Case study: Climate Rationale in Sri Lanka- Approved GCF Project

“Strengthening the resilience of smallholder farmers in the Dry Zone to Climate variability and Extreme events through an integrated approach to water management project (CRIWMP)”

Presenter : Eng. G.S.C Rodrigo
Project Director,
Climate Resilient Integrated Water Management Project (CRIWMP)
Ministry of Mahaweli Development & Environment
Sri Lanka
Lineup of the Presentation

- Climate Rationale and the Project Intervention
  - Climate change, evidences & predictions in Sri Lanka
  - Climate Impacts for the country
  - Vulnerability, Project geography and beneficiary selection while addressing the adverse climate impacts
- Project Objective
- Flow of the project activities addressing the adverse climate impacts
- Outputs/Components of the Project
- Paradigm Shift
Climate Rationale and the Project Intervention

CLIMATE CHANGE
Scientific underpinning for evidence-based climate rationale and theory of change of all GCF-funded projects and activities

CLIMATE IMPACT

Adaptation
- 2a) Climate impacts the project/programme aims to address
- 2b) Vulnerabilities, exposure and hazards resulting in risks

Mitigation
- 2a) Emission trajectory for the relevant country and sector
- 2b) Potential pathways to shift projected emissions trajectory

VULNERABILITY

INTERVENTION

- 3) Prioritized interventions for addressing barriers based on a multi-criteria analysis of options

PARADIGM SHIFT

- 4) Integration to broader domestic and international policy and decision-making processes
Climate Change Evidences and Predictions in Sri Lanka
Evidences in Rain Fall changes

Normal RF pattern in Sri Lanka

Maha

Yala

MAHA
North-East Monsoon
(Dec – Feb) reduced and
Variability
Increased (unpredicted pattern
of the rainfall)

YALA
South-West
Monsoon
(May – Sept)
stable

Source: Eriyagama 2009
Impact in RF changes

- Two main cultivation seasons are based on this Bimodal RF pattern
  - Yala - May-Sep
  - Maha - Dec-Feb

- Maha - Is the main Cultivation season of the country, where the DZ gets more rain for their cultivation from North East Monsoon

- Studies shows that there is variability of the North East Monsoon and reduction in RF amount.

- So the DZ farmers can’t plan the season due to unpredictable RF pattern
No of days with greater than 150mm Rainfall: 2000-2016

Source: Met Department, 2016
• This figure shows an increasing trend in number of days with high intensity Rain Fall per year

• It can be assumed that In future we can expect frequent high Intensity RFs: therefore frequent extreme events could be expected

• This can be adversely impact for the environment
Climate change predictions in Sri Lanka: warming trends
Change of Average Annual Temperature—Year 2020 & 2050

Temperature: Warming trends
Expected warming Trends

• The rate of increase of the temperature in the island has been categorized into three zones.

• It is predicted that, high rate temperature increase zone will be expanding in the future

• In other term, many parts of the country could expect a rise of temperature in the future
Climate change evidences in Sri Lanka: Extreme events 2016

COLOMBO
Comparison of 2016 rainfall with Average

Heavy Rain in mid-May and moderate rain in early June followed by a long dry period until mid-October

From: Met Department, 2016
Climate Impact
In 2014......

**Sri Lanka: Floods and Landslides - Dec 2014**
Affected countries: Sri Lanka

By 5 Jan 2015, an estimated 1.1 million people had been affected by floods, landslides and high winds since 19 Dec 2014 in 22 of 25 districts; 39 deaths had been reported. More than 30,000 people were staying in 230 safety centres in 17 districts. Over 6,400 houses were reportedly destroyed and an...

**Sri Lanka: Drought - Aug 2014**
Affected countries: Sri Lanka

The northeast monsoon, which supplies water for agriculture across the key paddy producing areas of Sri Lanka, received below average rainfall for consecutive months between September 2013 and March 2014, leading to prolonged drought across most of the country. By April 2014, over 728,000 people...

**Sri Lanka: Floods and Landslides - Jun 2014**
Affected countries: Sri Lanka

With the arrival of Southwest monsoon, the southern region of Sri Lanka received heavy rainfall with high winds within a short period of time in early June 2014. Kalutara district alone received 378mm of rainfall within six hours on 4 Jun, causing a massive landslide in the area. The floods and...
Impact of Adverse Weather Events-2014

• This news reported three adverse weather impacts for the country within the year 2014
  • June : WZ of the country affected by high intensity Rf (63mm/hr), flood and land slides
  • Aug : DZ affected by heavy drought (Drought prevails since September, 2013) 728,000 people affected
  • Dec : Flood, Land slides, High winds, most of the area in SL  (1.1 Mn People affected)

• Different areas were affected from different weather events at the same period
More floods !! More droughts !!
<table>
<thead>
<tr>
<th>Year</th>
<th>Cyclone</th>
<th>Drought</th>
<th>Flood</th>
<th>Landslides</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>17,662,054</td>
<td>19,921,772</td>
<td>159,111,089</td>
<td>22,586,775</td>
</tr>
<tr>
<td>2008</td>
<td>11,675,820</td>
<td>15,286,758</td>
<td>210,339,335</td>
<td>20,502,716</td>
</tr>
<tr>
<td>2009</td>
<td>4,387,936</td>
<td>27,655,774</td>
<td>202,680,398</td>
<td>4,928,667</td>
</tr>
<tr>
<td>2010</td>
<td>8,678,239</td>
<td>16,308,306</td>
<td>244,091,220</td>
<td>3,252,698</td>
</tr>
<tr>
<td>2011</td>
<td>20,997,295</td>
<td>12,263,596</td>
<td>589,835,798</td>
<td>34,397,743</td>
</tr>
<tr>
<td>2012</td>
<td>39,878,511</td>
<td>235,380,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>63,401,344</td>
<td>131,314,317</td>
<td>1,641,437,840</td>
<td>85,668,599</td>
</tr>
</tbody>
</table>
Project Objective

To strengthen the resilience of smallholder farmers, particularly women, in the Dry Zone, to Climate variability and Extreme events through improved water management to enhance lives and livelihoods.
Vulnerability
Base for selection of Project area: Three river basins (Across Natural Boundaries)

Highly unreliable water yields
Flood affected Grama Niladhari divisions in Malwathu Oya River Basin
Selected Project Area

• The project is implementing within three natural boundaries, Mi- Oya, Yan Oya and Malwathu Oya river basins which covers a large part of the dry zone

• These rivers are important when considering the vulnerability (of the community) to climate change, as the water yields in these rivers are really unreliable
District Vulnerability Ranking

By UNDP and Natural Resources Management Centre, Department of Agriculture

Most of these districts within the three river basins have most higher vulnerability index
Targeted Geographies and Beneficiaries

- High intensity of Village Irrigation System (tanks) areas
- Presence of vulnerable farmers;
- Significantly lack of drinking water
- High incidence of Chronic Kidney Disease of unknown origin

Map shows the CKDu Risk Rank
People in Mathavaithakulam cascade in Vauniya meet their drinking water requirement currently
People in Mathavaithakulam cascade in Vauniya meet their drinking water requirement
vulnerable women groups in the project area
## Project Budget Approx.

<table>
<thead>
<tr>
<th>Output</th>
<th>Description</th>
<th>GCF Grant (USD, Million)</th>
<th>GoSL Grant (USD, Million)</th>
<th>Budget (USD, Million)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Upgrading village irrigation systems and promoting climate-resilient farming practices in three river basins of the Dry Zone</td>
<td>21</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>2</td>
<td>Enhancing climate resilient, decentralized water supply and management solutions</td>
<td>10</td>
<td>6</td>
<td>16</td>
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<tr>
<td>3</td>
<td>Strengthening climate and hydrological observing and forecasting system to enhance water management and adaptive capacity</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Project Management</td>
<td>3</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>38</td>
<td>14</td>
<td>52</td>
</tr>
</tbody>
</table>
• 770,500 (of which 51% female) men, women and children will be directly benefited from improved access to water for agriculture and drinking, and improved climate related advanced warning.

• At least another 1,179,874 (of which 51% female) living in the three river basin and adjacent districts will be indirectly benefited from improved services from Agrarian Service Centers and early warning systems on weather
Targeted beneficiaries were based on vulnerability criteria including:

- Women headed households
- Young unemployed women in target villages
- Households with disability or kidney disease
- Conflict displaced/resettled
- Flood affected in the last five years
- Families with children/women displaying malnutrition (underweight/anaemic)
Upgrading village irrigation systems and promoting climate resilient farming practices in three river basins of the Dry Zone
Com 1: Upgrading village irrigation systems and promoting climate-resilient farming practices in three river basins of the Dry Zone

Key activities:

Develop climate resilient water management plans for village irrigation cascades - around 325 village Irrigation systems in 15-20 cascades in Mi, Malwathu and Yan Oya river basins

Why Cascade Village Irrigation Systems should be improved?? It is historically sustainable
Cascade water management system in SL
Some facts regarding VIS (Minor Tanks)

• 50% of Sri Lankan minor tanks are not functioning
• Imbalances between the catchment and the command areas due to illegal human activities.
• There is a difficulty to continue customary water management practices due to changes in social and cultural values
• Land fire for Chena cultivation
Human Interventions in the Sembige tank’s catchment of the Sivalakulama cascade within the Project area

Land Firing for chena cultivation
Project Interventions
Output 1
Thammanekkulam Tank
MATHAVILTHAKULAM CASCADE - Vauniya
Output 1- Climate Smart Agriculture (CSA)

- Drought/flood tolerant crops
- Water conservation practices
- Perennial crops in home gardens to enrich the catchment
- Ecological farming to protect drinking water source
- Crop diversification
- Different livelihood options
- Farmer markets
Integrated water management approach and Climate Smart Agriculture

- develop institutional capacities - of Agrarian Service Centers
- rehabilitation of irrigation facilities
- restoration of watersheds
- practice climate-smart and ecological agriculture
- targeting women farmers in the selected cascades
- improve markets
- participatory operations and maintenance plans-

To strengthen the resilience of vulnerable communities to Climate variability and extreme weather events
Farmer training on soil conservation bund and making the contour soil bunds
Dumbuluwagama Tank - Palugaswewa Cascade - Anuradhapura
Enhancing decentralized water supply and management solutions to provide access to safe drinking water to vulnerable communities
Drinking water solutions

35 Rural Water Supply Schemes

4000 Rain Water Harvesting Tanks

125 Advance Filtration systems
Water Source identification
Mottapeththawa Cascade - Kurunegala
Rain Water Harvesting - Output 02
MATHAVILTHAKULAM CASCADE - Vaumiya

2. Climate risk incorporated SOPs

3. Water source protection committees

4. Women organizations to manage systems

Water supply systems (RWSS/RWH/AFS)
• Cascade level water resource planning:
  • Manage available water within the cascade in optimum manner (Rain water use, Ground water use & surface water use)

• Climate Risk Incorporated SOP’s
  • Drought time: Water Pumping Durations, Water Pumping Rates, Cost maintenance
  • Flood time: Pump Protection, Chlorination dosage, Warning Communication

• Water Source Protection Committees:
  Mainly consider the water quality of the source
  Total water shed will be managed in different ways:
    Use of agro chemicals/ waste dumping sites / Cattle houses/ flow of other water streams/ Deforestation in spring area

• Women organizations to manage systems
  • Income generation for women – Bill reading, finance management, Leadership, O & M system
Strengthening climate and hydrological observing and forecasting systems to enhance water management and adaptive capacity of smallholder farmers to droughts and floods
Monitoring Agro – Meteorological data in the basins

Capacity Building
Department of Meteorology
Irrigation Department

Department of Meteorology (DOA/NRMC)

Co – Development of advisories, Disaster Preparedness Plan

Sub-national Level Agencies (DOPA, ASC, ID, DMC, DS, Div Sec) and Farmer Organizations

AWS, ARG, WS, SG

Forecast products

Electronic displays

Sms and other means

Farmers, communities

Response Measures
Climate SMART Ag, Water Mgt, Effective Flood/Drought Preparedness & Response

Strengthening climate and hydrological observing and forecasting systems to enhance water management and adaptive capacity of smallholder farmers to droughts and floods.
Network of Hydrological Observations - Department of Meteorology

<table>
<thead>
<tr>
<th>SN</th>
<th>Type</th>
<th>Number in SL</th>
<th>Current data transfer interval to head office</th>
<th>Proposed to establish by the Project in Project Locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agro Met Stations</td>
<td>40</td>
<td>Monthly</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Manual Rain Gauges</td>
<td>400+</td>
<td>Daily from 210 and Monthly from others</td>
<td>270</td>
</tr>
<tr>
<td>3</td>
<td>Automatic Rain Gauges</td>
<td>20</td>
<td>Every half an hour by SMS</td>
<td>10</td>
</tr>
</tbody>
</table>

Agro-Met Station

Rain Guage
Paradigm shift
Paradigm Shift

• Apply a Bottom – Up approach in Integrated Water Management
• Establish Climate Resilient Integrated Water Management Concept
Develop cascade level integrated water management plans in each cascade (CLIWMP)

Agricultural development plan

Village irrigation system upgrading plan

Disaster response, operation and maintenance plan

Groundwater management plan

Drinking water management plan

Institutional framework for a cascade water-user organization

Environmental management and catchment conservation Plan

To strengthen the resilience of vulnerable communities to Climate variability and extreme weather events
Thank you
Multi-Model Ensemble Projection
Change in Annual Rainfall in Sri Lanka

Source: Chandrapala, 2016
• Prediction of RF for three time periods comparative to the base period: 1975-2005

  • 2020-2040 – Comparing to 1975 to 2005, during this period the DZ of the country will become drier and WZ of the country will become wetter
  • 2040-2060 – Comparing to 1975 to 2005, during this period all the areas will become wetter and WZ of the country will become more wetter
  • 2070-2090 - Comparing to 1975 to 2005, during this period all the areas will become wetter and WZ of the country will become more wetter
Implement Mechanism

- Install meteorological equipment's & maintenance
- Establish institutional mechanisms to uptake and provide weather info

- Strengthen local institutes as knowledge hubs (Q2)
- Identify /share best practices/ coping strategies/demonstrations
- Officer /FO/ Community level Trainings/ awareness (development and use of advisories)
- Support strengthening farmer interface (producer groups, dissemination, displays mobile...etc)

- Conduct participatory flood/drought risk assessment for cascade/VIS levels
- Integrate weather/climate info into agriculture/water management plan/SOP’s/drinking water mgt  Q3/Q4
- Disaster Preparedness and Response Plan