



27th November – 4th December 2013 Sri Lanka

IRRIGATION : ANCIENT AND MODERN

M U A TENNAKOON PhD, DSc



IRRIGATION : ANCIENT AND MODERN

1. What is irrigation ?
2. Powers/forces behind irrigation
3. Inventions and Improvements in irrigation
4. Irrigation and civilization
5. Irrigation administration, political power and Royal patronage
6. Irrigation and human sustenance
7. Irrigation disaster prevention

Conclusions

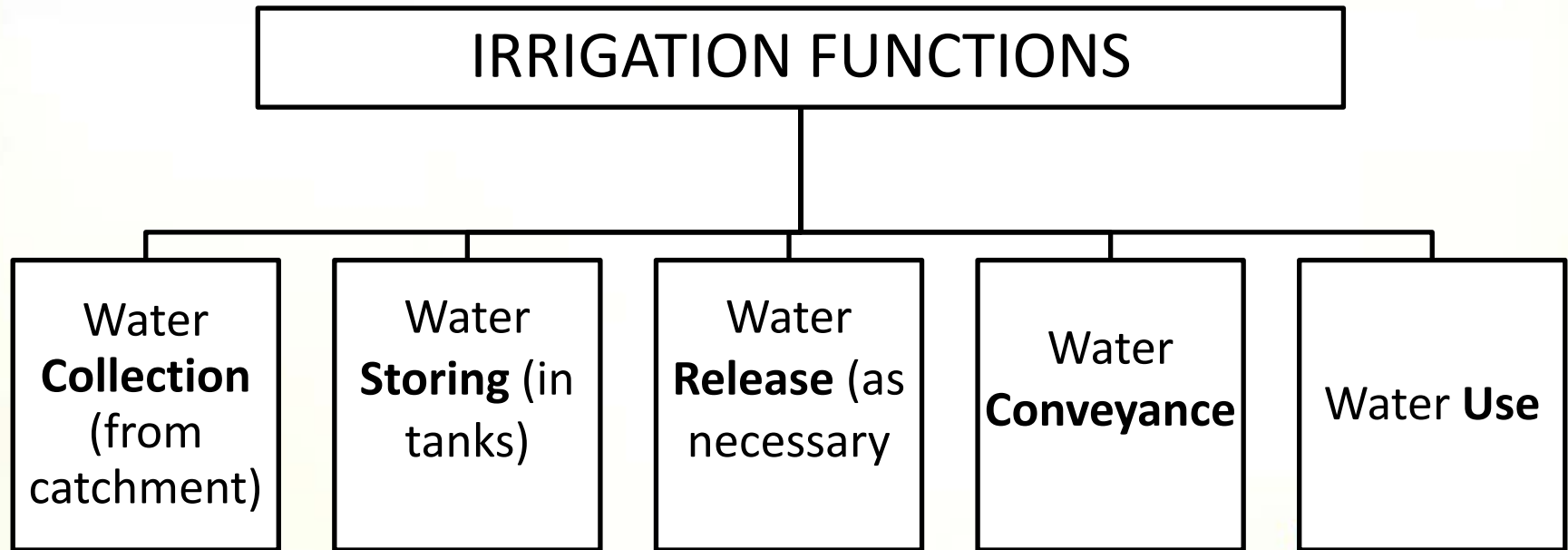
30 minutes








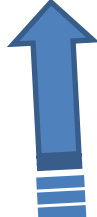
1. WHAT IS IRRIGATION ?

Irrigation is any form of water supply to land to grow any crop or plant in times of water shortages





2. POWERS/FORCES BEHIND IRRIGATION

- **Natural fall**  **Rain Fall**
- **Gravity** 
- **Push** 
- **Pull up** 
- **Combined forms**



2.2 Gravity

- **Carrying water across micro valleys have been mastered (in many countries) with gravity carefully manipulated**



From Sri Lanka

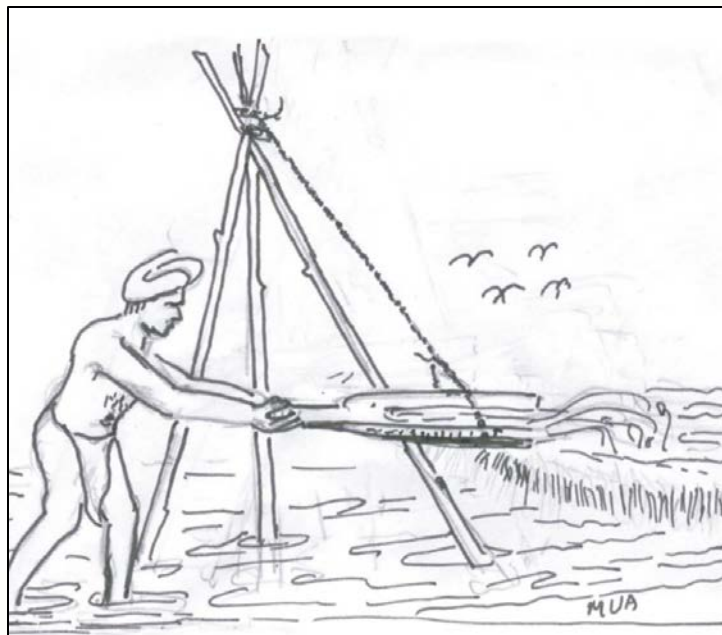


2.3 Push

- **250BC - Greece**
Arkimedes Screw



**Sri Lanka 1980s
onwards**





2.4 Pulls up

3000BC - Egypt

Saduf



Northern Sri Lanka





- Some times there are combinations

- pulls up + gravity

550BC - *Messapotamia*

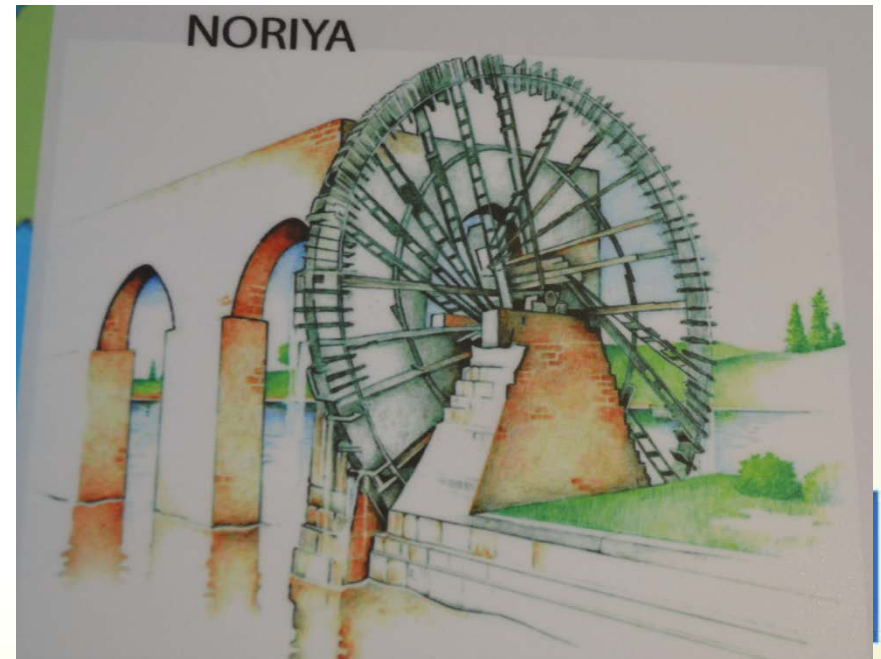
Qunant



- pulls up + push

700BC - *Egypt*

Noria





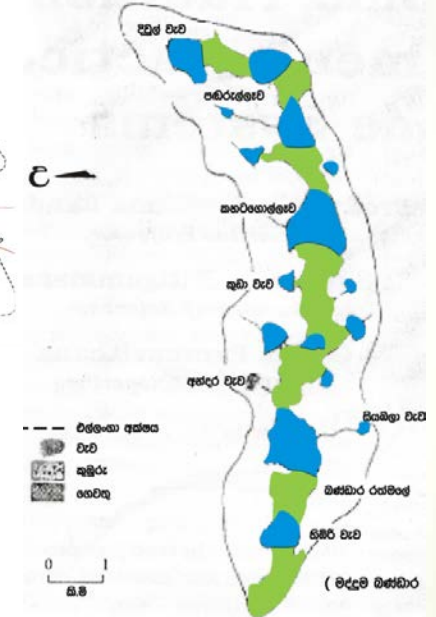
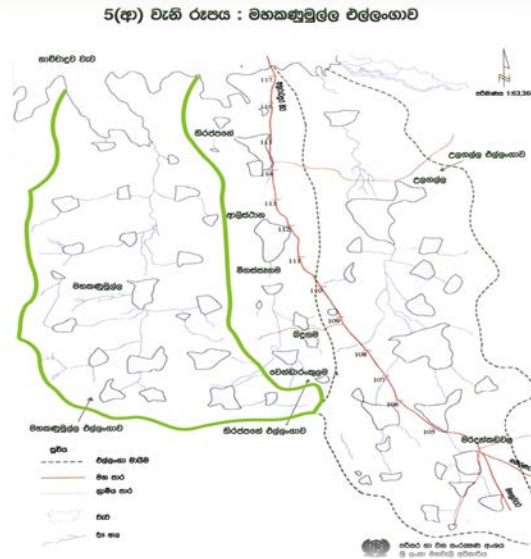
3. INVENTIONS & IMPROVEMENTS

- linking Water bodies in Cascade Tanks

SRI LANKA'S CASCADE BASED TANK storages are

Determined by :

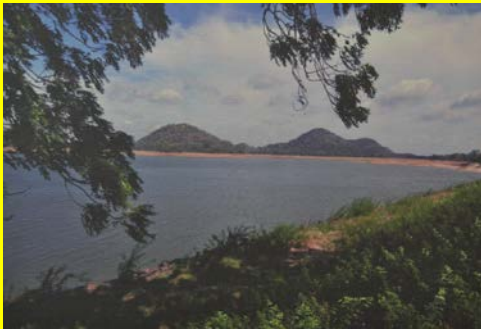
- Rainfall regimen
- Relief of land (undulating land)
- Presence of Meso- and Micro valleys



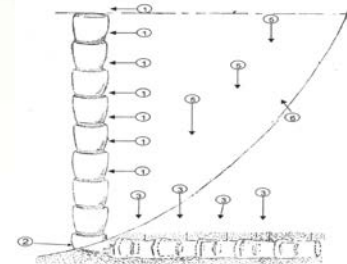


Storing, Release, Conveyance and Use

- **Storing**



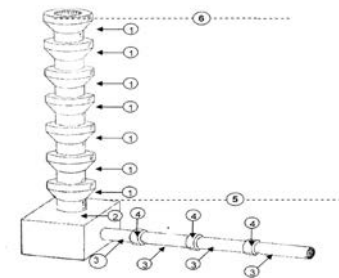
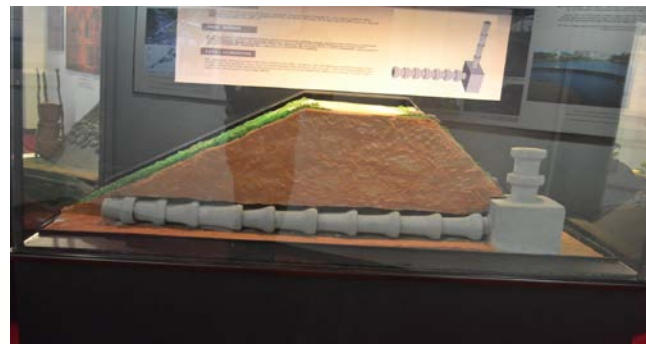
- **Release**



Clay Pipe Sluice System 1980s



**Maduru Oya
Sluice 270 AD**



**Concrete Pipe Sluice
System 1990s**



4. IRRIGATION AND CIVILIZATION

Sedentary life of man started with irrigation in many countries like in:

- Mesopotamia
- Egypt
- Indus Valley
- China etc.
- Any nations in the tropical and sub-tropical world have some form of ancient irrigation to claim



Irrigation and Civilization in Sri Lanka

First around natural water pools

- Where Humans became sedentary
- How they store water
- How they learned to cultivate near natural ponds
- How they learned to constrict tanks





Ancient Irrigation Administration

Fines

Strict orders of King Hamurabi of Babylonia imposed punishments for violators of Irrigation laws such as

- Land confiscation
- Heavy compensation payments
- Selling land owner to another as a slave

In Sri Lanka :

- Fines in gold for : delayed sowings, irregularities in sowing, causing submergence of other's land



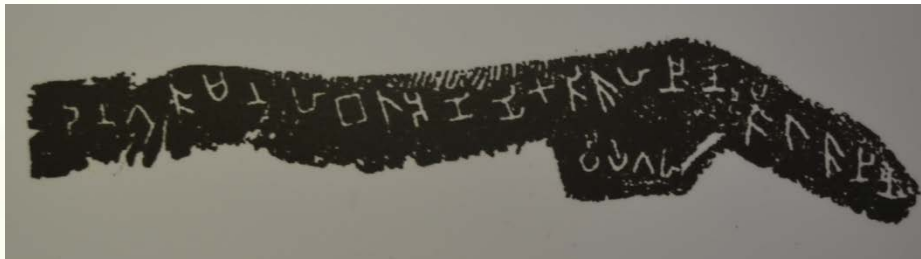
5. IRRIGATION ADMINISTRATORS IN ANCIENT SRI LANKA

- Irrigation Engineer (Dambulla Inscription)
- Canal administrators
- Irrigation Executive Officers
- Canal Protection Officers
- Canal Water Distributors
- Reservoir System Service Inspectors



Irrigation Administrators, Political Power and Royal Patronage in Sri Lanka

- Kings Patronized Irrigation constrictions all the way to keep their subject happy and economically prosperous.
- There were irrigation laws, fines for violators and irrigation administration



Rock slab inscription



Pillar inscriptions



6. IRRIGATION AND HUMAN SUSTENANCE WITH ...

- Water, Food, Plants, and all living beings acting in a symbiotic relationship is necessary for Human sustenance because –

The Planet is an organism. All of us are cells with deferent purposes. And, yet we are inter-twined serving each other, serving the whole (Dan Brown, “Angels and Demons” 2001).

- **More and efficient irrigation is required to feed 7 billion people shortly**



7. IRRIGATION DISASTER PREVENTION

- Irrigation devices are ageing
- Even some “modern” ones are 60 + years old
- Their safety has to be constantly ensured
- Dam safety is so important that it be developed as a separate branch of hydro-technology
- Needs more people trained as hydro -scientist to be vigilant and remedy faults – an international center? a university ? in a suitable country.