Ratio	IRR	NPV	BC Ratio	IRR	NPV
Paddy Benefits	2.24	24%	204	1.60	15%	139	1.35	11%	57	0.96	3%	(8)
Non-irrigation Benefits of water	1.44	13%	72	1.03	5%	6	0.86	1%	(22)	0.62	-10%	(88)
Total Restoration Benefits	3.43	41%	400	2.45	30%	334	2.06	25%	174	1.47	17%	108

Restoration of Small tanks as a viable option for meeting Bonn Challenge targets for SL using FLR principles



Key Messages

- Cascades are a good base for modern day Forest Landscape Restoration (FLR and Bonn Challenge), Ecosystem Based Climate Adaptation (EBA) and Ecosystem Based Disaster Risk Reduction (Eco-DRR) and REDD+
- Pihimbiyagollewa EBCA shows that investments on restoration and sustainable utilization of STCS could be justified economically when considering cascades associated other values, which are usually ignored in restoration decision making as they are non-market in nature
- Long-term sustainability of Tank Cascades depends on the holistic understanding socio-ecological aspects and requires a multidisciplinary and multi-stakeholder approaches in management, based on traditional and modern knowledge
- Possibility exist to combine tank cascades development to innovative local and global efforts - Making tank cascades as part of nature, culture, heritage and socio-economically sustainable system.



Thank you ...