



**Experience in
Integrated Water Resource
Management**

Mahaweli Diversion Scheme

Spacial Distribution of Rainfall In Sri Lanka

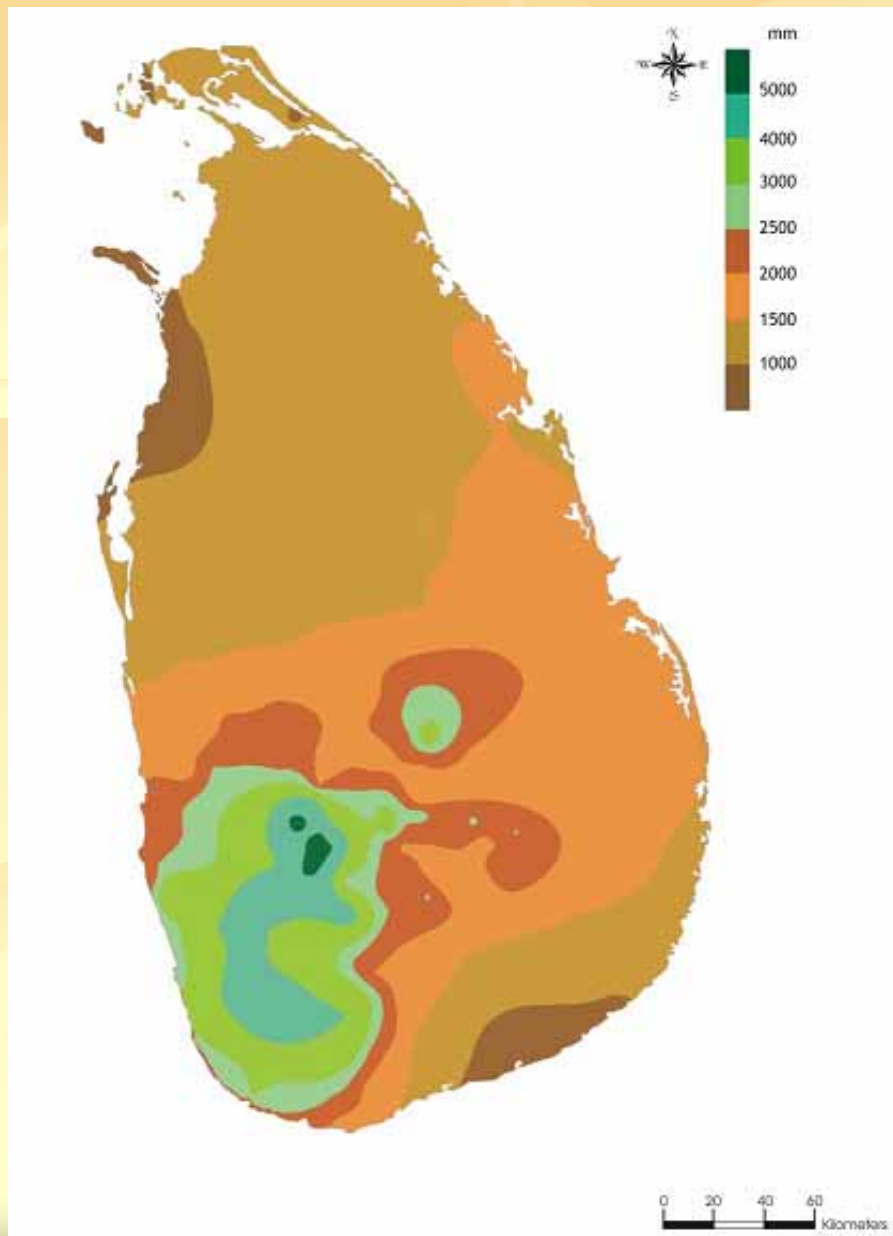
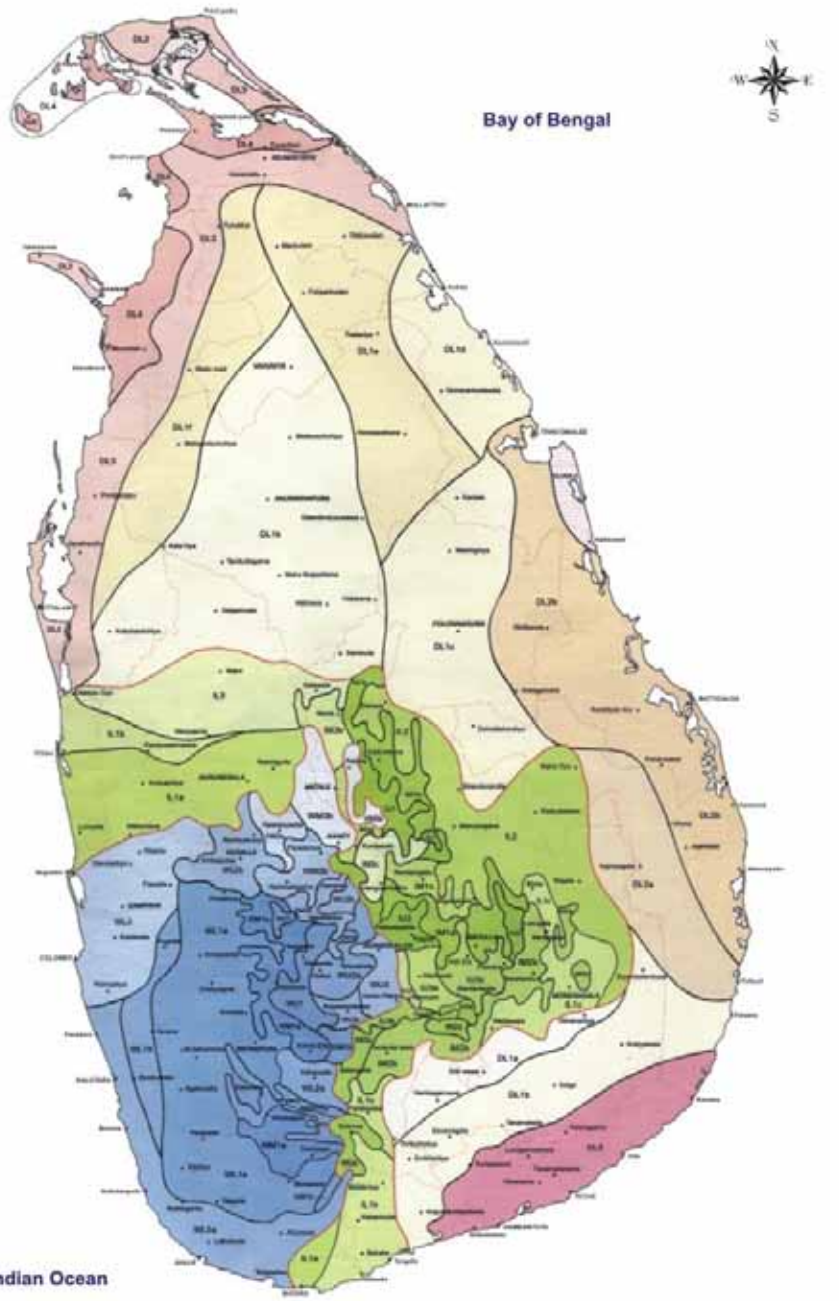


Table 13. Average rainfall during different rainfall seasons for 1961-90

Rainfall Season	Period	Average Rainfall (mm)	% of Annual Total
First Inter-Monsoon	March – April	268	14
South-West Monsoon	May – September	556	30
Second Inter-Monsoon	October – November	558	30
North-East Monsoon	December – February	479	26
Annual	January-December	1861	100

Agro ecological regions in Sri Lanka



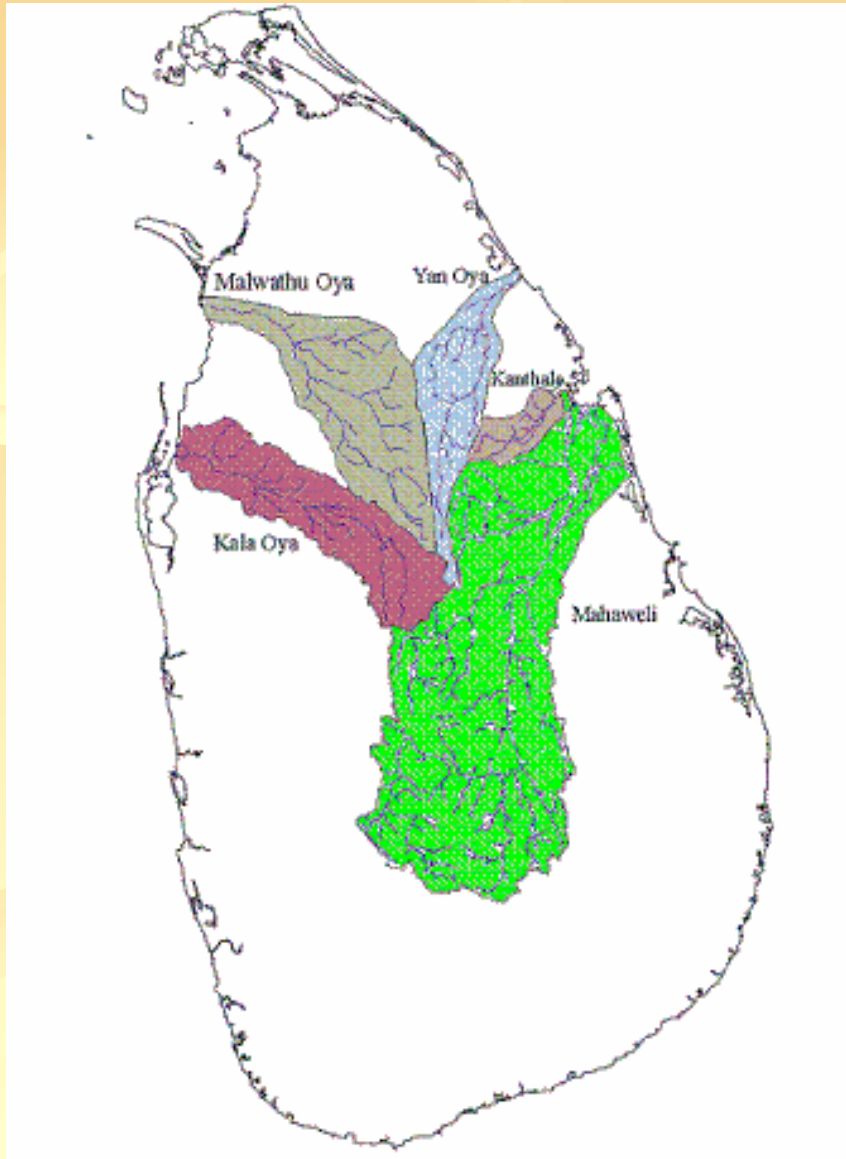
Zone	Average Rainfall (mm)	Range of Rainfall values	Area Sq. km
Dry	1450mm	Less than 2000mm	52,385
Wet	2400mm	More than 2000	12,205

Rationale for development of water resources of the Mahaweli

- Mahaweli is one of the few river basins that benefit from both monsoons.
- The volume is about 21% of the discharge of all the river basins of Sri Lanka.
- Mahaweli is considered as the most beneficial river with its copious flow (10,100) MCM per annum starting from the Central hills and running through a dry fertile plateau.



Basin wise planning in Mahaweli Development



- The Project resulted in harnessing the water resources of Mahaweli Ganga, a main tributary- Amban Ganga and the adjacent Maduru Oya.
- The benefits extended to adjacent Malwathu Oya, Yan Oya and Kala Oya basins.
- The land area contained under these river basins is about 30% of the total land area of Sri Lanka.

Irrigation System features

Principal Features of Irrigation Systems			
System (River Basin)	Scheme	Extent Available (ha)	Cropping Intensity
IH (Malwatu Oya)	Nuwarawewa	1,000	1.7
	Nachchaduwa	2,840	1.6
	Tis'wa/Basa'ma	600	1.4
	Sub Total	4,440	1.60
MH (Yan Oya)	Huruluwewa	4,500	1.5
	KHF Canal	2,500	1.6
	Sub Total	7,000	1.54
H (Kala Oya)	Neela Bemma	690	2
	Rajangana	8,400	1.8
	Kalawewa LB	6,640	1.7
	YE	4,750	1.7
	RB	14,050	1.6
	Dambulu Oya	2,280	1.8
	Kandalama	4,900	1.8
	Sub Total	41,710	1.71
		53,150	1.68
D1 (Kantale Oya & Amban Ganga)	Kantale	8,400	1.8
	Kaudulla	5,340	1.8
	Minneriya	10,930	1.8
	Giritale	4,860	1.8
	Sub Total	29,530	1.8

- Two Cultivation seasons-
Yala May to September
Maha October to March
- Two cultivation seasons associated with the two major rainy seasons, the south-west monsoon north-east monsoon period from December to February.

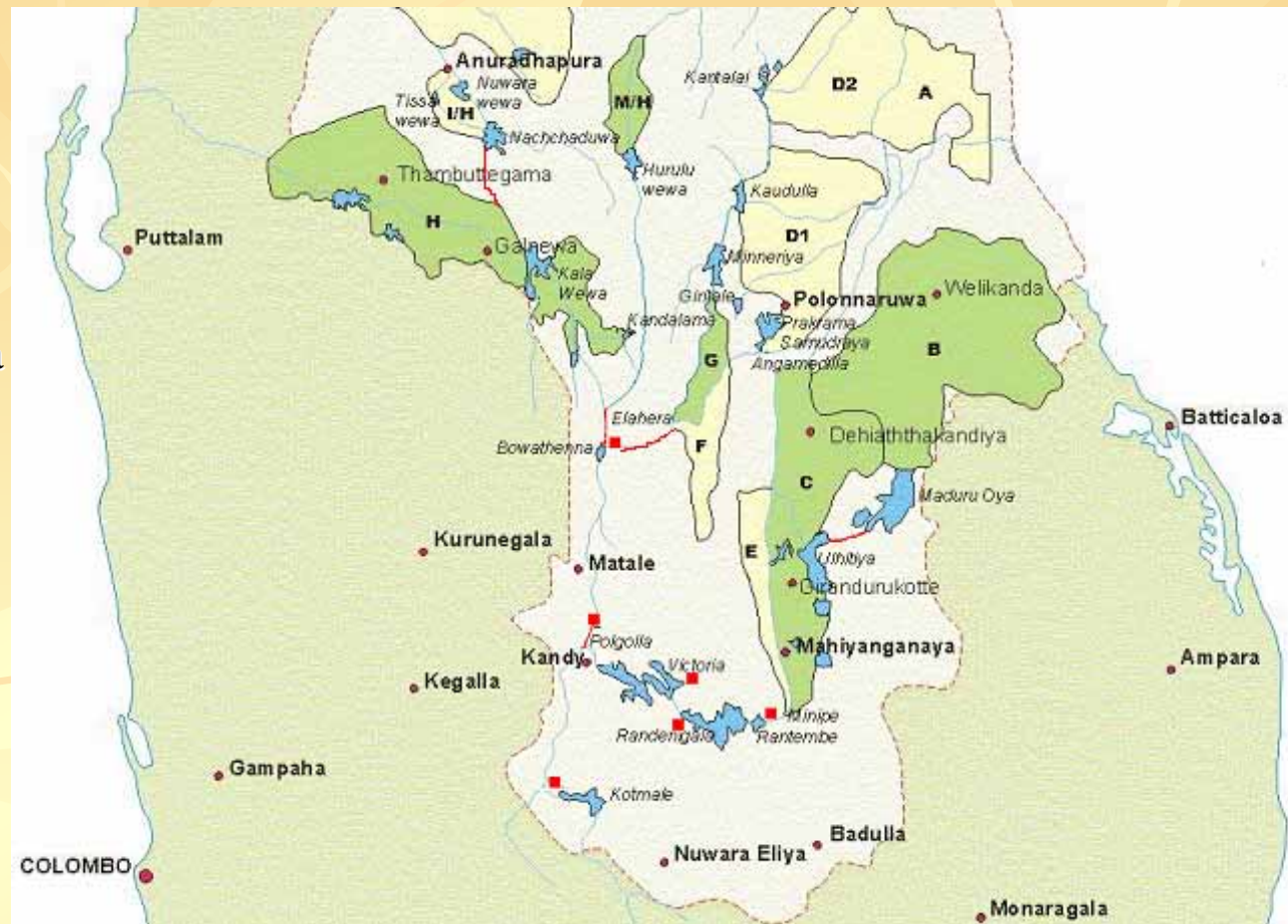
Cropping Intensity (CI)

Yala Extent + Maha Extent

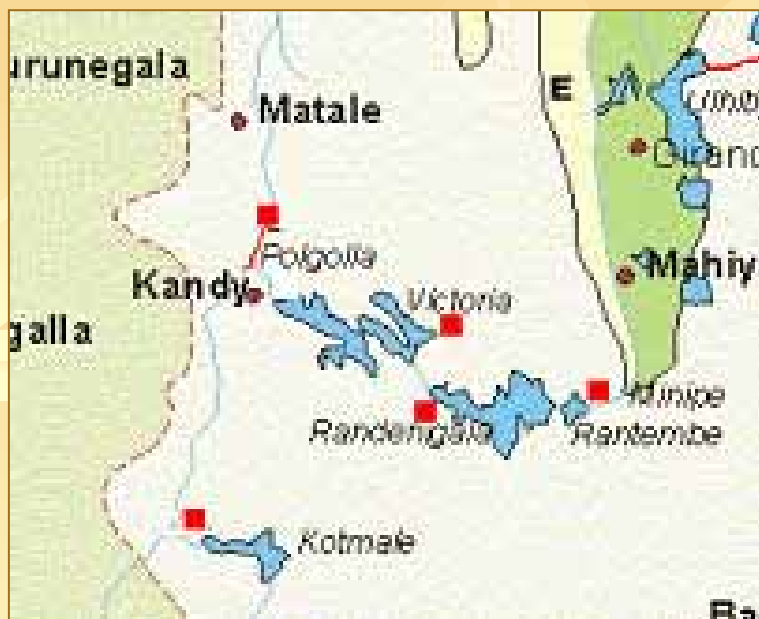
Total Irrigable Extent

Further Development of Mahaweli Water Resources In the 1980's

- In the decade of the 1980s more principal trans-basin diversions were introduced at Minipe (Right Bank) and Ratkinda
- Hydro electric power projects at Victoria, Kotmale, Randenigala and Rantembe.
- A complex system of irrigation canals has opened up the down stream areas in systems C, B, for settlement and agricultural development.



Allocation for Multi Sector Demands



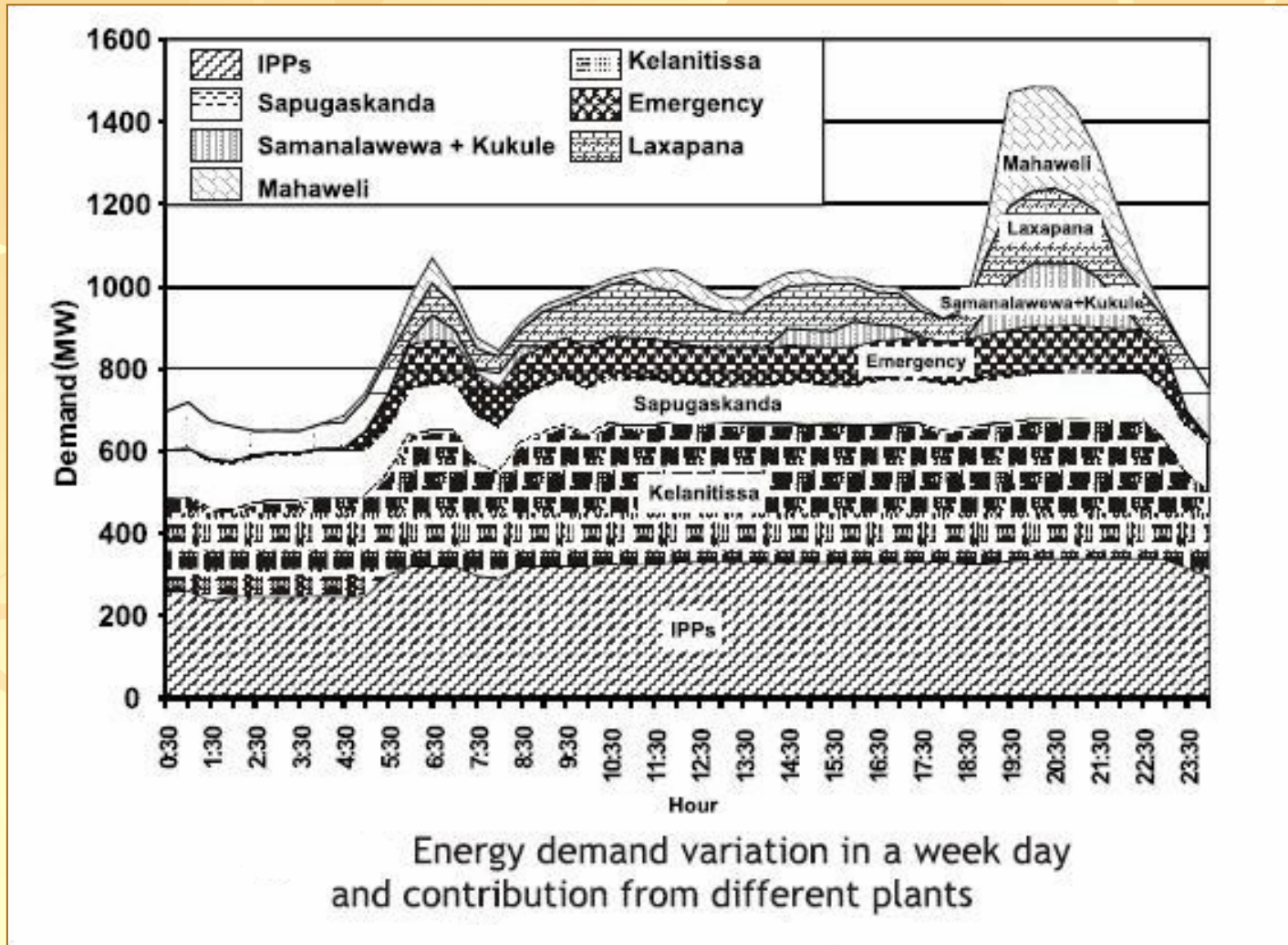
Hydro Power Plant	Installed Capacity (MW)	Energy Generation GWh / Year	Rated Head (m)	Active Storage (MCM)
Kotmale	201	349.6	201.5	150.7
Ukuwela	38	124.8	78	2.1
Victoria	210	560.2	190	687.2
Randenigala	122	276.3	78	558
Rantembe	49	157.3	31.5	6.4
Bowatenna	40	50.6	52.7	34.9
Sub Total	660	1518.8		1439.3

Diversion to Dry Zone

Average for	Diversion (mcm)
Last 5 years	778
Last 10 year	833
Last 20 year	915

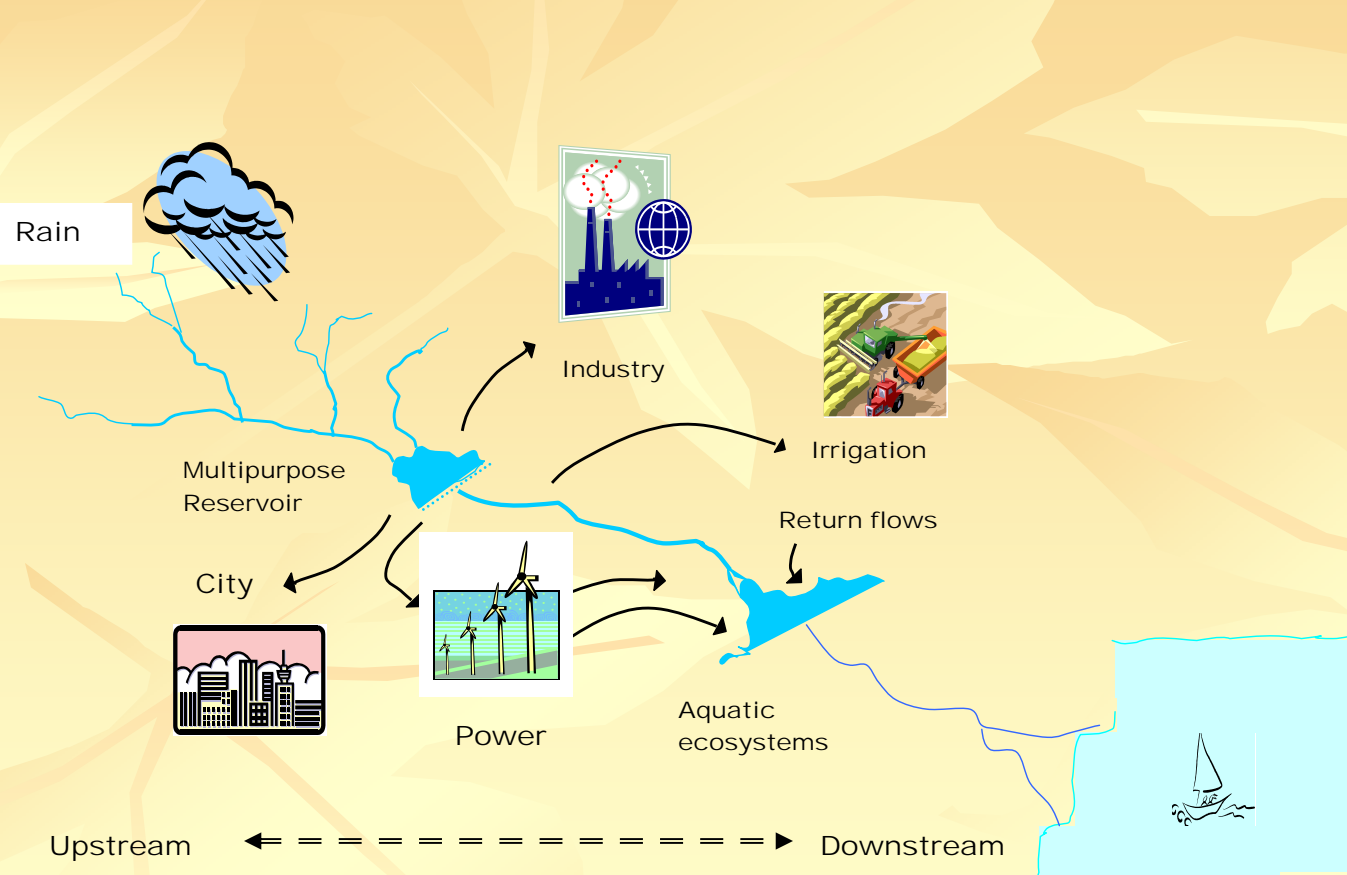
- Mahaweli Authority in consensus with the Ceylon Electricity Board of Sri Lanka has come to a policy decision that not more than 875 MCM should be diverted annually to irrigation areas.

Energy contribution from Mahaweli plants



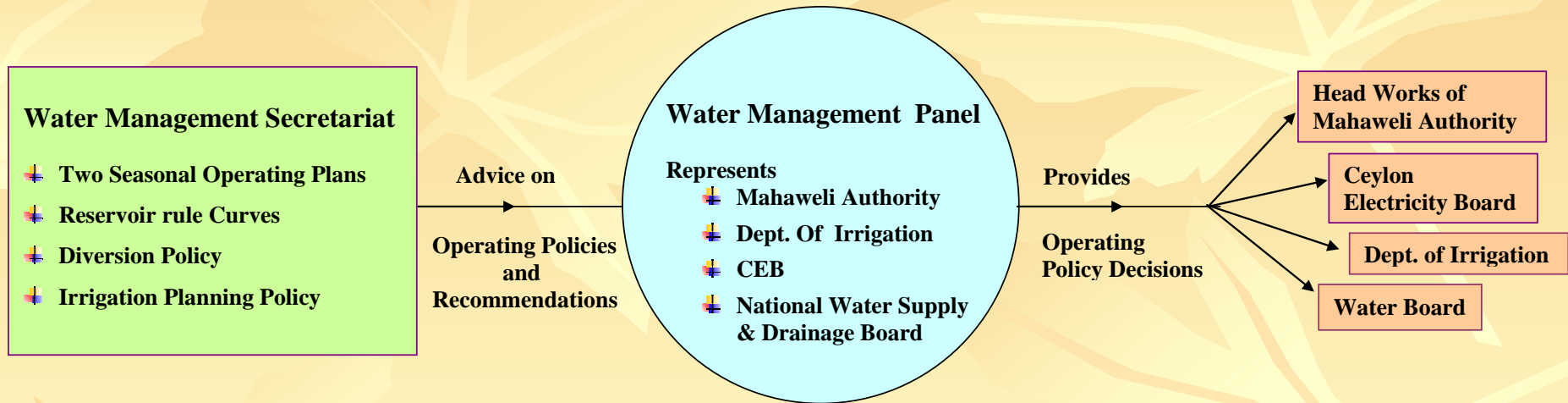
Need for Integrated Development for Mahaweli Diversion Scheme

Why You need Integrated Water Resource Development ?



- Energy generation amounts to about 51% of the total hydro power generation at present.
- Mahaweli contributes to about 20% to the national total rice production and a significant share in other field crops.
- A total of 110,530 settler households with 524,443 people have been so far resettled in these newly developed areas.

Establishment of Water Management Panel



- The Water Management Panel is the policy making body with regard to the issues in water management.
- Water Management Secretariat is a technical specialized body which advises the WMP

Seasonal Planning by using Acres Reservoir Simulation Programme

- ARSP is a general multi purpose, multi reservoir simulation program which is based on the premise that a water resource system can be represented by a flow network.
- Water resources allocation problems involving energy production, flood control, water supply, irrigation, low flow augmentation and diversion can be modeled using ARSP.
- It is capable of representing water resource system which incorporates the following physical processes.

Natural inflows

Precipitation, evaporation and evapotranspiration

Storages and releases of water by reservoirs

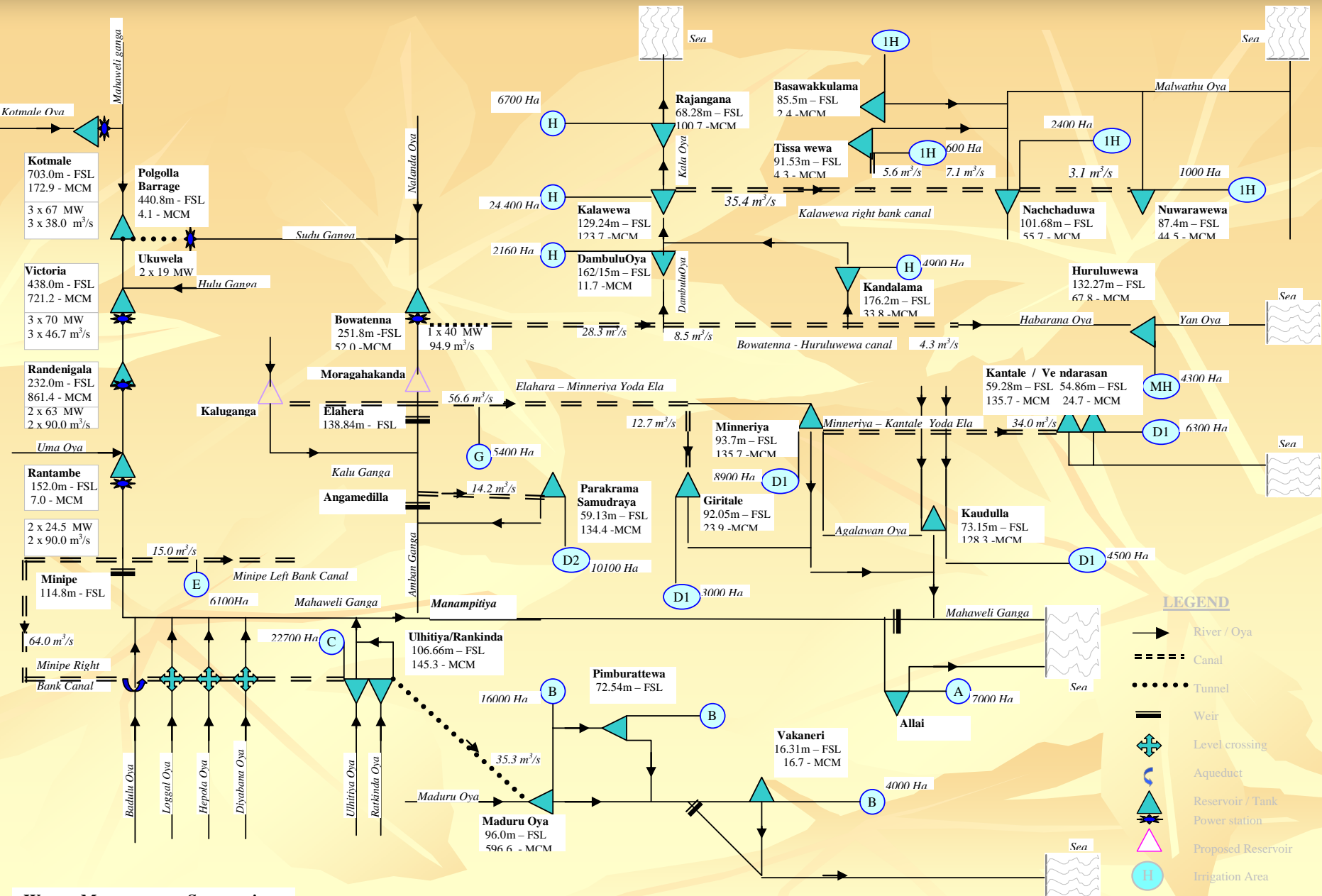
Physical discharge controls at outlet of reservoirs

Water flow in channel (Power & Diversion channels)

Hydropower releases

Water losses in channels

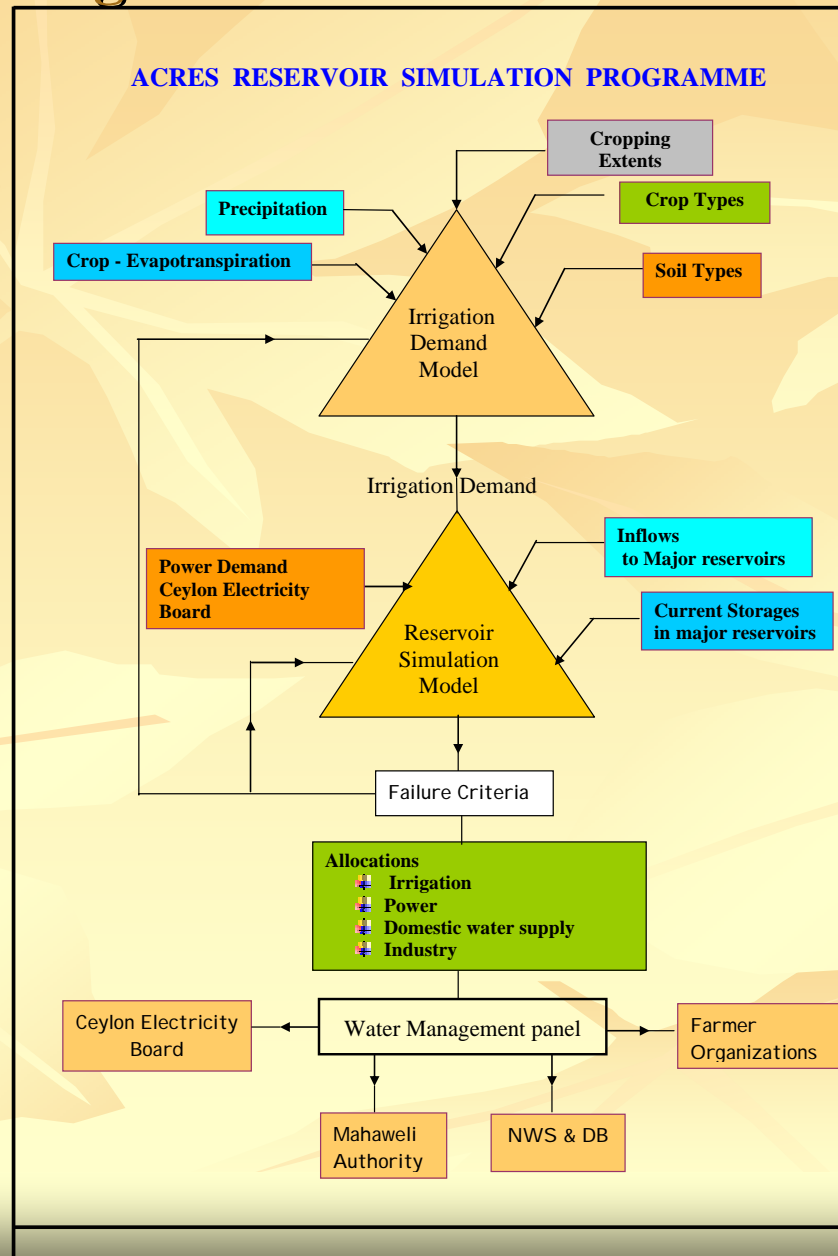
Consumptive Demands



**Water Management Secretariat
Mahaweli Authority of Sri Lanka**

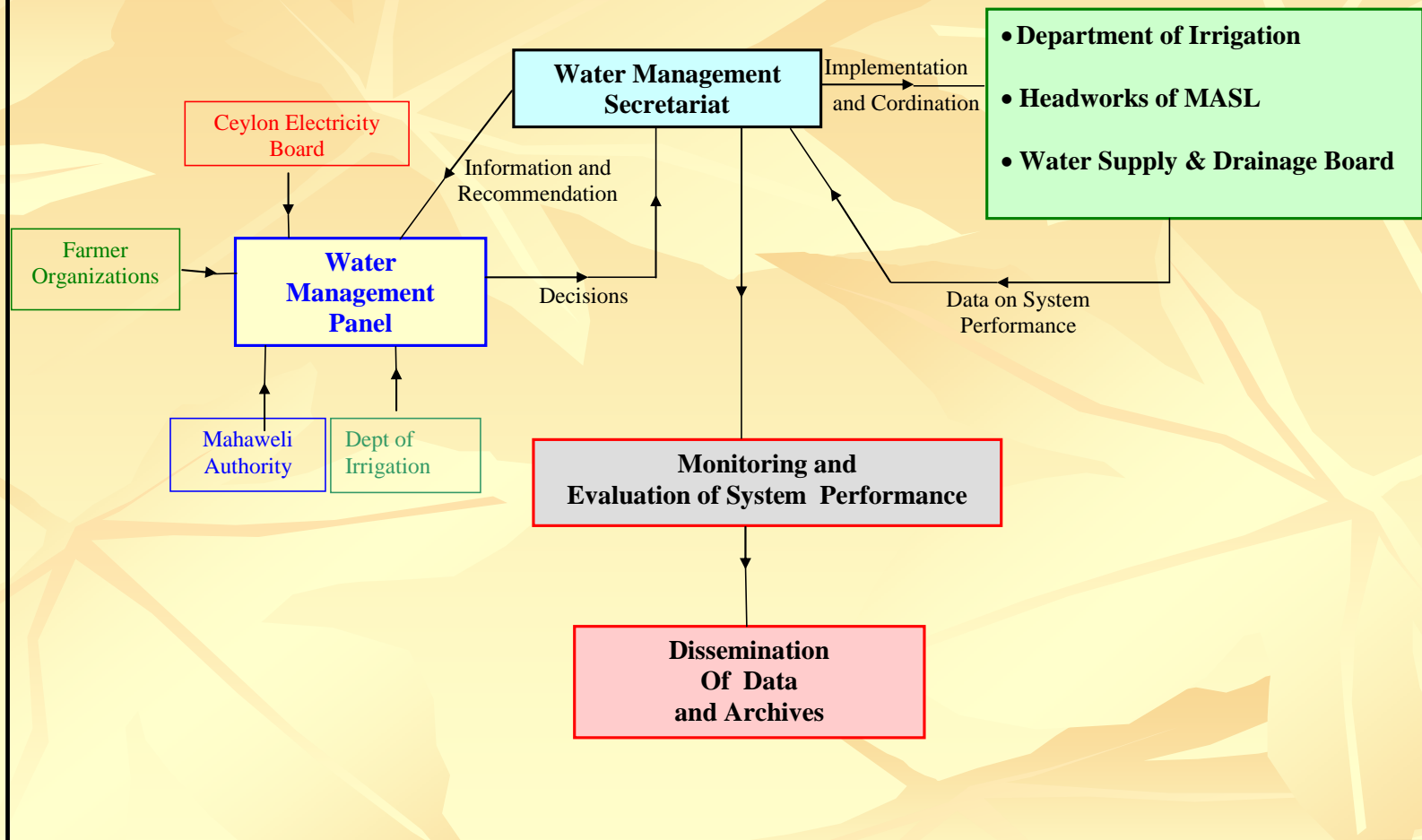
- LEGEND**
- River / Oya
 - === Canal
 - Tunnel
 - == Weir
 - ⊕ Level crossing
 - ↪ Aqueduct
 - ⬆ Reservoir / Tank
 - ⚡ Power station
 - △ Proposed Reservoir
 - ⊙ Irrigation Area


Seasonal Planning with the use of Reservoir Simulation Model



Network for water Resource Planning and Implementation

Water Resource Planning & Implementation in Mahaweli Authority



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- *May the rains fall in time*
 - *May the fields flourish*
 - *May all beings be well and happy*
 - *May the rulers be just*

Thank You !