# **Experiences from the Tohoku Disaster in Japan and**

Stakeholder Perceptions on Loss and Damage Associated with Climate Change and Adaptation



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Outline • The Tohoku 'triple' disaster of Japan **O**Background • Current state of recovery **O**Lessons learned • Loss and damage associated with climate change and adaptation **O**Background • Stakeholder perceptions OConclusions

### Experiences from the Tohoku Disaster

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## **The Damage**

- Causalities
  - Dead: 15,884
  - Missing: 2633
  - Evacuated: : 468,635

- Tsunami Shaking Fire, landslide etc Indirect causes
- Total value of damage: 16.9 trillion yen (\$217 trillion)
  - Private Property: 10.4 trillion Yen (\$134 billion)
  - Lifelines 1.3 trillion Yen (\$17 billion)
  - Infrastructures 2.2 trillion Yen (\$28 billion)
  - Agriculture, Forestry, Fishery 1.9 trillion Yen (\$24 billion) 80 &
  - Total Approx. 16.9 trillion Yen

Sources: Zare and Afrouz, 2012; Tohoku Bureau of Economy, Trade and Industry, 2012; Varvaeck and Daniel, 2011; Hayashi, 2013



# **The Radiation Damage**

- No comprehensive estimates of costs of nuclear radiation related fall out.
  - Abandoned cities, towns, agricultural lands, businesses, homes and property located within the roughly 310 sq miles (800 sq km) of the exclusion zones (20 km around the Fukushima plant)
- As of September 2012: 159,128 people were evacuated from the exclusion zone and people outside the zone are advised to evacuate on voluntary basis
- Independent assessments put up to 250 Billion USD for cleaning up Fukushima related damage.



## **The Comprehensive Response**

#### **Support for evacuees**

**Local Disaster Management Plans** 



Suzuki, 2014

## **Timeline of Key Response Measures**



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## **Recovery Cost Allocation for 2011 fiscal**

#### year



(Kajitani, 2013)

# **Insurance Payouts**

Insurance Type	Actual Payouts (billion ¥)	Comments
Earthquake insurance	1,218.6	As of 12 March 2012. <sup>(2)</sup> Includes domestic and foreign insurers. Source: The General Insurance Association of Japan (2012)
Japan Agriculture fraternal	883.2	As of 8 March 2012. Includes \$3 billion
insurance (JA Kyosai)		from catastrophe bond (Muteki, Ltd.) Source: JA Kyosai (2012a and 2012b)
Japan Fishery (JF Kyosai)	24.0	As of 22 March 2012. Source: JF Kyosai (2012)
National Federation of Workers and Consumers Insurance Cooperatives (Zenrousai)	113.6	As of 31 January 2012. Source: National Federation of Workers and Consumer Insurance Cooperatives (2012)
Japan Federation of Cooperative	93.6	As of 27 July 2011. Source: Ministry of
Mutual Aid (Co-op Kyosai)		Health, Labor, and Welfare (2012)
Other insurance (payouts to firms, etc.)	600.0	As of 20 May 2011. Source: Asahi News (2011b)
TOTAL <sup>(1)</sup>	(>) 2,933.0	\$36.7 billion

Notes:

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<sup>(1)</sup>Excludes mutual aid system for local governments (*Todoufukenmin Kyosai*), life insurance (except earthquake insurance), and other types of insurance.

<sup>(2)</sup>Nearly all claims have already been inspected (870,341 out of 878,898).

#### Remaining Budgets for 2012 fiscal year in the severely damaged prefectures Billion Yen



#### Reasons:

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- 1. Over capacity of construction sector
- 2. Price increase of materials and rigidity of price bidding
- 3. Mismatch of Job opportunities and specialties of unemployment, etc.

Delay of recoveries (debris removal, reconstruction, etc.)

Local government tries to modify the bidding system (simpler)

Kajitani, 2013

#### **Reconstruction Plan for Severely** Inundated Areas



Consensus building (stay or move), equity problem (only selected area), large amount of governmental financial aids (tax payer), Legal issues (no previous examples)

Kajitani, 2013

和計画策定事業)/油デー

|進手業 計画策定事業) (津の宮・滝浜地)

周策定事業)(波伝谷地

#### **Tsunami reconstruction in Namie Town**



Radiation hinders Namie Town's reconstruction (the area proposed by the National Government in 2011.12.18)

Namie Town

150mSv/year		
100~150	Difficult-to-return zones	
50~100		
20~50	<b>Residence restricted zones</b>	
10~20	Areas preparing for the	
	lifting of evacuation orders	
	Suzuki, 201	

# **Despite the significant efforts...**

Hardships in evacuees' lives and in the recovery process

- 1. Lack of proper communication led to solitary decisions of the affected local governments
- 2. Damages on the areas which suffering from declining population and aging
  - How to reflect the preconditions on rehabilitation/ recovery?
  - Can communities be revitalized?
  - More and more evacuees seek to "start new lives" in the other areas.
- 3. Devastation of the key industries of the region, i.e. agriculture, forestry and fisheries
  - How to rebuild and/or reconnect them with societies / economies in the wider areas.

# Road To Recovery: A Phenomenal One!

 Of the Tohoku Expressway's total length of 675 km, 347 km were damaged. All travel restrictions were lifted on March 24,2011.

![](_page_14_Picture_2.jpeg)

- Sendai Airport: commercial flights resumed on April 13. Regular domestic flights resumed on July 25, and international flights on September 25,2011.
- The Tohoku Shinkansen resumed operation along its entire line on April 29, and returned to its normal schedule on September 23,2011.
- Roads and railroads have been restored in urban areas, except in districts where buildings were washed away, the nuclear
- <sup>15</sup> accident had an effect, etc.

![](_page_14_Picture_7.jpeg)

Kyodo, 2013

Tohoku Bureau of Economy, Trade and Industry, 2012

# **Innovations in Reconstruction** Financing: Crowd-sourcing

- Fund was established to • support oyster farmers in the affected area.
- Sells "reconstructed oysters beforehand" 1 share costs 10,000Yen (approximately US\$80) for 20 oysters sometimes in the future. Currently collected US\$3.2million in 5 months.
  - The proceeds will be used for ships, equipments (oyster sorting facilities, septic tanks), aquaculture materials (timbers, ropes, baskets, etc.), and seed oysters. Hayashi, 2013

Oyster business reconstruction project from the Great East Japan Earthquake

# SAVE SANRIKU

Sanriku Oyster Reconstruction

Home Project Reports

About

Contact

October 16th

Project state of progress

The number of owners

The number of shares

#### We launched Sanriku Oyster reconstruction project!

We aspire to restore the gorgeous and rich ocean that used to embrace beautiful oysters in one of the world largest oyster producing areas, Sanriku.

iLink Inc. CEO Hiroaki Saito Japan Oyster Association Grand Oyster Meister Umail kakiya : direct quick seafood delivery Shop owner

(Left Right: Masanori Hatakeyama, a oyster producer in Karakuwa, Kesen'numa)

#### Calling for "Recovered Oyster owners"

10,000 yen (approx. US\$100) for one share = receive approximately 20 ovaters after the reconstruction

We need all oyster lovers' generous support.

http://sanriku-oysters.com/index.html

2 about the reconstruction support, "Oyster Owner Program"

![](_page_15_Picture_19.jpeg)

Aten there are 0,000 awners. re can create a path for shipping Sanriku systers. 10.000 owners. re can save ovster producers .000.000 owners. re can actualize oyster aquaculture reconstructio

### **Crowd-Sourcing of Rehabilitation and Reconstruction: Small Businesses**

11 Like Confirm メッソイートする 4,868

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#### セキュリテ被災地応援ファンド

![](_page_16_Picture_2.jpeg)

![](_page_16_Picture_3.jpeg)

#### http://oen.securite.jp/

Local small businesses in the affected area face difficulty to collect financial support for reconstruction.

- This project is open for small business in need. The web page introduces various small businesses such as Rice wine brewers, food processors, and retailers.
- Each business describe its
  rehabilitation plan and
  financial plan of the fund.
  Supporters can receive their,
  products in a few years.

Hayashi, 2013

# Internet based Supply Chain for Small Manufacturers

TOP > 震災復興支援モール 震災復興支援モール powered by このたびの東日本大震災で被災された皆様へ 心よりお見舞い申し上げます。 東日本大震災に関連し「ザ・ビジネスモール」を通じて、被災地周辺地域の「企業・団体」の復興を支援します。 必要な物資の確保などが 被災地間辺地域にで 取引量が減少している方へ 困難になっている方へ 「ザ・ビジネスモール」とは、全国の商工会議所・商工会が共同運営し、その会員26万社が情報登録をする日本最大級の企業情報 サイトです。中小企業の販路拡大支援を目的に2000年から運用を開始しています。共同運営する団体の会員企業であれば、ユー ザー登録をするだけで、自社の簡易ホームページ作成や商談案件の情報発信・提案を無料で行うことが可能です。 ザ・ビジネスモールとは 利用者より年間650件発信される案件に、提案することができます。また、自社を調達先として企業検索DBに登録し、利用者から問合せを受けることができます 販路の開拓にお困りの方 被災地域の風評被害や取引先を失った等により、販路が減少している企業様に対し、販路の開拓を支援します。 年間650件発信される実件に、提案することができます。 提案できる案件を探す powered by ザ・商談モール 売り手と買い手のマッチングの場で、販路の開拓や調達先探しの支援をする「ザ・商談モール」。 現在オープンになっている下記の買いたい案件に提案いただくことが可能です。 樹脂にウレタン塗装が出来る会社を探しています。(11月6日) パワーストーンの仕入先を探しています。(11月1日) (株)マキタの充電式クリーナー、エレクトロラックス(株)の充電式クリーナーを探し

http://www.b-mall.ne.jp/hukkoushien.aspx

ています。(11月1日)

The internet site is run by league of chamber of commerce to provide opportunity for small manufacturers in affected areas to receive more orders from all over Japan. It also support the firms in the area to find resource supply for their products. The 311 Tohoku disaster destroyed supply chains of the manufacturing; therefore, it is helpful especially for small businesses to re-establish their own.

Hayashi, 2013

## **The Resilience: After Three Years**

![](_page_18_Picture_1.jpeg)

Pictures from Miyagi, Fukushima and Iwate prefectures

![](_page_18_Picture_3.jpeg)

![](_page_18_Picture_4.jpeg)

![](_page_18_Picture_5.jpeg)

![](_page_18_Picture_6.jpeg)

(Source: The Atlantic, 2013. Reuters/Kyodo)

# Significant Lessons from the triple disaster

- Lesson I: Community based is the best way to manage disasters.
- Lesson II: Information sharing among different stakeholders including communities with integrated and transparent emergency planning is vital.
- Lesson III: Long-term partnerships, twinning, and coupling/pairing between local governments, NGOs, schools, expertise, and business sectors are a useful tool to respond in the case of disaster; nonetheless, how to coordinate them varies.
- **Lesson IV:** The triple disaster has tested financial and reconstruction preparedness and capacity to deal with such catastrophes even in developed country context.

## Stakeholder Perceptions on Loss and Damage Associated with Climate Change Impacts and Adaptation

Loss and Damage Associated with Climate Change Impacts and Adaptation: Stakeholder Perceptions for Shaping the Future Agenda of Asia Pacific

> S.V.R.K. Prabhakar and M. Nakata 3/27/2014

Institute for Global Environmental Strategies and Asia Pacific Adaptation Network

**Report:** Prabhakar, S.V.R.K. and M. Nakata. 2014. Loss And Damage Associated With Climate Change Impacts And Adaptation: Stakeholder Perceptions For Shaping The Future Agenda Of Asia Pacific Adaptation Network. IGES Research Report 2013-03. Hayama, Japan: Institute for Global Environmental Strategies. Available at http://pub.iges.or.jp/modules/envirolib/view.php?docid=4949

# Loss and Damage due to Climate Change

- Current level of GHG mitigation and adaptation measures are insufficient to fully neutralize the climate change related negative impacts
  - There will be residual impacts despite all the efforts
  - Partly, the loss and damage could be due to limited adaptation, failure of adaptation (maladaptation) and no-adaptation
  - There will be areas where limits to adaptation will be reached
  - Understanding the possible level of these losses and damages, their implications and required interventions is necessary

# **Stakeholder Perceptions**

• A stakeholder perception survey covering the subscribers of the Asia Pacific Adaptation Network (APAN) activities was carried out

- To identify the pertinent issues and perceptions among the stakeholders engaged in climate change adaptation
- To help design the agenda of knowledge networks engaged in climate change adaptation and disaster risk reduction
- Design:
  - Multiple choice questionnaire with some open ended questions
  - Administered online
  - **o** n=102
  - **Representation:** Non-governmental developmental organizations (38%), government departments (15%), independent think tanks (14%), universities (11%) and governmental think tanks (9%).
  - Age group: 30-50 (56%), 50-60 (21%) and 18-30 (17%).
  - 38% of the respondents worked in climate change adaptation, 30% in environmental management and 12% in disaster risk reduction.

#### Definition of L&D

![](_page_23_Figure_1.jpeg)

#### Scientific Understanding on L&D

![](_page_23_Figure_3.jpeg)

#### Areas where knowledge is limiting

![](_page_24_Figure_1.jpeg)

#### Sectors with Limited Scientific Understanding on L&D

![](_page_24_Figure_3.jpeg)

#### Capacities and Gaps to Address

![](_page_25_Figure_1.jpeg)

#### **Existing capacities and important interventions**

#### Important Stakeholders to address L&D

![](_page_25_Figure_4.jpeg)

# Conclusions

- Most respondents associated with APAN tend to show relatively better knowledge and tend to prefer sharing on-the-ground information and conducting pilot research programs than those respondents not associated with APAN.
- An overarching consensus is that capacities created at the local level can be the most effective way of addressing the L&D associated with climate change.
- Scientific knowledge is lacking in areas of agriculture, water resources, biodiversity and livelihoods and there is a need to enhance research and capacity building efforts in these areas.
- Among all the stakeholders, the primary role belongs to the research and academic institutions in generating needed scientific knowledge and tools that could help institutions address issues on the ground in addressing the L&D.
- Tools that help in assessing and maximizing adaptation effectiveness and avoid maladaptation, access to climate information that can put governments and other institutions at the center of decision making.

## Thank You! prabhakar@iges.or.jp; sivapuram.prabhakar@gmail.com