

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

Masaki Arioka

Executive Director of NPO SLIM Japan

Debris Treatment Process Comparison

between Conventional Method and Green Hill Method

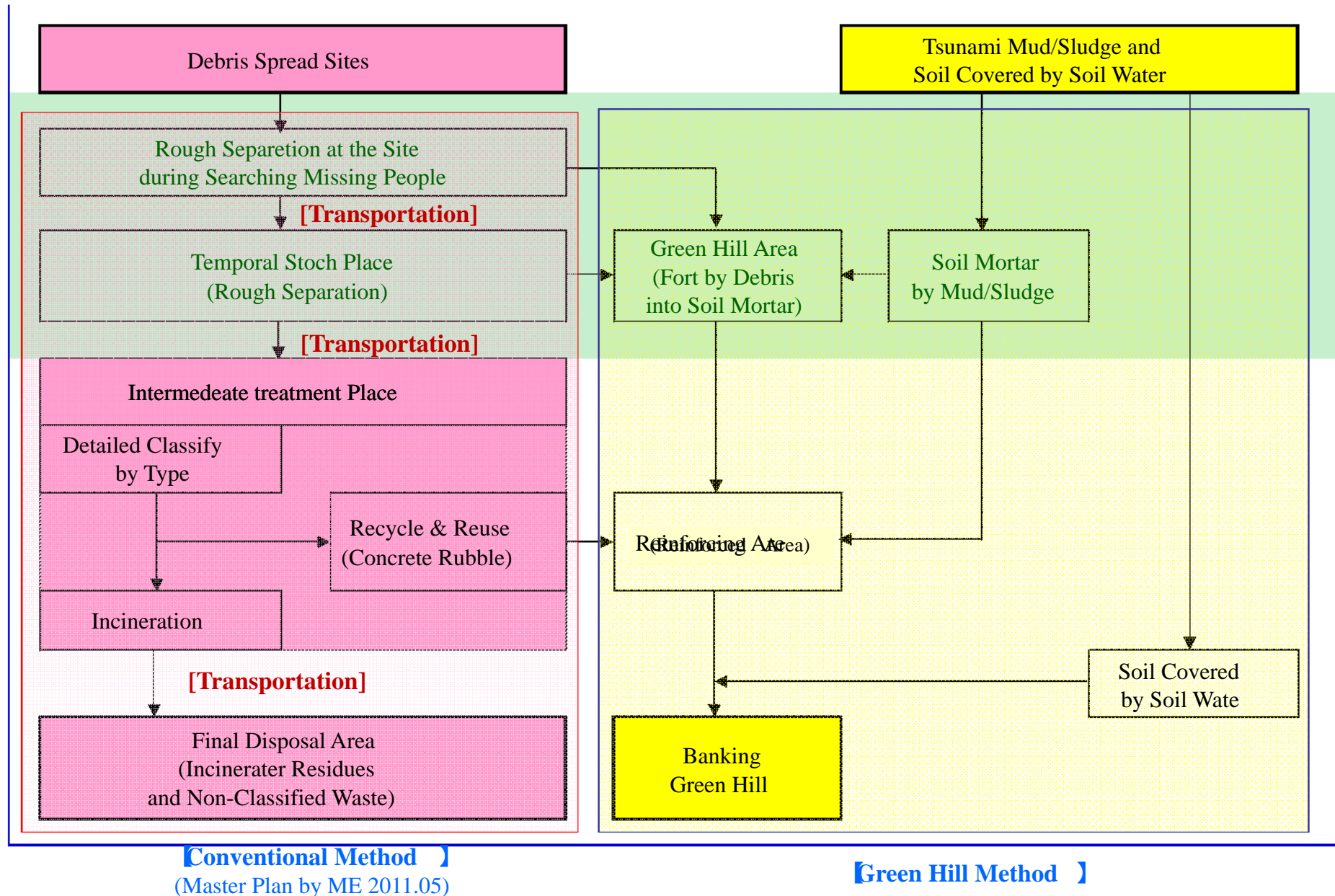
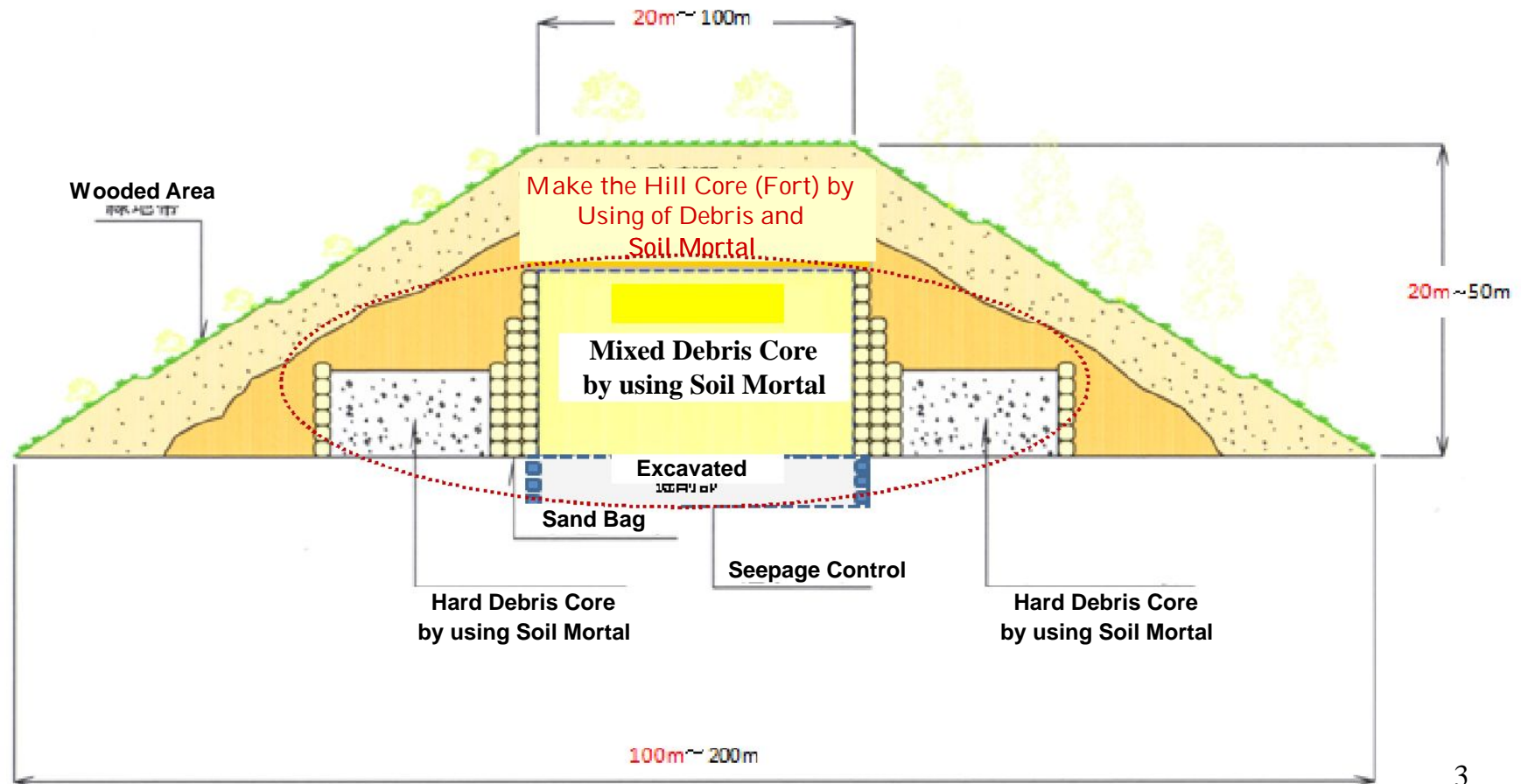


Image of Green Hill

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.**

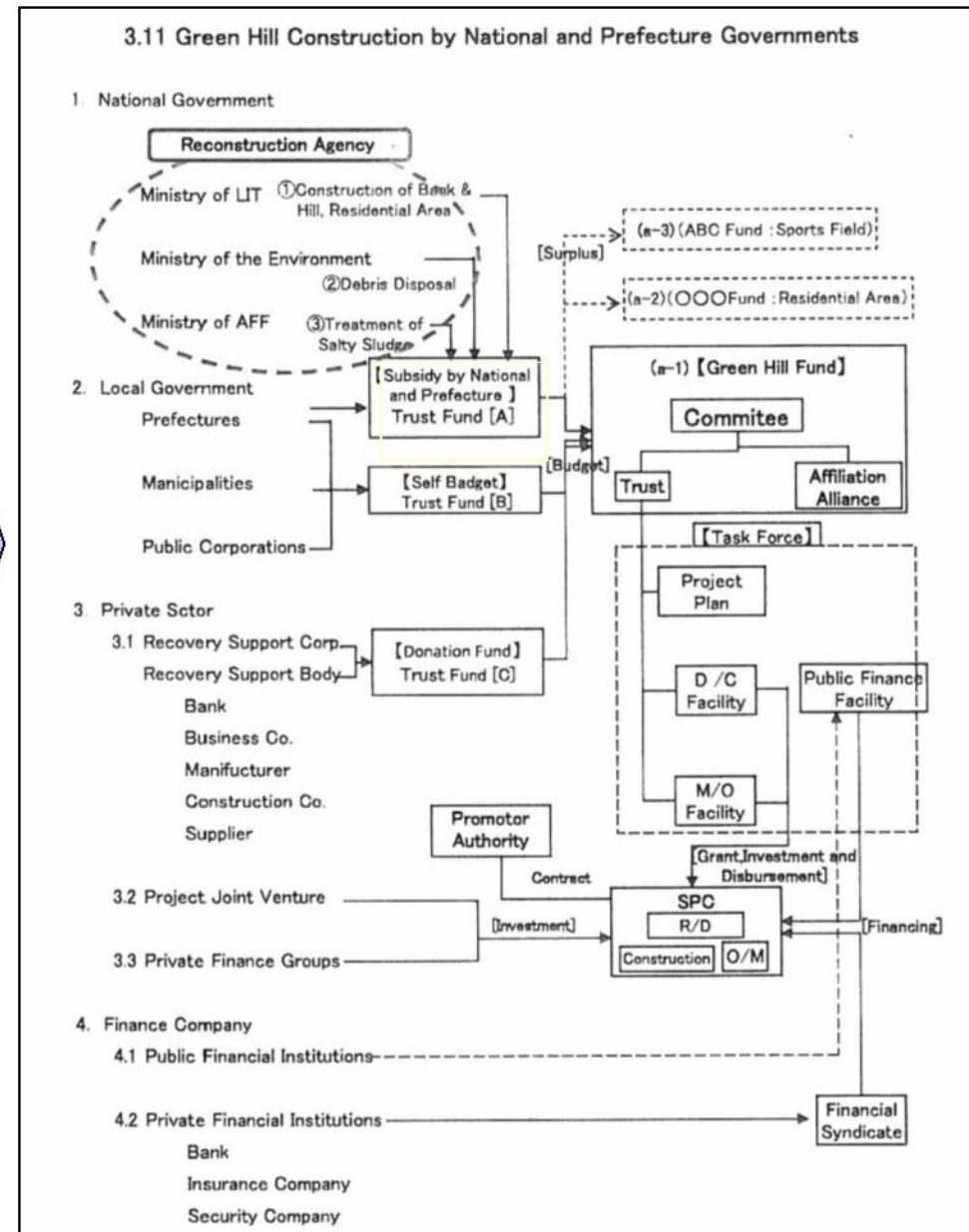
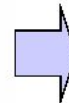
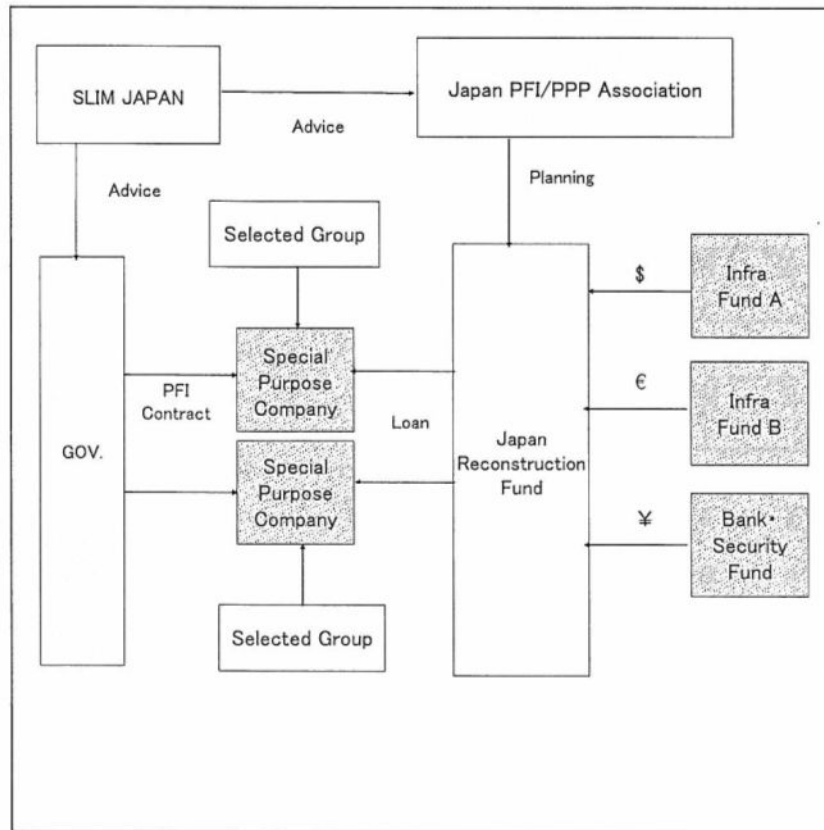
Breakdown of Debris and Mud Treatment (almost half cost compared with conventional method)

| Cost Item | notes | Proportion |
|--|------------------------------------|------------|
| Preliminary | Planning, Survey and Design | 2.2% |
| 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% |
| Maintenance and Risk contingency allowance | 30 eyars | 31.6% |
| 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, $H_{\max} = 4.5\text{m} \sim 6\text{m}$

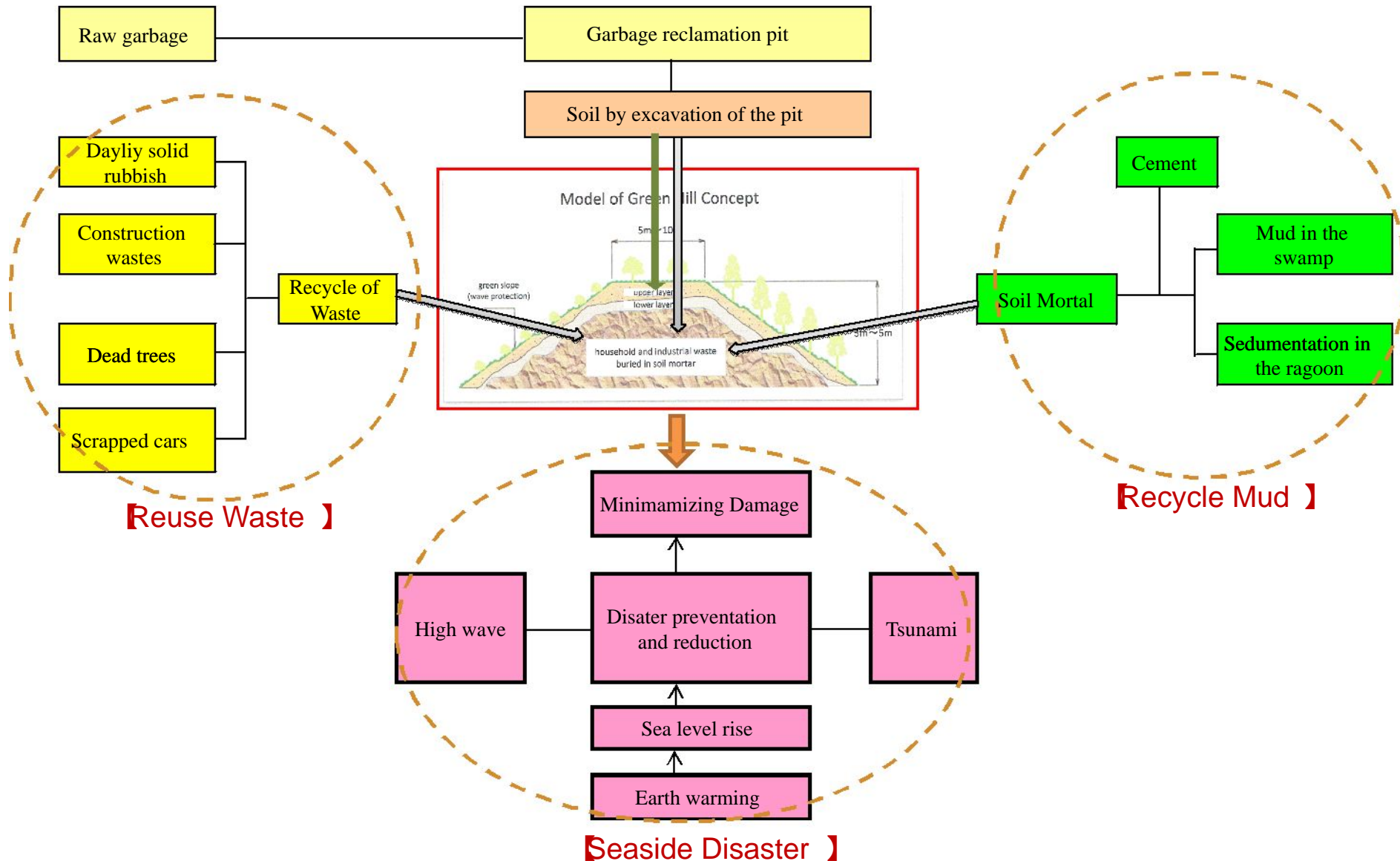
Death toll : more then 189



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.



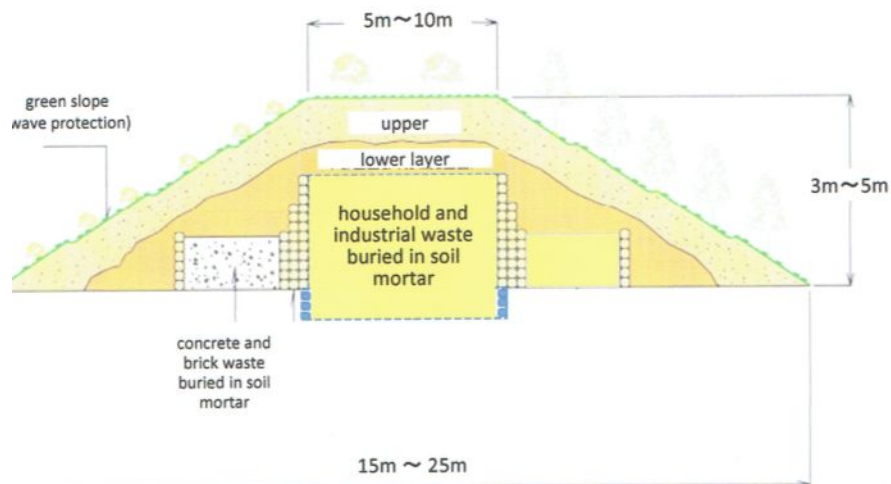
Green Hill by Waste and Mud (WMGL)



Typical Seaside of South Pacific Island



Design Outline of Green Hill Concept



Mud in Swamp



Waste

SLIM
J A P A N



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

