

# **Sri Lanka**

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**EXECUTIVES SEMINAR ON  
PUBLIC WORKS MANAGEMENT  
JAPAN**

**COUNTRY REPORT  
SRI LANKA**

**MINISTRY OF HIGHWAYS**

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## ***WATER RESOURCES AND RIVER MANGEMENT FOR SUSTAINABLE DEVELOPMENT***

### **BACKGROUND**

Even though three fourth of the earth surface is covered by water only as little as 2.5 % of this is pure and fresh. Much of the worlds water resources are in the form of icebergs in the arctics and other regions of extreme cold. As such, less than one per cent of the total volume of the water available is sustainable for human consumption.

A thousand cubic meters of water per year is the minimum need of each human. The UNDP says anything less is “are acute shortage of water”. Already 20% of the population is without pure drinking water. Scarcity of portable water has been identified as one of the major areas, the world will face in the 21st century.

In the year 2025 according to scientists 66% of the world population would find it difficult to meet minimum water requirements. This situation will seriously affect the third world Countries like ours. In this situation several countries will have to face shortage of good water as early as in 2005. Sri Lanka is one of them.

22<sup>nd</sup> of March was declared as World Water Day by the United Nations in 1990. Water for health is the theme for the future. Because average 30,000 children die daily of water related diseases. The Scarcity also affects agriculture. About 70% of the water available for human consumption is utilized for agriculture particularly in Asia and Africa.

### **PRESENT SITUATION**

According to surveys carried in Sri Lanka it has been revealed that the proportion of households with access to safe drinking water is about 67% and that only about 35% has access to pipe born water. By 2005 Sri Lanka has planned to expand the water supply to 80% and achieve total coverage by 2010. The requirements of funds for this is around Rs. 85 billion. 50% of this have to be from alternative sources. In order to achieve the targets the management of available water resources is important. As an initial step institutional arrangement with private sector partnership has been planned for the future.

### **WATER QUALITY**

Maintaining a appropriate balance between environmental quality and long term sustainable economic development has been recognized as the basic environment policy in the country. This requires the use of natural resources for the benefit of mankind with out disturbing the environmental balance with taking measures for the conservation of same. In line with this basic policy the Ministry of Environment and National Resources (MENR) the Central Environment Authority (CEA) and other relevant Government institution continued their activities in relation to environment conservation monitoring management of regulation in the water sector.

### **RIVERS IN SRI LANKA**

Sri Lanka is an island surrounded by sea. The water received is only by rain received during the monsoon period from May to July and September to December annually. The rainfall provides more water to the wet zone than the dry zone see map. All the water collected part is used in precipitation. Run off from catchments of Forest, Agricultural and urban sector areas are collected by the Natural Drainage systems up to the canals. The canals in tern are connected with the major rivers which will collect such water and

discharge to the sea. Due to the geographical situation high percentage of water is wasted with sediment transport to sea out of the Island. Collected water part is evaporated from the reservoirs. However it is to be noted that from ancient times Sri Lanka has a large network of man made and natural tanks, lakes reservoirs distributed within the Island.

The three major rivers starting from Samanala Kanda in Sabaragamuwa Province is a unique place where the Sri Pada of Lord Buddha has been placed. This Mahaweli, Kalani and Kalu Ganga. The two rivers flow though Sabaragamuwa, Western Province are Kalu and Kelani. These two rivers floods during the heavy monsoons. The Banks are Natural and the water is used for Bathing, Consumption and Industry. Certain section of the river are used for transport of people and goods. However the major use of the water is for drinking purposes. The National Water Supply and Drainage Board is operating and supply of safe drinking water from these two rivers. However sand mining has become a problem in these rivers causing damage to river banks and erosion of river bed. This has caused salinity in the domestic supply of water by the National Water Supply and Drainage Board.

The largest river is the Mahaweli which cover Sabaragamuwa Central, North Central and North East of Sri Lanka. This river is 331Km long. In 1970 this Government embanked upon a programme of the development of Mahaweli programme implemented to provide 671 Megawatts of power and 53500 Hectare agriculture lands. 175,000 families were resettled in theses areas A to H. This projects helped to control the water and reuse for obtaining power, Agriculture Industrial and Domestic purposes by constructing Series of Reservoirs.

The annual capacity of Mahaweli is 8.4 billion cum out of this it was planned to use 60%. The Project was executed by the Mahaweli Development Authority under the Ministry of Irrigation of Sri Lanka.

### **URBAN WATER SUPPLY**

This mainly from rivers and reservoirs. Treated and supplied to households. The problems are encountered due to wastage in transmission, distribution due to poor infrastructure maintenance.

### **RURAL WATER SUPPLY**

Tanks, wells, deep wells, miner water supply schemes are method of provision of water to rural poor. Covered wells are tested and provides goods quality water, but, deep wells does not provide a continuous supply due to poor maintenance. The supply of tanks are stagnant water naturally cleaned but, contaminated due to discharge of waste water and bathing and using by animals. However the water supply is in progress by NWDB with treatment supplied from such tanks. The rural supply water project has provided water for 182,392 by end of 1998 with their participation in providing labour. This project will be extended to cover other districts too.

### **SHORTAGE OF WATER**

From several years now there is water shortage in several areas in Sri Lanka. Namely North Western and Southern, parts of Sri Lanka. Greater Colombo area daily need is around 13 million gallons. This service the grater Colombo area and a floating population of 400,000 per day with an uninterrupted supply for a period of 24 hours.

### **POPULATION**

Water resources are diminishing due to population growth, environmental degradation and soil erosion. Another factor which has are effected on water resources is the lack of proper management in the disposal of household garbage.

## **WASTE**

Waste disposing measures has also aggravated the problem of water storage. According to surveys the urban population, around 40-50% of the total supply of water to urban areas are wasted. In Germany and Singapore the wastage is 3-8%. In Sri Lanka the daily per capita Consumption should be 100-115litres but, it is in the region of 180-200 liters. In countries like South Africa per capita consumption is restricted to 45 liters.

## **FUTURE PLANS**

With a view to keeping inland water bodies clean pilot projects called “Pavithra Ganga” project was launched to protect the Kalani river and Kaluganga. This was carried out with the assistance of public and local authorities. Under this project priority was given to tree planting, mitigating the effect of sand mining, controlling urban waste, controlling discharge of sewage and industrial effluent. Ministry of Environment and Natural Resources is coordinating matters with all other organizations

## **CONCLUSIONS**

Water is abundant but, mankind has to manage it properly. River environment have to be protected to keep clean water flowing and strategies have to be developed to control flow and stock the water in reservoirs and tanks much as possible. The maintenance of the BOD values within the required limits and quality of water. Market Instruments have to be used in the management of water for agriculture and industrial sector. Soil Erosion Control methods have to be adapted and soil conservation and protection of river catchments is important in arresting the silting of river beds and reservoirs. In formulating projects the environmental aspects have to be adapted for sustainable development.



## SPECIFIC SUBJECT I

### *RIVER ENVIRONMENT*

Sri Lanka has 4 large rivers which start from Adamspeak and flow to the sea. Namely Kalani, Kalu, Mahaweli, Walawe. The map shows the rivers and their basins. The rivers provides the water necessary for the energy production and further the agriculture requirements. Most of the rivers are used for drinking water and supply of industrial water. During the monsoons the water discharged into the rivers and fill the reservoirs and tanks and the balance flows to the sea.

The environment of the rivers contains the river banks, flood retention areas reservations, and bunds. Most of the rivers with rime has changed their flow paths carrying deposits of clay. In rainy season the river water carries material in suspension, solution and bed load. The river water is not possible to be used by people during this period due to speed of flow and impurities.

### RIVER WATER

The water in other times are used for Agricultural Industrial / Domestic purposes specially Mahaweli river produce the majority of the hydropower in Sri Lanka with its reservoirs Network. Domestic supply by treatment is supplied to most of the Colombo metropolitan and suburbs by using river water.

### RIVER BANKS

Naturally made other than places used by people for domestic, and public purposes. The banks are naturally covered with vegetation. Changes occurs during flood times due to speed of flow and alignment. Banks are eroded and the other sides are silted during flood

times. River Banks of Sri Lanka are damaged by transporting logs in rivers and disposing and collecting at banks of such materials. Speed boats which develop wave action also erodes unprotected river banks. This cause collapse of river banks causing change in cross section. The change in cross section causes change in river geometry and flow direction and speed. The natural Bamboo cover is protecting river banks during flood times.

### **FLOOD BUNDS / RETENTION AREAS**

The rivers are protected by statute by the Irrigation Department and local authorities, but however it is observed in Government / Private properties mining clay is a business for industries like, Bricks Pottery, tiles ect. for the Construction Industry. There are sometime uncontrolled excavation where reclamation is not carried out after extraction. This has caused environmental hazards producing stagnant water pools etc.

However the Government has launched in urban areas clean environment programmes on rivers like "Pavithra Ganaga" in the past few year with the assistance of non governmental organization, environmental groups and public to protect the river environments.

However it is becoming evident that the river environment are becoming polluted in urban and industrial areas due to discharge of waste and polluted waste water to rivers without proper treatment. Action is taken by the Central Environmental Authority to arrest this situation.

## **SPECIFIC SUBJECT II**

### ***TRAFFIC MANAGEMENT AND SAFETY***

#### **BACKGROUND**

The road density of Sri Lanka is very high with a length of 100,000 Km of roads within a 60,000sqr.Km area. However only 11460 Km of these are National Highways which are all paved. 16,000 Km of minor roads belongs to the Provincial Councils and majority of these are feeder roads. All other roads are urban and rural access roads.

#### **PRESENT SITUATION**

The National Network carries traffic volumes from 250 to 65,000 vpd. Urban roads carry heavy traffic and are mostly congested at peak hours. However the rural areas the traffic is low and speeds up to 40 - 70 Km / hour can be maintained . The urban roads are mostly asphalt paved and supported with constructed drains and paved footwalks. In dry weather most of the roads condition deteriorate due to bad drainage. Lack of proper maintenance is the cause for the poor condition of roads. Recent Survey conducted by ADB has shown that the maintenance cost/Km used by Sri Lanka is low compared to India and other developed countries.

The traffic is mixed and contains a majority of slow moving vehicles. Traffic composition in developing countries are different to the situation in a developed country. The roads are narrow and needs widening to provide facility for increasing traffic and growing pedestrian volumes. However the widening of the existing roads are not possible due to ribbon development and protest by urban population for land acquisition. Due to this the changes are always compromised for public requests and political aspirations. Long term objectives are not taken to consideration. Therefore existing roads on the other hand are fully occupied by traffic and foot walks by vendors and for other activities

of people causing damage to road fittings and furniture and hardship to pedestrians. Provision for individual benefits on roads carrying greater risk on road users.

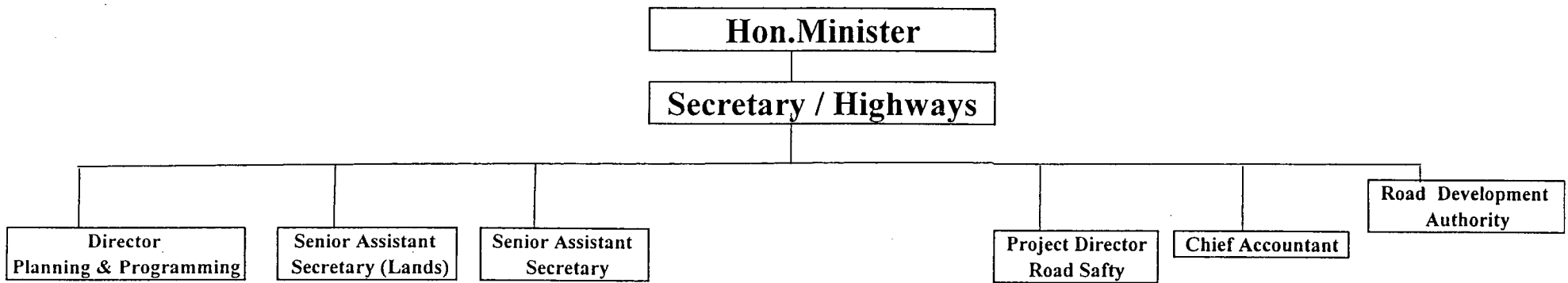
### FUTURE

At present there is a programme for improving junctions, inter section and urban areas by widening of roads installing traffic signals, traffic signs and constructing of overpasses and underpasses. There is a programme to clear road reservations from unauthorized structures.

However we have to note that with present fuel price fluctuations and energy crisis, the non motorized traffic also making prominence on the roads and will be a cause of more concern in the future for road designers. The roads safety is becoming more important today than any other time. Accident rate are increasing. Drivers discipline and low enforcement is deteriorating.

The Ministry of Highways has proposed the Expressway Network to reduce congestion and increase mobility and reduce congestion on the other roads. This total Network of about 380 Kms of Expressway will help to improve the total Network condition and improve traffic management. The present safety programme embarked includes, blackspot improvement, driver training, vehicle licensing, vehicles inspection, emergency and rescue operations, safety auditing of roads, vehicles over lording checks, will span for a period of 05 years and will definitely produce an impact on road safety in Sri Lanka.

**MINISTRY OF HIGHWAYS**  
**ORGANIZATION**

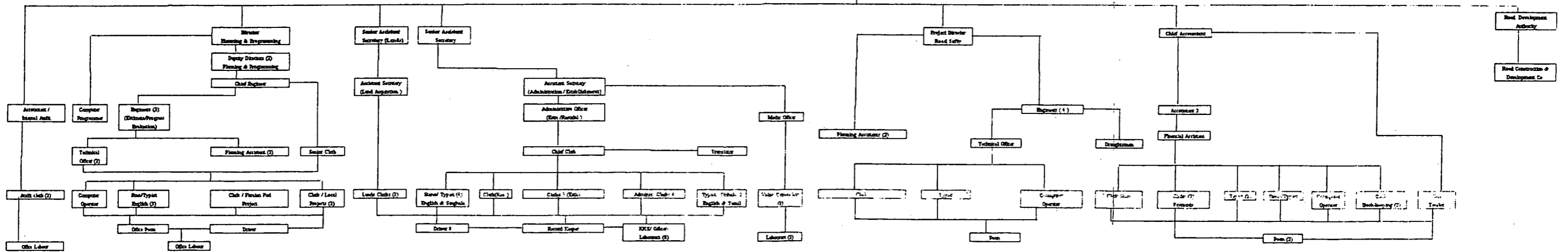




**MINISTRY OF HIGHWAYS  
ORGANIZATION**

Hon. Minister

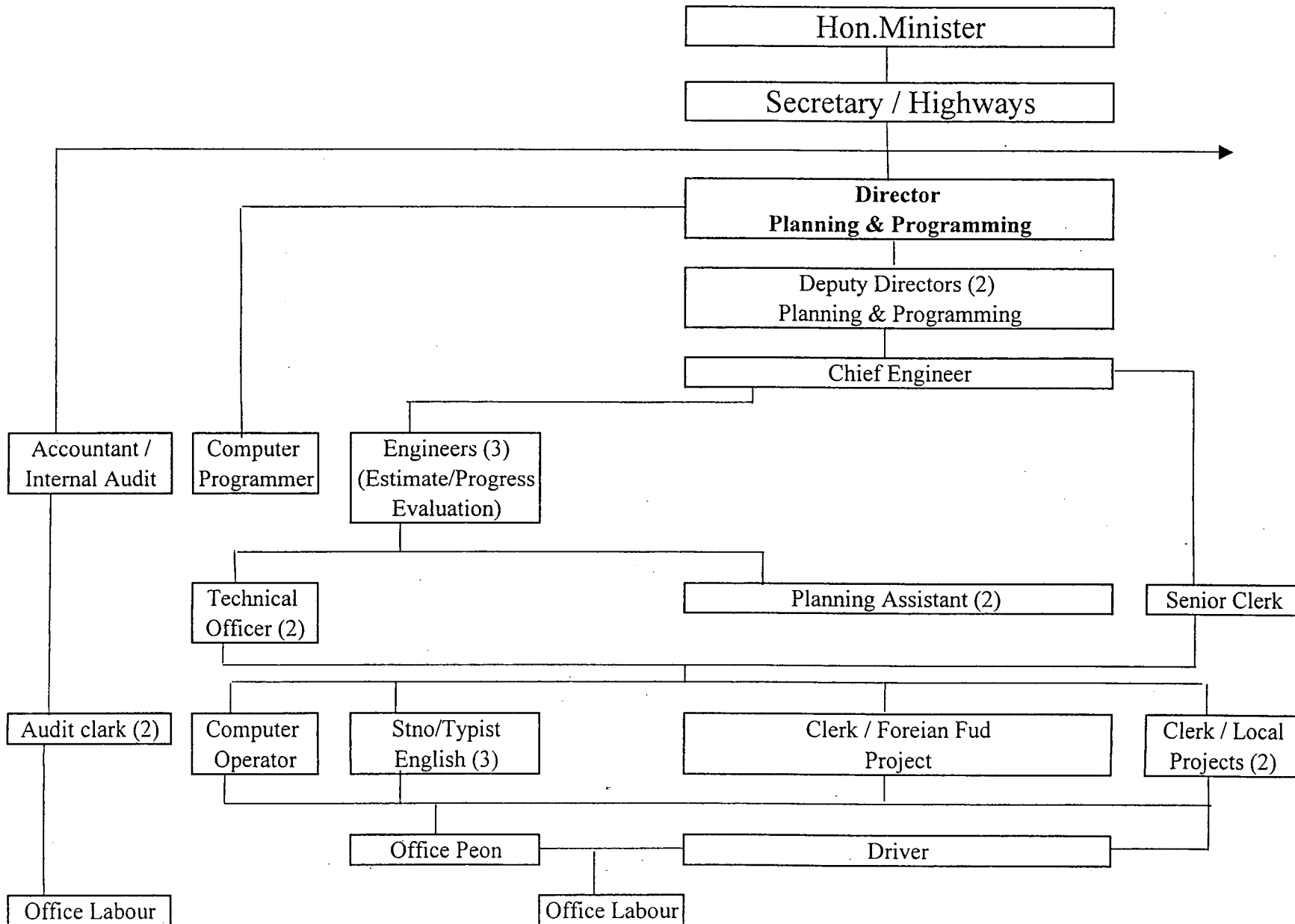
Secretary / Highways







**MINISTRY OF HIGHWAYS**  
**ORGANIZATION**

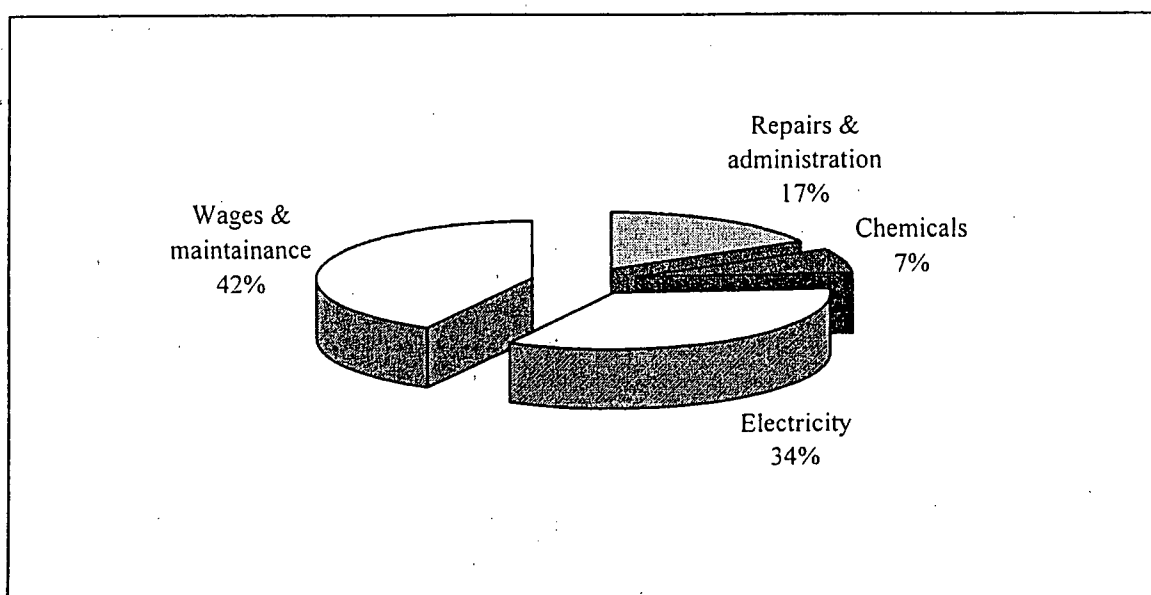


**Table 4 : Water Supply Schemes**  
**ADB Project**

District	No of Beneficiaries	Allocation Rs. Mn
Kalutara	281,476.00	124.00
Hambantota	141,185.00	234.50
Kegalle	326,550.00	187.80
Moneragala	129,077.00	249.00
Puttlam	400,000.00	358.30
Anuradhapura	186,146.00	270.80
<b>Total</b>	<b>1,464,434.00</b>	<b>1424.40</b>

( Source : National Water Supply & Drainage Board )

**Table 5 : Annual Expenditure on**  
**Water supply ( % )**  
**( In addition to the projects )**



**Table 2 : Urban Water Supply Schemes**

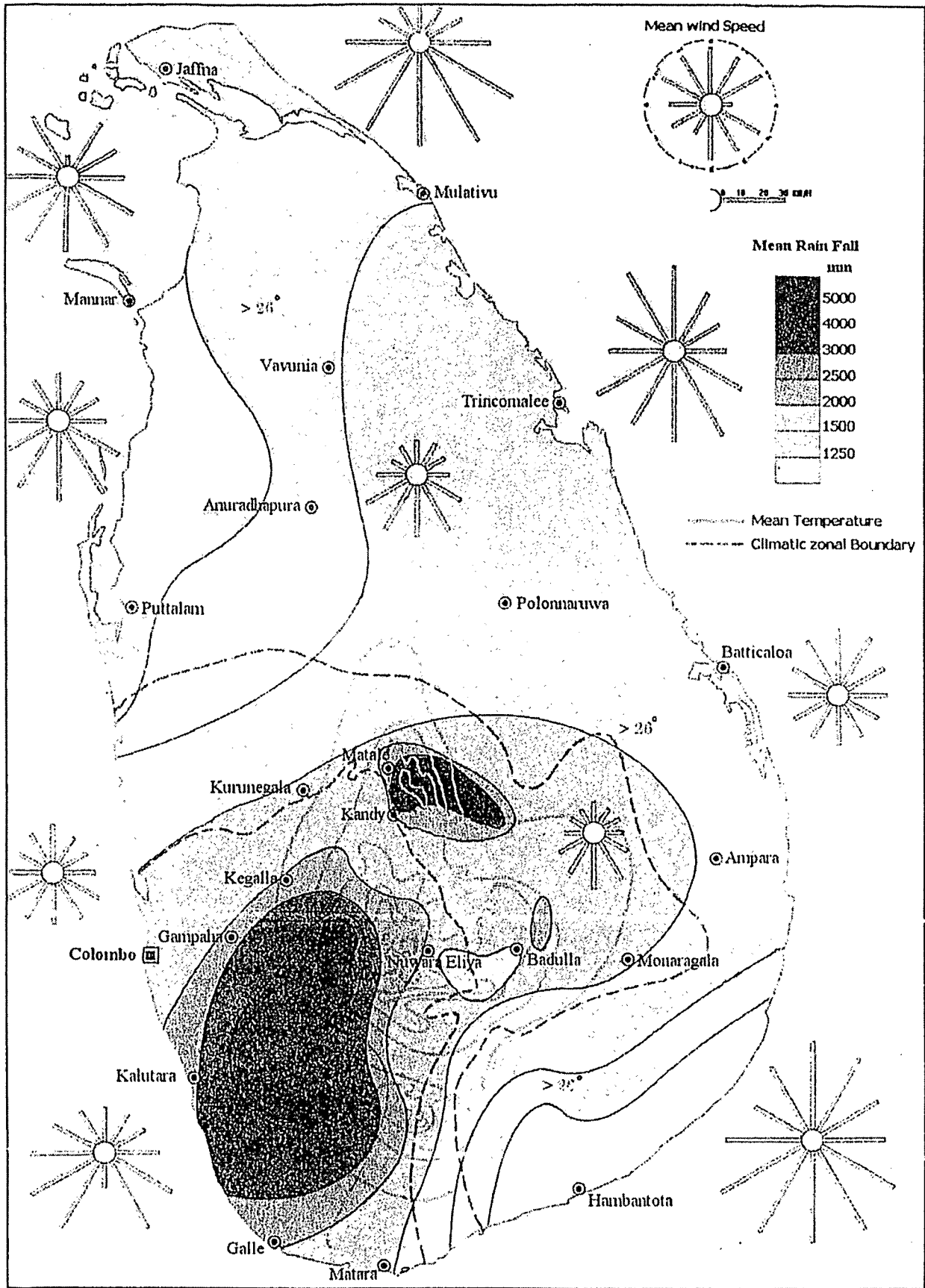
	No of Beneficiaries	Allocated funds for 1999 Rs. Mn
Colombo South	260,000	2,423
Avissawella	100,000.00	31
Hambantota - Muruthawela	16,000.00	120
Galle ( Improvement )	40,000.00	130
Kundasale U.W.S.S	56,000.00	110
Ambalangoda ( Improvement )	73,000.00	103
Anuradhapura	120,000.00	200

( Source : National Water Supply & Drainage Board )

**Table 3 : Community Water  
Supply and Sanitary Projects  
Targets of next 6 years  
Under Phase II**

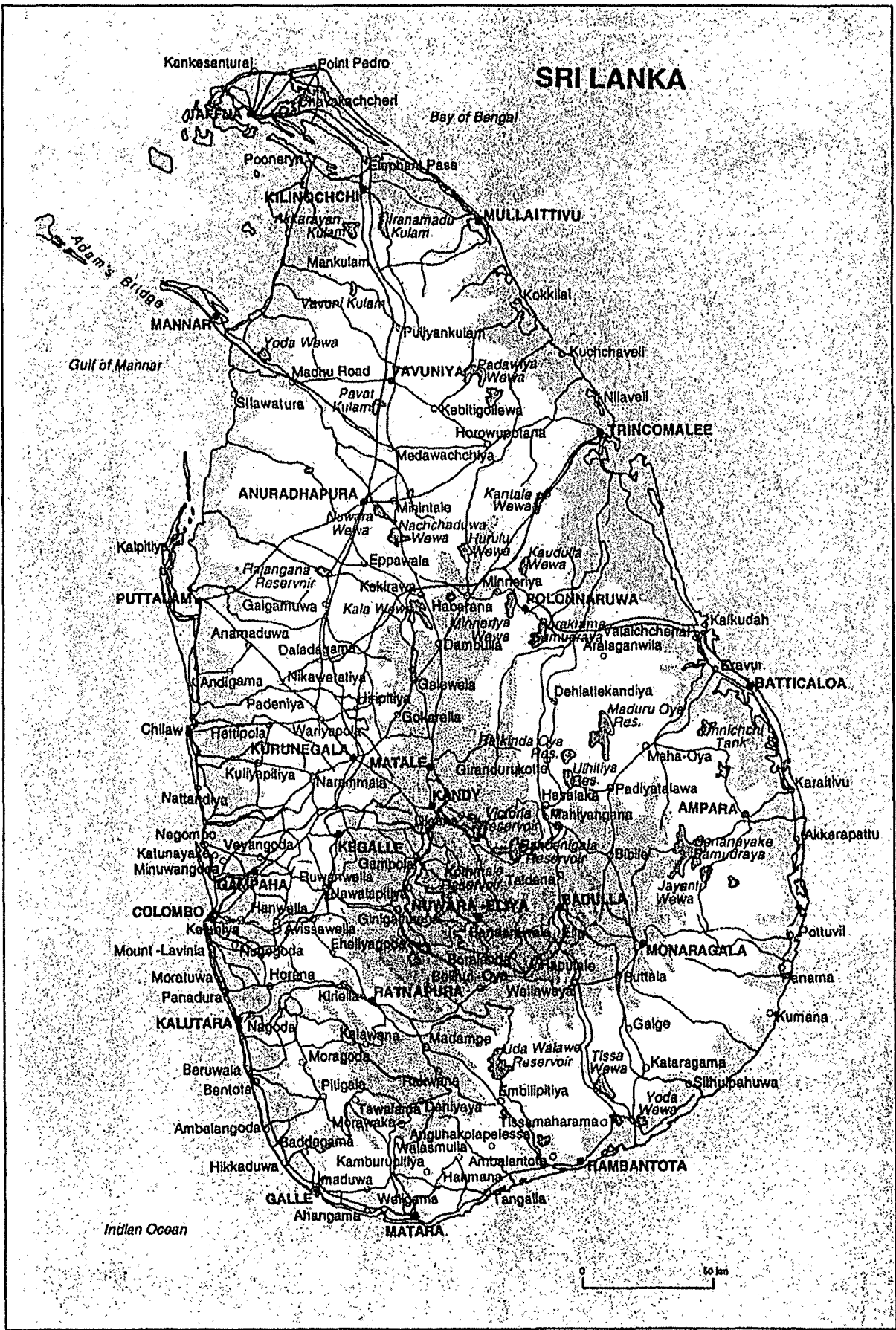
District	Rural	Townships	Schools	Expected cost Rs.Mn.
Colombo	80	6	30	441
Gampaha	190	6	35	1036
Galle	165	6	30	903
Matara	100	-	36	539
Matale	85	3	17	476
N'Elliya	85	2	18	469
Ratnapura	95	-	34	518
Badulla	80	-	30	434
Kurunegala	220	7	70	1204
<b>Total</b>	1100	30	300	6020

( Source : National Water Supply & Drainage Board )



Map - 1

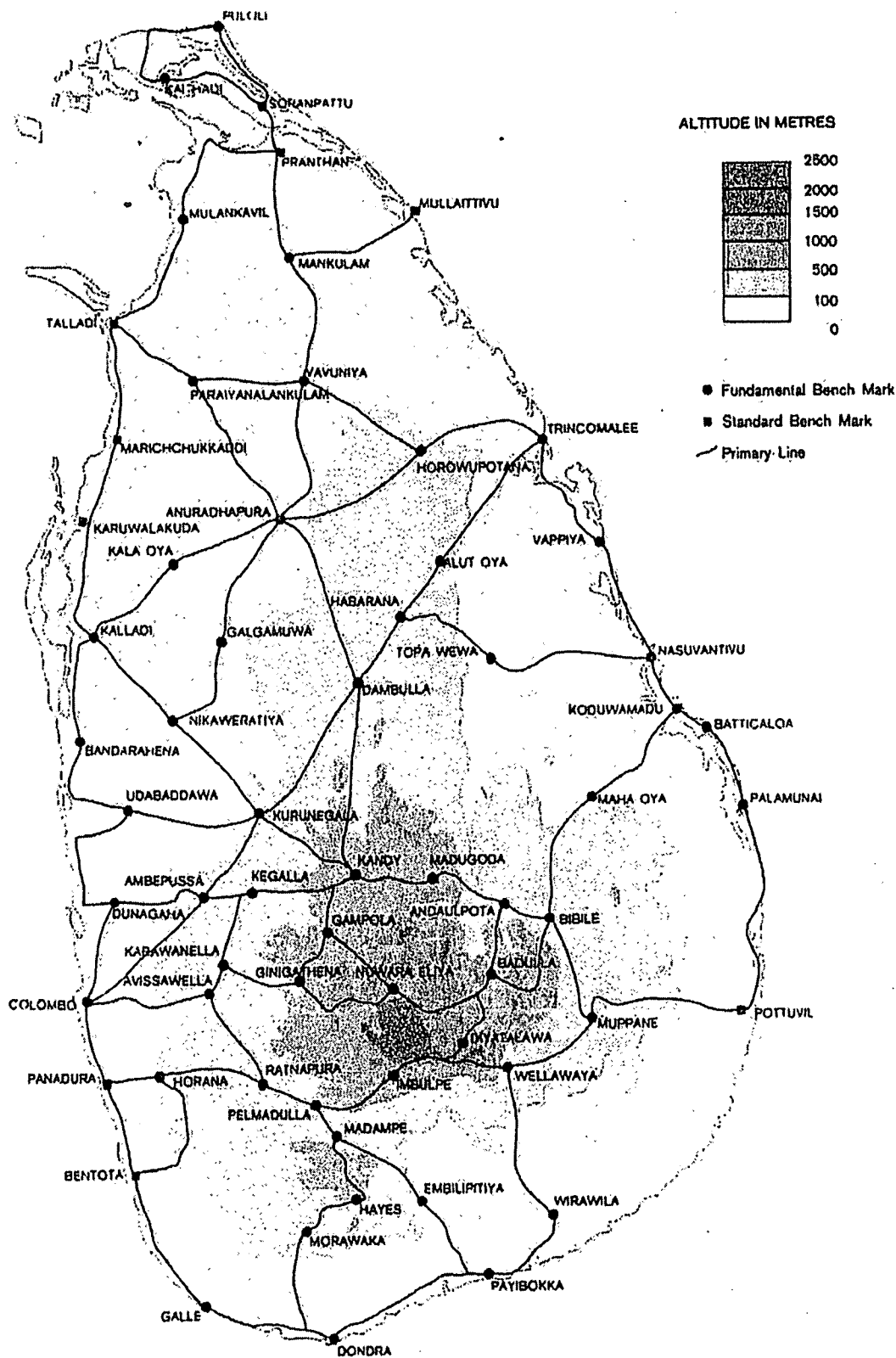
Climatic Zones



Map - 2

Road Network in the country (National Highways)

# PRIMARY LEVEL NET



Map - 3

Topographical Map

## MAIN CONSTRUCTIONS IN MAHAWELI PROJECT

Reservoir	Height of Dam metres	Length of Dam meters	Type of Dam	Gross Capacity cu.m. mill.	Permanent Capacity cu.m. mill.	Potential capacity M.watts	Annual units G.watt hrs.
Victoria	122	520	Concrete arch	721	688	70x3 = 210	605
Kothmale	87	600	Earth core rockfill	172	150	67x3 = 201	396
Randenigala	94	485	Concrete gravity	861	558	63x2 = 126	274
Rantambe	41.5	420	Concrete	22	18	25x2 = 50	103
Ulahitiya / Rathkinda	25	4960	Earth fill	145	82	-	-
Maduru Oya	41	1090	Earthfill	597	478	-	-
Bowathenna	29.8	226	Concrete	52	35	40x1 = 40	83
Udawalawa	36	4000	Earth fill	268	240	RB2X1+LB4X1 = 6	21
Ukuwela			Only Electricity Generation Plant			19X2 = 38	173
Polgolla	14.6	144	Concrete with gates	4.1	2.1	-	-
<b>Total</b>				<b>2842.1</b>	<b>1563.1</b>	<b>671</b>	<b>1655</b>

Note: Wastages in power generation not considered.

## INTER BASIN DIVERSIONS AND CANALS

Type	Capacity cu.m per sec.	length(km)		Development Zones
		Tunnel	Cannal	
<b>Diversion</b>				
Polgolla	56	8.06		'H', 'G, 'I' / 'H' and 'M' / 'H'
Bowathenna	28	6.85		'H', 'G, 'I' / 'H' and 'M' / 'H'
Right bank canal, Minipe	64			
Inter Bazin canal			30.90	'C' and 'B'
Rathkinda-Maduruoya tunnel	34	5.72		
<b>Main Canals</b>				
Zone 'H'			44.80	
Zone 'C'			28.30	
Zone 'B' (Left bank)			52.90	
Zone 'M' / 'H'			24.00	
Upper Walwa			72.80	
<b>Total</b>		<b>20.63</b>	<b>253.70</b>	