

Green Hill by Waste and Mud

from the Environmentally Sustainable View Point as PPP Project
(Before and after High Wave Disaster)

Before Tsunami Disaster at Ishinomaki



After Tsunami Disaster at Ishinomaki



2015.03.19

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Executive Director of NPO SLIM Japan

Debris Treatment Process Comparison

between Conventional Method and Green Hill Method

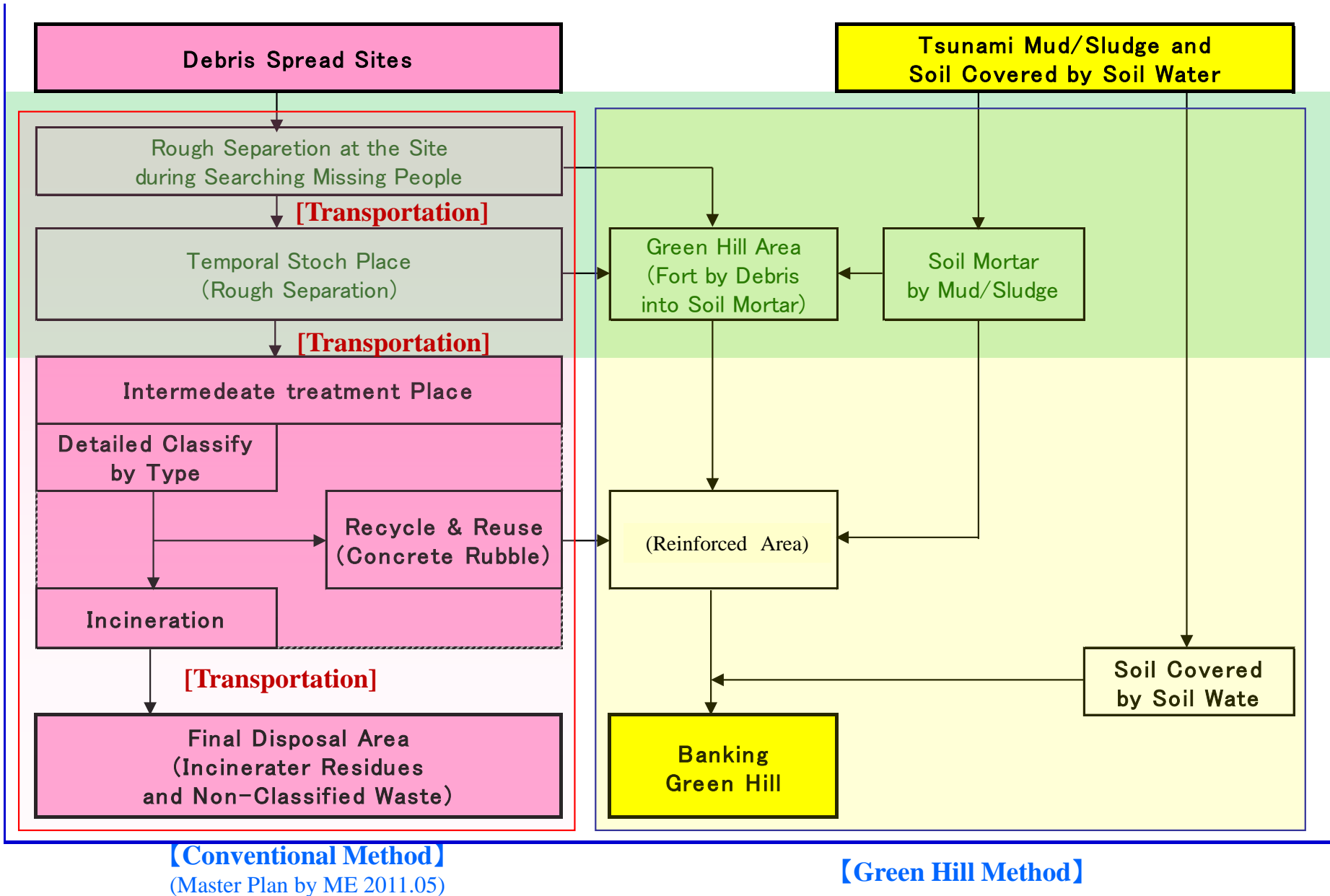
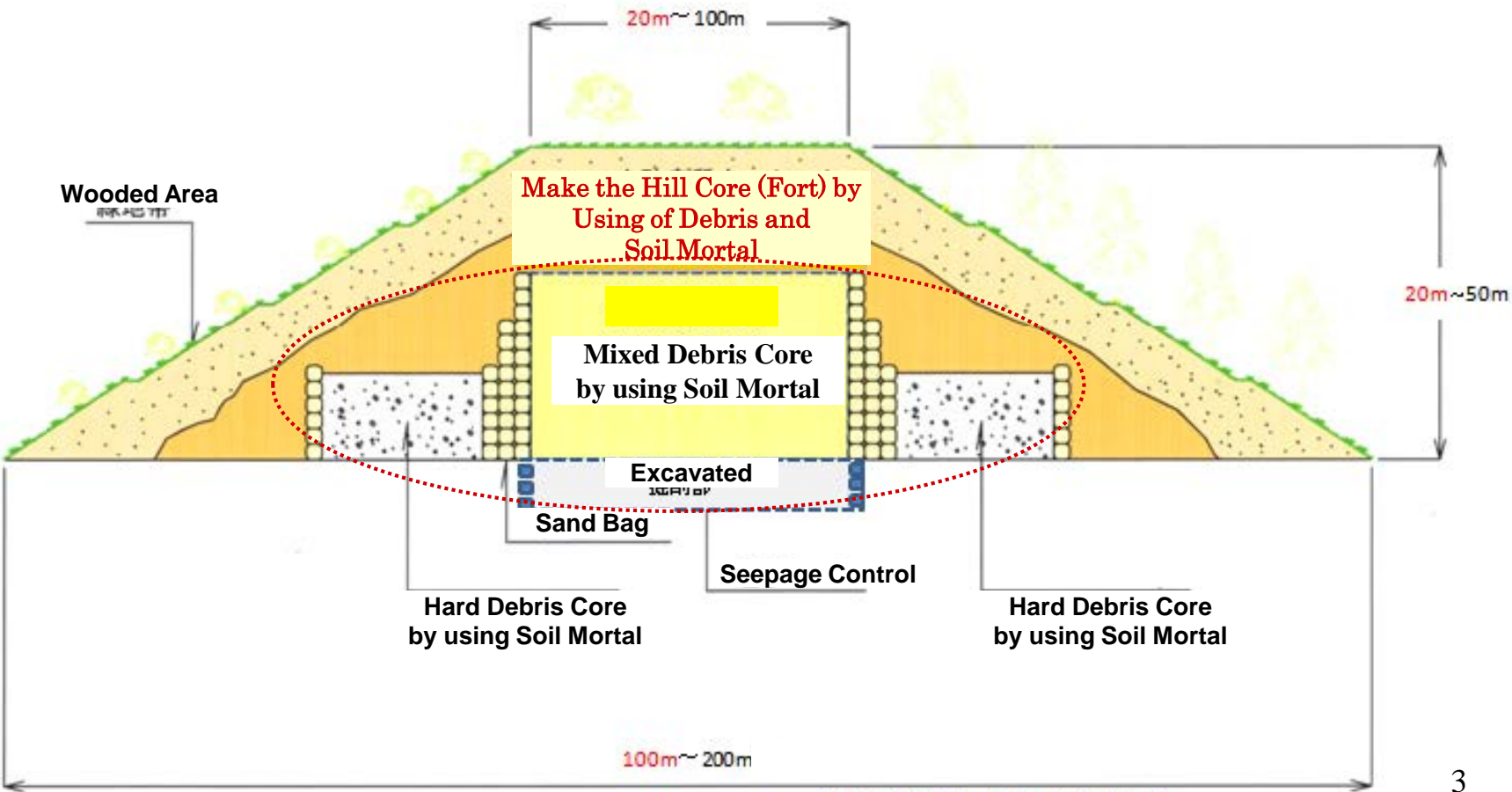


Image of Green Hill

By using Debris and Sludge



Morenuma Park in Sapporo, Hokkido

(2.7millm³ Waste Embakment)

Play Mountain



Mt. Moere



Intermediate treatment Place



Separation by Hand



Incinerator at the site



What are Advantages of Green Hill Concept

- (1) **Reduction of Traffic Hazard by ‘Local Reuse of Debris with less Separation and less Transportation’ under Extraordinary Situation.**
- (2) **The Simpler Works, the More Efficient Results from the View Point of Time, Cost, Energy and Environment.**
- (3) **Sustainability by Maintenance and Risk Management more than 30% of the Total Cost at least 30 years.**

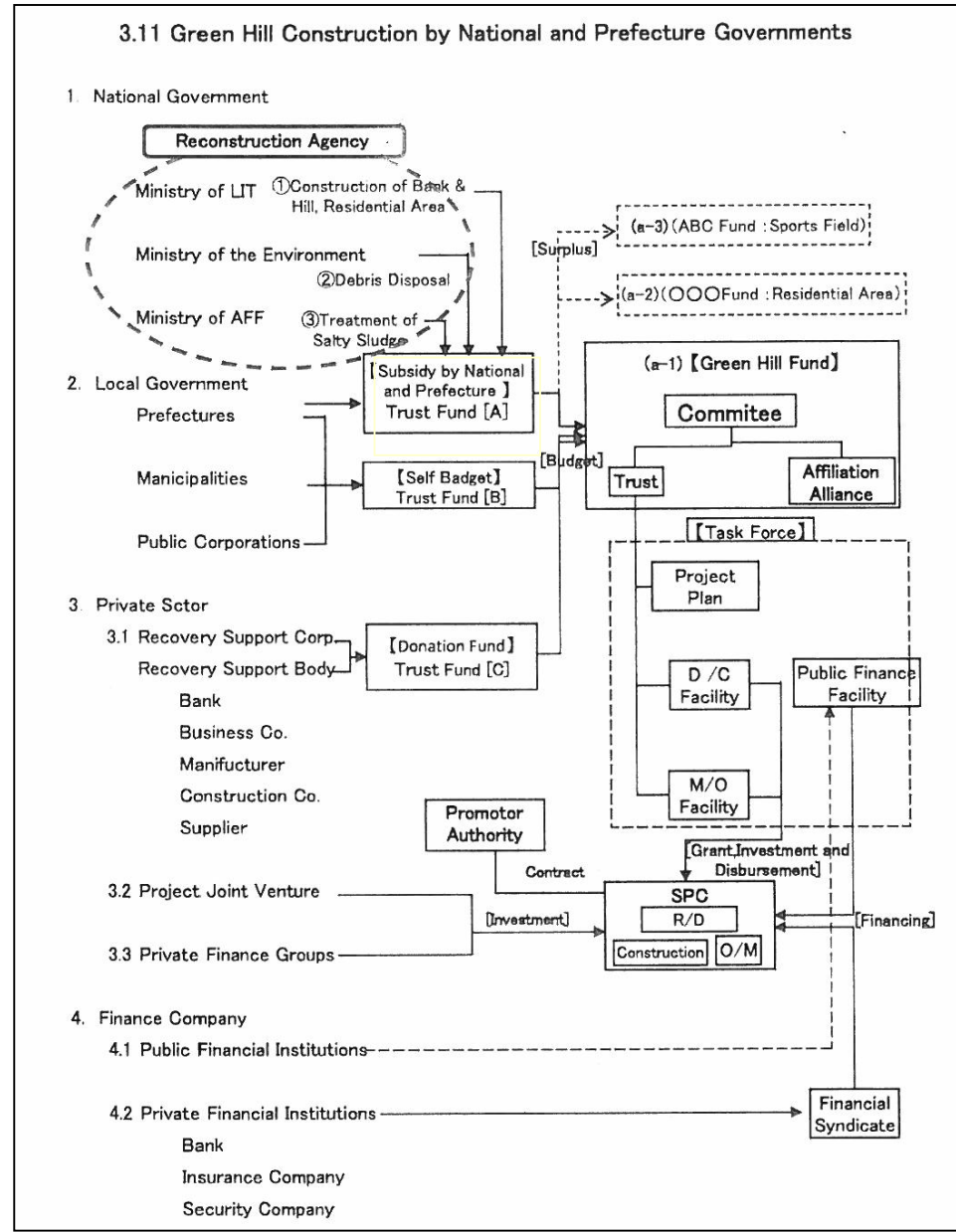
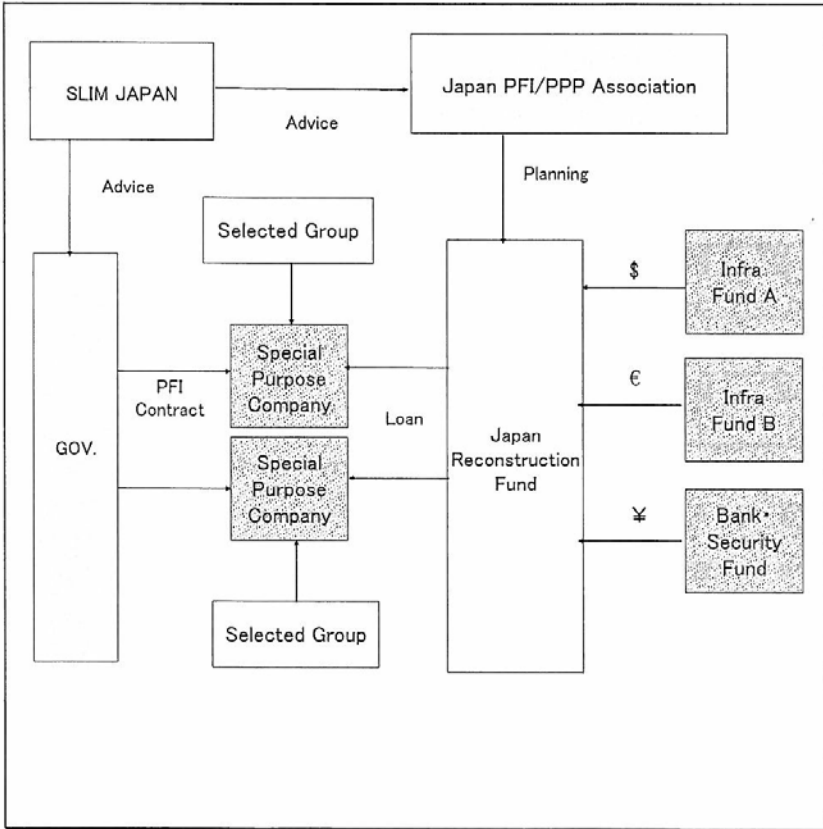
Breakdown of Debris and Mud Treatment (almost half cost compared with conventional method)

Cost Item	notes	Proportion
I Preliminary	Planning, Survey and Design	2.2%
II Direct Cost	Debris Treatment and banking	56.7%
1 Mixed Debris Core	Baried in tsunami mad soil morta l	29.3%
2 Hard Debris Core	Baried in tsunami mad soil morta l	7.8%
3 Banking, Drainage and greening	Including slaty soil by tsunami	6.5%
4 Temorary works, Site and overhead office enpense		13.1%
III Maintenance and Risk contingency allowance	30 eyars	31.6%
IV Land cost for banking area	Except public land such as roads	9.5%
Total		100.0%

Finance Scheme for Green Hill Concept

2011.10

2011.04



Country with Low Sea Level and Flat Land Maximum Altitude : 15 m



Samoa Earthquake

2009/9/29

MG 8.1, $H_{\max} = 4.5\text{m}\sim 6\text{m}$

Death toll : more then 189



Although Tongan People are afraid of Tsunami Disaster, only the thing they can do is to evacuate to relatively higher place far from their residential area.

KOLONGA-AFA-NIUTOUA TSUNAMI EVACUATION MAP



KALASI KEHEKEHE 'E TOLU 'OE PEAU KULA:

1. PEAU KULA FAKA-LOTO FONUA PE LOCAL TSUNAMI: LAU MINITI PE, A'U MAI E 'ULUAKI PEAU
2. PEAU KULA FAKAFEITU'U PE REGIONAL TSUNAMI: HOUA 1-3, A'U MAI 'AE ULUAKI PEAU
3. PEAU KULA FAKA-MAMANI LAHI PE DISTANT TSUNAMI: HOUA 3 PE LAHI HAKE, A'U MAI ULUAKI PEAU

MOE FEITU'U NI 'OKU TU'U LAHA HOOPUA SI HE POU KULA

- KO HO'O FAKATOKANGA'I PE NGAHI FAKA'ILONGA FAKA-NATULA 'I LAU, MOE HE HAVA TAHA SI HE HUFANGA 'ANGA, 'OUA TEKE TOE TALI SI HA FAKA-TOKANGA
- KA TUAI HO'O MOE, KAHA HE FALE MIFONGUA OFI TAHA KI HE FONGA VAKA TAIPOTU
- NOFO MA'U SI LAE 'OUA KUO 'ORTU E TALA KUO MALU KEKE FORI



NGAAHI FAKA'ILONGA FAKA-NATULA 'OE PEAU KULA

NATURAL SIGNS OF TSUNAMI

AAKE FAKAFOKIFA TAHI

MAHA FAKAFOKIFA TAHI ASI FEO MOE KA



BIG NOISE
LONGOA'A LAHI MAKEHE TAHI

BIG SHAKE



ME'A KE FAI KE HAOFAKI AI HO'O MO'UI:

- 'ILO'I E NGAHI FEITUU HUFANGA MOE HALA OFI TAHA KIAI
- MANATU'I E NGAHI FAKA'ILONGA FAKA-NATULA 'OE PEAU KULA
- FA'U HA PALANI FAKAFAMILI PE FAKA-KOLO
- FAKA-FANONGO MA'U PE KI HE FALE'I MOE FAKA-TOKANGA MEI HE MA'U MAFAI

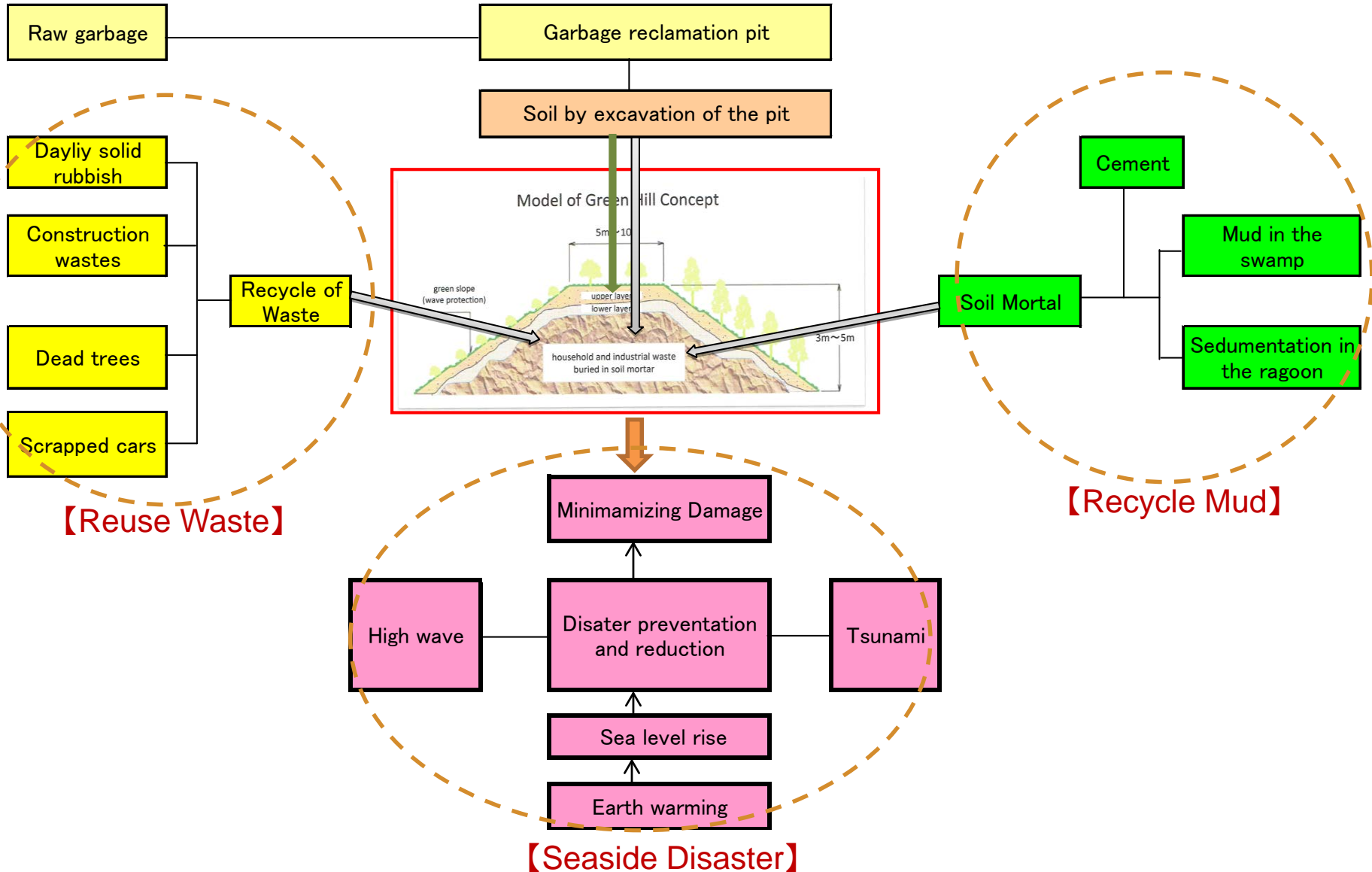
For further enquiries, contact NEMO at Ph# 676 26 340



Tsunami Evacuation Zone

Evacuation Centre
Evacuation Route

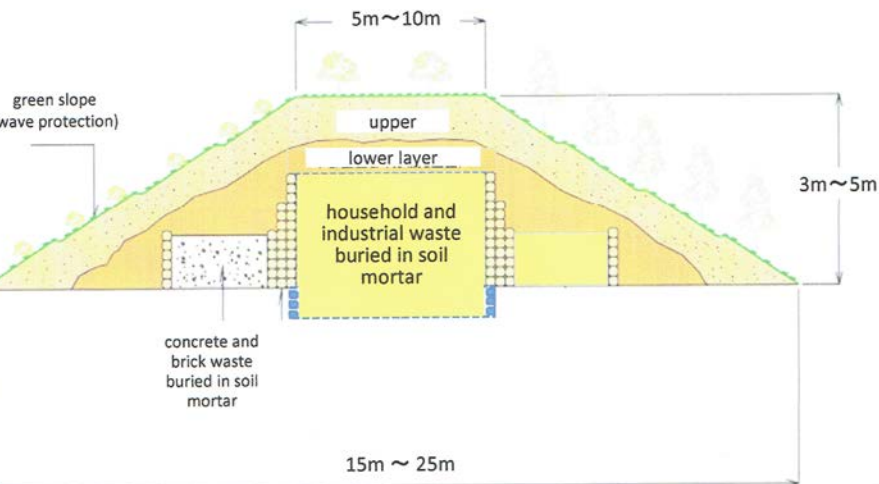
Green Hill by Waste and Mud (WMGL)



Typical Seaside of South Pacific Island



Design Outline of Green Hill Concept



Mud in Swamp



Waste



Scraped Car



Dead Tree



Daily Waste Landfill Place

2012. 07. 06



Two and
half years

2014. 12. 11



THREE PHASE OF EXECUTION SCHEDULE OF CAPACITY BUILDING PROJECT (For three years)

SLIM Proposal to ERCA (Environmental Restoration and Conservative Agency)

- (1) Consensus Formation with Related Authorities and Community Leaders and Confirmation of Feasibility by Basic Study
- (2) Confirmation of Various Engineering Factors Required for Project Realization and Effectiveness of Soil Mortar by Using Locally Available Sludge
- (3) Pilot Levee Construction as Starting Point for Mid to Long Term Project Realization

Green Hill by Waste and Mud from the view point of PPP

GREEN HILL CAPACITY BUILDING WORKSHOP, Environment Conference Room, 9TH 2014.

This program is not to provide "Green Hill" as infrastructure facilities but to provide assistance of the process of mid-to long term policy development undertaken by the Government in collaboration with the local communities

DIB to be considered as an alternative financial facility.

*CEO for Lands and Natural Resources
Ministry of Lands and Natural Resources*



POTENTIAL DEVELOPMENT IMPACT BOND STRUCTURE

