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)"

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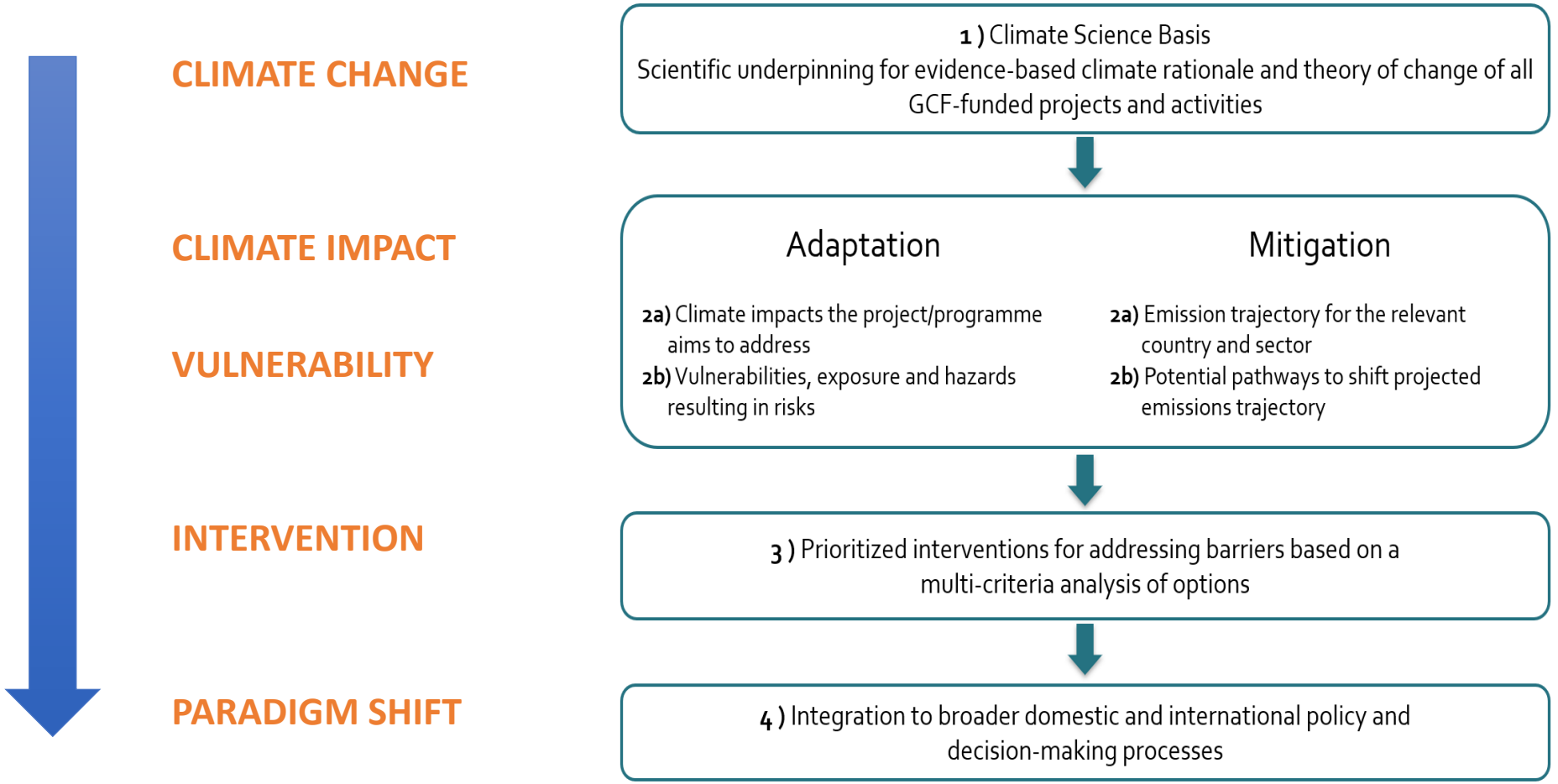
Sri Lanka

Lineup of the Presentation

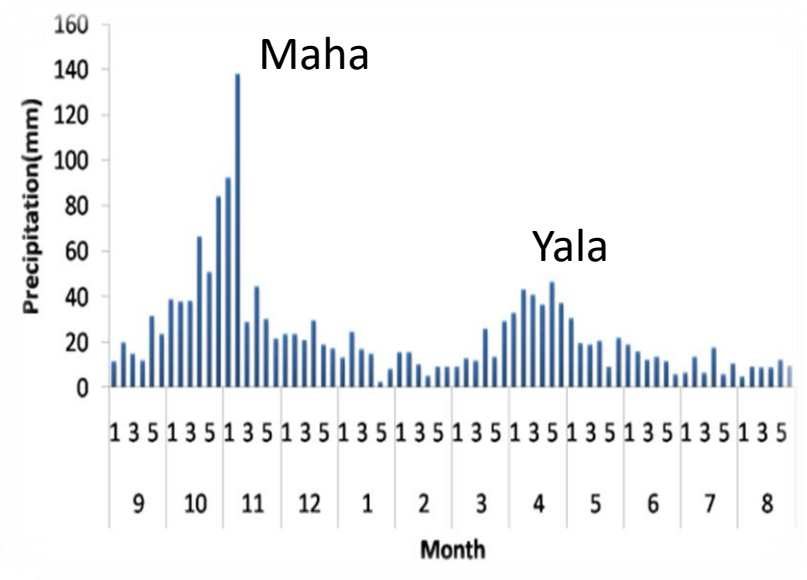
- Climate Rationale and the Project Intervention
- Climate change, evidences & predictions in Sri Lanka
- Climate Impacts for the country
- Vulnerability, Project geography and beneficiary selection while addressing the adverse climate impacts
- Project Objective
- Flow of the project activities addressing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

Climate Rationale and the Project Intervention

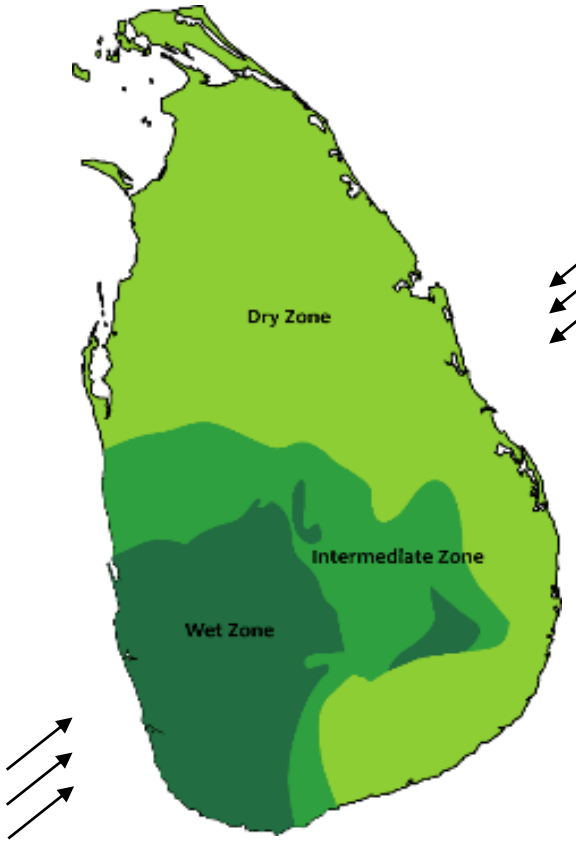


Climate Change Evidences and Predictions in Sri Lanka

Evidences in Rain Fall changes



Normal RF pattern in Sri Lanka



YALA

South-West Monsoon (May – Sept) stable

MAHA

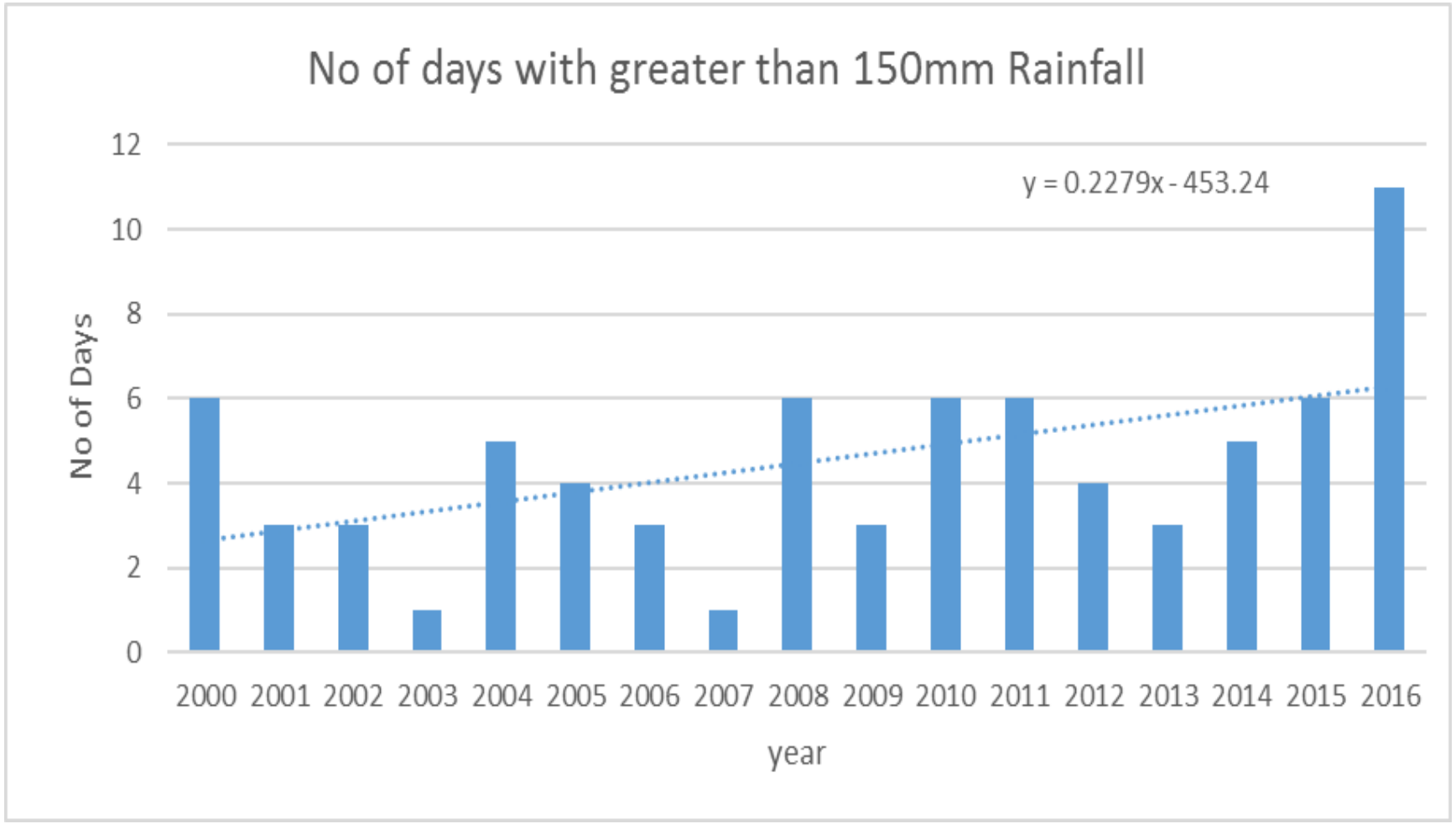
North-East Monsoon (Dec – Feb) reduced and Variability Increased (unpredicted pattern of the rainfall)

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

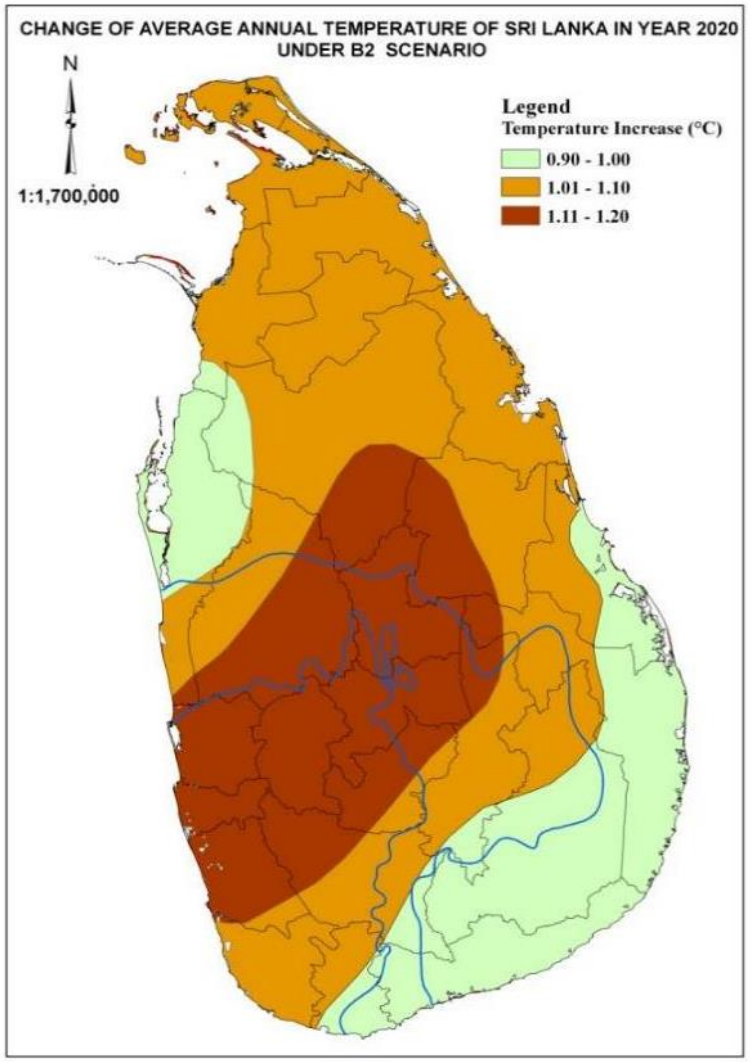
No of days with greater than 150mm Rainfall : 2000-2016

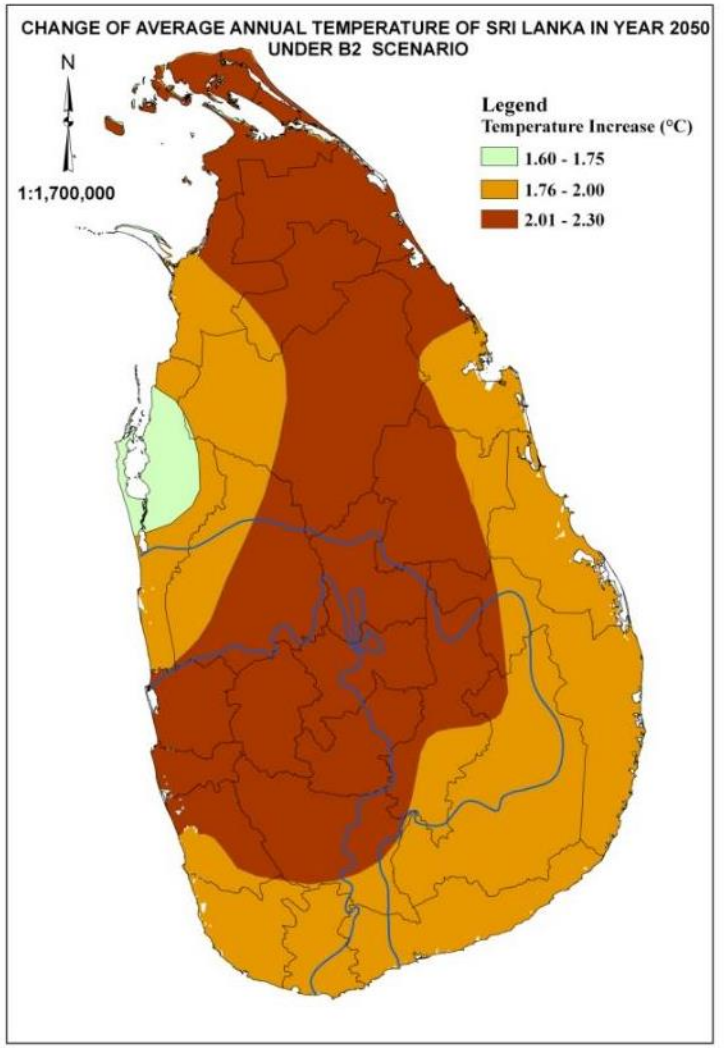


Source: Met Department, 2016

- 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 -Avarage Annual Temperature-Year 2020 & 2050





Temperature: Warming trends

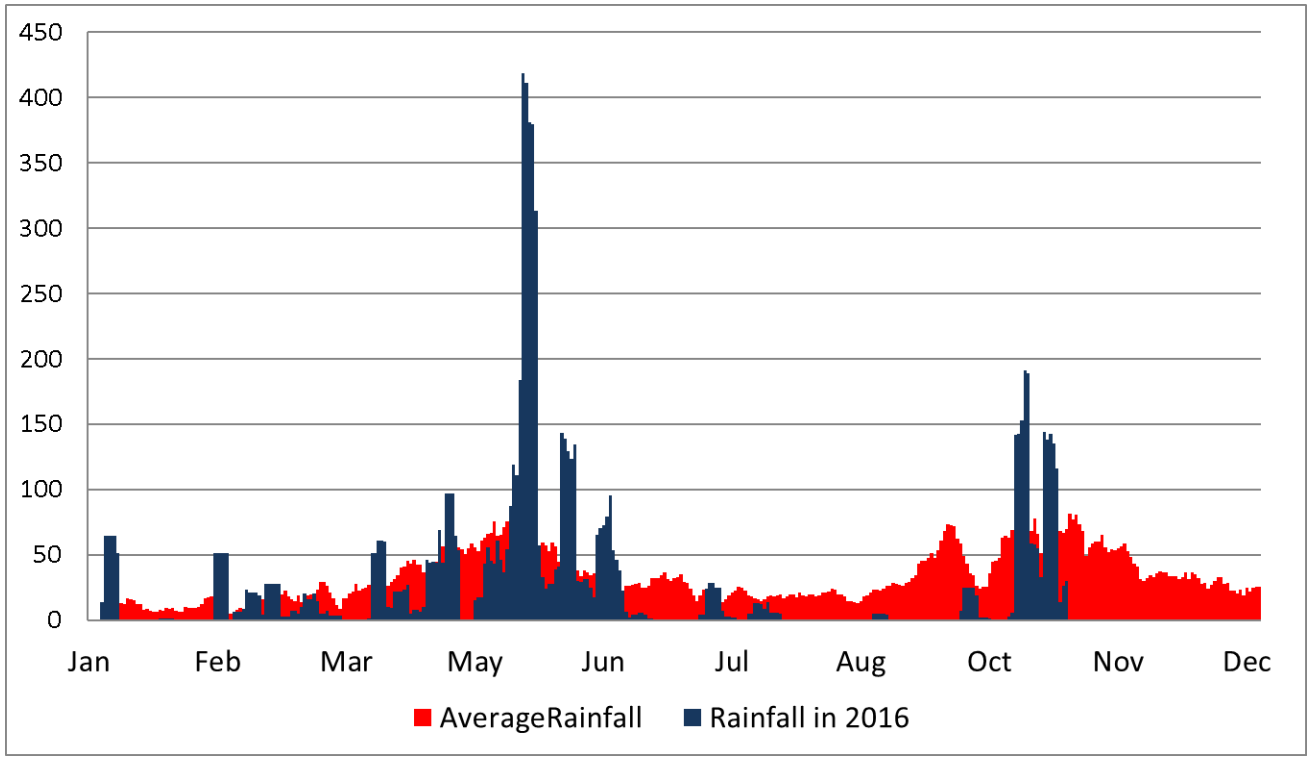
Expected warming Trends

- 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 !!

Supplied Disaster Relief (Rs.) : 2007-2012

Year	Cyclone	Drought	Flood	Landslides
2007	17,662,054	19,921,772	159,111,089	22,586,775
2008	11,675,820	15,286,758	210,339,335	20,502,716
2009	4,387,936	27,655,774	202,680,398	4,928,667
2010	8,678,239	16,308,306	244,091,220	3,252,698
2011	20,997,295	12,263,596	589,835,798	34,397,743
2012		39,878,511	235,380,000	
Total	63,401,344	131,314,317	1,641,437,840	85,668,599

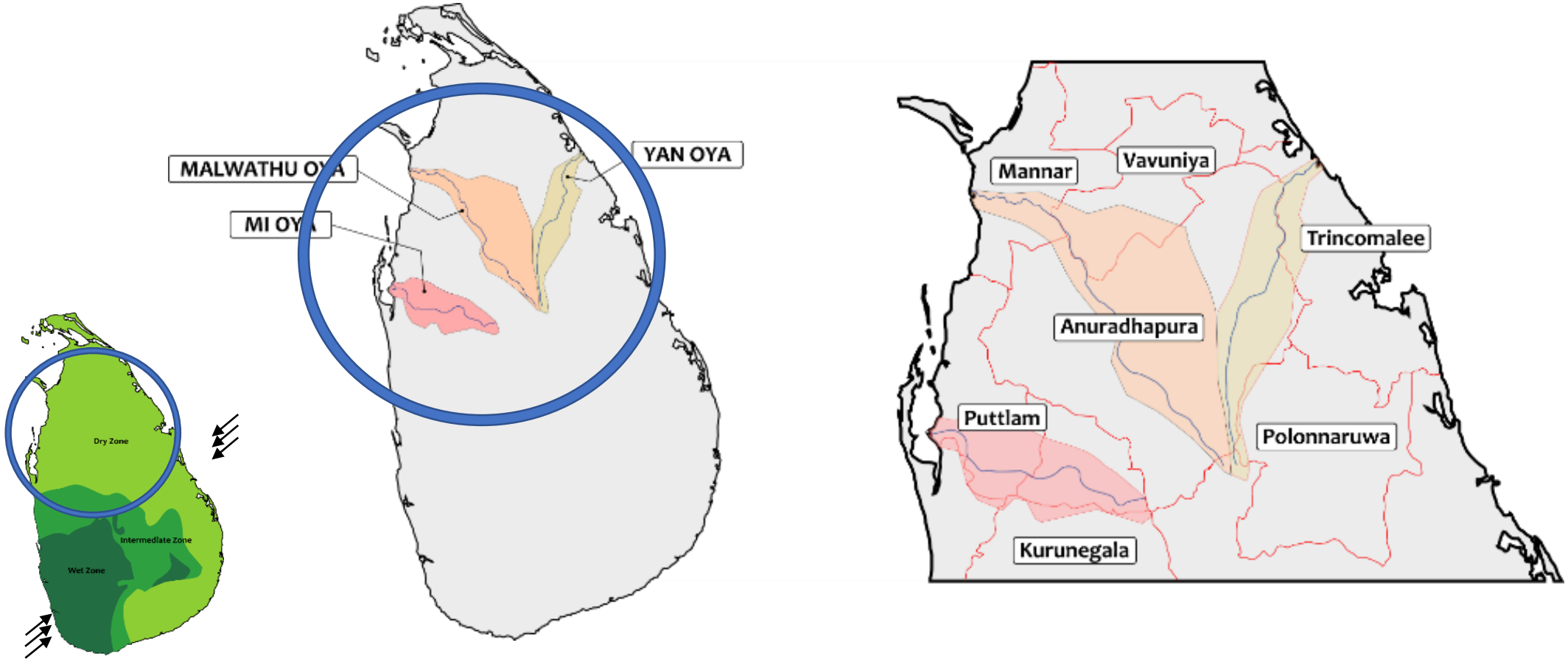
Project Objective

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

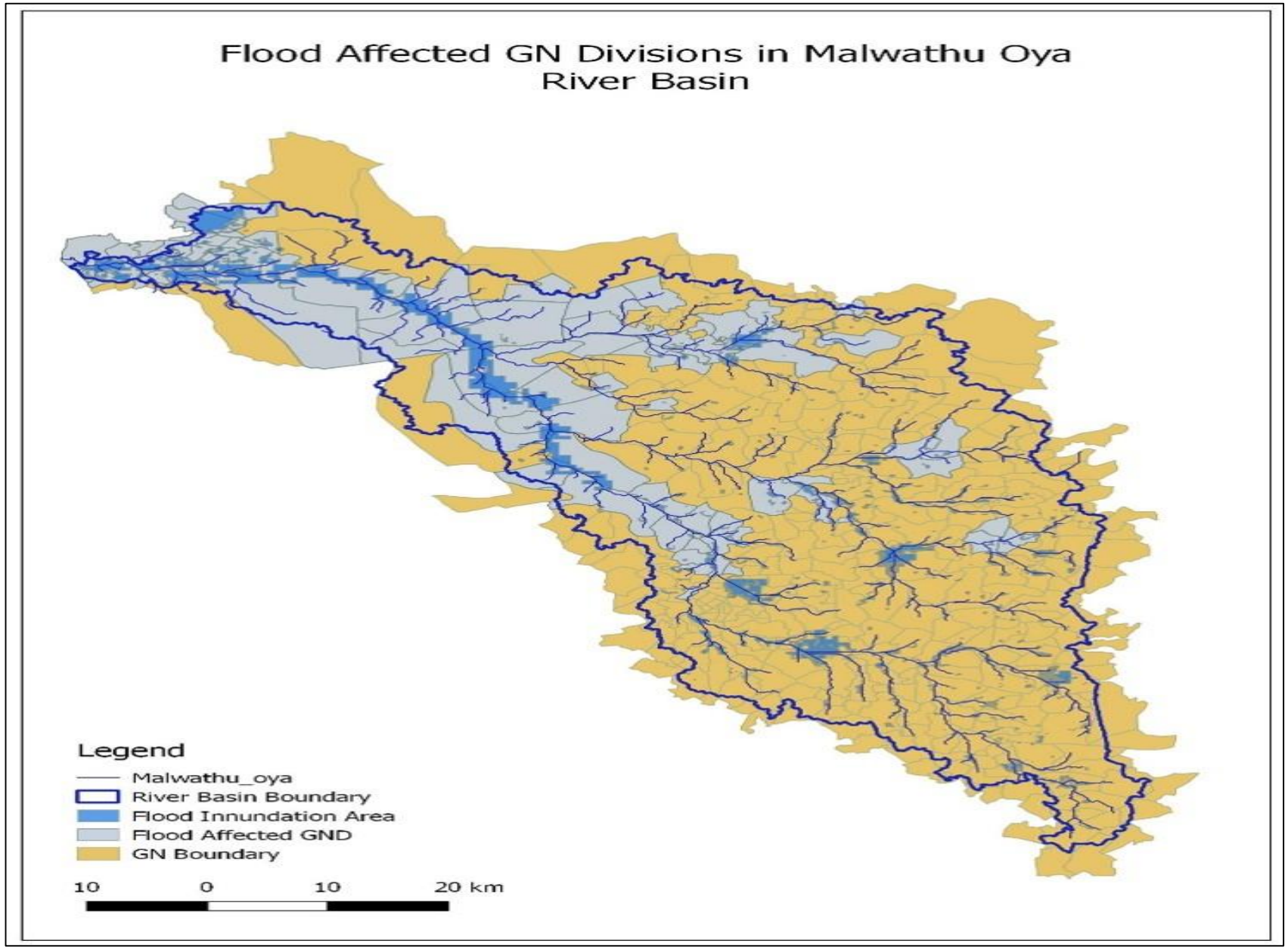
Build the resilience of the poor like *Ganga (36, mother of 4 children in Kurunegala in the Dry Zone) and her family* and those in vulnerable situations to climate related extreme events and disasters.

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

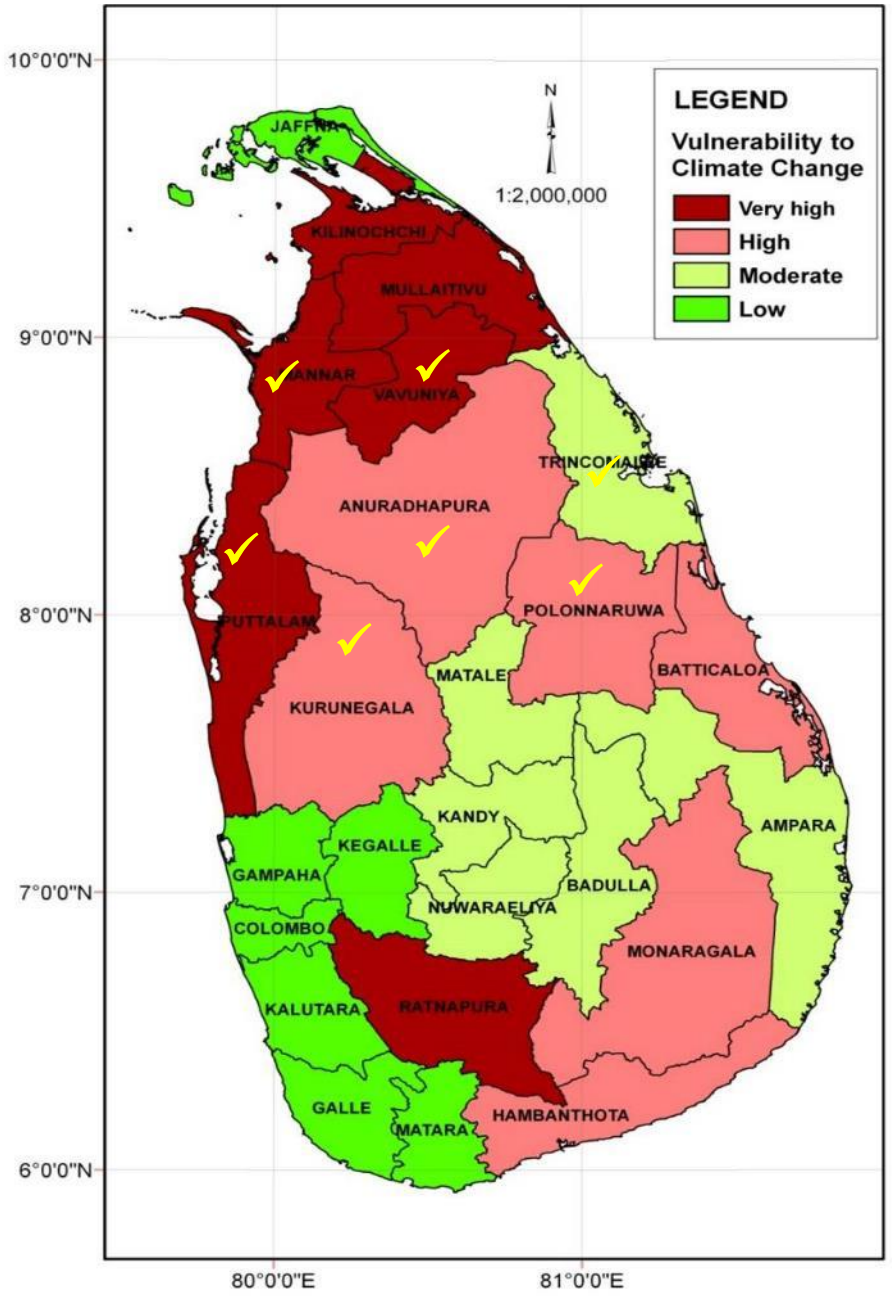
Selected Project Area

- 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

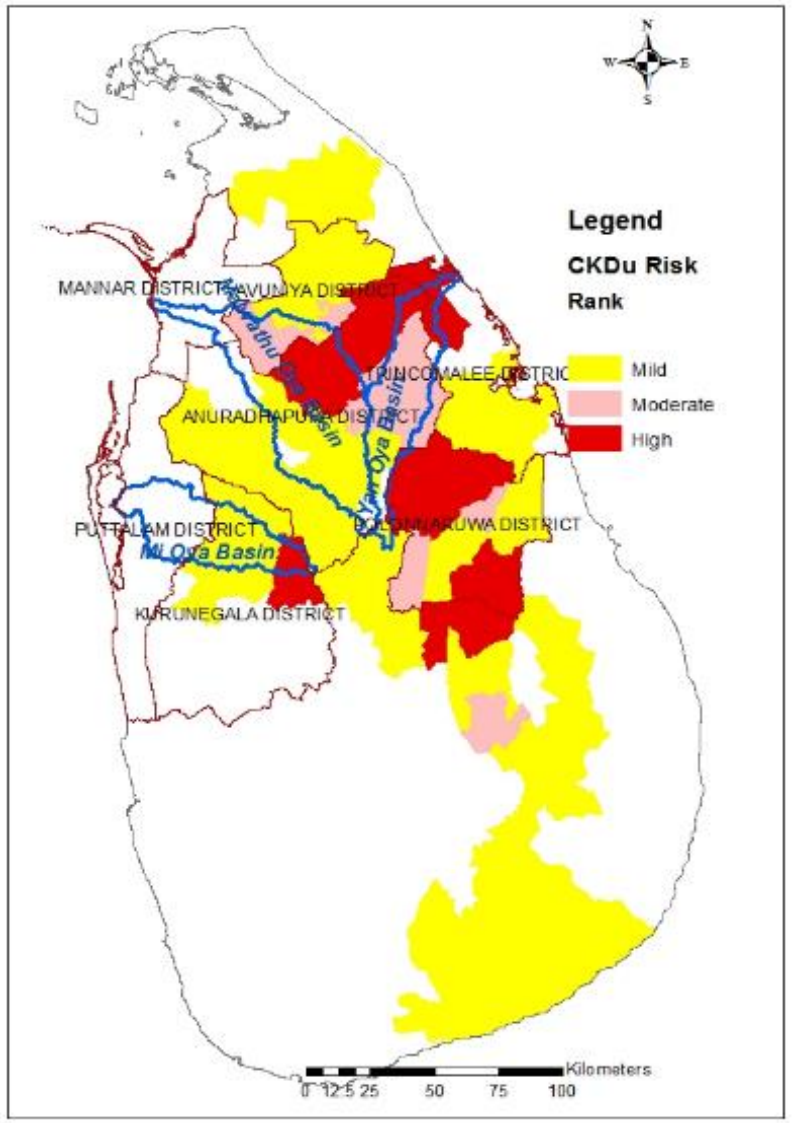
Climate Change Vulnerability Mapping in Sri Lanka 2012.
By UNDP and Natural Resources Management Centre, Department of Agriculture

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.

Output	Description	GCF Grant (USD, Million)	GoSL Grant (USD, Million)	Budget (USD, Million)
1	Upgrading village irrigation systems and promoting climate-resilient farming practices in three river basins of the Dry Zone	21	7	28
2	Enhancing climate resilient, decentralized water supply and management solutions	10	6	16
3	Strengthening climate and hydrological observing and forecasting system to enhance water management and adaptive capacity	4	1	5
4	Project Management	3	-	3
	TOTAL	38	14	52

Targeted beneficiaries

- 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

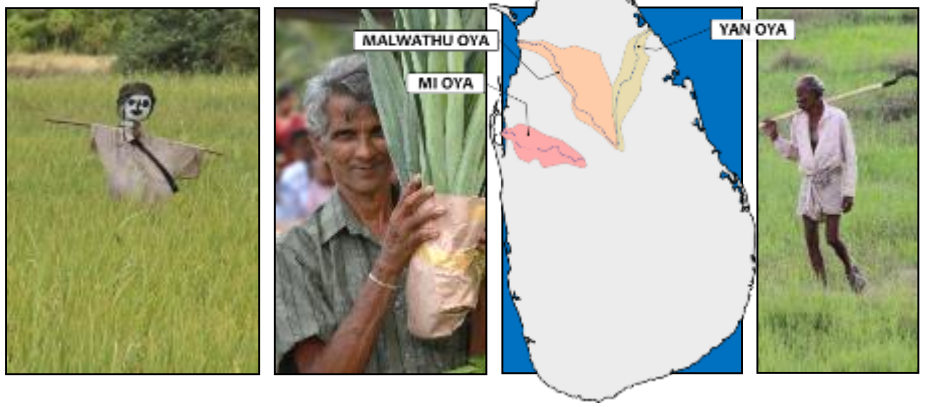
Targeted beneficiaries

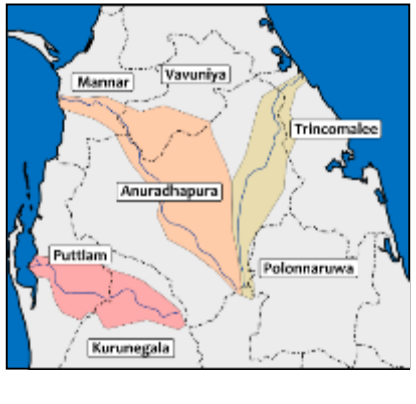
Targeted beneficiaries were based on vulnerability criteria including:

- 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)

Output 1

Upgrading village irrigation systems and promoting climate resilient farming practices in three river basins of the Dry Zone





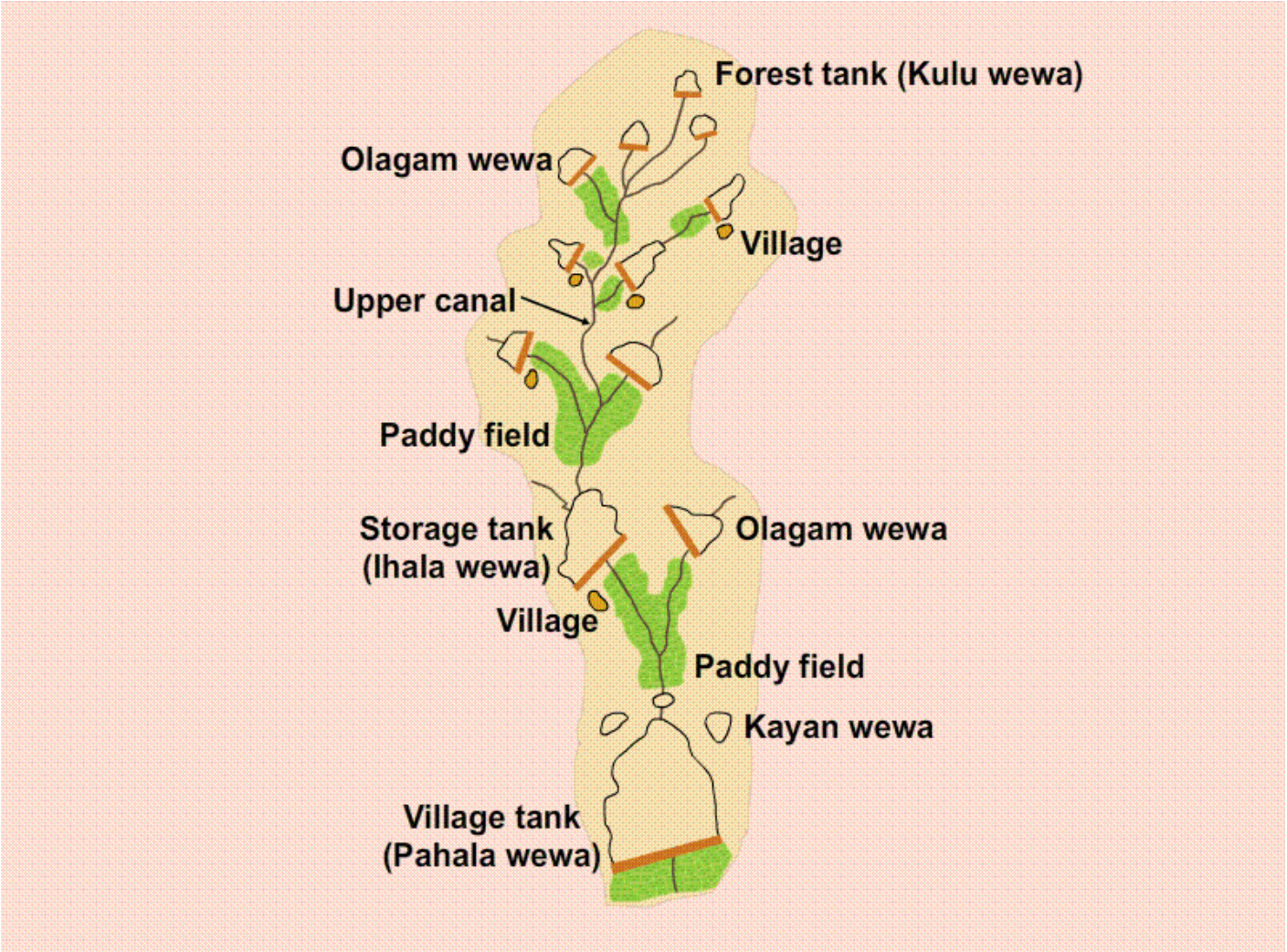
Com 1: Upgrading **village irrigation systems** and promoting climate-resilient farming **practices in three river basins of the Dry Zone**

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




Storage tank
(Ihala wewa)
Stream
(Diya para)
Olagam wewa
Paddy field
(Wel yaya)
Water hole (Godawala)
Rainfed farm
(hena)
Gasgommana
(Windbreak of
trees)
Village tank
(Pahala wewa)
Kattakaduwa
(interceptor)
Shrubland
(Landa)
Hamlet
(Gangoda)
Paddy field
(Wel yaya)
Drainage canal
(Kiwul ela)
Hamlet buffer
(Thisbambe)

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

Project Interventions
Output 1


වැව් ගම් පුබුදුව
குளங்கள் கிராமங்களின் மறுமலர்ச்சி
CRIWMP
Aluthgama Tank
MATHAVILTHAKULAM CASCADE - Vauniya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குளங்கள் கிராமங்களின் மறுமலர்ச்சி
CRIWMP
Thammanekkulam Tank
MATHAVILTHAKULAM CASCADE - Vauniya


වැව් ගම් පුබුදුව
குளங்கள் கிராமங்களின் மறுமலர்ச்சி
CRIWMP
Pulyankulam Tank
MATHAVILTHAKULAM CASCADE - Vauniya

වැව් ගම් පුබුදුව
குளங்கள் கிராமங்களின் மறுமலர்ச்சி

CRIWMP

Ordikulam Tank

MATHAVILTHAKULAM CASCADE - Vauniya

වැව් ගම් පුබුදුව
குளங்கள் கிராமங்களின் மறுமலர்ச்சி

CRIWMP

Yakandagaswewa Tank

SIVALAKULAM CASCADE - Anuradhapura

වැව් ගම් පුබුදුව
குளங்கள் கிராமங்களின் மறுமலர்ச்சி

CRIWMP

Wembu Wewa Tank

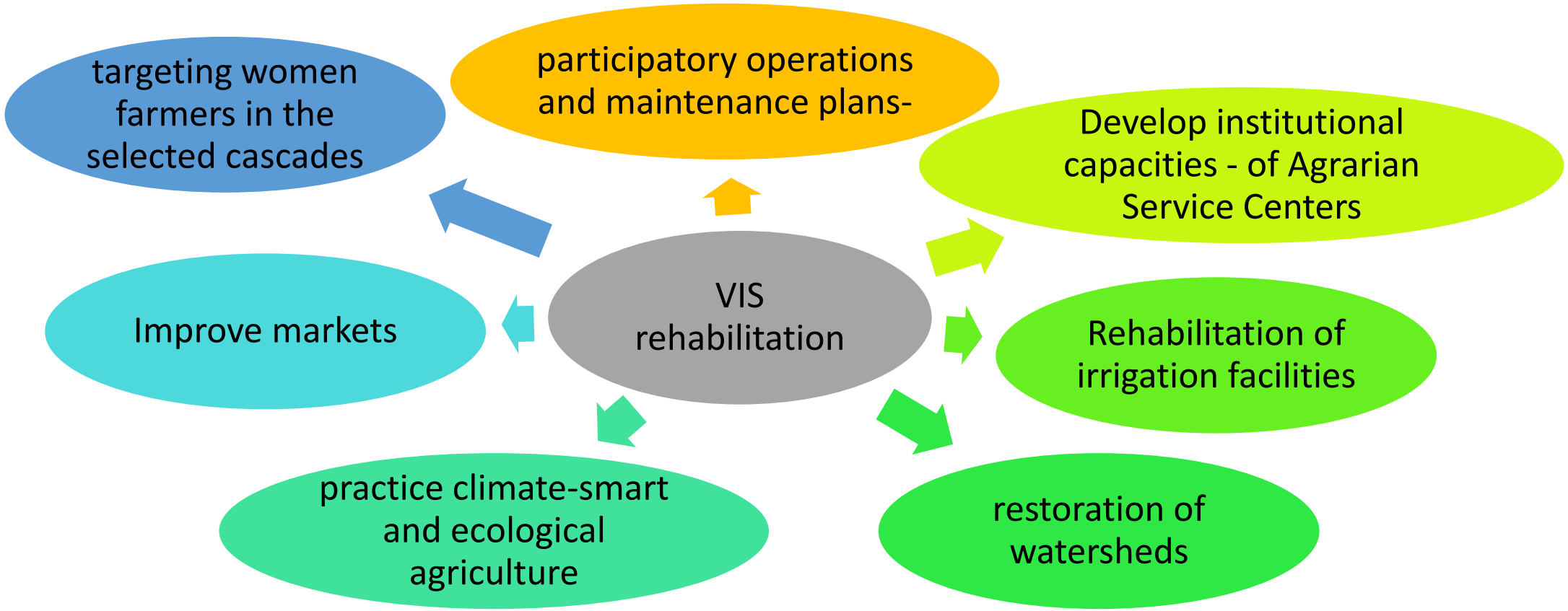
SIVALAKULAM CASCADE - Anuradhapura


CRMWMP
වැව් ගම් පුබුදුව
Field Visit and Technical Consultation - Cascade Eco System Development
Mahameddawa Cascade - Puttalam

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



To strength the resilience of vulnerable communities to Climate variability and extreme weather events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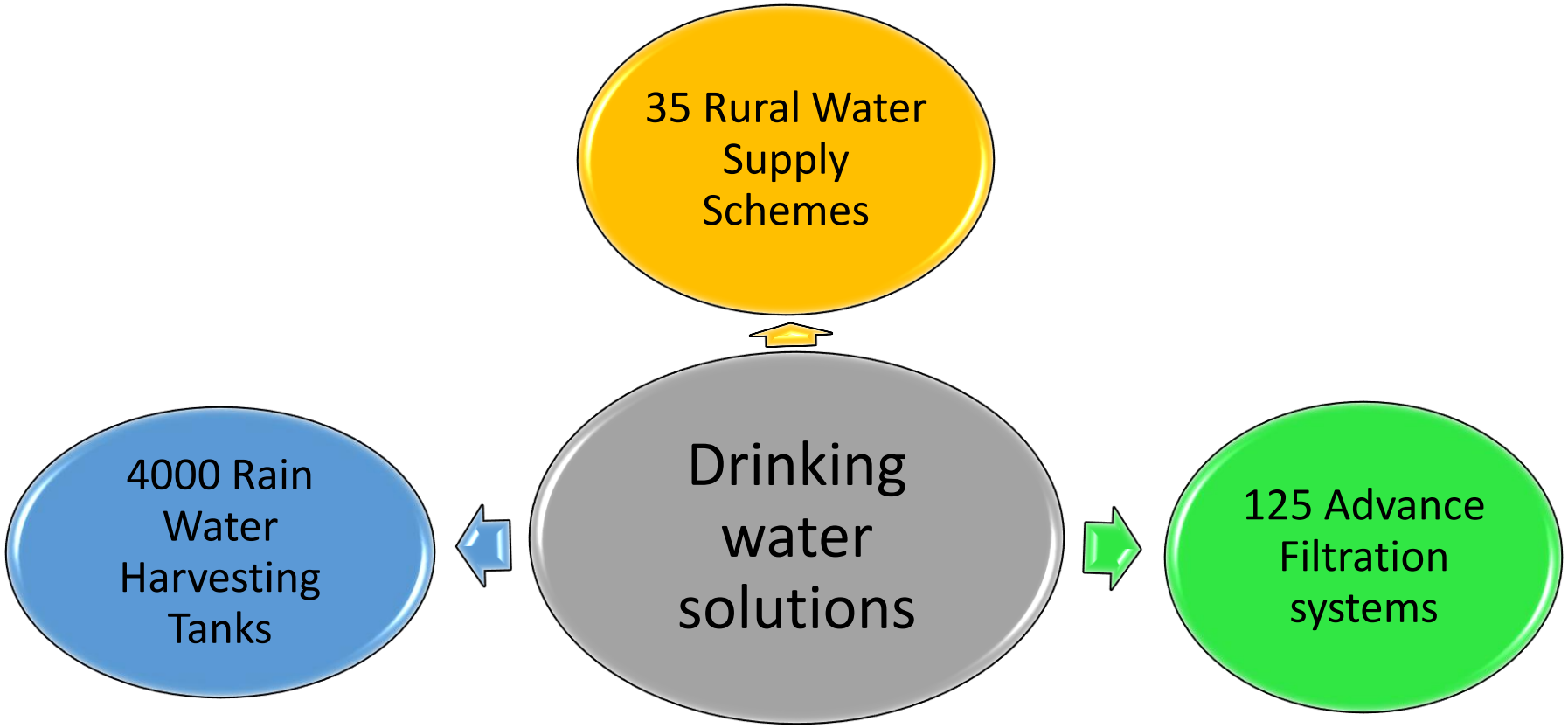
CRWMP
Famer training on soil conservation bund and making the contour soil bunds
Dumbuluwagama Tank - Palugaswewa Cascade - Anuradhapura

Output 2

Enhancing decentralized water supply and management solutions to provide access to safe drinking water to vulnerable communities


35 Rural Water Supply Schemes
4000 Rain Water Harvesting Tanks
Drinking water solutions
125 Advance Filtration systems


CRIWMP
වැව් ගම් පුබුදුව
Water Source identification
Mottapeththawa Cascade - Kurunegala


වැව් ගම් පුබුදුව
குளங்கள் கிராமங்களின் மறுமலர்ச்சி
CRIWMP
Rain Water Harvesting - Output 02
MATHAVILTHAKULAM CASCADE - Vauniya


වැව් ගම් පුබුදුව
குளங்கள் கிராமங்களின் மறுமலர்ச்சி
CRIWMP
Rain Water Harvesting - Output 02
MATHAVILTHAKULAM CASCADE - Vauniya

1.Cascade Level Water Resource Planning

4.Women organizations to manage systems

Water supply systems

(RWSS/RWH/AFS)

2.Climate risk incorporated SOPs

3.Water source protection committees

- 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 :

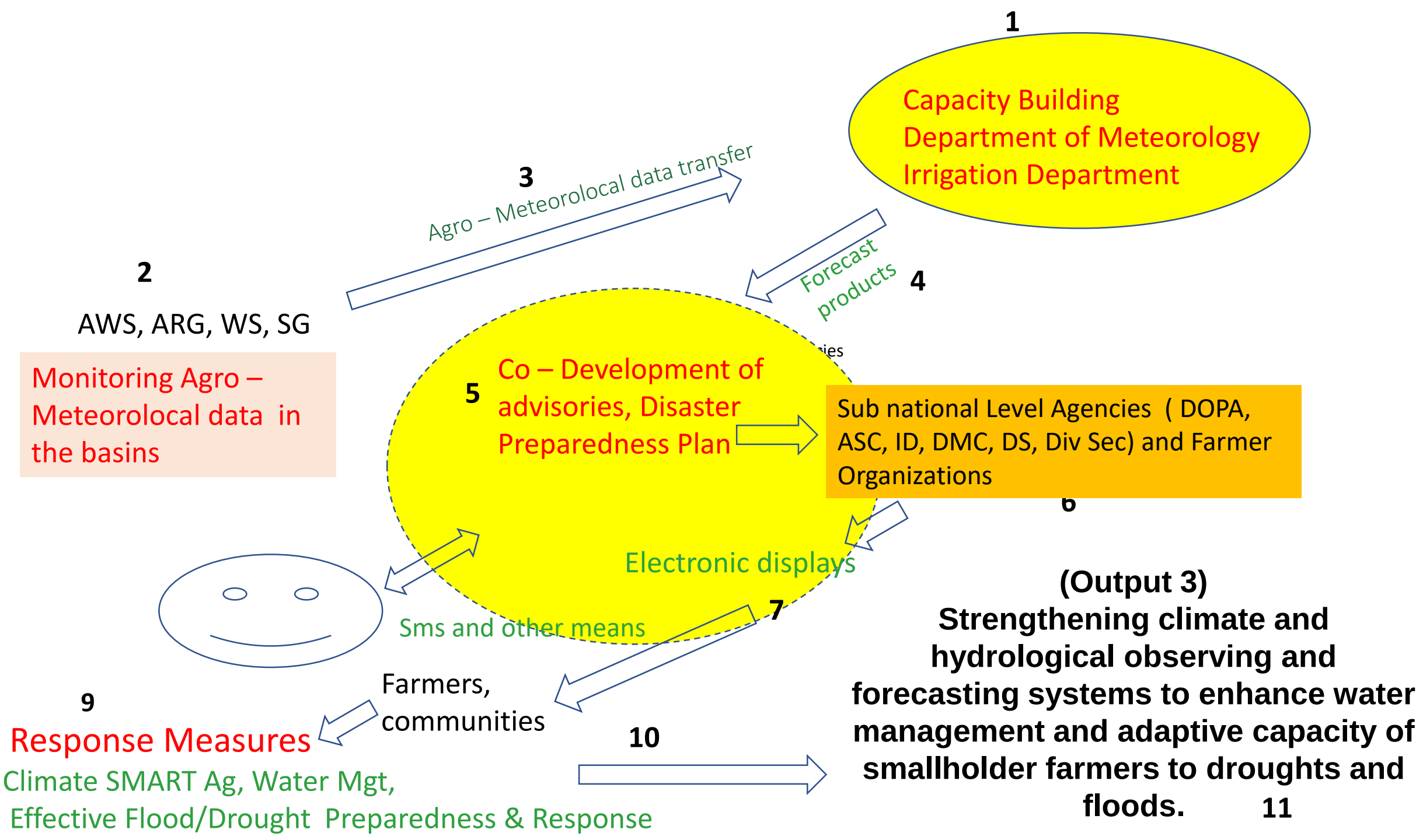
  Mainly consider the water quality of the source

  Total water shed will be managed in different ways:

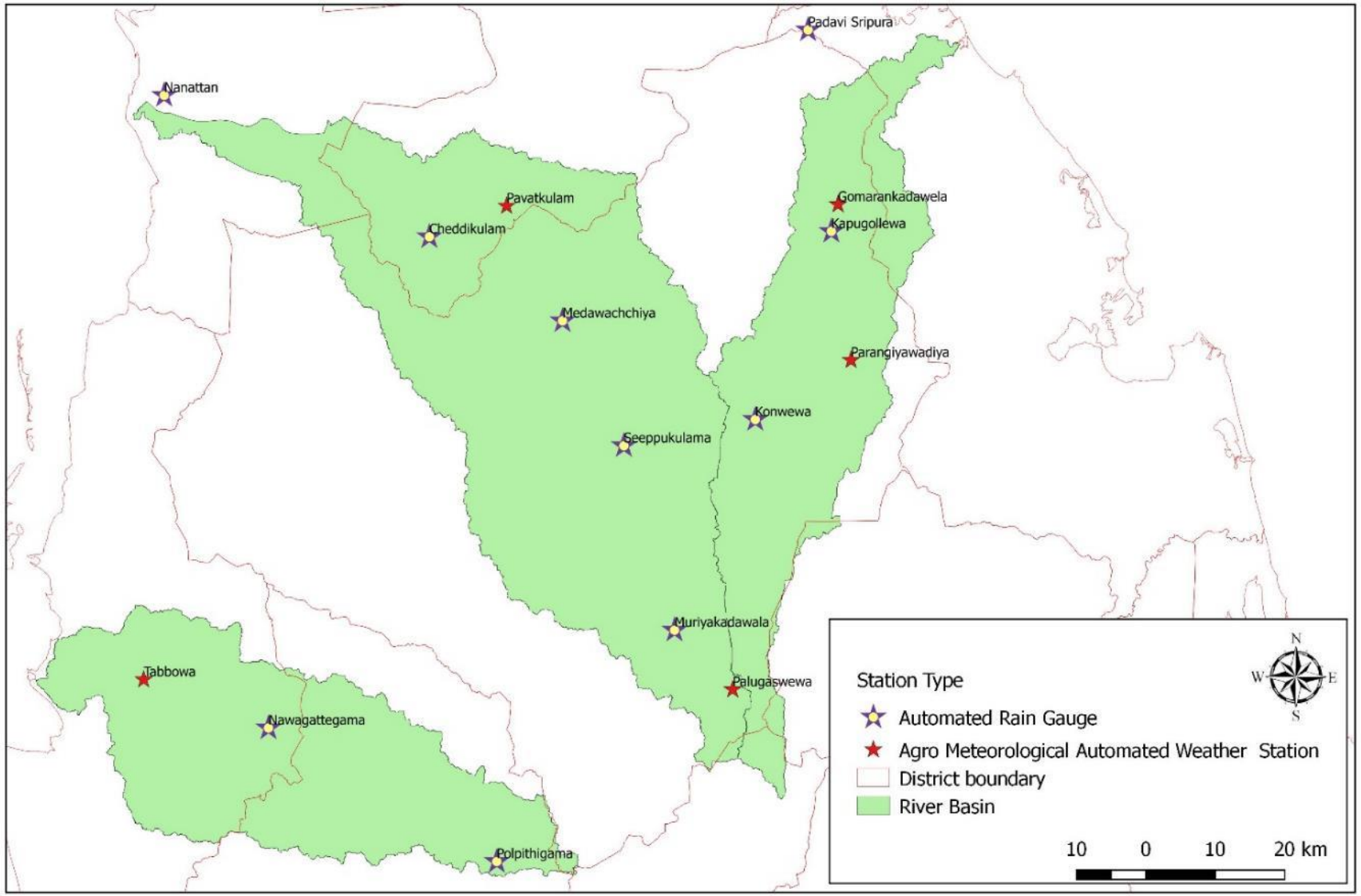
  Use of agro chemicals/ waste dumping sites / Cattle houses/ flow of other water streams/ Deforestation in spring area
- Women organizations to manage systems
  - Income generation for women – Bill reading, finance management, Leadership, O & M system

Output 3

Strengthening climate and hydrological observing and forecasting systems to enhance water management and adaptive capacity of smallholder farmers to droughts and floods


1
Capacity Building
Department of Meteorology
Irrigation Department
3
Agro – Meteorolocal data transfer
2
AWS, ARG, WS, SG
Monitoring Agro – Meteorolocal data in the basins
Forecast products
4
5
Co – Development of advisories, Disaster Preparedness Plan
Sub national Level Agencies (DOPA, ASC, ID, DMC, DS, Div Sec) and Farmer Organizations
6
Electronic displays
7
Sms and other means
Farmers, communities
9
Response Measures
Climate SMART Ag, Water Mgt,
Effective Flood/Drought Preparedness & Response
10
(Output 3)
Strengthening climate and hydrological observing and forecasting systems to enhance water management and adaptive capacity of smallholder farmers to droughts and floods.
11

Proposed Meteorological Stations



Network of Hydrological Observations - Department of Meteorology

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

Agro-Met Station

Rain Guage

Paradigm shift

Paradigm Shift

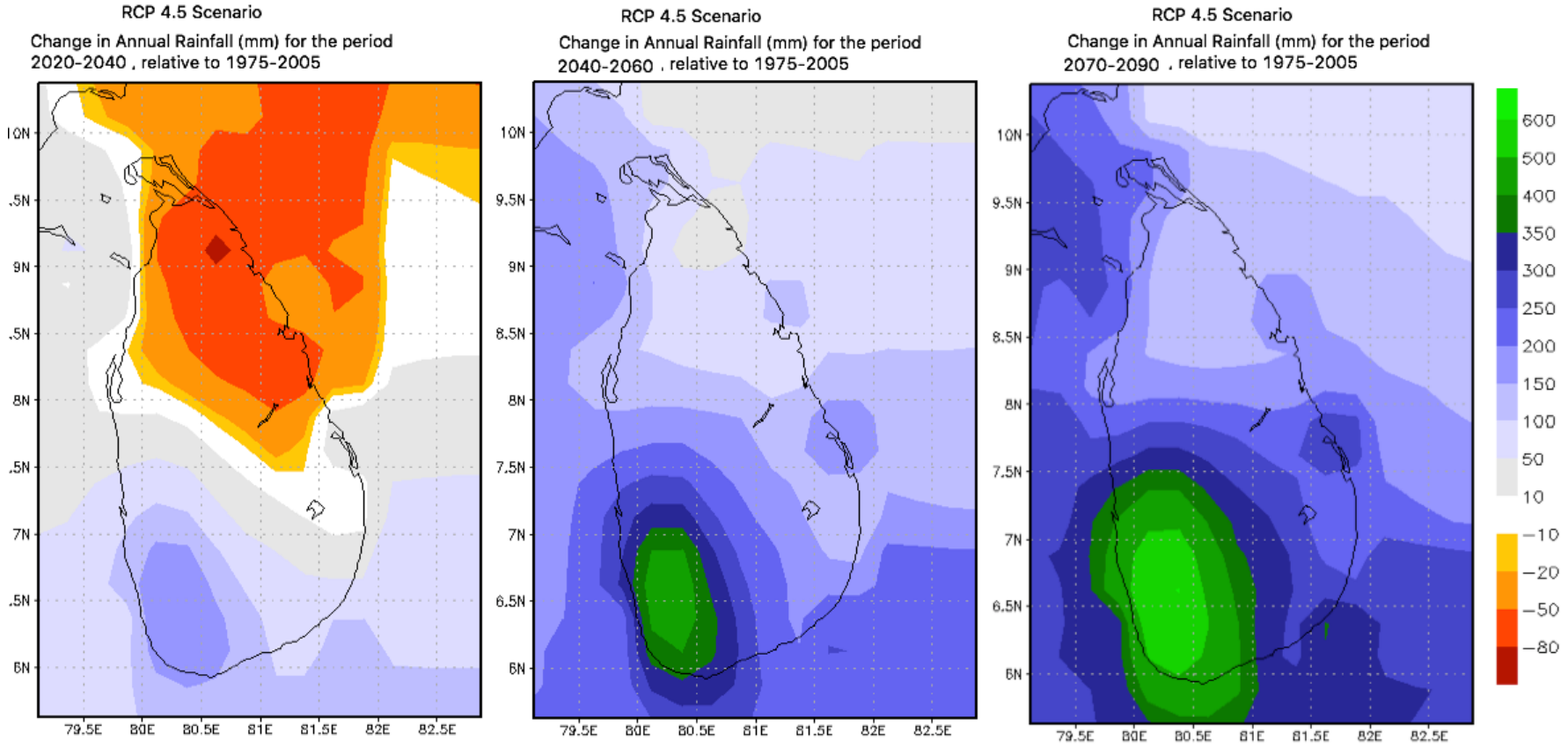
- Apply a Bottom – Up approach in Integrated Water Management
- Establish Climate Resilient Integrated Water Management Concept

Develop cascade level integrated water management plans in each cascade (CLIWMP)

To strength 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