

Experience of Disaster Management with Business Continuity Plan in Taiwan

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**National Science and Technology Center for
Disaster Reduction (NCDR)**

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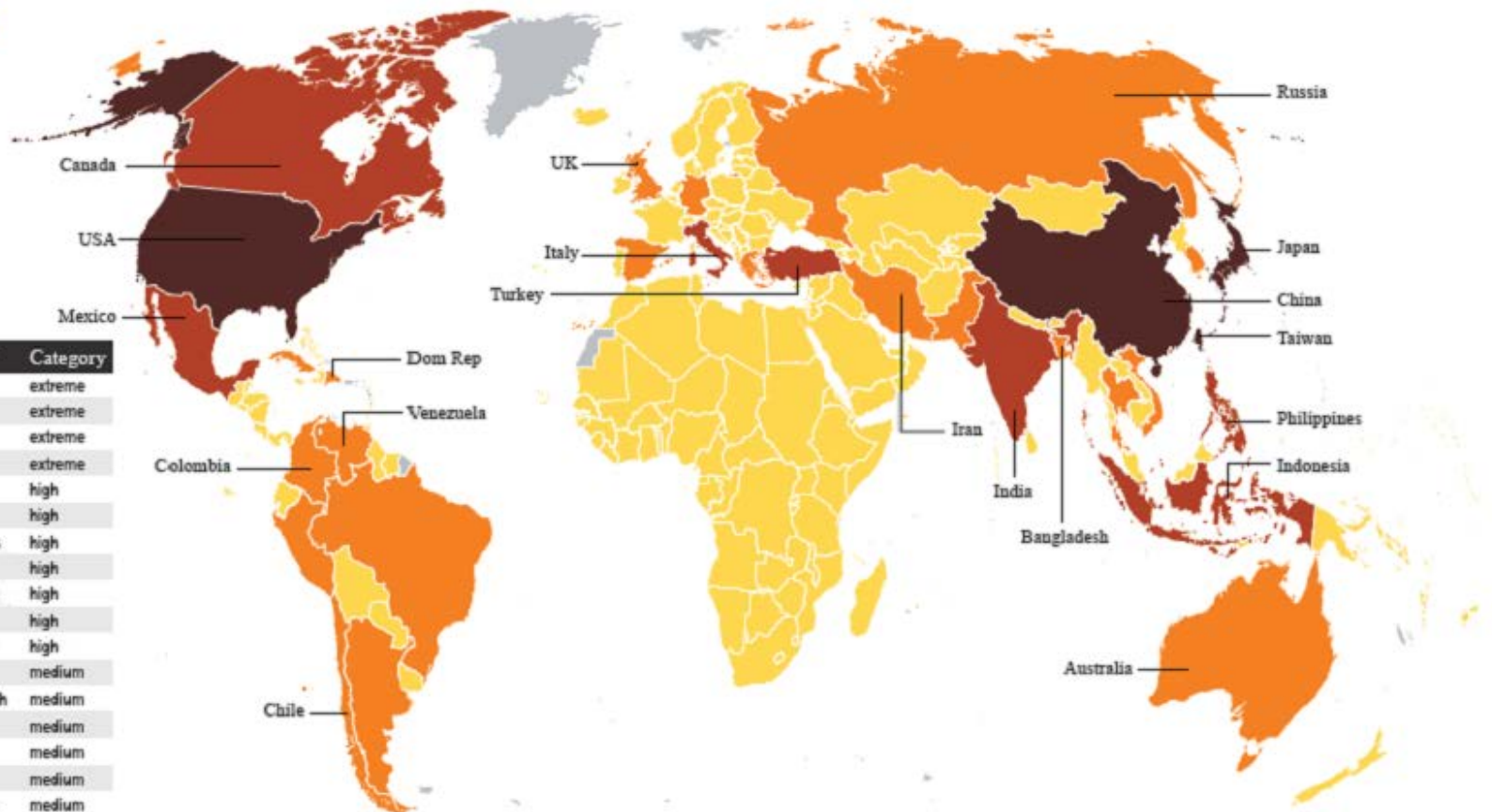
“Extreme” of Absolute Economic Exposure

Natural Hazards Risk – Absolute Economic Exposure Index 2011

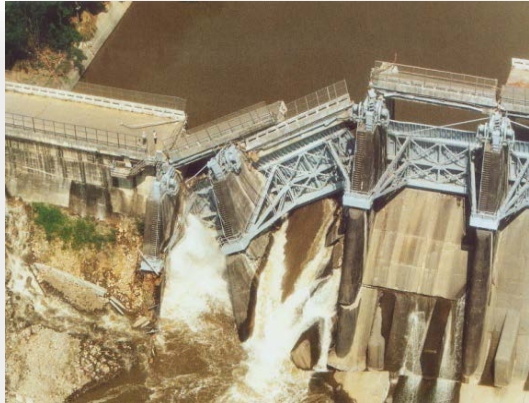


Extreme risk
High risk
Medium risk
Low risk
No Data

Rank	Country	Category
1	USA	extreme
2	Japan	extreme
3	China	extreme
4	Taiwan	extreme
5	Mexico	high
6	India	high
7	Philippines	high
8	Turkey	high
9	Indonesia	high
10	Italy	high
11	Canada	high
12	Iran	medium
13	Bangladesh	medium
14	Russia	medium
15	Australia	medium
16	Colombia	medium
17	Venezuela	medium
18	UK	medium
19	Dom. Rep.	medium
20	Chile	medium



Major Natural Hazards in Taiwan



Earthquake
(Chi-Chi quake 1999)



Landslide



Typhoon
(Morakot, 2009)

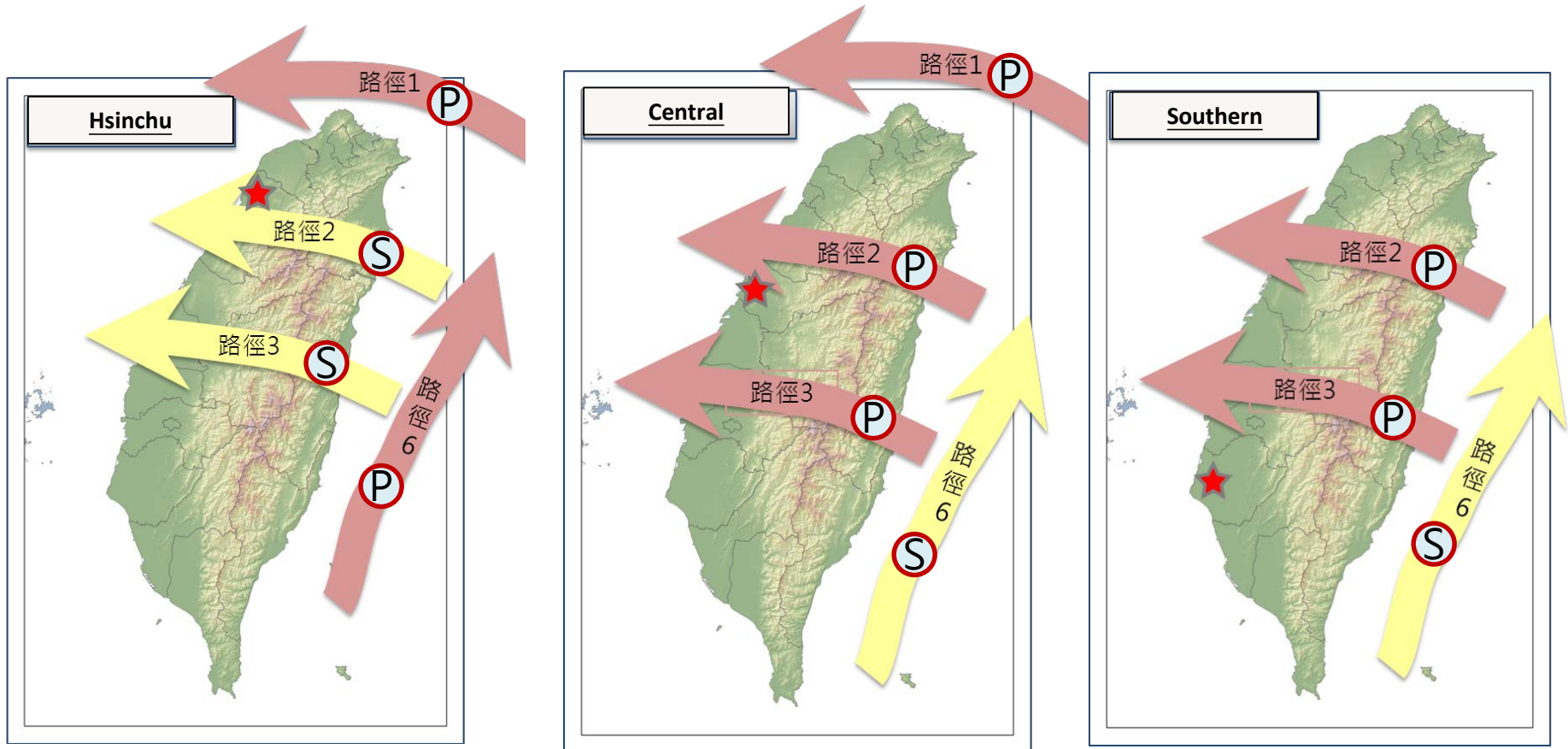


Flood



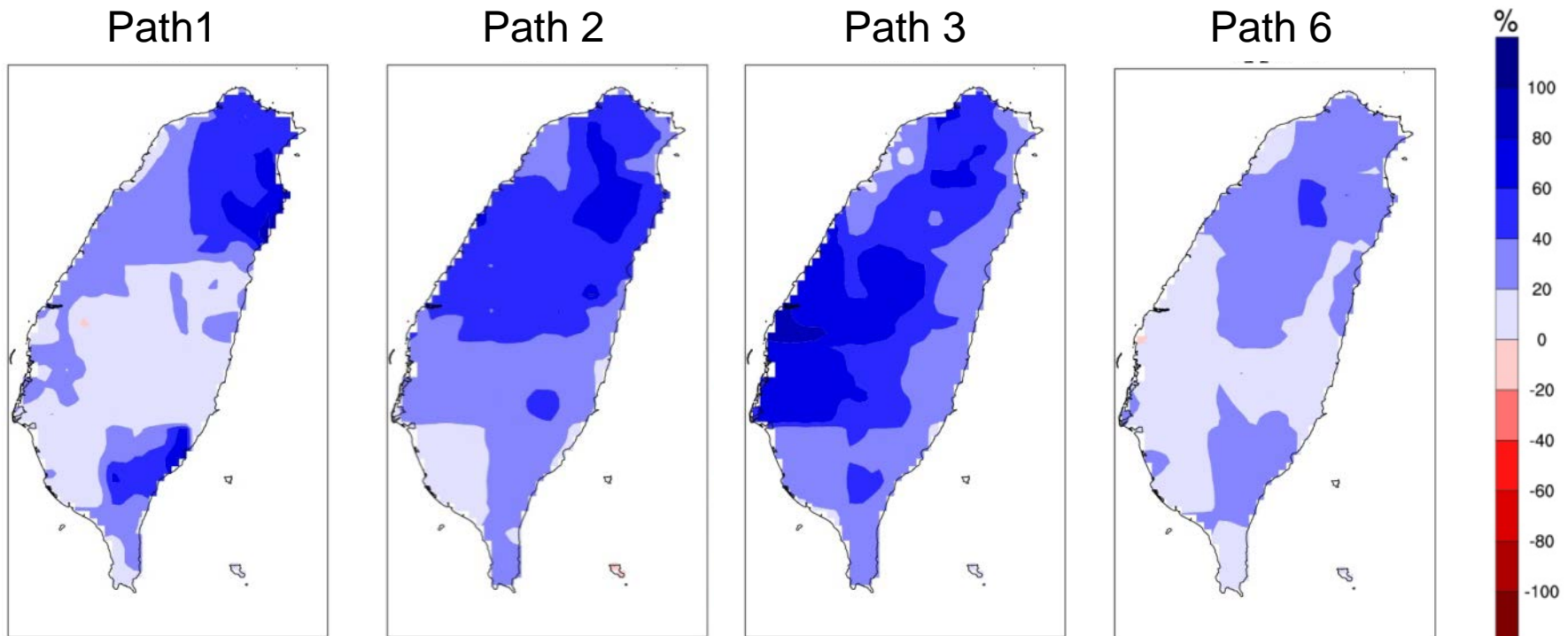
Debris flow

Threat of Typhoons

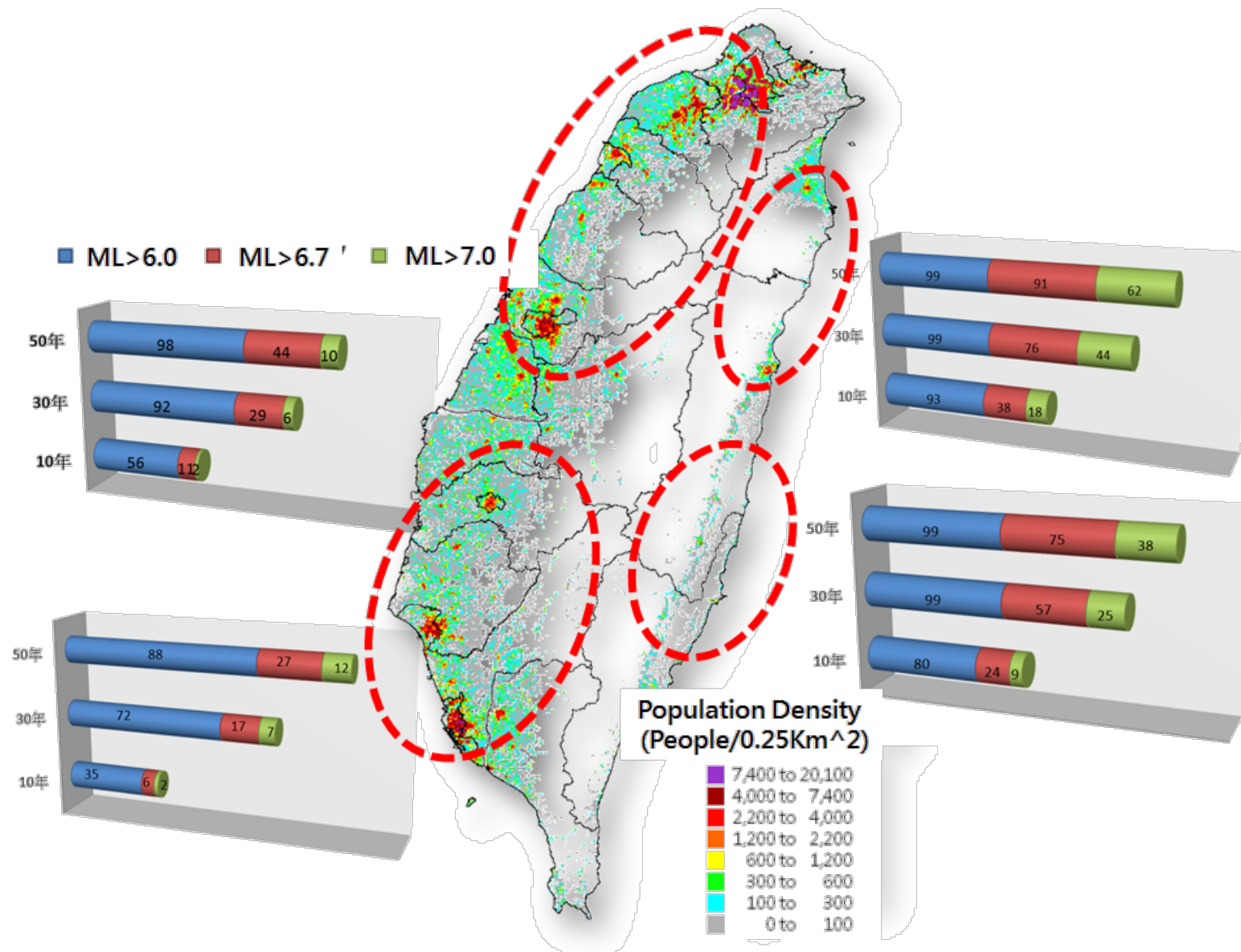


Trend Analysis of Typhoons under Climate Change

- **According to Path 1, 2, 3 and 6**, trends could bring increasing rainfalls in north and central areas, especially north.
- **Only Path 3** could bring obvious in south area.



Addition factor to consider in Taiwan



Challenges for business owners to think



- ◆ Worst case and performance
 - To identify coping capacities and capability
 - Responses and Disaster risk reduction
- ◆ Systems to support business could be getting aged day by day
 - Infrastructure, lifeline systems, buildings, population
 - Never-ending preparedness, DRR life cycle
- ◆ Generation gaps of DRR knowledge in a company
 - Typhoon vs Earthquake
 - Fading memories; young generation; knowledge and experience transfer
- ◆ Numerous interruptions and inconvenience
 - Direct impacts to livelihoods, business operation, social functions
- ◆ Pre-disaster recovery plan (BCP)
 - A consensus-based and reasonable scenario to call actions

Accumulation of knowledge, experience and know-how of BCP and BCM

◆ Information-intelligence knowledge Platform

- To build up Integrated systems and database adopt Open Data Approach
- To design scenario-based joint drill in the APEC region
- To involve the disaster risk management with financing sectors
- To keep BCM rating transparent
- To discuss disaster sign standard for risk communication

◆ Knowledge transfer and the best Practices sharing of BCM

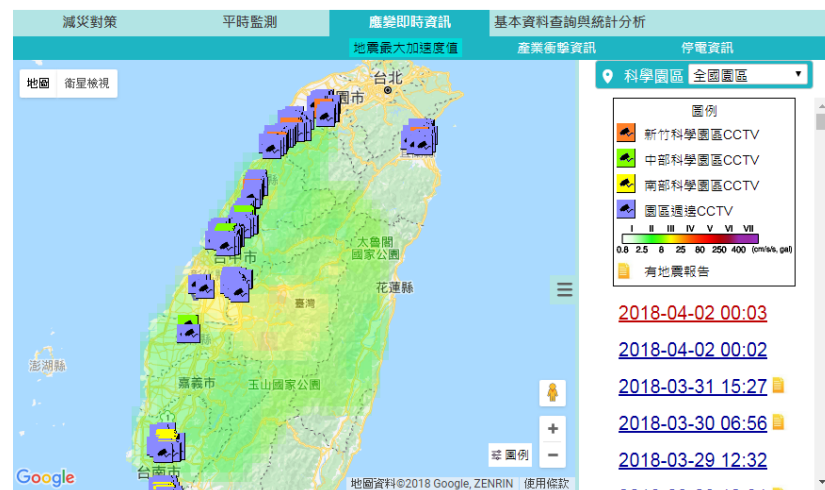
- To share information
- To share experiences of formulating BCPs
- To provide solution package on challenges while implementing BCPs

Platforms for Information Sharing



科學園區地震災害情資網

Science Parks



科學園區地震災害情資網



圖1 持續營運管理概念

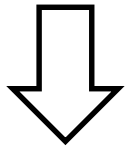
Synergized work on regional BCP/BCM – Cross sectorial collaborations



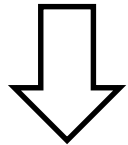
- ◆ Managing risks and impacts of natural disasters to business in the Asia-Pacific region with Public-Private Partnership
 - To offer feasible solution package to enhance regional resilience
 - To initiate a pilot study on BCM-based supply chain
- ◆ Seeking leadership and coordination for cross-sectorial coordination
 - To engage key stakeholders through Public Private Partnership
 - To keep flexibility among Private Sector and government to take leading role
 - To manage risk of critical infrastructures

Roles, investments and process to engage key stakeholders on BCP, BCM

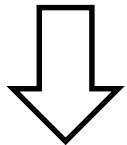
Science and technology



Understandable knowledge



People's mindset



Take actions

Transformation Investment

Interpretation Understanding risk

Perception Governance

Disaster preparedness

Gov, research

Digest scientific outcomes as becoming feasible and applicable
- **Risk Communication**

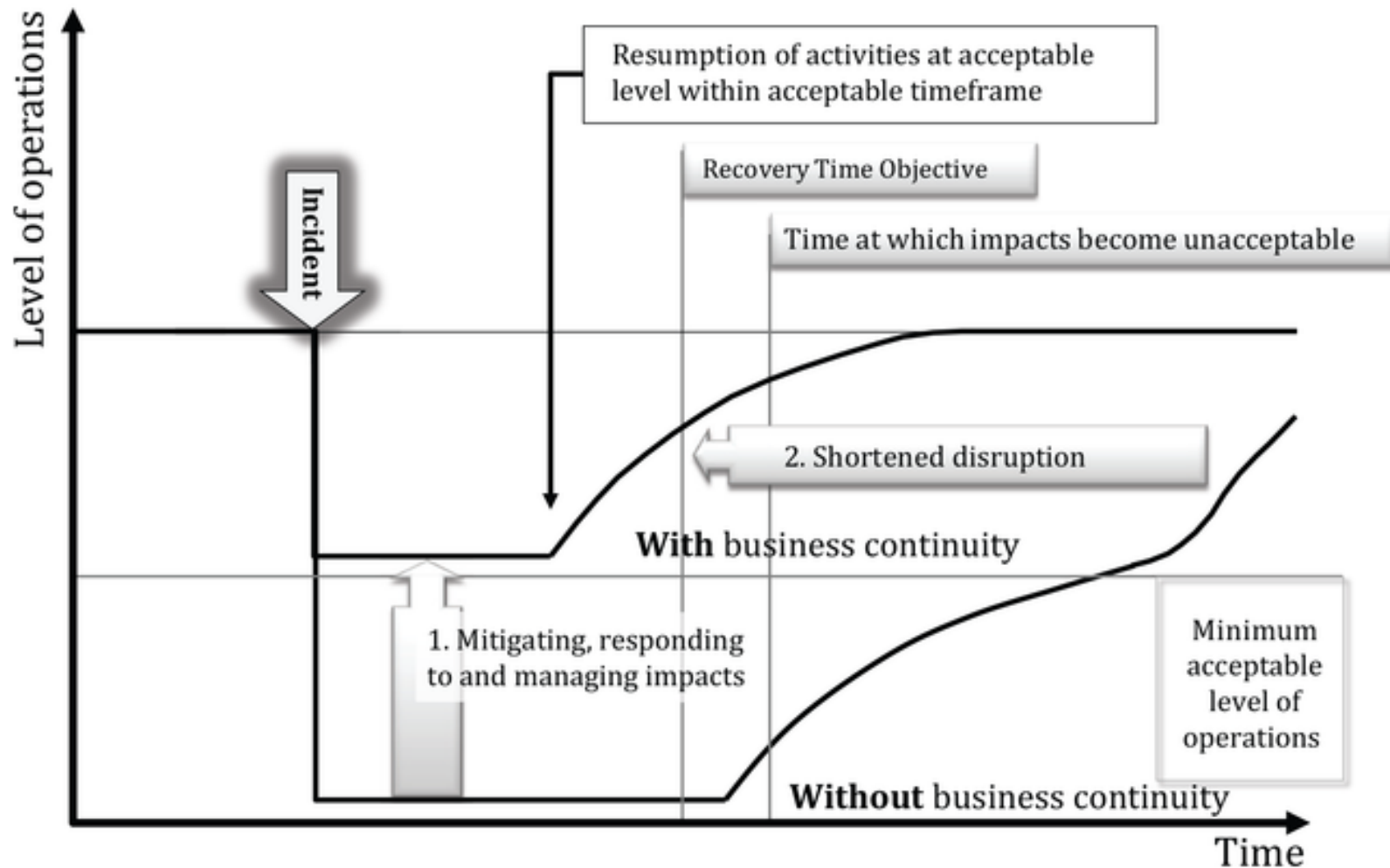
Gov, research community, Volunteers, professional

To explain the relevance and importance related to daily life
- **Enroot culture of DRR**

Gov, Research, Business, Volunteers, Professionals

To empower the capability and capacity on when and how
- **Conduct DRR lifecycle (BCP)**

BCP: Improve the Resilience after Disasters



10 steps to build-up BCP

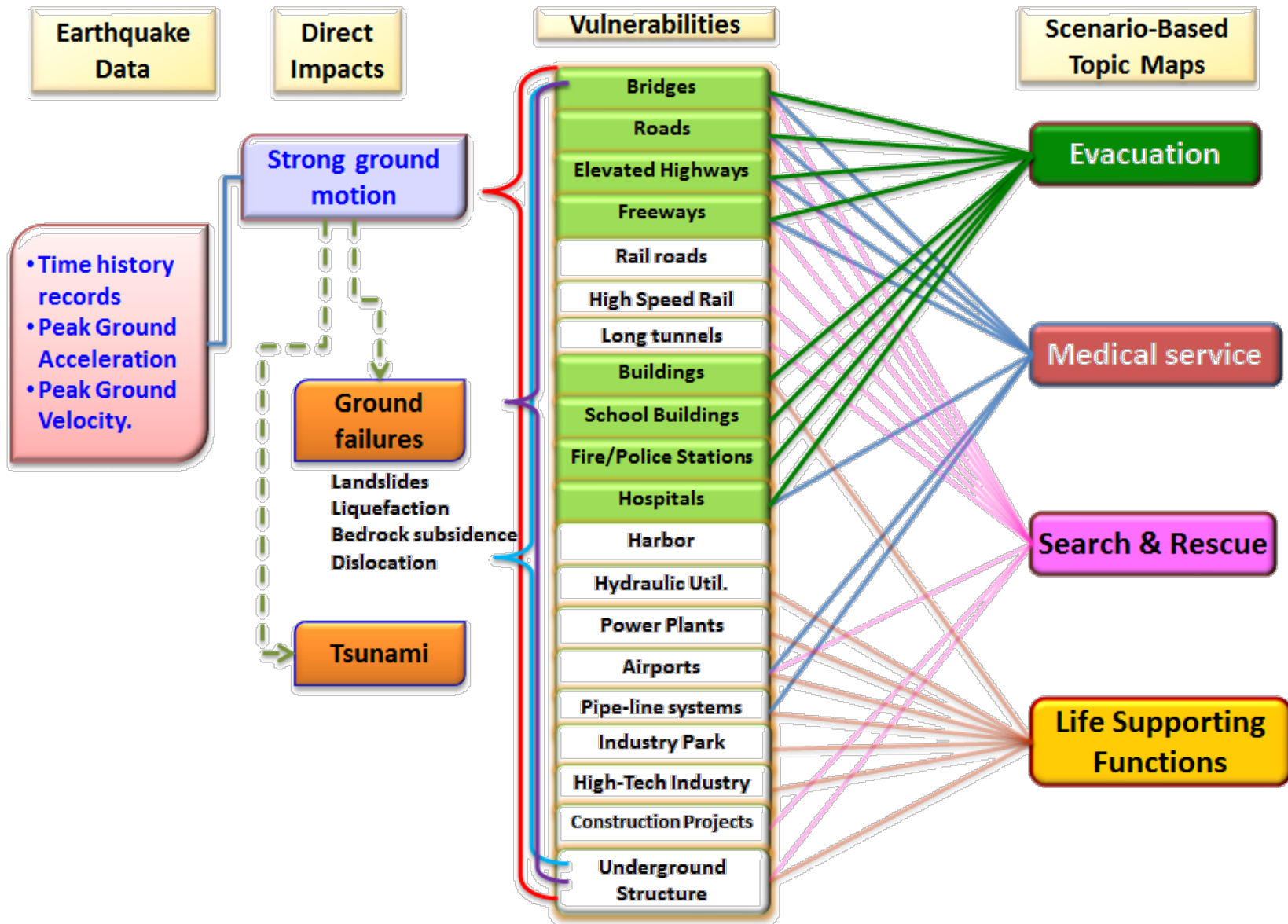
1. Determine BCP purpose, scope and team.
2. Prioritized activities and Recovery Time Objective
3. What do you need to resume key activities?
4. Risk assessment – know your tragic scenarios
5. Do not forget pre-disaster protection and mitigation
6. Emergency response to disaster
7. BC Strategies to early resumption
8. Be financially prepared
9. Exercise makes your plan functional
10. Ongoing review and improvement

To engage dialogues between public and private sectors

- ◆ Indicators to measure business recovery
- ◆ To match RTOs and RLOs
 - Recovery Time Objective (RTO)
 - Recovery Level Objective (RLO)
 - Discussion-based to identify demands and supply for business recovery
- ◆ Key topics related to RTO and RLO
 - Fuel, Power, water, gas, telecommunications and transportation
 - Time and progressive percentage of business recovery



Components of Scenario-based Preparedness and Scenarios



Scenario Simulation for Earthquake

Taiwan Earthquake impact Research and Information Application platform (TERIA)

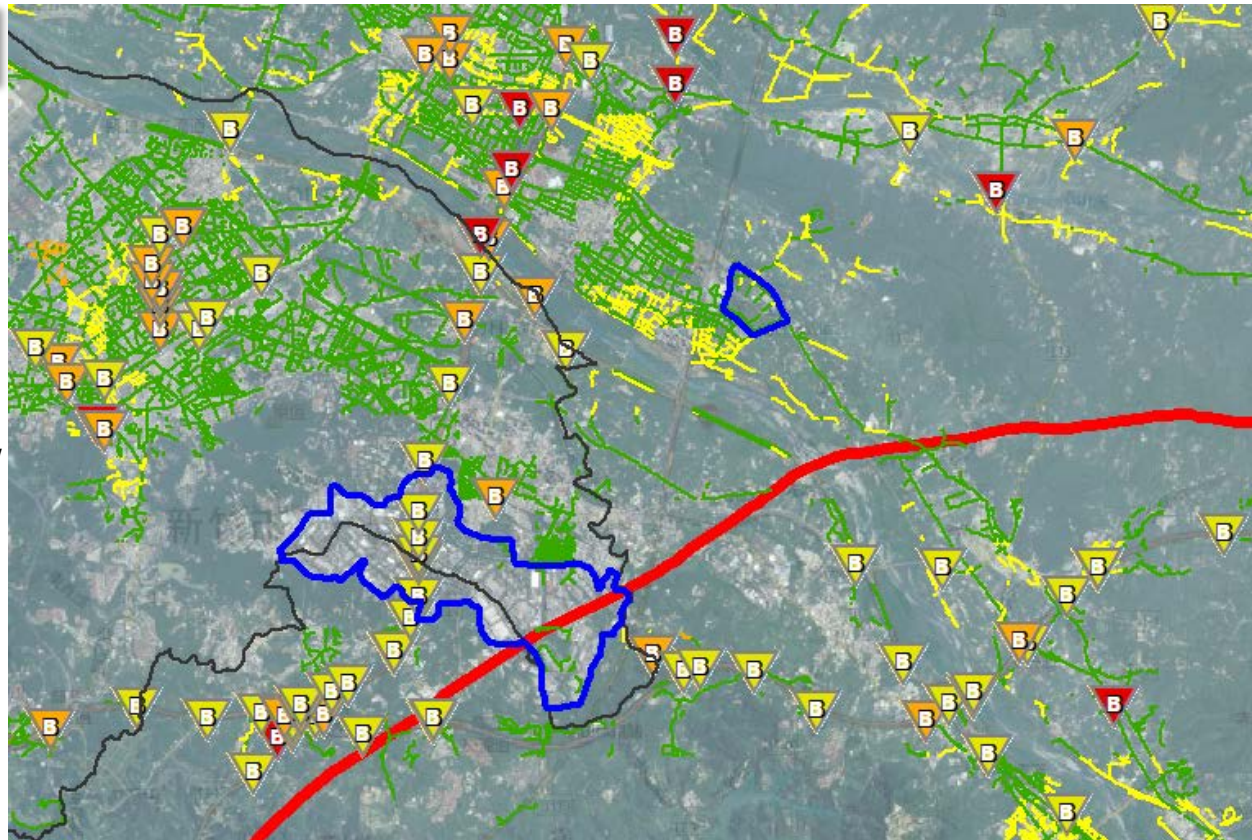
Risk of roads and bridges near Hsinchu Science Park

■ High Risk (Bridge):

- 國道：3座
- 縣道：4座
- 市區道路：2座

■ Risk (Road) :

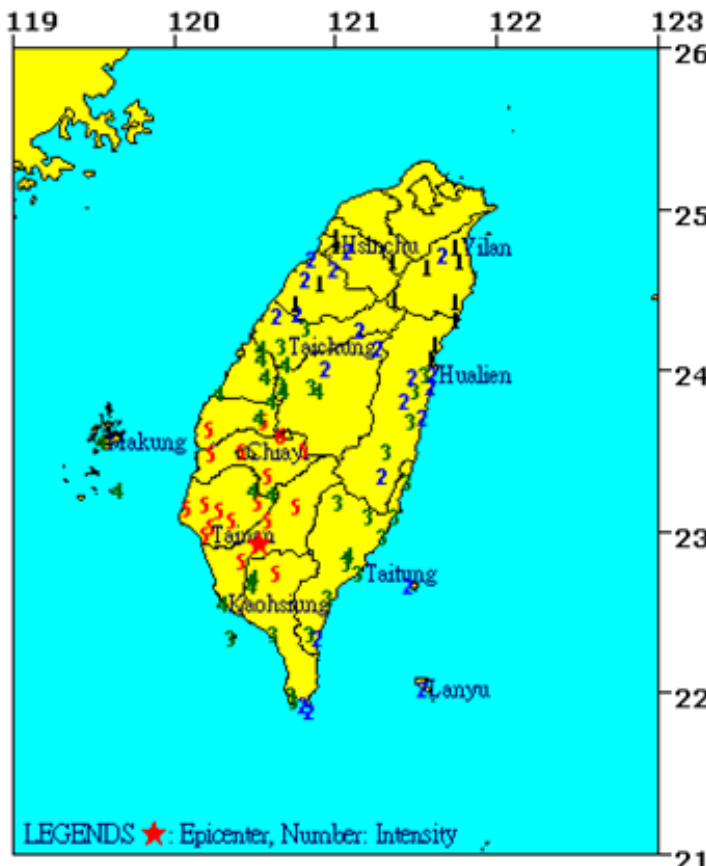
- Most of roads are at low or very low risk



Risk (road)
— Very low
— Low
— Medium

Risk (Bridge)
△ Low
△ Medium
△ High

Strong Ground Motion in 2016, Taiwan



Earthquake Report

CWB EARTHQUAKE REPORT

Earthquake No.: 105006

Origin time (GMT+08:00)

2/6/2016 3:57:27.2

Location: 22.93N, 120.54E

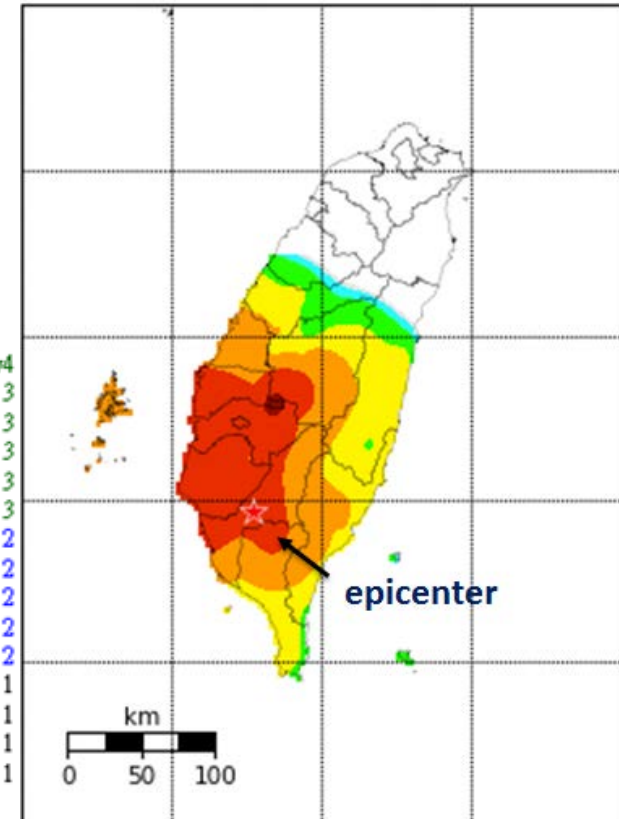
i.e. 27.4 km NNE of Pingtung County

Depth : 16.7 km

Magnitude(ML): 6.4

Local Largest Intensity :

Yunlin County	6	Central Changhua County	4
Kaohsiung City	5	Central Taitung County	3
Pingtung County	5	Hualien County	3
Tainan City	5	Pingtung County	3
Central Tainan City	5	Central Nantou County	3
Chiayi County	5	Central Taichung City	3
Central Chiayi City	5	Central Hualien County	2
Central Pingtung County	4	Miaoli County	2
Central Kaohsiung City	4	Central Miaoli County	2
Taitung County	4	Hsinchu County	2
Central Yunlin County	4	Yilan County	2
Penghu County	4	Taoyuan City	1
Changhua County	4	Central Hsinchu City	1
Nantou County	4	Central Hsinchu County	1
Central Penghu County	4	Central Yilan County	1
Taichung City	4		



Shake Map

Damages to public services

Item	Num. of service suspension	Num. of Restoration	Under repair	unrepairable
Tap water (household)	400,300	395,300	5,000	0
Electricity (household)	173,084	172,664	0	420
Natural gas (household)	1,241	1,034	0	207
Land-line phone (household)	1,248	1248	0	0
Cell-site for mobile phone (site)	131	131	0	0

Expected or non-expected damages to production lines after 2016 quake

Fallen pipelines



Assembly line



Capital-intensive investment

- ◆ Practice of TSMC, unit: USD 100 million



- ◆ Too big to fail
- ◆ For 2017, still over USD 10b

TSMC's BCM Introduction

Objective

- BCM includes guidelines and procedures to be applied by **companywide** emergency and nature disasters through **risk control, emergency response, crisis management and business continuity**

Scope of possible risks

- Potential accidents or incidents which could cause **significant production losses** to the company, such as fire, chemical/gas leakage, **earthquake, flood**, incoming **utility supply shortage**, process excursion, product contamination, supply interruption, strike, sabotage, pandemic and IT unavailable, etc..

Strategy

- **A framework with clear ownership of related function/department** to safeguard customers and key stakeholders' interest. **Periodic review** on threat identification, exercise and update on BCM.

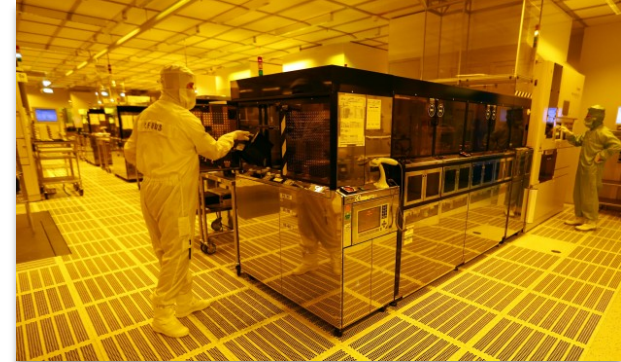
TSMC's Risk Management

- ◆ Enterprise Risk Management (ERM):
 - TSMC established its Enterprise Risk Management (ERM) program based on both its **corporate vision and its long-term sustainability and responsibility** to both industry and society. ERM seeks to provide for **TSMC's adequate management of risks on behalf of all stakeholders**.

- ◆ ERM Strategy:
 - Risk avoidance, risk transfer, risk mitigation and risk reductions are means to reduce corporate risks.
 - TSMC Business Continuity Management (BCM) is established to **maintain wafer production or services delivery** when a catastrophic incident occurs.

Factors on employees' safety to consider and make a plan

- ◆ Staff **at working** (an earthquake hits at office hours)
 - At office districts
 - At Fabs
 - Possible types of injuries because of object dropping, structural or non-structural collapse, chemical material leakage
 - Evacuation route and space
- ◆ Staff **at home**
 - Seismic capacity of residential areas
 - **Why this is also important?**
- ◆ Other issues
 - Safety check and channel to inform CEO and staff's families
 - Emergency medical resources



Focal issues to protect competitiveness & enhance resilience

- ◆ Identification and understanding of “risk”
 - Risk **priorities** (direct or indirect risks)
 - **Internal and external** risk
 - Physical and Social **vulnerabilities**
- ◆ Tools for risk communications and assessment
 - Applications of **big data and open data on GIS systems**
 - Channels to receive **early warnings**
- ◆ Financial tools to encourage measures on risk reduction
 - Incentives of **insurance premium** or **interest rate of loan**
- ◆ Standards for the whole supply chain to follow
 - **ISO 22301, Area Business Continuity Management**
- ◆ Scenarios to make plans and conduct drills
 - **the worst or reasonably worst case** to test defense capacity

Disaster Prevention vs. Business Continuity



	Disaster prevention	BCP/BCM
Purpose	Protect human lives and property	Strengthen organizational resilience and recovery rapidity
Scope	Independent facility	Business products and services
Teams	Emergency responders	Each department and supply chain
Objectives	Numbers of people affected by disasters	Recovery time and level of operation
Loss	Direct loss	Indirect loss, profit loss

Strengthen Disaster Prevention with BCP/BCM

Thoughts on Disaster Prevention

- Protect lives and properties
- Estimate number of people affected and direct loss
- Usually executed by emergency response department



Business Continuity Planning

- Rapidly recovery for critical procedures, services and product supply
- Estimate recovery time objective (RTO), recovery point objective (RPO), profit loss, indirect loss
- Establish cross sectorial Business Continuity Management team



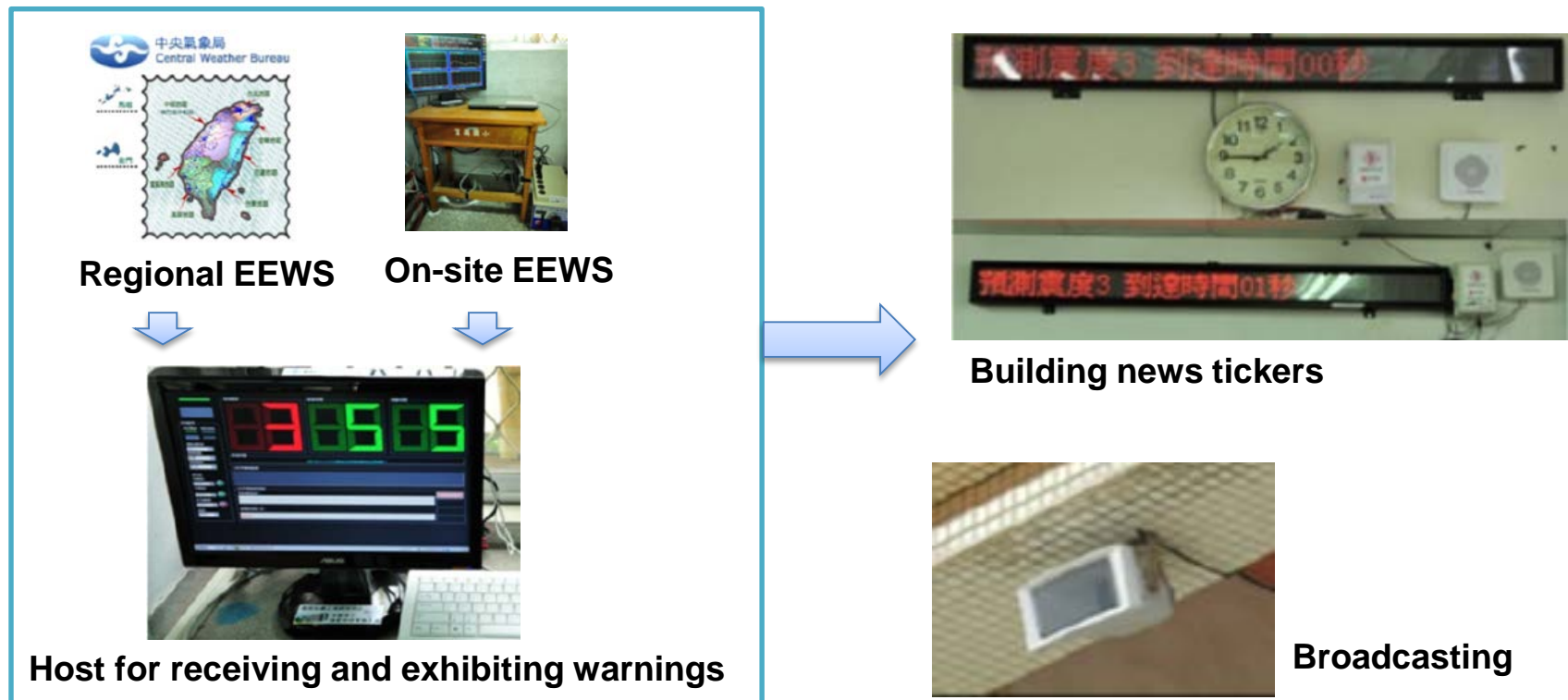
Benefits of integrating BCP/BCM to disaster prevention:

- **Level of operation** could be recovered rapidly, preserve **international competitiveness**
- Ensure core operations, optimize **investment for disaster prevention and reduction**
- Develop **systematic actions** of disaster prevention for all disasters and aspects



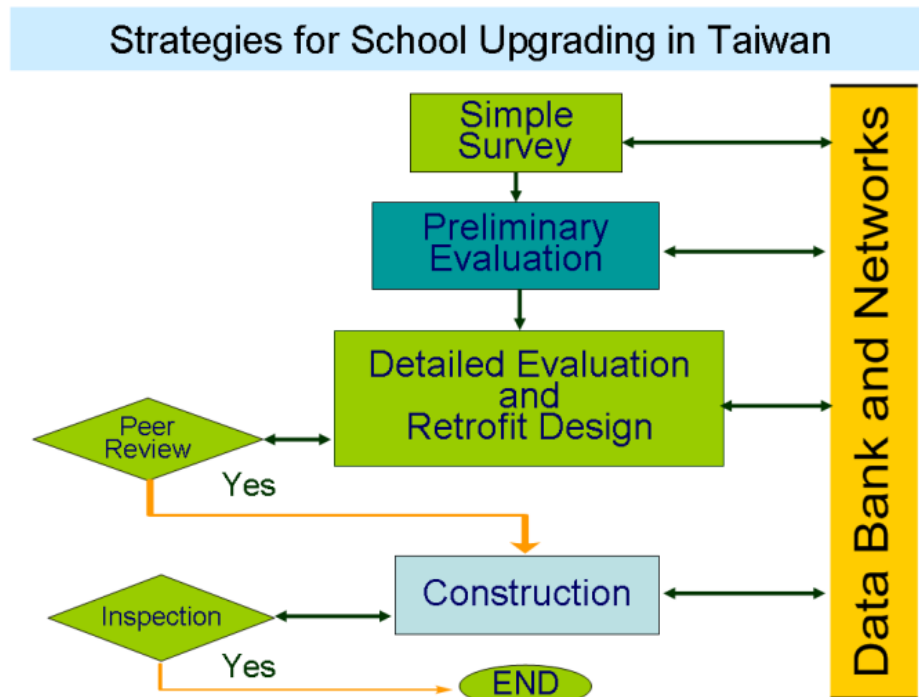
Risk Communication: Earthquake Early Warning System (EEWS) for Campus

- ◆ Risk communication allows people at risk to understand and adopt protective behaviors
- ◆ Earthquake Early Warning System (EEWS) for campus
 - Developed by Central Weather Bureau, National Center for Research on Earthquake Engineering and National Taiwan University



Seismic Retrofit of School Buildings

- ◆ In order to upgrade the seismic capacity of public school buildings and ensure the safety of students and teachers before the next severe earthquake, the seismic upgrading project was extensively executed.



Conclusions

- ◆ Lessons learned from historical disasters indicate disaster resilience should be considered through the disaster management cycle
- ◆ Compared to disaster prevention, BCP ensures core operations, allowing level of operations being recovered rapidly
- ◆ BCP speeds up the recovery time and provides a competitiveness advantage to an organization
- ◆ BCP could be applied to all entities including campus, not only for companies

Thank you for listening
