

Trust Issues in Disaster Communications



Yamada Town, Iwate, 20 April 2011

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9 Mar. 2017

An office in Disaster Case in Iwate Fisheries Technical Center



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Experiences in emergency response

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At 2:46pm on March 11, 2011



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Experiences in emergency response

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Office after Tsunami



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Experiences in emergency response

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What happened at the Office

- Iwate Fisheries Technical Center
 - ceiling panel fell down, PCs fell down
 - People headed up to the roof of 3-story bldg
 - Came down to have a warm room with potbelly stove <http://www.sozailab.jp/sozai/detail/1605/>
 - Real tsunami was more than one can imagine
 - A disaster kit:



- boots with a thick sole are useful
- Life jacket would not be usable in the rubble

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Experiences in emergency response

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Physical Management of Information

- The first floor(ground floor) was flooded
- Computers were soaked in seawater
 - Washed hard discs with pure water
 - some of the disks' data were recovered successfully but others' were not
 - USB stick memory with a cap protected data almost perfectly
- documents on paper
 - dirty water→get moldy→smell→discard
 - need to be digitalized
 - need to clean and preserve paper documents

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Experiences in emergency response

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Outline

1. What had happened and findings
2. Support required at disaster
3. Support organization
4. Some results from our experience
5. Issues of disaster communications
 - trust issues
 - distrust issues
6. Disaster communications
7. Future work

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Damage caused by the 3.11 disaster



- Tohoku Region:
 - Deaths: 15,818
 - Missing: 2,709
 - Injured: 4,681
- Iwate:
 - Deaths: 4,673
 - Missing: 1,173
 - Injured: 208

Reference:

1. National Police Agency
<http://www.npa.go.jp/archive/keibi/biki/higaijokyo.pdf>
Dec. 26, 2012

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History of Disaster from Tsunami in Iwate

June 15, 1896

March 3, 1933

May 23, 1960

March 11, 2011

Local wisdom: Tsunami "TenDenKo"
But still a great number of death

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What had happened- on 3.11 2011

- no communication line available
 - wired telephone line: no
 - wireless: some with temporary base stations
 - Limited telephone access
 - Non-limited packet-switched access
 - limited electricity
 - battery charging was a problem
 - No "never-die" networks

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Findings:

What is needed for Disaster Information System

- ✓ Need a standard format
 - Safety information
 - Information on sufferers: family, shelter
 - Shelter
 - Good Distribution: never be well-planned
 - Medical information: the disaster weak
 - donation: traceability
- ✓ Open Source: e.g. *Sahana*^[2,3]
 - Pros: Community of software developers
 - Cons: Open source needs to deal with local language
- ✓ Need a well-known interface
- ✓ Killer Application for Cloud Computing!

[2] Paul Currion, Chamindra de Silva and Bartel Van de Walle: Open source software for disaster management, *Comm. Of The ACM*, Vol. 50, Issue 3, pp.61-65 2007

[3] Sahana Japan: <http://www.sahana.jp/>

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Findings:

What is needed for disaster communications

speed

rhythm

trust

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Support for Iwate



Iwate is large:

- Iwate: 15,278.40 km² (5,899.02 sq mi)
http://en.wikipedia.org/wiki/Iwate_Prefecture
- Connecticut: 14,357 km² (5,543 sq mi)
<http://en.wikipedia.org/wiki/Connecticut>

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Technical Support required at Disaster

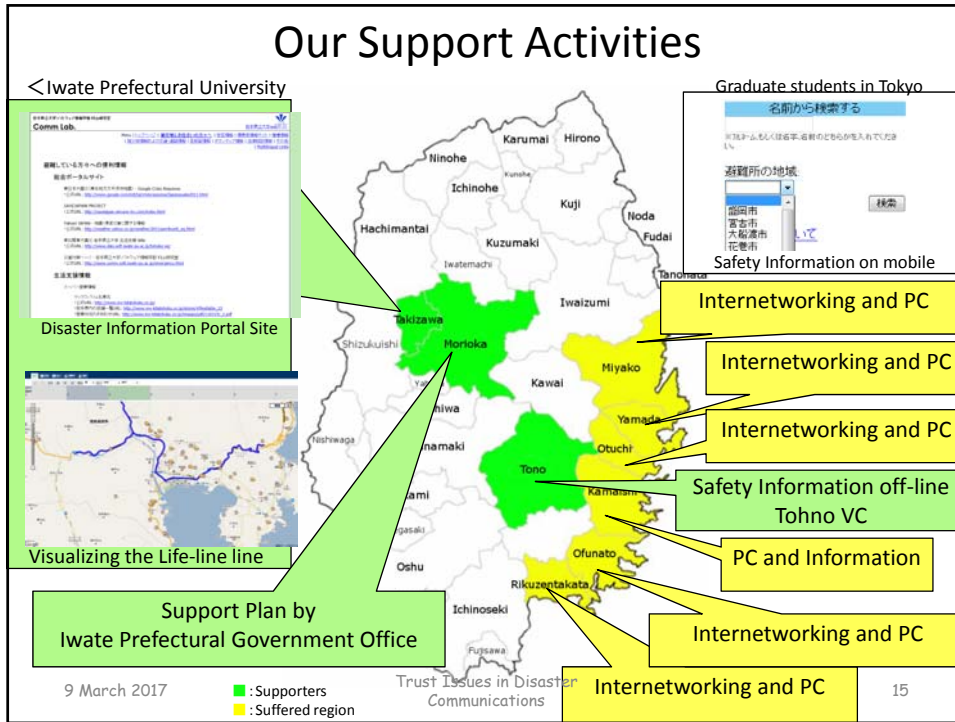
1. **Information acquisition and provision:**
 - People search: safety information: on-line, cell phone, off-line
 - Visualizing Lifeline information: e.g.) road condition, transport, electricity, water supply etc.
 - radioactivity, shopping and daily-life-related
 - portal sites of disaster information: www.go-iwate.org
 - No. of access: 5,892 (as of 12:30 Mar. 2, 2012)
2. **Networking for information infrastructure:**
 - internetworking with communication links
 - IT environment with PCs and printers
3. **Shelter information management for a local government**
 - List of people in a shelter: name/age/family/address
 - An information system for food and goods distribution
4. **Volunteer Support**
 - Tohno Volunteer Center: e.g.) local information for visitors

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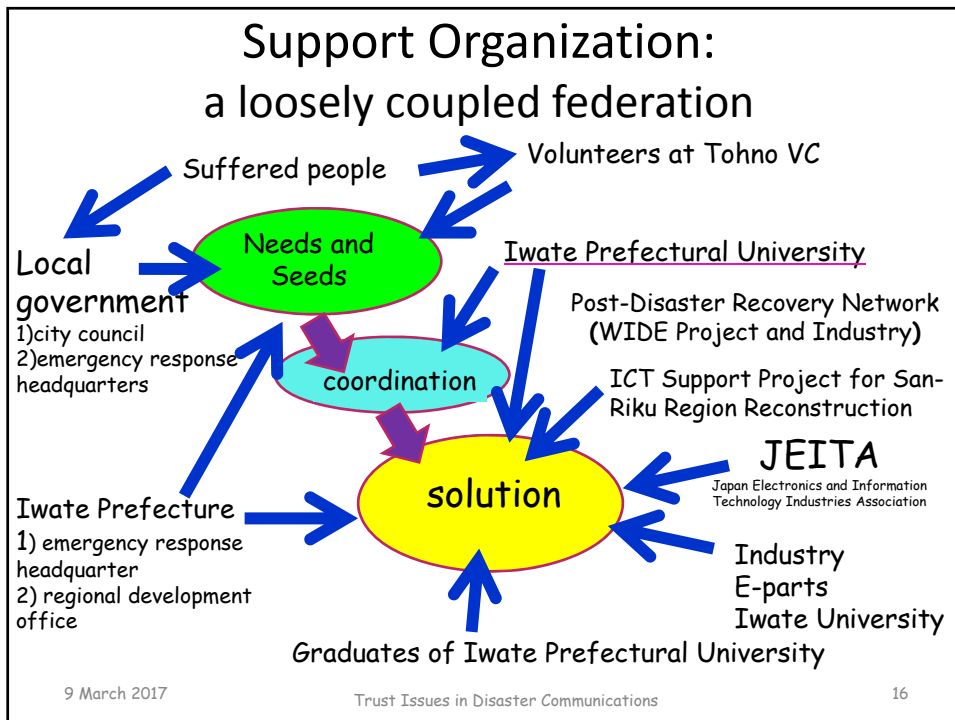
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Our Support Activities



Support Organization: a loosely coupled federation



Case Study: networking at disaster

Loose Cabling: so as to remove easily later



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ICT was not required desperately

1. Providers' viewpoint:
 - IT should be required
2. Need to understand the real need
 - Supporters and Cars, first
 - And then, ICT
3. Organizational Protocols
 - Hierarchy and independence of local governments
 - ◆ e.g.) convincing the need for networking
 - ◆ Prefectural offices: 1) emergency 2) normal
 - ◆ Local government offices: a) emergency b) normal

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Disaster Communications

Risk Communications

vs.

Disaster Communications

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Disaster Communications

- ✓ Risk Communications (e.g. nuclear plant, disaster prevention)
 - ✓ residents
 - ✓ specialists
- ✓ Disaster Communications
 - ✓ sufferers
 - ✓ volunteers
 - ✓ Administrative offices
 - ✓ Supporters:
 - organizations
 - individuals

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Nature of Disaster Communications

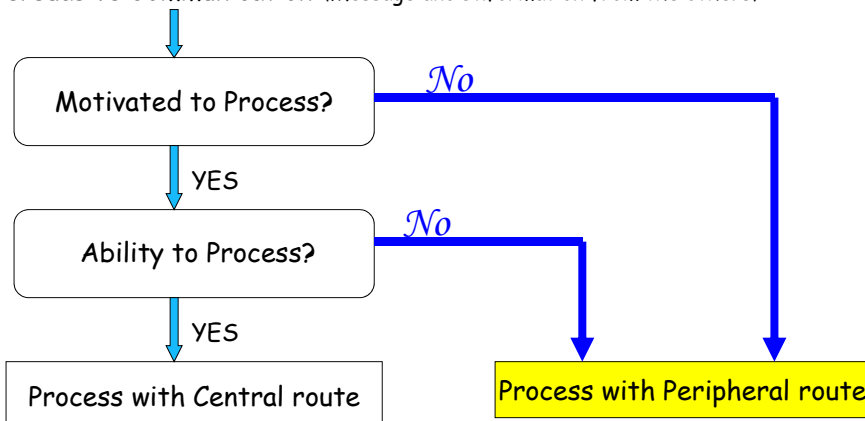
the same purpose but hard to cooperate

- ✓ Heterogeneity of people
 - Background, volunteer vs. business
- ✓ Most of us are novices
 - Need to deal with the matters without experiences
- ✓ Fatigue
 - Travel distance to go
 - A-few-hour sleep without weekend
- ✓ Communications with unknown people
 - Easy to misunderstand
- ✓ Need for decision-making in changing circumstances
 - No best optimized solution
- ✓ None knows the true needs
 - ICT is a part of solution
- ✓ Don't expect appreciation
 - No time; things keep happening one after another
 - Multiple issues to deal with at the same time



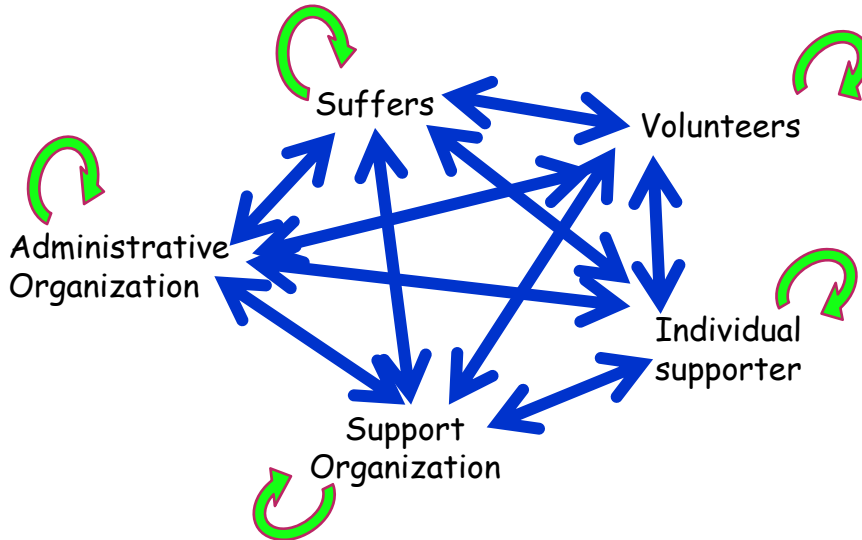
Elaboration Likelihood Model (ELM)^[4]

Persuasive Communication (Message and Information from the others)



[4] Petty, R. E., & Cacioppo, J. T. :Attitudes and persuasion: Classic and contemporary approaches. Dubuque, IA: William C. Brown 1981

Trust required in Disaster Communications



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Anshin vs. Trust

[5] Yamagishi, T. & Yamagishi, M.: Trust and commitment in the United States and Japan, *Motivation and Emotion* 18(2), pp.129-166 1994.

the community with Anshin:
there is no need for trust because no one
is supposed to deceive the other



the community with Trust :
judge the others based on the
information

Might be
deceived

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What we need is Trust

- Basic Factors of Cognitive Trust:
 1. Competence
 2. Integrity
 3. Benevolence
- Salient Value Similarity (SVS) model [6]

[6] Earle, T. C. & Cvetkovich, G. (1995). *Social trust: Toward a cosmopolitan society*. Westport, CT: Praeger Press.

the asymmetry principle of Trust

trust building
vs.
trust destroying

[7] Slovic, P. :Perceived risk, trust, and democracy.
Risk Analysis, 13, 675-682 1993

Distrust

- ✓ antonym of Trust:
 - Absence of Trust
 - Not Distrust
- ✓ cognitive trust vs. emotional trust
- ✓ Distrust is emotional part of trust

Distrust in Disaster Communications

- ✓ Easy to get distrust
- ✓ Need to have trust-processing
- ✓ Collaboration with the Salient Value Similarity (SVS) model

Related Work: Emergency Management

- **History:** the Office of Emergency Preparedness (OEP) in the Executive Office of the President
 1. a prototype Delphi System (1970)
 2. Emergency Management Information System for the Wage Price Freeze (EMISARI) (1971)
 - 200 to 300 users to exercise coordinated response to crisis situations
 - the companion PREMIS system: for collaborative actions
- **Crisis management:**
 - a highly flexible but also structured group communication system is required

[8] Murray Turoff: Past and future emergency response information systems, Comm. of the ACM Vol. 45 No. 4, April 2002

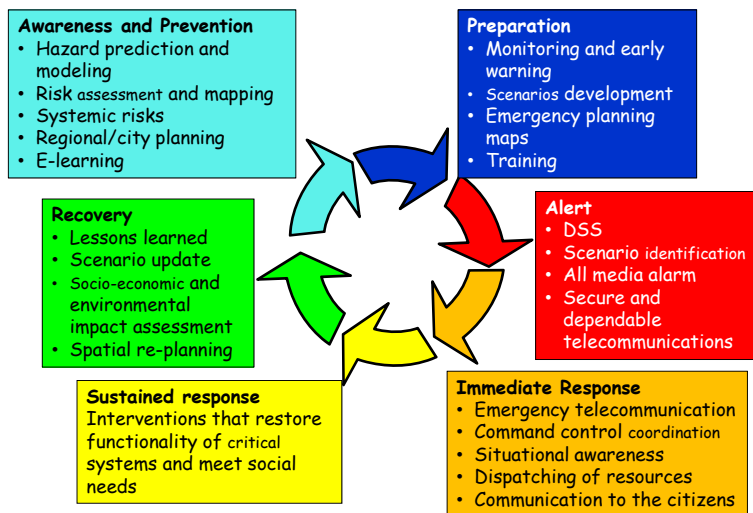
[9] Van de Walle, B., Turoff, M. and Hiltz, S.R. eds.: Information systems for emergency , M.E. Sharpe 2010

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The Integrated Disaster Management Cycle



Hiltz, S. R., Van de Walle, B. and Turoff, M. : The domain of emergency management information, in *Information systems for emergency management*, Van de Walle, B., Turoff, M. and Hiltz, S.R.eds pp.3-20 (2009). The original figure was produced by Guy Weets.

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from Short-term restoration to Long-term reconstruction

- ✓ Disaster Information System
 - Short term: safety information, lifeline, shelter, volunteer activity, goods distribution
 - Long term: care, jobs, housing, education, community, transport
 - ICT environment
 - From shelters to houses
 - Local governments
 - Public transport
- ✓ From infrastructure to applications
 - Reconstruction watcher
 - TanoHata Village Tsunami Museum
- ✓ Sustainable support: business models
 - Welcome to Project Fumbaro Eastern Japan
 - Amazon: wish list

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Recovery Watcher (Yamada, Kamaishi)



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Setting a PC and a web camera



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Thank you

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