Country Paper: Sri Lanka

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Country Profile

Geography

Sri Lanka lies in the Indian Ocean between north latitudes 5^0 55' to 9^0 51' and 79^0 41' to 81^0 53', east latitudes of the world. Sri Lanka covers an area of 65610 square kilo meters. The maximum length of the country is 432 km while 224 km of maximum width. Also, the 1700 km coastal area and 2905 square km inland water bodies consist in the Sri Lankan territory. The longest river aligned 335 km and the highest elevation point lay on 2524 meters above mean sea level.

Demography

The total population in Sri Lanka is 20.03 million in 2008. The Population growth rate is 1.31. The literacy rate is 94.5% and 90.65% of male and females respectively. The ethnicity of the population is 83.9%.sinhalese, 9% tamils and 6.4% moors and 0.7% of others. The expectation of life at birth is 71.7 & 77 years male and females respectively. The population lives in wet zone is 57% from the total.

Employment

Employment percentage in agriculture is 31.3% and 26.6% in industry sector. The services sector involves 42.1%.

Climate

Rainfall: The spatial distribution of mean annual rainfall over the island varies between 750 mm to 5500 mm within the country. Approximately, 2/3rd of land area of the country receives less than 2000 mm per annum. However, this amount is not well distributed over the year. Temporal rainfall variation shows bimodal distribution pattern in many parts of the country. The convectional convergence period (March to mid April) is characterized by the bright clear mornings, formation of clouds by the convectional activity in the early afternoon and thunderstorms in the late afternoon. The pre-monsoonal period (mid April to late May) is characterized by transitional weather pattern. During this period convectional activity is reduced and monsoon rains begin. The southwest monsoon period (late May to late September) begins the largest amount of rainfall to the southwestern lowlands and the windward side of the central highlands. The convectional cyclonic period (late September to late November) begin to weaken the monsoons and can include cyclones. The northeast monsoons (November to February) begins rainfall to the large extents of the lowland located in the eastern, northern and southern parts of the central highlands.
Due to this seasonality of rainfall, two dry periods can be clearly identified in many parts of the country. The length of the dry periods varies over the country. Generally shorter dry

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spell continues from mid January to mid March. The longer dry period extends from June to September. The two rainy periods are related to the two monsoons namely northeast and southwest. The two seasons are locally called "Maha" season and "Yala" season respectively. The Maha season extend from October to February and Yala season from March to September. Even if the total annual rainfall of Sri Lanka is comparatively high, year-to-year variation makes rainfall very unreliable.

Solar radiation: The solar radiation in the country varies between 275 - 400 cal/cm2/day during different months in different stations. The highest solar radiation is experienced in February and March and the lowest is in November and December.

Temperature: The mean monthly temperature of the island differs slightly depending on the seasonal movement of the sun with some modifying influence caused by rainfall. In the lowlands (below 300-m msl) the mean annual temperature is 27^0C with mean daily range of 6^0 C. Temperature changes with the changing elevation in the central highlands and generally temperature decreases by about 6 degrees per each rise of 1000 m from mean sea level. The temperature regime in Sri Lanka is favorable for plant growth in most parts of the country. Diurnal range of temperature is relatively small in the country.

Relative humidity: Relative humidity closely follows rainfall pattern of the region with diurnal differences caused by the warming effect of the sun during daytime and cooling effect of the night. RH values in the nights remain about 10% higher than the daytime RH. It remains above 70% through out the year in all parts of the country. Generally dry months record low values. The high RH is conducive for growth of plant pathogens.

Wind speed: High wind speed is damaging to some crops. Data show that wind speed varies over the year and over the country. May, June, July and August are windy months in most of the dry districts. During these months wind speed of over 20 km/hr is not uncommon.

Physiography

Based on elevation and nature of the terrain, five geomorphic regions can be identified; the coastal fringe, the central highlands, the south-west country, the east and southeast, and the north central lowlands. The central massif from which headwaters of all Sri Lanka's major rivers originates, is a compact physiographic unit bounded on the south by a high mountain, the Worlds End. The topography of the southwest; the other part of Sri Lanka's Wet Zone is characterized by long parallel ridges cut by the rivers beginning in the hill country. The eastern and south eastern lowlands are characterized by rolling hills, undulating plains and isolated residual hills. The coastal fringe has important fisheries and the region contains large parks and wildlife refuges that are home for wild elephants. The north central lowlands are somewhat similar to those in the east. In this region, the country's hydraulic civilization flourished.

Soils

The soils of Sri Lanka have been classified at great soil groups' level until recently and classified to soil series level now for major part. Mapping has been done at great group level and series level. Fourteen great soil groups have been described (Moorman and Panabokke, 1961). Generalized soil map of Sri Lanka is given in map. The chemical and physical properties of soil have been discussed by De Alwis and Panabokke (1972).

Land use

The total land area of Sri Lanka is approximately 6.56 million hectares. Out of this, nearly 300,000 ha are covered by water bodies. Present per capita land availability of the country is 0.3 ha. Moreover 2/3rd of the land area in the country falls within flat to undulating landform. The rest comprised of hilly and mountainous terrain where higher percentage of land area consists of highly dissected, steep slopes and narrow valleys.

Most recent scientific landuse mapping exercise undertaken by the Survey Department of Sri Lanka during 1983 - 1988 and the uses shown in these maps were grouped into 7 categories namely agricultural lands (arable), residential and buildup lands, forest lands, rangelands, water bodies, wetlands and barren lands.

Arable land extent of Sri Lanka is nearly 2.9 million hectares which are about 45% of the total land area of the country. The main agricultural land uses include paddy (27%) and plantation crops (tea, rubber and coconut, 24%). It has to be noted that about 44% of the agricultural lands are sparsely used which means that there remains a great potential for these lands to be properly developed / used. This is about 20% of the land area of the country. Traditional landuse in Sri Lanka had been rice lands in lowlands, and rainfed uplands and the homesteads in the uplands. Rice lands were irrigated from reservoirs or streams. The paddy lands provided the staple food rice while rainfed uplands provided coarse grains, pulses, oil seeds, vegetables and condiments. Homestead consists of house and perennial trees such as fruit and coconut.

This traditional landuse system in the country gradually changed with the influence of the western world starting from15th Century. An interest was developed to convert highlands to plantation crops. Cinnamon and Coconut were first established in coastal areas of the wet zone. Rapid change took place following introduction of coffee, tea and rubber plantations. Most of the forest in the wet zone was converted into plantations. This change of landuse resulted heavy soil erosion in the country.

In the dry zone, during the latter part of the 19th century, renovation of ancient irrigation schemes which had been abandoned was commenced. This resulted in clearing of forests for creating paddy fields and homesteads for new settlement schemes. Rapid increase of the irrigation extents in the country took place since 1930. This affected the traditional shifting cultivation where unavailability of forest lands made it impossible for farmers to have a sufficient fallow lands. This led farmers to do settled farming in the uplands. However low input farming practice continued in these lands and the result was an eroded upland with low production levels. This situation has posed challenges for land and water resources related researchers to put forward suitable / viable cropping systems to these situations.

Natural Resources Management

The Department of Agriculture has a separate centre of conducting research and development activities related to land and water resources and environment management. The vision of the Natural Resources Management Centre is to attain sustainable agricultural productivity through proper land and water resources management. The Center deals with Agro-meteorology where harness the potential of agro-climate for enhancing agricultural production while reducing the vulnerability to climate change, Soil surveying and land evaluation, Conservation Research and Development ,Geo-information and Remote Sensing, Water Resources Management, Soil Conservation Regulatory Division

Recent Developments in Agro-ecological Zoning

An agro-ecological region represents a particular combination of the natural characteristics of climate, soil and relief (Panabokke, 1996). When an agro-climatic map, which can be considered as areas where the integrated effect of climate is uniform throughout the area for crop production, is superimposed on soil and terrain the resulting map identifies agro-ecological regions in the island.

Sri Lanka was divided in to 24 agro-ecological regions (Panabokke and Kannangara, 1975). The differentiation of the Wet zone into its distinctive agro-ecological regions was governed primarily by differences in rainfall and elevation. In the Dry zone, on the other hand, it was the nature of the soil that primarily determines the identity of individual agro-ecological region. In the Intermediate zone, it was observed that rainfall, elevation and soil play an equally important role. According to this map, there were 10 agro-ecological regions in the Wet zone; 9 in the Intermediate zone and 5 in the Dry zone.

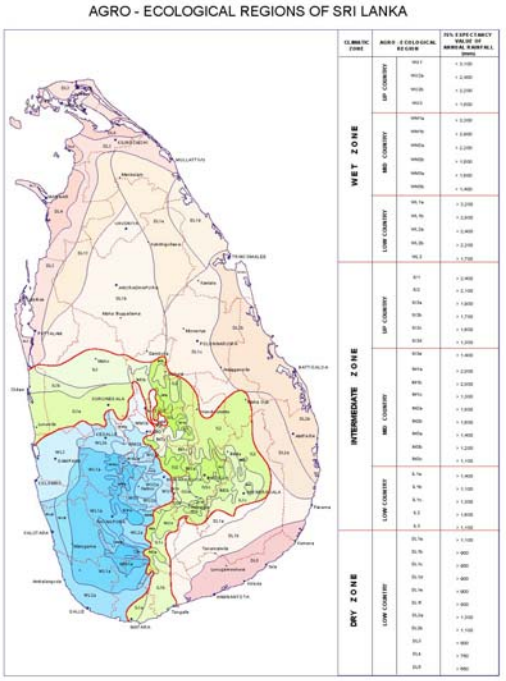

Figure 1: Agro-ecological map of Sri Lanka (2004)

In Sri Lanka the impacts of climate change is visible in the form of increased variability of seasonal rainfall (Punyawardene 2003), thus necessitates updating existing agro-ecological models. In view of the environmental change, availability of more spatial and temporal data and advancement of GIS technology led to the sub-division of 24 agro-ecological regions of Sri Lanka into a map with 46 agro-ecological sub-regions on an enhanced scale (Punyawardena et al, 2003). The demarcation of the island into 46 agro-ecological sub-regions is shown in the map (Fig.1). Months period from June to September is relatively dry. Low country Intermediate zone consists of 5 agro-ecological sub-regions. Other than IL2, all other agro-ecological sub-regions in the Low country Intermediate zone resemble a bi-modal rainfall distribution. Since Second Inter Monsoon (SIM) and NEM rains are the only effective rainy seasons in the region, the IL2 agro-ecological region exhibits a distinctly uni-modal rainfall distribution along with a long and pronounced dry period from April to September.

In the Dry zone, there are 11 agro-ecological sub-regions with distinct differences in rainfall distribution and edaphic features. The DL3, DL4 and DL5 agro-ecological regions of the Dry zone receive the lowest annual rainfall of the country along with some limitations of soils that are found in these regions. Out of 11 agro-ecological sub-regions, only DL1a and DL1b are characterized by two discernible peaks in the rainfall distribution and thus, support crops in

both Maha and Yala growing seasons. Those agro-ecological sub-regions found in the eastern sector of the Dry zone, i.e., DL1c, DL1d, DL1e and DL2a and DL2b, exhibit a distinct uni-modal rainfall pattern, and support only the crops in Maha season. The rest of the agro-ecological sub-regions of the Dry zone also support only the Maha crop since Yala rains in those sub-regions are not adequate to meet the evapotranspiration requirements (National Atlas of Sri Lanka, 2003).

Current Trends in Climate Change Vulnerability

Sri Lanka experienced in recent changes in climate change. Past few years are wetter years than the normal years and the rainfall is widely distributed

Effect of Temperature

Meanwhile, increasing ambient temperature is also inflicting several direct and indirect negative impacts on the crop growth. With the temperature increase more evaporation can be expected and this will substantially affect irrigation withdrawals. Higher temperatures, caused higher crop evaporative demand, mean that the general tendency would be towards an increase in irrigation demands. Due to higher temperature people tends to use more water and therefore high demand for water, ultimately heading to water scarcity. Also the projected temperature increase would degrade water quality by various means. Impacts of increasing temperature deserved a special attention under local conditions as the average temperature of the country has been rising annually at a rate of 0.01- 0.036 ^{o}C (Fernando and Chandrapala, 1995) as shown in figure 2.

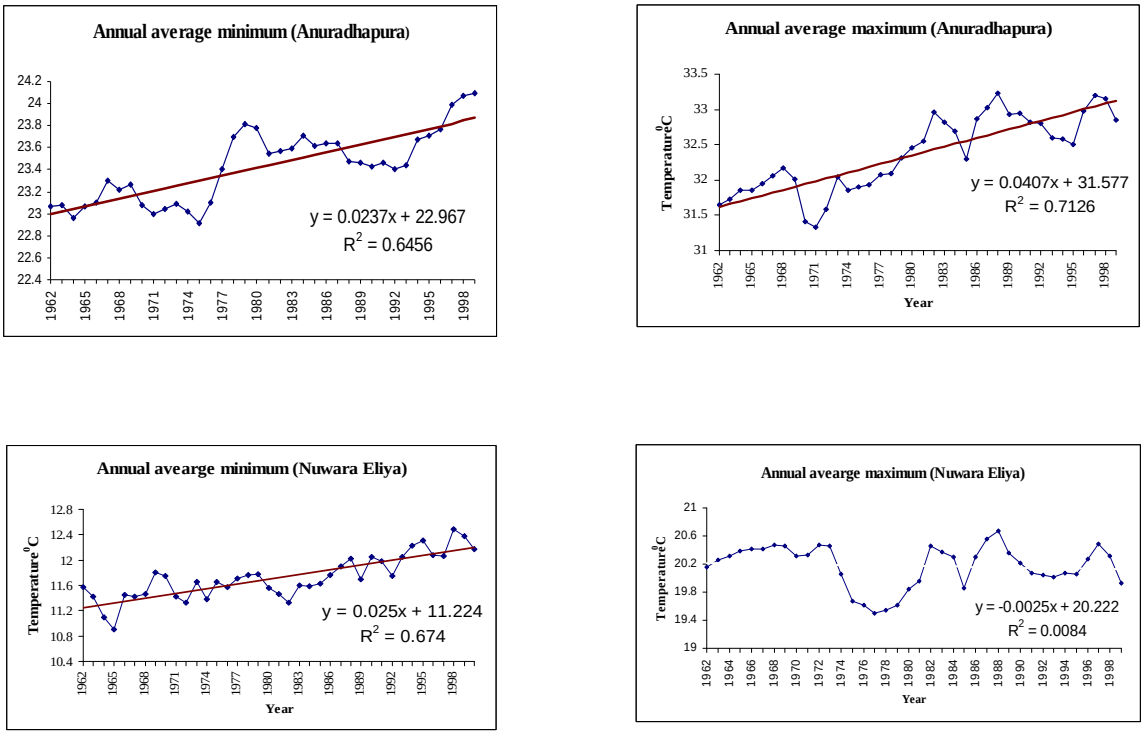

Figure 2: Trends of temperature changes in two locations of Sri Lanka

The notable effect was that rising temperature at Nuwara Eliya has remarkably affected the tuber formation and crop yield of Potato. Increasing temperature increases the respiration rates of many plants particularly rice grown the dry zone. This situation have already begun

to affect by yield lower rice yields in dry zone of the country which is the rice bowl of the country.

Effect of Rainfall

According to the results of General Circulation Models, the paramount issue in changes in precipitation will be the increase in extremes rather than a long-term change in average precipitation. That means high intense rain can be expected within a short period. This will lead to accelerating of soil erosion process. Already 33% of the land area of Sri Lanka is affected by soil erosion. Also the process of silting the reservoirs will be accelerated. (Eg: 54% of the Rantambe reservoir already been silted).

Table 1: Variability of all Sri Lanka rainfall during the period of 1931-60 and 1961-90 (Fernando and Chandrapala, 1995)

Season	CV (1931-60) %	CV (1961-90) %
First intermonsoon	23	27
Southwest monsoon	21	16
Second intermonsoon	22	23
Northeast monsoon	31	42
Year	11	14

Variability of both summer and winter monsoon rains and rains of convectional origin has increased significantly during recent decades (Table 1). As a result, both extremes i.e. water scarcity and excess water have become a recurrent problem in crop production in Sri Lanka. High intense rain can be expected within a short period and thereafter long drought period

Effect by the Recent Climatic Change

Lattter part of the year and early part of following year make the main growing season (wet seaseon) of the country. However, Sri Lanka experianced extreamly dry weather period during latter part of 2008 and early 2009 (Figure 3). The monsoon rains were delayed and was less than the expected resulting delay in the cropping season. Also already established crops were got affected by the seviour drought in January and February 2009. The target area of paddy for the Maha 2008/09 season was 752,975 ha. And predicted paddy production is 2.65 million mt. However, About 46,000 ha of paddy lands has affected by recent drought and expected production loss is about **112,000** mt. Crop damages are reported from major (8,341 ha) minor (14,814 ha) and rain-fed (22,535 ha) areas and the highest level of damage reported from rain-fed areas (17,774 ha with 50 –100 % loss). Total area damaged is 23,400ha (75-100% damage) and partial damages are reported from 22,870 ha. The estimated production loss is about **112,000 mt**. The highest extent of crop damage is reported from Moneragala district.

During this period the daily temperature was higher than that of mean temperature for the respective period and the RH was less than the mean values, experiencing high ET. That condition affected the pollen fertility of rice and created spikelet sterility in rice. This situation created lower grain yield in rice.

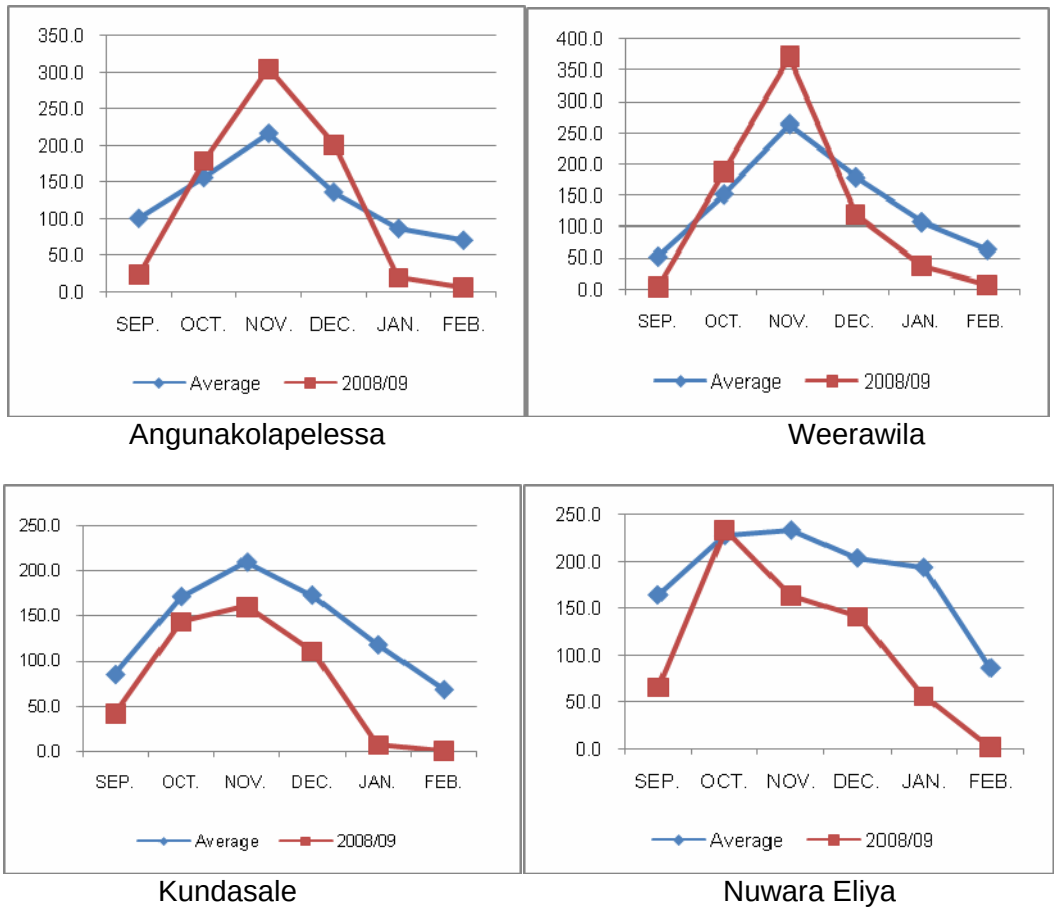

Figure 3: Average rainfall and the rainfall received during late 2008 and early 2009 at 3 locations in Sri Lanka.

The change in rainfall pattern has affected the fruit setting in tree-fruit crops. For example Rambutan needs about 3 week dry spell around late February or early march for flower initiation. However, in 2008 abnormal wet weather condition severely affected the rambutan production in the country

Also rainfall directly affect on cropping intensity and this is clearly illustrated by the Figure 4.

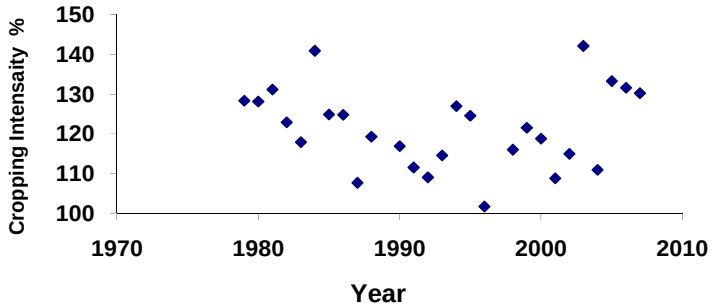

Figure 4: Change of cropping intensity (%) over the years

Sea Level Rise

Sri Lanka has a long coastline of 1660km and contains 24% of the land. Commercial ports and fishery harbors, principal road and rail infrastructure, richest areas of bio diversity are located along the coastline. Therefore coastline of Sri Lanka is very important in the context of Economy. Already 30% - 35% of the coastline is eroded at the rate of 0.3 – 0.5 meters per year. This will further increase with anticipated sea level rise, which will occur due to the projected increase in temperature. Salt-water intrusions are experienced in Sri Lanka due to high and low tide. A considerable land area which have been cultivated in past have been inundated due to see water intrution became saline. With the rise of see level this land area will be further increased and the people will be displaced. However technologies have to be developed to utilized these saline and potential saline fields.

Adaptation Measures

In spite of the technological advances made on improved crop management, irrigation, plant protection and fertilization, weather and climate are still key factors in agricultural productivity in any country. Farming systems and agronomic practices in most agricultural regions of Sri Lanka have evolved in close harmony with the prevailing climatic conditions of respective climatic regions of the island. However, it has been evident during recent decades that heritage of farming experiences and accumulated weather lore of centuries are no longer useful in the process of agricultural planning at any level. Climate of the island has undergone a change to such an extent that correct amount of rainfall does not come at the correct time of the growing season.

Increasing the buffer capacity is the appropriate adaptation measure, where buffer capacity should be considered in terms of increased water storage. At present Sri Lanka has an estimated 6 km^3 of potential storage capacity. This consists of 5.25 km^3 from major reservoirs, 0.38 km^3 from medium reservoirs and 0.41 km^3 from minor tanks. A substantial increase of this capacity by means of de-silting and rehabilitating existing storage tanks is required to overcome projected problems associated with increased extreme precipitation events. Water saving methods such as micro irrigation practices, moisture conservation practices, rainwater harvesting can be introduced to the farmers. As these methods are very expensive, government should help the farmers by means of subsidy or a loan. Re-use of drainage water is also a good adaptation measure, only if it suitable for reuse.

However, intensively managed livestock sector of the country is not so vulnerable to climate change compared to the impacts of the food crops sector. But, the situation is obviously different for extensively managed livestock sector where it is purely dependent on the rainfed pastoral systems. Meanwhile, additional pressure coming from ever-increasing population, poor terms of trade, weak infrastructure, lack of access to modern technology and information and civil disturbances will restrict the options available for people to cope with the negative consequences of climate change (Punyawardena, 2002).

Policy

Suggested Adaptation Strategies – Technical

- promote micro-irrigation (drip, sprinkler etc.);
- upland annual crop cultivation in the DZ to be transformed to perennial fruit crop cultivation with intensive irrigation management practices wherever possible;
- crop recommendation based on the agro-ecological suitability;
- promote on-farm soil and moisture conservation;
- rain water harvesting (domestic and on-farm)
- rehabilitation of irrigation canal network
- rehabilitation of minor tanks to operate at their design capacity ;
- re-use of drainage water, if suitable;
- use of tail water recovery pits for lift irrigation;
- program to improve the water use and conveyance efficiency;

- breeding for short age varieties;
- strengthen the breeding program for;
  - drought resistance
  - high temperature resistance
  - pest and disease resistance
  - salt resistance
- effective use of long range weather forecasting for agricultural planning;
- periodic revision of fertilizer recommendations;
- soil test based fertilizer application;

Suggested Adaptation Strategies – Policy Reforms

Although direct policies on climate change still to be formulated for Sri Lanka, However, there are number of policy implications have been adopted without knowing the effect of climate change. The present Soil Conservation act, National Environmental Act, Coast conservation act, Irrigation act, Agrarian service act and Policies developed in respect to those contained some policy guidelines is used at present. However direct policies in this regards should be developed.

- implementation of the Soil Conservation Act (1996);
- strict enforcement of National Environmental Act and other related ordinances;
- Adoption of proper national land use policy;
- easy credit schemes;
  - soil and moisture conservation
  - micro-irrigation
  - storage and processing
  - high quality seeds
- large scale drainage improvement projects in the LCWZ;
- develop guidelines for rational use of ground water;
- seek feasibility of any more trans-basin diversion of major rivers???;
- effective marketing strategy;
- a consistent government policy on every aspect of the economy lasting for a few decades ahead.

Impacts due to Increased Sea Level

Being an island Sri Lanka is highly vulnerable to sea level rise with varying degree of sectoral impacts. It is highly confident that sea water intrusion to agricultural lands will be inevitable event under a changing climate which will lead to further reduction of land available for agriculture. Increased sea level rise will also exacerbate the coastal erosion giving rise some additional pressure on land available for agriculture, directly and indirectly. Also, it may reduce the quality of both drinking and irrigation water in coastal regions by disturbing the interface between fresh and brackish water. It is highly likely that sea level rise will disturb the Gyben-Herzberg lens of fresh water found underneath of Regosol in coastal regions. These fresh water lenses provide the irrigation water for intensive agriculture in those regions.

Government investment in Climate Change and Natural Resources Management Fisheries and Aquaculture

Project/ Program	Purpose & issues addressed Beneficiaries & project area	Project status, time frame Description of implementation Process	Implementing Agency	Funding agency budget	Success/ Failures/ Constraints
Culture Based Fisheries in Seasonal Reservoirs	To contribute to the inland freshwater fish production To train & mobilize agrarian communities in culture based fisheries as a means of livelihood development To develop a scientific methodology for culture based fisheries	1998 to 2005 in 2 phases NAQDA and the University of Kelaniya jointly collaborated in this program with community participation	University of Kelaniya in collaboration with NAQDA	Australian Centre for International Agriculture Research (ACIAR)	Successful. Research results being used today for implementation of culture based fisheries
Reservoir Fisheries Management	To mobilize fisher communities in to fisheries societies and train them in sustainable utilization of reservoir fish resources	2000to 2004. This project was implemented by the officers of GTZ. NAQDA officers also assisted in implementation of the project.	GTZ implemented the project	German Technical Cooperation Program (GTZ)	Successful
Culture based fisheries in seasonal tanks & minor perennial tanks in the arid and semi-arid zones	Increase freshwater fish production through culture based fisheries Train fisher communities in culture based fisheries Train the fisher communities in business plan development for sustainable development and management of culture based fisheries in minor perennial tanks and seasonal tanks	Ongoing. So far fro 2003 to 2006, a total of 1800 Ha of seasonal tanks an d 8000 Ha of minor perennial tanks and 8000 ha of minor perennial tanks have been stocked		Asian Development Bank funded aquaculture Resource development & Quality Improvement Project (ARDQIP)	Successful
Post-Tsunami coastal rehabilitation and resource management program	The Program focuses on development of small scale fisheries and non-fisheries economic activities in the tsunami affected areas. It includes components for a) coastal resources management; b) small scale fisheries development; c) micro-enterprise and financial services development; d) social and economic infrastructure; and e) gender, policy support and program management. The target group includes poor rural women and men in tsunami affected communities.	On-going. USD 39.6 million of which USD 34.6 million loan. Co-funded by the Global Environmental Fund (GEF)	UNOPS	IFAD/ GEF	Women and men have recovered their assets, re-established their economic activities by diversification to new and profitable income generating activities. Communities strengthened; coastal resources managed sustainably; establishment of essential social and economic infrastructure.

Water Management

Project/ Program	Purpose and issues addressed Beneficiaries and project area	Project status, Time frame, Description of implementation process	Implementing Agency	Funding agency and budget	Success/failure constraints
Menik Ganga Diversion Project (Weheragala Reservoir) for Monaragala and Hambantota Districts	Augment irrigation supply to 5000 ha of water short lands under Lunugamwehera Project benefiting 2600 farm families while improving the drinking water supply	On-going; Nov 2005 – Dec 2006 but delayed up to end 2008; engineering works undertaken by Irrigation Department	Irrigation Dept. guided by Ministry of Irrigation.	GOSL RsM 1772.0	Delays in construction and excavation work owing to shortage of funds and technical staff;
2. Construction of Deduru Oyo reservoir For Kurunegala and Puttalam Districts	Will augment irrigation supply to 11000 ha under Magalla and Inginimitiya schemes and highland along the supply canal benefiting 14000 families.	On-going; March 2007 onwards	Irrigation Dept. guided by Ministry of Irrigation.	GOSL RsM 6500.0	700 families to be resettled with facilities; Shortage of technical staff.
3. Weli oya Diversion for Monaragala district	Provide assured irrigation to 1519 ha rice lands, benefiting 1750 families.	Completed;	Irrigation Dept. guided by Ministry of Irrigation.	GOSL RsM 998.0	Downstream development is not complete.
4. Hambantota Irrigation Rehabilitation Project	Assured water supply to 11,165 ha rice lands under Muruthawela and Urubokka Schemes benefiting 19,100 families.	Completed;	Irrigation Dept. guided by Ministry of Irrigation	GOSL and Credit from Kuwait Fund for Agricultural Development. RsM 1172.	
5. Rambukkan oya Reservoir for Ampara and Batticaloa Districts	Irrigation for 2000ha new lands	On-going; Dec 2006 started	Irrigation Dept. guided by Ministry of Irrigation.	GOSL; RsM 2500.0	Shortage of funds and inadequate fund allocation from the Govt and the Donor
6. Uma oya diversion for Badulla, Monaragala and Hambantota districts.	Augment and supply irrigation to 11500 ha of new and existing lands benefiting 10000 families; 90 MW electricity; Drinking Water for 4000 families.	Feasibility study completed; Project office opened from Jan 2008.	Ministry of Irrigation and Water Management	GOSL with Credit from Iranian Fund for Development RsM 15000.0	Shortage of machinery and equipment Shortage of staff
7. Sustainable Agricultural Water Management Project	Introduce pressurised micro irrigation with zero fuel cost and low labour use for 5000 families having an agro- well in rainfed dry zone areas	On-going; Phase I from Jan 2005 to Dec 2006; Phase II to be started soon.	Ministry of Agricultural Development and Agrarian Services	GOSL with Australian Aid RsM. 1610.0 Phase II-RsM. 1610.0	Had given good income for farmers; successful results; difficult to identify genuine farmers; salinity of water was a constraint.

Natural Resource Management

Project/ Program	Purpose and issues addressed Beneficiaries and project area	Project status, Time frame, Description of implementation process	Implementing Agency	Funding agency and budget	Success/ failure constraints
Program 3 : Enabling and Supportive Livelihood **Sub-Program** Natural Resources Management **On going** Implementation of soil conservation act	**Purpose :** To improve land productivity and smallholder income through sustainable use of natural resources base **Issues addressed:** Natural Resources Management & land use Planning, Soil and Water conservation, Conservation Agriculture, Physical Conservation measures **Beneficiaries:** Direct beneficiaries are dweller in selected catchments, Other beneficiaries are those who are receiving the improved technology through dissemination **Project areas :** Selected micro watersheds in mid and up country wet & intermediate zone and also in dry zone during the second half. Disseminate and implement soil conservation activities in farmers field Soil erosion prone areas in fields of Farmers , individuals in plantation agriculture, in Mid and Up country, particularly upper watersheds	**Project status** New **Time frame :** Five years **Implementation process**; Implementation through Natural Resources Management Centre, DOA and obtaining inputs from relevant stakeholder agencies On going & continuous	Natural Resources Management Centre of DOA Natural Resources Management Centre of DOA	US Dollars 20,000 2. million	Improvement of livelihood Inability subsidize soil conservation activities, lack of collaboration,
Drought mitigation					
Drought mitigation in selected districts	• To minimize crop failure by introducing and promoting distribution of quality seeds in to farmers in drought prone areas, especially in remote villages. • To promote drought tolerant agriculture methods and make ground water assessment maps available. • To promote soil rehabilitation programs, and use of micro irrigation facilities in drought prone areas. • To improve management of drinking water supply	Year 1-10 (2006-2015) Short, Medium and Longterm	Disaster Management Centre	USD 4.5 million	On going
Capacity Building					

Enhancing Training Capacities	• To increase capacity of faculty members to obtain knowledge on the state of the art technology and skills related to DRM subject and to enhance resources for training.	Year 1-2 (2006-2007) Short term	Disaster Management Centre	USD 2 million	
Distribution of flood resistant crop varieties Distribution of flood resistant crop varieties	• Preservation of flood Resistant varieties and seeds. • Breeding of flood resistar seeds. • Distribution of flood Resistance seeds to the farmers in flood prone areas.	Commenced in 2005 and is to be completed in 2008. Low cost loans and technical assistance are provided complying with the regulations and standards stipulated by the National Environmental Act.	Project Management Unit under the Ministry of Enterprise Development & Investment Promotion	JBIC The total project cost is Rs. 4817 mn.	Implementing successfully