

S2-8 : PRESENTATION MATERIALS AT SEMINER IN MALÉ

The Study on Tsunami Recovery, Rehabilitation and Development of Islands in Maldives

January 22nd, 2006

Japan International Cooperation Agency (JICA)
Yachiyo Engineering Company, Ltd.
NIPPON KOEI COMPANY, LTD.

Location Map of Maldives



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Current Situation in Male'
(Sea walls contributed to
protect Male' from
Tsunami.)



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TOR for the Survey

- ◆ Confirmation of the reconstruction policy (Short and Medium-term) from tsunami damage
- ◆ Plan and Design for Emergency Recovery Project
- ◆ Project Formulation Support for Medium-term reconstruction project
- ◆ Implementation of Demonstration Project (Community Based Living Environment Recovery and Disaster Risk Management Project)

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Counterpart Organization

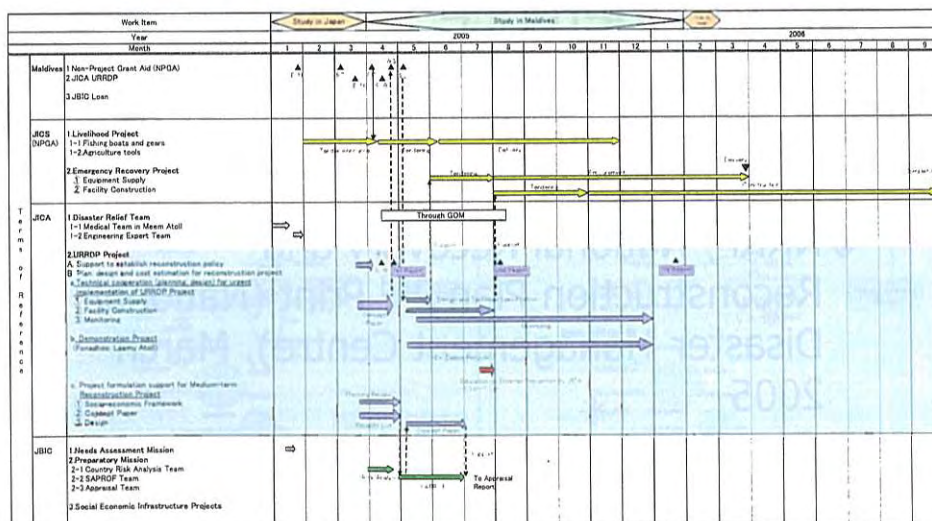
- ◆ Dept. of External Resources (DER), Ministry of Foreign Affairs
- ◆ Ministry of Planning and National Development
- ◆ Ministry of Finance and Treasury
- ◆ National Disaster Management Centre
- ◆ Ministry of Atolls Development
- ◆ Ministry of Transport and Communication
- ◆ Ministry of Environment, Energy and Water
- ◆ Other concerned Ministries

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Outline of Survey Schedule



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Cooperation Scheme Matrix

Proposed Project List- Short and Medium Term (As of 4th May, 2005)

Atoll	No.	Island	JICS (Non-Project Type Grant Aid)						JICA Study Team	JBIC (Yen Loan)				
			Short-Term Recovery Project							Demo Project	Mid-Term Infrastructure Project			
			1	2	3	4	5	6			Coastal facilities *1)	Sewerage system	Water supply system	Emergency Communication System
Alif Alif	AA-1	Mathiveri												
Vaavu	V-1	Feldhoo												
Thaa	Th-1	Dhiyamgilli								●				
	Th-2	Gurakhoo								●				
	Th-3	Thimrafushi								●				
	Th-4	Veymandhoo								●				
	Th-5	Kinbikhoo								●				
	Th-6	Hirilandhoo								●				
Laamu	L-1	Isdhoo				▲				●	n/a	n/a	●	
	L-2	Maabaidhoo				▲				●			●	
	L-3	Gan	●			●	▲			●		n/a	●	
	L-4	Fonadhoo		●	▲		▲	●	●	●	n/a	n/a	●	
	L-5	Maavah				▲				●			●	

Notes:
 *1) consisting Island harbour/jetty and coastal protection
 ●: Main Study Component on S/W, ▲: Study Component found after S/W

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Policy Coherence

- ◆ Tsunami: Impacts and Recovery (WB, ADB, UN) , Feb. 2005
- ◆ NRRP; National Recovery and Reconstruction Plan 2nd Print (National Disaster Management Centre), March 2005

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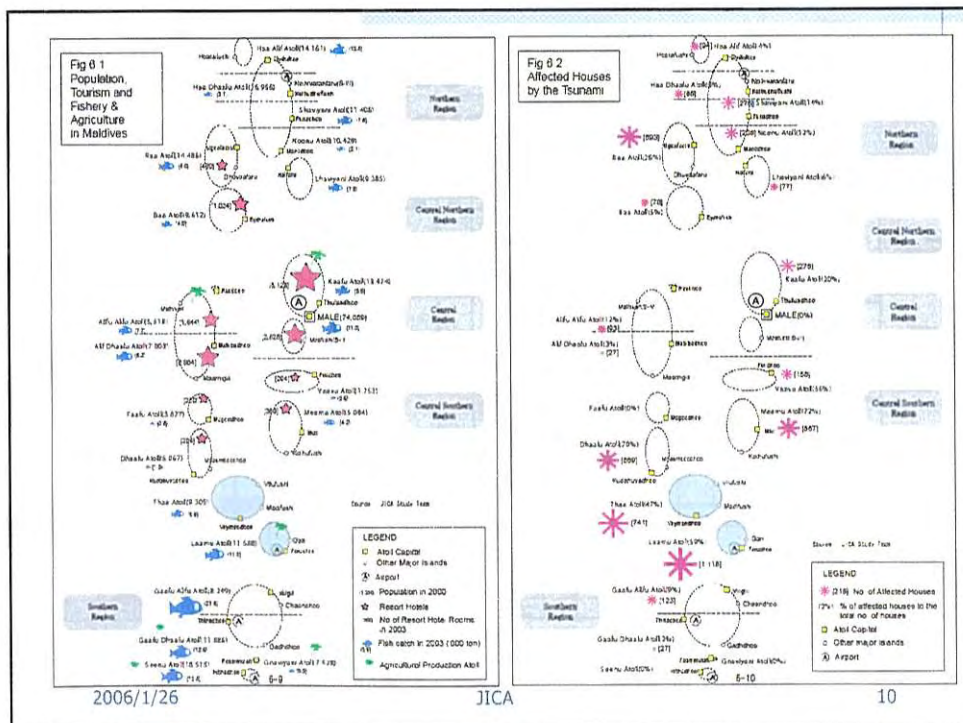
Major Sectors for Assistance (Non-Project Type Grant Aid)

- ◆ Concentrated in Laamu Atoll (Isdhoo/Isdhoo-Kalaidhoo, Maabaidhoo, Gan, Fonadhoo, Maavah)
- ◆ Cooperation for Infrastructure Reconstruction
- ◆ Cooperation for Government Facility Reconstruction
- ◆ Cooperation for Community Based Reconstruction

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Contents and Progress for Emergency Recovery Projects

◆ Infrastructure Reconstruction Project (Laamu Atoll)

✓ Rehabilitation of Power Distribution System

Contract awarded on 10th August, 2005/ Equipment manufacturing stage now/ Completion expected by March, 2006

★ Ground-breaking ceremony: 12th September, 2005

✓ Recovery and Development of Causeway

Contract awarded on 21st November, 2005/ Site preparation stage now/ Completion expected by September, 2006

✓ Construction of Multi-Purpose Building/Island Office with Solar Power System

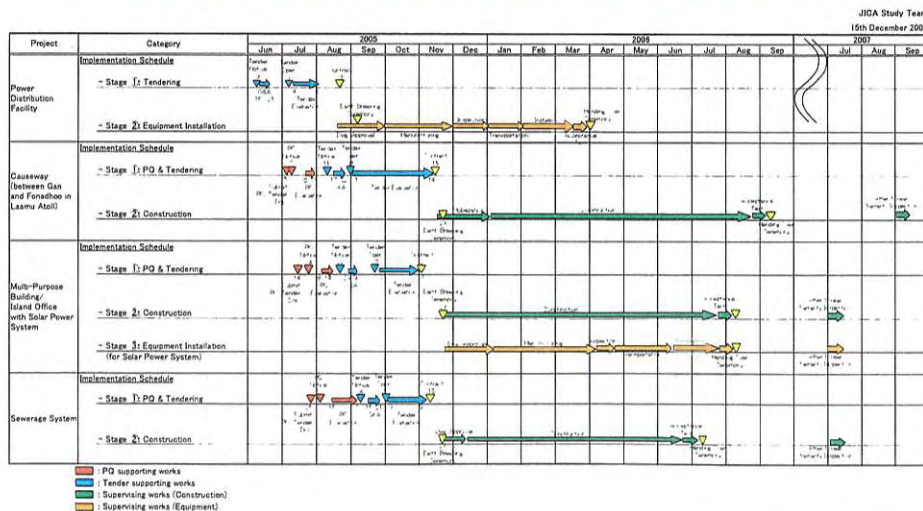
Contract awarded on 2nd November, 2005/ Site preparation stage now/ Completion expected by July, 2006

✓ Upgrading of Sewerage System

Contract awarded on 9th November, 2005/ Site preparation stage now/ Completion expected by July, 2006

★ Ground-breaking ceremony: 23rd November, 2005 (For the above three Projects)

Implementation Schedules for Emergency Recovery Projects



◆ Demonstration Project (Community Based Living Environment Recovery and Disaster Risk Management Project)

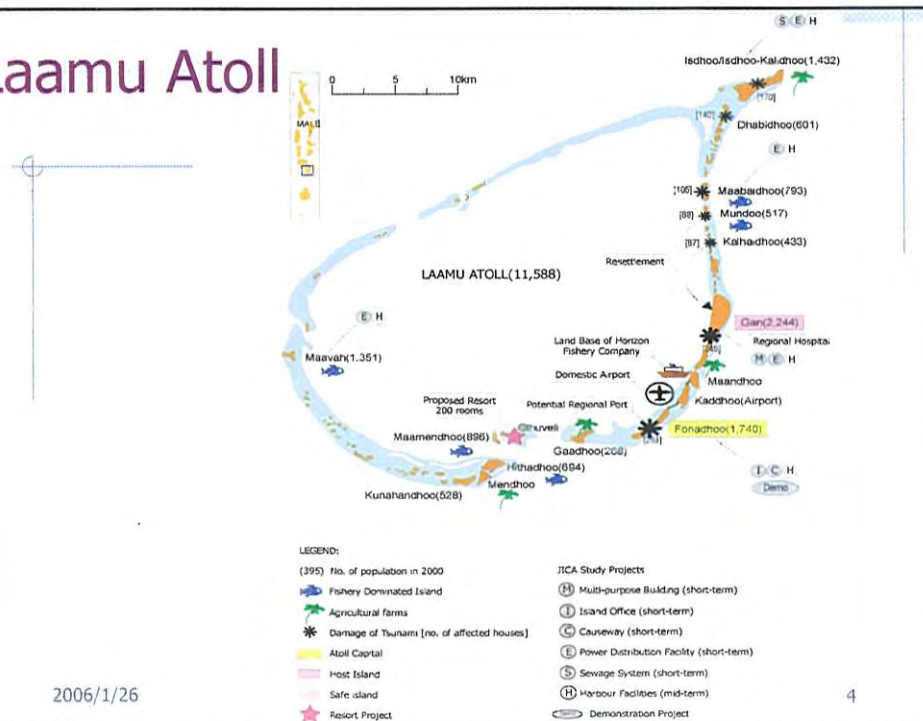
- ✓ **Recycling of Construction Materials**
- ✓ **Cooperation to Recover Living Environment**
- ✓ **Construction of Tsunami Monument and Evacuation Platform**
- ✓ **Education of Disaster Prevention**

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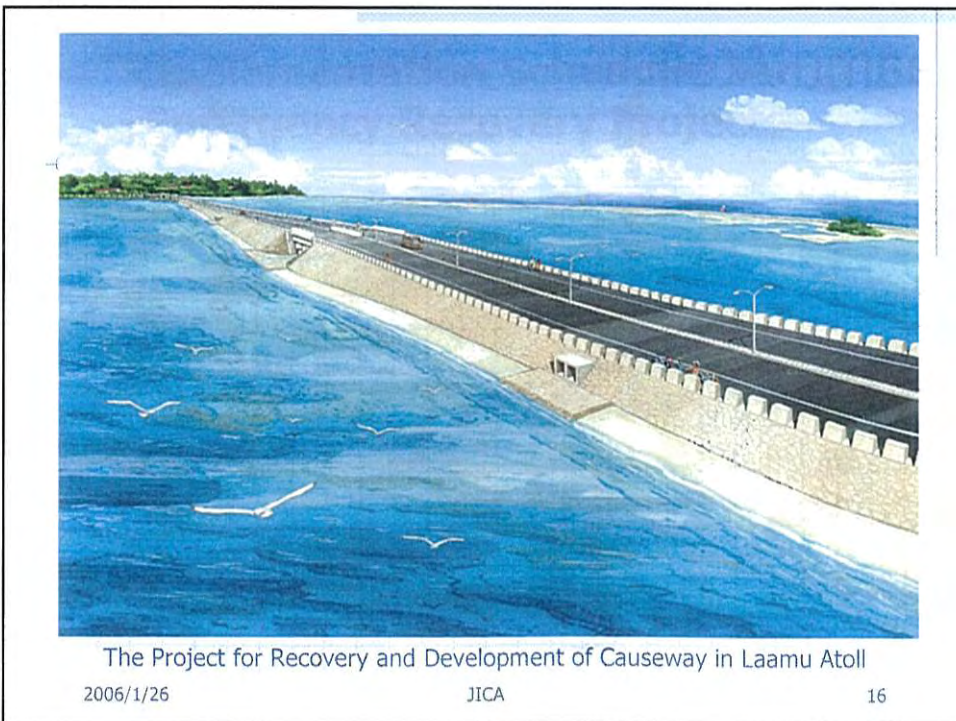
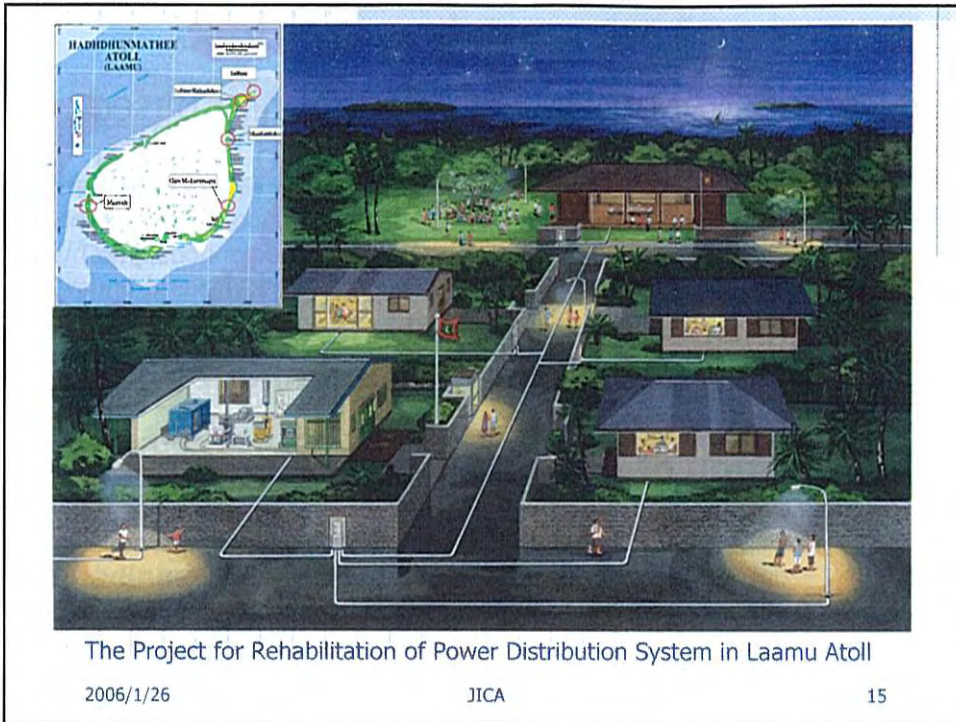
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Laamu Atoll

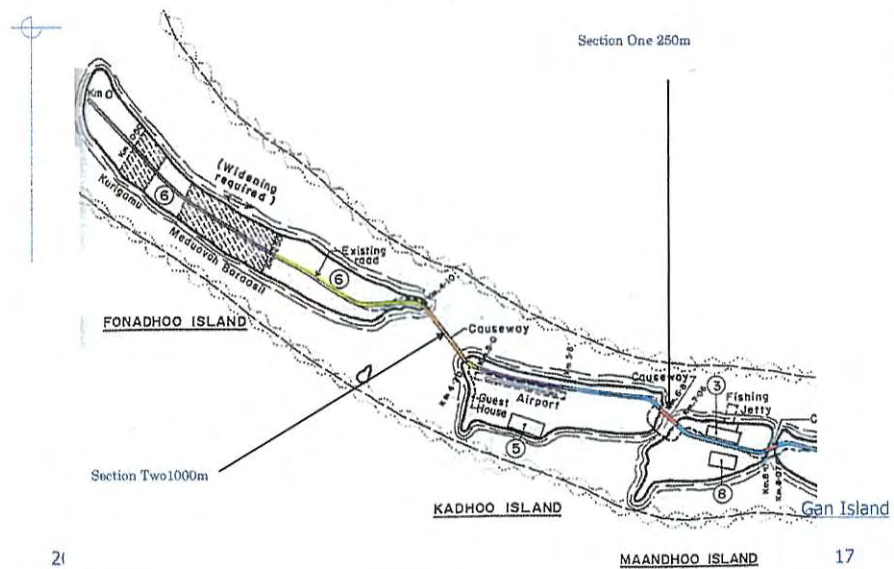


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Design of Causeway (2 causeways)



The Project for Multi-Purpose Building and Island Office with Solar Power System in Laamu Atoll

Multi Step Soil Treatment System

1st Step

2nd Step

3rd Step

4th Step

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The Project for Upgrading of Sewerage System in Laamu Atoll

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Ground-Breaking Ceremony (Causeway, Multi Purpose Building, Sewerage)
[On 23rd November, 2005]

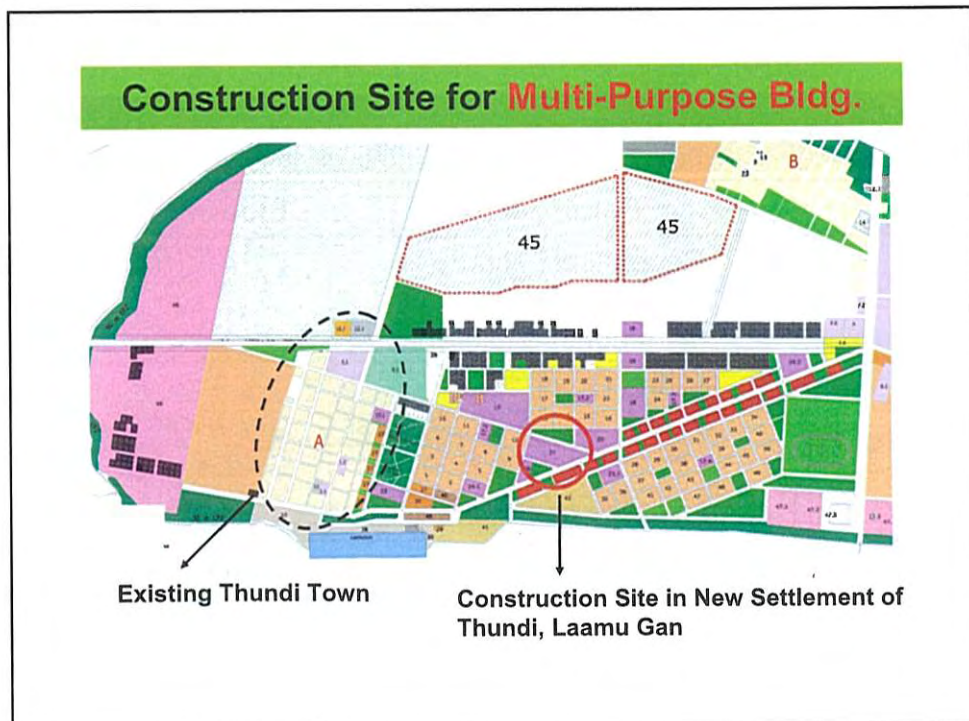
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Building Design Policies

Multi-Purpose Building *and* Island Office



Construction Site for Island Office



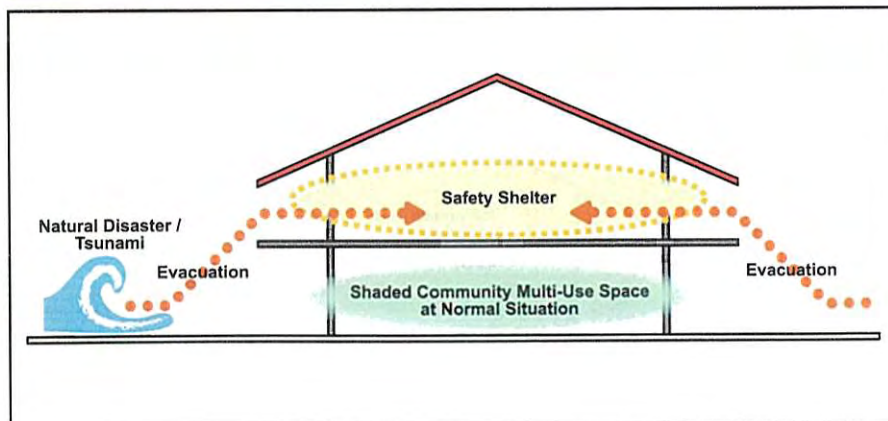
Room Requirement of Multi-Purpose Bldg.

	Required Room	Floor Area
Ground FL	Reception/Security, Utilities, Toilets, Community Multi Space	714 sqm
1st FL	Island Office, Island Court, Police Office, Post Office, Banking Booth, Community Facility, etc.	770 sqm
Total		1,484 sqm

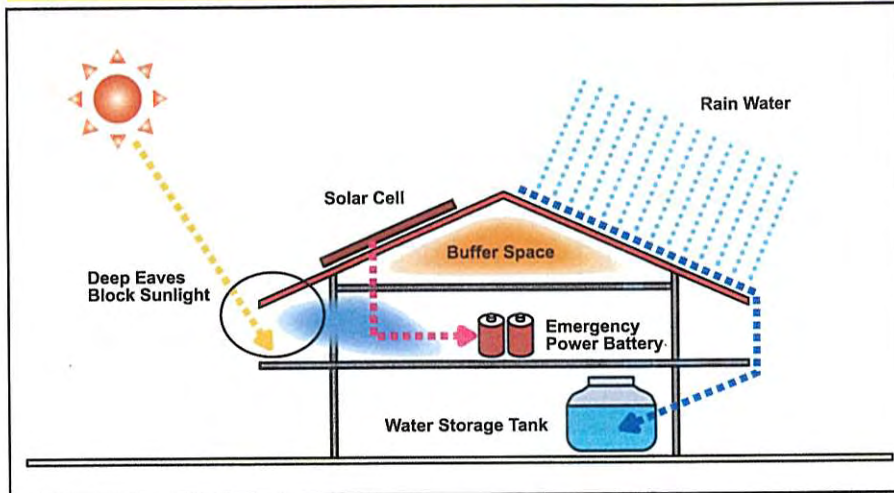
Room Requirement of Island Office

	Required Room	Floor Area
Ground FL	Utilities, Toilets, Community Multi Space	254 sqm
1st FL	Island Office, Guest Room, Island Committee's Room, Evacuation Terrace, etc.	358 sqm
Total		612 sqm

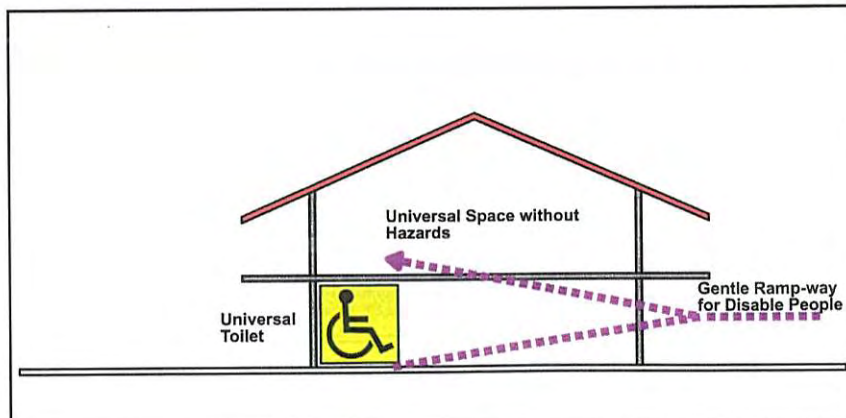
Policy 1: Disaster Shelter Function



Policy 2: Environmentally Suitable Building Shape and Composition



Policy 3: Consideration of Universal Space



Construction Cost

- Contract price for Multi-Purpose Bldg. and Island Office including Solar Power System

354.8 Million JPYen

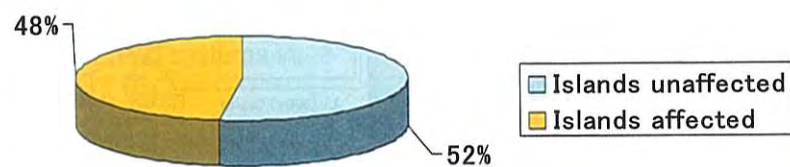
Implementation Schedule

1. P/Q : 24 July 2005
2. Tender Open : 20 September 2005
3. Award & Contract : 2 November 2005
4. Construction Period : November 2005 to July 2006

Solar Power System for Multi-Purpose Building and Island Office in Laamu Atoll



Power System Affected by Tsunami (inhabited islands only)



Tsunami totally disrupted the power supply in at least 95 islands out of 199 inhabited islands.

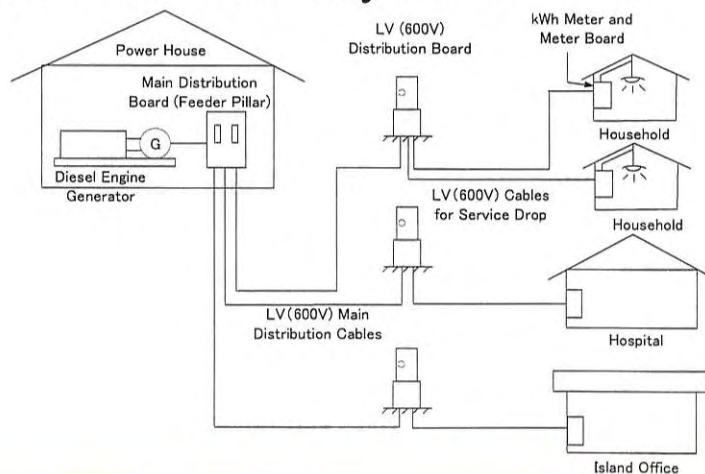
In almost all affected islands, the damage occurred to the distribution network, i.e. underground cables, distribution boxes, and household connections.

Damaged Power Distribution Systems by Tsunami



The strong wave scoured the ground (sand), pulled out cables and tore them. Lost or damaged distribution boxes were replaced by just buckets or pet bottles.

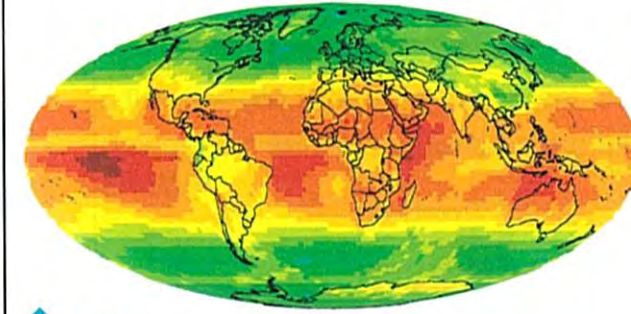
Power Distribution Systems in local islands



Power Distribution Systems are very vulnerable to line faults due to their configuration (No back-up circuits) .
→ Back-up power supply is required for important public facilities, such as Island Offices.

Opportunities for Renewable Energy Application

Estimated Global Horizontal Solar Radiation
1985 to 1988 Annual Average

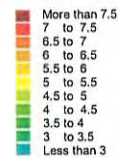


Stable solar radiation (6~6.5 kWh/m²/day) can be expected in Maldives.

(Other issues)

1. Impact of Global Warming
2. Insufficient supply of electricity
3. Increasing use of fossil fuels
4. High energy cost

kWh/m²/day



Data source: World Climate Research Program data available from the NASA Langley DAAC
NREL contact: Dave Reine (303) 275-4648
Date: December 14, 1994

Preliminary satellite-derived estimates based on the method of Dr. Rachel Parker, University of Maryland

Application of Solar Power Technology

Limited applications for solar photovoltaic (PV) systems in;

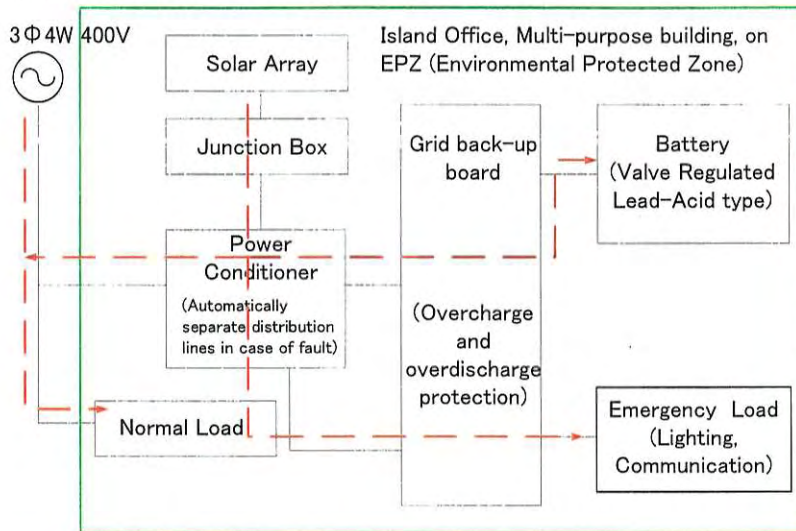
- 1) Navigation lights
- 2) Telecommunication systems in outer islands
- 3) Solar-Diesel Pilot Project (SMILES Project) by Ministry of Environment, Energy and Water (MEEW) funded by UNDP/GEF



However, feasibility study for Solar Home Systems (SHS), Solar Street Light, Solar Lanterns and Public Facilities are yet to be commenced.

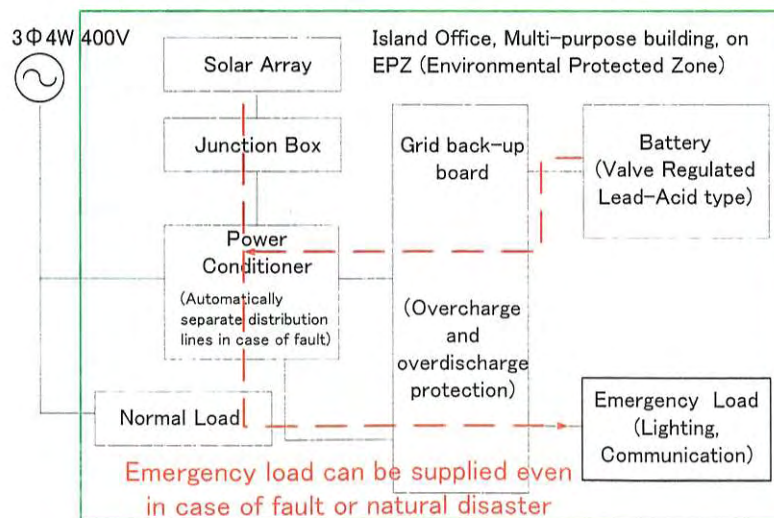
The Concept of Disaster-Proof Power Supply System

(1) Normal Operating Condition (Daytime)



The Concept of Disaster-Proof Power Supply System

(2) Emergency Operating Condition



Technical Transfer

Daily and Periodical Maintenance of Solar Array, Battery, Power Conditioner is a key to success.



- Technicians in Island Development Committee (IDC)
- Engineers in Ministry of Environment, Energy and Water (MEEW)



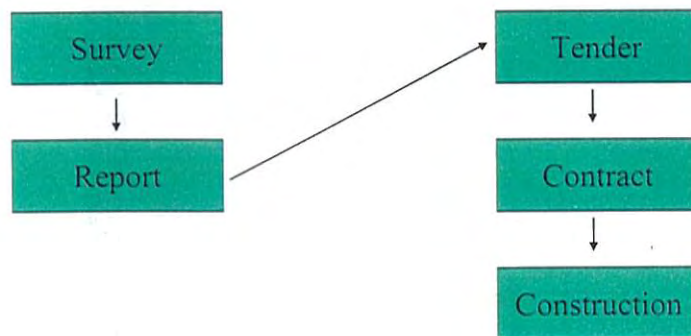
Sustainable operation of Solar Power System can be achieved, not only for this Project, but also other solar PV Project.

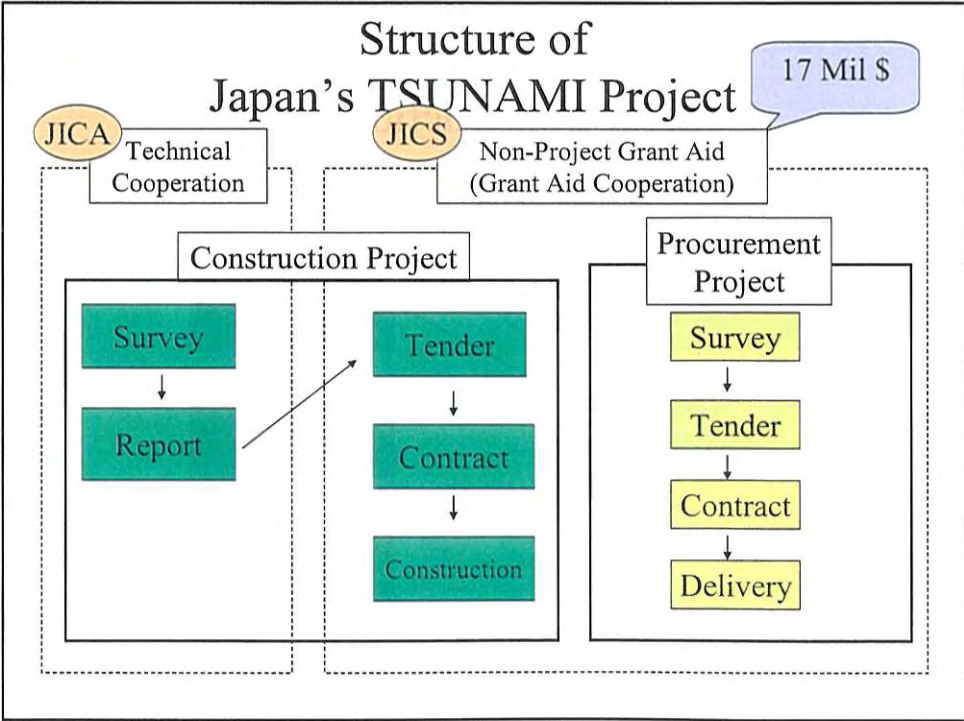
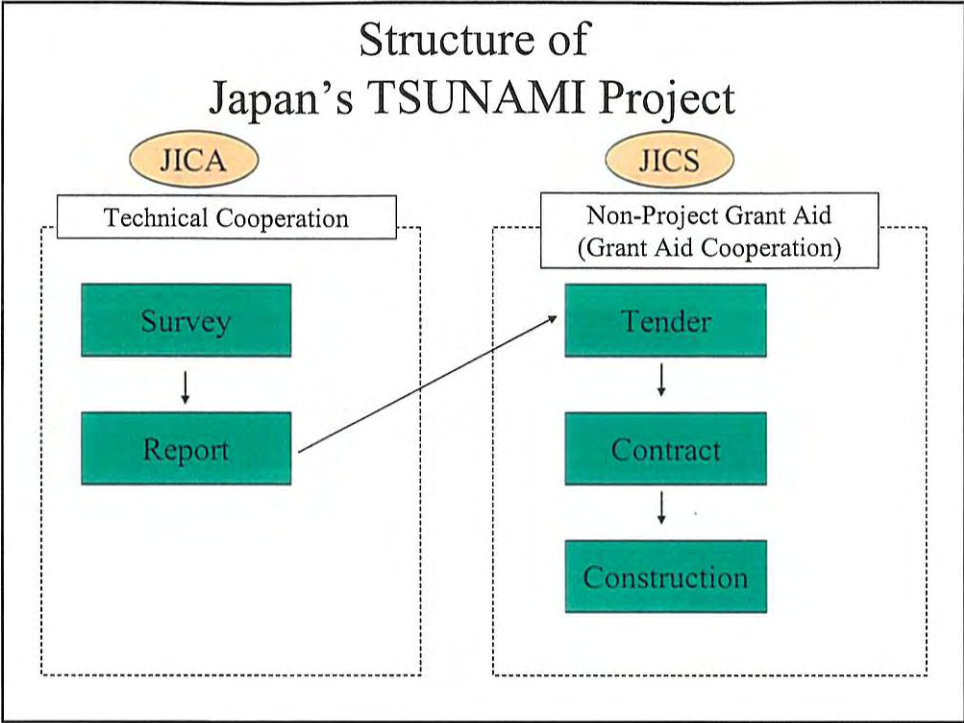
Outlines of Japan's Non-Project Grant Aid



Japan International Cooperation System (JICS)

Structure of General Construction Project





Summary of the Japan's Non-Project Grant Aid

1. When start?: 17th January, 2005
2. How large?: 17 million US\$ (=2 billion JPY)
3. What is Purpose?: To procure equipment and services necessary for rehabilitation for TSUNAMI disaster.
4. What is Characteristic?: Recipient can decide usage after disbursement.

Process of Non-Project Grant Aid (1)



Working Group between Maldivian and Japanese Government

Process of Non-Project Grant Aid (2)



Tender Opening

Process of Non-Project Grant Aid (3)



Handing Over