



Water Resources Management in Sri Lanka

**With special emphasis on
irrigation and flood
protection- An Overview**

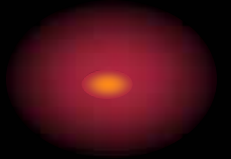
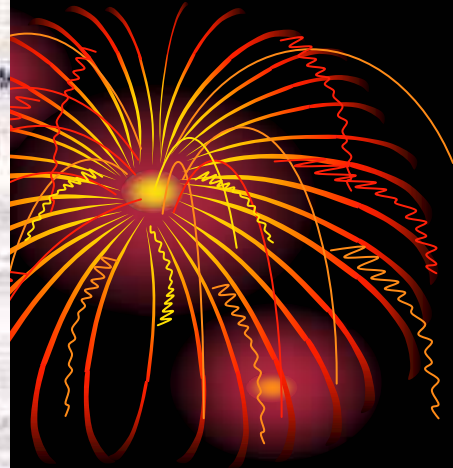


Vision of Water Mangement



“Not let a single drop of rain water flow to the sea without first being used for the welfare of mankind”.



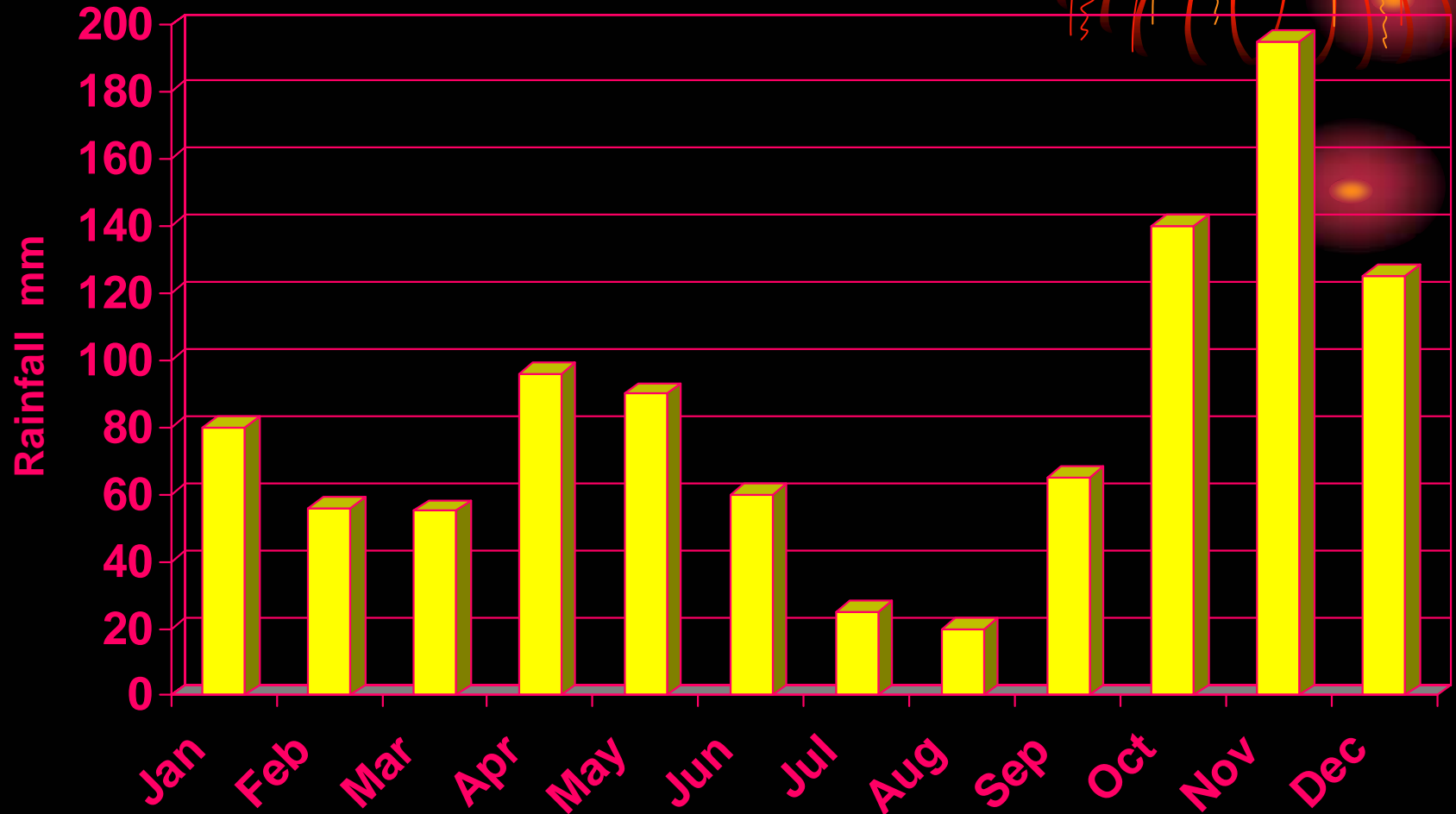


Water Resources in Sri Lanka

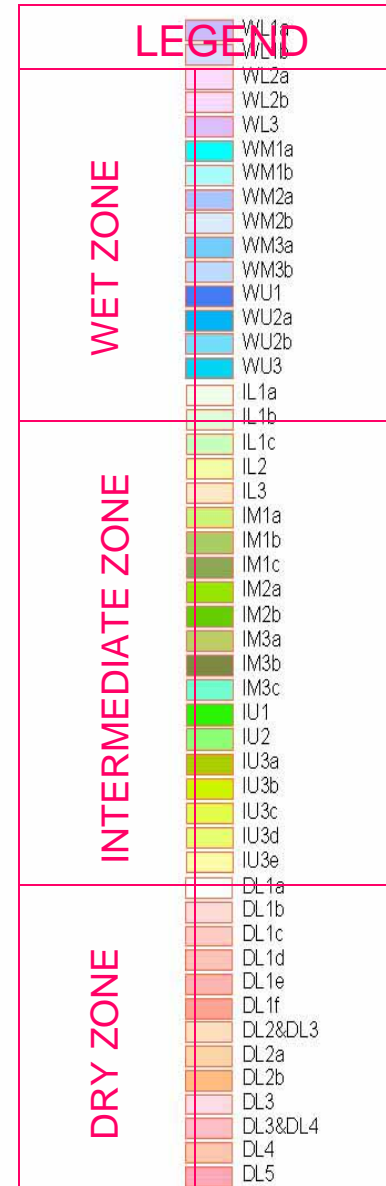
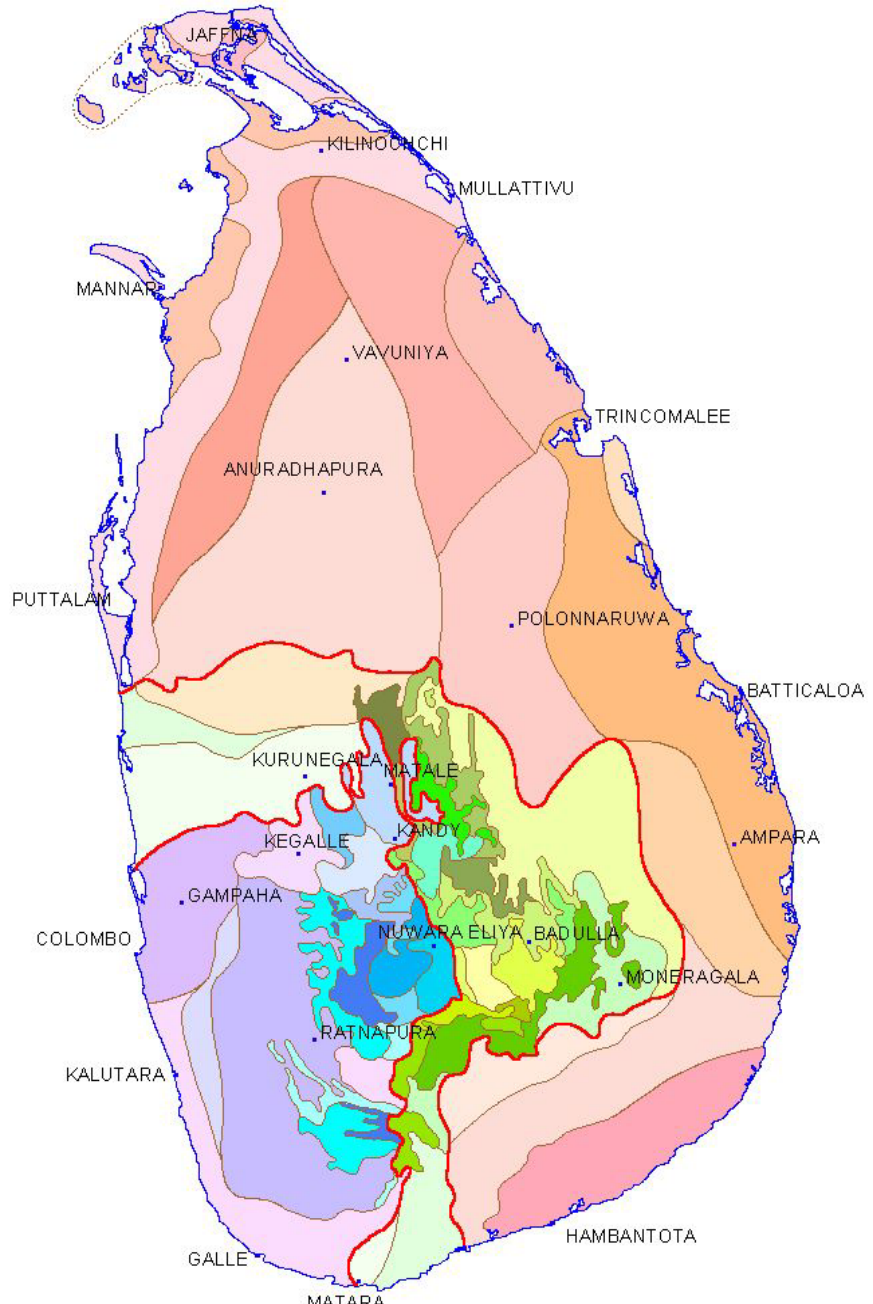
- Country divided into
 - Dry Zone <1750 mm rainfall
 - Wet Zone >2500 mm rainfall
 - Intermediate Zone between 1750-2500 mm rainfall.



Monthly Rainfall Variation



Agro – ecological Map of Sri Lanka, 2002



Present Water Utilization in Sri Lanka



1. Total Land Area 65,000 sq.kms
2. Annual Rainfall varies from 900mm to 6000mm
3. Dry zone receives less than 1500mm
4. Run off from rainfall in the dry zone 30%
5. Runoff from rainfall in the wet zone 60%
6. From available fresh water 30% is used for Agriculture
7. For Drinking and Industries 5%

FOOD SECURITY



- Consumption – 3,000
Thousand M.Tons
- Production – 3,800
Thousand M.Tons

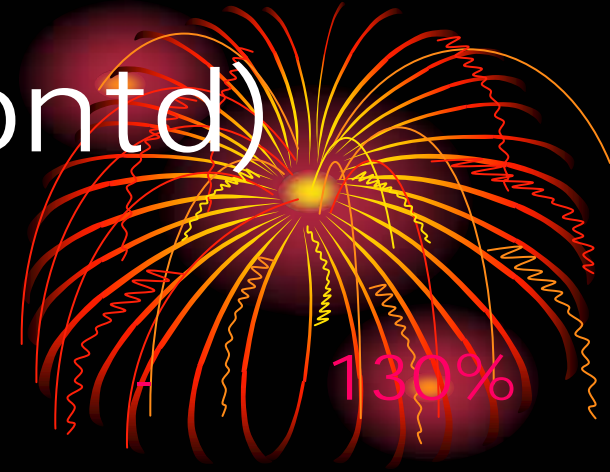
- Self sufficiency in cereals -
65%

Basic Statistics related to Irrigation



ha

Basic Statistics(Contd)



Major schemes
to 200%

Minor schemes
130%

Paddy Yield - Average

Yields at Ampara, Polonnaruwa
Ton/ha

Profitable yields

attractive as an investment
Ton/ha

Potential yield of present rice variety
Ton/ha

Present population

- 90% to

- 3.50 Tons/ha

- 5

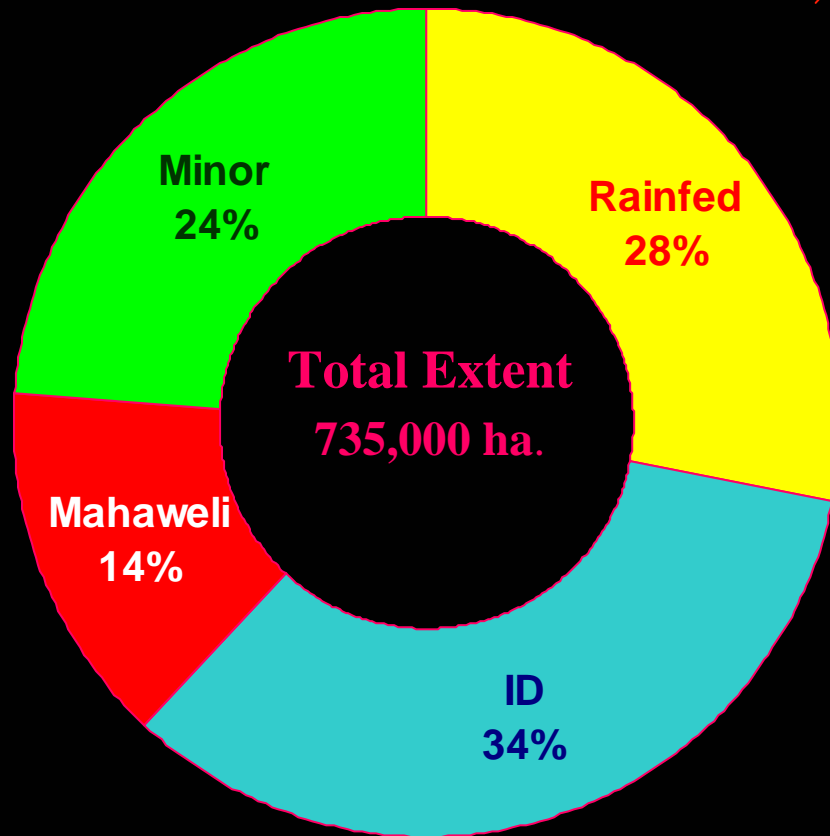
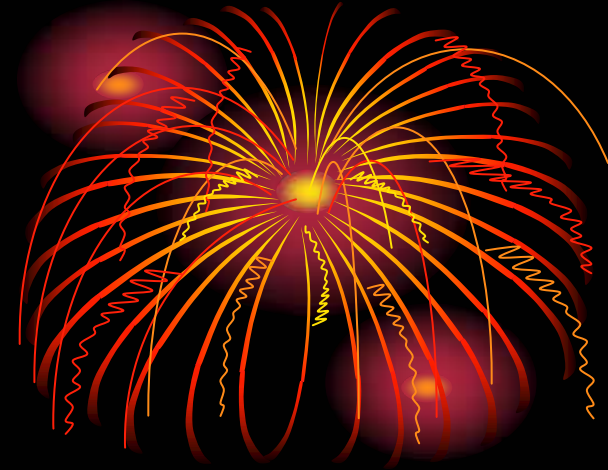
- 6

- 10

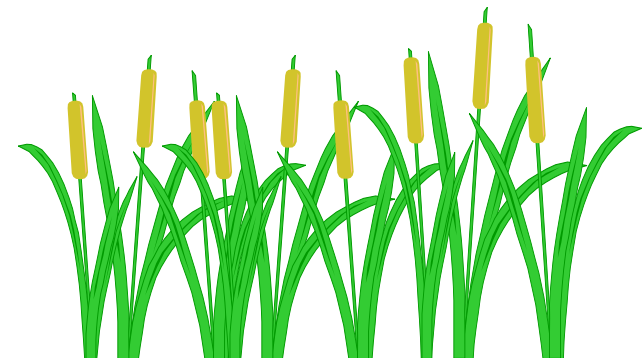
- 19 Mil

Cultivation of Paddy

2001



Irrigated Extent Total under Major Schemes



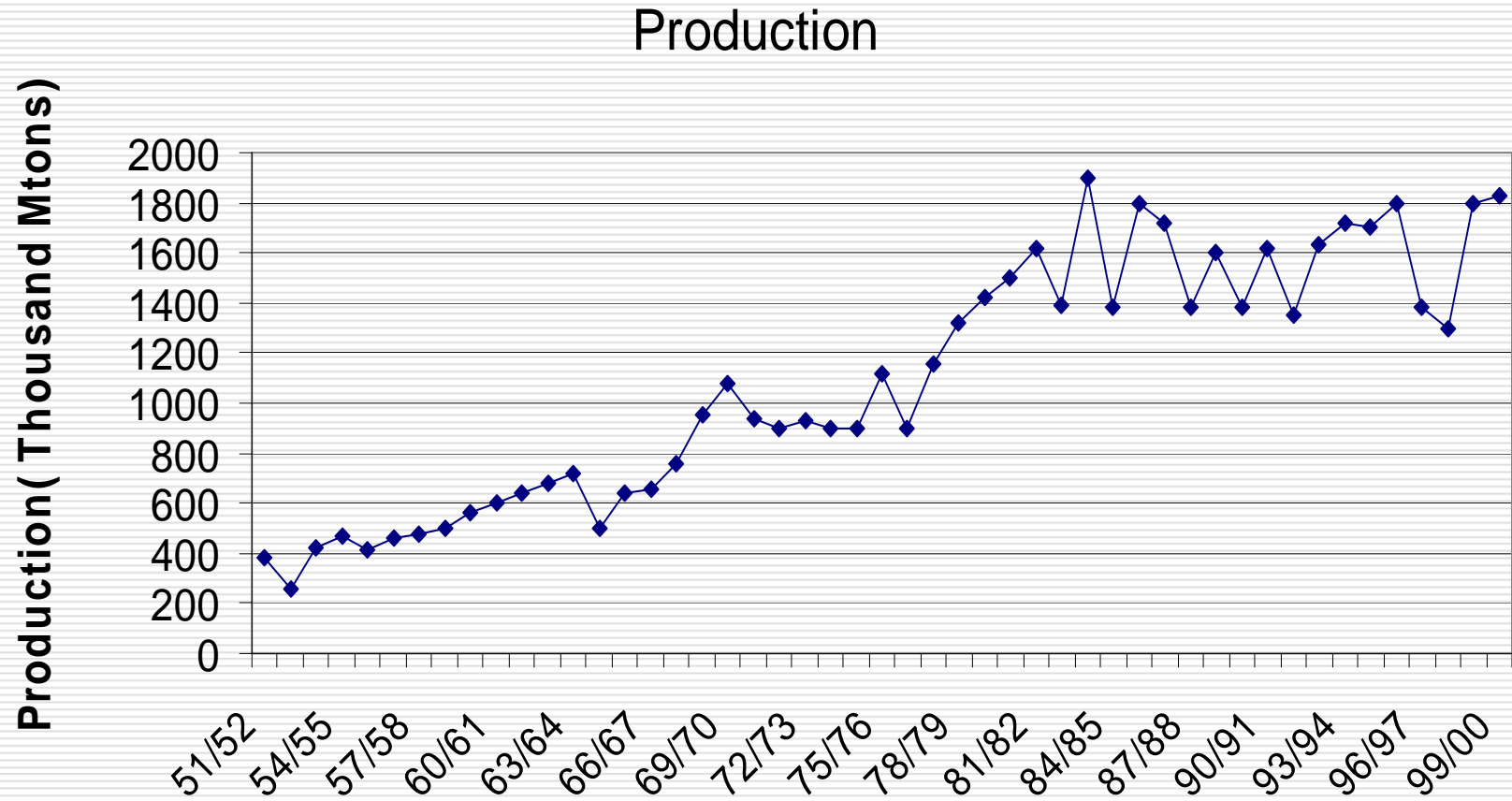
Ditric	Total Extent		District	Total Extent
Ampara	144,293		Moneragala	15,417
A'pura	90,950		Gampaha	9,929
Polonnaruwa	68,049		Matara	9,105
Hambantota	53,915		Vavuniya	6,756
Batticaloa	53,506		Ratnapura	5,038
T'malee	43,205		Matale	4,045
Kurunegala	32,827		Nuwara Eliya	3,016
Mannar	31,821		Galle	1,385
Kandy	21,511		Colombo	438
Badulla	20,917		Kalutara	350
Puttlam	15,551		Total Acres	632,024



YEAR	AREA CULTIVATED *1000 Ha	PRODUCED *1000Tons	YIELD Kg/Ha
1948	340	464	1365
1992	803	2340	3428
1993	835	2570	3511
1994	930	2684	3363
1996	749	2061	3513
1997	730	2239	3619
1998	848	2692	3634

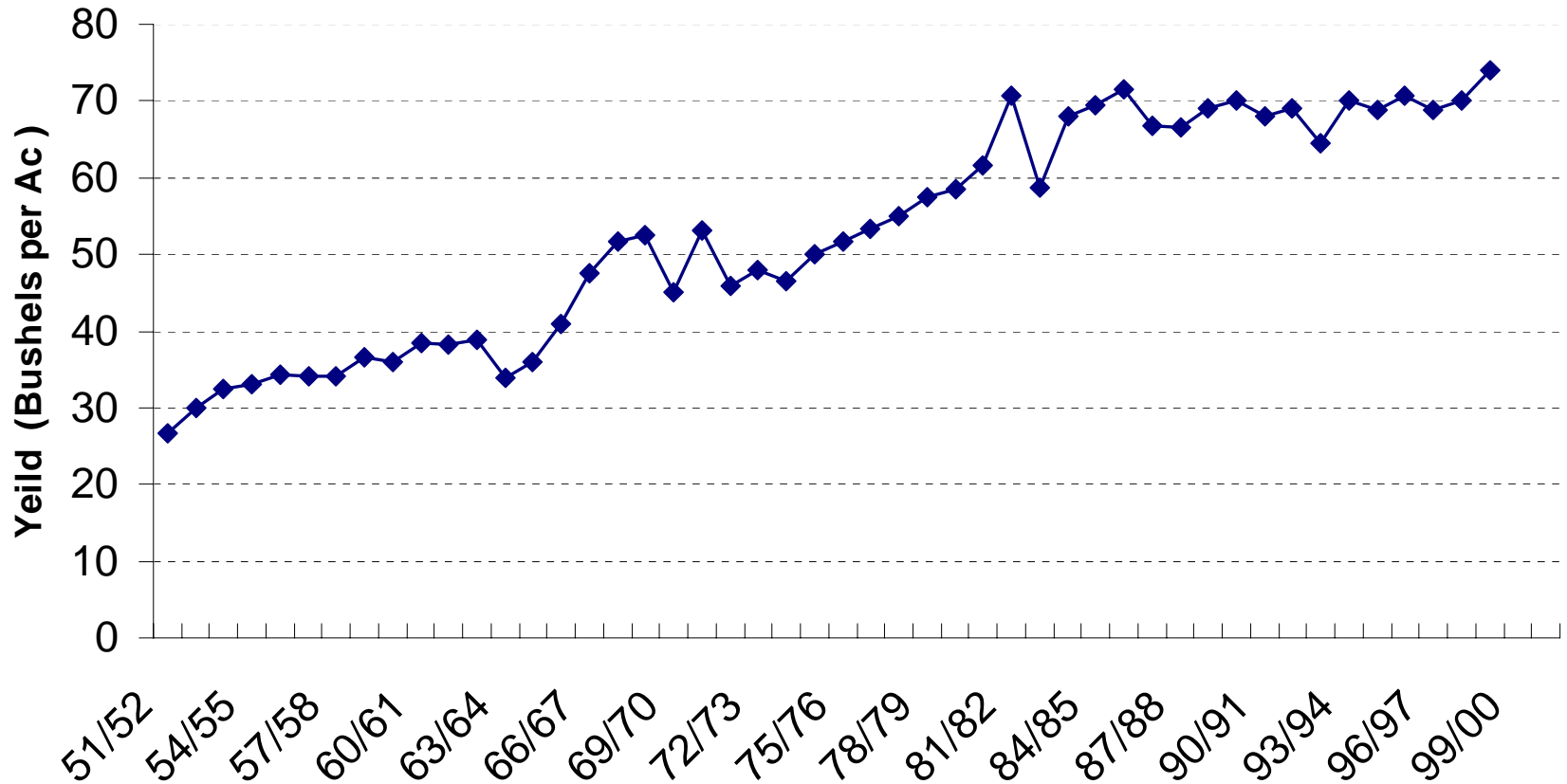
Source: Central Bank

Paddy Production 1952-2000



Paddy Yields 1952-2000

Maha

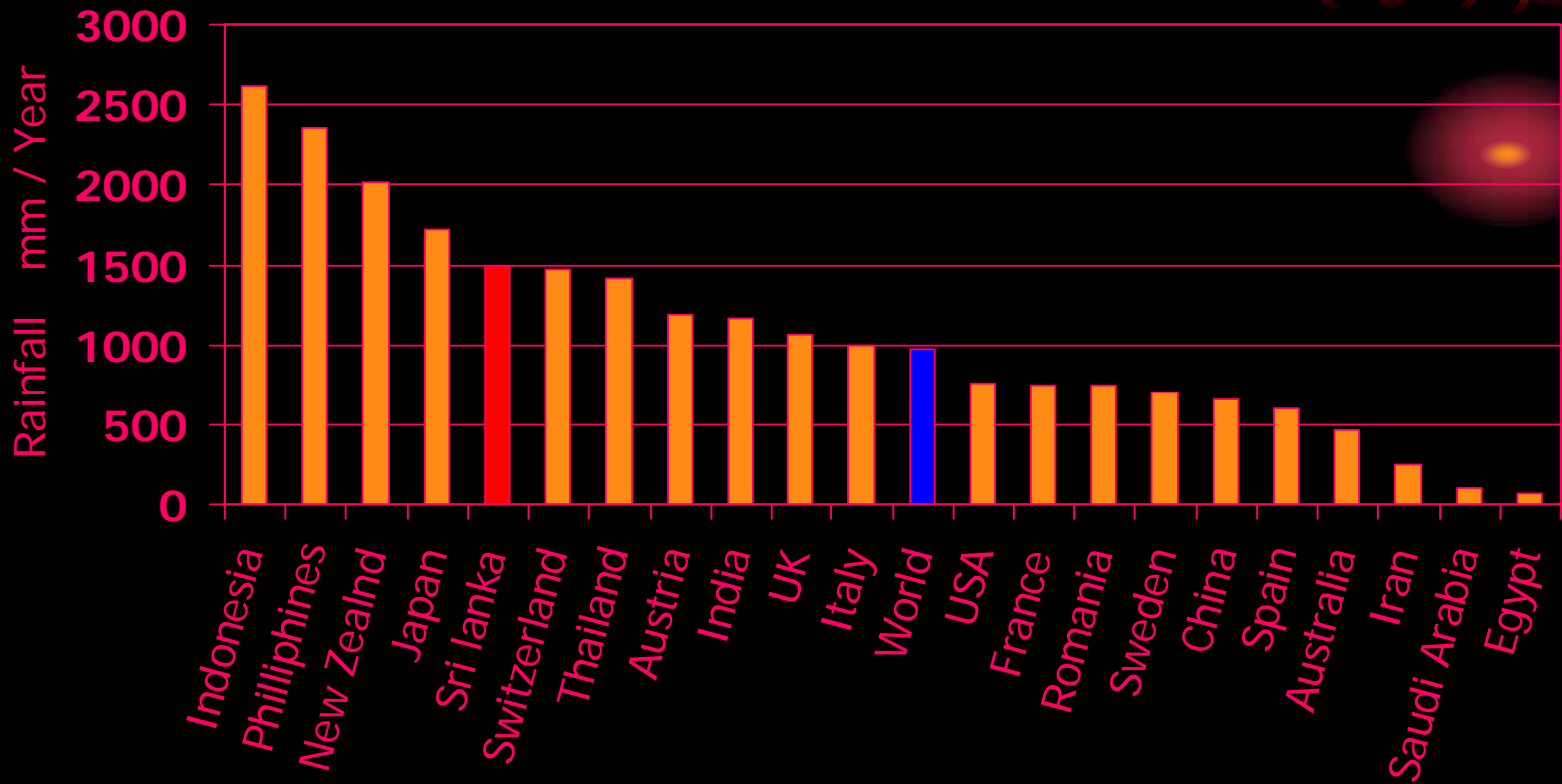


Local Issues Related to Paddy cultivation



- Cry for the augmentation and trans basin diversions for 100% cropping intensity in Yala season has not ended up.
- Any further increases in annual production of rice might lower the price of rice
- To make paddy cultivation economically viable to keep the farmers in irrigation schemes.
- Foreign funded agencies advocate a rational policy for water and river basin management plans for further investment assistance. A critical water shortage in future is highlighted in Sri Lanka.-(IWRM)

Annual Average Rainfall Distribution



Global Water Use



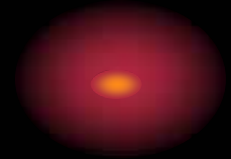
🔹 Asia	58.5 %
🔹 North America	18 %
🔹 Europe	14 %
🔹 Africa	4.5 %
🔹 South America	4.5 %
🔹 Australia	0.5 %
	100 %

River Water Volumes



● x 1000 Km³ / Year

● Europe	2.9
● North America	7.7
● Africa	4.0
● Asia	13.5
● South America	12.0
● Australia	2.4

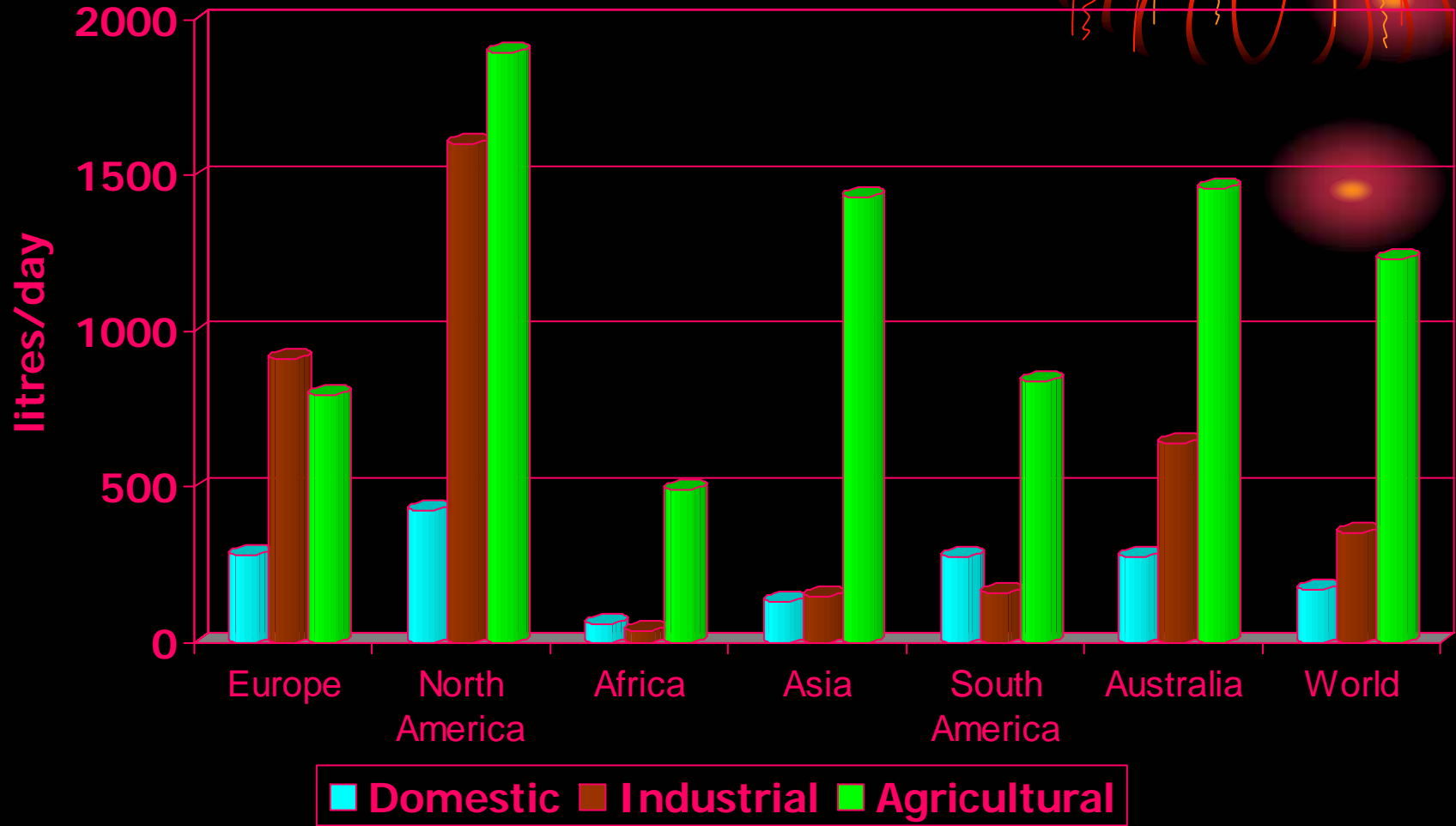


Classification of climate

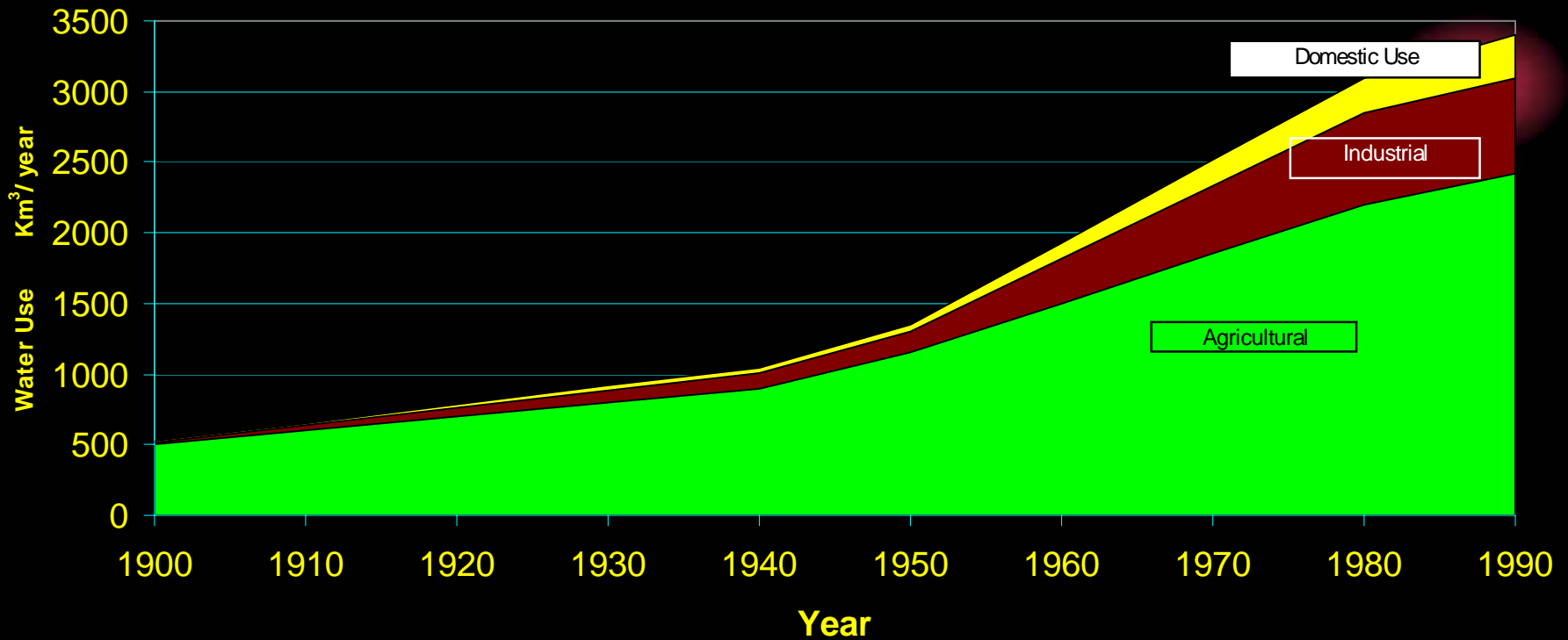


- Arid < 250 mm
- Semi Arid < 500 mm
- Sub Humid < 1000 mm
- Humid > 1000 mm

Per Capita Water Use 1995



Transition in World Water Use



Concerns of locals over global developments



- i. Water dialogue to date has been largely dominated by the expertise in non humid regions of the world. (USA, Europe & Australia).
- ii. Irrigation practices across the globe are highly diverse.
- iii. Paddy irrigation in Asia generates considerable amount of net economic externalities and social benefits because of multi-functional roles.
- iv. International debate on water needs to be more consistent with reality



DRAFT WATER RESOURCES POLICY IN SRI LANKA

Inadequacies

1. Inadequate strategy to obtain consensus from the public
2. Non inclusion of specific Development Policies-Not Development oriented
3. Emphasis on matters of less urgency



Setback in the strategy



1. Information based on inadequate authentic data
2. Inclusion of sensitive statements in policy documents
 - a. "No opportunity for further development of water resources"
 - b. "Further demands have to be met from the reallocation of already harnessed water"

Irrigation Technology in the humid regions should be essentially different to the semi arid regions

Humid(Paddy)

- a). Crop Water Requirements can not be pre determined.
- b). Re use is possible.
- c). Part of the rain is Effective
- d). Multiple use.
- e). Irrigation efficiency can not be easily defined.
- f). Benefits can not be easily quantified

Semi Arid(QIT)

Crop Water Requirements can be determined.

Can be used only once.

All rain is effective

Single use.

Efficiency criteria can be easily defined

Benefits can be easily quantified.



Paddy



g). Efficiency can be defined
be

Efficiency can
defined
only for the entire basin for a particular tract

h). Variable shadow price.

Shadow price is
constant

j). Surplus water
during the season
season

Scarcity of water
during the

k). Only supplementary Irrigation Full irrigation

l). External economy

No external
economy

Rice cultivation depends on the Ecosystem Approach



- In hydraulic engineering water is inanimate and active
- Water is animate and passive in the ecosystem
- Water is more than H₂O in ecosystem as it transport nutrients
- Evaporation is not a loss in ecosystem, but a part of the hydrological cycle

Multiple Role of Water Resources Development

- Numerous in efficiency
- Food Security
- Ground Water Recharge
- Bio Diversity in the aquatic landscape
- Micro Climate
- Other uses (Bathing, Drinking, Recreation)



Heart of Agrarian Culture



Bio diversity- These products can be sold in the market



Only Source of Water for Bathing to the Village Community

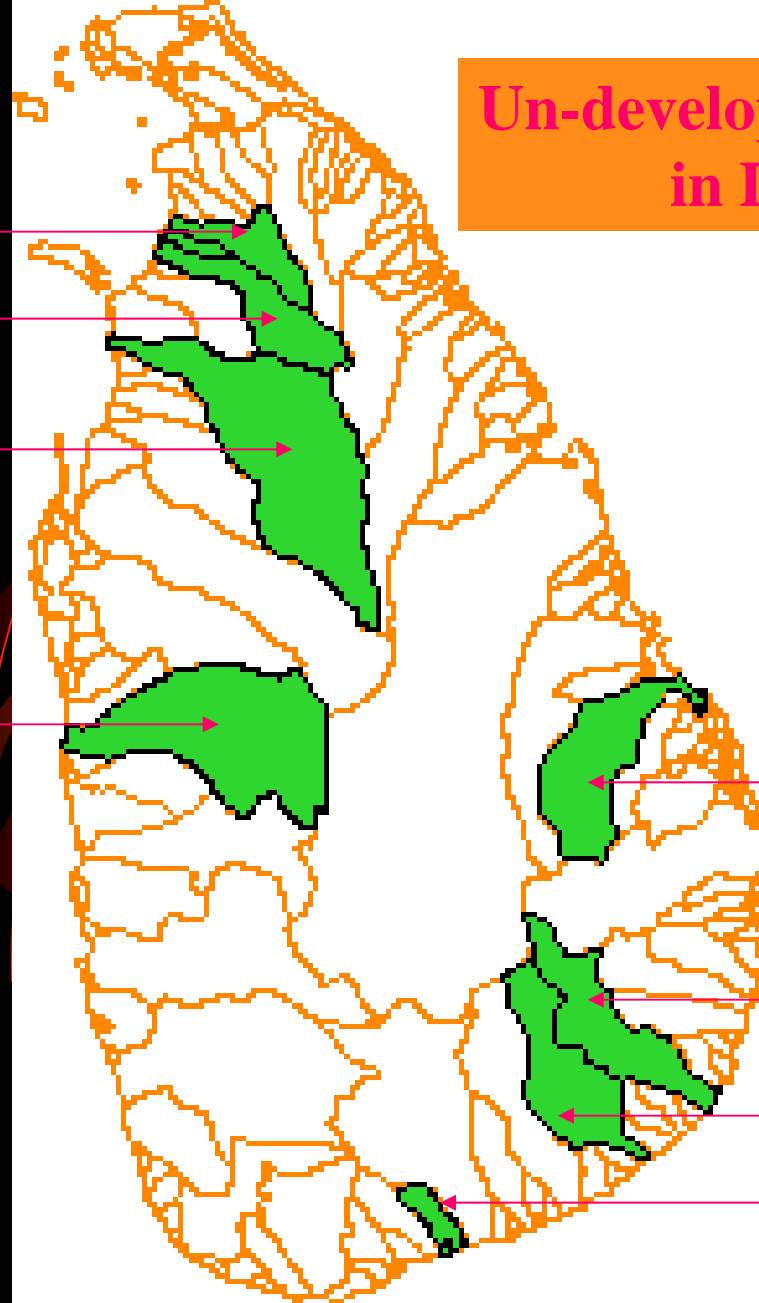


Un-developed large river basins in Dry-zone

Pali aru
Parangi aru

Malwatu
oya

Deduru oya



Mundeni aru

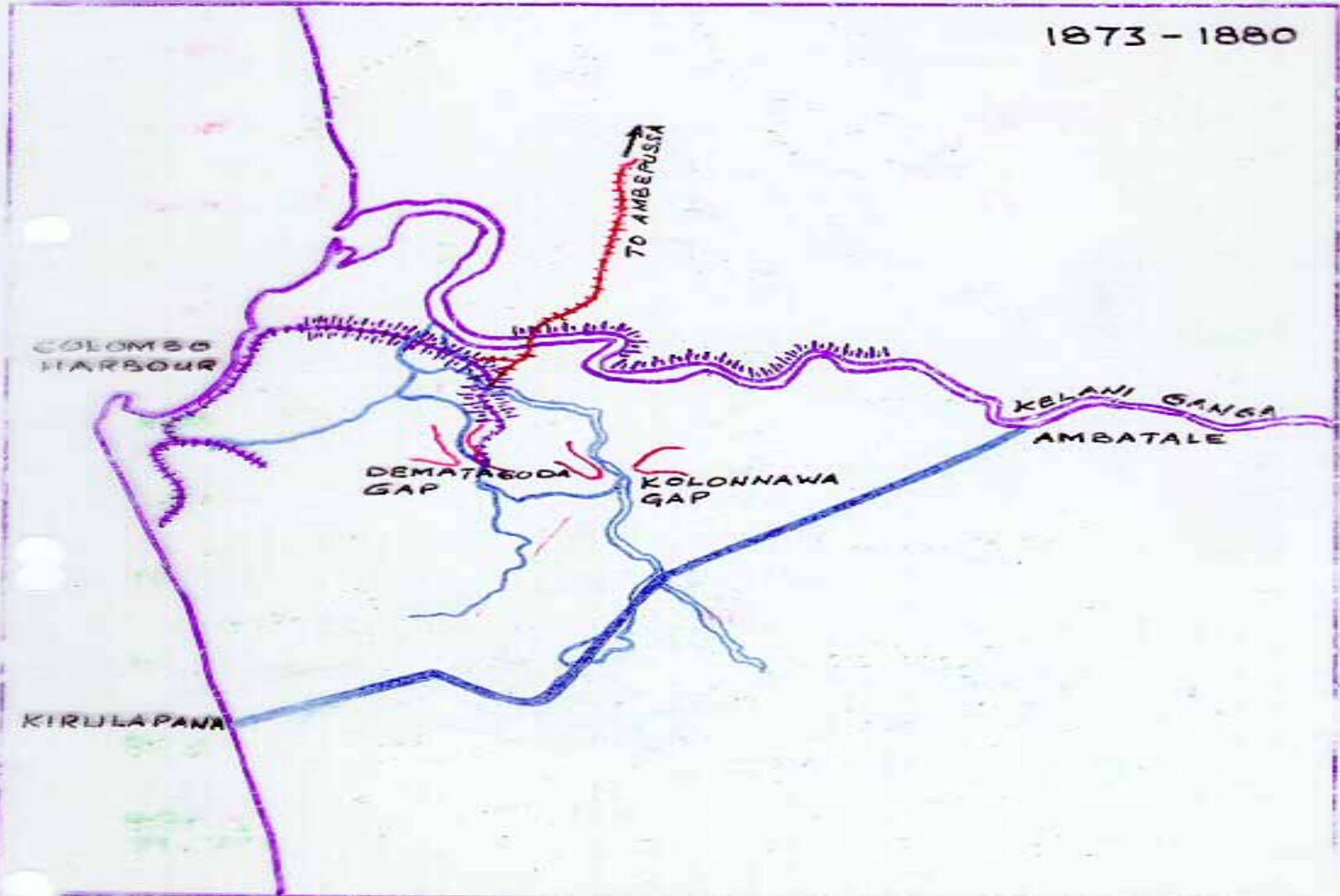
Kumbukkan oya

Manik ganga

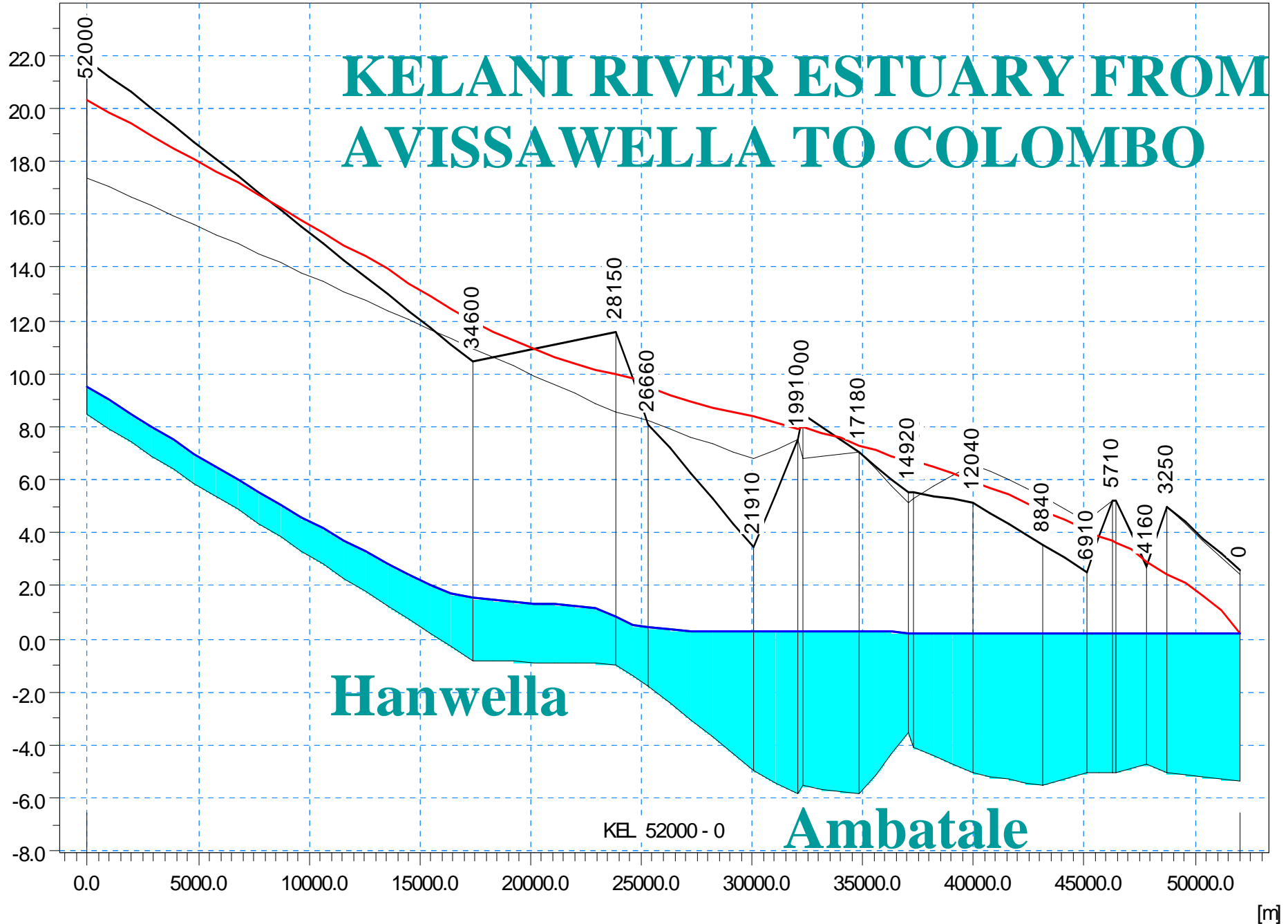
Kachchigal ara

KELANI FLOOD PROTECTION SCHEME

1873 - 1880



KELANI RIVER ESTUARY FROM AVISSAWELLA TO COLOMBO



Conditions of the Flood Bunds



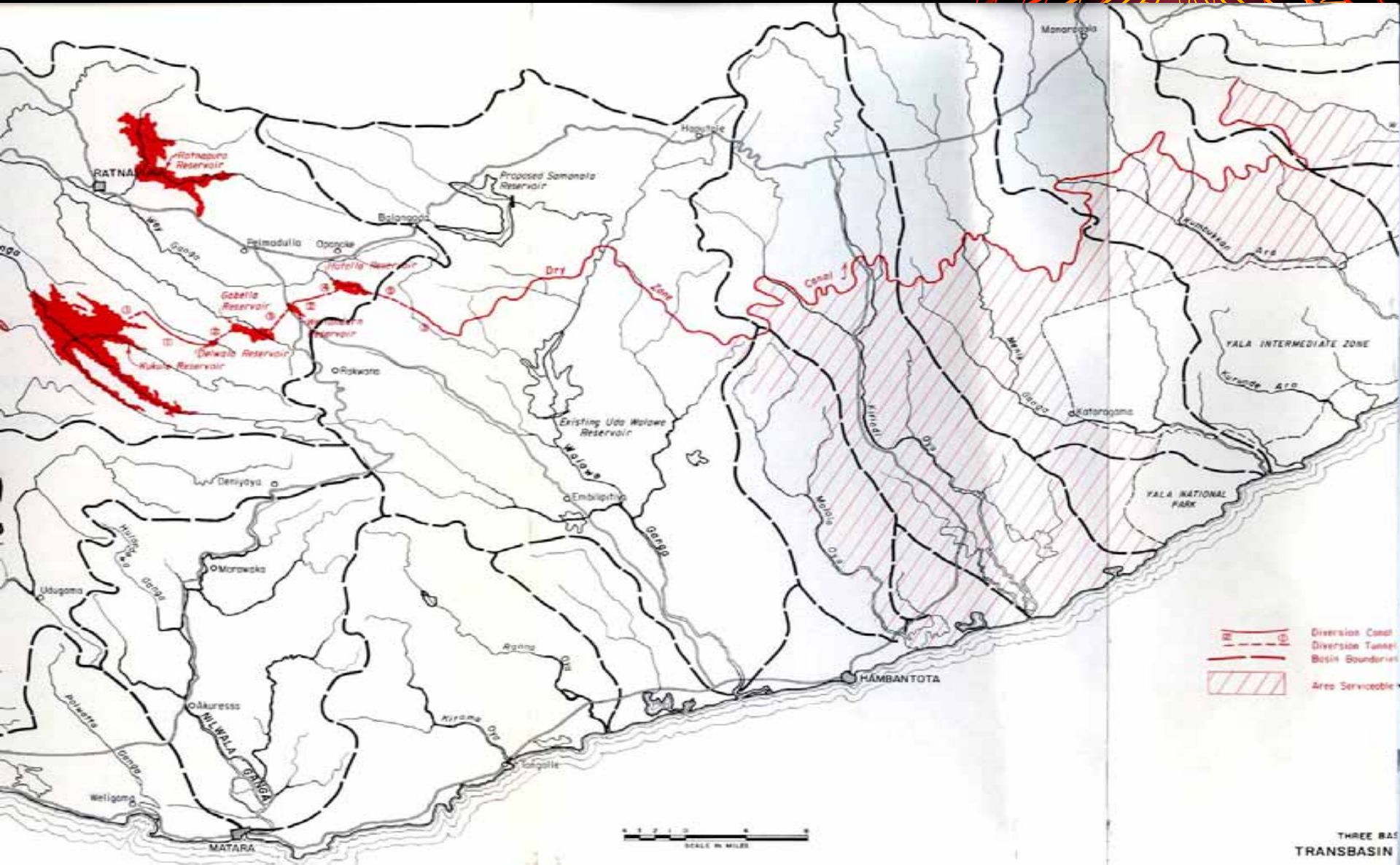
Kalu Ganga River Basin



Flooding of Ratnapura Town



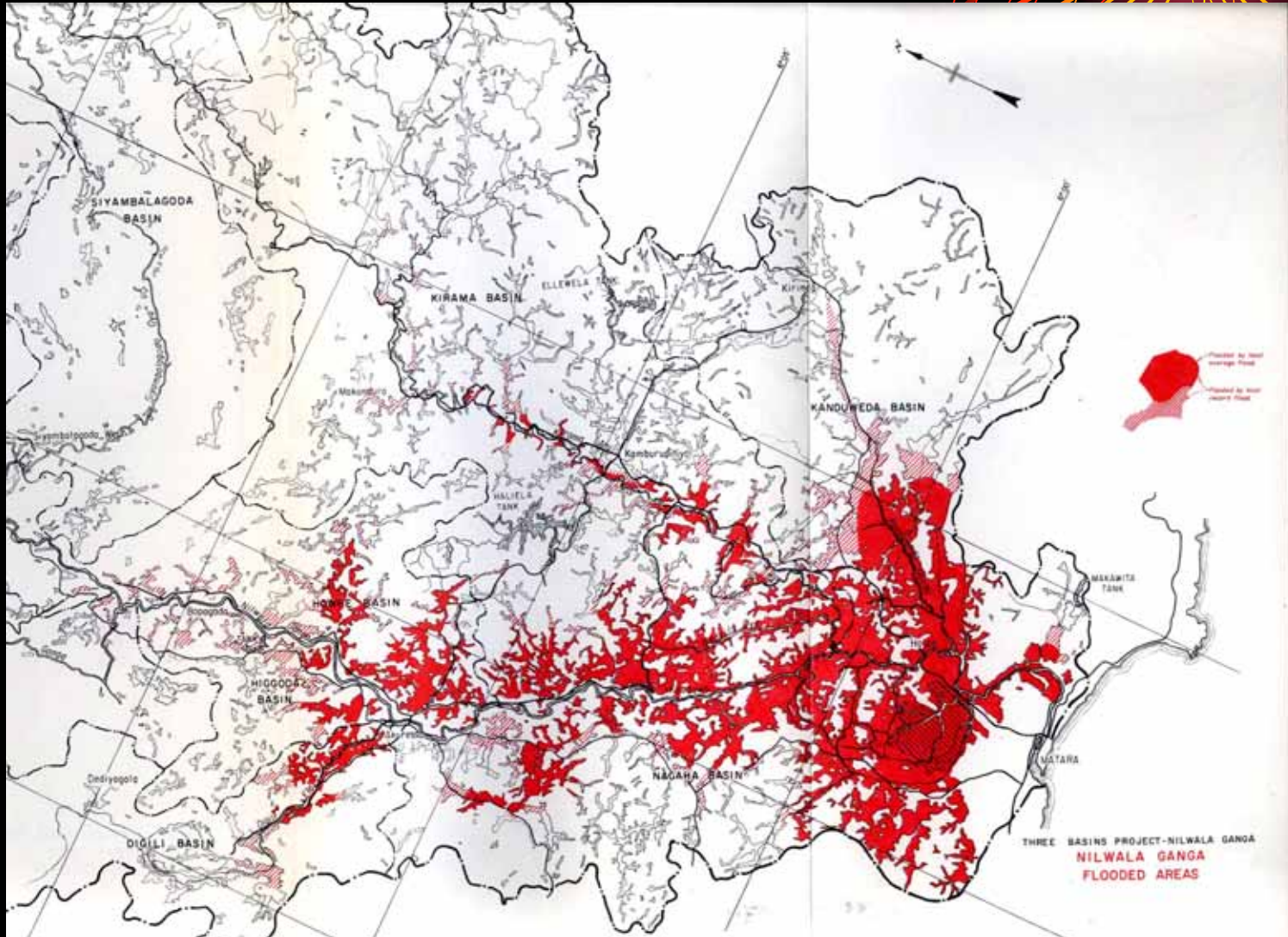
Upper Trans basin canal



Ratnapura Reservoir



Nilwala Flooded Area

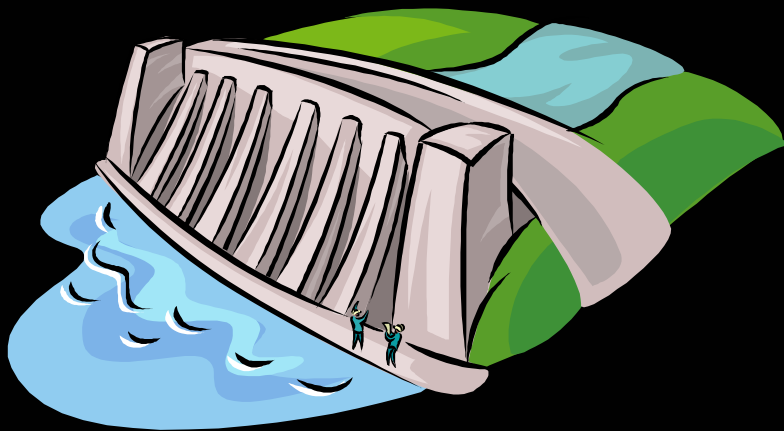




Proposed Moragahakanda Reservoir

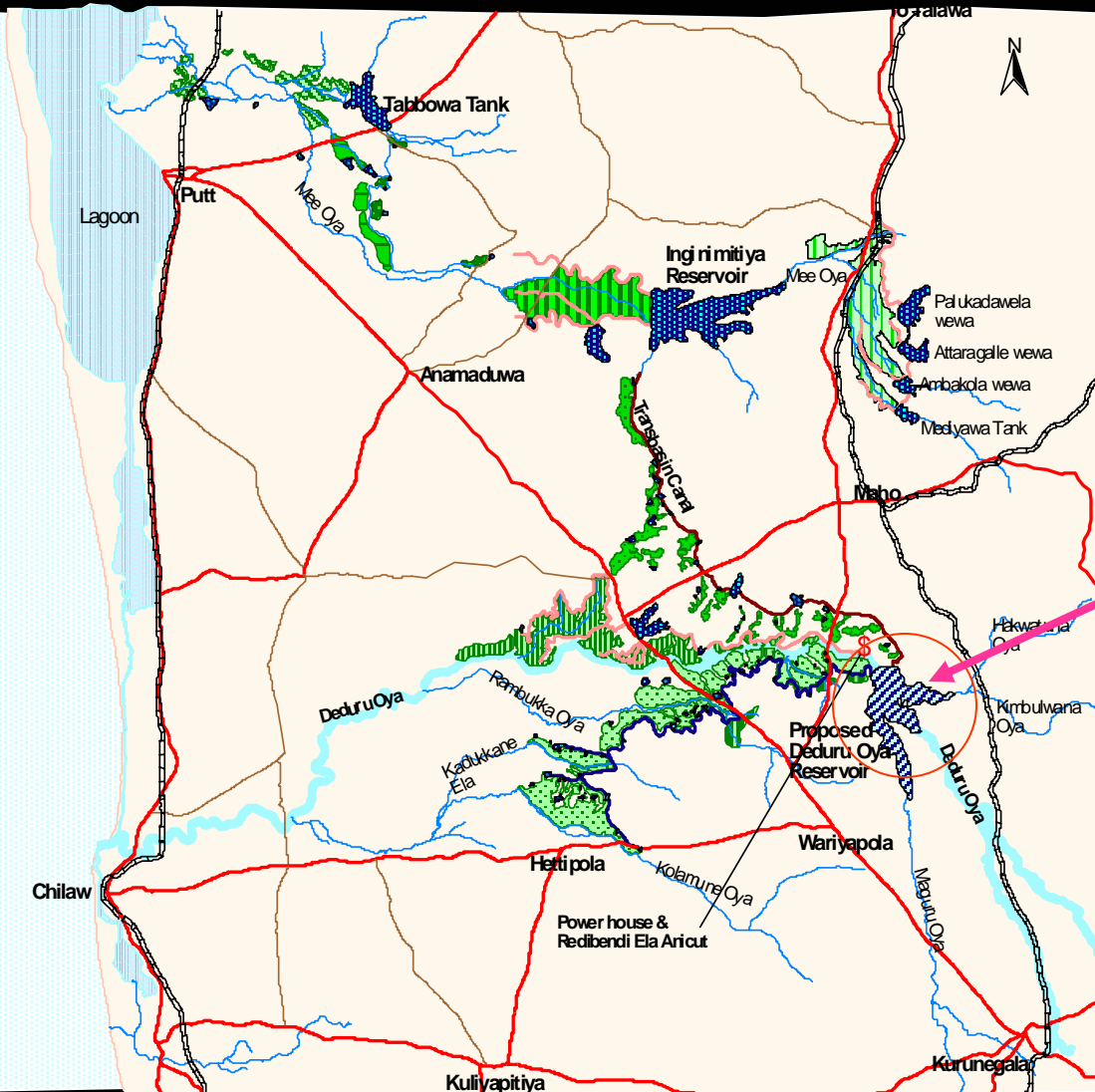


9. Uma Oya Diversion Project



- Two Dams
- Across Uma Oya & Mahatotilla Oya
- Tunnel 14 km
- Divert water to Kirindi Oya Basin
- Benefit Area 10000 Ha.
- Cost Rs. 3000 Mn

Deduru Oya & Mee Oya Basin



Technical Features

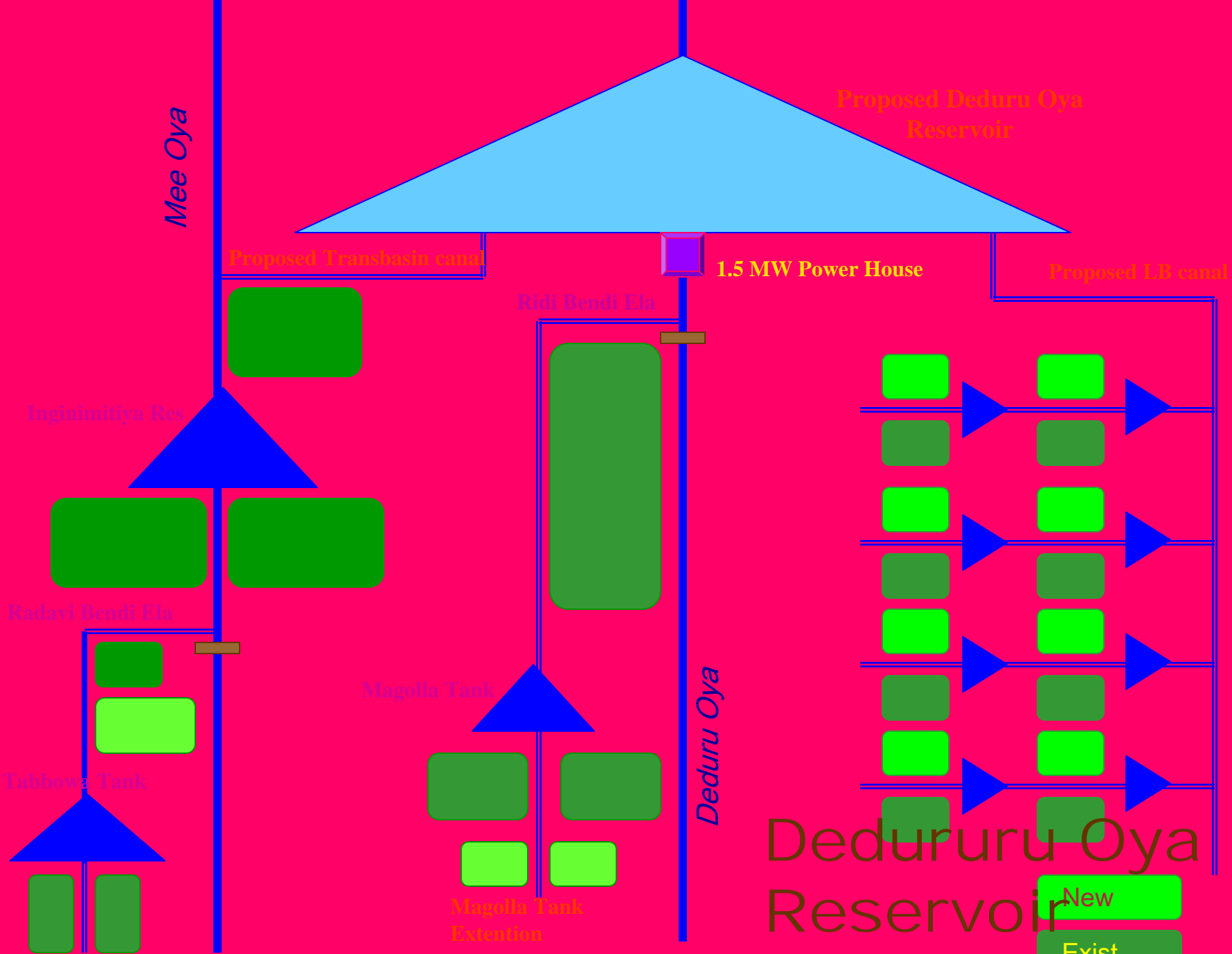
Catchment Area	2620 Sq.km.
Av. Ann. Yield	770 MCM
Reservoir Capacity	75 MCM
Dam Length	1900m
Spill Type	Radial gated
No of Gates	07

PROPOSED DEDURUOYA RESERVOIR

Project Benefit

Irrigable Area	12,500 ha.
No of Families	14,000
Power Generation	7.9 Gwh/Yr





Dedururu Oya
Reservoir
Project

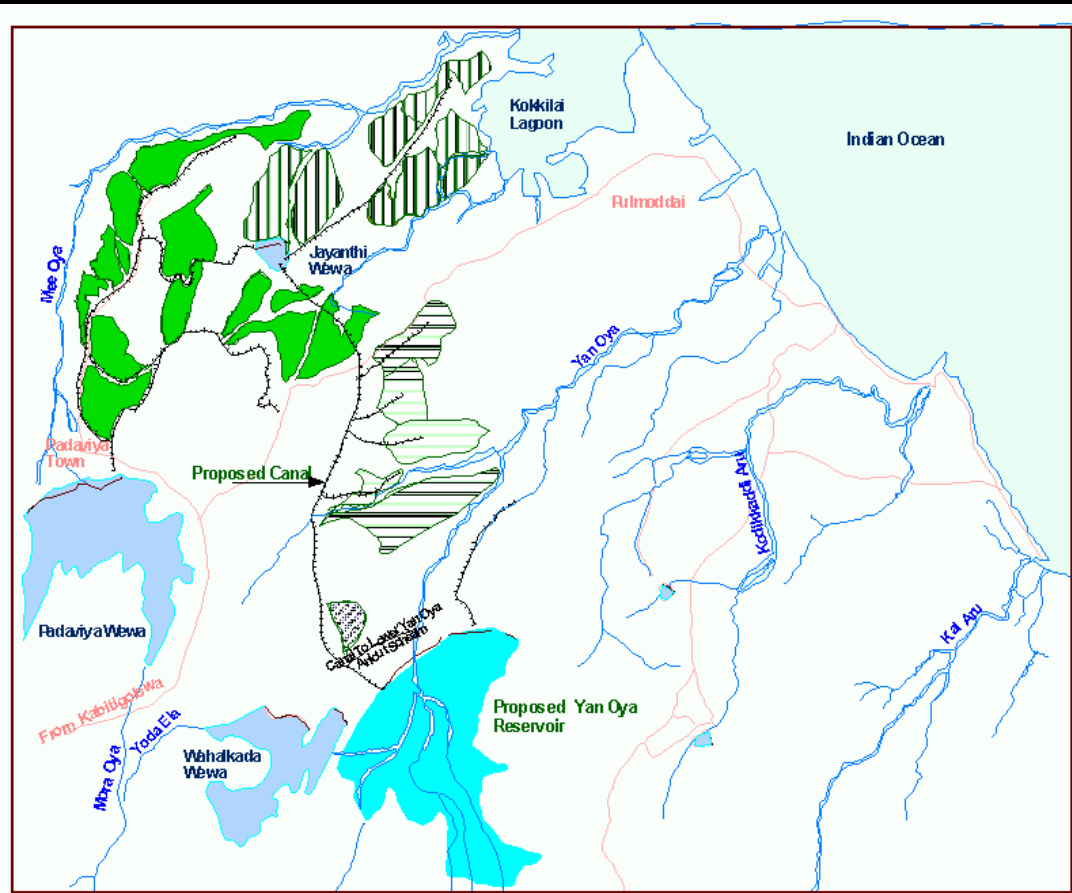
New
Exist.

Yan Oya Basin Development Project



Technical Features

- Catchment Area 1341 Sq.km
- Av. Runoff 229 MCM
- Reservoir Capacity 254 MCM
- Dam Length 2350m
- Spill Concrete Ungated



Project Benefits



Conclusion

We should move away from the generalized slogans and attempt to understand the diversity and Food security in managing water resources in the Asian Region. Integrated Water Resources Management emerged in the Arid and semi arid regions is an important and good concept, but has to be applied in the Asian region by giving due consideration to diversity.





Thank You

