

FLOOD HAZARD MAPPING PROJECT IN  
RATNAPURA CITY

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## 1.0 **Back ground and Objectives of the Planned Project**

In Sri Lanka there are four main river basins which are vulnerable to floods. They are

- (1) Kalu river basin
- (2) Kelani river basin
- (3) Gin river basin
- (4) Nilwala river basin

In each river basin there is no specific plan to face in case of a flood. Flood protection system prevailing in the country is also not at a satisfactory level. Structural measures and non structural measures have to be improved against floods as there are series damages to the property and life. There is no Flood Hazard Maps prepared for Sri Lanka. There are no early warning speaker system installed in our country. But people in the vulnerable area knows to evacuate to a safer place by their experience.

Objectives of the project

- 1) Prepare FHM in Ratnapura town area
- 2) Minimize the damages to life and property in case of a flood
- 3) Improve system of
  - ❖ Self help
  - ❖ Mutual support
  - ❖ Public assistance
- 4) Prepare flood hazard mapping manual
  - ❖ Fundamental information to help prepare flood hazard maps which display information about evacuation and inundation caused by levee breaches and other reasons.

## 2.0 **Target area of the Project**

### **Description of the River Basin**

Kalu River is the second largest river in Sri Lanka in terms of the discharge it carries annually to the sea. It originates from the central highlands at an altitude of 2000m msl and flows generally westward to reach sea at Kalutara on the western coast of the island. At the river mouth it drains an area of 2600 km<sup>2</sup> and discharges about 4000 MCM of water annually to the sea. See Fig. 1.1.

Being located in the wet zone, Kalu River basin experiences some of the highest annual rainfall depths received in the island. Some areas in the upper Kalu River basin receive annual rainfall in excess of 5000 mm.

Several studies have been conducted in the past with the aim of developing water resources of Kalu River basin with special attention on flood control aspects. However, except for the recently completed Kukule River run-of the river hydropower project, no large-scale water resource development projects have been undertaken in the river basin.

Studies conducted in the past to investigate the possibilities of developing water resources of Kalu River basin have mainly considered the feasibility of developing the water resources for generation of hydropower and providing irrigation water. In view of the regular damages caused by floods, flood control in the river basin has also received attention in all these studies.

These studies have lead to several possible project options for the development of water resources of the river basin. All the multi purpose project options considered have had flood control components in the form of reservoirs, levees and pumping stations.

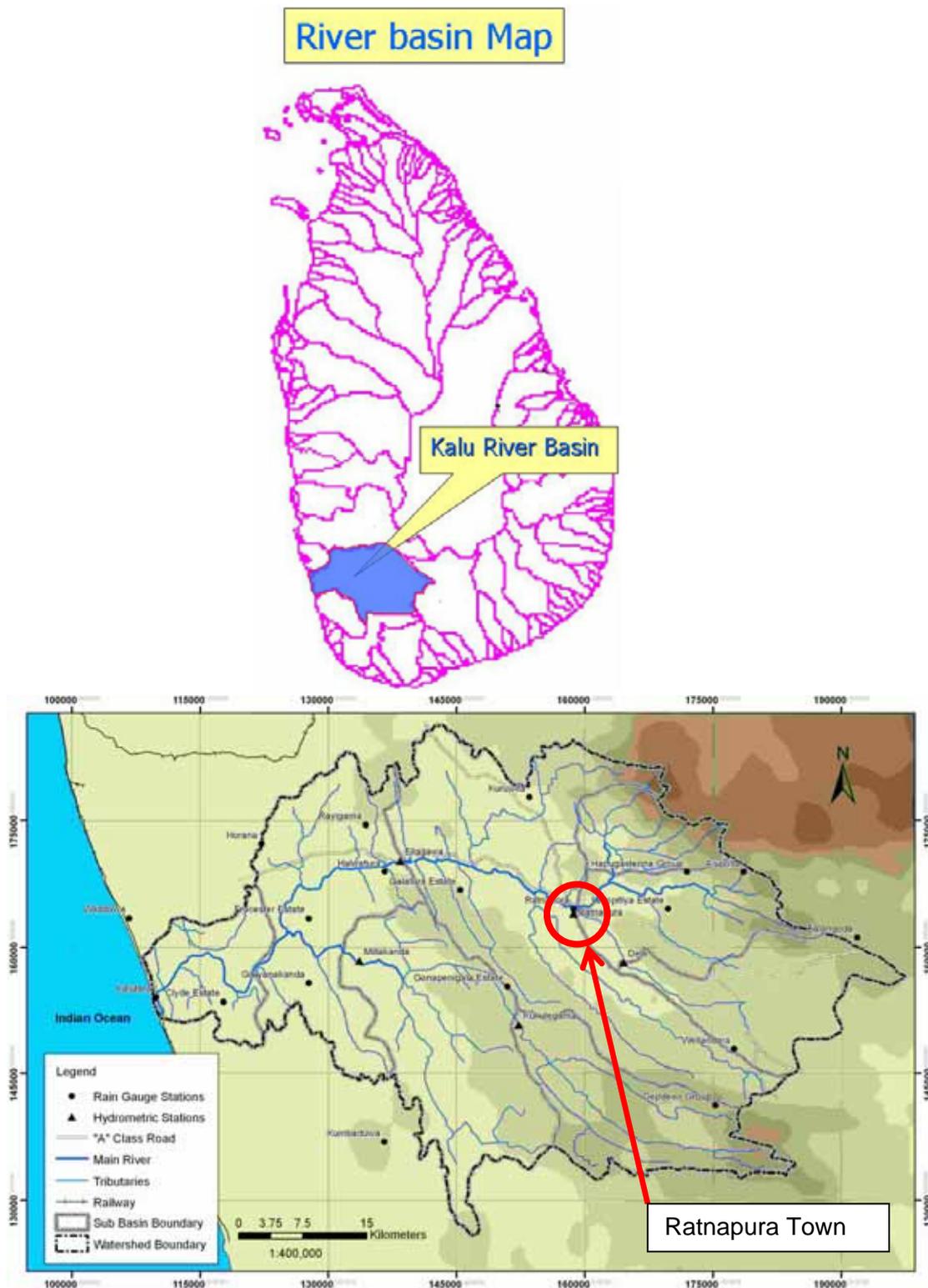


Fig. 1 River Basin – Kalu River

**Description of the Target area – Ratnapura Town**

Flood damages are almost an annual feature during the major rainy seasons in the river basin. In some years in which floods are of large magnitude, the damages are heavy and

widespread. In Kalu River basin, floods affect rural agricultural lands as well as highly built up urban centres such as Rathnapura town.

In May 2003, floods occurred in all river basins in the south-west of the island due to the action of a low pressure weather system prevailed for several days during the middle of southwest monsoon. The heavy rains that followed caused flooding in Kalu River basin and other major river basins such as Gin and Nilwala.(Fig 2). It is reported that heavy damages to life and property occurred while disrupting the day-to-day activities of the communities for several days. In 2003 floods, estimated damage to the Ratnapura area is Rs. 1,140 Mn and 122 people died in the incident.(Table 1 & 2).

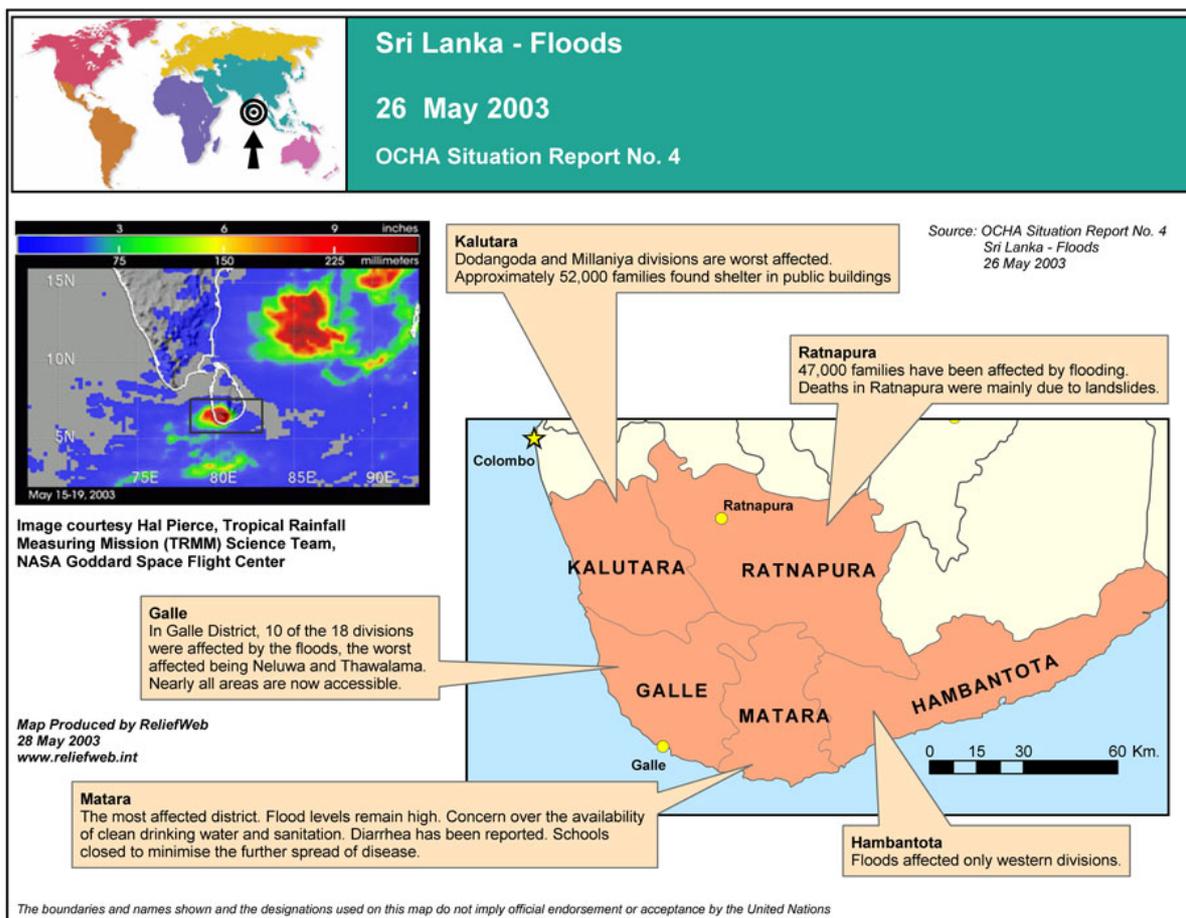


Fig 2 Floods in Year 2003

The occurrence of these floods has renewed the interest in investigating means of flood control and prevention in the respective basins. As the damages from the floods are on the increase with development of the river basin it is thought that flood control schemes could become economically attractive.

There were several studies has been done to mitigate the floods in Ratnapura town area by various study teams and none of the proposals has been implemented. Existing flood protection system is more than 50 years old and it covers downstream of the Ratnapura town area. But that is also not enough for the current floods. So the scope of the study is to mitigate the damage caused by floods in Ratnapura Town area.

**Table: 1.0 Summary Statistics of Damages due to Floods in May 2003 in Rathnapura District**

Number of Families Affected	34,473
Number of Deaths	122
No of Refugee Camps	30
No of people in camps	1,613
No of houses fully damaged	2,544
No of houses partially damaged	8,683
No of Schools damaged	47
No of wells affected	4,452

**Table: 2.0 Summary of the Value of Damages due to Floods in May 2003 in Rathnapura District**

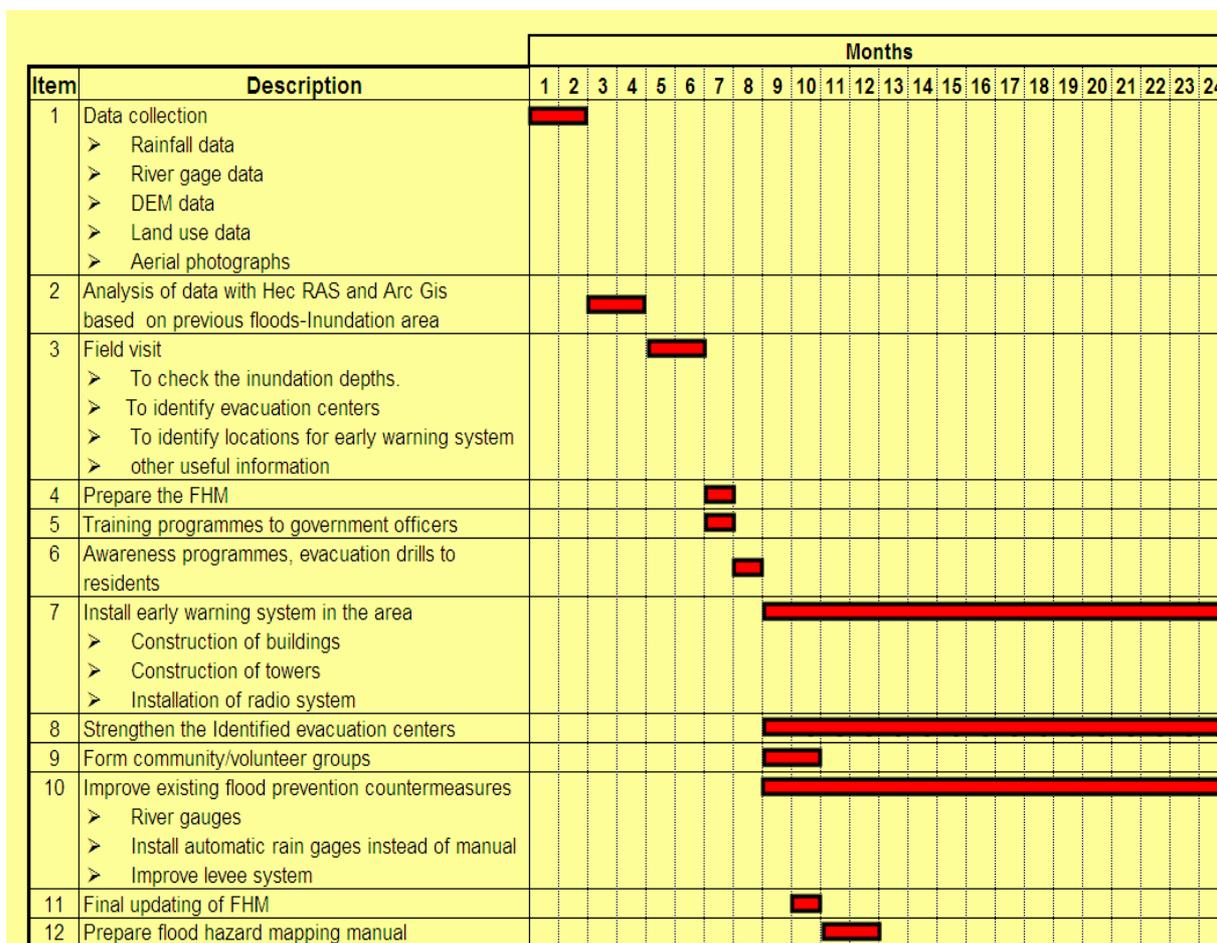
<b>Sector</b>	<b>Value of Damages (Rs million)</b>
Housing	600.7
School Buildings	22.0
School Equipment	7.0
Major irrigation schemes	7.0
Minor Irrigation schemes	26.3
Water Supply schemes	36.4
Industries	78.4
Agriculture	75.0
Rural Roads	144.0
Major Roads	79.0
Public Buildings	1.6
Electricity Network	62.7
<b>TOTAL</b>	<b>1,140.1</b>

### **3.0 Project Schedule**

- ❖ Data collection.
  - Rainfall data
  - River gage data

- DEM data
- Land use data
- Aerial photographs
- ❖ Analysis of data with Hec RAS and Arc Gis based on previous floods to get inundation area/depth.
- ❖ Field visit
  - To check the inundation depths.
  - To identify evacuation centers (Check strength, capacity, facilities).
  - To identify locations for early warning system
 in the field and other useful information by interviewing residents in the area
- ❖ Prepare FHM according to the inundation area map/field survey data.
- ❖ Conduct training programmes to government officers who are involved in floods
- ❖ Conduct awareness programmes, evacuation drills with the participation of residents in the vulnerable area.
- ❖ Install early warning system in the area.
- ❖ Strengthen the Identified evacuation centers.
- ❖ Form community group, volunteer group consisting residents in the area.
- ❖ Improve existing flood prevention countermeasures
  - River gauge
  - Install automatic rain gages instead of manual rain gages
  - Improve levee system
- ❖ Final updating of FHM.
- ❖ Prepare flood hazard mapping manual

#### 4.0 Concrete Implementation Items of the Project



## 5.0 Expected Benefits and Progress for Residents and Administrators

- ❖ To minimize the loss of lives and property in future floods
- ❖ To change the negative attitudes of residents in the vulnerable area
- ❖ Improve the existing flood prevention countermeasures.

## 6.0 Approximate cost estimate

ITEM	DESCRIPTION	QUTY.	UNIT	RATE (USD \$)	AMOUNT (USD \$)
1.0	Data collection <i>Rainfall data, River gage data, DEM data, Land use data, Aerial photographs</i>	Item	Allow.	Sum.	10,000.00
2.0	Softwares Arc Gis 9.2	2.0	Nos.	12,000.00	24,000.00
3.0	Hardware				
3.1	Colour printers(A <sub>3</sub> size)	2.0	Nos.	800.00	1,600.00
3.2	Laser printers(A4 size)	2.0	Nos.	400.00	800.00
3.3	Photocopier	1.0	Nos.	800.00	800.00
3.4	Plotter	1.0	Nos.	5,000.00	5,000.00
3.5	Fax machines	1.0	Nos.	200.00	200.00
3.6	Digital camera	2.0	Nos.	250.00	500.00
3.7	Office equipments	Item	Allow.	Sum.	100,000.00
4.0	Infrastructures				
4.1	Construction of buildings	2.0	Nos.	300,000.00	600,000.00
4.2	Construction of early warning towers	8.0	Nos.	10,000.00	80,000.00
4.3	Installation of radio system	Item	Allow.	Sum.	50,000.00
5.0	Strengthening the Identified evacuation centers	6.0	Nos.	120,000.00	720,000.00
6.0	Improve existing flood prevention countermeasures				
6.1	River gauges	2.0	Nos.	15,000.00	30,000.00
6.2	Remove existing rain gages and Install automatic rain gages	8.0	Nos.	10,000.00	80,000.00
6.3	Improve levee system	Item	Allow.	Sum.	50,000.00
7.0	Salaries of consultants and other supporting staff	Item	Allow.	Sum.	150,000.00
	<b>Total</b>				1,902,900.00
8.0	Engineering and administration(15%)				194,200.00
	<b>Grand Total</b>				4,000,000.00

## 7.0 Suggestion and opinions for Flood Hazard Mapping Training course

- ❖ The duration of the course is not enough
- ❖ During the town watching it is better if all the participants could meet one member of volunteer group, community leader to understand their role.
- ❖ If the evacuation drills are organized with the participation of FHM course participants, it will be a good experience to the participants to understand how it works.
- ❖ Town watching is very interesting to the participants as they can walk through the area to collect data experiencing cool climates of Japan
- ❖ FHM is a new concept to our country and it is very useful because in a one map lot of data can be included and it is very simple to understand.

- ❖ Week end cultural programmes are very interesting and it is a good opportunity to get an idea about Japanese life style and culture.
- ❖ Final Day fire evacuation drill is very interesting.( Fig 3)



Evacuation From the Building after the fire alarm



Arrival of fire fighting Group



Rescue the People



Training on use of fire extinguisher

Fig 3 Fire Evacuation Drill