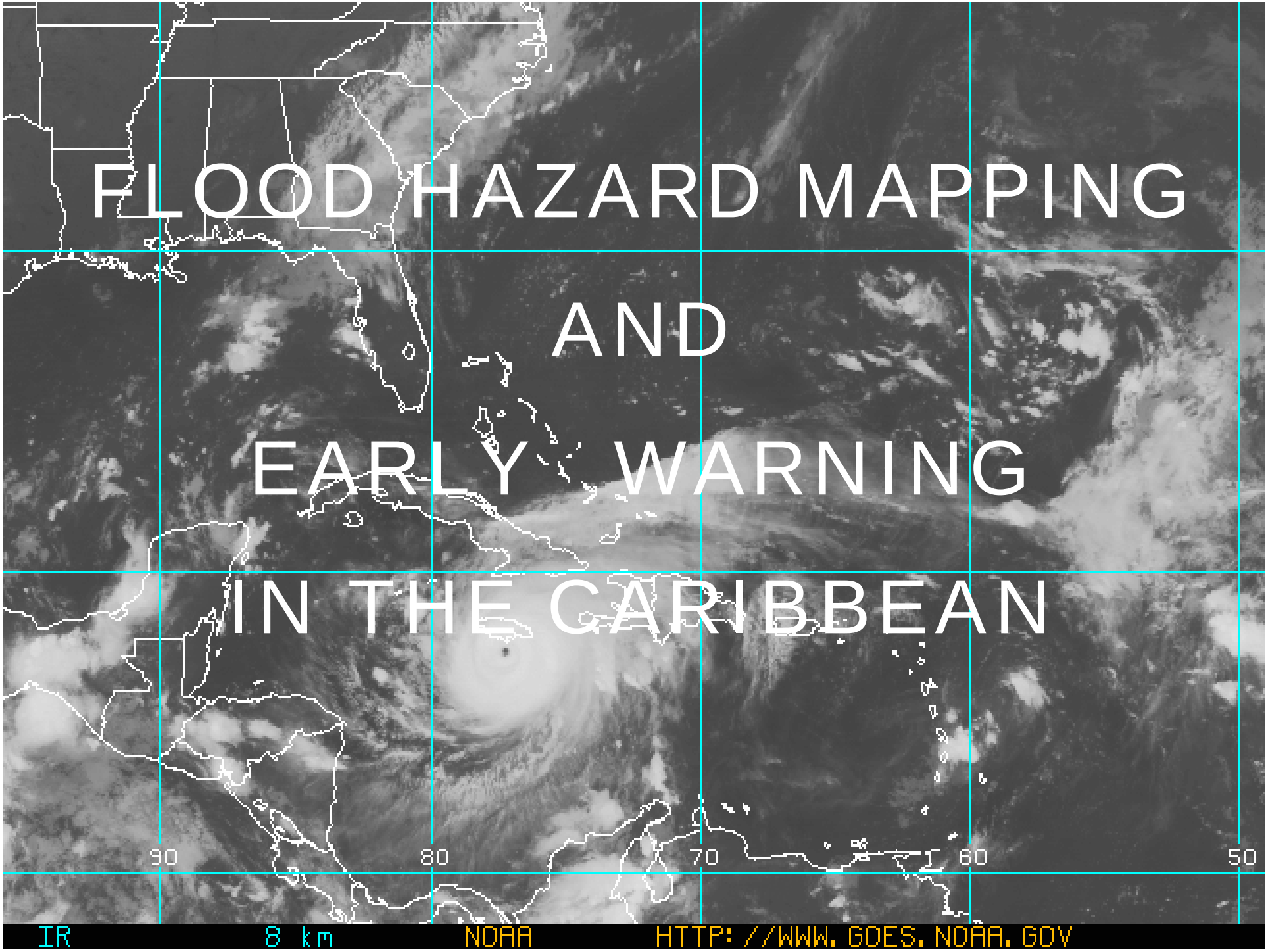

FLOOD HAZARD MAPPING
AND
EARLY WARNING
IN THE CARIBBEAN
90
80
70
60
50
IR
8 km
NOAA
HTTP://WWW.GOES.NOAA.GOV

INTERNATIONAL WORKSHOP ON WATER AND DISASTERS, LONDON, CANADA 13-14 DECEMBER 2004

FLOOD HAZARD MAPPING AND EARLY WARNING IN THE CARIBBEAN

Hidetomi Oi

Caribbean Disaster Emergency Response Agency (CDERA)

The Caribbean

SUMMARY

- **VULNERABILITY in the Caribbean**
  - **Majority are small island countries with limited resources.**
  - **A single disaster affects whole country, whole population.**
  - **Flood is a hazard affecting the Caribbean most frequently with the greatest damage.**

- **COPING**
  - **To effectively address flood hazards, a comprehensive approach is necessary, of which the first step will be FLOOD HAZARD MAPPING, and the most essential will be EARLY WARNING.**
  - **FLOOD HAZARD MAPPING started in 1980s, but areas covered by the hazard maps to date is still small compared with so many flood prone areas in the region.**
  - **EARLY WARNING started in 1990s, but is in operation only in Jamaica and Trinidad and Tobago.**
  - **Thus FLOOD HAZARD MAPPING and EARLY WARNING are still in the initial stage, and should be priority areas for the coming decade according to the Caribbean paper for WCDR.**

SUMMARY (CONT.)

- **CHALLENGES TOWARDS SELF-RELIANCE AND SUSTAINABILITY**

- **FLOOD HAZARD MAPPING through PARTNERSHIP OF REGIONAL ORGANIZATIONS**

  A partnership between CDERA and regional organizations with specific expertise is being established for the sustainable and self-reliant hazard mapping with resources available within the region.

  Capacity building of individual countries is unrealistic except for a few countries.

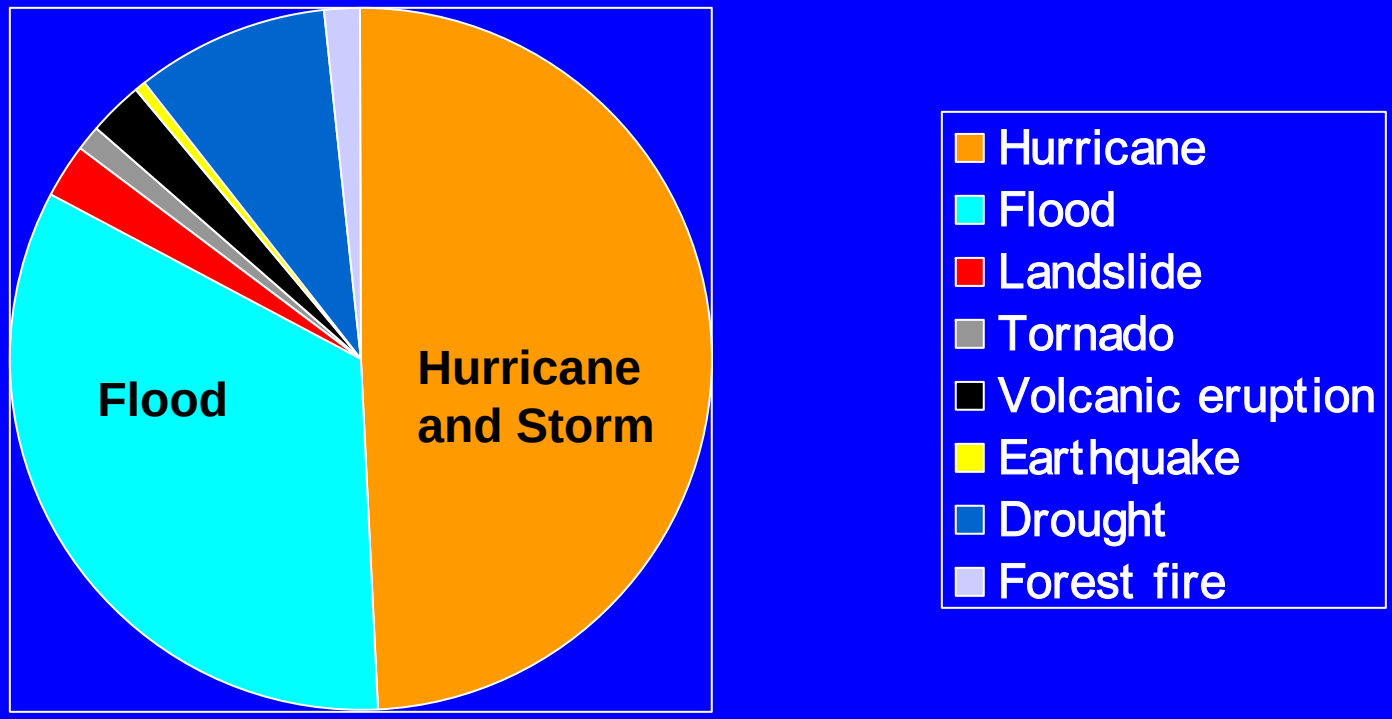
- **EARLY WARNING through COMMUNITY OPERATED SYSTEM WITH SIMPLE EQUIPMENT**

  Community operated early warning system is being pursued which uses simple and cheap manual equipment for rainfall and water level measurement with alarm unit.

  There are many countries where M/O of telemeter equipment, even automatic recording type equipment is difficult.

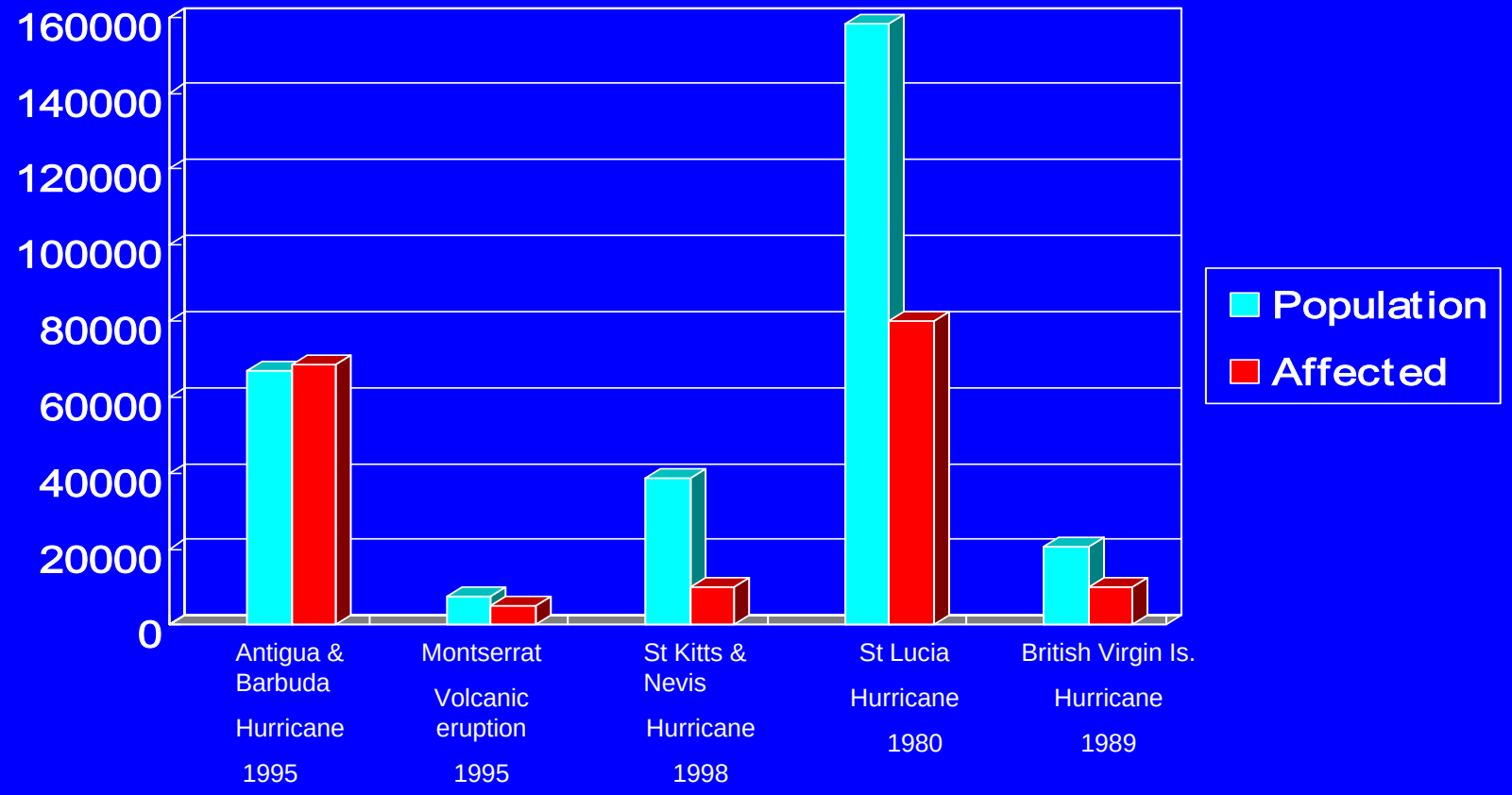
  Technology development for hydrological, meteorological monitoring by remote sensing is awaited.

DISASTERS IN THE CARRIBEAN (1981-2000)



Source: OFDA/CRED International Disaster Database

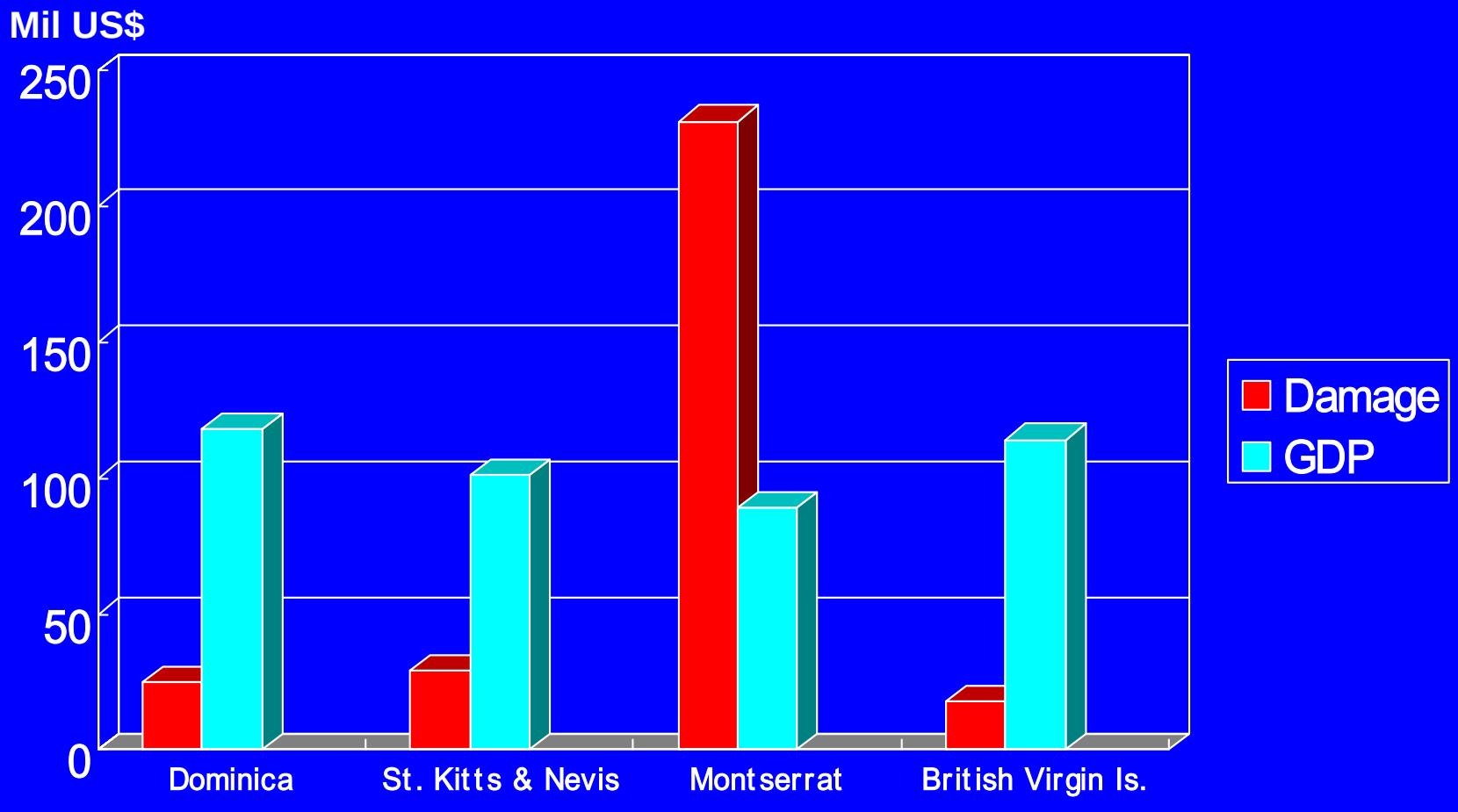
A single disaster can affect nearly whole population.



Population is 2001 base. In the case of Montserrat, the population was about 12,000 when the volcano started eruption in 1995. An estimated 8,000 refugees left the island and some returned.

Fragile economy : A single disaster can cause damage in the order of GDP.

- IMPACT OF HURRICANE HUGO (1988) -



CDERA Member States (16)

Country	Area (km^2)	Population (000)	Remarks
Anguilla	96	12	
Antigua and Barbuda	442	71	
Bahamas	13,939	257	
Barbados	430	270	Pilot country
Belize	22,965	241	
British Virgin Island	153	21	
Dominica	750	76	
Grenada	344	101	
Guyana	214,969	861	
Jamaica	10,991	2,600	
Montserrat	102	6	
St Kits and Nevis	267	43	
St Lucia	616	154	
St Vincent and Grenadines	389	114	Pilot country
Trinidad and Tobago	5,128	1,295	Pilot country
Turks and Caicos Islands	430	17	

FLOOD HAZARD MAPS

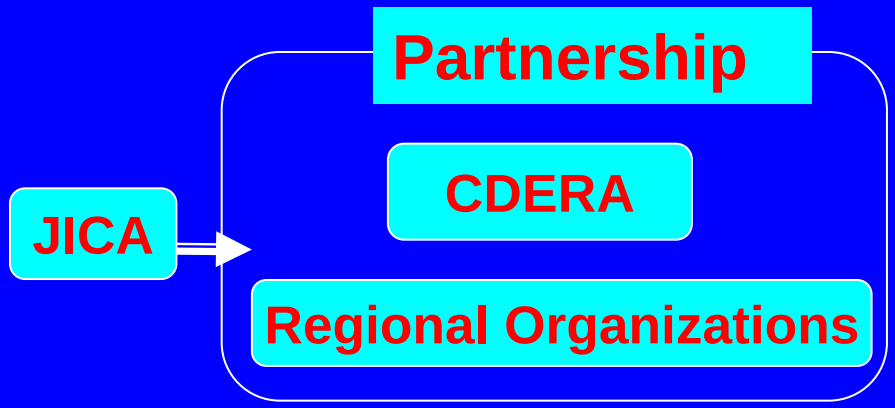
Country	Locations	Scale	Remarks
Antigua & Barbuda	Whole country	1:50,000	2001
Barbados	Speightstown	1:2,500	1988
Belize	5 towns	1:25,000	2001
Dominica	Rosseau city	1:5,000	2002 for early warning
Grenada	Whole country	1:25,000	1988
Jamaica	Rio Cobre Hope river	1:4,000 1:5,000	1994 for early warning 1994
St. Kitts & Nevis	Whole country	1:25,000	2001
Trinidad & Tobago	Caparo river Caroni river		For early warning
Turks & Caicos	Whole country	1:5,000 1:10,000	1999
Virgin Island (B)	Whole country	1:25,000	1996

PARTNERSHIP
OF
REGIONAL ORGANIZATIONS
FOR
FLOOD HAZARD MAPPING

Partnership of regional organizations for flood hazard mapping

CDERA	**COORDINATION**
Caribbean Institute for Meteorology and Hydrology	**FLOOD ANALYSIS**
University of West Indies (Trinidad)	**GIS**
	FLOOD ANALYSIS
University of West Indies (Jamaica)	**COMMUNITY DISASTER MANAGEMENT**

At present (2002-2005)



Pilot Countries

Barbados

St Vincent & Grenadines

Trinidad &Tobago

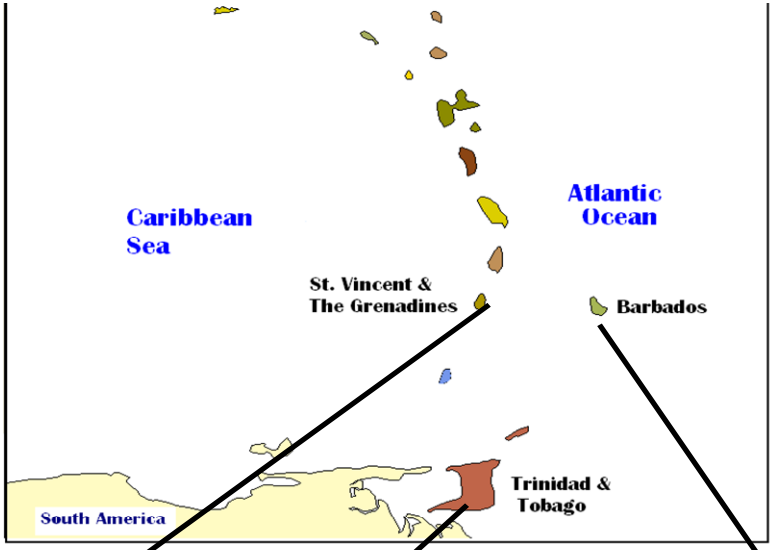
Flood hazard mapping is being carried out in three pilot countries under the partnership of CDERA and regional organizations with technical cooperation of JICA.

In the future (2005-)

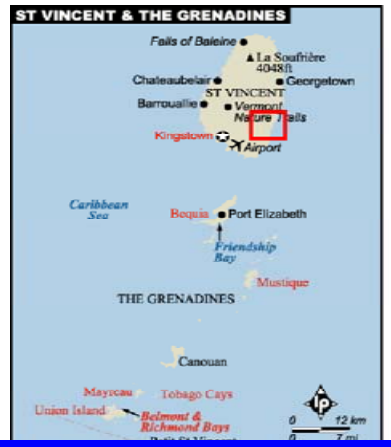
All CDERA member countries

Flood hazard mapping will be carried out for communities in flood prone areas in all CDERA member countries one by one, self-reliantly and sustainably based on the technology transferred, equipment provided, manuals prepared and experiences obtained through the implementation of pilot projects.

Pilot areas for flood hazard mapping (CDERA/JICA project)



St. Vincent & The Grenadines



St.Vincent & Grenadines

Mesopotamia

Trinidad & Tobago

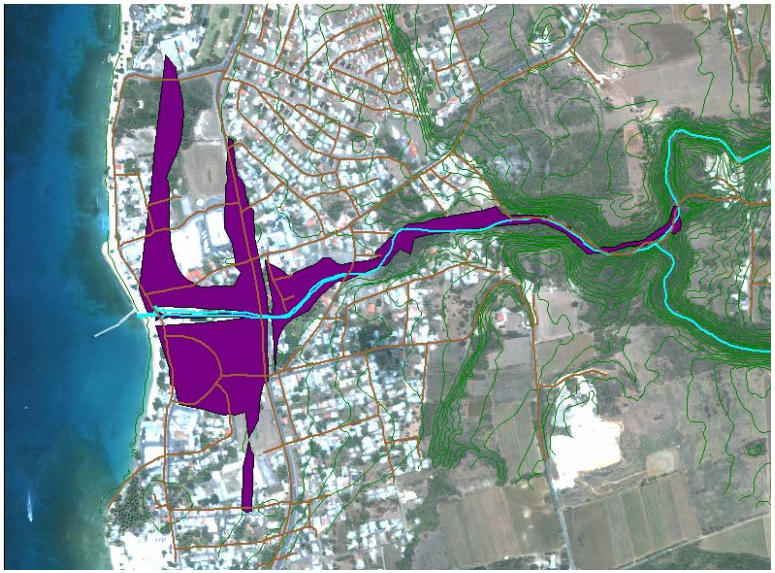
San Juan

Barbados

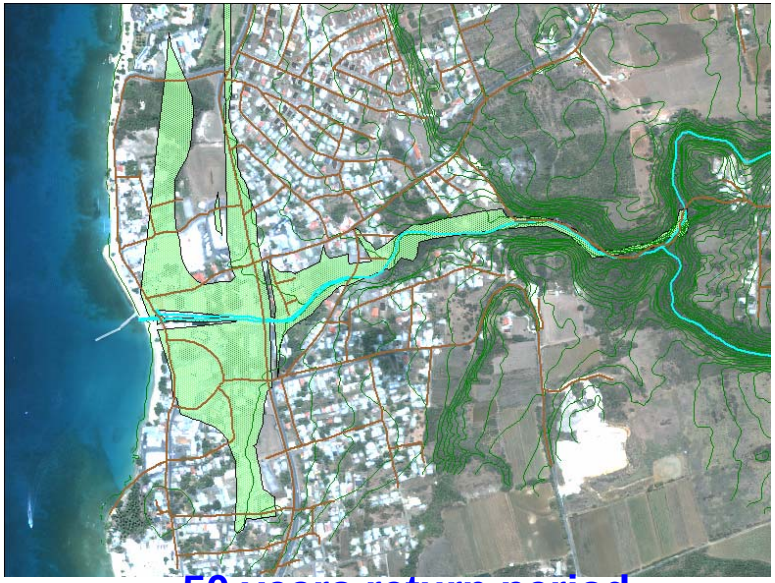
Barbados, Speightstown

Flood Plain Maps for Speightstown, Barbados

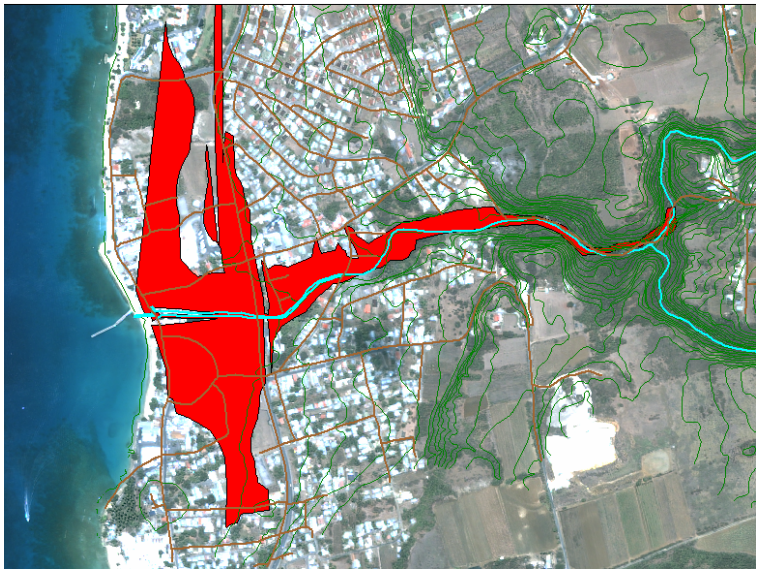
5 years return period



25 years return period



50 years return period

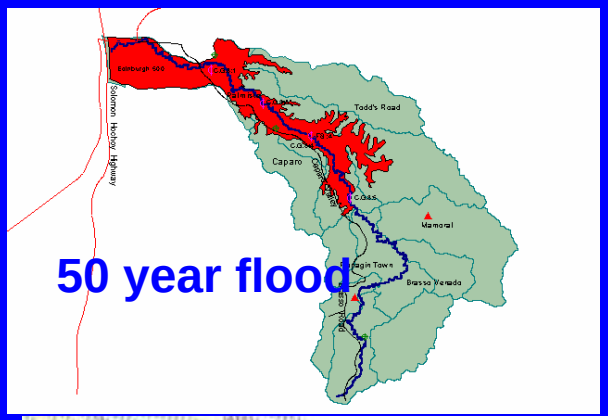


100 years return period

COMMUNITY BASED FLOOD WARNING USING MONITORING EQUIPMENT WITH ALARM UNIT

COMMUNITY BASED FLOOD WARNING

10 year flood

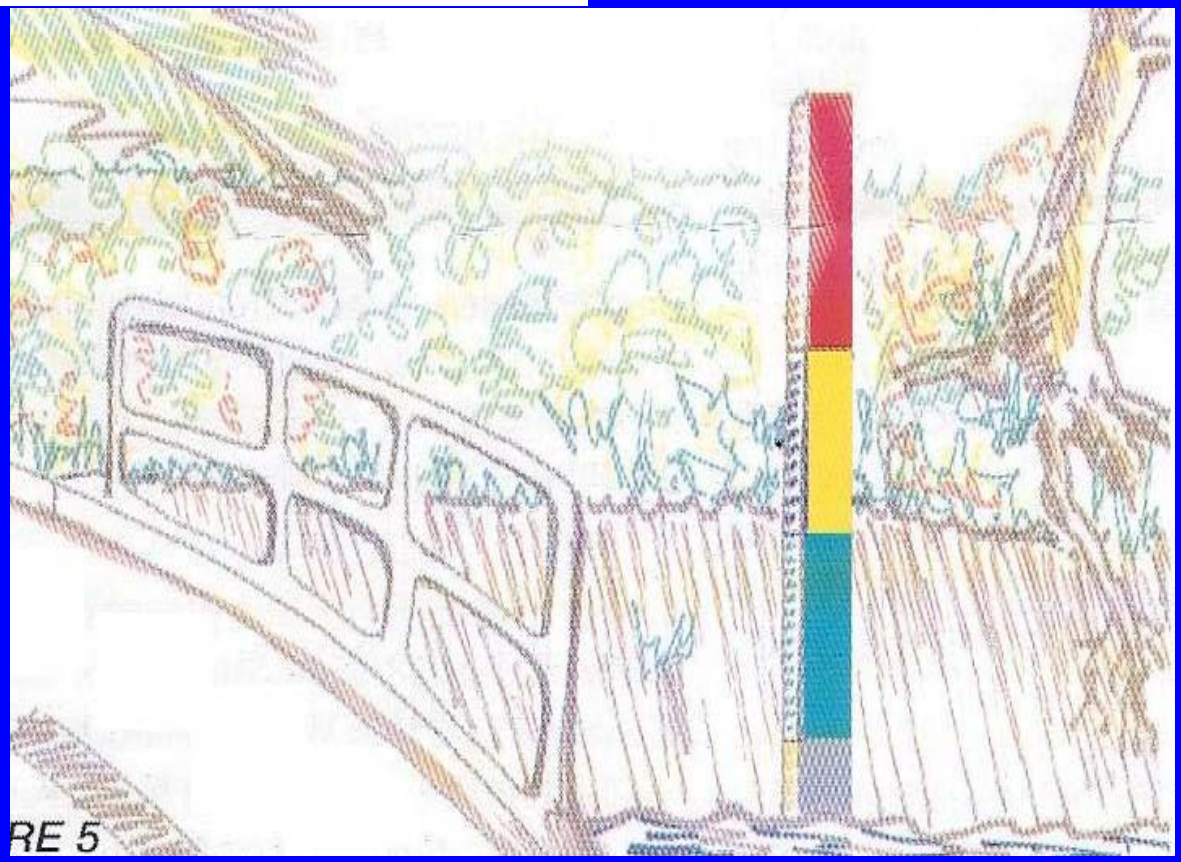


50 year flood

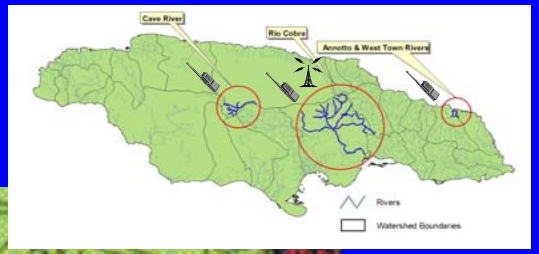
Caparo river, Trinidad

5 year flood

2 year flood



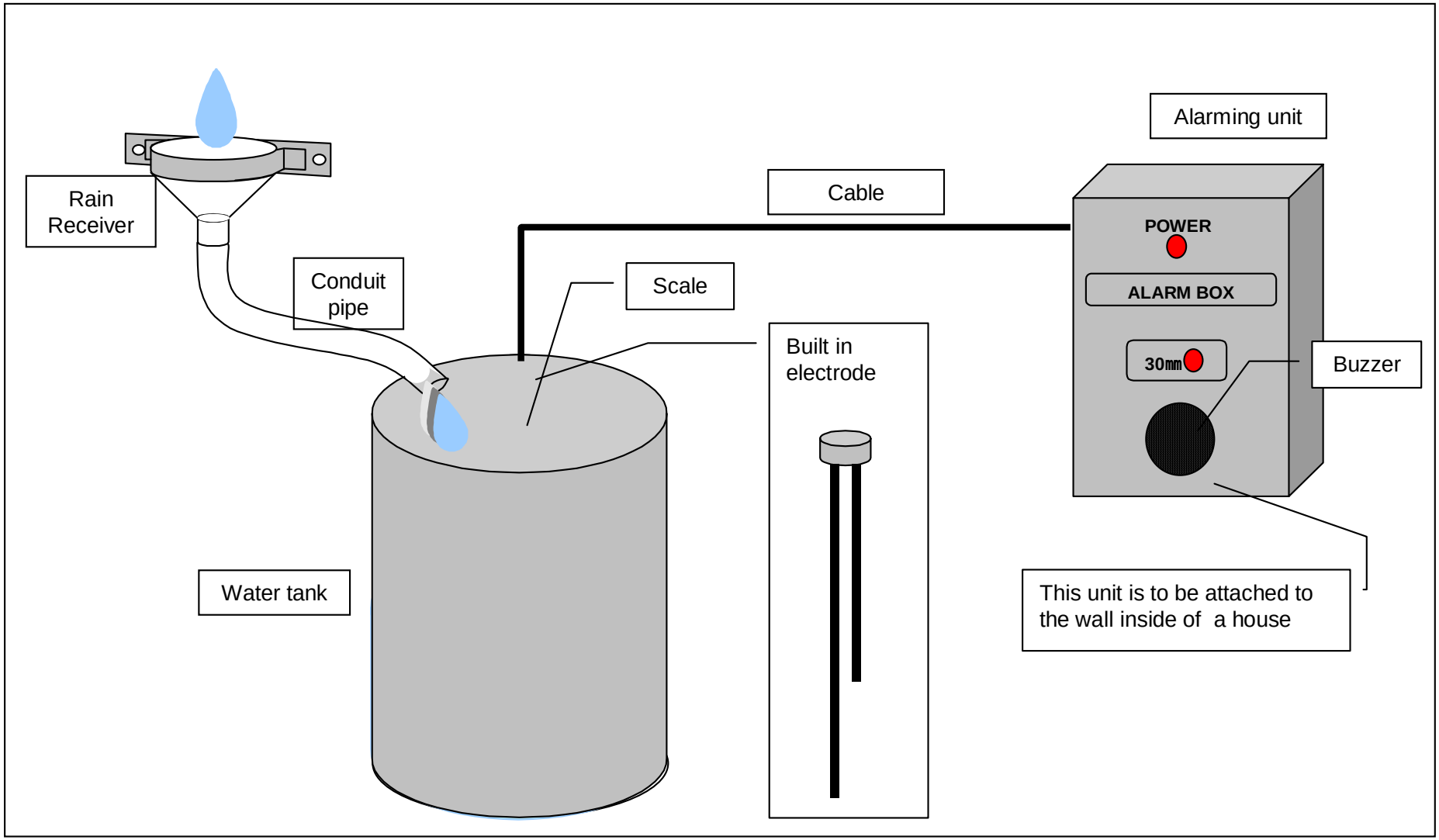
COMMUNITY BASED FLOOD WARNING **(RIO COBRE, JAMAICA)**



FLOOD GAUGES
Blue = Watch mode
Orange = Alert mode
Red = Critical

1:4000, for 10, 25, 50 and 100 years return period

Rainfall equipment with alarm unit for community based flood warning

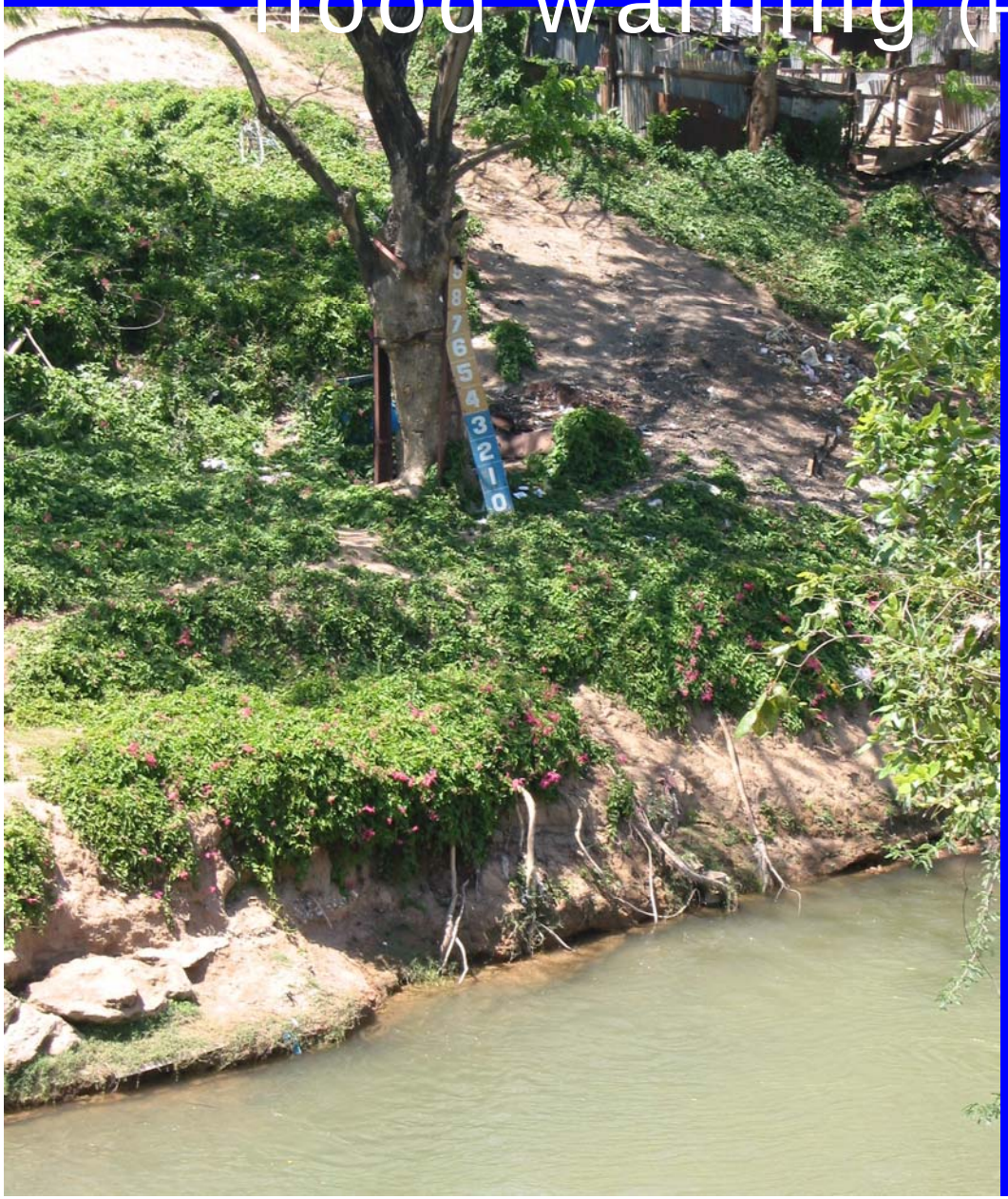


Rainfall equipment with alarm unit

In small catchments, warning should be based on rainfall.

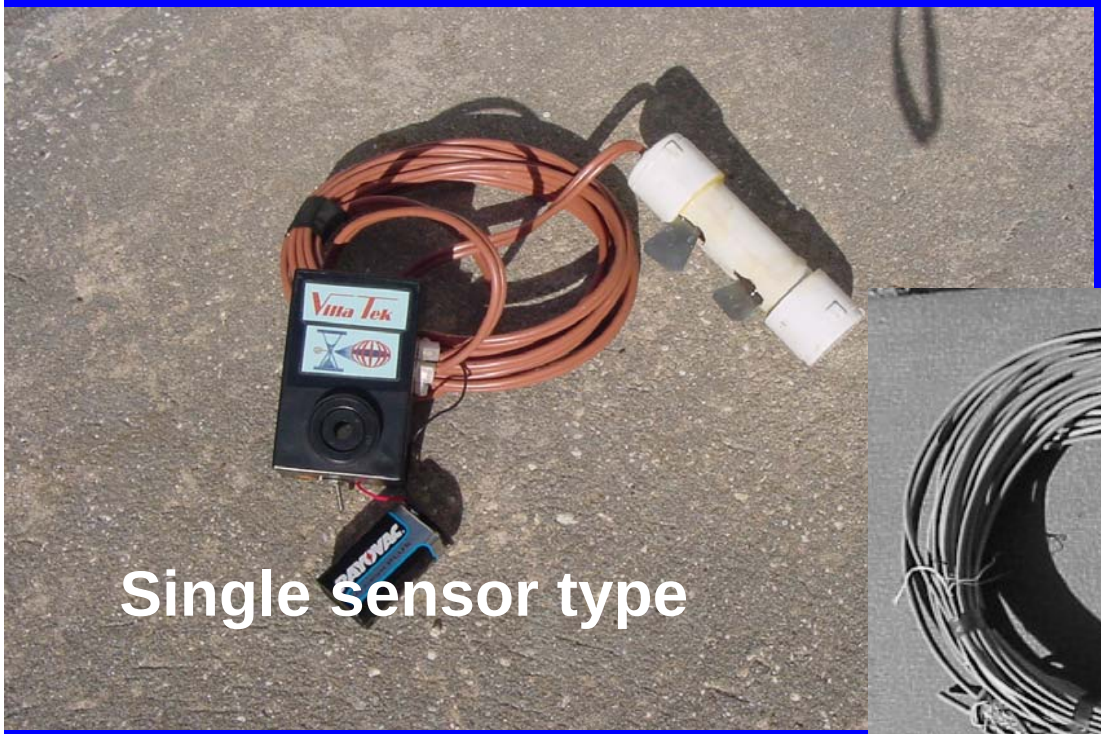
Equipment with alarm unit is necessary for the sudden intensive rainfall in the midnight.

Stuff gauge for community flood warning (Rio Cobre,Jamaica)

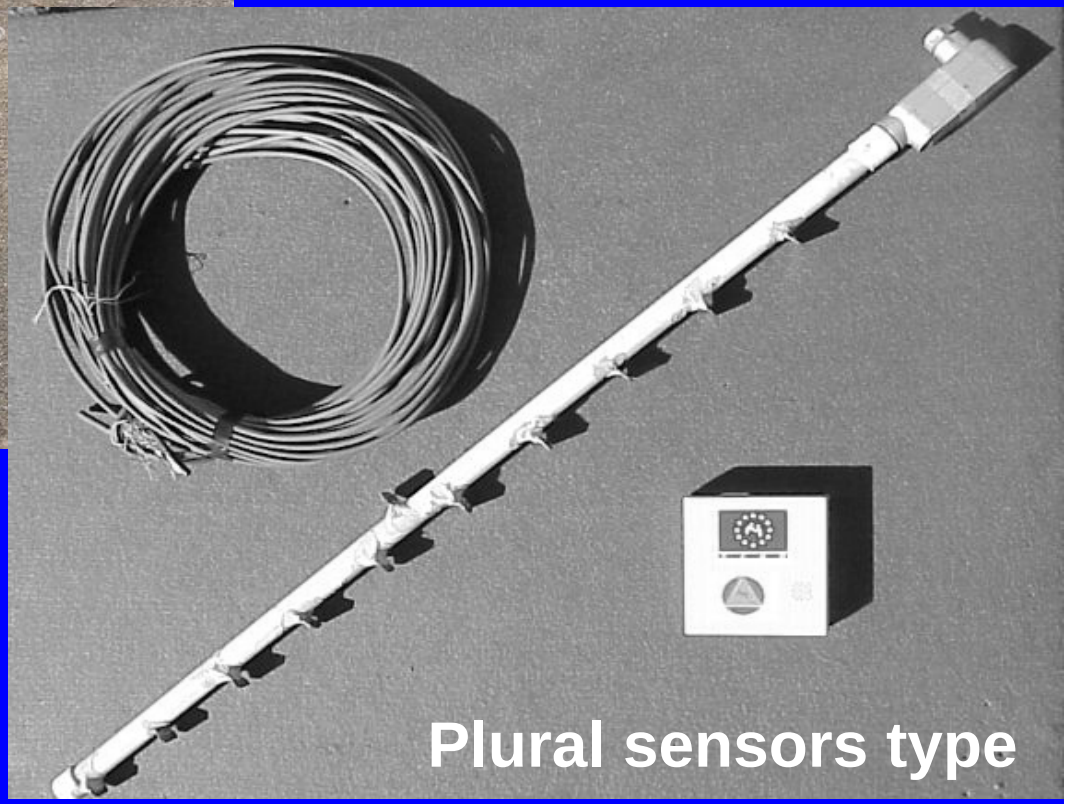


Difficult to go to the sites under heavy storm

Water level equipment with alarm unit, popularly used in community flood warning in Central America



Single sensor type



Plural sensors type


Costa Rica

Thanks

Caribbean Disaster Emergency Response Agency (CDERA)

http://www.cdera.org