

ICTs for Disaster Risk Reduction

Chanuka Wattegama

LIRNEasia



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Note: The opinions expressed in the presentation are author's own and may not reflect those of any organization he is/was affiliated to.

Date: December 26, 2004

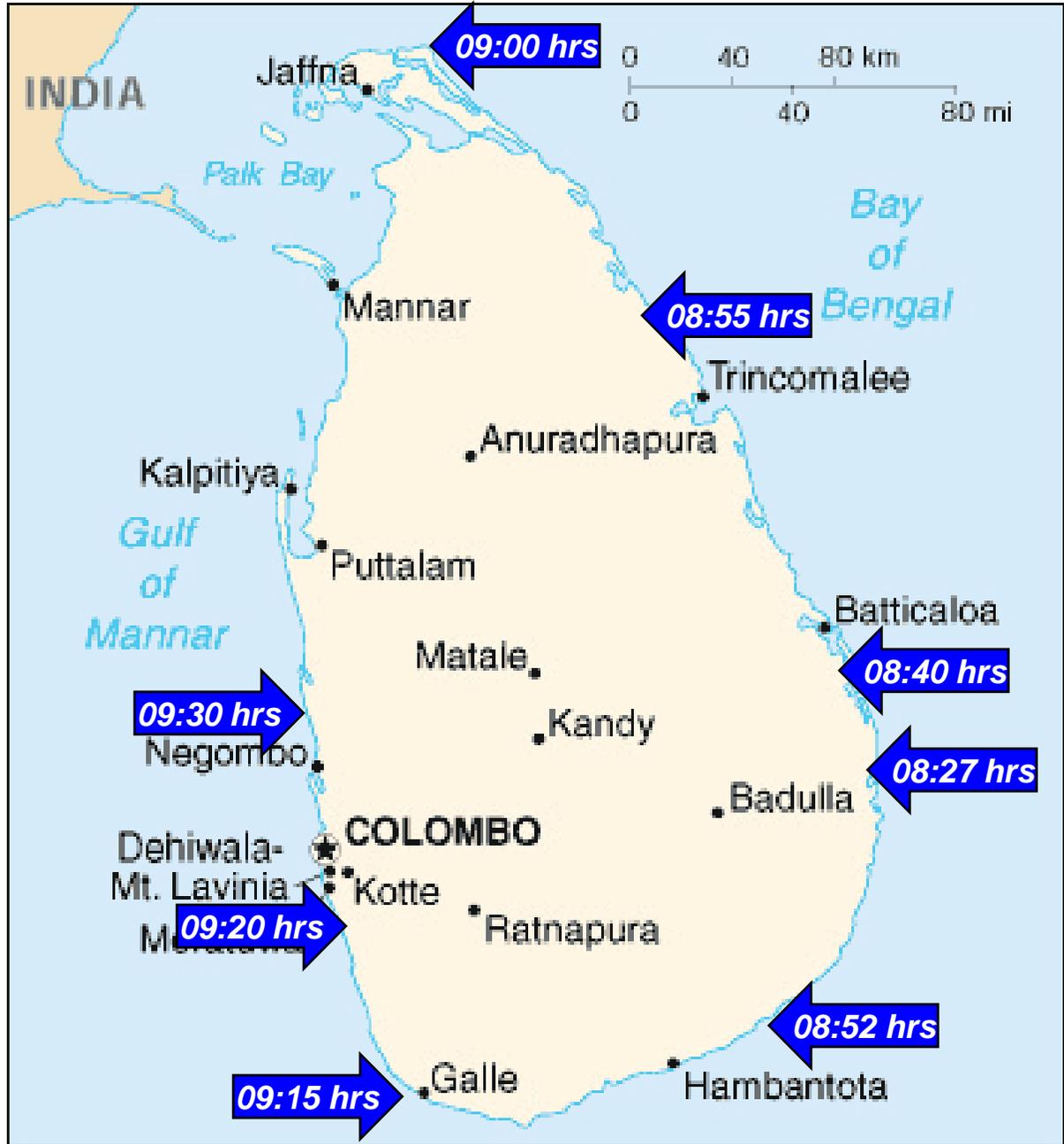


Large earthquake strikes off the tip of Sumatra, Indonesia
07:00 hrs

Pallekele Seismological Station relays data of seaquake from seismometer to GSMB in Colombo
07:06 hrs

PTWC revises magnitude to 8.5, mentions potential for tsunami
08:04 hrs

Sources: NYT, Sunday Times, Tamilnet,

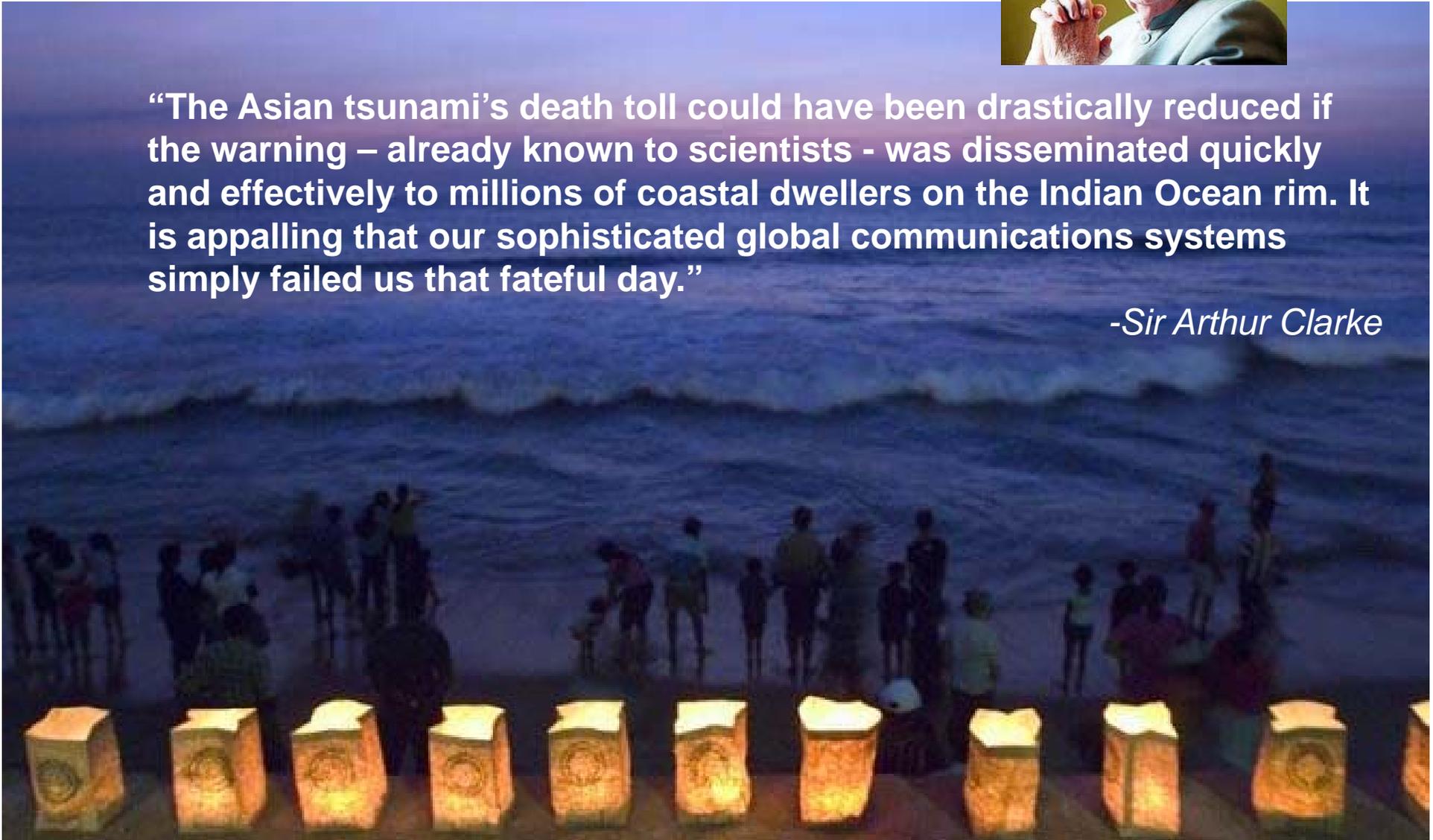


The tragedy...

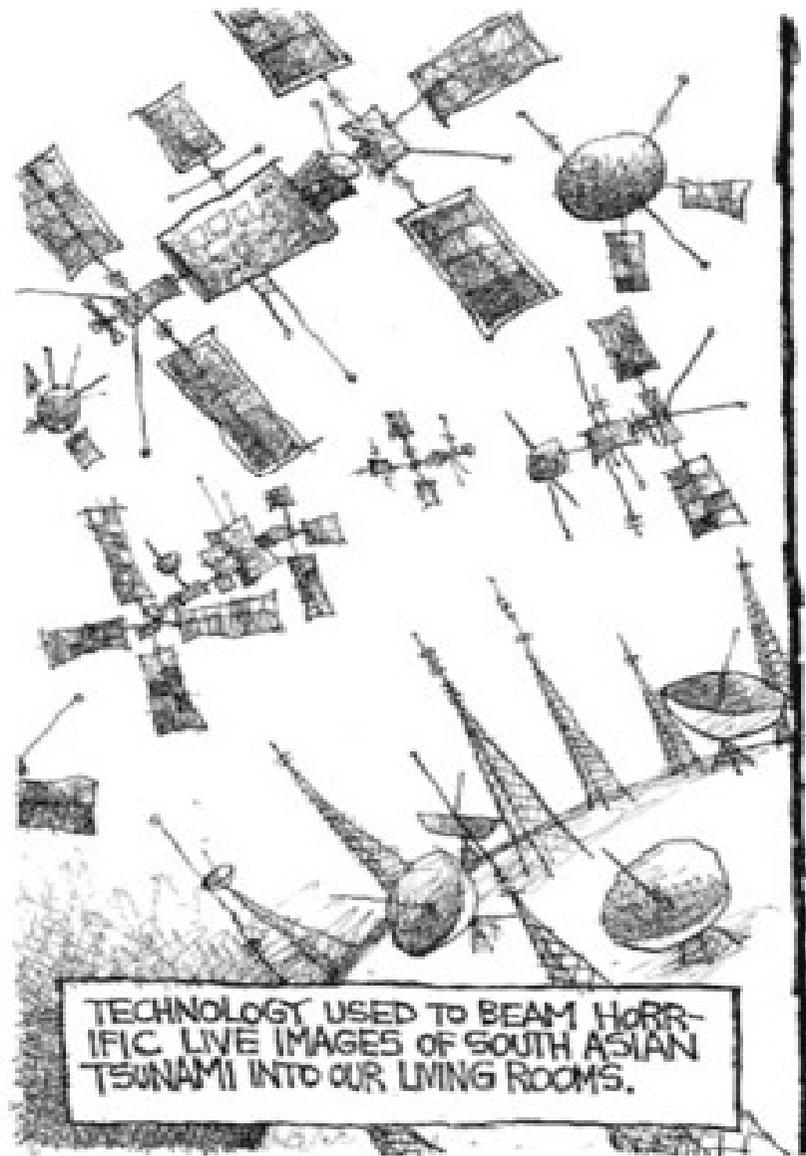


“The Asian tsunami’s death toll could have been drastically reduced if the warning – already known to scientists - was disseminated quickly and effectively to millions of coastal dwellers on the Indian Ocean rim. It is appalling that our sophisticated global communications systems simply failed us that fateful day.”

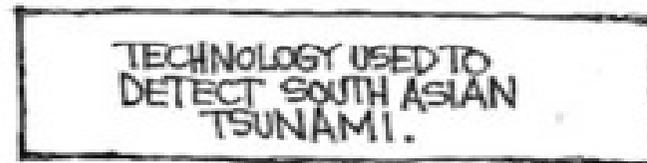
-Sir Arthur Clarke



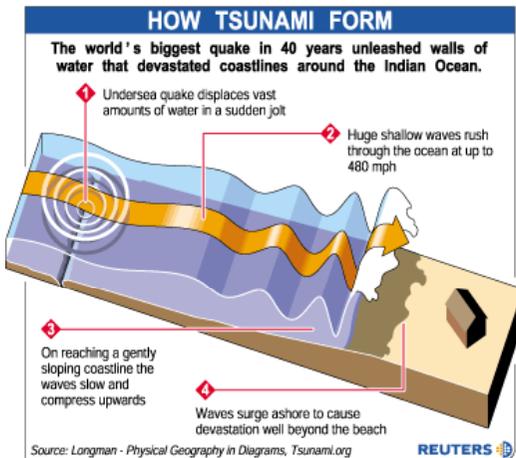
Was this the reason?



THE WIRENUTS
©2004 MATT DAVIES
12/02



While ICTs cannot prevent most hazards...



Hazard

1. A source of danger;
2. An unknown and unpredictable phenomenon that causes an event to result one way rather than another*

Vs.

Disaster

1. A state of extreme (usually irremediable) ruin and misfortune;
2. An event resulting in great loss and misfortune*

... they can reduce the risk of disaster

* Webster online dictionary

ICTs in Disaster Management...



Mitigation, Risk Reduction (through assessment) and Prevention – activities to reduce the chance of a hazard happening or prevent a hazard ending up as a disaster (long term)

Preparedness – plans to save lives or property and help the response and rescue service operations. Includes *Early Warning Systems and evacuation*

Response - actions taken to save lives and prevent property damage and to preserve the environment during emergencies or disasters, in the immediate aftermath. (short term)

Recovery – actions that assist a community to return to the normalcy after a disaster. (short term and long term)

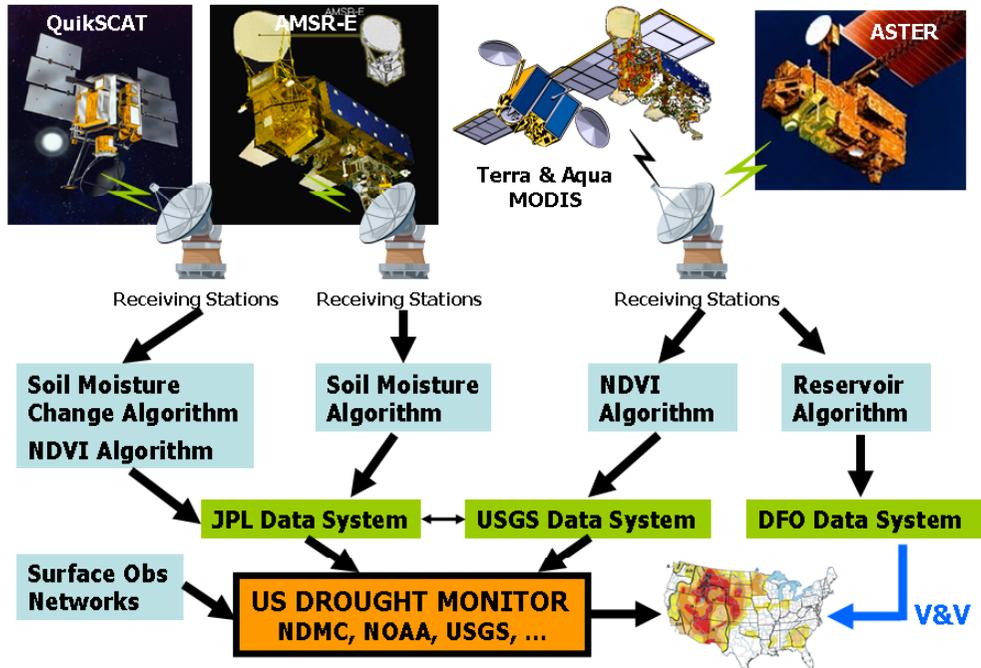
ICTs in Disaster Management...

1. ICTs in **Disaster Risk Reduction** (through risk assessment)

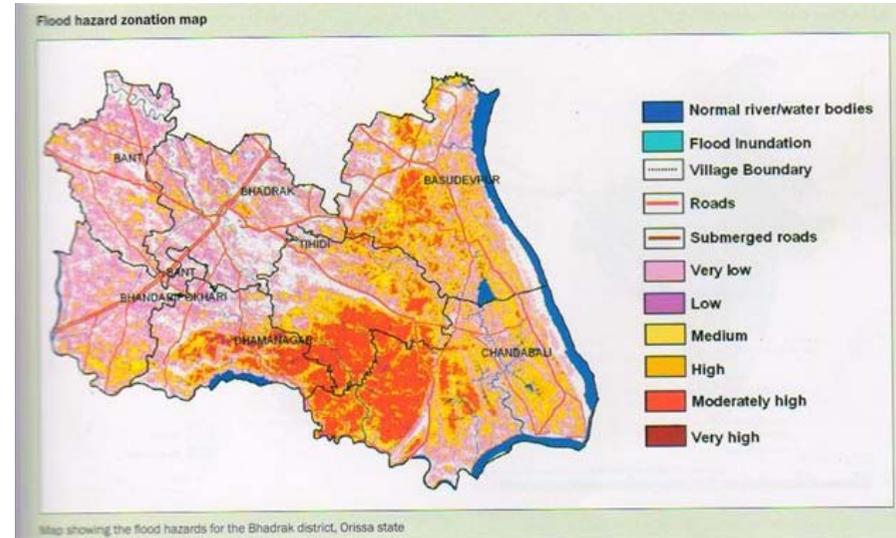
Monitoring disaster possibilities using Satellite communication and GIS tools

1. Drought

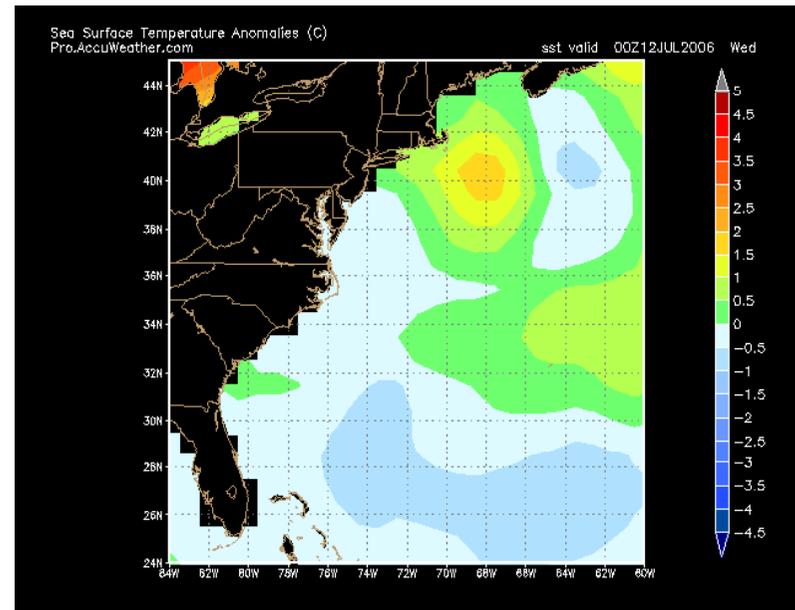
 National Drought Monitoring System Using NASA Data/Results – Wiring Diagram



2. Floods



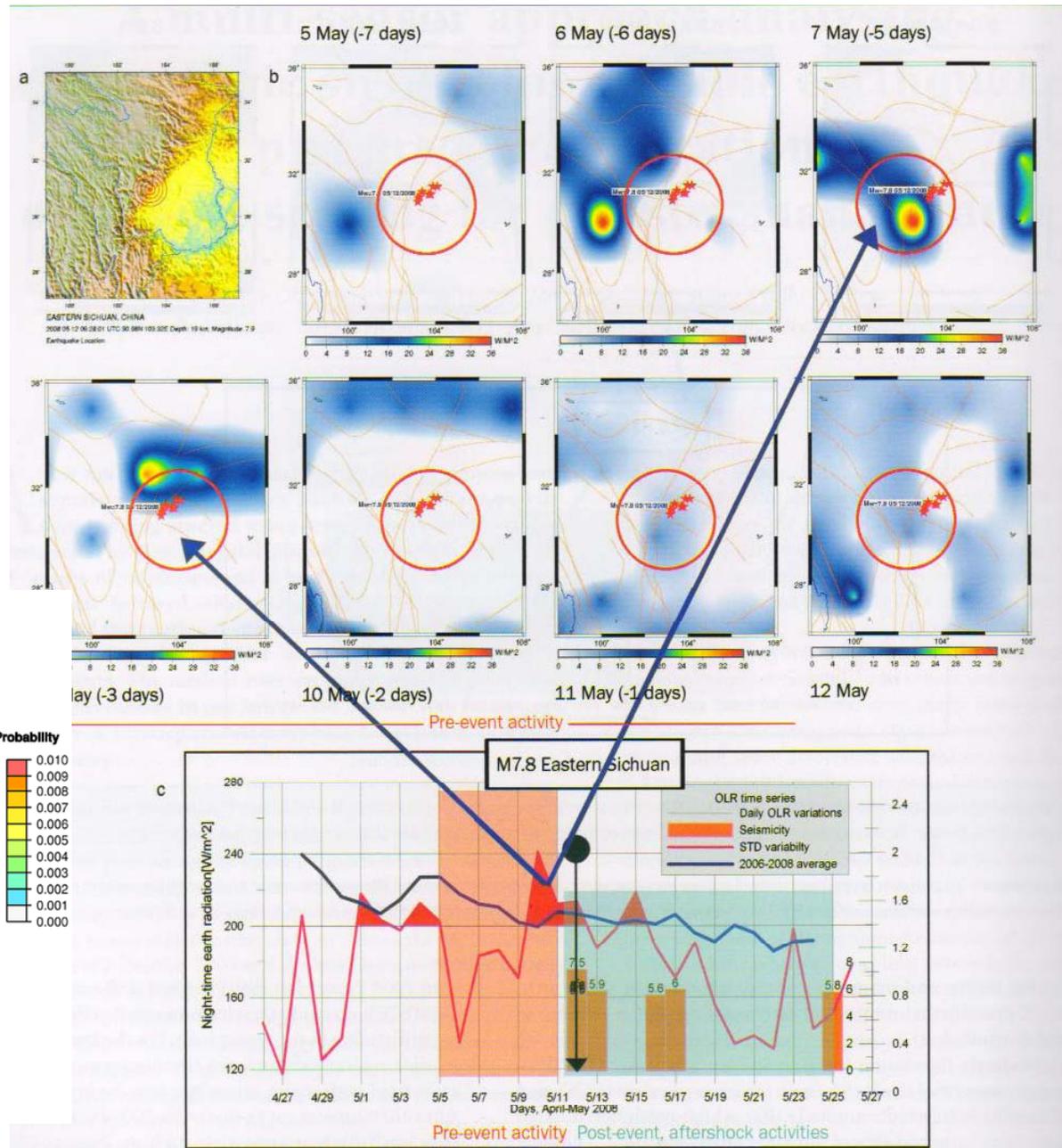
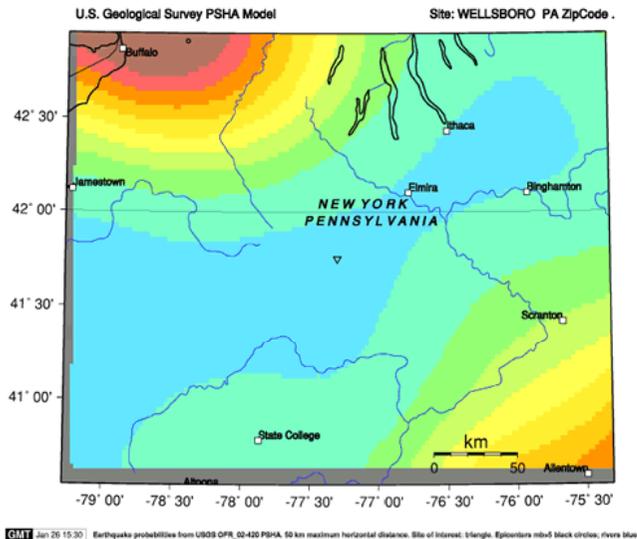
3. Global warming



Monitoring disaster possibilities using Satellite communication and GIS tools

4. Earthquake prone areas

Probability of earthquake with $M \geq 6.01$ within 100 years & 50 km



Daily night time outgoing long wave earth radiation in Eastern Sichuan, China from May 5 -12, 2008

ICTs in Disaster Management...

2. ICTs in Disaster Mitigation and Prevention

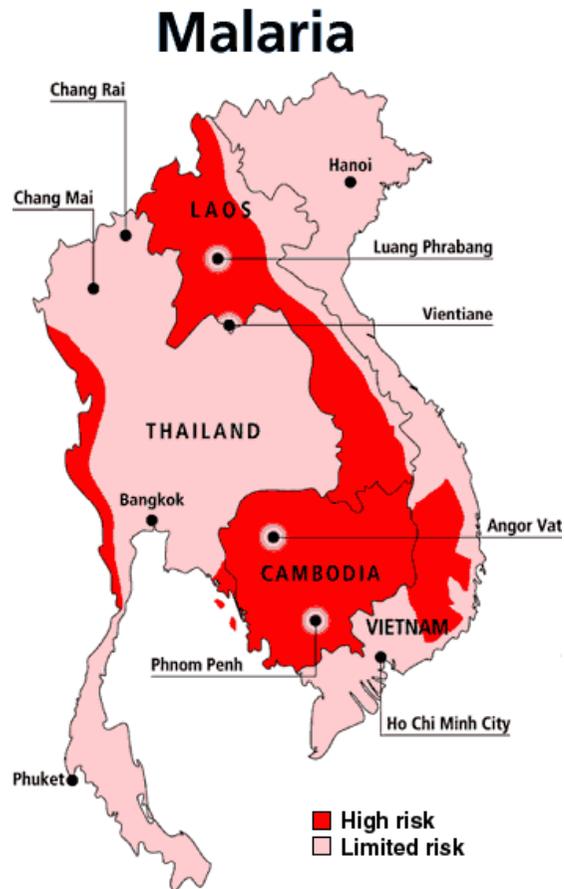
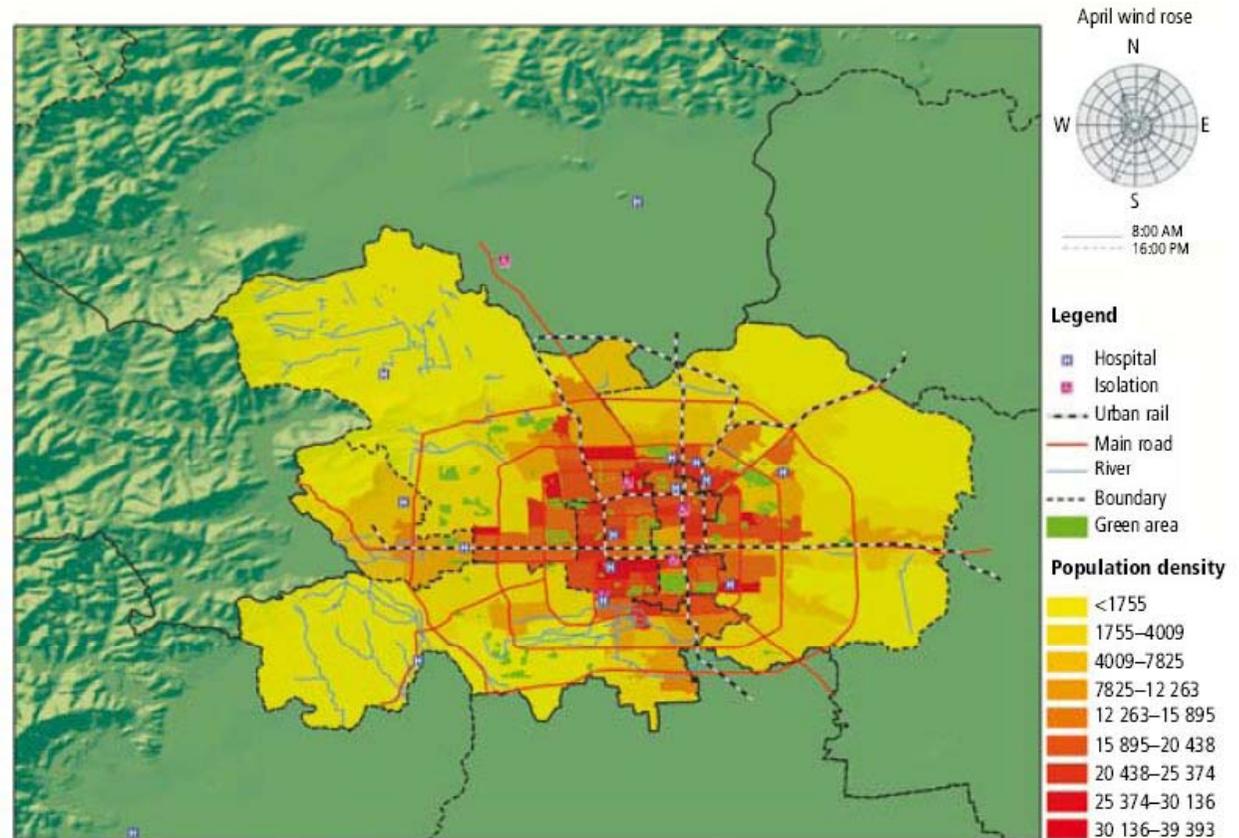


Fig. 1. Map of Beijing's 16 districts, showing features relevant to the spread of SARS^a



^a Population density is indicated by colour, while ring roads, light railways, hospitals and isolation locations are marked as in the legend.

Bio-Surveillance systems:

- Show spreading patterns of critical diseases
- Short term(SARS, Bird Flu) or long term (HIV/AIDS)
- Also address the issue of bio terrorism

Stochastic modelling:

- Mathematical simulations based on real data

Awareness creation:

- o Internet, E-mail, TV, Radio, Mobiles
- o Social networking, blogging

The image shows a YouTube player interface. At the top, the YouTube logo is visible with the tagline "Broadcast Yourself™". Navigation tabs for "Home", "Videos", and "Channels" are present. A search bar is located below the navigation. The video title is "A Brief Introduction to HIV and AIDS: What You Need to Know". The video player shows a woman in a white lab coat. A yellow text overlay at the bottom of the video reads: "A person can pass on HIV before tests show HIV+". The video progress bar shows 1:27 / 8:13. Below the video, the rating is "Rate: ★★★★★ 60 ratings" and the view count is "Views: 27,424". There are buttons for "Share", "Favorite", "Playlists", and "Flag".

The image is a public health poster from The Chinese University of Hong Kong. At the top, the university's name is written in Chinese and English: "香港中文大學 The Chinese University of Hong Kong". The main message is written in large, bold Chinese characters: "為己為人 戴口罩 勤洗手" (Be considerate: wear a mask, wash hands). Below the text is a cartoon illustration of a woman wearing a blue surgical mask and washing her hands at a sink with a running faucet. At the bottom, the English text reads: "Be Considerate: Wear Mask Wash Hands". A yellow banner at the bottom of the poster contains the text: "請留意SARS最新資訊 Watch for the latest news on SARS at www.cuhk.edu.hk/sars".

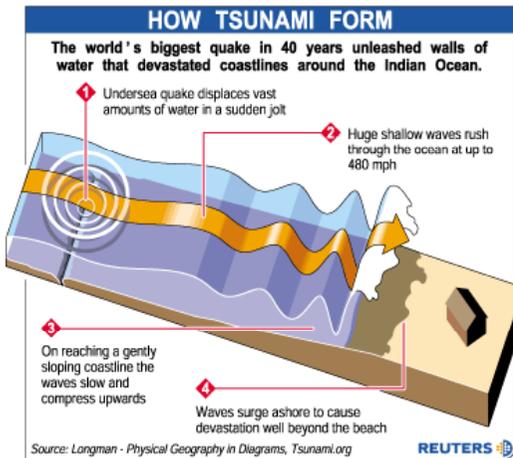
The image shows a "Related Videos" section from YouTube. It lists several videos with their titles, durations, sources, and view counts:

- When HIV Becomes AIDS (HIV #2)**: 03:51 From: [illumistream](#) Views: 48,007
- The most painful symptoms of HIV and AIDS**: 00:29 From: [WorldAidsDayNSW](#) Views: 32,213
- HIV 101**: 10:33 From: [revrobertdavis](#) Views: 32,916
- Ten More Myths About HIV/AIDS**: 12:03 From: [AIDSvideos](#) Views: 10,785

3. ICTs in **Disaster Response**

ICTs in Disaster Preparedness and Response

Rapid Onset Disasters



1/2 hour – 3 days



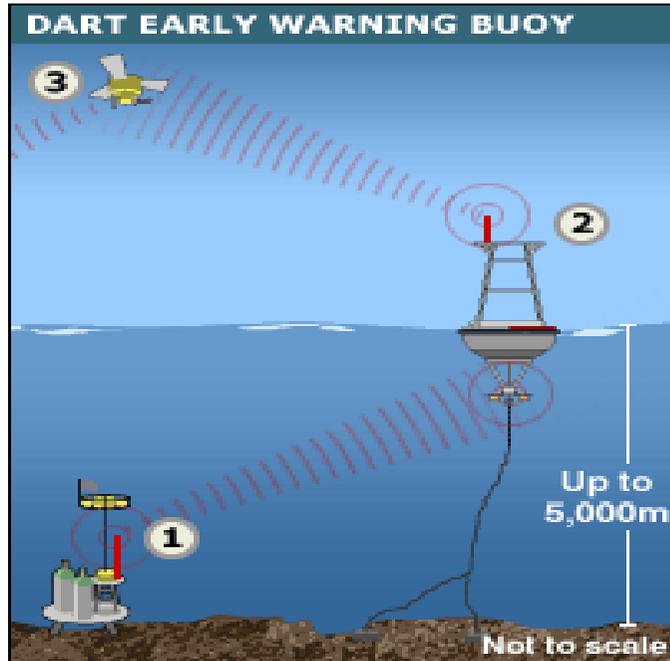
Hazard

Disaster

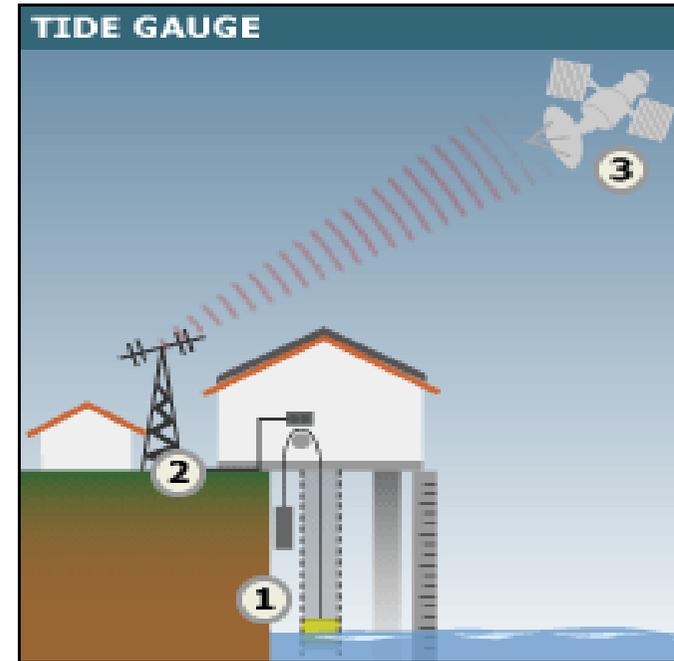
- If $> \frac{1}{2}$ hour disaster warning is not possible
- If < 3 days, it is a different kind of a disaster (drought, epidemic, famine) – needs diverse tools

Early Warning Systems - monitoring

eg. ADPC Tsunami and Multi-Hazard Regional Early Warning System



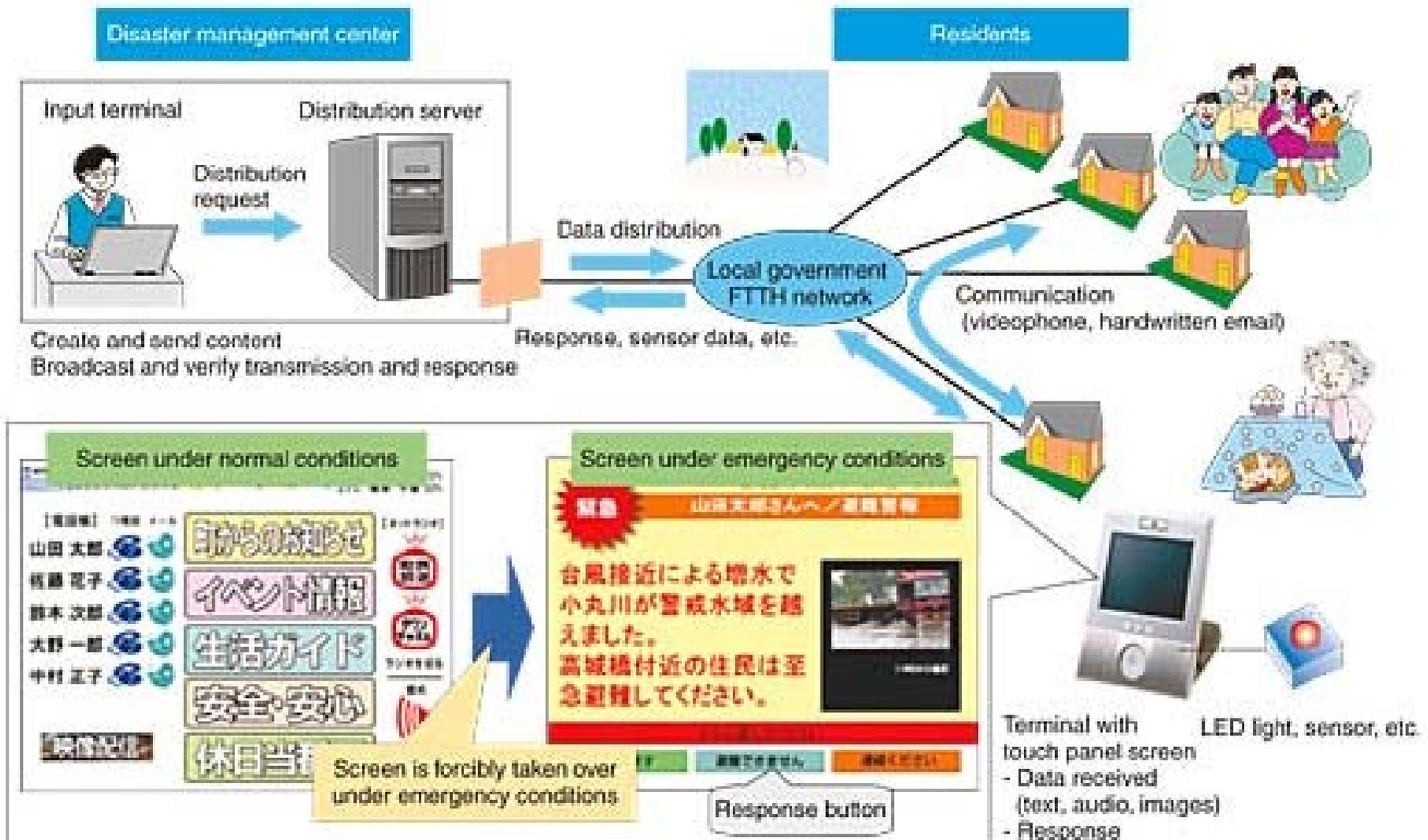
1. Recorder on sea bed measures water pressure every 15 mins - an unusual result triggers a reading every 15 secs.
2. Buoy measures surface conditions and sends this plus data from sea bed to satellite
3. Satellite receives data and relays it to ground stations



1. Float in a "stilling well" tube measures sea level
2. Data is processed and sent to satellite
3. Satellite transmits data to alert centres

Early Warning Systems

It is an end-to-end game...



Just
'monitoring'
hazards will
not help

BBC NEWS [Watch](#) **One-Minute World News**

Last Updated: Wednesday, 19 July 2006, 07:18 GMT 08:18 UK

[E-mail this to a friend](#) [Printable version](#)

Indonesia tsunami system 'not ready'

By Laura Smith-Spark
BBC News

Eighteen months after the devastating Indian Ocean tsunami, hundreds have died after a giant wave struck the Indonesian island of Java.

Their deaths have raised questions about the failure of a

News Front Page



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Asia-Pacific
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Middle East
South Asia
UK
Business
Health



Flood early warning system fails

An early warning system, designed to alert people in Carlisle of impending floodwaters failed during tests.

The £300,000 system came after devastating floods struck the city in January 2005, claiming three lives and leaving thousands homeless.



Floods last January affected more than 2,000 homes and businesses

Saturday's exercise was assessing how quickly residents could install door guards and air brick covers.

Ocean tsunami stem to sound t.

people died ni struck Java's on Monday.



Some villagers say there was little said people had or no warning ahead of the tsunami ng to flee the 2m-high wave triggered by an uake.

Early Warning Systems: Solutions for the 'elusive' Last Mile



1. Radio and Television

Advantages:	Relatively widespread, Low cost, Broadcasting possible, No limits to information
Challenges:	No use at night, non interactive

2. Telephone (fixed and mobile) – voice mode

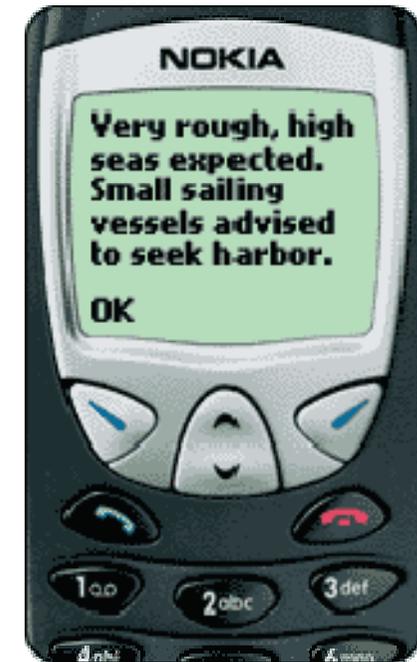
Advantages:	Relatively widespread, Low cost, No limits to information, Interactive
Challenges:	No broadcasting, Issues of authenticity, Don't reach non users, Congestion



Early Warning Systems: Solutions for the 'elusive' Last Mile

3. Mobiles - SMS

Advantages:	Relatively widespread, Low cost, Fast, Can be sent to groups, Customisable
Challenges:	No use at night, no use to non users, limits to information, broadcasting not possible, language issues, congestion



4. Mobiles (Cell broadcasting)

Advantages:	No congestion issues, can address a large group simultaneously
Challenges:	Local language issues, no acknowledgements

Early Warning Systems: Solutions for the 'elusive' Last Mile

Cell broadcasting:

- ❑ Existing feature in GSM, UMTS and CDMA systems. Supported by most phones and loaded in to switches/base stations. But not used.
- ❑ Does not suffer by overload conditions as messages are trafficked over a dedicated cell broadcast channel
- ❑ Messages can be customised, to the level of a cell
- ❑ Messages are authentic. The users knows it comes from a source of authority (unlike an SMS)
- ❑ Can be used for commercial purposes; A good model for a PPP.

Early Warning Systems: Solutions for the 'elusive' Last Mile



5. Satellite Radio

Advantages :

High reachability, broadcasts to a community, no limits to information

Challenges:

Costly if not widely used, Community arrangements required

6. Internet/E-Mail

Advantages:

Interactive, quick, multiple sources, continuous updates

Challenges:

Not widespread in many places, no use at night



Early Warning Systems: Solutions for the 'elusive' Last Mile

7. Amateur Radio and Community Radio

Advantages:	Good for rural, poor and remote communities
Challenges:	Not widespread, People lose interest if used only in case of disaster



8. Non ICTs (sirens, loud speakers)

Advantages:	Can be even used in any environment; useful even at night; good in rural setups
Challenges:	Maintenance of the system, Less authentic

4. ICTs in Disaster Recovery

SAHANA
Disaster Management System

English

Jump to: [Content](#) | [Module Menu](#)

SAHANA MAIN

- Sahana Home
- Camps Registry
- Organization Registry
- Camp Management System
- People Registry
- GIS Mapping
- Missing Person Registry
- Request Management System
- System Administration

Welcome to the Sahana FOSS Disaster Management System

Sahana is an integrated set of pluggable, web based disaster management applications that provide solutions to large-scale humanitarian problems in the aftermath of a disaster. These applications and problems they address are as follows:

- ◆ **Missing Person Registry**
Helping to reduce trauma by effectively finding missing persons
- ◆ **Organization Registry**
Coordinating and balancing the distribution of relief organizations in the affected areas and connecting relief groups allowing them to operate as one
- ◆ **Request Management System**
Registering and Tracking all incoming requests for support and helping donors connect to relief requirements
- ◆ **Camp Registry**
Tracking the location and numbers of victims in the various shelters setup all around the affected area

[Sahana Website](#) and [Brochure](#)

Login

User Name

Password

Done

PageRank

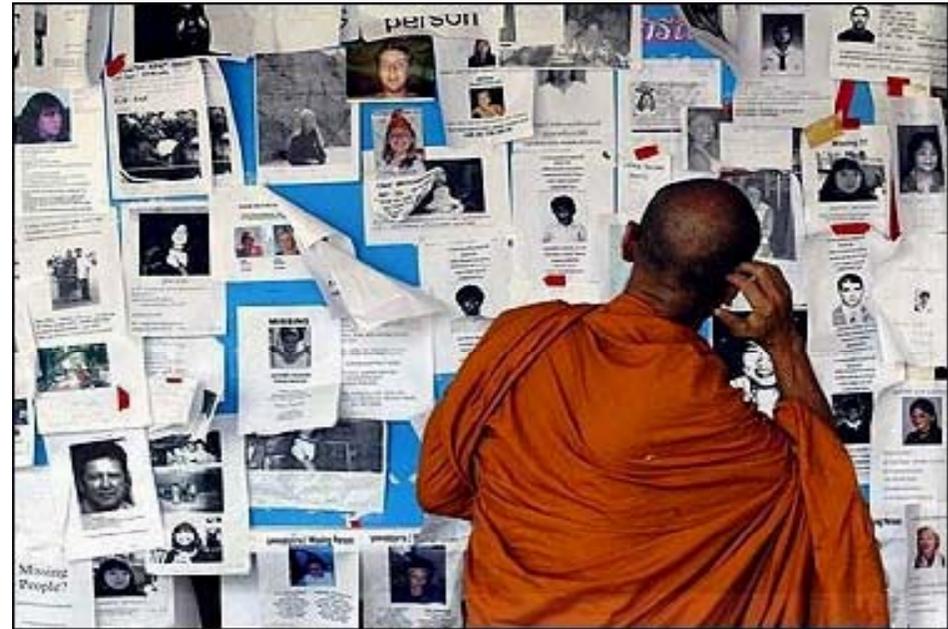
Adblock

Some key project resources provided by World Bank

A Web based portal with sub-applications built to address the common disaster coordination and collaboration problems in a disaster

Finding Missing People

“Please, please help me find my missing parents / child / relative”



IT Solution

- A centralized online bulletin board of victims
- Be able to record all structured meta data on a victim (inc pictures and biometric data)
- Indexing and Searching of all data
- Finding people through cross-referencing

MISSING PERSON REGISTRY

- Home
- Search for a Person
- Report a Missing Person
- Edit a Missing Person
- Report a Found Person

SAHANA MAIN

- Sahana Home
- Camps Registry
- GIS Mapping
- Missing Person Registry
- Organization Registry
- Request Management System
- System Administration

Login

User Name

Password

Login

Key: Fields marked with * are required (entry is compulsory)

Basic Search

Any Card Number

Any Name

Next

Total 10 Records were found

[Next 5 Records >>](#) [Last 5 Records >>|](#)

Picture	Name	Appearance	Missing Details	Status
	Master Yoda Yoda Yoda	Height : .66 Meters Weight : unknown Eye Colour : Light Brown Skin Colour : Other Hair Colour : Other	Last Seen : swamp planet of Dagobah	Missing (Click to change to found)
Audit	Add a tracker			
	Yoda Cartman Cartman Yo Cartman	Weight : infinity Eye Colour : Black Skin Colour : White Hair Colour : Unknown	Last Seen : south park Comments: Really fat	Missing (Click to change to found)
Audit	Add a tracker			

Done

The People Registry helps track and find missing, deceased, injured and displaced people and families

Coordinating Relief

“It is all a huge mess!”

“I get 1,000 packs of dry rations. Where I can send them?”

“You have sent all food to zone A while people starve in Zone B”

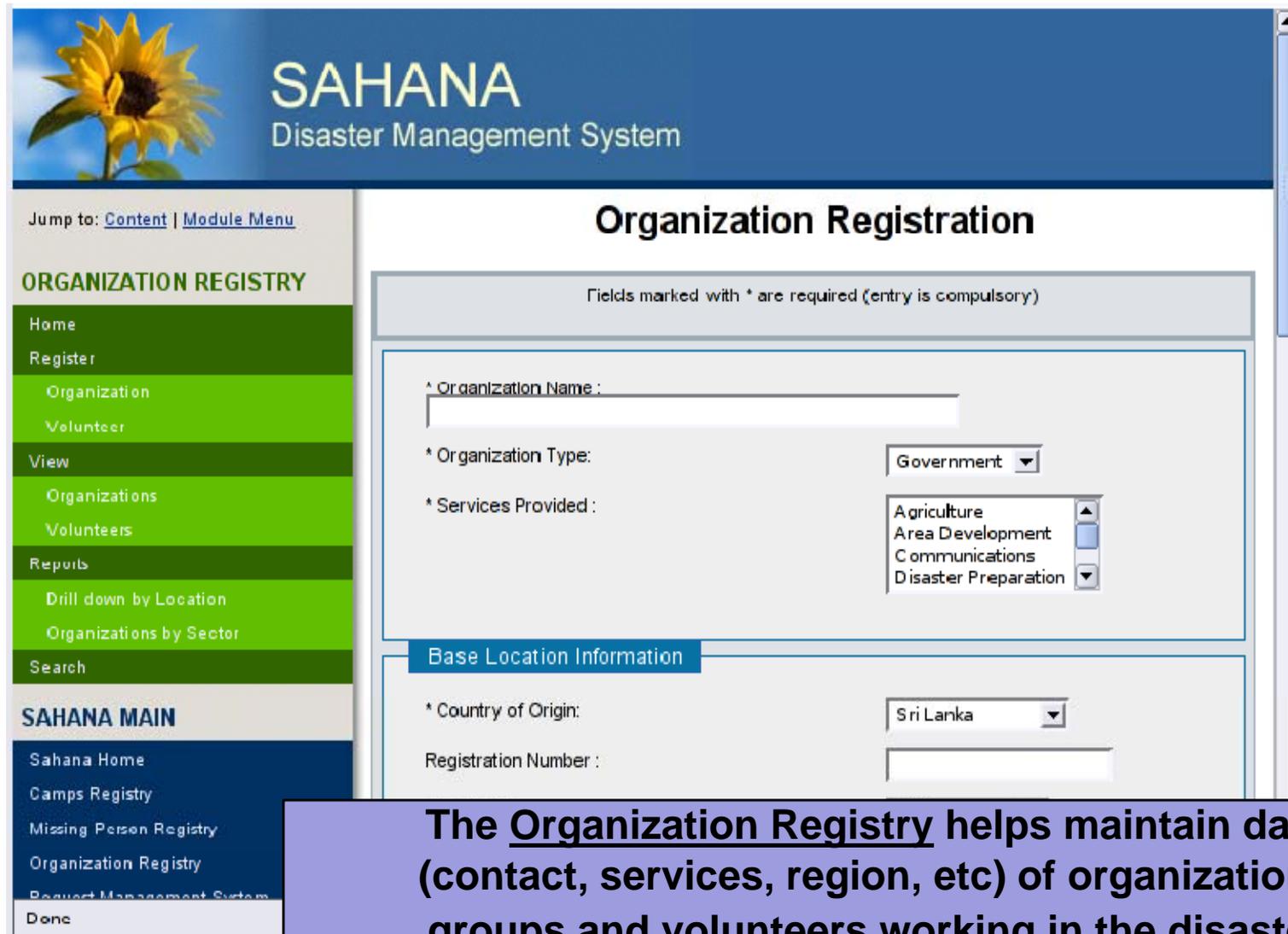
“Don’t send any more clothes; we have plenty of them. Send fresh water!”



IT Solution

- A contact list of orgs and the services they provide
- Reporting to ensure a balanced distribution and coverage of services and relief groups

Coordinating Relief



The screenshot shows the SAHANA Disaster Management System interface. The header features a sunflower logo and the text "SAHANA Disaster Management System". A navigation menu on the left includes "ORGANIZATION REGISTRY" with sub-items like "Home", "Register", "Organization", "Volunteer", "View", "Organizations", "Volunteers", "Reports", "Drill down by Location", "Organizations by Sector", and "Search". Below this is the "SAHANA MAIN" section with links to "Sahana Home", "Camps Registry", "Missing Person Registry", "Organization Registry", "Request Management System", and "Done". The main content area is titled "Organization Registration" and includes a note: "Fields marked with * are required (entry is compulsory)". The form fields are: "* Organization Name:" (text input), "* Organization Type:" (dropdown menu with "Government" selected), "* Services Provided:" (checkbox list with "Agriculture", "Area Development", "Communications", and "Disaster Preparation"), "* Country of Origin:" (dropdown menu with "Sri Lanka" selected), and "Registration Number:" (text input). A blue tab labeled "Base Location Information" is visible above the "Country of Origin" field.

The Organization Registry helps maintain data (contact, services, region, etc) of organizations groups and volunteers working in the disaster

Web 2.0 tools – Social Networking

facebook Home Profile Friends Inbox 1 Chanuka Wategama Settings Logout

Help the Sichuan, China Earthquake Victims / 帮助四川地震灾民
Global

Basic Info
Type: Common Interest - Current Events
Description: EARTHQUAKE QUICK FACTS:
Date: May 12, 2008
Location: Sichuan
Magnitude: 8.0
Dead: 69,196; Wounded: 374,176;
Missing: 18,385; Homeless: 4.8 million
Rescued: 6,541
Orphans: ~5,000; Elders left without caregivers: ~4,000

Relief efforts are underway, and now is the time for us to act.

This group is dedicated to helping the ongoing Earthquake Relief effort in China.

For the most up to date news regarding the Earthquake, join
<http://www.facebook.com/group.php?gid=13546698426>

Recent News

* DONATIONS CAN NOW GO DIRECTLY TO CHINA THROUGH THE CHINESE CONSULATE GENERAL:
<http://www.nyconsulate.prchina.org/eng/xw/t434656.htm>

* AS RELIEF EFFORTS TURNS INTO REBUILDING EFFORTS, PLEASE CHECK THE BOTTOM OF THE PAGE FOR DETAILS ON HOW YOU CAN HELP WITH REBUILDING IN SICHUAN

HandReach is a non-profit organization that helps rebuild schools and fund educational supplies in rural China. When you make the donation, specify that it is for Sichuan and everything will take care of itself.

Donations can be made by check or Paypal at:



[View Discussion Board](#)
[Join this Group](#)

Share +

Events
1 past event [See All](#)

[Prayer and Donation for Victim...](#)
New York, NY
Saturday, May 17 at 7:00pm

Related Groups

[Feed a Child with just a Click!](#)
Common Interest - Beliefs & Causes

[Let's break a Guinness Record! 2009 Approved by guinnessworldrecords.com](#)
Entertainment & Arts - General

[The Largest Facebook Group Ever](#)
Just for Fun - Facebook Classics

[GOOD NEWS! HOW TO GET THE OLD FACEBOOK BACK! :\)](#)
Common Interest - Self-help

Conclusion: Fortunately it does not have to be one technology over another...

	Risk Reduction	Mitigation and Prevention	Preparedness	Response	Recovery
GIS	√√√	√√√	√√		√
Analytical tools	√√√	√√√	√		√
Blogging			√√		√√√
Internet	√√	√√	√√	√√	√√√
Mobile (voice)			√	√√√	√√√
Mobile (non-voice)				√√√	√√√
Open Source	√√	√√			√√
Satellite Communication	√√√	√√√		√√√	√√√
Web 2.0, Social Networking			√	√	√√√
TV, Radio			√√	√√√	√√√

√√√ = Very important;

√√ = important

√ = relevant

Conclusion: Other issues (which ICT might not solve)...



- Extremely limited time to respond (eg. 2006 tsunami in Java)
- Delays in decision making / issuing warnings; coordinating problems
- Evacuation issues (eg Katrina)
- Uncertainty in warnings (eg Floods in Bangladesh, 2008)
- Irrational human behaviour during evacuations
- Lack of shelters to evacuate (eg pre-'90 floods in Bangladesh)
- Loss of livelihoods
- Loss of property

Conclusion:



**"A chain is as strong as its
weakest link"**



Thank You!

chanuka@lirneasia.net

chanuka@gmail.com

chanuka@hotmail.com