Macro-economic analysis, DR² AD Model
-How much investment in DRR is most appropriate for countries?- 

Symposium on Risk, Resilience and Disaster Management - Launching the World Bosai Forum/ IDRC Sendai 2019
23 November, 2018 in Davos, Switzerland

Kanayo Kousaka,
Consultant, Crisis Management Section
Disaster Prevention Planning Dept.
Land Infrastructure Business Div.
Pacific Consultants Co., Ltd.
Who We Are & What We Do

Pacific Consultants Co., Ltd.
Civil Engineering, Architecture & Project Management Consultancy

TRANSPORTATION INFRASTRUCTURE
- Road
- Bridge
- Tunnel
- Railway
- Aviation
- Defense Facilities Engineering

PROJECT MANAGEMENT
- Comprehensive Project Planning
- Transportation Planning
- Waste and Resource Management
- Architecture
- Environment
- Information System

BUISINESS DEVELOPMENT
- New Business Development
- PFI/PPP Management
- Administration Management
- Energy and Environment
- Project Development

LAND CONSERVATION
- River Engineering and Water Resources
- Disaster Prevention Planning
- Port and Harbor
- Water Supply and Sewage
- Geotechnical Engineering
## Who We Are & What We Do

### History

**Founded in 1951**

<table>
<thead>
<tr>
<th>Year</th>
<th>Project</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td>TOKAIDO Shinkansen</td>
<td>Design of structures</td>
</tr>
<tr>
<td>1963</td>
<td>Tomei Expressway</td>
<td>Design of structures</td>
</tr>
<tr>
<td>1971</td>
<td>Tanegashima Space Center</td>
<td>Design of launcher</td>
</tr>
<tr>
<td>1988</td>
<td>Honshu-Shikoku Bridge</td>
<td>Design of structures</td>
</tr>
<tr>
<td>1997</td>
<td>The Mechanisms under the Kyoto Protocol</td>
<td>Clean Mechanism Development</td>
</tr>
<tr>
<td>2002</td>
<td>Metropolitan Discharge Tunnel</td>
<td>Design of structures</td>
</tr>
<tr>
<td>2004</td>
<td>Tokyo International Airport Re-Expansion</td>
<td>Provide know-hows from planning and design to construction.</td>
</tr>
<tr>
<td>2009</td>
<td>Shibuya Station Redevelopment</td>
<td>Total planning</td>
</tr>
<tr>
<td>2011</td>
<td>Great East Japan Earthquake Recovery</td>
<td>Total engineering support for recovery</td>
</tr>
<tr>
<td>2013</td>
<td>Philippines Massive Typhoon Disaster Recovery</td>
<td>Total engineering support for recovery</td>
</tr>
</tbody>
</table>

**Tsukuba Technology Research Center**
Who We Are & What We Do

Domestic Bases
Who We Are & What We Do

Global Network & Bases

[Business Partnership]
- China
  - Institute of Architecture Design and Research, Chinese Academy of Sciences
- Korea
  - DOHWA Engineering Co., Ltd.
- Thailand
  - TEAM Consulting Engineering and Management Co., Ltd.
- Indonesia
  - PT. BITA BINA SEMESTA
- Indonesia
  - Jakarta office
Who We Are & What We Do

Disaster risk reduction and management and Crisis Management

Plan
- Anticipate damage
- Prepare risk maps for flooding, landslides and tsunamis
- Role of disaster risk reduction and management information

Do
- Preparation of various action plans and timelines
- Preparation of flooding, landslide and tsunami hazard maps
- Examination of flooding and landslide countermeasures
- Development and operation of disaster prevention information systems

Act
- Verification of various action plans
- Updating of flooding, landslide and tsunami hazard maps
- Effect verification of flooding, landslide and tsunami countermeasures

Check
- Disaster risk reduction and management and risk management training, planning and operational support such as drills

Striving to minimize damages
Private Sectors role in DRR as an engineering consultant

Various activity is needed to implement the Sendai Framework for Disaster Risk Reduction

Priority 1: Understand Disaster Risk
- Hazard map, Recognize vulnerability

Priority 2: Disaster Risk Governance
- DRR Strategy, Mainstreaming DRR, Disaster related data

Priority 3: DRR Investment
- Capacity Development to promote DRR investment

Priority 4: Preparedness for response
- Prepare for effective response

Priority 4: Build Back Better
- Promote BBB

Disaster Management Cycle

Plan

Prepare

Response

Improve
Invest in DRR before disaster strikes!

Importance of DRR Investment

✓ DRR Investment before the disaster is crucial to reduce the disaster damage.

✓ DRR Investment promotes the sustainable development as well as reduces the disaster damage.

We need to show the effectiveness of DRR investment clearly in order to prioritize DRR investment and get the budget!!
What is the **DR$^2$AD** model?

- **Disaster Risk Reduction Investment Accounts for Development**

**What’s the DR$^2$AD Model?**

- Macroeconomic model to measure the impact of DRR investment on economic growth.

- Initial version of the **DR$^2$AD** was developed by JICA, JICE, Kyoto University, and Pacific Consultants. It has been further improved by Kyoto Univ. and Pacific Consultants.

- The simulation of the effectiveness of DRR investment using **DR$^2$AD** model was introduced in the **GAR 2013** and **GAR 2015**.

**Theoretical Core of the SFDRR**

The concept that DRR investment is effective to national economic growth was developed into a part of theoretical core of the **SFDRR**.
What is the DR²AD model?

- Disaster Risk Reduction Investment Accounts for Development -

Demonstrate effectiveness of the DRR investment

Fig. Image of Sustainable Economic Growth
Appropriate Investment in DRR

Simulation of the **optimal level** of the DRR Investment

**Optimal Level as a Percentage of GDP**

![Graph showing GDP Growth by DRR level (Sample Path)](image)

**Optimal Level as a Percentage of Consumption**

![Graph showing Consumption by DRR level (Sample Path)](image)

Source:
We would like to conduct more Case Studies using the DR²AD model and welcome your collaboration.

Let’s promote DRR investment before disasters!
Thank you so much for allowing us to make a presentation.

-Pacific Consultants