

Appendix

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Appendix-1: 防災優先活動項目及び実施スケジュール (案)

Related Mission in IDMMP (Final Version May 2019)	Senda Framework monitoring & assessment		Year		Implementation Phase Target (g) - (g), (g)												Related Laws (BNPB mandate)	SDRR	SDG's	Related target in International Framework
	Development Plan		Phase	Phase	2030															
	Disaster Related Plans		Long Term	Middle Term	2019-2029															
Disaster Plan		Long Term	Middle Term	2018-2029																
Direction (Pillars) and Recommended Actions		Year		2018-2029																
Pillar 1 Mainstreaming DRR		Year		2018-2029																
Pillar 2 Enhancing Recognition of Hazard/Risk		Year		2018-2029																
Pillar 3 Increasing DRR Investment		Year		2018-2029																
<p>Mission1 Regulatory, Policy and Integrity in disaster preparedness and DRR</p>	P 1-11	Analysis of the current situation and issues in mainstreaming of DRR		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2045	<p>Priority for Action 2</p>		<p>Target 1.5 2.4 11.5 11.b 11.c 13.1</p>
	P 1-S1	Enhancement of legal provisions and procedures for mainstreaming of DRR and setting unified DRR target																		
	P 1-S2	Ensuring ministries use risk assessment and unified DRR target in development planning and decision makings																		
	P 1-M1	Incorporating DRR into development planning in central and regional levels and Implementation of DRR activities																		
	P 1-L1	Implementation of DRR activities in development in central and regional levels by each ministry																		
	P 1-I2	Capacity Development for DRR of each organization																		
	P 2-11	Clarification of Disaster Information																		
	P 2-S1	Enhancement of legal provisions and procedures for recognition of hazard/risk																		
	P 2-S2, M1	Continuous improvement of hazard/risk evaluation accuracy based on scientific basis																		
	P 2-S2, M1-(1)	Hazard: continuous improvement of analytical methods by "Step-by-Step Process" proposed by JICA																		
P 2-S2, M1-(2)	Vulnerability: improvement of evaluation accuracy and quality through betterment / enhancement of statistical and economic data																			
P 2-S2, M1-(3)	Capacity: clarification of evaluation criteria, improve the evaluation																			
P 2-M2	Construction/Expansion of hazard/risk evaluation system and improvement of analysis accuracy																			
P 2-L1	Continuous implementation and Improvement of hazard/risk evaluation on scientific basis and reflection to DRM																			
P 2-I2	Capacity Development for evaluation of hazard/risk																			
<p>Mission2 Investment for DRR & Preparedness</p>	P 3-11	Analysis of the current situation and issues in DRR investment		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2045	<p>Priority for Action 3</p>		
	P 3-S1	Evaluation of effectiveness of DRR investment in central and regional level																		
	P 3-S2(1)	Reflecting DRR investment in disaster management plans in central and regional level, and dissemination of regional disaster management plans																		
	P 3-S2(2)	Reflecting DRR investment in each of central development plans and regional development plans																		
	P 3-M1-(1)	Planning and Implementation of DRR investment of structural measures																		
	P 3-M1-(2)	Planning and Implementation of DRR investment of non-structural measures																		
	P 3-M1-(3)	Evaluation of projects (pre and post), and implementation of verification on effectiveness																		
	P 3-M2	Reflection of effectiveness of DRR investment into risk assessment																		
	P 3-M3	Feedback DRR investment into DRR related plans and development plans in the next/future period both in central and regional level.																		
	P 3-L1	Continuous implementation of DRR investment and reduction of economic loss by disaster damage																		
P 3-I2	Capacity Development for evaluation of DRR investment																			

Recommended Actions

Related Mission in IDMMP (Final Version May 2019)	Sendai Framework monitoring & assessment										Related target in International Framework																				
	Disaster Related Plans	Development Plan	Disaster Plan	Retained ministries	Implementation Phase Target (a) - (d), (f), (g)																										
					2019		2020		2021			2022		2023		2024		2025		2026		2027		2028		2029		2030		2045	
					Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target		Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target	Phase Target
Year		2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030		2045		Related Laws (BNPB mandate)	SDG's		
Phase		2019-2018		2020-2019		2021-2020		2022-2021		2023-2022		2024-2023		2025-2024		2026-2025		2027-2026		2028-2027		2029-2028		2030-2029		2045-2030					
Year		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2023-2024		2024-2025		2025-2026		2026-2027		2027-2028		2028-2029		2029-2030		2045-2030					
Phase		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2023-2024		2024-2025		2025-2026		2026-2027		2027-2028		2028-2029		2029-2030		2045-2030					
Mission5 Management and Governance	Pillar 6		DRR Cooperation and Coordination		All ministries																										
	P 6-11	Establishment of national level committee for arrangement of DRR cooperation and coordination																													
	P 6-S1	Enhancement of regulations for DRR both in central and local governments																													
	6-S1-(1)	Enhancement of ministerial regulation for DRR considering risk evaluation																													
	6-S1-(2)	Enhancement of local government regulation for DRR considering risk evaluation																													
	P 6-S2	Setting of unified DRR target among ministries, especially on DRR planning and implementation																													
	6-S2-(1)	Setting of unified DRR target in region, especially on DRR planning and implementation																													
	6-S2-(2)	Implementation and monitoring of cooperation/coordination both in central and local governments																													
	P 6-M1	Sharing of collected data, data analysis results, and risk evaluation results among organizations/agencies/ministries																													
	6-M1-(1)	Enhancement of inter-ministerial cooperation during policy/plan formulation in central and local governments																													
	P 6-L1	Capacity Development for DRR of each organization																													
	6-L1	Capacity development of each organization for improvement of risk evaluation and DRR related activities																													
	P 6-I2	Public Awareness																													
	6-I2-(1)	Development/Improvement of awareness raising program/campaign for public incl. students																													
	6-I3-(1)	Conducting awareness raising program/campaign for public incl. students																													
	6-I3-(2)	Development/Improvement and conducting specific awareness raising program /campaign for government staff of relevant agencies																													
6-I3-(3)	Incorporate DRR into curricular of schools, training institutes and universities																														
6-I3-(4)																															

Appendix-2: 防災優先活動項目モニタリングシート（案）

Monitoring sheet of recommended action

Related Mission in IDMMP (Final Version May 2019)	Sendai Framework monitoring & assessment		Year		2030												Remark				
	Disaster Related Plans	Development Plan	Year Phase	Implementation Phase Target (a) - (d), (f), (g)	RP-JP 2015-2045																
					Long Term				Middle Term				Short					Long			
					RP-JP 2005-2015	RP-JMN 2020-2024	RP-JMN 2025-2029	RP-JMN 2030-2034	RP-JMN 2020-2024	RP-JMN 2025-2029	RP-JMN 2030-2034	RP-JMN 2035-2039	RP-JMN 2020-2024	RP-JMN 2025-2029	RP-JMN 2030-2034	RP-JMN 2035-2039					
Disaster Plan		Disaster Plan		Year Phase		National IDMMP 2015-2045															
Direction (Pillars) and Recommended Actions		Direction (Pillars) and Recommended Actions		Year Phase		National IDMMP 2015-2045															
Pillar 1		Pillar 1		Year Phase		National IDMMP 2015-2045															
Pillar 2		Pillar 2		Year Phase		National IDMMP 2015-2045															
Pillar 3		Pillar 3		Year Phase		National IDMMP 2015-2045															
Mission 1		Mission 1		Year Phase		National IDMMP 2015-2045															
Mission 2		Mission 2		Year Phase		National IDMMP 2015-2045															

Related Mission in IDMMP (Final Version May 2019)	Sendal Framework monitoring & assessment										2030										Remark											
	Disaster Related Plans	Development Plan	Disaster Plan	Year Phase	2019					Implementation Phase Target (a) - (d), (f), (g)					2030																	
					Long Term	Middle Term	Long Term	Middle Term	Long	RP-JP 2015-2045																						
										National IDMMP 2015-2045																						
Direction (Pillars) and Recommended Actions		Disaster Plan		Long Term		Middle Term		Long		Short		Middle		Long																		
				2018		2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030				
				Achievement		Achievement		Achievement		Achievement		Achievement		Achievement		Achievement		Achievement		Achievement		Achievement		Achievement		Achievement		Achievement				
				Related		Related		Related		Related		Related		Related		Related		Related		Related		Related		Related		Related		Related				
				ministries		ministries		ministries		ministries		ministries		ministries		ministries		ministries		ministries		ministries		ministries		ministries		ministries				
				All ministries		All ministries		All ministries		All ministries		All ministries		All ministries		All ministries		All ministries		All ministries		All ministries		All ministries		All ministries		All ministries				
Mission3 Reliable Emergency Response	Pillar 4 Strengthening Residual Risk Management																															
	P 4-11	Clarification of Disaster Information for Contingency Plan and EWS																														
	P 4-S1	Enhancement of legal provisions and procedures for preparedness																														
	P 4	Improvement of contingency plan/preparedness plan																														
	4-M1-(1)	Improvement of hazards/risks analysis																														
	4-M1-(2)	Risk scenario assumptions																														
	4-M1-(3)	Formulation of contingency plan (examination of response plans, systems, resources, information, etc., preparation and documentation of response procedures such as SOP and Timeline)																														
	4-M2	Dissemination of contingency plan/preparedness plan																														
	4-M3	Implementation and maintenance of contingency plan/preparedness plan (education, training, update, etc.)																														
	4-M4	Application to various disaster types, spread throughout the country																														
	4-L1	Continuous improvement of contingency plan/preparedness plan																														
	P 4	Improvement of Early Warning System incl. MHEWS																														
	4-S2-(1)	Definition of roles and responsibilities of related agencies in EWS																														
	4-S2-(2)	Conducting full scale study based on hazard/risk profiles for EWS																														
4-M5	Reflect the results of the study to EWS, improvement of EWS																															
4-M6	Enhancement of dissemination of EWS, monitoring and review of EWS																															
4-L1	Improvement of details of Multi Early Warning System																															
P 4-12	Capacity Development for preparedness																															
P 4-13	Enhancement of Emergency Response																															
4-13-(1)	Continuous enhancement of capacity of BNPB																															
4-13-(2)	Enhancement of capacity of disaster response in regional level																															
Mission4 Recovery for better life	Pillar 5 Promoting BBB																															
	P 5-11	Analysis of the current situation and issues in recovery and reconstruction																														
	P 5-S1	Enhancement of legal provisions and procedures for recovery and reconstruction																														
	P 5-S2	Enhancement of Post Disaster Management																														
	5-S2-(1)	Formulation and establishment of recovery and reconstruction system based on the concept of "Build Back Better (BBB)"																														
	P 5-S3	Formulation and Implementation of recovery and reconstruction plans, relocation plans and land-use plans based on disaster risk assessment																														
	P 5-S4	Enhancement of capacity of post disaster activities in all levels including post disaster needs assessment (PDNA)																														
	5-S4-(1)	Development of mechanism to collect disaster and loss data and formulate post disaster needs assessment (PDNA) based on sectoral needs.																														
	5-S4-(2)	Establishment of a mechanism to ensure timely and immediate recovery of essential services and livelihoods with BBB concept																														
	PA 5-M1	Implementation of recovery and reconstruction in disaster damaged area																														
	PA 5-L1	Continuous implementation of recovery and reconstruction and preparation for future disaster																														
	PA 5-I2	Capacity Development for recovery and reconstruction																														

Related Mission in IDMP (Final Version May 2019)	Sendal Framework monitoring & assessment		2030												Remark	
	Disaster Related Plans	Development Plan	Phase	Implementation Phase Target (e) - (f), (g)												
				RP-JP 2005-2015				RP-JMN 2020-2024				RP-JP 2015-2045				
				2019	2018	2017	2016	2024	2023	2022	2021	2020	2019	2018		2017
Disaster Plan		Disaster Plan		National IDMP 2015-2045												
Direction (Pillars) and Recommended Actions		Direction (Pillars) and Recommended Actions		NDMP 2020-2024												
Pillar 6 DRR Cooperation and Coordination		Pillar 6 DRR Cooperation and Coordination		NDMP 2025-2029												
All ministries		All ministries		NDMP 2025-2029												
P 6-11		Establishment of national level committee for arrangement of DRR cooperation and coordination		2018												
P 6-S1		Enhancement of regulations for DRR both in central and local governments		2019												
6-S1-(1)		Enhancement of ministerial regulation for DRR considering risk evaluation		2020												
6-S1-(2)		Enhancement of local government regulation for DRR considering risk evaluation		2021												
P 6-S2		Setting of unified DRR target among ministries and reflection to DRR plans and development plans		2022												
6-S2-(1)		Setting of unified DRR target among ministries, especially on DRR planning and implementation		2023												
6-S2-(2)		Setting of unified DRR target in region, especially on DRR planning and implementation		2024												
P 6-M1		Implementation and monitoring of cooperation/coordination both in central and local governments		2025												
6-M1-(1)		Sharing of collected data, data analysis results, and risk evaluation results among organizations/agencies/ministries		2026												
P 6-L1		Enhancement of inter-ministerial cooperation during policy/plan formulation in central and local governments		2027												
P 6-I2		Capacity Development for DRR of each organization		2028												
6-I2-(1)		Capacity development of each organization for improvement of risk evaluation and DRR related activities		2029												
P 6-I3		Public Awareness		2030												
6-I3-(1)		Development/Improvement of awareness raising program/campaign for public incl. students		2031												
6-I3-(2)		Conducting awareness raising program/campaign for public incl. students		2032												
6-I3-(3)		Development/Improvement and conducting specific awareness raising program/campaign for government staff of relevant agencies		2033												
6-I3-(4)		Incorporate DRR into curricular of schools, training institutes and universities		2034												

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

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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.

1

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 Volcanoes **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”)*

2

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.



Source:
RECONMAP
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

3

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

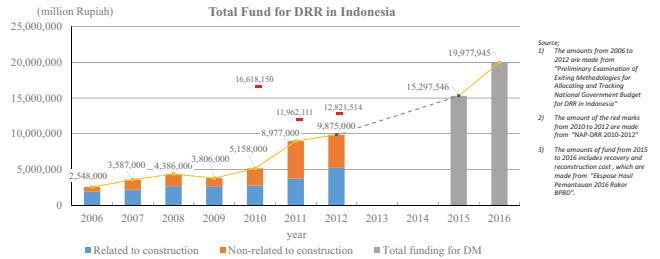
With regard to each part, JICA is ready to provide Japanese experience and practice. We JICA made this recommendation so as to be reflected into the next 5-year National DM Plans, 3-year National Action Plans implementation of those. However, in order to do so, **some concepts in it should be written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

4

1. DRR Investment

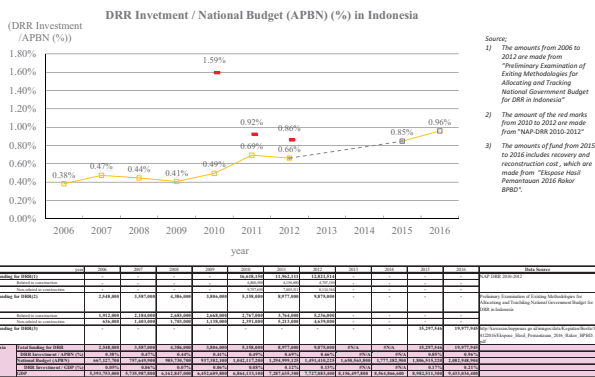
1-1 DRR Investment Comparison Among Indonesia, Japan, Philippines and others

DRR Investment in Indonesia has gradually increased

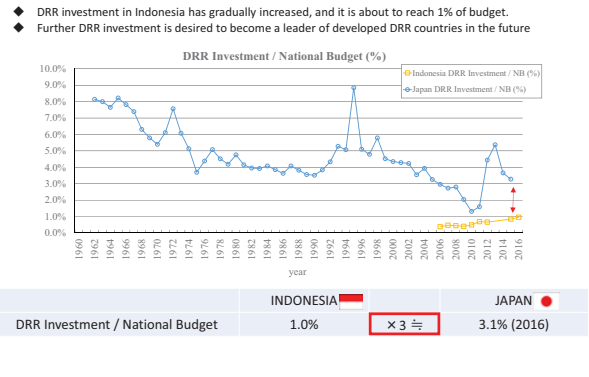


Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Total funding for DRR	6,135,000	8,193,000	9,164,000	17,939,000	24,839,625	22,696,514	32,150,514	32,150,514	32,150,514	32,150,514	32,150,514	32,150,514	32,150,514	32,150,514	32,150,514	32,150,514	32,150,514
Related to construction	2,548,000	4,386,000	5,158,000	11,962,111	16,618,150	12,821,514	9,875,000	9,875,000	9,875,000	9,875,000	9,875,000	9,875,000	9,875,000	9,875,000	9,875,000	9,875,000	9,875,000
Non-related to construction	3,587,000	3,806,000	4,006,000	5,977,000	8,221,475	19,829,000	22,275,514	22,275,514	22,275,514	22,275,514	22,275,514	22,275,514	22,275,514	22,275,514	22,275,514	22,275,514	22,275,514

DRR Investment / National Budget has reached 1%

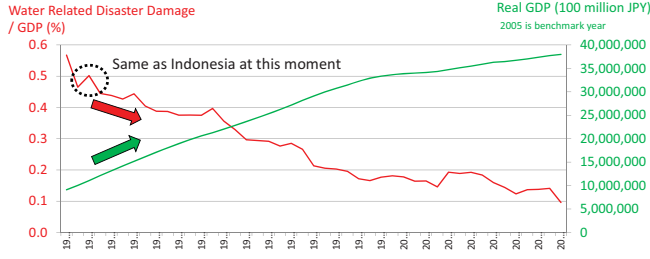


DRR Investment / National Budget (%)



DRR Investment Brings Economic Growth

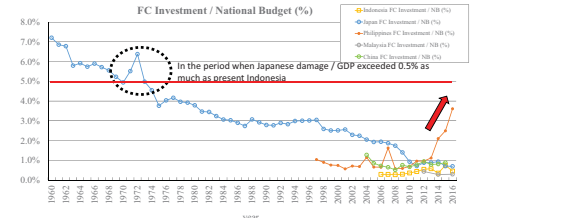
	INDONESIA		JAPAN
GDP in 2016	932 Billion USD	× 5 ≐	4937 Billion USD
The Average Disaster Damage / Year	30 Trillion IDR Except Forest and Land Fire	≐	41 Trillion IDR Water Related Disaster Except Tsunami 10 years average 2005-2014 Exchanged 345 billion JPY as 1 JPY = 118 IDR
Disaster Damage / GDP	0.5%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



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 HROTA, Chief Economist, Dr. Mikio SHIMAZAKI, 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 (HELPS), 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 Existing Methodologies for Allocating and Tracking National Government Budget for DRR in Indonesia" and the amounts in 2010 to 2011 are made from the budget of DRR.
4) The amounts of FC investment of Japan are made from the amounts of the budget of Water and Disaster Management Bureau, MITI, which includes the budget of flood control invest. cost project.

Example of DRR Investment Target in Philippines

PA10121 or the Philippines Disaster Risk Reduction and Management Act of 2010 (DRRM Act) is a new law which transforms the Phils' Disaster management system from disaster relief 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.

11

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

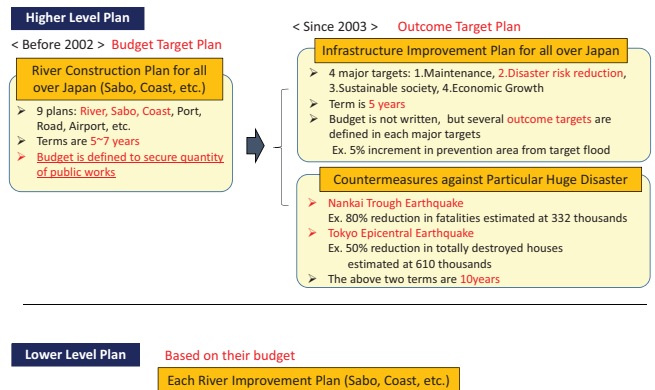
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1. DRR Investment

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

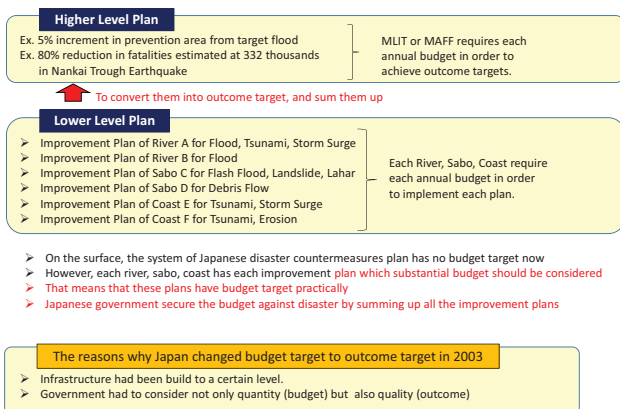
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Japanese government set DRR Plan



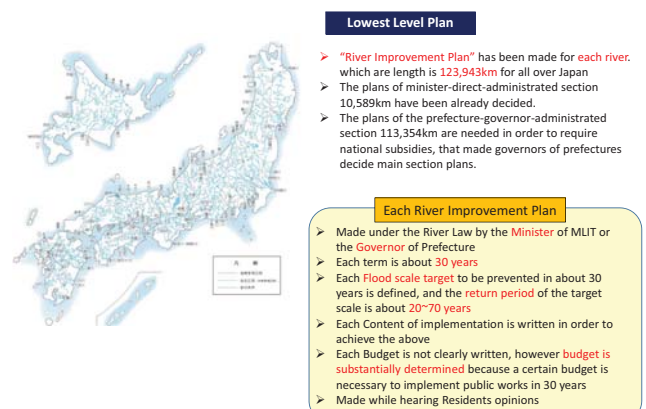
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The Summary of DRR Plan



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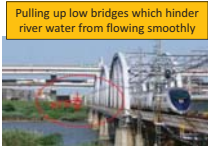
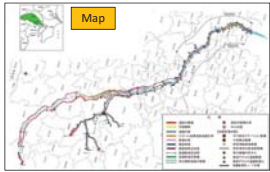
Each River Improvement Plan



16

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



- 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

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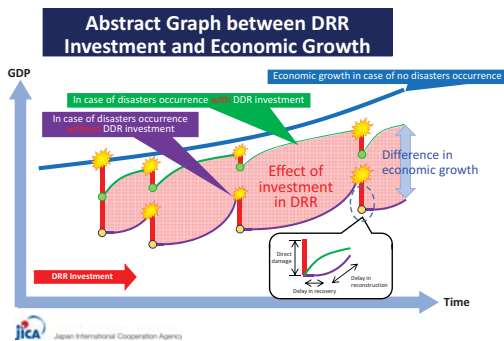
1. DRR Investment

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

18

Abstract Graph between DRR Investment and Economic Growth

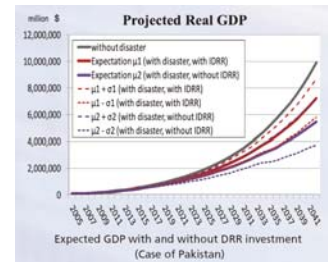
- Economic growth is hindered by disasters without DRR investment
- It is theoretically possible to show this situation with a macro growth model and calculate economic effects, however, there are still a lot of technical issues to be solved.



19

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

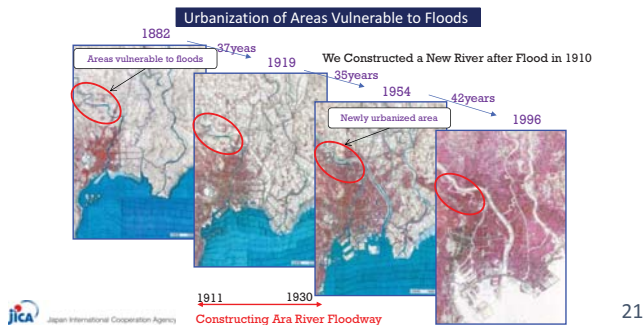


UN Global Assessment Report 2013, shown GDP will 25% down without DRR investment (Provided by JICA)

20

Importance and necessity of "Invest in Advance"

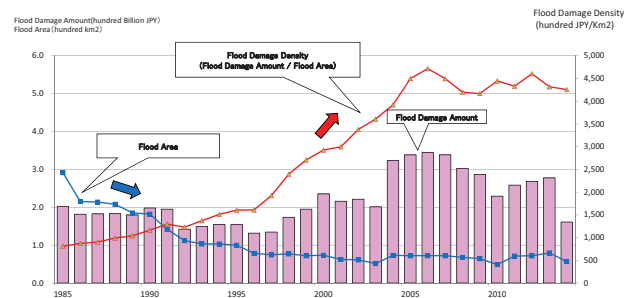
- One of Lessons learned from Japan's experience in Disaster Management is that disaster damage will expand afterwards unless DRR investment in advance is made considering anticipation of urbanization
- It is possible to statistically calculate the economic effect of investment utilizing the progress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



21

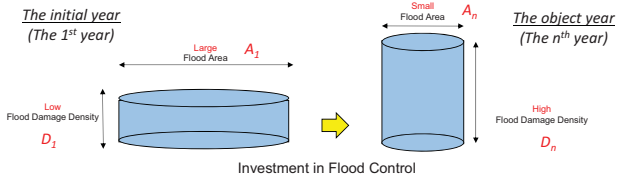
Changes in Flood Area and Flood Damage Density in Japan

- 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.

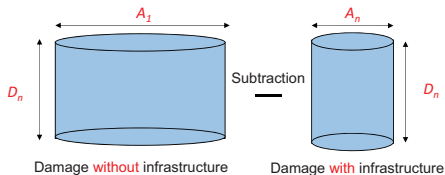


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Another Idea to Calculate the Annual Benefit of Infrastructure



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



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

Flood Control Investment Produced much Benefit



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

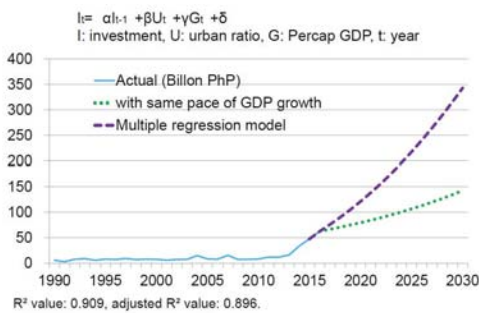
$$= \sum_{n=1961}^{2005} (B_n - I_n) > 40 \text{ Trillion JPY} \approx 4,720 \text{ Trillion IDR}$$

Where B_n and I_n are benefit and Investment in n^{th} 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 24

How Much Will Future Investment Reach in Philippines ?

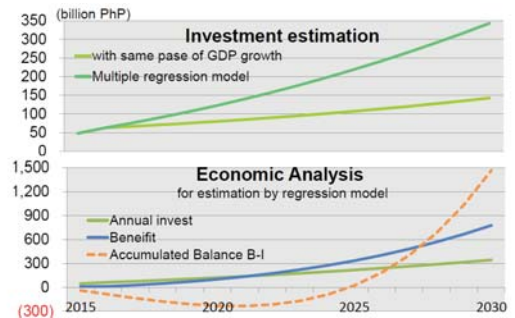
- > Accumulated investment in flood control in Philippines from 2016 to 2030 is estimated 1.47 ~ 2.79 Trillion PHP by JICA study model
- > 1.47 ~ 2.79 Trillion PHP \approx 391 ~ 742 Trillion IDR (calculated as 1PHP=266IDR)



$I_t = \alpha I_{t-1} + \beta U_t + \gamma G_t + \delta$
I: investment, U: urban ratio, G: Percap GDP, t: year
R² value: 0.909, adjusted R² value: 0.896.

Philippine Investment in Advance is Expected to Bring Economic Return

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



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

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.

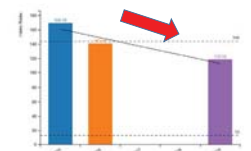
IRB (Indeks Risiko Bencana) is the indicator to asses the achievement of DRR activities in national and local level.

Basic Formula for RBI Calculation

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



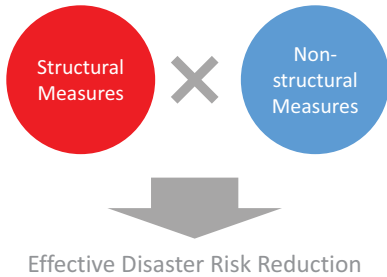
Disaster Risk Index in 2015



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

Basis of Disaster Risk Reduction

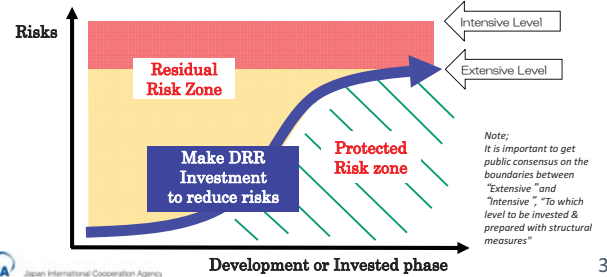
- Best mix of Structural Measures and Non-structural Measures are needed to reduce Disaster Risk



29

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



JICA Japan International Cooperation Agency

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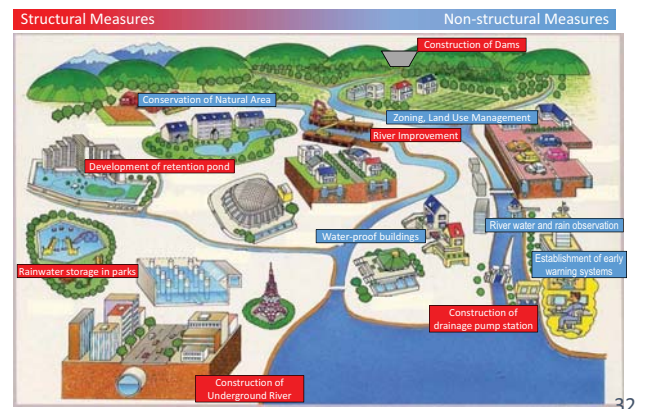
Sendai Framework Indicators and DRR Countermeasures

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

	Indicators	Major DRR Countermeasures
Humanitarian issues	Global Target A: Number of deaths and missing persons attributed to disasters, per 100,000 population.	<ul style="list-style-type: none"> • Development of Early Warning System • Development of Hazard Map • Zoning, Land Use Management • DRR Education, Evacuation Drill
	Global Target B: Number of directly affected people attributed to disasters, per 100,000 population.	
Development issues	Global Target C: Direct economic loss attributed to disasters in relation to global gross domestic product.	<ul style="list-style-type: none"> • Conservation of Natural Land • Construction of DRR Facilities such as Embankment, Retention Pond, Dam, Diversion Channel etc.
	Global Target D: Damage to critical infrastructure attributed to disasters.	
		<ul style="list-style-type: none"> • Up-grading the existing DRR Facilities
		Continuous Implementation of Comprehensive DRR measures

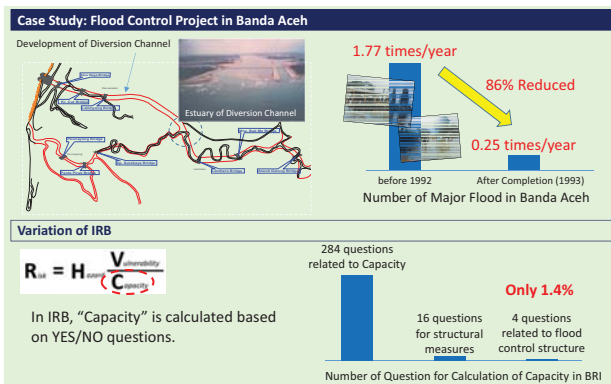
31

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



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



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

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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
 - Economic losses
 - Important infrastructure
- Humanitarian items are already included in current RBI
- 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.

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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

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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.



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2. Risk Index

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

37

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 km² 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

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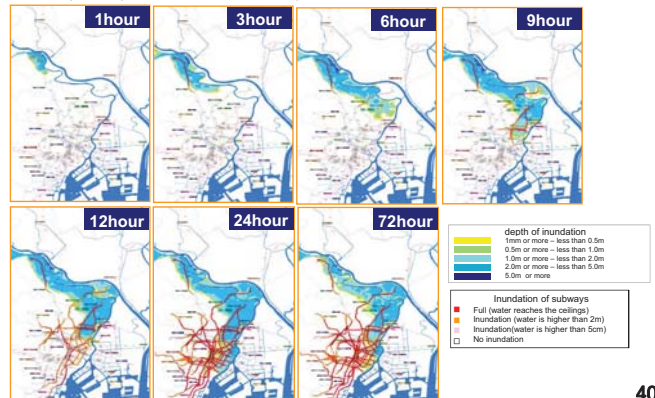
2. Risk Index

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

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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



40

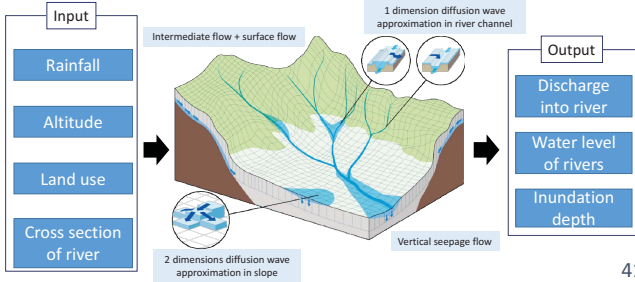
The concept of RRI Model

Traditionally, Rainfall and Runoff and Inundation are calculated separately

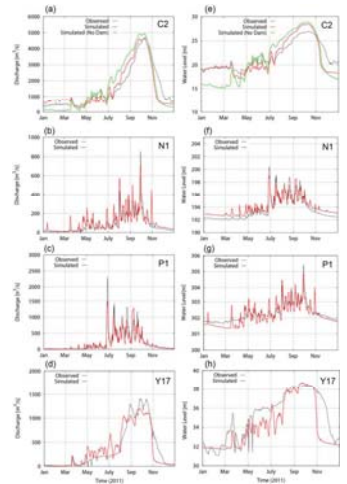
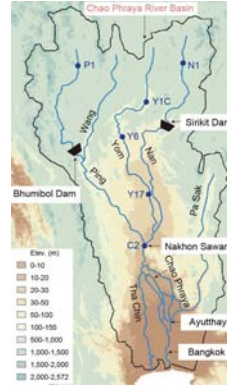
↓ ICHARM which is national research institute in Japan has made RRI Model for developing countries

RRI Model : Rainfall-Runoff-Inundation

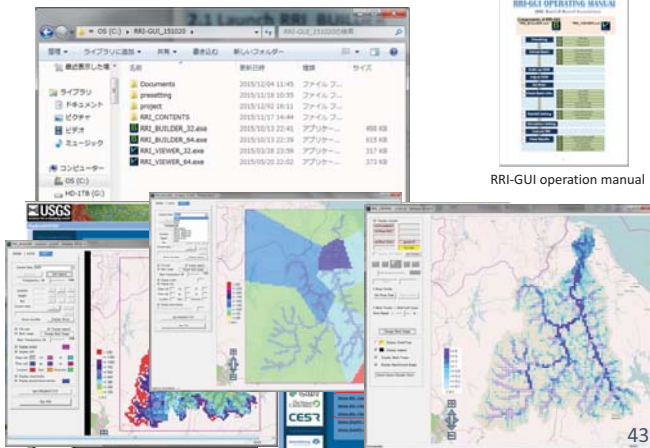
By using free data such as Information from satellites and weather forecast and so on, anyone can forecast flow volume, water level and inundation depth easily at the same time in quasi-real-time in the world for free



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



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)

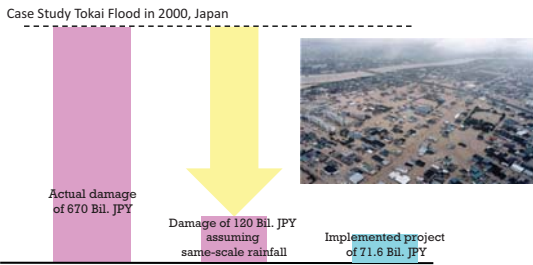


GRIPS: National Graduate Institute for Policy Studies

2. Risk Index

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

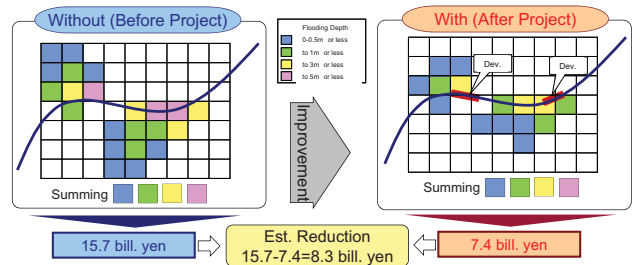
“Invest In Advance” is much better than “Build Back Better”



550 Bil. JPY (670 - 120) > 71.6 Bil. JPY

- > 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



15.7 bill. yen → Est. Reduction 15.7-7.4=8.3 bill. yen ← 7.4 bill. yen

Damage rate in accordance with inundation depth

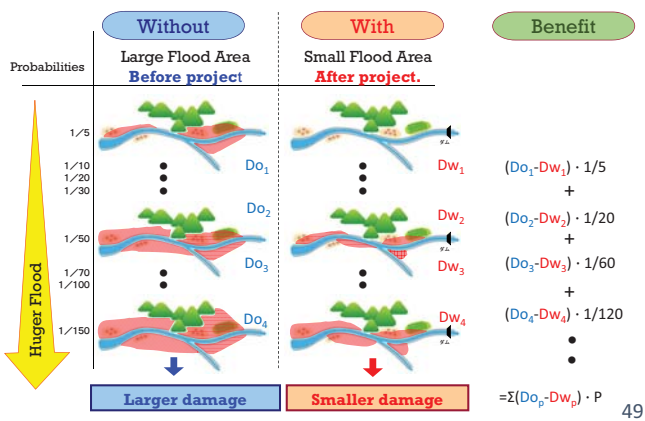
Depth	Under Floor		Above Floor	
	0~50cm	50~99cm	100cm~	100cm~
Houses	3.2%	9.2%	11.9%	34.2%
Household Goods	2.1%	14.5%	32.6%	60.5%
Depreciable Assets of Offices	9.9%	23.2%	45.3%	80.8%
Inventory Assets of Offices	5.6%	12.8%	26.7%	52.8%

For example, in case of house damage

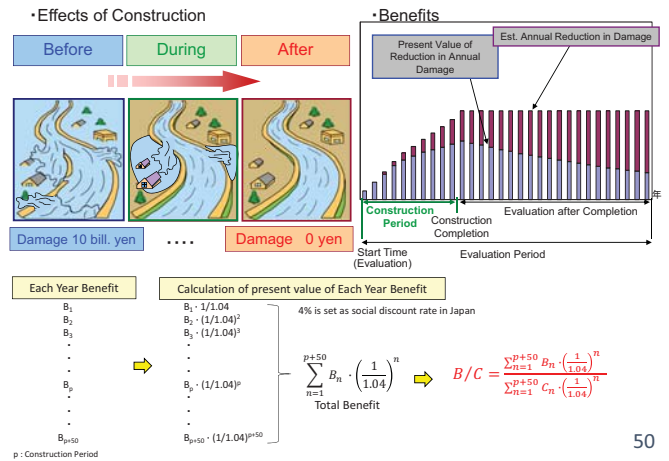
house damage = Total inundate m by flood
x Unit Price per 1m of houses
x Damage rate by flood depth

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

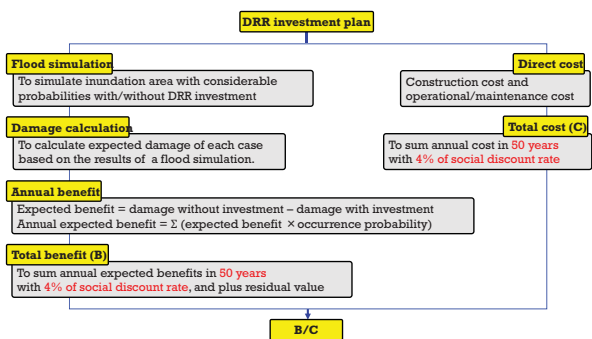
Expected Value by Calculating Several Scale Floods



Calculation of Present Value of Damage Mitigation



Outline of Cost Benefit Analysis in Japan

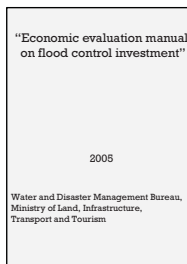


2 Sorts of Quantification of DRR Infrastructure Effect

CBA (Cost-Benefit Analysis)

→ Monetary Terms

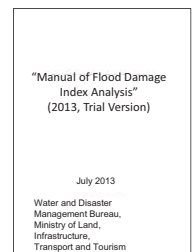
To compare the DRR investment cost with the benefit which is converted into monetary terms from effects



FDIA (Flood Damage Index Analysis)

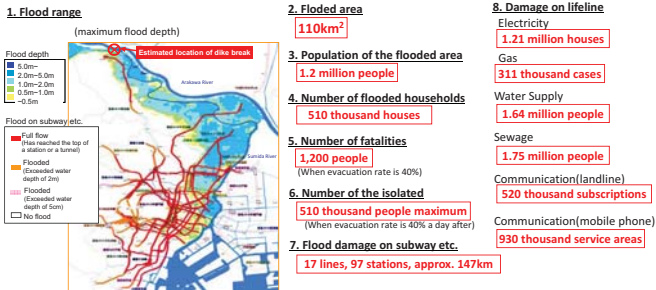
→ Non-Monetary Terms

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



Example of Flood Damage Index Analysis in Tokyo

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



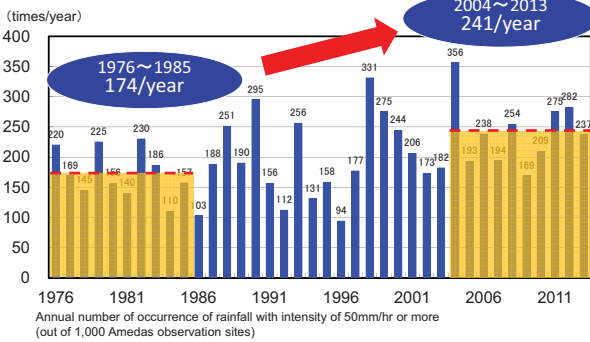
※All figures are approximate of the flood damage probability of about once in 1000 years

2. Risk Index

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

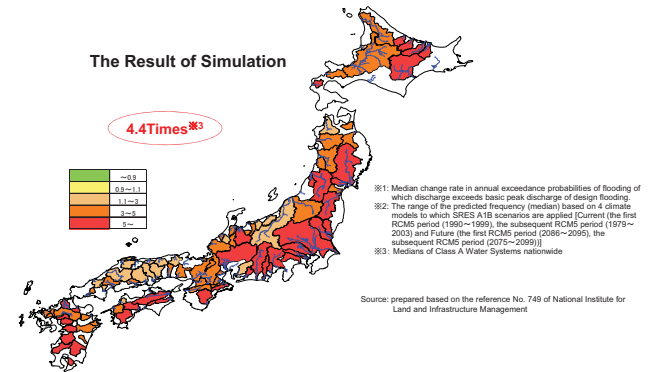
The Occurrence of Heavy Rainfalls Has been Increasing Recently

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



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).



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



Urban Flood Control System Improvement in Selected Cities JICA Loan No. IP-551

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.



Urban Flood Control System Improvement in Selected Cities JICA Loan No. IP-551

Example of Merapi

Before Eruption



Example of Merapi



After Eruption

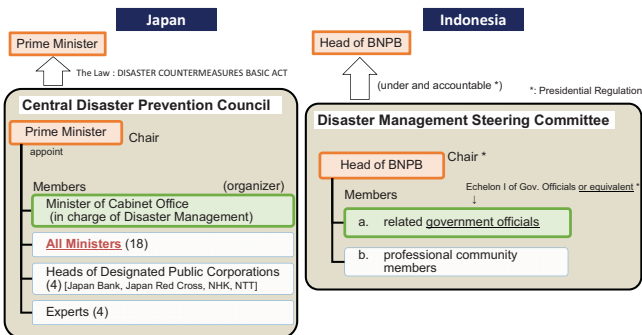


3. Cooperation with Line-Ministries

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**



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

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

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

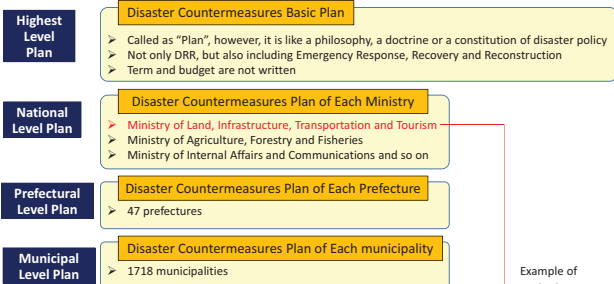
- Disaster occurs irrespective of administrative boundaries
- In Japan, firstly, hazard-based measures are considered, and based on that, reflected on each regional DRR plan.
- Central Government provide disaster risk information, DRR polices, standards for regional DRR plans, etc. to local Government.



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The System of Japanese Disaster Countermeasures Plan

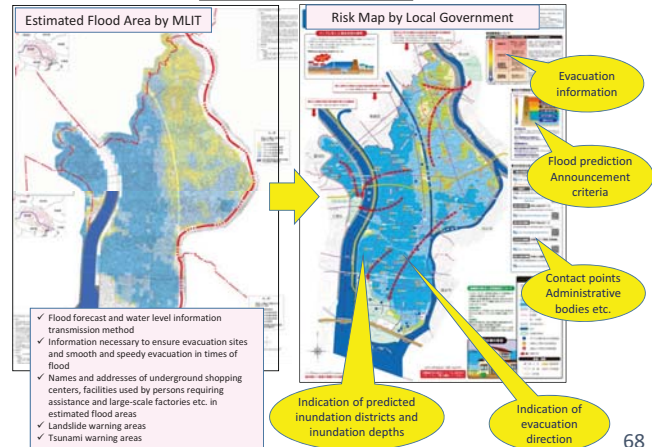
These plans compose a different system from DRR Improvement Plan



- 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

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Flood Risk Map



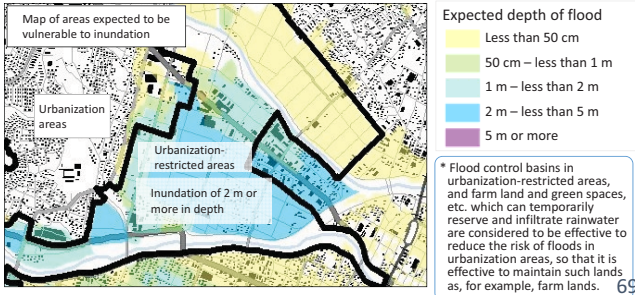
68

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)

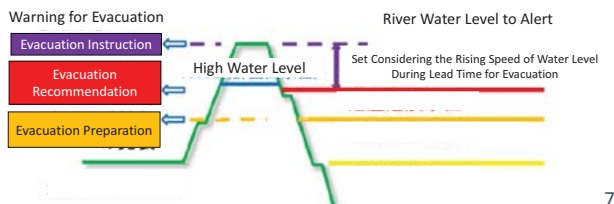
<Case where areas with high risk of inundation are designated as urbanization-restricted areas, and thus limited for use as building land>



69

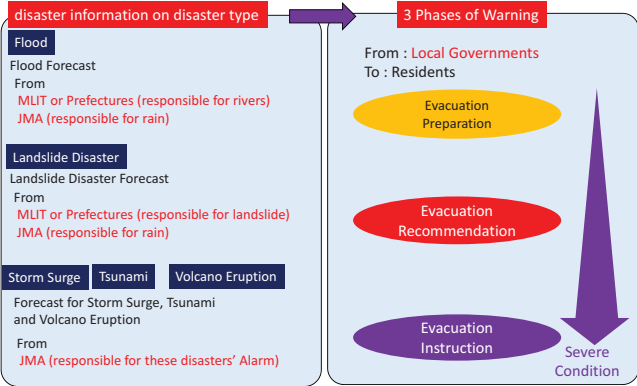
The Responsibility of Local Disaster Countermeasures in Japan

	Local Government	National and Local Department Responsible for Hazard
In Peace Time	<ul style="list-style-type: none"> ➢ Formulate a Local Disaster Countermeasures Plan ➢ Publish Risk Map ➢ Conduct Education and Training ➢ Invest Early Warning System 	<ul style="list-style-type: none"> ➢ 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	<ul style="list-style-type: none"> ➢ Issue Evacuation Instruction ➢ Rescue ➢ Other Various Activities 	<ul style="list-style-type: none"> ➢ Alert Local Government To Issue Evacuation Instruction



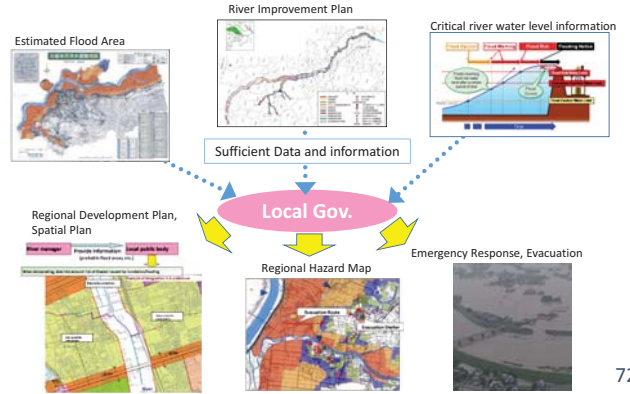
70

Disaster Information and Warning for Evacuation



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

Huge Flood in 2015

Example of Leadership by MLIT

"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

Weather and River Information	Local office of MLIT	Municipality	Residents	
-72h -48h -24h -18h	<ul style="list-style-type: none"> 1. Confirm forecast 2. Local Hydrographic Information 3. AMM news conference 4. Issuing heavy rain flood warnings 	<ul style="list-style-type: none"> 1. Disaster Reduction System 2. Disaster Reduction System 3. Disaster Reduction System 4. Disaster Reduction System 	<ul style="list-style-type: none"> 1. Check warnings on TV/radio/Internet, etc. 2. Check evacuation routes with hazard map, etc. 3. Prepare disaster prevention items 4. Check disaster prevention card 	
-12h -6h	<ul style="list-style-type: none"> 1. Standby Water Level for Flood Fighting Corps (XXX Water Level Gauging Station Water Level XXX m) 2. Flood Watch Water Level (XXX Water Level Gauging Station Water Level XXX m) 3. Evacuation alert Water Level (XXX Water Level Gauging Station Water Level XXX m) 4. Hurricane warnings 5. Heavy rain (XXX meteorological observation) 6. Flood Danger Water Level (XXX Water Level Gauging Station Water Level XXX m) 7. Heavy rain emergency warnings 8. Landfall of Typhoon 9. Design High Water Level (Overlapping) 	<ul style="list-style-type: none"> 1. Flood Forecast (Information on Flood Danger) 2. Flood Forecast (Information on Flood Danger) 3. Flood Forecast (Information on Flood Danger) 4. Flood Forecast (Information on Flood Danger) 5. Flood Forecast (Information on Flood Danger) 6. Flood Forecast (Information on Flood Danger) 7. Flood Forecast (Information on Flood Danger) 8. Flood Forecast (Information on Flood Danger) 9. 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Structural Measures by MLIT

Outline of the Project:

Based on the BBB concept, river improvement, dike improvement (heightening 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)



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

Formulation of timeline and Evacuation Training, Joint inspection of the section with high flood risk with the country, city, residents, etc., Disaster Countermeasures Council for Kinu River Large Scale Flood at downstream region

Corresponding to floods of highest risk, Estimated Inundation Map, Hazard Map, Inundation Analysis, Information and data sharing to the public and Communication with residents and implementation of training based on this

Non-Structural Measures by MLIT



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



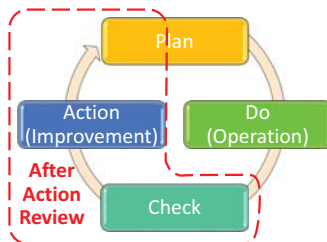
Resident Participation Workshop under the joint sponsorship of MLIT and City



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.

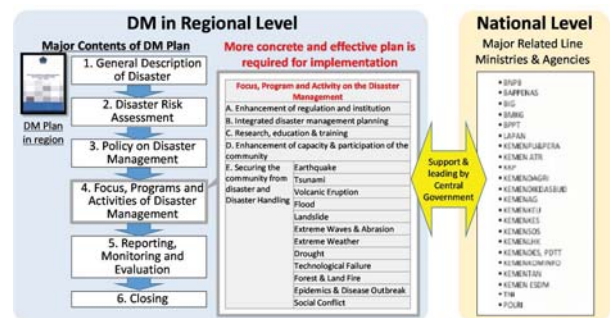
- The central government can strongly support and lead **DRR activities in region not only during disasters phase but also in normal times.**
- Each line ministry is **expected to support related organizations and to strengthen cooperation** in normal times.



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

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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

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Appendix-4: Japan Technology Fair on DRR Presentation Materials

Japan Technology Fair
on
Disaster Risk Reduction

Presentation Materials

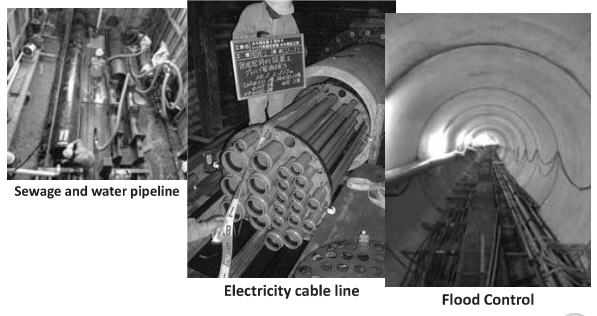
6 December, 2018 Jakarta

ISEKI MICRO TUNNELING TECHNOLOGY

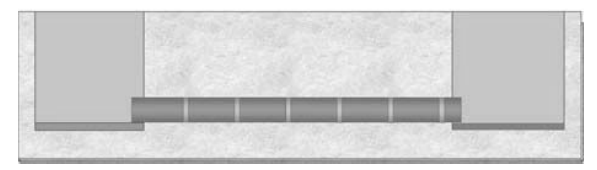


TECHNOLOGY INTRODUCTION

MICRO TUNNELING METHOD APPLICATION



Procedure of micro tunneling



CONTENT

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

WHAT IS MICRO TUNNELING METHOD?

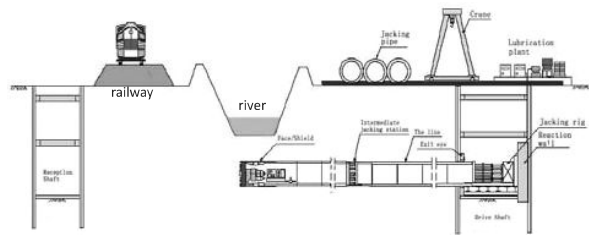
A method of directly installing pipes behind a boring machine using the force of a hydraulic jack from drive shaft to arrival shaft so the pipes would form a continuous pipeline in the ground.



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.

Basic elements for micro tunnelling

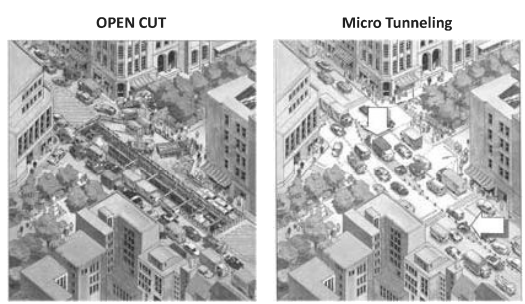


Movie

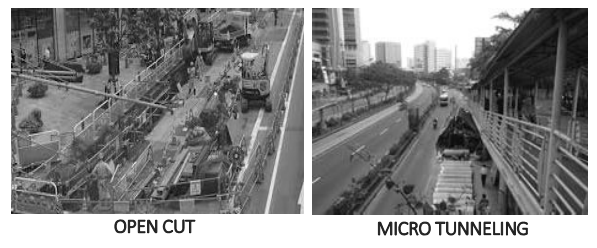


MICRO TUNNELING METHOD AND OTHER METHOD COMPARISON

Open Cut VS Micro Tunneling (Pipe Jacking)

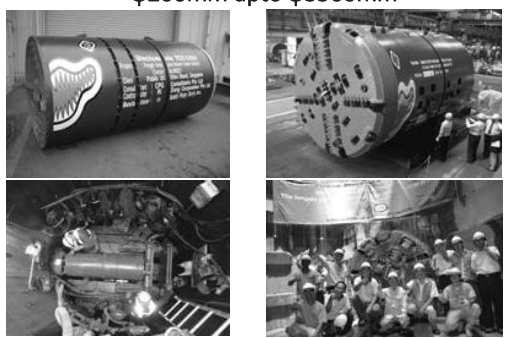


Open Cut VS Micro Tunneling (Pipe Jacking)



ISEKI SLURRY TYPE MACHINE

φ200mm upto φ3500mm



IMPLEMENTATION MICRO TUNNELING METHOD FOR FLOOD MITIGATION PROJECT

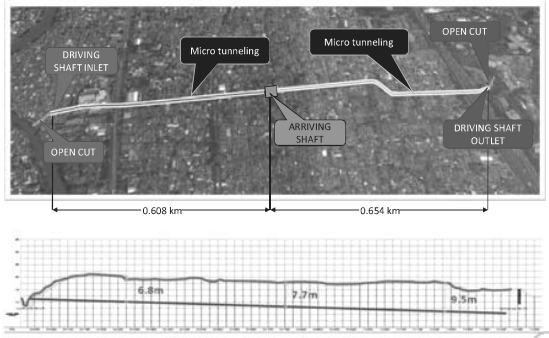
APPLY TO FLOOD MITIGATION PROJECT

- 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)

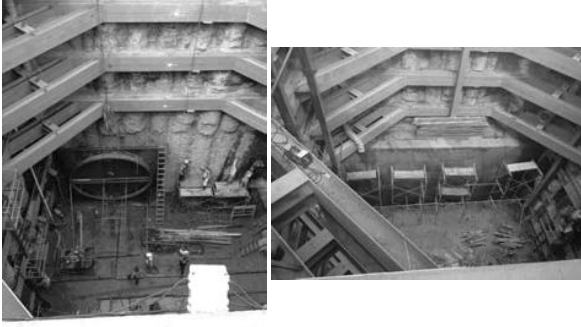
Sudetan Ciliwung – Kanal Banjir Timur



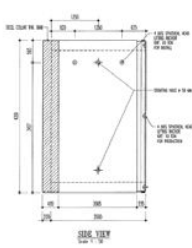
Sudetan Ciliwung – Kanal Banjir Timur



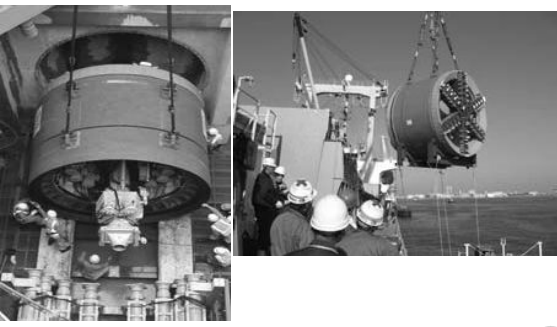
Structure Driving Shaft Outlet



Concrete Pipe



EPB Machine



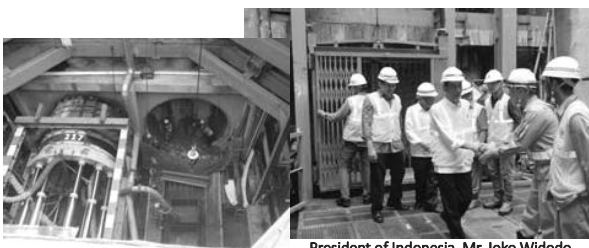
Site Situation



Curving line



Site Situation



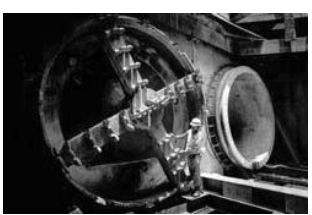
Construction situation line 1

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



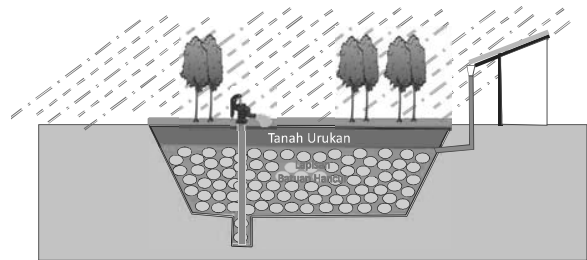
Tangki Reservoir Air Hujan Bawah Tanah [TAMETOTTO]



Daiken Co., Ltd.

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

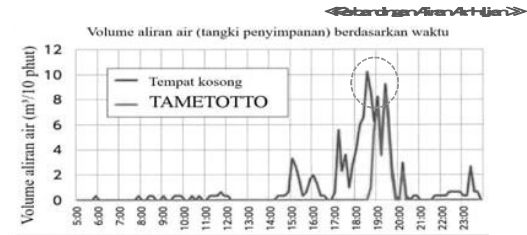
Dengan waktu konstruksi yang singkat, dapat menyimpan dan menggunakan air hujan jumlah besar dengan hanya sedikit perawatan, dengan kualitas yang sama seperti air minum.



Penjagaan Kualitas Air [TAMETOTTO]

Poin Pemeriksaan	Unit	Nilai Standar	28.10.2013	4.12.2013	17.2.2014	18.8.2014	28.10.2014	16.2.2015	4.8.2015
Suhu Air	°C	—	23.6	19.2	12.8	6.8	23.1	20.5	10.4
Jumlah Bakteri Umum (Jumlah bakteri dalam 1ml)	PCU/ml	< 10000	190	110	50	140	50	50	22
Bakteri E. Coli	—	Tidak terdeteksi	Tidak terdeteksi	Tidak terdeteksi	Tidak terdeteksi	Tidak terdeteksi	Tidak terdeteksi	Tidak terdeteksi	Tidak terdeteksi
Nitrogen Nitrat & Nitrogen Nitrit	mg/L	< 10	0.2	0.18	—	—	0.30	0.26	0.05
Ion Organik (jumlah Total Karbon Organik (TOC))	mg/L	< 3	0.4	0.2	—	—	0.2	0.2	0.4
Rasa	—	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Bau	—	Normal	Normal	Normal	Normal	Sedikit Berbau	Normal	Normal	Normal
Mutu Warna (Dengar Warna)	°	< 5	< 1	1.4	0.6	0.1	0.9	< 0.5	0.6
Kekeruhan	°	< 2	< 1	0.4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ion Klorida	mg/L	< 200	3.3	5.1	6.7	7.7	1.0	7.5	7.6
Nilai pH	—	6.8-8.6	6.6	7.9	7.9	7.8	8.0	7.9	7.9
Kalsium Magnesium dll (Hardness)	mg/L	< 300	< 50	156	80	87	97	89	78
Besi dan siswanya	mg/L	< 0.3	< 0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Mangan	mg/L	—	< 0.05	—	< 0.005	—	—	—	—
Rasid Pengapasan	mg/L	—	< 100	—	120	130	—	—	—
Silika	mg/L	—	< 15	—	3.6	3.0	—	—	—
Konsentrasi kalsium permanganat	mg/L	—	< 10	—	1.7	1.1	—	—	—
Pemeriksaan organik kimia (orde COD)	mg/L	—	< 2	—	0.7	0.8	—	—	—
Degradasi Total	mg/L	Normal	—	—	5.2	4.7	—	—	—
Konduktivitas Listrik	ms/cm	—	< 20	—	21	22	—	—	—
Si mg/L ppm	—	—	—	—	—	—	—	—	—

Hasil Pengurangan Bencana dari TAMETOTTO



Membandingkan TAMETOTTO (sekitar 1000) dengan daerah lain menggunakan total curah hujan 187mm/hari (Hujan densi 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 Geunilla yang semakin menjadi masalah sensus, 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 siram, 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 Phouxy Distrik Pu-von Pref. Attapeu (SD&MMP)	100 t	Air minum	Sekitar 200 pax
4	Mei 2017 • UN Habitat (Rencana Pemukiman)	"Proyek Konstruksi Fasilitas untuk Wanita" Rep. Dem. Rakyat LAOS	Distrik Samsai Pref. Attapeu (Publik Hall)	150 t	Air minum	Sekitar 200 pax
5	Januari 2018 • UN Habitat (Rencana Pemukiman)	Pilot Project untuk Workshop Pakar Teknik Lingkungan Vietnam	Kota Kanto (Sekolah Support Khusus)	100 t	Air siram tanaman dll	—



Alasan mengapa [TAMETOTTO] digunakan oleh UN-Habitat

- ① Biaya Konstruksi Murah (40.000¥/Kapasitas Penyimpanan Air 1t) → LAOS 15.000¥
- ② Konstruksi dalam waktu singkat (1 Bulan/Kapasitas Penyimpanan Air 100t) → LAOS 1 minggu
- ③ Tidak diperlukan skill konstruksi khusus, dapat menggunakan tenaga lokal
- ④ Material yang digunakan didapat dari lokal saja ⑤ Maintenance 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.

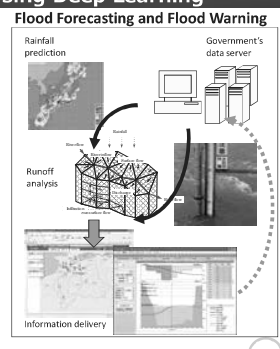
Development of the Real-Time River Stage Prediction Method Using Deep Learning

● Objective :

More accurate river-stage prediction

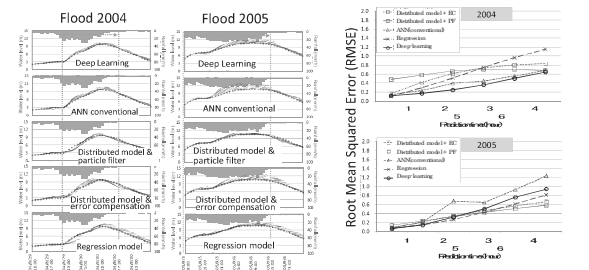
In Japan, Real-time prediction system is already in operation.
6 hour prediction is announced for every 10 minutes, every day.

- ① Rainfall prediction
 - ② Runoff analysis
 - ③ Assimilation/Collection
 - ④ Information Delivery
- Replace ② & ③ with deep learning



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 : Distributed > 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

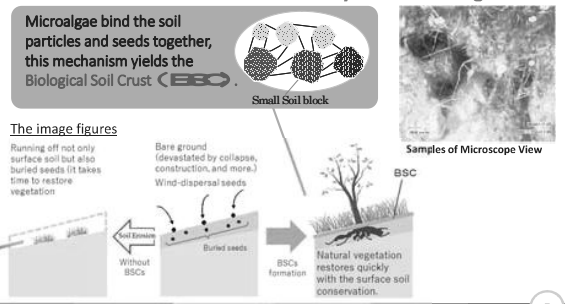


- It is widely known vegetation can suppress soil erosion.
- NK focused on Biological Soil Crust (BSC) which is natural phenomena which appear at the beginning of vegetation succession.
- BSC is a sheet of soil microorganism colonies formed by filamentous fungi, soil algae, lichens and mosses tangled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



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

● Example applied to a collapsed slope area

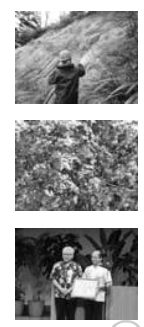


- This method can be utilized for prevent the spread of rill erosion
- And it can be utilized on steep slope and rock.
- There was a clear difference in the vegetation growing situation in the area sprayed with BSC and the area with natural condition.

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 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, Tohoku, 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, J. H.R. Rasuna Said, Kuningan, Jakarta

SLOPE PROTECTION LINE UP

Shallow Failure Rock Bolt
 Depth Collapse Condition
 Reinforcement of Building Foundation Mini Pile
 High and Long Coverage HSP (High Speed) Shotcrete
 Restoration of Mountain Road
 Ground Anchor
 Covering the Structure Geotiber
 Parent Pile Panel Wall
 The materials are recycled to be used as construction material.
 Trees material Sand

SLOPE PROTECTION EXPERIENCES IN INDONESIA



N-JET Method Ultrafine Cement + Double Packer Method JET Grouting Method Parfalt Grouting Method

Expacker - N Method Power Blender Method Cement Deep Mixing Method Ground Anchor "Ein Band Drill" Method



Terimakasih.

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ありがとうございました。

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

TAK ISHIKAWA
CHIEF REPRESENTATIVE, DIRECTOR
SOUTHEAST ASIA OFFICE
DECEMBER 06, 2018

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Flood Control Coastal Protection Geotech/Sediment Dam/Gate Observation/EWS Water Pollution

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

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EARTHQUAKE-RESISTANT STEEL STRUCTURE



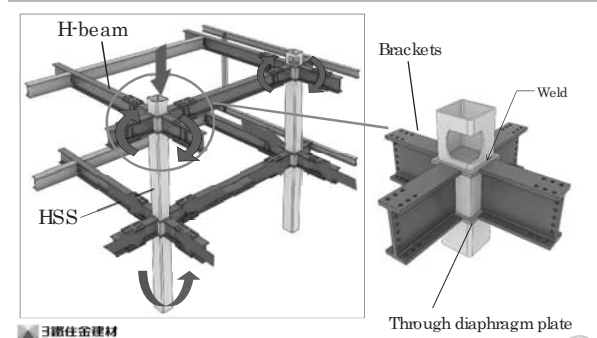
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STEEL STRUCTURE INTACT IN TSUNAMI DAMAGE



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TWO-WAY MOMENT FRAME CONNECTION



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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

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COMPARISON STEEL vs RC

Steel Structure

RC Structure

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

SHOPPING MALL

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CAR POOL

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TSUNAMI EVACUATION TOWER

Site:	Shizuoka
Height:	9.8m
Capacity:	200 persons

Site:	Osaka
Height:	10.5m
Capacity:	150 persons

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MULTIPURPOSE

Precondition
 • Estimated Tsunami Height: GL+3.0m

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

Evacuation Height : GL+11.0m
 Evacuation Height : GL+7.8m
 Tsunami Height : GL+3.0m
 GL(Ground Level)

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

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EVACUATION TOWER AS PUBLIC MARKET

BENEFIT

- Market can be kept open
- People get familiar and well
- Utilize the place and
- convenient in daily life
- Also acknowledge the
- distance and time required
- to reach the place
- Floor sizes can be
- decided depending on the
- population

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BANDA ACEH INDONESIA

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TYPES OF SEDIMENT DISASTER

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NONFRAME® Method

Slope Protection Co-exist with Environment

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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 CO2 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.

Construction image

2.0 m
Wire rope Base plate Steel bar
Best Applicable Slope angle 30 ~60°

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SLOPE STABILIZING IMAGE

Right after construction, NFM has not shown effect yet

When the slope is about to collapse either by heavy rain or earthquake, steel bars are bent slightly then resistance force arises

NSMP
Sliding force
Resistant force

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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

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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

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EARTHQUAKE RESISTANCE

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PROJECT EXAMPLE

Location: Shiga pref. Japan (national treasure temple)
Construction period: 2014
Slope gradient: 55°
Steel bar length: 3.0m
Soil property: sediment & bedrock

Project example for collapsed slope

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PROJECT EXAMPLE

"Coco mat" was used together to prevent erosion

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PROJECT EXAMPLE

1 year after construction, the site was perfectly covered with vegetation

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