

Accelerated Mahaweli River Project:
Economic Benefit and Ecological Impact

Introduction

Many of our rivers originating in the central highlands cascade down hundreds of meters emptying enormous volumes of water into the Indian Ocean. Of hundred and three river basins in Sri Lanka, several of them are heavily utilized in the dry zone lowlands since ancient time, but not fully utilised yet for the development of mankind.

The Mahaweli Ganga, the longest river which drains about 20% of the island has the benefit of coletting copious rainfall from both monsoons. It has the further advantage of having its catchment in the wettest part of the country in the central highlands, and flowing through the uninhabited vast fertile plains in the dry zone lowlands. The potential energy of Mahaweli waters in the central highlands is now being converted into hydro-electric power by harnessing its copious flow which fall through so many hundred meters, before reaching the dry zone lowlands.

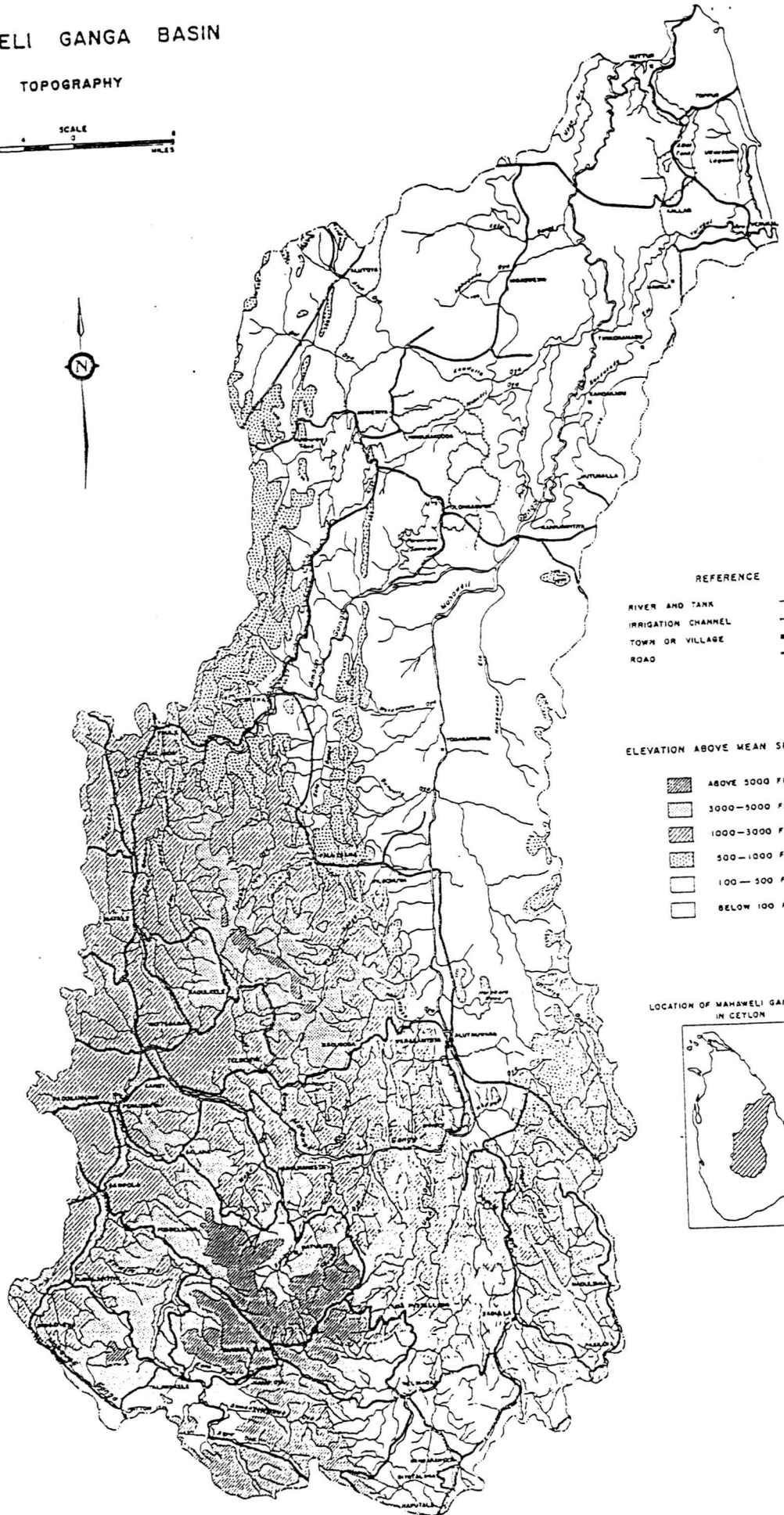
Mahaweli Reservoirs

The Kotmala Oya (Oya = Stream), one of the major tributaries of Mahaweli river, has been held back by a rock fill dam at Kandadora village, about 6.6km upstream of the confluence of it with Mahaweli river, giving rise to Kotmala Oya reservoir. Kotmala Oya which originates in the south central massif at an elevation of 2134 m drains an area of 543 km² before it meets the Mahaweli river. The trunk stream of the Mahaweli river has subsequently been dammed by a double curvature arch structure at Victoria falls, 58 km downstream of the Kotmala Oya Reservoir to form Victoria Reservoir. The Mahaweli water is conveyed to Victoria over the existing Polgolla barrage where water is diverted, northward from the left bank of the river through 6.5 km long tunnel to feed Bowetenna Reservoir. The Victoria is also fed by two major tributaries of the Mahaweli river, Huluganga and Maha Oya originating from Knuckles Range and the Central massif respectively.

The trunk stream of the river has been again blocked by a rock fill dam (94m high, 458m long), 19 km downstream of Victoria Reservoir, creating Randenigala Reservoir. Randenigala is also fed by the downstream tributaries of the Mahaweli river, Belihul Oya, Kurundu Oya and Maha Oya on the right bank and Kehelella Ela and Ma Oya on the left bank. The Mahaweli water is then diverted 500m downstream of the ancient Minipe-Yoda Ela wier to feed two major irrigation works, Ulhitiya Oya - Ratkinda reservoirs and Maduru Oya reservoir. This right bank transbasin canal is essentially a

MAHAWELI GANGA BASIN

TOPOGRAPHY



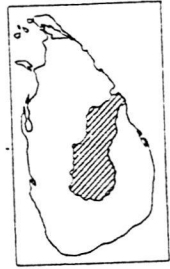
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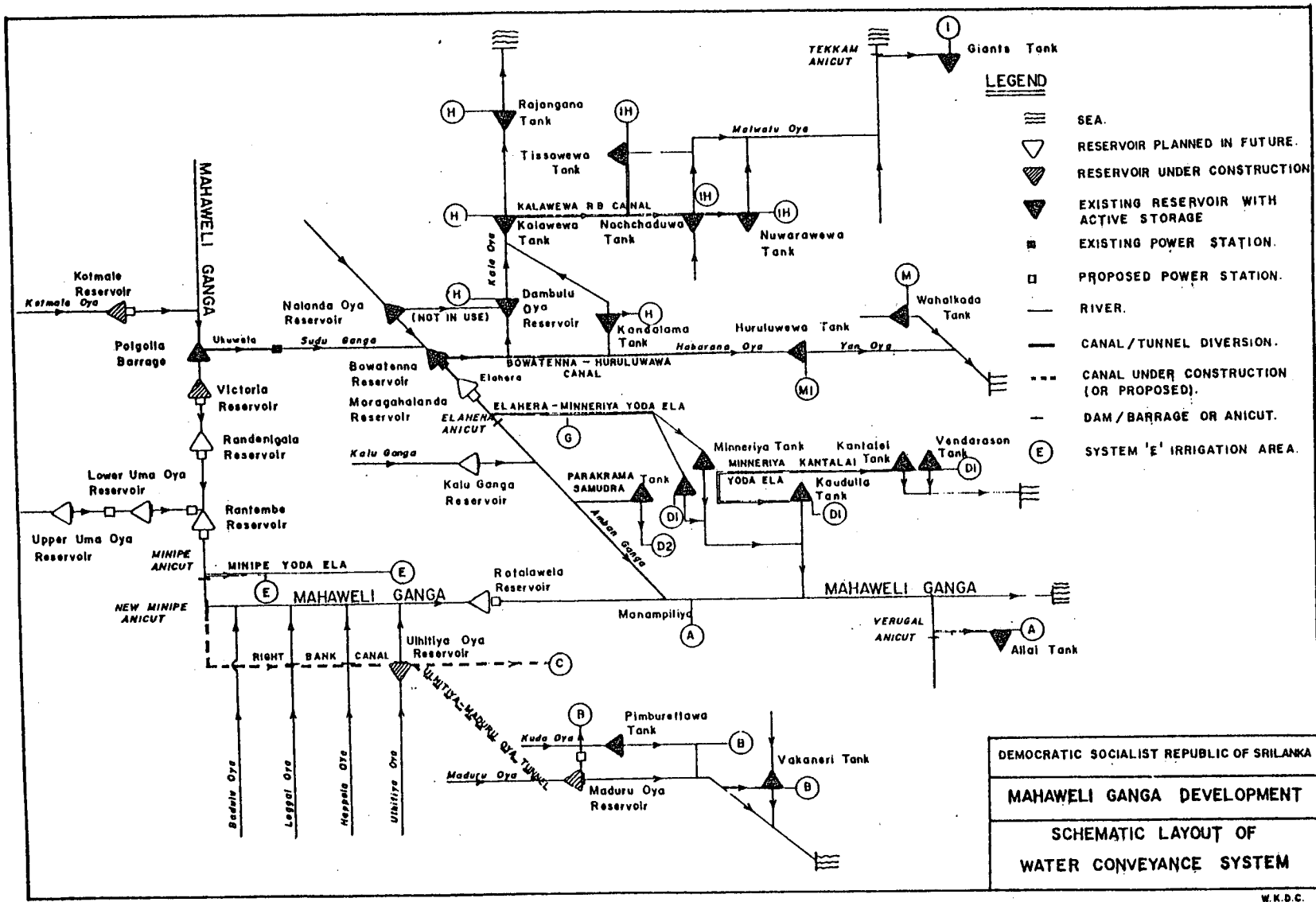
- RIVER AND TANK
- IRRIGATION CHANNEL
- TOWN OR VILLAGE
- ROAD

ELEVATION ABOVE MEAN SEA LEVEL

- ABOVE 5000 FEET
- 3000-5000 FEET
- 1000-3000 FEET
- 500-1000 FEET
- 100-500 FEET
- BELOW 100 FEET

LOCATION OF MAHAWELI GANGA BASIN IN CEYLON





LEGEND

- ≡ SEA.
- ▽ RESERVOIR PLANNED IN FUTURE.
- ▨ RESERVOIR UNDER CONSTRUCTION
- ▲ EXISTING RESERVOIR WITH ACTIVE STORAGE
- EXISTING POWER STATION.
- PROPOSED POWER STATION.
- RIVER.
- CANAL/TUNNEL DIVERSION.
- - - CANAL UNDER CONSTRUCTION (OR PROPOSED).
- DAM/BARRAGE OR ANICUT.
- ⊙ SYSTEM 'E' IRRIGATION AREA.

DEMOCRATIC SOCIALIST REPUBLIC OF SRILANKA
MAHAWELI GANGA DEVELOPMENT
 SCHEMATIC LAYOUT OF
 WATER CONVEYANCE SYSTEM

conveyance canal from which only bulk supply is delivered to existing reservoirs enroute (Viz., Mapakada tank, Damarawa tank and Horabora tank) and finally empties itself into Ulhitiya Oya-Ratkinda reservoirs. Ulhitiya Oya reservoir has been constructed by placing an earth fill dam on Ulhitiya Oya. This stream is one of the major tributaries of Mahaweli river originating from Uva basin.

The surplus water of the Ulhitiya Oya is led through a transbasin link tunnel of 5.4km into Maduru Oya reservoir. Maduru Oya reservoir the second largest standing water body in the country has been built by arresting Maduru Oya by an earth fill dam. This river which originates from Uva hills does not lie within the Mahaweli river basin.

Table 1. Some important features of newly built Mahaweli Reservoirs.

<u>Parameter</u>	<u>Kotmale</u>	<u>Victoria</u>	<u>Randenigala</u>	<u>Ulhitiya</u>	<u>Maduruoya</u>
Year of Sealis	1985	1984	1986	1983	1982
Elevation (m)	703	438	228	96	95.5
Area (ha)	970	2270	2750	2270	6280
Catchment Area (sq.km)	54.2	187	234	28.0	45.3
Volume m ³ x10 ⁶	174	730	860	146	596
Maximum depth(m)	42.1	30.4	31.4	6.1	21.0
Mean depth	17.9	32.2	31.3	6.4	9.5
Power MW	140	210	126		
Irrigation ha x 10 ³		40	30	40	20
Expected fish-yield t yr ⁻¹	48.5	170	137	454	942

Environmental Impact

The implementation of the Mahaweli river development programme has been resulted in the replacement of natural forest cover by standing water bodies, cultivated lands, dairy farms, townships

settlement and related infrastructure. This resultant changes are expected to bring about certain environmental changes common in any river development project. The following environmental impacts have been identified to be occurred in the future due to Accelerated Mahaweli River Development Project.

Wild Life

The loss of nearly 100,000 ha of natural forest would result in significant reduction of natural wild life habitat and in concomitant unavoidable loss of flora and fauna presently found in the project area.

Forest Resources

A large extents of forests would have replaced by agriculture under Mahaweli Development Scheme. This would have major impact on the traditional energy sources such as fuel wood of the rural population. The following environmental impact may also possible in the future due to severe deforestation.

1. Erosion in the uplands and subsequent flooding in the lowlands.
2. Changes in hydrology in micro catchment.
3. Changes in local rainfall patterns.
4. Changes in indigenous and endemic flora and fauna.

Aquatic Ecosystem

Damming and diversion of the Mahaweli river and subsequent creation of massive standing water bodies would have a series of ecological effects in both instream and offstream aquatic habitat. Some of the possible effects are as follows.

1. Sediment and suspended solid transport in water courses may alter potential habitat of many aquatic organisms.
2. Physical structures across the main river will be barricaded the upstream and downstream migration of riverine fish.
3. Accumulation of agrochemicals (eg. insecticides pesticides etc.,) in downstream reservoirs may affect on the aquatic life.
4. Flood plain ecosystems or so-called "villus" may be converted to perenial water bodies.