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CO-OPERATION OFFICE

ISTED

ISLAND

Information Systems for Local Authorities Needs to face Disasters

ISLAND

ISLAND partners of ISTED

(Institut des Sciences et Techniques de l'Equipement et de l'Environnement pour le Développement, Paris)

- **SOGREAH** Grenoble
- **CETMEF** Compiègne
- **CNR** Lyon
- **TNO/NITG** Utrecht
- **GRET** Paris Hanoi Phnom Penh

- **MRC** Vientiane
- **MARD** Hanoi
- **MOWRAM** Phnom Penh
- **LNMC** Vientiane
- **MICA** Hanoi

2002-03: First AsiaIT&C "get-in-touch"

From the Rhone valley to the Netherlands

2002-03: First AsiaIT&C "get-in-touch"

The CNR (Compagnie Nationale du Rhône) leisure marinas and barrages on the Rhone river

From the Rhone valley to the Netherlands

2002-03: First AsiaIT&C "get-in-touch"

From the Rhone valley to the Netherlands

2002-03: First AsiaIT&C "get-in-touch"

The **Delta plan** in the Zeeland province of the Netherlands

2003: Final AsiaIT&C seminar in Hanoi

2003: Final AsiaIT&C seminar in Hanoi

2000-04: the OSIRIS Project
Operational Solutions for the management of Inondation Risks
in the Information Society

Osiris has been developped on 3 pilot sites :

The Oder/Odra river basin, bordering Germany and Poland, an example of European transboundary cooperation, where the last severe inundation occured in 1997

The Nysa Klodzka river basin, a Polish tributary of the Odra, an example of a mountain river with flash-floods, where the last disaster occured in 1998

The middle basin of la Loire river in France, with remarkably high density of cultural heritage, industries and agriculture, where 3 outstanding inundations occured during the last century (1846 - 1856 - 1866)

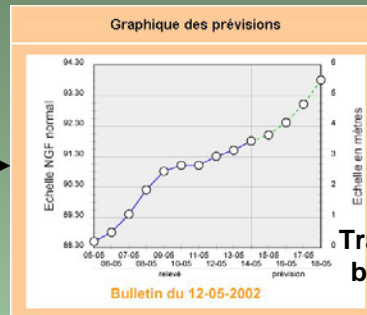**Loire and Oder river basins**: 3 pilot sites in **France, Germany, Poland** - **13** partners in **5** countries

Loire | Frankfurt / Oder | Klodzko district
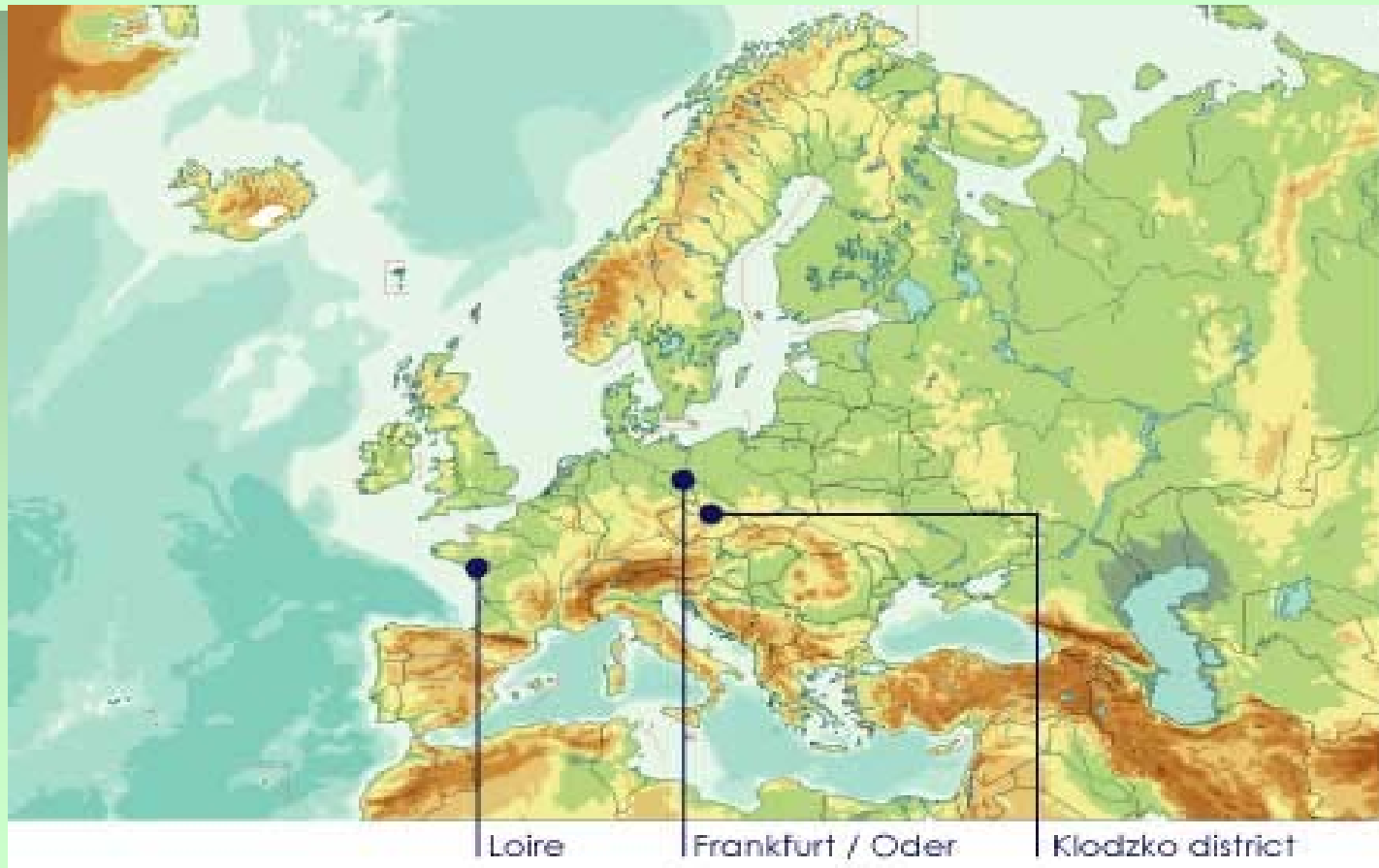
the fundamentals – the needs

The official channel for flood early warning information is top-down

Transmitted to the commune Mayors by the Prefect (province governor)
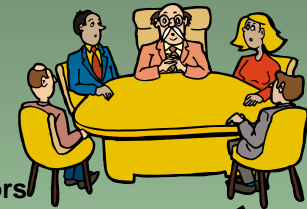
Graphique des prévisions

Bulletin du 12-05-2002

River basin forecast performed by the Flood Forecasting Service

Forecasts of water levels or trends on the closest possible scale

Feeding back local Information to the upper levels and civil security services

Problem in moving from the global scale to the local scale: warning → crisis management

To co-operate with the security and civil protection forces emergency response organisations (Red Cross etc) in order to optimize the use of resources

To have an action plan for timely and efficient response taking action according to the context and mitigating the impact of disasters

Conclusion: local ownership commune mayors need assistance and support tools for managing the information chain and organising communication with their local citizens and stakeholders

To provide reliable information to their local inhabitants and stakeholders so that they can prepare themselves and act on their own
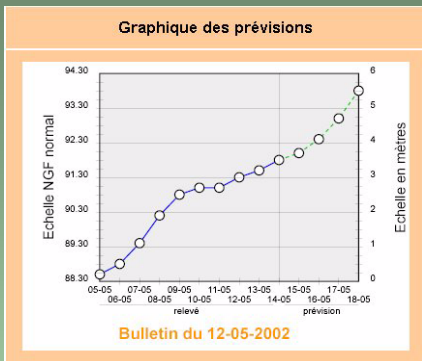
To mobilize local resources for **quick and direct action in all** issues which fall under the mayor's responsibility

CARTOGRAPHIE COMMUNALE NT-MESMIN

From official Forecasts to Local Management

De la prévision officielle (hauteurs d'eau)

Graphique des prévisions

Bulletin du 12-05-2002

Pendant la crise

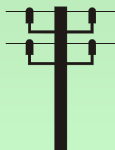**4 : Adapter la prévision officielle en une prévision locale**

5- Elaborer une prévision de scénario d'inondation (sur le territoire)

Avant la crise :

1 : Identifier les scénarios locaux d'inondation

Que manque-t-il ?

6 : Elaborer et gérer un plan d'intervention en temps-réel (croisement du scénario d'inondation et des actions prédéfinies)

2 : Identifier les enjeux et la vulnérabilité

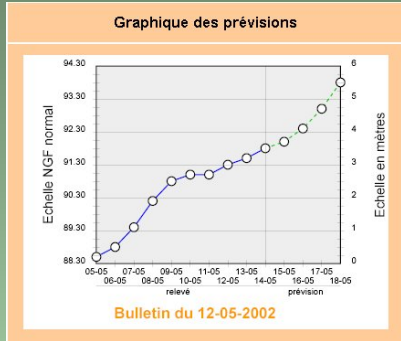**3 : Identifier les plans d'intervention, les procédures et moyens**

A la décision et l'intervention locale

From official forecasts to Local Preparedness and Management

From the official forecast

In the crisis management or simulation phase:

4: access to the official forecast

(5: adaptation of the official forecast into a local forecast)

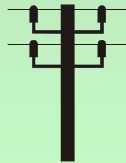**6: elaboration of a spatial flood scenario**

7: elaboration of a prioritized, "real-time" action plan

In the preparation phase:

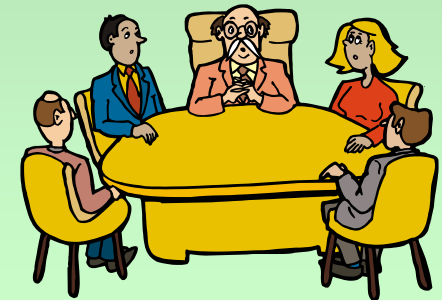**1: identification of local flood scenarios**

8: warning and communication with the parties concerned

2: identification of stakes and their degree of vulnerability

3: identification of intervention plans, procedures and resources

To field-based decision-making and intervention

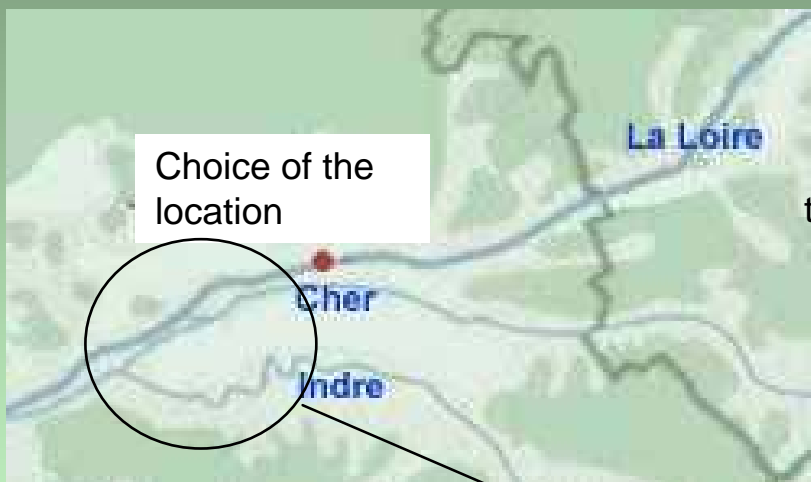# Managing the crisis : FLOOD SCENARIOS

✓ *in OSIRIS, a flood scenario corresponds to a series of flood states*

✓ *each official forecast is associated with a flood state*

The end-user can configurate his information needs

General case

Observed water level

Estimated discharge

Valider choix

La Loire

Choice of the
location

Cher

Indre

Choice of the
type of information

Choice of the
thresholds

CRUE DU 2 JUIN 1856
CRUE DE 1866
CRUE DU 20 OCTOBRE 1876
CRUE DU 8 AU DEC 1825
CRUE DU 23 OCTOBRE 1872
1835

Choice of
the
gauging
station

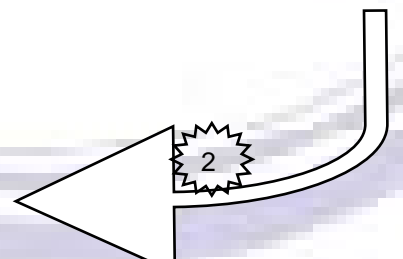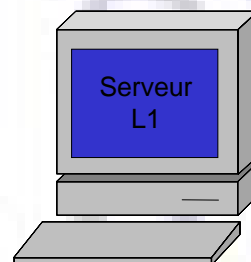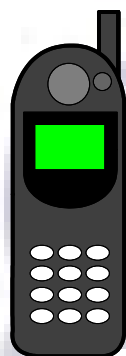STATION 1

STATION 2

Choice of the type of
messages :

from a pre-established list
depending on the thresholds
and the station, or freely
defined by the end-user if
no pre-defined message
suites his situation

As many times as the end-user needs
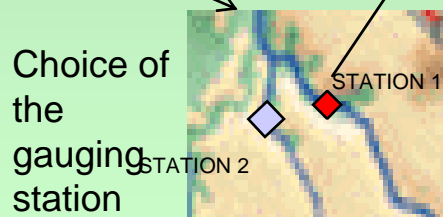
Once the configuration is done:

In Case of Passive Mode

For Users of Mobile Phone

1 Compose a specific phone number

Serveur L1

3

2
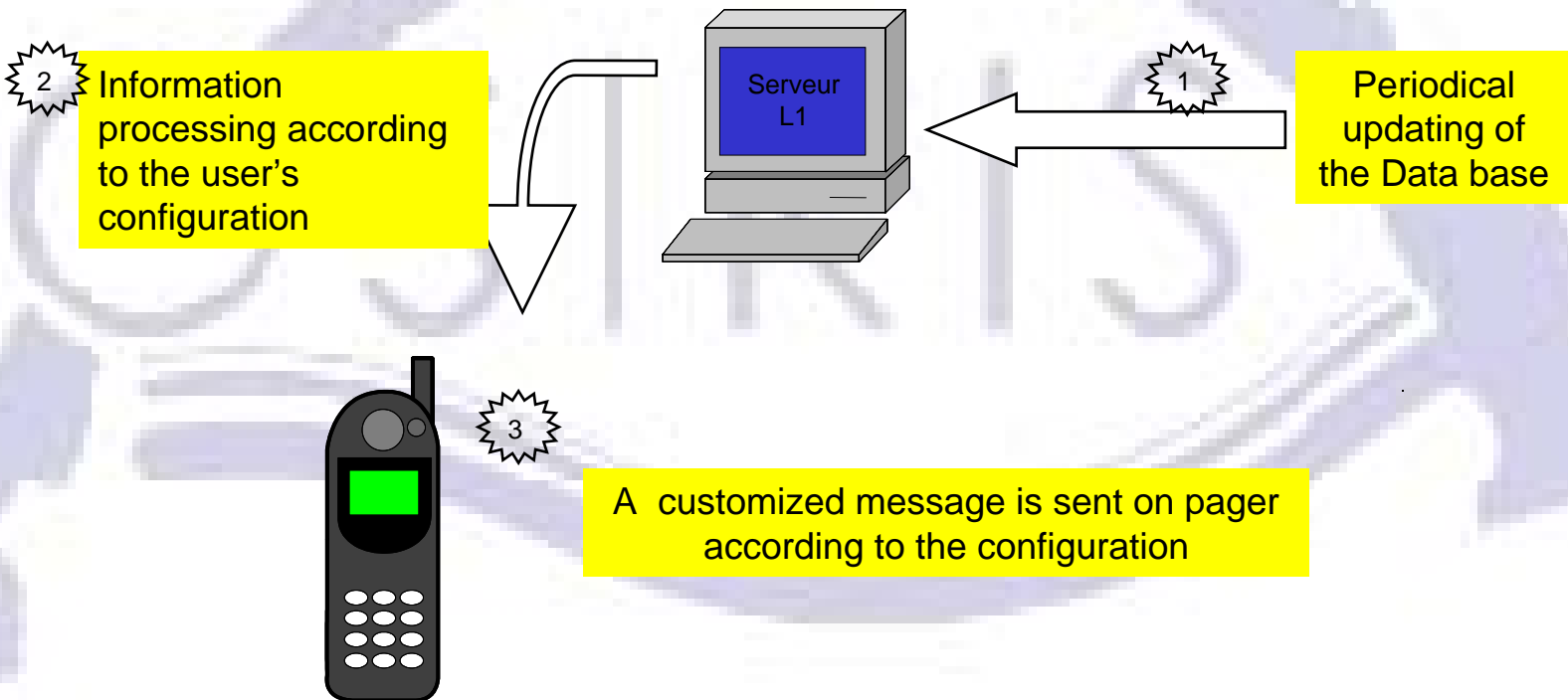
A customized message (pager SMS) is sent as defined by the configuration

Access to the Data Base, info processing according to the profile of the user (selection of messages, stations and thresholds)

SOGREAH
CONSULTANTS

Once the configuration is done :

In Case of Active Mode for

Mobile Phone users

2 — Information processing according to the user's configuration

Serveur L1

1 — Periodical updating of the Data base

3 — A customized message is sent on pager according to the configuration

Different OSIRIS Demonstrators

- **User Friendly Information System on Hydrological Situation (Osiris Loire InfEau)   Loire (L1)**

- **Tailoring Forecast Information for Local Diagnosis & Decision Support   Loire (L2)**

- **Information and Education Website   Klodzko (K1)**
- **Local-Level Decision Making Aid Tool including**
alert notification system   Klodzko (K2 & K2A)

- **Frankfurt Flood Information and Communication Management   Frankfurt/Oder (F)**

March 2005: ISLAND Workshops in Hanoi, Phnom Penh, Vientiane in partnership with MRCS

Opening in Hanoi by Pr **Le Van Minh**, DG of the International Coop Dept, MARD

March 2005: ISLAND Workshops in Hanoi, Phnom Penh, Vientiane in partnership with MRCS

and by **Franck Bingen**, EC Delegation

March 2005: ISLAND Workshops in Hanoi, Phnom Penh, Vientiane in partnership with MRCS

Chaired in Phnom Penh by Secretary of State **Ngo Pin** MOWRAM

March 2005: ISLAND Workshops in Hanoi, Phnom Penh, Vientiane in partnership with MRCS

and **Mao Hak**, DG of DHRW

March 2005: ISLAND Workshops in Hanoi, Phnom Penh, Vientiane in partnership with MRCS

Final workshop in MRCS chaired by CEO
Dr **Olivier Cogels**

March 2005: ISLAND Workshops in Hanoi, Phnom Penh, Vientiane in partnership with MRCS

ISLAND Project is a contribution under the FMM Programme of the MRC
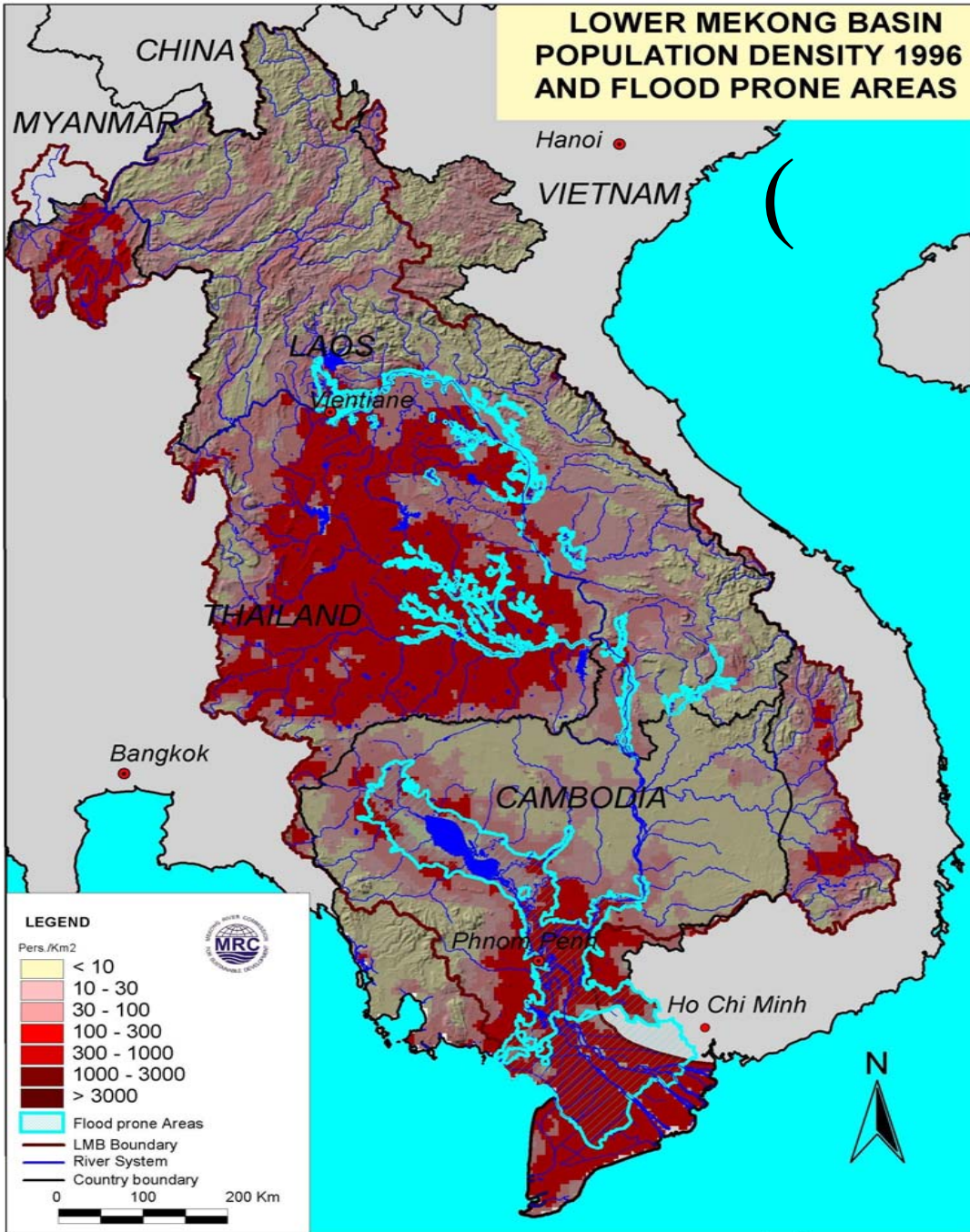
Dr **Thanongdeth**

FLOOD MANAGEMENT AND MITIGATION PROGRAMME

Workshop on Information Systems
for Local Authorities Needs to face Disasters (ISLAND)
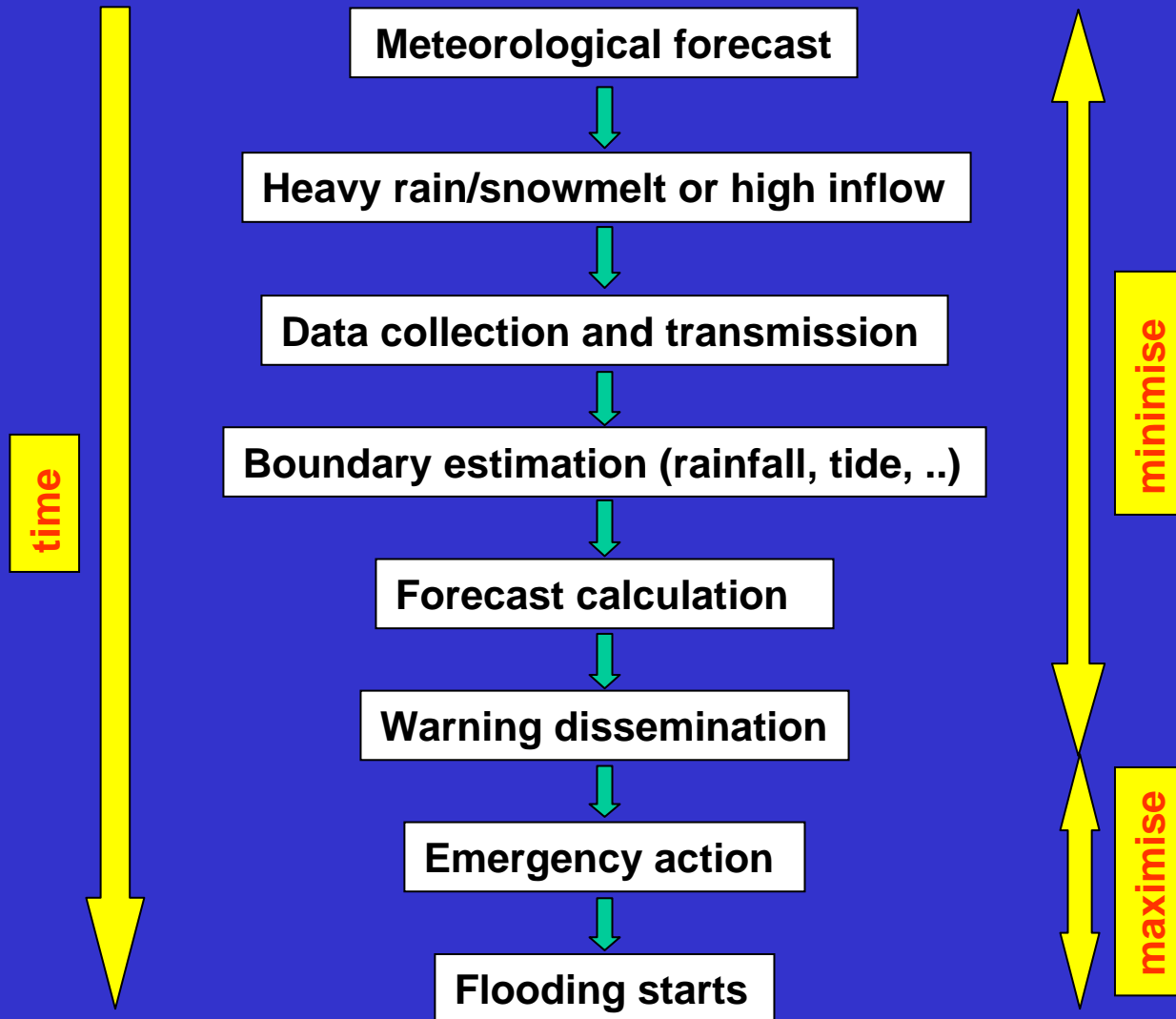
15 March 2005
MRC Secretariat, Vientiane, Lao PDR

Mekong River Commission
For Sustainable Development

LOWER MEKONG BASIN POPULATION DENSITY 1996 AND FLOOD PRONE AREAS (1996)

Flood Prone Areas

Flood forecasting, Warning and Dissemination

time →

Meteorological forecast

↓

Heavy rain/snowmelt or high inflow

↓

Data collection and transmission

↓

Boundary estimation (rainfall, tide, ..)

↓

Forecast calculation

↓

Warning dissemination

↓

Emergency action

↓

Flooding starts

minimise

maximise

Flood information from MRC
to communities through its partners

MRC forecasts

Weak Link

NMCs	Line Agencies	Red Cross/ IFRC	IOs	CSOs

Weak Link

Vulnerable Communities
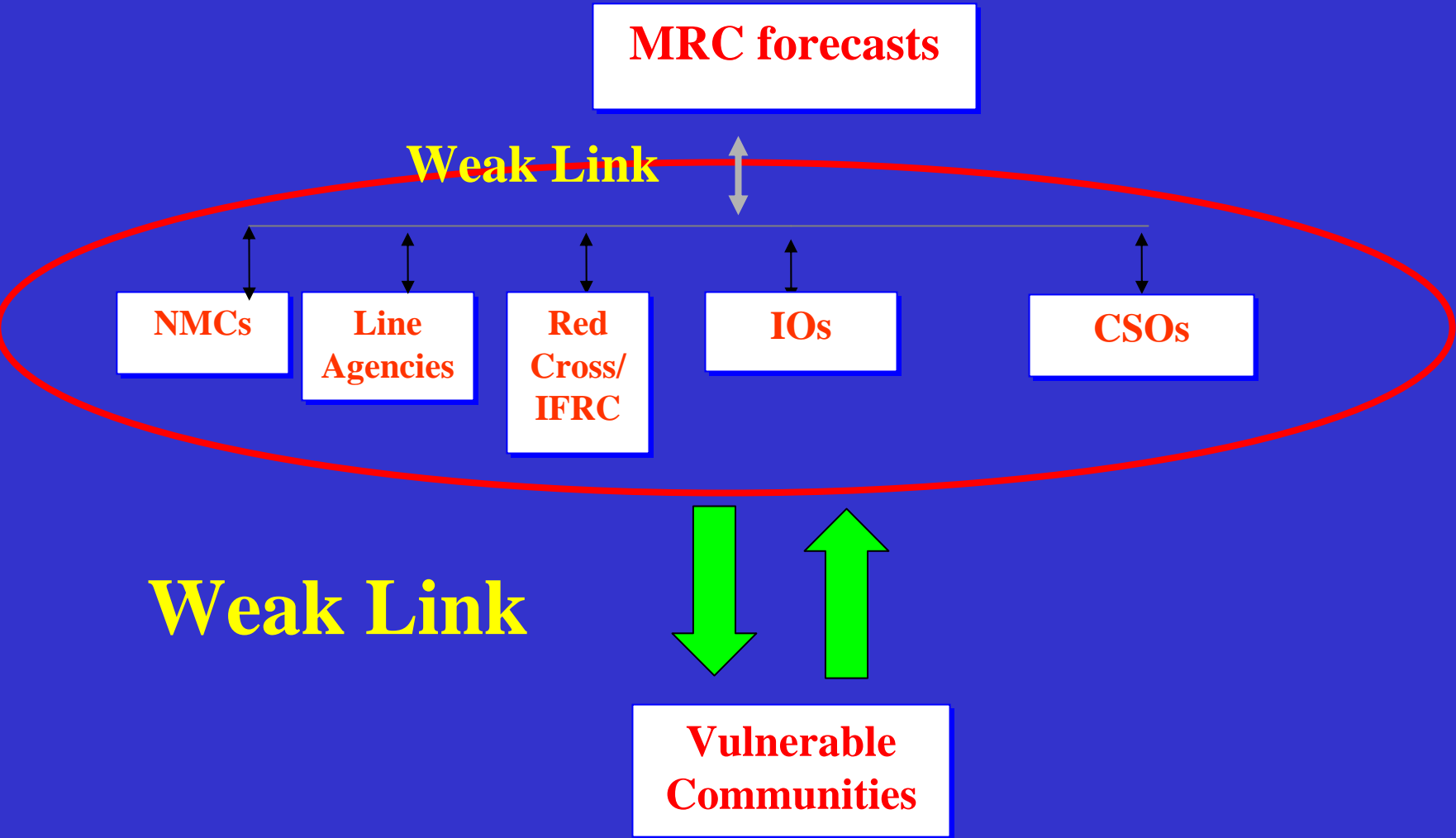
Provision of Flood Early Warning to vulnerable communities (USAID/OFDA):

- Inclusion of 34 new villages in Cambodia (total 40 villages)

- Project's launched in Lao PDR, early 2005

- Selection of sites (for 2005) in Lao PDR

Capacity Building for Flood Preparedness Planning (EC-ECHO)

- Funding Agreement signed in March 2005

- Adapting training course in three national languages (Khmer, Lao and Vietnamese)

- Conducting consultation with the countries

The ISLAND project sticks to the same philosophy for

community-based disaster preparedness:

The objectives are:

• To listen to the needs of the vulnerable communities, helping them to make their own risk and vulnerability assessment

• To provide access to adapted communication and information tools allowing their ownership by local communities

• To convey reliable and understandable messages from national and international sources about most relevant information needed for a sustainable development of the communities

The same **information system** can convey different sorts of information and the rural communities are not only concerned by flood early warning

Urgent information can be needed about:

- Fast floods and landslides causing roads to be blocked

- Pollution outbreak due to industrial leakage or hazard

- Risk of epidemic outbreak such as bird flu or s.a.r.s. cases

- Uncontrolled forest fire needing evacuation, etc

More **long term information** is needed about:

- How long will the flood stay in the fields ?

- When will the rain come after the drought ?

- Could we adapt the crops to better forecasts ?

Hai Duong province in the Red River delta with dikes (Bac Hung Hai big polder), Vietnam

Mekong floodplain in Champasak province, Lao

Prey Veng province in the Mekong delta without dikes, Cambodia

The test sites for the ISLAND project have been chosen in agreement with the national authorities, the villages are still to be chosen with the districts:
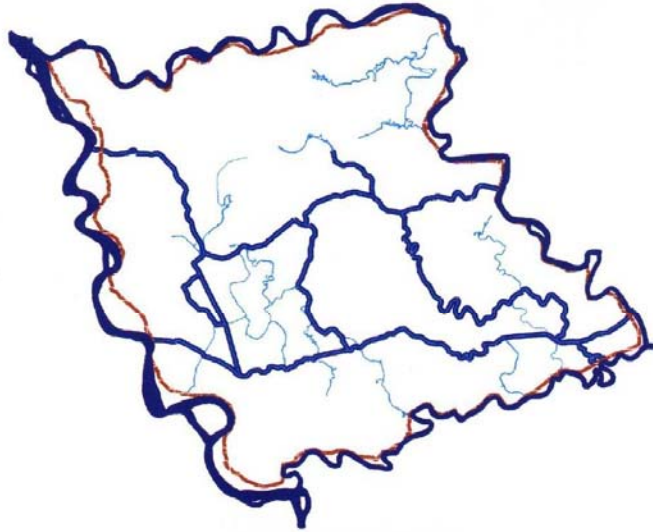
Country	Province	District	Communes or villages
VIETNAM	*Tinh* Hai Duong	*Huyen* Tu Ky	*Xa* An Thanh *Xa* Ky Son
CAMBODIA	*Khet* Prey Veng	*Srok* Peam Ro Ba Phnom	*Khum? Phum?*
LAO PDR	Champasak	Champasak	*Ban* Hai *Ban* Tha Deua

Downstream of Hanoi the Bac Hung Hai polder is the biggest of the Red River delta. The **Tu Ky** district of **Hai Duong** province is at the downstream corner of the irrigation and drainage system, therefore concentrating water and pollution from all the polder.
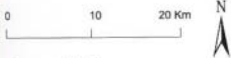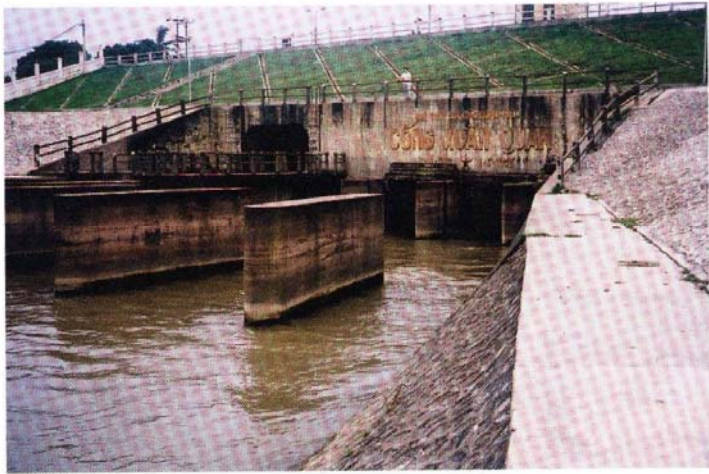
Plate 6 - **Transportation Network**
Bản đồ 6 - **Mạng lưới giao thông**

HAI DUONG

HANOI

Network type
Loại đường

Highway Nº5
Đường cao tốc Nº5

Urban area
Khu đô thị

Main roads
Đường quốc lộ

District center
Trung tâm huyện

Roads
Đường

Rail
Đường sắt

District limit
Ranh giới huyện

Navigation network
Đường sông

HUNG YEN

Plate 8 - **Main Canal Network**

Bản đồ 8 - **Hệ thống kênh trục cấp I**
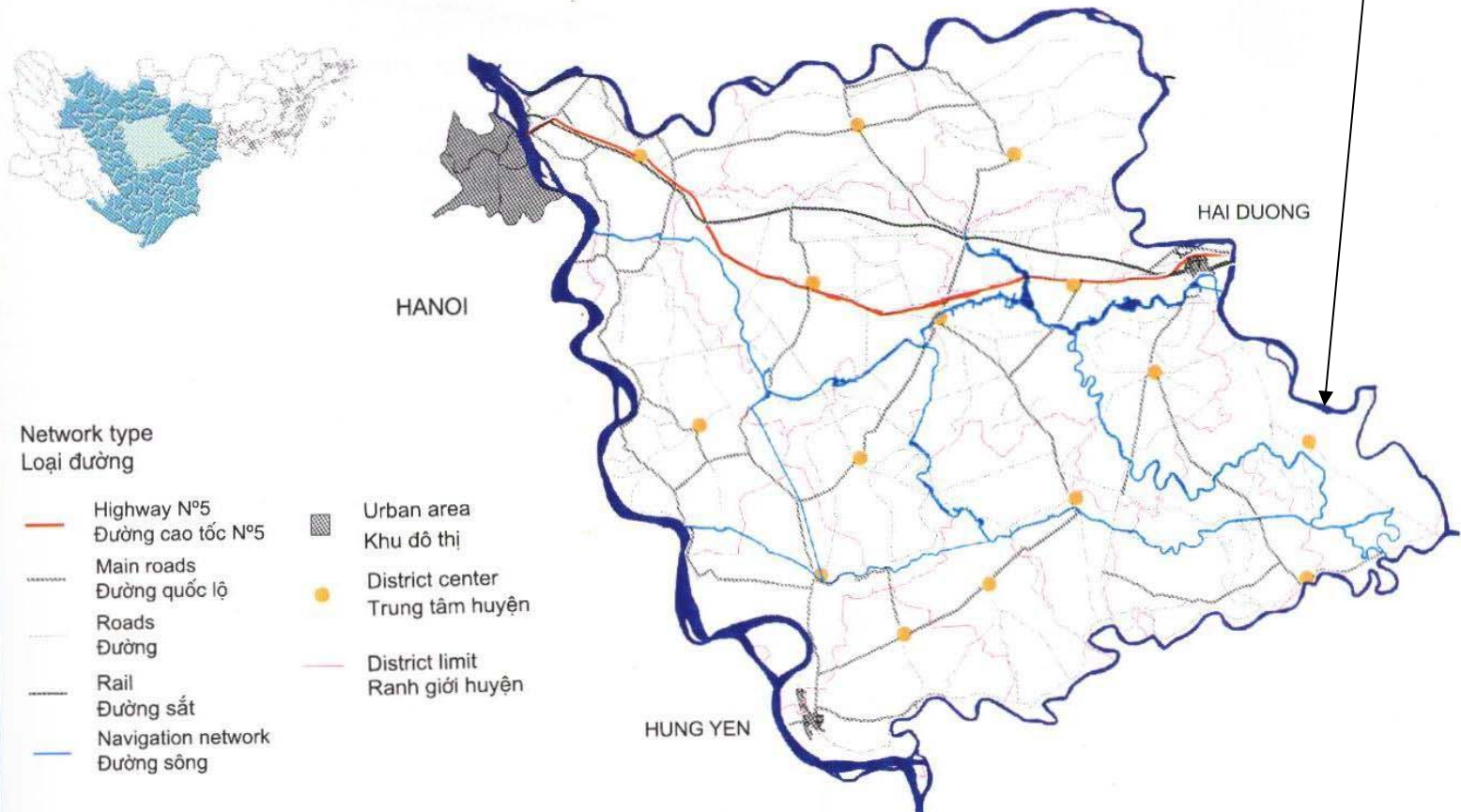
Natural water network
Kênh tự nhiên

Primary water network
Kênh trục cấp I

Main dike
Đê chính

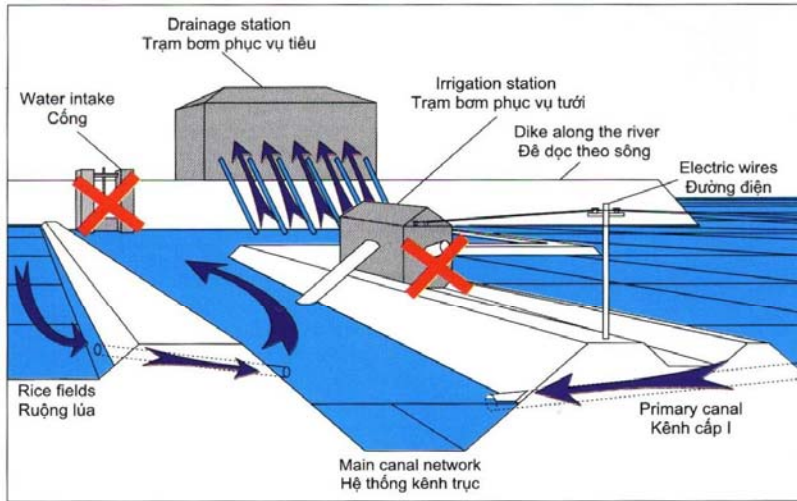| 0 | 10 | 20 Km |

N

Tu Ky district

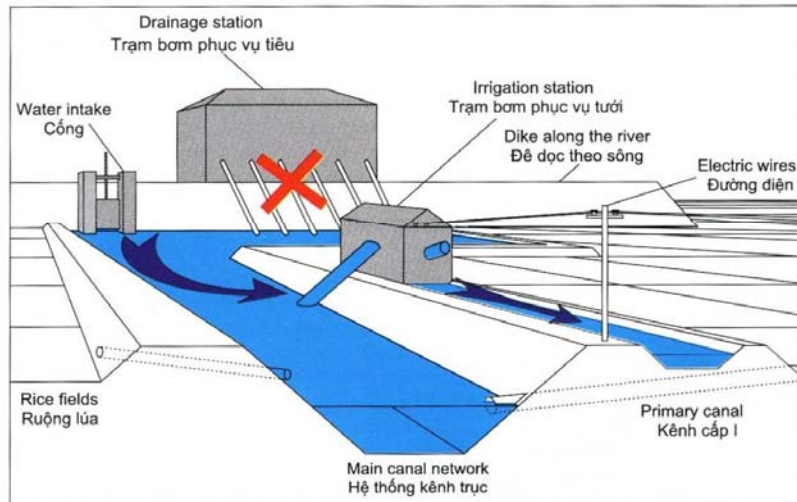**Bui Dinh Hoan**, v-dir of DARD Hai Duong province, chief of provincial FSC and Dyke control

Figure 3 - **Operation of the Bac Hung Hai Water Control System**
Hình 3 - **Hoạt động của hệ thống điều tiết nước Bắc Hưng Hải**

Drainage period : Giai đoạn tiêu nước

Drainage station
Trạm bơm phục vụ tiêu

Irrigation station
Trạm bơm phục vụ tưới

Water intake
Cống

Dike along the river
Đê dọc theo sông

Electric wires
Đường điện

Rice fields
Ruộng lúa

Primary canal
Kênh cấp I

Main canal network
Hệ thống kênh trục

Irrigation period : Giai đoạn tưới nước

Drainage station
Trạm bơm phục vụ tiêu

Irrigation station
Trạm bơm phục vụ tưới

Water intake
Cống

Dike along the river
Đê dọc theo sông

Electric wires
Đường điện

Rice fields
Ruộng lúa

Primary canal
Kênh cấp I

Main canal network
Hệ thống kênh trục

Sources / Nguồn:
- Jean Philippe Fontenelle,1999
- Jean Philippe Fontenelle,1999

© ATLAS BAC HUNG HAI (GRET- INSA

35

Ha Thanh has villages outside the main dykes

…which have to
be evacuated in
case of big flood

FLOOD ANALYSIS 2000-2001
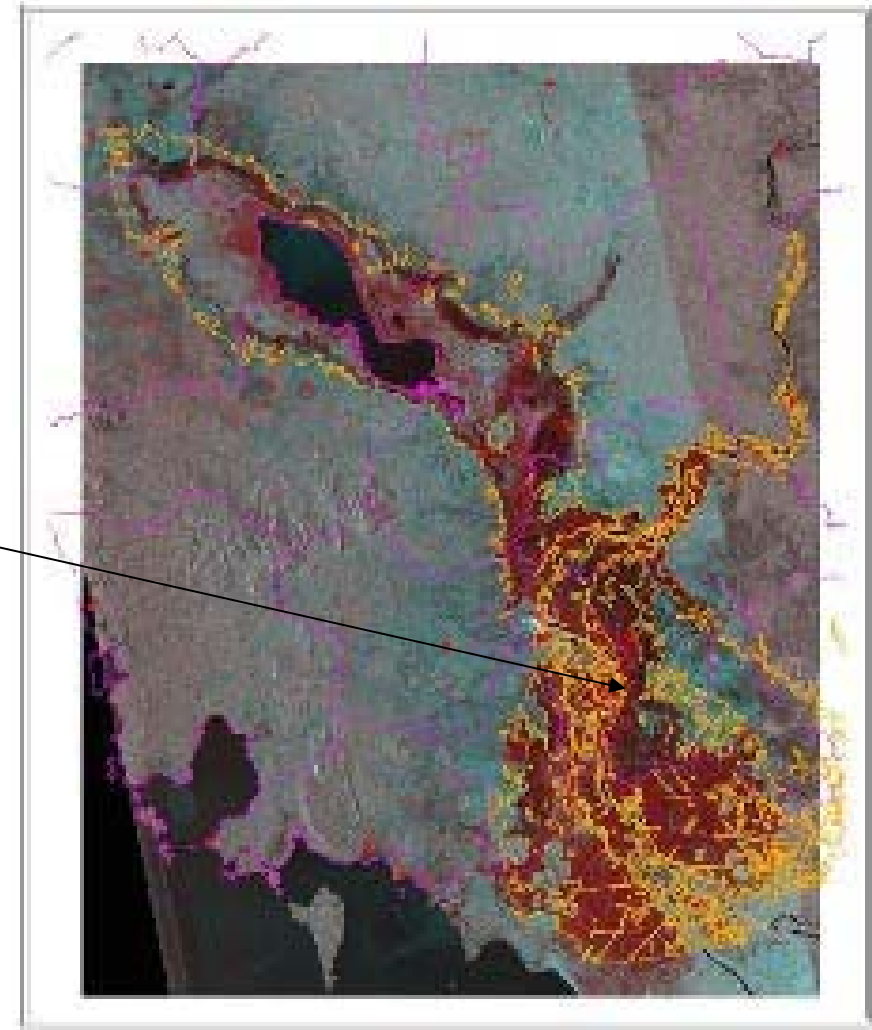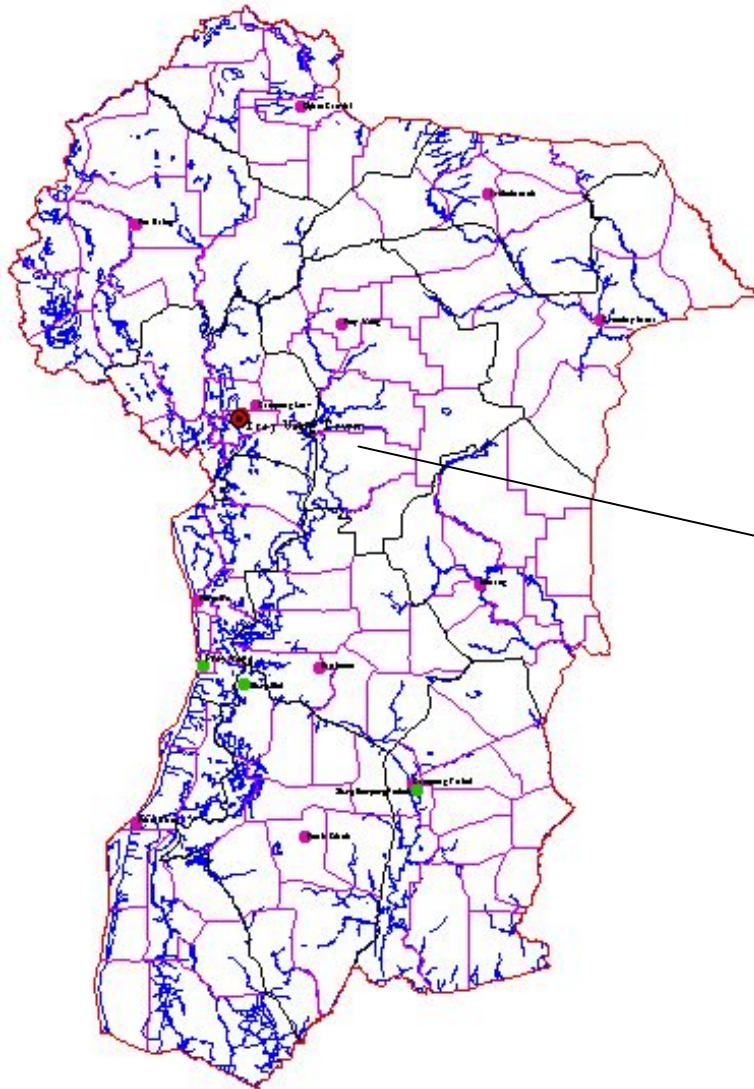
Legend
Province center
Flood 2001
Province boundary
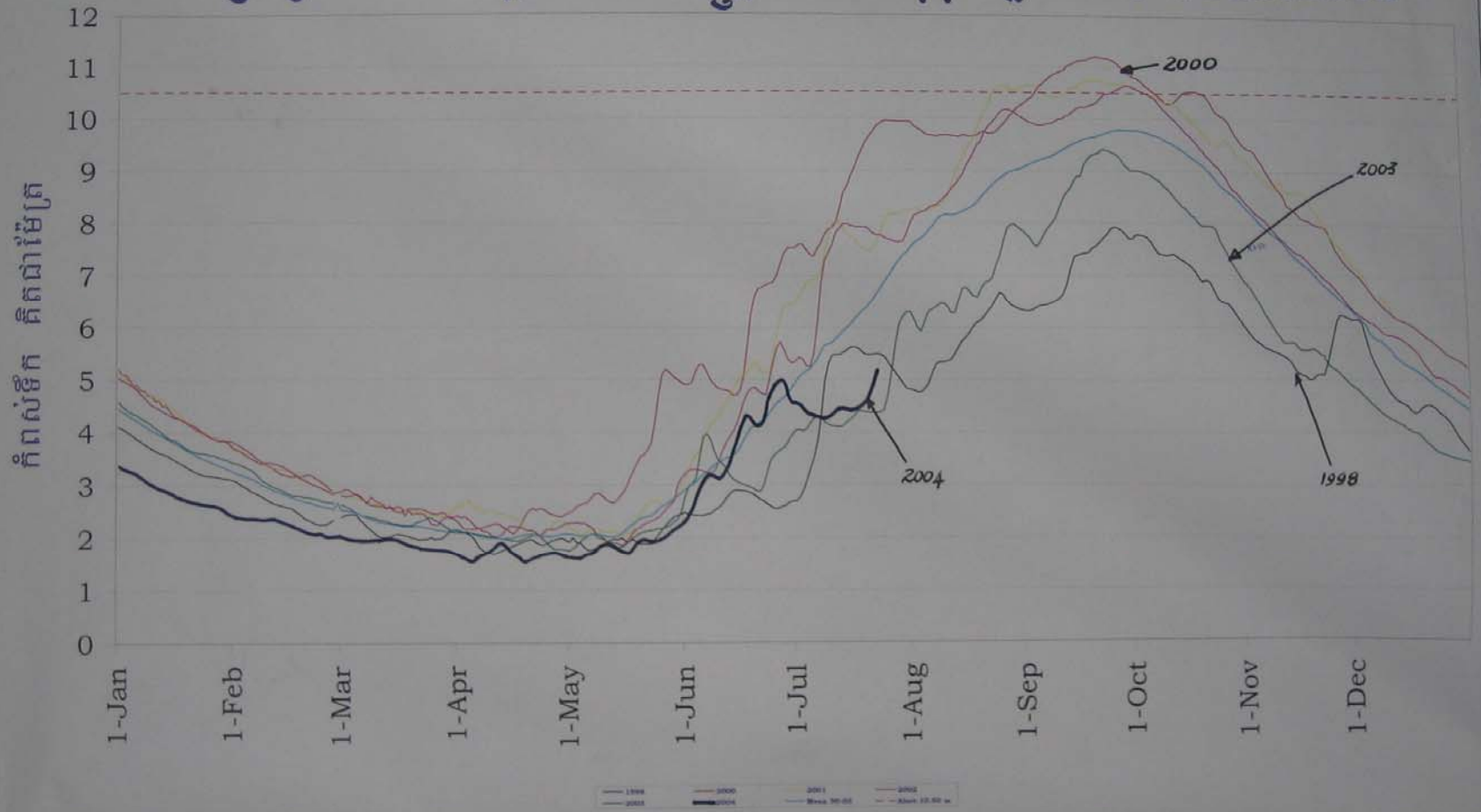
Downstream of Phnom Penh the **Prey Veng** province is almost entirely flooded by shortcuts of the Mekong during annual floods

ក្រាហ្វិកកំពស់ទឹក ស្ថានីយជលសាស្ត្របាសាក់_ចតុមុខ ឆ្នាំ១៩៩៨, ២០០០_២០០៤

Peam Ro district
Mlech commune

Theay
commune

**Ba
Phnom**
district

Ba Phnom district has 9 khum

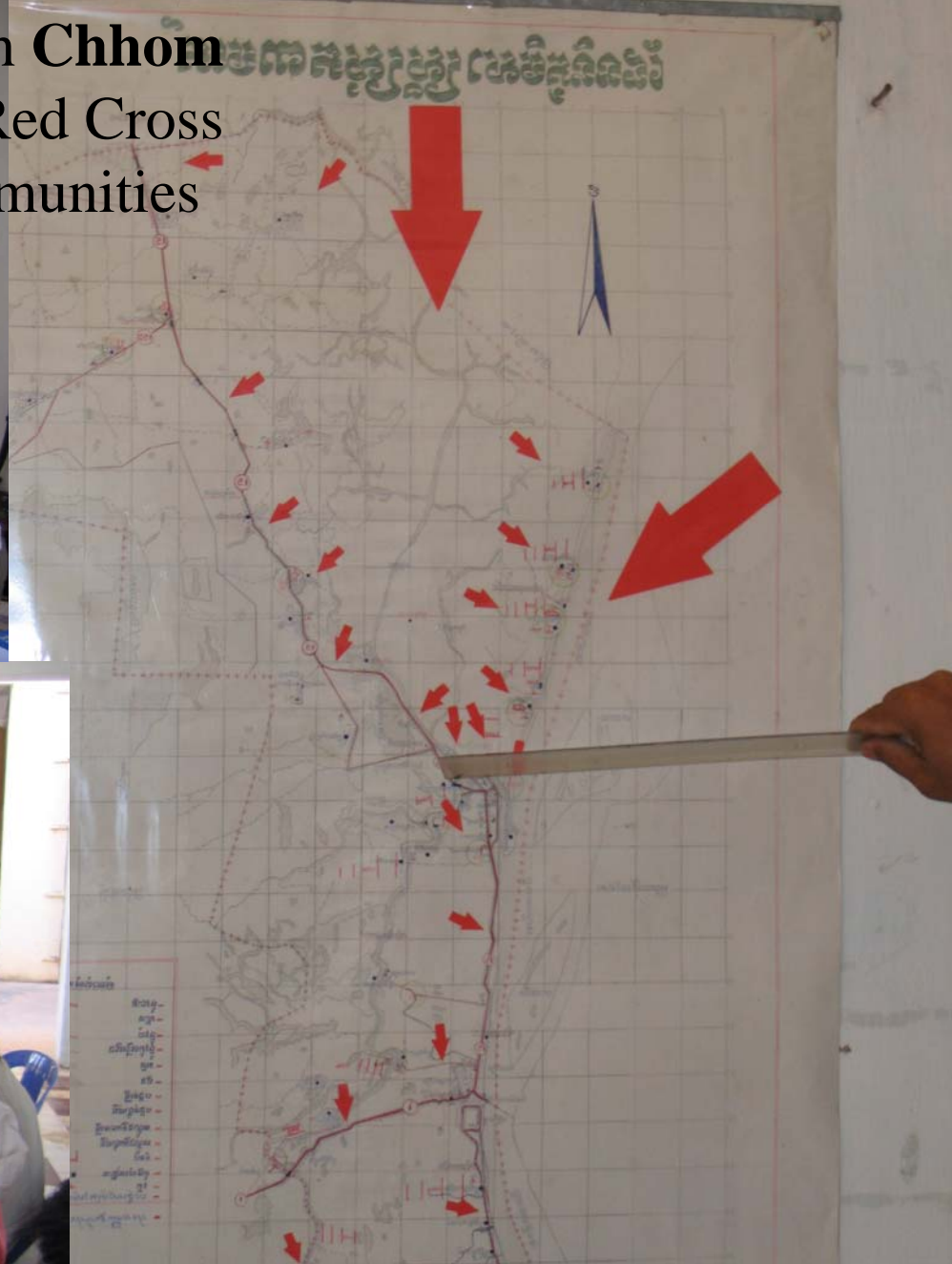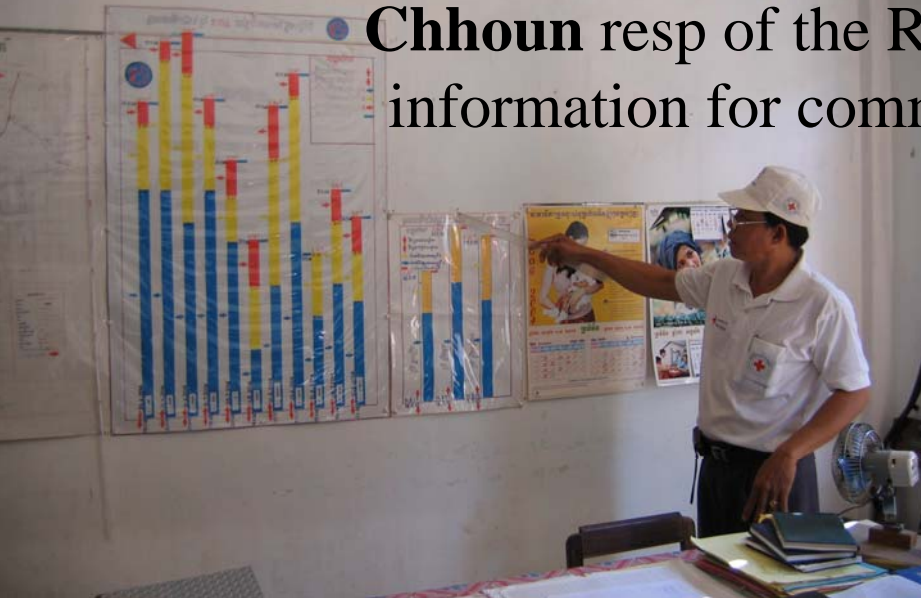The pagodas on the hill and the district v-governor **Hein Vanny**

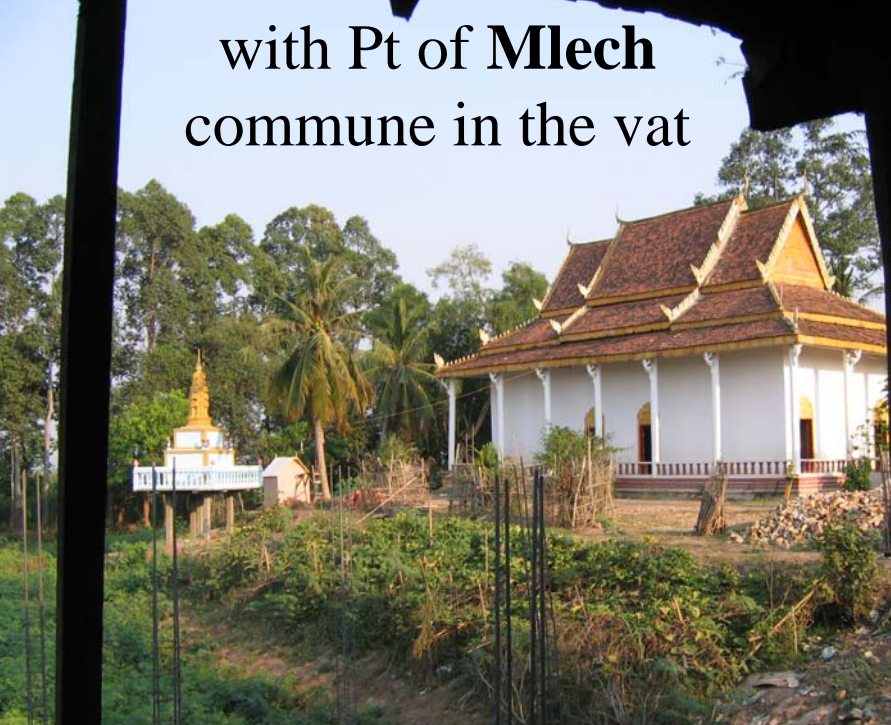**Theay** commune, visiting a village chief

The flood flows across the road on protected sections but there is a need for much wider bridges
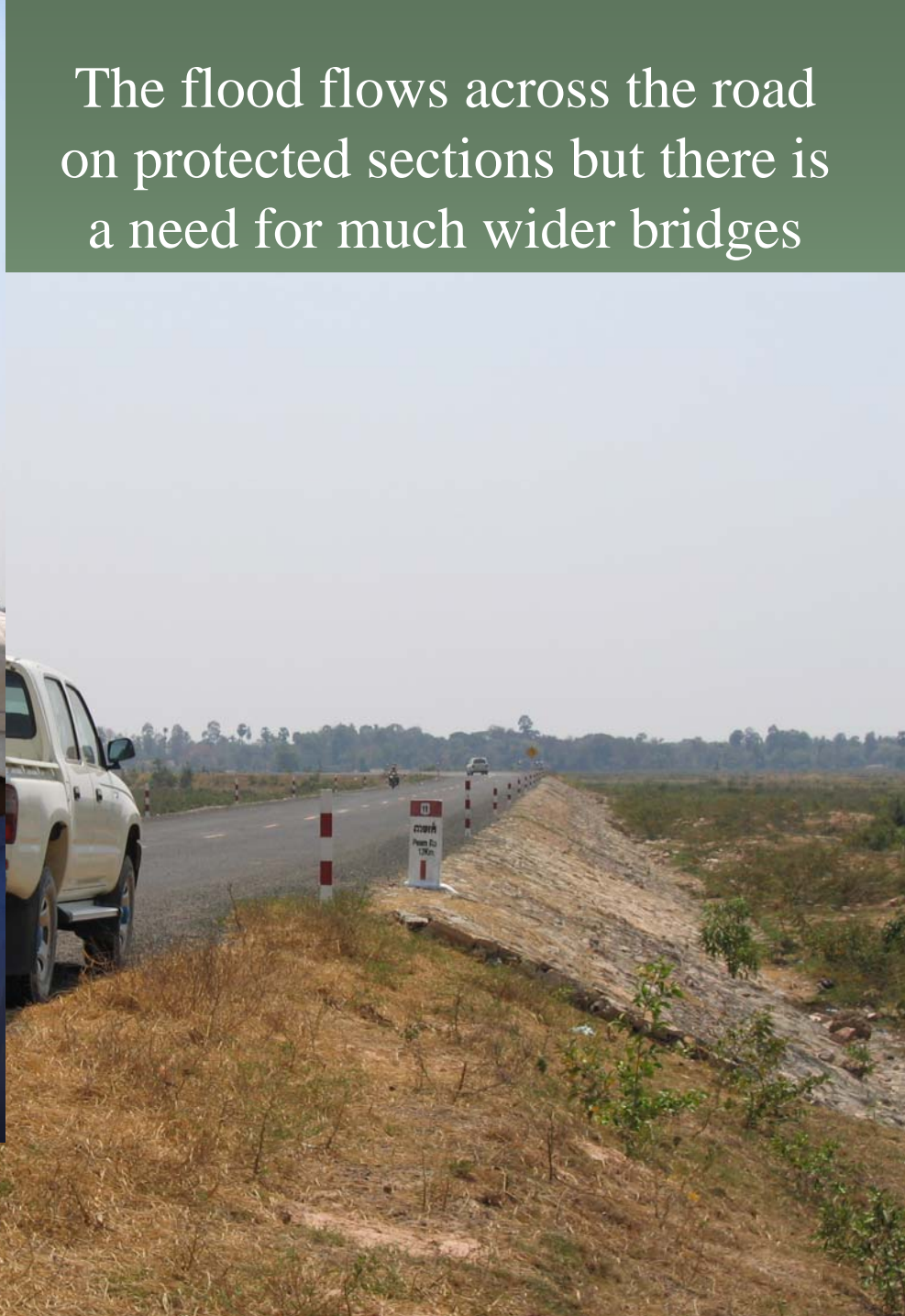
Peam Ro district with **Chhom Chhoun** resp of the Red Cross information for communities
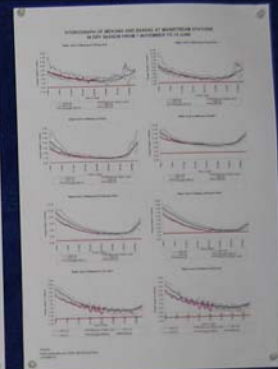
with Pt of **Mlech**
commune in the vat

MRCS Vientiane

DRY SEASON RIVER MONITORING

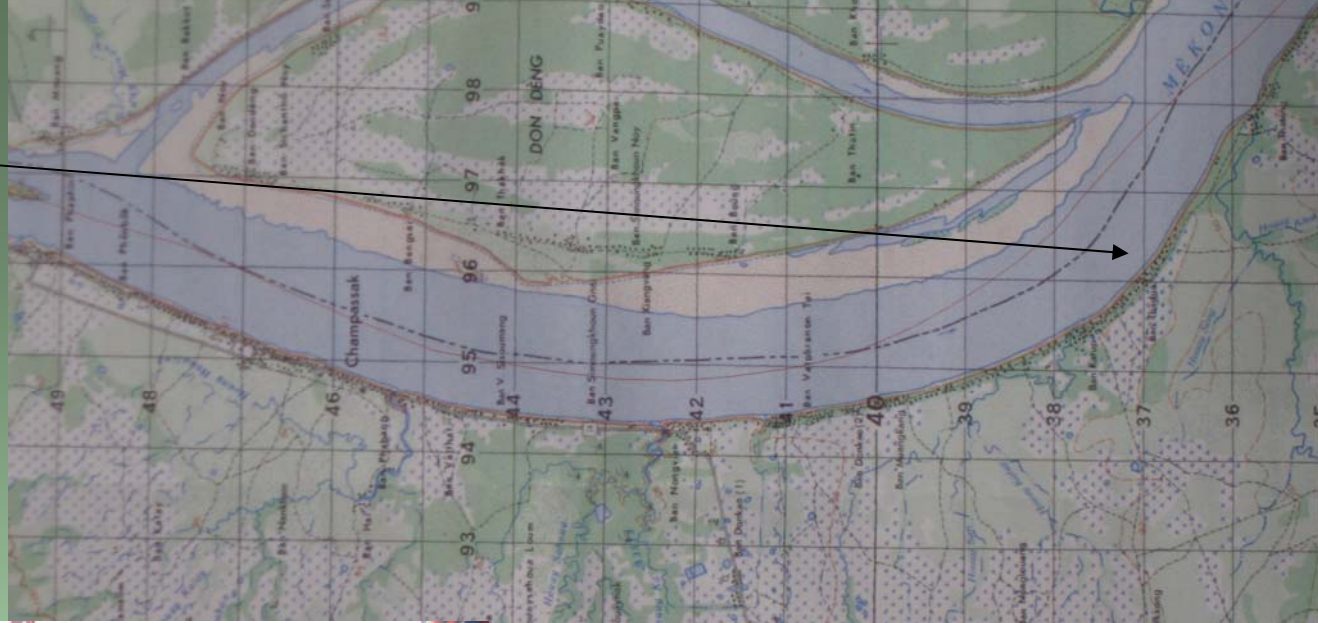Low water level in dry season, tidal effect downstream
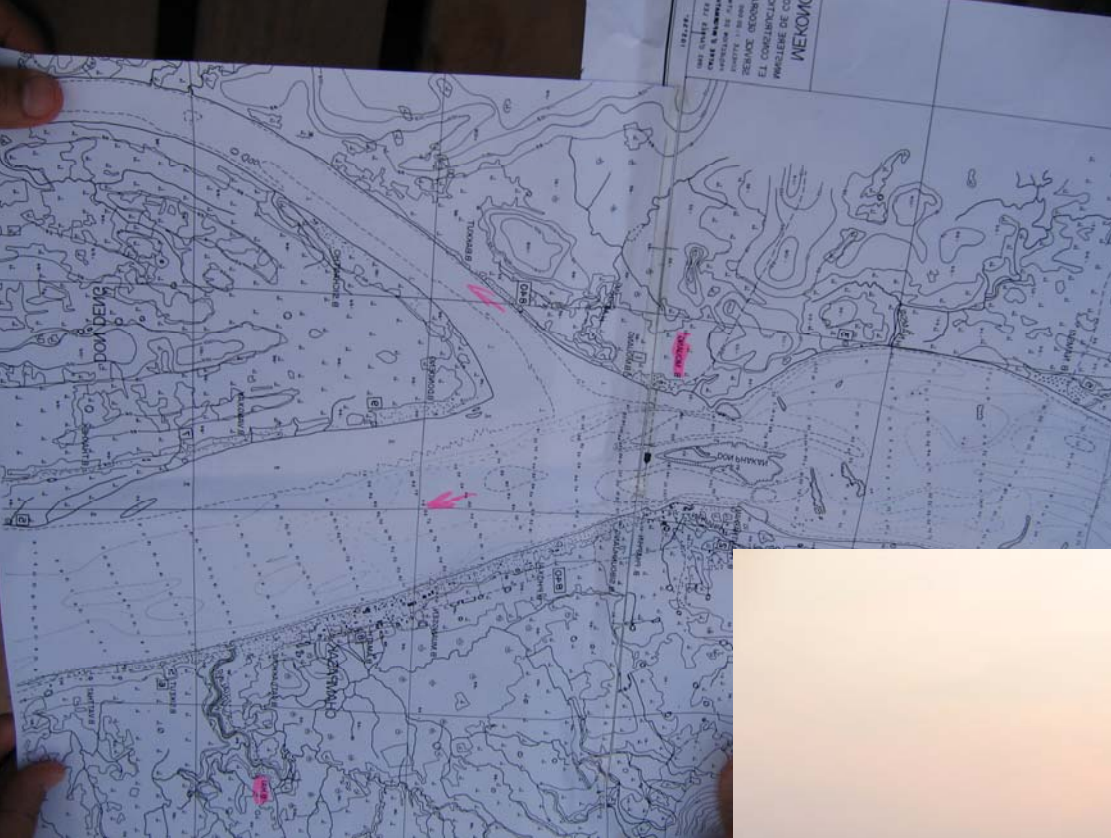
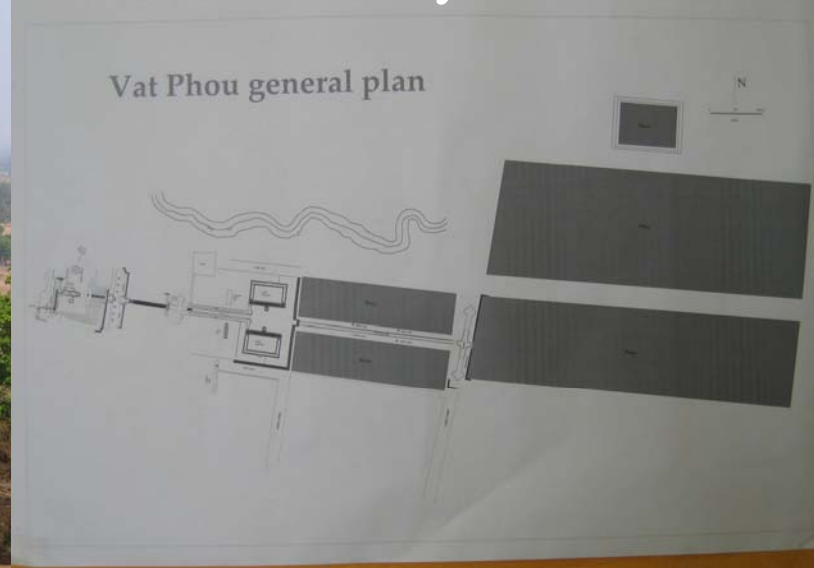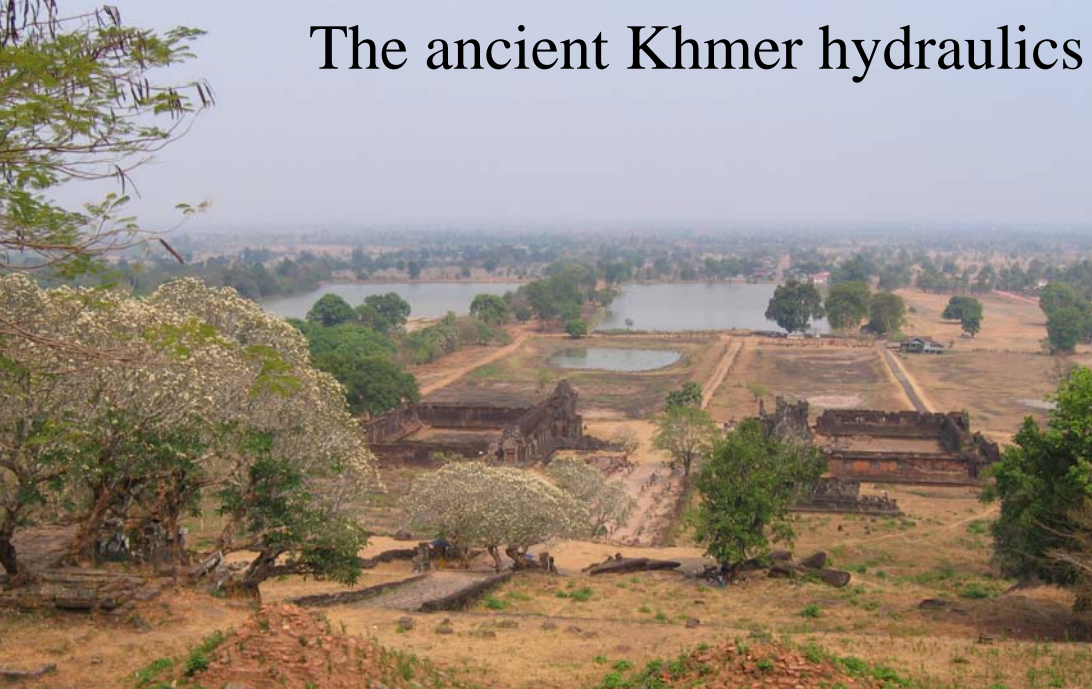Ferry to **Champasak** district and Vat Phu

Ban Hai, district v-gov **Sisoway** showing village gauge and pump provided by World Vision

Ban Tha Deua, meeting in the Vat with village chief and people

Vat Phu

The ancient Khmer hydraulics of basins or baray

Vat Phou general plan

The map is showing the protected area:

UNESCO

Champasak

LEGEND

ZONE 1: Champasak heritage and cultural landscape protection zone
ZONE 2: Sacred environment conservation zone
ZONE 3: Archaeological research zone
ZONE 4: Monument management zone

Vat Phou Management Plan
Study area

2. Construction of a repository, to properly preserve the anti during past and future research campaign. Window cases and ex

Final debriefing with Champasak district v-governor **SisowayArkhchavong** and **Thongdam Chaleunsouk** provincial waterways, **Thanongdeth** MRCS and **Sourasay** LNMC

- Flood mapping at district level would be more relevant

- The district should be directly connected to the data base

Multi domain approach
(from Hans Van Duijne TNO/NITG)

- ISLAND approach
  - Based on river floods forecasting and early warning
  - Addresses the needs of rural communities
  - Develops tools from the OSIRIS flood warning prototypes

- Other hazards that can be connected and might give you ideas to include:
  - Earthquakes, tsunamis, flash-floods
  - Coastal erosion
  - Landslides
 - Subsidence
  - Man induced hazards

Geohazard
in river basins and coastal zones

1. **Earthquakes** damage and collapse of infrastructures … by vibrations and collapse of land

2. **Tsunami/floods** damage and collapse on infrastructure by river & seawater inundations and (ground-)water pollution

3. **Landslides** damage and collapse of infrastructure … by soil flows and rock slides

4. **Coastal erosion** coastal damage and deterioration of land … by coastal waves, sea level rise and currents

5. **Land subsidence** permanent inundation of land and damage to infrastructure by soil consolidation and groundwater extraction

Examples of man induced hazards

- Extraction of building material – coral reefs destruction
- Fish farms and shrimp hatcheries – mangrove deforestation
- Uphill wood production – deforestation
- Dam construction – river & coastal erosion
- Drainage in lowlands – soil subsidence, arsenic levels
- Industrial development – subsoil and (ground)water pollution
- Shipping routes - Oil and chemical spills

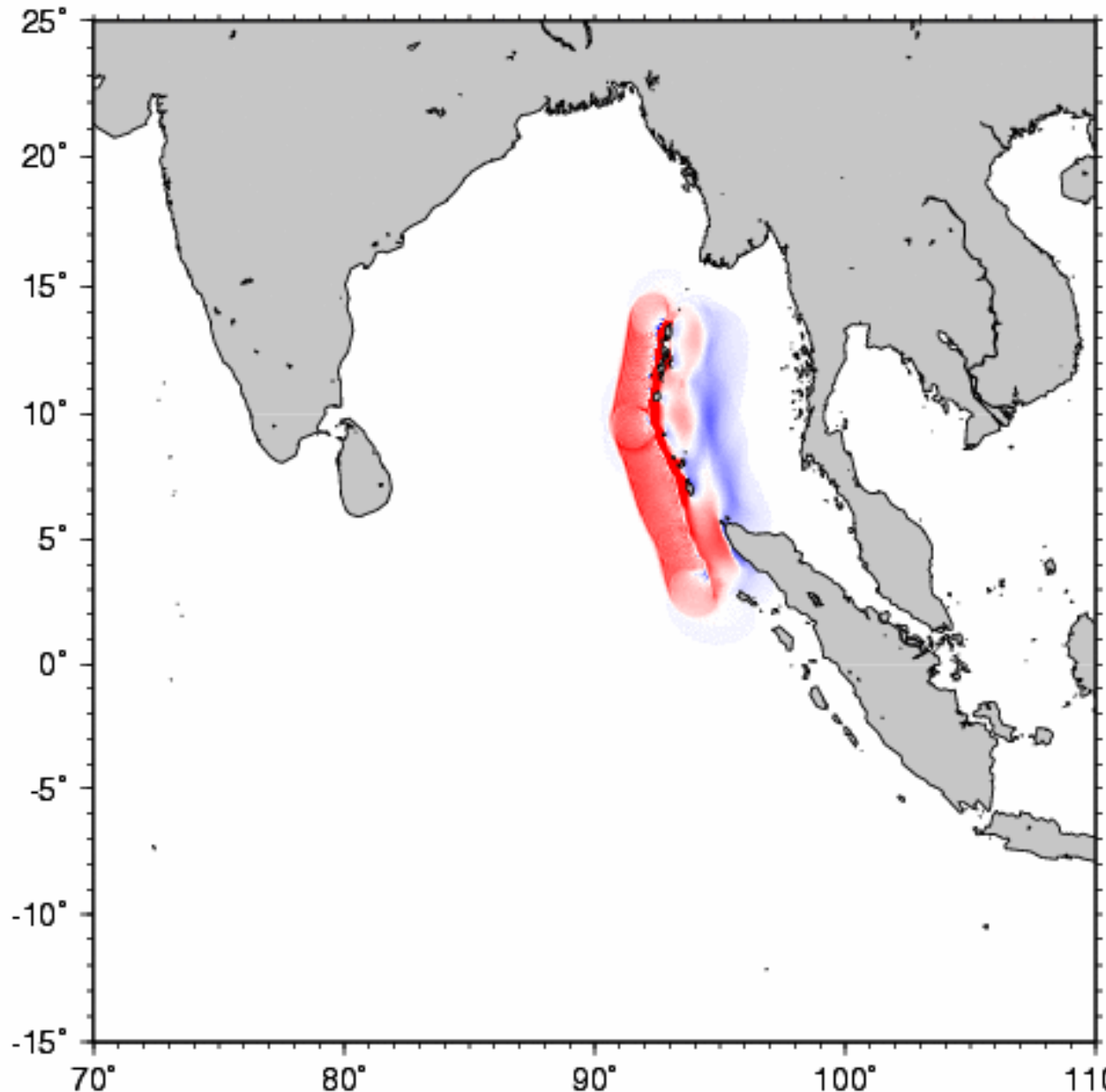# Monitoring, data gathering and investigation
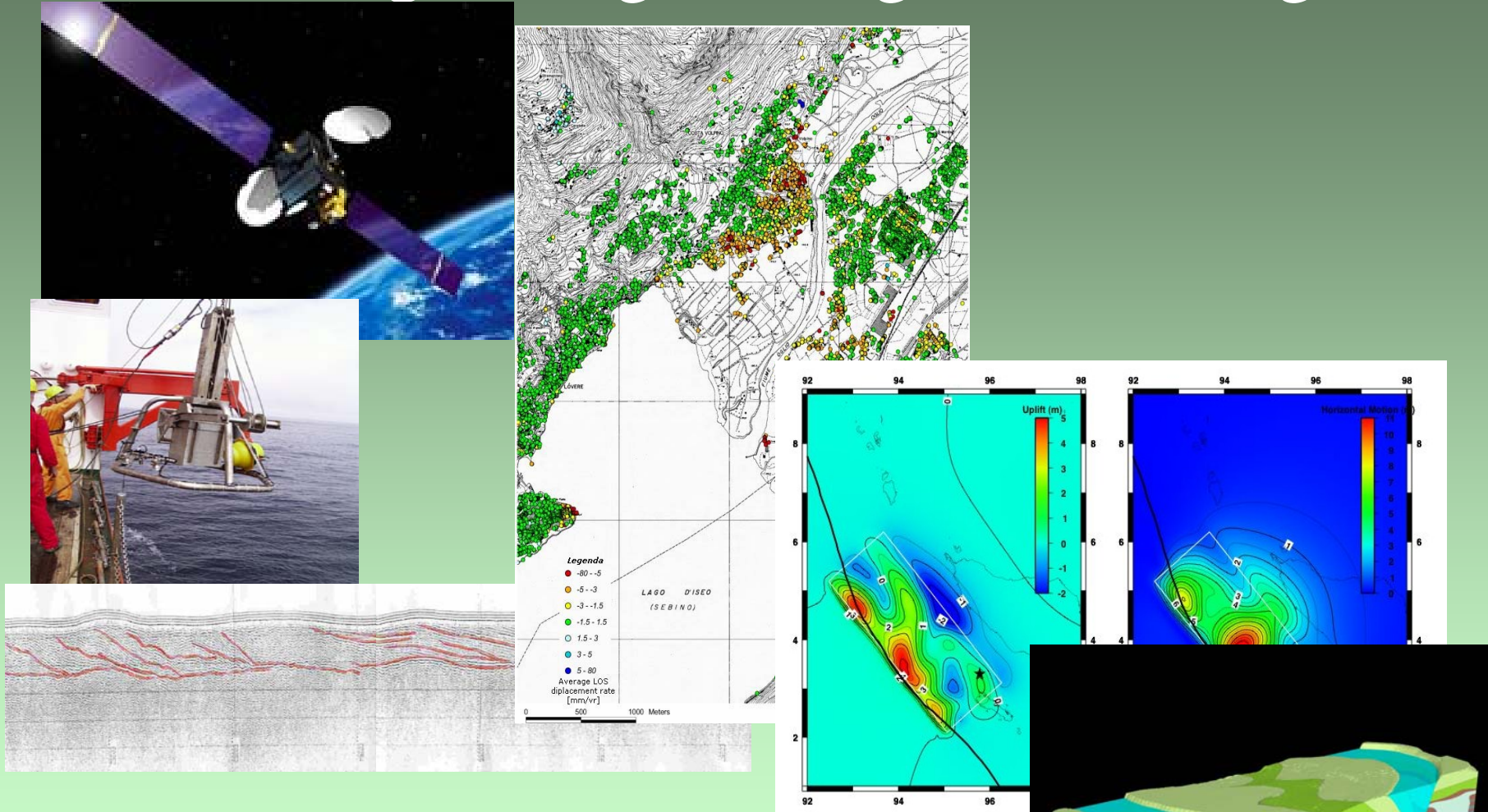
But the missing link of the information chain is the failure to reach the vulnerable villages

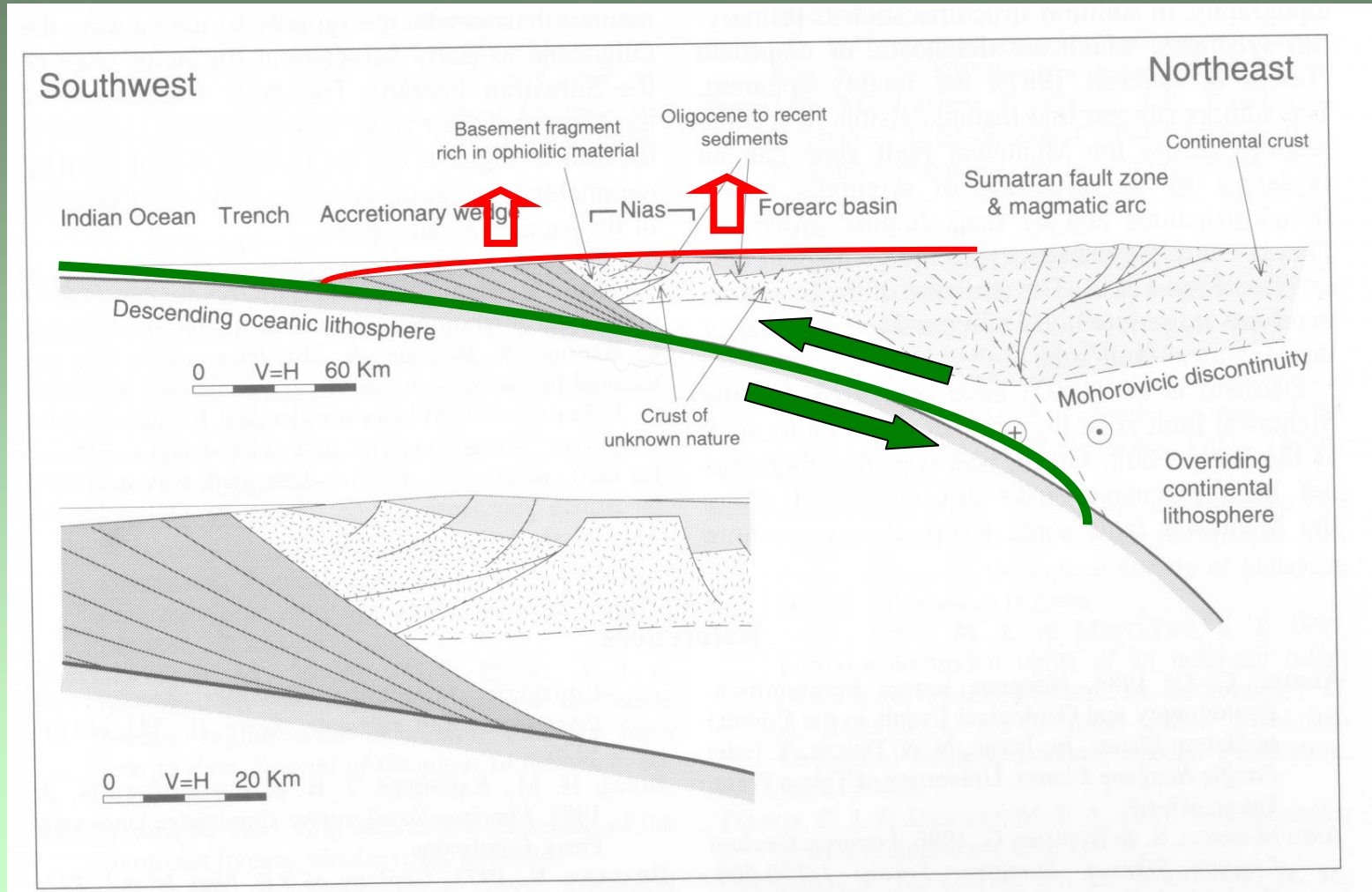# Incoming tsunami wave on high tide
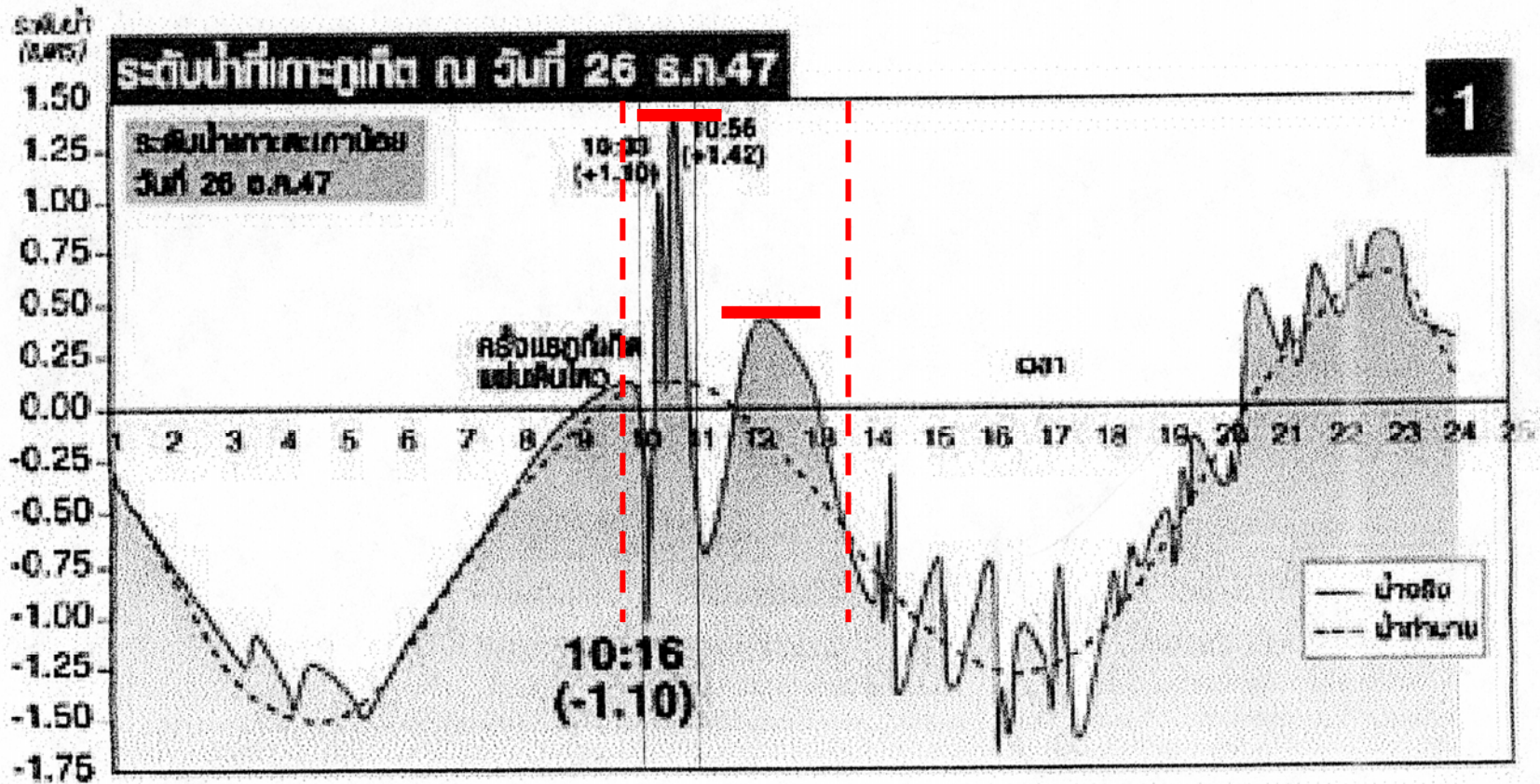
2004 Sumatra Earthquake 010 min

There was time enough for early warning except in Aceh and the Andaman. **But the information never reached the villages.** And few remembered what is a tsunami.

Tectonic compression and uplift
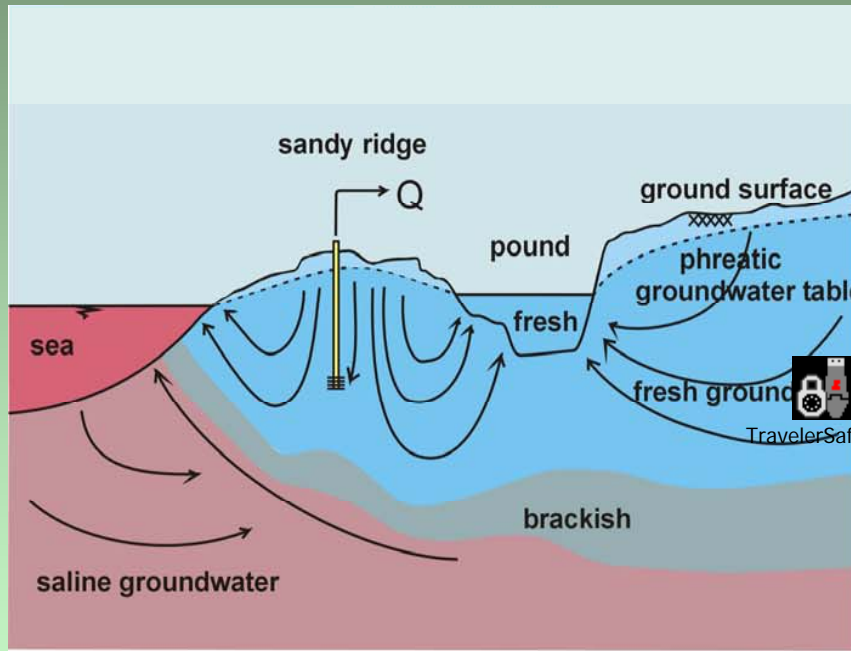
Coastal impact (quantity of water)

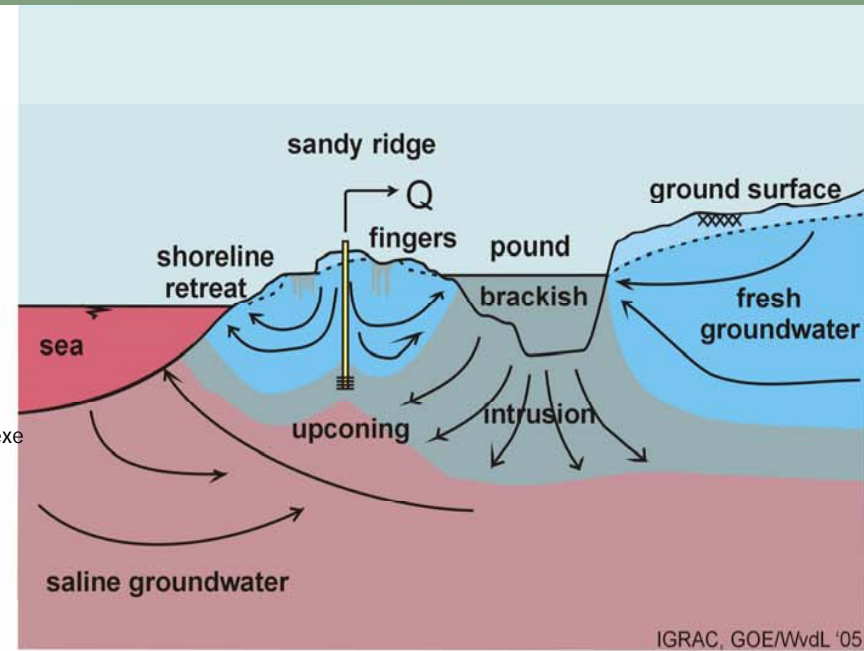**beach soils**   **bridge**   **drinking water**   **vulnerability**   **abandoned channel**
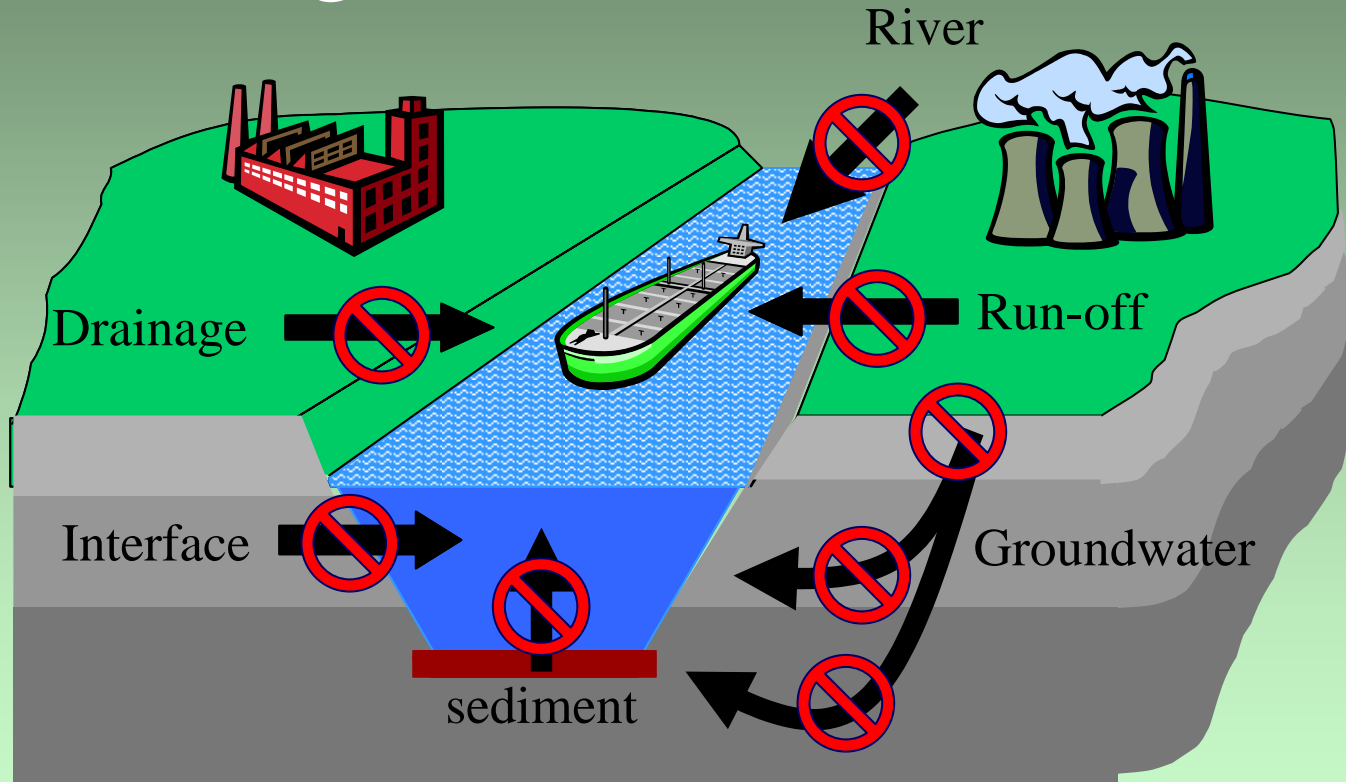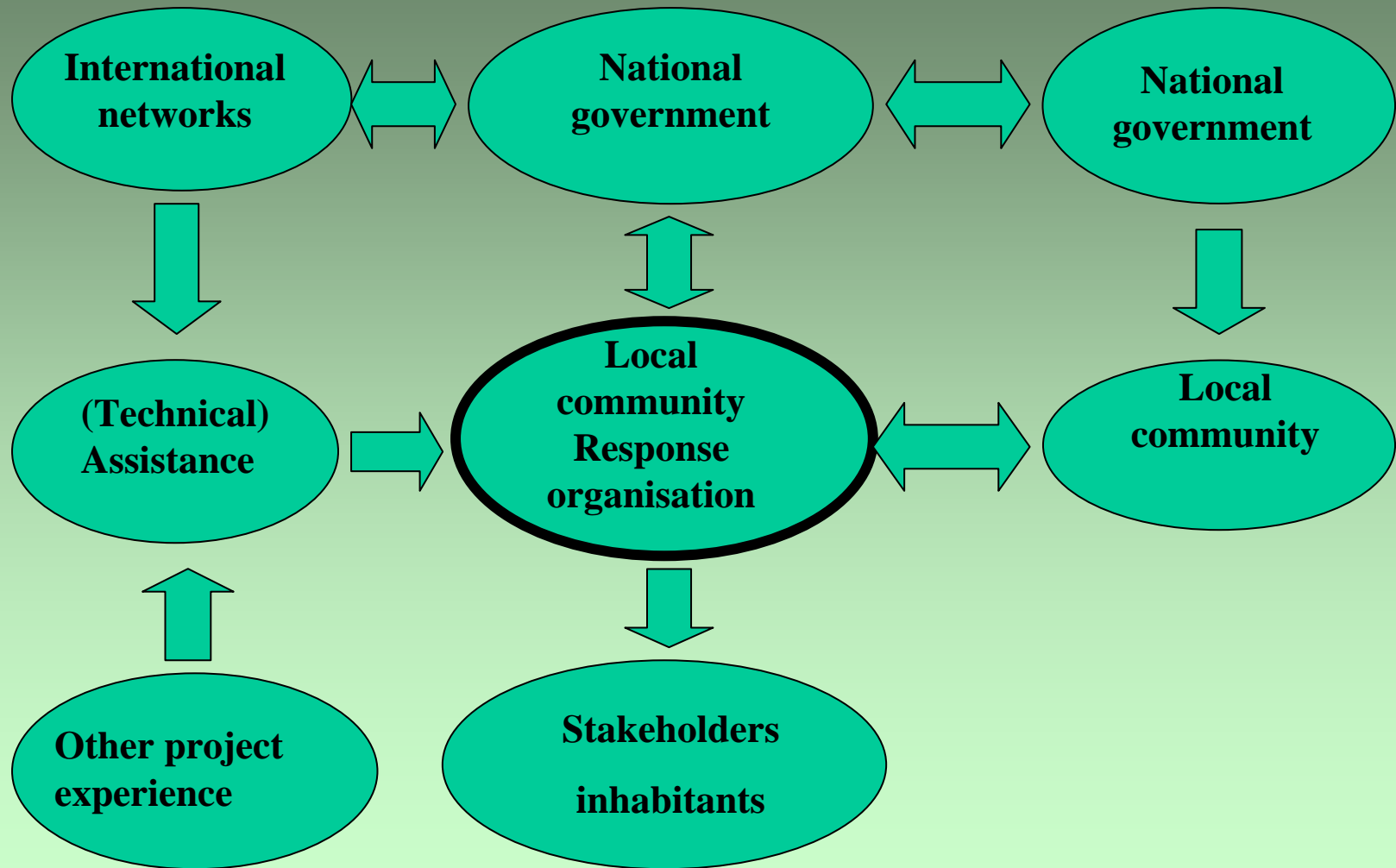
Coastal groundwater systems (quality)

River floods (quantity of water)

Quality of soil and (ground-) water

Communication for preparedness

Awareness and Preparedness

Prevention

Risk Assessment

Preparation

Contingency Planning

Response

action plan

Local Community

Response
Organisation
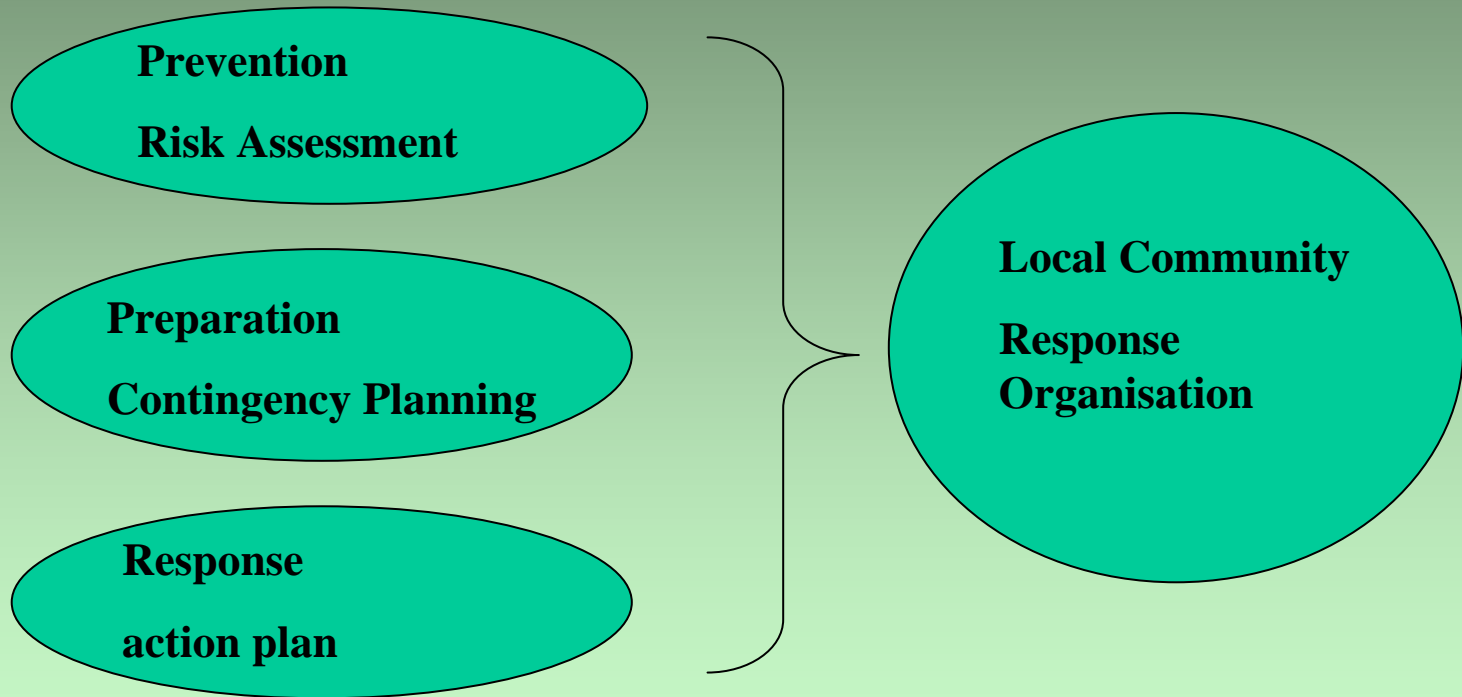
Response organisation
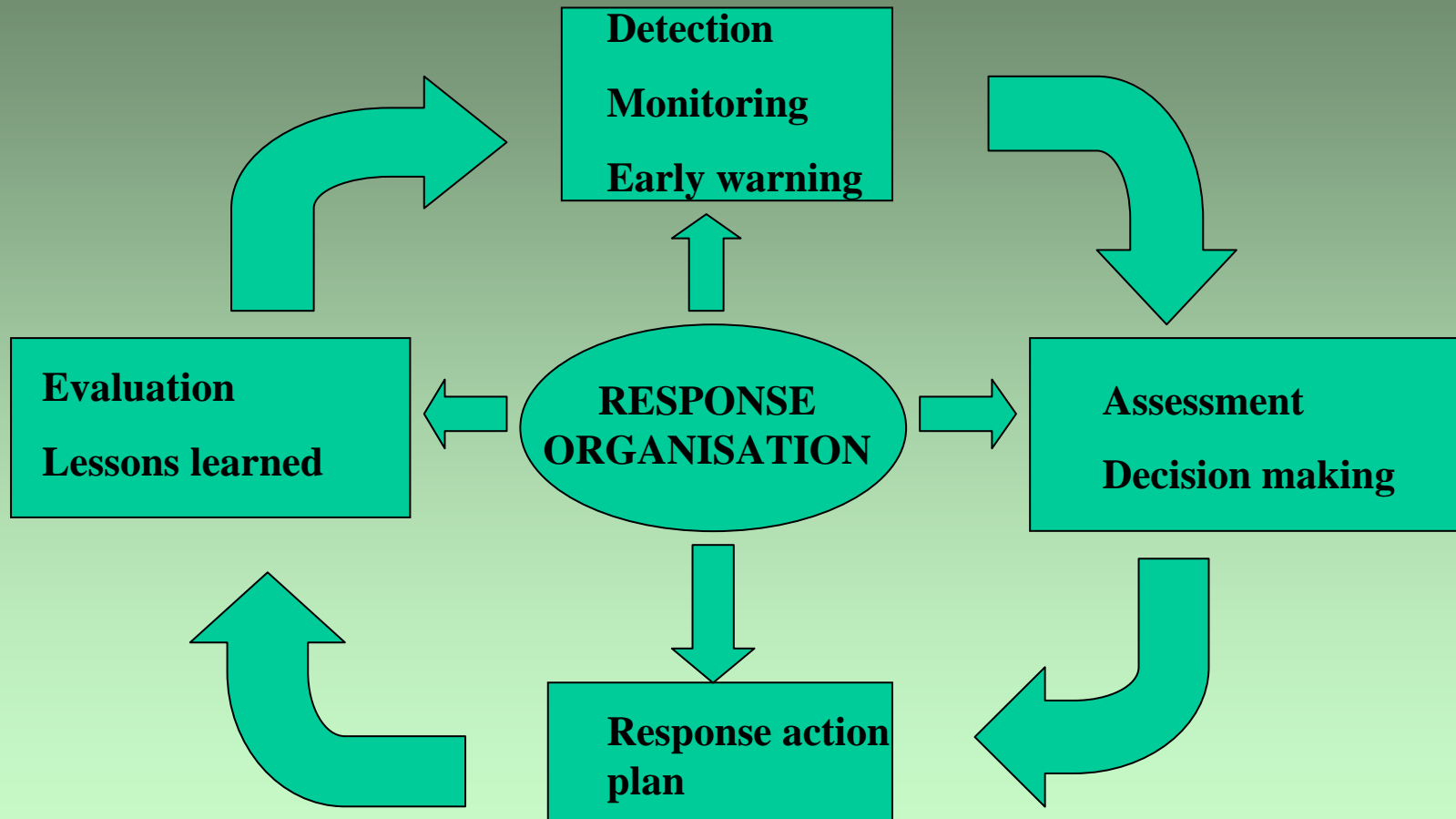
For whom ?

- The whole chain of decision makers is the beneficiary: national line agencies, provincial departments, districts, communes and villages

- The poorer and more vulnerable communities are given the highest priority (end of the chain)

- The civil protection agencies for emergency response are involved in the whole chain

- The non-governmental organisations involved in emergency response, poverty alleviation and sustainable development with the communities

- Municipal/provincial spatial planning must take into account the risk and vulnerability factors for zoning and/or relocation

Nguyen Hiep's Vietnam DMC presentation at MRCS Vientiane

LM Countries delegation at TNO Utrecht

Gilles Morel's demonstration at DHRW Phnom Penh

Exchanging experience between Mekong countries and with Europe

(from get-in-touch to operational projects)

Work agenda

step	Nov 04 Feb 05	March 05 workshops	April August 05	September 05 Feb 06	March April 06	May August 06 (floods)	September November 06
1- Preparation, workshops and field visits	Orleans Asia project manager	Hanoi, Phnom Penh, Vientiane					
2- Field surveys, participatory assessment			Hai Duong, Prey Veng, Champasak				
3- Develop adapted ITC tools, training				CETMEF MICA Asia partners			
4- Testing and evaluation, workshops, study tour					Hanoi, Phnom Penh, Vientiane	Hai Duong, Prey Veng, Champasak	
5- Reporting, validation and final seminars							Hanoi, Phnom Penh, Vientiane

We must help the most vulnerable !

Thank you