Funding Proposal

FP124: Strengthening Climate Resilience of Subsistence Farmers and Agricultural Plantation Communities residing in the vulnerable river basins, watershed areas and downstream of the Knuckles Mountain Range Catchment of Sri Lanka

Sri Lanka | International Union for Conservation of Nature (IUCN) | Decision B.25/04

15 April 2020

GREEN CLIMATE FUND

Funding Proposal

Version 1.1

The Green Climate Fund (GCF) is seeking high-quality funding proposals.

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF's Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

Project/Programme Title:	**Strengthening Climate Resilience of Subsistence Farmers and Agricultural Plantation Communities residing in the vulnerable river basins, watershed areas and downstream of the Knuckles Mountain Range Catchment of Sri Lanka**
Country/Region:	Sri Lanka
Accredited Entity:	IUCN
Date of Submission:	Initial submission on 25th June 2018; updated 25th February, 23rd May, 13th September, 15th November 2019, 14th January 2020, 22 January 2020, 03rd February 2020 and 11th February 2020.

Contents

Note to accredited entities on the use of the funding proposal template

- Sections **A, B, D, E** and **H** of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document.
- The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

Please submit the completed form to:

fundingproposal@gcfund.org

Please use the following name convention for the file name:
"[FP]-[Agency Short Name]-[Date]-[Serial Number]"

A.1. Brief Project / Programme Information		
A.1.1. Project / programme title		**Strengthening Climate Resilience of Subsistence Farmers and Agricultural Plantation Communities residing in the vulnerable river basins, watershed areas and downstream of the Knuckles Mountain Range Catchment of Sri Lanka**
A.1.2. Project or programme		**Project**
A.1.3. Country (ies) / region		**Sri Lanka**
A.1.4. National designated authority (ies)		Mr. Anura Dissanayake Secretary Ministry of Mahaweli Development and Environment (MMDE)
A.1.5. Accredited entity		IUCN – International Union for Conservation of Nature and Natural Resources
A.1.5.a. Access modality		☐ Direct ☒ International
A.1.6. Executing entity / beneficiary		**Executing Entities**: 1. Ministry of Mahaweli Development and Environment, Sri Lanka (MMD&E) 2. International Centre for Research in Agroforestry (ICRAF), Nairobi, Kenya 3. International Union for Conservation of Nature Sri Lanka Country Office Approximately 1.34 million people (690,015 Female, 653,201 Male) - Direct beneficiaries: 268,643 - Indirect beneficiaries: 1,074,573
A.1.7. Project size category (Total investment, million USD)		☐ Micro (≤10) ☒ Small (10<x≤50) ☐ Medium (50<x≤250) ☐ Large (>250)
A.1.8. Mitigation / adaptation focus		☐ Mitigation ☒ Adaptation ☐ Cross-cutting
A.1.9. Date of submission		24 June 2018
A.1.10. Project contact details	Contact person, position	Ms. Sheila Aggarwal-Khan Director, GEF & GCF Coordination Unit Tel.; Fax +41 22 999 0002
	Organization	IUCN
	Email address	Sheila.Aggarwal-khan@iucn.org
	Telephone number	+41 22 999 0292
	Mailing address	IUCN (International Union for Conservation of Nature) 28 rue Mauverney, CH-1196 Gland, Switzerland

A.1.11. Results areas *(mark all that apply)*

Reduced emissions from:

- ☐ Energy access and power generation
  (E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
- ☐ Low emission transport
  (E.g. high-speed rail, rapid bus system, etc.)
- ☐ Buildings, cities and industries and appliances
  (E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)
- ☐ Forestry and land use
  (E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)

Increased resilience of:

- ☒ Most vulnerable people and communities
  (E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)
- ☒ Health and well-being, and food and water security
  (E.g. climate-resilient crops, efficient irrigation systems, etc.)
- ☐ Infrastructure and built environment
  (E.g. sea walls, resilient road networks, etc.)
- ☒ Ecosystem and ecosystem services
  (E.g. ecosystem conservation and management, ecotourism, etc.)

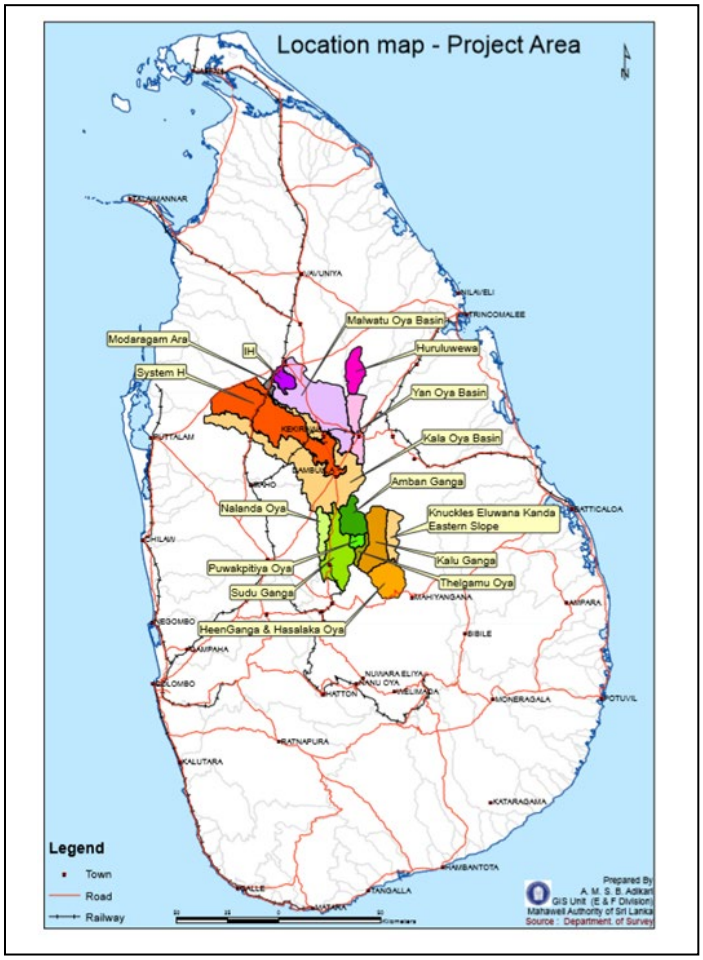
A.2. Project / Programme Executive Summary (max 300 words)

Please provide a brief description of the proposed project/programme, including the objectives and primary measurable benefits (see investment criteria in section E). The detailed description can be elaborated in section C.

1. The proposed project will enhance the ability of populations, especially that of the smallholder subsistence farmers to address climate induced shortages of irrigation and drinking water by improving the resilience of farm and land management practices and climate proofing the underlying ecosystems in the Knuckles / Amban Ganga highlands and lowlands. Climate smart project investments in agriculture and water sectors will ensure the resilience of agriculture and value-added livelihoods in the area while protecting and complementing the public investments of Moragahakanda multipurpose irrigation scheme and other development programmes. In achieving its objectives, the risks related to increased temperatures, changes to rainfall frequency and intensity, and the impacts of extreme events that cause extended droughts, frequent floods, severe landslides, and silting of reservoirs and tanks, contributing to different aspects of water supply and demand in the project area which increase the vulnerabilities of small-scale farmers, plantation operations and the natural ecosystems on which they depend are mitigated.

2. Key project activities will comprise: participatory governance and adaptive planning, establishment of climate adaptation information portals and advisory services, improved access to agricultural water supply and affordable renewable energy, participatory selection and implementation of best-fit climate-adaptive land management options to suit ecosystems, and value chain upgrading—to include product development, value-adding processes, farm business enterprises and standards and market access. The six-year project aims to induce transformative change and develop replicable financial models, electronic transaction systems and incorporate ecosystem payments into planning as a resilience model. The project will also facilitate the development of a participatory exit strategy to build the local capacity to sustain project achievements and subsequent progress in the post-project period. Primary measurable benefits will include: i) 1.3 million people (51.4 % women) who will benefit from the adoption of diversified, climate-resilient livelihood options; ii) 346,000 hectares of upland and lowland agro-ecosystems and natural ecosystems protected and strengthened in response to climate variability and change.

A.3. Project/Programme Milestone	
Expected approval from accredited entity's Board (if applicable)	
Expected financial close (if applicable)	TBD (date of agreement between IUCN and GCF)
Estimated implementation start and end date	Start: 01/1/2020 End: 31/12/2026
Project/programme lifespan	6 years



B.1. Description of Financial Elements of the Project / Programme

Please provide: an integrated financial model in Section I (Annexes) that includes a projection covering the period from financial closing through final maturity of the proposed GCF financing with detailed assumptions and rationale; and a sensitivity analysis of critical elements of the project/programme a description of how the choice of financial instrument(s) will overcome barriers and achieve project objectives, and leverage public and/or private finance a breakdown of cost estimates for total project costs and GCF financing by sub-component in local and foreign currency and a currency hedging mechanism:

3. The Government of Sri Lanka requests a GCF contribution of $ 39.78 m and will leverage (co-finance) a further $ 9.2m to develop systems in three key areas: natural resources management, introduction and adoption of sustainable financing for resilient livelihoods, and strengthening of institutions to meet the challenges of climate change.

4. Limited financial capacities in communities and the Government hinders the investments in adaptation to climate change. Without this incremental cost of adaptation, the resilience of the vulnerable groups will be severely reduced. This investment project will fill gaps in Government investments and fast track the adaptive management model development in the country towards climate resilience while generating lessons that will be useful, regionally and globally.

5. Current land use practices in the upper catchments are vulnerable to high intensity rainfall and winds and the crops are subjected to high temperatures, more intense, less frequent rainfall events leading to more frequent and severe droughts, accelerated upstream land degradation and run-off and changes in the time of flowering. The farmers and plantation workers in this area are already under the stress of poverty. Without significant measures to empower them to have reliable water supply for their daily living and agriculture along with value addition for their produce, they will be subjected to the extensive impacts of climate change. Introduction of adaptation measures requires working on several aspects in parallel including investments to enhance the income of the communities, technologies to reduce harvest loses and predicting climate variability to adjust crop selection. Further, it is necessary to connect the impacts of temperature changes including diurnal fluctuations to the changes in fauna, flora and the water cycle elements.

6. Fragmented expertise and weak coordination among different Government entities, lack of fine scale understanding of climate change impacts, non-congruence of administrative and hydrological boundaries/units and farmers and other producers not receiving stable and adequate prices for their efforts are system related challenges.

7. Key challenges and barriers to be addressed during the project include:

    - Living on the margins of poverty, subsistence farmers do not understand the climate risks, connections between soil-water-climate linkages and possibilities for them to counter the climate risk by working equipped with information, technologies and access to markets;
    - Limited financial capacity in communities and inadequate Government investments in adaptation to climate change including coordination and access to resources have weakened the capacity of farming communities, plantation workers and private sector value chains to reach the sustainability levels adequate to meet the challenges of climate vulnerability;
    - Access to technologies and best practices to improve the climate resilience including the cloud capture with good canopy cover, water retention and erosion management through land management and natural infrastructure, sediment load reduction to tanks and reservoirs by stabilizing stream sides and road side drainages, and value chain development-based products, services and innovation;
    - Policies and systems to re-invest the benefits (hydropower generation, savings from disaster risk reduction—floods and drought) towards ecosystem improvements, to enhancing community income, catchment protection, education and awareness and insurance; and
    - Slow adoption of information led planning, extension, education, monitoring and decision support systems to strengthen the planning and implementation of climate resilience measures.

8. GCF resources will be used in the project area to develop systems in three key areas; namely, natural resources management in selected water basins, introduce and adopt sustainable financing for resilient livelihoods and strengthen institutions to meet challenges of climate change.

9. The project will target sustainable farming communities, plantations and selected value chains (rice, maize and other high yielding value chains, such as strawberry and pepper). It will ensure that these value chains benefit from climate resilient land planning and use, as well as from water resources management techniques, which contribute to the mitigation of climate risks.

10. Ecosystem benefits achieved through the project interventions will be recycled back to the system by way of enhanced community income, payment to Government by hydropower generation and using taxes and revenues to invest back in catchment protection.

11. The identified co-financing valued at USD Mn 9.2 is from the Ministry of Mahaweli Development & Environment (MMD&E). This amount will be contributed by different divisions of the Ministry. USD Mn 5.9, will be from the Ministry's national budget for catchment protection, environmental governance contributing to activities 1.1.1, 1.1.2, and 3.2.2 plus cost sharing during programme management - PMU; Mahaweli Authority of Sri Lanka (MASL), a statutory body under the Ministry contributes USD Mn 3.0 from the revenue generated from hydropower generators within the project area as Payment for Ecosystem Services (PES) paid to MASL. The recovery of this revenue is already established (The Ceylon Electricity Board the utility purchasing the hydropower retains 8 to 10% of total payable as PES charge due to the provision of water, before paying the hydro power producers and remit it to MASL directly); and the Forest Department (FD) under the Ministry contributes USD 300,000, in terms of technical knowledge transfer in reforestation, identification of lands for conservation, and training and capacity building of staff and communities on new techniques. FD co-financing also includes the use of Forest Department facilities in Nuwara Eliya and Knuckles.

12. The co-financing will further improve during the project implementation through private sector collaborations, additional contributions by government agencies such as the Tourist Board, Export Development Board, and Department of Agriculture etc. where potential co-financing levels were not considered at this stage.

13. The GCF financing will be complementary to investments in the agriculture sector in the irrigated area by UNDP/ GCF (38 million USD) and the World Bank Smart Irrigated Agriculture Project (125 million USD: see the details in paragraph # 50). Both projects benefit from the additional water generated in the catchment by this investment project and this project will benefit from water use efficiency investments by UNDP/GCF and the World Bank.

14. The economic analysis delivered an Internal Rate of Return (IRR) of 21%. The sensitivity of a 10% increase of base case input values generated an IRR of 18% while a 10% perturbation in benefit reduction provided an IRR of 18%. In the worst-case scenario, where cost increases and benefit reductions were both applied simultaneously, at 10% on each side of the cost benefit computation, the project was able to deliver an IRR of 15%. The Net Present Value (NPV) of Benefits are higher than the NPV of costs indicating that the proposed project has a healthy economic analysis with a minimal investment of risk.

15. In addition to the adaptation benefits computed in the economic analysis, this investment also generates significant mitigation benefits as a result of project investments including improved canopy structure and reduction of land degradation. The estimated mitigation as tons of carbon equivalents is presented in detail in the Feasibility Study Section 6.6 and Section E6 in this proposal.

16. The project is implemented with extensive technical assistance from ICRAF and include sharing of cutting-edge technologies, information delivery methods and decision support systems that are time tested for climate resilience. The project also leverages resources (to be quantified during the implementation) with telecom operators (Dialog Axiata and Sri Lanka Telecom), marketing chains (Keels, Cargills and others), insurance (World Food Programme, Sri Lanka Insurance and Private Providers) and banks (Public and Private) to promote a range of products and services that are new to the project area to add value to the

produce and to enhance the climate resilience by better prepared communities with the right tools and knowledge.

17. Value added financing options will also be provided through the IUCN Green Listing Process. The Knuckles Conservation Forest area as a green listed destination will be promoted among international tourists and funded jointly by the investment and PES by the Government.

Output	Activity	GCF funding (USD)	Total co-financing (USD)	Amount (for entire project) (USD)
Output 1.1 Improved land and water management in upstream catchment areas to safeguard production of environmental goods and services	Activity 1.1.1Streamside protection and drainage management along roads	3,360,100	1,600,000	4,960,100
	Activity 1.1.2. Rehabilitation and establishment of village tanks, ponds and irrigation networks	4,848,800	1,600,000	6,448,800
	Activity 1.1.3 Restoration of forest mosaic landscapes	2,657,150	280,000	2,937,150
Output 1.2: Sustainable climate-resilient primary production in upstream catchment areas and downstream irrigated agricultural area	Activity 1.2.1 Increasing cropping intensity of irrigated rice in both upstream and downstream areas	1,000,000		1,000,000
	Activity 1.2.2 Intensification of Sustainable smallholder production	2,000,000		2,000,000
	Activity 1.2.3. Restoration and intensification of sustainable plantations	2,875,000	1,500,000	4,375,000
	COMPONENT 1 TOTAL	**16,741,050**	**4,980,000**	**21,721,050**
Output 2.1: Upgraded and more efficient green value chains and increased links to new markets developed	Activity 2.1.1 Conduct Domestic value chain mapping and green market assessments for products especially from small holder and subsistence farmers	2,500,000		2,500,000
	Activity 2.1.2 Provide technical support for Enterprise and institutional development to exploit green growth opportunities for small holder farmers in the uplands	2,125,000		2,125,000
	Activity 2.1.3 Identification and implementation of value chain upgrading options for smallholder and subsistence farmers engaged in climate smart agriculture	1,925,000		1,925,000
Output 2.2: Payment for ecosystem services (PES) established	Activity 2.2.1: Developing a portfolio of business cases for negotiating performance-based financial transfer mechanisms	1,985,000		1,985,000
	Activity 2.2.2: Setting up a PES intermediary body as a part of the multi-stakeholder platform,	925,000	2,500,000	3,425,000

	and its governance system established			
	Activity 2.2.3: Establish a monitoring system for PES schemes in the upstream catchment area	1,000,000		1,000,000
	COMPONENT 2 TOTAL	**10,460,000**	**2,500,000**	**12,960,000**
Output 3.1: Governance mechanism for sustainable land management and productivity enhancement in the upstream catchment area established	Activity 3.1.1. Develop an integrated land use policy and planning mechanism at sub-basin scale	2,000,000		2,000,000
	Activity 3.1.2. Develop a shared information system to support land use planning, climate adaptation, market information and monitoring of the performance of intervention options	2,000,000		2,000,000
	Activity 3.1.3 Development and refinement of SLM framework	2,000,000		2,000,000
Output 3.2: Integrated rural advisory capacity responsive to developing knowledge base, real time weather and market information	Activity 3.2.1. Establishment of nested-scale multi-stakeholder innovation platforms from sub-basin to GN scale	1,975,000		1,975,000
	Activity 3.2.2. Develop local capacity for adaptive and sustainable land management	1,500,000	1,255,000	2,755,000
	Activity 3.2.3. Development and production of simple to use guidelines, manuals and tools for matching options to context and implementing SLM, sustainable intensification and value chain upgrading options .	1,500,000		1,500,000
	COMPONENT 3 TOTAL	**10,975,000**	**1,255,000**	**12,230,000**
	Total of Components 1, 2 & 3	**38,176,050**	**8,735,000**	**46,911,050**
PROJECT MANAGEMENT COSTS		**1,598,950**	**465,000**	**2,063,950**
	GRAND TOTAL	**39,775,000**	**9,200,000**	**48,975,000**

Breakdown of cost estimates analysed by sub-component in local and foreign currency

Component	Total budget (for entire project) US $	Local currency LKR	GCF funding amount US $	Local Currency LKR
1. Climate-resilient sustainable land management (NATURAL RESOURCES)	21,721,050	3,475,368,000	16,741,050	2,678,568,000
2. Secure financing mechanisms for sustainable land management (SUSTAINABLE FINANCING)	12,960,000	2,073,600,000	10,460,000	1,673,600,000
3. Institutional capacity strengthened (INSTITUTIONAL SUPPORT)	12,230,000	1,956,800,000	10,975,000	1,756,000,000
4. PMU Management	2,063,950	330,232,000	1,598,950	255,832,000
Total project financing	48,975,000	7,836,000,000	39,775,000	6,364,000,000

- *a breakdown of cost/budget by expenditure type (project staff and consultants, travel, goods, works, services, etc.) and disbursement schedule in project/programme confirmation (term sheet) as included in section I, Annexes.*

Total Cost Category Summary							
	PMU Costs	**Component 1**	**Component 2**	**Component 3**	**Total GCF**	**Co-financing**	**Grand Total**
Staff Cost – National and Field base	1,119,600				654,600	465,000	**1,119,600**
Travel – Food & Accommodation, International training, Vehicles, maintenance	532,550				532,550		**532,550**
Financial and Technical Assistance – contracts to farmers, individual contracts, institutional contracts, workshops, capacity building, publication, communication, gender mainstreaming		21,721,050	12,960,000	12,230,000	38,176,050	8,735,000	**46,911,050**
Equipment and Supplies – Office Rent, Office Furniture & Equipment, Stationeries, Office supplies, utilities	411,800				411,800		**411,800**
	2,063,950	**21,721,050**	**12,960,000**	**12,230,000**	**39,775,000**	**9,200,000**	**48,975,000**

B.2. Project Financing Information

	Financial Instrument	Amount	Currency	Tenor	Pricing
(a) Total project financing	**(a) = (b) + (c)**	48,975,000	USD		
(b) GCF financing to recipient	(vi) Grants *	39,775,000	USD		
	** Please provide economic and financial justification in section F.1 for the concessionality that GCF is expected to provide, particularly in the case of grants. Please specify difference in tenor and price between GCF financing and that of accredited entities. Please note that the level of concessionality should correspond to the level of the project/programme's expected performance against the investment criteria indicated in section E.*				
	Total requested (i+ii+iii+iv+v+vi)	39,775,000	Options		

	Financial Instrument	Amount	Currency	Name of Institution	Tenor	Pricing	Seniority
(c) Co-financing to recipient		9.200,000	USD	Ministry of Mahaweli Development & Environment			
	Lead financing institution: N/A						
	** Please provide a confirmation letter or a letter of commitment in section I issued by the co-financing institution.*						

(d) Financial terms between GCF and AE (if applicable)

In cases where the accredited entity (AE) deploys the GCF financing directly to the recipient, (i.e. the GCF financing passes directly from the GCF to the recipient through the AE) or if the AE is the recipient itself, in the proposed financial instrument and terms as described in part (b), this subsection can be skipped.

If there is a financial arrangement between the GCF and the AE, which entails a financial instrument and/or financial terms separate from the ones described in part (b), please fill out the table below to specify the proposed instrument and terms between the GCF and the AE.

Financial instrument	Amount	Currency	Tenor	Pricing
Choose an item.	Not applicable	Options	( ) years	( ) %

Please provide a justification for the difference in the financial instrument and/or terms between what is provided by the AE to the recipient and what is requested from the GCF to the AE.

B.3. Financial Markets Overview (if applicable)

How market price or expected commercial rate return was (non-concessional) determined?

Please provide an overview of the size of total banking assets, debt capital markets and equity capital markets which could be tapped to finance the proposed project/programme.

Please provide an overview of market rates (i.e. 1-year T-Bill, 5-year government bond, 5-year corporate bond (specify credit rating) and 5-year syndicate loan.

Provide examples or information on comparable transactions.

Note: ***Financial market overview is not applicable as GoSL is seeking almost 100% grant under this GCF to assist small-scale farmers in climate vulnerable areas***.

Please fill out applicable sub-sections and provide additional information if necessary, as these requirements may vary depending on the nature of the project / programme.

C.1. Strategic Context

Geographical context and climate change vulnerabilities

18. Climate change is impacting Sri Lanka through changes in rainfall, temperature and wind. As described in detail in Section 3 of the Feasibility Study, the temperature components are increasing while rainfall is becoming more variable with rain falling in a smaller number of high intense events that are erosive. The people and economy of Sri Lanka are heavily dependent on water from highlands for irrigation, domestic and industrial use and electricity generation. The national water collection and delivery system is threatened by reservoirs silting up at alarming rates, climate change aggravating rainfall disparities across the country resulting in an increased impact of flooding and landslides in the wet zone, increasingly frequent and severe droughts in the dry zone1and an overall reduction in water availability is noted due to changes in precipitation and increasing evaporative losses due to higher temperatures and wind speeds[2].

19. The key climatic driver for accelerating degradation of catchments is intense rainfall. Events over 25 mm hr -1 are considered as erosive. Climate records from 1960 to 2015 show trends in increasing temperature, reduction in the number of rainy days, and an increase in the number of heavy rainfall events, particularly in the Matale, Central Hill areas located in the project's upstream catchment area[3]. Also, the changes to the temperature gradient from lowlands to highlands due to altitude and changes in wind regimes due to climate change has shifted the temperature related variables (ambient, minimum and maximum daily temperatures) as described in Section 3 of the Feasibility Report.

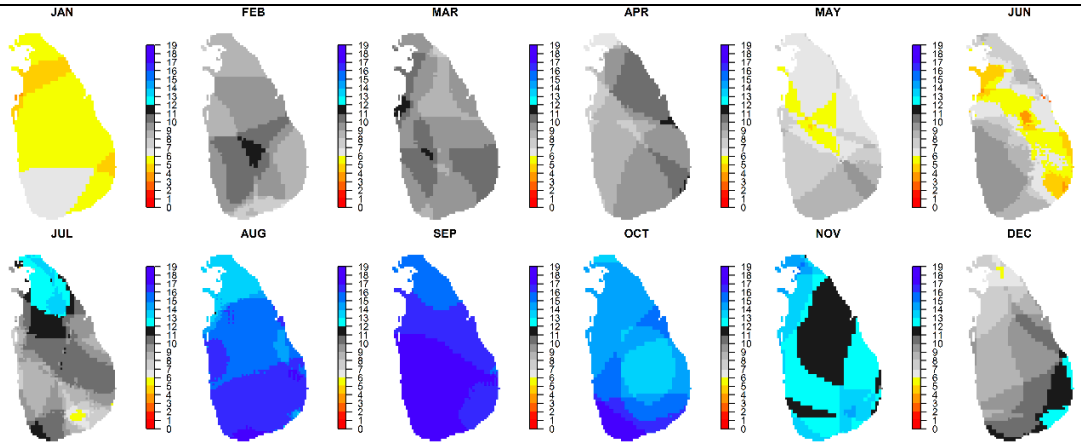
20. The climate influence (less rainfall and high intensity and increasing temperature) on the hydrology and ecosystems have prompted multiple mitigation measures including strengthening the canopy structure in the highlands to capture the South-West and North-East monsoons; and enhancing the rainwater harvesting and taking measures to increase the availability of groundwater, water that is available for services including drinking and water to be provided as surface or groundwater for agriculture and enterprises.

21. This requires a major change in the way the highlands and upper catchments are managed, both in technical (conservation and landscape management) and behavioral (community to agency functions) terms. For example, the highlands and upper catchments should be used for maximum rain capturing, harvesting of rainwater (surface and ground) and as a reserve to ensure adequate supply of water for multiple users in both highland and irrigated areas covered by this investment.

22. Site specific climate information were developed and presented in detail as part of the preparation of this proposal (Annex on climate change and Feasibility Report Section 3), in addition to the summary in the next section, using downscaled data from an ensemble of 19 global climate models for three emission scenarios

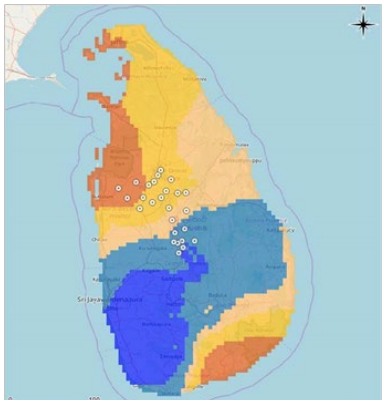
23. The analysis focused on results of Representative Concentration Pathway 4.5 (medium scenario) and summarized ensemble results according to guidelines in the IPCC fifth assessment[4] as being likely where 66% or more models show the same trend and unlikely if 33% or less do so. This indicates a consensus that the mean annual rainfall and its seasonality will increase in both the upstream and downstream project areas (see map below). More rainfall coupled with greater monthly variability indicates a likelihood of increasing erosivity and threats to water infrastructure and productivity.

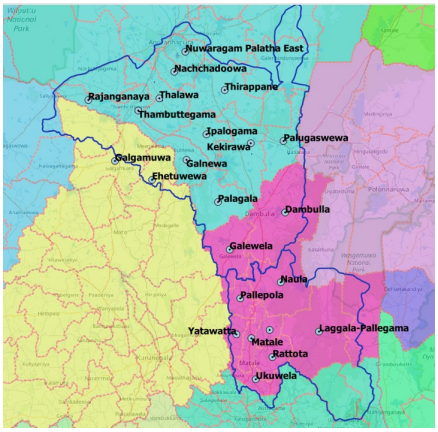
[2] Panabokke, C. R. ; R. Sakthivadivel; A. D. Weerasinghe. 2002. Evolution, present status and issues concerning small tank systems in Sri Lanka. Colombo, Sri Lanka: International Water Management Institute



Counts of GCMs that predict monthly increases in precipitation by the 2050s compared to the baseline centred on 1975. Blue colours indicate that increases are likely and red-yellow colours that they are unlikely, grey shades indicate a lack of consensus amongst models

24. When monthly predictions are considered (see the map above), it is clearer that higher rainfall is predicted only in some months, exacerbating the likelihood of erosive events. It is likely that rainfall will increase in August, September and October during the South-West Monsoon season but will decrease in January, a month in the middle of the North-East Monsoon. These results indicate concomitant problems of too much rain at certain times of the year and in some places causing erosion and flooding but not enough at other times and in other places, contributing to drought.





Left map of baseline annual precipitation of Sri Lanka included selected points (weather stations) used for predictions (dots). The colour scheme corresponds to the climatic zones of Sri Lanka with the dry zone split into three zones with 1,000-1,250 mm (dark brown), 1,250-1,500 mm (yellow-brown) and 1,500-1,750 mm(light borwn), the intermediate zone is shown in light blue (1,750-2,500 mm) and the wet zone is shown in dark blue (>2,500 mm). Map in the right indicates the locations of weather stations within the project area.

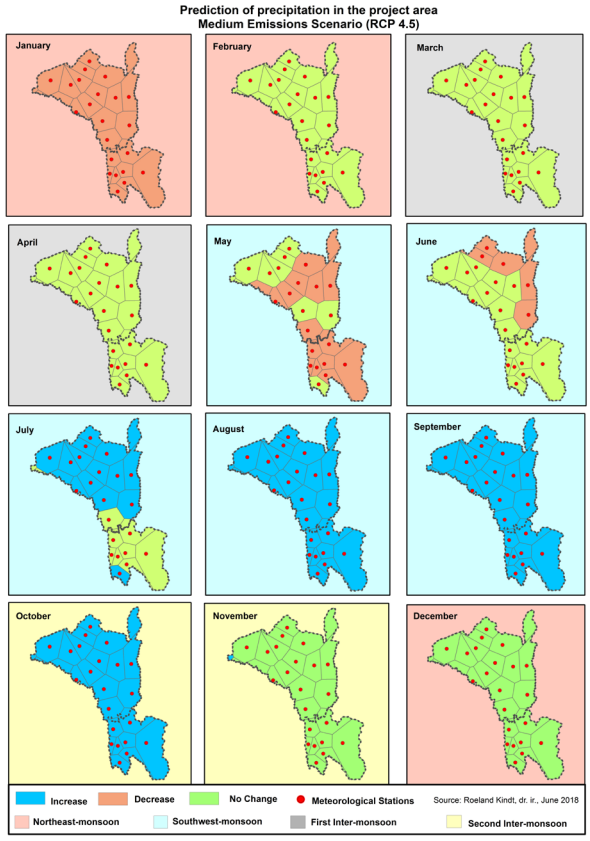
25. Climate data from these stations have been used to develop the climate predictions for the project area by Kindt[5] (2018) attached separately to this FP as the Climate Analysis. Kindt (2018) used RCP 4.5 and RCP 8.5—medium and high emission scenarios, respectively to generate monthly climate anomaly maps also considering the main agricultural seasons (Yala and Maha) and Monsoon Seasons, namely, the North-East (December to February – brown background), First Inter-monsoon (March to April – gray background), South-West (May to September – blue background) and Second Inter-monsoon (October to November – yellow background).

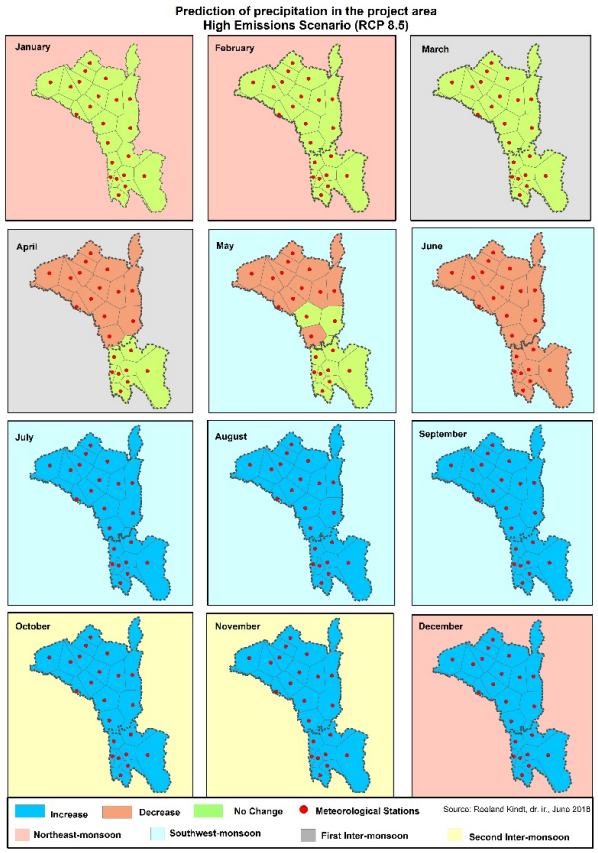
[3] Shiromani Jayawardena, Thanuja Dharshika and Roshan Herath. 2017: Observed Trends, Future Climate Change Projections and Possible Impacts for Sri Lanka *NeelaHaritha Climate Change Magazine of Sri Lanka* 2:144-151
[4] Mastrandea et al. 2011
[5] Dr. Roeland Kindt, Senior Ecologist, World Agroforestry Centre, Nairobi, Kenya

26. Shifts and intensity of rainfall associated with monsoons and inter-monsoons directly influence the climate agenda for forests, plantations and home gardens in the upper catchment area and also reflects in the water availability in both upstream and downstream areas.

27. Agricultural seasons for paddy cultivation in the upland catchment and irrigated downstream areas are April – May (sowing period during Yala season); June – July (growing period during Yala season); October – November (sowing period during Maha season) and December – January (growing period during Maha season).The Yala season corresponds to the South-West Monsoon, which occurs from May to September (light blue background in the figure), whereas the Maha season corresponds to the North-East Monsoon, which occurs from December to February (brown background in the figure). The precipitation in the Maha (February as per RCP 4.5) is likely to decrease, which would influence the rice and maize growing periods during the Maha season. In most locations, including upland and lowland project areas, May precipitation is projected to decrease in the rice and maize sowing periods of the Yala season. Precipitation during July (the growing period during the Yala season) is projected to increase. However, absolute magnitudes of precipitation increases are relatively small and therefore, lowland locations will continue to receive relatively small amounts of precipitation (a pattern important for planning irrigation schemes). In the case of the month of October (sowing period during Maha season), the precipitation is projected to increase, where there was no consensus among models. It is possible that this lack of consensus agrees with interannual variability that has been reported to increase. The higher precipitation expected for August to October is relevant for planning flood and erosion controlling measures, especially in highland areas.

28. Rainfall anomalies observed for RCP 4.5 and RCP 8.5 scenarios not necessarily matched yet demonstrated similar trends in certain months such as May to June (reductions in rainfall) and August to October (increases in rainfall). There are differences of rainfall anomalies in the upper catchment and lower catchment areas. For example, in April and May, precipitation is projected to decrease in lowland areas, in general in RCP 8.5. In the month of June, precipitation is projected to decrease but in July it is likely to increase. Between October to December, precipitation is likely to increase that include the sowing and growing periods in the Maha season. The likely increases in precipitation also justify investments in natural and other infrastructure to control flooding and erosion events.



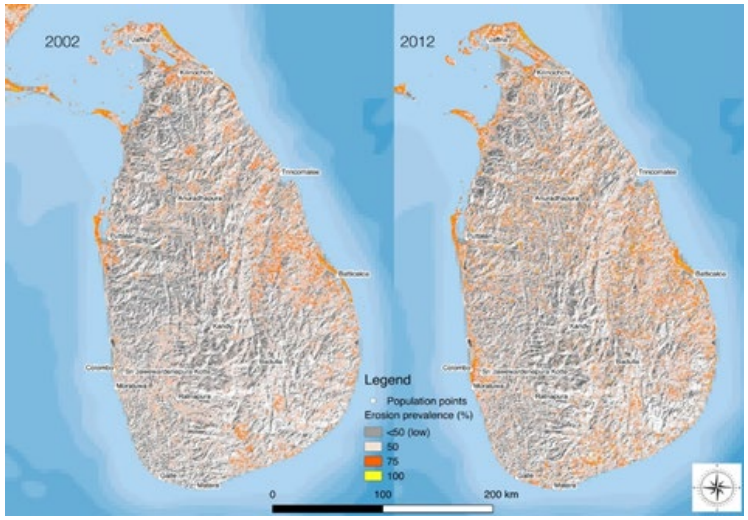


29. A key issue for erosion is the higher rainfall predicted for October when land preparations are taking place for paddy and for sowing and land preparations for other crops and home gardens anticipating the monsoon rainfalls. At that time the soils are vulnerable to erosion.

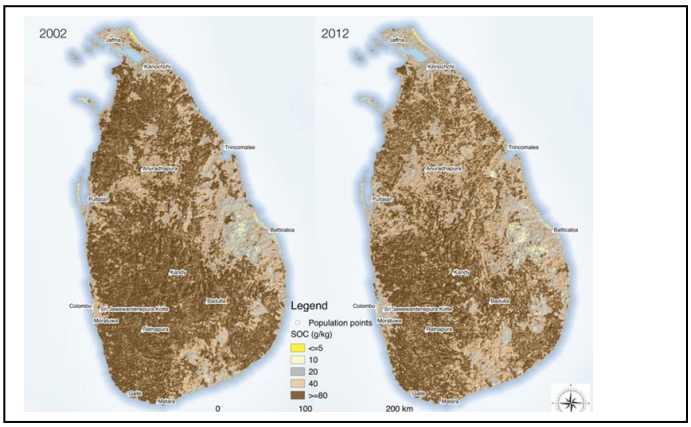
30. Comparison of the future and baseline monthly moisture indices shows that there is a likely decrease of the moisture index for the project area in January and May and for a part of the area in June (figures 2.1 – 2.2). These trends follow trends in precipitation, but as a result from the general increases in PET, larger sections of the project area are expected to experience decreases in the moisture index in May and June.

31. The downstream area is much dependent on the rain capture, ground storage and delivery of quality water with minimum sediments to ensure the reservoir capacity used in downstream irrigation. Where decreases in rains are predicted, especially in April to June period.

32. These predicted changes to future rainfall are of concern when considered in the light of changes in erosion prevalence between 2002 and 2012 (calculated from analysis of Modis satellite imagery using universal algorithms by the ICRAF Geoscience Lab rather than higher resolution imagery trained to local ground-truthing that would be available to create a more precise baseline for monitoring change during the project). The indication is that erosion is already a problem in highland catchment areas, and it is likely to get worse if actions are not taken to control it.



33. Satellite image analysis spanning 2002 and 2012 (MODIS satellite imagery based on the global LDSF database at ICRAF) indicates considerable reduction in soil organic carbon in Sri Lanka, particularly in the upstream catchment areas in the project area. Land degradation has pernicious knock on effects on livelihoods where it is associated with reduced agricultural productivity. Immediate effects on local food security are evident.



34. There is a clear link between erosion in upstream catchments and irrigation supply to downstream agriculture through sedimentation that is reducing reservoir capacity. Rantembe reservoir in the central hills now has only about half its original capacity (with 47% loss of capacity from 1990 to 2015). Similarly, the Polgolla reservoir has lost 45% of its capacity between 1971 and 2000. The volume of Randenigala reservoir has reduced by 58.5 MCM between 1985 and 2016. It is estimated that Victoria reservoir is losing 2-3 MCM of capacity per year (data from MASL)[6].

35. The plantation lands in the central highlands are generally owned by the Government and given on long-term leases to estate companies. The socioeconomic dimensions including the low labour productivity and minimum wage legislation has led to the abandonment of degraded low productive lands or a shift to out-grower schemes where estate workers are allocated areas that they use/manage land themselves. These workers are without proper landscape or climate knowledge nor are they aware of the offsite damages due to poor land use practices. This scenario leave workers with neither enough income to buy food to feed their family or maintain the fertility of the lands, making themselves vulnerable to climate change.

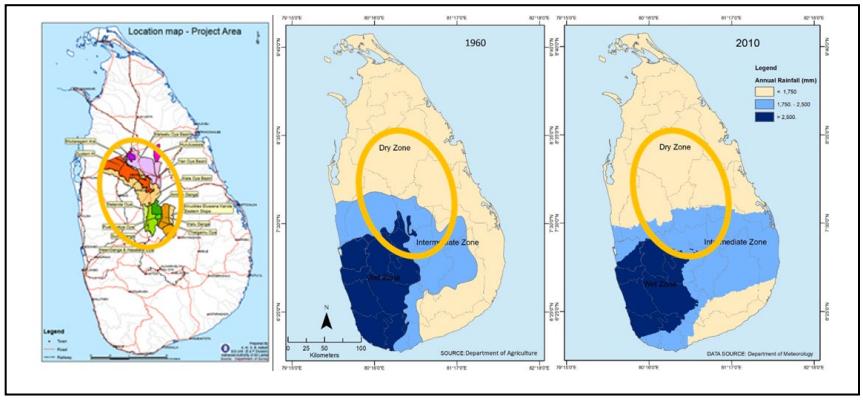
36. The famers in the downstream are impacted due to reduction in recharge/irrigation water and enhanced siltation of water holding facilities due to poor land management in the plantation sector. This factor is impacting the Government investments to provide irrigation water to the dryland areas in the downstream

[6] Personal communication Mr. R. Aruppola, Irrigation Engineer, Mahaweli Authority of Sri Lanka

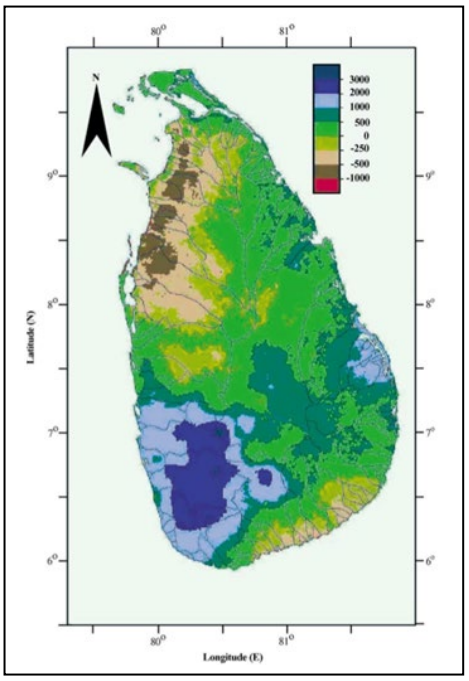
using Moragahakanda and other irrigation diversion schemes with significantly high investments (Feasibility Study Section 6.5). Montane and sub montane forests, which account for providing continuous water supply even during the dry periods are located along a narrow belt in high elevated mountain ridges, specially towards the northern part of the conservation forest. However, with the changes in climate due to a warming world, the possibility of such mountainous forests shrinking is high. The predicted climate change related situations such as prolonged droughts and heavy showers will increase the vulnerability of these areas in the future.

37. Communities that live in Pitawala, Rathninda and Mahalakotuwa who depend on water from mountainous streams, already experience limited water supplies in the dry months. Some of the guest houses, home stays and tourist attractions are also experiencing water issues in the same months. On the other hand, in rainy seasons, earth slips, and flash floods are frequent due to the heavy rainfall received within a short period of time. Due to these factors, communities that especially live in the northern region of the Knuckles Conservation Forest, are now experiencing adverse impacts of climate change.

38. A shifting of the climate regions in the country from 1960 to 2010 is reported. Indication is that the dry zone in the project area (marked by the circle) expanded in the recent past and part of the wet zone has changed to the intermediate zone. This fact has resulted in extended agricultural droughts, especially in rice maturation and harvest. Intense rains in the harvesting season in 2018 destroyed the harvest of mature rice in fields.



39. According to Bastiaanssen and Chandrapala (2003) [7], computed rainfall surplus (gross rain – actual evaporation) from June to June in 1990 to 2000, the project area falls between -500 mm in the lower catchment to +500 mm area in the upper catchment. With climate zones shifting, the project area is moving to the water deficit area that require intensive rainfall harvesting in both upper and lower catchments.

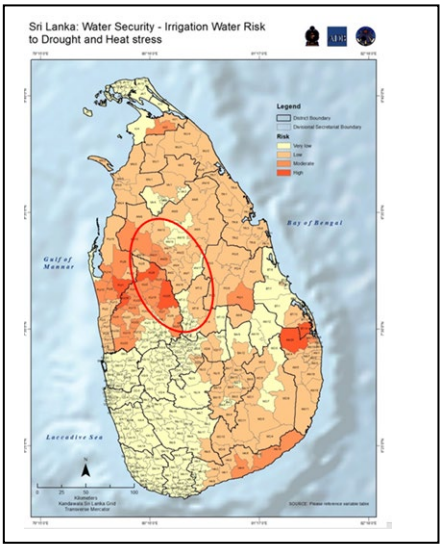


40. The rainfall captured by the highlands “cloud interception or cloud forest” from the South-West and North-East monsoons has changed due to poor land use. This can be mitigated by strengthening the canopy structure. The extent of rainfall harvested by the highland landscapes and landforms in the form of infiltration is declining due to land degradation, again due to land use. The siltation and reduction of the surface water holding capacity in ponds and tanks, including those in mega-investments are affected due to high erosion. Overall, it is necessary to enhance rain capture, rainwater harvesting to groundwater and enhance surface water storage to support drinking, irrigation, subsistence agriculture and enterprises.

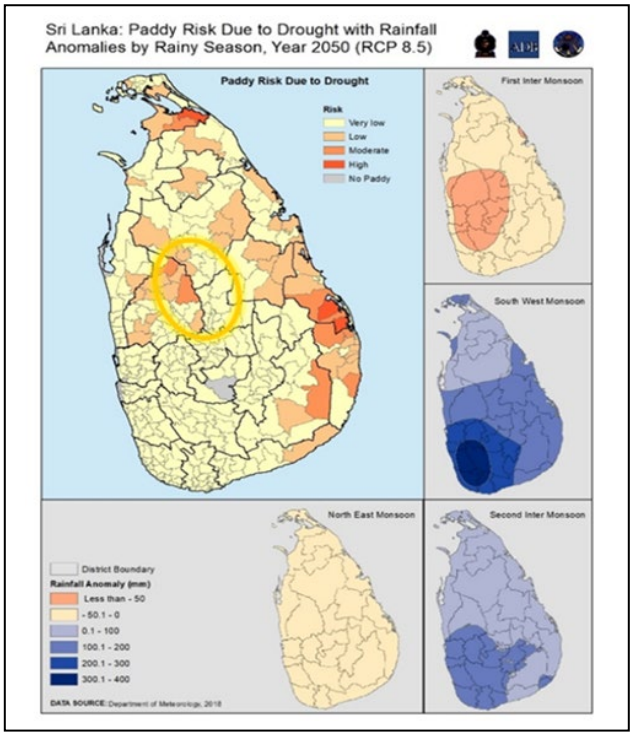
[7] Bastiaanssen, W.G.M and L. Chandrapala. 2003. Water balance variability across Sri Lanka for assessing agricultural and environmental water use. Agricultural Water Management 58: 171-192

Further, the temperature gradient from lowlands to highlands due to altitude and wind regimes and the shifting patterns of temperature (ambient, minimum and maximum daily temperatures) are noted due to climate change. These adverse impacts of modifications in the wind regimes and temperature can also be addressed though vegetation cover improvements.

41. As per a latest report of an ADB project, which is currently at the draft level, mentioned that droughts impacted over a million people (1,041,690) in Sri Lanka in 2017 and 855,307 in 2016 mainly through the failure of irrigated rice in dry zone farming areas. Across Sri Lanka, official estimates put the 2017 aggregate rice output at 2.5 million in 2017 tons (1.7 million tons, milled basis), which is 43% less than the output in 2016 and 41% lower than the mean of the previous five years. The decrease in production is the result of a severe drought at the end of 2016 and early 2017, which compromised water availability for irrigation for the 2017 main Maha and secondary Yala season crops, resulting in a considerable decrease in what was planted, widespread crop losses and reduced yields. Harvests of other crops, including maize, various pulses, chilies and onions, mainly grown under rain fed conditions, were also heavily reduced due to the drought. The project area (within the circle) has some of the highest water insecurities.



42. The highland catchments house key biodiversity hotspots as well as important agricultural and forest productions that are threatened by land degradation and there is a need to adapt to shifting climatic patterns including changes to flowering times of key export crops.



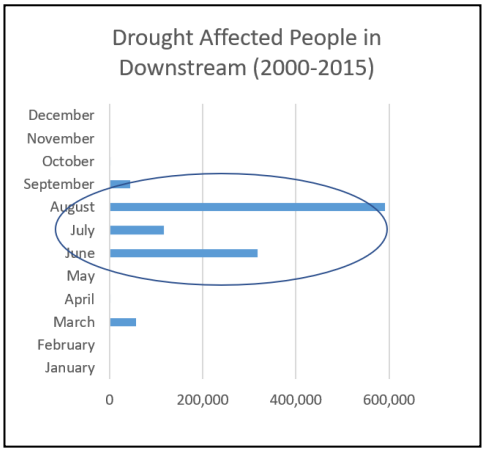
43. The immediate need to restore and sustainably manage land in the upper watershed areas to control sediment flow and rehabilitate failing parts of the water storage and distribution network, including making efficient use of water in agricultural production has been recognized. Cropping indices (the mean number of crops harvested per year) is <1 in some areas in the highlands as well as in downstream areas where land use is predominantly irrigated rice based on water supplies emanating from highland catchments. This is associated with many farmer families and estate workers facing food insecurity (the national prevalence of malnourishment stands at 22%). The project area where irrigation water is provided from the upper catchment is within the highest risk areas for paddy cultivation (circled area).

44. Nearly 72% of rice in Sri Lanka is grown during the wet seasons using rainfall. However, in dry areas where water resources are already stressed, the cultivations depend on irrigated water where the source is the upper catchment. Modelling studies on water requirements in irrigated paddy indicate that climate

impacts on the wet season paddy production were positive in southern parts of the country but negative across most of Sri Lanka8 requiring region/site specific adaptation strategies.

45. Extended dry periods in 2015, 2016 and 2017 affected maturation of the rice crop, as required water was not available at the critical point in the plant's life cycle. By the time this damage occurred, the bulk of the investment has gone, severely affecting the socioeconomics and nutrition of subsistence farmer families. The choice of planting short duration rice varieties (3 months – "Bala wee") or long duration rice varieties (5 months – "Mawee") is made at the beginning of the season based upon what rainfall has occurred at that time of planting. Many farmers choose long duration rice varieties, which provide a higher yield, banking on the weather being consistent with their expectations from the rainfall at planting time. Mahaweli irrigation system managers are being pressurized by the farmers who cultivate long duration varieties, to distribute water to maintain adequate availability to the downstream for longer periods. These are the issues needing urgent requirements to improve adaptive capacity; a) to build new or restore abandoned village tanks, b) improve capacity of existing village tanks and ponds for upstream farmers, c) to reduce sedimentation of reservoirs to improve water holding capacity alongside managing downstream demand for irrigation, and d) better decision-making tools for crop selection and practices.

46. Possible adaptation and mitigation measures need to be explored to safeguard rice production to ensure food security in the future and minimize the number of people affected by drought, particularly between August to June months in the year. Using national rice statistics and estimates of intensification, it was found that improvements in rice production can feed 25.3 million Sri Lankans (compared to a projected population of 23.8million people) by 2050 [9]. However, to achieve this growth, consumptive water use, and nitrogen fertilizer application may need to increase by as much as 69% and 23%, respectively. This assessment demonstrates the need for targets for maintaining self-sufficiency to incorporate avenues for improving resource use efficiency, especially of water. This concurs with the global yield variability of staple crops being heavily controlled by fertilizer use, irrigation and climate[10] with large opportunities to reduce the environmental impact of agriculture by eliminating nutrient overuse, while still allowing around a 30% increase in production of major cereals (maize, wheat and rice) through better water management.

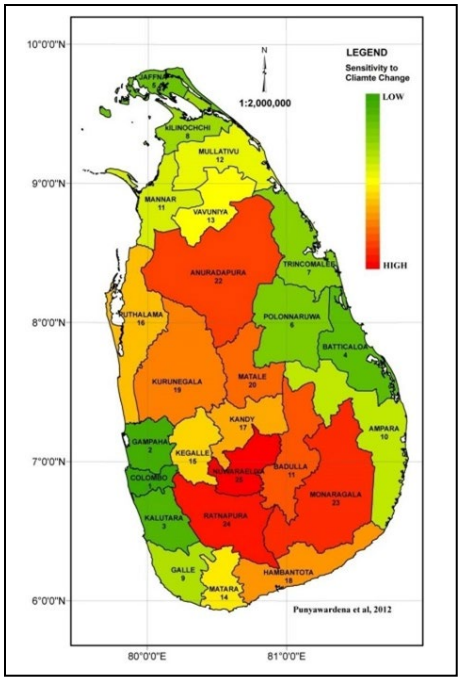


[8] De Silva, C.S. E.K. Weatherhead, J.W. Knox, J.A. Rodriguez-Diaz 2012. Predicting the impacts of climate change—A case study of paddy irrigation water requirements in Sri Lanka. Agric. Water Manage. (2007), doi:10.1016/j.agwat.2007.06.003

[9] Davis Kyle Frankel, Jessica A. Gephart Thushara Gunda 2016. Sustaining food self-sufficiency of a nation: The case of Sri Lankan rice production and related water and fertilizer demands. Ambio 2016. Volume 45, Issue 3, pp 302–312

[10] Mueller,Nathaniel D. James S. Gerber1, Matt Johnston, Deepak K. Ray, Navin Ramankutty2 & Jonathan A. Foley 2012. Closing yield gaps through nutrient and water management. 254 nature Vol 490

47. A national climate vulnerability study [11] with a district resolution suggests that the greatest overall sensitivity to climate change is in the dry zone areas (see maps below) where fewer rainy days coupled with higher temperatures and Potential Evapotranspiration (PET) led to drought, reduced crop yields and higher risk for farmers, while some of the districts most sensitive to climate change include key highland catchments. Accelerated degradation of climate sensitive highland areas impacts downstream irrigated agriculture, through reduced water yields and storage. This project explores the connection between a highly sensitive catchment area in the intermediate zone (Matale ranks 20 out of 25 districts nationally in terms of sensitivity) with the highly vulnerable downstream areas that its water irrigates (principally in Anuradhapura and Kurunegala districts that rank 18 and 19 out of 25 districts in terms of climate vulnerability).



Relevant strategies to adopt to climate change in the country

48. The National Adaptation Plan (NAP)[12] 2016-2025 highlights adverse effects of climate change in Sri Lanka including the consequences of rising temperatures, prolonged droughts, erratic high intensity rainfall, flash floods, landslides and rising sea levels critically affecting most economic sectors and depriving the nation and its people of livelihoods. The NAP identifies adaptation options and performance indicators for the nine identified most vulnerable sectors. This project directly addresses four of the nine vulnerable sectors (food security, water resources, ecosystems and biodiversity and export development) while demonstrating linkages to 33 out of the 56 priority actions in NAP as outlined in the "Feasibility Study."

49. The Natural Resource Management Centre (NRMC) oversees the implementation of the Soil Conservation Act No. 25 of 1951 where interventions on the prevention of soil erosion are designed and promoted. The National Water Resources and Drainage Board (NWSDB) is responsible for operationalizing the Water Resources Board Act No 29 of 1964 covering the water resources management related to irrigation, drainage; flood control, power; afforestation, soil erosion, prevention of pollution in rivers and policies and plans for the utilization of water resources. The Central Environment Authority (CEA) implements the National Environmental Act No 47 of 1980 to protect and manage the environment including the pollution of water resources.

50. The "National REDD+ Investment Framework and Action Plan (NRIFAP, 2017)[13]" advocates for forest and watershed restoration, sustainable natural resource management and governance, enhancement of land productivity and improvement of agroforestry models. The Sri Lanka Comprehensive Disaster Management Programme (SLCDMP)[14] recommends enhancing initiatives towards disaster risk reduction based on the "National Hazard Profiles (DMC/UNDP, 2012)[15]". "The Forestry Sector Master Plan 1995-2020" and the "National Action Programme for Combating the Land Degradation of Sri Lanka (NAP-

[11] Punyawardena R, Dissanaike T and Mallawatantri. A. 2013. Spatial variation of climate change induced vulnerability in Sri Lanka. An analysis of the components of vulnerability at district level. Peradeniya: Department of Agriculture. ISBN 978-955-674-139-1
[12] National Adaptation Plans 2025 - https://goo.gl/UrSzJc
[13] National REDD+ Investment Framework - https://goo.gl/3MSZBh
[14] Comprehensive Disaster Management Programme - https://goo.gl/8Ubeih
[15] Hazard Profiles of Sri Lanka (UNDP, 2012) https://goo.gl/8okLu6

CLD)" and the National Agriculture Policy of Sri Lanka" advocate risk reductions in domestic food production, floriculture and export crop sectors as a measure to increase the self-reliance of the country. The Agriculture Policy[16] states the need to "meet the basic needs of the farming community…through the adoption of technically feasible, socially acceptable, economically viable and environmentally friendly agricultural production technologies…"

51. Other key GoSL strategies related to the project are the "Green Lanka Strategy and Action Plan 2030"[17] that consists of 12 "Missions" with Mission 2 on "Mainstreaming Biodiversity Conservation for Sustainable Development" covering the proposed project activities on Payment for Ecosystem Services (PES) for conservation and Mission 7, "Water for All and Always" that highlights the need for catchment protection, water use efficiency improvements, demand side management of water etc., in line with the proposed project objectives and activities. The National Physical Plan[18] by the National Physical Planning Department (NPPD) highlights the importance of preserving the Central Highlands through nature solutions, such as vegetation and cropping practices to reduce siltation and erosion, in the face of increasing climate impacts. The Sri Lankan National Strategic Review of Food Security and Nutrition calls for action to i) adopt a cohesive sustainable agricultural approach by swiftly aligning the current agricultural practices and policies with food security and nutrition related policies to face contextual and climatic challenges ahead; and ii) prioritize the implementation of the national climate adaptation plan, community-based resilience building, and emergency preparedness, together with livelihood diversification initiatives to better withstand repeated natural disasters and impacts of climate change.

C.2. Project / Programme Objective against Baseline

Climate change drivers threatening water availability via erosion and siltation

52. Natural forest in the Central Highlands impacted by plantation agriculture, human settlements and development has increased soil erosion adding large amounts of sediments to river tributaries and then to reservoirs used for irrigation, power generation and human consumption. Recent studies indicated long-term erosion rates of about 13-30 t km-2 per annum with local sediment yields as high as 100-7,000 t km-2 y-1[19].

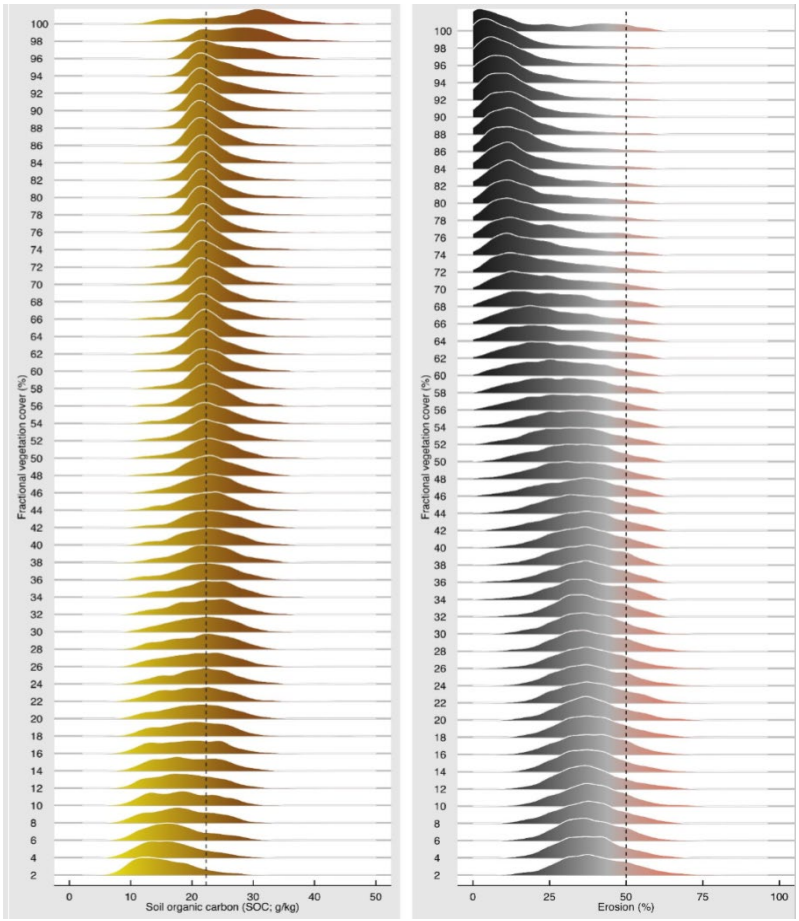
53. A simulation conducted by Rajarata University using Revised Universal Soil Loss Equation for one of the sub-watersheds within the project area (Feasibility Study Chapter 3 Section 3.10) indicated possibilities in reducing sediment loads (erosion potential) with improved land cover as proposed in the project. Simulation with limited data indicated a reduction of erosion potential from 0-45 t km-2 per annum to 0-21 t km-2 per annum.

[16] Sri Lanka National Agriculture Policy (2007) http://www.agrimin.gov.lk/web/images/docs/1252389643AgPolicy4.pdf
[17] Green Lanka or Draft National Action Plan - https://goo.gl/inYpcb
[18] National Physical Plan - https://goo.gl/grqbVc
[19] Tilak Hewawasam. 2010. Effect of land use in the upper Mahaweli catchment area on erosion, landslides and siltation in hydropower reservoirs of Sri Lanka. J.Natn. Sci.Foundation Sri Lanka 38 (1): 3-14

54. Out of these, reduction of storage capacities in reservoirs can be considered as the main concern with climate change induced high intensity rains—leading to impacts in the energy and agriculture sectors with national and local implications. To maintain the maximum storage capacities of reservoirs under changing climate it is necessary to employ adaptation measures in potential eroding areas as a major priority.

55. According to simulations done at ICRAF (2019) [20] using the vegetation and cover properties in the project area (upstream and downstream), the possibility of increasing soil organic carbon (SOC) and reducing soil erosion is indicated by increasing the vegetative cover.

Fractional vegetation cover change vs soil organic carbon and erosion potential in the project area (upstream and downstream)- ICRAF (2019)



56. The erosion estimates for Upper Mahaweli Basin (like the upper catchment) indicate a significant difference in erosion potential under different land cover categories. As such, the project aims to introduce changes to land cover that are less prone to erosion and sediment management practices to minimize reservoir siltation as a result of climate change induced rainfall intensity driven erosion.

[20] Fergus Sinclair - email communication

Land use type	Area (km^2)	Soil loss ($t\ km^{-2}\ y^{-1}$)	Bedrock erosion rate[1] ($mm\ ky^{-1}$)
Dense forest	356.6	100	37
Degraded forest and scrubs	435.7	2500	925
Degraded grasslands	141.9	3000	1110
Poorly managed seedling tea	3454.8	5200	1924
Seedling tea with some conservation	252.7	1500	555
Vegetatively-propagated tea	114.9	200	74
Paddy	285.7	300	111
Home gardens	537.7	100	37
Shifting cultivation and tobacco	484.6	7000	2590
Market gardens	163.6	2500	925

[1] Converted into corresponding bedrock erosion considering density as 2.7 g/cm^3.

57. Negative impacts included decline in soil fertility, reduction in soil depth, rapid siltation of hydropower reservoirs, sedimentation in agricultural-lands, sedimentation in rivers and floods in the lowlands, increasing frequency of landslides, damage to the infrastructure, and the change of water quality of waterways and ecological systems.

58. One of the factors that will be important, and to be addressed during the project implementation is the fact that the short-term sediment transport is more related to the energy (intensity of rain) rather than sediment limited. Therefore, it may be possible to develop an argument, which will have to be refined when more data is available, highlighting the need to avoid maximum flows by modifying land and sediment generating conditions *via* adaptive measures. Some of the initial thinking is available through vN et al 2017a[21], b[22].

Climate change drivers threatening agricultural productivity

59. Agricultural productivity in the downstream areas in Sri Lanka's dry zone are vulnerable to a combination of increasing seasonality of rainfall, resulting in fewer rainy days and longer intervals between them (described above) and increased temperatures. There is agreement amongst GCM predictions that temperatures will rise across the country between now and 2050 exacerbating drought through increasing potential evapotranspiration (PET). In the project area, the likely decreases in rainfall during rice and maize growing periods in the Maha season (January) and during rice and maize sowing periods in the Yala season (May) are likely to depress yields and increase irrigation water demand (see graphs below). It was already shown above that the largest increases in rainfall seasonality are predicted in the downstream agricultural areas where drought is already a problem. Other studies with five GCMs (Jayawardena et al. 2017 23) also suggested that precipitation for the South-West Monsoon was expected to increase, but that precipitation for the North-Eastern Monsoon was expected to decrease, which would further exacerbate problems of high rainfall in highland catchments and drought in the dry zone. Climate change impacts on livelihoods, food security and ecosystem services

[21] van Noordwijk M, Tanika L, Lusiana B. 2017a. Flood risk reduction and flow buffering as ecosystem services: I. Theory on a flow persistence indicator. Hydrol. Earth Syst. Sci. 21, 2321–2340
[22] van Noordwijk M, Tanika L, Lusiana B. 2017b. Flood risk reduction and flow buffering as ecosystem services: II. Land use and rainfall intensity effects in Southeast Asia. Hydrol. Earth Syst. Sci. 21, 2341–2360.
[23] Shiromani Jayawardena , Thanuja Dharshika and Roshan Herath. 2017: Observed Trends, Future Climate Change Projections and Possible Impacts for Sri Lanka *NeelaHaritha Climate Change Magazine of Sri Lanka* 2:144-151

60. Loss of soil carbon, often associated with unsustainable agricultural practices and exacerbated by erosion of topsoil is now seen as a global problem undermining soil health, water retention and fertility. There are two key issues for this project. Firstly, climate induced erosivity of rainfall results in the removal of topsoil that is high in carbon contributing to the reduction of soil carbon in the catchment while reducing reservoir capacity through sedimentation. Secondly, reduction in soil organic carbon is associated with a lower water retention capacity of soil, exacerbating flashiness of catchments, unable to hold water when it rains.

61. Drought impacted over a million people (1,041,690) in Sri Lanka in 2017 and 855,307 in 2016 mainly through failure of irrigated rice in dry zone farming areas. Across Sri Lanka official estimates put the 2017 aggregate rice output at 2.5 million tonnes (1.7 million tonnes, milled basis), which is 43% less than the output in 2016 and 41% lower than the mean of the previous five years. The decrease is the result of a severe drought at the end of 2016 and early 2017, which compromised water availability for irrigation for the 2017 main Maha and secondary Yala season crops, resulting in a considerable decrease in what was planted, widespread crop losses and reduced yields. Yields of other crops, including maize, various pulses, chilies and onions, mainly grown under rainfed conditions, were also heavily reduced by the drought.

62. The highland rice farmers and the downstream farmers in the project area are mostly subsistence farmers, because unlike other dry zone farmers who have the opportunity to grow two crops per year due to past Government investments to develop large scale water storage and irrigation systems, the rice farmers in the project area are unable on average to complete one crop per year on all of their paddy land (cropping intensity (CI) is <0.8). Rice is grown primarily for household consumption and CI<1 result in no surplus to sell. Climate change threatens the farmers' ability to grow enough rice for their annual household consumption and many have no other income source to broker their food security. Most farmers in these areas are paid a Government social welfare protection allowance (Samurdhi) that is provided with food in kind as support to all subsistence farmers.

63. Knuckles area highland paddy farmers carry out cultivation using rainwater and by tapping of stream water from mountain springs. Extended dry periods in 2015, 2016 and 2017 affected maturation of the rice crop, as required water was not available at the critical point in the plant life cycle. The choice of planting short duration rice varieties (3 months – "Bala wee") or long duration rice varieties (5 months – "Mawee") is made at the beginning of the season based upon what rainfall has occurred at that time of planting. Many farmers choose long duration rice varieties, which provide a higher yield, banking on the weather being consistent with their expectations from the rainfall at planting time but changing rainfall patterns are resulting in only short duration rice producing a reasonable yield.

Baseline efforts and investment

64. Moragahakanda Multi-Purpose irrigation and power generation project at the cost of 64 USD Million (proportional amount for the project area out of the total investment of 370 USD Million) by the Ministry of Mahaweli Development and Environment with ADB as the funding source is the main baseline project in the area. The Amban Ganga portion of the Moragahakanda project is relevant for the proposed GCF project (as apportioned). The purpose is to support downstream farmers with irrigation and drinking water to ensure high productivity in existing lands and cultivate new lands while meeting the drought related challenges. Water resources from the Knuckles upper catchment, in the form of surface, stream and ground water is one of the key inputs to the Moragahakanda scheme. The volume and frequency of water supply is affected by climate induced irregularities in the rainfall patterns. In addition, the higher rainfall intensity driven erosion and resultant siltation reduces the water holding capacities of structures in the Amban Ganga Reservoir area and is generally true for both upstream and downstream tanks too. This baseline investment is completed in 2018 and the current inputs in the project area is an investment of

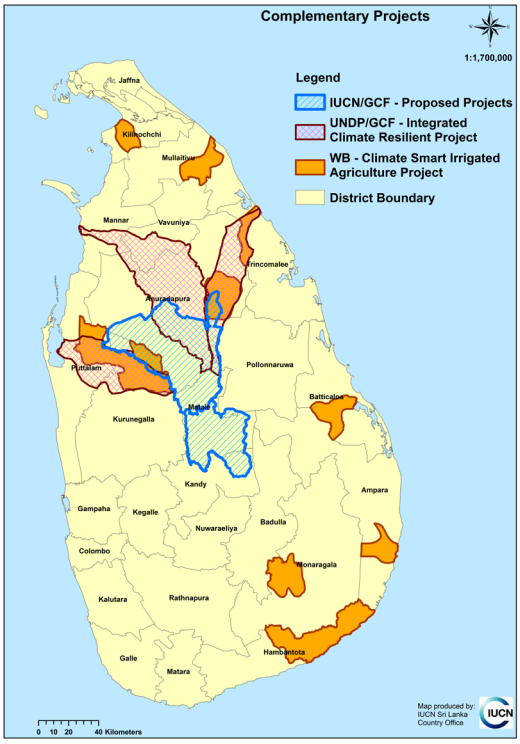
about 1.6 million USD per annum for catchment protection, which is inadequate given the increasing climate induced impacts.

65. To support the agriculture, in addition to irrigation water, the Government invests on fertilizer subsidy, poverty alleviation and other common services such as education, health and social welfare. Government investments also include the work on environment governance through Central Environment Authority (CEA) and the Ecotourism promotion work through the World Bank, about 0.2 million, using the natural beauty of the upper catchment of the Knuckles area.

66. Drinking Water Supply Projects by the National Water Supply and Drainage Board (NWSDB) valued at 6.5 million USD are aimed at providing safe drinking water by purifying the source water. The source water supply is affected by climate change in terms of quality and quantity. Quantity is affected by the droughts and the quality is impacted by increased sedimentation and chemical loadings due to intense rainfall related erosivity. GCF investment will increase the water availability, improve quality and address water use efficiency.

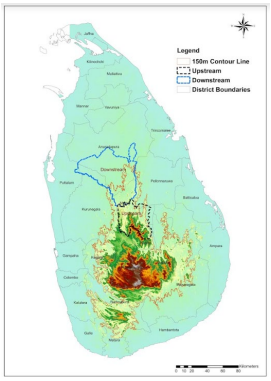
67. In the downstream area, the Agriculture Modernization Project of the Government is investing about 4 million USD from World Bank to strengthen the famer technology, improve water and energy efficiency, crop selection etc. as inputs. It will also improve supply chains, market establishments for farmer products including food processing. In addition, the Ministry of Primary Industries and Social Welfare promotes export agriculture; Dept. of Agriculture extension contributes towards transferring best practices to the field, training staff, dedicated support in providing plant breeding and analysis support; Land Use Policy Planning Department (LUPPD) led value additions in designing, training on land use options and carrying out new land use plans for uplands at different scales.

68. The Smallholder Tea and Rubber Revitalization Project valued at 7.8 million USD by the Ministry of Plantations with IFAD as the funding agency is aimed to support smallholder tea plantations, usually managed by private companies. The investment is expected to improve the lifestyles of the plantation communities through management improvements and limited investments as structural adjustments. Plantations have reduced their investments in conservation in the recent past due to financial difficulties. This will be a complementary initiative to GCF investment in the plantation areas. Poor conservation investments in the plantations contribute towards land degradation. Climate change is further aggravating the extent of degradation due to high erosion in poorly managed lands sparking an irreversible trend in land degradation and poverty.



69. Although not taken as co-finance, this GCF Investment project (Blue outline in the figure) complements well with two large complementary climate smart projects designed to provide irrigation water. They are the (UNDP/GCF) projects implemented through the Ministry of Mahaweli Development and Environment (Purple line border in the figure) focusing on integrated water management to improving water supply systems to meet droughts. The second project is the World Bank funded project of USD 125 million through the Ministry of Agriculture titled Climate Smart Irrigated Agriculture focusing on improvement of water use efficiency – marked by brown patches in the figure.

70. The Climate Resilient Integrated Water Management Project (34 million USD through GCF/UNDP) aims to improve the water holding capacity (tank rehabilitation) in selected areas of the Mi Oya, Malwathu Oya and Yan Oya command areas (Purple lines in the figure above). The proposed project complements the UNDP/GCF project by improving the availability and reliability of water provision through better catchment management and improved canopy structure for cloud interception. Therefore, the rehabilitated tanks and irrigation systems will have more water, especially in the drought seasons due to this investment project, thus demonstrating the complementarity. Similarly, the new World Bank funded Climate Smart Irrigated Agriculture Project – brown patches in the map) is also benefiting from the increased water supply through this investment to the irrigated area. On the other hand, as the World Bank investment will improve the efficiency of water use, it will help to add value to the additional water harvested through this project investment. Annexure 15 to this FP is a letter from WB project on potential synergy also highlighting over 20 million USD parallel financing to this project.



71. Government as a national policy [24] prioritized the conservation of Central Hills or Fragile Area (above 150 m contour line) to ensure the availability of water for agriculture and ecosystem services helpful in climate resilience and socio-economic development. It also propose a population reduction in the national policy to provide room for conservation. As such Government strategically use the GCF "Readiness" project and "REDD+ Investment Strategy" framework[25]" to device approaches (reduce degradation and improve green cover etc.) in the Central Hills. This investment project will serve as the first comprehensive pilot that combines multi-agency efforts covering about 16% of the total Fragile area. The results and experience of this project implementations, including the PES, Decision Support Systems and other innovations are expected to provide the guidance towards scientific, participatory climate resilient applications for investments to climate proof and conserve the balance 84% of the Central Fragile Area.

Gaps in Baseline Policy Environment

72. The project will support the policy improvements to ensure mainstreaming of climate resilience in land use planning, incorporation of PES in national budgets and plans etc. Illustrative areas included:

- Policy on data generation and sharing to strengthen decisions on climate resilience and support science-based decision making. Currently there is limited organized effort to collect data on the minimum set of variables required for modeling and simulation to support policy and decisions. Limited investments to measure/collect data with adequate accuracy, frequency and resolution. For example, the climate resilience needs, weather, soils, stream flow and water quality (sediment, fecal coliform, BOD, COD, Nitrogen, Phosphorus etc.) and land use characteristics among others.

- Policy environment to formalize the use of PES in climate resilient and ecosystem management. Currently the concept of PES is designed for the benefit of state agencies and to receive funds to national coffers. The communities who contribute to conserve and manage the ecosystems providing the environment services are not compensated nor rewarded.

- Policy articulating the potential land uses and limitations in the central hills. Present land use of central highlands is affecting the canopy structure that is directly relevant to rain capture. The same poor land uses are associated with land degradation, siltation of reservoirs and connected to climate resilience and the disasters such as droughts, landslides and floods.

[24] National Physical Planning Policy – 2050 section 5.1.3. on "Central Fragile area" - https://www.dropbox.com/s/lp9okucpxrwutos/National%20Physical%20Planning%20Policy%20-%202050.pdf?dl=0
[25] National REDD+ Investment Framework - https://goo.gl/3MSZBh

- Enabling Policy environment to use of Green Listing (Nature, Culture and Heritage) approach to enhance community income and engage the climate affected vulnerable poor. Currently there are multiple social welfare schemes to support the vulnerable, but the beneficiaries are not engaged in development. This Govt. investments on subsidies could be leveraged and made it compulsory for the beneficiaries and vulnerable groups to be part of the green activities that generate income for them while helping conservation. Connecting these groups with PES would be more meaningful and sustainable to minimize subsidies.

- Policy on the maximum pollutant (including sediment) loading for a given sub-watershed. Pollution from agriculture, industry, municipal streams and other hazardous waste are increasing and taking away the development gains through sicknesses known and unknown. Climate induced rain and temperature may aggravate the same. Using US Environment Protection Agency, "Total Maximum Daily Loading (TMDL)" approach the project may test pilot a similar local approach in a participatory manner at sub-watershed scale among communities and agencies and develop policies.

- Policy and approach to quantify, mainstream and use environment services in sub-regional planning including disaster resilience. Decisions taken at national and sub-national levels do not account for environment services in planning and the cost and benefits related to ecosystem-based disaster risk reduction. Public and donor resources are spent on disaster response (droughts, floods and landslides) without realizing the connection between ecosystem-based risk reduction and losses.

- Policy and guidance on abandoned tank rehabilitation. Currently the abandoned tanks are been rehabilitated using heavy machinery without much attention to the hydrologic and traditional knowledge related to tanks in the country. A protocol on tank rehabilitation is much needed.

- Policy and protocol for standards and labelling for value added products developed at the community level. Current, market practices do not pay much attention to labelling and standards for community level products. As a result, the maximum value of the product is not received by the very community.

C.3. Project / Programme Description

Project objective, outcomes and impacts (Theory of Change - TOC)

73. The project area links a critical climate sensitive upstream catchment (that we refer to collectively as the Knuckles area) with the highly climate vulnerable downstream command area to which it supplies irrigation water. The key problem that the project addresses is land users' lack of capacity to adapt to climate change, which lies at the nexus of a series of worsening climate change impacts and a series of barriers and constraints acting to address them. Causal factors for climate impacts and the barriers and constraints to addressing them interact and are interlinked, creating a vicious spiral of upstream catchment degradation that undermines agricultural production in downstream irrigated areas already stressed by higher temperatures and more frequent and severe droughts. This results in climate change negatively impacting livelihoods and food security in both the upstream and downstream rural populations.

74. The project makes direct interventions in the upstream area to help people adapt to climate change by managing their land and water more sustainably and profitably. This improves livelihoods of people in the upstream catchment (200,331 female and 183,759 male) while also contributing through environmental protection of the catchment (166,254 ha) to maintaining the irrigation water supply to the downstream area (506,264 ha; 122,150 of which are irrigated rice), where the project intervenes with advice on climate smart agriculture to ensure that efficient use is made of the water in downstream agriculture thereby benefiting the very climate vulnerable dry zone population (489,684 female and 469,442 male). The project therefore has an overall reach of 672,518 ha and 1,343,216 people.

75. The project objective is to generate resilient livelihoods and improved food security for subsistence farmers through capacity to adapt to climate induced change in critical upstream and downstream rural communities in Sri Lanka, including protection of the ecosystem service flows that connect them. The project interventions will also improve the canopy structure of the vegetation in the upland areas, thus enhancing cloud interception and increased rain capture.

76. This investment project contributes to three GCF adaptation impacts areas:

- increased resilience of the most vulnerable communities
- increased resilience of health, well-being and water and food security and
- increased resilience of ecosystems and ecosystem services

77. To achieve this, actions are required both to promote sustainable land use and profitability of farming and plantation management that can sustain it in upstream areas, as well as to promote efficient use of irrigation water and climate adapted agriculture in the downstream area (the intermediate project results).

78. Downstream area hydropower operators and farmers and industries related to agriculture receives their water inputs from the upland catchments. Govt. willingness to develop a PES schemes is a clear recognition of the value of catchment restoration. The PES is expected to provide the necessary investment to maintain catchment protection in the upstream. Both upstream and downstream populations face problems of food insecurity, which has been a stubborn indicator to shift in Sri Lanka (nationally WFP estimate that 22% of people are undernourished), despite the overall progress in terms of economic development[26].

79. In addition to the adaptation benefits, this investment project is based on modification of the canopy structure and restoration efforts, that will reduce land degradation and will provide a range of mitigation benefits. These were not considered in the economic analysis but estimated separately as complementary benefits using EX-ACT tool of the Food and Agriculture Organization of the United Nations.

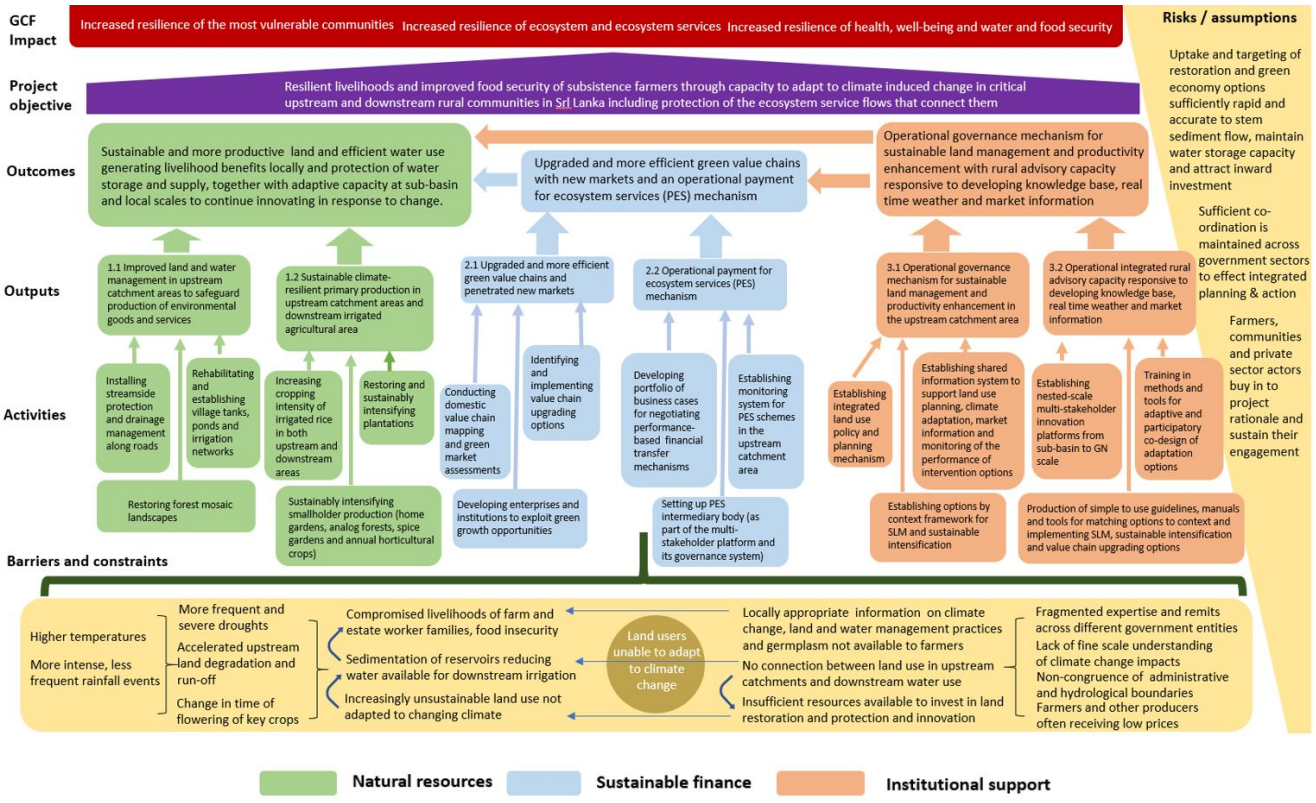
80. Catchment protection and adoption of climate adapted agricultural practices while necessary are not, enough on their own to tackle climate adaptation. For sustainability and success, the adaptation interventions need to be programmatically coupled with value chain upgrading to generate enough revenue from land use to make it sustainable. The growth of national and global markets for green products and services provides key opportunities to make climate adapted land use profitable enough to be sustainable. To address this, the investment project focuses on assisting GoSL in overcoming barriers and constraints that land users face in adapting to climate change with the following main thrusts on:

- assisting people to adopt improved **natural resource management (component 1 with outputs 1.1 and 1.2**) principally in the upstream catchment area, but also addressing the efficient use of irrigation water and food security in the downstream area (the green cluster of nodes in the center of the diagram);
- putting in place **sustainable financing (component 2 with outputs 2.1 and 2.2)** to enable people to invest in catchment protection and sustainable land use; through value chain upgrading and establishment of payment for ecosystem services schemes, respectively (the two blue clusters of nodes either side of the central green cluster of nodes in the diagram).
- providing **institutional support (component 3 with outputs 3.1 and 3.2)** to develop appropriate governance mechanisms, information systems and rural advisory services capable of delivering appropriate land use options across the project area (the salmon coloured nodes on the left- and right-hand sides of the diagram).

[26] http://www1.wfp.org/countries/sri-lanka accessed 1/06/2018

81. The project design and the Theory of Change (TOC) in the proposed project is organized under three main components with Component 1: Natural Resources (Green with outputs 1.1 and 1.2); Component 2: Sustainable Finance (Blue with outputs 2.1 and 2.2) and Component 3: Institutional Support (Brown with outputs 3.3).

82. The project objective is described as **resilient livelihoods and improved food security of subsistence farmers through capacity to adapt to climate change** in critical upstream and downstream rural communities, including protection of the ecosystem services that connect them. In the Theory of Change (TOC) diagram below, the six outputs are presented in three groups with two outputs in eacy group. The natural resource management group (NRM) outputs 1.1 and 1.2 are presented in green and aim to - address sustainable and productive land and water use; the sustainable financing outputs 2.1 and 2.2 presented in blue aim to improve Natural Resource Management; and the institutional support outputs 3.1 and 3.2 presented in brown is designed to promote sustainable financing and improve the governance of natural resources. These three groups taken together addresses the barriers and constraints for land users to adapt to climate change as highlighted in the yellow box at the bottom part of the TOC diagram.



83. Details of executing and implementing agencies against each component, output and activity has been provided at the end of the activity descriptions.

84. More infrastructure or hardware related measures will be included in activities 1.1.1, 1.1.2, 1.1.3, 1.2.1, 1.2.2 and 1.2.3. The remaining activities will be mostly non-structural measures.

Outputs, risks and assumptions

Output / activity	Risks	Assumptions
1.1 Improved land and water management in upstream catchment areas to safeguard production of environmental goods and services		
Installing streamside protection and drainage management along roads	Lack of co-ordination across government sectors associated with roads and water; lack of buy in from local communities to engage in required activity.	Existing social capital and governance mechanisms can be harnessed to effect project objectives.
Restoring forest mosaic landscapes	Lack of co-operation amongst farmers and forest authorities.	The integrated and inclusive governance mechanisms in the project will foster required co-operation amongst stakeholders.
Rehabilitating and establishing village tanks, ponds and irrigation networks	Lack of timely flow of funds to support rehabilitation activity.	Project implementation modalities ensure adequate fund flows.
1.2 Sustainable climate-resilient primary production in upstream catchment areas and downstream irrigated agricultural area		
Increasing cropping intensity of irrigated rice in both upstream and downstream areas	Upstream: farm households don't invest in water system rehabilitation Downstream: reservoir capacity not enough to provide irrigation water	Upstream: project modalities ensure farm households are prepared to invest their labour in water system rehabilitation. Downstream: watershed rehabilitation reduces sediment flow and maintains sufficient water storage capacity in reservoirs.
Sustainably intensifying smallholder production (home gardens, analog forests, spice gardens and annual horticultural crops)	Farm households not interested or able to invest in intensification	Options by context modality of project results in interventions suitable for different types of households in different places.
Restoring and sustainably intensifying plantations	Fractious interactions amongst plantation companies, estate workers and adjacent farmers.	Project modalities allow navigation between estate worker empowerment and plantation company profit.
2.1 Upgraded and more efficient green value chains and penetrated new markets		
Conducting domestic value chain mapping and green market assessments	Lack of co-operation form private sector actors	Market opportunities perceived by private sector to be worthy of investment

Developing enterprises and institutions to exploit green growth opportunities	Options not attractive to would be entrepreneurs	Market opportunities perceived by would be entrepreneurs to be worthy of investment
Identifying and implementing value chain upgrading options	Lack of engagement in value chain upgrading by private sector actors.	Consumer pressure continues to exert pressure for buyers of agricultural produce to operate against sustainability standards
2.2 Operational payment for ecosystem services (PES) mechanism		
Developing portfolio of business cases for negotiating performance-based financial transfer mechanisms	Lack of co-operation form private sector actors	Payment for ecosystem services opportunities perceived by private sector to be sufficient to engender their co-operation.
Setting up PES intermediary body (as part of the multi-stakeholder platform and its governance system)	Lack of willingness of key stakeholders to engage with multistakeholder platforms	Payment for ecosystem services opportunities perceived by key stakeholders to be sufficient to engender their engagement.
Establishing monitoring system for PES schemes in the upstream catchment area	Lack of tractable indicators that can be readily measured	Dashboard development in the project delivers trackable indicators at resolution fine enough to enable connection of land use change to ecosystem service flows
3.1 Operational governance mechanism for sustainable land management and productivity enhancement in the upstream catchment area. Establishing integrated land use policy and planning mechanism.		
Establishing integrated land use policy and planning mechanism	Stakeholders not prepared to engage with policy and planning mechanism	Stakeholders perceive engagement with the policy and planning mechanism as contributing to their empowerment and so worth engaging with.
Establishing options by context framework for SLM and sustainable intensification	Insufficient performance data available for robust analysis of what options work where and for whom.	Combinations of meta-analysis, modelling and trial data within the project will allow determination of suitability of different options for different people and places.
Establishing shared information system to support land use planning, climate adaptation, market information and monitoring of the performance of intervention options	Stakeholders not prepared to engage with SHARED engagement process.	Stakeholders perceive engagement with the SHARED process as contributing to their empowerment and worth engaging with.
3.2 Operational integrated rural advisory capacity responsive to developing knowledge base, real time weather and market information		
Establishing nested-scale multi-stakeholder innovation platforms from sub-basin to GN scale	Aggregation from GN to sub-basin scale is problematic.	Facilitated development of innovation platforms at GN level will engender sufficient co-operative will for groups to co-ordinate at larger scales.

Production of simple to use guidelines, manuals and tools for matching options to context and implementing SLM, sustainable intensification and value chain upgrading options	Insufficient data on suitability of options for different contexts	Combinations of meta-analysis, modelling and trial data within the project will allow determination of suitability of different options for different people and places.
Training in methods and tools for adaptive and participatory co-design of adaptation options	Lack of participation in training by key stakeholders	Project modalities ensure that training is attractive for intended participants.

Summary of components

Outcomes (O)

85. In order to make and sustain climate-adaptation through better management of natural resources, in addition to direct land use interventions with farmers and other land users (Component 1), the project will establish sustainable financing for it, through upgrading value chains and the development of a PES scheme to support catchment protection (Component 2). To achieve this, the project will also strengthen institutions through developing governance mechanisms that reconcile non-congruent hydrological and administrative boundaries as well as establishing the information systems and climate-responsive rural advisory services, that are required to enable land users to adapt to change (Component 3).

Component 1

86. This component focuses on improving land and water management with two key outcomes: safeguarding ecosystem goods and services generated in the upstream Knuckles catchment area (Output 1.1); and increasing productivity and climate resilience of primary production in both the upstream catchment area and the downstream command area to which it supplies irrigation water (Output 1.2).

Output 1.1. Improved land and water management in upstream catchment areas to safeguard production of environmental goods and services

87. This output focuses on providing locally relevant information and resources to effect best practices in catchment restoration and protection thereby addressing the key constraints:

a) locally appropriate information on climate change, land and water management practices and appropriate germplasm to affect them are not available to farmers and other land users in the upstream catchment area; and
b) sedimentation reducing water availability for downstream irrigation.

These are addressed through several interventions such as:

i. streamside protection and drainage management along roads;
ii. rehabilitation and establishment of village tanks, ponds and irrigation networks; and
iii. restoration of forest mosaic landscapes.

Key behavioral changes induced here are for farmers, foresters and plantation companies to adopt catchment protection practices, made possible by recommendations customized to local circumstances, co-adapted with local stakeholders to their circumstances and in the long-term sustaining a continuing culture of innovation and adaptation through local stakeholders co-learning about the principles of adaptation rather than only following externally provided prescriptions.

Output 1.2. Sustainable climate-resilient primary production in upstream catchment areas and downstream irrigated agricultural area conducted

88. This output rests on two key premises: that water yield of catchments can be sustained through catchment protection, so that Output 1.1 will deliver a greater and more reliable quantity of water for downstream irrigation and secondly that this water can be more efficiently used in downstream agriculture through improved irrigation methods and climate adapted cropping choices and management (including those contributions by UNDP and WB projects described in para 64. It also addresses the constraint that agricultural practice in the upstream catchment area is often not well adapted to climate change (more intense rainfall events and increasing wind events and speeds) and so faces low and declining productivity. In contrast to more direct interventions in the upstream, the emphasis with downstream farmers is to provide climate information and relevant climate adaptation options focused on improving water use efficiency. These constraints are addressed through interventions on:

- increasing cropping intensity of irrigated rice in both upstream and downstream areas;
- promoting sustainable intensification of smallholder production; and
- restoration and sustainable intensification of plantations (some sunk investment in restoration from project funds coupled with value chain upgrading from Output 2.1 to sustain).

A key focus will be on restoring plantations to productive landscapes that can sustain the nutrition of estate workers and their families through development of food forests, as well as reversing land degradation through soil and water conservation while operating at adequate profit level to make them sustainable enterprises that will attract continued inward investments (assisted by Output 2.1). Exemplar landscapes will be set up on this model to demonstrate their practicality. Climate-proofed tree species choices will be promoted from suitability modelling with downscaled climate change predictions. It requires behavioral changes in the rural advisory services and amongst farmers to come together in a partnership to, on one hand to provide customized options to farmers, and on the other, to evaluate the performance of these options across contexts and use smartphone Apps to record and share these data and perceptions.

Component 2

89. This component is focused on sustaining improved land management through the establishment of sustainable financing. This involves two major outputs: upgraded value chains developed with the private sector (Output 2.1) and the establishment of a PES mechanism to transfer value realized from using water derived from the upstream catchment to fund catchment protection (Output 2.2).

Output 2.1: Upgraded and more efficient green value chains and increased links to new markets developed

90. This output spans both upstream and downstream target beneficiaries by providing opportunities to sustain adaptive management through capturing enough resources to make local agriculture and associated businesses sufficiently lucrative to survive and prosper. This principally addresses the constraints of:

- farmers and other producers often receiving low prices for their produce and
- insufficient resources being available to invest in land restoration, protection and innovation to address climate induced change.
- lack of opportunities to include innovative internationally recognized mechanisms and standards to enhance the income using nature, culture and heritage in the area

It involves close co-operation with the private sector around key areas of activity:

i. domestic value chain mapping and green market assessments;
ii. enterprise and institutional development to exploit green growth opportunities;
iii. identification and implementation of value chain upgrading options; and
iv. taking advantage of new concept such as IUCN “Green Listing.”

Key behavioral change will be required amongst farmers and other value chain actors in the private sector, around developing and harnessing business skills and forming new forms of business relationships.

Output 2.2: Payment for ecosystem services (PES) mechanism established

91. This output focuses on how upstream target beneficiaries can sustain land use practices that protect ecosystem services in the catchment by providing funding to maintain them. This principally addresses the constraint that there is a lack of connection between upstream land use and downstream water use as well as contributing to overcoming insufficient resources being available to invest in catchment protection. These constraints are addressed by developing PES annual work plans:

- developing a portfolio of business cases to negotiate performance-based financial transfer mechanisms;
- setting up PES intermediary bodies as a part of the multi-stakeholder platforms at sub-basin scales; and
- developing a monitoring system for PES schemes and capacity to adaptively manage them in the upstream catchment area.

In addition, using the water balance model developed by the end of Year 3, the project will monitor supply and demand of water produced by the Knuckles Range and feed this into the planning of this PES mechanism.

This involves behavior changes that the Government has already committed to, through part of the co-financing with hydropower taxes, with respect to transferring of resources from water users back to land users acting to protect the catchment. This also requires broader development of awareness amongst those who benefit from ecosystem services generated in the upstream catchment of the need and costs of maintaining the ecosystem flow and hence the legitimacy of paying towards catchment restoration and protection.

Component 3

92. This component focuses on the provision of institutional support to enable farmers and other landowners in the upstream catchment and downstream command area to adapt their land use to climate change, making their livelihoods and landscapes more resilient.

Output 3.1 Governance mechanism for sustainable land management and productivity enhancement in the upstream catchment area established

93. This output addresses two constraints:

a) fragmentation of expertise across different GoSL ministries and departments; and
b) non-congruence of administrative and hydrological boundaries.

These constraints are addressed through:

i. novel application of stakeholder engagement methods to develop an integrated land use policy and planning mechanism at sub-basin scale with the involvement of key agencies;
ii. innovative development of a shared information system to support land use planning, climate adaptation, market information and monitoring of the performance of intervention options; and

iii. development and refinement of options by context framework for sustainable land management and sustainable intensification guided by the monitored water balance, erosion and ecosystem services, with the support of computer models and stakeholder agency discussions.

The game changer here is to set up multi-stakeholder innovation platforms at sub-basin scale that facilitate integration horizontally (across sectors and disciplines). This involves setting up new governance structures (implementation teams) that integrate across non-congruent administrative (Divisional Secretariat - DS) and hydrological (sub-catchment) boundaries described in detail in the management arrangements (C.7) of this document.

This involves significant behavior changes amongst the key stakeholders comprising the implementation teams in terms of sharing information, working conjointly on a problem-solving basis rather than from their own disciplinary or sectoral viewpoint and placing emphasis on the co-design and adaptation of interventions with local level stakeholders and co-learning about performance of options together.

Output 3.2. Integrated rural advisory capacity responsive to developing knowledge base, real time weather and market information created

94. This output focuses on tackling the key constraint of a lack of understanding about climate impacts, and the contextual conditionality of options to address them, at a fine enough spatial and temporal resolution to advise upstream land users on appropriate options for their specific contexts. Proposed interventions are:

- establishment of nested-scale multi-stakeholder innovation platforms from sub-basin down to local Grama Niladhari (GN) division scale and extensive capacity development;
- develop a comprehensive water balance approach considering demands and supplies and the variations as a result of climate change, project interventions and other developments and build capacity of key national institutions in the context of monitoring and managing the water supply-demand system even after the project ends;
- training in methods and tools for adaptive and participatory co-design of adaptation options using real time or periodic measurements of ecosystem variables including water budgets; and,
- development of simple to use guidelines, manuals and tools for matching options to context and implementing SLM, sustainable intensification and value chain upgrading options.

This involves a significant behavior change amongst the key stakeholders in terms of vertical integration (across scales of operation) and embracing a participatory approach that recognizes the importance of local perspectives on the appropriateness and performance of different land use options as well as developing the capacity to operate a responsive rural advisory system capable of tailoring advice to different contexts and in response to real time information about changing conditions.

Description of activity details under component outputs

Component 1: Climate-resilient sustainable land management (outputs 1.1 and 1.2)

Output 1.1: Improved land and water management in upstream catchment areas to safeguard production of environmental goods and services

95. This involves supporting action at both community and individual household level. For the village pond, irrigation network and road network, community action is required *via* the GN innovation platforms established in 3.3.1 with technical (RAS) and financial (from the PES mechanism) support, coordinated by the sub-basin implementation teams. Priority areas for intervention will be determined based on a sub-basin planning process in 3.1.1 using information derived from the information portal in 3.1.2 and funded where appropriate *via* the PES mechanism in 2.2.1. Initial funding will be provided as sunk costs directly from project funds to initiate catchment protection and improved water supply for upstream households and farms while the PES is gradually phased in to maintain best practice over the life of the project, so at the end of the project a sustainable mechanism is in place to maintain appropriate water flow and quality and control across the sub-basin implementation areas. The stream and pond network for the upstream area includes 32 abandoned village tanks identified for rehabilitation.

Activity 1.1.1: Streamside protection and drainage management along roads undertaken (IUCN)

96. These are conservation measures focused on the linear stream and road networks. This will include vegetation management to control run-off and enhance infiltration (this will have benefits for reducing reservoir spills (dam safety) and sedimentation and therefore downstream irrigation supply); and soil health management (soil C, water retention, biotic function) and focus on streamside management—led by the Department of Agrarian Development in the Ministry of Agriculture. Drainage management will also be implemented along roads and in relation to other soil disrupting construction activity (to prevent run-off and increase groundwater recharge, take water off rather than allowing it to accumulate down the hill) with community management to maintain dykes and clear silt. The water harvested in this way will be diverted to increase household and field water supply. This will involve the Road Development Authority in Ministry of Highways and the Provincial Roads Authority in the Provincial Councils.

97. Roads are a source of huge volumes of runoff that can be safely collected and stored either above or below ground for multiple uses including recharge of groundwater; to support the establishment and growth of trees along and besides the roads; for diversion into water pans and small dams for livestock and crop production. However, to gain fully from roads, the challenges arising from governance, social access to the resources along roads and the use of appropriate techniques to sustain the roads need to be addressed. Policy makers, planners and communities will first be sensitized to the importance and possible options for drainage management along roads. ICRAF works closely with the MetaMeta initiative in the Netherlands, who are currently implementing a global Roads for Water and Resilience project[27] and the relevant government ministries in Sri Lanka will be linked to the roads for water learning alliance, to foster learning and exchange of knowledge. This alliance brings together implementers, trainers, researchers, funders and policy makers involved in making roads work for natural resources management and resilience.

Activity 1.1.2: Rehabilitation and establishment of village tanks, ponds and irrigation networks conducted (IUCN)

98. Rehabilitation and development of approximately 100 village level ponds and irrigation channels including both direct rainwater-harvesting and tapping stream networks. This will include water flow and quality,

[27] Roads for Water. 2018. Roads for Water and Resilience. [ONLINE] Available at: http://roadsforwater.org. [Accessed 19 June 2018]

stream erosion and ground water re-charge monitoring at GN level and will be led by the Department of Agrarian Development in the Ministry of Agriculture.

99. Based on extensive experience of promoting rainwater harvesting in several countries[28], rehabilitation and development of village level ponds and irrigation channels (including both direct rainwater-harvesting and tapping stream networks) will be guided by a GIS based method for mapping rainwater harvesting options across biophysical and socioeconomics context[29]. The GIS-based tool will be used to generate thematic maps for prioritizing interventions in the target upstream areas through multi-criteria analysis. The tool employs basic data including administrative and infrastructural information (political subdivisions, roads, electricity); land and soil information (land use, land cover, geology, lithology, geomorphology, soil types, topographic data); climate information (temperature, precipitation, PET, ACZs); and water resources information (hydrology, hydrography, hydrogeology). The tool will quantify rainwater harvesting potentials across the target upstream area, guiding land users in locating appropriate sites for capturing and storing rainwater. Since the method considers relevant biophysical and socioeconomic parameters, the land with the best capability for agricultural production (either crop or livestock) is matched to the available water resources within the landscape/watershed. The tool produces thematic maps showing areas suitable for practicing various rainwater harvesting options, such as village tanks and farm ponds. Areas undergoing severe land degradation are identified, the hotspots mapped, and drivers of such negative land use identified and investigations for corrective measures done. The entire process is undertaken in full consultation with land users, local authorities and other stakeholders. The tool enables communities and local authorities to develop a sub-catchment management plan as a mid-term tool for prioritizing actions on the ground. ICRAF will work with the relevant staff in the Department of Agrarian Development in the Ministry of Agriculture to apply the method to the upstream target area. A monitoring system will be established by the Department of Agrarian Development in the Ministry of Agriculture. This monitoring system will include water flow (quantity) and quality, stream erosion and ground water re-charge monitoring at GN/minor-watershed level.

Activity 1.1.3: Restoration of forest mosaic landscapes undertaken (IUCN)

100. This component focuses on restoring degraded forests within protected areas and forest fragments, re-growing forests in priority areas for the supply of ecosystem services, especially for watershed protection, and the planting of trees outside forests for improved sustainability and livelihoods. The project will employ a Forest Landscape Restoration (FLR) approach such as IUCN/World Resource Institute developed ROAM [30]. The three pillars of FLR are (i) inclusive and devolved natural resource management, which ensures local communities' benefit for restoration activities and hence supports long-term sustainability of interventions; (ii) land use planning through multi-sectoral and multi-level governance, with a focus on ecosystem service delivery; and (iii) integrating a diversity of restoration technologies across the landscape to optimize livelihood and environmental outcomes. FLR is more than just planting trees. Fundamentally, it involves addressing the degradation drivers and transitioning a whole landscape to a restoration trajectory to meet present and future needs and to offer multiple benefits and land uses over time. In this project, key actions will include assisted natural regeneration and planting of diverse tree assemblages to restore degraded forests, and various agroforestry interventions, including climate smart agriculture, home gardens and boundary plantings. A focal area will be to enhance the ecosystem service provisioning of existing timber plantations (covering over 2,000 ha in the upstream catchment area), through understory rehabilitation and under-planting with species more suited to the local environment and people's needs than the pine and eucalyptus that were planted previously and that have been associated with degradation of ecosystem services in key parts of the Knuckles upstream catchment area.

[28] Maimbo M. Malesu, Jan de Leeuw, Alex Oduor. *Water harvesting experiences from the southern and eastern Africa network* [J]. Journal of Southeast University (English Edition), 2014, 30 (2): 186-191. [doi: 10.3969/j.issn. 1003-7985. 2014.02.009]

[29] Mati, B., Malesu, M. M., Khaka, E., Oduor A, R., 2006. Mapping the potential for Rainwater harvesting technologies in Africa: A GIS overview on development domains for the continent and nine selected countries. Technical Manual No. 7 Nairobi, Kenya: World Agroforestry Centre (ICRAF). ISBN: 92 9059 2117

[30] Restoration Opportunities Assessment Methodology (ROAM) - https://www.iucn.org/theme/forests/our-work/forest-landscape-restoration/restoration-opportunities-assessment-methodology-roam

101. Equally important will be the restoration of degraded grassland areas, which have thus far defied restoration attempts. Furthermore, the Knuckles area is experiencing rapid climate change and hence ensuring forest resilience and identifying appropriate species and genetic compositions of any plantings will be crucial. ICRAF will employ its experience in tailoring restoration approaches and embedding learning to address these challenges[31]. This activity will involve the Forest Department, Central Environmental Authority, Ministry of Mahaweli Development and Environment; Department of Agrarian Development, Ministry of Primary Industries; Wildlife Department, Ministry of Sustainable Development; Land Reform Commission, Ministry of Lands. The inclusive and developed decision-making will be conducted through the GN innovation platforms established in 3.3.1.

Output 1.2: Sustainable climate-resilient primary production in upstream catchment areas and downstream irrigated agricultural area conducted

102. Climate-adapted options for sustainable intensification will be matched to context using the framework developed in 3.1.3 using tools developed and refined in 3.2.3.

Activity 1.2.1: Increasing cropping intensity of irrigated rice in both upstream and downstream areas (MMD&E)

103. This activity focuses on the development of smart farming techniques to grow appropriate climate adapted varieties and make efficient use of irrigation water and fertilizer (maximizing use of organic inputs and recycling) as well as employing integrated pest control based on real time weather and pest incidence data (connected to the information system developed in 3.1.2.). The 130,943 ha of irrigated rice in the project area, over 90% of which is in the downstream command area (see Map below), represents 16% of the total across Sri Lanka[32].

104. Rice varieties are categorized into three types according to the time taken for maturity: short duration (up to 3 months), medium duration (3-4 months), and long duration (4-4.5 months) with the short and medium duration comprising over 93% of the rice production of Sri Lanka. There are two cropping seasons, Maha (from October to February) and Yala (from March to September). Traditional irrigation methods like furrow irrigation (FI) and continuous flooding irrigation (CI) result in a high-water loss. Water saving irrigation methods improve water use efficiency (WUE).

105. The System of Rice Intensification (SRI) that the project will promote is a climate-smart, yield-increasing system that is being utilized by more than 10 million smallholder farmers in over 55 countries. The innovation combines several agronomic practices to boost yields while reducing the use of purchased inputs and water. In contrast to the water intensive continuous flooding method, that causes anaerobic conditions in the soil, under SRI, farmers can practice alternate wetting and drying, increasing air retention capacity of the soil. The technology makes it possible to transplant 8-12 days earlier at wider distances compared to conventional 3-4 weeks old rice seedlings. This allows plants access to more nutrients and sunlight, producing stronger stalks and more tillers. SRI methods have reduced the irrigation requirement by 46-50% compared to conventional practice in Korea[33] and SRI practices produced a 49% higher grain yield with 14% less water than under conventional practices in India[34].

106. In addition to promoting SRI, the project will provide customized advice for enhancing rice productivity using appropriate varieties for each context, storage and processing to maintain quality as well as supporting enhanced production of associated crops for increased dietary diversity. Using seasonal forecasts was shown to increase agricultural income in a system with varying crop costs and returns in

[31] Harrison, R.D., Swinfield, T., 2015. Restoration of Logged Humid Tropical Forests: An Experimental Programme at Harapan Rainforest, Indonesia. Tropical Conservation Science 8, 4–16. https://doi.org/10.1177/194008291500800103;
Gellie, N.J., Breed, M.F., Mortimer, P.E., Harrison, R.D., Xu, J., Lowe, A.J., 2018. Networked and embedded scientific experiments will improve restoration outcomes. Frontiers in Ecology and the Environment 16, 288–294. https://doi.org/10.1002/fee.1810].
[32] AgStat 2013. Socio Economics and Planning Centre, Department of Agriculture, Sri Lanka
[33] Choi Joongdae Gunyeob, Kim Woonji Park Minhwan Shin Yonghun Choi Suin Lee Sunjoo Kim Dongkoun Yun 2014. Effect of SRI water management on water quality and greenhouse gas emissions in korea. Irrigation and Drainage 63: 263–270 (2014)
[34] Thakur, A. K., and N. T. Uphoff. 2017. How the System of Rice Intensification Can Contribute to Climate-Smart Agriculture. Agron. J. 109:1163-1182. doi:10.2134/agronj2016.03.0162

Sri Lanka by allowing more diversified crop choices[35]. This activity will involve the following four key elements.

i) Making better use of irrigation water (higher WUE) through better irrigation management and variety choice

107. The introduction of the SRI method will reduce the amount of water needed to grow rice, as well as reducing methane emissions. The soil is kept moist rather than continuously saturated, minimizing anaerobic conditions, improving root growth and supporting the growth and diversity of aerobic soil organisms. Baseline information on the amount of water being used in the current flood irrigation method will be calculated across the different rice varieties (short and medium duration) and compared to the amount using the SRI and with alternate wetting and drying (AWD). Using data on water provided and rice yields/ productivity, water use efficiencies will be derived across the three systems. This will be computed for different varieties. Baseline figures for the methane emissions across the different watering systems and varieties will also be determined.

ii) Achieving a cropping intensity greater than or equal to 2, with enhanced productivity

108. Nearly 72% of rice in Sri Lanka, is grown during the wet season in dry areas where water resources are already stressed. Suitable high yielding varieties appropriate to the sites will be used for each season. A baseline survey on the current varieties widely used by farmers and their potential yields will be carried out. In order to boost production in the drier season, SRI systems will be used. Under this system, the abundance, diversity and activity of soil organisms' bacteria, fungi, earthworms and other soil biota that improve soil fertility will be enhanced and will contribute to plant growth and health and consequently productivity. Rice seedlings will also be transplanted when young, less than 15 days old with just two leaves, quickly, shallow and carefully, to avoid trauma to roots and to minimize transplant shock. Rice plants will be planted singly and spaced optimally to permit more growth for the roots and leaf area and to keep all leaves photosynthetically active. Applications of fertilizers of organic origin (such as plowing the straw back into the field, green manure, cow dung, poultry manure, and liquid fertilizer) will be encouraged. SRI provides as much organic matter as possible to the soil; while chemical fertilizer gives positive results with SRI practices, the best yields come with organic fertilizers or manures as it helps to improve the soil texture and carbon, that in turn raises soil water retention. Weed control through simple mechanical hand weeders will be promoted that helps aerate the soil and so may outperform herbicides or conventional hand weeding. Other adaptation strategies that will be promoted where appropriate, include adjusting the planting window and use short duration varieties in response to weather forecast information. Capacity needs of the farmers will be done and appropriate awareness raising programs and trainings organized. The validated APSIM-Oryza module will be used to evaluate change in the potential areas for rice cultivation across the project area in response to predicted climate change scenarios[36].

iii) Storing, processing and assuring quality to achieve reasonable prices

109. Climate change has shifted the rain/wet period over the typically dry harvesting period, and thus harvesting rice has become a challenge for farmers because of fewer sunny days, and also the arrival of early winds has forced farmers to harvest wet rice, but they still continue to face challenges to dry the harvested rice as the number of dry sunny days are limited and unpredictable with quick rains and showers spoiling the open-air sun drying methods traditionally used. The project will promote the use of: dryers by individual farmers operating on renewable energy (wind, run of water, hydro, solar); and shelters made from locally available material that will ensure the right conditions of air drying (long slow as opposed to fast which impacts on quality). Purpose-constructed drying floors will also be recommended where there is a need to dry large quantities of grain. These would act as temporary storage facilities. Heated air driers will be recommended for use as fixed bed batch driers, where farmer

[35] Gunda T, J T Bazuin, J Nay and K L Yeung. 2017. Impact of seasonal forecast use on agricultural income in a system with varying crop costs and returns: an empirically- grounded simulation. T Gunda Environ. Res. Lett.12 034001

[36] Fernando M.E.K.K., D.A.B.N. Amerasekara1, R.K. Amarasingha, L.D.B. Suriyagoda, B. Marambe, L.W. Galagedara, G.L.L.P. Silva, R. Punyawardena, D. Parsons and H. Meink 2015. Validation of APSIM for long duration rice varieties in different agro-climatic zones of Sri Lanka. "Building Productive, Diverse and Sustainable Landscapes. Proceedings of the 17th ASA Conference, 20 – 24 September 2015, Hobart, Australia. Web site www.agronomy2015.com.au

collectives are able to afford them. Use of modern milling methods to ensure clean, whole grains and proper sorting of rice for quality will be recommended to ensure quality and hence good market access and prices.

iv) Dietary diversity (though enhancement of what is available across landscapes) and wind issues

110. Increase in wind events and speeds associated with climate change, in the interim season between rice crops, during which farmers try to cultivate a cash crop (typically a 3-month period in which beans, tomatoes and sweet potato are commonly grown) has negatively impacted yield. Recommendations to establish windbreaks or switch to wind resilient short-term crops will be promoted. Participatory development of options for other suitable crops will be made likely to include spices like basil and rosemary, onions, groundnuts or other locally available and marketable crops like cloves, pepper, and cardamom. Attention will also be given to, perennial crops and annuals such as Caryota urens, jackfruit, mango, coffee, cocoa, durian, salad curry leaves, that farmers depend on. Support on processing technology and value addition will, therefore, be a key element in this regard. Considering the limited crop choices of the farmers due to the wind problem, post-harvest losses need to be minimized and value addition options provided. Vegetables can also be processed to facilitate long- to mid-term storage to avoid post-harvest losses and enhance shelf life. This will reduce the impact of reduced prices caused by seasonal excesses in production of these commodities.

Activity 1.2.2: Intensification of Sustainable smallholder production (MMD&E)

111. This will focus on options for sustainable intensification of home gardens, analog forests, spice gardens and annual horticultural crops in the upstream catchment. Interventions include climate proofing of tree species choice, pruning to control distribution of light in mutli-strata systems and improve timber quality and agronomic management.

112. Smallholder farmers are the predominant land users in the upstream catchment area, producing food, tree products and environmental services from small landholdings. Smallholder farmers develop and manage such systems by nurturing trees, along with crops and livestock, on their farms and homesteads. These tree-farming systems are efficient agricultural and natural resource production systems. A prominent component of ‘trees outside the forest’, smallholder tree-farming systems are primarily ‘planted’ systems that restore marginal farmlands where annual agricultural crop production alone is no longer biophysically or economically viable. These systems can also be used to reclaim degraded public lands that have been abandoned, through ‘restoration agriculture’. Smallholder tree-farming systems can include forest-like systems (Analog Forestry) where selected species are integrated in natural and secondary forests. In these systems, farmers cultivate trees to diversify production; generate commodities for home consumption; enhance income through market sales; and reduce risk. Smallholder systems tend to contain multiple species, producing multiple products.

113. In the upstream catchment area, the most prominent and important smallholder systems include home gardens, spice gardens, annual horticultural crops, and analog forests. Home gardens are species-rich, tree-based systems usually occupying lands immediately surrounding or adjacent to the household and are used to produce a diverse array of foods, trees and other products from perennial and annual species. Tree components of these systems yield fruits, vegetables, medicines, spices, timber, poles, fuelwood, and other commodities (coffee, cocoa, tea). Traditionally focused on producing goods for home consumption, the advent of rural infrastructure and market-economies provide an opportunity for home gardens to be more commercially oriented including SPA industry raw materials (extracts and products) and medicinal/eco-tourism. Spice gardens can be considered a type of home garden focused on commercial production of species for local, national and international markets. Common crops produced in spice gardens include cinnamon, pepper, cardamom and cloves. Spice gardens also include timber, fruit, medicinal, commodity tree species and annual crops as secondary components.

114. As the name implies, annual horticultural systems focus on annual crop production. Crops commonly cultivated in these systems include kidney beans, beets, chilies, big onions, green gram, cabbages, bitter gourd, pumpkin, tomato, okra, eggplant, luffa, and long beans. These crops are produced for both household consumption and market sales. Individual farms cultivate a diversity of crops under low input

and rainfed conditions. While focused on annual horticultural crops, these systems also contain tree components that provide both service and production roles. The diversity of tree species is like home gardens and spice gardens.

115. Analog forests are an ecosystem restoration approach, which originated in Sri Lanka, that seeks to model the process of natural forest development and forest service functions in (re)establishing a sustainable ecosystem characterized by a high biodiversity to biomass ratio. Analog forests are designed through a synthesis of traditional and scientific knowledge, to optimize the production and service potential of the system rather than to maximize the productivity of a single species component while enhancing ecosystem diversity and services. While focused on ecosystem restoration, analog forests are also designed to provide economic benefits. Annual species are also components of analog forests.

116. Home gardens, spice gardens, annual horticultural systems, and analog forests can be viewed as a continuum of smallholder systems. From horticultural systems focused on annual crops, to home gardens and spice gardens representing perennial (tree) farming systems, to analog forests being a forest management and restoration approach; all include both annual and perennial species and are concerned with sustainable management. A difference being that home gardens, spice gardens and annual horticultural systems focus on enhancing smallholder livelihoods in an environmentally sustainable manner; and analog forests focus on ecosystem restoration with livelihoods as the secondary objective.

117. Farmers generally simultaneously pursue tree and annual crop cultivation only where these can be properly integrated and maintained. For example, the management practices undertaken to assure good annual crop yields through appropriate cultivation practices, weed control and fertilization also benefit their tree crops. Despite this, most smallholder systems are still suboptimal with regards to management practices and productivity. Farmers are interested in intensifying management to improve their productivity and livelihoods but are often unsure where to focus their efforts. Three key problems exist: farmers have limited knowledge of and access to quality germplasm, particularly for tree crops; limited experience and capacity in intensive tree crop management; and limited information on and access to value-chains.

118. To assist farmers to improve the sustainable intensification of their home gardens, spice gardens, annual horticultural crops and analog forests, this activity will offer a matrix of best-fit 'options by operational contexts'. In other words, the selected 'options' will offer farmers a menu of management practices relevant to their operational 'context'. As conditions regarding land availability and productivity, labor, capital, and other production resources will differ, each farmer can choose and adapt the management options that best-fit their specific conditions. Key options offered will include:

- Enhancing species diversity to reduce climate, biophysical and market vulnerability;
- Strengthening farmers' access to the best-available quality germplasm of priority climate-resilient species, varieties and cultivars that match local biophysical and soil conditions;
- Developing individual and group tree nurseries to empower farmers to independently produce high quality seedlings of priority species;
- Promoting thinning to achieve recommended spacing, remove unproductive trees, remove low value species, and increase the vigor and productivity of the remnant stand;
- Promoting pruning to remove unproductive branches, improve tree vigor and productivity, and increase light levels for understory intercrops;
- Promoting intercropping with annual crops to improve overall system productivity;
- Promoting the production and use of organic mulch and fertilizers to rehabilitate soils, improve water recharge, and produce products for the green economy;
- Exploring the feasibility of drip irrigation for high-value tree crops to improve water use efficiency and increase tree vigor and productivity; and
- Investigating the options of biomass to energy.

119. This menu of options will remain flexible and dynamic through the project period, with additional best-fit options identified collaboratively with farmers and project partners as they are rolled out and their performance evaluated. The options will be offered to farmers through a series of knowledge and capacity building events, including workshops, trainings, cross-visits and field days. The events will be field-

focused and hands-on. The project sub-basin teams will lead the activities with farmer partners and most field activities will occur on the farmer's land. Best-fit options selected by farmers, will be applied directly in their fields. This will assure that the farmer (or land manager) approves of the options selected and provides validation of the selected options that perform under their actual operational context. These events will be supported by the training methods produced under Activity 3.2.2 and the guidelines and manuals developed under Activity 3.2.3.

120. The implementation of best-bet options will include the establishment of 'exemplary landscapes' of key interventions. The exemplary landscapes will serve several purposes: i) sustainable intensification of smallholder production; ii) functional demonstrations of best-fit options; iii) opportunity for farmers to develop innovations; and iv) establishment of venues for future training and cross-visit events. Initial testing of best-fit options on farmers' land and in exemplary landscapes is expected to lead to broad requests for assistance from farmer partners, as well as, spontaneous adoption and innovation by other farmers and communities. This activity will be linked closely and mutually supportive of activities under Output 2.1 on financing systems development.

Activity 1.2.3: Restoration and intensification of sustainable plantations (IUCN)

121. This intervention will include tea, coconut, rubber, timber and large-scale cultivation of spices and include development of landscape planning at estate level and the development of food forests to address the food security of estate worker families, some of whom have entered into contract farming arrangements with estate companies.

122. The Sri Lankan plantation sector cultivates globally traded perennial commodities. The sector is a long-time mainstay of the national economy, a primary employer of the country's labor force, makes important contributions to the national GDP and is a significant source of foreign exchange. Major plantation crops in the project area include tea, coconut, rubber, timber, spices—cardamom, cinnamon, pepper, cloves, and nutmeg—and to a lesser extent fruits, vegetables and other food crops, predominantly for domestic consumption. Except for rubber, the country's major agricultural exports experienced growth between 2010 and 2015. Export earnings increased with agricultural exports comprising one quarter of the total.

123. The plantation sector is comprised of 20 privately managed regional plantation companies and three state owned companies. Despite the positive macro-economic outlook, most plantation companies face challenges due to volatile international markets, low productivity, high estate labor costs, restrictions on plantation management practices, and limited access to long term credit. Many plantations are of a mature age with low productivity and profitability that also reduces climate resilience. This condition is further exacerbated by a history of unsustainable land management, which caused soil erosion, siltation of waterways and degraded the natural capital of the plantations further aggravating climate impacts. As a result, the plantation sector generally lacks the financial resources and confidence to invest in rehabilitation or transformation of their current assets. A closely linked problem is the vulnerability of the plantation workers and their dependent families, whose welfare cannot be improved independently of the economic health of the plantation sector. Downturns in the plantation sector have resulted in under-employment of plantation workers, further putting into stress this population that was already at the bottom of the formal economy sector. Plantation workers have limited access to land, housing, savings, and basic infrastructure. Their location in remote rural areas allow them limited alternative employment and livelihood options, therefore they become prime candidates to experience climate risks as well.

124. To assist the plantation sector and plantation workers to achieve restoration and sustainable intensification of the plantation sector this Activity will offer a matrix of best-fit options by operational contexts. As under Activity 1.2.2, the options will offer plantations and plantation workers a menu of management practices relevant to their operational context; and plantations and plantation workers will be able to choose and adapt the management options that best-fit their specific conditions to improve climate resilience. The options offered to plantations will seek to improve plantation productivity and profitability. This will include the options offered under Activity 1.2.2. Utilizing those options, the project will also work with companies to transform under-performing crops and plantations into food gardens of nutritious and high-value superfood species that target domestic and export demand in the green

economy. Those efforts will include the adoption and development of agri-processing technology for post-harvest value-adding treatment that targets the production of higher-value green economy markets. Potential crops for post-harvest and value-adding processing could include jackfruit, mango, durian, kittul palm, moringa, coffee, cocoa, cardamom, cinnamon, pepper, cloves, and nutmeg. Efforts will also include the intensification of intercropping with high-value short-rotation horticultural crops.

125. The options offered to plantation workers will focus on strengthening their food security and livelihoods by establishing food forest production systems on land allocated to the workers by the plantation where they are employed. All the options offered under Activity 1.2.2 will be available to plantation workers. Utilizing those options, the project will promote the establishment of diverse multispecies systems that combine perennial and annual crops for plantation workers and their families. Diverse multispecies systems are linked to nutritious diets, enhanced livelihoods for farmers and climate-resilient farming systems. Further, such systems support dietary diversity and nutrient adequacy, which support the overall micronutrient intake and family health leading to sustainability and resilience. The combination of perennial and annual crops will provide the best combination of foods with nutrient density, energy content, micronutrients (mineral and vitamins), macronutrients (protein, carbohydrates) and phytochemicals (e.g. antioxidants). Such diverse diets are important to plantation worker families as they are low income earners, have limited access to and ability to purchase nutritious foods, and have limited access to health care facilities.

126. As in Activity 1.2.2, the options will be presented to plantation companies and plantation workers in a series of field focused, hands-on knowledge and capacity building events, including workshops, trainings, cross-visits and field days. Best-fit options selected by plantation companies and plantation workers will be applied directly in their fields, including the development of strategically placed exemplar landscapes. Training methods produced under Activity 3.2.2 and the guidelines and manuals developed under Activity 3.2.3 will support the knowledge and capacity-building events. This Activity will be closely linked and mutually supportive of activities under Output 2.1.

Component 2: Secure financing mechanisms for sustainable land management

Output 2.1: Upgraded and more efficient green value chains and increased links to new markets developed

127. Adoption of more environmentally sustainable land uses will only endure if they are profitable enough to sustain farmers and plantation companies sufficiently for them to continue to invest in agriculture with support from green co-financing facilities and the participation in trade regimes that value and are conducive to sustainable production and processing activities.

Activity 2.1.1: Conduct Domestic value chain mapping and green market assessments for products especially from small holder and subsistence farmers (ICRAF)

128. This involves the detailed geo-referenced mapping of existing agricultural value chains (cash crops, spices, herbs and fruits) to capture their current lengths (vertical upstream to downstream) and breadths (horizontal links to input and service sectors as well as the national system of innovation (NSI)) as well as the identification of respective intra-governance structures. It will result in a detailed overview of actors, especially weaker actors (women, small holder and subsistence farmers) their relationship to each other through business models, their physical location in biophysical and socio-economic systems as well as their placement in the intra-chain governance regime and in the political and macroeconomic systems of governance. The activity will further involve the establishment of modes of regular market analyses and trade regimes conducive to green production and processing methods as well as products plus an identification of Sri Lanka's agricultural value chains in national/regional/global markets qua opportunities of rent appropriation and comparative advantage.

Activity 2.1.2: Provide technical support for Enterprise and institutional development to exploit green growth opportunities for small holder farmers in the uplands (IUCN)

129. This activity involves the development of capacity to operate farms and collective groups as business enterprises. It further involves support to actors to set up soft institutions where needed (based on Activity 2.1.1) such as cooperatives, innovation platforms, producer, agri-business and trade associations or chambers of commerce in key foreign markets. Overall, the goal is to identify bottlenecks and inefficiencies along and across value chains, to co-innovate new green technologies and to stimulate the development of new businesses and business relationships to exploit green growth opportunities for small holders and subsistence farmers adopting sustainable practices. Key to this will be value chain innovation platforms that service as meeting points of stakeholders, including value chain actors such as smallholders, estates, input providers and Government.

130. Knuckles Conservation Forest (KCF) is a crucial geographical area in the proposed project site. The Knuckles region is a breathtaking landscape consisting of mountains, valleys and a variety of ecosystems and species. Its importance is reflected in the level of protection and international recognition that has been accorded at various times. The Knuckles Conservation Forest, together with the Peak Wilderness Protected Area and Horton Plains National Park (collectively referred to as the Central Highlands of Sri Lanka) was declared a UNESCO World Heritage Site in 2010. In 2000 the Knuckles area was declared a Conservation Forest by the Forest Department and in 2007, its buffer zone was declared as an Environmental Protection Area under the National Environmental Act. Aside from its scenic beauty, Knuckles is a vital watershed in the Mahaweli drainage system. It constitutes 30% of the watershed forest of the Mahaweli catchment, a major source of water for the country's agricultural sector. Further, the newly commissioned Moragahakanda and Kaluganga reservoirs also depend on the watershed of the Knuckles Conservation Forest. These features make KCF an ideal site to introduce the IUCN Green Listing process to provide the benefits to communities as a climate resilience measure as described in Activity 2.1.2. in the Feasibility Report Section 7.5.

131. The IUCN Green List certification process requires that local communities and rights-holders are effectively engaged in the governance and management of a protected area or candidate landscape. This includes equitable sharing of benefits, including ecosystem services that will help build adaptive capacity and secure resilience to social, ecological and economic changes induced by the climate crisis. Once the "Green List" label is awarded to the protected area, it will be used to actively promote the support and participation of local actors in relevant sectors and value chains. It will also underpin the sustainability credentials and premium value of local services and products. Local stakeholders such as non-governmental or civil society organizations directly supporting the protected area to achieve successful conservation outcomes will be empowered to use the Green List logo as a 'supporting partner' or a community enterprise producing a sustainably harvested or farmed product permitted in the buffer zone of a protected area. Specifically, the project will provide the Green List label to local tourism providers and community-based entrepreneurs, through a platform facility linked to sustainable and ecotourism promotion for the Green Listed sites in Sri Lanka. This will allow local providers the chance to market their services as compatible to a 'Green List' destination. The premium value added to the label will dovetail with site-based mechanisms that also equitably share more centrally-collected tourism benefits, such as entrance ticket sales, produce and souvenir outlets, and green fees, also linked to supporting the Green List label.

Activity 2.1.3: Identification and implementation of value chain upgrading options for smallholder and subsistence farmers engaged in climate smart agriculture (IUCN)

132. This involves the joint analysis (linked to Activities 1.2.1-3) and pursuit of meeting buyers' critical success factors and of value chain upgrading options with respect to products, processes, functions, inter-sectoral relationships, institutions (link to Activity 2.1.2) and new (green) technologies to achieve greater value chain efficiencies and market penetration of existing value chains, the participation in new value chains and/or the exiting from unprofitable or environmentally unsustainable value chains. For example, new products and services will be developed as well as a more targeted branding of existing products, because of their sustainable and equitable production or further processing. It can also involve the establishment of a Green Sri Lanka national brand and obtaining appropriate third-party certification and

quality assurance. The activity also involves the improvement of production, harvesting, post-harvest management, storage and transport technologies and the co-innovation of new technologies along the green value chain principles. Furthermore, it involves the creation of new markets for novel products such as sweet dwarf mangos, superfoods and Ayurveda products, which will be offered specially to smallholder and subsistence farmers to help them to "climate proof" their livelihoods.

Output 2.2: Payment for Ecosystem Services (PES) mechanism established

133. Operational PES schemes that have endured have invariably had a strong scientific basis and intensive facilitation, involving a series of inclusive and fair negotiations among related stakeholders, for the design, implementation, monitoring and evaluation of the scheme. Lessons from Asian countries[37] are applicable for implementation of new PES modalities in Sri Lanka. PES as a voluntary transaction, negotiated among private entities has been superseded by the implementation of conceptually similar but broader schemes, characterized by the involvement of and mediation by national and sub-national governments acting to connect those who benefit from and those who protect ecosystem functions. This broader definition of PES may include direct payments through public funds, by public authorities, to private landowners to maintain healthy watersheds or restore degraded land. In this project a portfolio of business cases and workplans for local partners will be developed to increase awareness and urgency for protecting the degraded Knuckles upstream watershed area, trigger a collective responsibility and actions, and enable joint investment (financially and non-financially) among stakeholders. The governance set-up of PES involves putting in place the financial and advisory support required to sustain climate adapted best practice in the upstream catchment. There is a clear potential to implement PES for the Knuckles catchment area as the Government of Sri Lanka is committed to implementing a PES modality, initially based on revenue from micro-hydropower generation to provide incentives to maintain best practice in terms of catchment protection.

Activity 2.2.1: Developing a portfolio of business cases for negotiating performance-based financial transfer mechanisms (IUCN)

134. A robust socioeconomic and ecological baseline and supporting information will become the core for the evidence of the provision of the ecosystem service (output-based payments) and address additionality concerns to reduce the cost of policy implementation. This comprises the basic appraisal of ecosystem services (ES) that are economically valuable and ES providers practicing environmentally protective best practices in the upstream catchment, including their livelihood options and local conservation knowledge. Information on ecosystem services and solutions for ES provisions will be linked to spatially explicit assessment and interventions of land degradation (Activity 3.1.2), and locations of prioritized PES schemes will be determined based on the integrated land use plan at sub-basin scale (Activities 3.1.1). Potential smallholders as PES participants will be selected by considering their opportunity costs, farming systems and other socioeconomic profiles by applying behavioral economic methods such as reverse auctions. Payment modalities will be discussed and consulted to both providers and beneficiaries. Options and values of revenue from ES beneficiaries, such as hydropower companies and large-scale water users, are determined based on a watershed valuation process, negotiation and policy analysis of possible revenue collections when engaging public entities. An incentive-based scheme, such as PES, synergized with relevant development programs (linked to Output 2.1) will become an alternative sustainable finance for activities 1.1.1, 1.1.2 and 1.1.3 (as a key element of the exit strategy).

Activity 2.2.2: Setting up a PES intermediary body as a part of the multi-stakeholder platform, and its governance system established (IUCN)

135. The potential roles of PES intermediary bodies include information exchange, programme design, upscaling and replication, networking, representation and mediation, administration and coordination of PES programmes, including payment collection, financing, distribution, performance monitoring and evaluation. The intermediary body will be a committee within the nested-multi-stakeholder platform

[37] Leimona, B., Van Noordwijk, M., de Groot, R., Leemans, R., 2015. Fairly efficient, efficiently fair: Lessons from designing and testing payment schemes for ecosystem services in Asia. Ecosystem Services 12, 16-28.

(Activity 3.3.1) and involve establishing an adaptive rural advisory services (RAS) facility to support adoption of catchment protection practices (including implementing regulations from 3.1.1 as well as prioritized promotion of best fit practice matched to local context. Intensive facilitation from the intermediary body will be essential to ensure that the committee members understand their roles, have enough capacity, and are able to monitor, evaluate, upscale and replicate PES (linking to Activity 2.2.3).

Activity 2.2.3: Establish a monitoring system for PES schemes in the upstream catchment area (ICRAF)

136. Initiated by participatory scoping of watershed problems, criteria and indicators for PES that are contextual for each PES scheme will be developed together with the multi-stakeholder forum members. A monitoring system for PES schemes comprises of both socioeconomic and ecological criteria and indicators by considering SDG and other national commitments to global goals, such as the Sri Lanka Nationally Determined Contributions (NDC) and National Adaptation Plan (NAP). Practically, the monitoring system will also determine the performance of ES providers in accessing the payment, financially and non-financially. Moreover, a series of capacity strengthening activities will be conducted for local stakeholders to strengthen their capacity to monitor, evaluate and develop further relevant criteria and indicators, when there is a need to modify existing, or establish new PES schemes in the future.

Component 3: Institutional capacity strengthened

Output 3.1: Governance mechanism for sustainable land management and productivity enhancement in the upstream catchment area established

137. Successful governance mechanisms require institutional ownership and support for inclusive and cross-sectoral planning and decision-making processes that are evidence based, up-to-date, relevant and readily accessible environmental, social and economic information. This involves institutional and multi-stakeholder coordination and engagement that bridges diverse stakeholders and sectors in a coherent way. Implementation teams will be set up and will represent a sub-basin multi-stakeholder innovation platform relevant to the needs of the location with contextualized composition according to the relevant government, civil society and private sector actors at the location, and identified through stakeholder mapping. These teams will develop integrated land use plans for the sub-basins using the information systems that support land use planning. The units will also co-ordinate implementation of the PES mechanism locally and the implementation of climate-adapted land and water management options at the local GN level. Local level innovation platforms will be constituted within existing GN structures to ensure a participatory grassroots co-design and local adaptation of options.

Activity 3.1.1: Develop an integrated land use policy and planning mechanism at sub-basin scale (IUCN)

138. To build robust institutional support for integrated land use policy and planning mechanisms at sub-basin level, the Stakeholder Approach to Risk Informed and Evidence Based Decision Making (SHARED) methodology will be used for co-designing and implementing an inclusive and evidence-based planning process across non-congruent hydrological and administrative boundaries and the development of an integrated land use policy. The SHARED stakeholder engagement process will involve multi-stakeholder workshops that bring together the relevant sectors and stakeholders, including the District Secretariat, representatives of key local agencies, private sector, plantations and farmers organizations. This will include stakeholder network, causal and outcome mapping, review of existing decision-making cycles and structures and the formulation of desired outputs. The workshops will be used to co-design information systems and define capacity, governance and information needs for each sub-basin implementation unit. The workshops will provide effective formats for land use planning, regulatory and incentive measures and capacity development to enhance integrated, evidence-based land use planning and policy development.

To carry out this activity and ensure long-term sustainability, three Sub-basin Integrated Delivery Teams (SIDTs) will be developed. These teams will be able to integrate across non-congruent administrative (Divisional Secretariat - DS) and hydrological (sub-catchment) boundaries. The implementation teams will represent a sub-basin multi-stakeholder innovation platform relevant to the needs of the location/sub-basin, with contextualized composition according to the relevant government, civil society and private sector actors at the location (linked to 3.2.1). They will develop land use plans for the sub-basin based upon co-designed information systems with customized dashboards (Activity 3.1.2) that comprise both socio-economic and biophysical information while providing a framework for monitoring of progress over time.

139. The implementation units will also co-ordinate implementation of the PES mechanism locally and the implementation of climate-adapted land and water management options at the local GN level where local level innovation platforms will be constituted within existing GN structures to ensure participatory grass roots co-design and local adaptation of options.

Activity 3.1.2 Develop a shared information system to support land use planning, climate adaptation, market information and monitoring of the performance of intervention options (ICRAF)

140. Information systems that can readily support integrated land use planning and adaptive implementation must house the relevant information as well as being both visually and virtually accessible. The information systems will be co-designed so that end users have significant input into the content and display of information. The customized systems will include high resolution landscape level socioeconomic and biophysical baselines along with other relevant and available information. The SHARED information system will facilitate iterative land use planning and adaptive management in innovation platforms across scales. The SHARED information system will support planning and implementation of activities and provide two-way interaction between land managers (smallholder farmers, plantations, local governments) and the project management. The regional offices of the Land Use Policy Planning Department (LUPPD) will play a key role to ensure sustainability of the systems developed by cost-sharing.

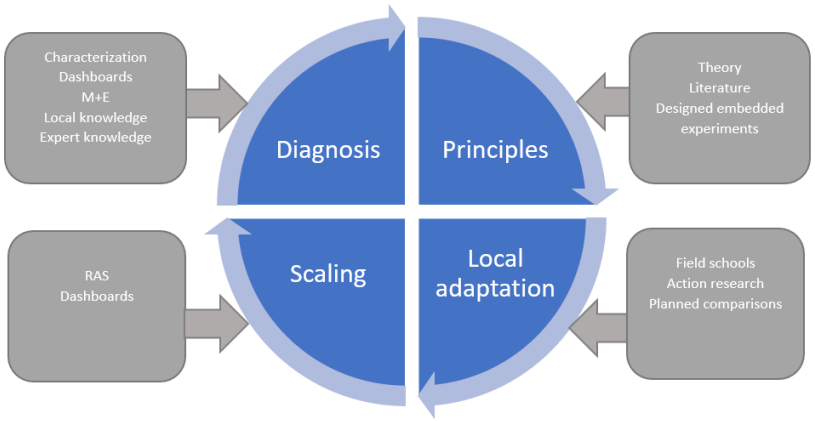
141. The information system will involve developing spatially explicit assessments of land degradation that are critical for the development of effective adaptation options and targeting interventions, while also providing a framework for monitoring of progress over time. This will comprise a landscape portal with dashboards, establishment of a high-resolution baseline for planning and development of Apps enabling two-way grassroots interaction with the information system. One Land Degradation Surveillance Framework (LDSF) site will be established in each sub-basin implementation unit. The LDSF is being applied for assessments of land degradation processes, soil health and ecosystem health more generally in over 40 countries in the global tropics as part of the Ecosystem Health Surveillance Framework (EcoHSS) developed by ICRAF. By providing a robust indicator framework, advanced analytics and diagnostics (models), this framework will be key to the development of spatially explicit interventions to protect and restore ecosystem functions and adaptation. Land degradation hotspots (e.g. soil erosion and compaction) and soil health variables (e.g. soil organic carbon) will be mapped at high spatial resolution (10 to 30m), by combining data collected from the LDSF sites with data from the global database. These assessments will build on national level assessments of erosion and SOC done during project preparation at moderate spatial resolution that were developed using MODIS satellite imagery to assess changes in these indicators over the decade from 2002 to 2012.

Activity 3.1.3: Development and refinement of SLM framework (ICRAF)

142. This Activity will synthesize the shared information system to support land use planning, climate adaptation, market information and monitoring developed under Activity 3.1.2. with the nested-scale multi-stakeholder innovation platforms for facilitating participatory engagement at the GN level established under Activity 3.3.1.

143. Options (O) are the things that farmers, communities or others can do differently. The contexts (C) are the social, environmental and institutional situations of each stakeholder. “Option by context interactions” (OxC) is shorthand for the core empirical facts that: contexts are very variable, whether considering individuals, farm households, farms, rivers, forests or any other element of the landscape, and they need suitable, valuable and acceptable options depend on context. Hence, while the principles to be applied may be applicable in much of the project area (eg: “Increase rice cropping intensity”), the details of exactly how to do this will depend on the specific contexts where it is practiced, being adapted to local needs and constraints.

144. The OxC framework (Core 4 Framework) describes the process of design and implementation of these diverse and adapted options.



The Core 4 framework is the general scheme for implementing the OxC approach. It can be used for all aspects of the project that require intervention on the ground (water, crops, forest, value chains). The four steps are:

- Diagnosis – compiling information from available sources on the specific problems, where they are and who they affect.
- Principles – assembling the ideas and knowledge that can be brought to bear on the problem.
- Local adaptation – putting the principles to work, usually requiring testing of alternatives using an action research or planned comparison approach.
- Scaling – putting the lessons learnt to work in more areas for more people.

145. The inputs to each of these stages are also summarized in the Core 4 Framework. The outputs of each stage inform the next and lead to the project outputs, particularly in outputs 1.1 and 1.2. They also contribute knowledge products that can be used beyond the project.

146. The shared information system will provide high resolution landscape level baseline information for planning and implementation of activities and provide a two-way interaction between land managers (smallholder farmers, plantations, local governments) and the project management. The information system will be compromised of both socioeconomic and biophysical data. This information system will be utilized by the GN level multiscale stakeholder platform to develop preliminary lists of management options that are relevant to land managers (smallholder farmer, plantations, and plantation workers) and operational contexts. When compiling the preliminary menu list, emphasis will be placed on SLM, sustainable intensification and achieving land managers economic objectives. The preliminary list will be reviewed and revised by project partners with expertise in smallholder and plantation systems. The revised list of management options by operational context will be used in Activity 1.2.2 and 1.2.3. Feedback from smallholder farmers (Activity 1.2.2) and plantation companies and plantation workers (Activity 1.2.3) will be conveyed back to project partners involved in this Activity to enable refinement of the process used to develop the preliminary list of land management options.

Output 3.2: Integrated rural advisory capacity responsive to developing knowledge base, real time weather and market information created

Activity 3.2.1: Establishment of nested-scale multi-stakeholder innovation platforms from sub-basin to GN scale (IUCN)

147. A key element of resilience enhancement of communities and ecosystems includes the engagement of relevant and diverse stakeholders across scales in adaptation planning. This is aided through the utilization of online dashboards and structured engagement to facilitate stakeholder interaction and interrogation with evidence. Understanding how various stakeholders interact with each other, as well as obtain, share and utilize information/evidence in prioritizing practices that minimize potential negative environmental impacts is key to developing context-appropriate innovation platforms. For example, the SHARED process includes the co-development of online dashboards to provide an opportunity for stakeholders to visualize and assess the multiple dimensions of climate resilient agriculture, for example: (1) root-causes of key constraints (barriers) to adoption, (2) stakeholder networks and their connectivity, i.e., to inform upscaling activities; (3) prioritization of options by women, men and youth; and (4) important trade-offs between environmental impact and increased agricultural production. In addition, the dashboard visualizes indicators of land health and climate variability in project areas to better understand and identify biophysical constraints. The SHARED methodology has been applied to engage stakeholders to integrate key insights, design suggestions, and visualizations for the appropriate end users. This will be initiated at SHARED workshops, where specific interactive exercises will guide decision makers through a design process from conceptualizing key themes, grouping of themes into appropriate modules based on decision making hierarchies and processes and with a commensurate process for prioritizing data, indicators and visualization options.

148. Based on priorities of the location, terms of reference will be established. Each will have a different composition according to the relevant government, civil society and private sector actors at the location. Multi-scale stakeholder innovation platforms will be linked across sub-basins to share information and learning related to adaption practice innovations interacting with co-designed information systems through two-way apps and face to face. They will allow interactive learning and sharing down to the GN level. The multi-scale innovation platforms are key to co-design and refinement of adaption options with farmers and land users.

149. The SIDT team activities will be supported by the Decision Support System (DSS) connected to all key agencies populated with monitored and field collected periodic and real-time data (water demand/supply, erosion, soils, fauna and flora including canopy structures and cover, socio-economic benefits etc). In order to facilitate visualizing the information and carryout scenario analysis as part of the DSS several climate, soil, water and economic models will be identified, calibrated and made operational during the early part of the project. These models will also inform the additional data collection needs including the intensity of flow, sediment and other variables. It is envisaged that the DSS will have a dashboard system, a complementary web page, manuals, training, communication materials to promote the relevance, use and upscaling with key agencies using it in day to day functions. The information will be updated frequently (ex: demand-supply water balance) in SIDT areas and covering the entire project area. Users will be able to retrieve the information by administrative, hydrologic boundaries or based on geographic coordinates. Access to data/information by agencies and public will be through a data sharing interface with different levels of access. Availability of information is expected to promote innovation, research and learning while adding value to project interventions such as project benefits as well as the extent of climate proofing.

150. The dashboards will be designed from the outset using open source data and hosted on the ICRAF GeoScienceLab Landscape Portal (landscapeportal.org). This is to ensure scalability and to access spatial datasets stored with the portal. The open source, real time updating in the dashboard design is intended to ensure users across national to local scales can access the data, with linked functionality and access on mobile devices. The open source principle in the dashboard design also intends for the dashboards to be embedded into decision-making processes, therefore ensuring access and functionality beyond the life of the project. The input of users and local context has been a major component in the beta design phase, taking the local context of the three target countries, in terms of data access, internet

feasibility and user preference (desktop versus mobile) as key design input guidelines. With time, the landscape portal will be mirrored and installed in the Sri Lanka national cloud operated by the Information Technology and Communication Agency (ICTA), Mahaweli Authority system or in a Government system selected as suitable based on the interactions with the project.

Activity 3.2.2: Develop local capacity for adaptive and sustainable land management (ICRAF)

151. This activity addresses key capacity developments required across the government to connect bottom up methods that ensure that feasible options are developed and top down Rural Advisory Service (RAS) mechanisms that are required to make them are widely available. This requires developing capacity to be able to operate a responsive and evidence-based rural advisory service that can incorporate developing knowledge and real time information about changing conditions in the short term (such as weather or pest outbreaks) and long-term (such as suitability of tree species in the context of climate change). The purpose of training is to ensure all involved can use the framework and tools (see 3.3.3). Training is needed at three levels:

- Project managers and principles, who need to understand the concepts and approaches being used. Short face-to-face training events are sufficient.
- Field officers who are responsible for implementing field activities. These will primarily be training-of-trainer events, requiring face-to-face events and distant backup.
- Farmers and others who will adopt new practices. These training events are conducted by those in the previous group.

152. The project will produce training guides and content for each level. Some of this will be material (eg short videos) that will be of value outside the project area.

Activity 3.2.3: Development and production of simple to use guidelines, manuals and tools for matching options to context and implementing SLM, sustainable intensification and value chain upgrading options (ICRAF)

153. The adaptive and responsive options by context framework employed in the project requires simple guidelines and tools that make it easy for it to be taken up and used at grassroots level. The tools to put the options by context framework into practice will be assembled from existing sources (mainly steps 1 and 2 shown in the Core 4 Framework in Activity 3.1.3) and developed specifically for this project (mainly steps 3 and 4 shown in the Core 4 Framework in Activity 3.1.3). They will consist of guides, checklists and frameworks for:

- using the data compiled from external sources or generated in previous stages
- analyzing and interpreting the data
- making decisions on options to promote in particular circumstances

154. Where appropriate, tools will be developed as interactive smartphone Apps capable of suggesting likely options for particular situations utilizing georeferencing in the smartphone with information held in the information system developed in 3.1.2, that may include real time weather and market information in addition to advice based on performance evaluation of options across the contexts that have been tried out in the project area. See for example the tree-finder App developed for Africa that shows the user data on the distribution of indigenous tree species in the natural vegetation type where the phone is located, combined with information on the products and services that different tree species can provide. It provides local community members, government agencies, private landowners, and other land managers with the information they need to select the most appropriate tree species for their landscape restoration or agroforestry effort.

155. Each activity will have a responsible/accountable Executing Entity (EE) to ensure the timely delivery of the activity and coordinate with other relevant activities. When EE does not have the technical and delivery capacity of an activity or a portion of an activity the EEs may opt to engage/outsource/contract a Partner entity (Government, Non-Government or Private) including Universities as presented in the

table below. The description of the partner entities is provided in the Feasibility Study (Annexure 2) and Stakeholder Analysis (Annexure 9).

EEs responsible for activities and potential partners

EE	Partners
Component 1 - Climate-resilient sustainable land management	
Output 1.1. - Improved land and water management in upstream catchment to safeguard production of environmental goods and services	
Activity 1.1.1 - Streamside protection and drainage management along roads	
IUCN Sri Lanka	Mahaweli Authority of Sri Lanka, Forest Department, Provincial Irrigation Department, Universities, Provincial Ministry on Road Development, Provincial Irrigation Department, Natural Resource Management Centre (NRMC) of Dept. of Agriculture and CBOs through IUCN Sri Lanka
Activity 1.1.2 Rehabilitation and establishment of village tanks, ponds and irrigation networks	
IUCN Sri Lanka	Department of Agrarian Development, Provincial Irrigation Department, CBOs through IUCN Sri Lanka, Department of Agriculture
Activity 1.1.3 - Restoration of forest mosaic landscapes	
IUCN Sri Lanka	Forest Department, Universities and Rainforest Rescue International (RRI)
Output 1.2. - Sustainable climate-resilient primary production in upstream catchment areas and downstream irrigated agricultural area	
Activity 1.2.1 - Increasing cropping intensity of irrigated rice in both upstream and downstream areas	
MMDE	Department of Agrarian Development, Provincial Department of Agriculture and Mahaweli Authority of Sri Lanka
Activity 1.2.2 - Sustainable intensification of smallholder production	
MMDE	Department of Export Agriculture (DEA), Provincial Department of Agriculture, Universities Department of Agrarian Development, Rainforest Rescue International, Department of Meteorology and ICRAF
Activity 1.2.3 - Restoration and sustainable intensification of plantations	
IUCN Sri Lanka	Ministry of Plantation Industries, Regional plantation Companies, Department of Export Agriculture and Biodiversity Sri Lanka (BSL)
Component 2. - Secure financing mechanisms for sustainable land management	
Output 2.1 - Upgraded value chains	
Activity 2.1.1 - Domestic value chain mapping and green market assessments for products especially from small holder and subsistence farmers	
ICRAF	Universities, Department of Export Agriculture, Department of Agriculture
Activity 2.1.2 - Enterprise and institutional development to exploit green growth opportunities for small holder farmers in the uplands	

IUCN Sri Lanka	Department of Export Agriculture, Provincial Department of Agriculture and National Enterprise Development Authority of Ministry of Industries and Commerce
Activity 2.1.3: Identification and implementation of value chain upgrading options for small holder and subsistence farmers engaged in climate smart agriculture	
IUCN Sri Lanka	Department of Agrarian Development, Department of Export Agriculture and Provincial Department of Agriculture
Output 2.2. - Payment for environmental services (PES) mechanism	
Activity 2.2.1 - A portfolio of business cases for negotiating performance-based financial transfer mechanisms	
IUCN Sri Lanka	ICRAF and MMDE
Activity 2.2.2 – A PES intermediary body as a part of the multi-stakeholder platform and its governance system established	
IUCN Sri Lanka	ICRAF and MMDE
Activity 2.2.3 - A monitoring system for PES schemes in the upstream catchment area	
ICRAF	IUCN and MMDE
Component 3 - Institutional capacity strengthened	
Output 3.1. - Governance mechanism for sustainable land management and productivity enhancement in the upstream catchment area	
Activity 3.1.1- Develop an integrated land use policy and planning mechanism at sub-basin scale	
IUCN Sri Lanka	LUPPD, NRMC (Department of Agriculture), MMDE and ICRAF
Activity 3.1.2 - Develop a shared information system to support land use planning, climate adaptation, market information and monitoring of the performance of intervention options	
ICRAF	NRMC (Department of Agriculture), LUPPD, Information Communication Technology Agency (ICTA)
Activity 3.1.3 - Development and refinement of an options by context framework for SLM and sustainable intensification	
ICRAF	LUPPD, Department of Agrarian Development, Department of Export Agriculture Universities, NRMC (Department of Agriculture), IUCN Sri Lanka
Output 3.2.: Integrated rural advisory capacity responsive to developing knowledge base, real time weather and market information	
Activity 3.2.1. - Establishment of nested-scale multi-stakeholder innovation platforms from sub-basin to GN scale	
IUCN Sri Lanka	Provincial Department of Agriculture, MMDE (planning), Universities and ICRAF
Activity 3.2.2 - Training in methods and tools for adaptive and participatory co-design of adaptation options	
ICRAF	NRMC (Department of Agriculture), IUCN Sri Lanka, Universities
Activity 3.2.3 - Development of simple to use guidelines, manuals and tools for matching options to context and implementing SLM, sustainable intensification and value chain upgrading options	

ICRAF	NRMC (Department of Agriculture), IUCN Sri Lanka, Universities

Roles of partner entities under activities led by EEs (MMDE, IUCN and ICRAF)[38]

Activity/EE	Pre identified contractors/Partners	Type of inputs anticipated
Activity 1.1.1 - Streamside protection and drainage management along roads (IUCN Sri Lanka)	Mahaweli Authority of Sri Lanka	• Conduct water quality/ sedimentation measurements • Provide base data • Develop maps to identify areas for water flow management
	Forest Department	• Identify sensitive and highly conserved areas • Provide measures and controls for forest streamside • Provide inputs on conserving forest species in river banks
	Provincial Irrigation Department	• Install sedimentation trapping methods in the irrigation channels • Control measures for water flow • Measuring sedimentation
	Universities	• Novel concepts of structural measures for streamside protection • Modelling and researching the sedimentation loadings for irrigation systems
	Provincial Ministry on Road Development	• Implement roadside drainage constructions and maintenance • Use of community labour and compensate them
	Natural Resource Management Centre	• Designing the streamside protection considering side specific requirements • Implement streamside protection activities
	Dept. of Agriculture	• Identification of crop varieties for streamside protection • Use of trapped sedimentation
	CBOs	• Undertake minor contracts for construction • Organizing community labour • use of trapped sediments in tree plantings and forestry
Activity 1.1.2 Rehabilitation and establishment of village tanks, ponds and irrigation networks (IUCN Sri Lanka)	Department of Agrarian Development	• tank de-siltation • rehabilitation of tanks • training community
	Provincial Irrigation Department	• Designing irrigation network for minor irrigation • Flood control measures • Runoff the water and spill water management
	CBOs	• Undertake minor de-siltation under DAD supervision • Organize community labour • Tree planting programs in riverbank and catchment
	Department of Agriculture	• Introducing new crop varieties • Value addition for agricultural production
Activity 1.1.3 - Restoration of forest mosaic landscapes (IUCN Sri Lanka)	Forest Department	• Conduct buffer zone plantation • Establishing fire belts • Conduct enrichment plantings • Contract with the community on farmer woodlots • Cash crop cultivation in forestlands • Implement the green listing plan for KCF
	Universities	• Research activities • Curriculum and train community on forest-related tourism • Skill enhance training to cater to tourism demand

[38] EEs identified under each activity are responsible for the delivery of the activity. For the sake of clarity, the EE responsible for a given activity is accountable for the delivery of the activity even if another EE is contributing technically to the same activity.

	Rainforest Rescue International (RRI)	• Organise cross-sharing visits for communities • Establish and train the community on plant nursery management
Activity 1.2.1 - Increasing cropping intensity of irrigated rice in both upstream and downstream areas (MMD&E)	Department of Agrarian Development	• Capacity building training for farmer associations • Training on the SRI method • Introducing resilient climate paddy and other crop varieties
	Provincial Department of Agriculture	• Provide seeds varieties to farmers • Multiplication of seeds which are tolerant to climate change and deliver high crop yield • Conduct farmer training on best agriculture practices
	Mahaweli Authority of Sri Lanka	• Facilitate the activity 1.2.1 in areas belongs to Mahaweli Area. • Replication of work in the downstream area mainly in Anuradhapura District which belongs to the project area • Conduct capacity building sessions for farmer organisations
Activity 1.2.2 - Sustainable intensification of smallholder production (MMD&E)	Department of Export Agriculture (DEA)	• Introducing export-oriented crops • Training on value addition options
	Provincial Department of Agriculture	• Provide plants and seeds to farmers • New farming technology and equipment • Conduct farmer training on best agriculture practices
	Universities	• Transform the new research knowledge to farmers through project support • Identification of problem areas for research • Facilitating innovation platforms • Design courses and farmer school curricula
	Department of Agrarian Development	• Identify possible land areas for expansions • Provide support to farmers on technical guidance in the field • Introducing precision farming technology in Sri Lanka • Disseminate seasonal weather forecasting to farmers for better plan the disaster impacts
	Rainforest Rescue International	• Sharing the experience in the rain forest areas and wet zone • Raise awareness among the public
	Department of Meteorology	• Provide weather forecasting and seasonal weather forecasting • Expand the monitoring stations in the project area • Baseline data provider on rainfall, temperature, wind etc. • Monitor the climate models and project impact in long term
	ICRAF	• Experience from other countries • Precision farming technology • Intercrop models on forest and commercial species
Activity 1.2.3 - Restoration and sustainable intensification of plantations (IUCN Sri Lanka)	Ministry of Plantation Industries	• Review policies on subsidies to the plantation industry • Provide facilitation for ministry managed plantation lands
	Regional plantation Companies	• Identify and allocate areas for plantation including degraded areas for improvements • Encourage the plantation community to participate in the GCF project
	Department of Export Agriculture	• Organising and promoting cultivation in plantation lands • Promote the processing of export crops • Provide quality plants and plant materials • Promoting the usage of carbonic fertiliser
	Biodiversity Sri Lanka (BSL)	• Private sector coordination
Activity 2.1.1 - Domestic value chain mapping and green	Universities	• Provide technical assistance to both institutes and farmer community • Field level assessments and studies

market assessments for products especially from smallholder and subsistence farmers (ICRAF)	Department of Export Agriculture	• Conduct market researches • Assisting marketing • Development of e-marketing platform to benefit the farmers in the area to enter the export market
	Department of Agriculture	• Crop forecast information system for export-based local buyers • Agrotechnology park for green technology • Production of planting materials and seeds • Regional warehouses and processing centres to farmers
Activity 2.1.2 - Enterprise and institutional development to exploit green growth opportunities for smallholder farmers in the uplands (IUCN Sri Lanka)	Department of Export Agriculture	• Identify new markets • Conduct exhibitions and symposiums to promote smallholder production in the project areas • Disseminate new technology for agriculture-based enterprises
	Provincial Department of Agriculture	• Establishing regional production zones in line with KCF Green Listing initiatives • A local platform for innovations • Capacity-building support to new agriculture-based enterprises
	National Enterprise Development Authority of Ministry of Industries and Commerce	• Facilitate and manage financial schemes to support smallholder enterprise development with the support of the project • Conduct CBO training
	Forest Department	• Implement actions under IUCN green listing certification process in Knuckles Conservation Area • Releasing lands for community-based conservation and sustainable economic development • Promoting the destination among local and international tourism organizations
Activity 2.1.3: Identification and implementation of value chain upgrading options for smallholder and subsistence farmers engaged in climate-smart agriculture (IUCN Sri Lanka)	Department of Agrarian Development	• Development of certification for organic farming and promote • Certification for climate resilience initiatives and contributions made by enterprises for efficient use of natural resources in farming
	Department of Export Agriculture	• Establish brand and areas specific image to the product • Facilitate and promote the green-related standards for existing and new enterprises
	Provincial Department of Agriculture	• Promoting regional production zones in line with KCF Green Listing initiatives • Developing Regional platform for innovations
Activity 2.2.1 - A portfolio of business cases for negotiating performance-based financial transfer mechanisms (IUCN Sri Lanka)	ICRAF	• Link Information on ecosystem services and solutions for ES provisions to spatially explicit assessment and interventions of land degradation • Develop criteria to select smallholder farmers as PES participants
	MMDE	• Provide policy development support • Aware and train the government officers in the project area • Facilitate the financial support initiation of Mahaweli Authority
Activity 2.2.2 – A PES intermediary body as a part of the multi-stakeholder platform and its governance system established (IUCN Sri Lanka)	ICRAF	• Technical support to establish PES intermediary body • Development of terms of reference and governance roles and responsibilities
	MMDE	• Administration of PES intermediary body • Policy development • Ensure sustainability • Replication in other vulnerable areas as a tested strategy

Activity 2.2.3 - A monitoring system for PES schemes in the upstream catchment area (ICRAF)	IUCN Sri Lanka	• Systemizing the recording of the impact of PES initiatives towards set indicators • Development of water quality measurement and timely reading together with the partners • Appropriate analysis
	MMDE	• System for PES audit • Facilitate information sharing
Activity 3.1.1- Develop an integrated land use policy and planning mechanism at the sub-basin scale (IUCN Sri Lanka)	LUPPD	• Map the land use at the sub-basin level • Facilitate integrated planning
	NRMC	• Identification and implementation of best land-use practices at sub-basin level
	MMDE	• Incorporate climate adaptation plans at the sub-basin level • Implementing adaptation programs identified by the integrated plan
	ICRAF	• Establishing a SHARED system • Technical support to SDT teams
Activity 3.1.2 - Develop a SHARED information system to support land use planning, climate adaptation, market information and monitoring of the performance of intervention options (ICRAF)	NRMC	• Implement sub-basin level solutions for degradation • Training government officers and community on best land-use techniques for climate induce issues
	LUPPD	• Development of Land use maps • Managing the SHARED database at the sub-basin level
	Information Communication Technology Agency (ICTA)	• Provide technical input to develop SHARED systems • User requirement and design of the database • Training the front and back end users
Activity 3.1.3 - Development and refinement of options by context framework for SLM and sustainable intensification (ICRAF)	LUPPD	• Generate land use maps to understand the context
	Department of Agrarian Development	• Identify the context-specific farming solutions • Context-specific crop diversification needs
	Department of Export Agriculture	• Identify the different options to cater to export needs • Study the potential export crops that suit for different climate impact contexts
	Universities	• The field surveys and studies • Global experience and lessons in similar contexts • Agriculture trials and models for testing • Testing potential adaptation measures
	NRMC (Department of Agriculture)	• Options for different land management • Knowledge codification
	IUCN Sri Lanka	• Options of conservation and adaptation without compromising the development opportunities
Activity 3.2.1. - Establishment of nested-scale multi-stakeholder innovation platforms from sub-basin to GN scale (IUCN Sri Lanka)	Provincial Department of Agriculture	• Evaluate best agriculture-related adaptation options to multiply the benefits
	MMDE	• Incorporate the options in national adaptation strategy • Conduct public innovation competition for adaptation issues
	Universities	• Research and development • The industrialisation of innovation with the support of the project
	ICRAF	• Technical inputs to innovation platforms • Innovative solutions for greening dry and intermediate zones mainly downstream areas of the project

Activity 3.2.2 - Training in methods and tools for adaptive and participatory co-design of adaptation options (ICRAF)	NRMC (Department of Agriculture)	• Codification of new knowledge generated from the project
	IUCN Sri Lanka	• Contribute to incorporate ES and BD related knowledge to strengthen climate adaptation
	Universities	• Codification of new knowledge generated from the project
Activity 3.2.3 - Development of simple to use guidelines, manuals and tools for matching options to context and implementing SLM, sustainable intensification and value chain upgrading options (ICRAF)	NRMC (Department of Agriculture)	• A series of guidelines, manuals and trainer guides • Development of smartphone apps • Distance learning courses and materials
	IUCN Sri Lanka	
	Universities	

C.4. Background Information on Project / Programme Sponsor (Executing Entity)

Describe the quality of the management team, overall strategy and financial profile of the Sponsor (Executing Entity) and how it will support the project/programme in terms of equity investment, management, operations, production and marketing.

156. The sponsor of this project is the Ministry of Mahaweli Development and Environment (MMDE) of Sri Lanka. The MMDE is the major policy making body in respect of Mahaweli development and environment management and natural resources conservation. It is mandated to coordinate and oversee environmental management of the country.

157. The Environment section of the Ministry comprise of key divisions for Air Resources and National Ocean Unit, Biodiversity Division, Climate Change Secretariat, Education Training and Research Division, Environmental Pollution Control and Chemical Management Division, Forest Resources Division, Land Resources Division, Environment Planning and Economics Division etc.

158. Financial status and project support: For 2016, MMDE has received allocation for projects of a value of approximately 353 USD million from the government budget[39]. Over the past few years, the MMDE has received and managed projects with grant funding including from Government of Korea, Government of Japan, Asian Development Bank, UNDP, WFP, UNEP, and EXIM Bank – Korea.

159. The Ministry's recurrent expenditure allocation for 2017 and 2018 were Rs. 5,274,042 million and Rs. 5,464,404 million[40], respectively. Further, the capital expenditure denoting investments in environmental and water management projects implemented throughout the country for the two years is projected to be USD 55 million for 2019 and USD 67 million for 2020. These include projects funded by GEF, GCF, Adaptation Fund and EU. The ministry is the executing agency for the USD 38 million GCF project that is being implemented with UNDP as the AE.

160. Statutory Institutions and Public Corporations under the purview of the MMDE are: Forest Department, Coast Conservation and Coastal Resources Management Department, Mahaweli Authority of Sri Lanka, Central Environmental Authority, Geological Survey and Mines Bureau, State Timber Corporation, Marine Environment Protection Authority, National Gem and Jewellery Authority, Central Engineering Consultancy Bureau (CECB), Gem and Jewellery Research and Training Institute, Moragahakanda and Kalu Ganga Reservoir Projects, Dam Safety and Water Resource Planning Project and Uma Oya Development Project.

[39] http://www.treasury.gov.lk/documents/10181/161077/bdgtestmates2016E-vol3.pdf/70ac63a4-6255-409c-bdff-3a5c9e78fd60
[40] http://www.treasury.gov.lk/documents/10181/490927/V_03_Approved_E.pdf/a144f791-c8c1-4620-8ac9-518747bc3541

161. MMDE has extensive experience in executing large foreign funded projects and is also currently managing the ongoing portfolio of foreign and government funded development projects. MASL (Mahaweli Authority of Sri Lanka) operates under the MMDE as a semi-autonomous institution, which has completed an array of large hydro and water resource development initiatives and its past experience will serve well in the implementation of the proposed project. MMDE has played a major role in the successful implementation of the Pro-poor Economic Advancement and Community Empowerment (PEACE) project (USD 33.6million, 2006-2011) in Kurunegala and Anuradhapura districts to empower the farming community for increasing the productivity of their agriculture lands through rehabilitation of irrigation systems using a loan given by the Japan Bank of International Corporation. In addition, major projects such as, Uma Oya Multipurpose Development Project (UOMDP, over USD 500 million) and Dam Safety and Water Resource Planning Project (DSWRPP, over USD 70 million) are currently being implemented.

162. As the implementing partner of the project, MMDE will chair the project steering committee and provide project management support and in-kind contributions to project implementation through its technical and administrative staff and systems. It will provide operations and management support to the project through its staff as well as the dedicated PMU set up for the project.

163. MMDE will also facilitate the participation of required Government entities as executing agencies in the project such as the Dept. of Agrarian Development, Dept. of Agriculture, Mahaweli Authority, Export Development Board etc.

164. Private sector involvement is investigated and promoted as executing partners to promote technology transfers, finances, market linkages and transformational change in the way products are developed, packaged and value added.

C.5. Market Overview (if applicable)

Describe the market for the product(s) or services including the historical data and forecasts.

Describe the competitive environment including the list of competitors with market shares and customer base and key differentiating factors (if applicable). Provide pricing structures, price controls, subsidies available and government involvement (if any).

165. The project will contribute towards strengthening agriculture-based value chains in order to enhance the adaptive capacity and resilience of small holder farmers. The project will interface with several Govt. programs such as Samurdhi-Welfare fund providing support to low income people. The feasibility study indicated over 7 million USD annually paid to the poor in the catchment area that can be used to interact with the poor. In addition, the Govt. economic support programmes or assistance to SMEs and MSMEs through local banks would help to leverage project funds depending on the type of value addition to agricultural produce.

166. The produce involved in the project include crops such as maize, rice, pepper, strawberry and medicinal plants. These products will be prepared for high value markets with appropriate preservation technologies, packaging and adoption of international labeling and standards.

167. Agricultural produce related value addition will be combined with tourism infrastructure and related marketing. The project area is rich in biodiversity, nature and culture resources that can be harness as a complementary value addition and income generation in the project area. For example, Knuckles Conservation Forest and its Riverston area is the highest visited conservation area managed by the Forest Department.

168. There are area specific products that can be branded and sold to high value markets. For example, bee honey, vanilla, cinnamon, other medicinal crops, trickle or syrup from a palm tree named “Kithul” where the syrup is very similar to Maple Syrup in the commercial market.

169. Overall, the enhanced export targets by the Govt. through the Dept. of Export Agriculture and Export Development Board provide several entry points for area specific brands that also include SPA products from medicinal plants and spices grown in the area. All products will fall under Sri Lankan regulations and laws.

170. The project therefore has the potential to take a jurisdictional approach in some landscapes combining the efforts of government agencies, corporates, NGOs, and other stakeholders around the shared goals in conservation, supply chain sustainability, and green economic development.

C.6. Regulation, Taxation and Insurance (if applicable)

171. There are no applicable licenses or permits related to project implementation.

172. MMDE will arrange with the national Treasury, through the National Budget on annual basis, to pay the relevant taxes on importation of equipment and vehicles. The budget allocations will be managed by the Finance division of the Ministry of Mahaweli Development and Environment and the matching funds equivalent to taxes will be released from that account at the time of the payment of taxes.

173. Project activities may include taxes related to services, which will be considered as part of the project costs. For example, if the services are procured directly by the GoSL implementing partners, then the national procedures will apply, which entail the payment of the Domestic Tax (VAT) amounting to 12.5% where applicable (e.g. venue and food for training).

174. For services procured by IUCN for the use of IUCN, Government taxes are not applicable based on the host country agreement between the GoSL and IUCN. The agreement provides IUCN Sri Lanka similar status as given for UNDP for operational purposes.

175. Insurances for staff and vehicles, when applicable under Govt. regulations, will be charged to appropriate components of the project.

C.7. Institutional / Implementation Arrangements

176. The focal Ministry for the project will be the Ministry of Mahaweli Development and Environment (MMDE).

177. IUCN is the Accredited Entity (AE) of the project. The AE functions and its related activities will be undertaken jointly by programmes hosted at Headquarters (GEF&GCF Coordination Unit, Global Finance Unit, Global Programme on Water) and the Regional Office for Asia.

178. The project will be implemented through three Executing Entities (MMDE, ICRAF and IUCN through its Sri Lanka office). In the EE role the IUCN Sri Lanka is functioning as an in-country entity based on its host country agreement on project management, member and advisory services.

179. In the AE role IUCN will provide oversight to the project consisting of a) Entering into contractual agreements with the Executing Entities (EEs): b) Managing and disbursing GCF funds to EEs, after providing no objection to work plans and budgets; c) Reviewing financial expenditures and progress reports; d) Overseeing Project implementation in accordance with the Project document and Annual Work Plans and Budgets, agreements with co-financiers and each executing agency rules and procedures; e) Providing technical guidance to ensure that the appropriate technical quality is applied to all Project activities; f) Providing financial reports to the GCF for Project funds received; g) Ensuring that the project complies with the terms agreed in the project's respective FAA as well as the AMA signed between IUCN and the GCF; and h) Undertaking regular supervision missions according to the IUCN's guidelines, at least one before the mid-term NSC meeting and one prior to the end of the year NSC aimed to review yearly progress and approve the next year AWP.

180. A project Executing Entity receives project specific GCF funding, under the supervision of the GCF Accredited Entity. Executing Entities oversee the tasks within the overall project management structure consisting a) Implementing day-to-day activities as per the project work plan and budget, including the Environment and Social management Plan; b) Undertaking procurement activities directly or through the Programme Management Unit (PMU); c) Managing contracts of suppliers and services providers; d) Hiring and managing project staff relevant to the EE managed project areas; e) Implementing activities as per the project work plan; and f) Carrying out financial and technical monitoring of activities, including the achievement of the outputs and outcomes EE is in charge of.

181. EEs will work with several Partner Agencies at the activity level based on agreements between Partner Agencies and EE facilitated by the PMU. Funds will be disbursed to Partner Agencies directly from EE financial operations based on the recommendation by the PMU, as per the AWP.

182. The Secretary, MMDE will chair the National Steering Committee (NSC), which will provide implementation guidance and support as well as financial and procedural oversight. IUCN will enact financial contracts and transfers with actors executing the project, with consolidated financial and technical reporting through the Project Management Unit that will be established under the MMDE. IUCN will carry out financial transfers in accordance with requests from the PMU, governed by the GCF procedural requirements.

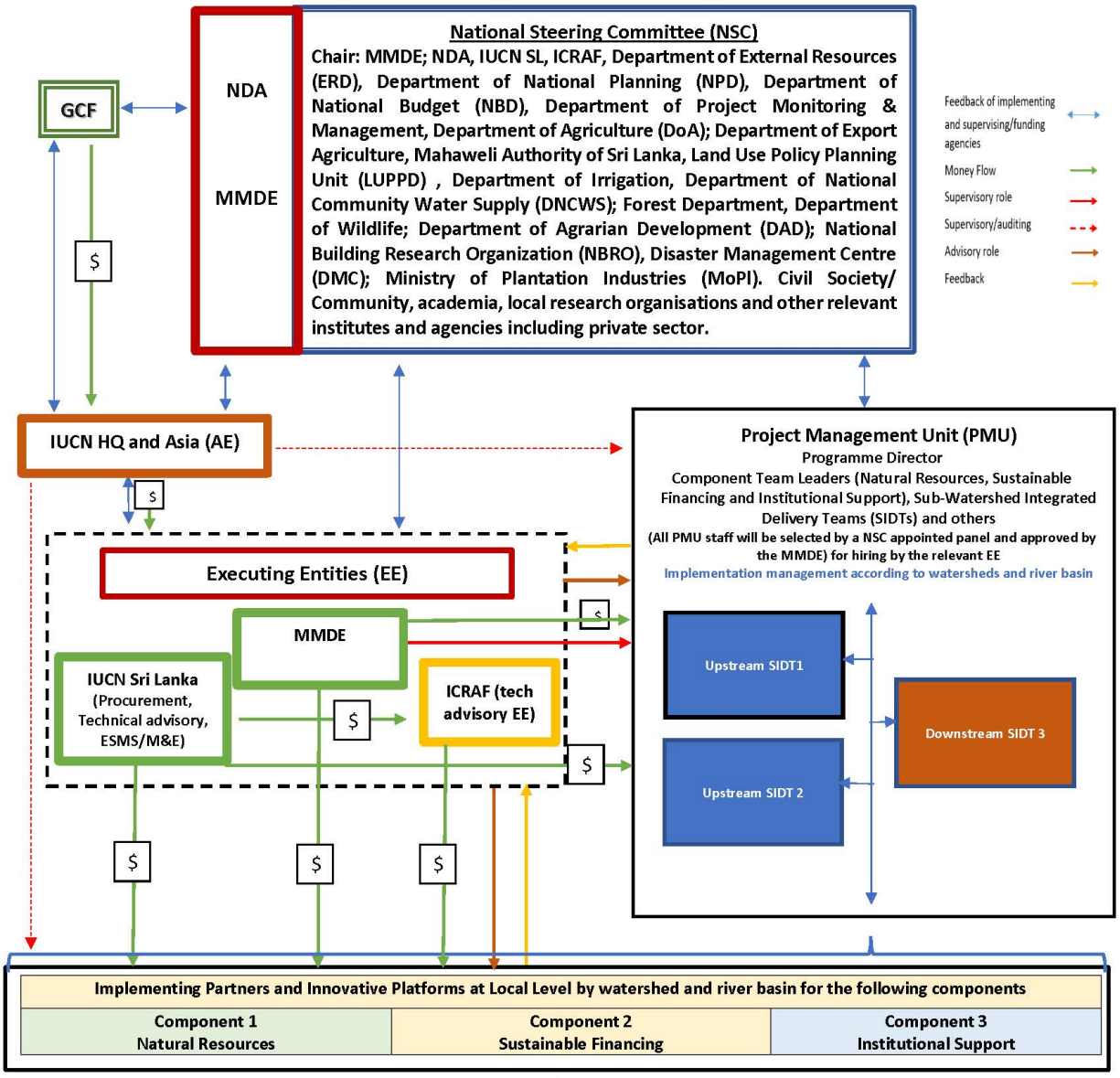
183. The strategic guidance and financial approvals for the project implementation will be provided by the NSC comprised of key entities appointed by the Secretary, MMDE. The National Steering Committee (NSC) is responsible for the governance of the project and oversight of the PMU. NSC will act in accordance with best practices and standards for governing bodies and ensure that the project management delivers expected results with best value for money, fairness, integrity, transparency and effective competition. The National Steering Committee will meet on a quarterly basis or at least three times per year.

184. Along with the three Executing entities (MMDE, ICRAF and IUCN), the NSC will include the Department of External Resources (ERD), Department of National Planning (NPD), Department of National Budget (NBD), Department of Project Monitoring & Management and other selected representatives from among: the Department of Agriculture (DoA), Department of Export Agriculture, Mahaweli Authority of Sri Lanka (MASL), Land Use Policy Planning Unit (LUPPD), Department of Irrigation, Department of National Community Water Supply (DNCWS); Forest Department, Department of Wildlife Conservation, Department of Agrarian Development (DAD), National Building Research Organization (NBRO), Disaster Management Centre (DMC), Ministry of Plantation Industries (MoPI), Civil Society/ Community, and relevant private sector organizations. In addition, any other relevant institutes and agencies co-opted as and when necessary.

185. PMU may include experts from local and international agencies identified based on project needs with the concurrence of the NSC to provide adaptive programme management support. Agencies specialized in specific areas such as Rainforest Rescue International and other specialized entities will be linked to PMU through this modality.

186. The Project Management Unit (PMU), established under the MMDE will perform according to the policy guidance from the National Steering Committee (NSC) of which IUCN will also be a key member. PMU is headed by the Programme Director selected through an open competitive process by a panel appointed by the NSC on a Terms of Reference approved by NSC along with other PMU staff. The selection of all PMU staff will be done by a panel appointed by NSC and approved by the Government executing entity (MMDE). Hiring of those selected will be carried out by IUCN and ICRAF based on the terms of references of the positions.

Project Management Arrangements



Department of Agrarian Development, Department of Agriculture, Mahaweli Authority of Sri Lanka, Irrigation Department, Forest Department, Forest Department Research Unit, Survey Department of Sri Lanka, Central Environment Authority, Gem and Jewelry Authority, Gem and Jewelry Research Institute, Geological Survey and Mines Bureau, Water Resource Board, Dept. of Meteorology, Disaster Management Center, Natural Resources Management Centre of the Dept. of Ag., Centre for Agriculture Research and Policy, Plant Genetic Resource Centre of Dept. of Ag., Genetics and Plan Breeding Division of Dept. of Export. Agriculture, Tea Board, Tea Small Holders Development Authority, Tea Research Institute, Rubber Control Department of Ministry of Plantation, Rubber Research Institute, Coconut Research Institute, National Botanical Gardens Department, Education Department, National Planning Department, External Resources Department, Department of National Budget, Industrial Technology Institute, Institute of Post-harvest Technology, Provincial Ministries of Education, Director of Horticultural Research Development Institute – Dept. of Ag. (soil testing), Agrarian Training Center of Dept. of Agriculture, Public Health Inspectors of Local Authorities, Land Use Policy Planning Department, National Building Research Organization, Road Development Authority, Provincial Road Development Authority, Ministry of Social Welfare and Samurdhi Authority, Dept. of Wildlife Conservation, Ministry of State Resources, Private Sector Plantations, Ministry of Plantations – Plantation Monitoring Unit, Sustainable Energy Authority of Sri Lanka, Ministry of Primary Industries - Dept. of Export Agriculture, Local Authorities and Pradesheeya Sabhas in the Project Area, District Secretariats in the Project Area, Divisional Secretariat Offices in the Project Area, University of Peradeniya; Universities and Research Institutes, Rainforest Rescue International and NGO involved in Analog Forestry, Institute of Policy Studies, Institute of Fundamental Studies, International Water Management Institute, Private Sector Companies, Research and Development Groups, Expert and Service Providers, Community Level Innovative Platforms and others in need basis.

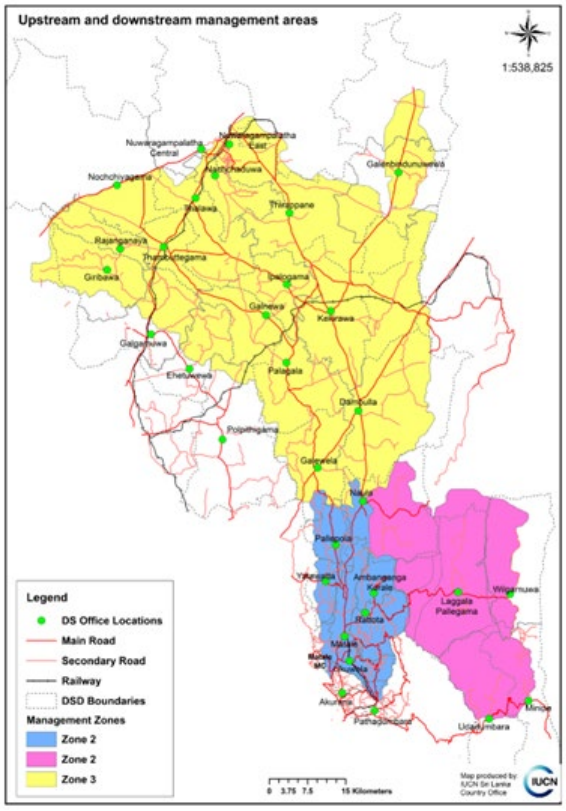
187. The Programme Director is responsible for the day-to-day operations of the PMU within the guidelines laid down by the NSC including the tasks of managing and monitoring the project risks initially identified and submit new risks to the NSC for consideration and decision-making on possible actions if required and update the status of these risks by maintaining the project risk log.

188. The project will use fund management modalities relevant to three Executing Entities based on an annual work plan developed by the PMU and subsequently approved by the NSC. The AWP indicates which activities should be funded by the MMDE applying the Government procedures and activities to be funded through other Executing Entities (IUCN and ICRAF) as per their internal procedures.

189. The PMU will be established in the Matale District with the management arrangements outlined in the chart above. The PMU will provide the NSC with quarterly progress reports and close its operations when the final project terminal evaluation report and other documentation required by the GCF and IUCN has been completed and submitted to the NSC and IUCN.

190. The PMU will further include the leads for three Project Components. In addition, the PMU will be staffed with required professional and technically qualified personnel selected by the NSC appointed panel and approved by the principal Executing Entity, MMDE. In all the PMU will strive to maintain a lean management structure.

191. For ground level delivery, under the PMU, the project will form Sub-basin Integrated Delivery Teams (SIDTs). It is proposed that the SDTs cover the following geographies and the detailed team structures will be developed during the project implementation based on the workplans and logistics. There will be two SIDTs for the upstream catchment and one SIDT for the downstream command area. The SIDTs will work with Implementing Partners and stakeholder entities in the form of Community Level Innovation Platforms (CLIPS) at GN levels to carry out project activities.



SIDT1 - The lower part of the Sudu Ganga sub-catchment including the Ukuwela, Matale and parts of Akurana and Naula DSs. The Nalanda Oya sub-catchment embracing Pallepola and Yatawatta (marked in purple). SIDT1 also includes the upland part of the Sudu Ganga sub-catchment including the Rattota and Amban Ganga Korale DSs.

SIDT2 - The five sub-catchments on the east of the target catchment area (Amban Ganga, Puwakpitiya Oya, Thelgamu Oya, Kalu Ganga and Knuckles Ellewana Kanda Eastern Slope). These are well connected and encompass the large DSs of Lagalla-Pallegama and Wilgamuwa and the larger eastern part of the Naula DS (the rest is part of 3 below). Much of the area is less degraded than other parts of the overall catchment so the density of intervention is anticipated to be lighter than in other sub-basin units. SIDT2 also includes the Heen Ganga and Hasalaka Oya sub-catchments in the south, comprising of the Udadumbara DS and part of the Minipe DS (marked in Blue).

SIDT3 - Covers the downstream irrigated area (marked in yellow) where there are possibilities to integrate with several other projects such as the UNDP/GCF and World Bank Smart Irrigated Agriculture Project engaged in enhancing water storage, delivery of water and improving efficiency of water use.

192. The PMU will develop the contracts, guidelines and technical documentation to engage and support SIDTs, Implementing Partners and CLIPs. PMU will ensure extensive coordination and experience sharing among Project Components, SIDTs, Implementing Partners and members of CLIPs. NSC will provide policy direction and guidance to improve the coherence and efficiency of this innovative approach to be developed as an up-scalable model.

193. Each SIDT will be managed by an Area Manager reporting to the PMU *via* the three component leads, who convene appropriate implementing partners for the work in the area, as directed and supported by the relevant PMU component teams. The SIDTs will have different composition according to the nature of options being implemented in each area.

194. The project, at the local level will coordinate closely with district and divisional coordinating committees to ensure smooth local level coordination in project implementation, provide ownership and ensure sustainability. The Divisional Secretaries (DSs), are expected to play an active role in project implementation, facilitation and monitoring, which is generally an assigned function of the office and play a key role in the grievance redress mechanisms, as described in the Environmental and Social Management Plan of the project.

195. Local stakeholders and community members have a key role and are expected to extend support in the implementation—through Community Level Innovation Platforms (CLIPS) at GN level and will be involved in monitoring of the project. During the inception phase of the project, the principal Executing Entity (MMDE) working together with the other two Executing Entities (IUCN and ICRAF), will consult with all stakeholders, including vulnerable community members, FOs, CBOs, private sector players etc. and facilitate an understanding of the roles, functions, and responsibilities within the Project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The stakeholders will be engaged at all levels of the project management process and will assess the progress of the project and enable adaptive project management in response to the needs and priorities of the communities.

C.8. Timetable of Project/Programme Implementation

Following is the proposed project tranches and respective deliverables and their completion time.

Task	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q 15	Q16	Q17	Q18	Q19	Q 20	Q21	Q22	Q23	Q24
Deliverable (D) and Milestone (M)	M18			M19		M1		M2, M3, M20		M4, M5, M6, M7, D1 & D2		M21	M8, D7	M9		M10, D3, M22	M11	M12	M13, M14, D4	M23	M15, D5	M16, D6		M17, M24, D8
Output 1.1: Improved land and water management in upstream catchment areas to safeguard production of environmental goods and services										Completion														
Activity 1.1.1: Streamside protection and drainage management along roads			x	x	x	X																		
Activity 1.1.2 Rehabilitation and establishment of village tanks, ponds and irrigation networks					x	X	x	X																
Activity 1.1.3: Restoration of forest mosaic landscapes			x	x	x	X	x	X	x	X														
Output 1.2: Sustainable climate-resilient primary production in upstream catchment areas and downstream irrigated agricultural area conducted																			Completion					
1.2.1 Increasing cropping intensity of irrigated rice in both upstream and downstream areas					x	X	x	X	x	X	X	X	X	X	X	X	X	X						
1.2.2: Intensification of Sustainable smallholder production						X	x	X	x	X	X	X	X	X	X	X	X	X	X					
1.2.3: Restoration and intensification of sustainable plantations					x	X	x	X	x	X	X	X	X	X	X	X	X	X	X					
Output 2.1: Upgraded and more efficient green value chains and increased links to new markets developed																						Completion		

Activity 2.1.1: Conduct Domestic value chain mapping and green market assessments for products especially from small holder and subsistence farmers					x	X	x																
Activity 2.1.2 Provide technical support for Enterprise and institutional development to exploit green growth opportunities for small holder farmers in the uplands							x	X	x	X	X	X	X	X	X	X	X						
Activity 2.1.3: Identification and implementation of value chain upgrading options for smallholder and subsistence farmers engaged in climate smart agriculture										X	X	X	X	X	X	X	X	X	X	X	X	X	X
Output 2.2: Payment for ecosystem services (PES) established										**Completion**													
Activity 2.2.1: Developing a portfolio of business cases for negotiating performance-based financial transfer mechanisms						X	x	X															
Activity 2.2.2: Setting up a PES intermediary body as a part of the multi-stakeholder platform, and its governance system established							x	X	x	X													
Activity 2.2.3: Establish a monitoring system for PES schemes in the upstream catchment area									x	X													
Output 3.1: Governance mechanism for sustainable land management and productivity enhancement in the upstream catchment area established																**Completion**							
Activity 3.1.1: Develop an integrated land use policy and planning mechanism at sub-basin scale					x	X	x	X	x	X													
Activity 3.1.2 Develop a shared information system to support land use planning, climate adaptation, market information and monitoring of							x	X	x	X	X	X	X										

the performance of intervention options																							
Activity 3.1.3: : Development and refinement of SLM framework									x	X	X	X	X	X	X	X							
Output 3.2: Integrated rural advisory capacity responsive to developing knowledge base, real time weather and market information																				Completion			
Activity 3.2.1: Establishment of nested-scale multi-stakeholder innovation platforms from sub-basin to GN scale					x	X	x	X	x	X	X	X	X	X	X	X	X						
Activity 3.2.2: Develop local capacity for adaptive and sustainable land management s									x	X	X	X	X	X									
Activity 3.2.3: Development and production of simple to use guidelines, manuals and tools for matching options to context and implementing SLM, sustainable intensification and value chain upgrading options																x	X	X	X	X	X		
Project Management	x	x	x	x	x	X	x	X	x	X	X	X	X	X	X	x	X	X	X	X	X	X	X
Project launch	x																						
Disbursement planning and Financial reporting		x		x		x		x		x		x		x		x		x		x		x	x
Annual performance reporting				x				x				x				x				x			x
Evaluations												x											x

Detailed deliverables and millstones of the proposed project

M1 – Protected streams and well managed drainage system for runoff water
M2 – Rehabilitation of tanks and other RWH methods established
M3 – A list / data base of business cases that required performance base financial transfer mechanism
M4 – Restoration of forest cover degraded
M5 – PES established under a multi stakeholder platform
M6 – Monitoring system is established.
M7 – Development of integrated land use policy and planning mechanism
D1 - Systems developed to Improve land and water management in upstream catchment to safeguard production of environmental goods and services
D2 – Payment for environmental services is developed
M8 – Completion of SHARED system development to support land use planning, climate adaptation and market information
M9- Training conducted on adaptive and participatory co-designing
M10 – Options are available for SLM and sustainable intensification
D3 – Mechanism to incorporate governance in SLM and productivity enhancement in catchment area
M11 – Large number of enterprises established who get the advantages of green growth enterprises and capacity of the institutes to support these enterprises are also developed
M12 – high cropping intensity in both downstream and upstream areas
M13 – High intensity of small holder production in downstream and upstream areas.
M14 – Restored plantations and sustainable intensification
D4 - Sustainable production by the small holder farmers in upstream and downstream areas
M15- All guidelines and tools for adaptation are developed
D5 – Rural advisory system is improved to respond climate, development, weather forecasting and farming practices
M16 – Options for value chain upgrading are implemented
D6 – More efficient green value chains and new markets for small holder farmers
M17 – Implementation completion of the GCF project
M18 – Inception Report
M19-M24- Annual Performance Reports
D7 – Mid-term Evaluation
D8 – End-of-Term Evaluation

D.1. Value Added for GCF Involvement

Please specify why the GCF involvement is critical for the project/programme, in consideration of other alternatives.

196. The GCF project will de-risk the Sri-Lankan economy from climate change threats, as it will contribute to climate proofing the Knuckles range area, as one of key areas in the country for climate related hydrologic controls due to its upper catchment role. The GCF investment will remove the barriers and build the enabling environment for crowding in further investments both from the public and the private side.

197. The grant provided by the GCF will contribute to establishing the key infrastructures and systems needed to attract investments further, from the private sector in the value chains targeted by the project. Through output 1.2, the project will provide the trainings and capacity to farmer communities to increase their productivity through intensifying rice production. The project will also increase production intensity in the tea, coconut, rubber, timber and spices sectors following capacity building and training activities provided by the project.

198. This investment will support to build the regional capacity towards resilience with adequate infrastructures related to storing and processing of the crops and to strengthen the value chains and livelihoods. As such, targeted subsistence farmers and smallholders who will supply to the value chains more regularly will benefit from enhanced livelihoods (increased and more resilient). Through output 2.1, the project will provide the region with the necessary tools to better inform investors on opportunities. The project will allow several innovative and sustainable techniques and approaches to be applied on the ground in using nature, culture and heritage unique to the area and to attract non-traditional tourists and others without damaging the ecosystem.

199. The value addition of the GCF involvement and investment is to catalyze paradigmatic changes in governance, management, information generation, access and utilization as well as adoption of climate smart agricultural practices, without which an estimated 1.3 million people will experience greater vulnerability and deterioration of their living standards, with subsistence farmers pushed beyond their coping capacities. They occupy over more than 300,000 ha of land in the Knuckles watersheds and downstream areas.

200. The GCF funding will make the Knuckles range watershed more resilient by strengthening the agriculture and water sectors' adaptive capacity. This will contribute to having the enabling environment for sustainable and resilient agricultural production systems, which will be more attractive to private sector investment. Without the GCF funding, the agricultural system will remain highly vulnerable to climate variations, with a high level of uncertainty and risks. This will not encourage investments and will propagate the risk in food insecurity on many communities and populations. These risks will not encourage investment in the agriculture sector, nor the improvement of smallholder farming communities.

201. GCF funding will focus on interventions that reduces land degradation and with it, improve water holding capacity of soils and ecosystems, physical infrastructure for water storage and irrigation for smallholder subsistence type farmers in the uplands is improved. Smallholder farmers' efforts for better management will be sustainably rewarded through better markets for their green products and the ecosystem services they produce will be paid. Binding this together are improvements to governance and management systems that focus far better on the management of water by being organized around watersheds with participation of stakeholders.

202. All of this requires catalytic investments to shift practices and behaviors that Sri Lanka can at present ill afford for historical reasons mainly due to the civil conflict. Furthermore, as a result of the 30-year civil war, and subsequent measures taken to revitalize the country's economy, the Government of Sri Lanka (GoSL) is encumbered with a large national debt of approximately $65 billion.

203. Most of the country's revenue is currently allocated towards debt repayment. The national government has prioritized enhancing the climate resilience of highlands ecosystems, its related ecosystem services, and the most climate vulnerable communities in the highlands and lowlands. However, they do not have available financial resources to make all the necessary investments.

204. The private sector operating in the highlands, primarily plantation companies and smallholders, realize that the land base on which their livelihoods depend is degrading, but their financial conditions are restricted. Most smallholders and plantations operate at breakeven to low profits. Further, the plantation companies that operate in this restricted area, where land management practices in neighboring locations affect their land resources as much as their own management practices, are reluctant to invest in improving sustainable land management practices that will raise costs and might be undone by the off-site management practices of others.

205. Smallholder families have limited land use or tenure rights. Under such conditions, families limit their investments to what is necessary to maximize productivity and profits in the near term. It is understood that the investment in management practices that support long-term sustainability of the land are not practical for short-term family or business practices.

206. For smallholders, plantations, other private sector entities, and conservation and development organizations, the reluctance to invest can be categorized to two general issues, high upfront (start-up) costs and the need for a longer-term investment/finance before returns or benefits are realized. Those two issues are aggravated by the current disjointed and fragmented management of the highlands, which lacks systematic spatial planning, guidance and incentives to sustainable management. A multi-sectoral, multi-stakeholder spatial planning and management approach is required to attain a transformative change in landscape management in the highlands and upper watersheds necessary to support the resilience agenda. Experience demonstrates that when such multi-sectoral, multi-stakeholder approaches are undertaken in an open equitable manner, stakeholders readily commit to sustainable management options that serve both the long-term productivity of the landscape and their own land use systems. As sustainable management measures begin to impact the ecosystem productivity and community livelihoods, investment in the resilience agenda will cease to be a barrier. Enhanced returns for smallholders and plantations will justify those investments.

207. By providing the catalytic investments outlined in this proposal, the GCF is contributing and adding value to the impacts described here. Failure to make these investments at this juncture is likely to exacerbate the situation further with much greater environmental and social costs in the future.

208. GCF grant funding is therefore critical to catalyze paradigmatic changes that increase the resilience of the highland ecosystem, the resilience of highland and lowland communities, governance and economic systems and the achievements of the expected results of the proposed project. The project has high impact potential in an area of central concern to the government. Consequently, it has the support of the government to the highest level, where a paradigmatic change in the management and governance of the highlands ecosystems is being sought.

209. The project design includes the development of a project exit strategy that will ensure project achievements and progress towards larger resilience goals will continue in the post-project period.

D.2. Exit Strategy

Please explain how the project/programme sustainability will be ensured in the long run, after the project/programme is implemented with support from the GCF and other sources, taking into consideration the long-term financial viability demonstrated in E.6.3. This should include a description of strategies for longer term maintenance of physical assets (if applicable).

Financial Sustainability

210. The project will put in place sustainable financing (component 2 with outputs 2.1 and 2.2) to enable people to invest in catchment protection and sustainable land use; through value chain upgrading and establishment of payment for ecosystem services schemes, respectively.

211. In order to make and sustain climate-adaptation through better management of natural resources, in addition to direct land use interventions with farmers and other land users (Component 1), the project will establish sustainable financing for it, through upgrading value chains and the development of a PES scheme to support catchment protection (Component 2).

212. Strategic interventions proposed in the project included recognizing the current royalty payment by private sector operators of hydro projects as Ecosystem Service (ES) payments. Enacting the legislature for ploughing them back in to enriching the upper catchment and also linking the project to national welfare programme, named “Samurdhi” will further the contributions to ES enhancements to national food security and poverty programmes. This process will empower the beneficiaries to understand the connection between climate change, environmental processes and resilience led sustainable development in a manner better resonate with them. Incentives and PES mechanisms proposed will be the transformation thinking that the empowered vulnerable communities will embrace through the project.

213. The project will establish the governance framework and monitoring framework for PES including setting up the PES intermediary body (as part of the multi-stakeholder platform and its governance system). The establishment of the governance framework includes setting up the financial and advisory support required to sustain climate adapted best practice in the upstream catchment. There is a clear potential to implement PES for the Knuckles catchment area as the Government of Sri Lanka is committed to implementing a PES modality, initially based on revenue from micro-hydropower generation to provide incentives to maintain best practice in terms of catchment protection.

214. The inputs from a wide spectrum of stakeholders covered real climate induced issues in the project area and these inputs were used in designing possible solutions offered in this project. With the engagement of ICRAF, IUCN and other Government agencies, the proposed project will demonstrate best practices of developing a region affected by climate change using innovative approaches with technical assistance by international agencies with all implementation by capacity built local agencies and community-based organisations. The international agency and national agency led designing of the project will become a local agency led and owned project within the first 2-3 years with limited direct implementation by international agencies. This assures that local agencies and local people continue project-initiated activities beyond the project as their own.

Environmental and Landscape Level Sustainability

215. In addition, resulting from this project there are significant shifts expected to sustainable, climate resilient agriculture, which will require less water, pesticides and artificial fertilizers. The project will restore forests and improve the tree cover while improving both productivity and value of crops that in turn will lead to, soil organic carbon stocks being replenished, water holding capacity improved and erosion greatly reduced. Connections to self-correcting systems, such as green value chains or PES, will help to maintain and improve these transformations while improving livelihoods and reducing vulnerability. The result will be a much more resilient system that especially accounts for the needs of women by paying attention to their roles in agriculture and green value chains for subsistence and smallholder farmers.

216. The project will improve capacities and practices of farmers and land managers. Once adopted and practiced through the project period the practices are expected to remain with them, including the additional sources of revenue, which is a key incentive for sustainability beyond the knowledge gained during the project. The unique feature in the proposed project is best science-based information at fine scale is expected to be used enabling participatory engagement, customized recommendations and the local adaptation of best practices while regulations, incentives (PES) and extensions are required to enable wide-scale adoption. The project will ensure these are well appropriated by smallholders and relevant decision-makers so that the activities go beyond the project lifetime. The development of rural infrastructure will support the value chains in the long-run and provide smallholders with better access to markets, which will go beyond the project life.

217. The implementation of best-bet options will include the establishment of 'exemplary landscapes' of key interventions. The exemplary landscapes will serve several purposes: i) sustainable intensification of smallholder production; ii) functional demonstrations of best-fit options; iii) opportunity for farmers to develop innovations; and iv) establishment of venues for future training and cross-visit events.

218. In addition, ecosystem benefits achieved through the project interventions will be recycled back to the systems being developed in the three key areas by way of enhanced community income, payment to Government by hydropower generation and using taxes and revenues to invest back in catchment protection.

Development of participatory exit strategy

219. The more detailed draft exit strategy will be presented in the middle of Year 3 at a mid-project stakeholders' meeting, which will include working group sessions for subgroups of participants to develop various components of the exit strategy. By the end of Year 3, it is anticipated that the strategy will be further developed, finalized and approved by partners and stakeholders through a series of stakeholders' meetings.

220. Commencing at the beginning of Year 4, the strategy will initially be led by the executing entities; with responsibility for planning, implementation and reporting gradually handed over to the key partners and stakeholders. It is foreseen that the 'key partners and stakeholders will include the irrigation project authority, local government agencies responsible for land management, representatives of smallholder communities, private sector entities, and possibly conservation organizations and/or development programmes.

221. Letters of commitment and terms of references will be signed by the key partners to demonstrate their commitment to the strategies. The exit strategy is likely to focus on: 1) management information; 2) upgrading, market and enterprise development for smallholders and plantations; 3) partnership development in land-use planning and ecosystem services management; and 4) regulations regarding sustainable natural resource management. However, the specifics topics addressed in the exit strategy will be determined and approved in

Year 3 as summarized above. The strategy document will specifically identify: 1) what activities the partners and stakeholders need to continue in the post-project period; 2) what types of capacity and mechanisms (including financial resources) are required to support those needs; 3) what the project can do to develop or facilitate those mechanisms; 4) who is involved and responsible for each activity, and 5) a monitoring and evaluation (M&E) scheme.

222. Key sources of support to implement the exit strategy may include in-kind support from farmers and communities, operational budgets of estate companies, operational and development budgets from local to national governments, support from the private sector, project funding from conservation organizations or development programmes, and rewards/payments from environmental sources. The exit strategies will be drafted in the beginning of Year 3 by representatives of the key executing entities. However, inputs for the draft will be drawn from all participants and stakeholders. Key sources of that input will include project achievements, lessons-learned and feedback received from participants and stakeholders during the project.

Sustainability of assets

223. The GCF investment do not involve large scale investments on assets other than the vehicles for project transport and equipment for processing of area-based products and value addition. These assets will be mainstreamed to the system during the project period and to be part of the exit strategy. The new post-project structure is expected to emerge starting year 3. The enhanced institutional capacity and the advancements in business ventures will take over the maintenance of such assets after the project period.

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224. As in any other projects the vehicles will be donated to the relevant Government Agencies for the use by the agencies in supporting the project-initiated work while maintaining them.

In this section, the accredited entity is expected to provide a brief description of the expected performance of the proposed project/programme against each of the Fund's six investment criteria. Activity-specific sub-criteria and indicative assessment factors, which can be found in the Fund's Investment Framework, should be addressed where relevant and applicable. This section should tie into any request for concessionality made in section B.2.

E.1. Impact Potential

Potential of the project/programme to contribute to the achievement of the Fund's objectives and result areas

E.1.1. Mitigation / adaptation impact potential

Specify the mitigation and/or adaptation impact, taking into account the relevant and applicable sub-criteria and assessment factors in the Fund's investment framework.

225. Expected project impacts would be the increased resilience of the most vulnerable communities, resilience of ecosystem and ecosystem services and resilience of health, well-being and water and food security. These broader impacts will be achieved through by making the climate vulnerable subsistence farmers' livelihoods adapt to climate change. The key approaches for the adaptation are sustainable land and water use in upstream watersheds generating livelihood benefits locally and the protection of water supply to downstream users together with adaptive capacity at sub-basin and local scales to continue innovating in response to change. Payment for Ecosystems will help much in this regard. In the meantime, more stable and productive land and water use in downstream areas currently relying on irrigation will benefit by the strengthened adaptive capacity at command area level and be able to continue to innovate in response to change. The protected irrigated water from the upstream will helpful in this regard.

E.1.2. Key impact potential indicator

Provide specific numerical values for the indicators below.

GCF core indicators	*Expected tonnes of carbon dioxide equivalent (t CO_2 eq) to be reduced or avoided (Mitigation only)*	*Annual*	Not applicable
		Lifetime	Not applicable
	• *Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced vulnerability or increased resilience);* • *Number of beneficiaries relative to total population, disaggregated by gender (adaptation only)*	*Total*	Approximately 1.34 million, 690,015 Female, 653,201 Male Direct: 268,643 F- 138,003 M- 130,640 Indirect: 1,074,573 F - 552,012 M - 522,561
		Percentage (%)	100% in the target area 51.4% Female 48.6% male

Other relevant indicators	• *346,000 hectares protected*		

Describe the detailed methodology used for calculating the indicators above.

226. For the calculation, beneficiaries' recent census data was matched to geospatial analysis of the relevant watersheds, with a disaggregation of the types of beneficiaries by gender, nature of agriculture/land management they were embarking on. Sri Lanka has excellent and up to date records on its population, which has made this analysis possible and reliable.

227. Assessments of possible impacts on soil, vegetation and ecosystems have been carried out using geospatial analysis, especially LDSF (described elsewhere in this document) as well as climate models. Global models have been used for this, which will need further validation during initial baseline surveys for precision.

Describe how the project/programme's indicator values compare to the appropriate benchmarks (i.e. the indicator values for a similar project/programme in a comparable context).

228. We are not aware of other projects that are seeking to achieve the same kind of impacts in agricultural, livelihood, topographical, geological, climatic, economic and pedological contexts such as this. Broadly speaking, this is a project that seeks transformation at ambitious scales, building on approaches, tools, capacities and a political will that reduce risk of failure.

E.2. Paradigm Shift Potential

Degree to which the proposed activity can catalyze impact beyond a one-off project/programme investment

E.2.1. Potential for scaling up and replication (Provide a numerical multiple and supporting rationale)

Describe how the proposed project/programme's expected contributions to global low-carbon and/or climate-resilient development pathways could be scaled-up and replicated including a description of the steps necessary to accomplish it.

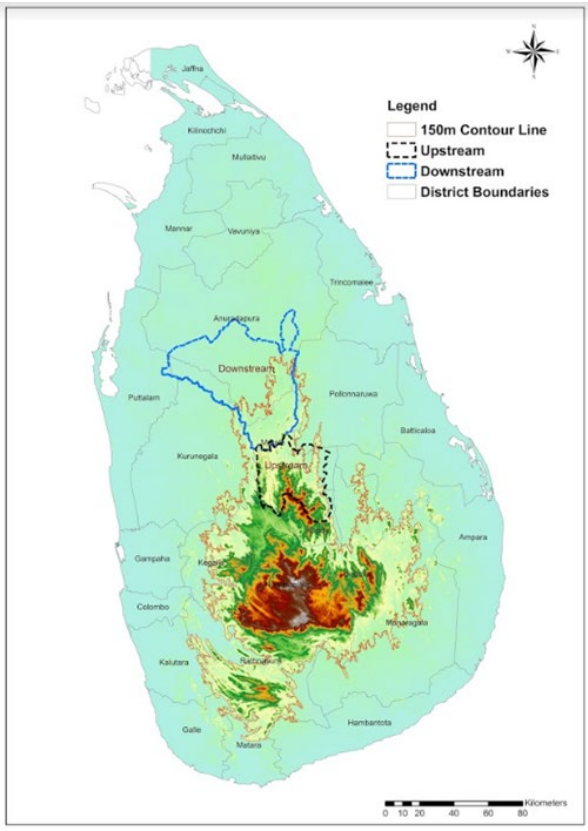
229. The key problem that the project addresses is that land users are unable to adapt to climate change, which lies at the nexus of a series of worsening climate change impacts and a series of barriers and constraints acting to address them. Causal factors for climate impacts and the barriers and constraints to addressing them interact and are interlinked, creating a vicious spiral of upstream catchment degradation that undermines agricultural production in downstream irrigated areas already stressed by higher temperatures and more frequent and severe droughts. This results in climate change negatively impacting livelihoods and food security in both the upstream and downstream rural populations.

230. The project outcome is to generate resilient livelihoods through capacity to adapt to climate induced change in critical upstream and downstream rural communities in Sri Lanka including protection of the ecosystem service flows that connect them. This contributes to three GCF adaptation impacts by increasing the resilience of: the most

vulnerable communities; their health, well-being and water and food security; and ecosystem services. It is through protecting, enhancing and harnessing ecosystem service flows that the livelihood impacts will be realized.

231. To achieve this, actions are required both to promote sustainable land use and profitability of farming that can sustain it in the upstream areas, as well as to promote efficient use of irrigation water and climate adapted agriculture downstream (the intermediate project results). These require different approaches but are interconnected because the downstream area receives its irrigation water from the upland catchments and the development of PES schemes by GoSL, that recognize the value of catchment restoration and protection in delivering water to downstream users, provides the necessary investment to maintain catchment protection upstream. Both upstream and downstream populations face problems of food insecurity, that has been a stubborn indicator to shift in Sri Lanka (nationally WFP estimate that 22% of people are undernourished), despite the overall progress of economic development[41].

232. Catchment protection and adoption of climate adapted agricultural practice while necessary are not enough on their own, to tackle climate adaptation because they are unlikely to deliver sustainable outcomes unless coupled with value chain upgrading that generates sufficient revenue from land use to make it sustainable. The growth of national and global markets for green products and services provides key opportunities to make climate adapted land use profitable enough to be sustainable. This leads to the project focus on assisting GoSL in overcoming barriers and constraints land users face in adapting to climate change through delivering four interacting outputs, each directed at overcoming one or more major constraints.



233. The project will support a paradigm shift in the way the stakeholder entities think of resource management (water, land, energy etc.) by transferring knowledge, demonstrating best practices and actively engaging communities to understand and prepare to meet the climate challenges impacting their resilience and sustainability.

234. The project provides an integrated technical approach with multi-agency participation to understand and manage water and natural resources with improved information sharing, technology and a shared vision in a catchment scenario and a command area management scenario. The processes and tools developed by the project will be mainstreamed at district, divisional and community levels during the project in a manner the best practices will be adopted to the governance system during the project period, ensuring the paradigm shift during the project stay in the system.

235. The GCF investment is aimed at establishing a national level integrated climate change and watershed resilience model that addresses aspects of surface water management, canopy related rainfall/fog interception, erosion control, prevention of sedimentation of tanks and reservoirs, stream-side and roadside management through a multistakeholder engagement process involving Government agencies, communities, plantation companies, subsistence farmers among others. This national model on conserving central hills (steep lands above 150 m mean sea level contour) to meet the climate challenges will also serve as the main pilot project for the GCF funded capacity building programme (Readiness Programme) starting November 26th, 2019. The total areal extent of the Central Highlands is 14,100 square kilometres approximately and the GCF investment will directly support interventions in an area of 1,280 square kilometres (above the 150 m contour) – equating to 9% of the Central Highlands.

[41] http://www1.wfp.org/countries/sri-lanka accessed 1/06/2018

236. The project is designed, and agencies were selected towards to bring out a model that is resilient, sustainable and up-scalable as a climate challenge approach. Involvement of Govt., agencies at national, sub-national and grassroot levels is one of the key approaches in this theory of change leading to a transformative value. The theory of change articulated below illustrates how project outputs contribute to the overarching outcome of resilient livelihoods through capacity to adapt to climate induced changes.

237. The project has the potential to deliver a model that can be adapted to other, similar mountainous regions where shifts and rainfall patterns coupled with land degradation are threatening livelihoods in the uplands and the lowlands. Because of the nature of the systems concerned it has relevance for scaling in Asian tropical and sub-tropical mountain regions, with some potential for adaptation to the Southern Western Ghats region of India which shares similar biophysical attributes and geological origins such as meso-American and South American systems where irrigation is a feature. In Africa some slopes of Ethiopian and Eritrean systems are likely to be of interest as well as in the Guinean Shield and possibly the Atlas Mountains.

E.2.2. Potential for knowledge and learning

Describe how the project/programme contributes to the creation or strengthening of knowledge, collective learning processes, or institutions.

238. The project's emphasis on information systems—storage, access, transformation and therefore transformative learning—supported by 'soft' and 'hard' systems is a central feature because of its emphasis on adaptive management, innovation and interactive improvement. This is central to the 'Options by Context' approach and the Core 4 framework. Data, information and knowledge (and ultimately wisdom) will be stored and accessed in distributed systems, so that bottlenecks and 'knowledge is power' gatekeeper behaviors are avoided. Use of open access, license-free software and data retrieval systems, smartphone access, learning groups, responsive governance and better market linkages through information are a part of this.

E.2.3. Contribution to the creation of an enabling environment

Describe how proposed measures will create conditions that are conducive to effective and sustained participation of private and public sector actors in low-carbon and/or resilient development that go beyond the program.

239. The proposed project will contribute to innovation, market development and transformation, in a significant way, towards low-carbon and resilient development. The foundation and the model established will use cutting edge knowledge mixed with traditional adaptation practices in Sri Lanka, which will resonate with the vulnerable populations. The institutional development (Component 3) encompassing the engagement and empowering of national level agencies to the community level (innovative platforms) will ensure the sustainability beyond the project. Further examples include, a) Introducing and demonstrating a new market or a new technology in a country or a region; and b) Using innovative funding scheme such as initial public offerings and/or bond markets for projects/programs.

240. Components of this project highlight the perceived climate resilient priority needs. The linkages to and upgrading of relevant 'green' value chains to support climate smart agriculture of small holders and subsistence farmers, introduction of PES and shifts in (local) governance, with concomitant institutional strengthening are core features described extensively.

E.2.4. Contribution to regulatory framework and policies

Describe how the project/programme strengthens the national / local regulatory or legal frameworks to systematically drive investment in low-emission technologies or activities, promote development of additional low-emission policies, and/or improve climate-responsive planning and development.

241. Component 3 deals extensively with this issue. To carry out this activity and to ensure long term sustainability, five new governance structures (implementation teams) will be developed that will be put in place to integrate across non-congruent administrative (Divisional Secretariat - DS) and hydrological (sub-catchment) boundaries. The development of these will involve the use of participatory decision platforms that explicitly account for risk and support resilience (the SHARED platform). Improvements to Land-use policy and planning, stakeholder innovation platforms, information systems and capacity strengthening of institutions are core elements as laid out in Section H.

242. The National Climate Change Policy implemented in 2011 refers to the importance of adopting climate change resilient practices including, enhancing knowledge and mainstreaming and integrating climate change issues into national development processes. The Nationally Determined Contributions (NDCs) specifically mention improving the resilience of vulnerable communities and reducing the risks to the health and wellbeing and, food and water security and ecosystems and ecosystem services and the project targets vulnerable populations impacted by water security and deteriorating ecosystem services.

243. GoSL's priority order for water management is drinking, irrigation and power generation. The project focuses very much on catchment protection to ensure safe drinking water and irrigation water year around and the project facilitate small-scale renewable energy thus supporting the energy generation aspects.

244. National Disaster Management Policy and Strategies, in line with Sendai Framework, promote disaster risk reduction and investments and participation of multiple stakeholder entities, as promoted in this project. The catchment protection in the upper Amban Ganga conservation area will reduce droughts and floods in both upstream and downstream locations while minimizing siltation of reservoirs and minimizing landslide potential.

245. The partnership model with private sector is very much in line with the Government's policy to use the private sector as the engine of growth and to help the Govt. welfare and subsidy programs to reap the benefit of private sector led technology promotions, value additions and market access.

246. The project endorses and supports the crop diversification to meet the challenges of climate change in the Agricultural Policy; and enhanced rainwater harvesting and use in the Rainwater Harvesting Policy (although the same was prescribed by ancient kings thousands of years ago); National Climate Change Adaptation Strategy and Action Plans on promoting mitigation and adaptation to improve the resilience of vulnerable groups; and the Sri Lanka Comprehensive Disaster Management Programme to protect catchments as a drought and flood risk reduction measure.

247. The national REDD strategy promotes Payment of Ecosystem Services (PES) using green cover and water resources management related ecosystem benefits as envisaged in the project. PES is also advocated in the National Adaptation Plan for Climate Change Impacts in Sri Lanka 2016-2025.

E.3. Sustainable Development Potential

Wider benefits and priorities

E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact

248. Because of this project we expect shifts to sustainable, climate smart agriculture, which will require less water, pesticides and artificial fertilizers. It will restore forests and improve the tree cover while improving both productivity and value of crops. As a result, soil organic carbon stocks will be replenished, water holding capacity improved and erosion greatly reduced. This will have co-benefits for biodiversity as a greater number of species, more appropriate to the systems concerned are maintained and managed. Connections to self-correcting systems, such as green value chains or PES, will help to maintain and improve these transformations while improving livelihoods and reducing vulnerability. The result will be a much more resilient system that especially accounts for the needs of women by paying attention to their roles in agriculture and green value chains for subsistence and smallholder farmers.

E.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

E.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

Describe the scale and intensity of vulnerability of the country and beneficiary *groups and elaborate how the project/programme addresses the issue (e.g. the level of exposure to climate risks for beneficiary country and groups, overall income level, etc).*

249. The *National Adaptation Plan (NAP) for Climate Change Impacts in Sri Lanka (2016-2015)* recognizes that Sri Lanka is highly vulnerable to the adverse effects of climate change. Projected climate change includes rising temperatures, prolonged droughts, variable erratic rainfall, flash floods, landslides and rising sea levels. All of those changes are foreseen to have negative impacts on most of Sri Lanka's economic sectors and deprive the nation and its people of livelihoods. The highlands of Sri Lanka are the main source of water—for all purposes—for the country, with most river systems and large reservoirs originating from them. The projected climate variability, coupled with current trends in land degradation, threaten agricultural productivity in the highlands and downstream areas and urban drinking water in large parts of the country that originate in the highlands. Much of the industrial base and some services sectors of the country likewise depend on the water resource flowing from the highlands and its environmental health. Unsustainable land management practices in the highlands causes widespread land degradation, siltation of reservoirs and the reduction in water quantity and quality for use in the highlands, the lowlands and urban centers. This situation threatens the food security, agricultural productivity and economic security of the country. Environmental degradation successively threatens the biodiversity and ecosystem of the highlands, which are both national and international public goods and part of the global commons. Protection of the Sri Lankan economy, its people's livelihoods and food security, and country's unique biodiversity and ecosystems are not only a national but international concern.

250. The NAP recognizes the nation's adaptation needs in terms of nine key vulnerable sectors; identifying adaptation options, actions and performance indicators for each vulnerable sector. The proposed project directly addresses four of the vulnerable sectors: food security, water resources, ecosystems and biodiversity, and export development. In the food security sector, the project will enhance the climate change resilience of smallholder systems by improving on-farm water management practices, promoting farming resource efficiency, improving access to quality germplasm, and strengthening capacity building through demonstrations and on-farm adoption of climate-smart practices. In the water resources sector resilience will be enhanced by improving watershed

management through participatory management mechanisms, promoting conservation farming practices, and strengthening capacity building through training including the promotion of local ecological knowledge and research findings. In the ecosystem sector resilience will be enhanced by including local communities in sustainable management programs, building awareness regarding how sustainable management safeguarding livelihoods, and promoting the use of local ecological knowledge in ecosystem management. The agricultural export sector will be strengthened through the measures mentioned under the food security sector, plus by assisting smallholders with integration into value-chains and small business management.

E.4.2. Financial, economic, social and institutional needs

251. Sri Lanka is facing a significant strain on its economy. Growth was largely driven by reconstruction and increased consumption and averaged about 6.3% between 2002 and 2013. Even while the country is categorized as a middle-income nation, there are deep regional disparities in wealth and well-being. The percentage of people living below the national poverty line in Sri Lanka (calculated at LKR 3,950 per person per month/ or USD 1.25 per person per day at PPP) declined from 22.7% in 2006/2007 to 6.7% in 2012/2013. Loans and borrowings that financed the post-war infrastructure expansion (roads, railways, housing) created a serious balance of payments crisis and an onerous debt burden that needs to be addressed by new macroeconomic policies. In the short-term, therefore, GoSL is constrained to fund resilience-related investments through domestic financing, especially the incremental investment required to build the coping capacity of vulnerable, rural communities.

252. Poverty and social exclusion are most prevalent in the under-developed rural districts with social vulnerabilities. The districts where the project interventions are situated contain large numbers of smallholder farmers who are cultivating under village irrigation systems are poorer.

253. There is an urgent need to implement a new model of water management for smallholder farming communities that will demonstrate how such smallholder farmers can access modern, improved technology and services to make traditional systems more climate smart and resilient. As such, the Government of Sri Lanka seeks GCF financing to implement such a model in some of the most vulnerable populations. The adaptation interventions in this project target public goods—irrigation, water supply, environmental conservation needs due to climate change, uplifting the living standards of the climate vulnerable smallholder farmers and estate sector communities.

254. Sri Lanka also faces technical and financial capacity gaps across institutions, impeding an integrated approach to water management, forest conservation, agriculture and climate smart land use planning practices. A lack of awareness and understanding of sectoral links when managing water supply systems also makes it difficult for institutions to coordinate and work together. The proposed project strengthens institutional capacity of the various government agencies through support to planning, coordination, and implementation of activities for water management, agriculture, and conservation. The project provides training for development of water resources management, planning and implementation of climate-resilient agriculture, water source protection and green agriculture with access to markets.

E.5. Country Ownership

Beneficiary country (ies) ownership of, and capacity to implement, a funded project or programme

E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

Please describe how the project/programme contributes to country's identified priorities for low-emission and climate-resilient development, and the degree to which the activity is supported by a country's enabling policy and institutional framework,or includes policy or institutional changes. Please also *specify the multi-stakeholder engagement plan and the consultations that were conducted when this proposal was developed.*

255. The project builds on several country frameworks evolved over a three-year period. The geography of Sri Lanka has resulted in the central highlands playing a key role in the water supply to subsistence farmers in the hill country catchments as well as in providing continuous water for irrigation and drinking for downstream farming communities. The same is identified as a priority in the "Green (Haritha) Lanka Strategy and Action Plan (Ministry of Mahaweli Development and Environment (2016)"[42]. The same need was confirmed during the "Land Health is National Wealth Workshop in 2017.[43]"

256. The "Green Lanka Strategy and Action Plan" related consultations were conducted during the latter part of 2016 and early 2017 and involved Government Agencies, Universities, Non-Governmental Agencies, Environment Advocacy Groups and Community Based Organizations. The compilation was completed in May 2017. The Green Lanka Mission 2 on "Mainstreaming Biodiversity Conservation for Sustainable Development" includes several actions related to the project activities including Payment for Ecosystem Services (PES) and multitude of conservation measures. Further the Mission 7 on "Water for All and Always" highlighted catchment protection, water use efficiency improvements, demand side management of water etc., very much in line with project objectives and activities. The subjects of protecting catchments to improve the rain capture by green cover in central highlands, enhancing soil quality to improve water holding capacity and enhancing of the ground water recharge based on scientific approaches were firstly and systematically identified during the preparation of the National Green Lanka Strategy and Action plan.

257. The project proponent MMDE identified the catchment protection as a critical measure to meet the challenges of climate change and in 2017, ICRAF was requested by the GoSL to co-organize and implement a national workshop on 'Land Health is National Wealth'. Lead government agencies involved were the Ministry of Lands, the Ministry of Mahaweli Development and Environment, and the Ministry of Agriculture. The workshop, held from 11-13 October in Colombo, was attended by 100 people, including Sri Lanka's leading experts and stakeholders – drawn from government, academia, private sector, and multilateral organizations – in all aspects of agriculture, plantations, forests, soils, water and energy management. Endorsed by the President of Sri Lanka, the workshop produced an Action Plan to improve the health of the nation's land and other natural resources.

258. After the successful 'Land Health is National Wealth' workshop, the Ministry of Mahaweli Development and Environment (the National Designated Authority, NDA), ICRAF, IUCN (the Accredited Entity, AE), the University of Peradeniya, other government agencies, and some international development and conservation organizations operating in Sri Lanka discussed options and opportunities to advance priorities set out in the National Adaption Plan for Climate Change Impacts in Sri Lanka (2016-2025), the Land health is national wealth workshop action plan, and similar national documents. Members of these consortium of committed organizations engaged in field fact-finding missions to the highlands and upper watersheds in February 2018.

259. Subsequently in March, members of the consortium met virtually and in person to jointly develop the initial draft of this concept note. In early April, lead members of the consortium—including the NDA, the AE, key government agencies, and ICRAF—met with representatives of the Green Climate Fund (GCF) to clarify criteria and further advance the development of this concept note.

260. The Office of the President of Sri Lanka has been aware and involved with these proceedings and expressed support. The private sector, environmental organizations, and local governance and community-based organizations have been informed of these proceedings and requested to provide inputs. These stakeholders were fully engaged in subsequent discussions and planning of the project.

261. In terms of climate vulnerability, Sri Lanka has introduced a number of national policies, strategies and action plans to enhance the resilience and adaptive capacity of climate vulnerable communities and ecosystems. Key policies

[42] Green Lanka Strategy and Action Plan (MMDE, 2017) (https://www.dropbox.com/s/yx5ah1tudj38igw/Green%20%28Haritha%29%20Lanka%20National%20Action%20Plan%202015-2022.docx?dl=0)

[43] Workshop Report on Land Health is national Wealth (2017) ((https://www.dropbox.com/s/v7sdtwtdnmmyf6x/Land%20Health%20is%20National%20Wealth%20Outcome%20Report.pdf?dl=0)

and plans are the *National Climate Change Adaptation Strategy for Sri Lanka in 2010*, the *Climate Change Vulnerability Profiles in 2010*, *National Climate Change Policy of Sri Lanka (NCCPSL) in 2011*, *the Technology Needs Assessment and Technology Action Plans for Climate Change Adaptation and Mitigation in 2014*, the *National Action Plan for Haritha Lanka Programme in 2009* and *Urban Transport Master Plan 2032* based on the *National Transport Policy in 2009*, National Hazard Profiles (2012), Comprehensive Disaster Management Programme (2014).

262. The proposed project aims are in line with the *National Climate Change Policy of Sri Lanka (2011),* with the key objective to develop the country's capacity to address climate change impacts effectively and integrate climate change issues into the national development process. This project is designed to create resilient livelihoods through capacity building to adapt to climate induced changes in critical upstream and downstream rural communities, while protecting of the ecosystem service flows that connect them.

263. The proposed project is also in alignment with the *National Adaptation Plan (NAP) for Climate Change Impacts in Sri Lanka (2016-2025)* in its primary objective. The *NAP-CC (2016-2025)* presented the *Nationally Determined Contributions (NDCs)* to strengthen the global efforts of both mitigation and adaptation. The area of adaptation in the NDCs, *inter alia*, to *build resilience in most vulnerable communities, sectors and areas to adverse effects of climate change and focus on human health, food security (agriculture, livestock and fisheries), water and irrigation while prioritizing adaptation initiatives that derive mitigation co-benefits,* is complemented in the said objective of the proposed project.

264. The project also aligns with the *Forestry Sector Master Plan 1995-2020*, *National REDD+ Strategy* and the *National Action Programme for Combating the Land Degradation of Sri Lanka (NAP-CLD)*.

265. The proposed project also seeks to introduce climate smart agriculture methodologies within the Amban Ganga upper catchment. Catchment and Control region as a means of deceasing the vulnerabilities and increasing the adaptive capacities of the targeted beneficiaries of the project. This supports the role that the *National Agriculture Policy of Sri Lanka* plays in the alleviation of poverty, by developing the agricultural sector, particularly the domestic food production, floriculture and export crops sectors etc., in its efforts to increase the self-reliance of the country. The objectives of the Agriculture Policy, *inter alia*, is to "…*meet the basic needs of the farming community…through the adoption of technically feasible, socially acceptable, economically viable and environmentally friendly agricultural production technologies…"*[44].

266. The adoption of climate smart agriculture methodologies, by the proposed project, would cause the agricultural production system in the Amban Ganga upper catchment and downstream areas of North-Western Province and selected Mahaweli H regions to become more climate change resilient. Such agricultural systems would also become more commercial oriented and integrated with market opportunities complementing the objectives of the Agriculture Policy, particularly the opportunities for these farmers to produce high quality primary products, access to foreign markets for such crops with export potential, encourage product branding, certification etc., for products to enter competitive markets, opportunities for agro-enterprises to cater to the needs of small farmers and promoting public and private investments in such venture etc.

267. The proposed project outcomes would mutually reinforce the national policies while being implemented in a complementary manner for the purpose of enhancing climate change resilience and the adaptive capacity of communities in the target area. These outcomes are in alignment with the *National Climate Change Policy of Sri Lanka* in sensitizing the communities in the selected area to adverse impacts of climate change while empowering them to take adaptive measures to minimize and/or avoid such impacts on their livelihoods as well as the biodiversity of the ecosystems in the catchment area and the ecosystem services they provide.

268. Therefore, the proposed project would not only have positive impacts within the boundaries and sectors described by *NAP CC (2016-2025)*, the *NAP-CLD*, the *Climate Change Vulnerability Profiles in 2010* and the *National REDD+ Strategy*, but also are in alignment with the *Nationally Determined Contributions (NDCs***)** in building the resilience

[44] Sri Lanka National Agriculture Policy (2007) http://www.agrimin.gov.lk/web/images/docs/1252389643AgPolicy4.pdf

in some of the most vulnerable communities, sectors and areas, such as in Amban Ganga upper catchment and downstream areas of North-Western Province and selected Mahaweli H regions, by seeking to enhance the food security (agriculture in this instance), water and irrigation while deriving mitigatory co-benefits.

269. Prior to the project formulation several field level vulnerable groups have been consulted, including, village communities and plantation workers. Consultations with plantation management and communities held in "Elkaduwa plantations" in the project area helped to understand how climate variability (rainfall intensity and shifts) affect the income sources and the extent of soil erosion losses. Efforts to establish forest gardens helped to understand the drivers of deforestation, climate impacts on soil erosion under different vegetations etc. The consultative session also included a visit to "Mathale Sudu Ganga" area on degraded lands and "Riverstan" area on grasslands.

270. Consultation with upstream area communities in the project area was conducted with the "Pitawala" community representatives (about 50 numbers) from four village communities, namely, Pitawala, Atanwala, Rathkinda and Puwakpitiya, participated by both men and women. Community leaders participated highlighted the climate influence in their livelihoods, primarily the impact on the subsistence Agriculture. Discussions revealed the reduced crop intensity in the area (less than 1), due to the lack of water aggravated by climate change.

271. Communities talked about the lack of price assurance, post-harvesting loses, transport issues, and lack of value addition opportunities, aggravated by climate challenge. Further the smaller land size, averaging between 0.5 to 1 hectare per family do not provide the economics of scale for farming and particularly vulnerable to climate change. In addition, the climate induced high winds in the area made the farmers to restrict farming work to one season from the traditional two seasons. Even during a season, the cultivated harvest could get wind damaged and sometimes the lack of water or more water can create shifts in cultivation seasons.

272. Consultations with the downstream communities in the project area occurred with the communities in the Hettipola town area in the downstream project area. Farmers use water brought to them through canals from the upstream catchment through the Moragahakanda reservoir or Bowatenna dam. Issues highlighted included wells drying due to long spells of dry dates primarily due to climate change and increasing difficulty in safe drinking water supply, forcing them to consume irrigation water. Irrigation water is contaminated with pesticides, fertilizer and dissolved minerals. In the area there are over 2,000 Chronic Kidney Disease (CKD) patients reported possibly due to poor water quality. Populations consuming rainwater has less CKD incidents.

273. Plantation communities in Knuckles conservation area consulted included community members residing in Eluwana area (including Hettipola, and Laggala-Pallegama DS divisional areas). This community reported having less CKD issues with 117 patients, probably due to the high-quality water in the areas. Their requirement is the reliable household water supplies based on harvested rainwater for irrigation and drinking.

274. Tamil speaking populations and communities in tea plantations consulted in tea areas reported a lack of funds to invest on water treatment and water efficient methods, as a climate adaptation measure. Due to the lack of water some of the tea states are being converted to cinnamon and export crops leading to further land degradation. It was observed that export-oriented spices can grow as a under growth in plantations to improve the income of the communities. Enasal and Cardamom are two traditional spices that bring good revenue; however, the farmers need initial capital for irrigation and processing of produce to prevent post-harvest losses as well as to provide value added products that will be long-lasting, nutritious, and hygienic. Potential landslides due to climate induced high intense rain is a factor of concern by the communities, in plantations.

275. During the project preparation, consultations were held to obtain inputs, understand the potential partnerships (Market linkages *via* retail chains, Standards and Green Listing, Insurance, Communication Modalities etc.). Some agencies and experts, such as the experts on Analog Forestry, Insurance and telecommunications, were recruited to the project design as partners. A detailed listing of stakeholder characteristics is presented in the annexure to the FP on stakeholder analysis.

276. There are several practices observed during the field visits. The yield of tea varies between estates. For example, in an "Organic" tea estate, factory workers, tea-pluckers and management indicated that they get about 1,400 to 2,400 kg/ha per day when compared to less than 1,000 kg/ha in poorly managed estates due to high levels of fertility loss caused by intense rains. In adjacent lands belonging to the Forest Dept. where undergrowth is spice crops have been a success even when Pinus is the main planted variety. In addition, the model conservation project, identified as the best pilot to observe "Analog Forestry"—recreating a forest environment in private lands located in the Mirahawatta Estate, provided a good example to adopt in the project to enhance conservation value of the lands and degraded climate impacted hill slopes.

E.5.2. Capacity of accredited entities and executing entities to deliver

Please describe experience and track record of the accredited entity and executing entities with respect to the activities that they are expected to undertake in the proposed project/programme.

277. The Accredited Agency (AE) for this project—International Union for Conservation of Nature—IUCN, is an organization that operates in Sri Lanka since August 1988 based on an agreement with the Government of Sri Lanka. IUCN policy and management directions are provided by the IUCN National Committee comprised of Govt. and Non Govt. entities, namely, Ministry of Mahaweli Development and Environment, Department of Wildlife Conservation, Central Environmental Authority, Forest Department, Department of National Zoological Gardens and Ministry of Agriculture, Agrarian Development, Minor Irrigation, Industries and Environment in Western Province, Wildlife & Nature Protection Society of Sri Lanka, Sewalanka Foundation, Federation of Wildlife Conservation, Green Movement of Sri Lanka and Small Fishers Federation.

278. Throughout IUCN's years of operation in Sri Lanka, the organization has been able to showcase the country its unique ability to implement projects involving a diverse range of partners using its well-established contacts that range from the grassroot level to government entities. IUCN helped Sri Lanka to collect and process a range of information using multi-sector and multi-stakeholder approaches related to CBD, UNFCCC, UNCCD and other conventions.

279. IUCN's convening power and working modalities will allow to efficiently execute its role as the oversight and governance on both technical and financial aspects of the project. IUCN Asia Regional Office in Bangkok and IUCN's GEF/GCF Unit in Head Quarters, Switzerland will provide necessary technical backstopping for smooth implementation of the project and to ensure quality reporting to GCF.

280. IUCN in Sri Lanka has helped the Government in developing several master plans and strategies. For example, during the last two years, IUCN Sri Lanka developed the "National Biodiversity Strategy and Action Plan", "Strategies and Actions for Marine Pollution Control", "Yan Oya and Upper Elahera Canal Human – Elephant Conflict Mitigation Plans", "Medium to Long-Term Strategy and Action Plan to manage and conserve Kelani River Basin" to name a few.

281. Water resources and land use planning has been a core area in IUCN in Sri Lanka. IUCN worked with HSBC on tank restoration to arrest droughts and floods in dry zone tank cascades, worked with Brandix Private Ltd. to improve Kelani River water quality, worked with Dilmah Conservation to develop a payment for ecosystem model in a tea estate, is working currently on a biodiversity accrual project in southern Sri Lanka funded by 10 private sector companies that also involves catchment conservation and natural resources protection.

282. IUCN has been involved in GEF programming including the current project development for IUCN/UNDP joint project covering tourism, water resources and sustainable forest management, BIOFIN, IFAD implemented Coastal Resources Project, Medicinal Plan related GEF project.

283. In terms of evaluations IUCN in Sri Lanka has conducted a range of evaluations on behalf of donors, with the most recent being the UN Environment funded "Lessons Learned from Five Years of Implementation of the Northern Province Integrated Strategic Environment Assessment".

284. IUCN administrative and financial processes are robust and uses top of the line Enterprise Resource Packages to deliver its services. IUCN maintains a communication and education programme. The Organization is well positioned to provide the AE related services and to help the Government and PMU to implement the proposed project towards the anticipated transformational change.

E.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

Please provide a full description of the steps taken to ensure country ownership, including the engagement with NDAs on the funding proposal and the no-objection letter.

Please also specify the multi-stakeholder engagement plan and the consultations that were conducted when this proposal was developed.

285. This project was initiated by the Ministry of Mahaweli Development and Environment (MMDE), the NDA itself due to the high climate sensitivity in the central hills and the potential climate impacts on social and economic sectors as identified in the National Adaptation Plan.

286. NDA has invited and engaged a technical support agency—ICRAF—The World Agroforestry Centre, other key agencies in a multi-stakeholder consultative process, they were engaged in field visits and in project preparatory stages.

287. Selection of IUCN as the AE was made by the MMDE early on in the process. Highest level support was received for the development of this initiative including H. E. the President of Sri Lanka (the President is the Minister of Mahaweli Development and Environment) and the Executive Director of GCF during his visit to Sri Lanka.

288. Stakeholder consultations included government agencies such as MMDE, Ministry of Agriculture, Ministry of Primary Industries, Ministry of Social Welfare Plantation Industries, Department of Agriculture, Ministry of Water Resources and Disaster Management, Ministry of National Policies and Economic Affairs, Selected Divisional Secretariats and local authorities, Mahaweli Authority of Sri Lanka, Department of Export Agriculture.

289. A number of civil society organizations were consulted during the development of the concept and the feasibility for proposal. Some NGOs were brought in as part of the project such as the Rainforest Rescue International and International Water Management Institute.

290. Communities were consulted throughout the process, specifically for the project purpose, and further understanding was added by the project experience IUCN and Govt. have had during other projects such as the Moragahakanda multi-purpose irrigation scheme where both entities worked extensively with the communities in the evacuation process of humans as well as fauna and flora. In addition, IUCN has an ongoing project where it is working with the Forest Department to conserve Knuckles Reserve Area.

291. A complete stakeholder mapping was carried out during the feasibility study and the roles and potential interactions of each entity is identified.

E.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project/programme

E.6.1. Cost-effectiveness and efficiency

292. As indicated in the Feasibility Study, it is estimated that a sum of USD Mn 1.2 could be saved from the Government's annual budget on tank de-siltation. It is assumed that 150 minor reservoirs require frequent tank rehabilitation (approximately LKR Mn 1-2 per small tank) to cope with the existing siltation issue. The Government budgets on frequent de-siltation could be diverted in consultation with the proposed project for PES sustainability and direct support to subsistence farmers to expedite the economic development.

293. On average a farmer has a land the size of 0.2-0.5 ha and the current monthly income/benefit from this land is calculated as LKR 6,000. After the project implementation, the income is expected to reach around LKR 15,000 per month where the project will support to increase the marginal benefit by LKR 9,000. The total economic benefits per annum will be USD Mn 6.5.

294. It is estimated approximately 1.3 million water units (water units according to the National Water Supply and Drainage Board) could be collected per year through roadside drainage management. It is valued as USD 48,000.

295. The main economic crops and other field crops significantly contribute directly to the overall economy in the country. There are fluctuations in the global prices for these plantations and the proposed project will work with communities and plantation companies to eliminate the drawbacks of the production and the quality due to climate change impacts. The project will also help to better plan the land use and decide the extent of cultivations and identify suitable crops to intercrop with the economic crops, especially when cultivating the abandon and degraded lands. These steps will benefit estate workers to enhance their living standards and the profit margins of the plantation companies. It is estimated that benefits worth of USD Mn 1.4 will be created for the sector.

296. Water for irrigation and domestic purposes during dry spells is an issue for both upstream and downstream areas of the proposed project area. This issue has strong linkages with gender issues created as a result of climate change. Women are more vulnerable due to the lack of water to fulfil domestic needs. The calculation considered the number of hours spent by women to find water, by traveling long distances. Considering most vulnerable areas for drought and water availability, the tank rehabilitation will directly have an economic impact worth minimum USD 375,000 where the women can be involved in productive economic activities during the time they spent before to find water.

297. Through the project involvement on value chain development, the marginal income per family will be approximately LKR 3,500 per month. In total, USD Mn 1.25 could be calculated as the economic benefit created from this benefit stream.

298. The chain of issues related to upstream agriculture production by subsistence farmers is climate change and productivity → low quality and less production → disadvantages in global competition → low demand → low income for subsistence farmers. This chain will be changed with the support of the project, as climate resilient high-quality production → crop intensification → competitive advantages i.e standards, green approaches, etc. → high global demand → high income for subsistence farmers. It is estimated approximately USD 800,000 worth of marginal economic benefits will be created.

299. Sri Lanka is importing herbals for domestic needs mainly from India and other Asian countries. The project area has an extensive forest cover that can be protected and conserved involving communities, especially subsistence farmers. One of the issues for subsistence farmers is the land inadequacy. Therefore, the proposed project will facilitate the releasing of lands to communities under close monitoring of Community based Forestry Organizations and the Forest Department. Non-Timber Forest Resources such as fruits, tree parts only for herbal production could be extracted in systematic ways. These products could be coupled with the opportunities created by tourism

and value chain development for agriculture production. It is estimated USD 800,000 of economic benefits will be created for the country per annum.

300. It is observed that making conservation an economically viable livelihood is of great importance. The daily rate for communities who support conservation activities will be approximately USD 20 per day, which is a very competitive rate in Sri Lanka to attract more youth, especially even well-educated people as a part-time engagement. It is calculated that an additional USD 200,000 will go to the hands who seek good employment in the area.

E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

Please provide the co-financing ratio (total amount of co-financing divided by the Fund's investment in the project/programme) and/or the potential to catalyze indirect/long-term low emission investment.

Please make a reference to E.6.5 (core indicator for the expected volume of finance to be leveraged).

E.6.3. Financial viability

301. Discounting rates: to obtain an idea of the actual or the net contribution to the economy of Sri Lanka by the proposed GCF investments, the economic analysis uses discounting rates 6% and 10%. The rationale behind the identification of these discounting rates is that the general inflation in Sri Lanka fluctuate within the range of those two values. i.e. in 2017 according to the Colombo Price Index prepared by the Central Bank of Sri Lanka, the annual inflation was 7%. However, it is possible to keep the inflation rate at a healthy level to the economy, therefore, the Government's fiscal policies will be aimed to keep the figure in single digits as per the standards of developed countries or rapidly developing countries.

302. The analysis delivered the Economic Internal Rate of Return (EIRR) for the base case at 21%. The possibilities of cost increases for the input/project activities and deviations from the assumptions used in the computation of EIRR may occur due to increases in difference between actual and estimated values, seasonal impacts (weather and emergencies) and market supply and demand context etc.

303. To test the sensitivity, a perturbation of under 10% increase of base case value was introduced and yet the project generated an EIRR of 18%. On the other hand, to test the sensitivity of potential changes on the benefit side, primarily due to potential weak support from partners than expected, changes in external environment such as disasters, access barriers, lack of community participation etc. a 10% reduction of benefits was introduced. The project still generated an EIRR of 18%.

304. In the worst-case scenario, where the cost increase and benefit reduction could be experienced simultaneously at a level of 10% on each side of the cost benefit computation, the project was able to deliver an EIRR of 15%.

305. The estimated costs are for six years and the benefits calculated are for 20 years. The Net Present Value of Benefits are higher than the NPV of costs. Therefore, it is observed that the proposed project has a very healthy economic analysis result and the investment risk is very minimal.

E.6.4. Application of best practices

Please explain how best available technologies and practices are considered and applied. If applicable, specify the innovations/modifications/adjustments that are made based on industry best practices.

306. ICRAF and IUCN will be introducing a series of climate smart agriculture practices, including agroforestry, Forest Landscape Restoration, land health monitoring and dashboards, as well as decision platforms such as SHARED. In addition, the project will build on a range of Sri Lankan innovations such as Analog Forestry. The following is a list of some of the key technologies and approaches to be introduced:

- Enhancing species diversity to reduce climate, biophysical and market vulnerability;
- Strengthening farmers' access to the best-available quality germplasm of priority climate-resilient species, varieties and cultivars that match local biophysical and soil conditions;
- Developing individual and group tree nurseries to empower farmers to independently produce high quality seedlings of priority species;
- Promoting intercropping with annual crops to improve overall system productivity;
- Promoting the production and use of organic mulch and fertilizers to rehabilitate soils, improve water recharge, and produce products for the green economy;
- Exploring the feasibility of drip irrigation for high-value tree crops to improve water use efficiency and increase tree vigor and productivity.
- Landscape planning of estates to allocate land appropriately to intensive cultivation of export crops, subsistence production of nutritionally rich diets for estate workers and their families and soil and water conservation, including the establishment of exemplar landscapes.
- Species suitability mapping to reduce climate, biophysical and market vulnerability;
- Best-available quality germplasm of priority climate-resilient species, varieties and cultivars that match local biophysical and soil conditions;
- Facilitation of: cooperatives, value-chain innovation platforms, producer agri-business and trade associations, incentive-based schemes, such as PES, synergized with relevant development programs
- The Stakeholder Approach to Risk Informed and Evidence Based Decision Making (SHARED) is a decision-making hub, specializing in the structure and implementation of evidence-based decision making for sustainable development outcomes developed by ICRAF. It pays close attention to a) socio-ecological systems; b) creating spaces for facilitated deliberation and interaction between stakeholders including governments, civil society and scientists; c) enhancing and coordinating cross-sectoral relationships; d) the process of knowledge creation and its strategic use and accessibility; e) developing capacity for integration and synthesis across knowledge domains; and f) bridging the experiential, behavioral and analytical aspects of decision making. It ensures the inter-relationship among social, environmental and economic dimensions is clearly taken into account within the complexity of decision-making.
- Land restoration technologies. This includes an understanding of the constraints and barriers to the adoption of specific technologies, such as agroforestry, conservation agriculture or erosion control mechanisms, as well as in the design of incentive mechanisms and restoration pathways, such as in the use of multi-cropping in plantation crops to improve ecosystem service outcomes as options for consideration in the development of climate smart projects and plans. These include Analog Forestry, Forest Landscape Restoration and Restoration Agriculture, as described in IUCN/WRI ROAM approach.
- Information and Innovation platforms: Combining SHARED with the development of Dashboard tools in an "Options x Context" approach, stakeholders will be empowered to make good decisions for themselves and for the environment, thereby steering land management on to a sustainable "green" pathway. This will link to investments made in the accompanying Readiness proposal on computing infrastructure for the platform, from servers through to PDAs and software. Note that the platform will be executed in open source software thereby avoiding licensing issues and costs.
- Land Degradation Surveillance Framework (LDSF): Developed by ICRAF and successfully implemented in about 20 countries on f continents, this tool will use locally calibrated, global models (based on data from over 40,000 locations) to generate predictive maps of key land health indicators, including soil organic carbon, erosion prevalence and vegetation degradation status. These data and spatial assessments will then be used to target interventions to restore degraded areas, or to avoid future degradation, and to co-develop Dashboard tools with stakeholders in Sri Lanka to enhance the evidence base for decisions, including prioritisation, land-use planning

and the selection of restoration options. These tools will also form the backbone of a monitoring and reporting system for tracking progress on outcomes.

E.6.5. Key efficiency and effectiveness indicators

GCF core indicators

Estimated cost per t CO_2 eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)

(a) Total project financing	US$ 48.98 million USD
(b) Requested GCF amount	US$ 39.78 million USD
(c) Expected lifetime emission reductions overtime (6 years)	1,938,655 tCO_2eq
(d) Estimated cost per tCO_2eq (d = a / c)	US$ 25.3 / tCO_2eq
(e) Estimated GCF cost per tCO_2eq removed (e = b / c)	US$ 20.5 / tCO_2eq

Describe the detailed methodology used for calculating the indicators (d) and (e) above. Please describe how the indicator values compare to the appropriate benchmarks established in a comparable context.

tCO_2eq estimate was done using FAO EX-ACT tool using project land use change statistics as outlined in the Feasibility Report Section 6.6 on carbon benefits and as per the spreadsheet on the tool as Annexure 19 to this FP. Indicators d and e were computed using the equation above. The estimated value of 7.8 tCO_2eq per ha per annum is comparable for tropical climates. This project is designed as an investment for adaptation and resilience and this mitigation benefit of over 1.9 million tCO_2eq is an additional global benefit.

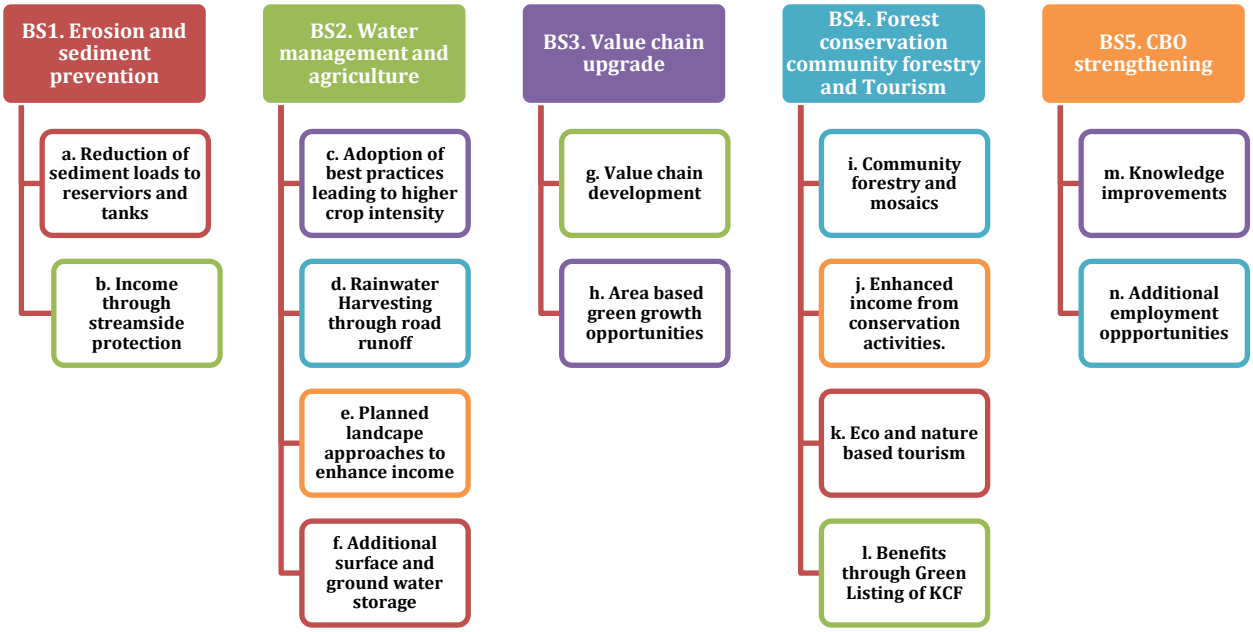
Expected volume of finance to be leveraged by the proposed project/ programme and as a result of the Fund's financing, disaggregated by public and private sources (mitigation only)

Other relevant indicators (e.g. estimated cost per co-benefit generated as a result of the project/programme)

F.1. Economic and Financial Analysis

Please provide the narrative and rationale for the detailed economic and financial analysis (including the financial model, taking into consideration the information provided in section E.6.3).

A Number of assumptions have been used to facilitate the economic analysis and five independent Benefit Streams (BS1 to BS5) have been identified based on the results framework to compute the values.



Methodology

307. Identification of Benefits Streams: The project consists of 18 activities. These activities are clustered into five benefits streams, which are again subdivided to 14 benefits (please refer the above diagram). The purpose of clustering these benefits expected from the implementation of the activities is to calculate benefits realistically in terms of financial figures. The Cost Stream: the budget of the 18 project activities including GoSL and GCF contributions were used in calculate the cost stream. The calculated period for the cost stream is 06 years, which is the time period of the project. Life Span of Benefits: it is estimated that the life span of the benefits will be 20 years. Scenario Used: in order to evaluate all the potential aspects of the economic analysis, especially the Internal Rate of Returns (IRR), three scenarios were used. They are, calculating the IRR under the basic situation, calculating the IRR at a 10% increase of costs and finally calculating the IRR at a 10% decrease of benefits.

The assumptions made on cost benefit streams and rationale for the calculations are provided below.

Benefits Stream	Sub Benefits	Description of Assumptions	Rationale of Economic Benefits Calculations
Cost Benefit Stream 1. Erosion and Sediment Prevention	a. Reduction of sediment loads to reservoirs and tanks	Erosion across the Knuckles upper catchment is reduced by 50%; Sedimentation of reservoirs reduced to a negligible level (<0.1 % loss of capacity per annum), directly benefitting the agriculture production capacity of 41,564 ha - 25% of the upstream area (Link to Activities 1.1.1 Streamside protection and drainage management along roads and 1.1.2 on rehabilitation and establishment of village tanks, ponds and irrigation networks). The Ambangaga development by GoSL/ADB and area tanks (96 village tanks; 18 large tanks; and 32 abandoned tanks) in the upstream area are at the risk of siltation due to climate influence. GCF Investment will assure the continued functionality of the reservoirs (currently annual siltation rate is > 2 %). GCF investment is expected to reduce the siltation rate to <1%. Agricultural benefits by the additional water holding has been calculated for 41,564 ha. An unrelated benefit of water management is the ability to manage landslides by site specific drainage and infiltration.	It is estimated USD 50,000 could be saved from the Government's annual budget on tank de-siltation. It is assumed that 8 minor tanks of approximately out of 150 tanks require annual tank rehabilitation (approximately LKR Mn 1-2 per small tank) to cope with the existing siltation issue. The Government budgets on frequent de-siltation could be diverted in consultation with the proposed project for PES sustainability and direct support to subsistence farmers to expedite the economic development.
	b. Additional income through streamside protection:	Streamside protection will allow the communities to grow plants that have an economic value and protect the stream sides while getting an income from the harvest and related products. For example, Areca nut, Bamboo and certain type of Timber can be planted in selected stretches of the over 2,000 km of stream network in the upstream area. This benefit is linked to Activity 1.1.1.	The estimated benefits for the community nursery holders will be USD 100,000 per year.
Cost Benefit Stream 2. Water Management and Agriculture	c. Adoption of best practices leading to higher crop intensity (from current 1.2 to over 1.7) in both upstream and downstream	Approximately 61,000 farmers in the project area will be benefited from water management and climate-adapted agricultural practices (including estate workers) - average cropping intensity for irrigated rice is expected >1.75. This benefit is linked to Activities 1.2.1 and 1.2.2. The small holder farmers in those areas will increase the production from own consumption to market oriented	In average a farmer has a land the size of 0.2-0.5 ha and the current monthly income/benefit from this land is calculated as LKR 6,000. After the project implementation, the income is expected to reach around LKR 15,000 per month where the project will support to increase the marginal benefit by LKR 9,000 at least for 3,300 farmer families. The total economic benefits per annum will be USD Mn 2.23.
	d. Rainwater harvesting through roadside drainage management	Proper road maintenance and harvesting of rainwater in over 159 km of road length in the upstream area, in addition to the sediment control benefit identified in Benefit Stream 1, will enhance the groundwater recharge by reducing the runoff by at least 30%, leading to an increase in the area water budget. This benefit is linked to Activity 1.1.2.	It is estimated approximately 1.2 Mn water units (water units according to the National Water Supply and Drainage Board) could be collected per year through roadside drainage management. It is valued as USD 190,000.

	e. Planned landscape and land use approaches to enhance area income	The landscape level planning covering 4,100 ha tea; 2,710 ha coconut; 2,250 ha rubber; 2,090 ha timber; 1,076 ha pepper; and 102 ha cinnamon at present in plantation areas can be optimized (intercropping and other changes) to generate better net benefits. This benefit involves Activity 1.2.3.	The main economic crops and other field crops significantly contribute to a healthy economy in a country. There are fluctuations in the global prices for these plantations and the proposed project will work with communities and plantation companies to eliminate the drawbacks of the production and the quality due to climate change impacts. The project will also help to better plan the land use and decide the extent of cultivations and identify suitable crops to intercrop with the economic crops, especially when cultivating the abandon and degraded lands. Overall these steps will benefit estate workers to enhance their living standards and the profit margins of the plantation companies. It is estimated that benefits worth of USD Mn 1.4 will be created for the sector.
	f. Additional surface and ground water storage through tank rehabilitation	Community led partial de-siltation and rehabilitation of 25 irrigation structures within the upper catchment area will improve the living condition of the families and especially women. At least 1000 families to be benefited.	Water for Irrigation and domestic purposes during dry spells is an issue for both upstream and downstream areas of the proposed project area. This issue has strong linkages with gender issues created as a result of climate change. Women are more vulnerable due to the lack of water to fulfil domestic needs. The calculation considered the number of hours spent by women to find water, by traveling long distances. Considering most vulnerable areas for drought and water availability, the tank rehabilitation will directly have an economic impact worth minimum USD 187,500 where the women can be involved in productive economic activities during the time they spent before to find water.
Cost Benefit Stream 3. Value Chain Upgrade	g. Value chain development	GCF investments will generate an additional income to an estimated 5,000 families by way of value chain upgrading options in the upstream area (certification, quality assurance, processing and innovative marketing). Family income is expected to increase allowing the resilience to improve. New level of production and branding of the products "Jurisdictional Area Approach" will be tested. New markets will be opened in the global market to “Area brand” products linked to agriculture, tourism and services related products.	The marginal income per family will be approximately LKR 3,500 per month, that will be generated by project involvement on value chain development. In total USD Mn 1.25 could be calculated as the economic benefit created from this benefit stream.
	h. Area based green growth opportunities	New approaches, technologies and low-carbon growth opportunities (also in line with Jurisdictional Area approaches) enhance the value of products and services in the Knuckles area. Benefits due to price mark up’s with branded products specific to area will bring more resources into the hands of the people. This benefit is link to Activity 2.1.2.	The chain of issues related to upstream agriculture production by subsistence farmers is climate change & productivity → low quality and less production → disadvantages in global competition → low demand → low income for subsistence farmers. This chain will be changed with the support of the project, as climate resilient high-quality production → crop intensification → competitive advantages i.e standards, green approaches, etc. → high global demand → high income for subsistence farmers. It is estimated approximately USD 800,000 worth of marginal economic benefits will be created

Cost Benefit Stream 4. Forest Conservation, Community Forestry and Tourism	i. Community forestry and mosaics including economically viable environmental conservation activities in nearly 126,000 ha (41,900 ha dense forest, 21,900 ha open forest and 62,200 scrub (degraded grassland)	In the upstream area leading to opportunities to grow and market supper foods, spices, medicinal plants and other niche market products. These products and sustainable harvesting opportunities could contribute to the transformational climate resilience, significantly and provide opportunities to develop public, private, people initiatives. The additional ecosystem services due to this greening will also be significant but not counted in the computation. This benefit is connected to Activity 1.1.2.	Sri Lanka is importing Herbals for domestic needs mainly from India and other Asian countries. The project area has an extended forest cover that can be protected and conserved involving communities, especially subsistence farmers. One of the issues for subsistence farmers is the land inadequacy. Therefore, the proposed project will facilitate the lands' release to communities under close monitoring of Community based Forestry Organizations and Forest Department. The Non-Timber Forest Resources such as fruits, tree parts only for herbal production could be extracted in a systematic way. These products could be coupled with the opportunities created by tourism and value chain development for agriculture production. It is estimated that USD 800,000 of economic benefits will be created for the country per annum
	j. Enhanced income for communities from conservation activities	GCF related investments will transform the employment opportunities to a higher level so that communities will appreciate and engage also minimizing the outward migrations. Currently the Climate Change impacts and other hardships on subsistence farmers who engage in agriculture are being influenced by the benefits of migration due to the risks associated with farming. To make a paradigm shift of this perception, a high attractive opportunity schemes to be introduced through labour-oriented adaptation activities. It is estimated that the large number of people could be attracted for adaptation and conservation related interventions if they are motivated by reasonable daily wage	It is observed the importance of making conservation as an economically viable livelihood. The daily rate for the communities who support conservation activities will be approximately USD 20 per day which is very competitive rate in Sri Lanka to attract more youth especially even well-educated people as a part time engagement. It is calculated an additional USD 200,000 will go to the hands who seek good employment in the area.
	k. Eco and nature-based tourism	This will generate economic advantages for communities through high value tourism based on nature, culture and heritage in the area plus seasonal changes of waterfalls and other nature related features. New trends in research and medicinal tourism can be explored. Private Sector (tour operators and companies) is a key along with promotional systems via multiple media.	The communities and authorities could get the involvement of the tourists in conservation activities and promote conservation, climate change adaptation, climate resilient community products especially herbals, fruits, dried fruits, knuckles branded products among the tourists. It is estimated that USD 525,000 will be additionally generated to the economy through these new diversifications of the tourism products.
Cost Benefit Stream 5. CBO Strengthening	l. Knowledge improvements related gains	Nearly 300,000 households receiving Integrated rural advisory capacity responsive to develop knowledge base, real time weather and market information. Timely information to farmers on climate, weather and commodity products will help farmers to plan against droughts, crop damages and income reductions due to excessive rain and market irregularities. This benefit is related to Activity 3.2.2 and involve the assumptions that the government will not require to pay compensation for disaster affected families on crop damages due to drought or intensified rains.	The benefits created from learning and knowledge are hard to be quantified in financial values. However, it can be calculated from the side of compensation on disasters. For the past decade, the GoSL has paid billions of Rupees as compensation for the disaster victims in Sri Lanka, especially the farmers who lose their cultivation due to floods and drought. Monthly compensation per family is LKR 10,000. It is estimated that the project will have an impact on at least more frequent disaster victims who will be benefit and take actions to manage their crop and cultivation according to the climate forecasts. USD 700,000 per annum could be saved at least if 11,200 frequently affected farmer families in Matale adopted themselves by managing their crops. The saved money could be pumped back to the economy as investments

	m. Additional employment opportunities to communities in service delivery:	Services on environmental monitoring, information collection and reporting, internet services, telemarketing, tour guiding, and many opportunities will emerge needing communities to improve their technical and communication skills. These services will change the area service delivery quality and quantity, significantly.	In parallel to the above-mentioned economic development, the supporting services are also increased. For example, local tour guides associations, internet cafes, coffee shops, fruit drying centres, recruitment agencies etc. will be established. It is estimated at least USD 100,000 worth of marginal service development in the area could be expected.

For yearly cost and benefits estimates, kindly refer the chapter 8 of the project feasibility study report (Annexure 2)

Computation of the Economic Viability of the Project

308. The project economic viability was computed (please refer to the feasibility study) using the values of the investments/inputs to reach each benefit, separately. Both GCF investment and GoSL co-financing were considered as investments/inputs. Similarly, the benefits were computed for the five different Benefit Streams as described earlier.

309. The computation used two discounting rates 6% and 10% based on the prevailing Sri Lanka conditions. The rationale behind the identification of these discounting rates is that the general inflation in Sri Lanka fluctuate within the range of those two values. i.e. in 2017 according to the Colombo Price Index prepared by the Central Bank of Sri Lanka, the annual inflation was 7%. However, it is possible to keep the inflation rate at a healthy level to the economy, therefore, the Government's fiscal policies will be aimed to keep the figure in single digits as per the standards of developed countries or rapidly developing countries.

310. The analysis delivered that the Economic Internal Rate of Return (EIRR) for the base case at 21%. The possibilities of cost increases for the input/project activities and deviations from the assumptions used in the computation of EIRR may occur due to, difference between actual and estimated values, seasonal impacts (weather and emergencies) and market supply and demand context etc.

311. To test the sensitivity, a perturbation of under 10% increase of base case value was introduced and yet the project generated an EIRR of 18%. On the other hand, to test the sensitivity of potential changes on the benefit side, primarily due to potential weak support from partners than expected, changes in the external environment such as disasters, access barriers, lack of community participation etc. a 10% reduction of benefits was introduced. The project still generated an EIRR of 18%.

312. In the worst-case scenario, where the cost increase and benefit reduction could be experienced simultaneously at a level of 10% on each side of the cost benefit computation, the project was able to deliver an EIRR of 15%.

313. The estimated costs are for six years and the benefits calculated are for 20 years. The Net Present Value of Benefits are higher than the NPV of costs. Therefore, it is observed that the proposed project has a very healthy economic analysis result and the investment risk is very minimal.

F.2. Technical Evaluation

314. The key drivers related to the climate impacts have been identified clearly to develop the technical interventions using soil-land-water best management practices and support awareness, advisory and information mechanisms by involving a range of Govt. and Non-Govt. partners with different skills/roles.

315. The key drivers contributing to the lack of adaptive capacity has been identified as the canopy related poor cloud capturing, wind and temperature related water evaporation; soil and land management related challenges worsened by climate change such as erosion due to high intensity rains, siltation of ponds and tanks; land degradation due to land fragmentation, poverty and management issues etc. In addition the subsistence farmers lack of capacity in terms of knowledge, access to better income sources or value chains and resources to invest in conservation have weaken their adaptive capacity or the ability to participate in sustainable land uses and practices that improve their overall quality of life, further impacted by climate challenges. As enabling environment related challenges unpredictability of rain and lack of management information associated with weather, markets and best practices etc. have been identified to strengthen and support the ecosystem improvements.

316. The project aims to support the communities to improve the efficiency of water, land and energy uses and engage in value added products, minimizing the pre-harvest waste such as fertilizer and water and post-harvest losses. While doing so, the sustainability of the project is ensured by applying the Payment for Ecosystem (PES) approaches to maintain infrastructure such as stream banks and roads etc. and benefits to the community through value added agriculture and tourism allowing them to better understand the value of ecosystems for quality livelihoods while meeting the climate challenges.

317. The three project components are designed to address different aspects of the resilience building for subsistence farmers in the upper catchment area and irrigated paddy areas downstream. The six outputs cover a diverse topic from sustainable land management and governance (3.1); PES (2.2); catchment management (1.1); sustainable agricultural production (1.2); value chains (2.1) and integrated rural advisory and knowledge management (1.2), not in an order but all inter-woven during the planning and implementation.

318. Technically the project is a complete package that involve multiple stakeholders providing their best to add value to the climate resilience in a way that is sustainable and replicable.

F.3. Environmental, Social Assessment, including Gender Considerations

319. IUCN has established an Environmental and Social Management System (ESMS) that is an integral part of IUCN's project cycle management. The ESMS provides systematic steps and operational tools for managing the environmental and social performance of projects implemented or supported by IUCN. The system allows IUCN to screen potential projects for negative environmental or social impacts and to develop suitable measures to avoid, minimize, or compensate for these impacts. It also ensures that the implementation and effectiveness of mitigation measures are monitored and that any adverse impacts arising during execution of a project are addressed. The ESMS and its procedures, four Standards and tools have been reviewed by the GCF accreditation panel and validated as being compliant with GCF requirements for analyzing low and medium risk projects.

320. The project has completed the screening procedures of the ESMS and has been classified as a moderate risk project (category B) based on the GCF interim Environmental and Social Policy—based on the Performance Standards of the International Finance Cooperation (IFC). The key findings of the ESMS screening are summarized below, the full ESMS Screening Report is attached (Annex 5).

321. The aim of the project is to generate resilient livelihoods by increasing the capacity to adapt to climate induced change in critical upstream and downstream rural communities in Sri Lanka including protection of the ecosystem service flows that connect them. The project includes activities around land management for irrigation agriculture, plantations and forest reserves (component 1), promotion of sustainable/green value chains and payment for ecosystem services (Component 2) and strengthening institutional capacity for land management (component 3).

322. Main ESMS relevant activities of component 1 include vegetation management to control run-off and enhance infiltration along roads, rehabilitation of village ponds for water harvesting, climate smart farming techniques for rice production, increasing efficiency of irrigation, fertilizer and integrated pest control, promoting agroforestry, home gardens and analog forests through a menu of services including crop diversity, access to germplasm, nurseries, cultivation practices; restoration and sustainable intensification of plantations through conversion of under-performing crops into food gardens, agroforestry practices including intercropping with high-value short-rotation horticultural crops.

323. Under Component 2, the project will strengthen the capacity of farmers and collective groups as enterprises through advice and training in areas such as agri-processing, product development, branding, certification. Component 3 is ESMS relevant in the sense that it aims to promote inclusive, multi-stakeholder and evidence-based land –use planning processes.

- The project is expected to have highly positive environmental impacts as restoration, reforestation and sustainable land management practices are expected to improve the biodiversity status of the respective land use systems and improve water infiltration and other ecosystem services. Also, social impacts are expected to be highly positive as it will improve ecosystem services relevant for local communities including water, enhance food security and provide other tangible economic benefits for different land owners and users. However, some risk issues have been identified by the ESMS screening and the details are presented in Annex A the Screening Report; main issues include:
- Potential need for short-term restrictions on the use of natural resources which might trigger livelihood impacts;
- Risks that impacts from conservation actions fall disproportionately on disadvantaged or vulnerable individuals or groups and / or that such groups might be disadvantaged or discriminated with regards to access to project benefits;
- Potential of insufficient attention to the needs of vulnerable groups when providing alternative livelihood options or promoting co-management arrangement for land used by communities;
- Introduction of climate proofed tree and crop species might require the use of non-native species with low risk of developing invasive behavior;
- Potential local environmental impacts related to agri-processing;
- Risks related to a potential use of pesticides when addressing pest infestation triggered by climate change.
- It is not expected that any of the identified risks would likely cause significant adverse environmental and/or social impacts; most of the risk issues are preliminarily judged as low risk issues, very few as moderate, and it is expected that they can be readily addressed through good management practices and mitigation measures. Because priority areas for interventions and further details of project activities will be defined only during the project's inception phase, e.g. on the basis of sub-basin planning process, an Environmental and Social Management Framework (ESMF) has been developed.
- The ESMF delineates the process of assessing risks and identifying suitable mitigation measures, spells out requirements for consultation and disclosure, establishes implementation arrangements and identifies financial resources needed for ESMF implementation. It further specifies ESMS relevant socio-economic data to be gathered by the social baseline analysis carried out during the project inception phase (see topics identified in the section B and C of the questionnaire). The ESMF also provides detailed guidance for ensuring compliance with the ESMS Standards. As such it includes elements of an Access Restrictions

Mitigation Process Framework (including SIA elements to be included in the social baseline analysis) and guidance on assessment needs for risk related to the introduction of species and when a Pest Management Plan will be needed. It also specifies requirements for the project-level grievance mechanisms to be set-up at project start and which will dovetail with IUCN's overarching institution-wide ESMS Project Complaints Management System (PCMS).

324. A Gender Analysis has been carried out that provides an overview of existing gender inequalities in Sri Lanka, with emphasis on the agricultural and natural resource sectors. It further identifies gender related issues that are relevant to the proposed project and examines potential gender mainstreaming opportunities to be implemented by the project. The assessment is based on key available information (listed in the references), observations made during field visits, and discussions with agriculture and natural resource professional working in Sri Lanka.

325. The Gender Analysis will be further expanded during the project's inception phase through in-depth consultations and focus group discussions to be held in the project site with local communities and other relevant stakeholder programmed—programmed as an integral part of the social baseline study. The ESMF provides guidance to ensure that these consultations also serve to capture concerns and assess potential project risks on women and men.

326. In rural Sri Lanka, women and men have different roles and responsibilities regarding agricultural and natural resource management. There are tasks that are shared by both genders, those that are dominated by women, and those that are dominated by men. This results in unique gender-based knowledge, experiences, and strategies regarding resource management, that are largely unknown to the other gender. To ensure that project activities achieve maximum success and impact, it is imperative to have equitable involvement, input and allocation of both women and men in all project interventions. The project will set a target of 35-50% participation by both genders in all activities. To assure that women have equitable access to project resources, services and activities the following approach will be applied:

- seek input regarding planning. implementation and priorities from women community leaders and partners who are respected locally, by government agencies and other partners;
- plan activities to meet women's time availability, location restrictions, and specific priorities; and
- organize women's groups and women only activities, if necessary, to provide conditions conducive for women to participate, share their knowledge and learn more effectively. Experience demonstrates that this approach will strengthen women's involvement and knowledge, as well as, enhanced their confidence regarding their own knowledge of agricultural and natural resource management options, build their leadership and decision-making capacity, and strengthen their willingness to contribute to public discussions.

327. Project activities will promote positive social and environmental impacts through the adoption of multi-species climate-smart agricultural and water management systems, including sloping agricultural land technology and natural vegetative strips, among poor climate-vulnerable smallholder farmers in both the highlands and the lowlands. Compared to monocultures, multi-species systems diversify farmers' livelihoods' streams, reduce risk (financial and environmental) and improve biodiversity by incorporating multiple species and varieties on the same piece of land.

328. A draft Gender Action Plan has been developed which will be further enhanced during the above-mentioned in-depth consultation with local communities and other relevant stakeholders. The Gender Action Plan provides a time-bound framework to implement the project's activities and achieve the project's outputs, results and outcomes in an equitable and gender-sensitive manner. It should further contribute to reducing climate change-induced social, economic and environmental vulnerabilities.

329. The Gender Action Plan also provides gender disaggregated targets, indicators and achievement against all project activities and outputs that contribute to the achievement of project results, outcome and impacts.

F.4. Financial Management and Procurement

330. The financial management between the AE and EEs of the project will be governed by IUCN's finance manual and policy and procedure on procurement of Goods and Services. Further, IUCN comply with Swiss Accounting Law as well.

331. IUCN has a comprehensive procurement policy in place which is available at https://portals.iucn.org/union/sites/union/files/doc/procurement_policy_and_procedure_v_1_3_february_2018.pdf. The policy outline formal procurement standards and guidelines across each phase of the procurement process, and they apply to all procurements in IUCN. The purpose of the policy is to ensure that IUCN obtains value for money in all its procurement activities and that procurement is conducted in an efficient and cost-effective manner that respects sustainability, the environment and ethical principles.

332. In addition to the above policies, delegation of authority plays an integral part of the above policies. This policy mainly outlines the limitation of authority delegated to each category. The policy is available at https://confluence.iucn.org/display/ERP/IUCN+Policies?preview=%2F589929%2F1605663%2FIUCN_Delegation+of+Authority_August2011.pdf

333. IUCN carried out the capacity assessments for all MMDE, ICRAF and IUCN Sri Lanka, the three EES associated with the GCF investment project and satisfied with the outcome as provided in the letter from IUCN Regional Director for Asia.

334. Funds will be transferred to IUCN according to the Accreditation Master Agreement (AMA) and the Funded Activities Agreement (FAA) related to this project. IUCN Headquarters' Global Finance Unit will manage fund disbursements to the Project Management Unit based on semi-annual work plans agreed by IUCN supervision team based in the regional office. Funds will be hosted in a bank account dedicated to the project. PMU is then responsible for transferring the funds to the executing entities and the services providers or suppliers that would have been competitively selected. PMU is also responsible to the accounting and fiduciary management of all funds disbursed. The PMU will adopt IUCN's accounting systems and will be audited independently (auditors selected through a competitive bidding process where TORs are approved by IUCN Global Finance Unit) on a yearly basis.

G.1. Risk Assessment Summary

The main environmental and social risk factors are:

- Potential need for short-term restrictions on the use of natural resources which might trigger livelihood impacts;
- Social risks related to potentially perceived unfair treatment or discrimination with regards to access to project benefits;
- Potential of insufficient attention to the needs of vulnerable groups when providing alternative livelihood options or promoting co-management arrangement for land used by communities;
- Introduction of climate proofed tree and crop species might require the use of non-native species with low risk of developing invasive behavior;
- Potential local environmental impacts related to agri-processing;
- Risks related to a potential use of pesticides when addressing pest infestation triggered by climate change.

Technical/operational and financial risk factors are:

- Conflict between communities and governments or levels of government (local, provincial, and national) over land use and natural resource planning may hamper implementation. Instability, conflict, and/or tensions may then constrain project implementation.
- Stakeholders adopt patterns of corruption, collusion and nepotism, endangering the introduction of good governance practices.
- A 'project' mentality develops where local people expect monetary compensation to participate in activities. A similar mentality may develop with government or other partners.
- Partners maybe unwilling or unable to follow project planning and/or project reporting protocols.

G.2. Risk Factors and Mitigation Measures

Selected Risk Factor 1

Description	Risk category	Level of impact	Probability of risk occurring
Potential need for short-term restrictions on the use of natural resources which might trigger livelihood impacts	Social and environmentalSocial and environmental	Medium (5.1-20% of project value)Medium (5.1-20% of project value)	MediumMedium

Mitigation Measure(s)

Reforestation of degraded lands in catchment areas might require restricting the access to those areas which are used by local communities for cattle grazing, firewood and other needs but is driving deforestation, until the vegetation is stable. It will only be during project implementation that the need of such restrictions is decided. The Environmental and Social Management Framework (ESMF) which includes relevant provisions from the Standard on Involuntary Resettlement and Access Restrictions (elements of a Process Framework) provide guidance on assessing the risk on local communities and developing suitable mitigation measures to be agreed with project affected people or communities. One mitigation measure already pre-identified is to put these restoration areas under a form of co-management (shared management between communities and the respective government agency) hence sharing not only decision making between those actors but also future benefits of resource harvesting. This and the application of the Standard's requirements are expected to reduce the probability of the risk occurring to low.

Selected Risk Factor 2

Description	Risk category	Level of impact	Probability of risk occurring
Social risks related to potentially unjustified preferential treatment or discrimination with regards to access to project benefits	Social and environmentalSocial and environmental	Low (<5% of project value)Low (<5% of project value)	MediumMedium

Mitigation Measure(s)

The project will adopt an inclusive and participatory planning approach when planning the details of project activities based on the stakeholder engagement strategy. Where beneficiaries of support activities (e.g. training on agricultural practices, business services such as certification, quality assurance, processing and collective marketing) need to be selected, this will be done in a transparent way with clear eligibility criteria to increase transparency and avoid unintended discrimination. For some activities the project will use a 'first ready, first served' approach to identify beneficiaries who are best prepared to succeed; while at the same time assisting new or less developed groups to become 'ready' to fully engage in project activities. Allocation of benefits might further follow the need to provide assistance or compensation to people affected by access restrictions (see risk factor 1). The executing entities will also use 'farmer-to-farmer' exchange to build partnership and healthy competition.

The project-level grievance mechanism is expected to further minimize tensions or conflicts building up applying a proactive approach to grievance and maintaining a constructive relationship with stakeholders to identify and anticipate potential issues early. These mitigation measures will reduce the probability of the risk occurring to low.

Selected Risk Factor 3

Description	Risk category	Level of impact	Probability of risk occurring
Risks that impacts from conservation actions fall disproportionately on disadvantaged or vulnerable individuals or groups and / or that such groups might be disadvantaged or discriminated with regards to access to project benefits	Social and environmentalSocial and environmental	Low (<5% of project value)Low (<5% of project value)	MediumMedium

Mitigation Measure(s)

The social baseline study carried out at the outset of the project will need to generate a comprehensive overview about the social diversity in the project site considering ethnicity, gender, religion, locality, language, class; and how social diversity affects opportunities for development and is associated with risks and vulnerabilities. Disadvantaged marginalized or vulnerable groups or individuals in the project sites will be identified and the risk of conservation actions falling disproportionally on them is assessed. These findings will inform the further process of planning the alternative livelihood options, developing co-management arrangements as well as promoting institutional capacity for land management and inclusive land use planning. Further guidance for ensuring that the needs of vulnerable groups are protected is given in the ESMF. This is expected to reduce the probability of the risk occurring to low.

Selected Risk Factor 4			
Description	Risk category	Level of impact	Probability of risk occurring
Risk related to tensions between ethnic groups, between the Tamils ethnic minorities and the Sinhalese majority	Social and environmentalSocial and environmental	Low (<5% of project value)Low (<5% of project value)	MediumMedium
Mitigation Measure(s)			
This is essentially an external risk where the project's influence is limited. However, the social baseline study needs to analyse risks related to ethnic diversity and power-relations and the potential of risks occurring in the project's area of influence, including the risk of the aggravating the situation. Suitable strategies for mitigate needs to be identified. Land use planning mechanism promoted under component 3 should ensure that ethnic minorities are appropriately represented in the multi-stakeholder platforms created by the project. This is expected to reduce the probability of the risk occurring to low.			

Selected Risk Factor 5			
Description	Risk category	Level of impact	Probability of risk occurring
Introduction of climate proofed tree and crop species might require the use of non-native species with low risk of developing invasive behaviour;	Social and environmentalSocial and environmental	Medium (5.1-20% of project value)Medium (5.1-20% of project value)	LowLow
Mitigation Measure(s)			
Any selection or advice on species selection will undergo a diligent assessment process. The IUCN Guidelines for Reintroductions and Other Conservation Translocations [45] will serve as guidance. The assessment process is described in more detail in the ESMF. These mitigation measures will further reduce the low probability of the risk occurring.			

Selected Risk Factor 6			
Description	Risk category	Level of impact	Probability of risk occurring
Potential local environmental impacts related to agri-processing (e.g. waste or effluence issues);	Social and environmentalSocial and environmental	Low (<5% of project value)Low (<5% of project value)	LowLow
Mitigation Measure(s)			
Capacity building and technology programmes of the project will introduce good industry practices to minimize waste using Cleaner Production principles; enhanced quality standards using GMP and other global standards and empowering SME's, MSME's and operators to adopt a sense of sustainable consumption and production with good record keeping so they themselves may compute the changes/benefits they achieved to minimize foot prints as well as to improve the bottom line. Champion identifications and recognitions annually in the project area may also improve the transformational change in waste generation and management. Further guidance for avoiding risks from			

[45] IUCN/Species Survival Commission, 2013, *Guidelines for Reintroductions and Other Conservation Translocations*. Version 1.0, available at https://portals.iucn.org/library/efiles/edocs/2013-009.pdf

processing installations will be provided in the ESMF. These mitigation measures will further reduce the low probability of the risk occurring.

Selected Risk Factor 7

Description	Risk category	Level of impact	Probability of risk occurring
Risks related to a potential use of pesticides when addressing pest infestation triggered by climate change	Social and environmentalSocial and environmental	Medium (5.1-20% of project value)Medium (5.1-20% of project value)	LowLow

Mitigation Measure(s)
The project will not fund the actual application of pesticides or chemicals and mostly work on the awareness and education side of pesticide use. E.g. promotion of weed control through simple mechanical hand weeders instead herbicides and of integrated pest control based on real time weather and pest incidence data. These activities are expected to lead to a reduction of quantities of biocide applied by farmers and plantations. Nevertheless, as climate change increase the prevalence of pests, there might be a situation where advisory services funded by the project might need to advice on targeted application of pesticides. The adherence to the IUCN Guidance Note on Pest Management Planning as described in the ESMF will further reduce the low probability of the risk occurring.

Selected Risk Factor 8

Description	Risk category	Level of impact	Probability of risk occurring
Conflict over project activities and resources may arise within and between communities and stakeholders hampering cooperation between beneficiaries/stakeholders and project implementation.	Technical and operationalTechnical and operational	Medium (5.1-20% of project value)Medium (5.1-20% of project value)	LowLow

Mitigation Measure(s)
Initial project implementation will be focused in areas where communities are committed to the project outcomes and have a history of collaboration and conflict resolution. ICRAF will use its Stakeholder Approach to Risk Informed and Evidence Based Decision Making (*SHARED*) decision support tool with those communities to identify their expectations of the project and a vision of sharing benefits with all beneficiaries and stakeholders. Continuous monitoring of social conditions in project areas will be enabled by the presence of project teams. These mitigation measures will further reduce the low probability of the risk occurring.

Selected Risk Factor 9

Description	Risk category	Level of impact	Probability of risk occurring
Conflict between communities and governments or levels of government (local, provincial, and national) over land use and natural resource planning may hamper implementation. Instability, conflict, and/or tensions may then constrain project implementation.	Technical and operationalTechnical and operational	Medium (5.1-20% of project value)Medium (5.1-20% of project value)	MediumMedium

Mitigation Measure(s)

Continue collaboration and consultation with communities and relevant government agencies at all levels through equitable sharing platforms, maintaining objectivity. Provide recommendations based on evidence to all parties so that discussions are on an equal footing. These mitigation measures will reduce the probability of the risk occurring to low.			
Selected Risk Factor 10			
Description	Risk category	Level of impact	Probability of risk occurring
Stakeholders adopt patterns of corruption, collusion and nepotism, endangering the introduction of good governance practices.	FinancialFinancial	Medium (5.1-20% of project value)Medium (5.1-20% of project value)	MediumMedium
Mitigation Measure(s)			
The project will promote participatory and equitable practices. Project will conduct due diligence at all levels, ensures transparent fiscal mechanisms, and adheres to international procurement standards adopted and implemented by IUCN. These mitigation measures will reduce the probability of the risk occurring to low.			
Selected Risk Factor 11			
Description	Risk category	Level of impact	Probability of risk occurring
A 'project' mentality develops where local people expect monetary compensation to participate in activities. A similar mentality may develop with government or other partners.	FinancialFinancial	Medium (5.1-20% of project value)Medium (5.1-20% of project value)	MediumMedium
Mitigation Measure(s)			
A strong emphasis will be placed at the outset on developing and socialising an exit strategy that makes it clear to participants that this project is a step in a programmatic, transformative process and there is therefore a need to look beyond project horizons. Secondly due attention will be paid to creating project 'ownership', particularly for individuals and organizations within participating communities. The project will be initiated in communities that are committed to the project outcomes. Project staff will be few in number and project assets (office, vehicles, etc) will be modest. These mitigation measures will reduce the probability of the risk occurring to low.			
Selected Risk Factor 12			
Description	Risk category	Level of impact	Probability of risk occurring
Partners maybe unwilling or unable to follow project planning and/or project reporting protocols	Technical and operationalTechnical and operational	Low (<5% of project value)Low (<5% of project value)	LowLow
Mitigation Measure(s)			
The project will be initiated with partners that are committed to the project outcomes and have experience in implementing similar projects. In addition, all partners will be engaged through performance based annual agreements, where failure to perform can result in an exit from the project unless there are adequate mitigating circumstances – results-based management will be the norm. The project will provide capacity building activities to partners regarding planning and reporting protocols. These mitigation measures will further reduce the probability of the risk occurring.			

Other Potential Risks in the Horizon
Risks that may emerge and need to be monitored, include: • Project implementation may strain the capacity and resources of local government agencies. • Due to limited availability of local expertise, it may prove difficult to access qualified staff to effectively implement the project. • The procurement of the supplies and materials required to implement activities and support partners may be difficult or expensive to procure, thus hampering project implementation • Traders and other private sector stakeholders may be reluctant to work with farmers in an equitable and transparent fashion. • Off-farm income generating opportunities may reduce farmers' investment in management options promoted by the project, hampering activities under all three outcomes.

H.1. Logic Framework.

Please specify the logic framework in accordance with the GCF's Performance Measurement Framework under the Results Management Framework.

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level[46]						
Paradigm shift objectives						
Increased climate-resilient sustainable development	The project catalyzes a paradigm shift in Subsistence Farmers and Agricultural Plantation Communities residing in the vulnerable river basins, watershed areas and downstream of the Knuckles Mountain Range Catchment of Sri Lanka can sustain income and food security levels because they have the information, services including finance & investments and skills they need to successfully adapt land and water management and agricultural practices to changes in temperatures and rainfall.					
Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Fund-level impacts						
GCF core indicator	Total number[47] of direct and indirect beneficiaries*	Baseline surveys and population census data from census reports.	Direct M- 0 F- 0 Indirect M- 0 F- 0	Direct F- 34,501 M- 32,660 Indirect F- 138,003 M-130,640	Direct F- 138,003 M- 130,640 Indirect F - 552,012 M - 522,561	The upstream and downstream population in the project area is considered as direct and indirect beneficiaries Breakdown and details of the direct and indirect beneficiaries to be collected at the inception and throughout the project period (gender disaggregated) using the definition in the footnote.
	Number of beneficiaries relative to total population	Divisional Secretariat records including welfare beneficiary's	Direct: 0 % Indirect: 0 %	Direct: 10 % Indirect: 30 %	Direct: 20.8 % Indirect: 79.2 %	Beneficiary population at the start considered as nil and with time increases and at the end cover the project area population. Project will track the changes in area income

[46] Information on the Fund's expected results and indicators can be found in its Performance Measurement Frameworks available at the following link (Please note that some indicators are under refinement): http://www.greenclimate.fund/documents/20182/239759/5.3_-_Performance_Measurement_Frameworks__PMF_.pdf/60941cef-7c87-475f-809e-4ebf1acbb3f4

[47] Direct beneficiaries are those who come into direct contact with the set of interventions (goods or services) provided by the investment. Individuals who receive training or benefit from program-supported technical assistance or service provision are considered direct beneficiaries. Services include training and technical assistance provided directly by program staff, and training and technical assistance provided by people who have been trained by program staff. If cooperatives or organizations receive training or technical assistance from the program, all members of the cooperative/organization are considered direct beneficiaries.

Indirect beneficiaries are those who benefit indirectly from the goods and services provided to the direct beneficiaries (as defined above). For example, indirect beneficiaries include members of the household of a beneficiary farmer who received technical assistance, seeds, tools, inputs, credit, livestock; farmers from a neighbouring community who might observe the effects of the training and demonstration plots in the target community and decide to adopt or model the new practices themselves; the population of all of the communities in a valley that uses a road improved by a food for work activity; or all individuals who may have heard a radio message about prices, but who did not receive the other elements of an agricultural intervention necessary

		income changes				specially among welfare receiving populations published by the Government annually
A1.0 Increased resilience and enhanced livelihoods of the most vulnerable people, communities and regions	A1.2 Number of males and females benefiting from the adoption of diversified, climate-resilient livelihood options (including fisheries, agriculture, tourism, etc.)	Project reports and Divisional Secretariat records.	M: 0 F:0 0[48]	F -172,504 M: 163,300	F: 690,015[49] M: 653,201	Sufficient connectivity of community buy-in to landscape scale water management practices to generate ecosystem service benefits at river basin scales Climate adapted practices adopted by farmers and plantations to deliver greater agricultural productivity and resilience Value chain upgrading significantly increases value captured locally
A2.0 Increased resilience of health and well-being, and food and water security	A 2.2 Number of food-secure households (in areas/periods at risk of climate change impacts	DS records of food security[50] and government food subsidy records.	No of food insecure HH in area at start 0 (of the 59,101 food insecure HH in the target area at project start)	No. of HH transitioned to food secure 14,775	No. of HH transitioned to food secure 59,101[51]	Project will carry out required surveys to generate the number of HH transitioned to different development status (ex: nutritional status; quality of water; HH income,etc.)
A4.0 Improved resilience of ecosystems and ecosystem services	A4.1 Coverage/scale of ecosystems protected and strengthened in response to climate variability and change	Reports of the Biodiversity Secretariat, Reports of Forest Department and Project reports, web portal and in	18,200 ha[52] of highland catchment 1000 ha[53] of lowland paddy rice 0 ha[54] of lowland	55,213 ha of highland catchment 30,537 ha of lowland paddy rice	166,254 ha of highland catchment 122,150 [55] ha of lowland paddy rice	Continuous analysis of the ecosystem benefits due to project interventions will be tracked using field-based measurements; computer simulations and the physical progress of the implementation of resilience measures. The

[48] The project will track the number of people (disaggregated by gender) in participating households and measure change in livelihood resilience for a representative sample. This number will be refined during the project baseline planning.

[49] This is an aggregate envelope from both upstream and downstream target areas of all people benefitting from the interventions, which is comprehensive because of the nature of catchment protection. We could improve on this using a more conservative aggregation of estimates for each land use / water intervention but that will require data not yet available.

[50] Availability of food and water, access to food and water, utilization of food and water and stable supply of food and water are the areas to be considered in defining food security. Climate change directly link to the stable supply of food and water while it indirectly link to other three. For example, climate change will lead to income drops and it will lead to low access to food and water due to poverty.

[51] This refers to staple food security in terms of calories from food staples. We will also look at nutritional value of diets through dietary diversity indices that we expect to impact

[52] We will show change across the whole area but initial conditions from using universal algorithms on 2012 satellite imagery suggest only a small initial area that is not vulnerable. These numbers will be refined in the refined baseline where ground truthing will improve estimates of initial conditions as well as allowing us to track change. The baseline estimate is for the original rather than expanded upstream catchment area

[53] Based on estimate of area under SRI rice after Hitihamu and Lurdu, 2012 http://dl.nsf.ac.lk/ohs/harti/24047.pdf

[54] Based on consultations during the feasibility study that indicate no climate proofing of homegardens or other smallholder cultivations are currently in place.

[55] This involves climate adaptation on the total area of lowland paddy.

		annual reports Including Simulation outputs of ecosystem changes	home gardens and other smallholder cultivations	14,559 ha of lowland home gardens and other smallholder cultivations	58,235 ha of lowland home gardens and smallholder cultivation	analysis may include trend analysis of erosion prevalence, soil organic carbon (SOC) and vegetation indices across target areas. it is assumed that at least 50% of paddy areas will use SRI method in paddy cultivation
	A4.2 Value (US$) of ecosystem service payments generated	PES payment records in project annual reports and Ministry records will show value realized.	Baseline is Nil	250 K USD per annum	1 M USD per annum	Estimations will be done using IUCN tools such as The Economics of Ecosystem Based Services and other tools

H.1.2. Outcomes, Outputs, Activities and Inputs at Project/Programme level

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Project/programme outcomes	Outcomes that contribute to Fund-level impacts					
A5.0 Strengthened institutional and regulatory systems for climate-responsive planning and development	A5.1 Institutional and regulatory systems that improve incentives for climate resilience and their effective implementation.	Records of regular Provincial, District, Divisional and Plantation related planning and progress monitoring mechanisms and Project Team developed records compiled twice a year and triangulated with the sector level agency reports such as agriculture, tourism, export promotion, crop production, irrigation, roads etc.	Proportion of days for which real time climate information available from the Dept. of Agriculture and Agrarian Services on rainfall Not available 0%	60%	90%	Enough community buy in to landscape level improvements in water and natural resource management in upstream target areas Sufficient farmer uptake of climate adapted practices in both upstream and downstream target areas Enough uptake of value chain upgrading options by businesses and other market actors Modalities for PES agreed and fully implemented by government Participatory co-adaptation of options and monitoring sufficiently embraced by both government and communities at local level
			Proportion of days for which real time water availability records available from Irrigation Dept. Not available 0%	60%	90%	

	A5.2 Number and level[56] of effective coordination mechanisms connecting project activities, implementation of PES funds and mainstreaming climate resilience		No Coordination mechanism at community level with less than optimal district level coordination nor sub-basin coordination	2 of Coordination. Mechanisms (Ex: District Coordination Mech. in all districts at Level = 2 Sub-Basin Coord. Mechanism at Level = 2	8 of Coordination Mechanisms (Ex: A District Coordination Mechanisms at all districts at Level = 3 B Sub-Basin Coordination Mechanisms at Level = 3	In addition the project is linked with provincial, district and divisional level agriculture/environment coordination mechanisms and plantation sector coordination mechanisms PES intermediary bodies and sub-basins (SHARED) are made effective through better coordination Scorecard to be developed with KPIs for coordinating the project activities including the PES modality implementation
A6.0 Increased generation and use of climate information in decision-making	A6.2 Use of climate information products/services in decision-making in climate-sensitive sectors	Dept. of Agrarian Services Reports Crop production and crop failure statistics from Agriculture Department and Agriculture Insurance Programmes Project Annual reports. Qualitative evaluation of the use of information as part of the monitoring effort. Including district agriculture / environment committee	Regional climate forecasts not available	Regional climate forecasts available	Regional climate forecasts available	Agriculture and Met Depts are capable in issuing regional downscaled climate predictions Evidence of the use of climate information at plantations, agriculture and agribusiness, tourism and other applications including district planning
			Mobile APPS to access climate information not available	Climate information accessible via mobile applications	Climate information accessible via mobile applications	
			No formal climate information generation and use targeting the project area – 0%	30 % of people surveyed indicate they used climate information in decisions (agriculture,	70. % people surveyed indicated they used climate information in decisions	

[56] In this context, the "level" of coordination mechanism is expressed in a scale of 1 to 4 with the scale referring to a level of effectiveness. (1 = no coordination mechanism; 2= coordination mechanism in place and meeting consistently; 3 = coordination mechanism in place, meeting regularly with appropriate representation (gender and decision-making authorities); 4 =coordination mechanism in place, meeting regularly, with appropriate representation, with appropriate information flows and monitoring of action items/issues raised)

		meeting minutes		business, other)	(agriculture, business, other)	
A7.0 Strengthened adaptive capacity and reduced exposure to climate risks	A7.1: Use by vulnerable households, communities, businesses and public-sector services of Fund-supported tools, instruments, strategies and activities to respond to climate change and variability (gender segregated when possible)	Reports of the District Disaster Management Center District planning unit annual reports Project reports and Divisional Secretariat records. Smartphone App usage metrics. Ministry records and annual reports Divisional level planning records	UII=0[57] Divisional land use plans by Land Use Policy Planning Department (LUPPD) is available	UII=10[58] 50% of DS divisions adopt plans at mid-term (improved detailed plans by LUPPD)	UII=56[59] 100% DS divisions in the project area adopt plans	Enough community buy in to landscape level improvements in water and natural resource management in upstream target areas Sufficient farmer uptake of climate adapted practices in both upstream and downstream target areas Enough uptake of value chain upgrading options by businesses and other market actors Modalities for PES agreed and fully implemented by government Participatory co-adaptation of options and monitoring sufficiently embraced by both government and communities at local level
Project/ programme outputs	Outputs that contribute to outcomes					

[57] The project will track uptake and usage of tools, instruments, strategies and activities developed by the project. Numbers reported are a use intensity index (UII) where the UII = (sumN ((1/((Nh - Nhu)/Nh)) * (1/((F - Fu)/Fu)) / Nt) x100; where: sumN is the sum across all project tools, instruments etc., Nh is total number of vulnerable households, Nhu is number of vulnerable households using the tool, F is the maximum desirable mean frequency of use; Fu the actual mean frequency of use and Nt the number of tools. Separate in depth survey for each tool will be conducted to track respondent feedback on impact of use on their response to climate variability.

[58] Equivalent to 25% usage by 25% of vulnerable households

[59] Equivalent to 75% usage by 75% of vulnerable households

1.1 Improved land and water management in upstream catchment areas to safeguard production of environmental goods and services	% reduction in Erosion prevalence across upstream catchment/s	Satellite technology presented in online dashboard. Ground measurements of stream flow and sediments leading to sediment load estimations (ex: US Army Corps of Engineers FLUX model)	Baseline measurements are not available and will be established within two seasons using monitoring stations placed at minor-watershed level	Mid-term would be 25% reduction from initial measurements (as implementation comes on stream only after design and planning that takes 12-18 months	Erosion prevalence across catchment reduced by 50%	Flow and sediment measurement stations will be setup to capture the data to estimate the erosion loads Erosion estimates for nearby catchments (Annexure 17 of FP) provides an indication of potential erosion rates although data for project area not available Cooperation between Divisional Secretariats (DS), Scientists and other agencies (irrigation, agrarian etc.) engage in field work across DS boundaries to address integrated action for hydrological units. PES scheme sustains funding for maintenance of soil and water conservation measures across the upstream target area.
	% reduction in sedimentation rates (and associated maintenance of capacity of reservoirs) within the upstream catchment ha of upstream catchments protected by soil and water conservation measures.	Sediment loading studies based on streamflow and sediment measurements at selected watersheds	No sediment reduction efforts in place	40% (sediment transport reduction is higher than erosion because of targeting)	Sedimentation of reservoirs reduced to a negligible level (<0.1 % loss of capacity per annum)	Targeted vegetation, streamside and roadside management interventions reduce sediment flow in line with modelled performance
	No of ha of forest mosaic landscapes	Satellite image analysis of vegetation	0 ha of landscapes	10,391 ha of landscapes and 500 ha	411,564 ha[60]	Sufficient buy in of farmers, communities and forest owners /

[60] This is 25% of the upstream catchment area, interventions are spatially targeted so that this coverage provides effective whole catchment protection

	restored and ha of grassland restored	cover rendered on dashboards	and 0 ha of grasslands	of grasslands	1,800 ha of grasslands	authorities to achieve adoption targets
1.2 Sustainable climate-resilient primary production in upstream catchment areas and downstream irrigated agricultural area conducted	No of farm households and plantation families (disaggregated by gender) benefiting from water management and climate-adapted agricultural practices (including estate workers)	Annual reports, Web-based dashboards at sub-basin scales, Divisional Secretariat records Dept. of Agrarian Dev. Records. Records of plantation companies	11,500 (disaggregate by gender)	23,919 (disaggregate by gender)	61,174[61] (disaggregate by gender)	Enough buy in of farmers, communities and plantation companies to achieve adoption targets for water management and climate-adapted agricultural practice. Value chain upgrading (in 3 below) is successful in increasing value capture by farmers and plantations enabling them to continue to invest in sustainable upstream land use.
	Average cropping intensity for irrigated rice	Satellite image analysis of rice cropping duration rendered on dashboards	Current cropping intensity <0.8 in target area	>1.2	>1.75	Farmers adopt agroecological rice intensification measures over a sufficient area to achieve mean intensification targets
2.1 Upgraded and more efficient green value chains and increased links to new markets developed	No of households benefiting from value chain upgrading options (certification, quality assurance, processing and collective marketing).	Annual reports and Divisional Secretariat records. District planning records Records of Ministry of Primary Industries	Baseline = 0	2,500	5,000[62]	Sufficient buy in from producers and other value chain actors to effect value addition.
	Number of people (disaggregated by gender) employed in green growth business start ups[63]	Surveys tracking business development	Not available = 0	625	2,500[64]	Sufficient buy in from people prepared to operate as green growth entrepreneurs,

[61] Need update with aggregate figures across the different upstream land uses
[62] Need to update with rationale based on projection of value chain upgrading potential
[63] Note that farming households and plantations are also beneficiaries of new green growth businesses that buy and add value to locally produced goods and services
[64] Need to update with rationale based on projection of green growth potential

						take risks and grow businesses. Continued growth prospects nationally and globally for green products and services
2.2 Functioning Payment for ecosystem services (PES) mechanism	Existence of a functional and efficient output-based PES system	MMDE records of revenue and payments by Hydropower operators Meeting minutes and action plans of PES governing body Plantation records Divisional Secretary Reports MMDE Financial system records and reports	Baseline is at 0 since there is no scheme in operation in the target area at the outset	250 K USD per annum	1 M USD per annum	Successful implementation of catchment protection measures in 2 above. Government commitment to developing PES modalities is maintained. Water users (principally micro-hydro power generators) continue to use water and pay the levy for PES Adequate capacity exists in national institutions to understand the water balance issues related to water-supply demand system in the Knuckles range
	% of local plantation communities benefitting from the financial incentives	Records of PES payments from MMDE	0 plantation communities	25% of the plantation communities	50% of the area-based plantation communities	PES scheme operates according to projected revenue stream
	Number of hydropower companies, and ES providers contributing financially to the cost of ES services	Records of PES payments from MMDE	0 facilities	4 hydro facilities with records	5 Hydro facilities operated by private sector	PES levy effectively implemented by MMDE

3.1 Governance mechanism for sustainable land management and productivity enhancement in the upstream catchment area established	No. of functional integrated (across admin / hydrological boundaries) sub-basin implantation teams (SIDTs)	Annual reports Project progress report Online information portal Google Analytics for portal and dashboards	There are no such integrated governance structures in the area at the outset	Three sub-basin governance units operational	Three sub-basin governance units operational	Sufficient buy in at DS level to co-operate in relation to coherent catchment boundaries.
	% of SIDT and CLIPs with women participating in the development of land-use plans and training programs	Records of attendance at SIDT meetings and of involvement in CLIPs. SHARED stakeholder evaluation workshops	0 there are no SIDTs and CLIPs at the baseline	20% for SIDT	60 % for SIDT	Gender transformative actions within the project are effective in realizing substantive participation of women in SIDTs
	% of sub-basin land use plans with SLM integrated	Documented plans	0 there are no CLIPs at the baseline	20% for CLIPS	60% for CLIPS	SIDTs effectively integrate SLM in CLIPs
	Level of access[65] to available and improved climate information	Surveys of users	0 there is no access in the target areas at the baseline	Level of access = 2 (like coordination related levels)	Level of access = 3	Weather station network established and effectively integrated with national system
3.2 Integrated rural advisory capacity responsive to developing knowledge base, real time weather and market information	% of farmers who had been reached the advisories	Records of use rates of smartphone Apps providing advice; subscription database Survey on application of advisories by farmers	0%	40 %	80 %	Sufficient buy in at GN level to operate local innovation platforms Sufficient buy in by farmers and communities to access advice provided

[65] the "level" of access mechanism is expressed in a scale of 1 to 4 with the scale referring to a level of effectiveness. (1 = no access mechanism; 2= access mechanism in place and meeting consistently; 3 = access mechanism in place, meeting regularly with appropriate representation (gender and decision-making authorities); 4 =access mechanism in place, meeting regularly, with appropriate representation, with appropriate information flows and monitoring of action items/issues raised)

		Sampling survey Project progress reports Soil-water-climate model outputs highlighting the changes in the ecosystem and extent of contributions towards climate resilience Project progress reports				A key information to track project success in terms of climate resilience
	% of target farmers using apps providing appropriate information	Use analytics collected by the applications	Smart phone apps on advisory services are not currently available = 0%	60 %	80%	Sufficient numbers of farmers find apps useful and adopt their use
	Proportion of farmers (disaggregate by women farmers) adopting new agricultural practices after training	Smartphone survey of farming practice (connected to mobile app usage)	0 by definition since it is new adoption that is targeted	20%	50%	Recommendations are effectively tailored so that sufficient farmers adopt new practices
	An Information based Decision Support System accessible to key agencies, researchers and public available and agency staff are trained to generate information, store and retrieve	Dashboard usage derived from use analytics statistics of the dashboards SHARED stakeholder evaluation workshops	Water balance (demand-supply) in each hydrologic area recorded and reported (0%)	90%	100%	Target users access and are able to effectively use data and information on dashboards

Activities	Description	Sub-activities	Deliverables
1.1.1: Streamside protection and drainage management along roads	These are conservation measures focused on the linear stream and road networks supporting action at both community and individual household level. Priority areas for intervention will be determined on the basis	Vegetation management to control run-off and enhance infiltration (this will have benefits for reducing reservoir spills (dam safety)	There are 2,373 km of stream and canals within the upper catchment of the project area

	of sub-basin planning process in 3.1.1 using information derived from the information portal in 3.1.2 and funded where appropriate via the PES mechanism in 2.2.1. Initial funding will be provided as sunk costs directly from project funds to initiate catchment protection and improved water supply for upstream households and farms while the PES is gradually phased in to maintain best practice over the life of the project, so at the end of the project a sustainable mechanism is in place to maintain appropriate water flow and quality and control across the sub-basin implementation areas.	and sedimentation and therefore downstream irrigation supply); and soil health management (soil C, water retention, biotic function) and focus on streamside management. Drainage management along roads and in relation to other soil disrupting construction activity (to prevent run-off and increase groundwater recharge, take water off rather than allowing it to accumulate down the hill) with community management to maintain dykes and clear silt	to be selected for project interventions The streamside interventions will be implemented by the Department of Agrarian Development in the Ministry of Agriculture There is 1,766 km of all types of roads in the upper catchment to be selected for project interventions The drainage management along roads will be implemented by the Road Development Authority in the Ministry of Highways and the Provincial Roads Authority in the Provincial Councils.
1.1.2: Rehabilitation and establishment of village tanks, ponds and irrigation networks	This will involve rehabilitation and development of village level ponds and irrigation channels (including both direct rainwaters harvesting and tapping stream networks) based on thematic mapping of priority areas for intervention. water flow and quality, stream erosion and ground water re-charge monitoring at GN level	Action will focus on: Thematic mapping of areas suitable for practicing various rainwater harvesting options such as village tanks and farm ponds. Construction and rehabilitation of farm and village ponds and the irrigation networks connecting them to field agriculture (including links to channeling water from roads in 1.1.1). water flow and quality, stream erosion and ground water re-charge monitoring at GN level	32 abandoned village tanks and 121 functional ponds and tanks within the upper catchment area Implemented by the Department of Agrarian Development in the Ministry of Agriculture
1.1.3: Restoration of forest mosaic landscapes	This activity focuses on restoring degraded forests within protected areas and forest fragments, re-growing forests in priority areas for the supply of ecosystem services, especially watershed protection, and the planting of trees outside forests for improved sustainability and livelihoods. The project will employ a Forest Landscape Restoration (FLR) approach in the forest mosaic landscape areas adjoining protected areas.	Key actions will include: Assisted natural regeneration and planting of diverse tree assemblages to restore degraded forests, Enhancing the ecosystem service provisioning of existing timber plantations through under storey rehabilitation and under-planting with species more suited to the local environment and people's needs than the pines and eucalypts that were planted previously	41,911 ha dense forest 21,905 ha open forest 62,204 scrub (degraded grassland) Implementation will involve Forestry and Central Environmental Authority, Knuckles Environmental Protection Agency, Ministry of Mahaweli Development and Environment; Department of Agrarian Development, Ministry of Primary Industries; Wildlife

		Restoration of degraded grassland areas, which have thus far defied restoration attempts. Ensuring forest resilience through use of climate proofing in selection of species and genetic compositions of any plantings	Department, Ministry of Sustainable Development; Land Reform Commission, Ministry of Lands with technical backstopping from ICRAF.
1.2.1: Increasing cropping intensity of irrigated rice in both upstream and downstream areas	This activity focusses on development of smart farming techniques to grow appropriate climate adapted varieties and make efficient use of irrigation water and fertilizer (maximizing use of organic inputs and recycling) as well as employing integrated pest control based on real time weather and pest incidence data (connected to the information system developed in 3.1.2.) Traditional irrigation methods like furrow irrigation (FI) and continuous flooding irrigation (CI) result in high water loss. Water saving irrigation methods improve water use efficiency (WUE). The System of Rice Intensification (SRI) that the project will promote is a climate-smart, yield-increasing system that is being utilized by more than 10 million smallholder farmers in over 55 countries. The innovation combines a number of agronomic practices to boost yields while reducing the use of purchased inputs and water. The project will also provide customized advice for enhancing rice productivity through use of appropriate varieties for each context, storage and processing to maintain quality as well as supporting enhanced production of associated crops for increased dietary diversity.	There are five key intervention areas: *i) Make better use of irrigation water (higher WUE) through better irrigation management and variety choice* *ii) Achieve cropping intensity greater than or equal to 2, with enhanced productivity.* iii) *Store, process (including drying) and assure quality to achieve reasonable prices* *iv) Dietary diversity (though enhancement of what is available across landscapes) and addressing wind issues* *v) Establish network of automatic weather stations to collect real time precipitation, temperature and wind data to parameterize crop models and understand fine scale variation in climatic conditions across the project area.*	122,150 ha downstream paddy 8,793 ha upstream paddy Implemented by the Department of Agrarian Development in the Ministry of Agriculture with ICRAF backstopping data collection and crop modelling.
1.2.2: Intensification of Sustainable smallholder production	This will focus on options for sustainable intensification of home gardens, analog forests, spice gardens and annual horticultural crops in the upstream catchment. Interventions include climate proofing of tree species choice, pruning to control distribution of light in mutlistrata systems and improve timber quality and agronomic management. Annual horticultural systems focus on annual crop production: kidney beans, beets, chillies, big onions, green gram, cabbages, bitter gourd, pumpkin, tomato, okra, eggplant, luffa, and long beans. These crops are produced for both household consumption and market sales. Individual farms cultivate a diversity of crops under low input and rainfed conditions. While focused on annual	Key intervention areas are: • Enhancing species diversity to reduce climate, biophysical and market vulnerability; • Strengthening farmers' access to the best-available quality germplasm of priority climate-resilient species, varieties and cultivars that match local biophysical and soil conditions; • Developing individual and group tree nurseries to empower farmers to independently produce high quality seedlings of priority species; • Promoting thinning to achieve recommended	There are 28,457 ha of home gardens in the upper catchment (upstream) to be considered in the project area

	horticultural crops, these systems also contain tree components that provide both service and production roles. The diversity of tree species is similar to home gardens and spice gardens. Analog forests model the process of natural forest development and forest service functions in (re)establishing a sustainable ecosystem characterized by a high biodiversity to biomass ratio. Analog forests are designed through a synthesis of traditional and scientific knowledge, to optimize the production and service potential of the system rather than to maximize the productivity of a single species component. While focused on ecosystem restoration, analog forests are also designed to provide economic benefits. Annual species are also components of analog forests. Home gardens, spice gardens, annual horticultural systems, and analog forests can be viewed as a continuum of smallholder systems. From horticultural systems focused on annual crops, to home gardens and spice gardens representing perennial (tree) farming systems, to analog forests being a forest management and restoration approach. All include both annual and perennial species and are concerned with sustainable management. A difference being that home gardens, spice gardens and annual horticultural systems focus on enhancing smallholder livelihoods in an environmentally sustainable manner; and analog forests focus on ecosystem restoration with livelihoods as the secondary objective.	spacing, remove unproductive trees, remove low value species, and increase the vigor and productivity of the remnant stand; • Promoting pruning to remove unproductive branches, improve tree vigor and productivity, and increase light levels for understory intercrops; • Promoting intercropping with annual crops to improve overall system productivity; • Promoting the production and use of organic mulch and fertilizers to rehabilitate soils, improve water recharge, and produce products for the green economy; • Exploring the feasibility of drip irrigation for high-value tree crops to improve water use efficiency and increase tree vigor and productivity.	
1.2.3: Restoration and intensification of sustainable plantations	This will include tea, coconut, rubber, timber and large-scale cultivation of spices and include development of landscape planning at estate level and the development of food forests to address food security of estate worker families, some of whom have entered contract farming arrangements with estate companies. Timber plantations in or near natural forest areas will be included in 1.1.3 while those in predominantly agricultural landscapes will be covered here.	• Landscape planning of estates to allocate land appropriately to intensive cultivation of export crops, subsistence production of nutritionally rich diets for estate workers and their families and soil and water conservation, including the establishment of exemplar landscapes. • Species suitability mapping to reduce climate, biophysical and market vulnerability; • Best-available quality germplasm of priority climate-resilient species, varieties and cultivars that match local biophysical and soil conditions; • Promoting thinning to achieve recommended spacing, remove unproductive trees, remove low value species, and	4,106 ha tea 2,713 ha coconut 2,251 ha rubber 2,090 ha timber 1,076 ha pepper 102 ha cinnamon

		increase the vigor and productivity of the remnant stand; • Promoting pruning to remove unproductive branches, improve tree vigor and productivity, and increase light levels for understory intercrops; • Promoting intercropping with annual crops to improve overall system productivity; • Promoting the production and use of organic mulch and fertilizers to rehabilitate soils, improve water recharge, and produce products for the green economy; • Exploring the feasibility of drip irrigation for high-value tree crops to improve water use efficiency and increase tree vigor and productivity.	
2.1.1: Conduct Domestic value chain mapping and green market assessments for products especially from small holder and subsistence farmers	This involves the detailed geo-referenced mapping of existing agricultural value chains (cash crops, spices, herbs and fruits) to capture their current lengths (vertical upstream to downstream) and breadths (horizontal links to input and service sectors as well as the national system of innovation (NSI)) as well as the identification of respective intra-governance structures.	Establishment of modes of regular market analyses and trade regimes conducive to green production and processing methods as well as products Identification of Sri Lanka's agricultural value chains in national, regional and global markets Scoping opportunities of rent appropriation and comparative advantage with respect to agricultural value chains.	Directory/database of stakeholders/actors needed for green market development Information on potential green market options including type of produce/products (agriculture, tourism and other) Guidelines on opportunities and directions to engage in value chain activities for subsistence farmers
2.1.2: Provide technical support for Enterprise and institutional development to exploit green growth opportunities for small holder farmers in the uplands	This involves the development of capacity to operate farms and collective groups as business enterprises. It involves support to actors to set up soft institutions where needed (based on Activity 2.1.1)	Bottlenecks and inefficiencies will be identified along and across value chains, to foster co-innovation of new green technologies Stimulate the development of new businesses and business relationships to exploit green growth opportunities for small holders and subsistence farmers adopting sustainable practices.	Collective farmer groups well informed of business opportunities and processes involved to establish green enterprises. Small holder farmers with business relationships with retail chains and service providers (SPA and Tourism) to market their products Strong relationships with financial entities such as local banks. Ability to use e-marketing and modern options to supply produce

2.1.3: Identification and implementation of value chain upgrading options for small holder and subsistence farmers engaged in climate smart agriculture	This involves the joint analysis (linked to Activities 1.2.1-3) and pursuit of meeting buyers' critical success factors and of value chain upgrading options with respect to products, processes, functions, inter-sectoral relationships, institutions (link to Activity 2.1.2) and new (green) technologies to achieve greater value chain efficiencies and market penetration of existing value chains, the participation in new value chains and/or the exiting from unprofitable or environmentally unsustainable value chains.	Development of new products and services Targeted branding of existing products and establishment of a Green Sri Lanka national brand that benefits climate smart agriculture. Obtaining appropriate third-party certification and quality assurance Improvement of production, harvesting, post-harvest management, storage and transport technologies.	New technologies along green value chain principles developed Creation of new markets for novel products such as sweet dwarf mangos, superfoods and Ayurveda products. ,
2.2.1: Developing a portfolio of business cases for negotiating performance-based financial transfer mechanisms	This will involve a robust socioeconomic and ecological baseline and supporting information that will become the core for the evidence of the provision of the ecosystem service (output-based payments) and address additionality concerns to reduce the cost of policy implementation. This comprises the basic appraisal of ecosystem services (ES) that are economically valuable and ES providers practicing environmentally protective best practices in the upstream catchment, including their livelihood options and local conservation knowledge.	Information on ecosystem services and solutions for ES provisions will be linked to spatially explicit assessment and interventions of land degradation (Activity 3.1.2), and locations of prioritized PES scheme will be determined based on the integrated land use plan at sub-basin scale (Activities 3.1.1). Potential smallholders as PES participants will be selected by considering their opportunity costs, farming systems and other socioeconomic profiles by applying behavioral economic methods such as reverse auctions.	Databases, maps and financial tools required to support business development and financial transactions made available through Divisional Secretariats and web portals Directory of experts, resource providers and support services towards output-based payment-based businesses including financial, legal and technology services Mechanisms made available to get the ecosystem and other valuations done to support output-based performance contracts and businesses. Including a system to link with Government development programmes. Mechanisms available for addressing grievances and settle conflicts preferably at divisional secretary level
2.2.2: Setting up a PES intermediary body as a part of the multi-stakeholder platform, and its governance system established	The intermediary body will be a committee within the nested-multi-stakeholder platform (Activity 3.3.1) and involve establishing an adaptive rural advisory services (RAS) facility to support adoption of catchment protection practices (including implementing regulations from 3.1.1 as well as prioritized promotion of best fit practice matched to local context).	Intensive facilitation to ensure the committee members understand their roles, have sufficient capacity, and are able to monitor, evaluate, upscale and replicate PES	The roles of PES intermediary body include information exchange, program design, upscaling and replication, networking, representation and mediation, administration and coordination of PES programs, including payment collection, financing, distribution, performance monitoring and evaluation.
2.2.3: Establish a monitoring system for PES schemes in the upstream catchment area	This involves establishing a monitoring system for PES schemes comprising both socioeconomic and ecological criteria and indicators. The monitoring system will determine the performance of ES providers in accessing ES rewards, financially and non-financially	Scoping of watershed, problems, criteria and indicators. Capacity strengthening activities for local stakeholders on how to	The criteria and indicators are developed by considering SDG and other national commitments such as the Sri Lanka Nationally Determined Contributions (NDC) and

		monitor, evaluate and develop criteria and indicators.	National Adaptation Plan (NAP)
3.1.1: Develop an integrated land use policy and planning mechanism at sub-basin scale	To carry out this activity and ensure long term sustainability, three new governance structures (implementation teams) will be developed that will be put in place to integrate across non-congruent administrative (Divisional Secretariat - DS) and hydrological (sub-catchment) boundaries 1. The five sub-catchments on the east of the target catchment area (Amban Ganga, Puwakpitiya Oya, Thelgamu Oya, Kalu Ganga and Knuckles Ellewana Kanda Eastern Slope). These are well connected to one another and embrace the large DSs of Lagalla Pallegama and Wilgamuwa and the larger eastern part of the Naula DS (the rest is part of 3 below). Much of the area is less degraded than other parts of the overall catchment so the density of intervention is anticipated to be lighter than in other sub-basin units. 2. The upland part of the Sudu Ganga sub-catchment including the Rattota and Amban Ganga Korale DSs. 3. The lower part of the Sudu Ganga sub-catchment including the Ukuwela, Matale and parts of Akurana and Naula DSs 4. The Nalanda Oya sub-catchment embracing Pallepola and Yatawatta. 5. The Heen Ganga and Hasalaka Oya sub-catchments in the south, comprising Udadumbara DS and part of Minipe DS.	Three sub-basin SHARED stakeholder engagement processes	Three integrated SHARED stakeholder engagement processes covering three sub-basin structures comprised of multisector information systems and multi-stakeholder engagement and planning mechanism A financial and resource mechanism in place to support the operation of the three sub-basin governance schemes consisting of Government, Private Sector, Farmer Organizations and other relevant actors. A support platform that uses digital technologies, modern communications and other tools for integrated land use planning and implementation including incentive systems for best practices.
3.1.2 Develop a shared information system to support land use planning, climate adaptation, market information and monitoring of the performance of intervention options	The information system will involve developing spatially explicit assessments of land degradation that are critical for the development of effective adaptation options and targeting interventions, while also providing a framework for monitoring of progress over time. Both socio-economic and biophysical information will be integrated.	Five LDSF baseline surveys with associated satellite image analysis Implementation of five sub-basin information portals and dashboards Development of an interface to connect sub-basins to an integrated upstream catchment portal	By providing a robust indicator framework, advanced analytics and diagnostics (models), the information system will be key to the development of spatially explicit interventions to protect and restore ecosystem function and adaptation. Land degradation hotspots (e.g. soil erosion and compaction) and soil health variables (e.g. soil organic carbon) will be mapped at high spatial resolution (10 to 30m), by combining data collected from the LDSF sites with data from the global database.
3.1.3: Development and refinement of SLM framework	This Activity will synthesize information to support land use planning, climate adaptation, market information and monitoring developed under Activity 3.1.2. with the nested-scale multi-stakeholder	Collation of local and expert knowledge to characterize variation in contextual factors conditioning suitability of recommended practices	This involves an iterative process of co-design and participatory evaluation following the 'core 4 framework' set out in the

	innovation platforms for facilitating participatory engagement at the GN level established under Activity 3.3.1. It will produce an organized set of intervention options for land and water management tailored to the range of local contexts occurring in the project area.	(listed in 1.1 and 1.2) across the project area Production of six initial option by context matrices for activities 1.1.1-3 and 1.2.1-3 and a gap analysis identifying information needs. Design of scaling so that planned comparisons embedded in the roll out of interventions use co-learning to fill information needs and efficiently adapt options to local context.	programme description in Section C3.
3.2.1: Establishment of nested-scale multi-stakeholder innovation platforms from sub-basin to GN scale	A key element of resilience enhancement of communities and ecosystems includes the engagement of relevant and diverse stakeholders across scales in adaptation planning, This is aided through the utilization of online dashboards and structured engagement to facilitate stakeholder interaction and interrogation with evidence. Understanding how various stakeholders interact with each other, as well as obtain, share and utilize information/evidence in prioritizing practices that minimize potential negative environmental impacts is key to developing context-appropriate innovation platforms.	Root-cause analysis of key constraints (barriers) to adoption of best practices. Mapping stakeholder networks and their connectivity to inform upscaling activities. Prioritization of options by women, men and young people. Trade-off analyses between environmental impact and increased agricultural production. Integrated water balance model (demand/supply) combined with a DSS by administrative, hydrologic and ecoregion levels	Specific interactive exercises will guide stakeholders to conceptualize key themes, group them into appropriate modules based on decision making hierarchies and processes with a commensurate process for prioritizing data, indicators and visualization options. Based on priorities of the location, terms of reference will be established for innovation platforms. Each will have a different composition according to the relevant government, civil society and private sector actors at the location. Platforms will be linked across sub-basins to share information and learning down to the GN level.
3.2.2: Develop local capacity for adaptive and sustainable land management	This activity addresses key capacity development required across government to connect bottom up methods that ensure that feasible options are developed and top down rural advisory service RAS mechanisms that are required to make them widely available. This requires developing capacity to be able to operate a responsive and evidence-based rural advisory service that can incorporate developing knowledge and real time information about changing conditions in the short term (such as weather or pest outbreaks) and long term (such as suitability of tree species in the context of climate change).	Training of: 1. Project managers who need to understand the concepts and approaches being used. This will be by one day face-to-face training events provided by ICRAF staff (three per year, pooled across sub-basins). 2. Field officers who are responsible for implementing field activities. These will primarily be training-of-trainer events, requiring face-to-face training (by managers for field officers) with distance-learning backup (five three-day events per year and access to distance learning	The purpose of training is to ensure all involved are able to use the framework and tools (see 3.3.3). The training will involve the executing partners implementing 1.1.1-3 and 1.2.1-3 as listed above.

		materials developed in 3.2.3.) 3. Farmers and others who will adopt new practices. These training events are conducted by the trainers attending the events in 2 above.	
3.2.3: Development and production of simple to use guidelines, manuals and tools for matching options to context and implementing SLM, sustainable intensification and value chain upgrading options	The adaptive and responsive options by context framework employed in the project requires simple guidelines and tools that make it easy for it to be taken up and used at grass roots level. These are developed: - using the data compiled from external sources or generated in previous stages - analysing and interpreting the data - making decisions on options to promote in particular circumstances	A series of guides, checklists, frameworks, Smart Phone Apps, videos and distance learning materials tailored to capacity needs defined in 3.2.2	Where appropriate, tools will be developed as interactive smartphone Apps capable of suggesting likely options for particular situations utilising georeferencing in the smartphone with information held in the information system developed in 3.1.2, that may include real time weather and market information in addition to advice based on performance evaluation of options across the contexts they have been tried out in the project area.

H.2. Arrangements for Monitoring, Reporting and Evaluation

331. Project level monitoring and evaluation will be undertaken in compliance with the IUCN 2015 Monitoring and Evaluation Policy, Accreditation Master Agreement (AMA) between GCF and IUCN and the IUCN Access to Information Policy.

332. Project monitoring will measure achievement of the performance indicators and report on the implementation progress of GCF project while it is being implemented. Performance indicators are identified according to the principles established in the GCF Initial Results Management Framework linking Time-bound sets of activities to a set of agreed adaptation results. IUCN maintains a standard list of technically well-informed indicators aligned to its donors core indicators, including GCF. IUCN aims to develop its standard indicators for each programmatic area with afferent measurement tools to ensure effective data collection and harmonized reporting. IUCN's Programme and Project Portal allows efficient and timely data management and project information disclosure

333. A project inception workshop will be held after the project document is signed by all relevant parties to: a) re-orient project stakeholders to the project strategy and discuss any changes in the overall context that influence project implementation; b) discuss the roles and responsibilities of the project team, including reporting and communication lines and conflict resolution mechanisms; c) review the results framework, re-assess baselines as needed, and discuss reporting, monitoring and evaluation roles and responsibilities and finalize the M&E plan; d) review financial reporting procedures and mandatory requirements, and agree on the arrangements for the annual audit; e) plan and schedule Project Board meetings and finalize the first year annual work plan. IUCN will prepare the inception report no later than one month after the inception workshop. The final inception report will be cleared by the National Steering Committee before submission to the GCF Secretariat.

334. A Project Implementation Report (PIR) will be prepared for each year of project implementation. Each report is cleared by the National Steering Committee before submission to the GCF Secretariat. The Programme Director of the project, the IUCN Country Office, and the IUCN Regional Technical Advisor will provide objective input to the annual PIR. The Programme Director will ensure that the indicators included in the project results framework are monitored annually well in advance of the implementation report submission deadline and will objectively report progress. The annual implementation report will be shared with the National Steering Committee and other stakeholders. IUCN will coordinate the input of the NDA Focal Point and other stakeholders to the implementation report. The final project implementation report, along with the terminal evaluation report, will serve as the final project report package.

335. Project mid-term (MTE) and final (FE) evaluations will be commissioned and managed by the IUCN Planning, Monitoring, Evaluation and Risk Unit – IUCN's independent evaluation office. Independent evaluators under the oversight of PMER will be contracted to conduct these evaluations. The evaluation criteria are aligned to the GCF IEU Evaluation Criteria. The MTE will assess (1) the relevance, effectiveness, efficiency and likelihood of impact and sustainability, (2) the coherence in climate finance delivery, (3) gender equity and social inclusion (minorities), (3) and country ownership. The FE will assess (1) the relevance, effectiveness, efficiency and likelihood of impact and sustainability, (2) the coherence in climate finance delivery, (3) gender equity and social inclusion (minorities), (3) and country ownership, (4) innovativeness in result areas, and (6) replication and scalability. The evaluation will apply a process tracing methodology. Data collection will include stakeholder interviews, site visits and documentary reviews. The IUCN management response will be reviewed by the National Steering Committee. Evaluation reports

and management responses will be made available to the public through the IUCN Evaluations Database.

336. The IUCN Sri Lanka office will retain all M&E records for this project for up to six years after project financial closure in order to support ex-post evaluations. A detailed M&E budget, monitoring plan and evaluation plan will be included in the proposal and ESM framework.

337. In addition to the above, National Steering Committee will be gathered quarterly or more often than that as per the requirement and monitor the progress against the annual project implementation plan. The Executive Entities which are IUCN, Ministry of Mahaweli Development and Environment and ICRAF will be responsible to lead the presentations of the progress for the out puts and activities they are responsible. Under the facilitation of the EE the contracted organizations for each sub activities (that are in line with the project TOC and the budget) will be presented the progress. Any bottlenecks will be exposed at this forum and the National Steering Committee will provide or get immediate actions to the internally and externally popped up issues.

1. FP-IUCN-GCF-Sri Lanka-Annexure 1 No objection letter
2. FP-IUCN-GCF-Sri Lanka-Annexure 2 Feasibility Study
3.
   a. FP-IUCN-GCF-Sri Lanka-Annexure 3a Economic Analysis
   b. FP-IUCN-GCF-Sri Lanka-Annexure 3b Economic Analysis – Excel Spreadsheet
4. FP-IUCN-GCF-Sri Lanka-Annexure 4 Co-finance letter
5. FP-IUCN-GCF-Sri Lanka-Annexure 5 Environment and Social Management Framework (ESMF)
6. FP-IUCN-GCF-Sri Lanka-Annexure 6 Gender Assessment and Action Plan
7. FP-IUCN-GCF-Sri Lanka-Annexure 7 Map Atlas
8. FP-IUCN-GCF-Sri Lanka-Annexure 8 Project Timetable and Tranches
9. FP-IUCN-GCF-Sri Lanka-Annexure 9 Stakeholder Analysis
10. FP-IUCN-GCF-Sri Lanka-Annexure 10 Project Management Structure
11. FP-IUCN-GCF-Sri Lanka-Annexure 11 Project Budget and Budget Notes
12. FP-IUCN-GCF-Sri Lanka-Annexure 12 Procurement Plan
13. FP-IUCN-GCF-Sri Lanka-Annexure 13 Monitoring and Evaluation Plan
14. FP-IUCN-GCF Sri Lanka-Annexure 14 WB Climate Smart Agriculture Project letter
15.
   a. FP-IUCN-GCF Sri Lanka-Annexure 15 a Capacity Assessment of EEs - MMDE
   b. FP-IUCN-GCF Sri Lanka–Annexure 15b Capacity Assessment of EEs - ICRAF
16.
   a. FP-IUCN-GCF Sri Lanka – Annexure 16a Project site climate analysis – rainfall deficit
   b. FP-IUCN-GCF Sri Lanka – Annexure 16b Project site climate analysis – PET and Moisture Index
17. FP-IUCN-GCF Sri Lanka – Annexure 17 Hydrologic and Climate Analysis
18. FAO Ex-ACT worksheet used for estimation of GHG mitigation gains by the project