CONTRIBUTION TO SOCIETY: The evolving role of risk reduction research

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Abstract: The needs of society and the role of disaster risk reduction research are constantly evolving. Over the next couple of decades there may be an increased focus on preparedness for very large, complex events – catastrophes. Moreover, motivation to implement the proposed actions to mitigate the risk of loss may increasingly need to be justified by the expected reduction in the risk of damage.

Western Institute for Catastrophic Loss Reduction (ICLR)

Experience of the past decade

Over the past decade:

* 4,300 disasters around the world
* more than 1 million killed by disaster
* more than $1.2 trillion in direct damage
* more large complex events

Increased focus on large disasters

Disasters occur every day, on average, somewhere around the world (4,300 disasters in 3,650 days).

* no longer exclusively rare, high consequence events

* modern media coverage also changing disasters

* disaster experts increasingly focus on large events

Over time the disaster risk reduction research community will likely be asked to increasingly focus on large disasters/catastrophes – $100+ billion in direct damage or more than 1 % of national GDP.

Reduced focus on fatalities

Improved warning systems, better construction practices and changes in lifestyles have significantly reduced the risk of disaster fatalities around the world.

* most disaster fatalities are in developing countries

* elsewhere disasters account for less than 1 % of fatalities

* reduced fatalities seldom is enough to secure mitigation

Because of our success, increasingly there is greater scope for society to achieve reduced risk of preventable loss of life by focusing on non-disaster perils, like traffic fatalities or cancer.

Increased focus on protecting property

For several decades there has been an alarming increase in the direct damage from disasters.

* largest losses in developing countries as a share of GDP
* largest losses in developed countries in dollar value
* many factors involved, with climate change soon to come

Modest additional investments in the construction of new buildings and infrastructure can significantly reduce the risk of failure. A greater challenge is retrofits for existing buildings and infrastructure. Most disaster fatalities come from vulnerable buildings.

Increased focus on complex events

Catastrophes are more complex than daily disasters.

* many essential systems may fail at the same time
* many stakeholders need assistance but have unique needs
* relatively little international experience and lessons learned

The role the research community is not clear at this time. High level general advice (e.g. disasters are becoming more complex) may have little impact on the behaviour of decision makers. High quality research on narrow elements of a complex event may also be difficult to turn into action. Case studies appear promising.

northumbria UNIVERSITY

Disaster and Development Centre

A Sociology of Disaster and Development (Disaster Risk Reduction) and its Contribution to Society

Symposium on Collaborative Research and Education in Safety and Security Areas, Kyoto University, 12th March, 2013

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Overview

1. Society in disaster risk reduction

2. Examples of social organisation for disaster risk reduction and development

3. Limitations and challenges in the current contribution of disaster risk reduction to society

Disaster, Development and Risk in Society

1. Disaster Risk = Hazard probability x Expected Loss
Loss Mitigation

or

2. Disaster Risk = Hazard x Vulnerability
Capacity

or

3. Disaster Risk = Unsustainable Development
Capacity for Sustainable Development

or

4. Disaster Risk Reduction as Development =
Risk Conscious, Wellbeing Motivated Sustainable Development

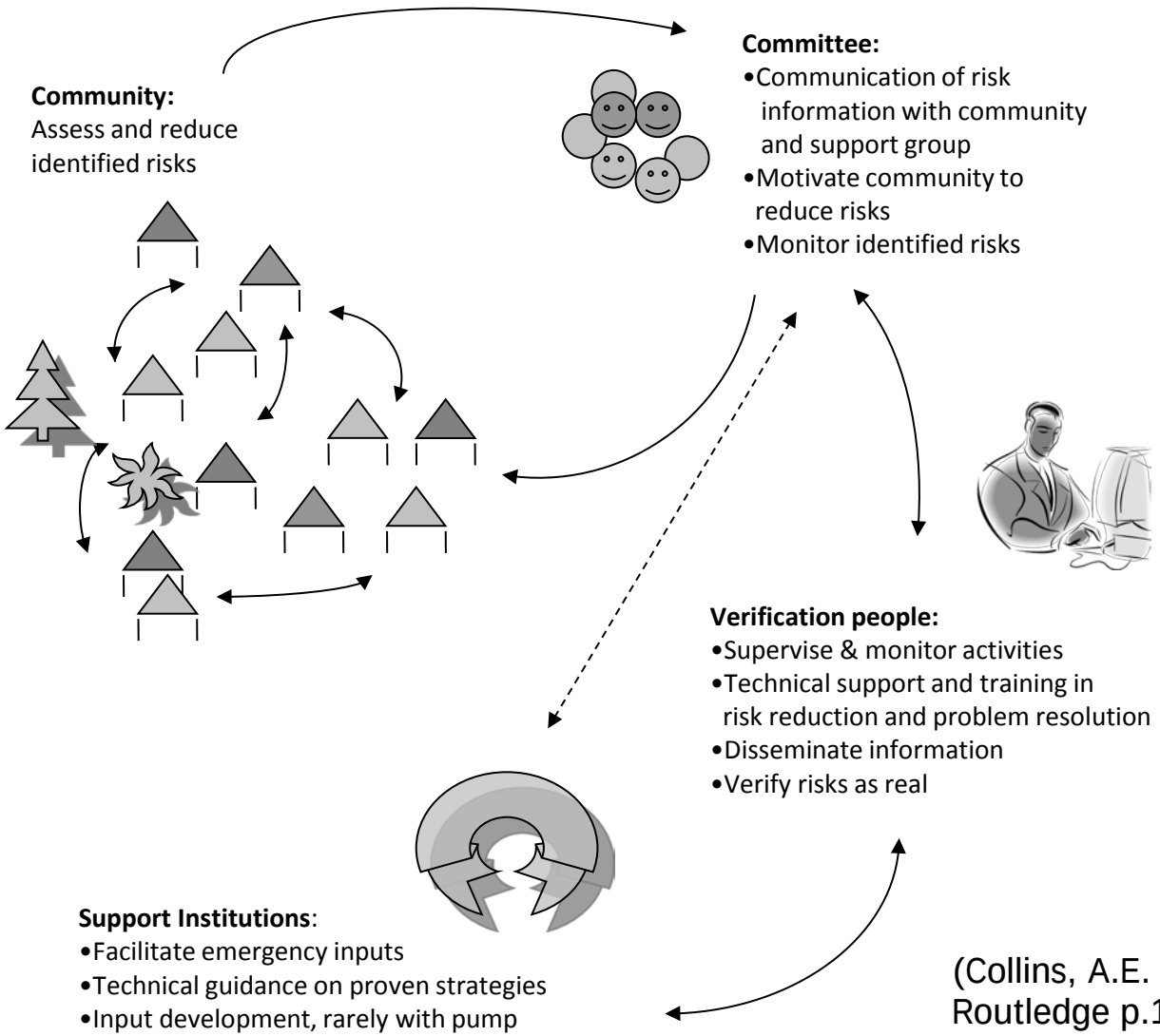
Societal Contributions

2. Examples of social organisation operational in disaster risk reduction and development

- People centred approaches
- Health centred approaches
- Stakeholder approaches
- Resilience approaches
- Rights based approaches
- Communications systems (social media)
- Humanitarian systems

i.e. Community Risk Engagement Processes

Additionality: i) helps build system that can be adapted to multiple risks, ii) improve overall household wellbeing rather than just control risks.



(Collins, A.E. 2009 *Disaster and Development*, Routledge p.151)

The Community Risk and Resilience Approach

- Community based risk and resilience assessment is the beginning of a process whereby local people take the lead in building their capacity to manage their own disaster risk reduction processes.
- It can produce a high level of engagement at community level.
- Political context within which it operates has a crucial influence – gates open and close.
- Broad concept of community involvement in risk reduction is not new but is hugely under-utilised, awaiting wider sets of experiences.
- Links rights, representation, knowledge, capacity and disaster risk reduction.

3. Limitations and opportunities of disaster risk reduction (DRR or D&D) for society

- Limited notions of vulnerability and vulnerable groups
- People desire more than to be resilient
- Raising expectations without sufficient results
- Lessons unlearnt
- Limits of experiential learning
- Small investment in uncertainty science – working with unknown
- Missed opportunities for early action
- A tendency to accept well known risks and injustices
- Weak cross-thematic conceptualisation – i.e. DRR and CCA
- Tendency for game playing – competitive behaviour with demise of communalism or cooperation and shared vision
- Limited cross-cultural interpretations of disaster and development in society

Concluding Comments

- DRR can impact favourably on society, but usually when people in society are in control of it's design
- Social organisation for D&D (DRR) involves the emergence of people centred strategies that are unique in 'place and time'
- It is time to address the limitations and opportunities of institutionalised DRR and associated concepts in terms of developmental contributions to society.

Technology and Society – Synergetic Relationship Contributing to innovations in Society: Experience from GCOE HSE Mumbai Project

Bijay Anand Misra
Professor Emeritus, School of Planning & Architecture, New Delhi, India

International Forum on Research Institutes for Disaster Risk Reduction

DPRI, Kyoto University 11-13 March 2013

Challenging Scenario of DRR

Despite advanced technologies available for DRR, why disaster losses are increasing mainly in the Developing Countries?

What are the major bottlenecks in implementation of the available technologies ?

How best such bottlenecks can be removed and quickly?

How the role of DRR research institutions can be more meaningful in the context ? From labs to real world field situations.

Science , Technology & Society Movement and DRR Research Instituions

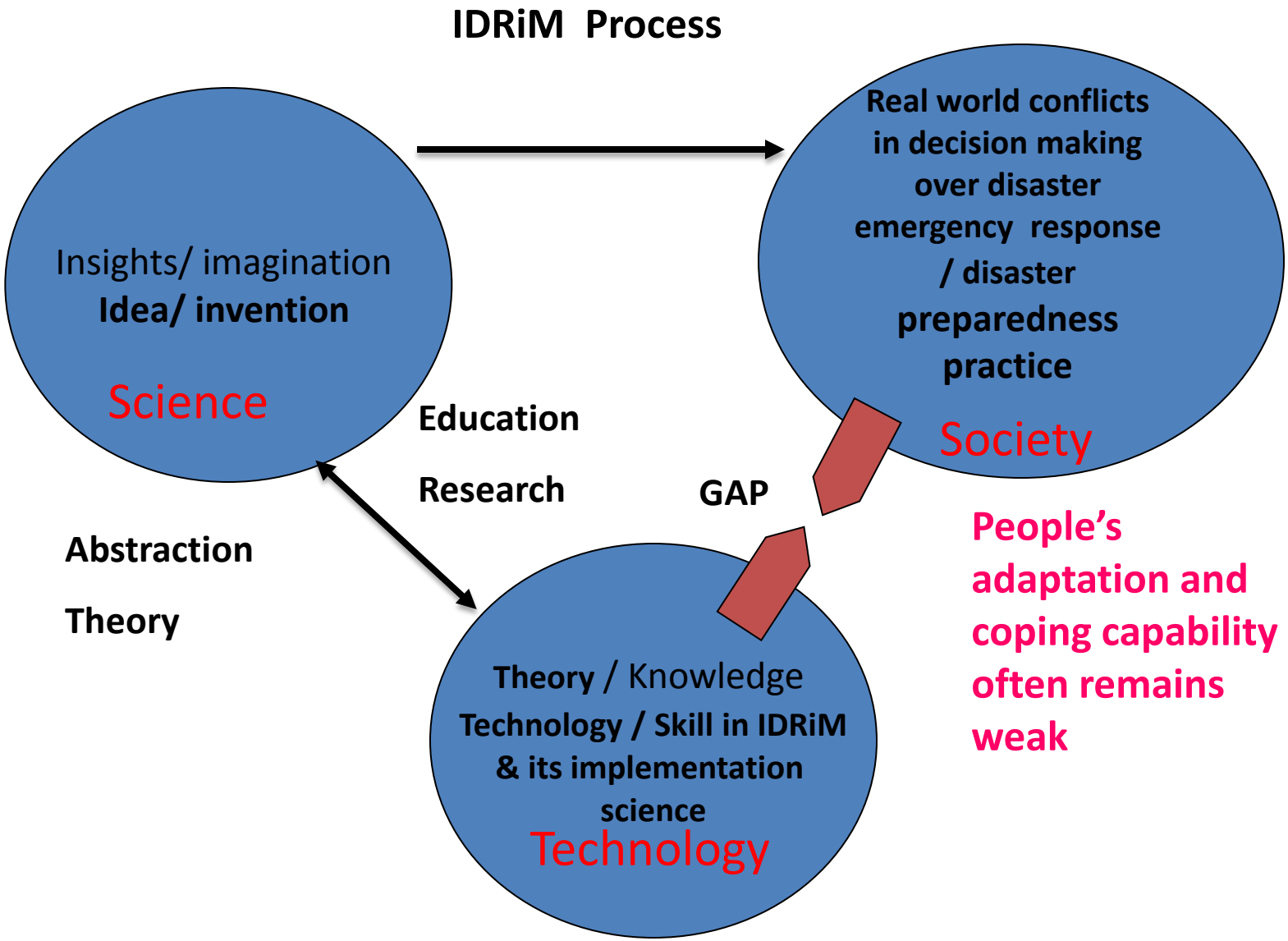
A related Fundamental question:

What can Technology do to bring forth innovations in Society?

Because Technology should always be for the benefit and welfare of Society and help develop safer and secured Societies.

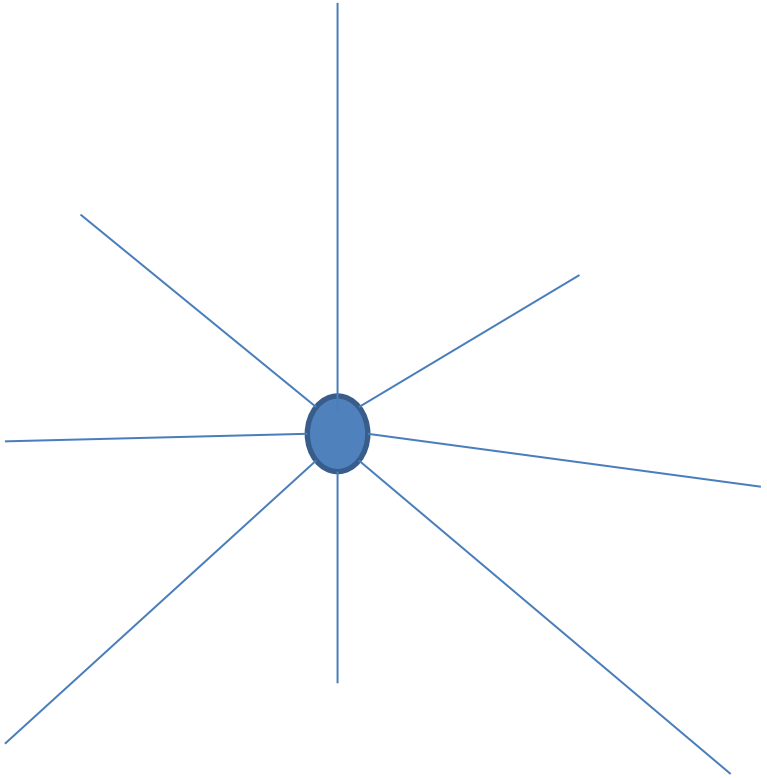
Therefore, emphasis should be on systematic implementation of technologies with institutional design and service delivery linked to the solutions in real-life Society.

Integrated Disaster Risk Management AND REAL WORLD DILEMMA



Technology & Adaptive Management Interface

Technology expands like long spines of radiating ability to reach specific needs. (Like Sea Urchin).



Technology does not expand people's power evenly and in all directions.

How to fill the space between the spines of technology radiating ability?

Adaptive Management when creative can be the answer. Focus on Process Technology

GCOE HSE Mumbai Project 2009-13
Aims at Implementation of Technology in Real World Life for DRR

The Team (Consortium)

DPRI, Kyoto University, Kyoto, Japan
SPA University, New Delhi
Indian Institute of Technology (University), Mumbai

JJ College of Architecture, Mumbai
Tata Institute of Social Sciences, Mumbai

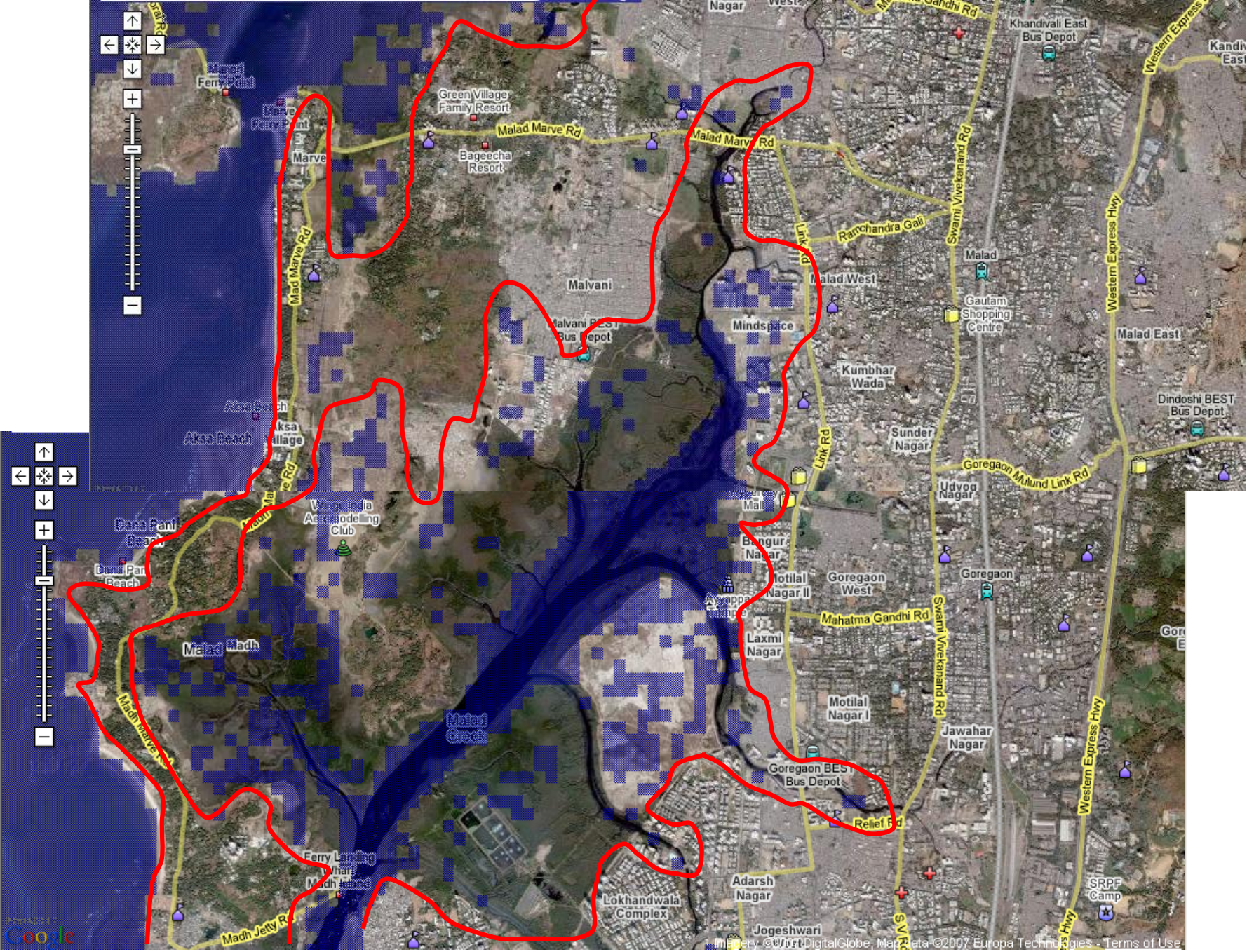
The Civil Defense, Mumbai
The City Government, Mumbai (MCGM)

Four Locally active NGOs

Five Hot Spot Communities, Mumbai

Highly vulnerable Flood Disaster Hot spot Community

Rajiv Gandhi Nagar, Dharavi, Mumbai


Malad Marve Rd
Green Village Family Resort
Bageecha Resort
Marve
Malvani
Malvani BEST Bus Depot
Mindspace
Ramchandra Gali
Swami Vivekanand Rd
Western Express Hwy
Khandivali East Bus Depot
Malad
Malad West
Gautam Shopping Centre
Malad East
Kumbhar Wada
Dindoshi BEST Bus Depot
Sunder Nagar
Link Rd
Goregaon Mulund Link Rd
Udyog Nagar
Aksa Beach
Dana Pani Beach
Wings India Aeromodelling Club
Bangur Nagar
Motilal Nagar II
Goregaon West
Goregaon
Mahatma Gandhi Rd
Laxmi Nagar
Madh
Malad Creek
Motilal Nagar I
Jawahar Nagar
Goregaon BEST Bus Depot
Relief Rd
Ferry Landing
Adarsh Nagar
Lokhandwala Complex
SRPF Camp
Jogeshwari
Madh Jetty Rd
Google
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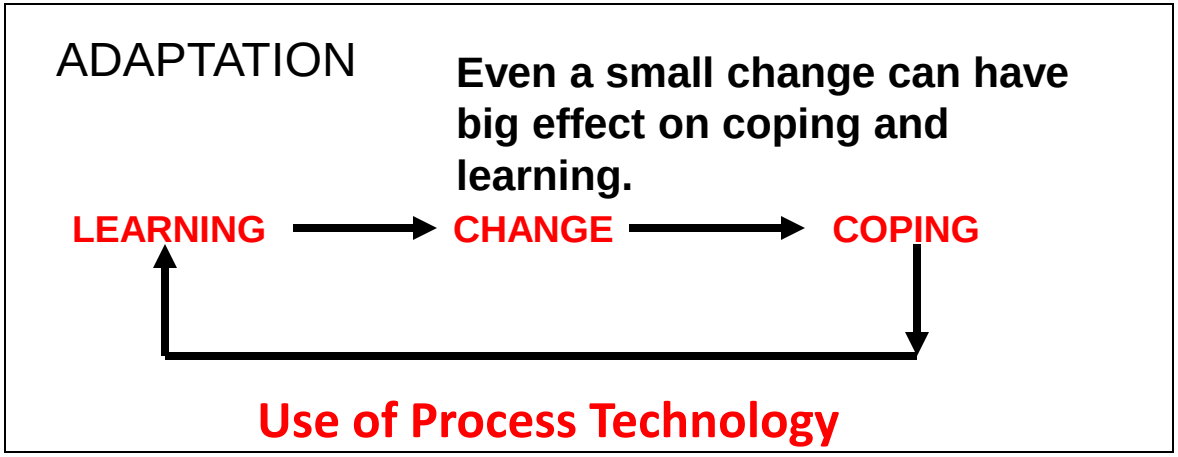
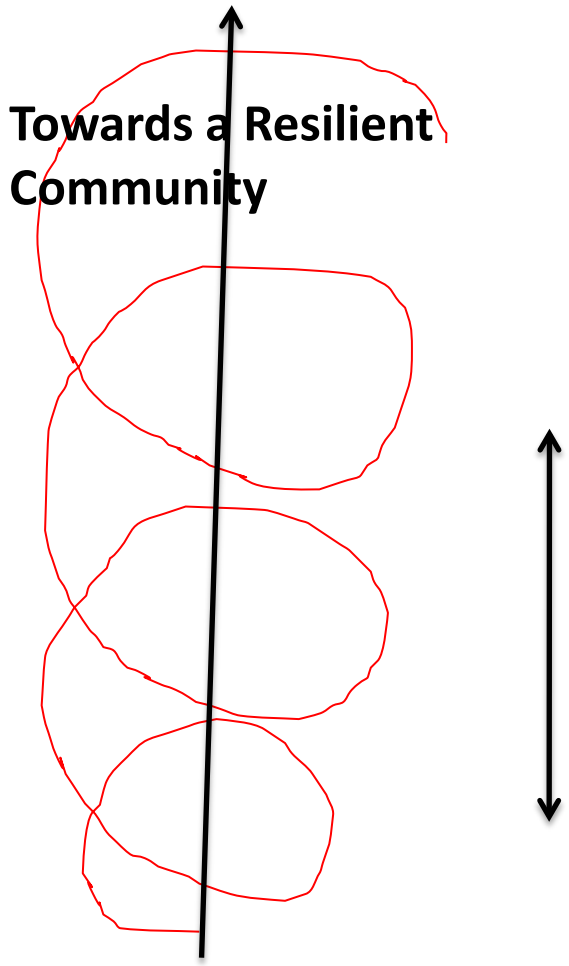
Enhancement of Learning & Coping capability of Community through Creative Adaptive Management

- People want to learn because they want to change.
- Individuals and systems change because they learn.
- Adaptation, therefore, is a process of transformational learning, changing and coping.



Developing Adaptation in a Creative Way



Creative adaptation is Multi-layering Spiraling lift effect

Level dimension – Family, Neighborhood (Tonari gumi), Hot Spot, City.

Time dimension- Short, medium, & Long term

Axis dimension - Enhanced Resiliency

Synergetic Relationship
Experience from GCOE HSE Mumbai Project Contributing to Society.

Implementation of Technology influences the Values of a Society by changing Expectations and also Realities.

Implementation of Technology is also influenced by the values of Society.

Perceived Usefulness is at the core of Technology acceptance.

GCOE HSE Mumbai Project
Advanced Technologies successfully used for

1. Vulnerability assessment
2. Urban Diagnosis
3. Micro-zoning , and Risk Mapping
4. Risk Communication , Risk Mitigation and Resilient Community.
5. Awareness building and early Warning systems.
6. Conflict resolution in decision making
7. Preparation of Community-Led Disaster Risk Management Plan (CLDRM) for Hot spots
8. Institution of Core Group as Green Innovation Group for Leadership.
9. Training for Advocacy power among the leaders.
10. Implementation of CLDRM as integrated action with the official DRR Plan of the city.

Thank you

DPRI International Forum

Relationship between Science, Technology and Society

Water Environment and Sanitation Technology during Flood Disaster (An example)

Dr Sandhya Babel

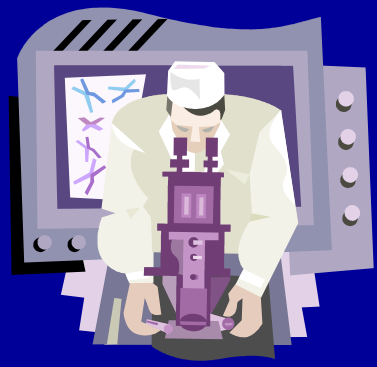
Sirindhorn International Institute of Technology

Thammasat University, THAILAND

&

DPRI, Kyoto University, JAPAN

March 12, 2013



Facts and figures: Thai 2011 flood

- Worst flooding in at least 5 decades
- More than 884 people killed
- Millions left homeless/ displaced
- 10 million people in 65 of 77 provinces impacted
- 700,000 residential units impacted in BMR
- 1.9 million ha including 1.4 million ha rice fields destroyed

Thailand flood

Thailand flood 2011

Social impacts

- Rich societies less affected as willing to pay and move to safer areas
- Poor societies were most vulnerable
  - Could not afford to move and loose lives or suffered from diseases
- Stealing/robbery increase
- Job curtailment
- Loss of property/business
- Psychological problems/mental trauma/phobic psychosis
- Acute scarcity of food/clean water
- Transportation/movement
- Spread of diseases/death – water borne diseases, burn
- Financial burden
- Submerged homes – no longer running tap water or working toilets, forcing residents to bathe and defecate in the open, often in waters surrounding their homes

Thailand flood 2011

Environmental impacts

- Water supply and sewerage looses much of its benefits – instead attributes to chemical and biological contamination
  - quality of Chaophraya river basin deteriorated by 70%
- Solid waste - 2 million tons of garbage added
  - streets became floating landfills – plastic bags, rotten food, sewage, animal carcasses
- Wildlife/biodiversity
- Skin, fungal infection, vector and water borne diseases, infectious diarrhea – more prevalent

Economic cost – 45.7 billion USD

AIT campus, Thailand

Role of science and technology for society

- Develop technologies and systemize that are efficient in a given situation, affordable, easily accessible, equitable for underserved, marketable
- Should be socially and culturally acceptable
  - toilets made were not accepted due to religious belief
- Examples
  - low cost water filters - work without electricity
  - portable toilets; sewage back flow valves - stop sewage from re-entering the house
  - floating septic tanks composed of airtight drums tied with bamboo frame

Technology for society – Floating toilet

- Weighing 800 kg, comprises two rooms, one with a modern toilet and another room with a Thai toilet flushed by pouring water
- Unit was 2.5 m wide and 3.5 m long made of plastic and "smart board", asbestos-free cement board, to make it durable and lightweight
- Waste treated with micro-organisms before discharge
- Once full, tank fitted underneath the toilet need to be disposed of at a proper place
- Siam Cement Group (SCG) with students from university made toilets costing 60,000 baht each and distributed to government offices in provinces for free

Floating Toilet (Bangkok flood 2011)

Role of science and technology

- Genetically modified food – controversy as society skeptical
  - Engineered for faster growth, resistance to pathogen, feed increasing population, extra nutrients
  - In 1994 – soybean, corn, canola
  - Fruits and vegetables (papaya, tomato)
- Effect of GM crops on environment – not known
- Risk of harm
- Tampers with nature
- Green peace – should be banned

Essentials of Science and Technology

Strong bond between science/technology and society; should play major role due to complex and increasing events

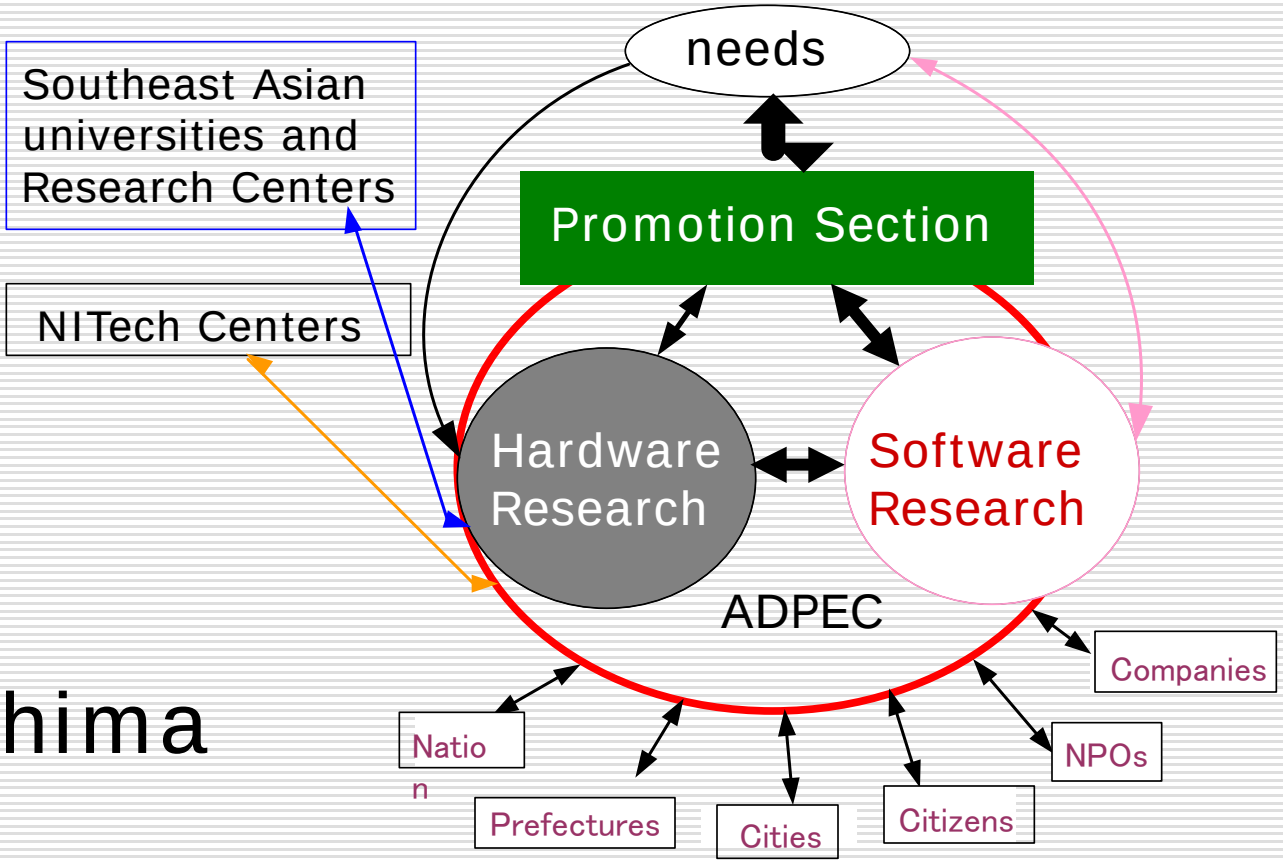
- Strengthen preventive action in order to limit direct damage
- Technically efficient
- Economically viable
- Socially acceptable; equitable
- Readily accessible
- Marketable; sustainable; environmental friendly

In addition:

- Awareness/ improving dissemination/communication
- Centralized database (improving ICT)

Contribution to Society

A Case of Advanced Disaster Prevention Engineering Center (ADPEC), Nagoya Institute of Technology (NITech), Japan



Eizo Hideshima

Contribution to Society in My Thoughts

The Roles and possibilities of researcher and university are:

1. Knowledge stock and distribution
2. A professional in community
3. Coordination and facilitation
4. Adaptive and challenging position

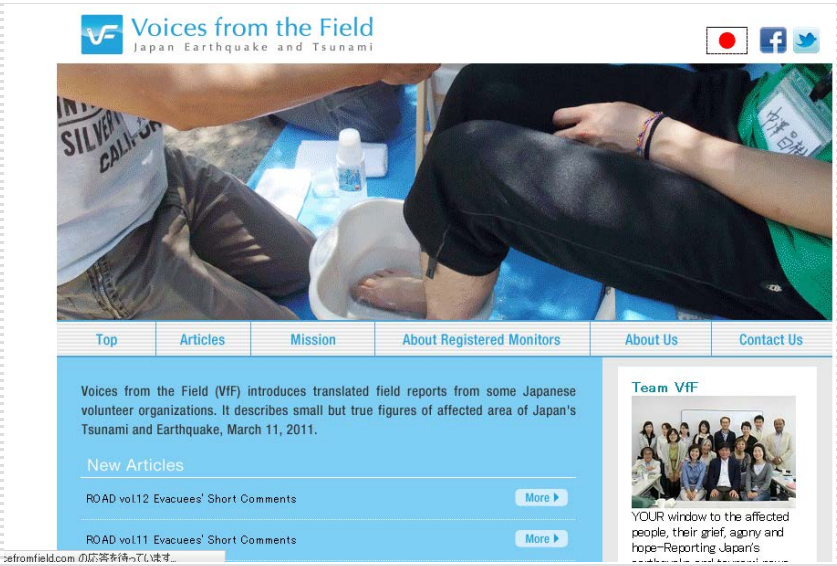
Agreements with gov't organization

The signing ceremony

Co-hosted symposium

Consultation in administrative committee

Drills and trials



DIG, HUG…

To help victims

Newer technology application

Contribution to Society in My Thoughts

We are still under development in this field and in the way of collaboration with the other sectors.

A tendency in Japan:

Few staff changes over organizations.

The fact brings the difficulty in communication.

A dilemma: universities are so stable as to play a role of platform but researchers cannot behave it easily.