



ADAPTATION FUND

PROJECT PROPOSAL

Climate Change Adaptation Proposal to Adaptation Fund

PART I: PROGRAMME INFORMATION

PROGRAMME: **Regular**

COUNTRY: **Sri Lanka**

TITLE OF PROJECT: **Addressing Climate Change Impacts on Marginalized Agricultural Communities Living in the Mahaweli River Basin of Sri Lanka**

TYPE OF IMPLEMENTING AGENCY: **Multilateral Implementing Agency**

IMPLEMENTING ENTITY: **World Food Programme**

EXECUTING ENTITIES: **Ministry of Environment in coordination with the Ministry of Agriculture and Ministry of Agrarian Services and Wildlife**

AMOUNT OF FINANCING REQUESTED: **US\$ 7,989,727**

CO-FINANCING:

PROJECT BACKGROUND AND CONTEXT

Sri Lanka is an island located at the southern tip of India, between 5° 55' and 9° 50' North and 79° 42' and 81° 53' East. It has a total land area of 65,610 sq. km; its population estimate in July 2006 was 20,222,240 with a growth rate of 0.78%. Three topographic zones, the central highlands, the plains, and the coastal belt are distinguished by elevation.

On the basis of rainfall distribution, the country is classified into three climatic zones, the Wet, Dry and Intermediate zones. The Wet zone covers the south-western region including the central hill country and receives relatively high mean annual rainfall over 2,500 mm without pronounced dry periods. The Dry zone covers predominantly the north central, northern and eastern part of the country, receives a mean annual rainfall of less than 1,750 mm with a distinct dry season from May to September. The intermediate zone receives a mean annual rainfall between 1,750 to 2,500 mm with a short and less prominent dry season (Figure 1). The island has 46 different agro-ecological regions differentiated by monthly rainfall expectancy and distribution, soil type, elevation, land use and vegetation.

Average temperature for the country is 27°C however there is a wide variation of minimum and maximum ranges in the topographic and climatic zones.

Sri Lanka has 103 rivers mostly emanating from the steep central hills, and about 30,000 reservoirs (mostly man-made) concentrated in the dry and intermediate plains to store rain water for people and nature.

Sri Lanka has a diverse natural resource base on which the country heavily relies for livelihoods, power generation and industry. Agriculture, including fisheries, is mainstay of the rural economy employing around 32.6% of the labour force and contributing 12.9% to the national GDP in 2010¹. The country experiences frequent natural disasters such as drought, floods, landslide, and cyclone events². Coastal hazards such as beach erosion and salinity intrusion into soils and aquifers are a common feature, especially in the dry coastal zones extending from southern Sri Lanka along the eastern coast around the northern part of the country.

Sri Lanka's Current Climate Regime

The climate in Sri Lanka is primarily determined by its position as an island nation in the Indian Ocean. Detailed studies on climatology of Sri Lanka show that the "climatic year" or "hydrological year" of the island begins in March. There are four rainfall seasons in Sri Lanka:

1. March to April: First Inter Monsoon (FIM) rains
2. May to September: South West Monsoon (SWM) rains
3. October to November: Second Inter Monsoon (SIM) rains
4. November to February: North East Monsoon (NEM) rains

These rainfall seasons do not bring homogeneous rainfall regimes over the whole island and this why the island exhibits such a high agro-ecological diversity, despite its relatively small size. Of the four rainfall seasons, two consecutive rainy seasons comprise the major growing periods, namely *Yala* and *Maha* seasons. Generally *Yala* season is the combination of FIM and SWM rains. However, only the FIM rain fall during the *Yala* season in the Dry zone from mid-March to early May.

¹ Annual Report, Central Bank of Sri Lanka. Provisional Estimate (2010)

² Historical records of Disasters in Sri Lanka - www.desinventar.lk

Being effective only for two months, the *Yala* season is considered as the minor growing season of the Dry Zone. The major growing season of the whole country, *Maha*, begins with arrival of SIM rains in mid-September/October and continues up to late January/February with the NEM rains.

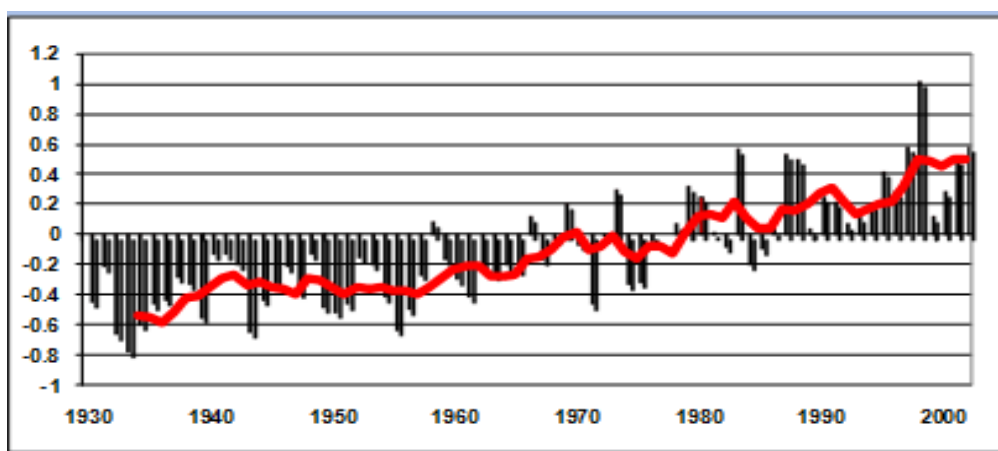
Season	Period	Average rainfall (mm)	Percentage of annual Total
First inter-monsoon (FIM)	March-April	268	14
South-west Monsoon (SEM)	May-September	556	30
Second Inter-monsoon (SIM)	October-November	558	30
North-east Monsoon (NEM)	December-February	479	26

Table 1. Average annual rainfall (1961-1990)³

Climate Change Projections and Scenarios

A number of meteorological studies point to a clear warming trend. A hundred years warming trend for the period 1896-1996 was estimated at 0.003 °C per year, with a 0.025 °C yearly increase over in the decade 1987 -1996 (Fernando,1997). Basnayake *et al.* (2002) and Zubair *et al.* (2005) found that mean annual day time maximum and mean annual night time minimum air temperatures are increasing.

Figure 1. Change in mean annual temperature in Sri Lanka 1930 to 2000 (Chandrapala 2000)



Observations of temperature found a decreased number of cold days and nights, and an increased number of warm nights and days in most meteorological stations (Samarasingha, 2009). The highest warming trends have been recorded in Anuradhapura and Badulla districts in the Dry and Intermediate zones.

Climate projections on the basis of General Circulation Models (GCM) point to an unabated warming trend and the likelihood of the Dry-zone boundary being pushed outward, bringing more land under lower rainfall regimes. The projected precipitation change in Sri Lanka for the year 2080

³However this pattern is subject to very wide regional variations. Please see annex 14 for further details

(Figure 2) indicates that the entire Dry and Intermediate zones, which represent 75% of the island, are projected to become drought prone with 30% less rainfall in worst hit areas if the prevailing climate change trends continue. Any negative anomaly of rainfall in the wetter part of Sri Lanka, especially the mountainous central parts of the country, is expected to compound drought effects in the Intermediate and Dry zones due to trans-basin effects.

Impacts of Climate Change on Weather in Sri Lanka

Increasing temperature

-Air temperature in Sri Lanka has increased by 0.64°C over the past 40 years and 0.97°C over the last 72 years, which reveals a trend of 0.14°C per decade. However an assessment of a more recent time band has shown a 0.45°C increase over 22 years, suggesting a rate of 0.2°C per decade

-Consecutive dry days are increasing in the Dry and Intermediate Zones (please see agro-ecological zones of Sri Lanka)

-Ambient temperature (both minimum and maximum) has increased

-The number of warm days and warm nights has increased, while the number of cold days and cold nights has decreased

Rainfall Variability

-Precipitation patterns have changed but conclusive trends are difficult to establish

-A trend indicating decreased rainfall has been observed over the past 30-40 years, but the change is not statistically significant

-There is an increasing trend of one-day heavy rainfall events across the country

-An increase in the frequency of extreme rainfall events is anticipated, leading to more droughts, floods and landslides

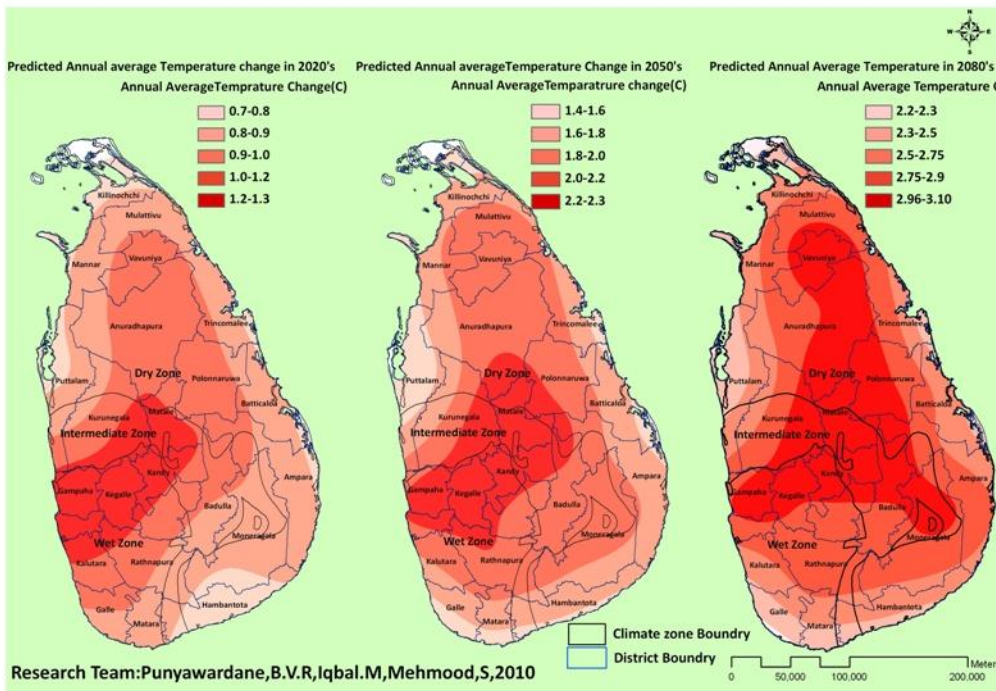
Drought

-Increased frequency of dry periods and droughts are expected

-The general warming trend is expected to increase the frequency of extreme hot days

Source: Department of Meteorology/ Adapted from the National Adaptation Strategy 2011-2016

Predicted Temperature change over Sri Lanka by PRECIS RCM in combination with ECHAM4 GCM for B2 Scenario



Projected Precipitation Changes over Sri Lanka by PRECIS RCM in combination with ECHAM4 GCM for B2 Scenario

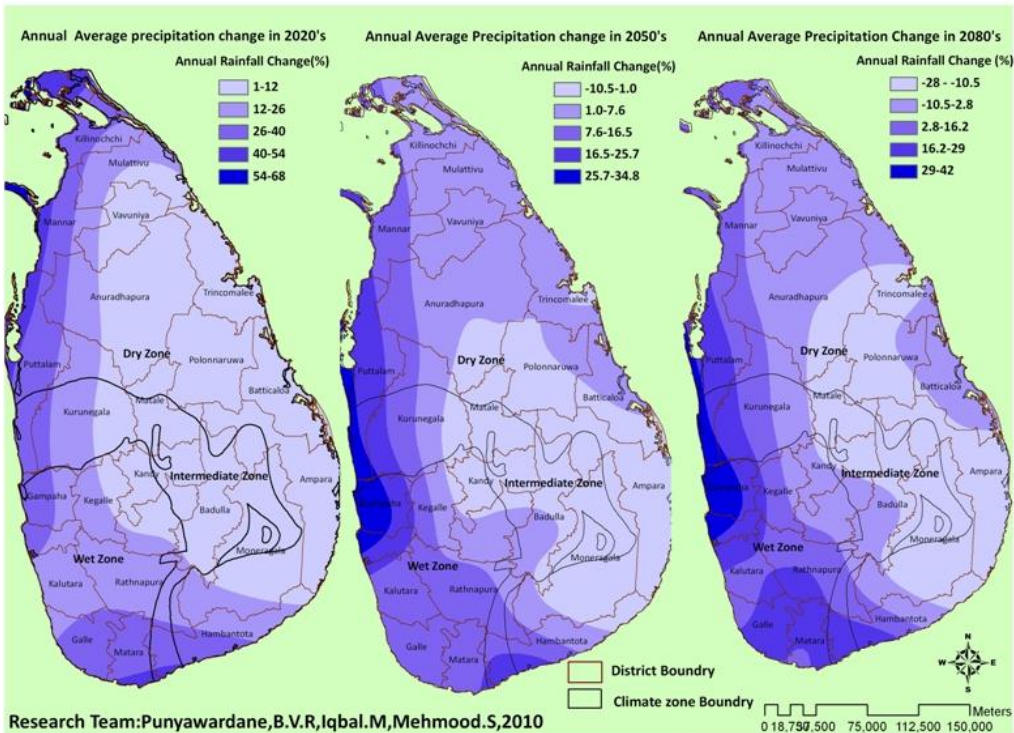


Figure 2: GSM Models for temperature and precipitation change

Climate Change Related impacts on Agricultural Production and Food Security

Analysis by the Sri Lankan Department of Meteorology indicates an increasing trend in rainfall variability over most parts of the island. Recent decades have seen an overall increase of extreme rainfall events, which are interspersed with longer dry spells and periods of drought. Consequentially, this pattern causes greater erosion of arable soil and more frequent flooding events. Temperature increase also impacts on agriculture productivity albeit to a lesser degree. It is estimated⁴ that the paddy irrigation requirement using HAD CM3 will increase by 23% (A2 scenario) and 13% (B2 scenario) which is mainly due to increase in temperature.

Variability of rainfall pattern (see table below) is greatest in the northeast monsoon which is essential for food crop cultivation. Overall, it was found that changes in precipitation have a stronger effect on agricultural productivity than temperature. The variability of the north-east monsoon that brings rains for the major cultivation season will effect production of paddy and other field crops.⁵ Rain fed paddies comprise of 30% of all rice paddies in the country.

Season	1931-1960	1961-1990
First inter-monsoon(FIM)	23%	27%
South-west Monsoon(SEM)	21%	16%
Second Inter-monsoon(SIM)	22%	23%
North-east Monsoon(NEM)	31%	42%

Table 2. Coefficient of variation of rainfall in Sri Lanka Source: Chandrapala, (1997)

Several studies, such as the Ricardian Valuation of Climate Change Impacts,⁶ have used global climate change scenarios to assess climate change effects on Sri Lanka's agriculture (Figure 3).

Model projections indicate varying degrees of crop losses due to climate change, depending on the models used. The projected effects of climate change on agriculture depend on the scenario: With medium warming and only a small increase in precipitation, agricultural losses of about 23% are predicted. The studies also indicate that climate change impacts will have considerable regional variation: While the wet high elevation areas of the country may benefit from warming, the hot dry northwestern and southeastern lowlands that are known to be drought prone (Figure 4) are expected to be adversely affected.

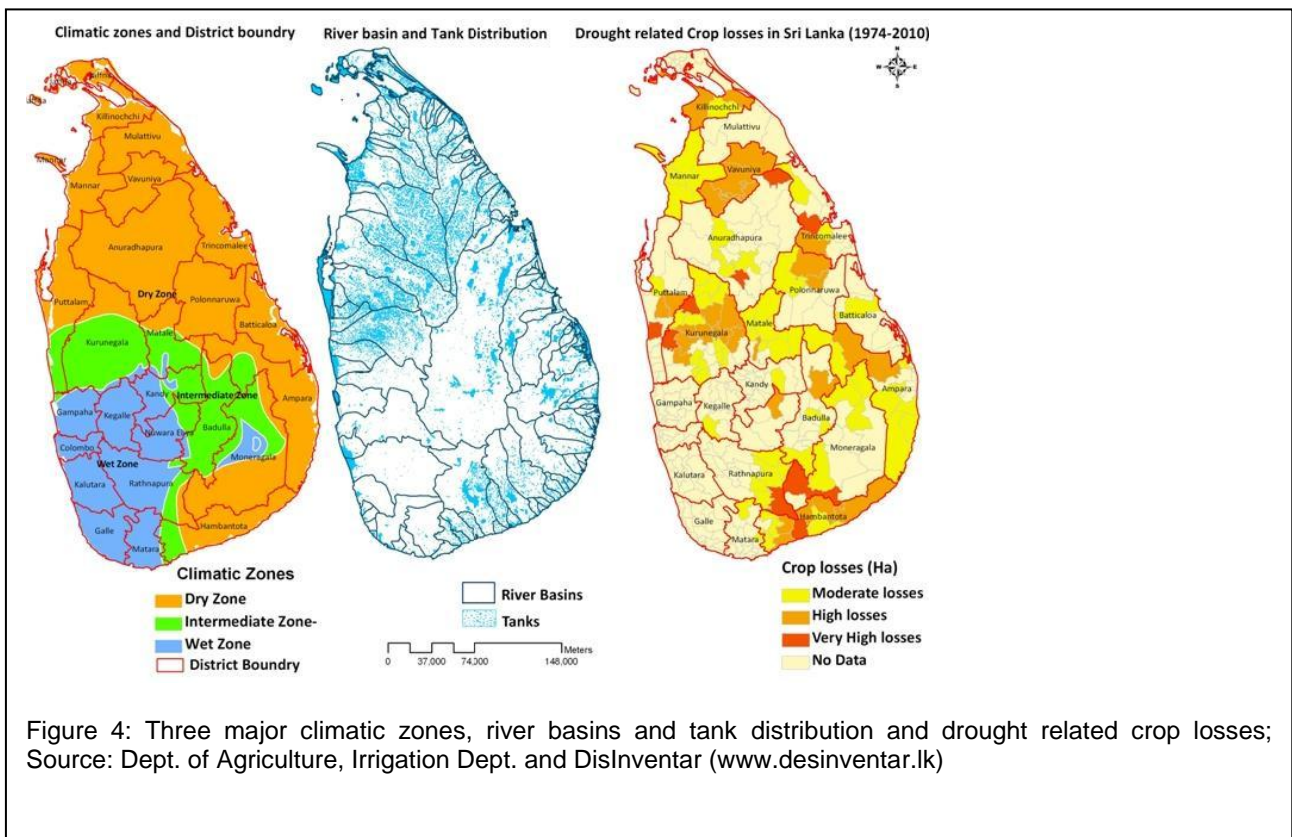
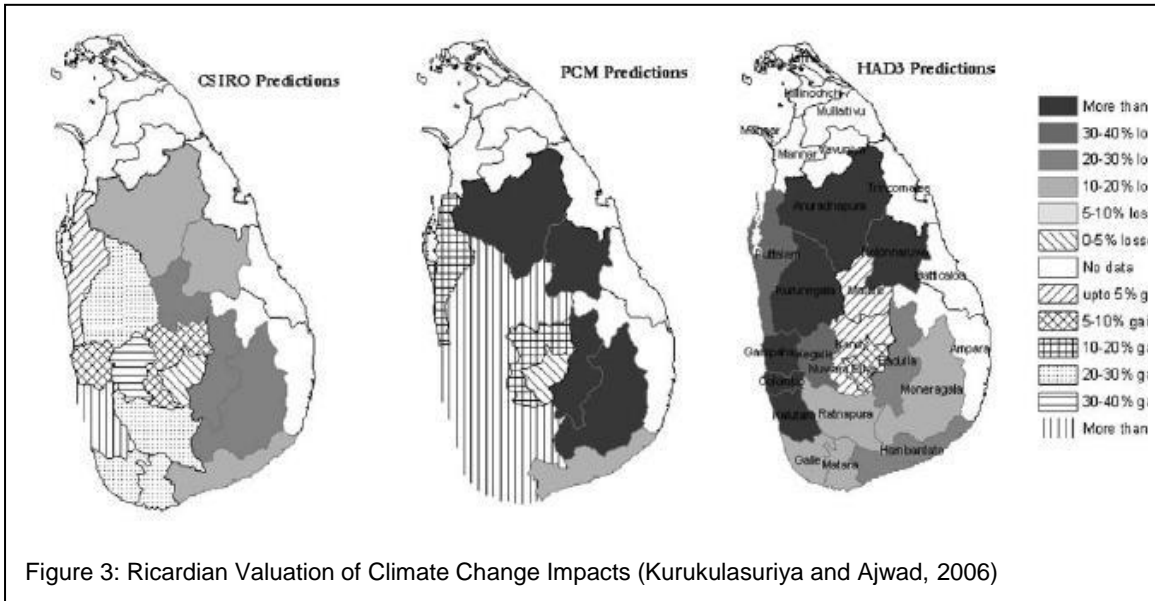
The International Water Management Institute (IWMI, 2010) completed a study⁷ which attempts to identify the country's agricultural vulnerability hotspots through the development of a Vulnerability Index consisting of three indices, namely, Exposure, Sensitivity and Adaptive Capacity. The study further sub-divides the exposure index into sub-indices, such as flood hazard, drought hazard and cyclone hazard, and a fourth index called multi-hazards, (combining drought, flood and cyclone hazards). Vulnerability was mapped at district level (Annex 10). The maps indicate that typical farming districts such as Nuwara-Eliya, Ratnapura and Anuradhapura Badulla, Matale and Polonnaruwa are more sensitive to climate change than the rest of the country due to existing soil erosion (up to 60 percent of the land area in Nuwara-Eliya district is affected) and their heavy reliance on primary agriculture.

⁴ Amarasinghe, Upali et al Spatial Clustering of Rural Poverty and Food Insecurity in Sri Lanka. IWMI 2006

⁵ Second National Communication to UNFCCC, Ministry of Environment

⁶ Kurukulasuriya and Ajwad, 2006

⁷Eriyagama, N Smakhtin, V Chandrapala, L Fernando, K(2010) Impacts of Climate Change on Water Resources and Agriculture in Sri Lanka. IWMI Research Report 135



According to Sri Lanka's Second National Communication to the UNFCCC (2011) and the recent National Strategy for Climate Change Adaptation (2011-2016), the sectors most affected by climate change are agriculture, water resources and public health. The Second National Communication warns that observable shifts in weather patterns, coupled with a continuous rise of ambient

temperature across the country and increasing variability of rainfall are projected to have large-scale effects on agricultural productivity, food and water security.

The expected impacts on water resources and the agriculture sector may trigger serious impacts on the country's food production, livelihoods and the economy. A recent study finds Sri Lanka to be one of the hotspots of food insecurity in the Asia-Pacific region⁸. Prolonged and more frequent drought is expected to reduce the availability of water for irrigation and this in turn could lead to a drop in crop production. Rice cultivation in major irrigation schemes will be substantially affected in severe drought years while production in other major and minor irrigation schemes will show significant shortfalls with greater frequency than in the past. The combined effect of higher temperatures and less rain is projected to lead to a greater than 11 percent loss in revenue from paddy by 2050⁹. A number of other field crops including coarse grains, grain legumes, oil seeds and condiments are grown on rain-fed upland areas in the Dry Zone. The production of these crops will also be adversely affected by severe fluctuations in rainfall.

Policies to address climate change concerns in Sri Lanka should therefore place a greater emphasis on dealing with long term changes in precipitation, and prioritize issues such as water and residue management, access to irrigation, drainage control, and resilient crop choices, also taking into consideration the river basin structure of Sri Lanka and the distribution of man-made tanks primarily located in dry and intermediate climatic zones.

Climate Change Induced Rainfall Variability and Associated Hazards in the Mahaweli River Basin

Of Sri Lanka's 103 rivers, around 20 are considered perennial. Of these, the largest draining area, some 10,000 square kilometers, belong to Mahaweli River Basin. This comprises over one sixth of the total land area of the country. The Mahaweli River rises in the mountainous south central part of the island, which receives an annual rainfall of 4000-5000 mm and discharges an average runoff of 8,600 million m³ annually into the sea. It is the principal source of water for irrigation in the dry zone. 40 Divisional Secretary Divisions (DSDs) in six districts and four provinces belong to the Basin. There are 38 sub-watersheds of tributaries that that augment the main river. Please see River Basin Hydrological Map in Annex 4.

The Mahaweli River Development Scheme has been the largest multipurpose development project implemented in Sri Lanka, yielding both irrigation and hydro power generation. However large areas of the Basin remained untouched by the development benefits of the Scheme. These areas, characterized by rain-dependent small farms in remote villages, remain some of the poorest in the country and are located in the mid and upper catchment and downstream.

Food insecurity and poverty in different regions of the Mahaweli Basin are linked to production patterns, income, disaster exposure, education, and other socio economic conditions, including number of family members. Water availability, especially irrigation water availability is directly and negatively associated with poverty.¹⁰ This corresponds to the vulnerability analysis in Annex where Divisional Secretary Divisions (DSDs)¹¹ of the Mahaweli Basin based on disaster exposure, irrigation and drinking water scarcity, erosivity of soil and food security. DSDs of Walapane,

⁸ESCAP Asia Pacific 2010

⁹Munasinghe Institute for Development, Sri Lanka. Agriculture and Climate Change 2010

¹⁰ Amarasinghe, Upali et al Spatial Clustering of Rural Poverty and Food Insecurity in Sri Lanka. IWMI 2006

¹¹ A Division or DSD is an administrative unit consisting of several villages. The Divisional Secretary is the Administrator of this unit and reports to the District Secretary. DSDs are the basis for planning and execution of all government development programmes.

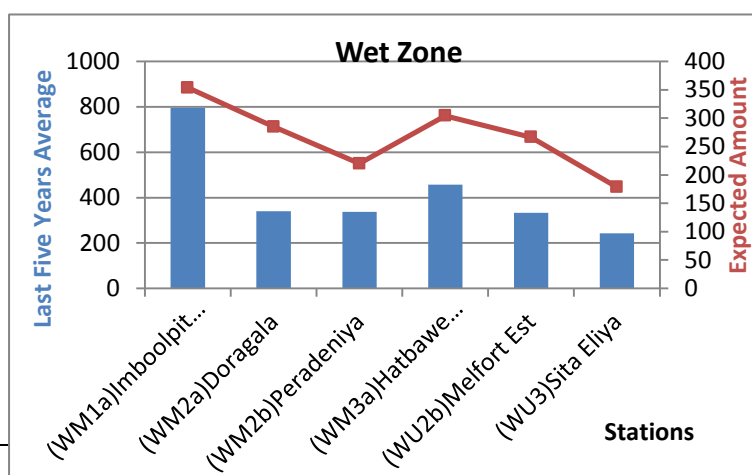
Hanguranketha, Ududumbara, Medirigiriya and Thamankaduwa emerge as the most vulnerable overall. These DSDs are not serviced by major irrigation. Farming communities in these DSDs live in drought-prone areas with small village irrigation structures, or on steep mountainous slopes with poor accessibility and very poor infrastructure (roads, markets, communication).¹²

Climate change in the Mahaweli Basin is manifest in increased natural disasters such as landslides, drought and floods, increased land degradation in the upper and mid elevations and reduced agricultural productivity. These problems are attributed to both temperature increase and rainfall variability. As is the case nationally, rainfall variability is by far the most important contributory factor to increased climate risk in the Mahaweli Basin¹³. Rainfall data obtained from the Natural Resources Management Centre, DoA was used to compute the coefficient of variation (CV) for weather stations of each of the Basin districts are presented in Annex 7

Climate related rainfall variability in the Mahaweli Basin is especially pronounced in the Dry and Intermediate agro-ecological zones, in the middle and lower catchment. In these areas, the major rainfall season begin with the second inter-monsoon (September to October) and lasts throughout the northeast monsoon (November to February). The variability of both these seasons has increased considerably. On the ground this means that the age-old knowledge of farmers on rainfall related cropping calendar is no longer valid. Analysis by the Department of Meteorology shows an increase of both incidence of consecutive dry days and incidence of one-day heavy rainfall events (Annex 6).

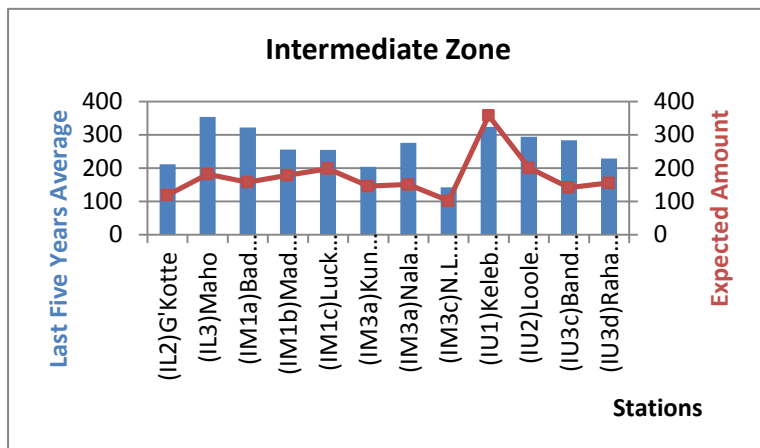
Rainfall distribution within a season also exhibits substantial anomalies. Late onset of rains, heavy and intense rainfall events, and pronounced dry periods are becoming increasingly common. Such variability is detrimental to crops, especially under rain-fed and minor irrigated conditions. In the past five years alone, actual rainfall distribution in many areas of the basin has shown significant deviation from the expected pattern.

Below are two charts depicting the expected pattern of rainfall (red line) against the five year average for SIM (second inter-monsoon). Rainfall data has been collected from meteorological and agricultural stations in the Mahaweli Basin. The graphs show average rainfall recorded by six stations in the wet-zone which forms the catchment of the river. In the intermediate zone, ten stations show above average rainfall and two stations depict normal rainfall. (Charts for other rainfall seasons are presented in Annex 7)



¹² World Bank Poverty Assessment 2006

¹³ Expert views presented at the Project Design Workshop, hosted by Ministry of Environment, Kandy September 31-October 01, 2011



This anomalous pattern is confirmed by farmers and local extension officials interviewed in a questionnaire survey during project design which is presented in detail in Annex 11. Both farmers and officials in catchment and command/downstream areas complained of late onset of monsoon, change in severity and distribution of rainfall, high intensity rainfall events after prolonged dry periods. And water scarcity for irrigation and drinking.

Rainfall changes in the upper catchment have negatively impacted reservoir inflows in the upper catchment, and this reduction is reflected in the gradual decline of hydro power output from the system. Climate change-related weather aberrations (such as high precipitation events and longer dry periods) also aggravates land erosion in the upper and mid catchments causing sedimentation of reservoirs leading to reduced storage capacity.

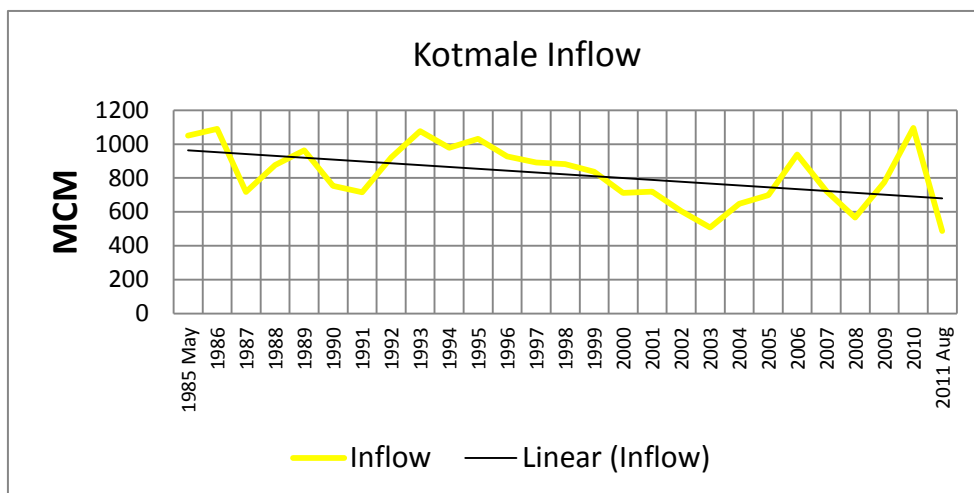


Figure 5. Inflow to the top-most reservoir in the system

Impact of Climate Change on Irrigation and Poverty in the Mahaweli Basin

Large parts of the downstream districts of the Mahaweli river basin receive irrigation through a network of reservoirs and feeder canals (referred to as major irrigation) administered by the Mahaweli Authority¹⁴. Impacts of climate-related rainfall variability are buffered in major irrigation areas by large stocking reservoirs and a well-administered irrigation distribution system. Climate risks are minimized due to the availability of irrigation water at the 'right' time and food production as measured by cropping intensity remains high Mahaweli Settlement Schemes¹⁵ receiving assured irrigation through trans-basin diversion.

However, there are other areas of the basin that have not benefitted from such development. Many upland or rain-fed farming areas lay scattered in the upper, middle and lower catchments without assured irrigation and exposed to natural hazards such as drought, floods and landslides. Some of these lands are entirely rain-fed, with cultivation times coinciding with monsoon rainfall. Some farmlands are serviced by small irrigation structures such as cascading village tanks (see Figure 6 below) and anicuts or canals conveying rainwater in the upper elevations. Socio economic analysis shows that poverty and food insecurity is highest among such rain-dependent farmers who have no access to assured irrigation. Farmers in rainfed systems (called upland farmers) have been traditionally poorer than settlers. Due to lack of irrigation at the right time, in the right quantities, these farmers have low productivity and produce crops that do not have high market value. Generally, one season (Maha) is cultivated fully. Livelihood insecurity is high during the lean rainfall season from April to September. Farmers become labourers and often migrate out of village in search of employment. Crops vary from rice in some village reservoir systems, to annual vegetables, to legumes, maize, millet and sorghum. Much of the produce is consumed by the farm family.

Rain-fed farming communities are ignored by extension services; and lack basic infrastructure such as electricity, communications and road networks to enable them to engage in more productive alternate livelihoods. In rain-fed and minor irrigated areas, climate change induced weather anomalies have the combined impact of hazard amplification and livelihood insecurity. As rain-fed farming areas are generally poorer; these impacts lead to further economic and social marginalization of these farming communities

Impacts of climate change such as temperature increase and rainfall variability is commonly experienced by all farmers in the basin. However, the target community (i.e. rain fed farmers) exhibit higher vulnerability due to low adaptive capacity and higher sensitivity of their livelihood systems to the climatic drivers. They also have fewer social or economic safety nets (insurance, credit and strong farmer organizations) that are accessed by irrigated rice cultivators.

Besides the obvious impact on productivity of rain-fed farms, climate change induced rainfall variability aggravates hazard conditions in the basin. Such as:

¹⁴ The Mahaweli Authority is a Basin Management Authority which came in to force after the Accelerated Mahaweli Development through which the river was dammed and diverted for hydro-electricity and Irrigation.

¹⁵ Cropping Intensity in major irrigation is over 150%

1. Increased risk of landslide occurrence in the upper and middle catchments due to increased one-day heavy precipitation events
2. Increased extent, and severity of erosion and land degradation in the middle catchment due to increased one-day heavy precipitation events and longer dry periods
3. Increased risk of flash flooding in the downstream districts due to unusual monsoon precipitation
4. Longer and more frequent drought incidents in the lower catchment due to increased temperature and delayed monsoons
- 5.

Target Farm Families	Land Holding	Land Tenure	Livelihood Assets	Livelihood Strategies
Walapane DSD Medirigiriya DSD	0.5-1.1 Ha	-Privately owned 25% -Long term Government permits 40% - Short-term conditional permits 28% -Squatters/ Landless 7%	-Land -Basic agricultural implements -Subsidised fertilizer and government support services -Farm animals	Seasonal cultivators Migrant labour during off-season Women employed in farm work
Major Irrigated areas under Mahaweli Development Scheme	0.2-0.3 Ha homestead and 1 Ha irrigated farmland	-Long term government lease	-Land -Water -Tractors, harvestors -Facilities and services of the Mahaweli Basin Management Authority -Banking and insurance services -Marketing support	Two major crop seasons are cultivated Cash crop cultivation Agricultural processing

Source: Amarasinghe, Samad and Anputhas, *Spatial Clustering of Rural Poverty and Food Insecurity in Sri Lanka* IWMI

Irrigation and Agriculture: A Traditional Adaptation Measure in Modern Times

Availability of land and water are crucial factors for poor people's livelihoods. Substantial intra-annual variations of rainfall severely constrain productive agriculture in many areas of Sri Lanka.¹⁶ Generally a small quantity of irrigation is required to tide over water deficits in Maha or the main season, while irrigation is a must for agriculture in Yala or the minor season. Thus access to irrigation infrastructure is considered necessary for poverty alleviation in rural areas.¹⁷

Sri Lanka has a rich hydraulic history. The country's irrigated rice production is a case study of how climatic conditions were overcome by careful planning of land and water management. Historical records indicate that Sri Lanka even exported rice elsewhere in Asia over 1000 years ago¹⁸.

The country has around 200 major and medium scale irrigation reservoirs and 35000 village irrigation systems¹⁹ which have lasted many centuries storing/carrying water for cultivation and other purposes. These were the centers of ancient village settlements and served to maintain ground water levels in addition to supporting irrigated agriculture. It is believed that these reservoirs played a key role in sustaining communities through periods of long drought.²⁰

Cascade systems are clusters of small village tanks interconnected for sustainability and improved downstream productivity. The main elements of a cascade system are the watershed boundary of the meso catchment, the individual micro catchments of the small tanks and the main valley and side valleys where irrigated agriculture is practiced. (See Figure 6 below.)

Despite their important role in mitigating rainfall variability, the maintenance of small tanks has traditionally been a village-focused effort. Over the past two centuries gradual institutionalization disrupted the traditional community-centered practices of reservoir upkeep. Today the small irrigation systems are plagued with a number of defects including abandonment, siltation, invasive species and disrepair of irrigation structures. Low cropping intensity is common in village irrigation systems (CI could be as low as 80% indicating that the tank does not sustain even the full cultivation of the main season).

¹⁶ Amarasinghe, Upali et al Spatial Clustering of Rural Poverty and Food Insecurity in Sri Lanka. IWMI 2006

¹⁷ Amarasinghe, Upali et al Spatial Clustering of Rural Poverty and Food Insecurity in Sri Lanka. IWMI 2006

¹⁸ De Silva K.M A History of Sri Lanka Reprint 2010.

¹⁹ Department of Agrarian Services has mapped 35,000 functioning village irrigation systems including minor tanks or reservoirs and anicut systems. There are a further 5000 abandoned systems.

²⁰ Panabokke C.R and Sakthivadivel R. Small Tanks in Sri Lanka: Evolution, Present Status and Issues. IWMI 2005

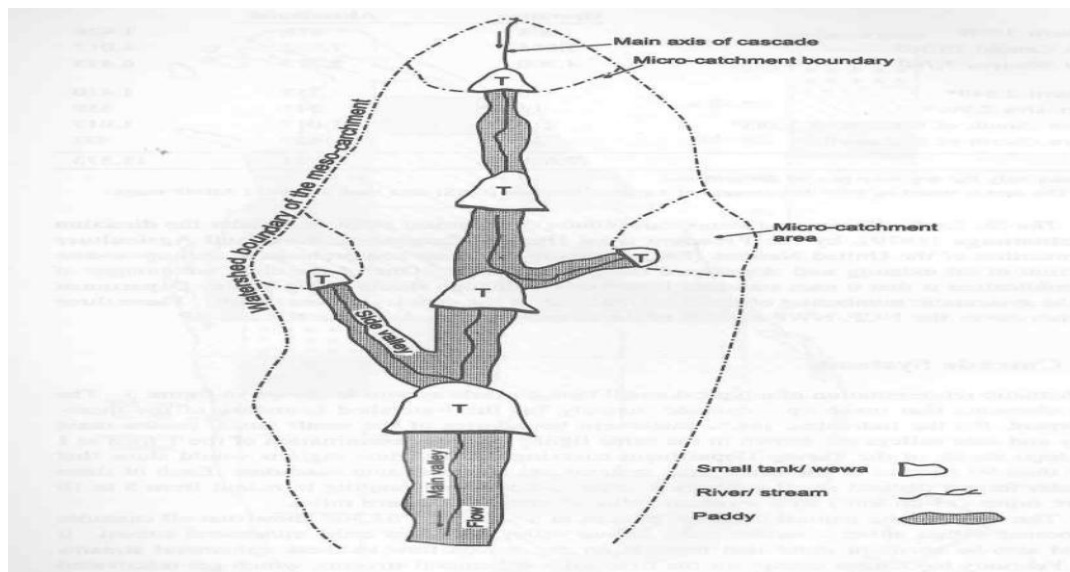


Figure 6. Schematic representation of a small tank cascade system. *Panabokke, 2005*

The Project and Target Locations

The project targets rain-dependent farming families in two hazard-prone divisional secretary divisions (DSDs) in the Mahaweli Basin identified through the vulnerability analysis detailed in Annex 9 (see Table 3 and Figure 7, below). The target groups (farm families and farmer organizations) were identified through the databases of the Department of Agrarian Development.

The overall objective of the project is to secure community livelihoods and food security against climate change-induced rainfall variability leading to longer droughts and more intense rainfall. To directly address these climate-induced impacts, the project proposes to;

1. Develop household food security and build resilient livelihoods for rain-fed farming households
2. Build institutional capacity in village, local, regional service delivery to reduce risks associated with climate-induced rainfall variability

The project will deliver tangible impacts on the ground that include increased local availability of food, livelihoods that can withstand current climate shocks, more information on risks and adaptive strategies, better connectivity to early warning and risk forecasting and, importantly, an efficient and informed agriculture extension service.

The outcomes and outputs are designed to address specific vulnerabilities faced by rain-dependent farmers; strategies to overcome dry season food and income security; introduction of diversified income sources to broad-base risk, improved water storage and irrigation to overcome uncertainty of rainfall, improved soil quality and fertility for increased production, and timely, quality agriculture advice and extension. The interventions were derived through field consultations held in three locations of the Mahaweli Basin.

The aim of the project is to deliver a menu of ‘no-regrets’²¹adaptive actions that will deliver substantial development benefits while addressing the specific climate related vulnerabilities identified through field surveys and secondary data analysis.

District/DSD	Sub watershed	Hazard exposure	Target Agrarian Service Areas	Target Population
Walapane (Nuwara Eliya District)	No 22 Beliul Oya	Highly prone to landslides in the upper elevations. Very high erosivity in the mid elevations with seasonal dry periods ²²	Munwatte Walapane Teripaha Nildandahinna Rupaha	The project will target 14039 families farming in minor and village irrigation systems
Medirigiriya (Polonnaruwa District)	No 2 Ambagaha Oya	Highly prone to drought. High exposure to climate change induced drinking water drought and irrigation drought. ²³	Pulasthigama Medirigiriya Galamuna	

Table 3. Project target areas

²¹ Low risk adaptive actions that reduce the overall vulnerability that are designed to be less sensitive to assumptions of future rate of climate change

²² Landslide Hazard Risk Maps of National Building Research Organization and Erosivity Maps of the Department of Agriculture

²³ See Drought Hazard Profile, Disaster Management Centre and Water Sector Vulnerability Assessment under the National Climate Change Strategy 2011-2016

Project implementation sites

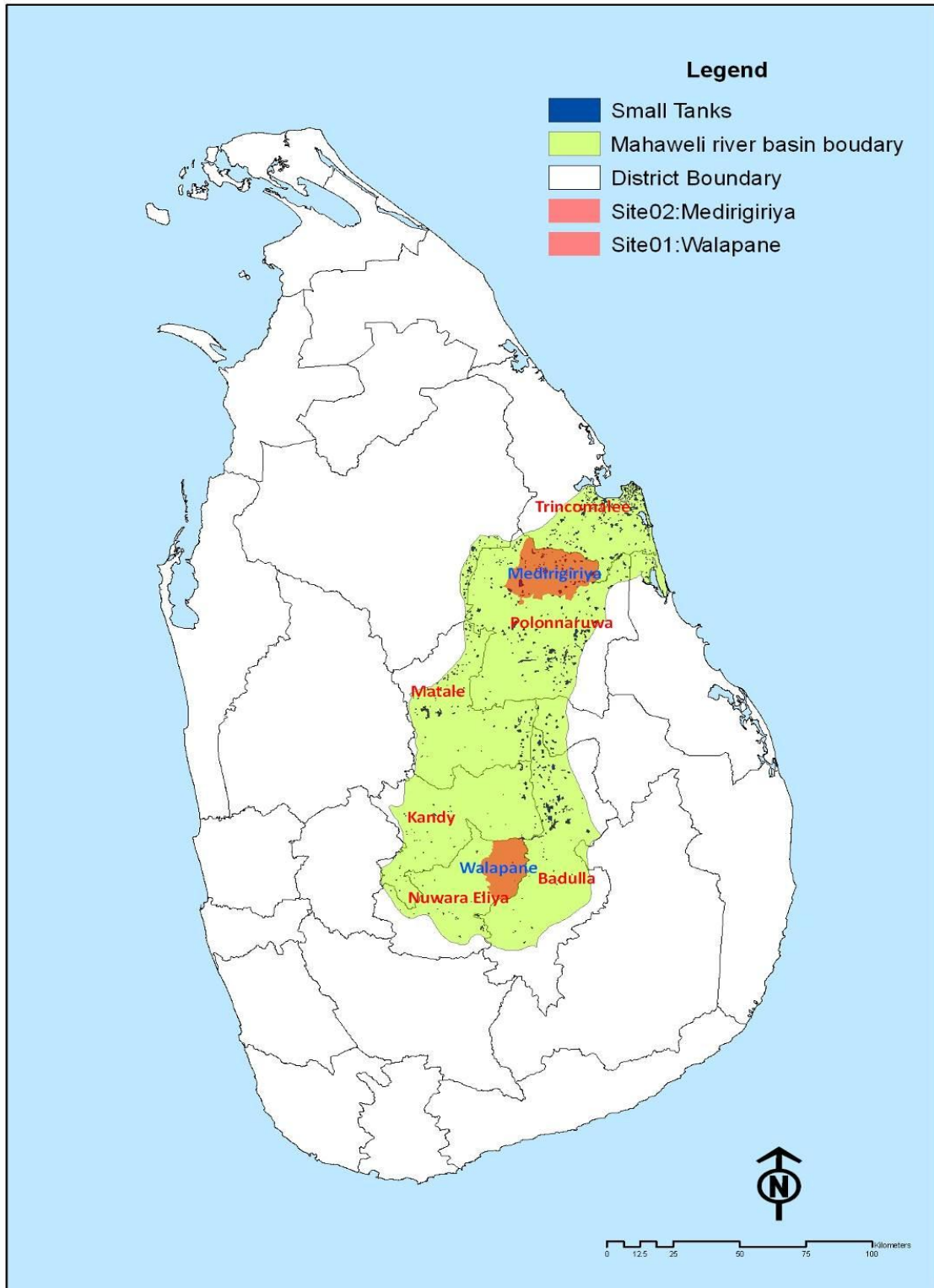


Figure 7. Map of small reservoirs in the Mahaweli Basin with project locations (DSDs) in brown

PROJECT / PROGRAMME OBJECTIVES:

The **overall goal** of the proposed project is to:

Build diversified and resilient livelihoods for marginalized farming communities in the Mahaweli River Basin through effective management of land and water resources.

Table 4: PROJECT COMPONENTS AND FINANCING

Components	Outputs	Outcomes	Budget US \$
1. Develop household food security and build resilient livelihoods for rain-fed farming households	1.1 Develop diversified home garden-based agro forestry in target DSDs to build household adaptive capacity to climate change	Diversified and strengthened livelihoods and sources of income for vulnerable farm families in minor irrigated and rain-fed areas	1,038,808
	1.2 Introduce and promote drought tolerant crop varieties and agronomic practices to counter effects of rainfall variability		265,069
	1.3 Identify and promote climate-resilient alternative income sources among rural farm households dependent on rain fed agriculture		874,000
	1.4 Promote improved post-harvest technologies as viable climate-resilient livelihood sources for farm women		875,200
	1.5 Build community assets and livelihood resources through cash-for-work to support climate risk reduction measures. ²⁴		1,024,425
Total for component			4,077,502

²⁴This output is linked to the integrated watershed management in Component 2, Output 2.3 ²⁴

Components	Outputs	Outcome	Budget
2. Build institutional capacity in village, local, regional service delivery to reduce risks associated with climate-induced rainfall variability	2.1 Train and mobilize officers at village, division and provincial level to design, and monitor local adaptation strategies	Strengthened ownership of climate risk reduction processes and increased replication potential of adaptation strategies at local level and basin/sub national level	257,110
	2.2 Strengthen farmer organizations with information, training and equipment to implement adaptation strategies		421,000
	2.3 Pilot integrated watershed management models in micro watersheds to safeguard climate sensitive livelihood assets such as land and water		1,236,104
	2.4 Risk Assessment and Adaptation Planning conducted with target communities		110,550
	2.5 Document and disseminate lessons of climate resilient livelihood development and watershed management approaches and best practices		252,696
	2.6 Design and implement early warning systems for climate induced risk of landslide and drought in Mahaweli Basin		315,000
Total for Component 2			2,592,460
TOTAL COMPONENTS			6,669,962
PROJECT EXECUTION COSTS (9.5%)			693,842
TOTAL PROJECT COST			7,363,804
PROJECT CYCLE MANAGEMENT FEE (8.5%)			625,923
AMOUNT OF FINANCING REQUESTED			7,989,727

PROJECTED CALENDAR:

Project Milestones

MILESTONES	EXPECTED DATES
Start of project Implementation	March , 2013
Midterm review	July 2014
Project closing	February, 2016
Terminal evaluation	August, 2016

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. PROJECT COMPONENTS (PARTICULARLY FOCUSING ON THE CONCRETE ADAPTATION ACTIVITIES OF THE PROJECT)

The project has two components. The first is designed to improve food and livelihood security for target farm households; the second addresses capacity gaps at village and divisional administration to support replication of the adaptive actions.

The outputs within these components were designed to address specific needs and gaps identified during stakeholder consultations- at national; basin and local level (see Annexes 5, 11 and 12 for details of consultative process). Activities are based on lessons of previous and on-going projects, and national technical agency recommendations bearing in mind the need to demonstrate tangible results over the implementation period of three years.

Component 1: Develop household food security and build resilient livelihoods for rain-fed farming households in Medirigiriya and Walapane DSDs

Outputs and Outcomes in Component 1 are fully aligned with the stated adaptation strategy of the national government to 'Establish food security in the face of climate change threats'.²⁵ The project would allow the Ministry of Environment to test the corresponding menu of actions and indicators that are included in the current National Environment Action Plan 2008-2012.²⁶ These actions include selecting and cultivating high yielding and drought tolerant rice varieties, adopting suitable land and crop management practices, adjusting rain-fed farming practices to rainfall variability, adopting a surveillance and forecasting system to measure impacts of climate change, and adjusting home gardening practices to a seasonal cropping calendar in order to reduce irrigation water demand.

The component directly addresses rainfall variability- which is the key climate change problem identified in the Basin- and the resultant impact upon and vulnerability of rain-dependent farm families.

Outputs and activities under Component 1 aim to minimize climate-induced livelihood risks and develop livelihood capital to overcome income poverty and food insecurity. The targeted DSDs are particularly vulnerable to food insecurity in the low-rainfall months of Yala (minor season) when farm work is scarce. Due to remoteness, access to markets and constraints of technology (and finances)

²⁵ Strategy 11 under meeting the Climate Change Challenge, National Green Lanka Action Plan, National Council of Sustainable Development under the Office of the President

²⁶ Under Strategy 6 to make Changes in Agriculture Practices to suit the changed climate

other livelihood options are unavailable to these farm families. There are documented instances²⁷ where families have just one small meal a day during the dry months; or forgo free medical facilities due to unavailability of funds for bus fare. Women are affected worse due to unavailability of water for domestic chores and sanitation during the dry season.

The component is designed to reach 14,039 families through 235 Farmer Organizations, to implement concrete adaptation actions (home garden development, livelihood and crop diversification and incentive payments) within the target DSDs.

There are important cross cutting benefits across the outputs. Chiefly building human and social capital for livelihood development through skills training and self-help groups, linking modern research and technology with poor farm families and strengthening local extension services by providing incentives to monitor results.

This component will address food insecurity and build household adaptive capacity through 5 key outputs;

Output 1.1: Develop diversified home garden-based agro forestry in target DSDs to build household adaptive capacity to climate change

This output will develop farm home gardens with a mix of annual and perennial multi-purpose species for household food security and income. Home gardens are well adapted agro-forestry systems that cover about 14% of the total land area of the country²⁸. There are several successful case studies of improved home garden models implemented through the GEF Small Grants Projects in the project area as well as in comparable farming areas elsewhere in Sri Lanka. These home gardens adopt space saving techniques, organic inputs, natural farming methods, hardy native species with low irrigation requirement and simple technologies for seed conservation. Home garden produce supports household nutrition, helps families to withstand economic shocks (seasonal change in vegetable prices) and allows women to earn additional income by selling excess production²⁹.

In the target area homesteads vary from 0.09 Ha to 0.3 Ha. This is considerable space for home garden development with a mix of perennials and annuals, meeting food, fodder, fuel and timber requirements of a household.

Home garden diversity is an important indicator of household level adaptive capacity. The higher the number of multi-purpose tree species available in home gardens, the better chances of meeting climate challenges. A healthy mix of perennials and annuals, vegetable, fruit, spice and timber/fuel wood species allows households to withstand rainfall variability and prolonged drought.

Home gardens already exist in the project area. However due to several factors, they are not productive or planned. Previous experience has demonstrated that awareness, training, inputs and seedlings and some monitoring can transform the baseline practice in to a productive home-garden that provides food, and non-food benefits.

This component would be implemented by Farmer Organizations (FO) with support from agriculture/agrarian extension officers in villages (see the description of Farmer Organizations in Annex 14, including their relationship with communities decision-making and implementation roll.)

²⁷ Baseline Survey and Case Studies of CBA project implemented by GEF SGP in the Mahaweli Basin

²⁸ Forest Department Statistics

²⁹ Marambe et al; Farmer Perception and Adaptation to Climate Change in Home Gardens of Sri Lanka. Faculty of Agriculture, University of Peradeniya.

Specific activities under this Output include:

- Survey the current food consumption and nutrition practices of sample households in the target areas
- Assess water availability and soil conditions to determine the best-suited home garden species mix.
- On the basis of this information, develop a measurable food consumption index for the project target areas
- Training on home garden planning and organic input production in all 235 FOs targeting 14039 families
- Seeds, equipment (hand tools) and planting material (suitable for the respective agro-ecological regions) provided to 14039 rain-fed farming households. Organic farming tool kit (includes barrels, buckets) provided to all selected households
- Monitoring at household level by FO and village level implementation committee

Output 1.2: Introduce and promote drought tolerant crop varieties and agronomic practices to counter effects of rainfall variability

The National Environment Action Plan prioritizes the development and dissemination of drought tolerant crops, especially rice, in all farming areas with drought hazard³⁰. The Department of Agriculture has also invested in research and development of ultra-short term rice varieties with lower irrigation water demand. Several universities are conducting field studies with the Department of Agriculture on traditional rice varieties³¹ that could meet the challenge of prolonged droughts and reduced irrigation availability.

This output aims to increase farm productivity in partnership with national technical agencies and allied research institutes. Drought-tolerant crops such as maize, mung bean, sorghum, and ground nut will be introduced. These can be cultivated in both seasons in village irrigation schemes under uncertain rainfall conditions. Improved agronomic practices will also be a focus, including integrated pest and weed management, using rainfall for speedy land preparation, and evaporation control by mulching.

Specific activities under this output include:

- Developing a field training module for drought tolerant agriculture with active participation of field extension officers, FO leaders and technical experts
- Training field extension officers and FO leaders in the target area covering 250 officials and 470 farmers (two members from each FO)
- Conducting field trials with 500 selected farmers on crop varieties and yield, lean season crop mixes and intercropping models
- Building community seed banks for expanded cultivation of successful field-tested varieties

³⁰ NEAP 2008-2012. Climate Change Sector. Strategy 6 to make Changes in Agriculture Practices to suit the changed climate

³¹ These are pre-green revolution ‘non-improved’ varieties which are not popularly cultivated today, but found to have climate resilient properties

Output 1.3: Identify and promote climate-resilient alternate income sources among rural farm households dependent on rain-fed agriculture

Alternate and climate-resilient income sources were identified by Government and community stakeholders as a priority to develop household adaptive capacity³². Alternate livelihoods are important to the target farming areas in order to supplement agricultural livelihood, especially during the long dry spell that coincides with the minor rainfall season or Yala from May to September. Alternative livelihoods will allow communities to withstand climatic stresses such as prolonged drought and intense rainfall events.

While a large menu of livelihood options were considered³³, the proposed project focuses on livelihood options that a) are socially accepted, b) can also contribute to food security and nutrition and c) have good market potential (such as inland fisheries, livestock farming and poultry for eggs, bee keeping and cashew/coconut production – see table below).

Possible alternate livelihoods	Supporting National Technical Agency	Inputs	Initial Market Assessment
Bee Keeping	Department of Agriculture	Bee boxes Extension support	Has good demand depending on quality
Livestock Farming	Ministry of Livestock Industry Milk Industries of Sri Lanka (MILCO)	Veterinary services Cow sheds Milk cans	Good demand and good price in both DSDs.
Inland Fisheries	National Aquatic Resources Development Authority	Stocking village reservoirs and tanks with fingerlings Fishing tackle	Good potential and regional demand exist for certain varieties. Good avenue to supplement protein in household diet.
Cashew Production	Cashew Corporation	Plants and fertilizer Extension Support	High value and good demand cash crops that thrive in dry regions
Spice Production	Department of Minor Export Crops, Moa	Plants and fertilizer Extension Support	High value and good demand cash crops for export market and high processing potential
Coconut Production	Coconut Development Board	Plants and fertilizer Extension Support	High demand for coconut and allied products nationally and locally.

Specific activities under this output include:

- Technical assessment of climate resilience of selected alternate livelihoods by relevant national agencies and their regional counterparts
- Training (skills development including small business management) and
- Inputs (equipment related to livelihood of choice) to selected members of the 235 FOs based on viable market oriented proposals received and approved by the village level implementing and monitoring committee
- Linking other viable proposals with micro-credit programs implemented by state or cooperative banks

³²In field-level stakeholder meetings and through CBA projects being implemented in similar rain-fed communities

³³ At stakeholder consultations and meetings with technical agencies such as Agriculture Department and Department of Agrarian Development

With regard to support to FOs above, individual or FO proposals will be submitted to Divisional Project Monitoring Committees which will use criteria for awarding successful (these criteria will be further developed during the formation of Divisional Level Monitoring Committees):

1. Degree to which current livelihoods are impacted by climate change
2. Potential for inputs and markets to be disrupted by climate change or variability
3. FO membership and FO guarantee of beneficiary
4. Current entrepreneurship experience and skills
5. Sustainably and locally sourced inputs
6. Market availability/access and potential
7. Technology requirements and the ability of government extension services to deliver in the area
8. Profitability of the enterprise
9. Risks identified and insurance considered
10. Number of employment opportunities generated by the venture
11. Ability of the applicant to contribute at least 25% of the venture funds

Output 1.4: Promote improved post-harvest technologies as viable climate-resilient livelihood sources for farm women

This output is targeted at developing avenues of income for rural women through provision of knowledge, skills, tools and market access.

Post-harvest losses in Sri Lanka are very high – sometimes over 40%.³⁴ Prevention of such huge losses in storage and transportation is a vital part of the food security plan within the national development framework.³⁵ WFP is engaged in developing post-harvest technologies in emerging rural enterprises in the post-conflict areas of Sri Lanka. The project will introduce post-harvest technologies as an adaptive strategy that contributes to; a) climate resilient livelihoods for women and b) improved household incomes, and resultant increased adaptive capacity. Demonstrated technology, market networks and effective self-help groups will form a cost-effective platform³⁶ on which the investments in this output could lead to spontaneous adaptive actions at the DSD level or even a wider landscape.

The strategy employed will closely resemble WFPs Purchase for Progress (P4P) program implemented in the post conflict districts of the northern and eastern provinces. At each Agrarian Services Centre (5 in Walapane and 3 in Medirigiriya) a post-harvest technology center will be established and staffed. This center will produce training material, conduct seminars and demonstrations on identified post-harvest technologies to farm women, organized in to self- help groups of five or six members each. There are a number of local micro-finance options that are available to rural women. This center will disseminate information on micro finance options and establish linkage with marketing/purchasing networks (especially the Mahaweli Authority network).

Eight post-harvest villages will be established (one per Agrarian Service Area) where all the elements of technology, financing and marketing will be fully demonstrated. Post-harvest technologies introduced will be closely linked to the primary crop production of these DSDs and the alternative livelihoods introduced through the project. The other DSDs will benefit from project seminars and demonstrations, as well as from the marketing links established through the project.

³⁴ IFAD Country Report on Sri Lanka. www.IFAD.org

³⁵ Mahinda Chintana Vision for the Future 2010 and Mahinda Chintana 10 year Horizon Development Framework

³⁶ Premaratne, S.P Rural Farming and Small Enterprises, Agriculture and Rural Development in Sri Lanka. Department of Economics, University of Colombo 2010

There are two main areas of intervention:

- 1) Developing improved methods of food storage, especially rice and grains, at household level
- 2) Food processing and value addition of primary agricultural products for 760 farm women in 8 villages organized in to 152 small groups and linked with local livelihood incentive programs.

Specific activities include:

- Establishing post-harvest centers and technology demonstrations (grain storage options, simple equipment for coconut oil extraction, milling of grains, fruit and vegetable dehydration, cashew and spice drying, and fish filleting/preservation) in 8 ASCs and training of staff climate resilient livelihood development
- Establishing and/or strengthening existing self-help groups in selected villages
- Training and equipment for above mentioned post-harvest technologies provided to the established self-help groups

Output 1.5: Build community assets and livelihood resources through cash-for-work to support climate risk reduction measures.

Payments and incentives will be provided to farm families in the micro watersheds to enable their participation in watershed management activities identified in Output 2.3. The payment scheme would be structured to government-approved rates and implemented during minor rainfall season (Yala season) when most rain-dependent farmers are without employment and income.

1500 households will benefit from cash-for-work schemes in two micro catchments in Medirigiriya and Walapane to carry out natural resource management and climate risk reduction activities which could include:

- Catchment reforestation and stream bank conservation involving tree planting and maintenance of these plants on state-owned lands in the catchment
- Slope stabilization and erosion control involved creating erosion traps such as dykes, stone hedges, trenches and live hedgerows on private and communal lands
- Minor maintenance work on the irrigation systems such as cleaning canals, turfing bunds, clearing weed growth inside reservoirs and manually dredging silted areas

Structure of Incentive Payments

Type of Activity	Rate	Monitored by
Stone Bunds	US \$1.05/ linear metre	Agriculture Inspector
Trenches	US \$ 0.61/ linear metre	Agriculture Inspector
Live Hedgerows	US \$ 0.22/ linear metre	Agriculture Inspector
Tree Planting/reforestation	US \$ 7 per 8-hour work day	Divisional Forest Officer
Minor Irrigation Repairs	US \$ 7 per 8-hour work day	Divisional Officer, DoAD

Specific activities include:

- Incentive scheme for soil conservation\ irrigation maintenance and community reforestation
- Nurseries established to propagate tolerant native species for catchment, stream bank reforestation and community forestry timber wood lots
- Providing tools and equipment such as pickaxes, hoes, spades, wheelbarrows for to participating households
- Design local a sustainable financing mechanism by third year

Component 2: Build institutional capacity in village, local, regional service delivery to reduce risks associated with climate-induced rainfall variability

This component will provide the necessary institutional strengthening to carry out outputs and activities in Component 1, develop additional risk reduction measures such as early warning/hazard forecasting systems and build knowledge and capacity for replication/mainstreaming of project lessons into regular programs government service delivery.

This component will target all rain-fed farming households (14,039) in both DSDs through local and village service delivery officials (primarily agriculture, agrarian services and disaster management) and Farmer Organizations. The capacity building and awareness creation outputs in Component 2 have been designed through extensive local-level discussion with farmer groups, extension officials and local development officials including divisional administrators.

Knowledge generation (feedback from the field) and knowledge management are separate outputs in Component 2 with specific target groups, such as national policy, media and other rain-fed farming communities within Basin. However, awareness and knowledge are integral to project activities. Most outputs are designed to incorporate climate change awareness, risk communication and climate risk screening for development. This is true of livelihood training (for farm families) and service delivery training (for officials and Farmer Organizations) in both components. Specific inputs (community exchange visits) are targeted towards replication of the model(s) elsewhere in the Basin.

The component includes six outputs:

Output 2.1: Train and mobilize officers at village, division and provincial level to design and monitor local adaptation strategies

This output targets officials working as field extension officers in Agriculture, Agrarian Development, Mahaweli Authority, Disaster Management, Forest Department and village administrative officials. The aim is to build capacity of these officials to identify climate threats, support the development of local adaptation strategies, and to introduce adaptive measures as part of the extension services and to monitor localized vulnerabilities in their geographical regions.

The need for such specialized capacity building emerged as a priority need in consultations held with local officials during project design (please see Annexes 11 and 12)

There are a number of village development initiatives being implemented by government (centrally and provincially) targeting socio-economic upliftment of these DSDs. The design of village development plans and prioritizing of development initiatives should ideally be screened for climate risks. If local officials, especially village/divisional administration, are aware of climate change risks and adaptation strategies such planning processes could be more sustainable in the long run.

Another aspect to the training is to use national-level hazard and risk maps to inform local development decisions. The landslide risk map, drought hazard map and the erosivity map are vested with different national technical agencies. Many of these mapping exercises have no local significance, or can be applied practically to local inform local development decision making. This is a gap that will be addressed through both training and providing IT equipment/associated skills to each Agrarian Service Centre in project areas.

Specific activities under this output include:

- Developing a training module for climate change, impacts on agriculture and natural resources, and climate-proofing rural development with government and FO participation
- Six Training of Trainers (TOTs) for climate risk screening in agriculture and natural resource management developed and conducted
- 250 officials at provincial, divisional and village level engaged in rural development are trained in climate proofing agriculture and natural resource management
- Equipment and tools (GIS software, localized hazard maps, vulnerability assessment tools) for climate risk management provided to eight Agrarian Service Centers

Output 2.2: Strengthen Farmer Organizations with information, training and equipment to implement adaptation strategies

This output will provide the necessary foundation to deliver most of the project results. Farmer Organization strengthening is the key to effective project delivery on the ground (see Annex 14 for Farmer Organization structure and mandate). As mentioned earlier FOs are the key community based organization through which farm families under each minor irrigation scheme/ each village will be reached. FOs are legally mandated with the upkeep and maintenance of small irrigation infrastructure, and are registered with the Department of Agrarian Development. The project will ensure that every target FO is registered, with elected office bearers and an established bank account.

Importantly, every FO in the target DSDs will develop a management plan for small-scale village irrigation structures under their purview. These plans will be guided by the village level implementation committee set up through the project and technically whetted by area Agrarian Services Centre and implemented through community and local government support. Multiple funding sources for the upkeep and maintenance of such irrigation structures would be developed-through membership contribution, through development programs implemented by national and provincial governments and technical agency budgets.

Farmer Organization leadership will receive awareness and training in climate risk identification and adaptation planning. FO leaders will be trained in the methodology of conducting Vulnerability Reduction Assessment (VRA)³⁷ so that they can conduct community-level VRA in each target village at the beginning and end of the project cycle. VRA in this project serves as a vehicle for household level awareness as well as a tool to plan adaptation actions and measure their effectiveness.

Specific activities under this output include:

- A survey of registered and unregistered FOs in the eight Agrarian Services Areas of target DSDs
- Participatory and technically sound management plans developed for every minor irrigation scheme with FO

³⁷VRA is a Community Based Adaptation tool with multiple uses- intervention targeting, results monitoring, assessing barriers and capacities and imparting awareness on climate risks. The tool is based on four composite indicators that measure current and future climate risks, magnitude of barriers and willingness to adapt. The same questions posed over 3-4 community meetings during implementation and the evaluation of the numerical scores that are derived, indicate if a project is on track at the community level.

- Ensuring that each plan has a sustainable financing mechanism for the upkeep of irrigation structures
- Training of FOs on method of conducting vulnerability reduction assessments (VRA) among member households

Output 2.3: Pilot integrated watershed management models in micro watersheds to safeguard climate-sensitive livelihood assets such as land and water

This output will demonstrate community based watershed management and adaptation planning. The output will be implemented in two micro catchments/watersheds within the main sub watersheds in the focus DSDs.

Micro catchments are already identified by the GIS unit of the Department of Agrarian Development (see below and map in Annex 4). However a number of ground-level surveys would need to be completed before identifying accurately the watershed boundaries, number of farm families and number of village irrigation systems within each micro catchment.

DSD	Sub Watershed	Micro Watershed	Area	No of Farm Families*
Walapane	BeliulOya (no 22)	Cascade no 1 and 2	202 sq. km	950
Medirigiriya	Ambagaha Oya (no 2)	Anicut clusters 6 and 7	153 sq.km	550

*provisional estimate

The aim is to restore irrigation systems, especially traditional village reservoir and anicut cascades, to their full potential. The climate adaptation benefit is that a functioning and healthy micro watershed with its associated water management structures would provide vulnerable farm families with sufficient irrigation for one full season and for part of the lean (*Yala*) season. To achieve this, several inter-related land and water conservation activities would be implemented.

A village irrigation cascade/ cluster system (see Figure 6) is a holistic water management system that was adopted millennia ago to overcome the single-monsoon phenomena in the dry and dry-intermediate zones. A typical cascade system has a conserved catchment giving good water yield for most of the year, inter-connected reservoirs that serve to augment downstream irrigation availability and silt traps, sedimentation ponds to sustain reservoir capacity.

Due to lack of management and catchment deforestation, small streams that supply irrigation and drinking water to mid elevation villages dry up fast. In the lower elevations, siltation and high evaporation rate reduce village irrigation reservoirs to mere mud pits. Ground water depletes and wells dry up.

The adaptation advantage of restoring as many features of the traditional system as possible is to increase water yield in a system and maximize the potential of village-level irrigation. In turn, this would increase cropping intensity and extent cultivated under each scheme.

Specific activities include:

- Survey and mapping of micro watershed, including the land-use, erosivity and contours of farm holdings in the area (see Figure 8 for a prototype plot-level survey plan from an on-going CBA project)
- Planning and technical oversight by line agencies and technical experts (see table below)

- Minor repairs and maintenance work on identified irrigation structures within the micro catchment to improve water yield and dry season storage
-

Community Based Conservation Activity	Line Technical Agency
Soil conservation through physical (drains, bunds) and biological (live hedgerows) means	Agriculture Department
Stream bank conservation through reforestation	Agrarian Services Department/ Forest Department
Conserving catchment forests and reforesting abandoned state lands through community forestry	Forest Department
Improving ground water infiltration by establishing, rehabilitating small ponds associated with irrigation systems	Agrarian Services Department
Small repairs and maintenance of irrigation and water management structures	Agrarian Services Department

DATA SHEET

Name of farmer : *A.G. Podimona* Village: *Diyalinda* Extent : *2 Ac.*

Present situation of soil erosion:
 Highly eroded: Moderately eroded : ✓ Slightly eroded :

Soil conservation measures:

SC MEASURE	EXISTING	RECOMMENDED
Stone bunds	✓	✓
SALT	✓	✓
Lock & Spill drains		
Soil bunds		
Terraces		

Recommended Crops: *Yala* *Maha*

Annual *OFC / Vegetables*

Perennial *Coconut, Banana, Mango*

— SALT existing

— SALT to be established

— Stone bund existing

— Stone bund to be established

— Lock & Spill drain existing

— Lock & Spill drain to be established

Slope Class %:	1. 0-10	4. 31-40	7. Over 60 ✓
	2. 11-20	5. 41-50	
	3. 21-30	6. 51-60	✓

Figure 8. Land Survey Data Sheet for one household showing existing and new soil conservation structures and recommended crops

Output 2.4: Risk Assessment and Adaptation Planning conducted with target communities

This output will support evidence-based knowledge management and decision-making by providing a feedback from the field.

The project will adapt UNDP's Vulnerability Reduction Assessment methodology (see Annex 13) as a means of taking climate risk information to communities while assessing their context-specific vulnerability to these risks. The tool would also allow for participatory adaptation planning where

individual Farmer Organizations; or a cluster of Farmer Organizations can commonly evaluate risk and prioritize adaptive actions.

This would involve conducting village/ FO level VRAs with the participation of all 14039 households at three stages during project cycle- at the start, at mid-point (18-22 months) and at the end of activity implementation. The VRAs would be conducted by FO officials with support of local extension officers.

Specific activities include:

- Training of FOs on conducting VRA among member households
- Conducting VRAs in every target FO by involving one member from every target household
- Evaluating results and prioritizing adaptive actions

Output 2.5: Document and disseminate lessons of climate resilient community-based watershed management

Building on the previous Output's assessments and reviews communications products will be developed to address specific knowledge management needs of the project. This includes documenting and disseminating lessons, improved media attention on the adaptation agenda with focus on the project area and influencing policy through project learning.

This project, as stated earlier, provides the Ministry of Environment with a platform to field tests its own strategies and actions/recommendations for climate change adaptation. This output would therefore serve as a necessary feedback mechanism through which successful practices and strategies are endorsed and up-scaled in future action plans.

Media attention on project impacts and results is an essential means of broadcasting replicable models to other regions, provinces and districts with similar issues. Media publicity will not only inform general public but also provide a channel to other government agencies, especially Finance Ministry, Department of National Planning, Government Poverty Alleviation Programs and other development sector stakeholders. This output will support organized visits to the project areas for Project National Steering Committee (NPSC) members and invited officials of national planning, Ministry of Environment etc. Targeted exchange visits from adjacent DSDs and elsewhere in the basin will support immediate replication of the model or some of its more successful elements in other vulnerable areas.

Specific activities under this output include:

- Developing 10 case studies/ lessons learnt on project strategies, approaches and pilots
- Preparing 5 policy guidance papers in tandem with these case studies highlighting the important aspects of development policy influence
- A media campaign targeting both print and electronic media (and also regional media in local languages) generating at least 50 media reports on the project
- Workshops and seminars to inform policy development at provincial and national level
- 25 exchange visits from adjacent communities to promote replication potential and bring the adaptation focus in to local development planning processes, especially village development plans

Output 2.6: Design and implement early warning systems for climate induced risk of landslide and drought in Mahaweli Basin

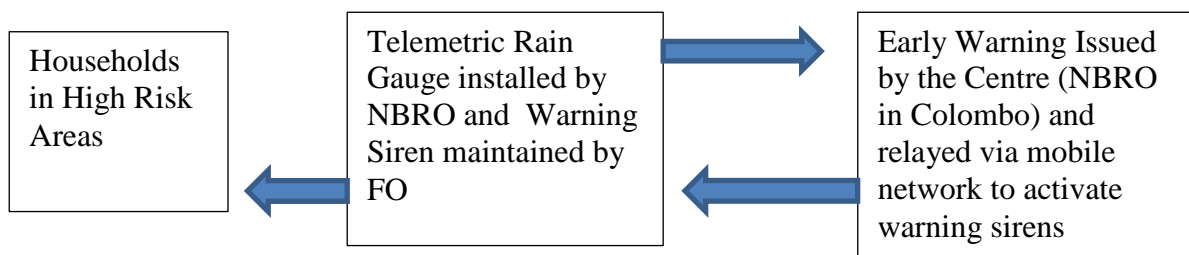
The output was designed to address specific adaptation needs in project target areas arising from 1) lack of a forecasting system that could forewarn farmers to change cropping patterns and crop

choice and 2) vulnerability of households living in identified landslide prone areas of the Walapane DSD. The aim is to disseminate sufficient early warning on significant diversion of the expected rainfall pattern so communities can successfully adjust their behavior pattern to reduce risk and respond to disaster signals. The project, together with the National Disaster Management Centre and its district offices, will build farm communities' capacity to evaluate their risk and adopt appropriate behavior change to mitigate disaster exposure, especially risk to livelihood assets such as land and irrigation systems. The early warning systems proposed by this output are directly related to safeguarding livelihood assets, especially rain-fed farmlands, from severe fluctuations of expected weather patterns during the two main cultivation seasons.

Landslide EWS for Walapane

Walapane DSD in the mid-elevations (200m-1500m) is highly prone to landslides due to slope, climate and geology. A number of project target households are located in areas with known landslide risk. Landslide risk areas have already been mapped by the National Building Research Organization (NBRO) and information at village level is available with the Disaster Management Centre and with each Divisional Secretariat. The project will link remote landslide prone villages with early warning information generated by the Centre through the installation of telemetric rain gauges and warning sirens. These will issue warning to evacuation in times of excessive rainfall, allowing people adequate response time to save livestock and other livelihood assets.

Already 02 warning sirens linked to telemetric rain gauges are operational in the DSD, but without widespread coverage to Project hopes to expand the coverage of this EWS by 15 more units covering high-risk areas of the DSD more fully.



Drought EWS for Medirigiriya

For drought-prone Medirigiriya and adjacent DSDs, the project pilot and implement a forecast communication model that would enable farmers to change cropping and water use practices ahead of time. The generation of seasonal forecasts for the two main cropping seasons is already underway through a Disaster Management Centre coordinated committee that brings together Departments of Meteorology, Irrigation and Agriculture. The project hopes to expand the scope of this committee to engage the village level network of the Department of Agrarian Development to disseminate the forecasts and possible adaptation measures recommended by the Agriculture and Irrigation Departments.

A previous project in the Mahaweli Basin generated seasonal predictions based on climatic information for a decision-making forum consisting of technical representatives of line agencies such as the Mahaweli Authority, Water Supply Board and Irrigation Department.³⁸ This project, in 2001, first trialed application of climate modeling and seasonal forecasting to support farmers and

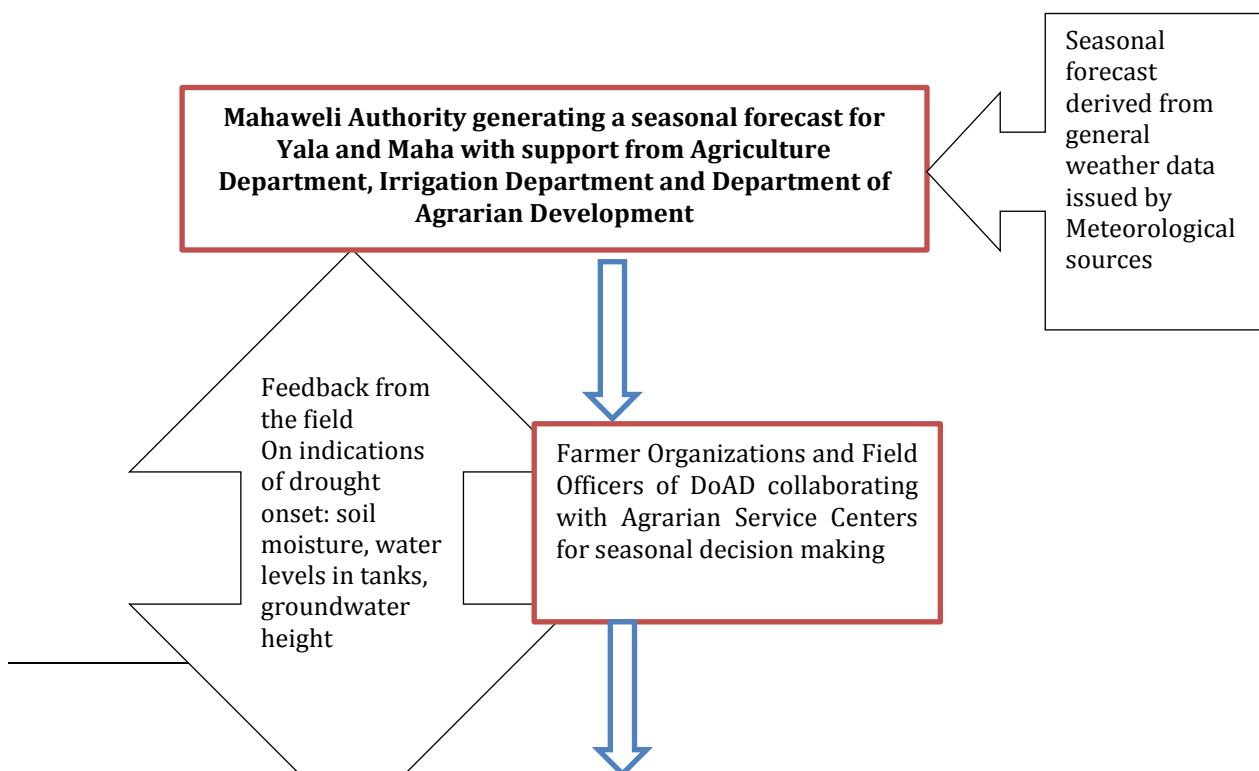
³⁸ Foundation for Climate, Environment and Technology Project Report on Seasonal Climate Information for Water and Environmental Management in the Mahaweli Basin. www.climate.lk

farmer entrepreneurs in the Mahaweli Development Scheme. The main aims were to (1) to identify necessary climate forecasts and information; (2) to develop hydro-climatic models and analytical tools and (3) to generate a framework to support decision-making. Mahaweli Authority and the Department of Irrigation are key members of this committee and used the climate data to support the seasonal water allocation decisions of the Mahaweli Development Scheme.³⁹

The project (see Annex 16 for more details on Forecasts) still generates seasonal climate information, however dissemination model remains weak. Further it was suggested that a drought prediction system should incorporate feedback from the field as well.⁴⁰ The project envisages conversion of Agro-meteorological information generated by the Department of Agriculture and Department of Meteorology in to communicable messages understood by farmers. This is expected to facilitate behavior change leading to better adaptation and preparedness for seasonal changes in climatic patterns. The Department of Agriculture will support the activity by prescribing suited crops and cropping alternatives to mitigate impacts of climate-induced variable rainfall. It is envisaged that at least two seasonal predictions will be tested out during the second and third years of the project- one for Yala (April) and Maha (Sept-Oct). These seasonal forecasts meet the need expressed by both farmers and extension officers of weather-related timely information. It strengthens other production related outputs especially, 1.1 and 1.2, and if successfully implemented could reduce risk of crop failure by almost 60%.⁴¹

The output has three specific activities:

- Strengthening of climatic data generation and sharing through NASCOM partner agencies, Department of Agriculture and Department of Agrarian Services
- A communication model (see below) that carries seasonal climate information to farmers together with practical adaptation measures
- Installation of 15 telemetric rain-gauges with warning sirens in high landslide risk-prone areas in Walapane Division



³⁹ Water resources are shared between hydro-electricity needs and irrigation needs through a water allocation mechanism governed by the Mahaweli Authority

⁴⁰ Director General of Meteorology at a stakeholder discussion

⁴¹ Zubair, L, Perera R and Manthirithilake H. Using Climate Information for Mahaweli River Basin management, 2007

Farmers making decisions about crop type and cultivation dates

Figure 9: Proposed communication model for drought early warning

B. ECONOMIC, SOCIAL AND ENVIRONMENTAL BENEFITS

The project strategy has taken to account the physical and economic vulnerability of rain-dependent farm families and will deliver a number of substantive socio-economic benefits.

For example, Component 1 will deliver specific household-level benefits such as seeds, tools, equipment, incentive payments and information. Component 2 will deliver benefits at the broader community and local service delivery levels, resulting in stronger Farmer Organizations, better informed extension officials, and timely risk information communication.

The project will deliver **social benefits** such as:

1. Improved food, nutrition and water security at household level
2. Increased capacity to manage common and household natural assets
3. Increased women's participation and income generation
4. Community organization and social cohesion through strong farmer organizations, ameliorating potential for conflict
5. Effective and informed service delivery to farm households
6. Community empowerment through information, participatory planning and risk mapping

One of the main benefits would be a measurable improvement of food consumption and nutrition. Rural under-nutrition, reflected in the percentage of underweight children (17% national; 22% rural: 30% estate)⁴² remains an indicator of household level food insecurity and income. In areas where successful home garden projects have been implemented the level of household nutrition has improved measurably.⁴³ There are documented instances where household income was supplemented as well.⁴⁴ The general rule of thumb is that investment in a 'well-maintained' home garden would be recovered fully within 3 years (18-36 months depending on the species mix)⁴⁵. It is a low-cost, low-technology strategy to overcome food insecurity that delivers a range of other environmental and climatic benefits, including increased tree cover in non-forested areas which is a part of the National Forest Policy.

⁴² MDG Country Report, Department of Census and Statistics, 2008

⁴³ Case Studies produced by GEF SGP Country Program

⁴⁴ The average monthly income, Rs. 3000 per month before the project started, increased on average by Rs. 824 with the introduction of income generation activities such as vegetable cultivation, seed collecting programs, ginger and turmeric cultivation, and plant nursery development. Counterpart International/ Forest Gardens of Sri Lanka. <http://www.counterpart.org/our-work/projects/forest-gardens-in-sri-lanka>

⁴⁵ Assuming that initial investment is US\$70 for organic home garden inputs. Cost recovery factors in savings in household food purchase, savings in chemical inputs, sale of produce and seeds, agro-processing at household level

Restoring irrigation structures and common assets such as catchment forests, stream banks through participatory planning will result in greater community-ownership of such interventions. Participatory management will bring together earlier disconnected service delivery closer to the village and Farmer Organization (FO). Through collective implementation of activities the project will aim to dissipate current level of tension and dissatisfaction with agriculture service delivery. Social cohesion within the village will result through collective decision-making on adaptive strategies and equitable support for home gardens and livelihoods.

Rural extension services are notably weak in Sri Lanka resulting in farmers depending on the input trader as the main source of information.⁴⁶ The project will support the revival of exiting service delivery in target areas by providing information, training, equipment, and monitoring support. This intervention will motivate village extension officials and restore farmer faith in the government's extension services.

The main **Economic benefits** derived from the project are:

1. Increased incomes through project related activities such as alternate livelihoods, increased crop production and cash-for-work *for target community*
2. Increased cropping intensity and extent cultivated, resulting in increased production in small irrigation systems *in target locations*
3. Reduced post-harvest losses and better food storage *in target households*
4. Home garden-based agro produce (value added) developed *in target households*
5. Women in vulnerable households will be encouraged to undertake food-based cottage industry *in target area*
6. Increased access to micro finance and skills for business management for women
7. Reduction in economic vulnerability during minor rainfall season in households *in target area*

There is national demand for diversified drought tolerant crops such as maize, sorghum, mung-bean and groundnut. The bulk of these are imported to the country at present and local production is encouraged. Livestock is an attractive alternate livelihood of choice for many farm families and could be well integrated in to home garden development. The price for raw milk is stable (unlike price of vegetable and other crops) and can provide a regular daily income of around U\$3/per cow.⁴⁷ This is significant for farm families who are without income opportunity over the minor rainfall season. Milk, cashew and coconut can be processed to a variety of high-value products (yoghurt, curd, spiced cashew and coconut oil) through local cottage industry run by women. These products will have a high demand in the local market.

Incentive payments for natural resources conservation will also address *Yala* season food and income insecurity. WFP, through the Government and NGOs, will use its regular modalities for delivering food or cash incentives to families engaged in soil conservation, reforestation catchments and minor repairs in irrigation structures. This incentive scheme constitutes just 17% of Component 1 budget, and will deliver direct income support 1500 households and wide ranging environmental benefits that cannot be readily monetized at present. Income from incentive payments for soil conservation and slope stabilization can range between \$55-\$75 per month per household⁴⁸, depending on plot-size, nature of work⁴⁹ and number of members engaged in such activity.

⁴⁶ De Silva, CJ, Agricultural Extension in Domestic Sector; Problems, Weaknesses and Suggestions for Improvement. Sri Lanka Journal of Agrarian Studies Vol 15, No 1 2011

⁴⁷ From field monitoring reports GEF SGP's Pilot Community Adaptation Project

⁴⁸ From field monitoring reports GEF SGP's Pilot Community Adaptation Project

⁴⁹ Stone work, bunds and ditches have a higher government-approved rate than tree planting, live hedgerows and turfing.

Both Walapane and Medirigiriya DSDs and their respective districts are prone to multi hazards and losses in crop, livestock, property and lives are commonly reported⁵⁰. Developing drought forecasting and landslide early warning systems will complement Disaster Management Centre's (DMC's) own efforts to operationalize the drought and landslide risk profiles already developed with the relevant technical agencies.⁵¹ EWS will be made cost-effective in their implementation by involving community in risk assessment and risk communication through models developed in Sri Lanka through DMC and other non-government counterparts.⁵² Working with existing hazards maps for drought and landslides would allow the project to look at more fine-grained vulnerability profiling within DSDs, and target early warning and risk reduction better.

Environmental benefits of the project include positive impacts on households (through home garden development) catchment (forests and degraded area conservation) and downstream (stream bank protection, water conservation). Project interventions will improve the ability of the ecosystems to be more robust to climatic variation and to provide the necessary provisioning services to people (and their livelihoods) and to nature. Community consultation workshops during project design demonstrated that farmers and local officials attribute climate change (or at least the localized manifestations of environmental stress such as lack of irrigation water, crop loss and crop damage, reduced soil fertility) to a number of environmentally unsound practices, such as:

- Deforestation, including forest fires, land clearing and encroachment
- Land use practices causing soil erosion
- Pollution of land and water
- Pollution of air

Consistent with these views, the project outcomes will deliver a number of specific environmental benefits that include:

In the target locations project outcomes will deliver a number of specific environmental benefits that include:

1. Soil conservation and reduction of erosion, sedimentation, and siltation of anicuts and village reservoirs *in the immediate locality*
2. Improved tree cover in home gardens and catchment area will have several interlinked environmental benefits- improved micro-climate, improved soil structure increased biodiversity, improved quality and availability of ground water *for target community*
3. Restoration of ecosystem integrity, goods, and services *for target community and downstream;*
4. Preservation of biodiversity in home gardens, in forests and in crop fields *to benefit target community*
5. Improved water management, irrigation water efficiency and access to water for domestic users

Knowledge management activities and information and risk assessment at community level (through Vulnerability Reduction Assessment) can give rise to number of autonomous adaptive actions in communities and households (water conservation, food storage, seed preservation).

⁵⁰ Disinventar.lk disaster incidence by DSD

⁵¹ A UNDP BCPR-funded project to operationalize the hazard profiles for drought and landslide together with DoA and NBRO (National Building Research Organization)

⁵² Such as Sri Lanka Red Cross Society, CARE and Practical Action

C. COST-EFFECTIVENESS OF THE PROPOSED PROJECT

Project has been designed to reduce rain-fed farmers' vulnerability to rainfall variability by 1) introducing alternate sources of food and income; 2) improving the water use efficiency of existing village irrigation systems.

The alternatives considered under cost-effectiveness could be applied to all rain-fed farming areas of the country constituting some 35 % of total farming area. These were derived through extensive consultation with the relevant technical agencies and with farmer families through the PRA mentioned in Annex 12.

1. Provide major or assured irrigation to enable farmers to cultivate two seasons
2. Provide the farmers with off-farm income avenues in industrial and services sector
3. Out-migration from areas highly vulnerable and socio-economically marginalised

The benefits of assured irrigation has been expounded earlier in the document; and proven through a number of field studies. Poverty prevails in rain-fed non irrigated and minor irrigated areas, whereas farmers living in major irrigation areas have a high cropping intensity (>150%) and a corresponding ability to earn larger annual incomes.

Department of Irrigation's Planning Department estimates that current costs (capital) of extending major irrigation costs around US\$ 2200 per acre of cultivable land. The project area covers 16,822 acres of cultivable land⁵³. The cost therefore of supplying these farm lands with assured irrigation through a major scheme would cost approximately US \$ 37 million. Rehabilitating old village schemes however costs US \$ 877 per hectare⁵⁴, totaling to US \$6.6 million.

The high cost of expanding major irrigation is the main reason that this alternative is not considered in the project.

Moreover, expanding the irrigation potential of the Mahaweli Scheme to cover the present rain-fed areas has several insurmountable constraints. Firstly there are hydrological limitations that prevent the expansion of Mahaweli Scheme. Even at present, there are areas within major schemes that suffer a water deficit at the tail end of a cultivation season, causing considerable crop loss. As such, the possibility of expanding the present coverage of irrigation in the Mahaweli Scheme is limited. River run-off measurements over a 40-year period show a steady decline in annual run off yield from 7515 million cubic metres in 1968 to less than 2000 million cubic metres.⁵⁵ This presents a real-time problem in further expanding the scheme to cover additional area.

Studies show that surface water storage is the most effective way of supplementing water for development (irrigation and drinking). The lifetime delivery costs of small storage reservoirs for rainwater ranges between 7-100 US\$/1000m³ (even after evaporation loss) making them the more cost effective method of supplying irrigation water. In comparison ground water development lifetime costs range from 20-110 US\$/1000m³ and trans-basin diversion costs are between 90-400 US\$/1000m³.⁵⁶ This demonstrates that restoring the effectiveness of surface water storage and delivery is the most cost-effective way of improving irrigation for rural farm families.

⁵³Department of Irrigation, Planning Branch

⁵⁴Department of Irrigation, Planning Branch

⁵⁵Department of Irrigation, at Annual Runoff at Manampitiya

⁵⁶Keller et al. Water Scarcity and Role of Storage in Development. International Water Management Institute 2001

Lift irrigation could also be an alternative. However, national experience in lift irrigation⁵⁷ has shown that while it serves to alleviate poverty in minor irrigation schemes, the approach is prohibitive in cost (both establishing a scheme and maintaining it) to support wider replication.⁵⁸ Lift irrigation requires energy for pumping and the cost of electricity or fuel (diesel/kerosene) is prohibitive for many small farmers.

The Department of Agrarian Development has surveyed and mapped DSDs that have minor irrigation schemes. Walapane DSD has 429 anicut systems and Medirigiriya DSD has 87 small village reservoirs, and the effective management of these small village irrigation systems would be the best short-to-medium term adaptive strategy for farm families. Improved storage in local village schemes, and improved water yield in anicut systems, will improve community adaptive capacity to rainfall variability while the project's livelihood and crop diversification initiatives will improve household-level adaptive capacity.

The other alternatives would be to introduce off-farm livelihoods (such as jobs in factories or in tourism or in trade) to all the vulnerable farm households. While the project envisions livelihood diversification, it is neither feasible nor practical to move the entire population away from farming. There are no major industries in these areas due to lack of connectivity and communications. Further, their current livelihoods, although exposed to vagaries of weather, ensures food security for part of the year and many would not shift 100% to a non-agricultural income source.

(Cost effective is further enhanced by basing interventions on best practices of concluded projects in the project area or in comparable locations.

1. Home Garden Development: There are many best practices. However the project will build on the experience of the CBA project implemented by GEF SGP and synergize efforts at the local level with the National Livelihoods Development Initiative Divi Neguma.

2. Post-Harvest Centres: World Food Program has implemented Post Harvest Centres to develop women's skills and income sources in the resettlement areas of post-conflict north and east through P4P project. Key lessons used to build activities related to Outcome 1.4 were social mobilizing related to small group formation for self-employment; types of processing activities popular with women (milling, food production, grain storage) and type of equipment needed for viable self-employment such as large stoves, cauldrons, ovens, scales, plastic sealers etc

3. Rehabilitation of Village Irrigation Structures: The project borrows from a number of initiatives including WFP, GEF SGP, IWMI and the Agrarian Services Department. The most cost-effective way of rehabilitating and maintaining has been proposed by reviewing the practices and lessons of these concluded projects. These lessons include formation of a village implementation team; securing technical support from Agrarian Services Extension Officers and Technical Officer; Cash and Food for Work schemes for labour participation, irrigation structure maintenance fund and mobilizing FOs to assume greater responsibility over the irrigation structure in its command area.

4. Land survey and soil conservation: The project improves on methods initially developed by Upper Mahaweli Watershed Protection Project (1984-1988) and subsequent agricultural land rehabilitation projects. It specifically builds on more recent experience in Walapane DSD in a pilot CBA Project implemented by GEF SGP. This includes a baseline survey of land plots to

⁵⁷In Rajangana (Anuradhapura District) and Neelabamma (Puttlam District)

⁵⁸Fernando A.P S Impact of Lift Irrigation Schemes on Rural Poverty Alleviation. University of Peradeniya, 2007

determine interventions, Sloping Agricultural Land technology, using local material and cash crops for hedgerows etc.

5. Vulnerability Reduction Assessment in Adaptation Planning: The VRA was used in GEF SGP projects for impact monitoring. Lessons of this project demonstrate that the tool could be adapted for community awareness and adaptation planning as well.

Overall, there are four main characteristics of the project that considerably enhance its cost-effectiveness:

- 1) The menu of highly replicable, development-oriented solutions to climate variability that ensures value for money
- 2) A strategy that makes most of existing government extension services and administrative platforms by complementing and supporting their activities/objectives
- 3) Implementing natural resource management and livelihood asset building activities with community participation
- 4) A strategy that avoids duplication of funds and activities by linking with key agencies; and a delivery mechanism that ensures extremely cost-effective implementation (see below)

D. CONSISTENCY WITH NATIONAL OR SUB-NATIONAL SUSTAINABLE DEVELOPMENT STRATEGIES

Sri Lanka ratified the United Nations Framework Convention on Climate Change (UNFCCC) on 16 March 1993, and has submitted its Initial and Second National Communications to the UNFCCC. The country ratified the Kyoto Protocol on 3 September 2002.

Many environmental and natural-resources related policies have been prepared and adopted by the Government to guide implementation of initiatives that address climate change. In 1992 the Government launched its National Environment Action Plan (NEAP), which identified 12 components aimed at responding to pressing environmental problems of the time. That might have an impact on the local environment in the future and took a holistic approach Sri Lanka's PRSP in March 2003 was considered to be successful by the World Bank Environment Department in mainstreaming key environmental and climate change considerations. One important factor influencing this is that community-driven development has played a major role in the implementation of the poverty reduction strategy.

In this project, both components are designed to align with (adaptation) priorities in several key government plans (see below and Table 5). This includes the National Plan for Sustainable Development, the National Environment Action Plan 2008-2012 and the Second National Communication to UNFCCC. They are also in line with the National Climate Change Adaptation Strategy of Sri Lanka 2011-2016. The proposed project is consistent with the priorities laid out in the Government's Second National Communication to the UNFCCC, and directly supports the strategy to '*Establish Food Security to face Climate Change Threats*' of the National Action Plan for Sustainable Development under the Office of the President.

The key government policies on which the project is based are:

Key National Policy and Responsible Agency	Project elements consistent with policy
1. National Development Policy (Mahinda Chintana 10 year Horizon Development Framework 2006-2016) Department of National Planning	Increasing irrigation water availability and efficiency, Reducing rural poverty and dependence on marginal livelihoods, increasing agricultural productivity and reducing post-harvest losses, increasing household food security and nutrition, drought early warning, rehabilitation of degraded lands
2. National Agricultural Policy	Irrigation water management, soil moisture

Department of Agriculture	conservation, soil conservation, land conservation in watersheds, organic agriculture, home gardening, integrated pest management and integrated plan nutrition systems, conserving agro-biodiversity and promoting tolerant species
3. National Disaster Management Policy	Early warning systems linked to community preparedness and risk assessment
4. National Forest Policy	Increasing tree cover in non-forest areas, reducing pressure on natural forests by supporting community woodlots, management of Multiple-use forests
5. National Environmental Policy	Restoration and conservation of eco systems, conservation of native species and agro-biodiversity, water resources conservation and management, soil conservation
6. National Watershed Management Policy	Conserving of high elevation watersheds of major rivers and micro catchments of streams above 300m
7. National Fisheries and Aquatic Resources Policy/ National Livestock Policy	Promotion of inland fisheries and livestock farming to increase incomes and food security of rural farming households
8. The National Physical Plan	Addresses the issue of protecting upper catchments and depopulating or restricting destructive land use practices on erosive hill slopes.

Project Components	National Environmental Acton Plan / Haritha Lanka ⁵⁹ Strategies and Indicators	National Climate Change Adaptation Strategy Priorities	Second National Communication Adaptation Priorities
1. Diversified and strengthened livelihoods and sources of income for vulnerable farm families in minor irrigated and rain-fed areas	<p><u>Establish Food Security to face Climate Change Threats</u></p> <p>-Number of climate resilient rice varieties identified and extent cultivated</p> <p>-Identification and application of suitable land and crop management techniques</p> <p>-New cultivation patterns for vulnerable rain fed farming areas identified and introduced</p> <p>- Percentage of farms adopting techniques such as recycling farm waste and crop residues</p>	<p>Use of indigenous crop varieties with resilient features for crop improvement</p> <p>Livestock development</p> <p>Maintaining crop gene banks</p> <p>Promoting organic agriculture and integrated pest management</p>	<p>Drought resistant crop varieties</p> <p>Alternate/ efficient irrigation practices</p> <p>Efficient agronomic practices such as</p> <ul style="list-style-type: none"> • Soil moisture conservation: mulches, ground cover crops • Improve soil organic matter. • Provision of Irrigation facilities • Rain water harvesting

⁵⁹ Haritha Lanka (Green Sri Lanka) is the National Action Plan for Sustainable Development of the Government of Sri Lanka, developed by the National Council for Sustainable Development headed by the President

2. Strengthened ownership of climate risk reduction processes and increased replication potential of adaptation strategies at local level and basin/sub national level	-Change of farmer behavior, in changing cropping patterns, crop calendar, crop types -Forecasting system in place to advice farmer practice	Increasing available irrigation water including improvement of minor irrigation schemes, improving ground water recharge, and enhancing micro climate Safeguarding available irrigation water including reduced siltation of reservoirs	Rehabilitation of small tanks to improve irrigation water availability and ground water recharge

Table 5. Project alignment with national plans and strategies

The project further promotes the Government’s vision for rural agricultural renaissance and further reduction of rural poverty⁶⁰.

At the regional level, the project will link with provincial and district level community development and disaster risk reduction programs.

E. MEETS RELEVANT NATIONAL TECHNICAL STANDARDS

Project activities will be implemented and monitored by technical agencies and their local representation. This ensures that all project outputs will meet the relevant national technical standards in their design and execution.

⁶⁰ Mahinda Chintana Vision for the Future 2010 and Mahinda Chintana 10 year Horizon Development Framework

Project components and outputs will meet technical standards prescribed in agriculture, agrarian services, forestry, disaster management and water resources management technical guidelines and norms. Technical safeguards for slope stabilization such as width, depth, height of erosion or wind barrier, technical safeguards for minor irrigation repair for bunds, canals and sluices, technical standards for stream bank reforestation will be followed and incorporated during activity design and implementation by the relevant focal agencies engaged in implementing and monitoring the project at national and divisional level. The project will also identify needs and gaps in appropriate sector technologies aligned with adaptation needs and develop/field test suitable solutions with community participation.

Activity	Applicable Standards	Application to Project	Monitoring
1. Minor Irrigation Repairs and Rehabilitation	<p>Technical Standards for minor irrigation repair and maintenance</p> <p>Cash for Work norms and standards applied by WFP</p> <p>Financial standards applied by Divisional Secretariat for contracting and monitoring technical inputs</p>	<p>by Department of Agrarian Development's Technical Officers</p> <p>Project Management Unit</p> <p>Project Management Unit</p>	<p>Department of Agrarian Development's Engineers</p> <p>WFP Project Coordinator</p> <p>Divisional Project Monitoring Committee</p>
2. Soil Conservation	<p>Department of Agriculture standards on land rehabilitation</p> <p>Sloping Agriculture Land Technology</p> <p>Cash for Work norms and standards applied by WFP</p>	<p>Project Management Unit and DSD Extension Officers</p> <p>Project Management Unit</p>	<p>Natural Resources Management Division of the Department of Agriculture</p> <p>WFP Project Coordinator</p>
3. Stream Bank Conservation	<p>Standards on stream bank conservation</p> <p>Choice of species in catchment reforestation</p>	<p>Project Management Unit</p> <p>Project Management Unit</p>	<p>Irrigation Department and Forest Department through Divisional Project Monitoring Unit</p>
4. Participatory Adaptation Planning	<p>Vulnerability and Risk Assessment Standards</p>	<p>Divisional Coordinators and Project Management Unit</p>	<p>WFP Project Coordinator</p>
5. Landslide risk management	<p>Technical and monitoring standards of the National Building Research organisation</p>	<p>Divisional Coordinators and Project Management Unit</p>	<p>National Building Research Organisation</p>
6. Drought Forecasting	<p>Seasonal forecasts are designed and issued by Department of Meteorology and Mahaweli Authority</p> <p>Norms on field dissemination</p>	<p>Project Management Unit</p> <p>Project Management Unit</p>	<p>Mahaweli Authority with Department of Agrarian Development</p>

	warning on drought		
--	--------------------	--	--

F. DUPLICATION OF THE PROJECT

The project target area is not the focus of any other climate adaptation initiative. In fact, this is the first, focused government-led effort to implement a climate adaptation project based on identified priorities on the ground. A number of NGO-led micro projects are field testing adaptive strategies on a much smaller scale. For example, IUCN with CARE Sri Lanka implemented several projects on dry zone agriculture that revolved around restoring small reservoirs for intensified agriculture. Practical Action, a UK Based NGO has field tested saline-resistant traditional rice varieties that can restore coastal paddies affected by salinity.

These projects, however, do not use state technical agencies for delivery; nor are they developed around national policies and programmes, therefore with limited policy impact. However the lessons and practices of many micro projects, especially the GEF Small Grant Programme's Community Based Adaptation pilot projects, have influenced the design of the activities and delivery/monitoring and assessment modality.

A review of on-going projects shows that there is no duplication of the proposed project with other projects financed by bilateral or multilateral organizations, especially as the project target area- the Mahaweli Basin- is not the focus of large donor driven projects.⁶¹ This project would be the first one to explicitly focus on improving the resilience of communities and preservation of ecosystems as an adaptation strategy. This project will complement on-going government programs that are being implemented to improve rural agricultural productivity, manage drought and landslides, irrigation and watershed management, and conservation of biodiversity.

During the design process, stakeholders of donor-funded projects were consulted, in order to avoid any potential duplication of efforts, resources or geographical coverage, and to ensure synergy between the ongoing initiatives and the proposed project. Table 6 presents a summary of recently concluded, on-going, and pipeline projects that deal with rural livelihoods, irrigation management, catchment conservation, forest management, bio diversity and climate change.

Project	Objectives	Complementarities	Geographical coverage/Agency
Divi Neguma (National Livelihood and Food Security Programme) (World Bank and National Budget)	To develop good model home gardens and encourage processing of home garden produce for household nutrition and income	The project proposes a number of similar capacity development and local livelihood development activities including home gardens. The project could complement this national imitative in target DSDs delivery and provide a more effective package of DSD level developmental benefits.	GoSL Ministry of Economic Development All Districts
Purchase for Progress	To improve production	Lessons from farmer	

⁶¹ With the exception of Trincomalee district which is in the previously conflicted affected eastern province

(P4P) World Food Programme (WFP)	of soya and maize, and develop marketing chain for its eventual processing in to a nutritional dietary supplement for children	Organisation based production, women-focused storage and marketing of agricultural produce	North Central and Northern Provinces
Community Based Adaptation to Climate Change (Ausaid/ GEF SGP)	To pilot science and technology-backed interventions to counter risk of climate-related hazards on livelihoods of rain fed farmers	Replicable actions and risk reduction strategies for project output implementation	Five locations in Puttalam, Ratnapura, Hambantota, Nuwara Eliya and Kurunegala districts
Mainstreaming agro-biodiversity conservation and use in Sri Lankan agro-ecosystems for livelihoods and adaptation to climate change (GEF 1V/ UNEP)	Adaptive management, post production support and policy/institutional framework that protects agro biological diversity in Sri Lanka	Directly supports research and development aspects of the proposed project. Also envisioned that the corresponding implementation period may benefit both projects through lessons learnt. Since project is implemented through MoE, duplication will be minimal.	National but project activities concentrated in three ecologically diverse agriculture landscapes- village tanks, suburban paddies and forest home gardens of the mid-country
Mainstreaming biodiversity conservation and sustainable use for improved human wellbeing and nutrition (GEF 1V/ UNEP/FAO)	Develop a long-term development framework including guidelines, strategies and systematic approaches for conservation and utilization of agro biodiversity (for improved nutrition) in Sri Lanka using an ecosystem approach.	The project will contribute substantial knowledge on traditional crops, especially edible yams and wild rice varieties with high nutrition value to improve home garden design.	National. Part of a global project including countries Kenya, Brazil and Turkey in addition to Sri Lanka
Operationalizing Hazard Maps and Development controls in landslide hazard areas (UNDP BCPR)	To initiate hazard-map based awareness and rational development planning in landslide and drought prone districts and divisions	Elements of complementarity with the early warning and community-based natural resource management outputs	All Districts identified as being prone to drought and landslides
Community Forestry Project (Ausaid and UNDP 2012-2017)	Reduction in deforestation and forest degradation by lowering the dependency on extractive forest resources.	This project will complement the adaptation fund project on the conservation and management of critically important ecosystems through community participation; and sustaining the quality of forest areas and reforestation through participatory approaches...	
Enabling activities for the preparation of Sri	To strengthen the technical and	Mainstreaming climate change concerns into the	National/ Ministry of Environment

Lanka's second national communication to the UNFCCC (UNDP completed)	institutional capacity of Sri Lanka in mainstreaming climate change concerns into the country's sectoral and national development planning processes.	country's sectoral and national development planning processes will complement the proposed Adaptation Project in terms of collaboration with relevant agencies and seeking continuation of project activities beyond the project period.	
Strengthening capacity to manage and control Alien Invasive Species in Sri Lanka (UNDP 2011-2015)	To build capacity and communications among the multiple stakeholders on the introduction and spread of IAS; foster an enabling policy, institutional and planning environment; generate and share knowledge	Invasive species affect village irrigation systems and forest ecosystems. The Mahaweli Basin has a range of IAS related problems and there are a number of community-engaged strategies to manage IAS through this project.	National/ Ministry of Environment
Promoting Sustainable Biomass Energy Production and Modern Bio-Energy Technologies (UNDP 2012-2017)	To provide policy support; develop commercially viable fuel wood supply; and create a viable investment environment	Developing mechanisms for commercially viable fuel wood supply will impact on commercial value of forest plantation and the findings will be useful to the proposed Adaptation Project	Central and Western Provinces/ Sri Lanka Sustainable Energy Authority and Forest Department

Table 6. Complementary projects, recently concluded, present and pipeline project

Lessons and Practices of GEF/ SGP Community-Based Adaptation to Climate Change Projects

Five CBA projects were implemented by the GEF Small Grants Program in Sri Lanka in 2010. Project locations were based on a desk review of vulnerability to current climatic trends by an expert panel. The most vulnerable agro-ecological zones were represented in the projects that dealt with climate-related natural disasters such as flood, drought and landslide. In all five locations the primary focus is to increase communities' adaptive capacity through long and short term interventions in improving livelihood resources and environmental conditions linked to their livelihoods such as soil quality, improved tree cover and access to water. The activities met the expectations of the target communities' need for short term results such as improved harvests, better incomes, secured environmental goods and the project's aim of ensuring long-term adaptive capacity of both eco system and social fabric.

The proposed project borrows heavily from water-management and land management experience of two of these CBA projects. In a drought prone downstream location, the CBA project restored an ancient village reservoir used for storing water for local irrigation. The CBA project rehabilitated the village reservoir, strengthened the dam, renovated canals, and conserved the catchment with FO support; and also worked out a sustainable mechanism to upkeep the reservoir and irrigation infrastructure in future. The second project is located in steep and sloping with severe soil erosion. This CBA project aims to introduce soil conservation and sustainable agricultural practices, and establish a market for agricultural produce. Alternate crops and alternate livelihoods were introduced to the project site to wean farmers from current destructive land-use practices

Vulnerability Assessments conducted using UNDP VRA (Vulnerability Reduction Assessment) tool provided an inroad for better community and local official level awareness creation on climate change and its impacts on farming systems/livelihood. The tool not only provided an avenue for

measuring the baseline vulnerability situation but also a means of measuring impacts along a timeline. *It is proposed that this tool be used in the proposed project through the FOs to generate climate change awareness and for measuring impact of interventions.*

G. THE LEARNING AND KNOWLEDGE MANAGEMENT COMPONENT

This is the first dedicated climate adaptation project implemented by government through MoE. Diligent monitoring and assessment of results and impacts is crucial in order to test effectiveness of government-prescribed adaptation measures, especially in agriculture and water management. The results and best practices also need to be disseminated widely to politicians, policy makers, technocrats and public.

The project will serve as a learning model that will allow national technical agencies to test out their own assumptions for community-based adaptation. This is especially true of the strategy (in the National Sustainable Development Plan and National Environment Action Plan) to protect food security and agricultural livelihoods from climate related impacts. This will provide the government with the opportunity to review context specific approaches establish best practices and scale up successful activities to achieve resilience communities and ecosystems to climate impacts in a wider landscape.

To meet this requirement the project has included outputs 2.5 and 2.6 to meet the specific needs of knowledge generation, analysis and dissemination at different management levels. Output 2.4 will also satisfy many of the monitoring and evaluation requirements of the project, including bi-annual technical reports from the national implementing agencies and other co-opted agencies. Activities under this output will also provide for independent evaluation of project results and analysis of impact on the field at mid-term and end of project (also see the monitoring and evaluation framework below).

The project has a specific knowledge management output especially targeting the up-scaling of lessons and best practices; and generating opportunity for spontaneous and autonomous adaptation in communities with similar ecological and socio-economic conditions. This output will develop a coherent knowledge management and a range of knowledge products (case studies, policy papers, and technical briefs and media reports) that are widely (and publicly) disseminated. Information and communication is integral to technical outputs where farmer and official climate change risk awareness would be developed. The use of VRA in communities ensures household level risk dissemination and provides a means of measuring adaptation impacts and behavior change through project interventions.

H. THE CONSULTATIVE PROCESS

Project formulation and design involved wide ranging stakeholder consultation over a long period of time (2010 September to 2012 January). Consultations were held either bilaterally on “one to one meetings” or through formal group consultation, namely National Stakeholder Workshops convened by the Ministry of Environment. A detailed view of the consultative process is attached in Annex 5.

Consultation with local level stakeholders, and communities was done through field visits and an outsourced Participatory Appraisal of Climate Change Problems and Adaptation Priorities in the Mahaweli Bain. Project formulation team visited key districts and conducted district level consultations prior to deciding on target divisions. Consultations were held with the Government Agents, Chief Secretaries of Provinces, District Agricultural Officers, and other relevant persons.

Extensive community consultation was conducted in three locations (one in mid-country intermediate zone and two in the low-country dry zone) within the basin, and with field level extension officers involved in service delivery for these areas (see Annex 11).

In September 2011 a consultative stakeholder workshop was held to design project components and outputs. This workshop was attended by key government agencies such as Ministry of Environment, Irrigation Department, Department of Agriculture, Mahaweli Authority and Forest Department. Deliberations and discussions at this workshop paved the way for the development of the current project proposal, its goal, its components and main outputs (please see Annex 12 for Stakeholder Workshop Report)

The completed project document has been shared with all stakeholders by Ministry of Environment for validation of indicators and targets.

Table 7. Key Project Stakeholders

Stakeholder	Roles
Ministry of Environment	The Ministry has overall responsibility in the country for conservation of the environment and natural resources management. It will serve as the executing agency of the project and will provide policy, management guidance and oversight to the project.
Ministry of Agriculture	The Ministry is national level agency for agricultural policy and legislation and sustainable development of the agriculture sector. In collaboration with the MoE, it will provide policy and technical management guidance to the project at national level.
Ministry of Agrarian Services and Wildlife	The Ministry is in charge of agrarian reform, agrarian services and wildlife conservation. In collaboration with the MoE, it will provide policy and technical management guidance to the project.
Department of Agriculture	The Department of Agriculture is the national agency for agricultural research, development and extension including soil conservation. The Department will serve as an executing partner of the project.
Department of Agrarian Services	The Department of Agrarian Development is in charge of providing agricultural inputs and services to farming communities and management and rehabilitation of minor tanks. The Department and its agrarian extension arm will serve as an executing partner of the project.
Forest Department	The Forest Department has the mandate for conservation and management of the countries forests. The Department has an extensive network of local officials who will provide technical support to project activities at Divisional level
Mahaweli Authority of Sri Lanka (MASL)	The Mahaweli Authority oversees water management and conservation activities in the main Mahaweli Basin.
Disaster Management Centre of Sri Lanka	The DMC is the focal agency for disaster risk reduction and preparedness including early warning systems. The DMC's district offices in Polonnaruwa and Nuwara Eliya will support project activities related to EWS
Provincial and District Authorities	Provincial District and Authorities provide implementation support at the local level and ensure mainstreaming of local level policies.
Department of Livestock Development and National Aquatic Resources Development Agency	Will provide technical support to implement project activities at national and divisional level
Meteorology Department	The Department collects disseminate all weather related data of the country and will support the drought forecasting model.
Divisional Secretariats (DSDs)	DSDs are the primary local development planning and

	administrative unit which implements and monitor a range of local development projects. The DS brings together all state and non-state development actors in a given administrative area. In the project the DSD-level implementation and monitoring committee will be the primary unit for technical collaboration, communication and project oversight
Farmer Organizations (FOs)	Farmer Organizations are local community based organizations registered with the Department of Agrarian Services. In the project FOs will represent farming families working in minor irrigated areas and carry out the ground level project delivery and household level monitoring of results
Farm Families	Farm families are direct beneficiaries and key implementing partners of the project.
WFP	WFP will provide technical inputs to the project and be responsible for project formulation, implementation, monitoring, evaluation and reporting. WFP implements many resilience-building, climate change adaptation-related activities in partnership with many different Government agencies of Sri Lanka at national and local levels. WFP has already been involved in pilot climate change mitigation projects in collaboration with the Forest Department of the Ministry of Environment in conflict-affected districts in the eastern and northern provinces.
UNDP	UNDP Provides technical and capacity support to the DMC and has been extensively involved in risk profile development, especially for drought. UNDP is also a key actor in environmental management and climate change projects in Sri Lanka in partnership with MoE.

I. Justification for funding requested and focusing on the adaptation

Component 1- Develop Household food security and build resilient livelihoods for rain-fed farming households

Baseline without Adaptation Fund Support

In rain-fed farming areas, rice can only be cultivated during the Maha (major) cropping season that is November to January- and that too depends on the quantity and temporal spread of rainfall. In the next season, which is Yala (minor) season from April to July, other field crops (maize, groundnut, sorghum) could be cultivated depending on water storage in village reservoirs and ground water availability. Cropping intensity in rain-fed farming areas and minor irrigated areas remain low (70-90%) which indicated that even one full season cannot be supported under current climatic uncertainties.

The minor season in most rain-fed areas mean that farmers have to migrate out looking for employment or that they undergo severe food and livelihood insecurity. This is the main reason that keeps these families entrenched in poverty. Malnutrition-related health problems are common and these communities are physically distant from service providers –government administration, free health care and even schools. Rain-fed farming households differ greatly from neighbours with access to assured irrigation in terms of access to financial support, insurance or extension services. They are also disadvantaged when it comes to marketing their produce.

By the end of the Maha season prices of primary crops reduce drastically since the entire country is harvesting crops. At this time, market prices plummet and farmers earn barely enough to cover cost

of production. The Government has prioritised reduction of post-harvest losses, but at village level there is little penetration of technology, capacity, and financing for effective post-harvest industries.

Without secure livelihood, many rain-fed farming household engage in damaging practices- such as poaching, mining, or felling timber in catchment forests. In clearing and cultivating stream-banks and reservoir catchments, and engaging in short term cash cropping on steep slopes. These practices erode soil, cause downstream siltation, damage to irrigation structures, reduction in water yield and storage in village reservoirs and, in turn, damage the very livelihood assets that farmers depend so greatly.

Without the project, and its package of grassroots interventions these farm families will continue to face aggravated livelihood and food insecurity. They will continue to destroy their own livelihood assets for short term benefit and in turn cause greater damage to a wider landscape.

Climate variability has increased livelihood insecurity of these communities. The shifting of rainfall pattern has a direct impact on rain-fed farming practice and storage in small reservoirs and anicuts. In many cases, farmers are unable to cultivate the major season fully, leaving them bereft of the staple food crop. Longer periods of seasonal drought and intense rainfall, erodes the existing natural resource base on which farm livelihood is hinged- water and soil. There is a discernible worsening of the baseline situation due to climate variability and its associated impacts.

Adaptation Alternative

The project is designed to address target communities' exposure to climate-induced rainfall variability and its manifestation in droughts or short periods of intense rainfall.

Therefore project activities were designed (See Annex 12) as interventions that would 1) Support rain-fed farming communities to overcome livelihood-related issues caused by current climate change and 2) Support farm families to broad-base their livelihood risk to future climate change.

Climate Induced Hazard	Impacts on Farmers	Project Output Interventions
<p>1. <i>Increased land degradation (severity, extent, frequency and no. affected) caused by rainfall intensity and variability</i></p>	Soil fertility declines affecting yield	Soil and moisture conservation through community engagement Output 1.5
	Damage infrastructure and loss of lives due to landslides	Community based stabilization of sloping lands in vulnerable DSDs Output 1.5 Landslide early warning and preparedness Output 2.6
	Socio-Economic impacts including nutrition and food insecurity, poverty	Agro-forestry including home gardens for food and income Output 1.1 Diversified crop and livestock production systems introduced and promoted in vulnerable DSDs to buffer the effects of livelihood insecurity especially during Yala season. Output 1.3
<p>2. <i>Increased frequency and duration of drought</i></p>	Crop damage and loss	Changing cropping patterns and agronomic practices including crop diversification and short term varieties Output 1.2 Rehabilitation and renovation of village tanks including catchment conservation for better water storage and yield in

		village irrigation systems. Output 2.2 and 2.3 Drought forecasting developing long range forecasting capability with technology transfer and adjusting cropping seasons Output 2.6 Technologies to improve water use efficiency in agriculture including micro irrigation Output 2.2 and 2.3
	Food and nutrition insecurity	Post-harvest technologies including storing, processing and value addition Output 1.4
	Increased pests and diseases	Integrated Pest Management Output 1.2

Under Component 1, the proposed project will address the specific issue of Yala (minor) season food and livelihood insecurity by developing home garden-based production, food processing and storage, and incentive payments for community engagement in natural resource management, especially soil conservation. Previous project experience⁶² has demonstrated that is most productive engage community in common work during Yala season, and if this developed into an avenue to gain additional income through incentive payment (cash or food for work) it serves the dual purpose of preventing labor migration and ensuring project outcomes are met in a timely manner.

The adaptation alternative will ensure that farmers can cultivate larger extents of land than before, that cropping intensity in a village system would be increased denoting use of agricultural land in both seasons and the introduction of drought-tolerant and ultra-short lifespan rice varieties.

After the project, farming households dependent on rainfall for agricultural production will show demonstrable improvement in food consumption pattern, they will have access to information, seeds, and extension services to improve current cultivation practice. They will be able to engage in other types of agricultural pursuits that have demand and a ready all-year-round market. Women of these households, who are currently confined to providing labor in farm fields, will have access to technology and be networked with micro finance programs that can support them to start food processing cottage industries.

At the end of the project target farm households will have access to at least two main sources of income- with one source that is not sensitive to climatic variation. Non-crop cultivation options (livestock, bee keeping, poultry, and fishery) and high-value perennial cash crops such as cashew and coconut have been successfully adopted by other communities with comparable vulnerability to climate change. It is expected that such no-regrets, development-oriented income generation activities will support climate-vulnerable rain fed farmers to face current climate change and future exacerbation of impacts.

Component 2: Build institutional capacity in village, local, regional service delivery to reduce risks associated with climate-induced rainfall variability

Baseline without Adaptation Fund Support

⁶²CBA projects implemented by GEF SGP employed this strategy of using the lean season to complete project-related natural resource management and irrigation maintenance, which allowed farmers to engage in their traditional agricultural pursuits during main rainfall reason

Consultations with officials and farmers in the Mahaweli Basin confirm a well-recognised and amply articulated gap in awareness regarding climate change impacts and appropriate adaptation measures. This gap is most evident among the rural agricultural population, who are most at-risk from climate change and service providers immediately linked to them.

The capacity of communities and field level service providers (especially in agriculture, agrarian services and water management) to respond to climate change impacts is weak. Currently there is vague interpretation of the climate science at local level, and climate risk screening (or even environmental or disaster risk screening) is not a part of the normal development process. Extension services are fairly constrained to provide comprehensive service delivery in their technical area, much less advise farmers on how to tackle rainfall variability induced by climate change. Farmer Organisations lack knowledge and awareness of climate-related risks, they lack technical knowledge of maintaining their irrigation structures and lack a plan or finances to implement a plan.

In the absence of the project, these deficiencies will likely to remain and seriously affect community capacity to initiate spontaneous or autonomous adaptation or to engage in risk-free development. Developing skills of local level extension workers to promote climate resilient agriculture (drought tolerant varieties), and to train technical officers, community organisations, in managing rainfall variability in rain fed farming areas is an adaptive element that is absent in local development. Land and water management activities are implemented ad hoc. Village reservoirs are rehabilitated to local political demand or engineering assessments, without proper consideration of the watershed, the irrigation cascade system or catchment conservation. There are no replicable models of village irrigation management at watershed/ micro catchment level within or outside of the Basin; or models that address climate –proofing of physical livelihood assets through community based natural resource management.

The government has a number of strategies and actions related to adaptation priorities but little concrete implementation experience. Therefore replicable, fully-costed adaptation alternatives are not currently available for policy making.

Adaptation Alternative

Component 2 will address some direct climate-related hazards and build community and local institutional capacities to climate-proof local development, focusing on agricultural livelihoods.

Through the Vulnerability Reduction Assessment (VRA) local communities will develop their capacity to recognise climate risks and plan adaptive measures to overcome such risks.

Local service delivery officials in agriculture, agrarian and irrigation sectors will benefit from training on managing climate risks to agriculture. This will improve their ability to provide advice to farmers and village level extension officers to cope with rainfall variability. The project will also provide each ASC and each Divisional Secretariat trained staff, IT-based equipment and tools for interpreting and analysing climate change or hazard data. The project will enable national implementing agencies to access international technical assistance in areas such as early warning systems development and timely conveyance of such messages to populations at risk.

Farmer organisation strengthening will have multiple benefits. FOs will be supported to engage in collective planning of irrigation maintenance including catchment conservation. They will be supported to develop a financing strategy for these irrigation management plans and linked with

funding sources- through farm household contribution, common enterprises⁶³ and local government financing sources. Importantly this approach will ensure that the project leaves behind sufficient information, implementation experience and local planning capacity at grassroots. Strengthened FOs together with the VRA tool enables autonomous adaptation actions. They will have the capacity to design and implement small-scale solutions to localised climate impacts. They will also be able to demand that climate concerns to taken to consideration in local development programmes implemented by government.

The community-based watershed management output will have wide implications on the planning basis of many development projects. Current practice of sectoral planning and administration-oriented implementation will be challenged through this model which will plan and execute a wide range of community based natural resource management initiatives based on watershed boundaries. This model attempts to demonstrate a cost-effective and integrated approach to improving irrigation efficiency (and cropping intensity) without expensive infrastructural investments.

The project will rectify the deficiency in knowledge and awareness on impacts and best practices by generating technical reports, extension bulletins disbursing these knowledge objects to a wide range of stakeholders and beneficiaries. The project will promote the incorporation of recognized cultural knowledge to address climate change risks. Communities and in particular women, will be involved in planning and designing local solutions.

Documented successes, combined with exchange visits from similar rural communities and their FOs, will promote local adaptation responses from neighbouring rain-fed farming villages and their service providers.

It is anticipated that Adaptation Fund resources will help to leverage additional resources from donor community and the Government of Sri Lanka.

J. Sustainability of Project Outcomes

The project will take a livelihood-based approach to adaptation developing key community assets such as; knowledge, human capacity, physical and natural resource assets, social and financial capital. Project impacts will positively influence level of awareness, preparedness, production volumes, income generation, and service delivery in order to build capacity to adapt- at household and community level. Combined with implementation modality of using existing government and community structures, this approach ensures that project impacts are sustainable in the long run.

Salient features of project strategy contributing to sustainability:

-The project will support the execution of key national plans, policies and strategies such as the National Environment Action Plan 2008-2012, the National Agricultural Policy, National Water Management Policy, National Disaster Management Policy and National Climate Change Adaptation Strategy 2011-2016 among others.

-The project will utilize existing national institutions, at the central and local levels for project execution. This approach would prevent parallel institutional arrangements at grassroots and ensure that project implementation strategy is merged in to existing programs of the two departments at divisional or ASC level.

⁶³Such as collective auctioning of reservoir fish stocks by FO to private sector

-Capacitating and supporting local service delivery by implementing key activities of the project through government extension services and existing cadre of officers.

-Community empowerment and ownership through participatory planning and execution of project activities at local and community level. The focal community-based organization at village level will be the Farmer Organization (FO). Farmer Organizations are legal entities recognized by the government and registered with the Department of Agrarian Development. Farmer organizations will be supported to have a technical and financial plan for future maintenance of minor irrigation works.

-Demonstrating the viability of watershed-level natural resource management to ensure climate-resilience in minor irrigation. The related outputs are described in detail below, but the outcome would be a replicable model of community-based watershed (micro catchment) conservation and management with an in-built payment for ecosystem services (PES) model for sustainability and continuity.

-Strong feedback mechanisms to assess impact and results at 1) village level to measure household level change in adaptive capacity 2) divisional level to monitor community activities, especially livelihood resilience building and 3) national level to ensure technical compliance and replication of lessons and models.

-Knowledge management and dissemination to support the mainstreaming of the approach through key national agencies such as Ministry of Environment, Ministry of Agriculture, Ministry of Agrarian Services and the Disaster Management Centre.

Please see Annex 3 for detailed description of the exit strategy for each output.

PART III: PROJECT MANAGEMENT MECHANISMS

IMPLEMENTATION ARRANGEMENTS

A. Arrangements for Project Implementation

The proposed project will be executed by the Ministry of Environment (MoE), in close collaboration with the Ministry of Agriculture and the Ministry of Agrarian Services and Wildlife. The World Food Program (WFP) will serve as the AF Multilateral Implementing Agency (MIE) of the project. See Figure 8, below, for the project's governance structure.

A National Project Support Unit (PSU) will be established within the MoE. A Project Manager will be appointed to manage the project under the overall technical and management guidance of the Climate Change Secretariat and Policy Planning Division (PPD) of the MoE.

Policy guidance to the project will be provided by a National Project Steering Committee (NPSC) headed by the Secretary, Ministry of Environment. The membership of NPSC will consist of Secretary, Ministry of Environment, Secretary Ministry of Agriculture, Secretary, Ministry of Agrarian Services and Wildlife, Secretary, Ministry of Disaster Management and Human Rights, Secretary, Ministry of Local Government and Provincial Councils, the Conservator General of Forests, Director, Climate Change Secretariat, as well as representatives from the Ministry of Finance and Planning, National Planning Department, Department of External Resources and Central Environmental Authority. It will also include a representative from WFP. The Director, PPD will be an ex-officio member of NPSC and will serve as the Secretary of NPSC. The NPSC would meet once in every six months. The Program Manager will be an invited observer of the NPSC.

National Project Support Unit (PSU)

A National Project Support Unit (PSU) will be established by Ministry of Environment consisting of a National Project Manager (reporting to the MoE/ and other Executing Partners through the NPSC) and support staff. Responsible parties for the execution of particular project Outputs, especially view of swift delivery of technical deliverables, will be co-opted by the PSU as needed and recommended to the NPSC for approval. The Project Manager will serve as the Secretary of NPSC. The PSU will be supported by National Implementing Agencies through the National Project Management Committee. The PSU will prepare reports for the review by the NPSC based on Divisional Project Management Committee recommendations and observations. The PM will prepare semi-annual progress review report which will be presented by the MoE at the National Steering Committee meetings.

National Project Management Committee

The National Project Management Committee will be convened by the MoE and will meet quarterly. This committee basically consists of the national implementing agencies (Director General or nominee of Department of Agriculture and Commissioner of Agrarian Services or his Chief Engineer/ Director Extension Services, Chief Secretaries of the Provinces or Provincial Environmental Ministries), the Project Manager and WFP Coordinator. It is responsible for monitoring the technical standards of outputs, activities and methodologies employed and should clear all technical reports produced by the project. The National Project Management Committee will input to the bi-annual technical review of outputs and progress based on feedback from the Divisional Level and monitoring visits.

WFP Project Coordinator

The overall monitoring of the project will be provided by WFP. WFP will appoint a Project Coordinator, His/her main function would be monitoring and verification of the implementation of activities in accordance with the approved work plan. The WFP coordinator will also be responsible for overseeing procurement and financial management.

Divisional Project Support Unit

At the field level, a Divisional-level Project Support Unit will be created. For cost-effectiveness this would be housed within the Divisional Secretariat or a divisional unit of the national technical agencies- Agrarian Services or Agriculture. The Divisional Project Support Unit (PSU) will have one full time staff supported by the Project Execution Budget to coordinate between the different divisional actors and Farmer Organizations, and to be responsible to report the meetings of the Divisional Implementing and Monitoring Committee to the National Project Management Committee.

Divisional Project Implementing and Monitoring Committee

The Divisional Project Implementing and Monitoring Committee will consist of the Divisional Secretary (or nominee), the District DMC representative, District officials from DoA and DoAD and Divisional Forest Officer. The Divisional Project Support Unit provides secretarial support to the Committee.

This Committee will meet quarterly and any other time so required and decided by the DS/ or requested by the Divisional PSU. The committee will review progress and implementation modality employed at village level and make necessary recommendations to keep activities on track to delivery targets.

Village Level Project Monitoring Committee

This is a small unit of village officials brought together to implement the project and also streamline different village development interventions. The unit will oversee the implantation of project activities

by FO, and participate in developing village strategies and awareness programs, especially VRA. The committee will consist of the Village Administrative Officer (commonly known as the Grama Niladhari/ Village Official) reporting to the Divisional Secretary and the ARPAS (Village Level Agrarian Extension Officer) reporting to the DO/ Agrarian Services at each Agrarian Services Centre.

Farmer Organizations

FOs will be the project implementing CBOs and will be responsible for keeping activity accounts, files for each household and for regular monitoring and updating of field level progress.

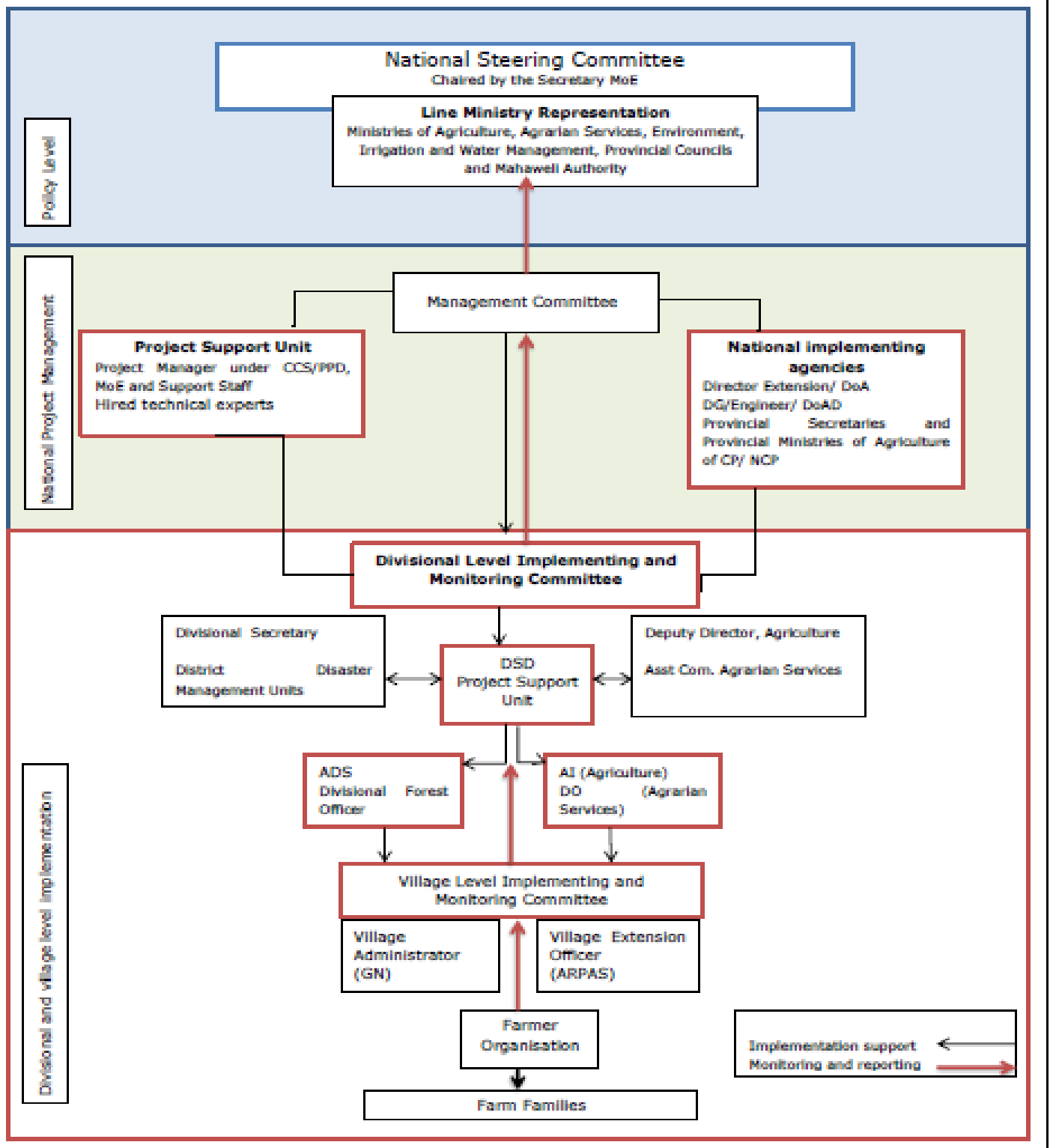


Figure 10. Project Implementing Arrangements

D. Financial and Risk Management

Financial and project risk management measures will be assessed as an on-going process throughout the project as below

Table 7. Risks and responses

Risk		Response Measure
Scientific and technical information in relation to climate change and its effects on the Basin remain incomplete and uncertain	Low	Sri Lanka has reliable, quality-assured meteorological data over 100 years which is ample evidence that the climate is changing. However more localized impacts especially in rain-fed farming areas are more difficult to determine, especially as the declining trend of annual rainfall is not statistically significant. However field observations and farmer experience demonstrates that rainfall variability is a real phenomenon.
Lack of awareness among participating communities and local officials on CC and potential impacts	Medium	The project aims to sensitize communities through VRA and officials through awareness programs as part of the project execution.
Local (District and Divisional) Government in project implementation areas fail to prioritize climate change policies in their strategies and plans.	Low	Climate change adaptation needs and priorities are reflected in national policies and plans, but a void remains at local/sectoral level. Divisional and District staff working on environment, disaster management and agriculture will be strongly networked into the project so that local development planning in project areas will henceforth build in climate risks and responses.
Policy makers and politicians prioritize economic benefits over sustainable and resilient ecosystems.	Low	The project will demonstrate cost-effective and economically sound models of adaptation and generate local demand, through communication strategies, to influence policy
Additional development (financial and marketing) support for alternate livelihoods and crops are unavailable in the target DSDs at the required time	Low	The project has been designed to provide technology and inputs for such climate-resilient livelihoods, in line with the government's national programs for food security, poverty alleviation and village development. All these programs are active in the DSDs and the Divisional Level Monitoring Committee will be tasked with further liaison between regular development programs and project objectives.

C. Monitoring and Evaluation Arrangements

Overall responsibility for monitoring and evaluation will rest with WFP and the Ministry of Environment-based Project Support Unit. Outcomes and outputs will be monitored during project implementation using data compiled by Project Support Unit with reporting from the DSD level Implementing and Monitoring Committee. Additionally, PPD with the PSU will be responsible for preparing six-monthly monitoring and evaluation reports (Semi-annual Progress Reports) that will be submitted to the National Project Steering Committee. The reports will contain adequate information for the Steering Committee to make necessary recommendations and decisions on project implementation.

M&E will be carried out concurrently with project execution. Quarterly technical reports will be collated from each DSD to a format that would enable efficient target tracking. The bi-annual technical report consists of a review of these DSD implementation reports by national technical agencies and their own field monitoring reports to ensure technical compatibility.

Annual Progress Review will be coordinated and produced by the WFP Project Coordinator and National Project Manager, with inputs and guidance from the MoE. The data for monitoring will consist of financial, procurement and physical progress reports as well as compliance with the requirements of the environmental and social assessment and management frameworks, along with financial audit reports. The issues to be reviewed by NPSC on monitoring and evaluation would include the efficacy, efficiency, sustainability, acceptance by the stakeholders of project actions. Quantitative targets will be supplemented with narrative reports. Such reports would be made available in time for NPSC to review and discuss during its meetings.

The M&E plan is based on the below table 8 and the results framework in table 9.

Table 8: M&E Plan

Type of M&E Activity	Responsible Parties	Budget (US\$) does not include staff time	Time Frame
Project Inception Workshop (IW)	Project Manager and WFP Coordinator	3500	Within first three months
Inception Report	Project Coordinator	2000	Two weeks after IW
Quarterly Technical Reports from Divisional Monitoring Committee	Project Assistants/ Project Coordinator	6000	End of each quarter
Bi-annual Technical Reports from Basin level Coordinating Committee	Project Assistants/ Project Coordinator	7500	End of every six months together with SAPR
Semi-annual Progress Reports (SAPR)	Project Coordinator WFP Coordinator/ PPD Ministry of Environment	8500	End of every Six Months
Annual Progress Reports (APR)	Project Coordinator WFP Coordinator/ PPD Ministry of Environment	7500	End of each year
Meetings of Project Steering Committee	PPD MoE, Project Coordinator	2500	First after IW and thereafter to review SAPR

Meetings of Technical Advisory Committee	PPD MoE, Project Coordinator, project assistants	2500	At least six monthly to review divisional and basin reports
Technical Reports	Technical Consultants	0	As required
Mid-term Evaluation (MTE)	External Evaluator/ Technical Consultants/ Project Coordinator	20,000	At mid-point of project execution- 18-20 months
Final Evaluation (FE)	External Evaluator/ Technical Consultants/ Project Coordinator	25,000	End of project cycle
Final Report	PPD MoE, Project Coordinator, WFP Coordinator	0	At least two months before project cycle ends
Financial Information Audit	WFP, UNDP	22,000	Yearly
TOTAL		107000	

Project Inception Report

A Project Inception Report will be prepared immediately following the Inception Workshop by the Project Manager with oversight by WFP Coordinator and PPD of MoE. It will include an overall Project Work Plan covering the three year period and a detailed First Year Work Plan divided in quarterly time-frames detailing the activities and progress indicators that will guide implementation during the first year of the project. The Report will also include the detailed project budget for the first full year of implementation, prepared on the basis of the Annual Work Plan, and including any monitoring and evaluation requirements to effectively measure project performance during the targeted 12 month time-frame.

The Inception Report will include a more detailed narrative on the institutional roles, responsibilities, coordinating actions and feedback mechanisms of project related partners. In addition, a section will be included on progress to date on project establishment and start-up activities and an update of any changed external conditions that may affect project implementation. When finalized the report will be circulated to project counterparts who will be given a period of one calendar month in which to respond with comments or queries.

Project Mid-Term Evaluation (MTE)

An independent review of progress against milestones at mid-cycle (18th to 20th month of implementation) will be carried out as part of the M&E Plan. The MTE will determine progress made towards the achievement of objectives and will identify corrective actions if needed. It will focus on effectiveness of delivery, timelines and efficiency of implementation and will present the initial lessons of project implementation and management. The findings will be incorporated in a mid-term review report.

D. Project Logical Framework Analysis

The **overall goal** of the proposed project is to:

Build diversified and resilient livelihoods for marginalized farming communities in the Mahaweli River Basin through effective management of land and water resources.

The overall objective: To mitigate effects of climate change induced rainfall variability and its impacts on livelihood and food security on farm households in two vulnerable divisions of the Mahaweli River Basin

Specific Objective 1: To develop household food security and build resilient livelihoods for rain-fed farming households in Medirigiriya and Walapane DSDs by improving the use of natural resources and strengthening livelihoods in the face of climate hazards

Specific Objective 2: To build institutional capacity in village, local and regional service delivery to reduce risks of climate induced rainfall variability

Table 9. Project Results Framework

Goal:	Build diversified and resilient livelihoods for marginalized farming communities in the Mahaweli River Basin through effective management of land and water resources.				
	Indicator	Baseline	Target	Means of Verification	Risks and Assumptions
Objective: To mitigate effects of climate change induced rainfall variability and its impacts on livelihood and food security in rain-fed farming communities in three sub watersheds of the Mahaweli River Basin	Percentage of target population adopting risk reduction measures	Less than 10% of target population (14039 households) practice climate risk reduction measures	75% of target population (14039 households) practice at least one climate risk reduction measure introduced through project interventions such as. Responding to early warning and forecasting Household level Non-farm income sources Home-garden food production Improved water management Post- harvest technologies Resistant crop varieties Knowledge of climate risks and adaptation strategies	Household survey at the start and end of project	Climate risk information and livelihood demonstrations convince farm families of the need to and possibility of adaptation at household and community level

	Household consumption score	<p>Both DSDs indicate food insecurity in VAM (Vulnerability Analysis and Mapping Data)</p> <p>Walapane- Very High Medirigiriya- Moderate</p> <p>A more sensitive index similar to household consumption score will be developed through the project's initial household consumption surveying</p>	14039 farming households indicate improved levels of food security compared to the initial consumption survey	Household survey at the beginning and at the final quarter of the project	<p>Household level consumption patterns will deviate from the Divisional aggregate.</p> <p>Food insecurity is linked to livelihood insecurity and risk exposure of rain-fed farm families</p>
<p>Outcome 1</p> <p>Diversified and strengthened livelihoods and sources of income for vulnerable farm</p>	Percentage of target households with sustained climate resilient livelihoods	Farm families under minor irrigation/rain fed conditions highly exposed to climate change-related livelihood	14039 target households have developed at least one climate resilient livelihood strategy or alternate source of	<p>Field monitoring reports</p> <p>End of project survey</p>	Selected livelihood options are complimentary to state and other development interventions in the

families in minor irrigated and rain fed areas	No of women with new source of income	insecurity ⁶⁴ Threat level: Very High Women in target areas practice tradition rain fed farming	income -Home gardens generate income in 50% of target population - Women's contribution to household income increased by 50% in target households		identified DSDs. Access to financing and markets for better livelihood targeting
Output 1.1 Develop home garden-based agro forestry systems in target DSDs to diversify livelihoods and build adaptive capacity of households to climate change	No of diversified home gardens created through project intervention Value of food and income generated through diversified home gardens	Home garden diversity low-medium Low- >10 species of food and multi-purpose tree species Medium-10-25 High- <25 species	14039 rain-fed farming families benefit from home garden improvement -Diversity (no of multi-purpose tree species) in home gardens improved -Household income from home gardens increased	Village level data sheets maintained by Farmer Organizations Field monitoring reports by Agriculture Extension Officers	Community interest and investment in developing and maintaining home-gardens Active marketing chains for home garden produce (raw and processed food, spices, fuel wood and medicinal herbs) readily available at

⁶⁴ Based on questionnaire survey of climate impacts on livelihood during project design

					community level
<p>Output 1.2</p> <p>Introduce and promote drought tolerant crop varieties and agronomic practices to counter effects of rainfall variability</p>	<p>No and type of drought mitigation practices introduced</p>	<p>Low awareness and adoption of drought tolerant agronomic practices</p>	<p>All Farmer Organizations trained to engage in drought tolerant agriculture</p> <p>Farmer field trials conducted with national technical agencies for 500 farm families selected by FOs</p> <p>Seed banks and seed distribution established in each ASC</p>	<p>Before and after survey of participating officials on level of climate risk awareness</p> <p>Focused group discussions with FOs</p> <p>End of project survey</p>	<p>Information, models and seeds stocks for drought resistant agriculture, applicable and appropriate for project target area, is available with Department of Agriculture and Agrarian Services or with State Universities</p>
<p>Output 1.3</p> <p>Identify and promote climate-resilient alternate income sources such as livestock, perennial cash crops and inland fisheries</p>	<p>No and type of alternate livelihood assets created</p> <p>No of women participated in livelihood training</p>	<p>Low level of access to non-farm livelihood assets including</p> <p>Information</p> <p>Training/skills</p> <p>Market linkage</p> <p>Finance</p>	<p>Six technical assessments for climate resilience and market chain analysis conducted</p> <p>Training provided to all FOs on selected livelihood options per DSD by specialized state agencies</p>	<p>Report on market chain analysis</p> <p>DSD level monitoring committee reports/ meeting minutes</p>	<p>Community willingness to uptake alternate livelihoods</p> <p>Level of interest in local service delivery to encourage and follow up on livelihood diversification</p>

			Livelihood support equipment provided to six viable livelihood proposals from every FO		
<p>Output 1.4</p> <p>Promote improved post-harvest technologies as viable climate-resilient livelihood sources for farm women</p>	No of farm women engaged in project-introduced post-harvest livelihoods	Non availability of information and training on post-harvest technologies at ASCs	<p>Post-harvest centers established (equipped and staffed) in 08 ASCs in the two project DSDs</p> <p>One post-harvest village established in each ASC area 760 farm women in 08 villages linked with local livelihood incentive programs</p>	<p>DSD level monitoring committee reports/ meeting minutes</p> <p>ASC Centre monitoring reports</p> <p>Training attendance and small group microfinance reports</p>	<p>Adequate local production for post-harvest food processing available</p> <p>Marketing networks connected with ASCs</p> <p>Micro finance based credit available to small groups to develop business</p>
<p>Output 1.5</p> <p>Build Community Assets and Livelihood Resources through cash for work to support</p>	Percentage and level of community participation cash for work system	0% participation in PES schemes in target area	1500 households benefit from cash for work schemes in two micro catchments in target DSDs	<p>Attendance records</p> <p>Incentive disbursement records at FO</p>	Adequate monitoring oversight and fiscal control mechanisms in place for effective PES delivery through existing village

climate risk reduction measures	Number of women participating in cash for work program			level	service delivery and farmer organizations
Outcome 2 Strengthened ownership of climate risk reduction processes and increased replication potential of adaptation strategies at local level and basin/sub national level	Percentage of target population (Gender Disaggregated) aware of predicted impacts of climate change and appropriate responsive adaptive actions to safeguard livelihood assets	Lack of awareness of climate impacts and adaptive actions at household and community level Extension officers and CBO officials have no training on climate proofing local community development	All 14039 households participate in climate risk assessment in target area receive climate change awareness At least 50% of community risk assessment meetings consist of women All FOs in target area receive information and tools to develop local adaptive strategies to safeguard livelihood assets All local and divisional-level officials engaged in agriculture, fisheries, forestry and disaster	Field and DSD monitoring committee reports End of project survey of households Final Project Evaluation Feedback reports of officials received training/TOT	Demand for climate change awareness and adaptive strategies among communities Capacity and motivation of local service delivery to implement and monitor adaptive actions

			management receive at least one training on supporting adaptive strategies		
<p>Output 2.1</p> <p>Train and mobilize officers at village, division and provincial level to design, and monitor local adaptation strategies</p>	<p>No of village, divisional and provincial officers trained to address climate risks</p>	<p>Training programs on climate risk management are not available at regional and local level</p>	<p>One training module developed</p> <p>Six TOTs developed and conducted</p> <p>=>250 officials trained at provincial, divisional and village engaged in rural development</p> <p>All Agrarian Service Centers in project DSDs receive climate risk management tools</p>	<p>Training module published</p> <p>Evaluation reports from faculty and participants</p> <p>DSD monitoring committee reports</p>	<p>Climate risk screening and climate proofing is an identified need in local development sectors</p>
<p>Output 2.2</p> <p>Strengthen Farmer Organizations with information, training and equipment to implement adaptation strategies</p>	<p>Capacity of farmer organizations to respond to climate risks</p>	<p>Farmer Organizations lack information on risks, and lack planning capacity to address them</p> <p>Some villages do not have formalized farmer organizations</p>	<p>All farmer organizations in target DSDs have developed management plans for local irrigation management and catchment conservation</p> <p>Management plans are funded through</p>	<p>DSD monitoring reports</p> <p>field monitoring reports</p> <p>Agrarian Service Centre records on FO registration</p>	<p>Farmer organizations represent the most climate vulnerable segments of the rural population in the two DSDs</p> <p>Farmer organizations are motivated to invest time and effort in</p>

			<p>community and government input</p> <p>All FOs in the target divisions are registered with Agrarian Services and have elected representatives</p> <p>At least six members each FO trained to conduct vulnerability reduction assessments as input to 2.4</p>		<p>project implementation at village level</p>
<p>Output 2.3</p> <p>Pilot integrated watershed management plans to safeguard climate sensitive livelihood assets such as land and water</p>	<p>Availability of watershed-level irrigation management plans</p> <p>Increased extent cultivated under pilot minor irrigation schemes</p>	<p>No cluster/cascade-level watershed management plans exist</p> <p>CI in village tanks in lower catchment <90%</p> <p>CI in anicut systems in middle catchment <70%</p>	<p>Management plans for two micro watersheds developed and implemented Farmer Organizations</p> <p>Increase cropping intensity in both systems to over 100%</p>	<p>Technical reports from supervising agencies on completion</p> <p>DSD monitoring committee reports</p> <p>Focused group discussions among FOs</p> <p>End of project evaluation</p>	<p>Support of national technical agencies to design and implement watershed management plans</p> <p>Cropping intensity is directly related to water availability</p>
<p>Output 2.4</p> <p>Conduct Risk</p>	<p>Level of</p>	<p>Target population</p>	<p>VRAs conducted in all</p>	<p>VRA data sheets</p>	<p>High level of</p>

Assessment and Adaptation Planning with target communities	awareness among target group of climate risks Capacity of community to plan and prioritize adaptive actions	unaware of climate risks and adaptive measures	Farmer Organizations targeting 14039 households at three month, eighteen month and end of project >45% female participation	in each FO Report on results analysis	participation in VRA exercise
Output 2.5 Document and disseminate lessons of climate resilient livelihood development and watershed management approaches and best practices	No of news outlets in the local press and media reported on project lessons No of new project proposals/ new community based adaptation initiatives generated within and outside the DSDs	Reporting on climate adaptation in national media poor No such project proposals exist	10 case studies generated 05 Policy Briefs Produced and shared with NPSC 50 media reports on project outcomes (35 print and 15 electronic) 02 Provincial Workshops to share project learning National Workshop to share project learning 20 CBA proposals from other vulnerable communities generated	Steering committee meeting minutes Media monitoring reports DSD monitoring committee reports	Media interest in climate adaptation remains high Exchange visits will generate sufficient interest in corresponding FOs

			through exchange visits		
<p>Output 2.6</p> <p>Design and implement early warning systems for climate induced risk of landslide and drought in Mahaweli Basin</p>	<p>Development and functioning of early warning systems</p>	<p>No community based landslide warning in project DSDs</p> <p>No drought/seasonal forecasting systems in place</p>	<p>Developed and implemented drought forecasting and timely dissemination model for Mahaweli Basin</p> <p>15 Community based landslide early warning systems with telemetric rain gauges are operationalized in Walapane DSD</p>	<p>Project mid-term review and end of project evaluation</p>	<p>Timely meteorological information generated and disseminated</p> <p>Households ready to modify behavior according to forecast/warning</p>



PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT

The proposed project is in line with Government of Sri Lanka’s policies and priorities. Hence, it has been endorsed by the Government of Sri Lanka. A copy of the endorsement letter is attached.

<p>Mr. B M U D Basnayake Secretary, Ministry of Environment and Focal Point, The Adaptation Fund</p>	<p>Date:</p>
--	--------------

B. IMPLEMENTING ENTITY CERTIFICATION

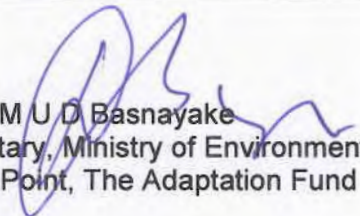
I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, understand that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this Project.

<p>Implementing Entity Coordinator Country Director World Food Program, Sri Lanka</p>	
<p>Date:</p>	<p>Tel:</p>
<p>Project Contact Person:</p>	
<p>Tel: E-mail:</p>	

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT

The proposed project is in line with Government of Sri Lanka's policies and priorities. Hence, it has been endorsed by the Government of Sri Lanka. A copy of the endorsement letter is attached.

 Mr. B M U D Basnayake Secretary, Ministry of Environment and Focal Point, The Adaptation Fund	Date: 08/10/2012
--	------------------

B. IMPLEMENTING ENTITY CERTIFICATION

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, understand that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this Project.

Implementing Entity Coordinator  Mads Lofvall Country Director a.i. World Food Program, Sri Lanka	
Date:	Tel: +942555521, Ext 2110
Project Contact Person:  Kathy Derore Head of Programme World Food Program, Sri Lanka	
Tel: +942555521, Ext 2400 E-mail: Kathy.derore@wfp.org	



පරිසර අමාත්‍යාංශය
சுற்றாடல் அமைச்சு
Ministry of Environment

"සම්පත්පාය" අංක 82, රජමල්වත්ත පාර, බත්තරමුල්ල, ශ්‍රී ලංකාව.
"சம்பத்பாய" இல. 82, ரஜமல்வத்த வீதி, பத்தரமுல்லை, இலங்கை.
"Sampathpaya" No. 82, Rajamalwatta Road, Battaramulla, Sri Lanka.
Gen. Tel: +94 - 11 - 2882112 - 3

සේනම්
செயலாளர்
Secretary
+94-11-2877290

ෆැක්ස්
பெக்ஸ்
Fax
+94-11-2877292

මගේ අංකය
எனது இல
My No.

04/04/06/16 Vol II (A)

අංකය
இல
No.

දිනය
திகதி
Data

08/10/2012

Letter of Endorsement by Government of Sri Lanka

The Chairperson
The Adaptation Fund Board
Adaptation Fund Board Secretariat
C/O Global Environment Facility
G 6-602-1818 H Street NW
Washington DC

Dear Sir

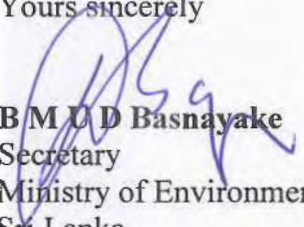
Endorsement for the Project on Addressing Climate Change Impacts on Marginalized Agricultural Communities Living in Mahaweli River Basin of Sri Lanka

In my capacity as Designated Authority for the Adaptation Fund in Sri Lanka, I confirm that the above national project proposal which was amended as per the comments made by the Adaptation Fund Board is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Sri Lanka.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. This project will be implemented by World Food Programme and executed by the Ministry of Environment in collaboration with the Ministry of Agriculture, Ministry of Agrarian Services and Wildlife.

Thanking you

Yours sincerely


B M U D Basnayake
Secretary
Ministry of Environment
Sri Lanka

"මේ පිටපතේ සහ සහ තොරු මේ සඳහා මෙම අනුමැතිය පිරිසිදු කිරීමට ද, මිනිසුන් සරණ පිටුවහලට ද, පිටත පැහැර ද එසේ

"நாம் வாழும் இந்த பூமி மற்றும் மரம் செடி செடிகள் மனிதனுக்கு மட்டுமன்றி வளம் வெளியில் பறந்து

பறவைகள் மற்றும் பூமியிலுள்ள விலங்குகளுக்கும் ஏனைய அனைத்து விலங்குகளுக்கும் சொந்தமானது"

Annex 1: Budget

Full Project Budget					
Project title: Addressing Climate Change Impacts on Marginalized Agricultural Communities Living in the Mahaweli River Basin of Sri Lanka					
Outcome Project/Activity	Responsible party / Implementing agency	Donor Name	Budget Description	Total (USD)	Budget Notes
Component 1: Develop household food security and build resilient livelihoods in rain-fed farming communities					
Outcome 1: Diversified and strengthened livelihoods and sources of income for vulnerable farm families in minor irrigated and rain-fed areas					
1.1 Develop home garden-based agro forestry systems in target DSDs to diversify livelihoods and build adaptive capacity of households to climate change	MoE/DoA/ DoAD/WFP	Adaptation Fund	Training and monitoring for homegarden development	75,956	1
			Seeds, implements and material for organic home gardening	931,786	2
			Household survey	41,800	3
1.2 Introduce and promote drought tolerant crop varieties and agronomic practices to counter effects of rainfall variability			Training for adaptive, drought resistant cropping	31,728	4
			Farmer field trials	233,341	5
1.3 Identify and promote climate-resilient alternate income sources such as livestock, perennial cash crops and inland fisheries			Training for resilient livelihoods	211,500	6
			Livelihood support equipment	587,500	7
			Institutional support	75,000	8

1.4 Promote improved post-harvest technologies as viable climate-resilient livelihood sources for farm women			Post-harvest centres established	115,200	9
			Equipment and technical advice to women's groups	760,000	10
1.5 Build community assets and natural resources through cash-for-work to support climate risk reduction measures.			Incentives for soil conservation/reforestation	861,525	11
			Nurseries/equipment	81,900	12
			Sustainable financing mechanism designed	15,000	13
			Travel/reporting	66,000	14
			Sub Total Component 1	4,077,502	
Component 2: Build institutional capacity in village, local, regional service delivery to reduce risks associated with climate-induced rainfall variability					
Outcome 2: Strengthened ownership of climate risk reduction processes and increased replication potential of adaptation strategies at local level and basin/sub national level					
2.1 Train and mobilize officers at village, division and provincial level to design, and monitor local adaptation strategies			Module on climate risk screening in agriculture, water resources and local development	43,800	15
			Training of Trainers	37,310	16
			IT and GIS equipment to Divisions	176,000	17
2.2 Strengthen Farmer Organizations with information, training and equipment to implement adaptation strategies			FO organization support	91,000	18
			Irrigation management plans	330,000	19
2.3 Pilot integrated watershed management models in micro watersheds to safeguard climate sensitive livelihood assets such as land and water			Survey of land parcels within watershed	93,600	20
			Minor repairs to irrigation structures	1,105,004	21
			Technical workshops and oversight	37,500	22

2.4 Risk Assessment and Adaptation Planning conducted with target communities	Training on VRA methodology for FO leaders	1800	23
2.5 Document and disseminate lessons of climate resilient livelihood development and watershed management approaches and best practices	VRA Conducted in all Target FOs	105,750	24
	Analysis of results	3000	25
	Knowledge Management Strategy	72,000	26
	Case Studies and Policy Briefs	39,500	27
	Results Dissemination	86,196	28
	Community exchange visits	55,000	29
2.6 Design and implement early warning systems for climate induced risk of landslide and drought in Mahaweli Basin	Drought forecast system for Mahaweli Basin	105,000	30
	Localized landslide EWS for Walapane DSD	210,000	31
	Sub Total Component 2	2,592,460	
Project Execution Cost			
	Project Manager	56,200	
	Project Office support staff	28,900	
	Vehicle and office equipment	65,000	
	Monitoring and Evaluation	107,000	
	Operational cost of Project Office	45,000	
	Travel	48,182	
	Divisional coordinators (02)	18,000	
	Divisional Office support (02)	10,800	
	WFP Coordinator	95,000	
	Outsourcing costs for Technical Support	221,418	
	Total Project Execution Costs	695,500	
Total Project Cost		7,365,462	

Indirect Support Cost***			
	Total Indirect Support Costs	589237	
Amount of Finance Requested		7,954,699	

Budget Notes (CR 21)

Budget Note	Description	Unit Cost	No of Units
1	Local workshops in each target FO	US\$ 225/workshop	
	Travel and DSA for monitoring	US \$98/FO	235
2	Local subcontract for procuring and distributing annual and perennial seedlings/ planting material and organic gardening equipment	US \$ 65.60/ at per household	14039
3	Food security survey Local Travel and DSA	\$ 522.5/ FO	80 (35 Walapane/45 Medirigiriya)
4	Local consultants to develop training modules in two national languages	70 days @ US\$ 150/day	2
	Divisional workshops in two divisions	US\$ 386/workshop	20
	Local consultants (experts) as resource persons for workshops.	US\$ 150/day	20
5	Inputs, technical support and seeds for field trials	US\$ 466/ hectare	500 hectares
6	Training Programmes on climate-resilient alternate livelihood provided to one member of every target household	Six training programmes at US\$ 150/pp = US\$900/per Farmer Organization	235
7	Equipment is provided to ten best business project proposals from each Farmer Organisation evaluated by the divisional level monitoring committee	US\$250 to 10/ per FO	235
8	Institutional subcontracts livelihood and market chain reviews conducted by line agencies and departments that oversee relevant climate-resilient alternate livelihood option	\$ 12,500 per introduced livelihood option	6
9	Establishing and maintaining Post-Harvest Centres for three years Equipment for food processing – milling, dehydrating, grinding etc Salary of 01 manager	US\$ 13,500/ per ASC US\$ 900/ per ASC	8
10	women’s groups (of six women each) supported to establish viable local industries in food and agro products processing Meetings and training: Food for Training	US\$ 250	152

	Equipment for cottage industry	US\$ 4750	
11	Incentives payment (cash-for-work)	US\$ 4.3/day** for an estimated 133 days over project period	1500 individuals /households
12	Establishing and maintaining seedling nurseries for catchment and stream bank reforestation for 12 months.	US\$ 4380 per nursery	5
	Equipment for soil conservation work	US \$ 40/household	1500
13	Designing a sustainable financing mechanism as an exit strategy Local Consultant	US\$ 150/day	100
14	Travel and DSA for monitoring cash for work	US\$ 44/ household	1500
15	Training module on climate risk screening development programmes in two national languages.	US\$ 150 per day x 2	146
	Local consultant		
16	Institutional subcontract to conduct TOTs (two-day workshops) in the two Divisions for climate resilient development planning	US\$ 4385/training programme	6
	Divisional /sub divisional workshops for local officials	US\$440/ workshop	25
17	GIS Software, tools and associated training to two Divisional Secretariats	US \$ 22,000/ ASC	8
18	Institutional subcontract for capacity survey of all target FOs;	US\$ 55,000	01
	Travel and DSA for ASC staff to provide institutional support to FOs over project period	US\$ 4500/ ASC	08
19	Irrigation Management Plan Development		
	Local consultancy support to ASCs	\$150/day x 40 days	08
	Maintenance Fund	\$ 1200/FO	235

20	Institutional subcontract for land survey Walapane: 300 land plots Medirigiriya: 150 farmlands	US\$ 220/ plot in steep hills US\$ 184/ plot in low elevations	300 150
21	Institutional subcontracts to FOs for minor repair work on irrigation structures Walapane: 20 anicut clusters Medirigiriya: village tank cascade 01 of five interconnected tanks Village tank cascade 02 of three interconnected tanks Village tank cascade 03 of three interconnected tanks	\$ 25,000/ FO \$ 45,000-55000/ FO	20 11
22	Planning, monitoring and technical oversight by relevant state agencies Local consultancy for technical oversight	\$150/day	250 days
23	VRA Training for FO Leaders facilitated by ASC	US\$ 225/workshop	8
24	Local VRA meetings	US\$ 225/meeting x 2	235
25	Local Consultant	US\$ 150/day	20
26	Local consultant for knowledge management	US\$ 150/day	480 days
27	Local consultant to develop communications products including production and printing costs Policy Briefs Case Studies (print and electronic)	US\$ 2500 US\$ 2000 US\$ 5500	5 8 02
28	Results Dissemination Media exposure visits Television documentary National and Basin Workshops	\$4400/visit \$13,500 \$ 9000	08 01 2

	Travel DSA for National Project Steering Committee to visit project locations	\$ 3250/visit	6
29	Institutional subcontract to organize and conduct community exchange visits	US\$ 2200	25
30	Institutional subcontract for drought forecasting in Medirigiriya DSD	US\$ 105,000	01
31	Institutional subcontract for design and implementation of local landslide early warning in Walapane DSD	US\$ 210,000	01

- *These rates are approved government rates for daily DSA/Travel
- **Approved labour rate per person day
- ***Indirect Support Costs see Description Below

Disbursement Matrix

	Upon Agreement signature	One Year after Project Start ^{a/}	Year 2 ^{b/}	Year 3	Total
Scheduled Date	15/03/2013	14/03/2014	14/03/2015	14/03/2016	
Project Funds		2,593,865	2,898,716	1,878,820	7,371,401
Implementing Entity Fee		279,731	200,000	146,838	626,569

***Indirect Support Costs

The indirect support cost component of the budget covers the costs of management services provided by WFP Sri Lanka Country Office and WFP Headquarters in support of the implementation of the proposed project over its duration. A breakdown of the specific functional areas follows:

Finance, Budget and Treasury Advice

- General oversight, management and quality control
- Ensure conformance with WFP judiciary standards and internal control processes
- Manage, monitor and track financial transactions
- Manage all AF financial resources through a dedicated Trust Fund
- Human resource management

Programme Support

- Technical support, troubleshooting, and support missions as necessary
- Specialised policy, programming and implementation support services

Performance Management Support

- Provide technical support in the areas of risk management, screening of financial and risk criteria and indicator selection
- Provide guidance in establishing performance measurement processes

Procurement Support

- Procurement and supply management
- Support in identification of suppliers and cost-efficient procurement processes

Information and Telecoms Support

- Includes maintaining information management systems and specific project management databases to track and monitor project implementation

Evaluation and knowledge management advice

- Technical support in methodologies, TOR validation, identification of experts, results validation and quality assurance

Audit and Inspection Support

- Provision of independent audit
- Ensure that financial management practices comply with AF requirements and support audit actions as required

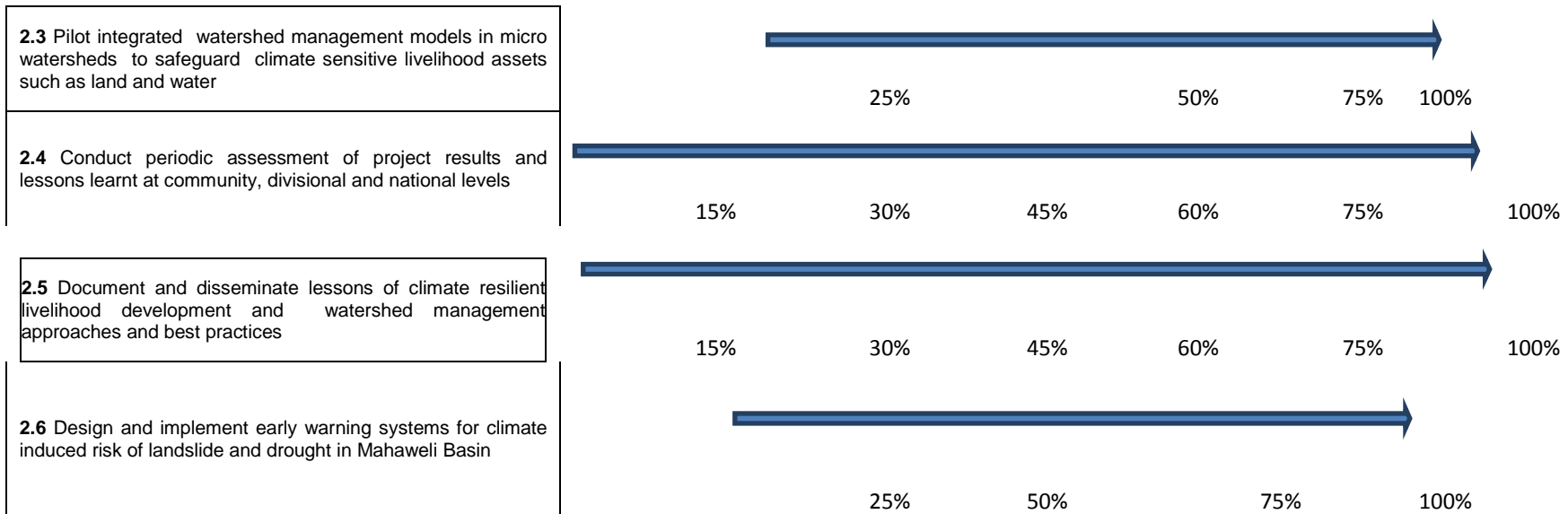
- Ensure financial reporting complies with WFP and AF standards
- Ensure accountability and incorporation of lessons learnt

Legal Support

- Legal advice to assure conformity with WFP legal practices and those of Sri Lanka
- Contract review

ANNEX 2. PROJECT IMPLEMENTATION AND DISBURSEMENT SCHEDULE

Component 1	Project Implementation											
	YEAR 1				Year 2				Year 3			
	Y1/Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1.1 Develop home garden-based agro forestry systems in target DSDs to diversify livelihoods and build adaptive capacity of households to climate change												
1.2 Introduce and promote drought tolerant crop varieties and agronomic practices to counter effects of rainfall variability												
1.3 Identify and promote climate-resilient alternate income sources such as livestock, perennial cash crops and inland fisheries												
1.4 Promote improved post-harvest technologies as viable climate-resilient livelihood sources for farm women												
1.5 Build community incentives/ Payment for Ecosystem Services for natural resources management to implement climate risk reduction measures.												
Component 2	Y1/Q1	Q2	Q3	Q4	Y2/Q1	Q2	Q3	Q4	Y3/Q1	Q2	Q3	Q4
2.1 Train and mobilize officers at village, division and provincial level to design, and monitor local adaptation strategies												
2.2 Strengthen Farmer Organizations with information, training and equipment to implement adaptation strategies												



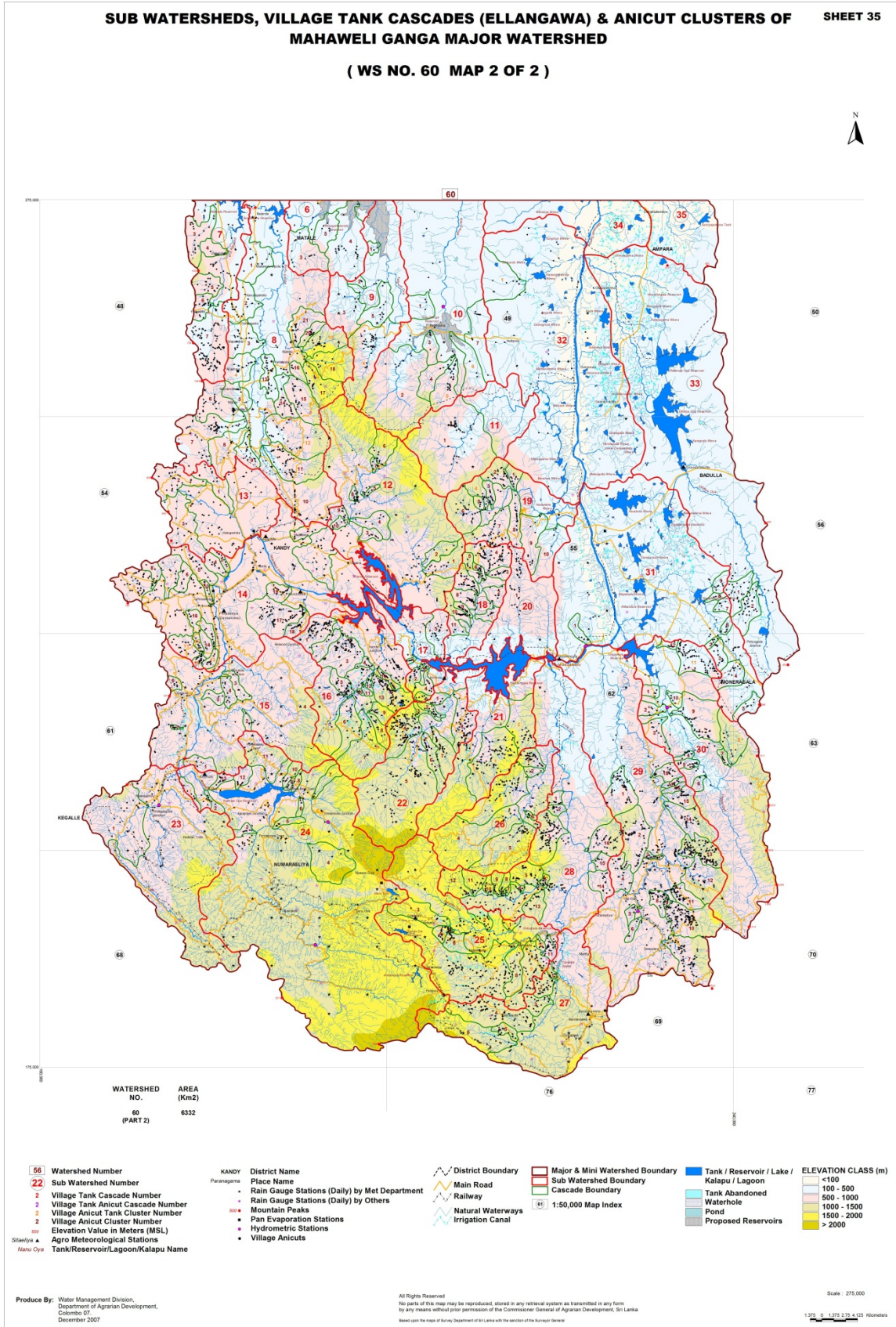
ANNEX 3. SUSTAINABILITY OF PROJECT OUTPUTS

Project Outcomes	Project Outputs	Sustainability Mechanism	Responsibility
Diversified and strengthened livelihoods and sources of income for vulnerable farm families in minor irrigated and rain-fed areas	1.1 Develop diversified home garden-based agro forestry in target DSDs to build household adaptive capacity to climate change	Each home garden will be monitored at household level, periodically visited by FO official/ village monitoring committee. Once a well-monitored home garden demonstrates household savings and income, and micro climatic improvement there is greater interest and investment in its future upkeep.	DoA/ DoAD Farmer Organisations
	1.2 Introduce and promote drought tolerant crop varieties and agronomic practices to counter effects of rainfall variability	The direct involvement of Agriculture Department and its extension services ensures that farmer field trials are replicated in similar agro-eco zones	DoA Mahaweli Authority Farmer Organisations
	1.3 Identify and promote climate-resilient alternate income sources among rural farm households dependent on rainfed agriculture	If technology and extension services (and marketing avenues) are available, the level of adoption will be high among farm families	Communities DoA/Divisional and District Secretaries
	1.4 Promote improved post-harvest technologies as viable climate-resilient livelihood sources for farm women	If technology and extension services are established through project and marketing avenues and micro finance are available by networking, the level of adoption will be high among farm women	Communities DoA/Divisional and District Secretaries
	1.5 Build community incentives/ Payment for Ecosystem Services for natural resources management to implement climate risk reduction measures*	Incentives in the form of cash-or-food for work will be transformed in to a sustainable PES schemes developed with FOs, DSD level committee and Mahaweli Authority who has a regular budget for environmental conservation in catchment areas	MoE Farmer Organisations
Strengthened ownership of climate risk reduction	2.1 Train and mobilize officers at village, division and provincial level to design, and monitor local	Training and mobilizing extension officials and local development officials on climate risk screening in their fields will ensure that climate impacts are considered in improved	National Project technical committee and DoA

processes and increased replication potential of adaptation strategies at local level and basin/sub national level	adaptation strategies	service delivery	
	2.2 Strengthen Farmer Organizations with information, training and equipment to implement adaptation strategies	Strong FOs constitutes a key sustainability mechanism for the project. FOs are the focal community based organization and are primarily responsible for the minor irrigation systems under their purview. Participatory planning and developing financing mechanisms for their upkeep would form a key part of the output, enabling FOs to move from being passive demotivated and distanced from service delivery in to dynamic and capacitated CBOs able to assess their risks and plan accordingly	DoAD Farmer Organisations
	2.3 Piloted integrated watershed management models in micro watersheds to safeguard climate sensitive livelihood assets such as land and water	Survey and mapping land plots will be done together with the Natural Resources Management Centre of the DoA. This ensures institutionalized capacity for this methodology. To maintain project interventions in watershed protection and irrigation enhancement several sustainability mechanisms will be put in place; -PES scheme for community engagement in soil and catchment conservation -FO will levy a small free from farmers benefitting from the improved irrigation to supplement the maintenance budgets -Inland fishery resource in the small tanks will be managed by FO and bi-annual auctioning to private sector will yield substantial benefit -FO will receive a government grant for IAS control and essential maintenance of irrigation system	Mahaweli Authority Forest department DoA Farmer Organisations
	2.4 Conduct periodic assessment of project results and lessons learnt	This output contributes to project delivery and results monitoring. It also contributes to dissemination of lessons and the development of replicable models in output 2.5. Basically this output will develop community capacity to assess their own climate risks and local government capacity to integrate climate related risks in to development planning and agriculture extension at Divisional level.	FOs Divisional Project Implementation and Monitoring Committee PSU
	2.5 Document and disseminate lessons of climate resilient livelihood development and watershed management	Media exposure and field visits to project sites would bring about longer term coverage. The exchange visits would spur replication interest in other communities. The case studies and policy briefings would enable MoE and Department of	MoE MoA MoAD and WL

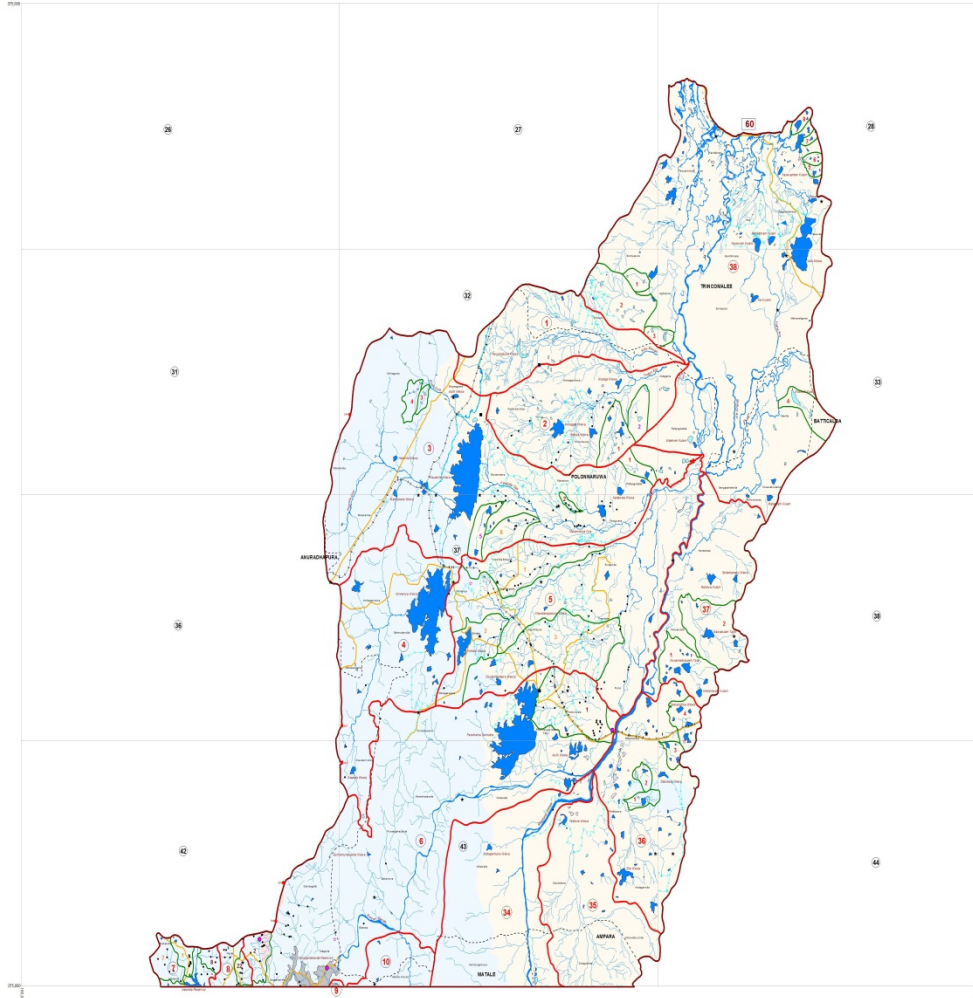
	approaches and best practices	National Planning to better target policy and development interventions	
	2.6 Design and implement early warning systems for climate induced risk of landslide and drought in Mahaweli Basin	Early warning systems would be closely linked with the national technical partner agencies and the area Disaster Management Centres for sustainability	District DMC Communities

ANNEX 4: MAP OF MAHAWELI RIVER WATERSHED



**SUB WATERSHEDS, VILLAGE TANK CASCADES (ELLANGAWA) & ANICUT CLUSTERS OF MAHAWELI GANGA MAJOR WATERSHED MAP
(WS NO. 60 MAP 2 OF 1)**

SHEET 34



WATERSHED NO.	AREA (Km ²)
60 (PART 1)	4040

Produce By: Water Management Division,
Department of Agrarian Development,
Colombo 07,
December 2007

All Rights Reserved
No parts of this map may be reproduced, stored in any retrieval system or transmitted in any form
to any means without prior permission of the Commissioner General of Agrarian Development, Sri Lanka
Based upon the map of S.A.C., Department of Lands with the sanction of the Survey General

<p>60 Watershed Number</p> <p>1 Sub Watershed Number</p> <p>2 Village Tank Cascade Number</p> <p>2 Village Tank Anicut Cascade Number</p> <p>2 Village Anicut Tank Cluster Number</p> <p>2 Village Anicut Cluster Number</p> <p>79 Elevation Value in Meters (MSL)</p> <p>79 Agro Meteorological Stations</p> <p>79 Tank/Reservoir/Lagoon/Kalapu Name</p>	<p>MATALE District Name</p> <p>Tissamahelli Place Name</p> <ul style="list-style-type: none"> • Rain Gauge Stations (Daily) by Met Department • Rain Gauge Stations (Daily) by Others • Mountain Peaks • Pan Evaporation Stations • Hydrometric Stations • Village Anicuts 	<ul style="list-style-type: none"> --- District Boundary --- Main Road --- Railway --- Natural Waterways --- Irrigation Canal 	<ul style="list-style-type: none"> --- Major & Mini Watershed Boundary --- Sub Watershed Boundary --- Cascade Boundary 1:50,000 Map Index 	<ul style="list-style-type: none"> ■ Tank / Reservoir / Lake / Kalapu / Lagoon ■ Tank Abandoned ■ Waterhole ■ Pond ■ Proposed Reservoirs 	<p>ELEVATION CLASS (m)</p> <ul style="list-style-type: none"> ■ <100 ■ 100 - 500 ■ 500 - 1000 ■ 1000 - 1500 ■ 1500 - 2000 ■ > 2000
--	--	--	---	---	---

Scale 1:50,000

1:50,000 0 100 200 300 400 500 Kilometers

ANNEX 5: CONSULTATIVE PROCESS 2010-2011

Consultation	Date/Place	Participants	Purpose/ Achievement
Initial consultation with Ministry of Environment (MOE)	7 th September 2010 Colombo	Additional Secretary of MOE, Programme Officers of WFP	Expressed WFP intention of framing a proposal for Climate Adaptation Board.
Discussion with Secretary of MOE	13 th September 2010 Colombo	Secretary, Deputy Country Director and Programme Officers of WFP	Secretary agreed in principle for a proposal
National Stakeholder workshop with key agencies	25 th January 2011 a Colombo	Participants from MOE, Ministry of Agriculture, Irrigation, Mahaweli Authority, Government Agents, Department of Forest, Programme Officers of WFP and Project Consultants.	Basic concept of the proposal was discussed and opinions of participants were obtained.
Provincial Stakeholder workshop of key provincial officers	20 th January 2011 at Kandy	Provincial and District Officers of stakeholder agencies of Kandy, Matale, Badulla and Nuwara Eliya Districts, WFP programme officers and Consultants	Discussed climate change adaptation measures with respect to local conditions. Agreed on feasible measures with community participation. Consultants noted the adaptive measures.
Discussion with Chief Secretary, Central Province	2 nd February 2011 at Kandy	Programme officers of WFP, Consultants	Discussed other projects at provincial level and agreed on the outline proposal.
Meeting with Director General of Irrigation	8 th February 2011 and Colombo	Director General of irrigation, Programme Officers and Consultants	Discussion on the water management difficulties and data of water resources.
Meeting with Director, Department of Meteorology	10 th February 2011 at Colombo	Director, WFP Programme Officers and Consultants	Discussed recent changes in weather patterns, rainfall and recent publications on the subject.
Community consultations with farmers in three villages of Mahaweli Basin in the mid and lower catchments	September 5-15, 2011 Marassana, Bakamoona and Welikanda in Mahaweli Basin	Programme Officer and Engineer, World Food Programme; Evaluation team from the Agribusiness Centre University of Peradeniya	Conducted PRA with farmers in several villages to ascertain ground level issues and problems related to climate change and livelihood in the Mahaweli Basin. The PRA revealed a number of issues faced by farmers in this region from water scarcity to crop damage. The field observations are presented in Annex 11 Table 03. This issues were used as the planning basis for re-structuring the project
Community consultations with Mahaweli and agriculture field extension officers and local (village) administrators in three locations of Mahaweli Basin	September 5-15, 2011 Marassana, Bakamoona and Welikanda in Mahaweli Basin	Programme Officer and Engineer, World Food Programme; Evaluation team from the Agribusiness Centre University of Peradeniya	Conducted questionnaire-based assessments of the views of officials and field extension officers of the severity and impact of climate change on rural livelihoods. Their views are presented in annex 11
Brainstorming session to discuss outcomes of field consultations	October 26, 2011 World Food Programme Office, Colombo	Director, Policy Planning Division, Ministry of Environment; Dr. L.H.P Gunaratne, University of Peradeniya, MS. Janakai Meegastenna, Irrigation Department; Dr. Ananda Mallawatantri, UNDP; Mr. Giancarlo	Present the field observations and PRA results to the proponent agencies and MoE. These issues were considered to be the basis for designing the revamped adaptation proposal from Sri Lanka. This brainstorming also paved the way

		Stopponi WFP; Mr. M. Azmey, WFP; Mr. K. Mullegamgoda, WFP; Ms. T. Dissanaike, Proposal Writer	for effective discussions at the Stakeholder workshop in Kandy
Stakeholder workshop to design project objective, outcomes and outputs	October 31, November 01, 2011 Kandy	A number of government Ministries and agencies were represented including Mahaweli Authority, Agriculture, Environment, Forestry, Agrarian Services . Representatives from UNDP and WFP, including technical experts from UNDP RC in Bangkok and WFP Rome.	The project design workshop included several key presentations and a brainstorming on climate related problems, issues faced by farmers and suggested solutions. The workshop resulted in the skeletal matrix of Outcomes, Outputs and Activities. A detailed report of the stakeholder workshop is in annex 12
Meeting with Climate Change experts from Department of Meteorology and Department of Agriculture to map vulnerability of DSDs within Mahaweli basin	November 16, 2011 World Food Programme Office, Colombo	Director Climate Change, Department of Agriculture; Senior Meteorologist, Department of Meteorology; Head, Agribusiness Centre, University of Peradeniya, Proposal Writer, Programme Officer WFP	To look at the administrative Divisions of the Mahaweli Basin in terms of disaster exposure, poverty and rural employment to determine vulnerability to the observed and expected impacts of climate change. Vulnerability profile of the basinw as created and from this assessment the most vulnerable DSDs were determined.
Meetings at the Water Management Division of the Department of Agrarian Development	November 10 and 26, 2011 Colombo	Head, Water Management Division of the Department of Agrarian Development; Proposal Writer, Programme Officer WFP	To obtain accurate and up to date data on extent of farming lands, and farm households; and river basin, sub basin mapping data for project design
Meeting to finalise project design and results framework	November 22, 2011 World Food Programme Office, Colombo	Management and Programme Staff WFP, ARR, Environment UNDP, proposal writer	Proposal writer presented the developed components, activities and budgets for review by agencies.
Meeting with officials of Ministry of Environment to verify project design and results framework	November 26, 2011 Ministry of Environment, Battaramulla	Director Policy Planning Division, Ministry of Environment and Proposal Writer	Sharing the project framework and budget with the coordinating officials of the Ministry of Environment to obtain their preliminary comments and suggestions
Presentation of project design to Ministry of Agriculture	December 21, 2011 Ministry of Agriculture, Battaramulla	Secretary, Ministry of Agriculture; Director, Natural Resources, MoAg; Proposal Writer; Programme Officer WFP	Full presentation of Adaptation Proposal to the Ministry of Agriculture for their comments and observations
Presentation of Project Design to Ministry of Environment	January 06, 2012 Ministry of Environment, Battaramulla	Secretary, Ministry of Environment; Additional Secretary MoE; Director, Biodiversity and Policy Planning; Asst. Director Climate Change and other MoE Staff/ DCD Programme UNDP/ DCD Programme WFP/ Programme Head WFP; ARR Environment and Energy, UNDP	Full presentation of Adaptation Proposal to the Ministry of Agriculture for their comments and observations. This was especially important since a new Secretary of Environment took office in late December.

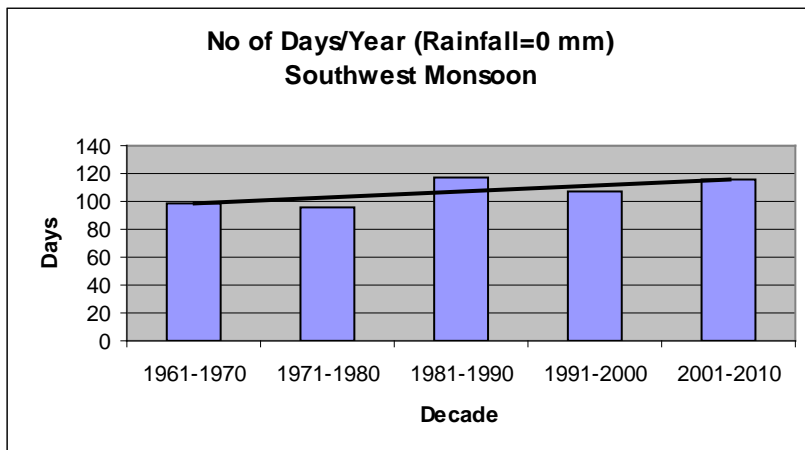
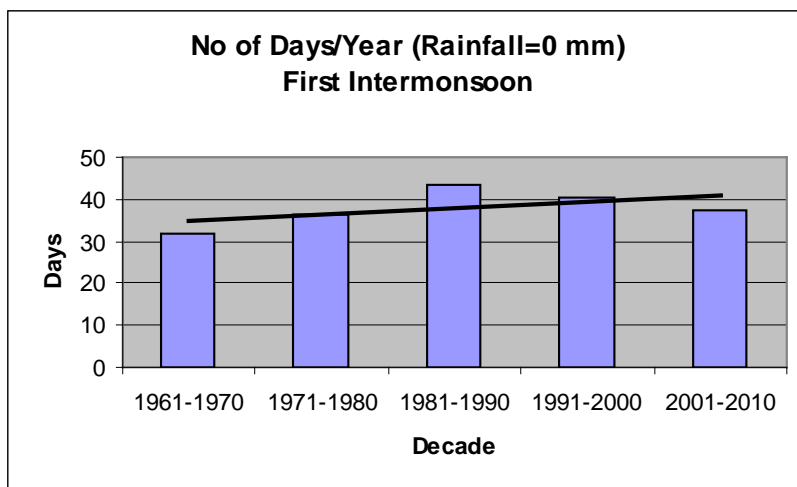
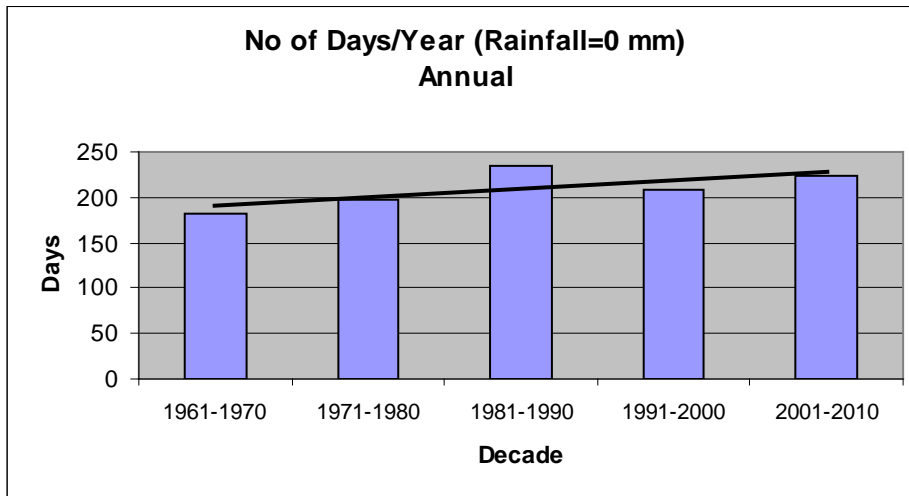
ANNEX 6: RAINFALL VARIABILITY IN WALAPANE AND MEDIRIGIRIYA

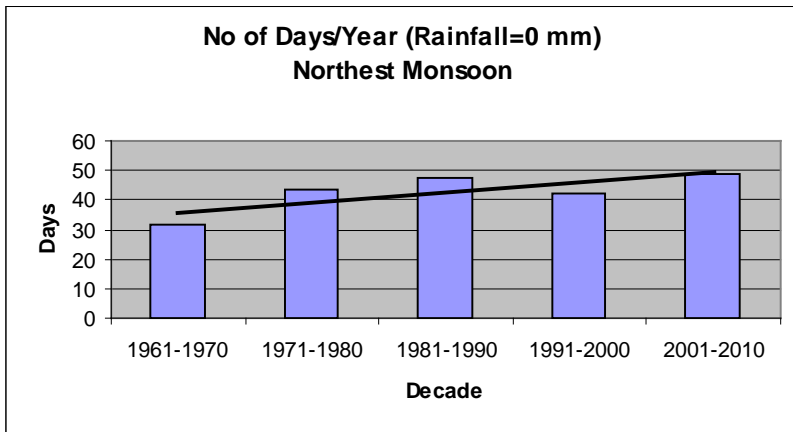
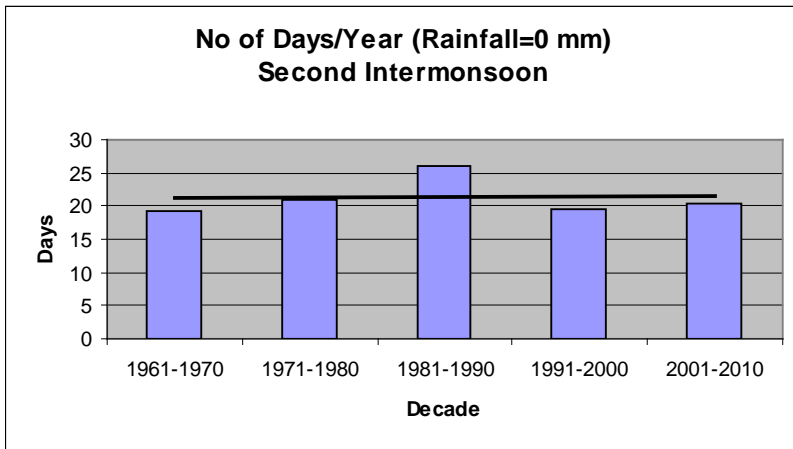
**Data and analysis by the Department of Meteorology, Sri Lanka

Rainfall analysis at Kurunduoya (Walapane)

No of Dry Days/Year

The number dry days in Kurunduoya area has increased during the all seasons except Second Inter Monsoon.

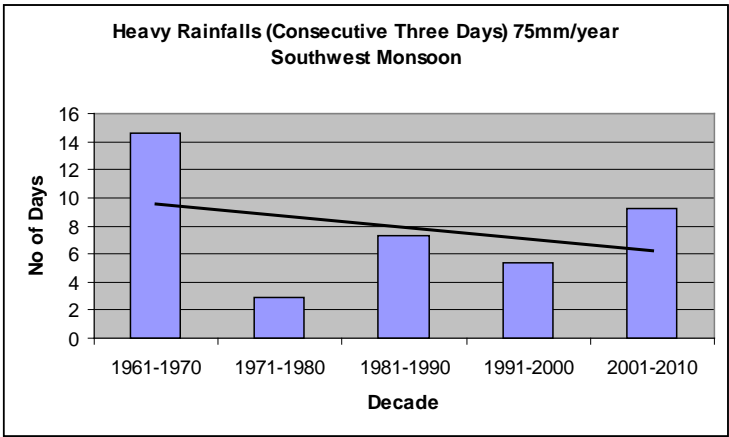
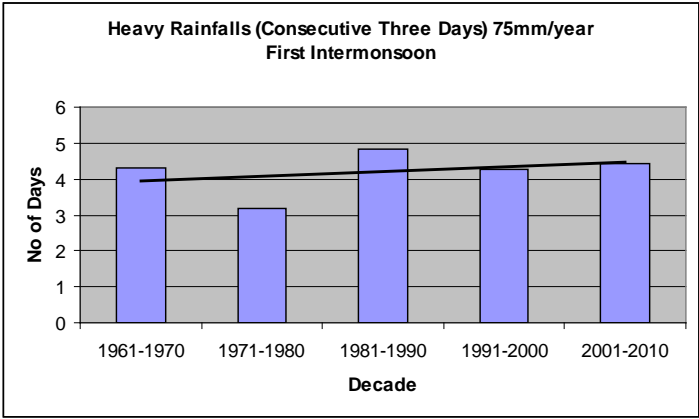
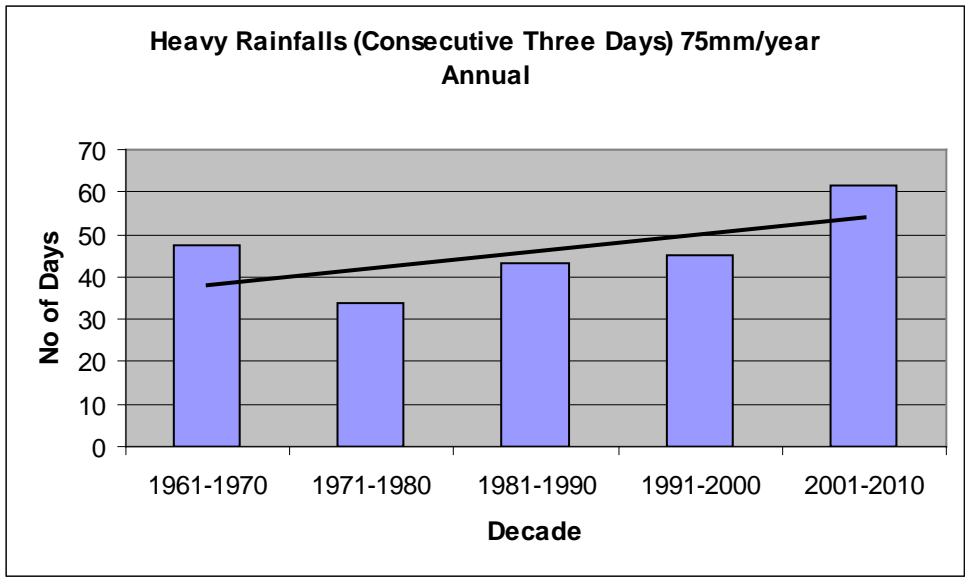


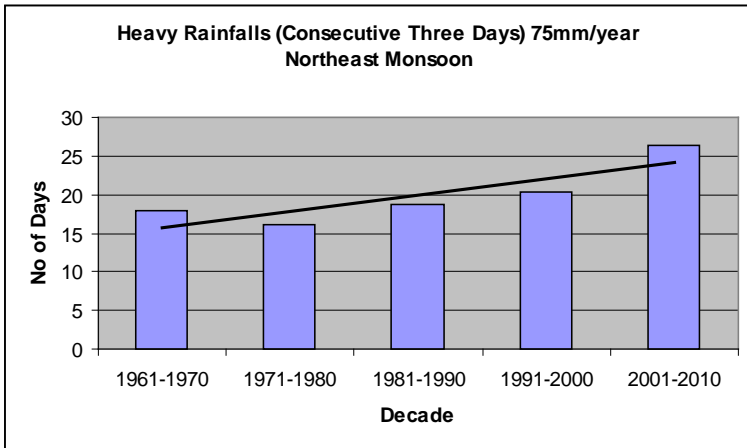
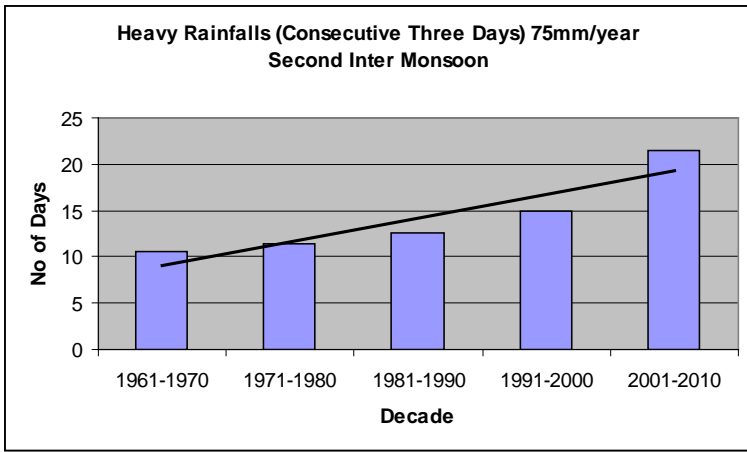


Rainfall analysis at Kurunduoya (Walapane)

Heavy Rainfall Events

Generally, three day cumulative rainfall has increased. In addition, there is clear increase of such events during the second inter-monsoon and northeast monsoon.

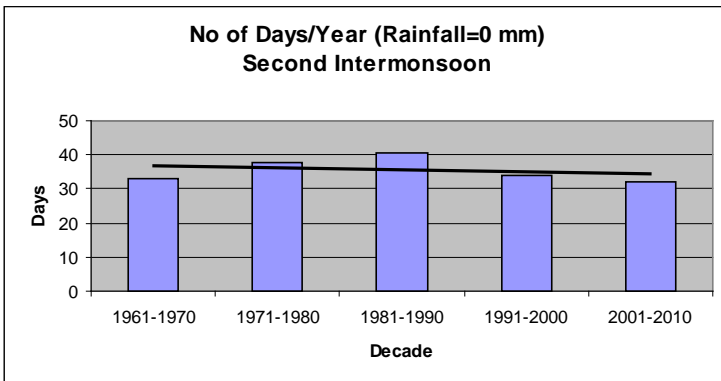
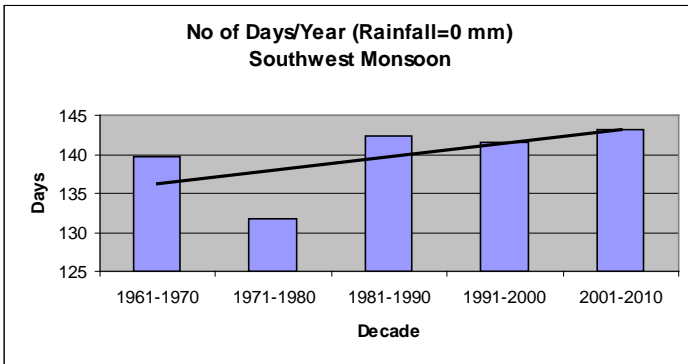
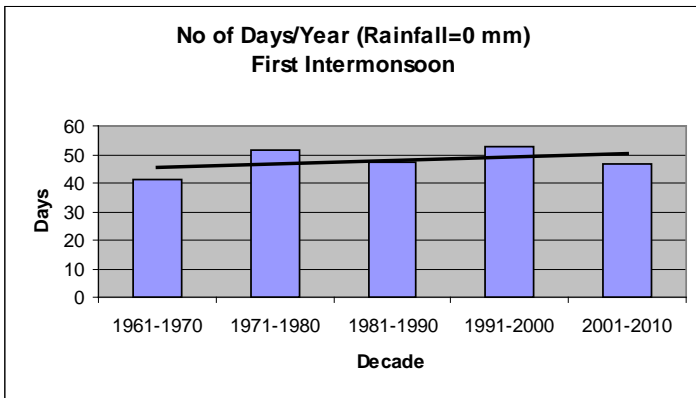
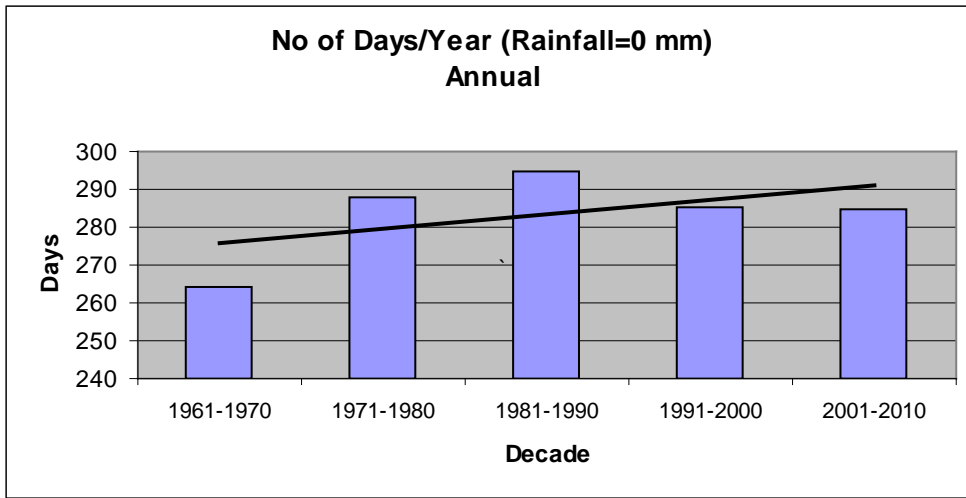


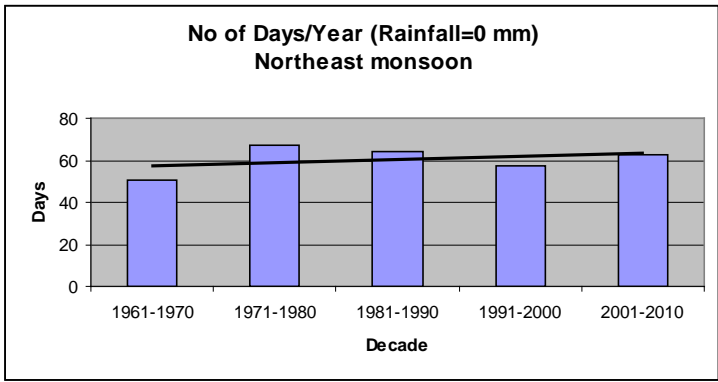


Rainfall analysis at Medirigiriya

No of Dry Days/Year

The number dry days in Medirigiriya area has increased overall, but notably during the first inter-monsoon and the south-west monsoon seasons





ANNEXE 07: RAINFALL VARIABILITY IN MAHAWELI BASIN

Divisional Level CV of rainfall in four seasons

Source: Natural Resources Management Centre, DoA

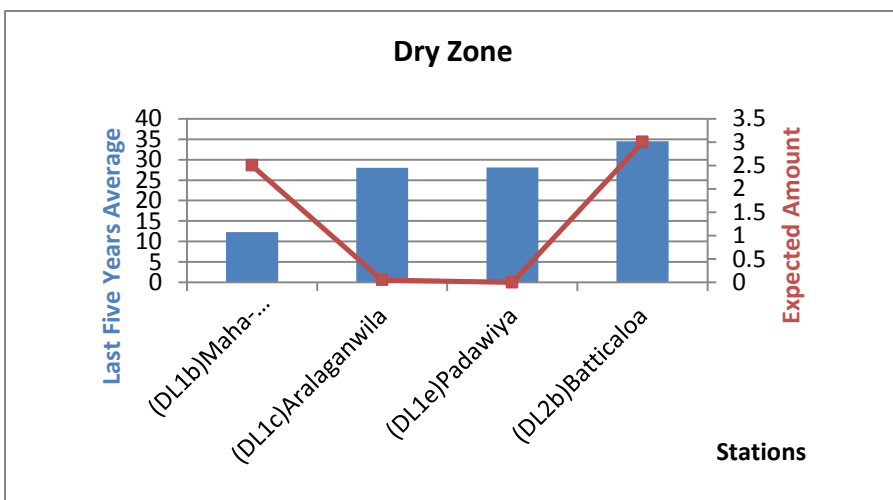
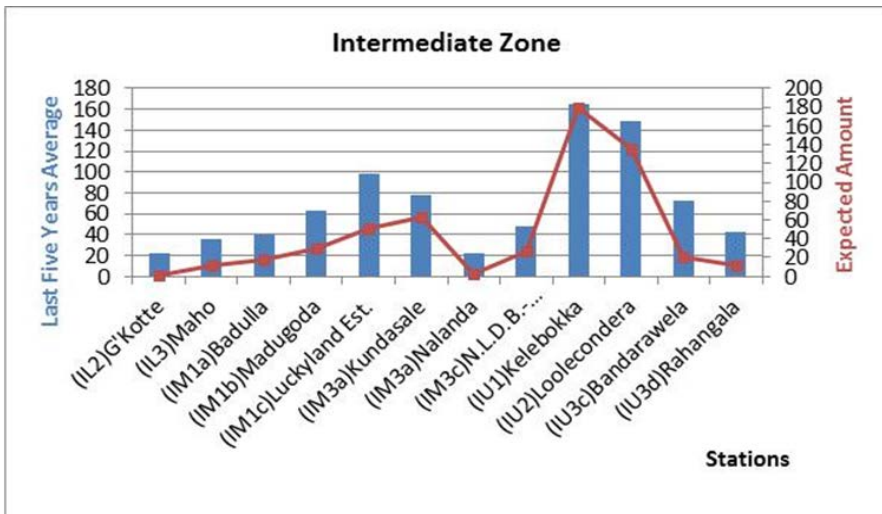
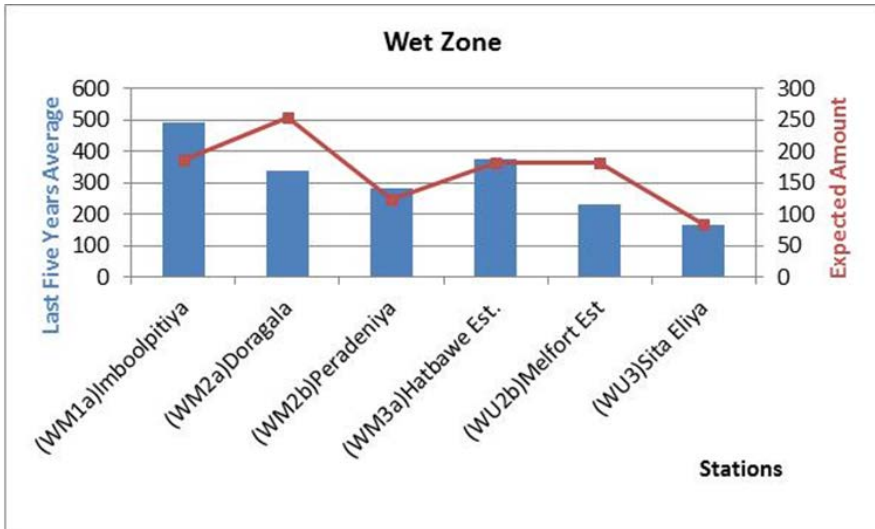
No	District	Division	Period	FIM	SWM	SIM	NEM
1	Badulla	Mahiyanganaya	1940-1969	49.67	50.36	41.78	31.57
			1970-1999	63.24	50.99	33.77	55.06
2	Badulla	Ridimaliyadda	1943-1969	81.2	42.63	38.05	41.03
			1970-1977	61.76	60.69	32.75	40.95
3	Badulla	Kandaketiya	1948-1969	32.26	60.79	42.47	31.72
			1970-1999	67.75	40.10	44.33	43.35
4	Badulla	Meegahawkivula	1948-1969	32.26	60.79	42.47	31.72
			1970-1999	67.75	40.10	44.33	43.35
5	Badulla	Paranagama	1964-1969	34.93	28.5	41.04	30.51
			1970-2000	51.21	38.46	42.28	38.39
6	Badulla	Hali-Ela	1950-1969	46.79	28.74	34.31	27.58
			1970-1980	28.24	26.67	30.40	34.58
7	Kandy	Minipe	1940-1969	47.08	46.66	40.18	34.99
			1970-2000	14.42	57.18	30.40	25.72
8	Kandy	Udadumbara	1940-1969	54.66	73.57	48.02	41.52
			1970-1974	29.48	53.43	26.89	44.05
9	Kandy	Panvila	1984-2000	47.41	24.34	28.82	40.70
			1992-2000	54.42	60.71	43.90	33.94
10	Kandy	Medadumbara	1992-2000	54.42	60.71	43.90	33.94
11	Kandy	Kundasale	1975-2000	44.54	28.45	33.31	44.02
12	Kandy	Harispattuwa	1971-1993	42.93	24.90	30.53	51.59
13	Kandy	4 gravents	1976-2000	48.22	29.14	28.49	61.44
14	Kandy	Pathahewheta	1989-1999	32.48	33.03	33.97	57.93
15	Kandy	Doluwa	1983-2000	61.77	35.38	30.69	48.60
16	Kandy	Delthota	1989-1999	53.72	34.38	37.85	41.31
17	Kandy	Udawalpala	1994-2000	37.23	21.73	33.86	35.52
18	Kandy	Pasbage korale	1983-2000	61.77	35.38	30.69	48.60
19	Matale	Pallepola	1996-2002	52.08	25.94	35.70	42.20
20	Matale	Wilgamuwa	1955-1970	45.9	37.28	33.66	35.48
22	Matale	Matale	1970-1999	60.72	32.02	38.09	61.30
25	Matale	Ukuwela	1993-1999	53.55	20.82	30.02	66.62
26	Nuwara Eliya	Hanguranketha	1992-1002	55.27	33.32	54.36	34.87
27	Nuwara Eliya	Walapane	1961-1969	18.5	28.5	31.28	18.42
			1970-2001	56.24	31.34	36.76	29.75
28	Nuwara Eliya	Nuwara Eliya	1966-1969	17.64	28.21	28.23	26.78
			1970-1999	49.71	25.09	34.17	48.62
29	Polonnaruwa	Medirigiya	1970-1999	49.60	42.00	41.19	51.70
30	Polonnaruwa	Welikanda	1942-1969	72.21	54.97	43.65	43.60
			1970-1972	71.12	23.06	10.11	11.42
31	Polonnaruwa	Lankapura	1945-1969	43.76	38.93	36.18	53.36
			1970-1980	39.81	51.72	53.44	34.65
32	Polonnaruwa	Thamankaduwa	1993-2001	59.98	86.77	29.14	23.18
33	Polonnaruwa	Elaheera	1960-1969	10.46	67.87	29.82	44.16
			1970-1999	54.93	42.32	44.63	49.22
34	Polonnaruwa	Dimbulagala	1984-2000	79.99	38.72	41.97	39.23
35	Trincomalee	Muttur	1952-1969	92.93	67.43	45.12	57.93
			1970-1978	87.65	44.11	24.53	52.81
36	Trincomalee	Kinniya	1950-1969	65.71	50.09	50.21	47.05
			1970-1999	90.40	54.56	53.94	79.19
37	Trincomalee	Kantalai	1966-1969	52.92	36.52	39.28	38.51
			1970-1999	75.39	34.80	38.36	41.74
38	Trincomalee	Seruvila	1952-1969	92.93	67.43	45.12	57.93
			1970-1978	87.65	44.11	24.53	52.81

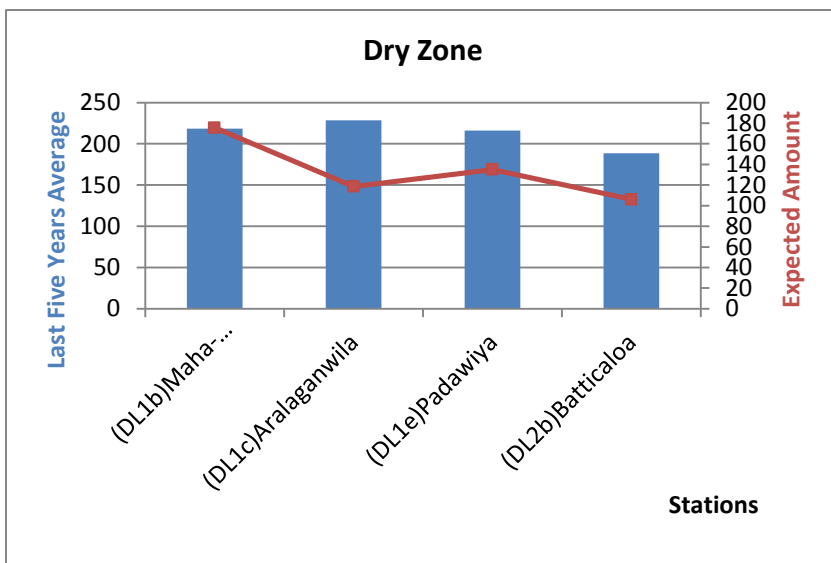
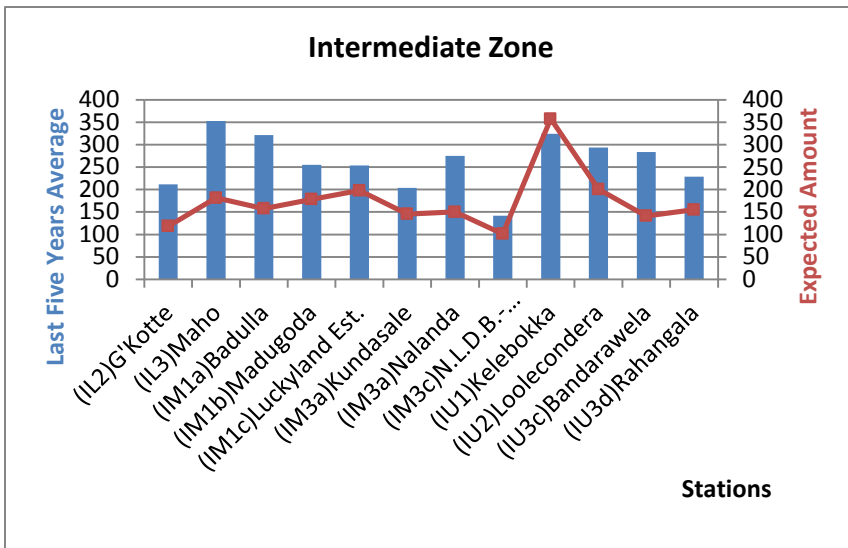
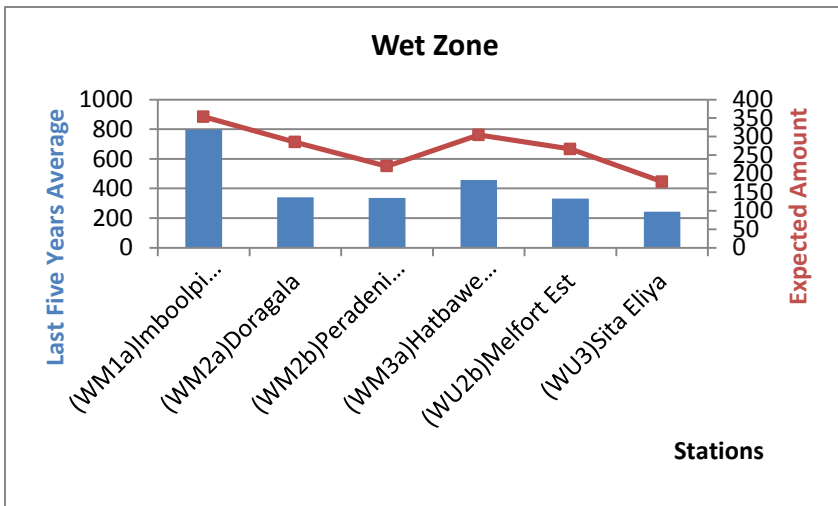
Rainfall Variability: Mahaweli Basin Meteorological Stations

Dr. B.V.R.Punyawardena, Climatologist, Natural Resources Management Centre, Department of Agriculture

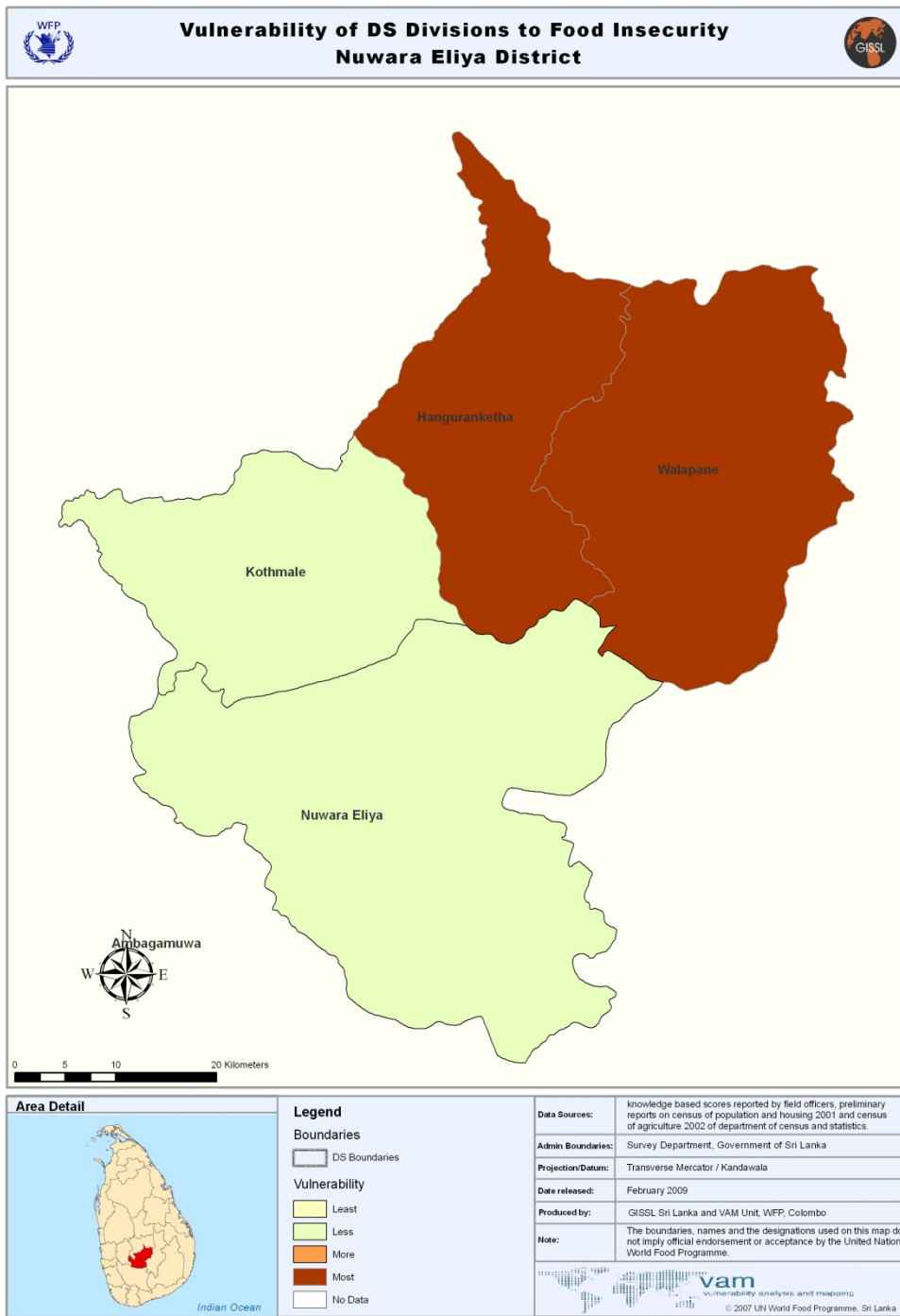
Rainfall of past five years measured against the long-term (60 year) norm

First Inter-monsoon- April





ANNEX 8. DIVISIONAL FOOD SECURITY ATLAS



Legend

Boundaries

DS Boundaries

Vulnerability

- Least
- Less
- More
- Most
- No Data

Data Sources:	knowledge based scores reported by field officers, preliminary reports on census of population and housing 2001 and census of agriculture 2002 of department of census and statistics.
Admin Boundaries:	Survey Department, Government of Sri Lanka
Projection/Datum:	Transverse Mercator / Kandawala
Date released:	February 2009
Produced by:	GISL Sri Lanka and VAM Unit, WFP, Colombo
Note:	The boundaries, names and the designations used on this map do not imply official endorsement or acceptance by the United Nations World Food Programme.

vam
vulnerability analysis and mapping
© 2007 UN World Food Programme, Sri Lanka



Vulnerability of DS Divisions to Food Insecurity Polonnaruwa District



0 5 10 20 Kilometers

Area Detail



Legend

- Boundaries**
- DS Boundaries
- Vulnerability**
- Least
 - Less
 - More
 - Most
 - No Data

Data Sources:	knowledge based scores reported by field officers, preliminary reports on census of population and housing 2001 and census of agriculture 2002 of department of census and statistics.
Admin Boundaries:	Survey Department, Government of Sri Lanka
Projection/Datum:	Transverse Mercator / Kandawala
Date released:	February 2009
Produced by:	GISSL Sri Lanka and VAM Unit, WFP, Colombo
Note:	The boundaries, names and the designations used on this map do not imply official endorsement or acceptance by the United Nations World Food Programme.



ANNEX 9: DIVISIONAL VULNERABILITY ANALYSIS

H - High
V.H - Very High
M - Moderate
L - Low
V.L - Very Low

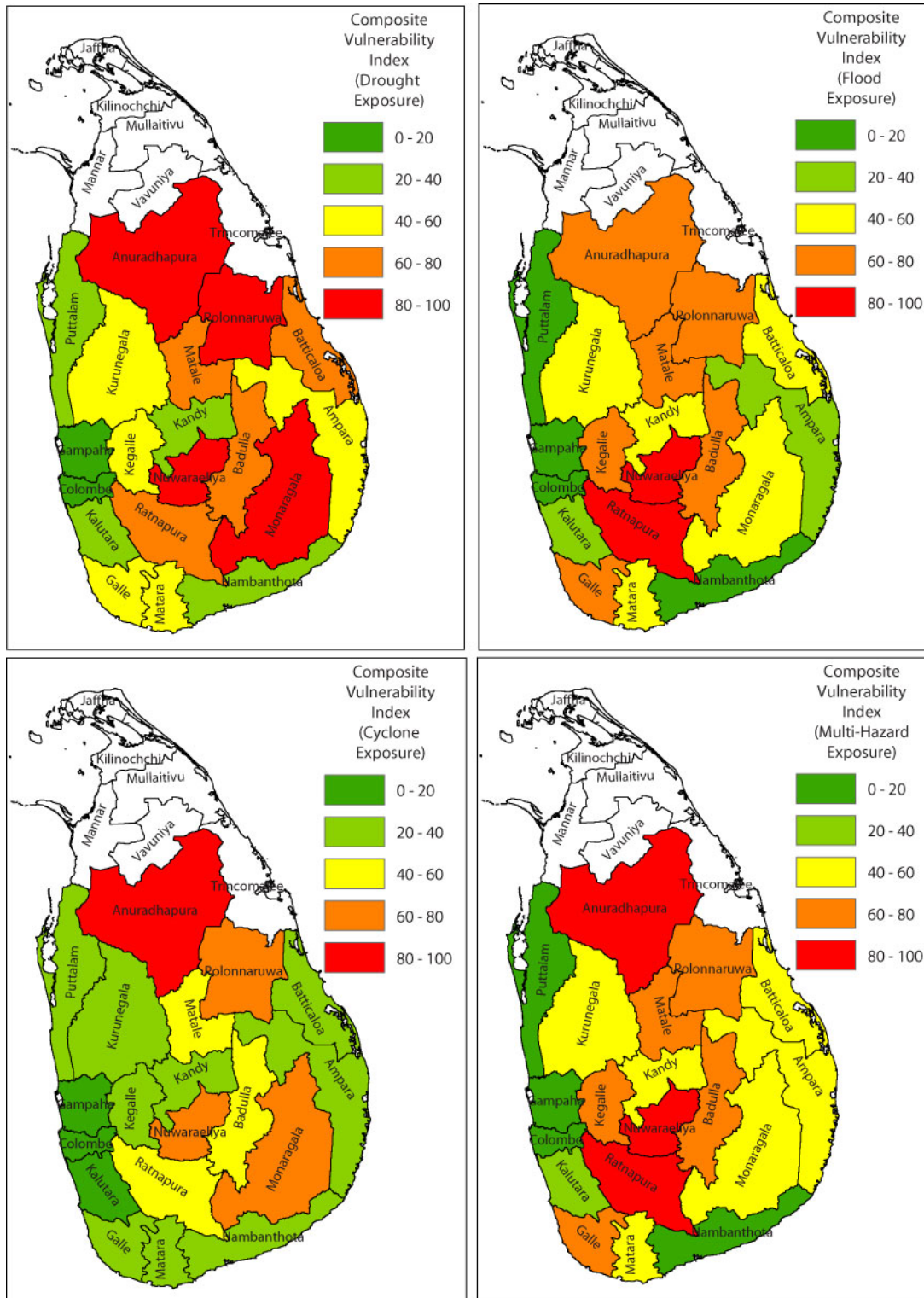
District	DS Division	Drought Risk	Landslide Risk	Irrigation Drought Exposure[1]	Drinking Water to Drought[2]	Erosivity(rainfall) /Erodability (soil)	Food Security (WFP)
Badulla	Mahiyangana	High		M	M	L	V.L
Badulla	Rideemaliyadda	High		M	H	L	L
Badulla	Kandeketiya	M	M		H	M	L
Badulla	Meegahakiula	M	M		H	M	L
Badulla	Paranagama	L	H		M	H	M
Badulla	Haliela	L	H			M	M
Badulla	Welimada		H			H	M
NuwaraEliya	Walapane	L	V.H			V.H	H
NuwaraEliya	Hanguranketha	L	H			V.H	H
NuwaraEliya	Nuwara Eliya	V.L	V.H			M	L
NuwaraEliya	Kotmale	V.L	H			H	L
Kandy	Pasbage Korale	V.L	V.H			H	
Kandy	Minipe	M				L	L
Kandy	Udadumbara	M	V.H			H	H
Kandy	Panwila	L	H			M	L
Kandy	Medadumbara	L	V.H			H	L
Kandy	Kundasala	L				M	M
Kandy	Harispattuwa	L	H			M	M
Kandy	Four Graveats	L	H			M	M
Kandy	Pathahewaheta	L	V.H			V.H	M
Kandy	Dolluwa	L	H			H	L
Kandy	Delthota	L	H			V.H	L
Kandy	Uda Palatha	V.L	H			H	M
Kandy	Ganga Ihala Korale		V.H			H	L
Matale	Pallepola	M	L			M	L
Matale	Wilgamuwa	H				L	H
Matale	Laggala-pallegama	M	M			L	H
Matale	Matale	M	M			M	M
Matale	Ambanganga Korale	L	M			M	L
Matale	Rattota	L				H	L
Matale	Ukuwela	L				M	L
Polonnaruwa	Medirigiriya	V.H		H	M		L

Polonnaruwa	Welikanda	V.H					L
Polonnaruwa	Lankapura	V.H					M
Polonnaruwa	Thamankaduwa	V.H					H
Polonnaruwa	Elahera	V.H					L
Polonnaruwa	Dimbulagala	V.H					L
Trincomalee	Muttur	V.H					H
Trincomalee	Kinniya	V.H					L
Trincomalee	Kantalai	V.H					L
Trincomalee	Seruwila	V.H					H

[1] and [2] National Climate Change Adaptation Strategy 2010. Sector Vulnerability Profile: Water

ANNEX 10: DISTRICT LEVEL VULNERABILITY MAPS BY INTERNATIONAL WATER MANAGEMENT INSTITUTE

Impacts of Climate Change on Water Resources and Agriculture in Sri Lanka: A Review and Preliminary Vulnerability Mapping: Eriyagama, N.; Smakhtin, V.; Chandrapala, L.; Fernando, K. 2010. International Water Management Institute. 51p. (IWM Research Report 135). [doi:10.5337/2010.211]



**ANNEX 11:
RESULTS OF FARMER AND OFFICER PARTICIPATORY STAKEHOLDER
ASSESSMENT DURING PROJECT DESIGN**

1. Experience and observations about climate change of officials working in agriculture extension in Mahaweli Basin **Catchment Area**

Experience/Observations	Observed (%)	Influence (%)		
		Low	Moderate	High
1. Increase of the maximum temperature	100	0	41	56
2. Increase of the minimum temperature	77	7	56	26
3. Increase of the average temperature	89	7	52	37
4. Water scarcity	92	7	26	63
5. Land slides	63	15	15	44
6. Loss of biodiversity	74	11	41	26
7. Reduce the crop yield	100	19	44	37
8. Change in the starting time of the seasons	100	11	52	30
9. Change of the duration for cultivation seasons	77	11	41	33
10. Increasing recurrence interval (frequency) of Floods	85	19	26	44
11. Increasing recurrence interval (frequency) of droughts	89	7	30	48
12. Increase of severity /duration of floods	85	15	30	41
13. Increase of severity /duration of droughts	92	15	37	37
14. High frequent land slide incidents	60	7	33	30
15. Frequent forest fires	92	4	7	41
16. Soil erosion	96	4	48	37
17.Reduce soil fertility	100	10	56	30
18. New pests and diseases for crops	81	10	37	37
19. New pests and diseases for livestock	81	17	52	19
20. Deepen ground water levels	96	14	37	41
21. Lack of water supply for irrigation	96	7	37	41
22. Reduced duration of irrigation water supplied	92	7	52	26

2. Experience and observations about climate change of officials working in agriculture extension in Mahaweli Basin **Command Area**

Experience/Observations	Observed (%)	How serious (%)		
		Low	Moderate	High
1. Increase of the maximum temperature	100		52	48
2. Increase of the minimum temperature	78	24	71	5
1. Increase of the average temperature	96	8	68	24
4. Water scarcity	100	8	50	42
5. Land slides	57	35	40	25
6. Loss of biodiversity	81	38	31	31
7. Reduce the crop yield	100	15	50	35
8. Change in the starting time of the seasons	92	7	59	33
9. Change of the duration for cultivation seasons	75	35	52	13
10. Increasing recurrence interval (frequency) of Floods	66	25	55	20
11. Increasing recurrence interval (frequency) of droughts	85	30	48	22
12. Increase of severity /duration of floods	68	35	35	30
13. Increase of severity /duration of droughts	92	28	52	20
14. High frequent land slide incidents	52	37	37	24
15. Frequent forest fires	44	47	29	23
16. Soil erosion	92	16	52	32
17. Reduce soil fertility	92	16	40	44
18. New pests and diseases for crops	100		55	44
19. New pests and diseases for livestock	66	30	55	15
20. Deepen ground water levels	88	12	64	24
21. Lack of water supply for irrigation	96	7	70	22
22. Reduced duration of irrigation water supply per season	77	33	41	25

Farmer Field Observations on Climate Change

Experience/Observation	Is it major climate change problem? (% agreed)
1. Change in the starting time of the seasons	90
2. Change of the duration for cultivation seasons	75
3. Reduced yield	65
4. Less amount of annual rain fall	85
5. Increasing recurrence interval (frequency) of floods	60
6. Increasing recurrence interval (frequency) of droughts	80
7. Increase of severity /duration of floods	45
8. Increase of severity /duration of droughts	75
9. High frequent land slide incidents	10
10. Frequent forest fires	30
11. Soil erosion	42
12. New pests and diseases for crops	55
13. Deepen ground water levels	43
14. Lack of water supply for irrigation	25
15. Reduced duration of irrigation water supply per season	35

ANNEXE 12: OUTCOMES OF STAKEHOLDER WORKSHOP IN KANDY, SEPTEMBER 2011

Participants List

Name	Designation	Institution
Ajith Silva	Director	Ministry of Environment
Dr. B.V.R Punyawardena	Climatologist	Department of Agriculture
Dr. S.M Somarathne	Consultant	Independent expert on agriculture
Dr. Ananda Mallawatantri	Assistant Resident Representative	UNDP
Janakie Meegastenna	Deputy Director	Irrigation Department
S.M.D de Alwis	Deputy Director	Irrigation Department
L.H.P Gunawardena	Head. Agri Business Centre	University of Peradeniya
S.C Nissanka	Engineer	Ceylon Electricity Board
Tilaka Samaratunga	Director	Mahaweli Authority of Sri Lanka
A.M.B.K Attanayake	Director, Environment	Mahaweli Authority of Sri Lanka
S.M.S.L Wickremasinghe	District Forest Officer, Kandy	Forest Department
Anoja Herath	Assistant Director	Climate Change Division, MoE
M.Azmey	Consultant	World Food Programme, Sri Lanka
Giancarlo Stopponi	Head of Programme	World Food Programme, Sri Lanka
Kitsiri Mullegagoda	Programme Officer	World Food Programme, Sri Lanka
Randall Purcell	Senior Advisor	World Food Programme, Rome

Summary Of Discussions on impacts and interventions in Mahaweli Basin

Hazard	District	Impacts	Interventions
<p>1. Increased land degradation (severity, extent, frequency and no. affected)</p> <p>Caused by rainfall intensity and variability</p>	Badulla, Nuwara Eliya, Kandy, Matale	Increased erosion/ Reduced soil fertility	Community based stabilization of sloping lands in vulnerable DSDs
		Increased siltation of downstream reservoirs	
		Damage infrastructure and loss of lives due to landslides	Soil and moisture conservation in vulnerable DSDs Landslide early warning and preparedness

		Socio-Economic impacts including nutrition and food insecurity, poverty	Agro-forestry including home gardens for erosion control and Diversified crop and livestock production systems introduced and promoted in vulnerable DSDs to buffer the effects of livelihood insecurity especially during Yala season.
2. <i>Increased frequency and duration of drought</i>	Polonnaruwa, Trincomallee, Badulla (Mahiyangana and Ridimaliyadda) Matale (Laggala Hettipola Division) Kandy (Hewaheta) Nuwara Eliya (Walapane)	Crop damage and loss	Changing cropping patterns and agronomic practices including crop diversification and short term varieties Rehabilitation and renovation of village tanks including catchment conservation. Drought forecasting developing long range forecasting capability with technology transfer and adjusting cropping seasons Technologies to improve water use efficiency in agriculture including micro irrigation
		Food and nutrition insecurity	Post harvest technologies including storing, processing and value addition
		Drinking water scarcity/ ground water depletion	Recharge ground water through new RWH ponds Domestic RWH
		Increased soil salinity	Management of soil salinity through drainage improvement and tolerant varieties
		Livestock losses	Enhanced feed availability for livestock
		Aggravated water related conflicts including HEC	Strengthening institutional capacities
		Frequent forest fires	Community based interventions for prevention of fire
		Increased pests and diseases	Integrated Pest Management

3. <i>Increased frequency of downstream flash floods</i>	Polonnaruwa Trincomalee	Crop damage and loss Livestock loss	Flood resistant agronomic practices including resistant crop varieties Improved drainage and water storage Stream Bank stabilization (biological and soft engineering)
		Increased water and vector borne diseases	Awareness and institutional preparedness
		Infrastructural damage to roads, irrigation and minor tanks	Technology transfer / strengthening of local authorities
		Interrupted market access	Flood early warning including institutional arrangements for improved preparedness
		Pollution of drinking water wells	Well Protection
		Food and nutrition insecurity	Post-harvest technologies including storage
		Loss of livelihood and increased poverty	Livelihood diversification, shift to perennial farming
3. <i>Strengthening adaptive planning capacity and knowledge management in the Mahaweli Basin</i>			Vulnerability risk mapping in the Mahaweli Basin
			Identifying and communicating climate risk information to vulnerable communities
			Training and developing capacity of local, divisional and district officials to apply climate risk information to development planning.
			Community based adaptation planning incorporated in to village development plans
			Share knowledge and build skills for wider replication and sustainability of project interventions

ANNEX 13: THE GENERAL STRUCTURE OF VULNERABILITY REDUCTION ASSESSMENT

What is the VRA?

- A participatory impact assessment tool used in UNDP’s Community Based Adaptation programming. Theoretically based on UNDP’s Adaptation Policy Framework
- VRA forms part of a comprehensive M&E framework, with locally defined impact indicators
- Designed to measure the success of an individual project AND compare the scores across a portfolio of projects demonstrating a programme-wide impact
- Flexible methodology which can be further defined to suit a range of communities and national contexts
- The VRA asks communities directly if the CBA activities are correctly targeted- whether the activities have directly contributed towards the objectives of the project. Therefore simply completing project activities is not an indication of success

The VRA is based on a set of 4 indicator questions. These questions are meant to test out the below listed conditions in the target community

- Assessing current vulnerability: Vulnerability of livelihood to existing climate change or variability
- Assessing future climate risks: Vulnerability of livelihood to emerging threats of climate change or variability
- Formulating an adaptation Strategy: Magnitude of barriers to adaptation (institutional, policy, technological, financial)
- Continuing the adaptation process: Ability and willingness of the community to manage climate change risks

Indicator	Question	Ranking
1. Assessing current vulnerability	How much is YOUR livelihood at risk from climate change or variability at present?	1. Extremely Negatively 2. Quite Negatively 3. Unable to Say 4. Positively 5. Quite Positively
2. Assessing future climate risks	If the current climate trend doubled in intensity, how would that affect your livelihood?	
3. Formulating an adaptation Strategy	What has held you back in taking some positive action in this regard? How large are these barriers?	
4. Continuing the adaptation process	How willing are you to continue the project interventions after the funded period?	

Scoring is done on the H-Form, either as a group, in several groups or individually.

<p>Reasons for negative response</p> <p>Reason</p> <p>Reason</p> <p>Reason</p>	<p style="text-align: center;">Question written here</p> <p style="text-align: center;">Unfavourable score Favourable score</p> <p style="text-align: center;">Very Bad Bad Moderate Good Very Good</p> <p style="text-align: center;">1 2 3 4 5</p> <hr/> <p style="text-align: center;">How could this score be improved?</p> <p>Comment</p> <p>Comment</p>	<p>Reasons for positive response</p> <p>Reason</p> <p>Reason</p> <p>Reason</p>
---	--	---

VRA Scoring

- Scores are developed either by averaging individual numerical responses to the question, or by arriving at a consensus score for each question
- A simple average of the four questions is used to develop a VRA score for the meeting- but this in itself is not such a useful score for planning, rather it becomes meaningful as it is measured at pre-and-post project stages
- The key quantitative output of the VRA is the degree of change from the baseline score
- VRA should be conducted for projects at least three times during their lifespan

ANNEX 14

FARMER ORGANISATIONS: STRUCTURE AND MANDATE

Farmers' Organisations in Sri Lanka are legal entities established under the Agrarian Development Act (no 46 of 2000). It is registered with the Department of Agrarian Development by application to the Commissioner General, who upon registration assigns each a number.

An area could have one or many Farmers' Organisations as determined by the Commissioner General of Agrarian Development. Every registered Farmer Organisation shall be a body corporate having perpetual succession and a common seal. Membership is open to every person whose livelihood is agricultural and above sixteen years of age and is resident of the area of authority of the Farmers' Organisation in which he is seeking membership or he has been engaged in agricultural activities in that area of authority for a period exceeding two years. Every Farmers' Organisation shall elect its own office bearers. Regulations may be made in respect of the manner of election of office bearers and their terms of office, manner of transaction of business at meetings of the organisations, functions of the organisations, maintenance of the accounts of the organisation and audit of such accounts.

A General Meeting of the members of a Farmers' Organisation shall be called in every year. When a Farmers' Organisation fails to convene a general meeting at least once in two years, the Agrarian Development Council of that area shall have the power to convene such meeting.

The government of Sri Lanka, through 1980s has attempted to transform the way irrigation schemes are operated, maintained, and financed. The aim was to improve productivity of irrigated agriculture and to reduce government expenditures on irrigation operations and maintenance. The core of this effort was a policy to transfer irrigation management responsibilities to farmer organizations. Farmer Organizations were meant to help improve water distribution and maintenance at the tertiary level and to provide representatives that could speak for the farmers to the government agencies. These 'participatory irrigation management' efforts were overseen by officers from key government agencies. There have been a number of efforts by government agencies both Department of Agrarian Development and Department of Irrigation to increase farmer participation in operation and maintenance of village irrigation systems and feeder channels of major irrigation systems in order to reduce government overheads in maintaining irrigation systems.

However, a number of factors contributed to farmer disinclination towards participatory irrigation management. Farmers tended to regard irrigation structures, whether major irrigation channels and headworks; or village tanks as state owned property through years of top-down rehabilitation interventions by successive governments since the 1930s and especially in 1970s and 1980s.¹

¹ Farmer Managed or State Managed: The case of Village Irrigation Tanks in Sri Lanka. Perera J,L (1985)

ANNEX 15: TERMS OF REFERENCE OF NATIONAL PROJECT MANAGER

The National Project Manager (PM) will be responsible for achieving the outputs and, hence, objectives of the project, and ensuring the co-operation and support from the executing and implementing entities.

The PM will be responsible for managing the implementation of the project, which includes personnel, subcontracts, training, equipment, administrative support and financial reporting under the guidance of the executing agency (MoE). The specific responsibilities of the PM will be to:

1. Set up and manage the project support unit (PSU), including staff facilities and services, in accordance with the project work plan;
2. Prepare and update project work plans, and submit these to Designated Director, MoE and Project Coordinator, WFP for clearance and ensure their implementation consistent with the provisions of the project document.
3. Ensure that all agreements with designated implementing agencies and responsible parties are prepared, negotiated and signed.
4. With respect to external project executing agencies:
 - a) ensure that they mobilize and deliver the inputs in accordance with their implementation agreement and contract, and
 - b) provide overall supervision and/or coordination of their work to ensure the production of the corresponding project outputs.
5. Act as a principal representative of the project during review meetings, evaluations and in discussions and, hence, be responsible for preparation of review and evaluation reports.
6. Ensure the timely mobilization and utilization of project personnel, subcontracts, training and equipment;
7. Assume direct responsibility for managing the project budget on behalf of MoE, ensuring that:
 - a) project funds are made available when needed, and are disbursed properly;
 - b) accounting records and supporting documents are kept;
 - c) required financial reports are prepared; and
 - d) the project is ready to stand up to audit at any time.
8. Exercise overall technical and administrative oversight of the project, including supervision of national and international personnel assigned to the project.
9. Report regularly to and keeps Project Management and Steering Committees up-to-date on project progress and problems, if any.
10. Ensure timely preparation and submission of required reports, including technical, financial, and study tour/fellowship reports;
11. Perform others coordinating tasks as appropriate for the successful implementation of the project in accordance with the project document.

Responsibilities on project completion and follow-up.

In order to ensure the efficient termination of project activities, the PM will:

1. Prepare a Terminal Report for consideration at the Terminal Tripartite Review meeting and submits a copy of this report to the WFP Country Director and designated Executing Agency's official for comments at least 12 weeks before the completion of the project;
2. Make a final check of all equipment purchased under the project through a physical inventory, indicating the condition of each equipment item and its location; discusses and agrees with the WFP and the implementing agent(s) the mode of disposition of such equipment and follow up on the exchange of letters among the WFP, Government and implementing agent(s) on the agreed manner of disposition of project equipment; take action to implement the agreed disposition of equipment in consultation with the project parties.
3. Ensure all terminal arrangements relating to project personnel are completed at the final closure of the project.

General qualifications

Education: Post-graduate level in Agriculture, Agrarian or Irrigation Management, Environmental Sciences or other fields related to Natural Resources Management.

Experience: At least 5 years work experience in the relevant area;
Demonstrated management experience and organizational capacity;

Skills: Good analytical skill
Good interpersonal and communication skills
Good computer skill

Language: Fluent in English

ANNEX 16: Seasonal Forecasts to avoid drought-damage to crops in the Mahaweli Basin

The Foundation for Environment, Climate and Technology (FECT) with the International Research Institute for climate and society (IRI) and Mahaweli Authority of Sri Lanka (MASL) initiated a project to apply climate information and prediction for water management in the Mahaweli Basin; exploring ways to integrate it into the Mahaweli Scheme's regular crop and water planning cycle. Climate Risk Management in the Mahaweli River Basin aimed to identify the source of necessary climate information and forecasts; develop hydro climatic models and tools and to generate a framework to support decision making. The project supported the establishment of the NASCOM (National Steering Committee on Seasonal Climate Predictions and Applications) with Mahaweli Authority and Irrigation Department to manage water resources in the Mahaweli Scheme in tandem with forecasts issued seasonally.

Seasonal interventions points were;

- In September (the beginning of the Maha or main cultivating season) decisions as to extent of rice cultivated based on water storage, farmer consultations and prediction for SIM (Second Inter-monsoon) and NEM (North East Monsoon).
- In April (Beginning of Yala or minor cultivating season) decisions of extent of rice and other field crops based on water storage, farmer consultations and irrigation managers

Climate information was needed at both points. The project's initial activities found that there was significant predictability for in-situ variables in the Mahaweli River Basin; and that climate variability and land use changes had to be taken in to account in analyses. It was proved that seasonal climate information could be profitably introduced to the basin management in a typical tropical setting.

However, this project focused seasonal forecasts for irrigation management that supported settler famers under the Mahaweli Development Scheme. Farmers who already had the benefit of large scale assured irrigation. The Adaptation Project on the other hand, hopes to build on training and forecast generation that the FECT project initiated to support a different clientele- rain-fed upland famers who are the project's target group. As such the Department of Agrarian Development would be the key stakeholder working with the Mahaweli Authority and Department of Agriculture to use generated climatic information to issue forecasts and crop recommendations to farming communities in minor irrigated or totally rain-fed farming areas.

This project, back in 2000 studied the failure of communication that led to the wrong forecast being issued in the 1997-1999 El Nino episode. Local media and application experts misinterpreted climate information that was flowing in from the western media, predicting drought and crop failure. They did not communicate crucial nuances in seasonal or regional variations that makes impacts in India totally different to those in Sri Lanka. As opposed to the drought conditions predicted by the international media for the entire sub-continent; Sri Lanka had more rainfall in the main seasons resulting in higher crop productions.

While knowledge of these variations were common to local and foreign climate scientists; the message transferred through local media and applications experts in water resources, health and agriculture (who relied on international forecasts) to farmers and extension officials was incorrect. Whereas in the El Nino event of 2002, local scientists presented a more indigenous view of the conditions in Sri Lanka during such an event, and prediction for near or above normal rainfall was issued by the Department of Agriculture, which was duly substantiated by the bumper rice crop of 2002-2003.

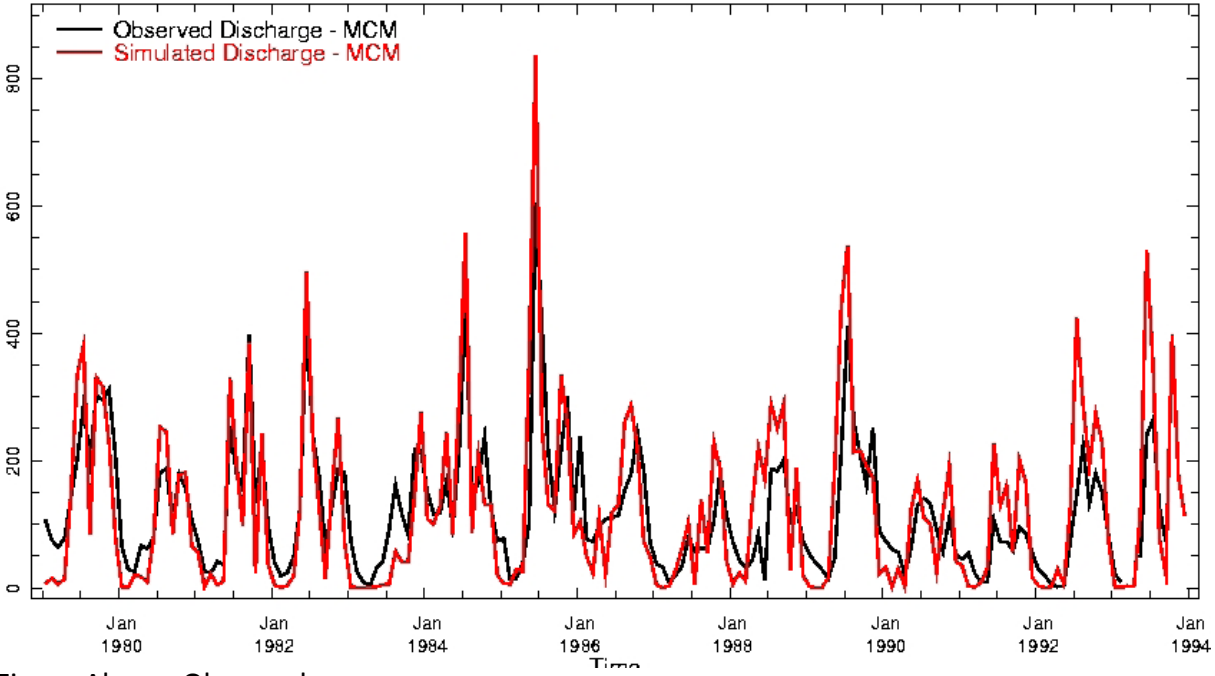
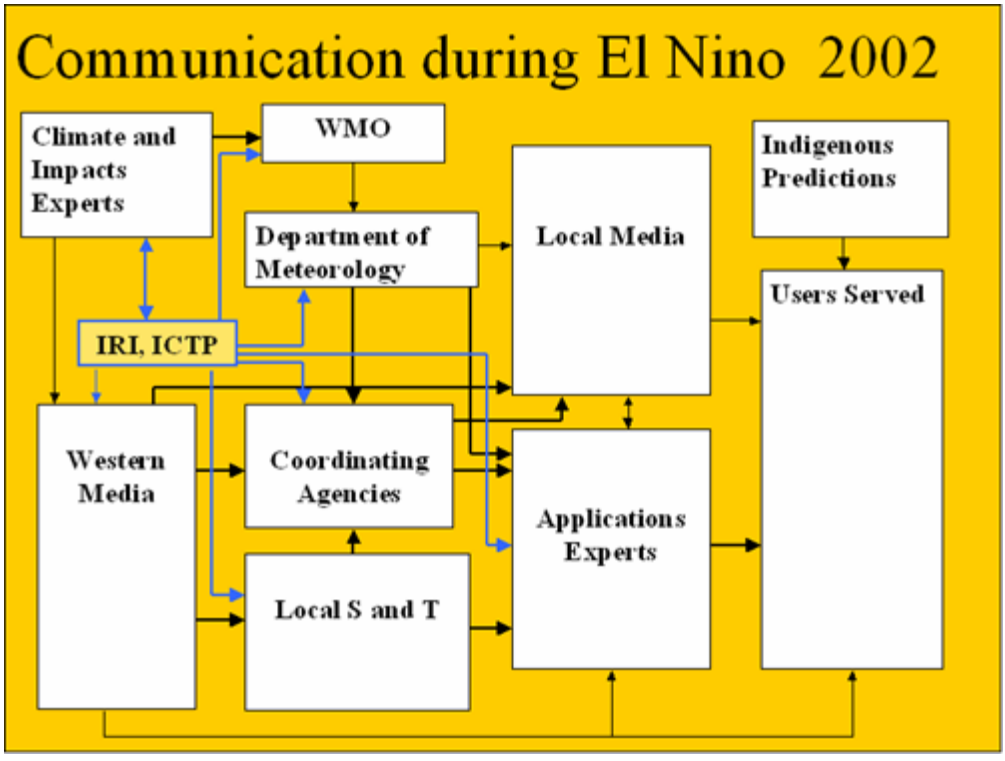


Figure Above: Observed and Simulated Discharge at Peradeniya. The simulation shows good fidelity to the observed records. The catchment model can generate soil moisture,

evaporation and other hydrological properties.



In 2002, the right information was communicated by local scientists to extension workers and media. Thus unlike in 1997 where both the impact of the El Nino on rainfall and agriculture was incorrectly communicated, a much better understanding of El Nino and its impacts were communicated.