Promote public investment in DRR

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How does Japan keep securing ex-ante DRR budget?
The effects of investment in Disaster Risk Reduction are usually unrecognizable. If structures or facilities for Disaster Risk Reduction are constructed and work well, it is hard for citizens to imagine the damage possibly occurred without the such measures. **Justifying investment in Disaster Risk Reduction always incurs difficulty.**

**How do we promote public investment in DRR?**

One solution is to formulate Investment Plan through close discussion among stakeholders including policy makers. But …

- what projects should be put in the Plan?
- which should be given priority?
- how do we justify each DRR project?
Large Flood in Niigata in July 2004
(15 people died and approx. 21,000 buildings were damaged in Niigata Pref.)

Inundation caused by Ikarashi River levee failure  (Sanjo City, Niigata Prefecture)
River improvements were implemented based on the July 2004 flood experience.

Total cost: about 118.2 billion JPY

“Actual” damage and loss data after disasters struck
In July 2011 the Shinano River Basin experienced a total rainfall of approx. 1,000mm, which was the largest rainfall on record and 1.6 times more than that of July 2004, but both damages to buildings and human casualties were reduced dramatically. \textbf{The investments were successfully justified in the end!}

<table>
<thead>
<tr>
<th>Total Rainfall 1)</th>
<th>Number of Buildings Damaged 2)</th>
<th>Number of fatalities or missing 3)</th>
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</thead>
<tbody>
<tr>
<td>Total rainfall 647mm</td>
<td>9,778 buildings (90% reduction)</td>
<td>12 persons (90% reduction)</td>
</tr>
<tr>
<td>2004.7</td>
<td>2011.7</td>
<td>2004.7</td>
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<tr>
<td></td>
<td>421 buildings</td>
<td>1 person</td>
</tr>
<tr>
<td></td>
<td>Total rainfall 1,006mm</td>
<td>150.2 b.yen (98%)</td>
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<td></td>
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<td>3.5 b.yen</td>
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</tbody>
</table>

1) Kasabori rain gauge station
2) 2004.7: "7.13新潟豪雨 水害記録誌 (March 2006 Niigata Prefecture)
   2011.7: Produced by Niigata Prefecture based on 「第1回平成23年7月新潟・福島豪雨対策検討委員会」
3) Shinano River Downstream, Ikarashi River, Kariyata River Disaster Rehabilitation Emergency Project Pamphlet (Shinano Karyu River Office, Niigata Prefecture)
Investment in recording damages and losses caused by disasters

Flood Damage Statistics Survey (since 1961)

• Actual damage caused by water-related disasters such as floods, landslides, storm surges, tsunamis, etc. is estimated every year.
• The survey provides basic data indispensable for presenting the necessity and the effectiveness of flood control measures.

**Damages to General Asset**
- housings, household commodities, machineries for businesses, agricultural products

**Damages to Assets for Public Services**
- Transportation, communication, etc

**Damages to public Infrastructure**
- Cost for emergency rehabilitation, etc
“Actual” damage and loss data after disasters struck

• A general statistics survey based on the article 19 of the Statistics Act (approved by Minister for Internal Affairs and Communications)
• Carried out by MLIT’s Water and Disaster Management Bureau in collaboration with prefectures and municipalities.
Along with the basic survey on flood disaster damages, it is also required to estimate possible future damages by flood disasters so as to justify investment in “ex-ante Disaster Risk Reduction”.

Cost-Benefit analysis is a useful tool that can provide strong evidence for the relevance of Flood Disaster Risk Reduction investments from the economic aspect.

The benefit is presented as the expected value of the reduction of possible damages that future projects produces. The estimation of the expected damages should be as accurate as possible.

Therefore, efforts must be done to improve the accuracy of damage estimation through covering various kinds of damages, which include indirect damages as well as direct damages.
Cost Benefit Analysis

Methods to estimate possible future damage can be used to estimate the benefit of DRR projects.

Estimated amount of mitigated damage (Benefit)

Expected amount of damage without improvement

Expected amount of damage with improvement

Probability scale: indicates the probability of the occurrence of floods, with 1/100 representing a flood that occurs once in one hundred years.

Expected flood prone area analysis result without improvement

Expected flood prone area analysis result with improvement

Methods to estimate possible future damage can be used to estimate the benefit of DRR projects.
Way Forward

1. To justify investment in DRR, disaster risk should be clearly described with economic analysis.

2. Actual damage data, especially economic data, would be strong to justify investment.

3. But standardized methodology on actual damage data is still on the way to be adopted in some other countries.

4. Details of the methodology on cost-benefit analysis are not yet standardized in each country.

5. Government officials should have capacity to communicate with S&T.