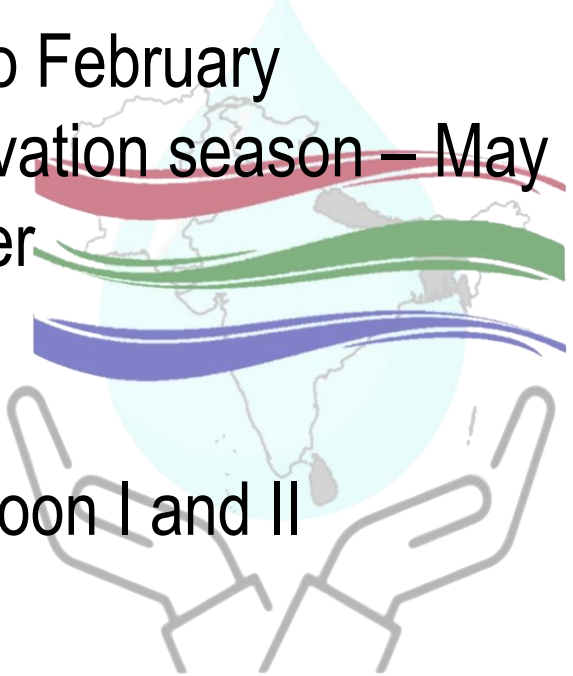
Introduction to Field Research Themes and Field Sites

Dhammika Dayawansa
Department of Agricultural Engineering
Faculty of Agriculture
University of Peradeniya

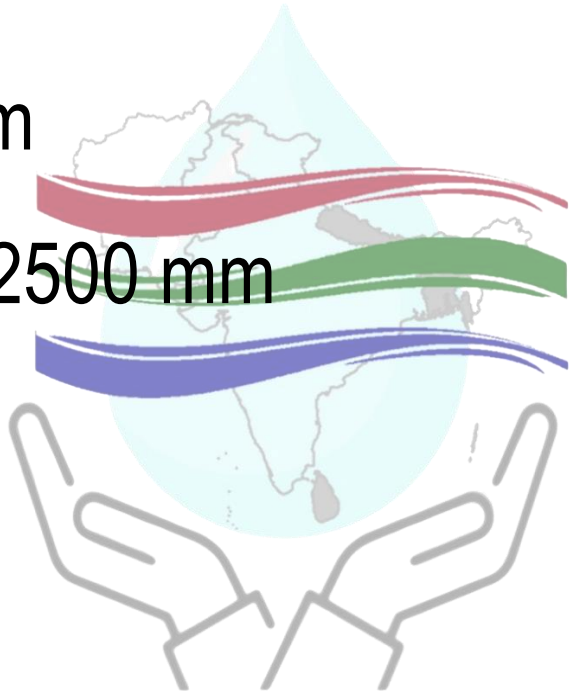
Climate of Sri Lanka

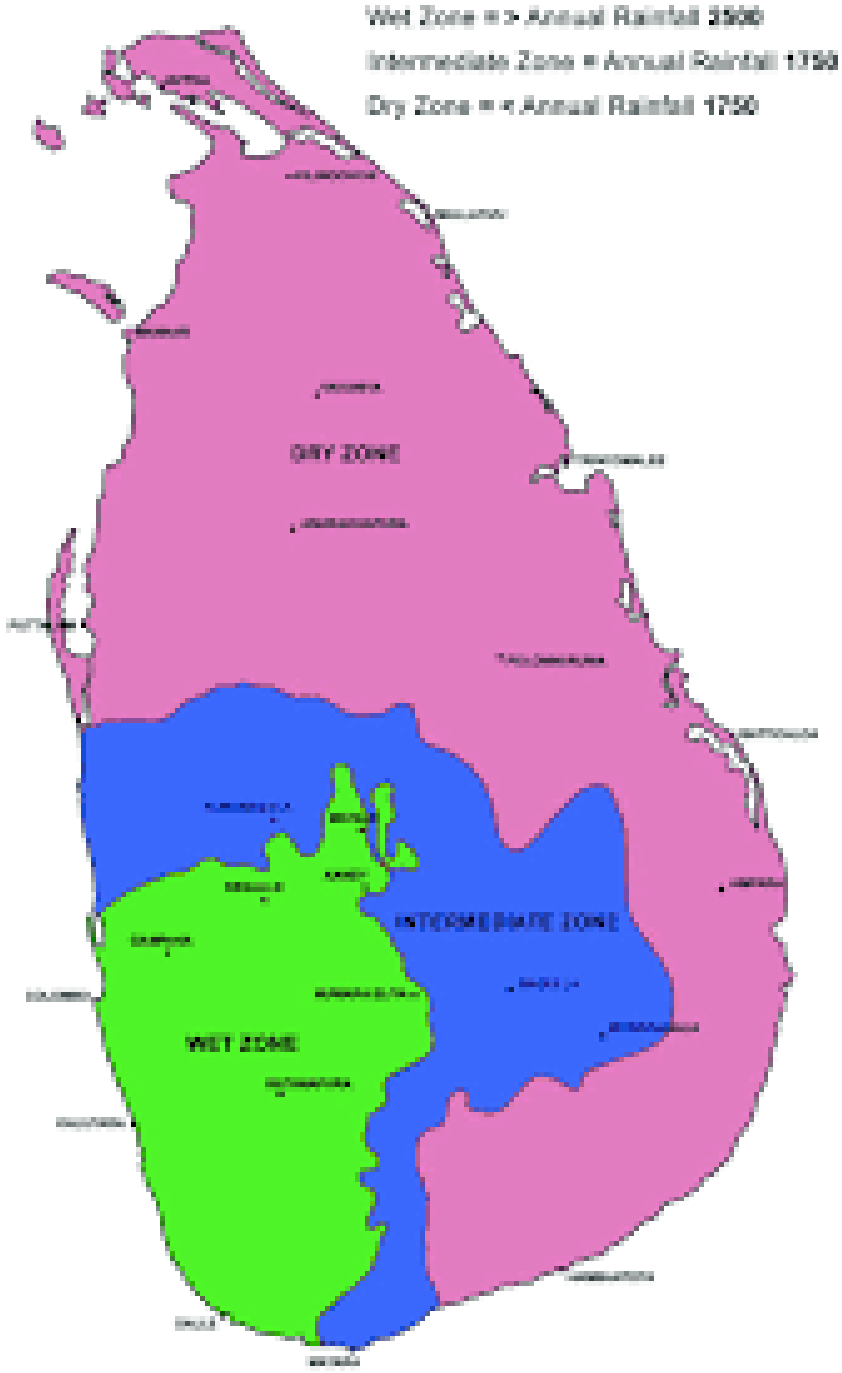
- Climate controls the magnitude and distribution of water resources in Sri Lanka
- Sri Lankan climate – Tropical and Monsoonal
- Two major monsoons
  - North East monsoon – Maha cultivation season – November to February
  - South West monsoon – Yala cultivation season – May to September
- Inter monsoons
  - Convective rainfall
  - Two inter monsoons – Inter monsoon I and II



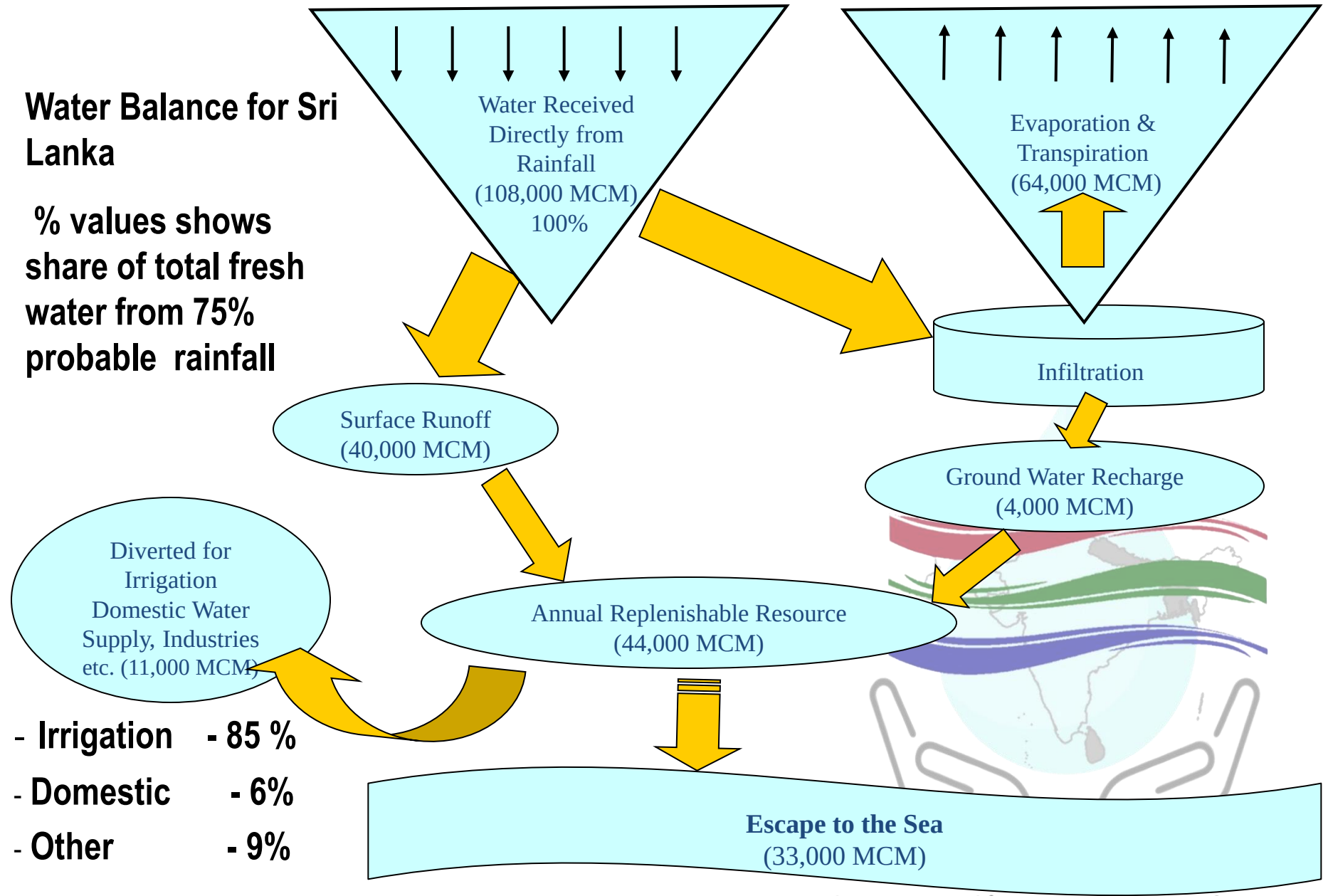
Climate of Sri Lanka

- Major Climatic Zones
  - Arid Zone : < 1250 mm of mean annual Rainfall
  - Dry Zone - 1250- 1875 mm
  - Intermediate Zone - 1875-2500 mm
  - Wet Zone Over 2500 mm




Wet Zone = > Annual Rainfall 2500
Intermediate Zone = Annual Rainfall 1750 - 2500
Dry Zone = < Annual Rainfall 1750
DRY ZONE
INTERMEDIATE ZONE
WET ZONE

A generalized national water balance of Sri Lanka

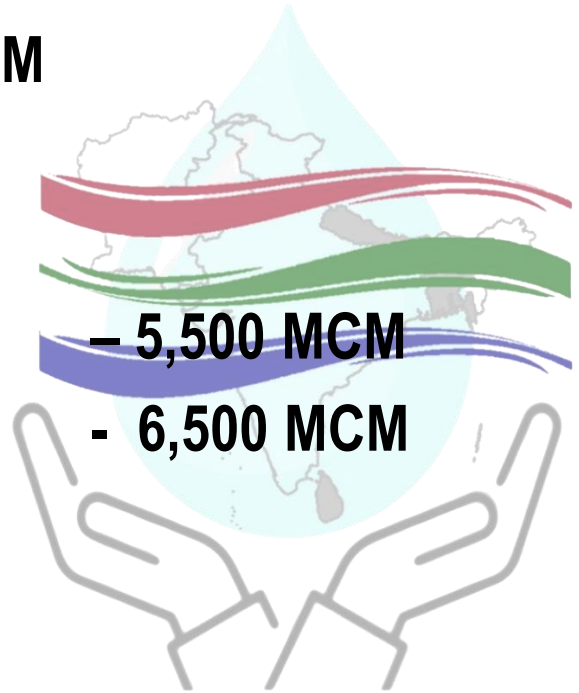


Spatial variation of surface water

- **Total annual availability - 45,000 MCM**

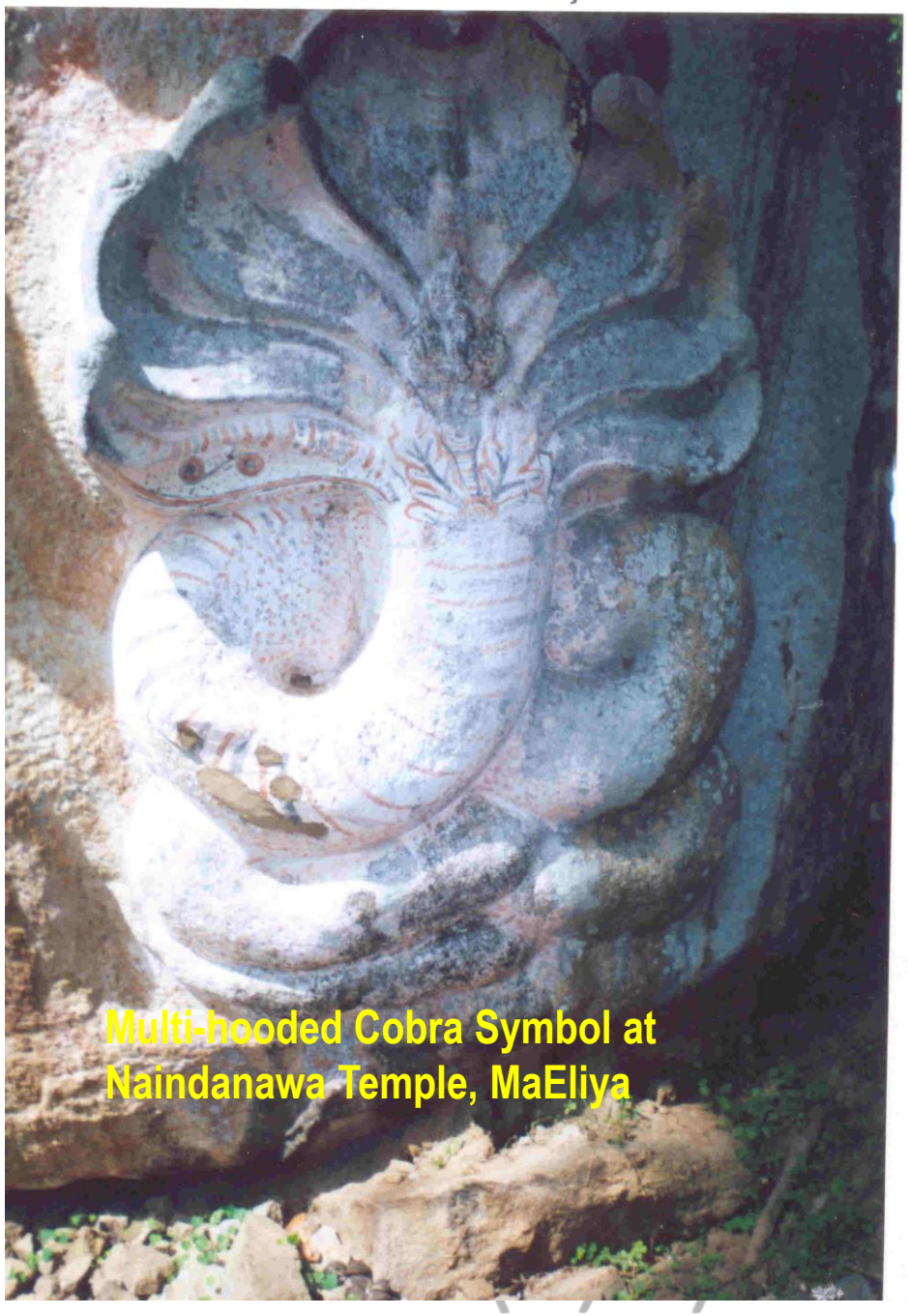
- **Wet zone (15 rivers) - 22,000 MCM**
- **Mahaweli - 11,000 MCM**

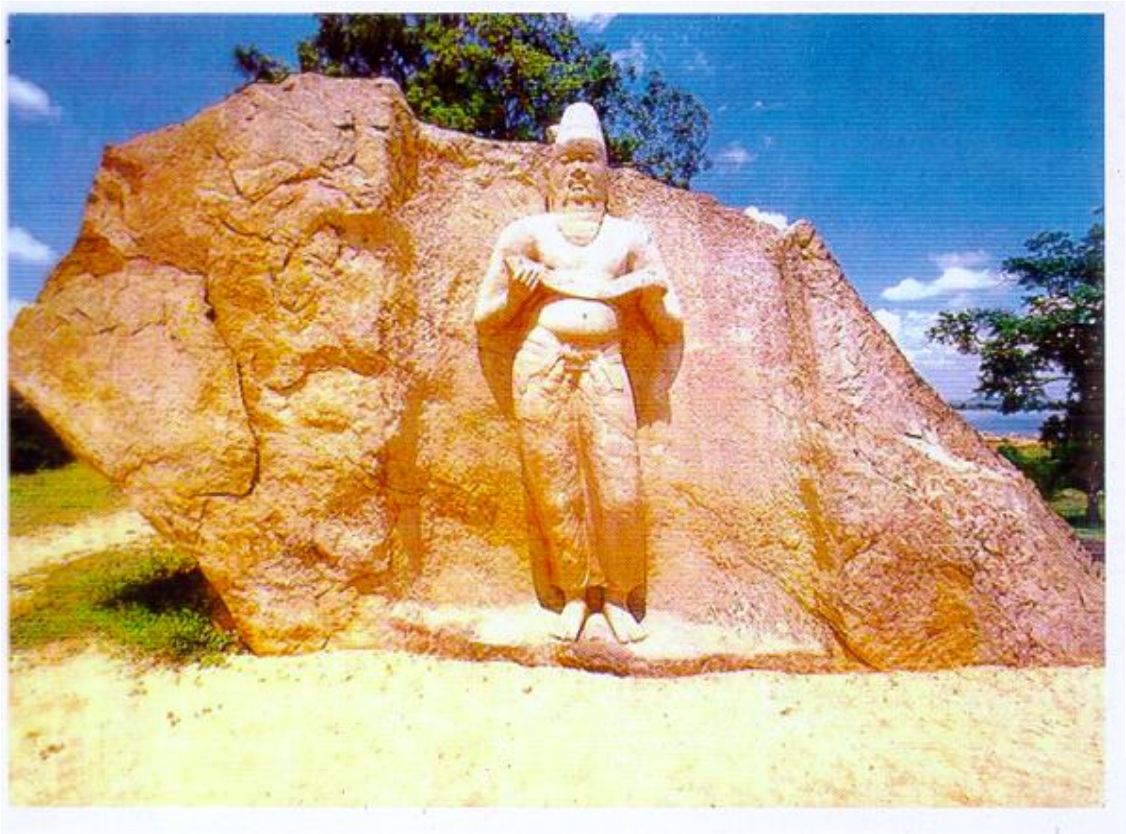
- **Dry zone**
  - **Walawe, Gal Oya and Deduru Oya – 5,500 MCM**
  - **Other rivers (84 rivers) - 6,500 MCM**



Landscaped Water Gardens of Sigiriya

A symbol of multi-hooded Cobra is discovered in many sites of ancient irrigation and water works.

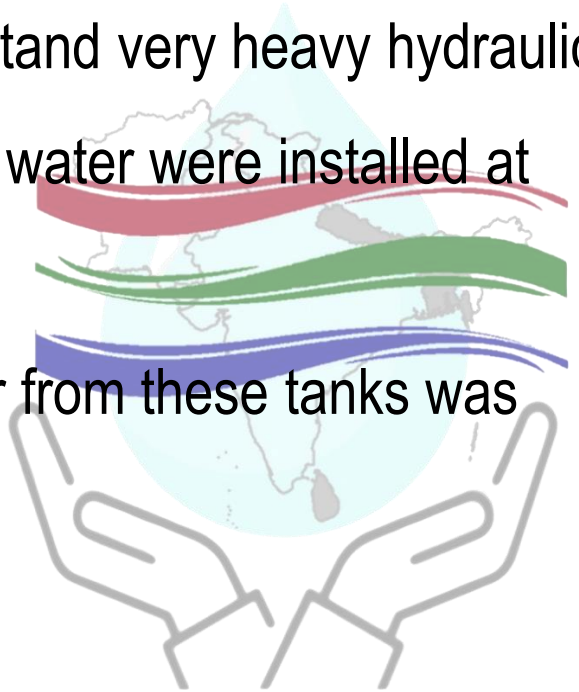




“Let not a single drop of water received from rains go waste into the sea without benefiting the man and the beast”

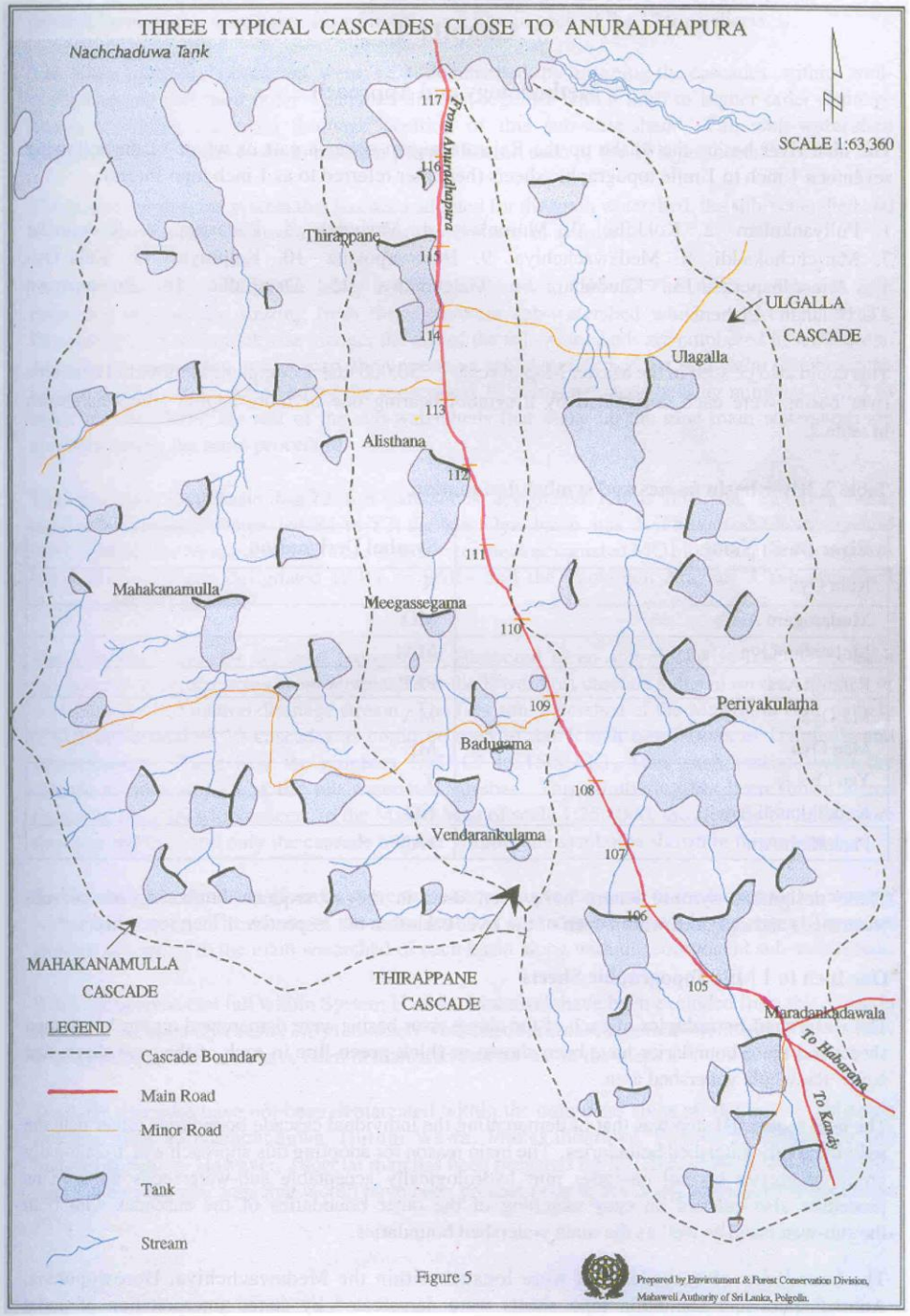
(King Parakramabahu, 12 Century AC)

- Sri Lankan engineers utilized the waters of Mahaweli river and other rivers that flowed down to the plains from the mountains of the wet zone.
- The construction of their canals exhibited an amazing knowledge in trigonometry
- Their dams had broad bases able to withstand very heavy hydraulic pressures and outlets for the discharge of water were installed at suitable points in the embankment.
- The method of regulating the flow of water from these tanks was ingenious.



" When the central government was disrupted and the major tanks fell into disrepair, village life could carry on quite adequately.

Each village still possessed its own small-scale irrigation system which was maintained by the villagers themselves."



Minor Irrigation Systems

Village tank settlements – Backbone of civilization

Small tank systems have always occupied a priority place in our national heritage.

Village + Tank + Stupa

Forest tank – for wildlife

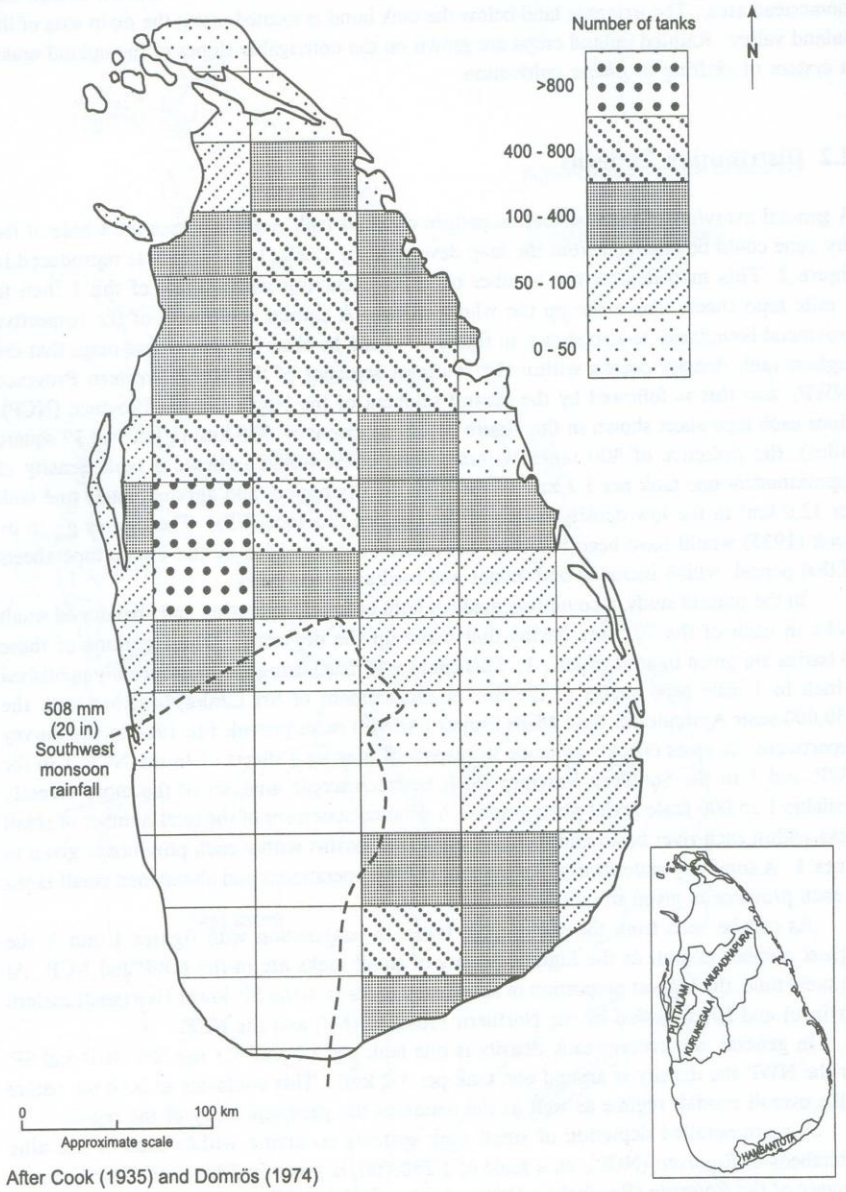
Mountain tank – for slash and burn cultivation

Erosion control tank – silt trapping

Storage tanks – twin tanks

Village tank – village level irrigation – connected to the twin tanks by a canal

Figure 2. Islandwide distribution pattern of small tanks.

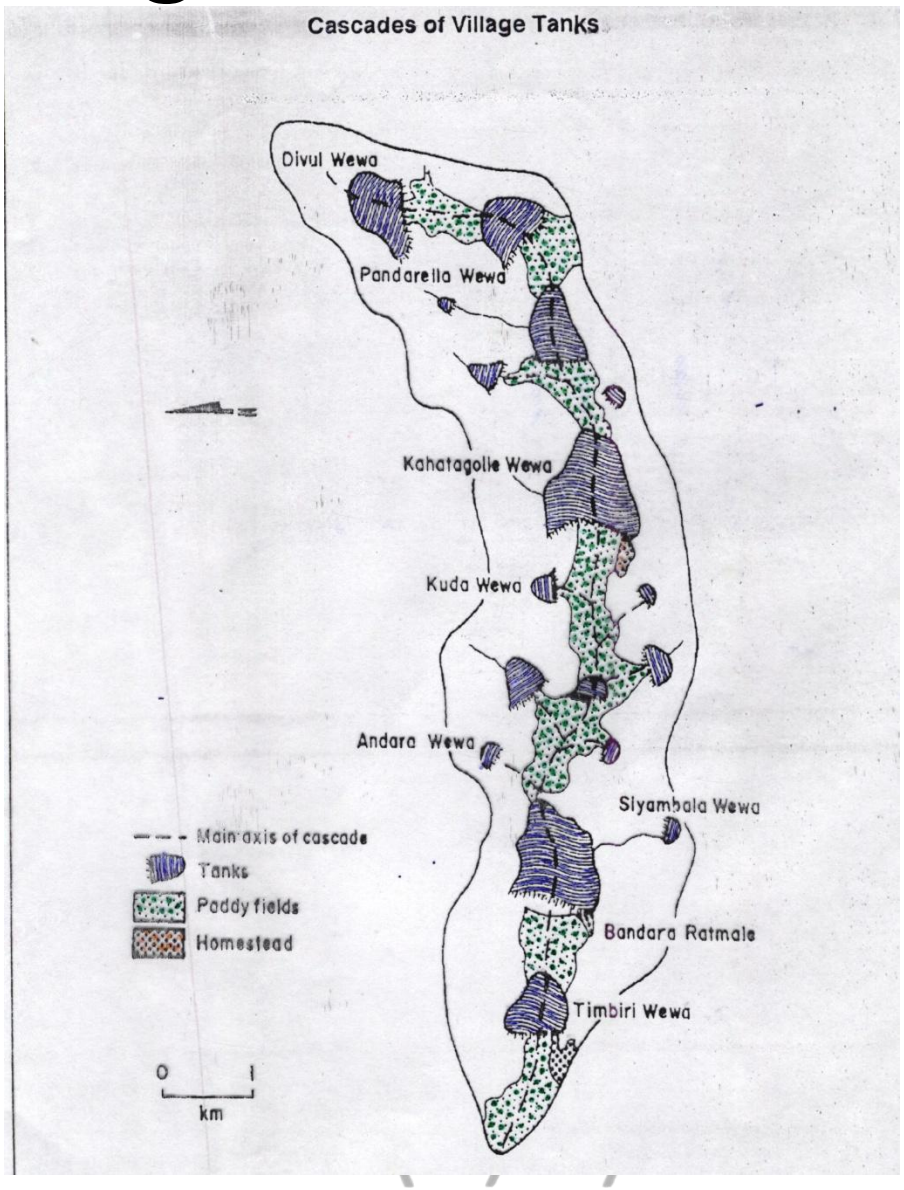


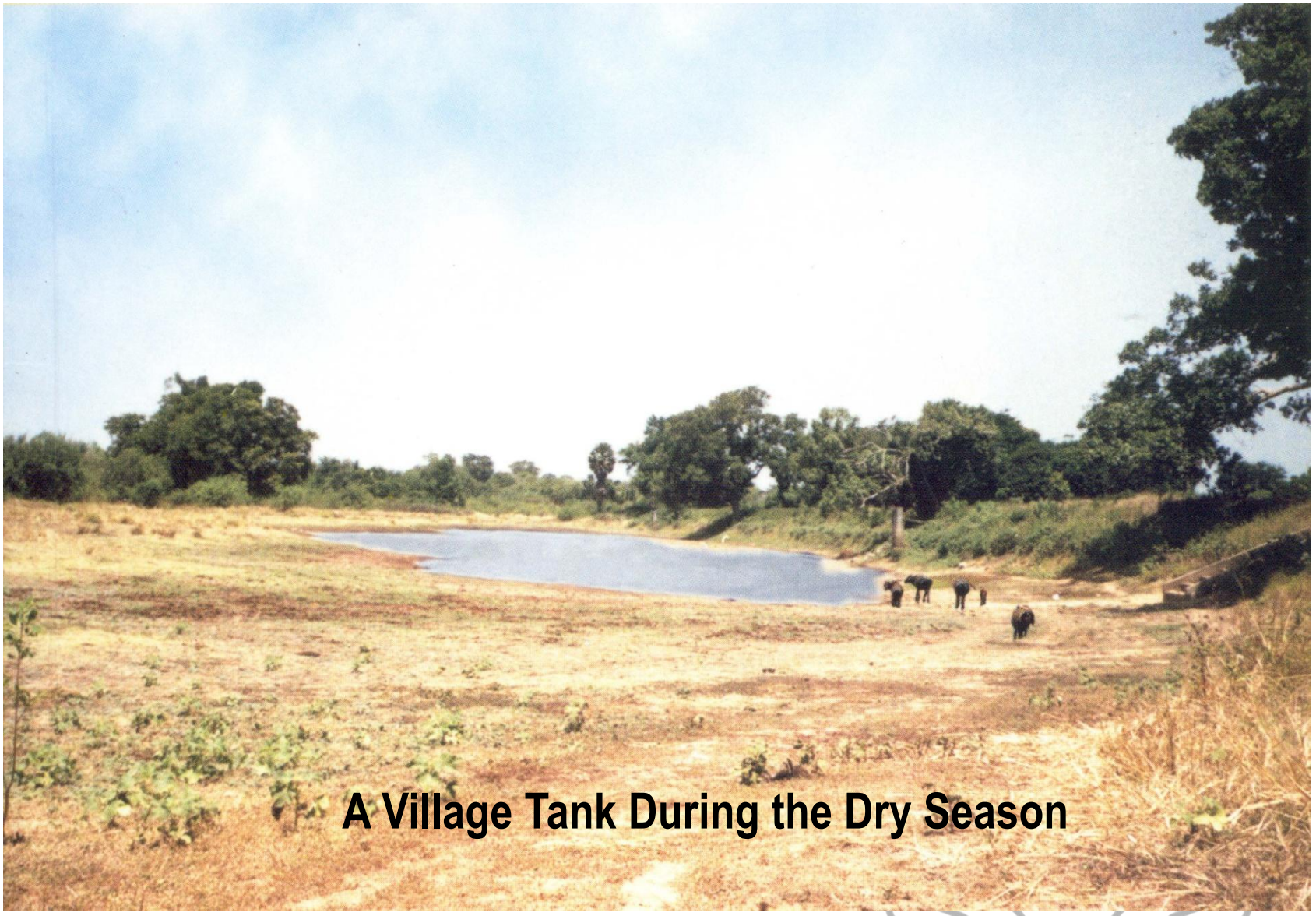
After Cook (1935) and Domrös (1974)

Cascade of village tanks

"A 'cascade' is a connected series of tanks organized within a micro-catchment of the dry zone landscape, storing, conveying and utilizing water from an ephemeral rivulet".

(Madduma Bandara, 1985)





A Village Tank During the Dry Season

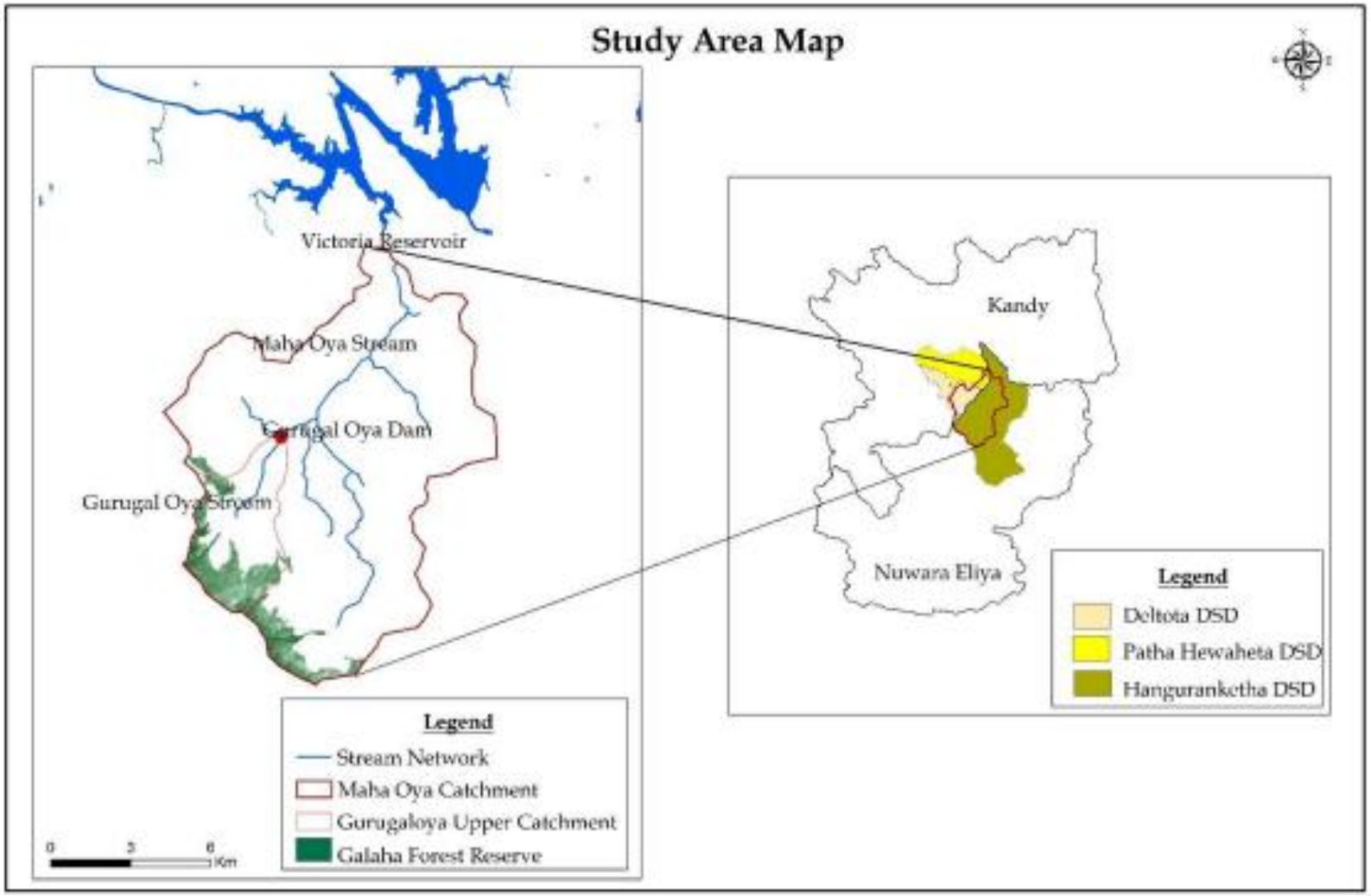
Closer views of village tanks in cascade systems

Murapola Ela Irrigation Scheme

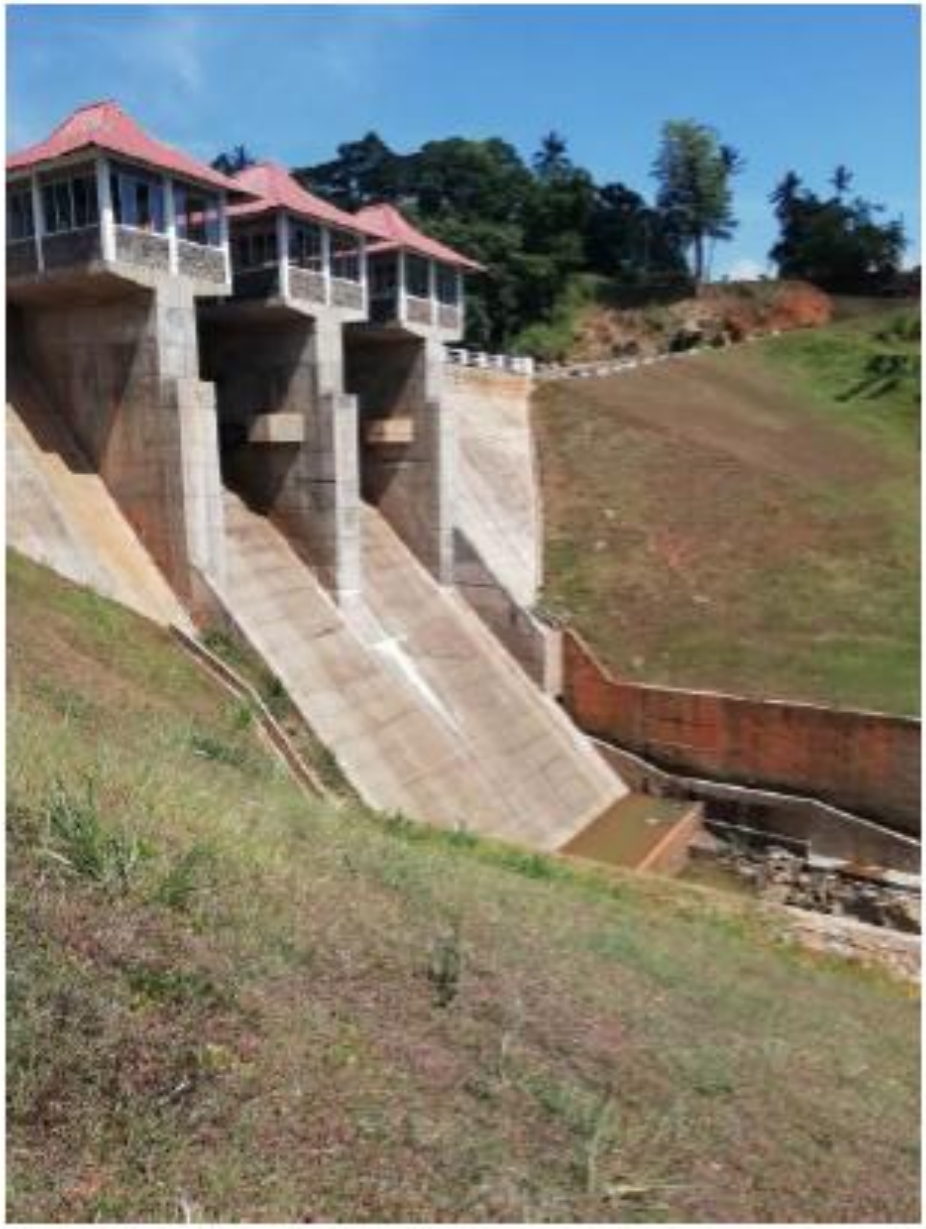
The Field Site

Background

- Situated in the Central Province of Sri Lanka
- It has been constructed in 1947 by the Irrigation Department .
- At the initial stage, an anicut has been constructed across the Gurugal oya and water has been distributed through a canal with a length of 16.5 km.
- In 2015 the system has been rehabilitated and has constructed a new small reservoir in the upstream of the old anicut.


Study Area Map
Victoria Reservoir
Maha Oya Stream
Gurugal Oya Dam
Gurugal Oya Stream
Legend
Stream Network
Maha Oya Catchment
Gurugaloya Upper Catchment
Galaha Forest Reserve
0
3
6
Km
Kandy
Nuwara Eliya
Legend
Deltota DSD
Patha Hewaheta DSD
Hangurankotha DSD


Galagedara
Akurana
Katugastota
Teldeniya
Kandy
Hasalaka
Mahiyanganaya
Kehelulla
Ekiriyankumb
Andaulpotha
Mawanella
Gurugaloya Dam
- ගුරුගල්ඔය...
Rideemaliyadda
Bibile
Walapane
Nannapu
Nawalapitiya
Madulsima
Kotmale
Ragala
Ginigathhena
Badulla
Hali-ela
Nuwara Eliya
Hatton
Welimada
Ella
A26
B5
A5
B57
B86
B36
B56
AB13
B67
A7
B71
B43
B44
Google
Map data ©2025
Sri Lanka
Terms
Privacy
Send Product Feedback
10 km



Research Questions

- Understanding Inequalities in Irrigation Water Access: Insights from the Gurugal Oya Irrigation Project

  What factors contribute to the unequal distribution of irrigation water among farmers in the Gurugal Oya Irrigation Project, and to what extent are these inequalities shaped by technological (design) factors/policies/ institutional factors/ geospatial factors/ existing socio-economic inequalities?

- Impacts of irrigation-driven agriculture on livelihoods among diverse socio-economic groups: A case study of Gurugal Oya Irrigation project

  How has the Gurugal Oya irrigation system impacted household livelihood improvement in terms of income, agricultural productivity, crop diversification, increased employment opportunity and socio-economic well-being?

- The role of Gurugal oya dam construction in addressing farmer needs under Changing climate conditions

  How has the construction of the Gurugal Oya Dam contributed to addressing farmers' needs and enhancing agricultural resilience under changing climate conditions?