

# Water cycle and WRM in changing climate in Sri Lanka

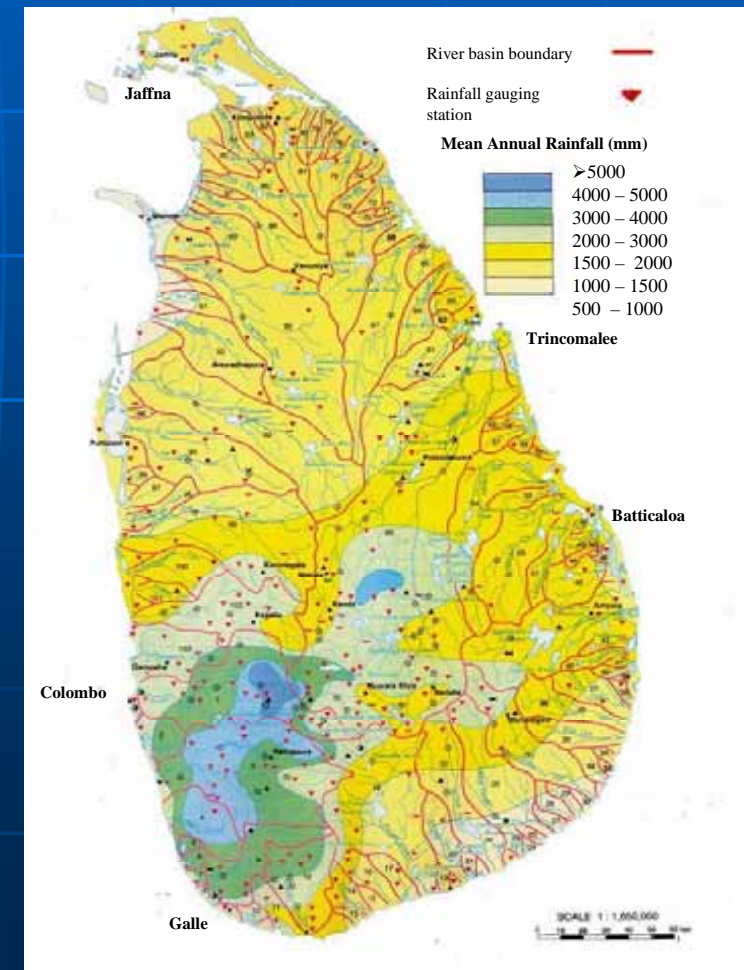
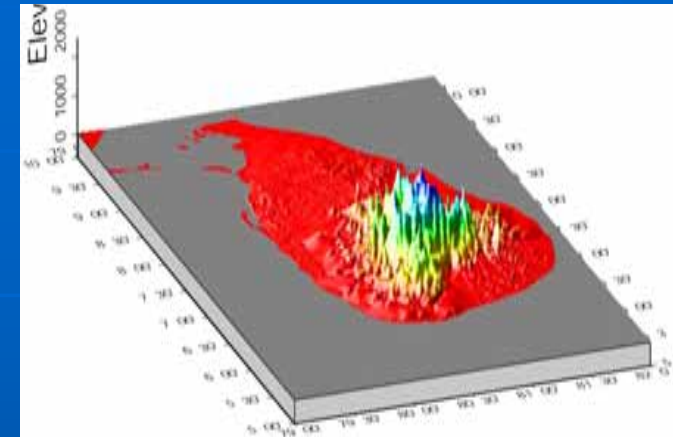
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# Direct impacts on water cycle experienced

More extreme events –

- extreme rainfall intensities
- less wet days and warmer temperatures



# Changes in water cycle

Frequent high rainfall intensities

frequent floods

landslides

damages to hydraulic structure

crop failure

soil erosion – infertile land, sedimentation,

e.g. March is a dry month on average but heavy rains have lashed Sri Lanka this year 2008.

Inundation has displaced many people (4 died, 7,000 displaced)

Paddy harvest has been affected

# Changes in water cycle

Less wet days and warmer temperatures  
soil moisture deficit

High rainfall intensities  
Soil erosion in mountainous regions

Soil infertility and soil moisture deficit –  
Tea industry is vulnerable to climate changes



# WRM under climate change impacts

Disaster mitigation - vulnerable population and areas for flood hazard, landslide hazard have increased.

- Flood mitigation measures are required
- Flood warning, flood control, flood proofing, etc.

Rice productivity- paddy is cultivated by irrigation

- storage based irrigation systems are strengthened
- flood drainage to prevent inundation of low land farm lands

Reliability of hydropower - 40% energy by HP (2005)

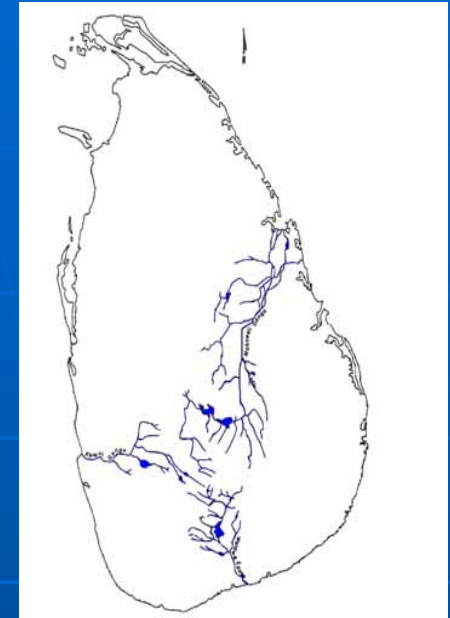
- storage reservoirs based HP schemes against run-of-river HP schemes

Sustainability of reservoirs - increased sediment and debris inflow

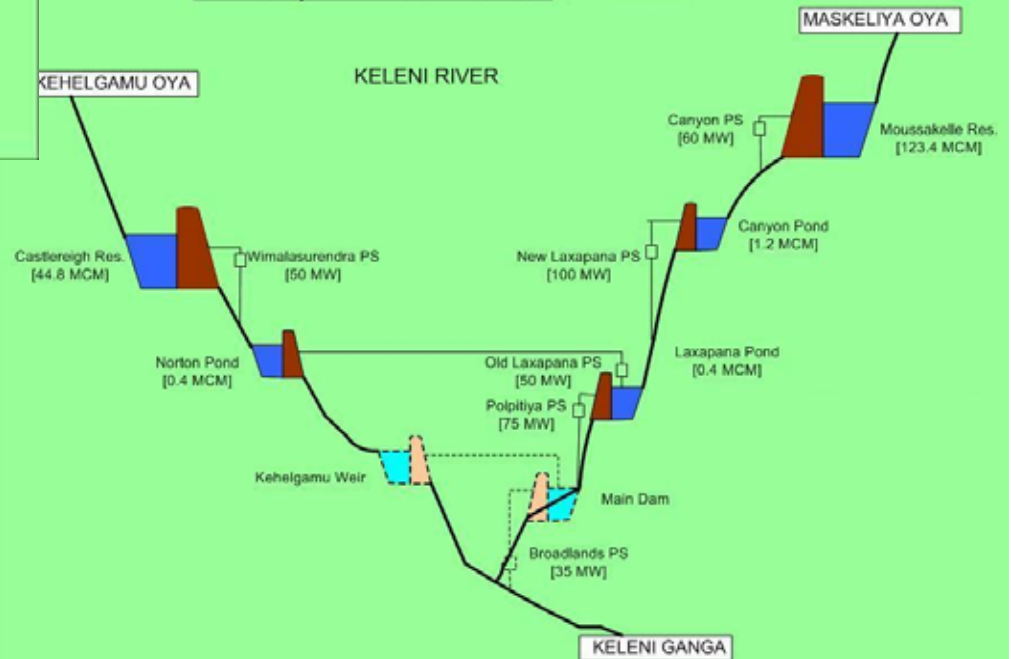
- catchment land use management for soil erosion control

# Reservoir cascades along major rivers

Reservoir system in Mahaweli River Basins



Reservoir system in Keleni River Basin

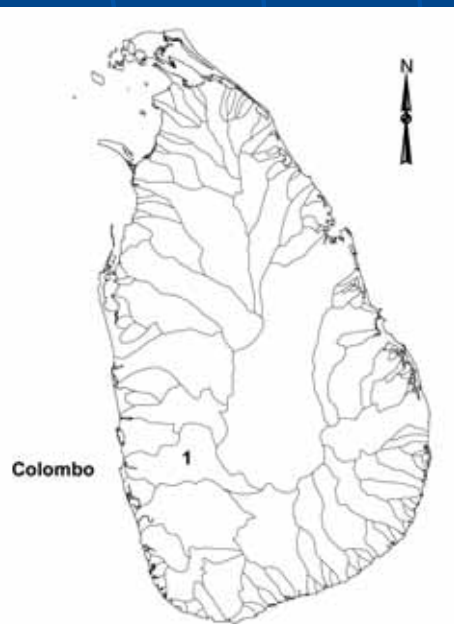
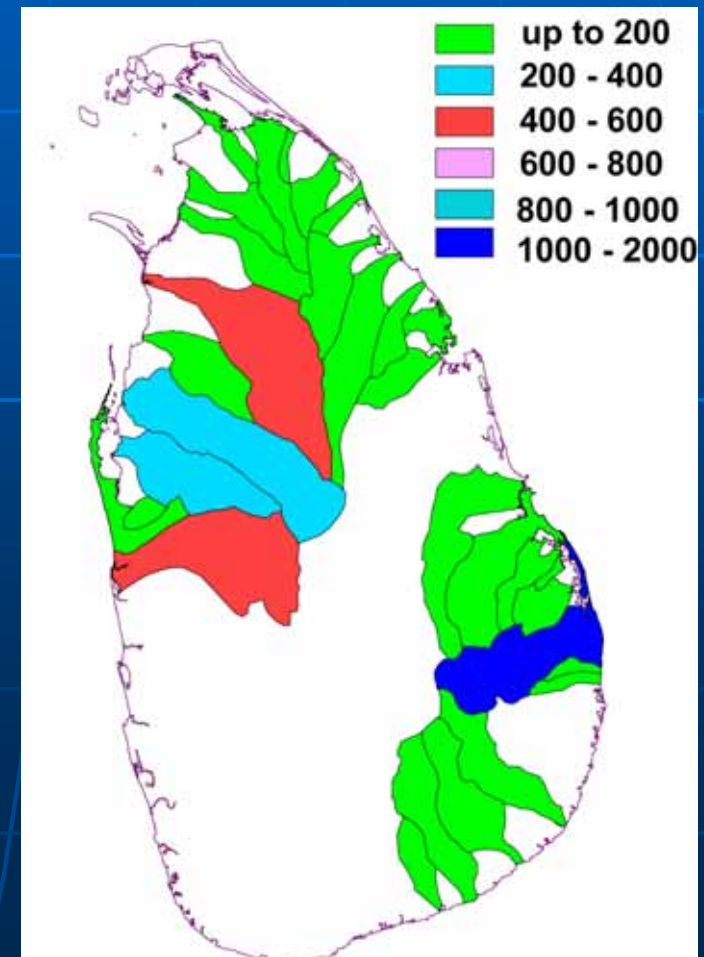
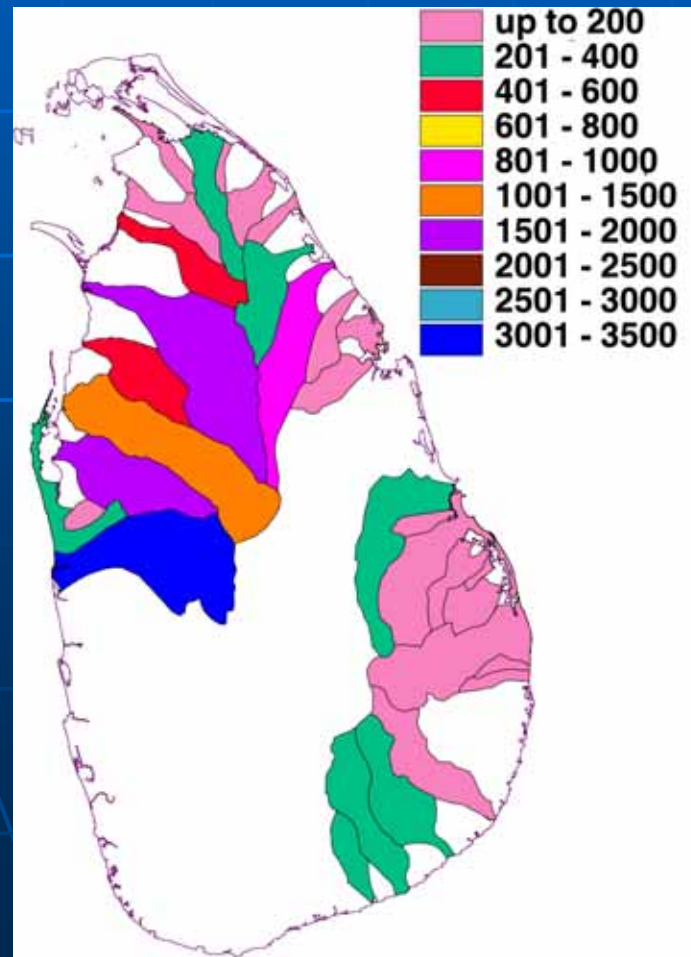


# Reservoirs for minor irrigation systems

Number of irrigation reservoirs > 12,000,  
a total storage capacity of 0.43 km<sup>3</sup>, exists where the annual rainfall < 1500mm with a high seasonal variation and with an annual potential evaporation of about 1700mm, for WM for paddy cultivation in the dry zone for two seasons per year.

No of reservoirs

Capacities of reservoirs (MCM)



# Sediment issues in Rantembe HP Reservoir



Catchment Area  
3118 km<sup>2</sup>

Gross Storage  
7.1 MCM



# Initiatives

The centre for climate change studies in the  
Dept. of Meteorology (since 1999 )

<http://www.meteo.slt.lk/cccs.html>

The major functions : Research into cc and related issues,  
monitoring and modeling of cc, Information gathering and  
dissemination, documentation services, establishing links  
and representation with relevant international agencies

## Involvement of research community CC studies

Universities

Research institutions

NGOs (e.g. Foundation for Environment, Climate and Technology)

# Way forward

## Information (data) and tools

- Advancements in real-time data acquisition systems
- Advancements in modelling (hydrometeorology, hydrologic, land surface, drought, ...)

## Awareness and expertise Capacity building



## Sustainable WRM

for prediction of flood risk levels,  
flood warnings, landslide warning based on rainfall estimation  
in advance

Prediction of drought months in advance for decision makers  
Seasonal water management (reservoir operation, etc.)

Thank You