Appendix-3: 次期国家計画への提言プレゼンテーション資料

Annex

Supplementary explanation materials for
Key Questions Matrix by Japan
for
IDMMP (RIPB in Bahasa) 2015-2045

Table of Contents

Executive Summary

- GOI(Government of Indonesia) has a great efforts for Disaster Management and it produces a good example of "BBB" in Yogyakarta and increase of DRR budget.
- Same as Indonesia, Japan also experience & recover from many disasters before reaching current development status. Lessons learned from this long experience on Disaster Management, one thing is confirmed "DRR Investment is more effective and more contribute to secure the development of the country".
- For a long term perspective, to make a better *RIPB,* we advise you to consider to include following concept:
  (a) Increasing the DRR investment including structural measures
  (b) Improving/upgrading the Risk Index
  (c) Improving the cooperation & coordination between Line-ministries in both central and local government

Notes:
For more information please refer to following document, showing a simple analysis on Indonesian current existing situation, including the introduction of Japanese experience on DRR Investment.

Expectation for Indonesia as a Leader Country of Disaster-Prone Countries

- Since Tsunami in 2004, Indonesia has reduced disaster risk with various policies and implementation of countermeasures
- Especially, Indonesia has good experience and practice in the fields of Emergency Response and "Build Back Better"
- Emergency response at Merapi and Agung Volacanoes were admirable experiences.
- Reconstruction in Yogyakarta Earthquake in 2006 was an excellent example of the concept "Build Back Better", which brought following reconstruction policies like Typhoon YOLANDA in Philippines in 2013, and final result in Sendai Framework in 2015
- For the future, Indonesia as a leader country of disaster-prone countries is expected to emphasize Preparedness including prevention and mitigation as well as post-disaster policies.
- Indonesia is also expected to lead international discussion with its policies which are going to be started in the coming Master Plan

For example, Slogan like this

Not only "Build Back Better",
But Also "Invest In Advance"
(or something like "Build up Resilience")

A Good Precedent for BBB in the World

BBB in Yogyakarta, Central JAVA Earthquake in 2006

- **Nearly 100,000 houses were rebuilt and reconstructed with earthquake-resistant design based on BBB concept.**
- **The local government implemented good recovery with policy and funding supported by the central government**
- A scheme of construction application, earthquake-resistance design and financing mechanism, etc., was established, leading to rapid reconstruction and recovery.

Immediately after EQ

After reconstruction with Earthquake-resistant Design

Source; REKOMPAK Rebuilding Indonesia's Communities After Disasters: The Secretariat of the Multi Donor Fund for Aceh and Nias and the Java Reconstruction Fund, The World Bank

It has led to the concept of "BBB" in SFDRR

Indonesia can establish a new concept on DRR as an international DRR leader

Master Plan (Draft) P15

Goal : By 2045, the number of HIGH – RISK districts / municipalities will decrease from the 75% to 40-45%.

- This Goal in the Master Plan is very challenging
- To achieve the goal, a substantial amount of hardship is anticipated even with your remarkable efforts
- 5-year National DM Plans and 3-year National Action Plans subsequent to the Master Plan and implementation of those plans are very important to achieve the goal

JICA analyzed Indonesian DRR and made a recommendation
- Not only to achieve the Goal
- But also to "Build up Resilience" practically
- And to become a Genuine Leader of Disaster-Prone Country that no one could possibly compete against

The recommendation consists of 3 parts.

1. DRR Investment
2. Risk Index
3. Cooperation with Line-Ministries

With regard to each part, JICA is ready to provide Japanese experience and practice.
We JICA made this recommendation so as to be reflected into the next 5-year National DM Plans, 3-year National Action Plans implementation of those.
However, in order to do so, some concepts in it should be written on the Master Plan (IDMMP).

1. DRR Investment

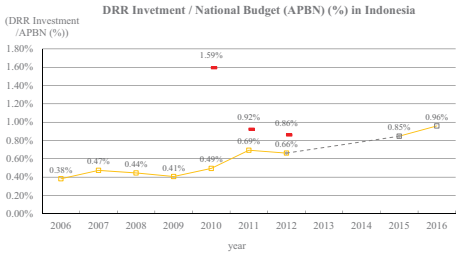
1-1 DRR Investment Comparison Among Indonesia, Japan, Philippines and others

DRR Investment in Indonesia has gradually increased

Source;
1) *The amounts from 2006 to 2012 are made from "Preliminary Examination of Exiting Methodologies for Allocating and Tracking National Government Budget for DRR in Indonesia"*
2) *The amount of the red marks from 2010 to 2012 are made from "NAP-DRR 2010-2012"*
3) *The amounts of fund from 2015 to 2016 includes recovery and reconstruction cost , which are made from "Ekspose Hasil Pemantauan 2016 Rakor BPBD".*

Total funding for DRR													(million Rupiah)
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016		Data Source
Total funding for DRR(1)	#N/A	#N/A	#N/A	#N/A	16,618,150	11,962,111	12,821,514	#N/A	#N/A	#N/A	#N/A		NAP DRR 2010-2012
Related to construction	-	-	-	-	6,960,000	4,500,000	3,987,514	-	-	-	-		
Non-related to construction	-	-	-	-	9,658,150	7,462,111	8,834,000	-	-	-	-		
Total funding for DRR(2)	2,548,000	3,587,000	4,386,000	3,806,000	5,158,000	8,977,000	9,875,000	-	-	-	-		Preliminary Examination of Existing Methodologies for Allocating and Tracking National Government Budget for DRR in Indonesia
Related to construction	1,912,000	2,184,000	2,683,000	2,668,000	2,767,000	3,764,000	3,236,000	-	-	-	-		
Non-related to construction	636,000	1,403,000	1,703,000	1,138,000	2,391,000	5,213,000	6,639,000	-	-	-	-		
Total funding for DRR(3)	-	-	-	-	-	-	-	-	-	15,297,546	19,977,945		http://kerwanan.bappenas.go.id/images/data/Kegiatan/Rakor/1412016/Ekspose_Hasil_Pemantauan_2016_Rakor_BPBD.pdf
Amount	2,548,000	3,587,000	4,386,000	3,806,000	5,158,000	8,977,000	9,875,000	#N/A	#N/A	15,297,546	19,977,945		
DRR/National Budget (%)	0.38%	0.47%	0.44%	0.41%	0.49%	0.69%	0.66%	#N/A	#N/A	0.85%	0.96%		
National Budget	667,127,700	757,449,900	985,730,700	937,382,100	1,042,117,200	1,294,999,125	1,491,410,225	1,650,563,800	1,777,182,900	1,806,515,226	2,082,948,900		Bahan Nota(s) (LKPP) - Ministry of Finance

DRR Investment / National Budget has reached 1%



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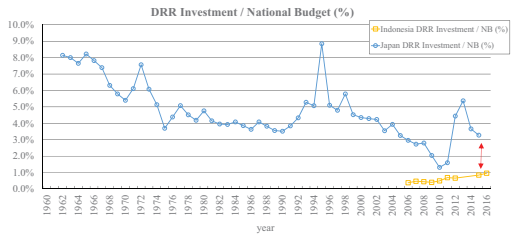
In the Chair ' s Summary at the closing ceremony, John Holmes, UN Under-Secretary-General for Humanitarian Affairs and Chair of the ISDR in the event called "Global Platform for DRR" held in Geneva, 16-19 June 2009, 'By 2010, establishment of clear national and international financial commitments to DRR, for example to allocate, **at least 1% of development funding**" '
Indonesia have achieved "1% of development funding" as 1.39% in 2010 and as 1.18% in 2011 according to another source, "Indonesia's Experiences in DRR Investment Accounting in National Budget" by Dr. Suprayoga Hadi, BAPPENAS at workshop on the Tracking of DRR and Recovery Investment Data with International Aid in Helsinki, Finland on 13 – 14 April 2011

DRR Investment / National Budget (%)

- DRR investment in Indonesia has gradually increased, and it is about to reach 1% of budget.
- Further DRR investment is desired to become a leader of developed DRR countries in the future



	INDONESIA		JAPAN
DRR Investment / National Budget	1.0%	×3 ≒	3.1% (2016)

1) The amounts of DRR investment in Indonesia from 2006 to 2012 are made from " Preliminary Examination of Exiting Methodologies for Allocating and Tracking National Government Budget for DRR in Indonesia" and the amounts of fund in 2015 to 2016 include recovery and reconstruction cost , which are made from "Ekspose Hasil Pemantauan 2016 Rakor BPBD".

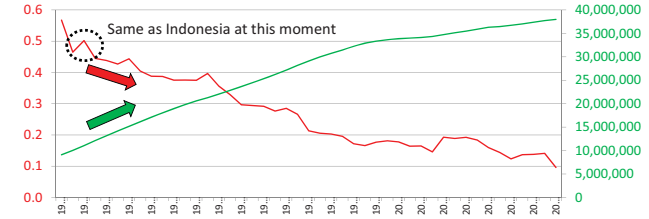
2) The amounts of DRR investment in Japan are calculated by subtracting disaster recovery project costs (made from "Damage statistics of disaster (MLIT) " from the total disaster management budget (the Cabinet Office) in each year from 1998 to 2016. The amounts of DRR investment from 1962 to 1974 include disaster recovery project costs. The amounts of DRR investment from 1975 to 1997 include disaster recovery project costs of agriculture related facilities.

DRR Investment Brings Economic Growth

	INDONESIA		JAPAN
GDP in 2016	932 Billion USD	×5 ≒	4937 Billion USD
The Average Disaster Damage / Year	30 Trillion IDR Except Forest and Land Fire	≒	41 Trillion IDR Water Related Disaster Except Tsunami 10 years average 2005-2014 Exchanged 345 Billion JPY as 1 JPY = 118 IDR
Disaster Damage / GDP	0.5%	/ 5 ≒	0.1%(2014)

Water Related Disaster Damage / GDP (%)

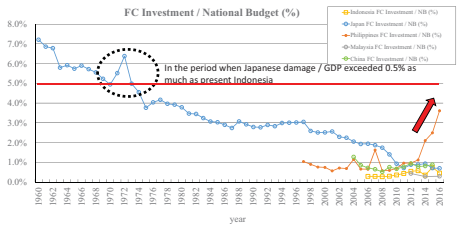
Real GDP (100 million JPY)
2005 is benchmark year



Japan has achieved economic growth with reducing disaster damage by high amount investment
No DRR, No Economic Growth

Flood Control Investment / National Budget (%)

- Regarding flood control budget, Indonesia has been closing up to Japan
- In the period when Japanese damage / GDP exceeded 0.5% as much as present Indonesia, Japan invested around 5% of the national budget in flood control
- Philippines has been increasing rapidly



	INDONESIA	PHILIPPINES	JAPAN	
Flood Control Investment / National Budget	0.5%(2016)	3.6% (2016)	Around 5.0% (early 1970s)	0.7% (2016)

1) The amounts of FC investment in the Philippines and China are made from "ESTIMATING DEMAND FOR FLOOD CONTROL INFRASTRUCTURE, Dr. Koki HIROTA, Chief Economist, Dr. Mikio ISHIWATARI, Senior Advisor on Disaster Management and Water Resource Management, JICA" in the 10th Meeting of High-level Experts and Leaders Panel on Water and Disaster (HELP), 21 September 2017, Gyeongju, Republic of Korea.

2) The amounts of FC investment in Malaysia are made from annual budget speech "http://www.treasury.gov.my/index.php/en/budget/annual-budget.html"

3) The amounts of FC investment in Indonesia from 2006 to 2009 are made from the construction cost related to flood control structures shown in "Preliminary Examination of Exiting Methodologies for Allocating and Tracking National Government Budget for DRR in Indonesia" and the amounts in2010 to 2011 are made from the budget of PUPR.

4) The amounts FC Investment of Japan are made from the amounts of the budget of Water and Disaster Management Bureau, MLIT, which includes the budget of flood control incl. sediment, coast project.

Example of DRR Investment Target in Philippines

PA10121 or the Phiippines Disaster Risk Reduction and Management Act of 2010 (DRRM Act) is a new law which transforms the Phils' Disaster management system from disaster relied and response towards DRR.

【RA 10121】
Transforms & reforms the way we deal with disasters
- ✓ that impact of disasters can be reduced by addressing the root cause of disaster risks
- ✓ from disaster response to risk reduction
- ✓ emphasis on strengthening peoples' capacity to absorb stress
- ✓ Proactive and developmental approach in managing disaster

☐ **Sec. 21. Local Disaster Risk Reduction and Management Fund (LDRRMF).**
The present Local Calamity Fund shall henceforth be known as the Local Disaster Risk Reduction and Management Fund (LDRRMF). **Not less than five percent (5%) of the estimated revenue from regular sources shall be set aside as the LDRRMF** to support disaster risk management activities such as, but not limited to, pre-disaster preparedness programs including training, purchasing life-saving rescue equipment, supplies and medicines, for post-disaster activities, and for the payment of premiums on calamity insurance.

Indonesian DRR Investment should be increased

	INDONESIA	PHILIPPINES	JAPAN	
	2016	2016	Early 1970s	2016
Disaster Damage / GDP	0.5%	?	0.5%	0.1%
DRR Investment / National Budget	1.0%	?	Around 6.0%	3.1%
Flood Control Investment / National Budget	0.5%	3.6%	Around 5.0%	0.7%

As regards the scale of Disaster Damage, GDP and budget, Indonesian DRR and Flood Control investment could increase 6 ~ 10 times as much as present amount

In order to become the genuine DRR Leader Country, it is worth considering whether the budget target should be set in 5-year National DM Plans or 3-year National Action Plans subsequent to the Master Plan

1. DRR Investment

1-2 Japanese System of DRR Plans Which Have Their Budget Target Practically

Japanese government set DRR Plan

Higher Level Plan

< Before 2002 > Budget Target Plan

River Construction Plan for all over Japan (Sabo, Coast, etc.)
- 9 plans: River, Sabo, Coast, Port, Road, Airport, etc.
- Terms are 5~7 years
- Budget is defined to secure quantity of public works

< Since 2003 > Outcome Target Plan

Infrastructure Improvement Plan for all over Japan
- 4 major targets: 1.Maintenance, 2.Disaster risk reduction, 3.Sustainable society, 4.Economic Growth
- Term is 5 years
- Budget is not written, but several outcome targets are defined in each major targets
  Ex. 5% increment in prevention area from target flood

Countermeasures against Particular Huge Disaster
- Nankai Trough Earthquake
  Ex. 80% reduction in fatalities estimated at 332 thousands
- Tokyo Epicentral Earthquake
  Ex. 50% reduction in totally destroyed houses estimated at 610 thousands
- The above two terms are 10years

Lower Level Plan Based on their budget

Each River Improvement Plan (Sabo, Coast, etc.)

The Summary of DRR Plan

Higher Level Plan

Ex. 5% increment in prevention area from target flood
Ex. 80% reduction in fatalities estimated at 332 thousands in Nankai Trough Earthquake

MLIT or MAFF requires each annual budget in order to achieve outcome targets.

To convert them into outcome target, and sum them up

Lower Level Plan
- Improvement Plan of River A for Flood, Tsunami, Storm Surge
- Improvement Plan of River B for Flood
- Improvement Plan of Sabo C for Flash Flood, Landslide, Lahar
- Improvement Plan of Sabo D for Debris Flow
- Improvement Plan of Coast E for Tsunami, Storm Surge
- Improvement Plan of Coast F for Tsunami, Erosion

Each River, Sabo, Coast require each annual budget in order to implement each plan.

- On the surface, the system of Japanese disaster countermeasures plan has no budget target now
- However, each river, sabo, coast has each improvement plan which substantial budget should be considered
- That means that these plans have budget target practically
- Japanese government secure the budget against disaster by summing up all the improvement plans

The reasons why Japan changed budget target to outcome target in 2003
- Infrastructure had been build to a certain level.
- Government had to consider not only quantity (budget) but also quality (outcome)

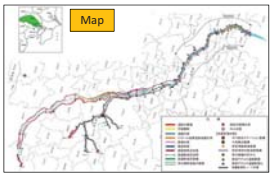
Each River Improvement Plan

Lowest Level Plan
- "River Improvement Plan" has been made for each river. which are length is 123,943km for all over Japan
- The plans of minister-direct-administrated section 10,589km have been already decided.
- The plans of the prefecture-governor-administrated section 113,354km are needed in order to require national subsidies, that made governors of prefectures decide main section plans.

Each River Improvement Plan
- Made under the River Law by the Minister of MLIT or the Governor of Prefecture
- Each term is about 30 years
- Each Flood scale target to be prevented in about 30 years is defined, and the return period of the target scale is about 20~70 years
- Each Content of implementation is written in order to achieve the above
- Each Budget is not clearly written, however budget is substantially determined because a certain budget is necessary to implement public works in 30 years
- Made while hearing Residents opinions

Example of Each River Improvement Plan in Japan

- Each "River Improvement Plan" is almost as many as 100 pages
- List of detail implementation is written in it
- Before starting each project, Cost-Benefit Analysis is necessary



River Embankments

Dams

Retarding Basins

Pulling up low bridges which hinder river water from flowing smoothly

- This railway connects Tokyo and Narita International Airport
- Japanese government implements everything for DRR

Underground Discharge Tunnel

- 6.3km tunnel
- Deeper than 50m under ground

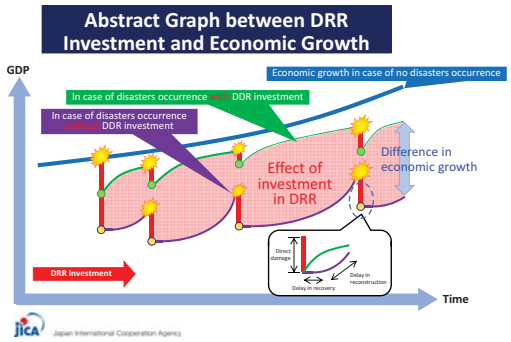
- This stadium was used the final game of the World Cup of soccer
- When a flood occurs, the flood will flow under the stadium first to prevent resident area from inundating

1. DRR Investment

1-3 Japan Can Assist to Evaluate the Contribution to Economic Growth by DRR Infrastructure

Abstract Graph between DRR Investment and Economic Growth

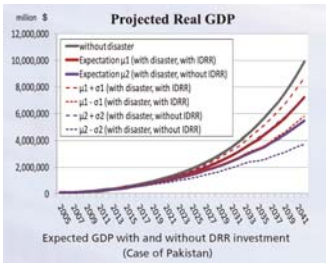
- Economic growth is hindered by disasters without DRR investment
- It is theoretically possible to show this situation with a macro growth model and calculate economic effects, however, there are still a lot of technical issues to be solved.



We are now studying Dynamic Economic Growth Model

Evaluation with a dynamic economic growth model is not impossible, but it has some hurdle to clear in practical terms

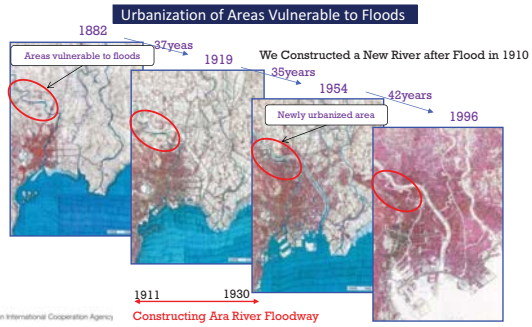
- It needs various historical data
- Severe disaster would seldom occur, not every year. That makes it more difficult to identify values of coefficients.
- Multicollinearity might happen between DRR Investment and other investment
- This model should be modified to be capable of processing endogenous DRR investment



UN Global Assessment Report 2013, shown GDP will 25% down without DRR investment (Provided by JICA)

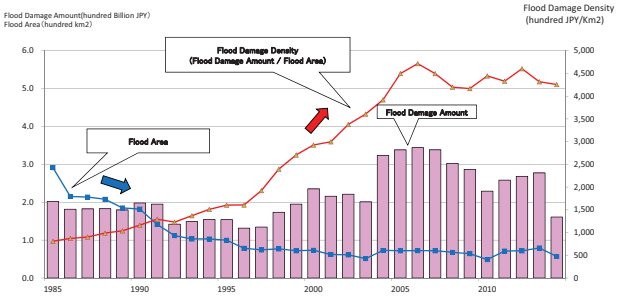
Importance and necessity of "*Invest in Advance*"

- One of Lessons learned from Japan's experience in Disaster Management is that disaster damage will expand afterwards unless DRR investment in advance is made considering anticipation of urbanization
- It is possible to statistically calculate the economic effect of investment utilizing the progress of urbanization in the future,

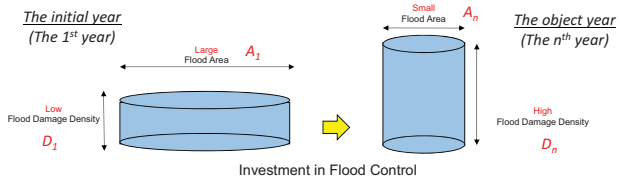


Changes in Flood Area and Flood Damage Density in Japan

- As a result of Investment, we have reduced the flood area, but the flood damage density has increased
- In other words, There would be much more flood damage if we had not invested.

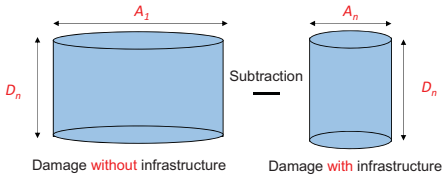


Another Idea to Calculate the Annual Benefit of Infrastructure



Investment in Flood Control

We can calculate the object year benefit by subtraction ⇨ $A_1 \cdot D_n - A_n \cdot D_n$



Damage without infrastructure　　Damage with infrastructure

We can identify the total benefit by the sum of each year one ⇨ $\sum_n (A_1 - A_n) \cdot D_n$

Flood Control Investment Produced much Benefit

Mikio Ishiwatari and Kenichi Tsukahara : "TECHNICAL NOTE ON THE ESTIMATION OF INFRASTRUCTURE DEMAND FOR FLOOD CONTROL" Bridging the Infrastructure Gap in Asia, ADB-JICA Joint Side Event at the 50th Annual Meeting of the ADB Board of Governors, 2017.5

Kenichi Tsukahara and Noriyasu Kachi : "Using Data and Statistics to Explain Investment Effectiveness on Flood Protection", Journal of Disaster Research Vol.11 No.6, 2016

Total Net Accumulated Economic Effect from 1961 to 2005

$= \sum_{n=1961}^{2005} (B_n - I_n)$ > 40 Trillion JPY ≒ 4,720 Trillion IDR

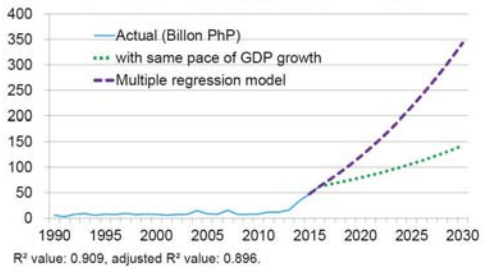
Where B_n and I_n are benefit and Investment in nth year respectively . $B_n = (A_1 - A_n) \cdot D_n$

By taking advantage of this acknowledge, supposing the future investment and flood damage density, we might estimate future benefit of investment in Indonesia

How Much Will Future Investment Reach in Philippines ?

- Accumulated investment in flood control in Philippines from 2016 to 2030 is estimated 1.47 ~ 2.79 Trillion PHP by JICA study model
- 1.47 ~ 2.79 Trillion PHP ≒ 391 ~ 742 Trillion IDR (calculated as 1PHP=266IDR)

$I_t = \alpha I_{t-1} + \beta U_t + \gamma G_t + \delta$
I: investment, U: urban ratio, G: Percap GDP, t: year



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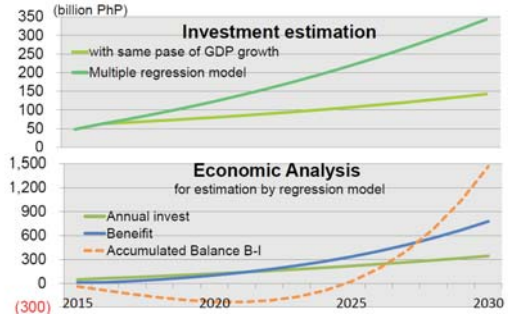
Philippine Investment in Advance is Expected to Bring Economic Return

- It is estimation of benefit and investment
- Accumulated balance will become positive in 2025



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2. Risk Index

2-1 Our understanding of IRB (Indeks Risiko Bencana Indonesia)

IRB (Indeks Risiko Bencana) – How it contribute for DRR in Indonesia?

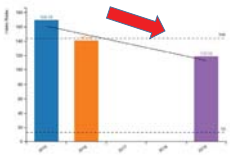
IRB (Indeks Risiko Bencana) is tool to figure out the condition of negative impact against the potential disaster.

Basic Formula for RBI Calculation

$$R_{isk} = H_{azard} \frac{V_{ulnerability}}{C_{apacity}}$$

Disaster Risk Index in 2015

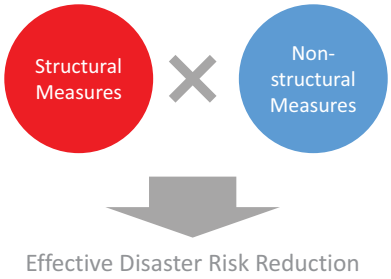
IRB (Indeks Risiko Bencana) is the indicator to asses the achievement of DRR activities in national and local level.



Example of IRB evaluation in Bima City. The target and trend of achievement.

Basis of Disaster Risk Reduction

- Best mix of Structural Measures and Non-structural Measures are needed to reduce Disaster Risk

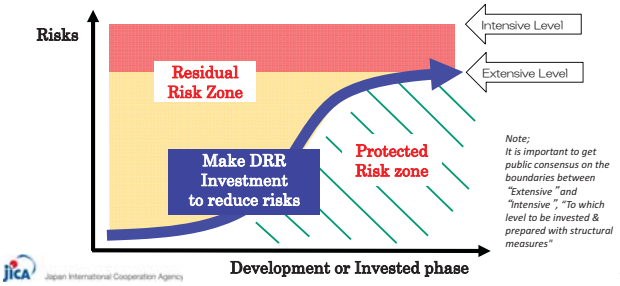


Complementarity of Structural Measures and Non-structural Measures

- To reduce risk with DRR investment mainly by structural measures is the top priority. (although depending on disaster types and regional characteristics)

  However, there are limits of capacity of structural measures, and there are risks during construction of structural measures and even after construction of structural measures when disaster exceeding capacity of structural measures occures.

- In order to overcome these "residual risks", it is effective to evacuate "non-structural measures" and/or diversify residual risks with "Insurance".

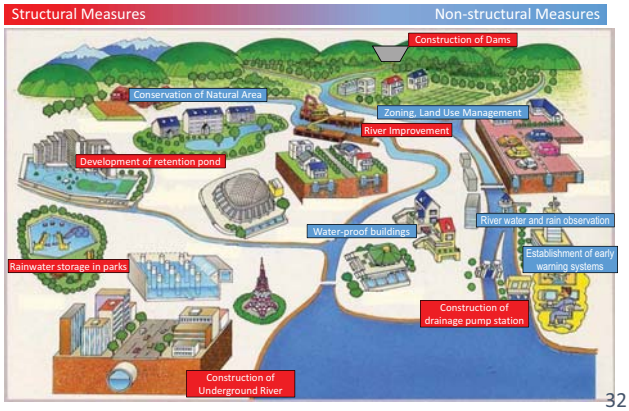


Sendai Framework Indicators and DRR Countermeasures

To reduce the Disaster Risks, best mix of Structural Measures and Non-structural Measures are needed.

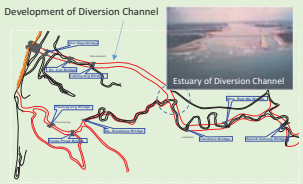
Indicators	Major DRR Countermeasures
Humanitarian Issues / Development Issues	Early Warning / Prevention
Global Target A: Number of deaths and missing persons attributed to disasters, per 100,000 population.	• Development of Early Warning System • Development of Hazard Map • Zoning, Land Use Management • DRR Education, Evacuation Drill • Conservation of Natural Land • Construction of DRR Facilities such as Embankment, Retention Pond, Dam, Diversion Channel etc.
Global Target B Number of directly affected people attributed to disasters, per 100,000 population.	
Global Target C Direct economic loss attributed to disasters in relation to global gross domestic product.	• Up-grading the existing DRR Facilities
Global Target D Damage to critical infrastructure attributed to disasters.	Continuous Implementation of Comprehensive DRR measures

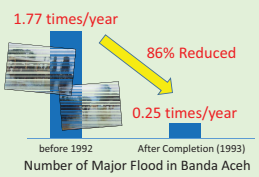
Comprehensive DRR Investment (Case of River Basin Management) with best mix of Structural Measures and Non-structural Measures



Can current IRB (Indeks Risiko Bencana) evaluate DRR investment adequately?

Case Study: Flood Control Project in Banda Aceh



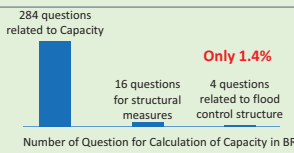


Number of Major Flood in Banda Aceh

Variation of IRB

$$R_{ist} = H_{comp} \frac{V_{vulnerability}}{C_{capacity}}$$

In IRB, "Capacity" is calculated based on YES/NO questions.



The effort of infrastructure development investment is undervalued by current RBI calculation method.

Road Map of IRB (Indeks Risiko Bencana) Upgrade

Identifying the challenges on IRB and its Calculation Method

Modification of Calculation Method of factors of IRB

Upgraded IRB should be utilized for progress monitoring of Sendai Framework based on its 4 indicators.

- Mortality
- Affected Persons

Humanitarian items are already included in current RBI

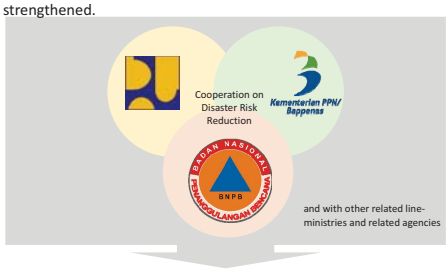
- Economic losses
- Important infrastructure

To evaluate the contribution toward reduction of economic losses and damages to important infrastructure, investment of structural measures must be adequately reflected in the IRB.

Cooperation among Related Ministries

Upgraded IRB can take into consideration a DRR investment by public works (PUPR/Dinas PU), private sector etc.

Cooperation among BNPB, BAPPENASS and PUPR must/will be strengthened.



- Implementation of Comprehensive Disaster management
- Reduction of Actual Disaster Risks

Opportunity to Show Indonesia's Presence in the International Society

The process of modification of IRB, enhancement of cooperation among BNPB and other line ministries, and Implementation of Comprehensive Disaster management can be announced as a good example of advanced disaster prevention efforts in the world at international conference such as the Asian Ministerial Conference on DRR 2018 in Mongolia.

2. Risk Index

2-2 How Should the Risk Index be improved in order to Reflect the Effect of DRR Infrastructure appropriately

Risk Index has room for further improvement

$$R_{isk} = H_{azard} \frac{V_{ulnerability}}{C_{apacity}}$$

Risk Index is very strong tool
- It can evaluate everything relevant to disaster
- Various aspects are integrated into one index
- It provides organizations concerned with motives

However, the effect of DRR infrastructure does not account for large portion of Risk Index
- In order to reflect the effect of DRR infrastructure much more in Risk Index, improvements in 2 points are effective

1. Simulation

- Disaster Damage simulation is necessary
- There are various simulation models at each hazard in the world

For example in Indonesia
- PU has the target of 3090km river improvement by 2020
- PU converted this output into outcome as many as 2000 km^2 area prevented from flood
- As above, it is useful to take advantage of the result of PU calculation

2. Damage Function

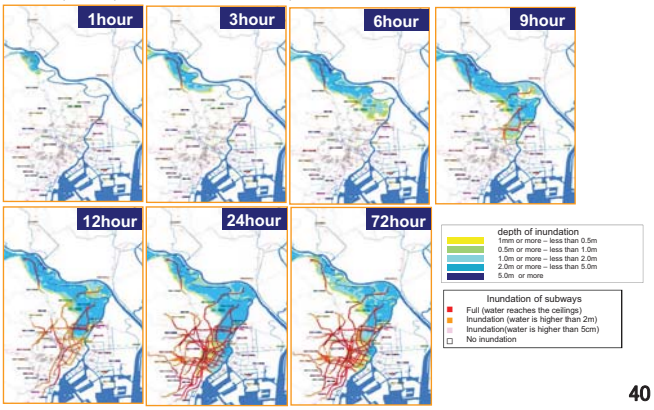
- If deep analysis is necessary, especially monetary term analysis like CBA, damage function is indispensable
- Structures, materials of Indonesian houses, private company and infrastructure should be reflected
- It will take a certain time to set damage functions, because they should be defined by investigation of the past disaster damage

2. Risk Index

2-3 Japan Can Provide RRI Model Which was Built for Developing Countries to Simulate Floods Easily and for Free

In Order to Implement CBA, Complicated Simulation is necessary

- Japan simulates all floods of main rivers for risk assessment and CBA
- These figures below are time-series expansion of inundation in Tokyo through the ground and subway tunnels
- The probability of this simulation is once in 200 years



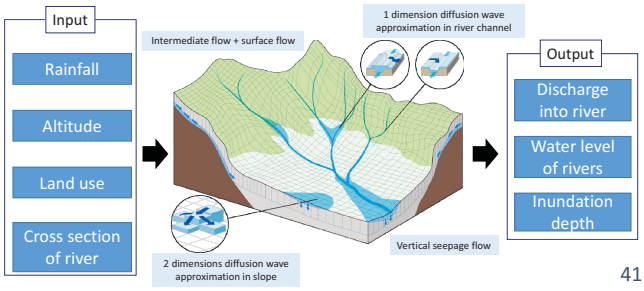
The concept of RRI Model

Traditionally, Rainfall and Runoff and Inundation are calculated separately

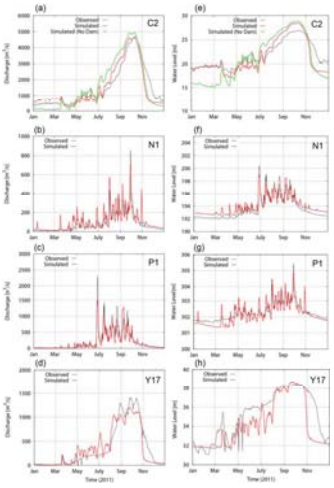
ICHARM which is national research institute in Japan has made RRI Model for developing countries

RRI Model : Rainfall-Runoff-Inundation

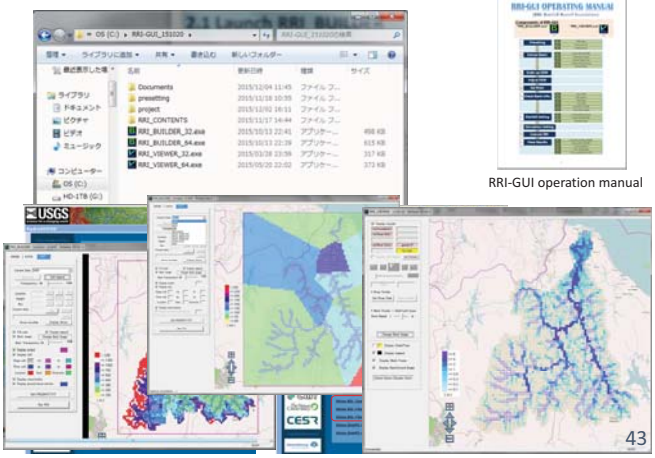
By using free data such as Information from satellites and weather forecast and so on, anyone can forecast flow volume, water level and inundation depth easily at the same time in quasi-real-time in the world for free



Calculation on Discharge and Water Level by RRI Model in Thailand Flood 2011



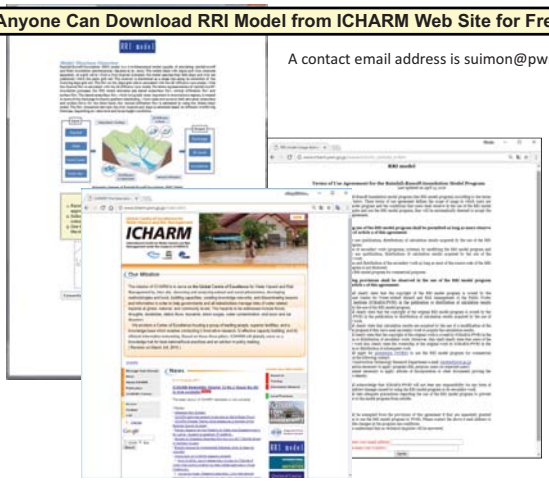
Graphical User Interface of RRI Model



RRI-GUI operation manual

Anyone Can Download RRI Model from ICHARM Web Site for Free

A contact email address is suimon@pwri.go.jp



ICHARM Provides Training Programs on Capacity Development for Usage of RRI Model

Capacity Development for Flood Risk Management (one-month program with JICA)

Water-related Risk Management Course of Disaster Management Policy Program
(one-year M.Sc. Program with JICA & GRIPS)

RRI workshop organized by PAGASA, Philippines (2016)

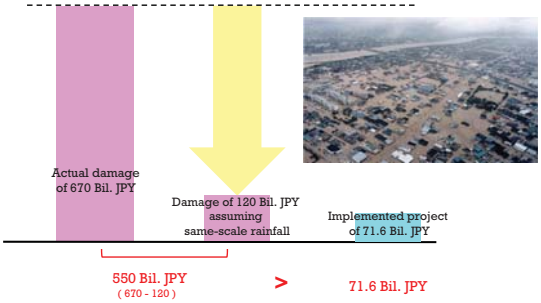
GRIPS: National Graduate Institute for Policy Studies

2. Risk Index

2-4 Japan Can provide the Specific Expertise in "Cost-Benefit Analysis"

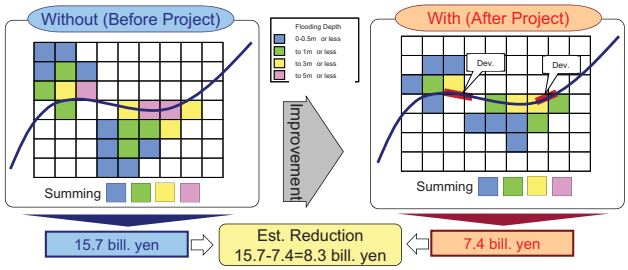
"Invest In Advance" is much better than "Build Back Better"

Case Study Tokai Flood in 2000, Japan



- We conducted "Build Back Better" just after the disaster
- 71.6 Bil. investment can gain 550 Bil. damage reduction from next disaster
- We really regret that we should have conducted the project before the disaster
- After this disaster, we compare benefit with cost in all the project, we give priority to projects which have higher value of Benefit/Cost ,and conduct within the limitation of budget

Example of Calculation of Estimated Damage Reductions



Damage rate in accordance with inundation depth

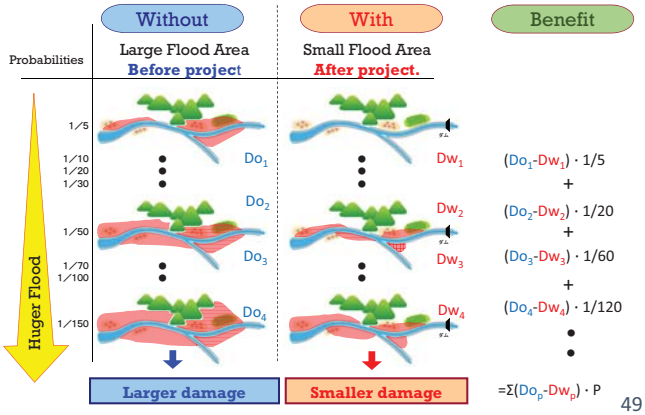
Depth	Under Floor	Above Floor		
		0~50cm	50~99cm	100cm~
Houses	3.2%	9.2%	11.9%	34.2%
Household Goods	2.1%	14.5%	32.6%	60.5%
Depreciable Assets of Offices	9.9%	23.2%	45.3%	80.8%
Inventory Assets of Offices	5.6%	12.8%	26.7%	52.8%

For example, in case of house damage

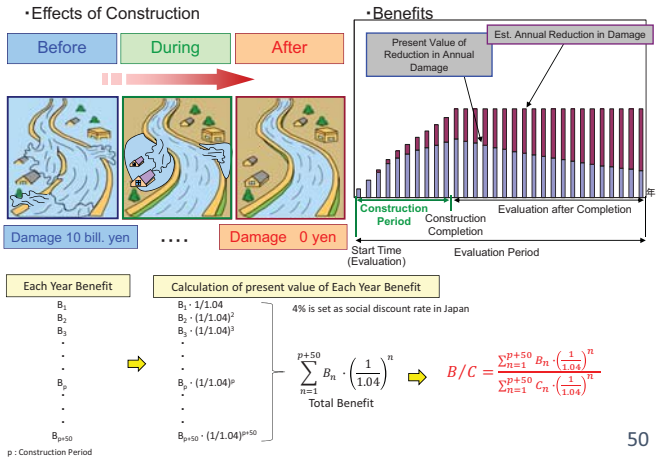
house damage = Total inundate m² by flood
x Unit Price per 1m² of houses
x Damage rate by flood depth

Except for categories in the table, the following are included
- agriculture loss
- infrastructure loss
- emergency response cost
- loss of disrupted activities

Expected Value by Calculating Several Scale Floods

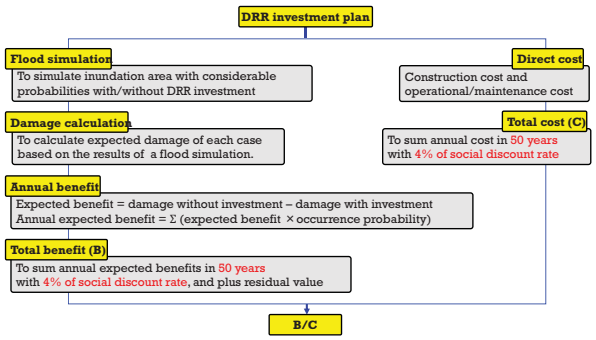


Calculation of Present Value of Damage Mitigation



$$B/C = \frac{\sum_{n=1}^{p+50} B_n \cdot \left(\frac{1}{1.04}\right)^n}{\sum_{n=1}^{p+50} C_n \cdot \left(\frac{1}{1.04}\right)^n}$$

Outline of Cost Benefit Analysis in Japan



2 Sorts of Quantification of DRR Infrastructure Effect

CBA (Cost-Benefit Analysis)
→ Monetary Terms

To compare the DRR investment cost with the benefit which is converted into monetary terms from effects

"Economic evaluation manual on flood control investment"

2005

Water and Disaster Management Bureau, Ministry of Land, Infrastructure, Transport and Tourism

FDIA (Flood Damage Index Analysis)
→ Non-Monetary Terms

To convert effects into quantitative indicators and check the change by DRR investment, in order to evaluate effects that can not be converted into monetary terms

"Manual of Flood Damage Index Analysis" (2013, Trial Version)

July 2013

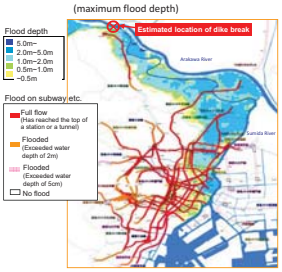
Water and Disaster Management Bureau, Ministry of Land, Infrastructure, Transport and Tourism

Example of Flood Damage Index Analysis in Tokyo

Each value is calculated by applying each threshold of inundation depth for each phenomena as CBA

1. Flood range

(maximum flood depth)



2. Floded area
110km²

3. Population of the flooded area
1.2 million people

4. Number of flooded households
510 thousand houses

5. Number of fatalities
1,200 people
(When evacuation rate is 40%)

6. Number of the isolated
510 thousand people maximum
(When evacuation rate is 40% a day after)

7. Flood damage on subway etc.
17 lines, 97 stations, approx. 147km

8. Damage on lifeline

Electricity	1.21 million houses
Gas	311 thousand cases
Water Supply	1.64 million people
Sewage	1.75 million people
Communication(landline)	520 thousand subscriptions
Communication(mobile phone)	930 thousand service areas

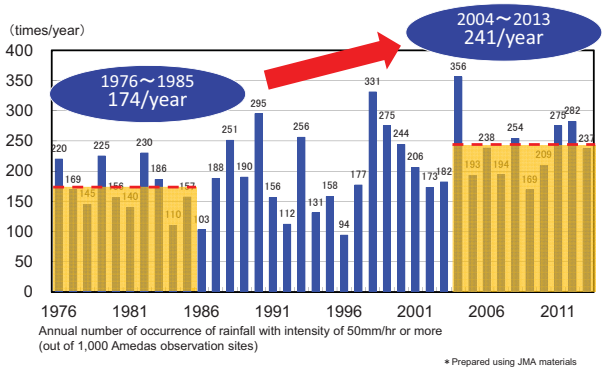
※All figures are approximate of the flood damage probability of about once in 1000 years

2. Risk Index

2-5 Japan Can Provide the Method of Predicting the Impact of Climate Change in the Future

The Occurrence of Heavy Rainfalls Has been Increasing Recently

The occurrence of rainfalls with intensity of 50mm/hour or more has increased by 40% than that of 30 years ago

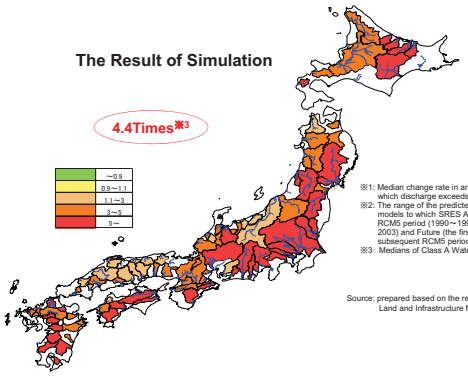


Annual number of occurrence of rainfall with intensity of 50mm/hr or more (out of 1,000 Amedas observation sites)

＊Prepared using JMA materials

Frequency of the Flood That Exceeds River Capacity Would Increase

It is predicted that the frequencies ※1 of the flooding that exceed river capacity will increase by about 4.4 times ※2 in the climate-changed-future than those under the present climate conditions (based on SRESA1B scenario).



※1: Median change rate in annual exceedance probabilities of flooding of which discharge exceeds basic peak discharge of design flooding.
※2: The range of the predicted frequency (median) based on 4 climate models to which SRES A1B scenarios are applied [Current (the first RCM5 period (1990～1999)), the subsequent RCM5 period (1979～2003) and Future (the first RCM5 period (2086～2095), the subsequent RCM5 period (2075～2099))]
※3: Medians of Class A Water Systems nationwide

Source: prepared based on the reference No. 749 of National Institute for Land and Infrastructure Management

3. Cooperation with Line-Ministries

3-1 Good Examples in Indonesia on Cooperation between Line-Ministries and Local Government

DRR Structural Measures against Flood by PU

DRR Structural Measures against Flood

Padang

Anai River
Design Discharge
1,300 m³/s
(25-year return period)

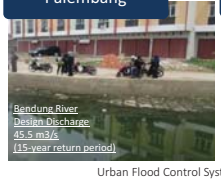
Surabaya (Wonokromo River)

Wonokromo River
Design Discharge
420 m3/s
(25-year return period)

Gorontalo

Bolango River
Design Discharge
200 m3/s
(20-year return period)

Palembang

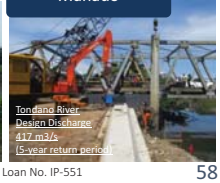


Bendung River
Design Discharge
45.5 m3/s
(15-year return period)

Surabaya (Brangkal River)

Brangkal River
Design Discharge
274 m3/s
(25-year return period)

Manado



Tondano River
Design Discharge
417 m3/s
(5-year return period)

DRR Non-Structural Measures against Flood by PU

The Participatory Workshop had conducted by following organizations.

Host:	**Balai Wilayah Sungai Sulawesi I (BWS SI)**
Partner:	BPBD Manado City
Participants:	Residents along Tikala River and Sario River, Manado City
Consultant:	: Yachiyo Engineering Co. Ltd. and PT Bunken Jaya Consultant
Objective:	To disseminate the methods of prevention, mitigation, preparation, and response against flood damage through Workshop and to raise awareness with target communities, and to establish a model case of a workshop for disaster prevention at community level for the future diffusion activities by GOI in other areas/regions.


Opening Remarks


Group-work by facilitator


Wrap up presentation of Group-work

Example of Merapi

Before Eruption


Evacuation


Drill

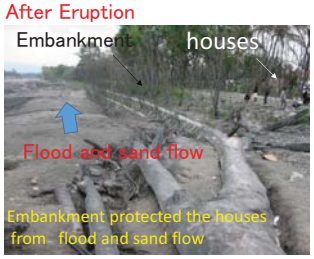

Socialization


Education

Example of Merapi


People evacuated

After Eruption


Embankment houses

Flood and sand flow

Embankment protected the houses from flood and sand flow


Evacuation facility


Sabo dam

Sabo dam stops sand flow

3. Cooperation with Line-Ministries

3-2 Japanese Structure for Cabinet Office to Demonstrate Strong Leadership over Line-Ministries

Comparing Structure between Japan and Indonesia

- Minister of CAO can coordinate basic and major policies with all the ministers by using this Council
- The reason is Prime Minister has the power to order everything to all the ministers

Japan

Prime Minister

The Law : DISASTER COUNTERMEASURES BASIC ACT

Central Disaster Prevention Council

Prime Minister — Chair

appoint

Members (organizer)

- Minister of Cabinet Office (in charge of Disaster Management)
- All Ministers (18)
- Heads of Designated Public Corporations (4) [Japan Bank, Japan Red Cross, NHK, NTT]
- Experts (4)

Functions:
Expression of opinions to Prime Minister about the following
a. basic policy of disaster prevention disaster management
b. major points in overall coordination of disaster countermeasures

Indonesia

Head of BNPB

(under and accountable *)

*: Presidential Regulation

Disaster Management Steering Committee

Head of BNPB — Chair *

Members

Echelon I of Gov. Officials or equivalent *

- a. related government officials
- b. professional community members

Functions:
a. formulating the concept of policy on national disaster management
b. monitoring
c. evaluating disaster management

Obligation to Report to the National Diet on Disaster

DISASTER COUNTERMEASURES BASIC ACT

Art. 9. para.2

The government must report each year to the Diet about its plans for disaster prevention together with a general situation of measures undertaken for disaster prevention, as provided for by Cabinet Order.

Contents of the White Paper (2015)

Special Topic: WCDRR and International Cooperation of Japan in DM

Part 1: Status of the Efforts of Countermeasures against Disaster

Part 2: Overview of Countermeasures Taken on DM in FY2013

Part 3: Plan for DM in FY2015

Overview
Chap.1: Improvement of the legal system
Chap.2: Research on science and technology
Chap.3: Disaster Prevention
Chap.4: National land conservation
Chap.5: Disaster recovery
Chap.6: International cooperation in DM

It is obligation to submit the White Paper to the national Diet on countermeasures taken in the previous year and plans to be taken this year
This also gives CAO the power to coordinate line ministries

3. Cooperation with Line-Ministries

3-3 System in Japan on Cooperation between Line-Ministries and Local Government

Strong and close relationship between central government and local government on the viewpoint of disaster situation in Japan

- Disaster occurs irrespective of administrative boundaries
- In Japan, firstly, hazard-based measures are considered, and based on that, reflected on each regional DRR plan.
- Central Government provide disaster risk information, DRR polices, standards for regional DRR plans, etc. to local Government.

The System of Japanese Disaster Countermeasures Plan

These plans compose a different system from DRR Improvement Plan

Highest Level Plan
- Disaster Countermeasures Basic Plan
  - Called as "Plan", however, it is like a philosophy, a doctrine or a constitution of disaster policy
  - Not only DRR, but also including Emergency Response, Recovery and Reconstruction
  - Term and budget are not written

National Level Plan
- Disaster Countermeasures Plan of Each Ministry
  - Ministry of Land, Infrastructure, Transportation and Tourism
  - Ministry of Agriculture, Forestry and Fisheries
  - Ministry of Internal Affairs and Communications and so on

Prefectural Level Plan
- Disaster Countermeasures Plan of Each Prefecture
  - 47 prefectures

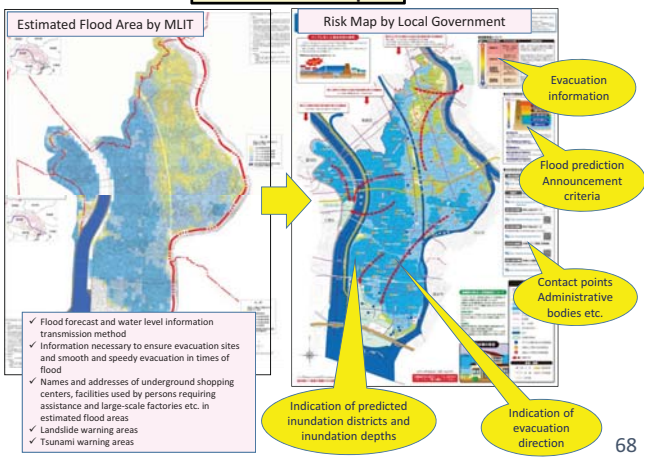
Municipal Level Plan
- Disaster Countermeasures Plan of Each municipality
  - 1718 municipalities

Example of contents

① In Chapter 1, "Disaster Prevention," MLIT advises on DRR policies in regional development plan as necessary in order to systematically promote DRR.

② In Chapter 16 "Standards for preparing Regional DRR Plans", in order to plan the promotion of DRR structuring measures of cities, it shall be stipulated to consider DRR policies in the Regional Development Plan

Flood Risk Map

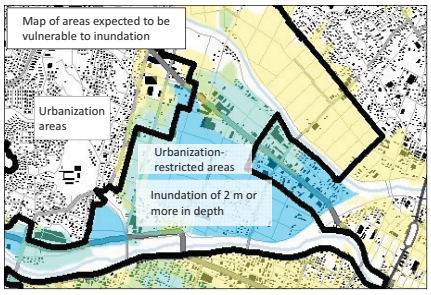


Considerations in Land Use Plans

Technical standards for expansion of urban areas which are set forth in the City Planning Act

* Urbanization promotion area
Any areas specified as urbanization promotion areas which are to be urbanized preferentially and systematically within ten years or so will not include, in principle, any areas where disasters may occur due to overflow stream, flood, tsunami, tidal wave, etc. (Excerpt of a Cabinet Order concerning Article 3 of the City Planning Act)

<Case where areas with high risk of inundation are designated as urbanization-restricted areas, and thus limited for use as building land>

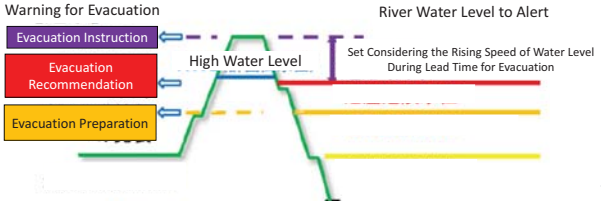


Expected depth of flood
- Less than 50 cm
- 50 cm – less than 1 m
- 1 m – less than 2 m
- 2 m – less than 5 m
- 5 m or more

* Flood control basins in urbanization-restricted areas, and farm land and green spaces, etc. which can temporarily reserve and infiltrate rainwater are considered to be effective to reduce the risk of floods in urbanization areas, so that it is effective to maintain such lands as, for example, farm lands.

The Responsibility of Local Disaster Countermeasures in Japan

	Local Government	National and Local Department Responsible for Hazard
In Peace Time	➢ Formulate a Local Disaster Countermeasures Plan ➢ Publish Risk Map ➢ Conduct Education and Training ➢ Invest Early Warning System	➢ Invest in Public Works of River, Landslide, Lahar, Earthquake, Tsunami, Storm Surge ➢ Estimate and Publish each Disaster Risk ➢ Conduct Education and Training ➢ Invest Alerting System
In Emergency Time	➢ Issue Evacuation Instruction ➢ Rescue ➢ Other Various Activities	➢ Alert Local Government To Issue Evacuation Instruction



Disaster Information and Warning for Evacuation

disaster information on disaster type

Flood

Flood Forecast
From
MLIT or Prefectures (responsible for rivers)
JMA (responsible for rain)

Landslide Disaster

Landslide Disaster Forecast
From
MLIT or Prefectures (responsible for landslide)
JMA (responsible for rain)

Storm Surge **Tsunami** **Volcano Eruption**

Forecast for Storm Surge, Tsunami and Volcano Eruption
From
JMA (responsible for these disasters' Alarm)

3 Phases of Warning

From : Local Governments
To : Residents

Evacuation Preparation

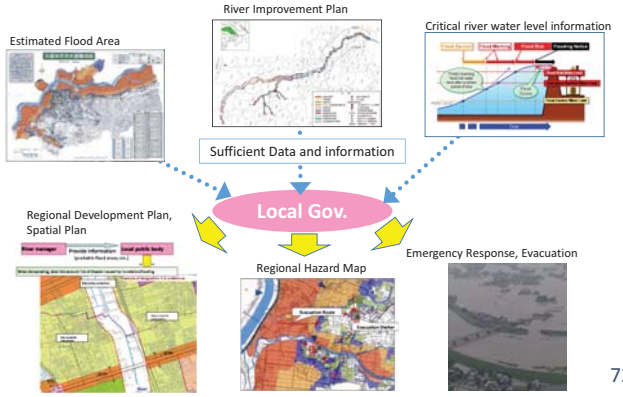
Evacuation Recommendation

Evacuation Instruction

Severe Condition

Data and Information Sharing with Local Government

- Flood risk data and information is shared with local government by MLIT in Japan
- Only those who knows Hazard can provide useful information for Disaster Management
- That makes it easy for local government to implement various countermeasures



3. Cooperation with Line-Ministries

3-4 Examples in Japan on Cooperation between Line-Ministries and Local Government

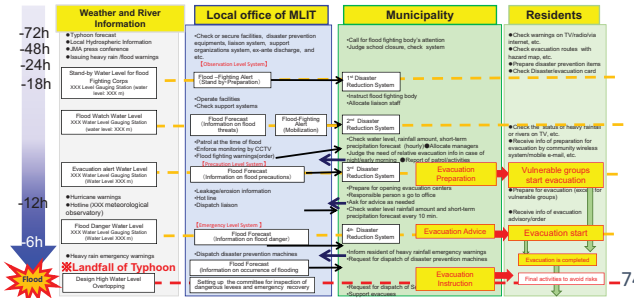
Example of Leadership by MLIT

Huge Flood in 2015

"Build Back Better"
MLIT is improving the river embankment for 60 billion JPY (7.2 trillion IDR)

Both of structural and non-structural measures were being conducted by MLIT

Time-series disaster management operation plan
Table on must-do list decided by all the stakeholders along the lines with time left by disaster occurrence



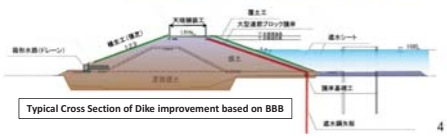
Structural Measures by MLIT

Outline of the Project:

Based on the **BBB concept**, river improvement, dike improvement (hightening and widening), leakage countermeasures, etc. are implemented within six years of intensive concentrated investment

Photo of Dike Improvement based on BBB Concept

Overall project cost:
Approx. 60 billion JPY
(Approx. 7.2 trillion IDR)



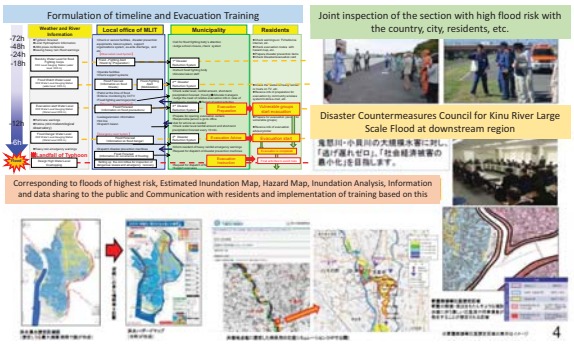
Typical Cross Section of Dike improvement based on BBB

BBB concept:
Dike is heightened and widened based on BBB concept.

Non-Structural Measures by MLIT

☐ **Non-Structural Measures**

The country, prefecture, and city together promote information sharing, formulation of their own timeline focusing on evacuation advisories and lead time, evacuation training based on timeline and creation of a mechanism for wide-area evacuation through participation of related organizations are implemented as non-structural measures to urge residents to evacuate



Non-Structural Measures by MLIT

Incoming emergency bulletin mail

Data and Information Sharing Exercises during flood

Evacuation Training linked with Emergency Bulletin Mail

Disaster Education

MLIT Staff Directly Organize Training and Instruct Residents

Time Line Table by each resident for themselves

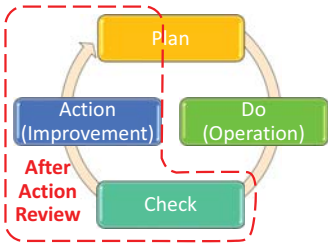
Each resident make Time Line Table by reference to governmental Time Line Table

Resident Participation Workshop under the joint sponsorship of MLIT and City

Staff of MLIT are instructing residents

After Action Review

- Japanese government (CAO, MLIT, JMA, etc.) usually **verifies executed response, activities and measures to occurred disasters in order to review measures** after huge disasters. **(After Action Review: AAR)**
- The results of AAR are shared with the organizations concerned.
- Each organization modifies their regulations and plans. If necessary, laws are amended.
- Thus, **Japan has improved disaster policies and measures with continual AAR.**



- At AAR, do not pursue the responsibilities of a specific person, but also to strengthen disaster reduction action and disaster response to the next disaster

3. Cooperation with Line-Ministries

3-5 The desirable cooperation between central government and local government in Indonesia to formulate realistic, practical and effective DRR plan

Improvement & Strengthening of Disaster Management in region

In region, there is still room for improvement and strengthening in Disaster Management.

- The central government can strongly support and lead **DRR activities in region not only during disasters phase but also in normal times.**
- **Each line ministry is expected to support related organizations** and **to strengthen cooperation** in normal times.

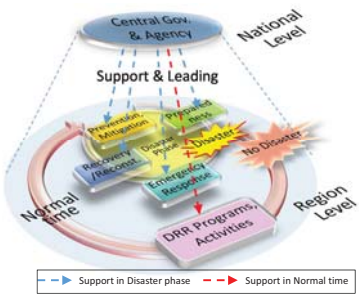
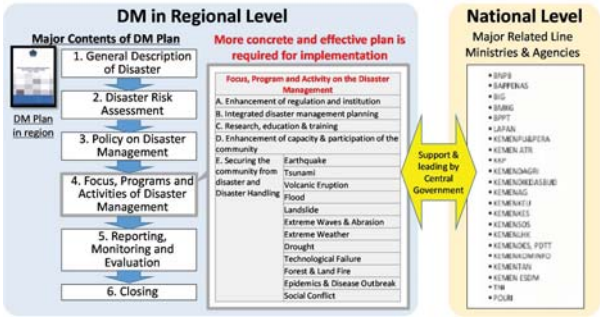


Fig. Image of Disaster Management in regional area and support & leading by Central Government (Source: JICA Study Team)

Close Support & Strong Leadership by Central Government

Each line ministry is expected to support related organizations and to strengthen cooperation



Roles of Central government and Local government for DRR plan and its implementation

Central government (Line Ministries)
Overall strategy, General policy, Large scale structural measures, Technical regulation, Securing budget, etc.

Local government
All issues facing local government itself except above items

Coordination should be strengthened
For example,
with **Coordination Guidelines shown by BNPB**

Steps for Local DRR plan preparation

1. To know local hazards
2. To confirm Risk information prepared by Central government (Line Ministries)
3. To confirm DRR measures (mainly structural) planned by Central government (Line Ministries)
   (Effective DRR measures are depending on disaster types and regional characteristics)
   (Not enough information by National government, can use practical information by community =local memory)
4. To know residual risks considering time-span of above item 3.
5. To plan DRR measures (mainly non-structural) for reduce residual risks
6. To set priority on above DRR measures (short, middle and long term)
7. To secure budget by both local and national government
8. To implement DRR measures by local government/modify the plan continuously

Appendix-4: Japan Technology Fair on DRR Presentation Materials

Japan Technology Fair
on
Disaster Risk Reduction

Presentation Materials

6 December, 2018 Jakarta

ISEKI MICRO TUNNELING TECHNOLOGY

CONTENT

- ◆TECHNOLOGY INTRODUCTION
- ◆MICRO TUNNELING METHOD AND OTHER METHOD COMPARISON
- ◆IMPLEMENTATION MICRO TUNNELING METHOD FOR FLOOD MITIGATION PROJECT

TECHNOLOGY INTRODUCTION

WHAT IS MICRO TUNNELING METHOD?

A method of directly installing pipes behind a boring machine using the force of a hydraulic jack from drive shaft to arrival shaft so the pipes would form a continuous pipeline in the ground.

Adopted where:

* Road with heavy traffic or where underground facilities are congested.
* Crossing railtrack or river, which is difficult to dig from ground surface.
* When the conduit is being buried deep underground.
* Where open cutting is not appropriate due to permission etc.

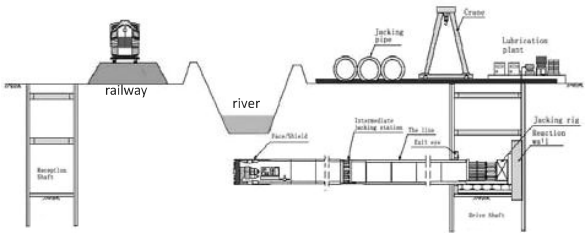
MICRO TUNNELING METHOD APPLICATION

Sewage and water pipeline

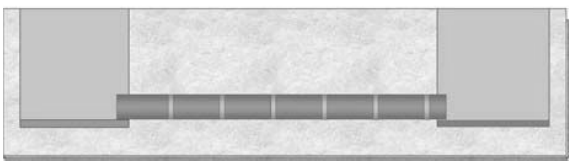
Electricity cable line

Flood Control

Basic elements for micro tunnelling



Procedure of micro tunneling

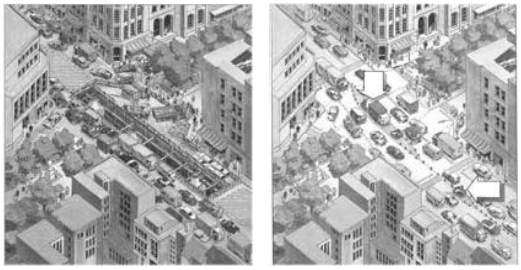


Movie

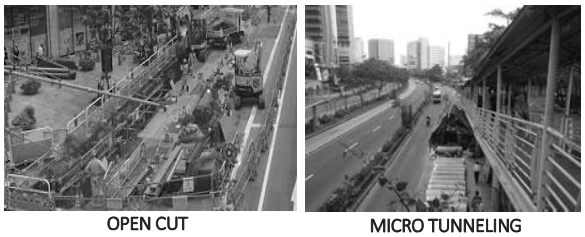
MICRO TUNNELING METHOD AND OTHER METHOD COMPARISON

Open Cut VS Micro Tunneling (Pipe Jacking)

OPEN CUT | Micro Tunneling

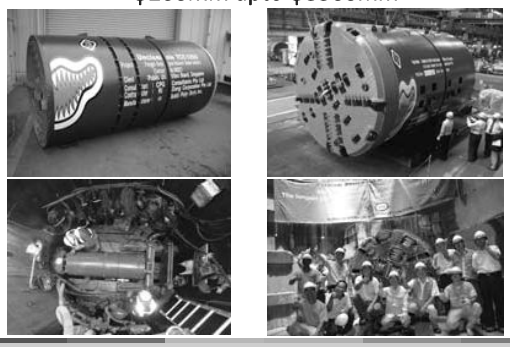


Open Cut VS Micro Tunneling (Pipe Jacking)



OPEN CUT | MICRO TUNNELING

ISEKI SLURRY TYPE MACHINE
ϕ200mm upto ϕ3500mm

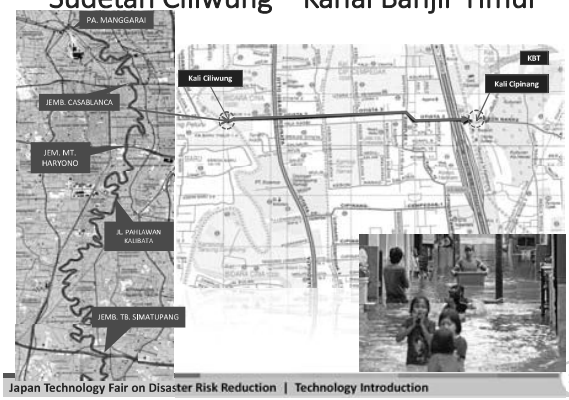


IMPLEMENTATION MICRO TUNNELING METHOD FOR FLOOD MITIGATION PROJECT

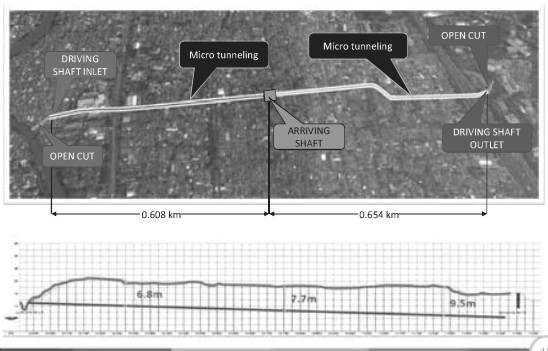
APPLY TO FLOOD MITIGATION PROJECT

- Purpose : Diversion channel Twin tunnel
- Funding : 100% Local Fund of Indonesia
- Main Contractor : PT Wijaya Karya Tbk
- Sub Contractor : Kidoh and Iseki
- Methodology : EPB type micro tunneling
- Concrete pipe : ϕ3500mm (O.D 4050mm)
- Contents : 2 Driving shaft & 1 arriving Shaft
  ϕ3500 meter ⋊4 line (Total 2.4km)

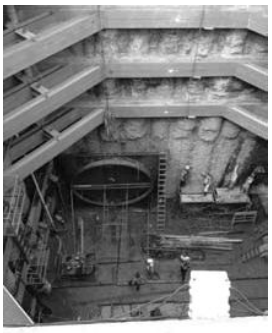
Sudetan Ciliwung – Kanal Banjir Timur



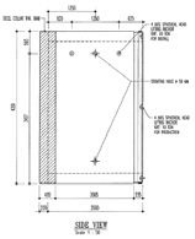
Sudetan Ciliwung – Kanal Banjir Timur



Structure Driving Shaft Outlet



Concrete Pipe

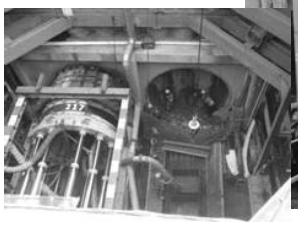


EPB Machine

Site Situation

Curving line

Site Situation

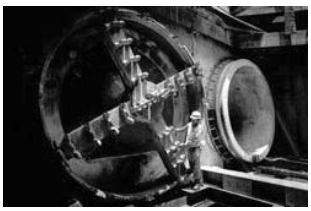


Construction situation line 1

President of Indonesia, Mr. Joko Widodo visited Project Site.

Site Situation

Construction situation line 2



Machine Breakthrough

The result of Sudetan Ciliwung project

- Accuracy : Vertical 0 mm, Horizontal 5mm.
- Period : Shaft 4 month, Tunnel 10 month (twin tunnel, total 1140m).
- Probably the longest drive in the world by 3.5 meter diameter.
- 2 line from outlet to arriving was completed.
- 2 line from inlet is waiting for land acquisition.

THANK YOU

ISEKI POLY-TECH, INC.
Alvan Sukmawijaya
alvan@iseki-polytech.com

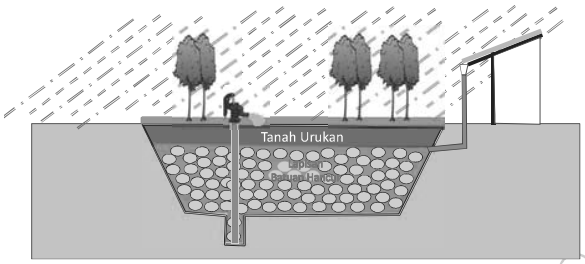
Tangki Reservoir Air Hujan Bawah Tanah

[TAMETOTTO]

Daiken Co.,Ltd.

Apakah [TAMETOTTO]? (Sebuah Tangki Reservoir Air Hujan Bawah Tanah)

Dengan waktu konstruksi yang singkat, dapat menyimpan dan menggunakan air hujan jumlah besar dengan hanya sedikit perawatan, dengan kualitas yang sama seperti air minum.



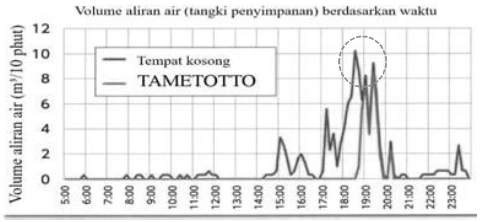
Penjagaan Kualitas Air 「Tametotto」

	Poin Pemeriksaan	Satuan	Nilai Standar Air Minum Air Baruh	Juni 2012 (Saat Konstruksi)	28.10.2013	4.12.2013	17.2.2014	18.8.2014	28.10.2014	16.2.2015	4.8.2015
1	Suhu Air	℃	—	23,3	19,5	12,9	8,6	23,1	20,5	10,4	22,6
2	Jumlah Bakteri Umum (Jumlah bakteri dalam 1ml)	Pc/mL	< 100	*** 1900	88 Terbukti Signifikan	110	Realisasi	120 Kualitas Air setara Air minum !	56	5 ⇒ ⇒ ⇒	10
3	Bakteri E. Coli	—	Tidak terdeteksi	* Tidak terdeteksi	Tidak terdeteksi	Tidak terdeteksi	Tidak terdeteksi	Tidak terdeteksi	Tidak terdeteksi	Tidak terdeteksi	Tidak terdeteksi
4	Nitrogen Nitrat & Nitrogen Nitrit	mg/L	< 10	0,2	0,18	—	—	0,30	0,26	0,95	0,35
5	Unsur Organik (Jumlah Total Karbon Organik (TOC))	mg/L	< 3	0,9	0,6	—	—	0,5	<0,3	0,4	0,5
6	Rasa	—	Normal	—	Normal	Normal	Normal	Normal	Normal	Normal	Normal
7	Bau	—	Normal	—	Normal	Sedikit Berbau Lembab	Sedikit Berbau Lembab	Normal	Sedikit Berbau	Normal	Normal	Normal
8	Mutu Warna (Derajat Warna)	°	< 5		< 1	1,4	0,6	0,7	0,8	<0,5	0,8	1,2
9	Kekeruhan	°	< 2	< 1	< 0,1	0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1	< 0,1
10	Ion Klorida	mg/L	< 200	< 20 ppm	3,3	5,1	6,7	7,7	1,0	7,3	7,6	3,0
11	Nilai pH	—	5.8～8.6	6.0～7.0	6,8	7,9	7,9	7,8	8,0	7,9	7,9	7,9
12	Kalsium, Magnasium dll (Hardness)	mg/L	< 300	< 50 ppm	156	80	87	97	89	78	94	80
13	Besi dan senyawanya	mg/L	< 0,3	< 0,05 ppm	< 0,03	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01
14	Mangan	mg/L	—	< 0,05 ppm	—	—	< 0,005	< 0,005	—	—	—	—
15	Reside Penguapan	mg/L	—	< 100 ppm	—	—	120	130	—	—	—	—
16	Silica	mg/L	—	<15 ppm	—	—	3,6	3,0	—	—	—	—
17	Konsumsi kalium permanganat	mg/L	—	10 ppm	—	—	1,7	1,1	—	—	—	—
18	Permintaan oksigen kimia (nilai COD)	mg/L	—	2 ppm	—	—	0,7	0,8	—	—	—	—
19	Oksigen Terlarut	mg/L	Normal	—	—	—	5,2	4,7	—	—	—	—
20	Konduktivitas Listrik	mS/m	—	< 20	—	—	20	22	—	—	—	—

※mg/L=ppm

Hasil Penanggulangan Bencana dari TAMETOTTO

<Perbandingan Aliran Air Hujan>



Membandingkan TAMETOTTO (sekitar 100t) dengan daerah lain menggunakan total curah hujan 187mm/hari (Hujan deras di Chugoku dan Kyushu pada Juli 2009). Sebagai hasil simulasi curah hujan dari Kyushu University, jika dibandingkan dengan area kosong, didapati bahwa [TAMETOTTO] dapat mengurangi kecepatan aliran air 121.5m3 selama puncak dan dapat memperlambat kecepatan air 171m3/10min sampai dengan puncak (pada gambar) Dengan hujan besar Gerilla yang semakin menjadi masalah serius, TAMETOTTO akan menjadi cara yang efektif untuk mengatasi kekhawatiran akan banjir di area perkotaan besar.

Performa di Dalam dan Luar Negeri

No	Tanggal Konstruksi ~ Pemberi Order	Nama Konstruksi	LOKASI	Kapasitas	Tujuan	Jumlah Target Pengguna
1	Juni 2012 • Pengembangan Perumahan oleh Perusahaan sendiri	Town House 「OGINOURA Garden Suburb」	Kota Itoshima Prefektur Fukuoka	112 t	Air bilasan toilet, air kolam, air siram tanaman dll	18 Keluarga (sekitar 70 pax)
2	Juli 2015 • UN Habitat (Rencana Pemukiman)	「Water of Life Project」 Rep. Dem. Rakyat LAOS	Desa Taoum Distrik Pu-von Pref. Attapeu (SD)	100 t	Air minum	Sekitar 400 pax
3	Juli 2015 • UN Habitat (Rencana Pemukiman)	「Water of Life Project」 Rep. Dem. Rakyat LAOS	Desa Phouxay Distrik Pu-von Pref. Attapeu (SD&SMP)	100 t	Air minum	Sekitar 200 pax
4	Mei 2017 • UN Habitat (Rencana Pemukiman)	「Proyek Konstruksi Fasilitas untuk Wanita」 Rep. Dem. Rakyat LAOS	Distrik Sansai Pref. Attapeu (Publik Hall)	150 t	Air minum	Sekitar 200 pax
5	Januri 2018 • UN Habitat (Rencana Pemukiman)	Pilot Project untuk Workshop Pakar Teknik Lingkungan Vietnam	Kota Kanto (Sekolah Support Khusus)	100 t	Air siram tanaman dll	


2.Desa Taoum 〈LAOS〉


3.Desa Phouxay 〈LAOS〉


5.Kota Kanto 〈Vietnam〉

Alasan mengapa 「Tametotto」 digunakan oleh UN-Habitat

①Biaya Konstruksi Murah〈40.000円/Kapasitas Penyimpanan Air t〉→LAOS 15.000円
②Konstruksi dalam waktu singkat〈1Bulan/Kapasitas Penyimpanan Air100t〉→LAOS1 minggu
③Tidak diperlukan skill konstruksi khusus, dapat menggunakan tenaga lokal
④Material yang digunakan didapat dari lokal saja ⑤Maintenance mudah setelah pemasangan

NIPPON KOEI

Nippon Koei Co., Ltd.

Our Latest Attempts for the Future of Technology

CONTENT

① DEVELOPMENT OF THE REAL-TIME RIVER STAGE PREDICTION METHOD USING DEEP LEARNING

② Environmentally-friendly Technology for Preventing Surface Soil Erosion Utilizing Soil Organisms

Nippon Koei Co., LTD.

Development of the Real-Time River Stage Prediction Method Using Deep Learning

● **Objective :**

More accurate river-stage prediction

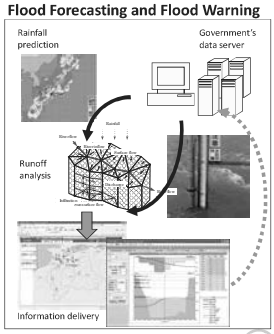
In Japan, Real-time prediction system is already in operation.

6 hour prediction is announced for every 10 minutes, every day.

① Rainfall prediction
② Runoff analysis
③ Assimilation/Collection
④ Information Delivery

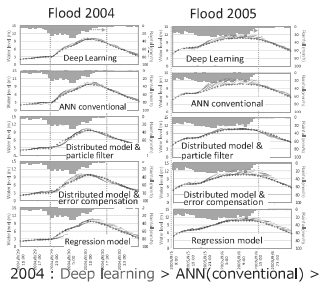
Replace ② & ③ with deep learning

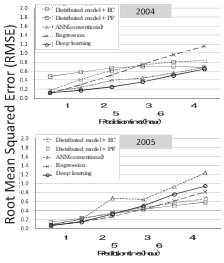
Flood Forecasting and Flood Warning



Development of the Real-Time River Stage Prediction Method Using Deep Learning

● **Evaluation in past study (2004, 2005)**





2004 : Deep learning > ANN(conventional) > distributed. Esp long prediction time

2005 : Disitributed > Deep learning > ANN(conventional)

Environmentally-friendly Technology for Preventing Surface Soil Erosion Utilizing Soil Organisms

● **Objective : Counter measure for Soil erosion**

- Soil erosion cause below problems
  - ➢ decrease in water retention,
  - ➢ flooding to the downstream area,
  - ➢ decrease in food production,
  - ➢ deterioration of water quality,
  - ➢ destruction of ecosystem and so on

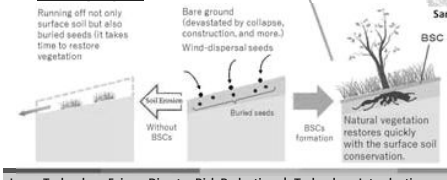
- It is widely known vegetation can suppress soil erosion.
- NK focused on Biological Soil Crust (BSC) which is natural phenomena which appear at the beginning of vegetation succession.
- BSC is a sheet of soil microorganism colonies formed by filamentous fungi, soil algae, lichens and mosses tangled with soil particles and soil clouds on the ground surface.

Environmentally-friendly Technology for Preventing Surface Soil Erosion Utilizing Soil Organisms

● **Mechanism of Soil Crust formed by Soil Microorganisms**

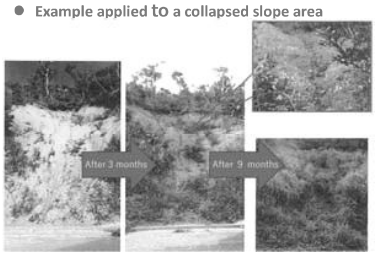
Microalgae bind the soil particles and seeds together, this mechanism yields the Biological Soil Crust (BSC).

The image figures

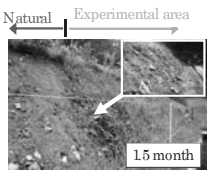


Environmentally-friendly Technology for Preventing Surface Soil Erosion Utilizing Soil Organisms

● **Example applied to a collapsed slope area**



● **Difference in vegetation cultivation between experimental area and natural area**



- This method can be utilized for prevent the spread of rill erosion
- And it can be utilized on steep slope and rock.
- There was a clear difference in the vegetation growing situation in the area sprayed with BSC and the area with natural condition.

Environmentally-friendly Technology for Preventing Surface Soil Erosion Utilizing Soil Organisms

● **Key points**

- This technology promotes vegetation of the land. It is effective for countermeasures against soil erosion.
- The microalgae constituting BSC are cosmopolitan. Therefore, we can use this microalgae around the world, without concern for genetic contamination.
- This technology was developed by NK and Public Works Research Institute in Japan.
- The Best Award for 2015 Subtropical Greening Case Presentation: Okinawa

① DEVELOPMENT OF THE REAL-TIME RIVER STAGE PREDICTION METHOD USING DEEP LEARNING

- Confirmed the accuracy of flood prediction method using Deep learning
- NK is try to apply AI to some other fields as new generation technology

② EROSION PREVENTION TECHNOLOGY UTILIZING MICROALGAE (BIOLOGICAL SOIL CRUST : BSC)

- The BSC method promotes vegetation of the land. It is effective for countermeasures against soil erosion.
- We can utilized this BSC method around the world, without concern for genetic contamination.

Thank you for your attention , Terimakasih

Geotech/Sediment

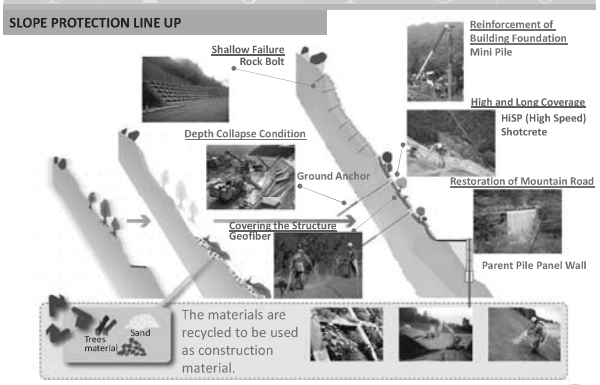
Japan Technology Fair on DRR

NITTOC

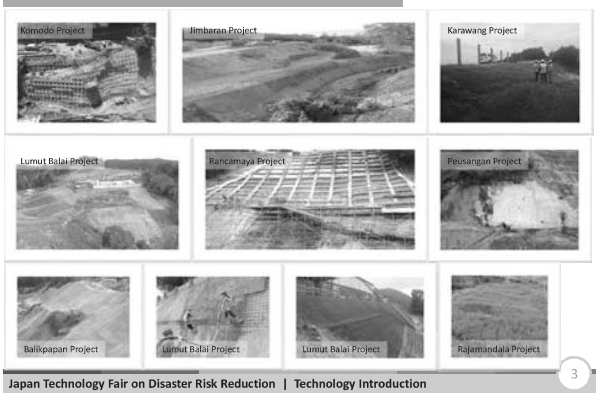
NITTOC CONSTRUCTION CO., LTD
PT. NITTOC CONSTRUCTION INDONESIA

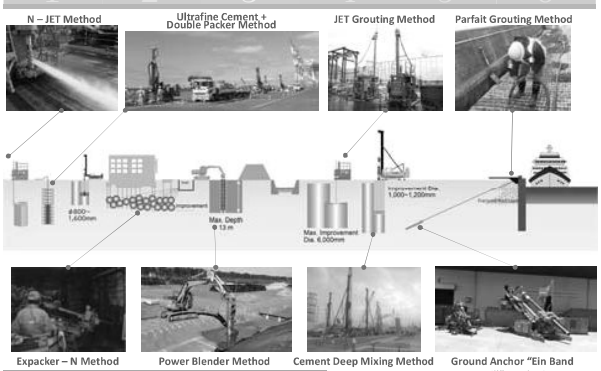
- **Name of Company** : NITTOC CONSTRUCTION CO., LTD.
- **Capital** Outstanding Shares; 43,919 thousand shares
  Capital; 6,000 Million Yen (≒60 Million USD)
  Registered on first section of Tokyo Stock Exchange
- **Office** Higashi Nihonbashi3- 6- 10, Chuo- ku, Tokyo
  - **Branch Office** : 8 Branches (Sapporo, Touhoku, Tokyo, Hokuriku, Nagoya, Osaka, Hiroshima, Kyushuu) & 42 Marketing branches in Japan.
- **Name of Company** : PT. NITTOC CONSTRUCTION INDONESIA
- **Capital** 51,000 Million Rupiah
- **Office** Generali Tower, Gran Rubina 16F unit G, Jl. H.R. Rasuna Said, Kuningan, Jakarta

SLOPE PROTECTION LINE UP



SLOPE PROTECTION EXPERIENCES IN INDONESIA





SOIL IMPROVEMENT LINE UP

SOIL IMPROVEMENT EXPERIENCES IN INDONESIA

Terimakasih.

NITTOC
PT. NITTOC CONSTRUCTION INDONESIA

ありがとうございました。

NITTOC
NITTOC CONSTRUCTION CO., LTD

Japan Technology Fair on DRR

Technology Introduction from NIPPON STEEL & SUMIKIN METAL PRODUCTS Co., Ltd.

TAK ISHIKAWA
CHIEF REPRESENTATIVE, DIRECTOR
SOUTHEAST ASIA OFFICE

DECEMBER 06, 2018

Nippon Steel & Sumikin Metal Products Co.,Ltd.

TABLE OF CONTENTS

COMPANY OVERVIEW

1. A core member of NIPPON STEEL & SUMITOMO METAL Group
2. Various products in Building and Civil Engineering fields
3. "BOSAI" – Disaster Prevention/Reduction fields using Steel Materials
4. Contributed in creating Technical Standards applied for Public Works over decades

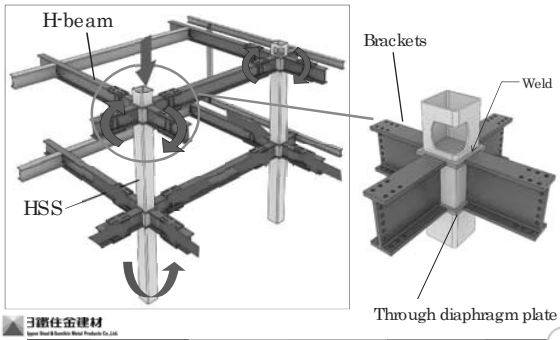
Company's Product Fields examples

- BUILDING
- CIVIL ENGINEERING TRAFFIC INFRASTRUCTURE
- BOSAI DISASTER PREVENTION

EARTHQUKE-RESISTANT STEEL STRUCTURE

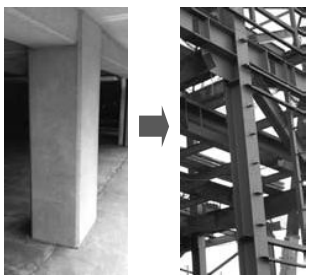
STEEL STRUCTURE INTACT IN TSUNAMI DAMAGE

TWO-WAY MOMENT FRAME CONNECTION



COMPARISON STEEL vs RC

RC → STEEL



BENEFIT OF STEEL STRUCTURE

- ✓ Light Weight Structure
  ⇒Low cost in construction including foundation work
- ✓ Factory Pre-Production
  ⇒ Quick Construction & Stable Quality
- ✓ Smaller Size Structure with Long Span
  ⇒ Optimize Floor Space
- ✓ Clean construction site

COMPARISON STEEL vs RC

Steel Structure | RC Structure

	Steel Structure	RC Structure
Cost	70%	100%
Weight	20%	100%
Construction Time	70%	100%

SHOPPING MALL

CAR POOL

TSUNAMI EVACUATION TOWER

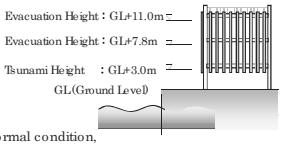
Site: Shizuoka
Height: 9.8m
Capacity: 200 persons

Site: Osaka
Height: 10.5m
Capacity: 150 persons

MULTIPURPOSE

Precondition
- Estimated Tsunami Height: GL+3.0m

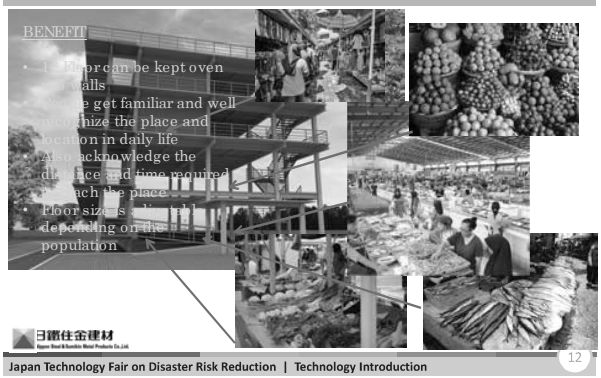
Evacuation Space
- Area: 144m²
- Capacity: 200 people (0.7m²/person)



2nd & 3rd Floors for multi-purpose in the normal condition, such as warehouse, classroom, church, meeting room etc.

EVACUATION TOWER AS PUBLIC MARKET

BENEFIT
- [illegible] can be kept oven [illegible] alls
- [illegible] get familiar and well [illegible] nize the place and [illegible] location in daily life
- [illegible] acknowledge the [illegible] distance and time required [illegible] each the place
- Floor sizes [illegible] depending on the population

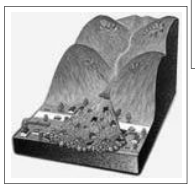


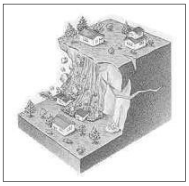
BANDA ACEH INDONESIA

TYPES OF SEDIMENT DISASTER

Landslide

Debris Flow

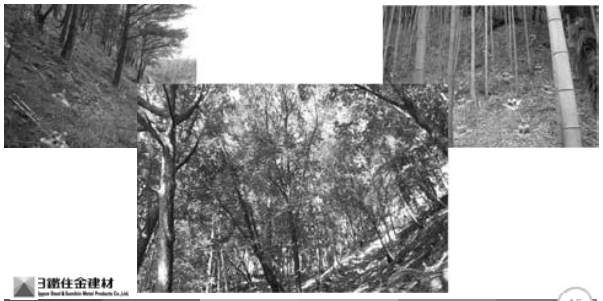




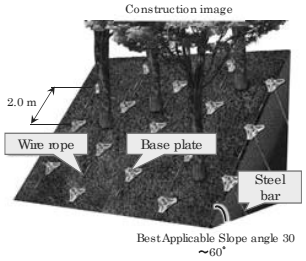
Slope Failure

NONFRAME® Method

Slope Protection Co-exist with Environment



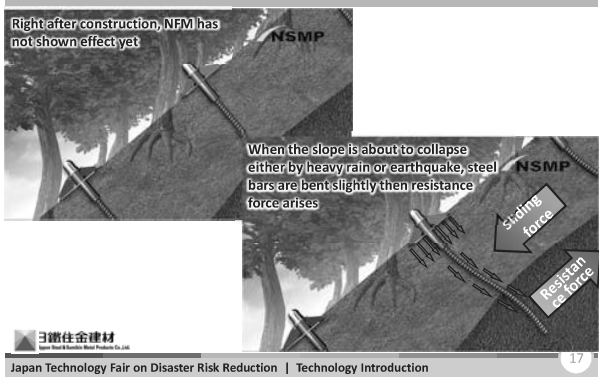
NONFRAME® METHOD



Methodology

- This method stabilizes the slope through the interaction between natural ground and reinforcing materials driving a number of rock bolts/soil nails along the slope.
- Because trees and soil are not removed, this method preserves the ecological system and contributes CO_2 reduction.
- Furthermore, this method is more cost effective than other support methods as it does not involve cutting trees and earth or disposing of soil.
- The construction equipment is lightweight thereby offering superior workability in either rocky or steep wooded slopes.
- In addition to the ultimate goal of disaster prevention function, it provides better preservation of the environment by taking advantage of its environment friendly measure.

SLOPE STABILIZING IMAGE

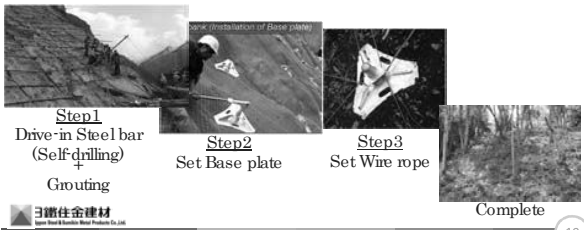


AWARDS

- 2015 "Best Resilience Award" at Japan Resilience Award 2015
  Association for Resilience Japan
- 2014 Minister's Award at "The Centennial Anniversary for Forest Conservation Project in Japan"
  MAFF: Minister of Agriculture, Forestry and Fisheries
- 2013 "Top 60 Forest Management Works transmit to posterity"
  MAFF: Minister of Agriculture, Forestry and Fisheries
- 2012 2012 Nikkei Superior Products and Services Awards
  Nikkei Incorporated
- 2011 Minister's Award at Good Design Awards 2011
  METI: Minister of Economy, Trade and Industry
  Minister's Award at 8th Eco-Products Awards
  MLIT: Minister of Land, Infrastructure, and Transport

CONSTRUCTION PROCESS

- ✓ Easy and Quick in Construction
- ✓ Does not required special tools or equipment
- ✓ Approx. 30% faster than conventional method



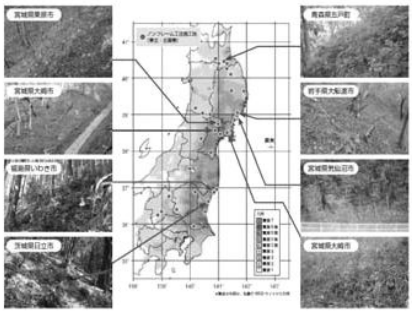
Step1
Drive-in Steel bar (Self-drilling)
+
Grouting

Step2
Set Base plate

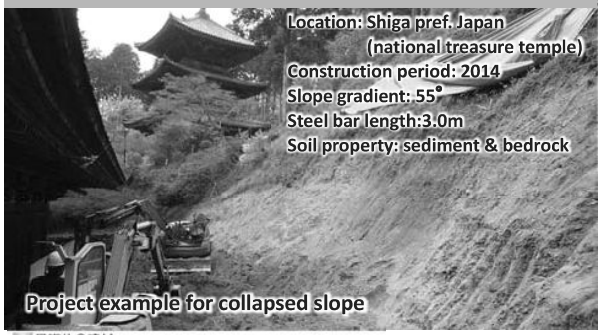
Step3
Set Wire rope

Complete

EARTHQUAKE RESISTANCE



PROJECT EXAMPLE



PROJECT EXAMPLE

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