# Competition for Water Demands, Management conflicts and Inter- related Issues in MalwathuOya Basin of Sri Lanka

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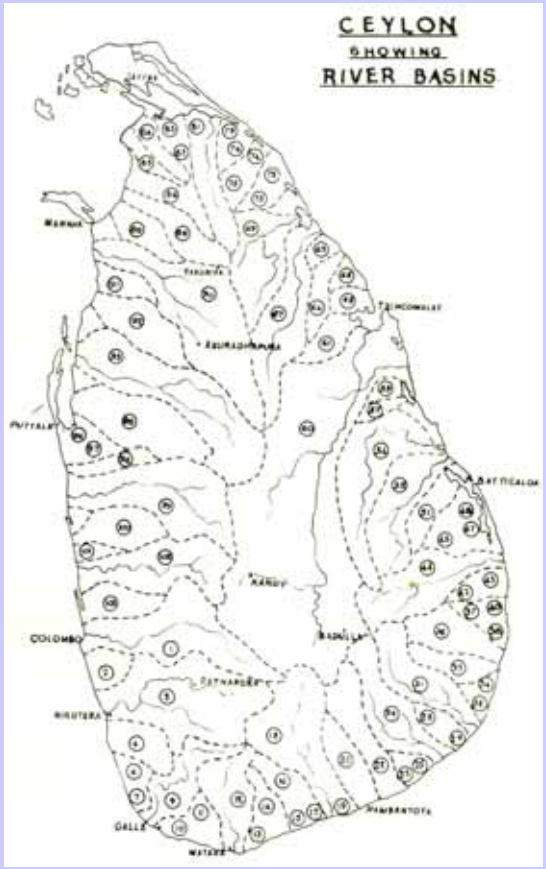
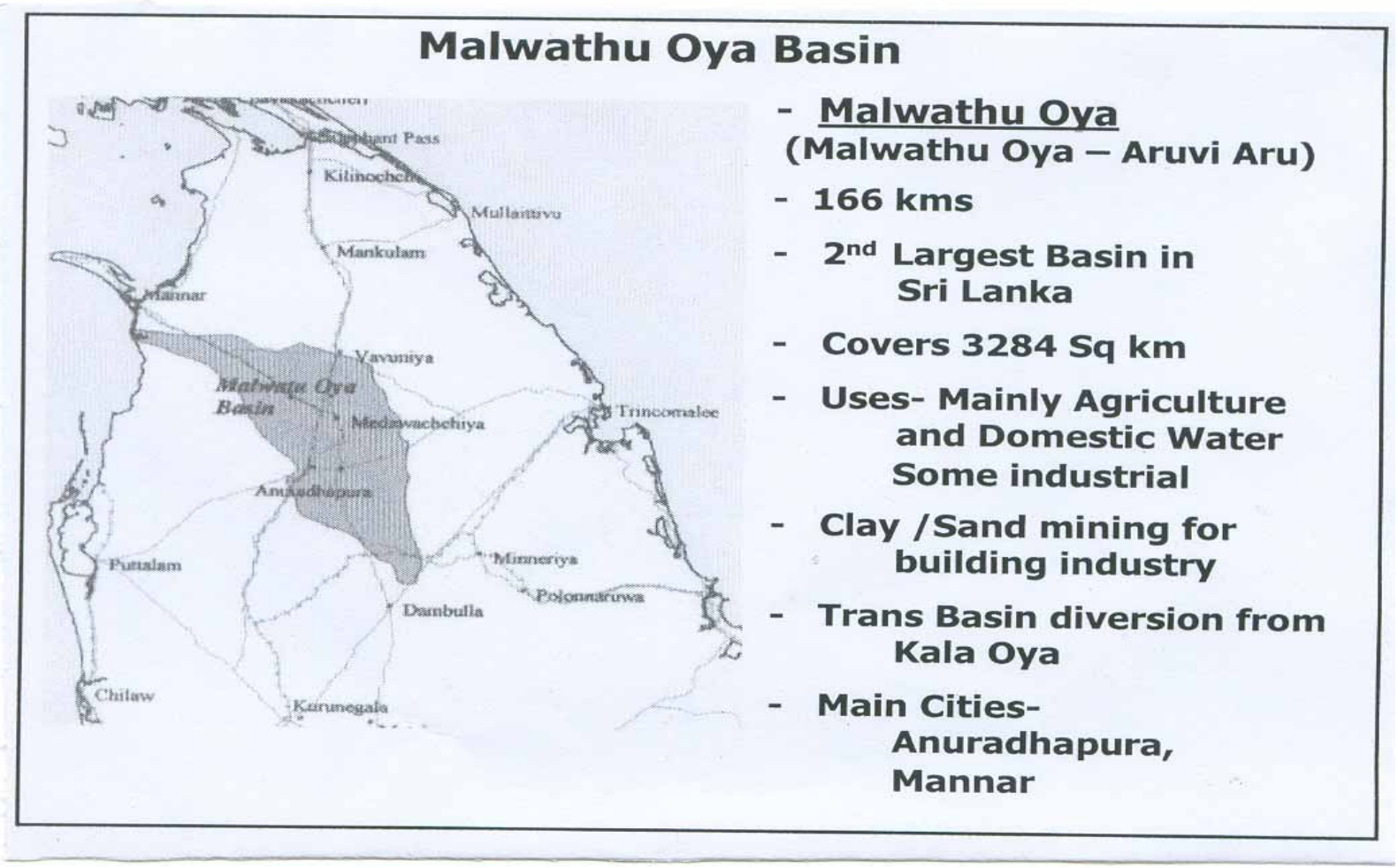
# River Basins of Sri Lanka - 103



# Introduction - Malwatu Oya Basin

## 2nd largest basin . 14th in Water Resources



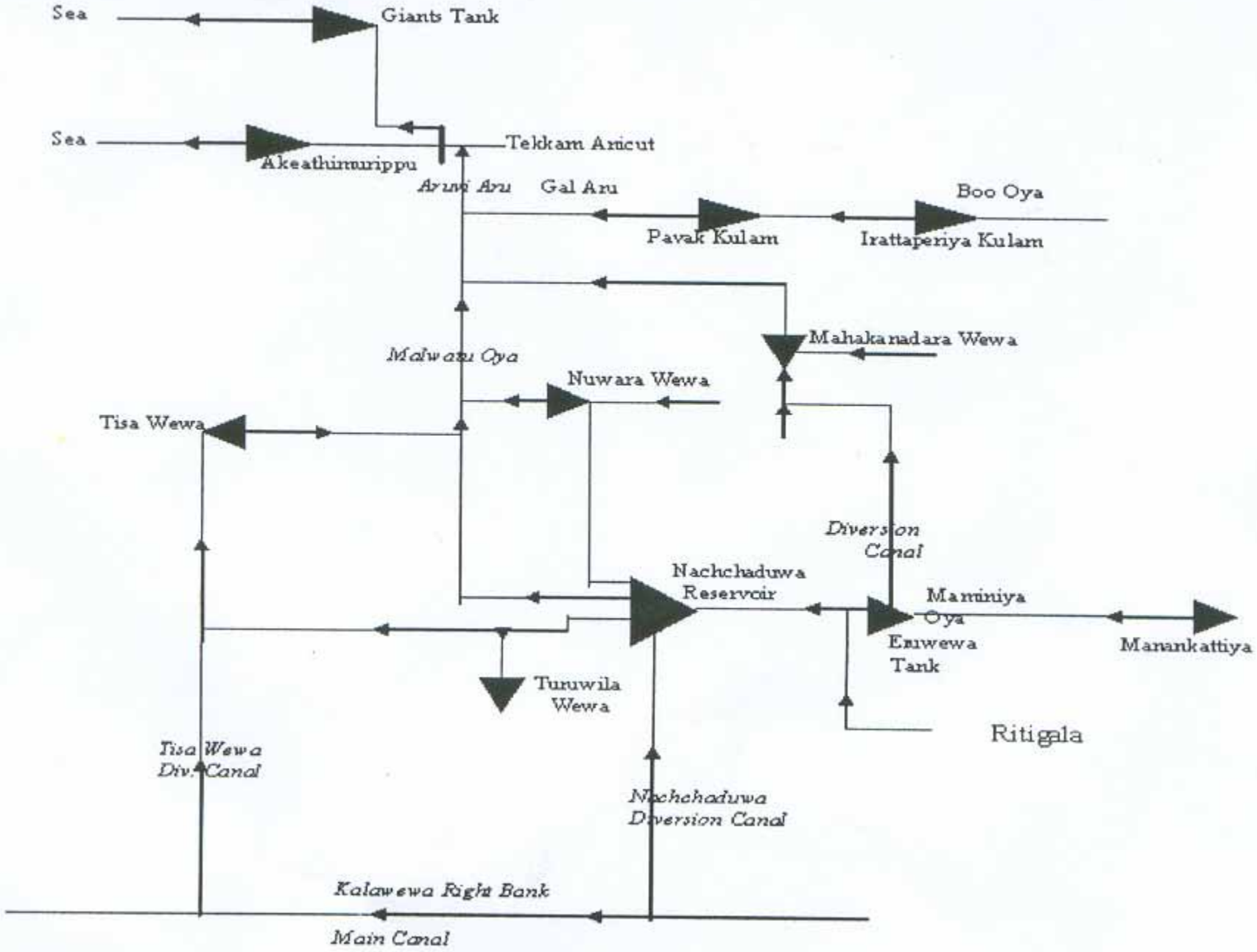
# Basin Characteristics

- Gross Catchment Area 3284 Sqkm
- Mean Annual Rainfall 1447 mm
- Yield from mean annual rainfall 4750MCM
- Length of river 166.4 Km
- Surface run off 112 MCM
- Run off at Kapachi covering 2099 Sqkms area 413MCM
- Total Storage in the basin 360 MCM

## Basin Characteristics Contd..

- Irrigation Issues 573 MCM
- Domestic Usage 5.2 MCM
- Industrial Usage 2.0 MCM
- Agro –Wells > 2800
- No of major tanks 08
- No of Medium scale tanks 36
- No of village tanks >1105

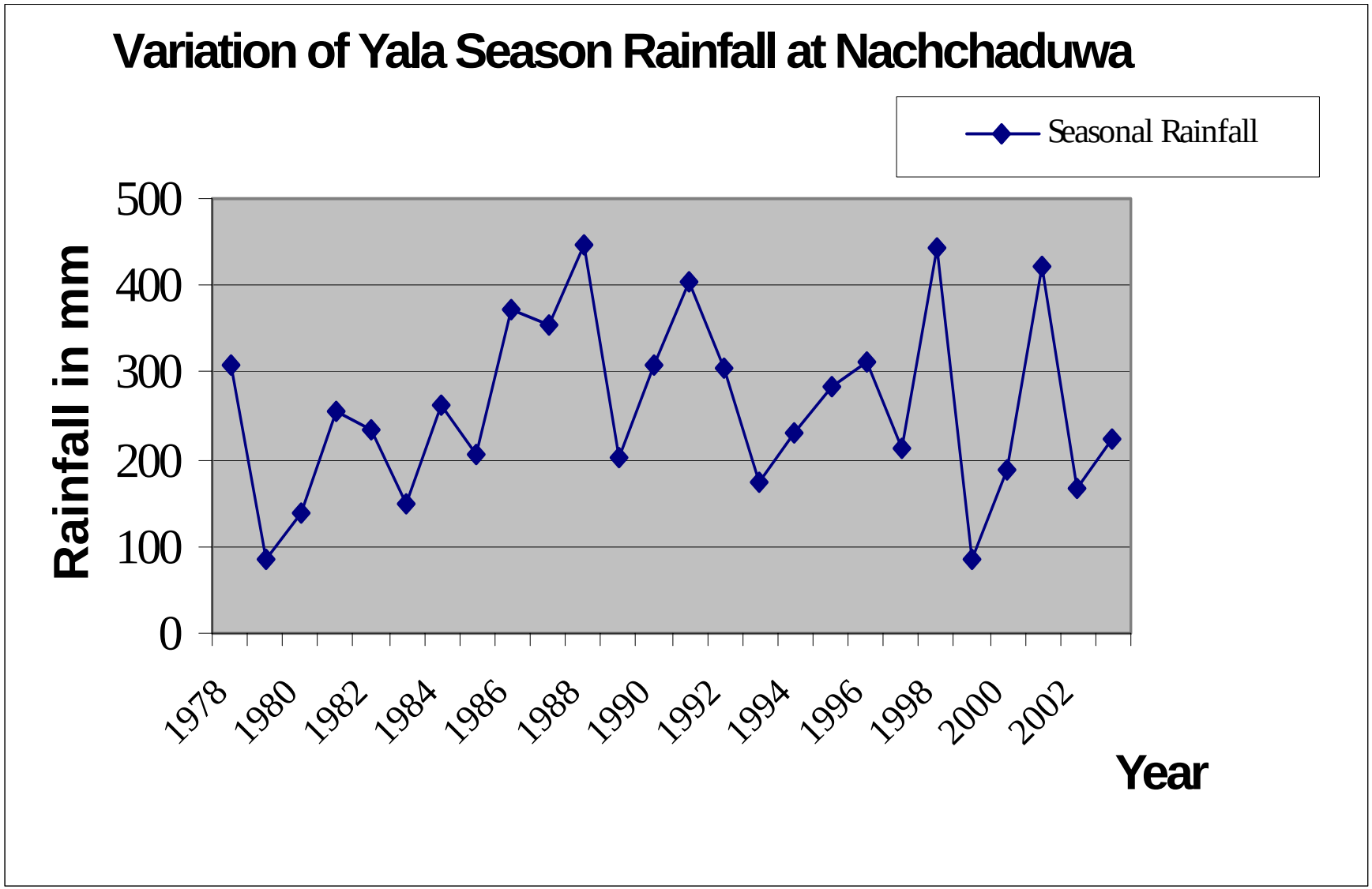
# Schematic Diagram of Malwathu Oya Basin

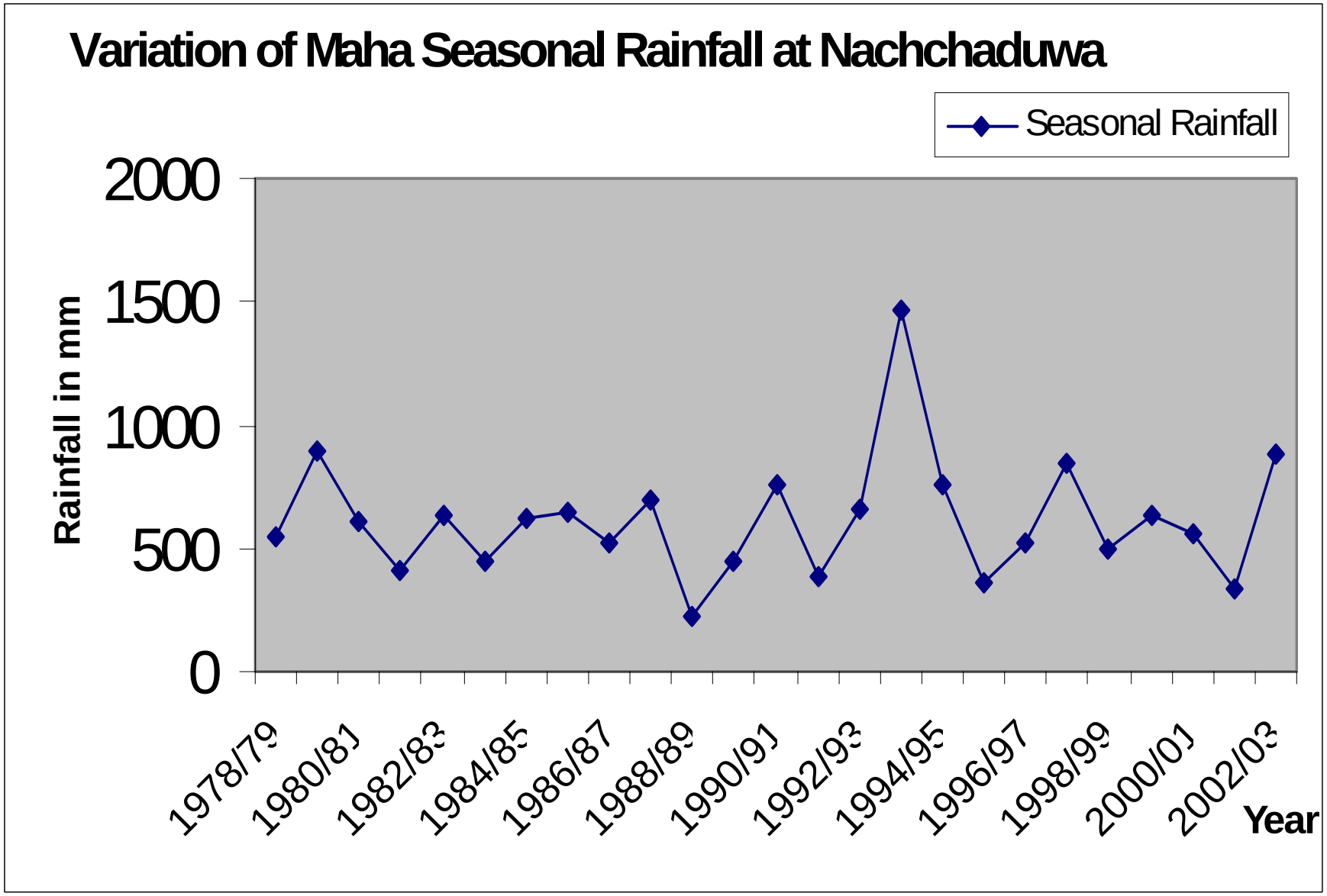


# Major Tanks in the Malwathu oya Basin

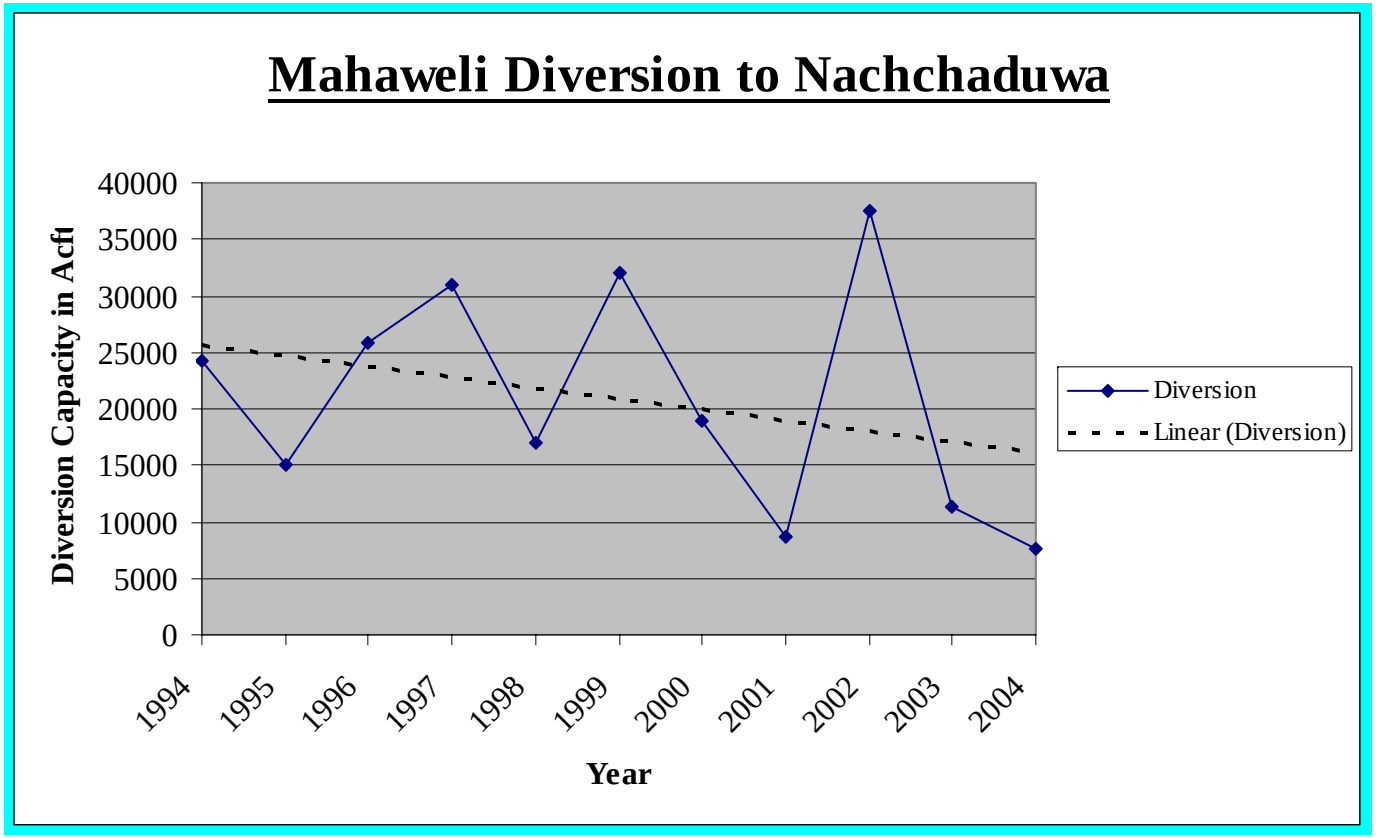
- **

| Name of the Reservoir | Catchment Area ($Km^2$) | Capacity at FSL - MCM | Capacity at DSL - MCM | Full Supply Level – m Above MSL | Command Area - Ha |
|---|---|---|---|---|---|
| Nachchaduwa | 604 | 55.70 | 1.2 | 101.68 | 2540 |
| Nuwarawewa | 83.2 | 44.5 | 1.23 | 87.4 | 1215 |
| Tissa wewa | 5 | 4.3 | 0.3 | 91.53 | 400 |
| Mahakanadarawa | 323 | 42 | 1.23 | 94.79 | 2430 |
| Basawakkulama | 9 | 2 | 0.12 | 85.5 | 370 |
| Mannakattiya | 62.8 | 8.6 | 0 | 97.2 | 609 |
| Giant’s Tank | 97.28 | 38.80 | 0 | 13.4 | 9824 |
| Akathimurippu | 3.84 | 8.55 | 0 | 10.50 | 2522 |
| Irattaperiyakulam | 31.33 | 4.34 | 0 | 80.72 | 203.56 |
| Pavakkulam | 294.4 | 33.21 | 0.73 | 71.10 | 1673 |

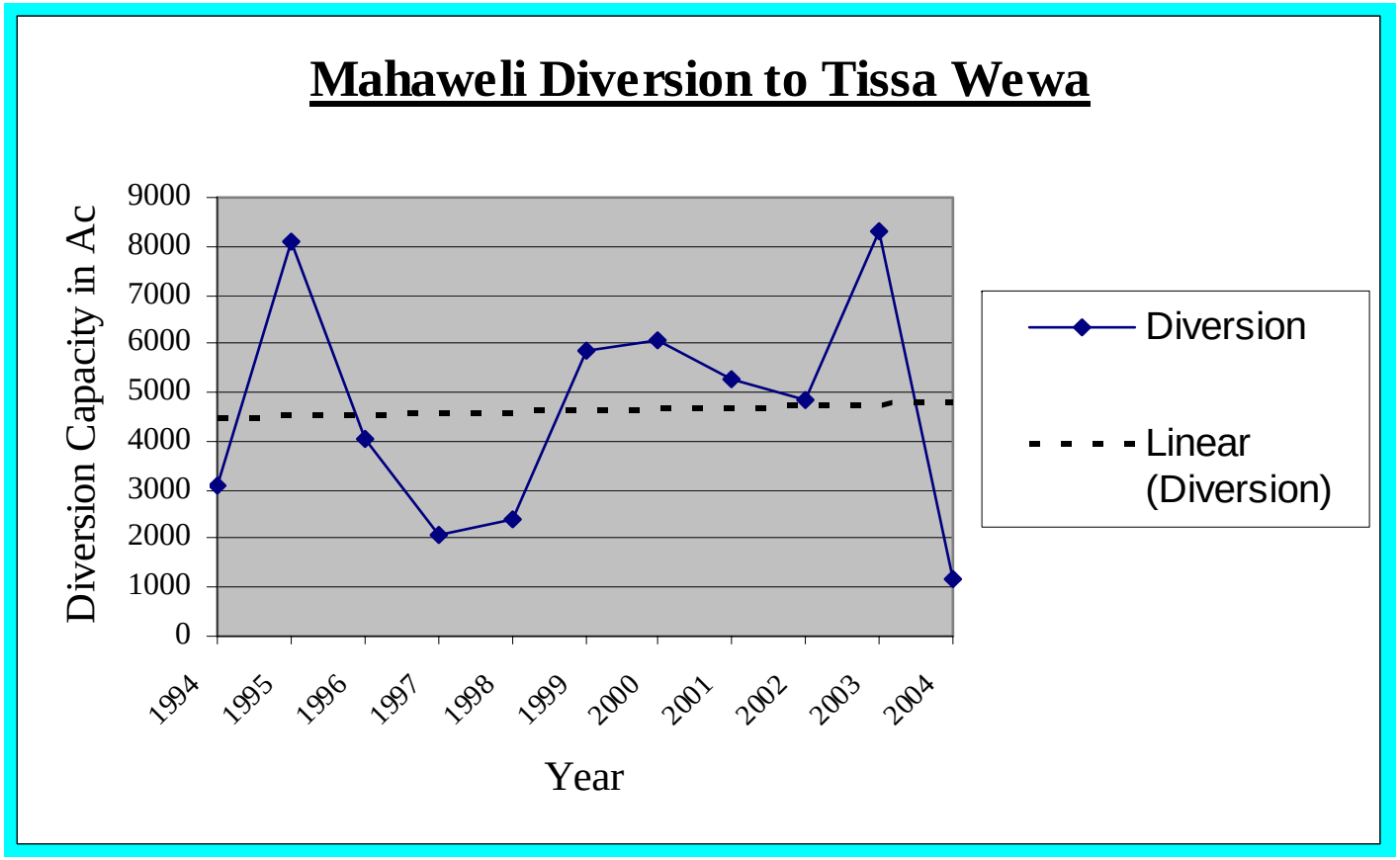

Variation of Yala Season Rainfall at Nachchaduwa
Seasonal Rainfall
Rainfall in mm
500
400
300
200
100
0
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
Year


Variation of Maha Seasonal Rainfall at Nachchaduwa
Seasonal Rainfall
Rainfall in mm
2000
1500
1000
500
0
1978/79
1980/81
1982/83
1984/85
1986/87
1988/89
1990/91
1992/93
1994/95
1996/97
1998/99
2000/01
2002/03
Year

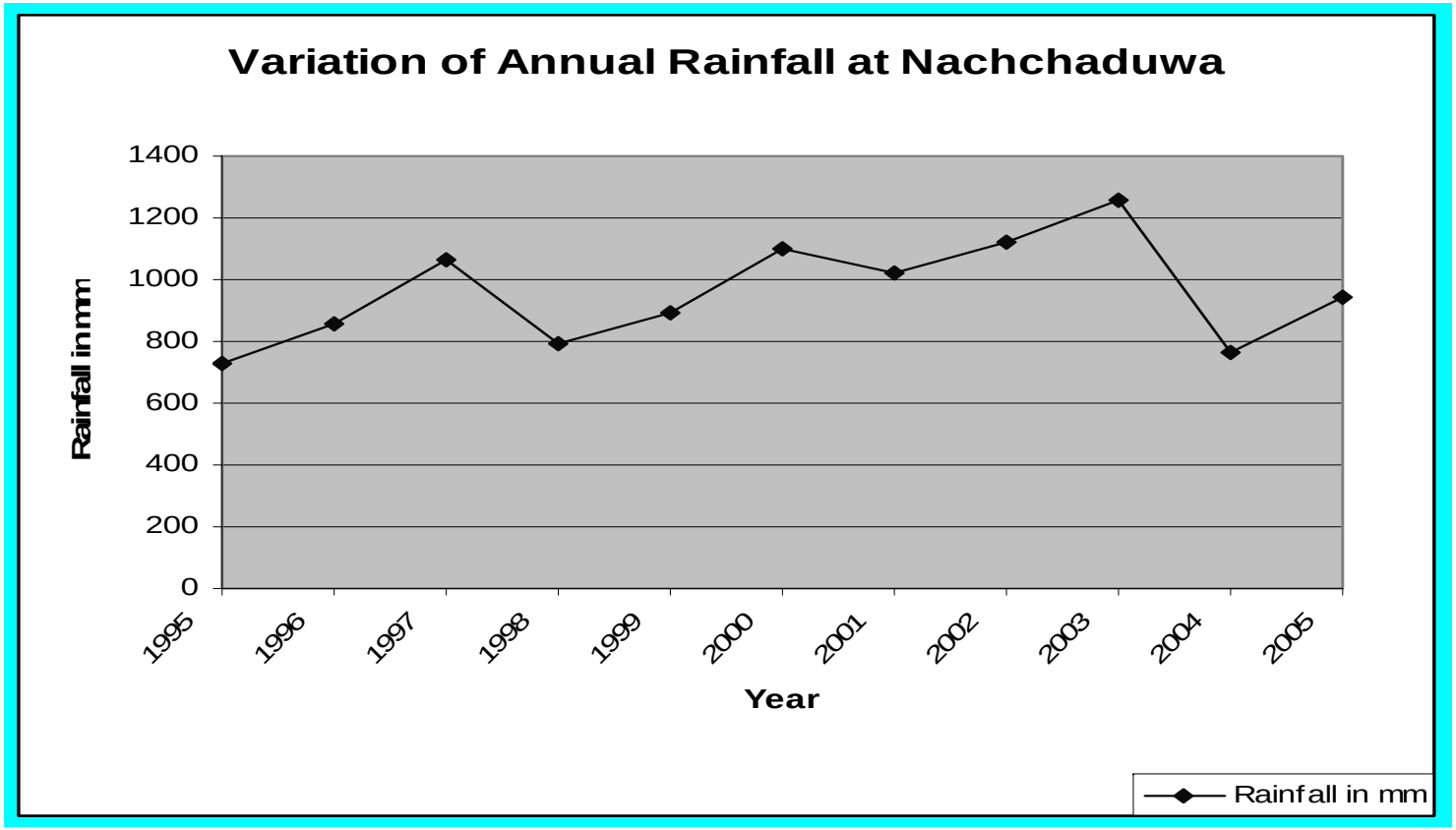
# Trans- basin Diversion



# Trans-basin Diversion



# Rainfall Variation



## Trans-basin Diversion

To meet shortage,

water is diverted from Kala Oya (Jaya Ganga) to Nachchaduwa and Tissa Wewa, Nuwara Wewa and Abhaya wewa.

# Issues and Conflicts

- Two Main Areas
  - Inter Sectoral
  - Intra Sectoral
  1. Irrigation,
  2. Water Supply and Sanitation
  3. Industrial

## Current Status

- Water Resources are administered By various Institutions- No single body having sole authority
- Lot of legal acts/ordinance with various institutions- same scope but no one executed and responsible

## Current Status Contd..

- Irrigation Department is the oldest Department which handled the water resource development specially the irrigation sector
- With the need of rapid development new institutions established but no coordination among the institutions perfectly

**Basic fault**

Programmes are purpose oriented , no proper objective oriented in water resources development and natural resource management

# Issues and constraints in Irrigated Agriculture Sector

- Reduction of Tank storage due to changes in rainfall pattern
- Reduction of Tank storage due to sedimentation of tank beds
- Less efficiencies in irrigation systems
- Increase of water use for unit area of land
- Reduction of Irrigation interval due to high evaporation rate
- Reduction of cropping intensity

# Issues and constraints in Irrigated Agriculture sector Contd..

- More water demand for paddy cultivation
- Water losses due to inadequate water management practices
- Inadequate crop diversification
- Extraction of unlimited amount of water from wells
- Unplanned digging of agro wells
- Less use of rainfall for land preparation in paddy cultivation in major irrigation systems

# Issues and constraints in Irrigated Agriculture Sector Contd..

- Deforestation in upper catchments and clogging of springs
- Use of traditional agriculture practices
- Improper on-farm water management practices
- Disorganize situation and less courage in seasonal planning
- Inadequate water supplies to the Down stream farmers

# Issues and constraints in Irrigated Agriculture Sector Contd..

- More water demand for salinity areas
- Uncertainty in trans-basin diversion
- Constraint in water deliveries for irrigated agriculture due to abstraction for domestic purposes
- Weaknesses in operation and maintenance of irrigation systems
- Siltation of irrigation canals
- Management conflicts among water sector institutions

# Domestic and Industrial Needs

- Basin Population > 325,000
- Per Capita Consumption 180 liters/ day
- Pipe borne Water Supply in Anuradhapura extracts 18,000$M^3$ /day
- Current Extraction

  4.4 MCM/ year (Nuwara Wewa)
  1.8 MCM/ year (Tissa Wewa)
- Immediate Future demand 7.7 MCM/ year
- 24 hour supply in 2025 requires around 27 to 30 MCM and therefore further trans-basin diversion

# Issues and Constraints – Water Supply

- Contamination of surface and ground water due to over use of agro-chemicals and fertilizer.
- Degradation of water quality due to environmental problems in upper catchments areas.
- Dumping of garbage and effluents to the Malwathu Oya, City tanks and some tributaries from Holes and other industries.
- Increasing the demand due to urbanization of main and sub towns.
- Increase of hardness in drinking water.
- High fluoride concentration causing the health hazards.

# Issues and Constraints – Water Supply

- Increasing the wastewater volume
- Misuse of pipe born water supply and wastages
- Lack of technical knowhow in O & M where the water supply systems managed by the local authorities
- Over exploitation of ground water from shallow & deep wells
- Dissatisfaction of consumers in some instances due to inadequate supply and poor quality(high chlorine content)
- Contamination of surface & ground water due to bio chemicals reactions

# Issues and Constraints affected to Water Resources and Environment

- Impact to the bio-diversification
- Sand mining and bank erosion of Malwathu oya
- Pollution of water and mining of tank beds and river banks due to brick industry
- Reduction of fish density in water bodies due to water pollution
- High growth of water weeds and aquatic plants in water courses.( Eutrofication)

# Issues and constraints affected to water resources and environment. Contd..

- Deforestation : reduction of food, shelter,security,water for wild lives specially due to chena cultivation and illicit timber cutting.
- Illicit construction of anicuts causing health hazard problems during low flow conditions.
- Collection of garbage and effluent along riverbed and flood plain and their low degree in decaying.
- Dumping of paddy husk from Rice mills.
- Soil erosion and reduction the productive land.
- Water and air pollution due to agro-chemical.

# Deforestation in upper watershed just down side of Ritigala Mountain

# Herbal plant nursery

# Brick industry closer to the river bank

# Heavy growth of aquatic plants

# Pollution by laundry workers

# Dumping  garbage in to the river

# Sand mining area

# Reduction of soil fertility

# Approach for Water Resources Planning and Management

## Irrigated Agriculture Sector

- Improve the water management practices to reduce irrigation duty
- Increase the productivity of the cultivable lands : increasing yield over the inputs
- Rain water harvesting in home gardens
- Conducting extensive training programs for farmers to manage available surface and ground water

# Industrial and Domestic Water Supply

- Minimize the losses from water supply schemes
- Introducing Rain water harvesting methods
- Studying and mapping of ground water resources
- Preparation of guideline for deep and shallow well construction
- Awareness programs for water saving techniques
- Improving ground water recharge rate / Contour dams , check damd etc
- Preparation of water quality report

# Protection of Environment and Ecological setting of the basin

- Implement a program for Removing obstructions in river.
- Construct proper drainage system with waste water treatment units when the effluent discharge from various institutions.
- Construction of washing tanks for laundries and introducing purification system for waste water.
- Replanting of suitable tree species along river banks and degraded upper catchments
- Cascade based integrated development

## Protection of environment and ecological setting of the basin Contd..

- Organizing shramadana campaigns.
- Conducting awareness program for school children and general public.
- Arrangement for collection of polythene/ plastic refuse.
- Regulating and restricting to sand mining,brick industry.
- Eviction of encroachers from river banks.

# Conclusion

- Co-ordinated management of water, land and other natural resources of Malwathu oya basin is essential part and action plan discussed above should be done through an integrated management approach with the support of Govt. organizations, NGOO, CBOO and the beneficiaries but it can not be done without empowerment of people and institutions

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# Thank You