Attendance of Simplified Gauge Assembling WS at Fiji Met Service

28-Sep-11

NO.	Name	Title	Country	Phone
1	Kanaya Masaaki	JICA Expert	Japan	8326477
2	Lloyad Tahani	SIMS	Solomon	24218
3	Fred Ferah	SIMS	Solomon	23021
4	Michael Siau	SIMS	Solomon	36310
5	Litiana Bainimarama	NDMO Fiji	Fiji	9238825
6	Epeli Tuda	Ministry of Defence	Fiji	3211613
7	Paula	WAF	Fiji	7051400
8	Nemani Bolaqace	WAF	Fiji	7052751
9	Iosefo Erenio	Water Authority	Fiji	7052740
10	Manoa Baro	WAF	Fiji	7052747
11	Tomasi Naborisi	WAF	Fiji	7051423
12	Joseph Tangi	Gusadalcanal Province Edu. Dept	Solomon	28042
13	Herrick Savusi	NDMO SI	Solomon	27936
14	Sipuru Rove	NDMO	Solomon	27937
15	Frank Manola	NDMO SI	Solomon	27936
16	Jale Hataogo Uluilakebe	FM 5	Fiji	9317152
17	Ashok Kumar	Water Authority	Fiji	7052438
18	Seremaia. K	WAF Hydro	Fiji	7052835
19	Jack Kaobata	WRD, MMERE	Solomon	67721522
20	Michael Maehaka	MMERE	Solomon	21522
21	Samuela Kanalawa	NDMO	Fiji	9031385
22	Vani Vakatalai	NDMO	Fiji	9937350
23	Sera Tawalagi	JICA Ba	Fiji	9188743
24	Megumi Matsuoka	JOCV, Ba	Fiji	8652481
25	Alefereti Abenisiga	DOS. BA	Fiji	8776708
26	Ropate Rakadi	NDMO	Fiji	9803414
27	Omachi Toshikatsu	River Engineer, Dr	Japan	
28	Oi Hideomi	Senior Advisor	Japan	
29	Kameyama Tsutomu	JICA Expert	Japan	
30	Yamazaki Yoshitaka	JICA Expert	Japan	

Attendance of Simplified Gauge Assembling WS at Fiji Met Service

29-Sep-11

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16	Nemani Bolaqace	WAF	Fiji	7052751
17	Michael Maehaka	MMERE	Solomon	21522
18	Jack Kaobata	WRD, MMERE	Solomon	67721522
19	Josatoki Teuo	Strategic Planning Officer	Fiji	3222322
20	Jale Hataogo Uluilakebe	FMS	Fiji	9317152
21	Niko Nadalo	Ba Rural Local Authority	Fiji	6674050
22	Seremaia. Koroi	WAF Hydro	Fiji	7052835
23	Samuela Kanalawa	NDMO	Fiji	9031385
24	Epeli Cawanibuka	MMERE	Fiji	7052405
25	Emosi Catanasiga	MMERE	Fiji	7052036
26	Sera Tawalagi	JICA, Ba	Fiji	9188743
27	Megumi Matsuoka	JOCV, Ba	Fiji	8652481
28	Mosese Ravasakula	Ministry of Finance	Fiji	3222157
29	Omachi Toshikatsu	River Engineer, Dr	Japan	
30	Oi Hideomi	Senior Advisor	Japan	
31	Kameyama Tsutomu	JICA Expert	Japan	
32	Yamazaki Yoshitaka	JICA Expert	Japan	

Attendance of Simplified Gauge Assembling WS at Votua Village

30-Sep-11

NO.	Name	Title	Country	Phone
1	Kanaya Masaaki	JICA Expert	Japan	8326477
2	Fred Ferah	SIMS	Solomon	23021
3	Sipuru Rove	NDMO	Solomon	27937
4	Vani Vakatalai	NDMO	Fiji	9937350
5	Joseph Tangi	Gusadalcanal Province Edu. Dept	Solomon	28042
6	Michael Siau	SIMS	Solomon	36310
7	Lloyad Tahani	SIMS	Solomon	24218
8	Paula	WAF	Fiji	7051400
9	Epeli Tudia	Ministry of Defence	Fiji	3211613
10	Iosefo Erenio	Water Authority	Fiji	7052740
11	Manoa Baro	WAF	Fiji	7052747
12	Litiana Bainimarama	NDMO Fiji	Fiji	9238825
13	Tomasi Naborisi	WAF	Fiji	7051423
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19	Jale Hataogo Uluilakebe	FMS	Fiji	9317152
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21	Seremaia. Koroi	WAF Hydro	Fiji	7052835
22	Samuela Kanalawa	NDMO	Fiji	9031385
23	Sera Tawalagi	JICA, Ba	Fiji	9188743
24	Megumi Matsuoka	JOCV, Ba	Fiji	8652481
25	Omachi Toshikatsu	River Engineer, Dr	Japan	
26	Oi Hideomi	Senior Advisor	Japan	
27	Kameyama Tsutomu	JICA Expert	Japan	
28	Yamazaki Yoshitaka	JICA Expert	Japan	
29	Romilusi Petero	Turaga ni Koro, Votua village	Fiji	
30	Karen Bernad (Ms)	UNDP	Fiji	9086072
31	other villagers (appx. 40 people)			
32				

The Strengthening Community-Based Disaster Risk Management Project In The Pacific Region

Project Seminar

Suva

14 December, 2011

National Disaster Management Office,

Ministry of Provincial Development and National Disaster Management

Project Seminar

for The Strengthening Community-Based Disaster Risk Management Project

Conference Room at Studio 6
Suva
14 December, 2011

AGENDA

Seminar Objectives:

1. To report the progress of the JICA Project
2. To share the good practices and lesson with the stakeholders
3. To learn other initiatives and project activities for finding synergy effect

TIME	SESSION	FOCUS	RESOURCE AGENCY/PERSON
09:30-10:00	**Registration**		*All Participants*
10:00-10:15	Opening Remarks	Greeting	*PS of Ministry* *Representative of JICA Fiji Office*
10:15-10:45	**Session 1**	Outcome 1	*WAF, Fiji Project Team*
10:45-11:15		Outcome 2	*CWD/BDO*
11:15-11:45		Break	*All Participants*
11:45-12:15		Outcome 3	*NDMO*
12:15-12:45		Discussion	*All Participants*
12:45- 13:45	**Lunch**		
13:45-14:15	**Session 2**	Project Profile	*IWRM Project in Nadi*
14:15-14:45		Project Profile	*PCIDRR Project*
14:45-15:15		Break	*All Participants*
15:15-15:45		Project Profile	*Ba CC Project, UNDP*
15:45-16:15	**Closing Remarks**	Vote of Thanks	*Director of NDMO*

The Strengthening Community Based Disaster Risk Management

Project Purpose: A system in which the residents of the selected community is able to evacuate appropriately is established

National Disaster management Office

OUTCOME 1

Met Service / Water Authority

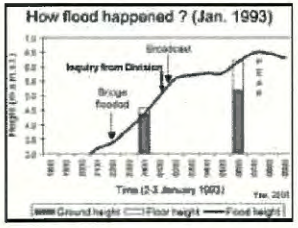
Rainfall / Water Level Gauges

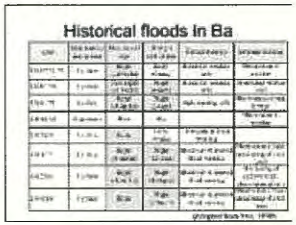
Training / Exercise

OUTCOME 2

Commissioner Western Division / Ba District Office

Disaster Management Plan



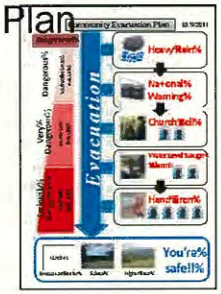


Training / Exercise

OUTCOME 3

Ba District Office

CDP / Evacuation Plan



Training / Exercise

The Strengthening Community-Based Disaster Risk Management Project in The Pacific Region

(Technical Cooperation Project)

<For Outcome 1>

©Seremaia Koroi	Supervisor
©Paula Tawakece	Technical Officer

Water Authority of Fiji, The Republic of Fiji Islands

1

Task for Outcome 1

(1) Develop Capacity of WAF Hydrology for Flood Forecasting

- ✓ Capacity development to collect flood runoff data
- ✓ To set and calibrate flood runoff model, training for C/Ps personnel

(2) Strengthen a system for issuing a flood warning

- ✓ To establish flood warning code based on flood runoff model
- ✓ To improve the system for data transmitting from FMS and WAF to NDMO
- ✓ To improve the system by which NDMO informs residents of warning information

2

Output in 1st Year

- ✓ To attend lectures on Hydrological Cycle and Flood Runoff
- ✓ To collect rainfall data during past floods
- ✓ To prepare the configuration under Flood Runoff Model
- ✓ To order Ba River cross section survey to local contractor
- ✓ To do reconnaissance survey on existing hydrological stations
- ✓ To prepare the specification and order of Ba hydrological network system
- ✓ To recommend data transmitting system from WAF/FMS to NDMO
- ✓ To enlighten communities on simplified warning system

3

Type of Floods in Fiji

- Flood results from heavy and prolonged rainfall when the rivers and streams levels bursts over the banks and inundates the surrounding areas.
- There are three types of flood:
- **Flash Floods**- occurs with a few hours of heavy rain with no warning. This is common in Fiji because of the steepness of the catchment area and short distance of the rivers or streams.
- **Rapid Onset Floods** – occurs with long period of heavy rain and this can last for few days depends on the size of their catchments.
- **Slow Onset Floods** – sometimes occurs to rivers with big catchment areas and with a long period of time.

4

FLASH FLOODS

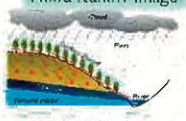
5

FLASH FLOODS

6

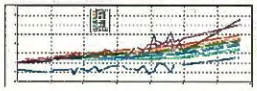
Concept of Flood Hydrology

Flood Runoff Image



Network in Storage Function Model

Hydraulic Calculation from Discharge



Parameter Calibration of Model

Lecture and Drill, starting from October, 2011

Run-off Analysis Manual 1
[Collection and Arrangement of Rainfall and Water level Data]

Run-off Analysis Manual 2
[Formulating of Flood Forecast Model and verification]

Hydraulic Analysis Manual

Four (4) manuals shall be prepared as flowchart

Establishing of Flood Warning Standards Manual

Lecture and Drill from October 2011

- Current Survey at Key Channel Section
- Preparation of observation, O&M manual
- Hydrological Data Arrangement and Detection of Abnormal Values
- Drill and Data arrangement of Average Rainfall Depth in the sub-Catchment
- Drill of Parameter and Constants for Flood Runoff Model (Storage Function Model)
- Lecture and Drill of Model Verification
- Drill of Hydraulic Calculation applying Non-Uniform Flow
- Rating Curve (H-Q) Estimation through Current Survey
- Lecture on Setting Flood Warning Code (Water Level)
- Preparation O&M Manuals on Simplified Warning Gauge
- Develop a Manual on Warning Transmitting, applying to Evacuation Drill

Technical transfer for WAF

(1) How to transfer hydrological technique

- Lecture was carried out at once a week or twice from mid Oct. to beginning of Dec..
- According to document manual, we were taught hydrological knowing those is a basic way of thinking and a principle and a real calculation method by JICA project team.

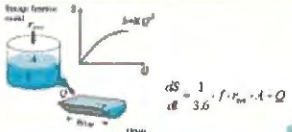
(2) Technical parts menu

- 'Average depth of rainfall over area (Thiessen method)'
- 'Arrangement of HQ curve'
- 'Hydraulic accounting (Steady flow)'
- 'Runofff analysis'
- And else

Manual documents

Lecture scenery

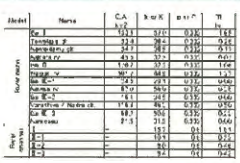
Flood Runoff Model (Storage Function Model)



f : Runoff coefficient
Ke : Constants for Storage function method
S : Storage in basin area (m^3)
Q : Direct run - off from basin area (m^3/s)
R_{ave} : Average depth of rainfall in basin area
A : Basin area(km^2)

$$\frac{dS}{dt} = \frac{1}{3.6} \cdot f \cdot r_{ave} \cdot A - Q$$

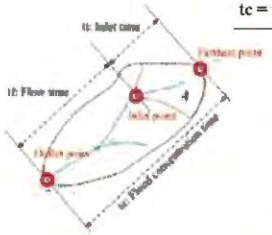
Constants of Catchment & River Channel



Sub Catchment Division

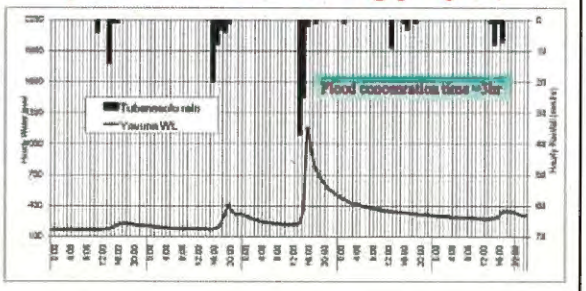
Flood concentration time

Flood concentration time (tc)
tc = ti + tf

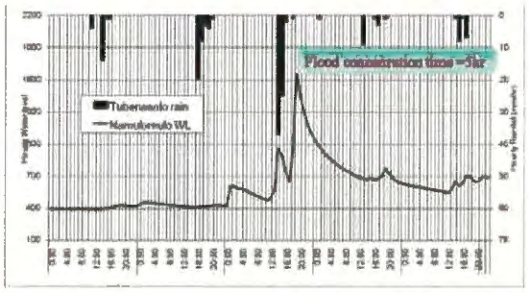


ti –inlet time
tf = flow time = L / V
time it takes for flow from the remotest point to the inlet point or farthest
point of river channel
time it takes from the inlet point or farthest point of the river channel to the
outlet point or point under consideration
L: Length of river channel from its outlet
point to its farthest point (m)
V: flow velocity (m/s)

Example of flood concentration time (Nadi flood forecasting project)



Example of flood concentration time (Nadi flood forecasting project)

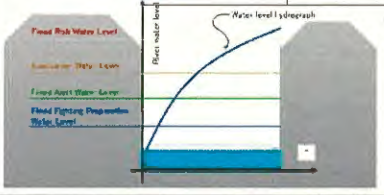


Flood Risk Water Level

- Due to Law in Japan, installation of some 4 kinds of river water level for prevention of flood disasters, occurrence of every water level means measure of beginning flood fighting works, degree of risk for flood damage, as bellow.

Flood Risk Water Level

Water level name	Measure or Action
Flood Risk Water Level	Water level that might have a possibility for being considerable housing inundation.
Evacuation Water Level	Water Level that governor of prefecture/city/village issues evacuation.
Flood Alert Water Level	Water Level that governor of prefecture/city/village informs attention for flooding to the residents. And flood fighting corps is to be mobilized.
Flood Fighting Preparation Water Level	Water Level that flood fighting corps is to stand ready

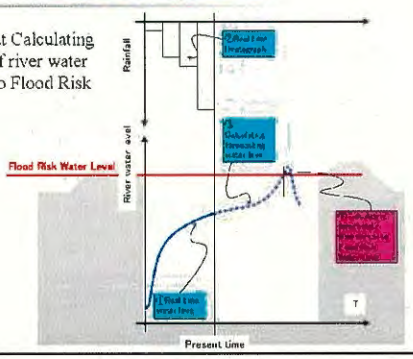


Case of Ba river

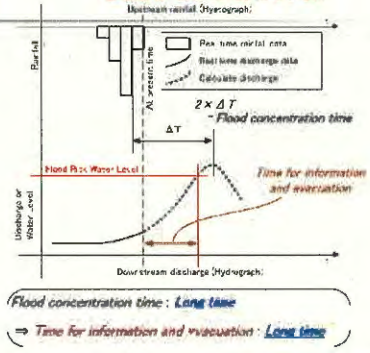
- Flood Risk Water Level is having **situation of not securing to safely flow flood by river channel**, minimum water level of inundation by another means. When river water level make as same as Flood Risk Water Level and people start to evacuate on this time, not securing to safely evacuation on a defense of disaster of flood.

Case of Ba river

This case is that Calculating forecast time of river water level arriving to Flood Risk Water Level.



Case of Ba river



Flood concentration time : Long time

⇒ Time for information and evacuation : Long time

Some point noticed through a lecture (1/2)

1. It is important that Hourly hydrological data is observed continuously at same place and in terms as long as possible.
2. In case of Ba river basin which has a catchment area of more than 900km2, and during the past flood data there were only two rainfall stations operating (Navala, Varaciva) in this catchment area and one water level station (Toge) set on main river.
3. Continuously high quality of data is needed at the observation stations (rain fall, river level). Field survey should be carried out at the water level stations after every major floods and should also carried out discharge observation survey during floods.

Some point noticed through a lecture (2/2)

4. At water level station, so these datum are used TBM (Temporally Bench Mark) that is remote to datum MSL (Mean Sea Water level) of Topographic map and river cross section, we think that should do field survey for the purpose of knowing relation of TBM and MSL.
5. For flood forecasting, we should use several rainfall stations inside catchment area and near the catchment border line.

The need of a qualified Hydrologist in Fiji, that studies the effects on flows brought about by changes in land use such as afforestation or crop irrigation; planning responses to specific weather conditions, such as droughts and floods, and assessing the impacts of such events on water catchments and supplies; undertaking hydrological modeling to allow the development of flood forecasting and drought management strategy; assisting in the planning of water resource development by forecasting and monitoring water usage and rainfall.

General Configuration of Ba Hydrological Network System

Hydrological Station with GPRS
- ✓Koro (Rain)
- ✓Toge (Rain, W.L)
- ✓Nalalowa (Rain)
- ✓Ba (W.L)

Ba Hydrological Network with New Equipment

- Rain Gauge Station
  - Toge
  - Koro
  - Nalatowa
- Water Level Gauging Station
  - Toge
  - (Navala)

Location of Hydrological Station

25

Result of GPRS test at Navala

1. Downstream from Navala Village we could not receive any Vodafone wave signal.
2. Downstream near Toge, receive some wave signal, but are unstable.
3. When we move to higher places but away from the river we received good wave signals.

26

BROADBAND CONNECTION

- A need for a new broadband line for the Ba Project Server to be installed at the WAF office in Lautoka.
- Have installed a server for the Nadi Flood Early Warning System at the WAF Operation Room.
- The two servers should collect data from the project stations in Ba and Nadi and one should work as a backup for the other server.

27

NIWA TRAINING AT WAF SERVER

28

Preparation Work

Preparation work was smoothly done with the support of Hydrology staffs

Frame Work for Base Concrete Placing

Adjustment of Frame with Solar Panel

29

New Equipment Installation

Nalatowa station are identified through GPRS Frequency Test by WAF

Nalotawa Raingauge Station

WAF Staff. at Koro Raingauge Station

30

New Equipment Installation at Toge

Toge station is a base station for flood forecasting calculation

Assembling by WAF Staff
- Data logger, Flash Net, Battery in the box

Completed Toge Station with Rain gauge, W.L Gauging

31

Simplified Warning Gauge for Community

- Promote greater awareness for communities prior to flooding
- Complementary warnings from government agencies
- Teaching the principles of hydrological monitoring to young engineers

More detailed information and trial assembling coming tomorrow

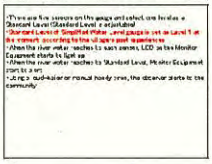
32

Reducing Vulnerability in Community

- As we are all aware of that river flooding in Fiji is a frequent risk due to high rainfall, small river catchments and low lying coastal areas. With the frequent floods occurring in Fiji, the installation of the early warning system will help reduce the flood damages to towns and rural areas.
- Machines that are installed along the Ba River will be transmitting data into a server installed at Ba NDMO's office. During flood periods the river levels will be closely monitored by the NDMO officers and the levels will be sent to all the residents in Ba through text messages or by radio for early evacuation.
- For the critical levels along the Ba River, it will differ according to the geographical structures where people live.
- The JICA Engineers have installed three critical level machines at **Nasolo, Votua** and **Nawaqarua** Village, that triggers a warning siren for early evacuation.

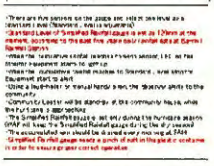
33

Installation of Simplified gauges in Nasolo (Water Level Gauge)



34

Installation of Simplified gauges in Nasolo (Rainfall Gauge)



35

Installation of Simplified gauges in Nawaqarua (Water Level Gauge)

36

Installation of Simplified gauges in Nawaqarua (Rainfall Gauge)

Installation of Electric Siren in Nawaqarua (at Community Leader's house)

Frequency test (Upper catchment of Ba river)

In Nadrugu

Nadrugu = Out of coverage

Halfway point between Toge and Navala

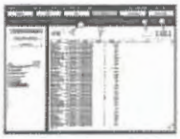
Halfway point = Out of coverage

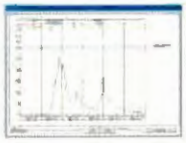
Establishment of Display System in Monitor

Item on Monitor

✓Real Time Hydrological Data

✓Flood Forecasting Hydrograph





RECOMMENDATION

- Request to the JICA Office if we could have more Hydrological Training from the Professional Engineering Hydrologist
- [Mr Imagawa san] next year.
- The training done this year is too short compared to the subjects covered because most of the topics needs more training and exercise e.g. Hydraulic Accounting, Runoff Analysis, Arrangement of HQ Curves.

THANK YOU VERY MUCH AND ARIGATO GOSAIMASU

Progress of Flood Disaster Management Plan in Ba district

The strengthening community-based disaster risk management project in the pacific region

December 14, 2011, Suva
Mua Metsuisela
(mmetuisela@yahoo.com)
Ba Provincial Administrator

Ba District profile

- Fijian
  - Pop. 16697 (34.3%)
  - 6 Tikinas
  - 29 Villages
  - Turaga ni koro
- Indian
  - Pop. 31783 (64.1%)
  - Settlements
  - Advisory councils
- Rotuman
  - Pop. 106 (0.2%)
- Others
  - Pop. 724 (1.5%)
- Total
  - 49310 (as of 2007)

(Population: 2007 Census)

Disaster profile of Fiji

Type of disaster	# of Events	Killed	Total Affected	Damage (000 US$)
Drought	2	-	147,228	15,000
Earthquake (seismic activity)	2	-	-	-
Flood Unspecified	3	10	77,667	5,500
Flood Flash flood	2	2.5	300	3,500
Flood General flood	4	4.3	2,920	18,437
Flood Storm surge/coastal flood	1	4	-	-
Storm Unspecified	1	1	3,369	25,000
Storm Tropical cyclone	33	15.5	24,952	12,245

(EMDAT 1900-2010)

Ba Town, Jan. 2009

Economic loss of $112m (FJD) , 11 causalities

JICA Project

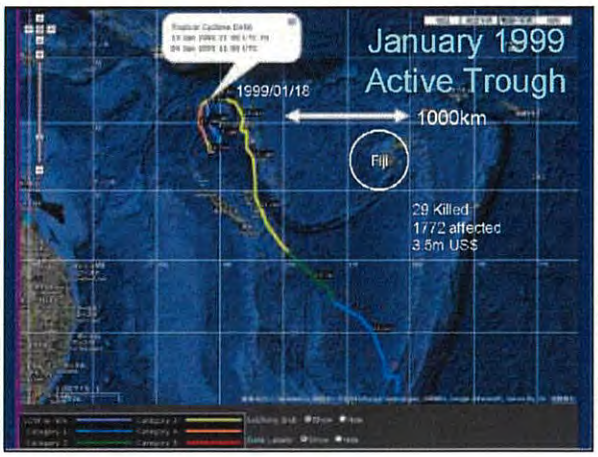
- Period
  - 2010.11– 2013.11
- Component
  - Flood analysis, Disaster Plan, Community
- Counterparts
  - NDMO
  - WAF, FMS
  - BDO, CWD
- Pilot communities
  - Nawaqarua…263
  - Nasolo…130

Notable floods in Western division

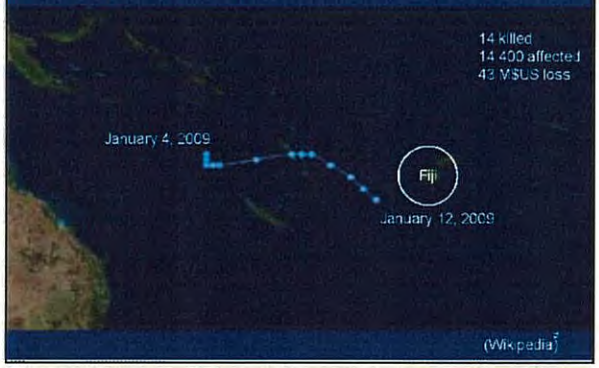
9 floods: Non Cyclone origin 14 floods: Cyclone origin.

5 notable floods in Ba occurred during 1991-2011. (McGree et al. 2010)

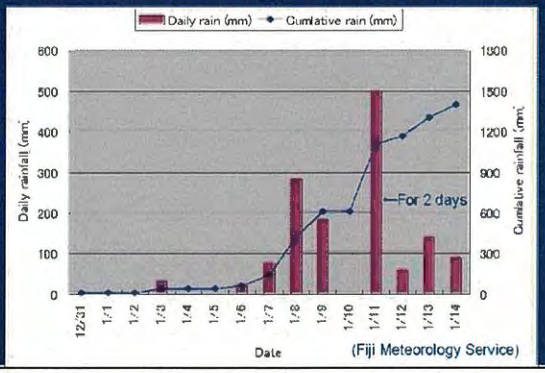
Year	Month	Day	Reason	Ba	Nadi	Rakiraki	Sigatoka
1871	3	20	Hurricane	x			x
1892	12	15	Cyclone	x			x
1914	12	24	Hurricane			x	
1918	2	7		4			
1929	12	11	Hurricane				x
1931	2	21	Hurricane	1	?		x
1933	3	27					x
1938	12	22		9			
1939	1	21	Hurricane	7	6	x	
1955	3	8			?		
1956	1	30	Minor cyclone	3		x	
1958	3	6	Minor cyclone	8			
1964	3	22	Storm	x	7		x
1965	2	9	Hurricane	x	4		x
1972	10	24	Cyclone Bebe	x	5	x	
1983	2	28	Cyclone Oscar		9		x
1986	4	10	Cyclone Martin	x	10	x	
1993	1	3	Cyclone Kina	6			x
1993	2	26	Avtive trough linked with Polly	x	3		
1997	3	8	Cyclone Gavin	10	8		
1999	1	18	Trough	5	2	x	
2004	4	7	Tropical depression 10F			x	
2009	1	7	Tropical depression 04F	2	1		x
Total			23	17	12	7	10



Tropical Depression 04F, 2009



Rain during 2009 flood



Tentative informal warning levels

Warning stage	Indicator	Monitoring organization	Media for dissemination
Readiness	Cyclone season	NDMO	Awareness week
Alert	Cyclone or TD nearing	FMS	Radio, TV, newspaper
Warning I	Rain 100mm/day	NFA, Police, WAF, FSC	Radio, telephone
Warning II	Rain 25mm/hour	NFA, Police, WAF, FSC	Radio, telephone
Warning III	Nadrau bridge flooded	WAF	Radio, telephone, siren
Warning IV	Ba tramline bridge flooded	DDMO, Police, Town council	Radio, telephone, siren
Action	Flooding in town imminent	DDMO, Police, Town council	Siren

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(Yeo, 2000, Modified by consultation with Ba district)

Early Warning dissemination

- Formal warning
  - FMS
  - WAF
  - NDMO
  - ↓
  - Radio, TV, web
  - DDMO
  - ↓
  - Public
- Informal warning
  - Police, NFA, FSC
  - School, residents
  - ↓
  - DDMO
  - ↓
  - Police, NFA, FSC, town council, School
  - ↓
  - Public

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Message for Warning II (example)

- Rainfall at upstream over past one hour exceeded 25mm at xx am today, in addition to 100 mm rainfall yesterday.
- This is second warning stage out of four stages.
- Residents in xxx Tikinas are advised to move properties to higher places, and prepare for evacuation with radio, food, & water.
- Children, women, elders, & handicapped should evacuate immediately.

13

Resource location

- Left bank
- NFA (RT)
- Police station (RT)
- Mission hospital
- Nailaga health center
- Dept. of road
- WAF
- Army from Lautoka
- Right bank
- DISMAC (RT w/o batt.)
- Police HQ (RT)
- Ba health center
- Education dept.
- Red cross
- Boat
- Army from Tavua

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For faster response

- Check International response news.
  - www.reliefweb.int
- Check national media.
  - FBCL, Fiji Times, Fiji Sun, Fiji village, Fijiana times, Fiji today etc.
- Use of aerial survey at early stage.
- Bottom up reporting from police, village, school, health facilities.

15

Contact list for community

- FMS
- District
- Police
- School (evacuation center)
- Health center
- Red cross
- FBCL, News agencies

16

Annual SOP

	Month	Government	Community
Normal	Jun.-Aug.	Update info.	Update info.
Before	Sep.	DRM committee, Drill	DRM committee, Drill
During	Oct.-Apr.	Cyclone season	Cyclone season
After	May	Report, Committee, & Plan revision	Committee, Plan revision

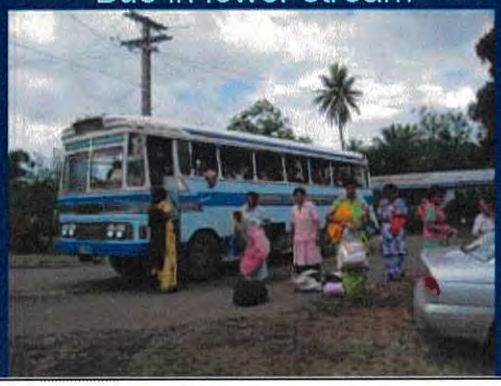
17

1st DRM committee in Ba (Nov.2)

MOA between Ba District & Bus company

18

Bus in lower stream



19

Inundation area & facilities

20

(Modified after SOPAC 2009)

Memorandum Of Agreement Ba District & Bus company

- In case rain fall reaches to Warning level 1, (100mm/day) district office will issue warning to public via radio and telephone.
- In case rain fall reaches to Warning level 2, (25mm/hour) district office will issue evacuation order to public via radio and telephone.
- Communities with simplified rain gauges and water gauges will also report to District Office when rainfall reaches to warning level 1 or 2.

21

Memorandum Of Agreement Ba District & Bus company

- District Office Ba will coordinate with Chamanlal Transport Company to start evacuation of communities in lower stream of Ba river.
- Priorities for evacuation of the local population shall be given to children, aged, disabled, sick, and women, followed by the other abled male population.
- Chamanlal Transport Company agreed to charge nominal fare to evacuees from their villages/settlements to the evacuation centers and return after disaster.

22

2nd DRM committee (Dec. 2)

- Internal discussion report
- SOP for stake holders
- Flood hazard map
- Disaster resource map

23

Summary

- DRM plan developed through consultation.
- DRM plan tested by drill and revised.
- Resource database & map developed.
- DRM committee held to develop SOP.
- MOA agreed between bus company.

24

Way forward in 2012

- SOP development for stakeholders
- Disaster education through schools
- Disaster drill including Bus company
- Information sharing among stakeholders
- Disaster plan inclusion into OHS

25

Commitment of Western Division to develop Flood Disaster Management Plan

The strengthening community-based disaster risk management project in the pacific region

December 14, 2012, Suva
Kolinio Saukuru
(kolinio.saukuru@govnet.gov.fj)
Planning office, CWD

26

Capacity Assessment (July)

- Disaster resources
  - Staffs
  - Infrastructure
  - Communication
- Disaster experience
  - Experience
  - Response
  - Problems

Consultation meetings (Jul. –Aug.)

Lautoka Ba

4 meetings were held at Commissioner's office in Lautoka and Ba district office.
Early warning procedures defined.
Tasks & lead agency for disaster response defined.

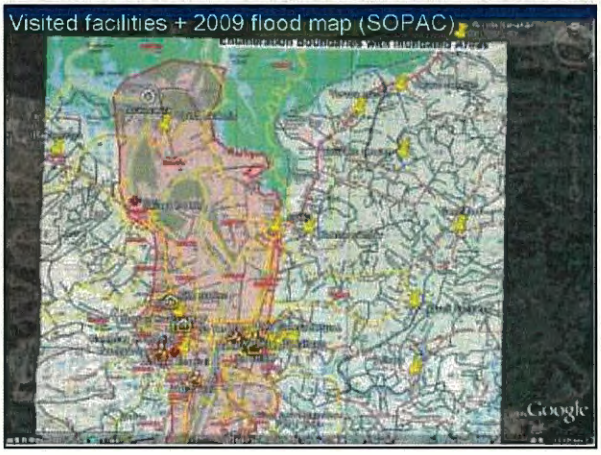
28

Disaster resource inventory (Aug.)

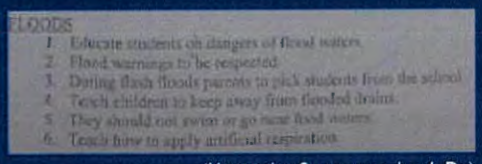
- Facilities visited
  - 30 Schools
  - 5 Police stations
  - 4 Health facilities
- Work
  - Interview
  - Location
  - Observation
- Period
  - 1st Aug. – 11th Aug.
- Members
  - CWD
  - WAF
  - Ba Police
  - JICA expert

29

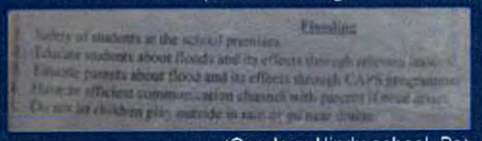
Visited facilities + 2009 flood map (SOPAC)



Disaster management plan at school



(Koronubu Sangam school, Ba)



(Qerelevu Hindu school, Ba)

32

Table top exercise (Aug.17-18)

Lautoka

Ba

Developed disaster plan presented.
Major flood in Ba similar to 2009 was given as scenario
30+ stake holders participated
Disaster situation & response were discussed with maps.

33

Objective

- To upgrade the capacity of preparedness of the key public and private sector agencies involved in disaster management.
- To ensure effective inter-operable understanding and to avoid conflict of roles during disaster operations.
- To strengthen the inter agency capabilities of building community resilience towards disaster management.
- To factor the above as integral component of the district disaster management plan.

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4 groups in Table top Exercise

Early Warning	FMS ,NDMO, WAF, Media
Response	Divisional Commissioner, Police, RFMF, Provincial Council
Recovery	Police, RFMF, Red Cross, DDOC
Reconstruction	Public Utilities, FEA,Telecom,Vodafone

35

Result of Table Top exercise

- FMS raised the importance of assigning a timeline to the disaster management plan so as to ensure effective and proper evacuation of the community members.
- Training to be conducted to the community leaders on Initial Damage Assessment which has been agreed in principle by NDMO and NDMO is currently conducting on that.

36

Result of Table Top exercise

- Communities to establish in-built mechanisms at community level , e.g. Community Disaster Committee to work with the community leaders. Local govt. authorities has to strengthen this at the municipal boundary communities
- Resource Plan to be properly documented by each agency to ensure effective inter-operable understanding in terms of resource allocation and manpower dispositions.

37

Plan revision (Aug.24-25)

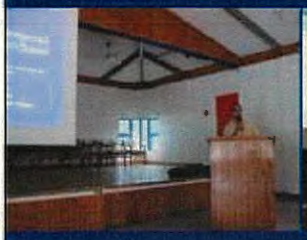
Lautoka

Ba

Disaster plan reviewed and revised.
Local NGOs will be included.
Disaster committee will be established in Western Division

38

1st DRM committee in Lautoka (Oct.28)



- JICA Training report
- Action plan
- SOP discussion
- Cyclone response plan
- Cyclone outlook

39

2nd DRM committee in Lautoka (Dec.1)

- Discussion on Draft DRM plan
- Temporary SOP for stakeholder

40

Issues for SOP

- Sharing list of evacuation centers.
- Map of evacuation centers.
- Positioning of disaster resources
- Flood hazard map.
- Disaster education
- Compilation of After Action Report

41

Legal framework

• By 2013 ⟶	• Future
• National plan & act	• National plan & act
– Disaster in general	– Disaster specific
– Response oriented	– Full disaster phase
• Ba flood DRM plan	• Local disaster plan
– Flood specific	– Disaster specific
– Full disaster phase	– Full disaster phase
– Local profile	– Local profile
• SOP for stakeholders	• SOP for stakeholders
– Flood specific	– Disaster specific
– Full disaster phase	– Full disaster phase
– Under OHS framework	– Under OHS framework

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Community-Based Disaster Management In The Republic of Fiji
< For Outcome 3>

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Ba District Office
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1

1. Preparation Stage (Oct 2010 – March 2011)

Workshop for Introduction of the Project


4

Task for Outcome 3

Expected Output:

The target community's awareness on disaster preparedness is enhanced

(1) Raising Awareness
- ✓Community Profiling
- ✓Evacuation Plan and Drill

(2) Enhancement of Communities' Self Resilience
- ✓Risk Finding
- ✓Rainfall and Water level Monitoring

2

1. Preparation Stage (Oct 2010 - Mar 2011)

Baseline Survey

[Findings]
- ✓High Possession Rate of AM Radio and Mobile phones
- ✓Few people have experienced Evacuation Drill
- ✓Early Warning System is expected to improve

Nawaqarua

[Households] 41
[Population] 246 (Male 132:Female 114)
over 60 years old: 15 (6%) (7:8)
under 5 years old: 38 (15%) (23:15)
challenged people (wheel chair, crutch):2

[Evacuation Rate in Jan 2009] 66% (30% stayed at home)
[Participation Rate of Evacuation Drill] 6%

Nasolo

[Households] 15
[Population] 81 (Male 39:Female 42)
over 60 years old: 3 (4%) (1:2)
under 5 years old: 11 (14%) (7:4)
challenged people (wheel chair, crutch):1

[Evacuation Rate in Jan 2009] 93%
[Participation Rate of Evacuation Drill] 0%

5

Activity Schedule

1. Preparation Stage (October 2010 to March 2011)
- Baseline Survey : Living standard, Experiences, Attitudes
- Workshop : Introduction of the Project

2. Implementation Stage (April 2011 to March 2012)
- Awareness Raising : Community DM Plan, Evacuation Plan & Drill
- Risk Assessment : Simplified Hydro Gauges, Hazard finding

3. Practice Stage (April 2012 to March 2013)
- Standardization : Development of Standard / Model for CBDM
- Exercise : Counterparts conduct CBDM with Manuals

4. Extension (April to October 2013)
- Promotion : CBDRM Programme
- National Strategy : CBDRM Mainstreaming

3

2. Implementation Stage (Apr 2011 – Mar 2012)

Installation of Simplified Rainfall Gauges/Water Level Gauges


6

2. Implementation Stage (Apr 2011 – Mar 2012)

Community Disaster Plan

[Findings]
- ✓Disaster Plans were existed (PCIDRR)
- ✓Contact Directory were revised
- ✓Necessity to follow their Action Plan

Nawaqarua

Nasolo

CDMC Contact Directory

7

2. Implementation Stage (Apr 2011 – Mar 2012)

Hazard – Risk Mapping

[Findings]
- ✓Designated Evacuation Centre is far (Nawaqarua)
- ✓Evacuation Route is rocky and slippery (Nasolo)

Nawaqarua

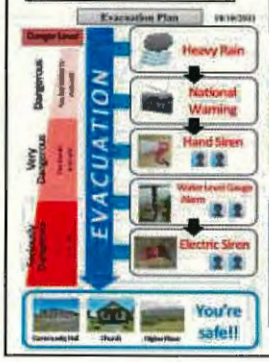
Nasolo

10

2. Implementation Stage (Apr 2011 – Mar 2012)

Evacuation Plan and Drill

[Findings]
- ✓Evacuation Plan developed with community
- ✓Residents were actively participated in Drills



Nawaqarua

Nasolo

8

3. Practice Stage (Apr 2012 – Mar 2013)

Standardization of CBDRM

[Focus]
- ✓Counterparts will take a lead (NDMO, BDO)
- ✓Programme and Manuals for operation will be prepared (NDMO and JICA Experts)

Workshop / Community Disaster Plan

Evacuation Plan

Evacuation Drill

Daily Rainfall Record

Risk Mapping

11

2. Implementation Stage (Apr 2011 – Mar 2012)

Hydoro Monitoring

[Findings]
- ✓Daily Rainfall Record book were prepared
- ✓Person in charge of record were confirmed

Nawaqarua

Nasolo

9

3. Practice Stage (Apr 2012 – Mar 2013)

Proposal of Countermeasures for Risk Reduction

[Focus]
- ✓Completion of the Community hall (Nawaqarua)
- ✓Improvement of the Evacuation route (Nasolo)

Nawaqarua

Nawaqarua Village Community Hall
Church located on lower ground can not cater for all the residents. The designated evacuation Centre, Votua Catholic School has insufficient capacity. This community hall is expected to complete.

Nasolo

Nasolo Village Evacuation Route
There is a higher evacuation area close to the village. But the route for higher area is narrow, rocky and slippery. It is hard for walk up, especially for Kids, women, elderly and handicapped residents. The countermeasure for road improvement is necessary.

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4. Extension (Apr – Oct 2013)

CBDRM Programme / Annual Corporate Plan

[Focus]
- ✓To put the CBDRM Programme in the Corporate Plan
- ✓To achieve the National Development Goal

Community Based DRM Programme:

Based on the good practices from all the stakeholders, the CBDRM programme will be prepared in place in order to promote the activities nationwide.

This programme will show us a series of concrete actions, and should be included in the Annual Corporate Plan, and necessary budget would be allocated.

⇩

CBDRM Programme

Annual Corporate Plan of Ministry of Provincial Development

13

4. Extension (Apr – Oct 2013)

Mainstreaming CBDRM

[Focus]
- ✓To achieve the National Development Goal

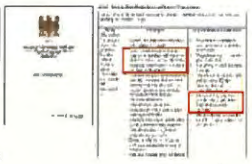
Project Overall Goal:

A system in which the residents of the area(s) other than selected community is(are) able to evacuate appropriately is enhanced.

⇩

ROADMAP FOR DEMOCRACY AND SUSTAINABLE SOCIO-ECONOMIC DEVELOPMENT 2009-2014
A Better Fiji for All

4.2.12 Disaster Risk Reduction and Disaster Management
[Strategies]
-Improve community response capacity in dealing with disasters and risks with effective, integrated and people focused early warning system.
[Key Indicators]
-Models of best practice developed and adopted to support disaster risk reduction.



14

Vinaka

15

PCIDRR

PACIFIC COMMUNITY-FOCUSED INTEGRATED DISASTER RISK REDUCTION

THE PROJECT

- Term
- Funding
- Target Areas

PROJECT OBJECTIVE

- Train communities
  - Hazards
  - Response Arrangements
  - CDP
  - DRRAP
  - First Aid

OUTCOME

- CDP formulation
- DRRAP formulation
- Disaster Ready Community
- Disaster Ready Rural Schools

FORECAST

- Increase community resilience
  - Train other areas
  - Monitor previously trained communities
  - Assist as need arises

FORENET Project

FORENET TEAM.
Project Coordinator: Dr. Dan Orcherton (Senior Lecturer in Climate Change)
PACE-SD Pacific Center for Environment and Sustainable Development – University of the South Pacific

Research Assistant:

Research Volunteers:

Kind acknowledgements of all of the communities of :

Nadrugu; Navala: Nakoroboya; Bukuya and Koro:

Special thanks to community facilitators (trainers):

In Navala

In Nadrugu:

Nakoroboya Village:

In Bukuya:

In Koro:

Objective

- The objective of the research project is to assess, characterise and plan for the sustainable management and protection of upland ecosystems in the Ba watershed.

Long-term objective

- The long-term objective is to jointly develop a Watershed Management Master Plan (WMMP) for the sustainable management of natural resources, protection and conservation of natural ecosystems within the Upper Ba watershed and for the mitigation of flooding at the lower portion of the Ba watershed including the Ba Township.

Reconnaissance mission

- The Project required the FORENET team of researchers to select 6 pilot communities in the upper Ba watershed and complete a semi-detailed reconnaissance of baseline socioeconomic and biophysical information. The following villages were selected as pilot communities: (i) Nadrugu; (iii) Navala; (iii) Nakoroboya; (iv) Bukuya; (v) Koro; and (vi) Nanoko

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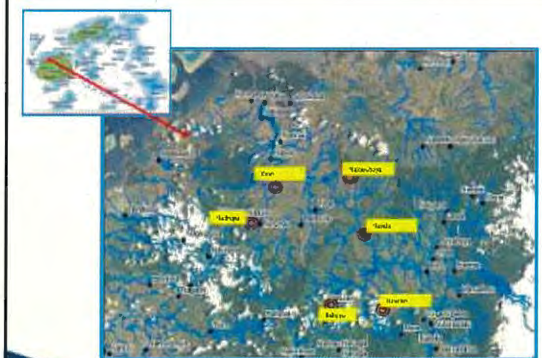


Methodology

- Free Prior and Informed Consent
- Modified PACE-SD methodology
- Participatory Action Research
- Participatory Mataqali delineation
- In-depth ethnographic analysis
- Informal focus/discussion groups
- Semi-structures questionnaires
- Informal "oral" transect walks
- Biophysical forest and agroforest inventories (measurement of height, dbh)

Livelihood outcomes
•Well-being ranking of social groups (social mapping); communities or social actors in regions (at different moments in recent history)
•Analysis of historical aerial photographs and remote sensing images and data with a specific focus on environmental change.
Livelihood strategies
•Ranking of income sources
•Mapping of migration patterns
•Inventory and ranking of income and expenditure
•Seasonal calendars of production, employment and income
• Seasonal agrarian calendars for planting, and harvesting
Policies, institutions and processes
•Actor network analysis and 'power network diagrams'
•Market inventories and commodity price tracking
•Narrative or institutional histories from key informants (including on traditional rules, tenure and markets)
Livelihood assets
•Asset surveys and resource mapping, including soil and vegetation surveys and inventories of the quality of housing stock, water supply and sanitation systems.
•Seasonal calendars of asset availability and quality.
•Social network and Venn diagrams.
Vulnerability context
•Study of meteorological and demographic data
•Research in historical archives with a particular focus on the socio-political context and market fluctuations

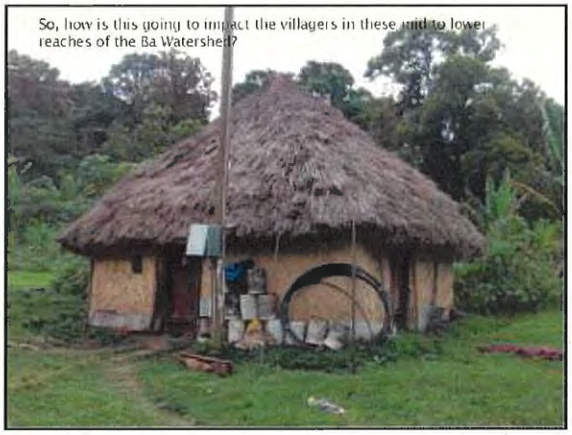
Results

- During the first six months the project, we have successfully completed a detailed assessment of the first six pilot communities previously mentioned.
- This included an assessment of the community's socioeconomic and biophysical resources (by mataqalis)' [eg: forestry (timber and non-timber resources), agriculture crops, livelihoods assets, as well as information on deforestation, degradation and hillside erosion in priority areas].
- The FORENET project will be working very closely with local villages in participatory social, cultural and biophysical resource assessments as well as in the overall on-the-ground aspects of project consultation, planning and implementation of the Project.

This will cause significant downstream erosion problems for communities of Navala village, and other communities in the Ba Watershed

12/12/2013

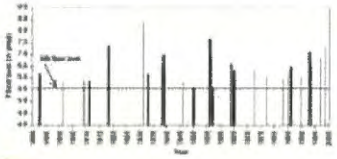
So, how is this going to impact the villagers in these mid to lower reaches of the Ba Watershed?



We also must consider the current flood levels and rainfall information.

Historical flood-level trend for the Rarawai (Ba) area plotted against time in Figure 1 (Yeo et al., 2007). As a generic indicator of severity, the 500 mark flooded on 28 occasions during the 111-year period from 1892 to 2002, an average of one major flood every four years (Yeo et al., 2007).

Figure 1. Record of annual floods in Ba River (Yeo, et al., 2005).



12/12/2013

According to Yeo et al. (2007), floods that were not associated with tropical cyclones also occurred during the months of both negative and positive SOI values (Figure 2). The high magnitude of February 1918 in the January 1999 floods occurred during periods of strongly positive SOI.

Figure 2 also demonstrates the major flooding of the Ba River can occur at any value of the SOI and it is difficult to see the SOI being of significant value for flood forecasting in the Ba watershed (Terry et al., 2001).

Approximately 26 out of the 35 major flood events in the past 111 years were associated with tropical cyclones (Yeo et al., 2007). It tends to experience drier years during El Niño Southern Oscillation (ENSO) (warm events) and more wet years during La Niña (cold events) (Lopeseth and Rapert 1990; Ho et al. 1997).

Thus, with a monthly rainfall taken over flow formula in the Ba River showed good correspondence with Ba flood events with a time lag of two months (Terry et al., 2001; Yeo, et al., 2007). Thus, Ba River floods have been observed to tropical cyclones associated with negative and positive SOI values (Figure below).

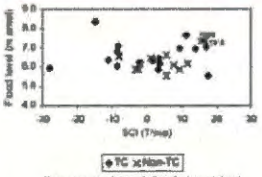


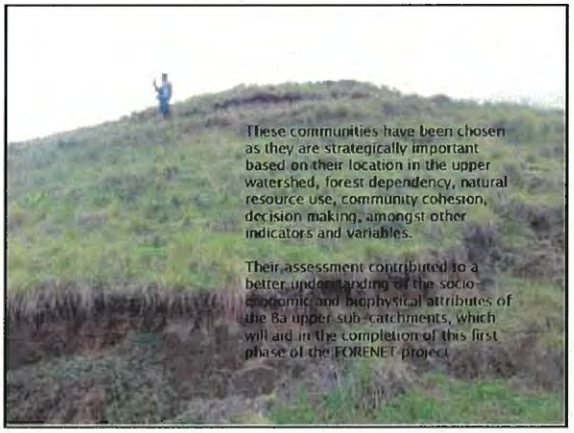
Figure: Area ratio between Ba River flood magnitude and monthly SOI, 1892-2002. (Source: SOI data from Australian Bureau of Meteorology, Jo-Yeo et al., 2007)

12/12/2013

Steep valleys like that of the upper Ba River promote particularly rapid-rising floods during heavy rains. Flooding still occurs throughout Ba sub-catchment areas despite the fact that the valleys and gorges themselves contain varying degrees of remnant secondary growth forest and grassland cover (Photo right): approximately 43% of the catchment area (JICA, 1998).

Pilot communities chosen were representative of the different districts in the Upper Ba province: **Nakoroboya** and **Navala** belong to the Qaliyalatina district, **Nadrugu**- Naloto, **Bukuya**, **Nanoko**-Navatusila, and **Koro** belong to the Savatu district.

12/12/2013



These communities have been chosen as they are strategically important based on their location in the upper watershed, forest dependency, natural resource use, community cohesion, decision making, amongst other indicators and variables.

Their assessment contributed to a better understanding of the socio-economic and biophysical attributes of the Ba upper sub-catchments, which will aid in the completion of this first phase of the FORENET project.

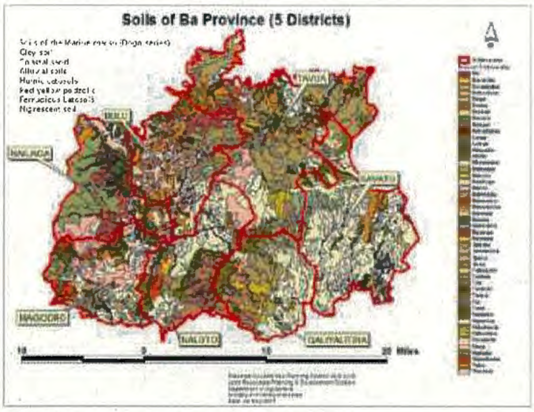
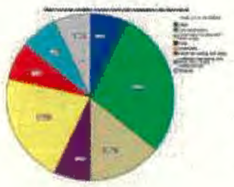


Table 2. Common crop types and (%) occurrence on farms in pilot communities (Upper Ba Watershed)[1].

Crops	(%)	Vegetables	(%)	Pulses	(%)	Fruits	(%)	Timber and non-timber	(%)
Dalo	5	Cabbage	10	Curry leaves	40	Cowpea	5	Pine	25
Cassava	30	Chinese cabbage	5	Dhania	50	Mango	10	Mahogany	10
Kawai	5	Cucumber	5	Jetty	10	Guava	10	Sandalwood	5
Yams	10	Chilly	5			Watermelon	5	Native trees	50
Dalo ni Tana	5	Capsicum	5			Pineapple	10	species	10
Kumala	10	Okra	10			Breadfruit	20	Fiber, fruits and	
Yaqona	5	Beans	10			Vudi, banana	10	other non-timber	
Sugarcane	10	Maize	5			Pumpkin	5	products	
	20	Bele	10			Citrus	5		
		Eggplant	10			Pawpaw	5		
		Rourou	20			Avocado	5		
		Peas	5			Coconuts	10		

[1] Source: Eder, M (2011) Baseline information on the Ba Water catchment, Land Use Section, Koronivia Research Station, Ministry of Agriculture, 2011. Land Use Planning Division (unpublished data)



As a general indication of main economic activities, all the six communities exhibited some similarities, but in terms of overall importance in most communities, roots and tubers accounted for 28.5% and vegetables (bean, bele, tomatoes, egg plant, plantain and pineapple), 21%.

Approximately 14% of economic activities on all farms in the upper watershed were derived from mixed cane farming with other crops (mostly dalo, cassava, taro and kumala-sweet potato and yam).

Timber and non timber forest products, along with occasional timber harvesting (and sales), sales of fruits small scale fisheries (eels, fresh water prawn, etc), and mixed cane farming with other crops represent 36% of the main economic activities in all villages under study.

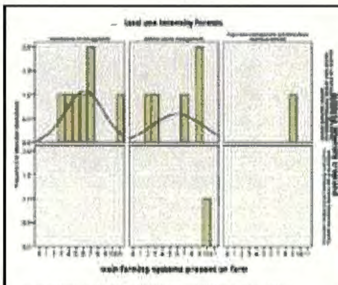
The main economic activities in each village were generally determined by access to markets, road conditions, accessibility to (or use) of middlemen, availability of resources to buy seed, incidence of pests and diseases, etc.

Main farming systems (including agroforestry systems)

From the socio-economic and biophysical surveys, the main farming systems present on farms were mixed homegardens for subsistence, medicinal, and food security (21.4%); sequential cropping systems (annual and short term or other root crops) 21.4% and a relatively equal distribution of other farming systems (windbreaks, live fences, hedgerow intercropping, some soil conservation systems (eg: use of vetiver grass bamboo or zero tillage), woodlots, use of non timber forest products (for medicine, fibre, or construction), and small scale (fresh water fisheries) totaling 43% of the main farming systems including agroforestry systems), on farms in all six villages.

Terrestrial ecosystems	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	•	•	•	•	•		•	•	•	•	•	•
[illegible] Village, Ba	•	•	•	•	•		•	•	•	•	•	
Nadrugu	•	•	•	•		•	•	•	•	•	•	
Navala	•	•	•	•		•	•	•	•	•	•	
Nakoroboya	•	•	•	•		•	•	•	•	•	•	

• [illegible] of Terrestrial Ecosystems



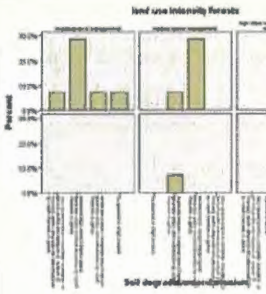


Figure (left) Land-use intensity (forests), land-use intensity cropland vs. soil degradation and erosion

In the majority of the six farms studied, there was an absence of any type of forest management or silviculture.

Farmers are generally engaged in low land-use intensity (extensive agriculture) with **roughly 30% of** these farms had soil erosion problems (Figure left).

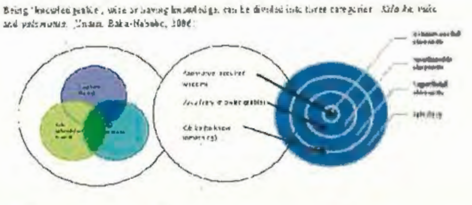
This indicates that land is being systematically cleared (using slash and burn or migratory agriculture techniques) and used for short-term crop rotation. No visible forms of crop or forest management were seen in all communities and farmers generally grow kava, cassava or other root crops, with relatively no consideration for soil conservation. The only exception was the villages of Nadrugu and Busuya, where the community had a rudimentary silvicultural plan to include the planting of pine trees on areas previously logged (reforestation).

12/12/2011

Fijian World-Views

Indigenous Fijian epistemology include the way that one and/or culture are thought (Unaisi, Baba-Nabobo, 2006). From the ethnographic analysis of the six villages, the notion of important indigenous knowledge stems from a more universal holistic concept of *vanua*. This is manifest in indigenous ways of knowing and creates knowledge as part of the *vanua*. This knowledge itself refers to their notion of maintaining values, skills, and acceptable behaviour. *Vanua* (as viewed by many of the Navala, Nakorotubu and Nadrugu villagers) is a place-based concept of Fijian holistic world view and was intimately linked with the *mataqali*'s and community land management (Figure 7)

Being "knowledgeable", wise or having knowledge, can be divided into three categories: *Kila ka*, *vuku* and *yalomatua*. (Unaisi, Baba-Nabobo, 2006)



(a) (b) (c)

Figure 7(a) The world of the Fijian worldviews (three worlds in one), according to Unaisi, Baba-Nabobo, 2006) **Figure 7 (b)** summarised Fijian knowledge types according to Unaisi, Baba-Nabobo, 2006 **Figure 7 (c)** [illegible] (Fijian and Kiribati indigenous knowledge (Source: Dr. Teweiariki Teaero, School of Education, [illegible]) The intersection of these three worldviews and knowledge types are manifested (in [illegible]

Village governance

Village governance varied from village to village, but in general most followed a general pattern (Figure below). Village governance is usually set up in a traditional manner, allowing for a holistic understanding of *Vanua* and *Vugalei* world views, and in expanding all governance structures according to indigenous protocol.

[illegible]

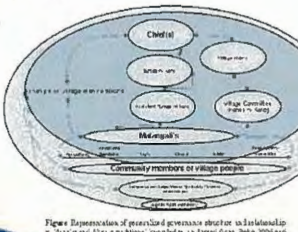
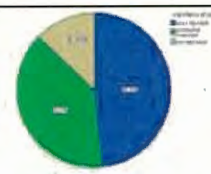


Figure: Representation of generalized governance structure and relationship to *Vugalei* and *Vanua* traditional knowledge (adapted from Baba 2006 and [illegible], 1997).

12/12/2011



Slightly less than half the villagers spoken to during the kava sessions, considered kava to be very important (**49%**); about **38%** said that *yaqona* was somewhat important, and a smaller majority (**13%**) said that it was not that important.

Most kava drinkers in the villages considered its importance rests primarily on the fact that it is a source of income (mainly because of stable market prices, availability of local markets–Ba Town or Nadi), and that kava plants themselves maintain high rates of on-farm productivity.

Most farmers commented on ease of accessibility to plants, cultivars and/or seed-plants.

The importance of Kava in *Vanua* research

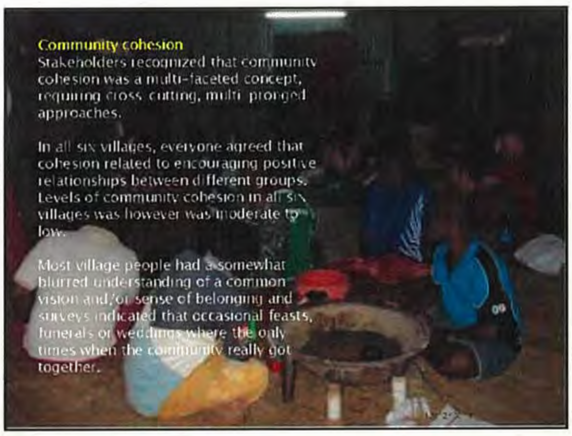
Kava (*Piper methysticum* Forst.f.) is a member of the pepper family (Piperaceae), sustains a central place within upland Fijian culture and social life based on its profound symbolic meaning and cultural understanding (Lebot et al., 1997). Research found that in all communities studied, Kava (*yaqona*) plays an integral part of the villagers' daily lives, either as a complementary social activity (both culturally and spiritually), in ceremonies or rituals, or as an important economic commodity (source of income to improve livelihoods).

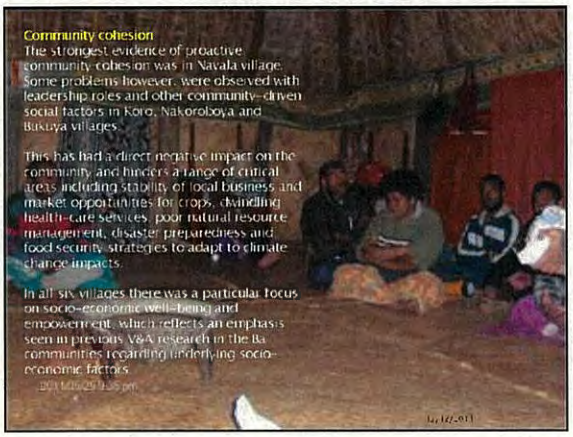
Figure (left): Importance of *yaqona* in all six villages in Upper Ba watershed. Results based on ethnographic analysis and participant observation.

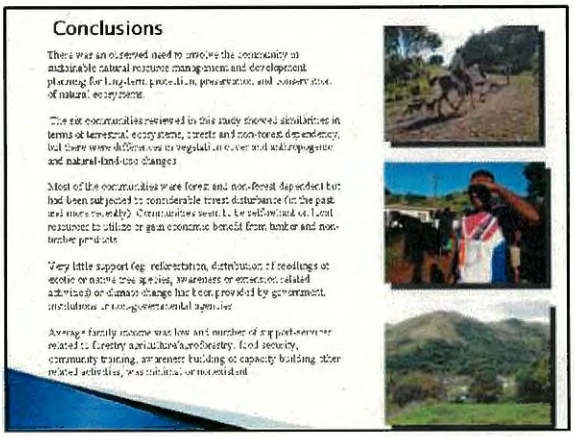
Photo above: [illegible] of the village [illegible] the use of *yaqona* (*Piper methysticum* Forst.f.) (Photo D [illegible])

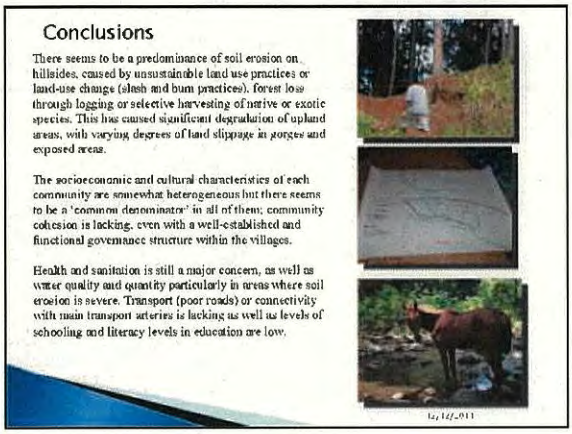
The social, cultural and economic conditions of some of the communities in the Upper Ba watershed were considered poor to marginally improving. Over the past decade or so, there have been very little governmental or non-governmental projects or programmes to assist villagers in coping with climate change or related events or [illegible]

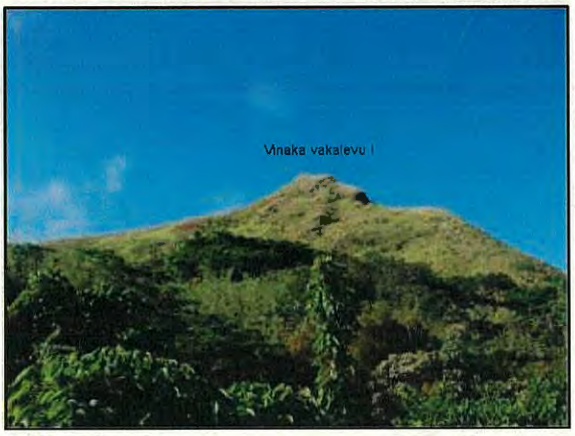
12/12/2011




Community cohesion
The strongest evidence of proactive community cohesion was in Navala village. Some problems however, were observed with leadership roles and other community-driven social factors in Koro, Nakoroboya and Bukuya villages.
This has had a direct negative impact on the community and hinders a range of critical areas including stability of local business and market opportunities for crops, dwindling health-care services, poor natural resource management, disaster preparedness and food security strategies to adapt to climate change impacts.
In all six villages there was a particular focus on socio-economic well-being and empowerment, which reflects an emphasis seen in previous V&A research in the Ba communities regarding underlying socio-economic factors.


Conclusions
There was an observed need to involve the community in sustainable natural resource management and development planning for long-term protection, preservation, and conservation of natural ecosystems.
The six communities reviewed in this study showed similarities in terms of terrestrial ecosystems, climate and non-forest dependency, but there were differences in vegetation cover and anthropogenic and natural land-use changes.
Most of the communities were forest and non-forest dependent but had been subjected to considerable forest disturbance (in the past and more recently). Communities want to be self-reliant on local resources to utilize or gain economic benefit from timber and non-timber products.
Very little support (eg. reforestation, distribution of seedlings of exotic or native tree species, awareness or extension related activities) or climate change has been provided by government institutions or non-governmental agencies.
Average family income was low and number of support-services related to forestry agriculture/agroforestry, food security, community training, awareness building or capacity building other related activities, was minimal or non-existent.


Conclusions
There seems to be a predominance of soil erosion on hillsides, caused by unsustainable land use practices or land-use change (slash and burn practices), forest loss through logging or selective harvesting of native or exotic species. This has caused significant degradation of upland areas, with varying degrees of land slippage in gorges and exposed areas.
The socioeconomic and cultural characteristics of each community are somewhat heterogeneous but there seems to be a 'common denominator' in all of them; community cohesion is lacking, even with a well-established and functional governance structure within the villages.
Health and sanitation is still a major concern, as well as water quality and quantity particularly in areas where soil erosion is severe. Transport (poor roads) or connectivity with main transport arteries is lacking as well as levels of schooling and literacy levels in education are low.


Vinaka vakalevu !

PROJECT SEMINAR FOR THE STRENGTHENING COMMUNITY – BASED MANAGEMENT PROJECT

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34	Kanaya san	JICA Project Team	
35	Yamazaki san	JICA Project Team	
36	Imagawa san	JICA Project Team	
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38	Samuela Kanainaliwa	NDMO	
39	Ropate Rakadi	NDMO	
40	Mereoni Sariki	NDMO	
41	Elenoa Lomalagi	NDMO	
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The Strengthening Community-Based
Disaster Risk Management Project
In
The Pacific Region

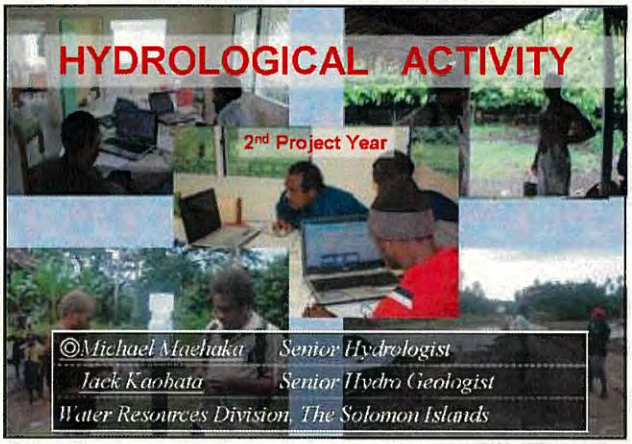
International Workshop

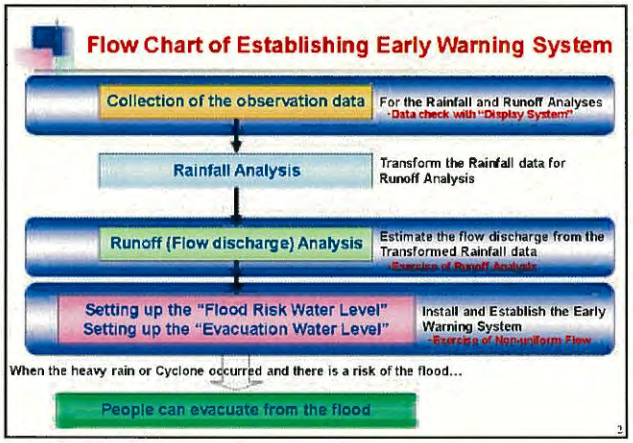
Honiara Hotel, Honiara

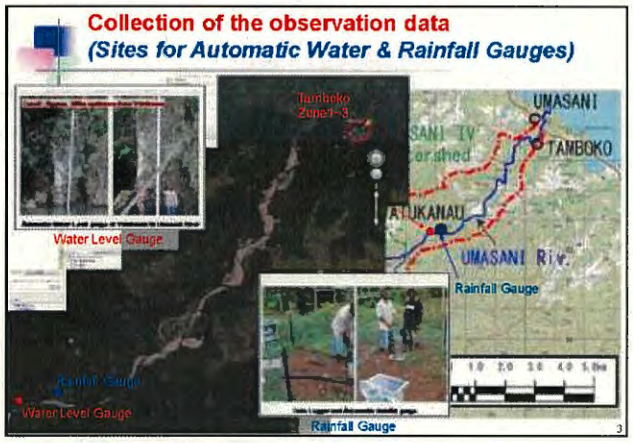
22nd February 2012

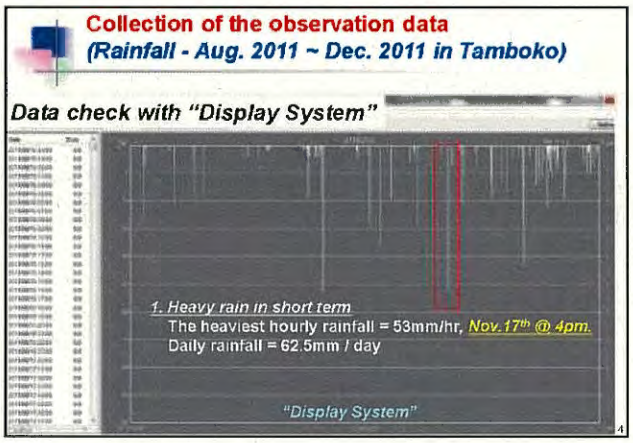
National Disaster Management Office

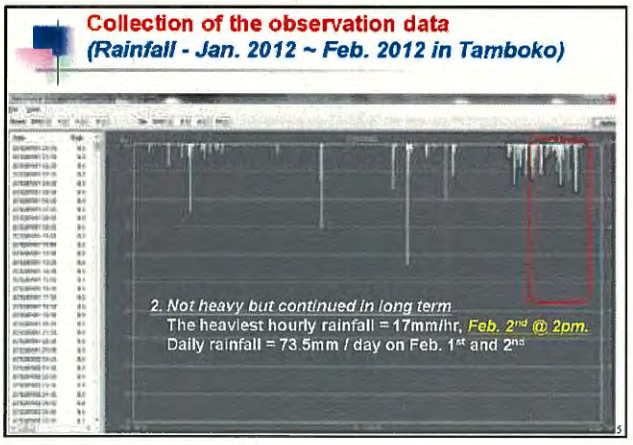
Ministry of Environment, Climate Change,
Disaster Management and Meteorology

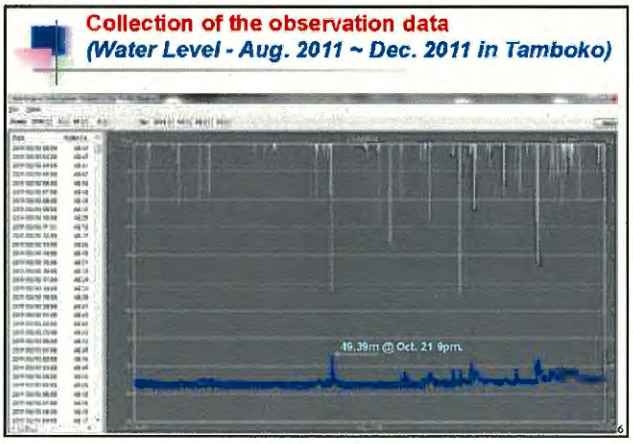

HYDROLOGICAL ACTIVITY
2nd Project Year
©Michael Maehaka Senior Hydrologist
Jack Kaohata Senior Hydro Geologist
Water Resources Division, The Solomon Islands


Flow Chart of Establishing Early Warning System
Collection of the observation data
For the Rainfall and Runoff Analyses
-Data check with "Display System"
Rainfall Analysis
Transform the Rainfall data for Runoff Analysis
Runoff (Flow discharge) Analysis
Estimate the flow discharge from the Transformed Rainfall data
-Exercise of Runoff Analysis
Setting up the "Flood Risk Water Level"
Setting up the "Evacuation Water Level"
Install and Establish the Early Warning System
-Exercise of Non-uniform Flow
When the heavy rain or Cyclone occurred and there is a risk of the flood...
People can evacuate from the flood

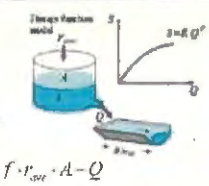

Collection of the observation data
(Sites for Automatic Water & Rainfall Gauges)
Tamboko
Zone1~3
UMASANI
TAMBOKO
ATUKANAU
UMASANI Riv.
Water Level Gauge
Rainfall Gauge
Water Level Gauge
Rainfall Gauge


Collection of the observation data
(Rainfall - Aug. 2011 ~ Dec. 2011 in Tamboko)
Data check with "Display System"
1. Heavy rain in short term
The heaviest hourly rainfall = 53mm/hr, Nov.17th @ 4pm.
Daily rainfall = 62.5mm / day
"Display System"


Collection of the observation data
(Rainfall - Jan. 2012 ~ Feb. 2012 in Tamboko)
2. Not heavy but continued in long term
The heaviest hourly rainfall = 17mm/hr, Feb. 2nd @ 2pm.
Daily rainfall = 73.5mm / day on Feb. 1st and 2nd


Collection of the observation data
(Water Level - Aug. 2011 ~ Dec. 2011 in Tamboko)
49.39m @ Oct. 21 9pm

Storage Function Model in Umasani River basin
(using Storage Function Model)



$$S = K \cdot Q^{P}$$

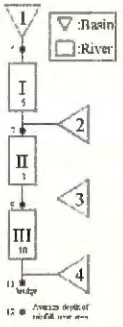
$$\frac{dS}{dt} = \frac{1}{3.6} \cdot f \cdot r_{ave} \cdot A - Q$$

f : Runoff coefficient
Kp : Constants for Storage function method
S : Storage in basin area (m^3)
Q : Direct run - off from basin area (m^3/s)
R_{ave} : Average depth of rainfall in basin area
A : Basin areas(km^2)

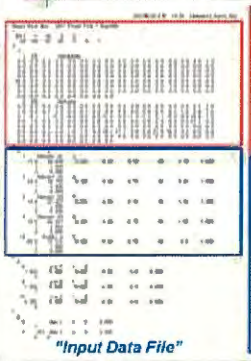
"Program of Storage Function Model"

Storage Function Model in Umasani River basin
(Building up the model)

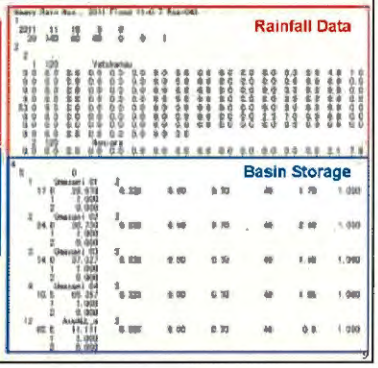
Model Parameter



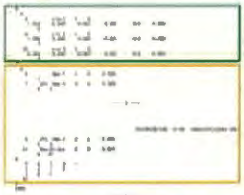
Storage Function Model in Umasani River basin
(Preparation for Input Data 1)



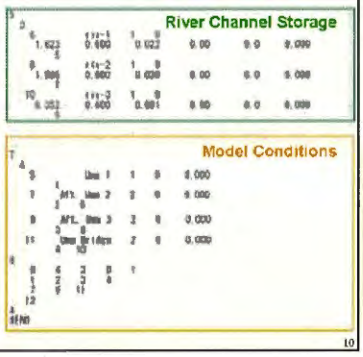
"Input Data File"



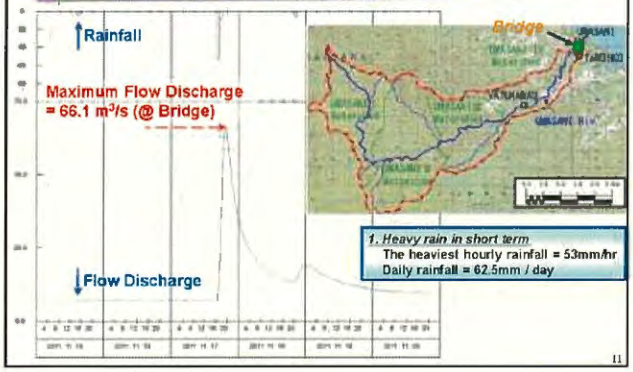
Storage Function Model in Umasani River basin
(Preparation for Input Data 2)



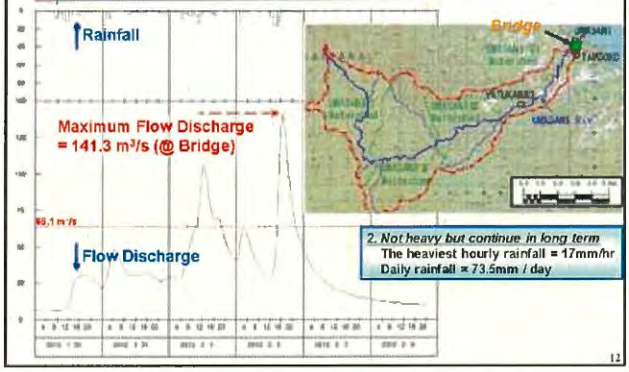
"Input Data File"



Storage Function Model in Umasani River basin
(Result of Runoff Analysis using observed data 1)

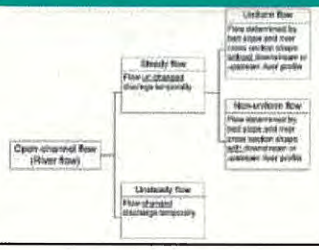


Storage Function Model in Umasani River basin
(Result of Runoff Analysis using observed data 2)



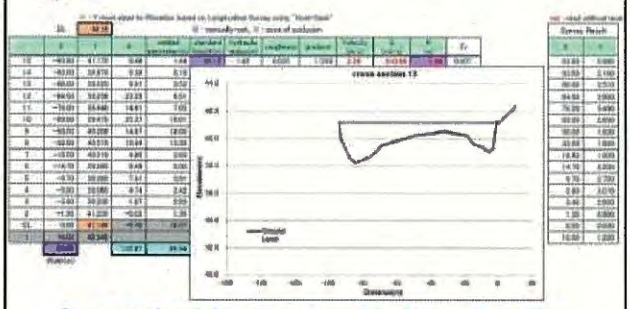
Non-uniform Flow in Umasani River

Uniform Flow	If a constant discharge flows through a channel with unchanging shape of section and gradient, the hydraulic quantities should be determined by uniform flow calculations as a rule.
Non-uniform Flow	When a constant discharge flows through a channel with longitudinally changing shape of section and gradient, the hydraulic quantities should be determined by non-uniform flow calculations as a rule.



13

Non-uniform Flow in Umasani River
(River surveyed data arrangement)

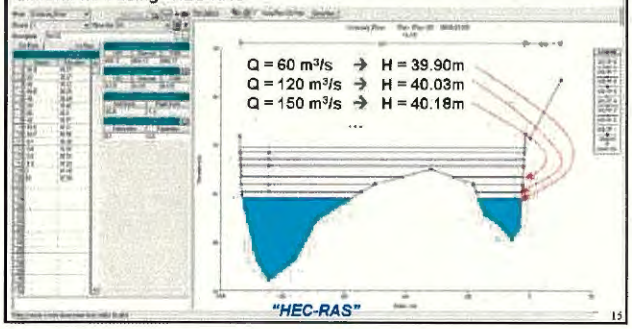


Cross sectional data arrangement for Non-uniform Flow

14

Non-uniform Flow in Umasani River
(using HEC-RAS)

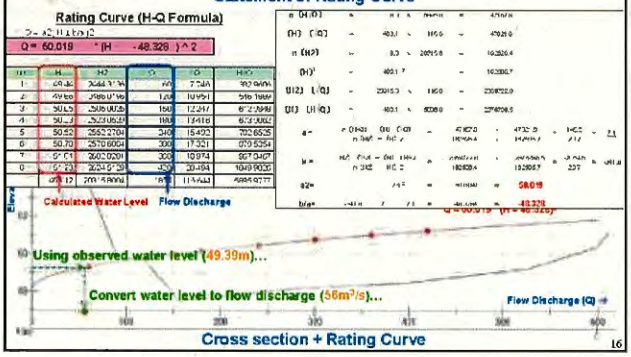
Set the flow discharge and calculate the corresponding water level by non-uniform flow using "HEC-RAS"



15

Non-uniform Flow in Umasani River
(Rating Curve)

Statement of Rating Curve

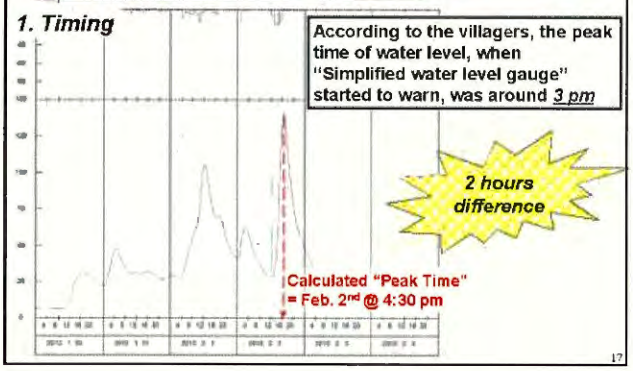


Cross section + Rating Curve

16

Storage Function model & Non-uniform Flow
(Model verification based on observed data 1)

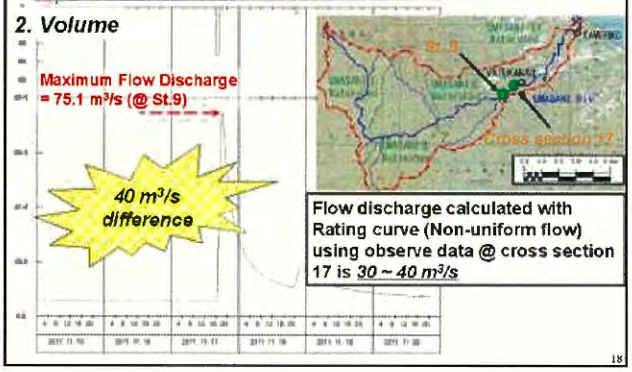
1. Timing



17

Storage Function model & Non-uniform Flow
(Model verification based on observed data 2)

2. Volume



18

Conclusion

- The runoff model and Non-uniform model which were developed for Umasani river basin are primary model. *Model verification using long term observed data is required. However it is important for such models to be developed for the purposes of future flood forecasting.*

- Because there is no telemetry System available, real time forecasting is not possible as yet (Hopefully, when we have such a system in place, the out come might be different from now).

19

Progress in Flood DRM Plan for Guadalcanal Province

The strengthening community-based disaster risk management project in the pacific region

February 22, 2012, Honiara
Joseph Tangi
(tangi.joseph4@gmail.com)
Guadalcanal Education Department

Outline

- 1. DRM plan framework
- 2. Informal Flood Warning in Guadalcanal
- 3. Table top exercise
- 4. Information sharing

1. Cluster system in Solomon Is.

N-DOC	P-DOC	RCC
Logistics & support	Response initial assessment & logistics	Damage & hazard mapping
Response & initial assessment		
Welfare/IDP	Welfare/IDP	Shelter & welfare
Livelihood	Public services & livelihood	Livelihood
Public services		Public services & facilities
Infrastructure	Infrastructure	

National Disaster Management Plan, 2009

Village DR planning

Warning Codes	Flooding/Wave surge – Features/Characteristics
BLUE ALERT	Heavy rain warning - flooding **may follow in 24 – 48 hours** Heavy swell warning – high waves **may occur in 24 – 48 hours** Start taking pre-cautionary measures
YELLOW ALERT Likely within 12 hours	Heavy rain warning - flooding **likely in next 12 hours** Heavy swell warning – high waves **likely in next 12 hours** Take action to secure gardens, property and canoes
RED ALERT	**Heavy rain warning** – flooding **expected within 3 – 12 hours** Heavy swell warning – 3.5m+ waves **expected within 3 – 12 hour hours** Complete preparations urgently and move to a secure place

Extension of plans

	Normal	Warning	Response	Recovery
National / Province			Cluster	Cluster
Province (JICA)	Cluster	Cluster	Cluster	Cluster
Village DR plan		Blue, Yellow, Red		
Community (JICA)	White	Blue, Yellow, Red	Purple	Green

Annual SOP

	Month	Gov't	Community
Normal	Jun.-Aug.	Update info.	Update info.
Before	Sep.	Drill	Drill
During	Oct.-Apr.	Cyclone season	Cyclone season
After	May	Report, revise plan	Revise plan

2. Formal Rain gauges

Formal Rainfall monitoring

	Meteorology service	Water resource department
Monitoring	Manual	Automated
Frequency	Every 3 hours	Every hour
Communication	Manual reading	Off line
No. of stations	2	5
Available data	1960-	1965-

Needs for "Informal" warning

- Dense monitoring station is needed.
  - Rainfall may vary from place to place.
- Real time monitoring is needed
  - Data transmission is a key.
- Schools can be informal station.
  - Mobile phone & radio can be used.
  - School committee as dissemination channel.

Early Warning dissemination

- Formal warning
  - SIMS
  - NDMO
  - WRD
  - Radio, TV, web
  - PDMO
  - Public
- Informal warning
  - School, Clinic
  - Residents, Police
  - PDMO
  - Radio, School
  - Police, Clinic
  - Public

Schools in East Guadalcanal

Schools in West Guadalcanal

Early warning strategy

Area	River	Habited area	Communi cation	Early warning
North east	Longer	Coast to inland	Mobile, FM radio	Feasible
North west	Smaller	Mostly in coast	HF radio, AM radio	Possible
South	Steep	?	HF radio	Difficult

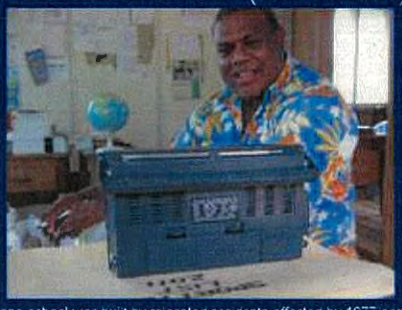
Commercial radio

Station	Wave	Coverage	Operation	Generator
SIBC	AM/FM	National	6am-11pm	Yes
BBC	FM	Guadalcanal	24 hr.	No
ABC	FM	Guadalcanal	24 hr.	No
PAOA	FM	Guadalcanal	24 hr.	Yes
GFM	FM	Guadalcanal	24 hr.	Yes
ZFM	FM	Honiara	?	?

Conditions of school for simplified rain gauge installation

- School in Upstream
- Have mobile phone
- Have solar panel
- Disaster aware school & teacher

Radio at school (Turarana)



Turarana school was built by relocated residents affected by 1977 earthquake. They have working experience of disaster response. They have radio in teachers' room.

Teacher at Selwyn collage

- "I teach disaster to students in the beginning of my geography class, because our school was destroyed by cyclone Namu in 1986."

3. Needs for disaster exercise

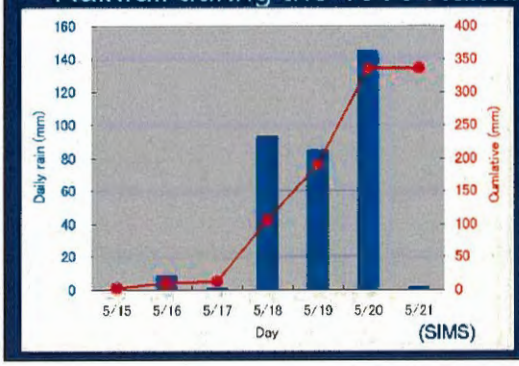
- Disaster does not happen every year.
- Officers changes position time to time.
- People forget disaster experience.
- Each disaster is different.

↓

- Exercise to keep memory.
- Exercise with different scenario.

Cyclone Namu 1986

Rainfall during the 1986 Namu



Scenario 1986 Namu

Date	Situation	Phase
5/16 18h	TC Namu formed	Stand by
5/18 9am	Daily rain 93mm	Warning
5/19 9am	Cumulative rain 188mm	Evacuation
5/21 9am	Rainfall stopped	Response
5/28	1 week after	Recovery

Clusters in province

- Response initial assessment & logistics
- Welfare/IDP
- Public services & livelihood
- Infrastructure

Tabletop exercise

Results of exercise

Needs found by exercise

- Access from coast.
- Liaison with G-Pol.
- Rapid initial assessment template.
- Liaison with other clusters.
- Information management.

4. Information sharing

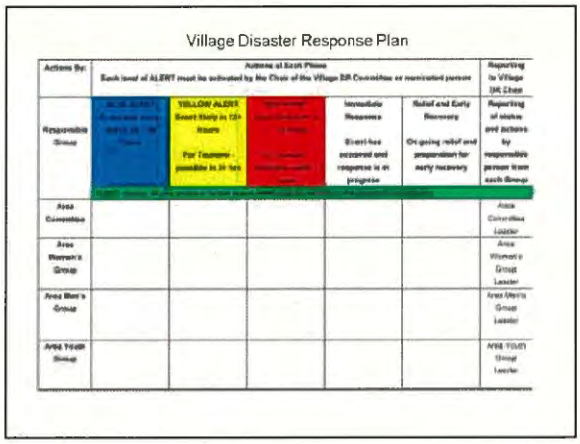
- Information floods during disaster.
- Information sharing needed.
- Blog (web log) is easy to use to publish daily events.
- Start using Common Blog among stakeholders.
- Learning by using.

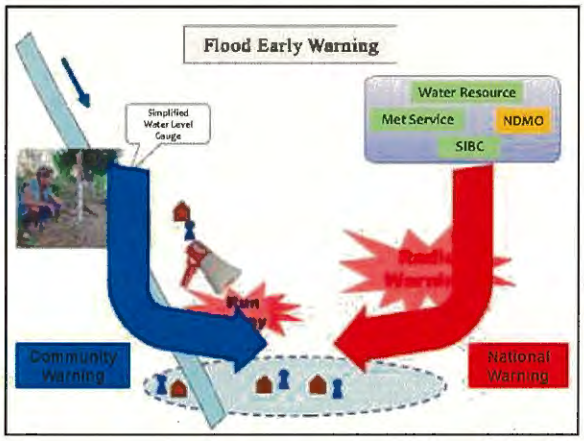
Summary

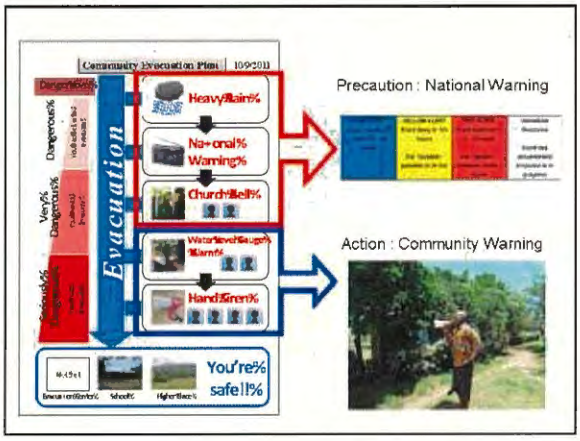
- Provincial plan in line with National plan.
- Informal Flood Warning to be installed.
- Tabletop Simulation for 1986 TC Namu.
- Common Blog for Information sharing.

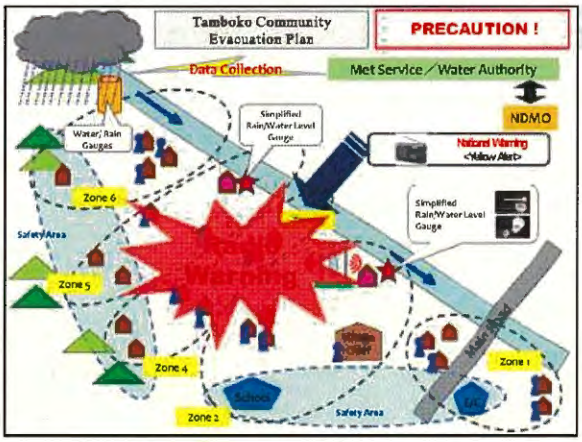
Thank you.

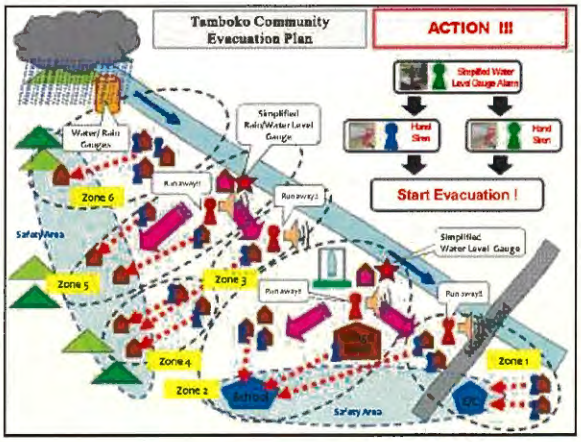

Community Flood Warning
Rain Gauge
Water Level Gauge


Village Disaster Response Plan


Flood Early Warning
Simplified Water Level Gauge
Water Resource
Met Service
NDMO
SIBC
Community Warning
National Warning


Community Evacuation Plan
Evacuation
Precaution : National Warning
Action : Community Warning
You're safe!!


Tamboko Community Evacuation Plan
PRECAUTION !
Data Collection
Met Service / Water Authority
NDMO
Zone 6
Zone 5
Zone 4
Zone 2
Zone 1
Safety Area


Tamboko Community Evacuation Plan
ACTION !!!
Start Evacuation !
Zone 6
Zone 5
Zone 4
Zone 3
Zone 2
Zone 1
Safety Area

Simplified Water Level Gauge

- To visualize traditional knowledge
  → villagers have known danger water level
- A complementary warning
  → a trigger for run away
- Maintained by Community
  → Technical Support by NDMO, Water Resource Div.

Gauge Assembling Workshop in Nadi on 28 Sep 2011

Community-Based Disaster Management in The Solomon Islands

Herrick Savusi
Provincial Disaster Officer
Guadalcanal Province
National Disaster Management Office

Community Based Disaster Management

Purpose: To enhance People's Awareness of Disaster Prevention

1. Preparation Stage (October 2010 to March 2011)
   - Baseline Survey : Living standard, Resource, Experiences
   - Workshop : Introduction of the Project
2. Practice Stage (April 2011 to March 2012)
   - Risk Assessment : Risk Map, Community EW (Hydro Gauges)
   - Exercise : Evacuation Plan & Drill
3. Systematization (April 2012 to March 2013)
   - Documentation : Village Awareness Programme / CDMP
   - Memorization : Voice Record, Radio Drama, Role Play, Museum
4. Extension (April to Oct 2013)
   - National Development Strategy : CBDM Promotion
   - Seasonal Event : National Day for Disaster Preparedness

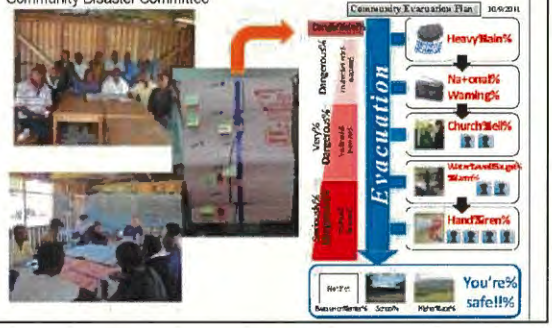
2. Implementation Stage (April 2011 to March 2012)
Risk Assessment : Risk Map, Community EW (Hydro Gauges)
Exercise : Evacuation Plan & Drill

Rain Gauge

Water Level Gauge

2. Implementation Stage (April 2011 to March 2012)
Risk Assessment : Water Level / Rainfall Monitoring
Exercise : Evacuation Plan & Drill

Community Disaster Committee



2. Implementation Stage (April 2011 to March 2012)
Risk Assessment : Water Level / Rainfall Monitoring
Exercise : Evacuation Plan & Drill

Evacuation Drill on 23rd Oct

Tamboko Village

Community Based Disaster Management

Purpose: To enhance People's Awareness of Disaster Prevention

1. Preparation Stage (October 2010 to March 2011)
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Republic of Fiji Islands

The Strengthening Community-Based Disaster Risk Management Project in The Pacific Region

(Technical Cooperation Project)

<For Outcome 1>

Water Authority of Fiji, Western Division

1

Task for Outcome 1

(1) **Develop Capacity of WAF Hydrology for Flood Forecasting**

- ✓ Capacity development to collect flood runoff data
- ✓ To set and calibrate flood runoff model, training for C/Ps personnel

(2) **Strengthen a system for issuing a flood warning**

- ✓ To establish flood warning code based on flood runoff model
- ✓ To improve the system for data transmitting from FMS and WAF to NDMO
- ✓ To improve the system by which NDMO informs residents of warning information

2

Output in 1st Year

- ✓ To attend lectures on Hydrological Cycle and Flood Runoff
- ✓ To collect rainfall data during past floods
- ✓ To prepare the configuration under Flood Runoff Model
- ✓ To order Ba River cross section survey to local contractor
- ✓ To do reconnaissance survey on existing hydrological stations
- ✓ To prepare the specification and order of Ba hydrological network system
- ✓ To recommend data transmitting system from WAF/FMS to NDMO
- ✓ To enlighten communities on simplified warning system

3

FLOOD FORECASTING
Rainfall Impact and River Respond]

- Flood forecasting is the real – time estimation of stage , discharge , time of occurrence and duration of flooding, especially of peak discharge at a specific catchment discharge outlet resulting from rainfall

4

TYPES OF RAINFALL WITH RESPECT TO TYPES OF FLOOD

Rainfall Type	Duration	Intensity	Scale	
Long Rain Floods	Several day or Week	Low	Up to several thousands of Km²	Hindering rainfall in a wide area
Short Rain Floods	Short Duration	High	Local and Regional Scale	Heavy Rainfall
Flash Floods	Very Short Duration	Very High	Local	Localized heavy Rainfall

5

Ba River Catchment Model

BA RIVER DRAIN AN AREA =937KM²

FLOODS IMPACT JAN 2012 west FIJI

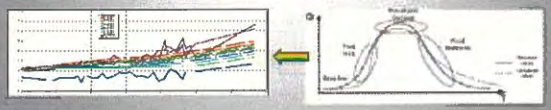
Concept of Flood Hydrology

Flood Runoff Image

Network in Storage Function Model

Hydraulic Calculation from Discharge

Parameter Calibration of Model



Lecture and Drill, starting from October, 2011

Run-off Analysis Manual 1
[Collection and Arrangement of Rainfall and Water level Data]

Run-off Analysis Manual 2
[Formulating of Alood Forecast Model and verification]

Hydraulic Analysis Manual

Four (4) manuals shall be prepared as flowchart

Establishing of Flood Warning Standards Manual

Lecture and Drill from October 2011

- ✓ Current Survey at Key Channal Section
- ✓ Preparation of observation O&M manual
- ✓ Hydrological Data Arrangement and Detection of Abnormal Values
- ✓ Drill and Data arrangement of Average Rainfall Depth in the sub-Catchment
- ✓ Drill of Parameter and Constants for Flood Runoff Model (Storage Function Model)
- ✓ Lecture and Drill of Model Verification
- ✓ Drill of Hydraulic Calculation applying Non-Uniform Flow
- ✓ Rating Curve (H-Q) Estimation through Current Survey
- ✓ Lecture on Setting Flood Warning Code (Water Level)
- ✓ Preparation O&M Manuals on Simplified Warning Gauge
- ✓ Develop a Manual on Warning Transmitting, applying to Evacuation Drill

Technical transfer for WAF

(1) How to transfer hydrological technique

- ✓ Lecture was carried out at once a week or twice from mid Oct. to beginning of Dec..
- ✓ According to document manual, we were taught hydrological knowing those is a basic way of thinking and a principle and a real calculation method by JICA project team.

(2) Technical parts menu

- ✓ 'Average depth of rainfall over area (Thiessen method)'
- ✓ 'Arrangement of HQ curve'
- ✓ 'Hydraulic accounting (Steady flow)'
- ✓ 'Runoffff analysis'
- ✓ And else

Manual documents

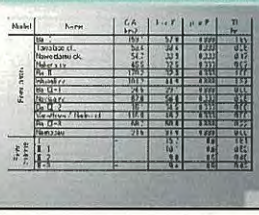
Lecture scenery

Flood Runoff Model (Storage Function Model)

$$\frac{dS}{dt} = \frac{1}{3.6} f \cdot r_{ave} \cdot A - Q$$

f : Runoff coefficient
Ep : Constants for Storage function method
S : Storage in basin area (m^3)
Q : Direct run - off from basin area (m^3/s)
$\bar{r}_{ave}$: Average depth of rainfall in basin area
A : Basin area(km^2)

Constants of Catchment & River Channel



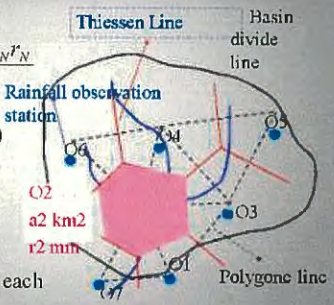
Sub Catchment Division

14

Average depth of rainfall over area Calculation (3)-Thiessen Method

$$r = \frac{a_1 r_1 + a_2 r_2 + \ldots + a_N r_N}{A}$$

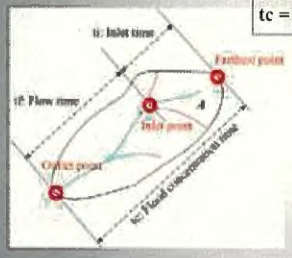
r: Average rainfall(mm)
A: All Basin areas(km^2)
N : Number of rainfall observation points
a_i : Polygonal area(km^2)
r_i : Amount of rainfall in each observation point(mm)



15

Flood concentration time

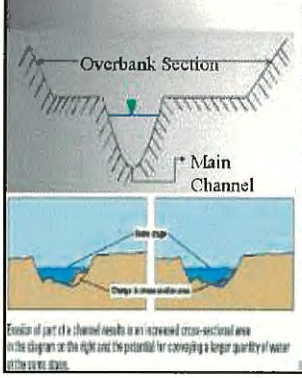
Flood concentration time (tc)
tc = ti + tf

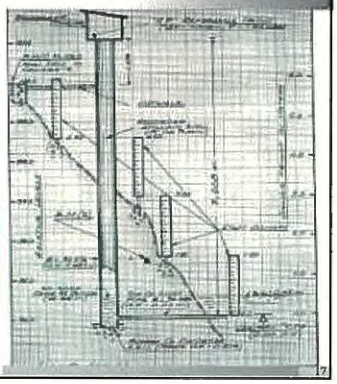


ti –inlet time
tf – flow time – L / V
time it takes for flow from the remotest point to the inlet point or farthest
point of river channel
time it takes from the inlet point or farthest point of the river channel to the
outlet point or point under consideration
L: Length of river channel from its outlet
point to its farthest point (m)
V: flow velocity (m/s)

16

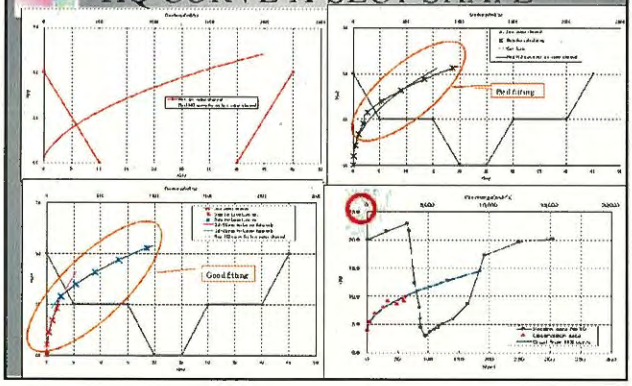
Catchment Calibration Apparatus





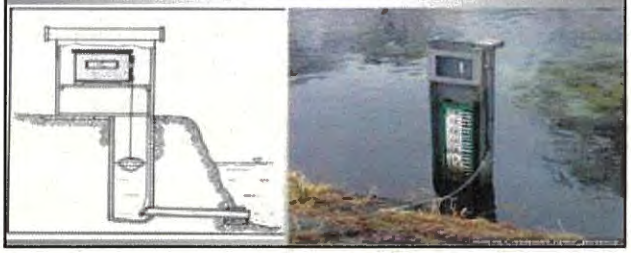
17

HQ CURVE X-SECT SHAPE



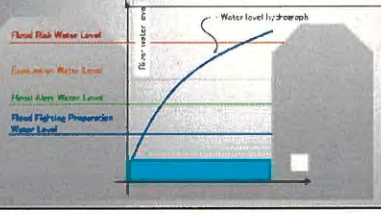
Flood Risk Water Level

- Due to Law in Japan, installation of some 4 kinds of river water level for prevention of flood disasters, occurrence of every water level means measure of beginning flood fighting works, degree of risk for flood damage, as bellow.



Flood Risk Water Level

Water level name	Measure or Action
Flood Risk Water Level	Water level that might have a possibility for being considerable housing inundation.
Evacuation Water Level	Water Level that person of province/municipality/village informs attention for flooding to the resident. And flood fighting corps is to be mobilized.
Flood Alert Water Level	Water Level that person of province/municipality/village informs attention for flooding to the resident. And flood fighting corps is to be mobilized.
Flood Fighting Preparation Water Level	Water Level that flood fighting corps is to start ready



20

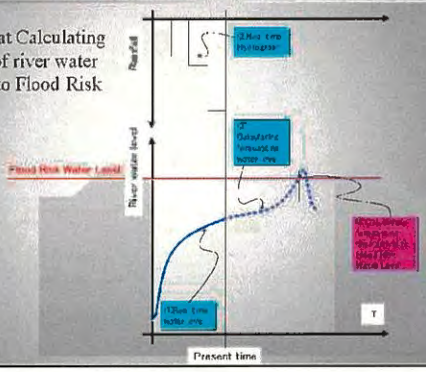
Case of Ba river

- Flood Risk Water Level is having **situation of not securing to safely flow flood by river channel**, minimum water level of inundation by another means. When river water level make as same as Flood Risk Water Level and people start to evacuate on this time, not securing to safely evacuation on a defense of disaster of flood.

21

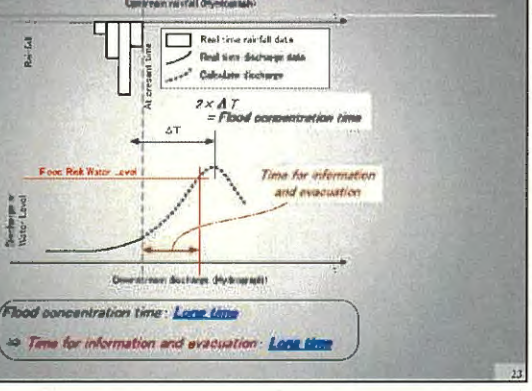
Case of Ba river

This case is that Calculating forecast time of river water level arriving to Flood Risk Water Level.



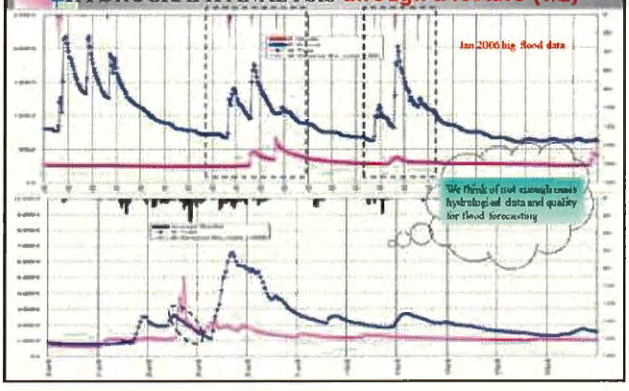
23

Case of Ba river



23

DATA QUALITY PROBLEM DETECTABLE BY HYDROGRAPH ANALYSIS through a lecture (1/2)



General Configuration of Ba Hydrological Network System

25

Ba Hydrological Network with New Equipment

- Rain Gauge Station
  - Toge
  - Koro
  - Nalatowa
- Water Level Gauging Station
  - Toge
  - (Navala)

Location of Hydrological Station

26

Result of GPRS test at Navala

1. Downstream from Navala Village we could not receive any Vodafone wave signal.
2. Downstream near Toge, receive some wave signal, but are unstable.
3. When we move to higher places but away from the river we received good wave signals.

27

BROADBAND CONNECTION

- A need for a new broadband line for the Ba Project Server to be installed at the WAF office in Lautoka.
- Have installed a server for the Nadi Flood Early Warning System at the WAF Operation Room.
- The two servers should collect data from the project stations in Ba and Nadi and one should work as a backup for the other server.

28

Preparation Work

Preparation work was smoothly done with the support of Hydrology staffs

Frame Work for Base Concrete Placing

Adjustment of Frame with Solar Panel

29

New Equipment Installation

Nalatowa station are identified through GPRS Frequency Test by WAF

Nalotawa Raingauge Station

WAF Staff, at Koro Raingauge Station

30

New Equipment Installation at Toge

Toge station is a base station for flood forecasting calculation

Assembling by WAF Staff

✓Data logger, Flash Net, Battery in the box

Completed Toge Station with Rain gauge, W.L Gauging

31

Simplified Warning Gauge for Community

- Promote greater awareness for communities prior to flooding
- Complementary warnings from government agencies
- Teaching the principles of hydrological monitoring to young engineers

More detailed information and trial assembling coming tomorrow

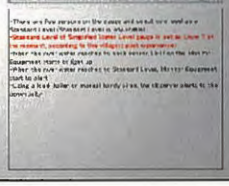
32

Reducing Vulnerability in Community

- As we are all aware of that river flooding in Fiji is a frequent risk due to high rainfall, small river catchments on low lying coastal areas. With the frequent floods occuring in Fiji, the installation of the early warning system will help reduce the flood damages to towns and rural areas.
- Machines that are installed along the Ba River will be transmitting data into a server installed at Ba NDMO's office. During flood periods the river levels will be closely monitored by the NDMO officers and the levels will be sent to all the residents in Ba through text messages or by radio for early evacuation.
- For the critical levels along the Ba River, it will differ according to the geographical structures where people live.
- The JICA Engineers have installed three critical level machines at **Nasolo**, **Votua** and **Nawaqarua** Village, that triggers a warning siren for early evacuation.

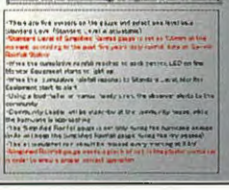
33

Installation of Simplified gauges in Nasolo (Water Level Gauge)



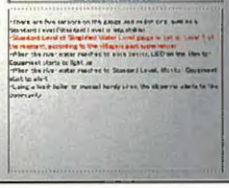
34

Installation of Simplified gauges in Nasolo (Rainfall Gauge)



35

Installation of Simplified gauges in Nawaqarua (Water Level Gauge)



36

Installation of Simplified gauges in Nawaqarua (Rainfall Gauge)



37

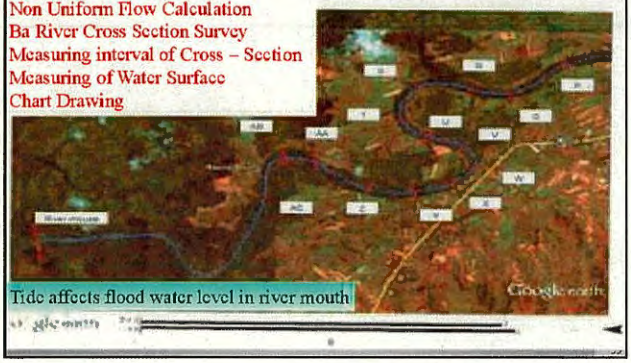
Installation of Electric Siren in Nawaqarua (at Community Leader's house)

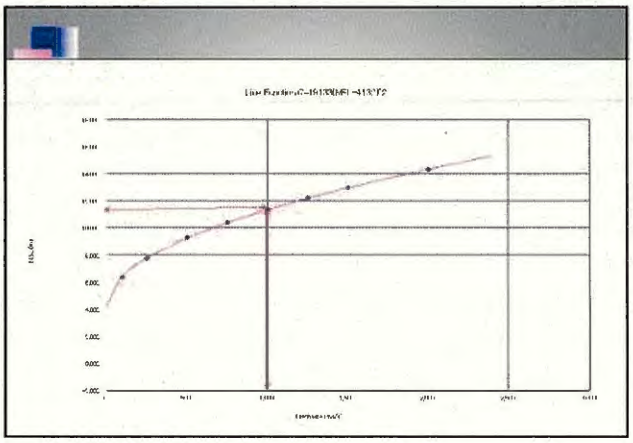


38

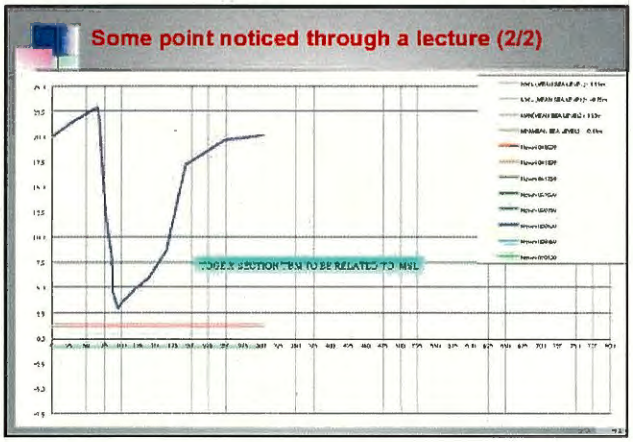
PRACTICAL APPROACH -2012

Non Uniform Flow Calculation
Ba River Cross Section Survey
Measuring interval of Cross – Section
Measuring of Water Surface
Chart Drawing





Some point noticed through a lecture (2/2)

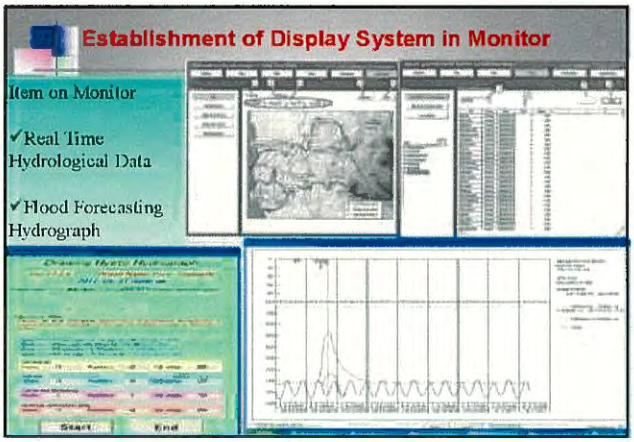


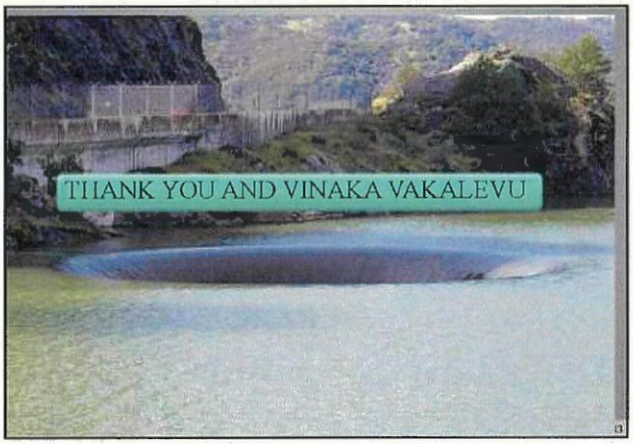
Establishment of Display System in Monitor

Item on Monitor

✓Real Time Hydrological Data

✓Flood Forecasting Hydrograph




TI IANK YOU AND VINAKA VAKALEVU

The Strengthening Community-Based Disaster Risk Management Project In The Pacific Region

Project Seminar

Suva

21 November, 2012

National Disaster Management Office, FIJI

Program

TIME	SESSION	FOCUS	RESOURCE AGENCY/PERSON
8:30-09:00	**Registration**		*All Participants*
09:00-9:15	Opening Remarks	**Greeting**	*Representative of JICA Fiji Office*
09.15-09.35	Welcome Speech	**Greeting**	*Permanent Secretary Provincial Development & National Disaster Management: Mr. Filipe Alifereti*
09.35-09.55	Report of Japan Training	Disaster Management	*National Disaster Management Office Mr. Joji Satakala*
09.55-10.15	Report of Japan Training	Hydrology & Hydraulic	*Hydrology Department Mr. Paula Tawakece*
10.15-10:40		**Break**	*All Participants*
10.40-11:00	**SESSION 1**	**Outcome 1** Ba Early Warning Information System	*Hydrology Department Mr. Paula Tawakece*
11:00-11:20		Simplified Early Warning System	*Hydrology Department Mr. Tomasi Naborisi*
11.20-11.50		*Questions & Answers*	
11:50-13.00	**Lunch**		*All Participants*
13:00-13:20	**Session 2**	**Outcome 2** Standard Operational Procedures	*Ministry of Health, Ba Hospital Dr.Luse Tinaikui*
13:20-13:40		Regional Disaster Management Plan	*Commissioner Westerns Office Mr. Kaie Nawasa*
13.40-13.50		*Questions & Answers*	
13.50-14.15	**Session 3**	**Outcome 3** Nawaqarua Community Evacuation Drill	*Fiji Red Cross Society Mr. Pauliasi T Caucau*
14.15-14.25		*Questions & Answers*	
14:25-14.45	Report of Japan Training	Disaster Education	*Education Department, G-Province, SI Mr.Joseph Tangi*
14.45-14:55		*Questions & Answers*	
14.55-15.20	Special Report	Key Issue, IFM	*Nadi IWRM Demo Project Mr. Vinesh Kumar*
15.20-15.30		*Questions & Answers*	
15.30-15.40	**Closing Remarks**	Vote of Thanks	*Director, National Disaster Management Office Mr. Manasa Tagicakibau*

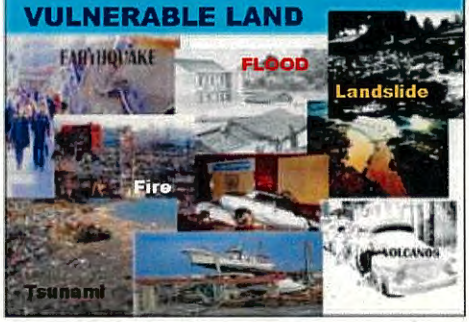
Lesson and Impression in Japan Training

Mr. Joji Saketala
NDMO, FIJI

Impression

- Archive of historical disaster events.
- Lessons Learned from past experience
- Public Education is their main priority
- Disaster Management is incorporated into development efforts
- Clear demarcation of responsibilities among the national, prefectural and local authorities
- Ohkouzu diversion channal – before, present &future – best rice in japan.
- Institutionalizing of Tsunami disaster into the Education curriculum.
- The used of NPO or Volunteers to assist during Disaster

VULNERABLE LAND



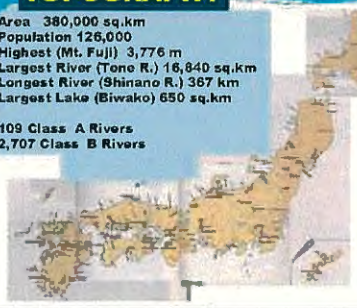
FLOOD COUNTER MEASURES

- DAMS
- RETARDING BASINS & CONTROL BASINS
- RIVER CHANNEL IMPROVEMENT
- FLOODWAYS
- FLOOD GATES
- PUMPING STATIONS
- REFORESTING

TOPOGRAPHY

Area 380,000 sq.km
Population 126,000
Highest (Mt. Fuji) 3,776 m
Largest River (Tone R.) 16,840 sq.km
Longest River (Shinano R.) 367 km
Largest Lake (Biwako) 650 sq.km

109 Class A Rivers
2,707 Class B Rivers



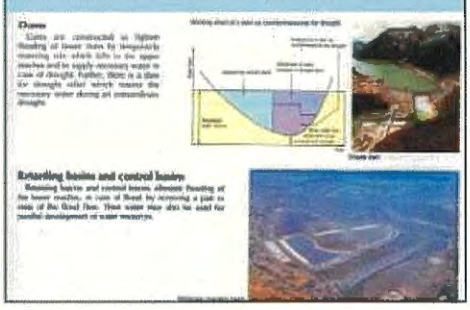
NATURAL CONDITIONS

- Narrow strip
- High mountain
- Weak rock and soil
- Steep and short rivers
- Chronic Typhoon
- Active volcanoes
- Frequent Earthquake

FLOOD COUNTER MEASURES

- EROSION CONTROL OF MOUNTAIN STREAM & RIVER BANK
- BANK PROTECTION – SAND BAG
  SODA MATRESS
  TYRES
  GABION MATRESS

COUNTERMEASURES AGAINST FLOOD



COUNTERMEASURES AGAINST FLOOD

River channel improvement

Flood channel improvement is to be executed so that flow volume will be enlarged by channel widening, bank construction and solidification, and riverbed dredging, and so that flooding which is inferior to the design flood will be discharged safely without inundation.

Floodways

A floodway is an artificial canal to divert a part of a flood over the middle and lower reaches of a river stream to another river or sea. In case existing channel improvement cannot cope with the design flood, a floodway is to be constructed.

COUNTERMEASURES AGAINST FLOOD

Floodgates

In case of flood, water from a main river flows back up a tributary and may cause an inundation. A floodgate is used to prevent flooding caused by such reverse flow.

Pumping station

In case of flooding in some area, once the water level of a river rises, drainage is impossible. To pump drainage of inner water of these areas, a pumping station is installed.

Foundation by wood frame and Bank protection by gabion mattress (Kenya)

Erosion control of mountain stream and riverbank (Nepal)

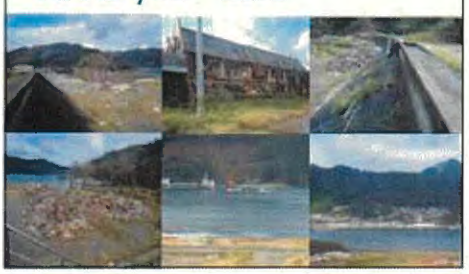
REFORESTING and Crib by gabion mattress (Nepal)

KAMAISHI FIELD TRIP

- STORY BEHIND THE SUCCESS
- WORKING TOGETHER FOR DISASTER
- FIGHTING DISASTER – MTIGATION/PREVENTION
- LINKING DISASTER TO DAILY LIFE–
- DISASTER EDUCATION – 1hr per wk
- THREE DRILLS ANNUALLY
- HOW THEY KEEP MEMORY OF DISASTER

Erosion control of mountain stream and riverbank (Nepal)

KAMAISHI CITY – TSUNAMI MARCH, 11TH 2011



SANJO CITY FLOOD MANUAL FOR CITIZEN

- HOW TO RETRIEVE INFORMATION
- EVACUATION STAGES - EVACUATION CENTRE
- HOW TO EVACUATE
- DISTRIBUTION OF INFORMATION & GOODS
- EVACUATION PROCEDURES FOR DISABLED
- SETTING OF LOCAL DISASTER PREVENTION ORG.
- INFOR ON RAIN &
- CHECKLIST

MOU IN SANJO CITY PLAN

- LOCAL GOVT.
- MEDIA - COMMUNITY FM RADIO ETC
- SUPPLIERS & DISTRIBUTION OF GOODS
- REMOVAL OF DEBRIS
- TRANSPORTATION
- RECOVERY & REHAB
- WELFARE

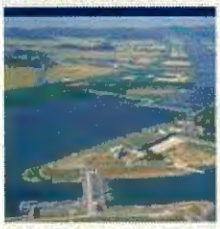
TRADITIONAL FLOOD MITIGATION WORK

NIGATA CITY

- EDUCATION CENTER
- GEOGRAPHY
- HISTORY
- CULTURE
- WORKS
- DISASTER
- COMMUNITY ORGANIZATION - KEY DISASTER AGENCIES, NGOS, VOLUNTEER/FIRE FIGHTING ALL WORKS OF LIFE INVOLVE THEM IN DISASTER WORKS

THE SHINANO RIVER STATION

- FIRST FLOOR - HISTORY & LIFE OR ENCOUNTER & KNOW
- SECOND FLOOR - TECHNOLOGY & WORKS LEARN & FEEL
- THIRD - LIBRARY
- FOURTH - OBSERVATORY



OHKOUZU MUSEUM

SHINANO RIVER & FLOOD GATE

2012/11/19

SODA MATRESS WORK

IMPACT OF COMPREHENSIVE DISASTER MANAGEMENT TRAINING

STRONG POINTS

- Archive of historical disaster events
- Lessons Learned from past experience
- Public Education is their main priority
- Disaster Management is incorporated into development efforts
- Clear demarcation of responsibilities among the national, prefectural and local authorities
- Ohkawa diversion channel – before, present &future – best use in japan
- Institutionalizing of Tsunami disaster into the Education curriculum - Kamaishi

Lessons and Actions learned from the Training

Problem	Lessons Learned in Japan	Actions to be Taken
Limited use of flood country measures and improper water resource management strategies.	Maximum use of EWS including Technological equipments.	Proposed government to procure equipment to evaluate the sustainability of flood prone Areas and monitoring system.
Lack of Technical expertise in Fiji ➢River Diversion ➢Retention Dam ➢Creation of River Out flow	More advance in technology and more qualified personnel in each respective areas of work.	➢Proposed government the importance of Training for the Technical Expertise. ➢Through bilateral arrangements between Japanese and Fiji government.

PROPOSED ACTIVITIES FOR FIJI

- Public education &awareness to be strengthened and to be in vernacular
- Basic training on met and hydrology – so warnings and advisories are properly given
- Archived information for public education and predictions
- After Action Reports to be done
- Smart Partnership and networking
- Strengthening of Integrated Appraisal information sharing
- Crisis Management Exercise for NDMO, WAF, MET to test SOP
- More disaster management trainings for local municipalities
- Hazard Mapping to be incorporated into work plan of the Dept. of Town & Country Planning and the Rural Local Authority
- Enforcing the HASAW Act, 1996

2012/11/19

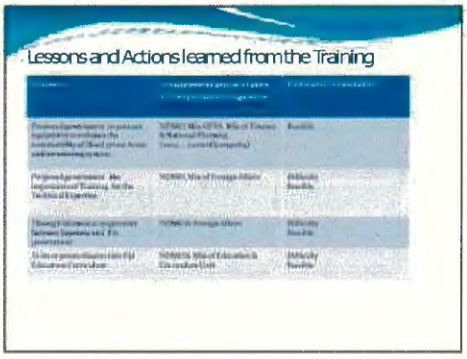
2012/11/19

Lessons and Actions learned from the Training

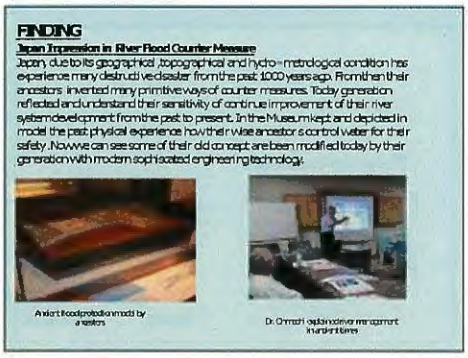
Lessons and Actions learned from the Training

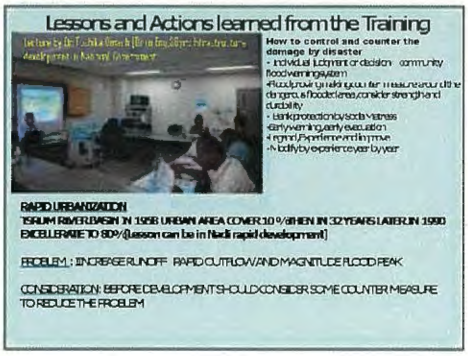
Problem	Lessons Learned in Japan	Actions Taken
GAPs identified in the disaster Act and DM plan	Links between Central Government, Prefectural and Municipalities are very intact in relation to Disaster Act and DM Plan Clear demarcation of responsibilities at all levels of Governance.	DMA Currently under Review Wider consultation with all disaster key agencies Roles of Municipalities to be included in the DMA. Municipalities, Support Agencies and communities to have DM Plans.
Outdated policy	Reviewed annually or changes should need arises	Conduct regular consultations and policy review

Lessons and Actions learned from the Training




Strengthening Community Based Disaster Risk Management
Training - Japan
17th – 30th September, 2012
Hydrology & Hydraulics
Paula Tawakece
Technical Officer- 1
National Metrology & Hydrology Service
The Republic of Fiji Islands

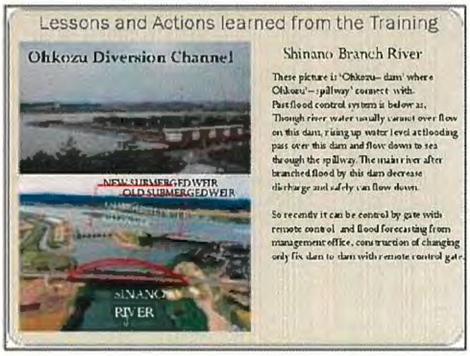

FINDING
Japan Impression in River Flood Counter Measure
Japan, due to its geographical ,topographical and hydro - metrological condition has experience many destructive disaster from the past 1000 years ago. From then their ancestors inverted many primitive ways of counter measures. Today generation reflected and understand their sensitivity of continue improvement of their river system development from the past to present. In the Museum kept and depicted in model the past physical experience how their wise ancestor s control water for their safety .Now we can see some of their old concept are been modified today by their generation with modern sophisticated engineering technology.
Ancient flood protection model by ancestors
Dr. Ohmachi explained river management in ancient times

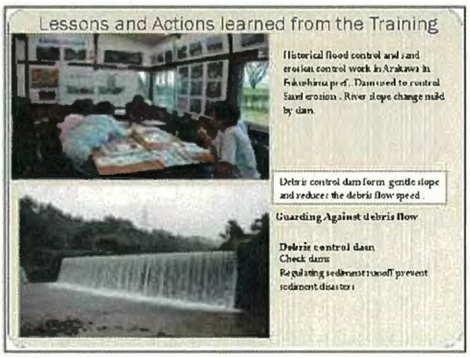

Lessons and Actions learned from the Training
How to control and counter the damage by disaster
- Individual judgment or decision community flood warning system
-Flood proofing making counter measure around the dangerous flooded areas consider strength and durability
- Bank protection by soda Matress
-Early warning, early evacuation
-Legend, Experience and improve
-Modify by experience year by year
RAPID URBANIZATION
TSURUMI RIVER BASIN IN 1958 URBAN AREA COVER 10 % THEN IN 32 YEARS LATER IN 1990 EXCELLERATE TO 80% (Lesson can be in Nadi rapid development)
PROBLEM : INCREASE RUNOFF RAPID OUTFLOW AND MAGNITUDE FLOOD PEAK
CONSIDERATION: BEFORE DEVELOPMENT SHOULD CONSIDER SOME COUNTER MEASURE TO REDUCE THE PROBLEM


flow by 3 times compared to 50 years ago
Now Japan considering the measure against Climate Change trend to improve past planning and design to avoid future disaster and begin to change construction action standard and software for example hazard map
Rainfall intensity and annual daily maximum rainfall is used in design of dams
HARDWARE
SOFTWARE


Lessons and Actions learned from the Training
(Dynamic Hazard Map)


Lessons and Actions learned from the Training
MINISTRY OF LAND INFRASTRUCTURE AND TRANSPORT
RIVER,ROAD AND PUBLIC BUILDING
•Mandated to forecast flood-Monitor Meterological,Hydrological, water quality observation
•Maintenance procedure is under the government. instrumentation,survey..[Quality Control]
•Conference room equip with CCTV and TV in 24 hrs image observing the field situation can be seen on the screen Use as Operation centre during and after disaster or disaster prevention centre in wider area


Lessons and Actions learned from the Training
Ohkozu Diversion Channel
NEW SUBMERGED WEIR
OLD SUBMERGED WEIR
SINANO RIVER
Shinano Branch River
These picture is 'Ohkozu– dam' where Ohkozu'– spillway' connect with.
Past flood control system is below as,
Though river water usually cannot over flow on this dam, rising up water level at flooding pass over this dam and flow down to sea through the spillway. The main river after branched flood by this dam decrease discharge and safely can flow down.
So recently it can be control by gate with remote control and flood forecasting from management office, construction of changing only fix dam to dam with remote control gate.


Lessons and Actions learned from the Training
Historical flood control and sand erosion control work in Arakawa in Fukushima pref.. Dam used to control Sand erosion . River slope change mild by dam.
Debris control dam form gentle slope and reduces the debris flow speed .
Guarding Against debris flow
Debris control dam
Check dams
Regulating sediment runoff prevent sediment disasters

Lessons and Actions learned from the Training

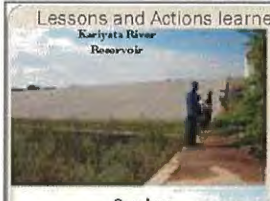
Flood forecasting System in Sagami River

Flood forecasting System in Sagami River, Kanagawa pref..
These forecasting system is observing water level and discharge with rainfall forecasting using rainfall mesh data from Meteorological Agency.
Doppler radar process change to rainfall contour lines then convert to mesh data in intensity rainfall done by Japan metrology Agency.

6 hours ahead Flood forecasting

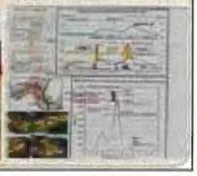
Lessons and Actions learned from the Training

Kariyata River Reservoir



These picture is retarding basin for flood control at 'Kariyata river' Niigata pref.. Though this area outside river bank usually used as paddy field or farm, now it is used as reservoir to store excess flood water temporally when flood occur, and delayed flow down safely to down stream.
From design flood, excess flow to reservoir construction have effect of cut off the peak of discharge hydrograph and can safely flow downstream after flood. Therefore make flood risk potential low in downstream area from dam.

Open levee



Lessons and Actions learned from the Training

Hazardous point of the river (bridge replacement is planning)

Lessons and Actions learned from the Training

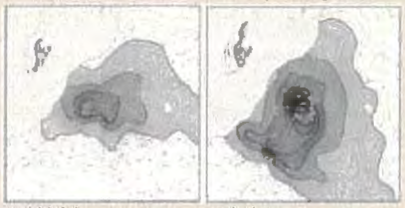
Super levee is very wide levee (around 300m width at Ara River)

The picture shows' Super levee' in 'Ara – river' in Tokyo and Saitama pref.. Super levee design is wider than normal type levee at 5m, the land on the levee outside river is used for housing or apartment. This kind of levee is very hard by flood to break. This measures compound land use and flood control in urban area for many housing.

Difference of Rainfall Distribution in Sanjo City

- 72 hours at 24:00 on 13/07/2004
- 72 hours at 24:00 on 30/07/2011

Rainfall - Less inundation | Heavy Rainfall - Big inundation



9 people died in flood

Fiji Situation-LESSON LEARN ,2009..2012 FLOOD

Flood Risk Mitigation Project ACTION PLAN

Flood Forecast and Early Warning System (Non Structural Measure)

Fiji faces frequent floods every year that needs to be address. Flooding is a major problem with potential to produce a disaster national importance. The Metrology and Hydrology provides a range of flood warning and hydrometeorology advisory services aim at reducing the social and economic impact. A house warnings about the expected extent of a flood allow flood preparedness and emergency services to activate procedures to ensure an efficient community response. In urban areas this response will include action such as removal of household effects to location above predicted flood levels and evacuation of people in low lying areas. In rural areas flood warning provide time for stock to move to safer ground and for removal of pumps and other agricultural equipment in and near river banks.
A relatively recent development is the introduction of an event reporting Voda Phone telemetric system for flood warning. The system consist of field stations which transmit rainfall and river level information by Voda phone Repeater link to a receiving station. The system overcomes many of the problems associated with data collection and analysis for flood forecasting and warning, particularly in Basins where warning times are short and potential avoidable damage is high.

Hydro-meteorological design data, which include information on the intensity, frequency and duration of rainfall, are used to design a wide range of drainage such as large dams. Reliable design data mean the performance of these structures during heavy rainfall can be planned to minimize the community impact of the failure.

Flood Warning Enhancement

The Water Authority of Fiji is responsible for river monitoring and flood forecasting. Its Hydrology Unit is the sole agency of hydrological work in Fiji. Currently assisting in the implementation of the two Flood forecasting project in the western division are Ba and Nadi Basin under way as Pilot projects. It has an established hydro-metro network that covers the western division in three project areas: Water Supply Schemes, Hydro-Electricity Schemes and General Water resource (Flood Forecasting). The pilot projects is our first experience in Flood warning system in the west of Fiji. Many other areas in the division those are prone to flooding which is the target to be equip with flood Warning in the near future. After the great deal of damage by flood 2009 and 2012 the government was mooted to improve hydrological operation and institutional frame work. For this it has been approved by the cabinet to see hydrology merge with the National Metrology of Fiji.

Hydrology work Issues

Challenges

- After flooding the collection of river discharge and maintenance work
- Provided with suitable 4x4 vehicle
- No instrument spare parts in local market
- Data Analysis Capacity

Achievement able

- Improve Technical Capability
- Merger with Metrology Dept
- Government prospect to telemetric all hydrological station in Fiji
- Increase number of stations in the Ba catchment for ideal model studies

Strengthening of Hydrology Unit

- Request Jica to provide Technical Hydrologist under their voluntary scheme for Hydrology Unit.
- To prepare Hydrology flood SOP
- To have a flood forecasting model for Ba and Nadi River
- To collect accurate good quality data from the hydrological network

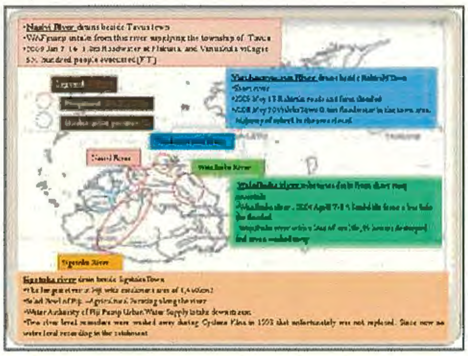
Project Conscious in Expansion

The Government of Fiji has describe its intention to expand and equip Hydrology operation to other areas in Fiji that are at risk to flooding to be incorporated with rising river level and rain gauge monitoring information during flood. Prospect to developments of Flood forecasting system and Early Warning System in the western division identified are:

- Sigatoka River
- Nasivi River
- Rakiraki River
- Upper Wainibuka River and Tributaries

There are four Areas phase in this Installation and Construction Work Are Categorize hereafter

The First Phase the Procuring of appropriate instrument that will be indented overseas. The second is the implementation phase which includes adequate training in operating and maintaining the equipment. The prime requirement will be for simple and robust equipment that will operate satisfactorily in the tropical maritime environment. Care must be taken to ensure the equipment has long operating life and needs minimal maintenance.



Improvement on Early Warning System

- Upgrade all station instrument
- Before wet season check and service instrument capabilities
- Install Staff gauge at possible flood areas and educate observers about flood events
- Installation of siren at strategic point to alert warning
- Intensify Flood awareness campaign and TV broadcast during wet season period

Lessons and Actions learned from the Training

Problem	Lesson learned in Japan	Action to be taken
Insufficient number of hydrometric stations in the study catchment	Empirically 50 km² per station network	1. Preparation of presentation slide which can convince them the importance of hydrological data for flood prevention 2. Request the government to purchase three set of instrument per year
Lack of equipment to alert warning	Risk flood prone areas are equip with siren and monitoring camera. Monitoring camera image of river level is transmitted to the screen in the conference room	1. Propose to the government for equipment procurement to enhance reliable information system from critical flood prone areas 2. Monitoring information will be provided to NDMO

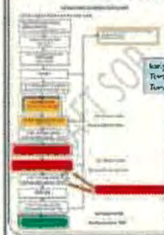
Lessons and Actions learned from the Training

Problem	Lesson learned in Japan	Action to be taken
Unavailable of disaster prevention resource map / flood hazard map	Flood hazard map is available from each municipality office. Provided to the public, individual and postures of recorded water depth, projected water depth and evacuation centers	1. Task force 1 and 2 are now conducting drawing of disaster prevention resource map 2. Task force 3 is now conducting community based one. 3. Following the project activity, making hazard maps in other areas

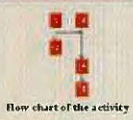
Whole town hazard map

Lessons and Actions learned from the Training

Problem	Lesson learned in Japan	Action to be taken
Insufficient operation and management of flood forecasting	*Understanding the risk of flood damage to the people *Preventing and avoiding the risk *Mitigating damages during the flood *Preventing the expansion of damage	1. Conducting drill of flood forecasting system in Nadi River using SOP 2. Find out the problem encountered in activity 1 and examine the solution 3. Building SOP for Ba River 4. Install the minimal required equipment in Ba town. 5. Conducting drill of flood forecasting system in Ba River



Early Warning Siren will be installed in Nadi Town on 12.10.2012 to be replicated to Ba Town - 2013 depend on the effectiveness



Flow chart of the activity

Lessons and Actions learned from the Training

Problem	Lesson learned in Japan	Action to be taken
Inadequate hydrological data / Maintenance work Lack of understanding the important of keeping hydrological and disaster record	Since many years ago people keep the record of disaster (400 years ago) and hydrological data (more than 50 years ago) for reminding the lessons they learned from the past disaster and future improvement in flood prevention measures because people knew the importance of it	*Request government to provide reliable and producing quality / robust equipment and housing structure in respect to its long term operation *IT personnel staff to archive data in safe and well secure program.

Record of ancient construction work for flood prevention

Kariyata River reservoir
(Farmers allowed local government to use their land for reservoir)

Lessons and Actions learned from the Training

Problem	Lesson learned in Japan	Action to be taken
Lack/Appropriate action after flood	*Local government in Japan evaluated the effectiveness of counter measures they took by questionnaire survey to the communities *The exercise was carried out in Saga City by a professor from the university. *From the report they to improve counter measures in Saga City	It will be replicated to Fiji situation questionnaires: *Could you receive the information received FMS or disaster related organization. *Was the timing of issue appropriate *Which action did your household take during flood *Did your support the vulnerable people during the disaster *How did you receive the evacuation information

Sanjiv Lily sellan (Deputy Director of Emergency affairs)

Lessons and Actions learned from the Training

Actions	Implementation date & Responsible agencies	Difficulty (Feasibility)
Request the government to purchase three set of instrument per year	2013-2015- NHMS	Feasible*
Propose to the government for equipment procurement To enhance reliable information system from critical flood prone areas Monitoring information will be provided to NDMO	2012 – 2013- JWRM, NHMS	Feasible*

*Because the flood in 2012 Fijian government understood the importance of flood prevention and agreed November 2013 budget already. That is the reason why those actions described above are feasible

Bubble type water level gauge

Rainfall gauge

13

Reducing Vulnerability in Community

- As we are all aware of that river flooding in Fiji is a frequent risk due to high rainfall, small river catchments on low lying coastal areas. With the frequent floods occurring in Fiji, the installation of the early warning system will help reduce the flood damages to towns and rural areas.
- Machines that are installed along the Ba River will be transmitting data into a server installed at Ba NDMO's office. During flood periods the river levels will be closely monitored by the NDMO officers and the levels will be sent to all the residents in Ba through text messages or by radio for early evacuation.
- For the critical levels along the Ba River, it will differ according to the geographical structures where people live.
- The JICA Engineers have installed three critical level machines at **Nasolo, Votua** and **Nawaqarua** Village, that triggers a warning siren for early evacuation.

Nawaqarua critical site equip with simplfied Early warning system

15

Lessons and Actions learned from the Training

Actions	Implementation date & Responsible agencies	Difficulty (Feasibility)
*Ask Mr Yamasaki and Jacques to draw disaster prevention resource map. *Community base already provided by Mr Kanaya	2012 – 2015 NDMO,NHMS	Feasible
1 Conducting drill of flood forecasting system at Ba River using SOP 2 Find out the problem encountered in activity 1 and execute the solution. 3 Making SOP for Ba River 4 Install the minimal required equipment in Ba town 5 Conducting drill of flood forecasting system at Ba River	2012 – JWRM, NHMS SERVICE	Feasible

Simplified Warning Gauge for Community

- Promote greater awareness for communities prior to flooding
- Complementary warning from government agencies
- Teaching the principles of hydrological monitoring to young engineers

Lessons and Actions learned from the Training

Actions	Implementation date & Responsible agencies	Difficulty (Feasibility)
*Request government to provide vehicle and procuring quality /robust equipment and housing structure in respect to its long term operation *IT personnel staff to archive data i.e. safe and well secure program	2012 – 2015 – (NDMO) NHMS	Feasible
It will be replicated to Fiji situation questionnaires: *Could you receive the information received FMS or disaster related organization *Was the timing of issue appropriate *Which action did your household take during flood *Did your support the vulnerable people during the disaster *How did you receive the evacuation information	2012 – JWRM, NHMS SERVICE	Feasible

Installation of Simplified gauges in Nasolo (Water Level Gauge)

14 添-279

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Installation of Simplified gauges in Nasolo (Rainfall Gauge)



17

Maintenance Check (1)

- Electric Siren, Stand by Generater
- Silting Up in W.L Gauge, After Flood


Inspection / Test, before Cyclone season and fast after flood event.
(Warning Issue in the Drill)

Electric Contact Test for Warning Level

19

Installation of Simplified gauges in Nawaqarua (Water Level Gauge)

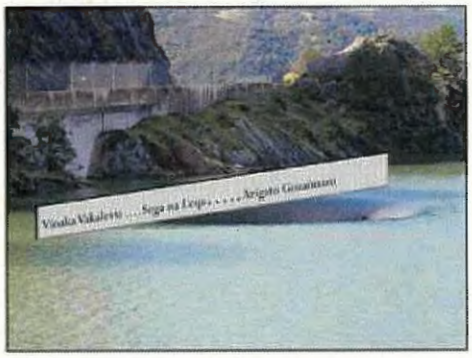


Maintenance Check (2)

- Monitor Buzzer Sound Check
- Battery Charge by Gender


Installation of Simplified gauges in Nawaqarua (Rainfall Gauge)





Installation of Electric Siren in Nawaqarua (at Community Leader's house)



18

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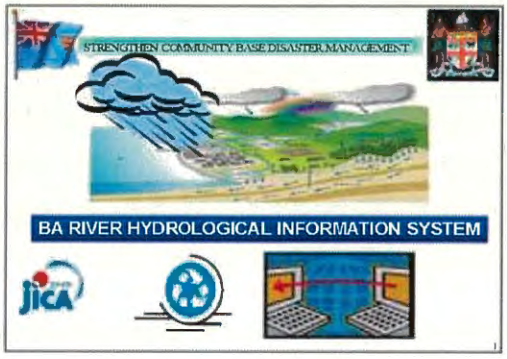
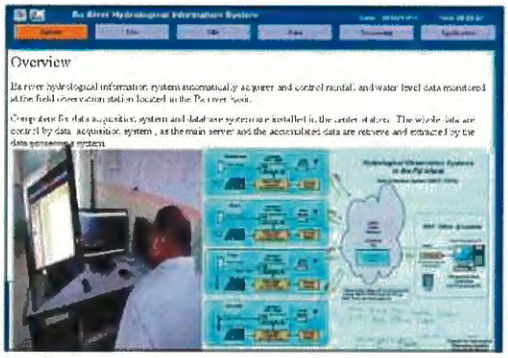
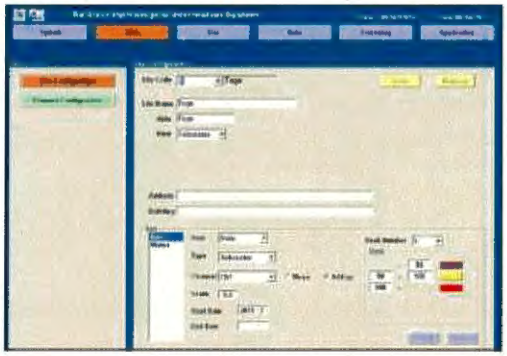
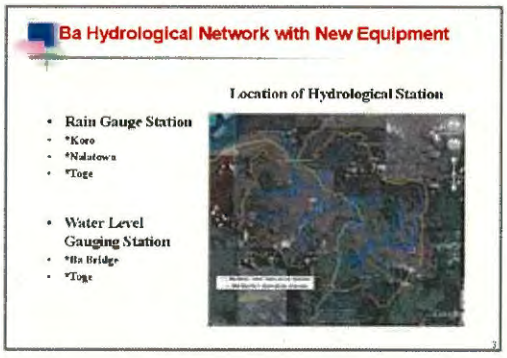

STRENGTHEN COMMUNITY BASE DISASTER MANAGEMENT
BA RIVER HYDROLOGICAL INFORMATION SYSTEM
JICA

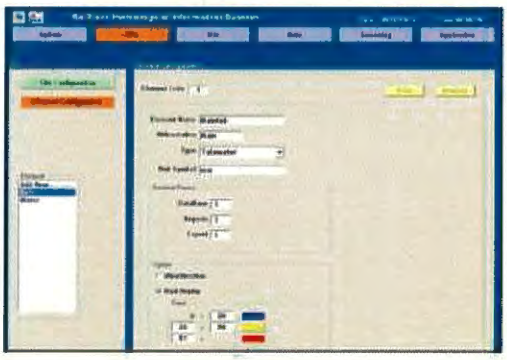
1

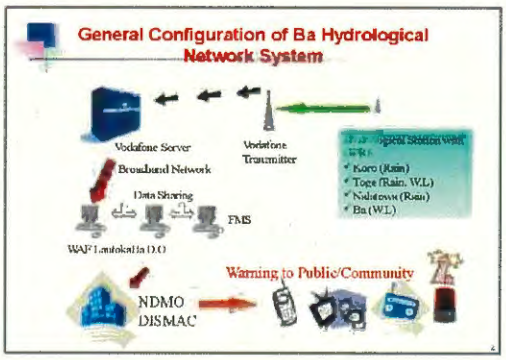

Overview

3

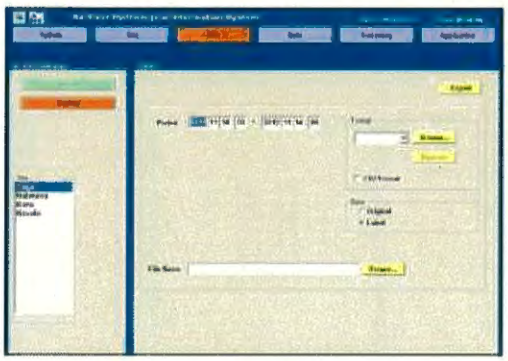



Ba Hydrological Network with New Equipment
Location of Hydrological Station
Rain Gauge Station
*Koro
*Nalatown
*Toge
Water Level Gauging Station
*Ba Bridge
*Toge




General Configuration of Ba Hydrological Network System
Vodafone Server
Vodafone Transmitter
Broadband Network
Data Sharing
FMS
WAF Lautoka Ha D.O
Warning to Public/Community
NDMO
DISMAC

2



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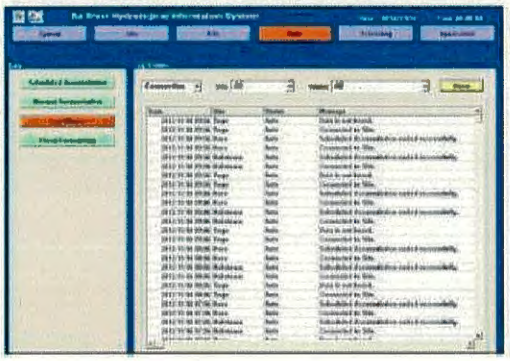

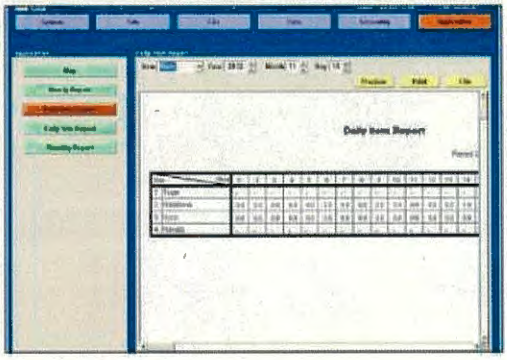

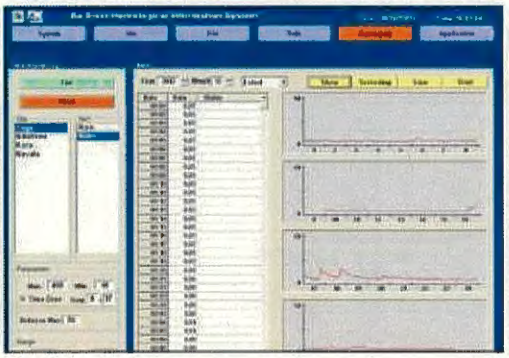

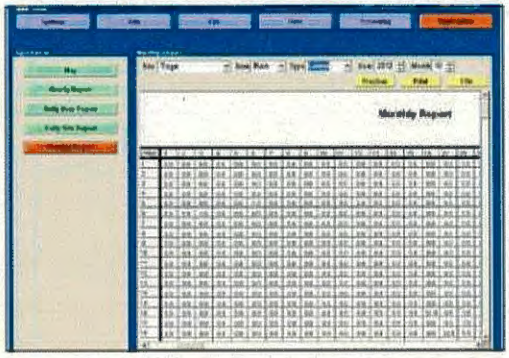

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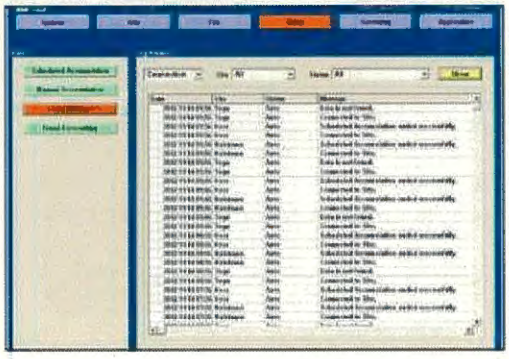

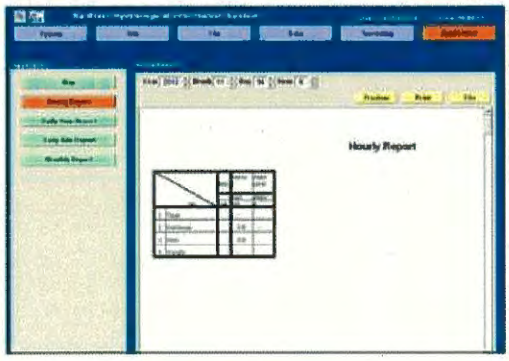

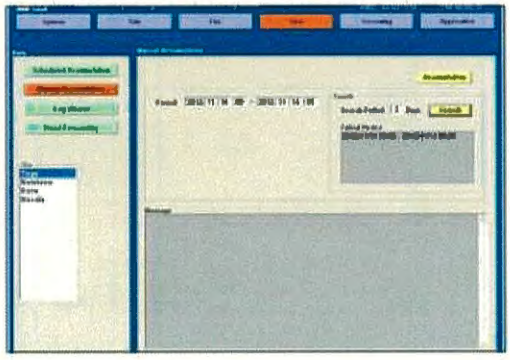

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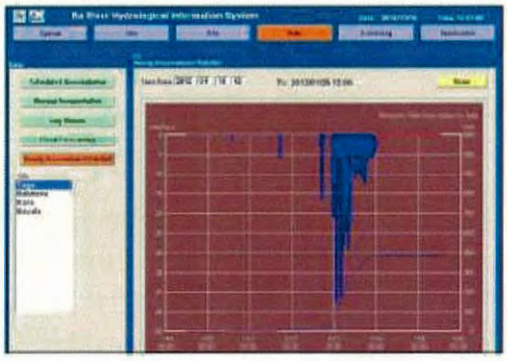
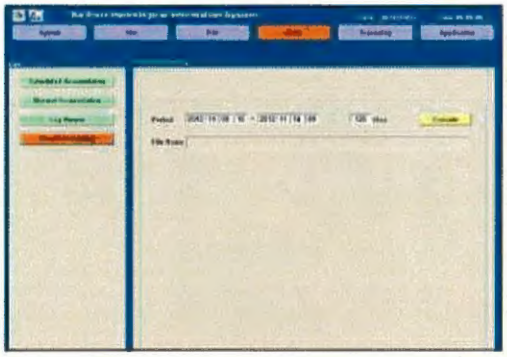


END

VINAKA.....ARIGATO



9

11

Reducing Vulnerability in Community

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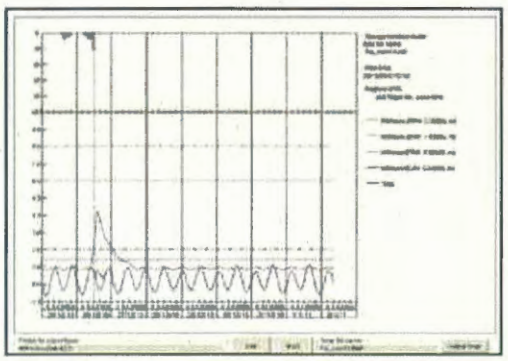

Nawaqarua critical site equip with simplfied Early warning system

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15

Simplified Warning Gauge for Community

- Promote greater awareness for communities prior to flooding
- Complementary warnings from government agencies
- Teaching the principles of hydrological monitoring to young engineers

Installation of Simplified gauges in Nasolo (Water Level Gauge)

16

Installation of Simplified gauges in Nasolo (Rainfall Gauge)

Installation of Simplified gauges in Nawaqarua (Water Level Gauge)

17 添-284

Installation of Simplified gauges in Nawaqarua (Rainfall Gauge)

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Maintenance Check (1)

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- Silting Up in W.L Gauge, After Flood

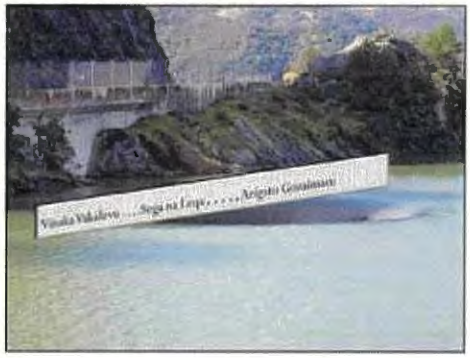
Inspection / Test, before Cyclone season and just after flood event.
(Warning Issue in the Drill)

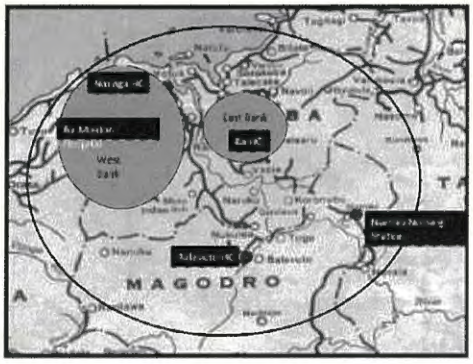
Electric Contact Test for Warning Level

Maintenance Check (2)

- Monitor Buzzer Sound Check
- Battery Charge by Gender

19





INTRODUCTION

- **Total Population** : 55,642 (27% I Taukei, 73 % Fijians).
- **Settings** : 13 zones, 18 villages, 114 settlements, 36 kindy, 45 Primary, 9 Secondary schools, 1 Tertiary institution.
- **Health Facilities** : 1 hospital (50 bed capacity), 3 Health Centers, 1 Nursing Station, 1 Health office.
- **Staffs** : 137

20

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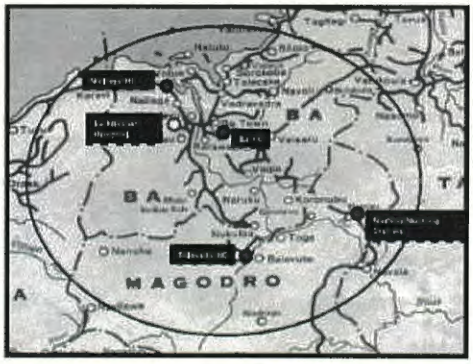
STANDARD OPERATING PROCEDURES
DISASTER MANAGEMENT PLAN

DRAFT

BA MEDICAL SUBDIVISION

AIM :

- To provide a guideline as Standard Operating Procedures for all stages of Disaster Management within the Ba Medical Subdivision..



OBJECTIVES:

- Minimize the potential loss of lives and the impact of disasters.
- Ensure prompt and appropriate disaster responses to affected communities
- Achieve rapid recovery and rehabilitation following any emergency / disaster
- Ensure provision of adequate resources to support implementation at various levels.

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A. PREPAREDNESS (Before)

1. General District Profile to be prepared
2. Simulation & Mock Exercise training & implementation at least on a yearly basis for all sub divisional staffs facilitated by MOH HQ/ NDMO
3. Coordination
4. Resources, Logistical & Community Support
5. Communication Strategies
6. Ensure that there is allocation of budget for disaster activities.
7. SWOT Analysis of previous experience and exposure.

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1. General District Profile to be Prepared

- Demo. Analysis - baseline district profile with identified high risk areas, vulnerable groups (Mapping).
- Staffing & HR requirements for response phase.
- Health Facility status
- Community Awareness Preparedness, NGO participation.

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3. COORDINATION

(a) Intrasectoral Roles: Form SD Disaster Committee/ Existing OHS Committee :
(SDMO, SDHS, SIC Hospital, SDHI, M.O's /HC)
- Form Disaster Teams – West & East Bank.
- Delineate & document roles of each committee/ teams

(b) Intersectoral Roles (PPP) : NGO's, Civil societies
- Identify & understand their roles
- Establish close working relationships within the district (MOU/MOA)

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5. COMMUNICATION STRATEGIES

- Ensure that channels of communication are identified.
- Forms of communication available
- Standard Reporting templates are available.
- Contact Database

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B. WARNING

- SDMO - inform the Ba medical HODs / subordinates of the alert and its implications.
- All health facilities within the Ba Medical area on standby for emergency services provision.
- All standby resources coordinated for deployment and engaged for operations.

1. Needs Assessment & Situation Report

- Regrouping of Disaster teams & converge into one team.
- Need to obtain standardized Reporting templates
- Determine scope of Disaster Impact : Situation assessment report
- Assess damages to health facilities, submit to DMOW with cost estimations.
- Rapid Health Assessment : Impact of disaster on affected families/communities, provision of medical care.

2. Disease Surveillance

- Strengthen disease surveillance.
- Vector control programs : mosquito larval sampling, breeding source reduction campaigns.
- Water Supply Monitoring Surveillance
- Food Security and Surveillance
- Proper Waste Disposal .

- **REDUCE DISEASE INCIDENCE AND TRANSMISSION**

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3. Health Services Provision and Rehabilitation of Victims & Affected Population

- Outreach clinics to affected areas / communities :awareness on post disaster outbreaks
- Health Clinics to evacuees & monitoring of ECs
- Maintain general curative & emergency care - all health facilities
- Assistance and co-ordination for the early return of evacuees to their homes

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Possible MOU/MOA

1. Food company/ Business communities	Relief food supply
2. Fiji Water / Island Chill	Relief water supply
3. Fishermen	Boat for rescue
4. NGO/CHURCH	Emergency assistance Evacuation Centers
5. NFA	Post Disaster Assistance - clean up
6. Vodafone/ Telecom/Digicel	Communication Support
7. WAF	Water supply
8. Military	Security, Post Disaster Activities
9. Private pharmacies	Medical supplies / Drugs
10. Correction Services	Post Disaster Assistance - clean up
11. Airports Fiji Limited	Mercy Flights / Flying Squad
12. Within MOH	Support/ Assistance : HR, Transport ,technical support

APPENDIX TO SOP

- Contacts list : staffs, TNK, VHW, HOD's of other ministries,WAF, FEA,NFA, other stakeholders.
- Resource list
- Resource map
- Partners' list
- Reporting templates [illegible]
- (developed within, DMOW, HQ)
- MOU formulation

10

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Progress in Flood disaster management plan

November 21, 2012. Suva
Kate Nawaqa
Planning department, CWD
kate.nawaqa@govnet.gov.fj

So far,

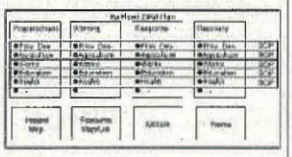
- 2010-11
  - Data collection, Draft
- 2011-12
  - Consultation meetings
  - Field survey for resources
- 2012-13
  - Lessons from floods
  - Sectoral SOP development
  - Field survey for communities

Disaster document system

- National Act
- National Plan
- National SOP
- Ministerial Plan
- Divisional SOP
- **District plan**
- **Sector SOP**

1

Document system of District Plan



Preparedness

- Relief preparation
  - Understanding hazard
  - Basic information
  - Potential
- Community strengthening
  - Education
  - Training
  - Formation of community DRR organization
  - Partnership with NGOs
  - Possible tie with community
  - The vulnerable
  - Regional mutual assistance
- Sectoral Preparedness
- Lifeline
  - Water, Electricity, Tel
- Mitigation
  - Floodplain
  - Dredging

Comparison

- Current Plan
- How to do it ?
- Arrangement
- Management
  - Information
  - Staffing
  - Operation

- New Plan
- What to do it ?
- Principle
- Division of role
  - Citizen
  - District gov't
  - Division gov't
  - National gov't

Early warning

- Elements
  - Monitoring
  - Interpretation
  - Message
  - Communication
  - Action
- Criteria
  - Cumulative rain
  - (water level)
- Warning stages
  - Stand by
  - Evacuate
- Forms & Informal

Elements in plan

- Why
  - Aims objectives
- When
  - Before, during, after, recovery
- Who
  - Division, District, Ministry, Lifeline, Community
- What
  - Tasks during each phase
- How (well described in current plan)
  - Principle of tasks, Lead / Support agencies

Response & recovery

- System establishment
  - Gathering
  - Info. collection
  - Communication
- Emergency response
- Recovery
  - Sectors
  - Lifeline
- Reconstruction
  - Case ida
  - Infrastructure
  - Agriculture

2

4

Difference in planing

	Japan	Fiji	Aus./US.
Preparedness	Xxxxx	xx	Xxx
Warning	Xxxxx	x	Xxx
Response	Xxxx	Xxxx	Xxxxx
Recovery	Xx	xxxx	Xxxxx

Appendix

- Contact list
- Evacuation center database
- Health, Police facilities database
- Resource map
- Disaster catalogue
- Report format

Components of plan

- Preparedness
  - Items added after Japan
- Early warning
  - Added for Ba river flood early warning system
- Response
  - Review from Disaster records
- Recovery
  - Review from SITREP

Sectoral SOP development

- Input material prepared in Jan. - July
- 25 organization visited & given "input"
- Worked for 2 months internally
- 20 organizations submitted SOP
- Joint presentation on Oct. 19
  - Evaluated by audience
- Evacuation drill on Oct. 26 in Ba
- Sectoral drill on Nov. 15-

New features

- Flood specific plan in Ba
  - Historical flood analysis
  - Flood hazard map
  - Flood early warning
- Emphasis on preparedness
  - At all level ... Citizen, Private, Local government sectors
  - Education & Drill
- Partnership
  - Civic participation
  - MOU with Private, NGOs
  - Stakeholder

Outcome of sectoral drill

- Agriculture dept. on Nov. 15
  - Lautoka team... 1/50,000 map
  - Ba team ... Resource map (JICA)
- Results
  - Many issue raised
  - More preparedness needed
  - Needs for resource, ..Comm, & Transp.
  - Other section will join to develop SOP

3

5

SOP Submission results

- 25 organization visited & given 'input'
- 20 stakeholders submitted output
  - 15 stakeholders prepared documents
    - Quantity : From 2 to 45 pages
    - Quality : From concept to Detailed description
  - 5 stakeholders prepared slides only
    - Needs to convert to document
- 5 stakeholders did not submit

Audience evaluation results

Items	Ave. Pts.	Note
Compliance to current framework	4.1	Better covering area
Structure of SOP	4.1	
Contents of SOP	4.1	
Inclusion of task profile	4.0	Needs to include
Inclusion of lessons from recent disaster	4.1	Needs to include
Practicality of SOP	4.1	Be specific
Appendix of SOP	4.0	Needs to add

Viewpoints for evaluation

- Structure
  - Time lined description?
  - Task description by section?
- Contents
  - Sector specific task description?
  - Local context included?
  - Lessons included?
- Resource list

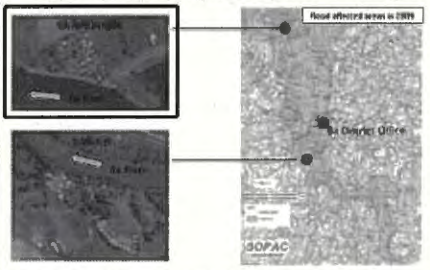
OUTCOME 3: CBDRM

Evaluation Drill in Ba District

Mr. Pauliasi Caucau
Field Programme Officer
Red Cross/IICA Project

BACKGROUND

Pilot Sites: Nawaqarua & Nasolo Villages

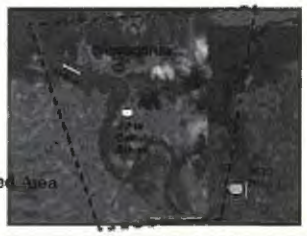


Overall evaluation by audience

Organization	Point	N Vote	Organization	Point	N Vote
CWD	5.0	1	BTC	4.0	3
Health	4.5	9	LCC	4.0	3
FSC	4.5	5	Welfare	4.0	2
RFMF	4.4	4	Coop	4.0	7
Police	4.4	5	FMS	3.9	11
Labor	4.4	8	Women	3.7	1
TFL	4.1	6	Works	3.7	3
			NFA	3.3	3

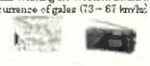
BACKGROUND

- **Village Location:** Low-lying area away from non-inundated area
- **Evacuation Centre:** Lack of capacity at the Votua Catholic School
  - → *How to encourage the villagers to go to safer place in the early stage?*

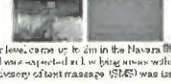


SCENARIO for DRILL

25th Oct
09:00 AM — The GALE Warning for Western Division was issued by FMS
The occurrence of gales (73 – 87 km/hr) was expected within 24 hours.



30th Oct
08:30 AM — Heavy Rain was monitored in upper stream. The river
Flood was expected in Low lying areas within 2 hours.
1st Advisory of text message (SMS) was issued by FMS (Hydro unit)



08:45 AM — Water level came up to 2m in the Navara Station
Flood was expected in Low lying areas within 1 hour
2nd Advisory of text message (SMS) was issued by FMS (Hydro unit)

09:30 AM — Water level came up to danger level in Nawaqarua Village
Surveillance Water Level Gauge issued an alert

DISMAC Operation in the Drill

- **District Office**
  - To Activate EOC / Information Collection / Report
  - Bus arrangement for Evacuation
- **Police, RFMF, NFA**
  - Search and Rescue Team
- **Health Department**
  - Schools Arrangements for Evacuation Centre
- **Education Department**
  - Health Screening at school
- **Road Department, Town Council, PWD, Labour Department, Court House, FEA, Agriculture Department, Red Cross, WAF, Social Welfare Department, Telecom**
  - Emergency Support
  - Damage Assessment

Evacuation Drill Time Record

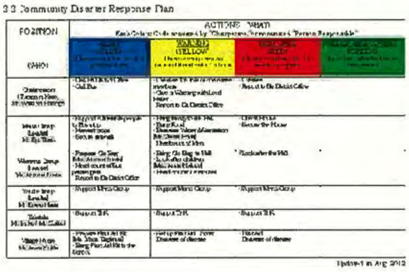
Evacuation Time [1st Advisory ~ safer place] → about 1 hour

1 hour 03 minutes

Time	Action	Place
8:30	1st Advisory (Text Message) was reached	Nawaqarua
8:45	2nd Advisory (Text Msg) / Hand Siren	Nawaqarua
8:52	Rescue team arrived	Nawaqarua
9:06	Bus arrived at the village	Nawaqarua
9:17	Bus departed for the school	Nawaqarua
9:33	Bus arrived at SDKP school	SDKP
9:39	Bus arrived at St. Teresa school	St Teresa
9:50	Villagers settled in the hall of St. Teresa	St. Teresa
9:55	Health Assessment started	St Teresa
10:41	Bus departed for the village	St. Teresa
11:08	Bus arrived at the village	Nawaqarua
11:17	Villagers returned to their houses	Nawaqarua

Evacuation Drill: Response of Villagers

Village Disaster Committee followed the Response Plan



Evacuation Drill: Response of Villagers

Villagers followed the Evacuation Plan

Review of Evacuation Drill

Emergency Operation Centre: Ba District Office

- Each roll in the EOC was not clarified.
  - → Who receive the report? What should be reported?
  - → Coordination of EOC.
  - → Responsibility of each stakeholders.

Review of Evacuation Drill

Evacuation Centre: St. Teresa School

- Health Team stand by well.
- Head of teacher did not be informed about the Drill.
  - → It was informed to School Manager.
- Standard Template for report is necessary.
  - → Many formats delivered last flood in Jan/Mar 2012.

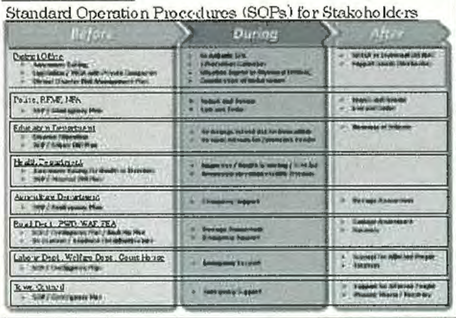
Review of Evacuation Drill

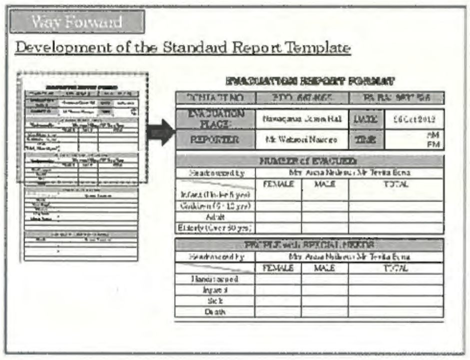
Nawaqarua Village

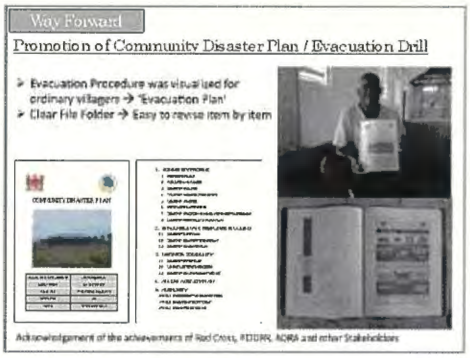
- Turaga ni Koro has been very busy.
  - → Work sharing in the village can be enhanced.
- House doors left open when they evacuated.
  - → Security should be considered.
- Simplified Gauges can be maintained by Villagers.

Way Forward

Standard Operation Procedures (SOPs) for Stakeholders

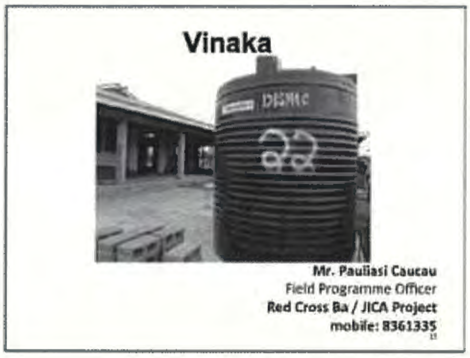


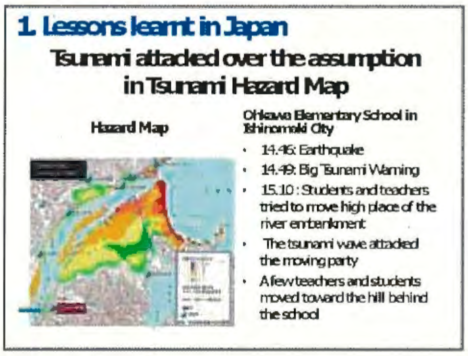

Way Forward
Development of the Standard Report Template
EVACUATION REPORT FORMAT
EVACUATION PLACE:
REPORTER
DATE
TIME
AM
PM
NUMBER of EVACUEES
FEMALE
MALE
TOTAL
Adult
PEOPLE with SPECIAL NEEDS
FEMALE
MALE
TOTAL
Handicapped
Sick
Death

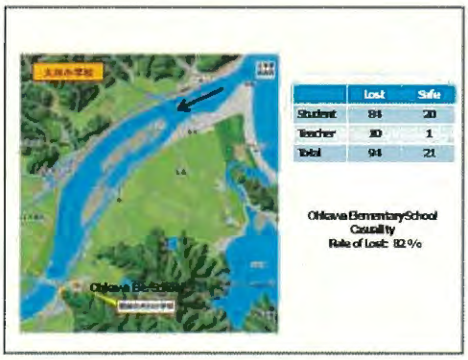

Way Forward
Promotion of Community Disaster Plan / Evacuation Drill
➢ Evacuation Procedure was visualised for ordinary villagers → 'Evacuation Plan'
➢ Clear File Folder → Easy to revise item by item
COMMUNITY DISASTER PLAN


FIJI PRESENTATION
BY
Mr Joseph Tangi
Guadalcanal Provincial Education Dept
SOLOMON ISLANDS


Presentation Outline in Fiji
1. Lessons learnt in Japan
-Comparison between Ishinomaki City and Kamaishi City
2. Action plan


Vinaka
DISMAC
Mr. Pauliasi Caucau
Field Programme Officer
Red Cross Ba / JICA Project
mobile: 8361335


1. Lessons learnt in Japan
Tsunami attacked over the assumption in Tsunami Hazard Map
Hazard Map
Ohkawa Elementary School in Ishinomaki City
• 14:46: Earthquake
• 14:49: Big Tsunami Warning
• 15:10 : Students and teachers tried to move high place of the river embankment
• The tsunami wave attacked the moving party
• A few teachers and students moved toward the hill behind the school


Ohkawa Ele. School
Lost
Safe
Student
84
20
Teacher
10
1
Total
94
21
Ohkawa Elementary School Casualty
Rate of Lost: 82 %

Kamaishi City Condition after Earthquake (14.46, 11/03/11)

3

3 Fundamental Rules against Tsunami (Miracle of Kamaishi)

- Do not hang up on the assumption (illusion)
- Do your best as you can run away
- Take an initiative for evacuation

	No. of Total Student
Elementary School	1927
Junior High School	999
Lost	(5)

*5 students out of school management by another reason at Earthquake

Kamaishi City Board of Education & Damaged School

4

2. Action Plan

Problems	Lessons Learnt	Actions to be taken
1. FINANCE		
Lack of sufficient budget for DRM	The priority supports from all level of country government to local community as DRM is very important. eg.Kamaishi , Shinano response	1. Advocate for increased budgetary allocation during budget process 2. Increase school grants to include DRM activities. 3. Provincial Govt support to education sector increased 4. Access from EIE funds from Ministry of Education.

Government provides assistances

5

Problems	Lessons Learnt	Actions to be taken
2. CURRICULUM		
DRM Curriculum not fully integrated into the education system at all level.	Disaster curriculum be developed for schools primary-high schools Eg.Kamaishi & Sanjo city	1. Nation curriculum division to develop disaster curriculum for schools. 2. Education Authorities & teachers to develop school based curriculum. 3. Guadalcanal Province Education dept to establish policy for safe schools programme with NDMO.

Sanjo City Board of Education School curriculum

Each subject has some topics related to the disaster prevention

6

Group Discussion on Flood Disaster Prevention Education Curriculum

Draft of Flood Disaster Prevention Education Curriculum [Class 1st - Math]

S-1 Class 1st (1) <Outline of Education>

Category :

Target Grade	Class 1st	Target Class	Math	Required time	45 minutes
Goal	To enable children to calculate the distance,Height and route for the evacuation during Flood.				
Material to be used	Prepare a measuring tape, number of straw, ear meter sticks or meter				

1 Introduction
- Compare previous Flooding
- Distance measured
- How long does it take to reach

2. Development
- Teachers to demonstrate materials to be used in the activity And highlight the critical level to Evacuate
- Measure the distance to from your house to the river
- Measure the water level of the previous flood

3 Conclusion
Summarize the activity through questioning

4. Verification
The will be able to understand when the water level reaches the Gil, and they need to evacuate

Draft of Flood Disaster Prevention Education Curriculum [Class 1st – P.E.]

S-1 Class 1st (2) <Outline of Education>

Category

Target Grade	Class 1st	Target Class	P.E.	Required time	45 minutes
Goal	To enhance children to be physically and mentally Fit				
Material to be used	Ordinary clothes				

1 Introduction
- Discuss the swimming activity
- Previous story related to flood incident
- Challenges they face
- How they can improve

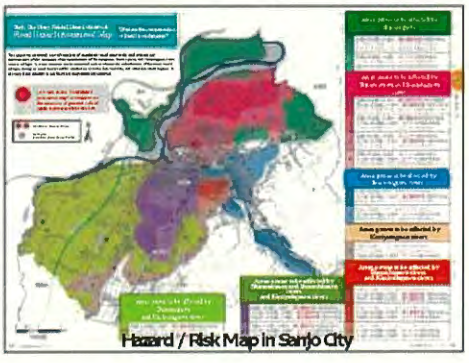
2 Development
- Teachers to demonstrate
- Children swim across the river a to be supervised
- Used skills and knowledge discussed

3. Conclusion
- Assessment activity through questioning i.e. floating

4. Verification
- They will able to understand how difficult to walk/swim
- Don't swim or walk across the river during flood

Problems	Lessons Learnt	Actions to be taken
4. HAZARD /RISK MAPPING		
Lack of hazard maps in schools, community, public, etc	Maps kept and used. eg. Niigata, Sanjo, Kamaishi, Shinano.	1. Undertake risk assessment of school buildings and assets 2. Hazard maps of schools done. 3. Support school plans with historical data of past disasters.

Problems	Lessons Learnt	Actions to be taken
3. AWARENESS		
1. Very little knowledge on characteristics of hazards 2. Challenges with communication and distances so awareness on DRM is not fully spread. 3. Little or no knowledge of Disaster Risk Reduction activities due to lack of information.	Data,Records,Histories and informations are: & analysed &distributed &practiced eg.Shinano,Kamaishi,Sanjo	1. Training and awareness on hazards 2. Update Information and improve public awareness materials for different levels of education. 3. Use of other medium for information sharing etc radio broadcast, SMS, posters, pictures etc 4. Simulation exercises and drills



Problems	Lessons Learnt	Actions to be taken
5.COMMUNICATION ACCESS	Lessons Learnt	Actions to be taken
Most Schools do not have means of communication or access to communication	Communication access facilities are provided for teachers,students,parent,police,etc Eg.Sanjo	1. Establish communication systems to schools eg HF radios. 2. Education Authorities to enable schools access to the mobile phone network 3. Map out communication providers within area of school eg Rural Health Clinics, Police stations, Church Radio net works

The Strengthening Community-Based Disaster Risk Management Project In The Pacific Region

Project Seminar

Tanoa Plaza Hotel, Suva

15 October, 2013

National Disaster Management Office,

Ministry of Rural & Maritime Development and National Disaster Management

Programme

TIME	SESSION	FOCUS	RESOURCE AGENCY/PERSON
8:30-09:00	**Registration**		*All Participants*
9:00-9:15	Opening Remarks	**Greeting**	*Representative of JICA Fiji Office*
09.15-09.35	Welcome Speech	**Greeting**	*Permanent Secretary* *Director of NDMO* *Commissioner of CWD*
09.35-09.50	**Session 1**	Evacuation Drill	*Mr. Alifereti Abenisiga (BDO)*
09.50-10.10		Guidebook Presentation	*Mr. Alifereti Abenisiga (BDO)*
10.10-10:40		**Break**	*All Participants*
10.40-11:00	**Session 2**	Ba DM Plan	*Mr. Metuisela Mua (Ex. BDO)*
11:00-11:20		DM in Health sector	*Mr. Saula Matakarawa (DH)*
11.20-11.50		*Questions & Answers*	
11:50-13.10	**Lunch**		*All Participants*
13:00-13:20	**Session 2**	BCP&Drill	*Ms. Sainiana Tinai (Ba Hart Home)*
13:20-13:40		TOT for Awareness	*Mr. Manasa Draki (Ex. DBW)*
13.40-13.50		*Questions & Answers*	
13.50-14.05	**Session 3**	SEWS and Warning Standard	*Mr. Tomasi Naborisi (FMS)*
14:05-14.20		Management of Ba System	*Mr. Leonard Bale (FMS)*
14.20-14:50		*Questions & Answers*	
14.50-15.20	**Session 4**	Project Management (SCBDRM Project)	*Mr. Ropate Rakadi Tuikenawa*
15.20-15.30		*Questions & Answers*	
15.30-15.40	**Closing Remarks**	Vote of Thanks	*Mr. T. Kameyama (Chief Adviser)* *Mr. Manasa Tagicakibau (Director)*
15:40-		**Refreshment**	

NDMO: National Disaster Management Office
FMS: Fiji Meteorological Service
CWD: Commissioner Western Division Office
BDO: Ba District Office
DBW: Department of Ba Women
DH: Department of Health, Ba

OUTCOME 3

[EVACUATION DRILL]

[GUIDEBOOK For Community Based Flood Risk Reduction]

Alifereti Abenisiga
Assistant District Officer
Ba District Office
aliferetiabenisiga@yahoo.com

[EVACUATION DRILL]

DATE	VILLAGE	EARLY WARNING/ Transmission Tools	EVACUATION PLACE	COMMENTS
10 Oct 2012 Tue	Nawaqarua	Simplified Gauges/ Hand Siren, Loud Hailer	Votua	About 200 villagers participated. JICA Experts facilitated.
19 Oct 2012 Wed	Nacoa	Simplified Gauges/ Hand Siren, Loud Hailer	Community Hall	About 70 villagers participated JICA Experts facilitated.
26 Oct 2012 Fri	Nawaqarua	Simplified Gauges, Text Messages/ Hand Siren, Loud Hailer	St Teresa School, Community Hall	154 villagers participated JICA and CDC members facilitated villagers used buses for evacuation.
23 Nov 2012 Fri	Nacoa	Simplified Gauges/ Hand Siren, Loud Hailer	Community Hall Hill	45 villagers participated CDC members facilitated.
2nd Aug 2013 Fri	Nabutu	Simplified Gauges/ Loud Hailer	Community Hall	About 200 villagers participated CDC members facilitated.
14 Sep 2013 Sat	Nawaqarua	Simplified Gauges/ Electric Siren, Hand Siren, Loud Hailer	Community Hall	225 villagers participated CDC members facilitated.

Evacuation Drill in Nawaqarua October 2012

BACK GROUND

- **Village Location:** Low-lying area away from non-inundated area
- **Evacuation Centre:** Lack of capacity of the Votua Catholic School
  → ***How to encourage the villagers to go to safer place in the early stage?***

SCENARIO of the DRILL

The Advisory of text message (SMS)

26th Oct

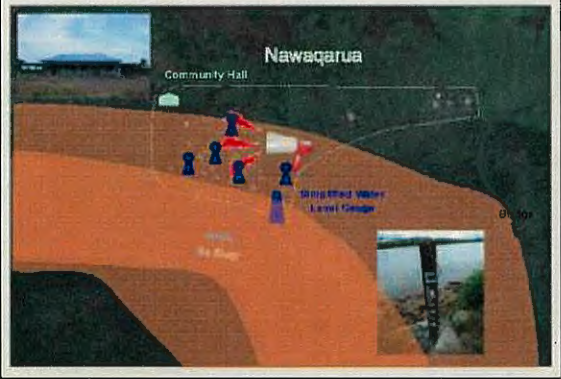
08:30 AM Heavy Rain was monitored in upper stream of Ba river.
Flood was expected in low-lying areas within 2 hours.
1st Advisory of text massage (SMS) was issued by FMS (Hydro unit).

08:45 AM Water level came up to 2m in the Navara Station.
Flood was expected in low-lying areas within 1 hour.
2nd Advisory of text massage (SMS) was issued by FMS (Hydro unit).

09:30 AM Water level came up to danger level in Nawaqarua village.
Simplified Water Level Gauge Alert was issued.

SCENARIO of the DRILL

SCENARIO of the DRILL



Review of Evacuation Drill

Nawaqarua Village

- Turaga ni Koro has been very busy.
  - → Work sharing in the village can be enhanced.
- House doors left open when they evacuated.
  - → Security should be considered.
- Simplified Gauges should be maintained by Villagers.

Evacuation Drill in Nawaqarua September 2013

Evacuation Plan　Response Plan

BLUE: ALERT

YELLOW: WARNING

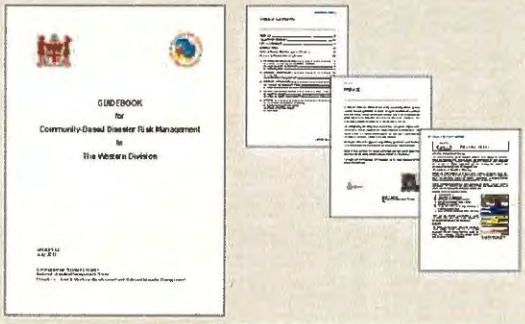
YELLOW: WARNING

Review of Evacuation Drill

Nawaqarua Village

- Villagers have been familiar with the simplified gauges
- The Time required for Evacuation in the village was shortened
  - → 10 minutes in 2012 → 6minutes in 2013
- Villagers played their role properly.
  - → Time Keeper, Rescue Team, Head Counting etc.

Guidebook for
Community Based Flood Risk Reduction in Western Division



Guidebook for
Community Based Flood Risk Reduction in Western Division

Purpose

To provide minimum requirements of the **Community Disaster Planning** which aim to enhance the Community Resilience for multi hazards in Fiji.

Objective

1. To enhance the capacity of Community on DRR
2. To improve the coordination of local agencies
3. To avoid duplication among different organizations

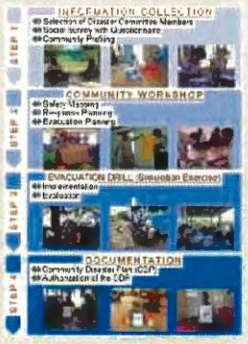
Process for Community Disaster Planning

STEP 1:
INFORMATION COLLECTION

STEP 2:
COMMUNITY WORKSHOP

STEP 3:
EVACUATION DRILL
(Simulation Exercise)

STEP 4:
DOCUMENTATION



STEP 1: INFORMATION COLLECTION

Social Survey for Community

"Questionnaire for Community"

STEP 1: INFORMATION COLLECTION

Social Survey for each Household

"Questionnaire for Household"

STEP 1: INFORMATION COLLECTION

Selection of Disaster Committee Members

"CDC Member List" in Community Disaster Plan

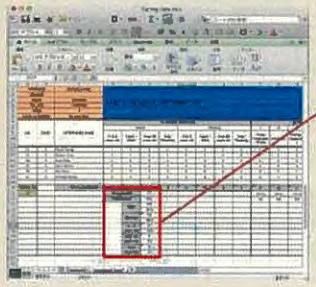
[Members of CDC]

No	NAME	POSITION	CONTACT	SIGNATURE
1		Chairperson		
2		Vice-Chairperson		
3		Secretary		
4		Women's Group Leader		
5		Men's Group Leader		
6		Youth Group Leader		
7		Village Nurse		
8		Tatatale (Pastor)		
9		Member (Teacher)		
10		Member		

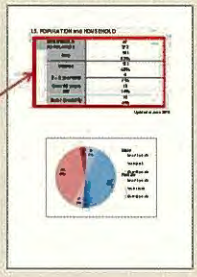
STEP 1: INFORMATION COLLECTION

Community Profiling

"Household" sheet in Excel File of "Survey Data"



"Population and Housing" in Community Disaster Plan



STEP 2: COMMUNITY WORKSHOP

Community Safety Map

Procedure of Safety Mapping

History of Disaster Event

Risks and Resources

Safety Map

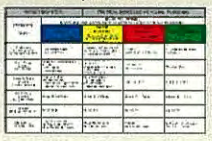
STEP 2: COMMUNITY WORKSHOP

Community Response Plan

Procedure of Response Planning

National Warning Arrangement

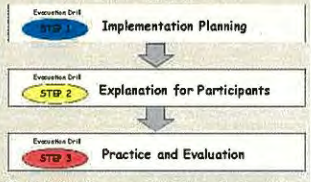
Response Plan



Evacuation Plan

STEP 3: EVACUATION DRILL

Procedure of Evacuation Drill



Implementation Plan

Explanation for Participants

Practice and Evaluation

STEP 4: DOCUMENTATION

Signature on Community Disaster Plan

Progress in 2013 regarding Disaster Management Planning

Suva, October 15, 2013

Metuisela Mua
Former Provincial Administrator, Ba
mmetuisela@gmail.com

The strengthening community-based disaster risk management project in the pacific region
Japan International Cooperation Agency

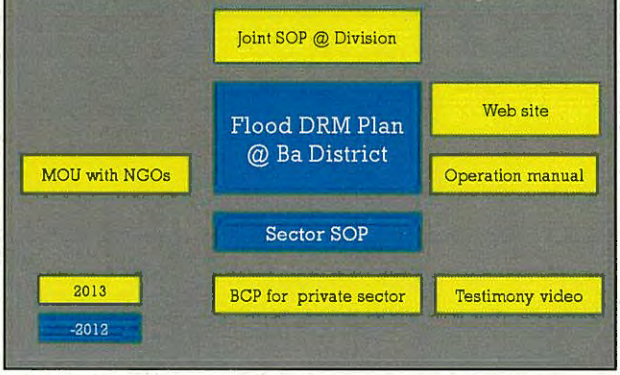
Outline

1. Weakness in DRM in Fiji
2. Achievements in 2013
3. Way forward

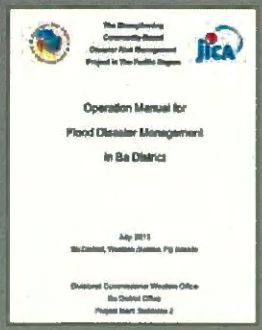
1. DRM plan revision

Weakness in	Strengthening by
Coordination	Manual development
	Division of role table
	MoU with NGOs
	Contact sheet
Dissemination	Manual distribution
	Web site development
	Communication drill
Sustainability	Web site development
	Legalization

2. DRM document system



Manual development



- A5 Diary Size
- 32 pages
- Practical
  - Task description
  - Division of role table
  - Contact sheet
- Checked and distributed to staffs

MoU with NGOs

- Coordinated response by DISMAC & NGO
- Standard MoU formed through consultation
  - Non legal document
  - Based on goodwill
  - Work within capacity
- 6 NGOs signed
- Regular meeting held

Introduction of equipments

Barometer

Portable TV & DVD player

Video recording of disaster story

Police: 1993 TC Kina

NFA: 2009 flood

Education: 2009 flood

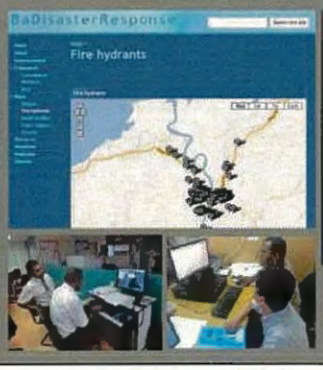
Welfare: 2009 flood

Agriculture: Awareness

Judicial: 2012 flood

Compiled to DVD and will be distributed.
Played on DVD player at reception desk.

Web site development



"Google site" used.
Posted by DISMAC.
From preparedness to recovery.

Communication drill

Activities
- Flood warning dissemination
- Bottom up report

Better use of SMS
- Shorten word
- SMS Template in draft
- Mailing list
- 1000 SMS/FD1.5

3. Issues for way forward

Issues	Actors	Term
Annual committee	FMS, CWD	Short
Announcement & use of web	BDO, CWD	Short
MoU with private sectors	BDO	Short
Replication to other communities	BDO	Long
Replication to other districts	CWD	Long
Replication to other divisions	NDMO	Long
Legalization of plan & SOP	CWD, NDMO	Long
Inclusion to OHS system	Labor dept.	Long

Thank you very much.

Progress of Disaster Management in Health Department

Suva, October 15, 2013

Mr. Saula Matakarawa
Environmental Health Officer
Ministry of health

The strengthening community-based disaster risk management project in the pacific region
Japan International Cooperation Agency

Outline

- Role of health department in disaster
- Achievements in 2013
- Way forward

2

Roles of health department

Before disaster

- Conducting health census
- Outreach to communities
- Identify vulnerable areas

After disaster

- Mobilization of teams
- Preventing disease outbreak
- Attending injuries
- Endemic /Pandemic diseases prevention

3

Typical diseases in disaster

- Dengue
- Leptospirosis
- Typhoid
- Food poisoning

(Divisional health office, 2012)

4

Achievements in 2013

- Manual revision
- Info. management
- Evac. center inspection
- Video recording

5

Manual revision

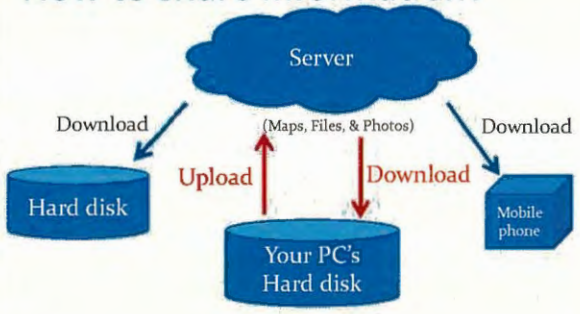
Comments added to ...

- 4.2.5 Mortuary
- 4.3.2 Evacuation center support
- 4.3.4 Water provision
- 4.3.5 Food provision
- 4.3.6 Relief goods distribution
- 4.3.7 Health care for the affected

Manual distributed to staffs

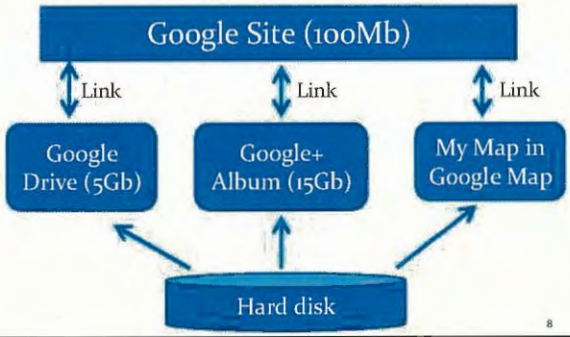
6

How to share information?



7

How to develop web site?



8

Info. management in Health dept.

- Disease mapping
- Facility mapping
- Community mapping

9

Evac. Center Inspection

- ECs mapping
- Photo database
- Facility survey
  - Hygiene
  - Water
  - Capacities ?

10

Video recording

- Narrators
  - Officers in Ba
  - Community leaders in Ba
- Contents
  - Experience & lessons
  - Message to audience
- Demonstration
  - 50 DVD distributed
  - Player @reception
  - Web site
  - Mobile phone

11

Way forward

- Improvement of evacuation centers
- Sharing information using web
- Education using video
- Partnership with NGO
- Replication to other areas

Thank you very much !

saulmatakarawa@gmail.com

12

Development of Business Continuity Plan at Shady Cool Enterprises

Suva, Oct. 15, 2013

Ms. Sainiana Tinai
Shady Cool Enterprises

The strengthening community-based disaster risk management project in the pacific region
Japan International Cooperation Agency

Outline

- About Shady Cool
- Why BCP ?
- What is BCP ?
- How we developed it ?

Shady Cool Enterprises

Business Continuity Plan (BCP)

July, 2013
Shady Cool Enterprises
Multiracial Women Co-operative Limited
Ba HART

2

About Shady Cool Enterprises

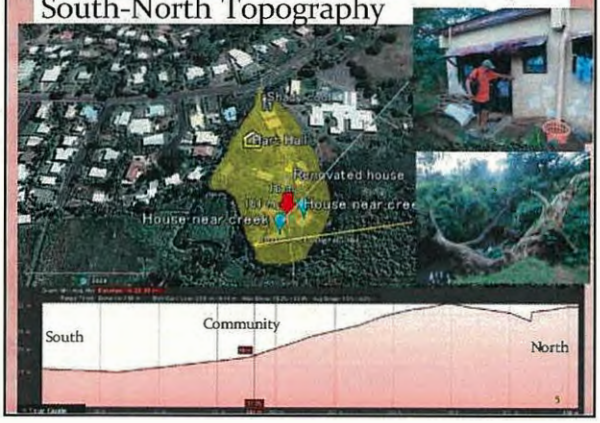
Established in 2012 with JICA volunteer.
Located 1km west of Ba river.

14 female staffs live in same community.
Staffs operate cafeteria, catering & shop.

3

East-West Topography

South-North Topography



5

Why BCP?

Why BCP?

- Protect the safety of Customer
- Protect the safety of Staffs & family
- Mutual Help with Community
- **Continue business after disaster**

What to protect?

- People
  - Customer
  - Staffs
- Properties
  - Buildings
  - Equipments
  - Goods in shop
- Money
- Data
  - Accounting

6

How we developed BCP ?

JICA Volunteer (-June, '13)

- Form a Team
- Map Community
- Identify Hazard
- Imagine Situation
- Identify Resources
- Prioritize Recovery

JICA Expert (June-July, '13)

- Map Community
- Risk Management
- Disaster Management
- Conduct Drill

7

Contents of BCP

- 1. Objectives
- 2. Disaster Committee
- 3. BCP
  - 3.1 Target Disaster
  - 3.2 Expected Situation during Disaster
  - 3.3 Recovery Time
  - 3.4 Risk Management Plan
- 4. Emergency Operation Procedure
- 5. Evacuation Procedure
- 6. Education and Training
- Appendix
  - A.1. Map
  - A.2. Contact List
    - A.2.1. Staff
    - A.2.2. Emergency, Company
    - A.2.3. Government Agency, NGO
  - A.3. Stock List
  - A.4. Safety Check List

8

Risk Management Example

Water from borehole lasts 2 days if power stops.

Water Management

- Ask DISMAC to rent generator to pump up water.
- Seek to install rain water tank.
- Learn water conservation management.

9

Risk Management Example

Management in Goods

- Sell goods to promote home stock before season.
- Sell goods useful for disaster.
- Diversify goods provider.
- Have agreement for preferred service with vendors or NGOs.

Goods in Shop

10

Disaster Management Examples

Phase	Recovery time	Response	Response Detail
Initial Response	Immediately	Evacuation	• Evacuation according to Evacuation Plan
	~1 hour	Rescue Secondary Disaster Prevention Safety confirmation	• Rescue by using rescue stock stuffs. • Response for secondary disaster • Safety confirmation (staffs & family.)
	~1.5 hour	Mutual Help	• Safety confirmation within HART Ba.
	~2 hours	Damage Assessment Request for assistance	• Damage Assessment of Shop, equipments, life lines • Request for assistance, manpower
	~24 hours	Releasing and Sharing Information	• Collecting Damage Assessment Data • Damage Assessment around community • Report Damage Assessment
Recovery Response	~3 day	Mutual Help	• Cleaning up • Serving foods
	~7 days	Releasing and Sharing Information	• Reopen • Communication to all stakeholders

11

Evacuation drill

- Scenario
  - Flooding in community at night
  - Evacuate to hall
- Participants
  - Residents in 2 houses
  - Staffs in shop
- Date
  - July 25, 6pm-730pm

Way forward

- Implement risk management.
- Dissemination through chamber of commerce.
- Replication to other shops.
- For more details, contact:
  - Ms. Sainiana Tinai
  - Mr. Metuisela Mua

Thank you very much !

Disaster Awareness Activity for Women

Ratsu Manasa Draki
Department of Women, Ba

Background

Under the JICA's "The Strengthening Community-Based Disaster Risk Management Project in The Pacific Region"

Installation of Flood Warning System

Capacity Building for NDMO

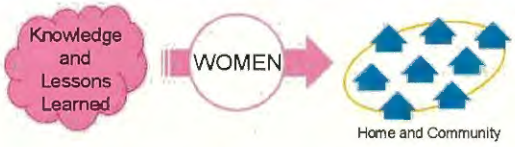
Enhancement of Community

- ✓Disaster Committee Meetings
- ✓Disaster Management Plan
- ✓Evacuation Drill

Why Women?

- The most of disaster victims are them
- They are close to a daily life

WOMEN is the key person for Disaster Prevention
Especially in Home and Community



Partners

- Women's Club in a Community
- Ba Women's Forum
- Soroptimist International Club of Ba
- NDMO
- Ba District Office (DISMAC)
- JICA Expert

Methodology

Planning
- Securing the Supplies
- Making Road Map of Activity
- Preparation for Training of Trainers and Workshop in a community

Implementation
- Conducting the Training and Workshop
- Promoting the Activity

Evaluation
- Giving feedbacks to Facilitator of workshops and communities.
- Revising the roadmap of disaster awareness program

Training of Trainers, ToT

Trained the leader of women group in a community by JICA expert. -- basis of disaster prevention and know how of conducting workshop, etc.

Workshops

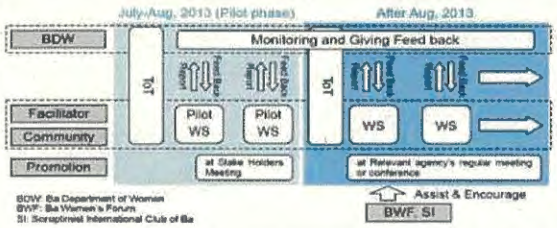
Conducted the disaster awareness Workshops by leader of women group in the community.

Example of Workshop results

At the workshop, participants had extracted disaster risks. Also tried to find solution and identified priorities.

Future Plan

Based on the pilot WS, Ba Department of Women have established future plan for Disaster Awareness Activity w/ local NGOs and communities.

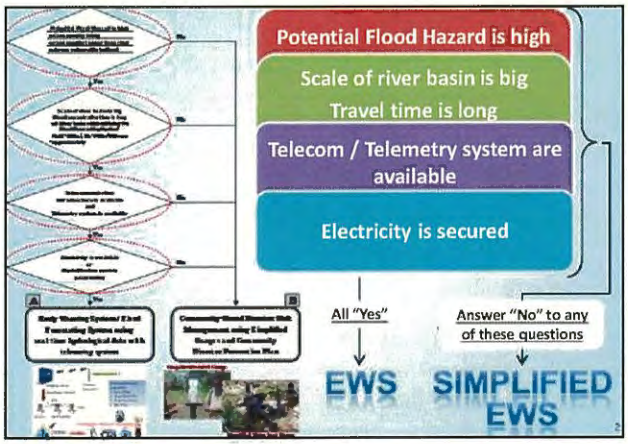


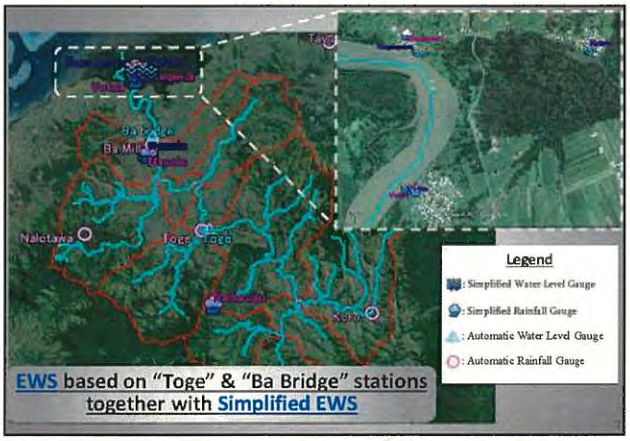
Challenges

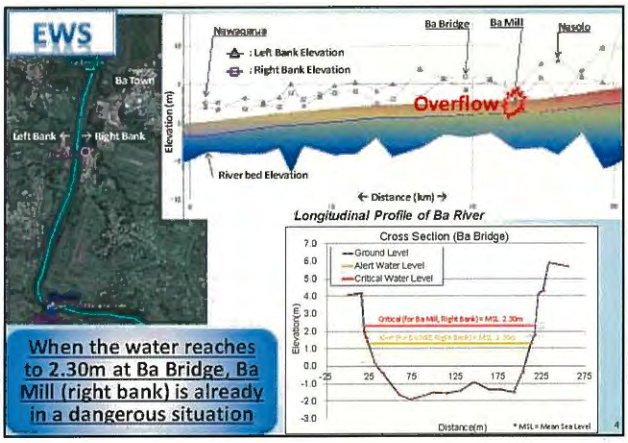
- With increased of disaster awareness of women, desired disaster knowledge in the Department of Women is also increase. Therefore, the well collaboration with DISMAC is needed.
- Budget allocation for disaster awareness activity in the Department of Women

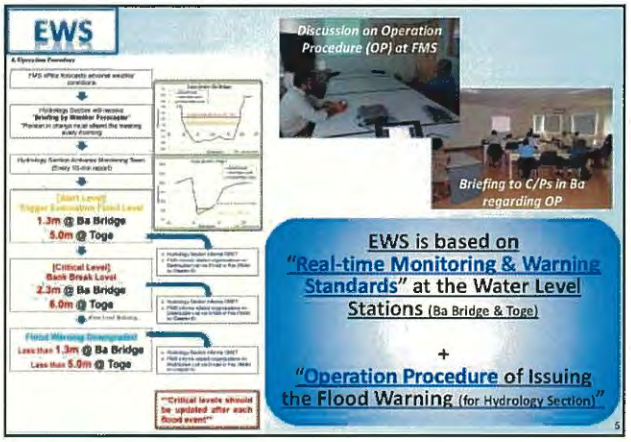
Early Warning System (EWS)
-Warning Standard & Simplified EWS-

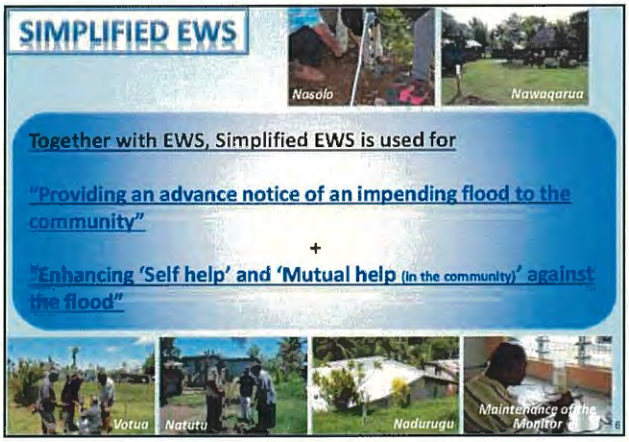
Tomasi Naborisi
Hydrology Section, FMS











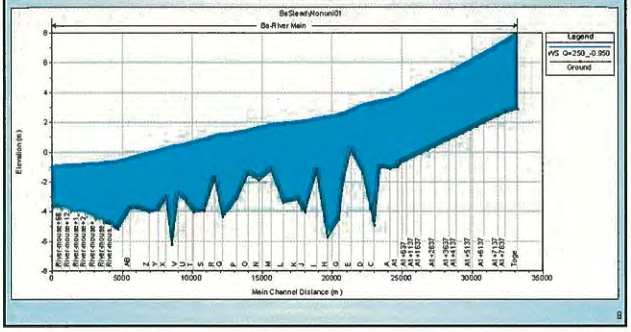
SIMPLIFIED EWS

List of simplified gauges and other equipment (hand siren, loud-hailer and etc.) to check/update the warning standards for the simplified gauges and functional check by C/P oraganisation

SIMPLIFIED EWS

Maintenance manual is distributed to the community in order to strengthen the "Self-Reliant + Sustainable CBDRM"

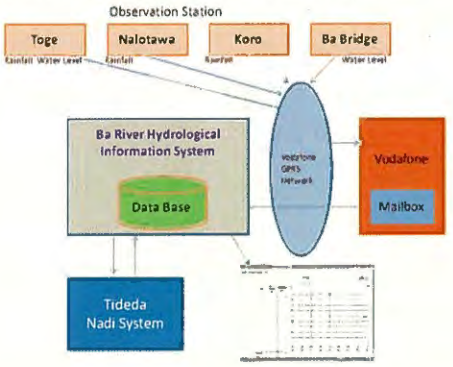
EXAMPLE OF THE NON-UNIFORM FLOW CALCULATION



Management of Ba River Hydrological Information System

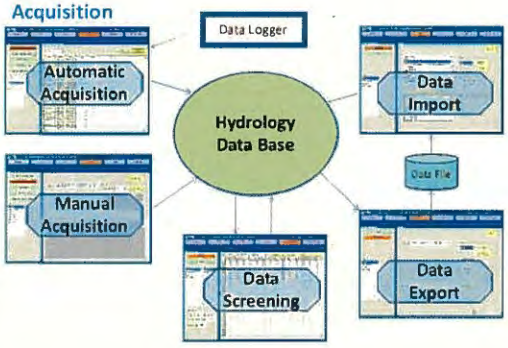
Leonard Bale
Fiji Meteorological Service

Ba River Hydrological Information System



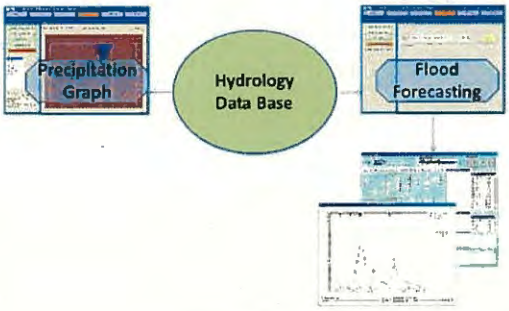
Ba River Hydrological Information System

Acquisition



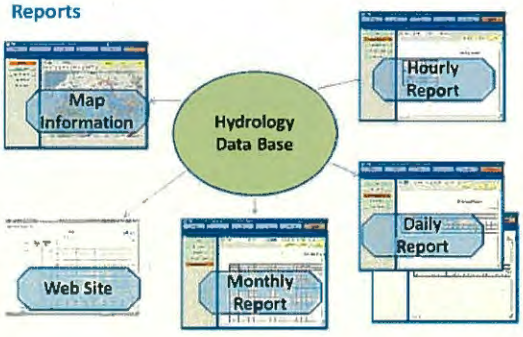
Ba River Hydrological Information System

Analysis



Ba River Hydrological Information System

Reports



Site Maintenance

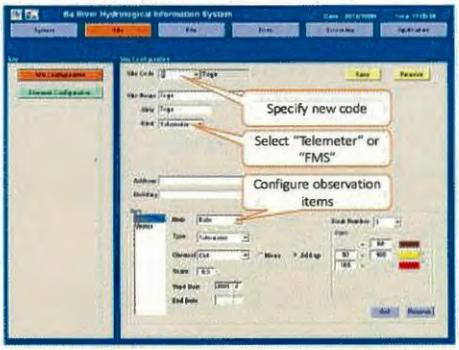
Briefing session

NDMO

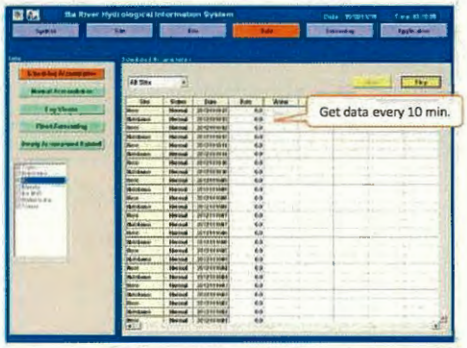
FMS

- Ba River Hydrological Information System
- Web site

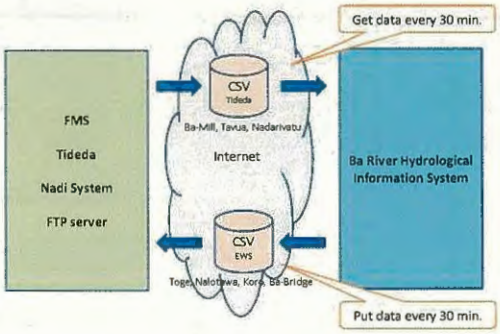
To add new Observation Station easily



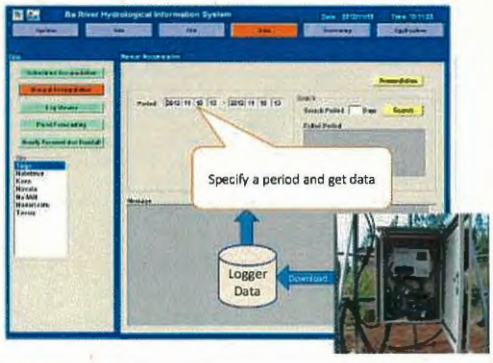
Automatic Acquisition



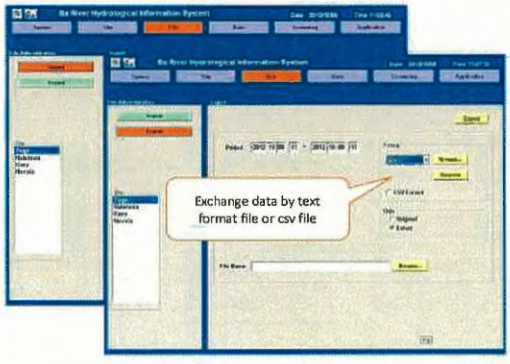
Exchange Hydrological Data



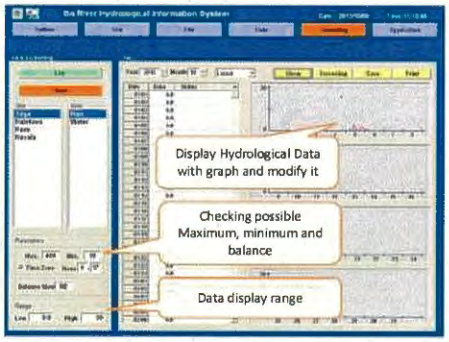
Manual Acquisition



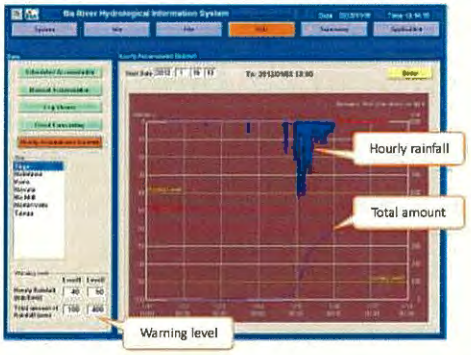
Import/Export



Data Screening



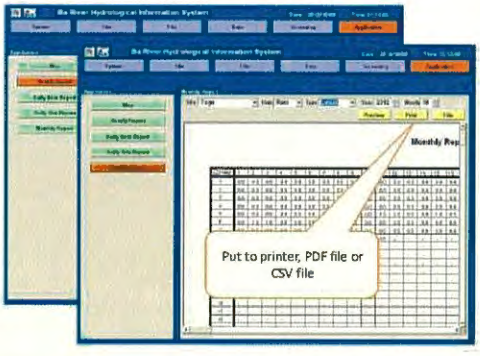
Precipitation Graph



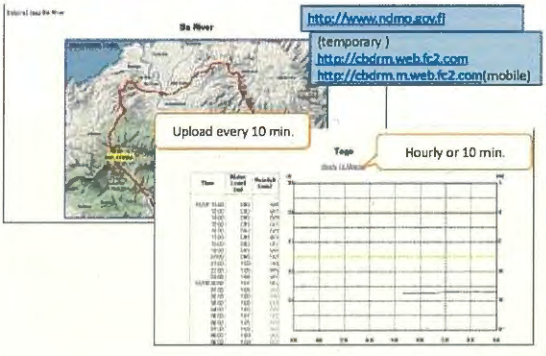
Flood Forecasting

Map Information

Reports



Web Site



The Strengthening Community-Based Disaster Risk Management Project In the Pacific Region

Management of JICA SCBDRM Project

Ropate Rakadi (NDMO)

Background of the Project

- Pacific region vulnerable to natural disasters, due to geographical and topographical factors,
- Flood forecasting required in specific rivers
- Community vulnerable by constrains of infrastructures and transmitting warnings,
- Insufficient manpower in officials

2

International & Regional Instruments

Hyogo Framework for Action 2005-2015 (HFA)
developed 5 thematic areas for DRR & DM implementation

Pacific Plan 2005
calls for the development and implementation of policies and plans for the mitigation and management of natural disasters

Regional Framework for Action 2005
supports an 'all hazards' and integrated approach to the main streaming of DRR & DM

Pacific Islands Framework for Action on Climate Change
advocates the reduction of risks associated with the impact of extreme weather and climate variability through the application of various principles

World Bank Policy Note 2006 – Not If but When
advocates risk management of natural hazards in order to minimize the impact of disasters

6 Themes in the 2nd World Conference on Disaster Reduction, Kobe, Japan

- 6 Themes
- Theme 1: Governance – organizational, institutional, policy and decision-making frameworks
- Theme 2: Knowledge, information, public awareness and education
- Theme 3: Analysis and evaluation of hazards, vulnerabilities and elements at risk
- Theme 4: Planning for effective preparedness, response and recovery
- Theme 5: Effective, integrated and people-focused early warning systems
- Theme 6: Reduction of underlying risk factors

National Action Plan in Fiji

- Translation/national adaptation of the Regional Framework for Action and other linked instruments
- Whole-of-Country approach
  - Consultations at national, local and community or village level
- Identify disaster risk reduction and disaster management strategies

NDMO Functions & Roles

- Implement policies laid down by the Council and Cabinet
- Advise National Disaster Controller, and the Council on disaster related matters
- Initiate formulation of policies for development for DRR and DM in the country
- Arrange council meeting and provide secretariat support and follow up
- Deal with DM issue at national Level
- Initiate and coordinate preparation of rehabilitation plans after national disaster
- Coordinate DM training, education and awareness
- Other functions required by council from time to time

SCBDR Project

- **Project Purpose**
  - A sustainable system in which the residents of the selected community are able to evacuate appropriately is established through the capacity development
- **Outcomes**
  - -1. A flood warning system is developed to raise alerts over the target community / residents
  - -2. NDMO's disaster management capacity is developed.
  - -3. The target community's awareness on disaster preparedness is enhanced

•1st Year : October, 2010 – March, 2011
•2nd Year : April, 2011 – March, 2012
•3rd Year : April, 2012 – March, 2013
•4th Year : April, 2013 – October 2013

- **Overall Goal**
  - A system in which the residents of the areas other than selected community is able to evacuate appropriately

Target River Basins (Ba) of the Project & Pilot Communities (Nasolo, Nawaqarua)

Target Area
(Viti Levu Island and Ba River Basin)

Flood Area Ba River Basin 2009

8

What is Technical Cooperation Project

- Capacity Development of C/Ps and Organization
- Technical Transfer
- Self-help Efforts of C/Ps
- Bottom Up of C/Ps's Capacity
- Project Design Matrix Approach for Project monitoring and evaluation.

9

Usage of Project Design Matrix (PDM)

- Project Design Matrix (PDM) is logical framework of the Project
- PDM is a tool to identify the purpose, outcomes, indicators, assumption, inputs, results and activities of the Project
- PDM approach is popular in the international organization and useful to monitor the progress of the Project,

10

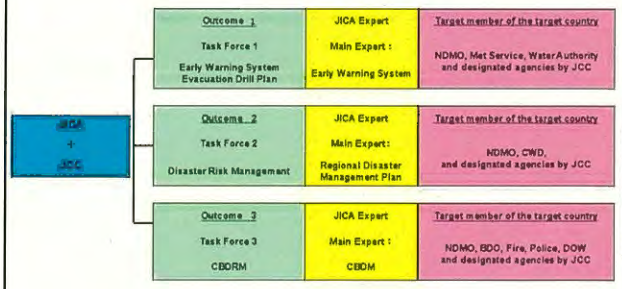
Joint Coordination Committee (JCC) and Task Force

- Review the overall progress
- Review and exchange opinions on major issues
- Share of awareness and information for efficient project implementation
- Hold a meeting between JICA and JCC, when PDM is changed

JCC
Chairperson : Permanent Secretary of Ministry of Rural & Maritime Development, and Disaster management
- PS, Ministry of Defense, National Security and Immigration - PS, Ministry for Agriculture - PS, Ministry of Health - PS, Ministry of Rural & Maritime Development and Disaster Management. - PS, Ministry of Public Works, Transport and Public Utilities - Director General, Fiji Red Cross - Chief Executive, National Fire Authority - Director, NDMO - Director, FMS - CEO, WAF

11

Organization of Task Force



12

NDMO Support for Outcome 1

(1) **Traditional Partnership with Communities**
- ✓ Approval of Hydrological & Simplified Warning Equipment Setting
- ✓ Maintenance and Guard Support from Local Residents

(2) **Coordination between FMS and WAF Hydrology**
- ✓ Construction Support with WAF Hydrology
- ✓ Fencing & Gate Structure Arrangement for the Equipment

(3) **Funding for Data Transmitting using Vodafone Network**


13

NDMO Support for Outcome 2

(1) Support to CWD and Division DISMAC
- ✓ Leading of Independent Discussion by Promotion of Decentralization
- ✓ Work Plan Explanation by NDMO Staff
- ✓ Workshops Support for Sector SOP Preparation & Ba DM Plan

(2) Duplication of DM Operating Manual & CBDRM Guide Book



14

NDMO Support for Outcome 3

- ➢ Support for Implementation of awareness program and evacuation drill
- ➢ Preparation for obtaining various viewpoints during screening procedure of CBDRM Guide Book
- ➢ Promotion with Ba Women Forum to Japan Embassy on Grassroots Project of building 32 Communities resilient to Flood (SEWS, Awareness, TOT, Simulation Drill)

15

Which is difficult for you? Risk Management or Time Management

Vinaka Vakalevu!
Arigatou Gozaimasu

16

THE STRENGTHENING COMMUNITY-BASED DISASTER RISK MANAGEMENT PROJECT IN THE PACIFIC REGION

Project Seminar, 15th October 2013, Tanoa Plaza Hotel, Suva

ATTENDANCE

No.	Name	Organisation	TEL / Email	Signature
1	Alifereti Abenaiga	BA District Office	6674056	
2	Ratu Manasa Draki	BA District Office	6674056	
3	SAULA MATAKARAWA	MINISTRY OF HEALTH - BA	6674045 saulmatakarawa@gmail.com	
4	SAINJANA TINAI	BA HART HOME	9719375	
5	NIKO TUIVUYA	Ministry of Health	9225754 niko.tuivuya@govnet.gov.fj	
6	JUDE KOHLHASE	ADB	9993109 - jkohlhase@adb.org	
7	ICHIRO MIMURA	@ JICA	3302522	
8	Shigeki Ishigaki	"	"	
9	Nilesh Prasad	✓	✓	
10	Maka Finau	Mineral Resources Dept	9964754	
11	APETE SORO	" " "	3381611	
12	Tsutomu KAMEYAMA	JICA Team	836-8088	
13	Tomohiro UMEKI	JICA Project Team	8351959	
14	Epeli Nicuron	NZAID	3311422(125) epeli.nicuron@met.govt.nz	
15	Akira Shinoya	JICA Project Team FMS	—	
16	TOMASI N.		7777346 Exelonis@gmail.com	
17	SAMUELA. K	NDMO	9031385	
18	M MUA	JICA BA	9328634	
19	Rasom	NDMO	9905533	
20	Leonard Bale	MET SERVICE	9905377	LBale

THE STRENGTHENING COMMUNITY-BASED DISASTER RISK MANAGEMENT PROJECT IN THE PACIFIC REGION

Project Seminar, 15th October 2013, Tanoa Plaza Hotel, Suva

ATTENDANCE

No.	Name	Organisation	TEL / Email	Signature
1	[illegible]	NDMO	[illegible]	
2	SUNIA-RATUKEM	NDMO	sunia.ratukem@[illegible]	
3	Jim Pedro.	NDMO	jimpedro49@gmail.com	
4	MANASA-R. TAGICAKIBAU	NDMO	manasa.tagicakibau@govnet.gov.fj	
5	VOSITA. K	FBC	vkotowasawasa@fbc.com.fj	
6	ERENA.	FBC	[illegible]	
7	Tu Tangi	AusAID	tu.tangi@ausaid.gov.au	
8	John Marley	AusAID	john.marley@ausaid.gov.au	
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The Strengthening Community-Based Disaster Risk Management Project In The Pacific Region

International Workshop

Kitano Mendana Hotel, Honiara

24 October, 2013

National Disaster Management Office,

Ministry of Environment, Climate Change, Disaster Management and Meteorology

International Workshop

on the Strengthening Community-Based Disaster Risk Management Project

Conference Room at Kitano Mendana Hotel
Honiara, Guadalcanal Province

24th October 2013

AGENDA

Seminar Objectives:

1. To report the outcomes of the JICA Project
2. To share the good practices and lesson among the stakeholders

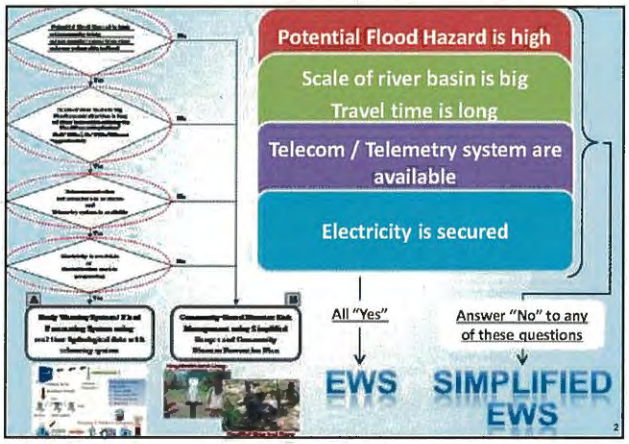
TIME	SESSION	FOCUS	RESOURCE AGENCY/PERSON
08:30	**Registration**		*All Participants*
09:15	**Opening Remarks**	Greeting	***Mr. Jonathan Tafiariki,*** *Deputy Director of NDMO Solomon* ***Mr. Usui****, Representative, JICA Solomon Office*
09:30	**Session 1 [FIJI]**	Outcome 1	*'Hydro Information System in Ba'* ***Mr. Samuela, Kanainaliwa****, Clerical Officer, NDMO*
10:00		Outcome 2	*'DM Meetings and Plan for Ba River Basin'* ***Mr. Kaie Nawasa****, CBDRM Officer, CWD*
10:30		Break	*All Participants*
11:00		Outcome 3	*'Guidebook for Community Based Flood Risk Management'* ***Mr. Alifereti Abenisiga****, Assistant District Officer, BDO*
11:30		Q & A	*All Participants*
12:00	**Lunch**		
13:30	**Session 2 [SOLOMON]**	Outcome 1	*'Flood Runoff Model'* ***Mr. Jack Kaobata****, Senior Hydrologist, WRD*
14:00		Outcome 2	*'Provincial DM Plan and Manual'* ***Mr. George Baragamu****, Chief Operation Officer, NDMO*
14:30		Training in Japan	*'Disaster Education – Tsunami Awareness in Japan'* ***Mr. Joseph Tangi****, School Inspector, Education Div. G-P*
14:45		Training in Japan	*'Outcomes of the training in Japan'* ***Mr. George Paikai****, Police Officer, Ministry of Police*
15:00		Break	*All Participants*
15:30		Outcome 3	*'Guidebook for Village DRM and Evacuation Drill'* ***Mr. Herrick Savusi****, Provincial Disaster Officer, NDMO*
16:00		Q & A	*All Participants*
16:30	**Closing Remarks**	Vote of Thanks	***Mr. Kameyama****, Chief Advisor, JICA Project Team*

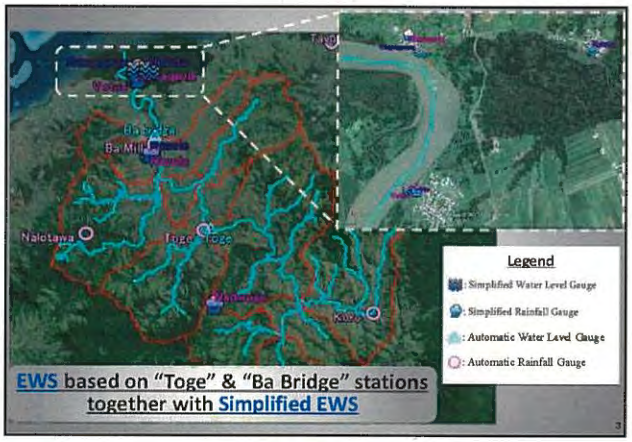
NDMO: National Disaster Management Office
WRD: Water Resource Division in Honiara
G-P: Guadalcanal Provincial Government Office
WAF: Water Authority in Fiji
CWD: Commissioner Western Division Office
BDO: Ba District Office

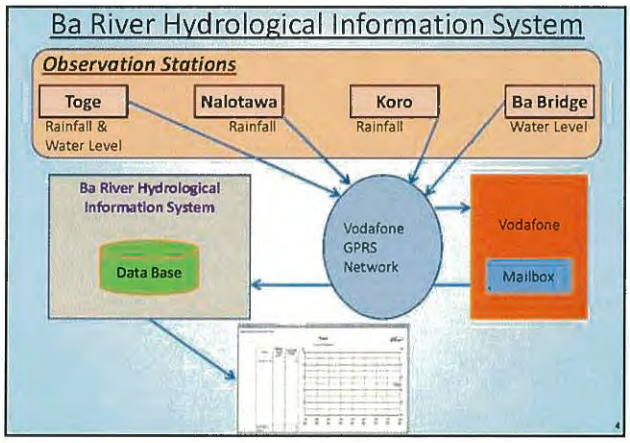
Early Warning System (EWS) & Ba River Hydrological Information System

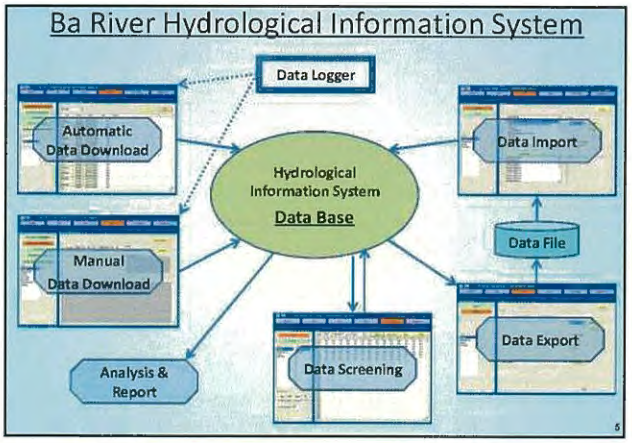
-Warning Standard & Simplified EWS-

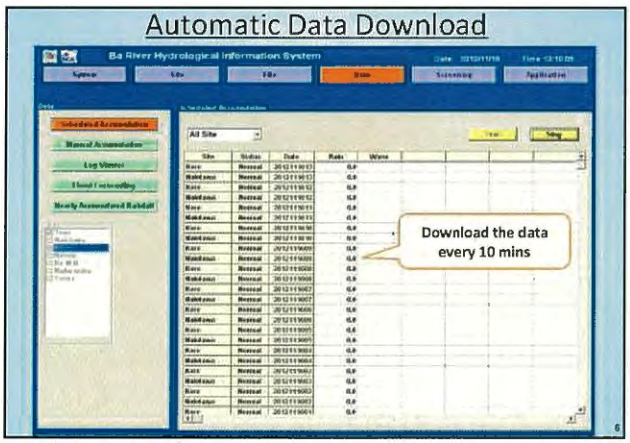
Samuela Kanainaliwa
NDMO, The Republic of Fiji Islands



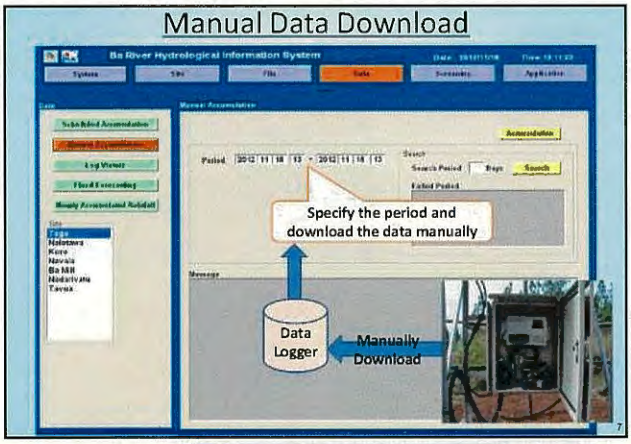




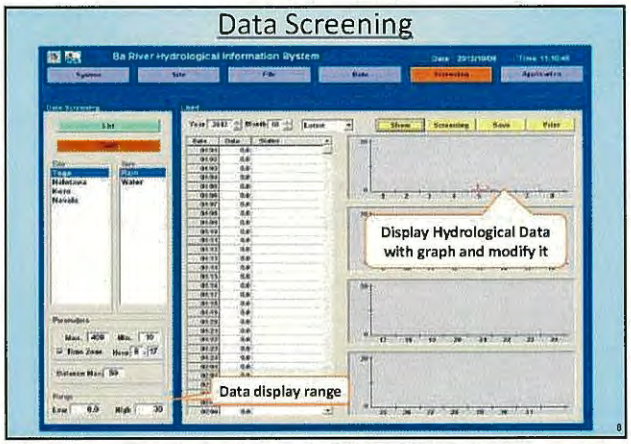




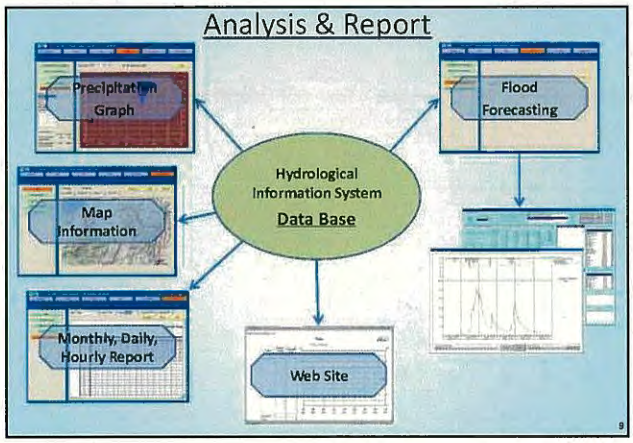
Manual Data Download



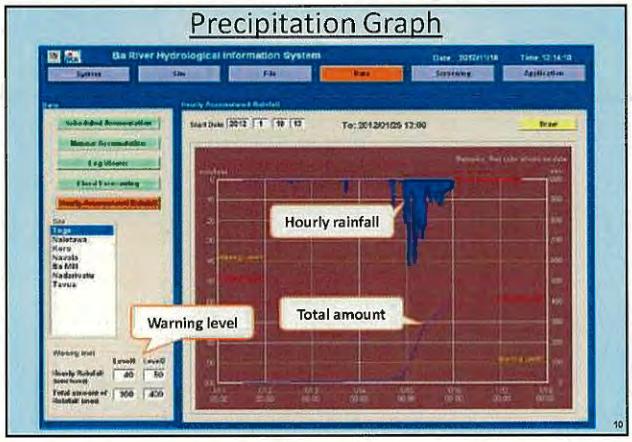
Data Screening



Analysis & Report

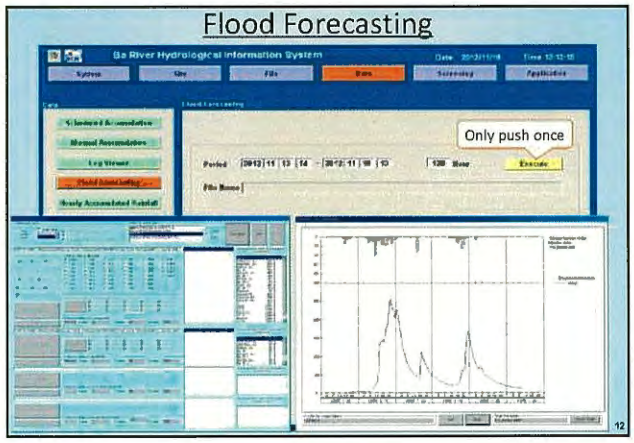


Precipitation Graph

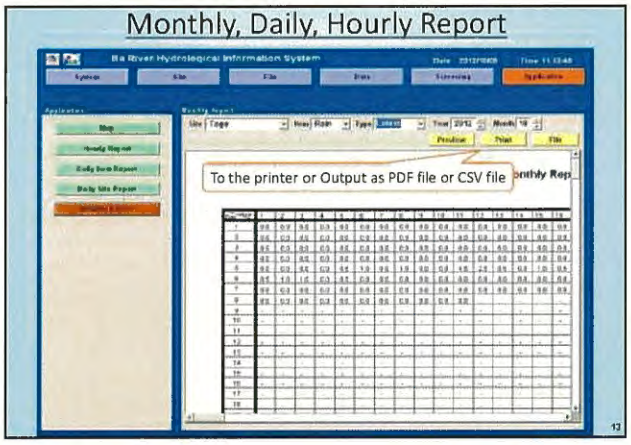


Map Information

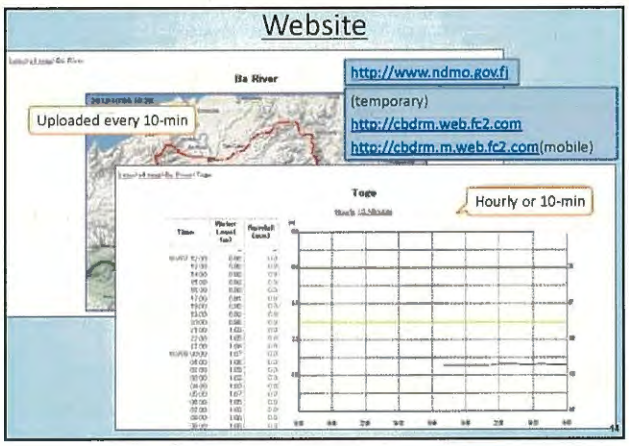
Flood Forecasting



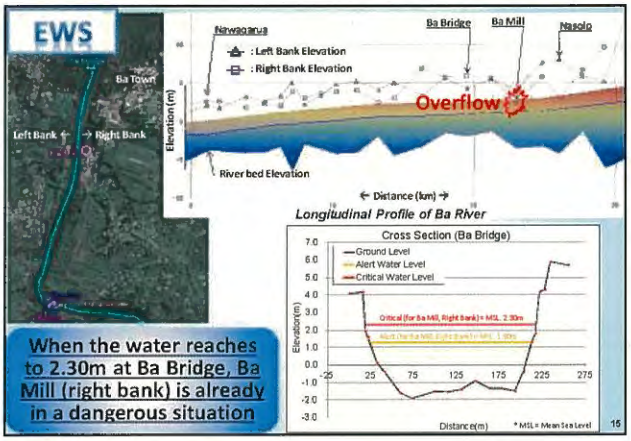
Monthly, Daily, Hourly Report



Website

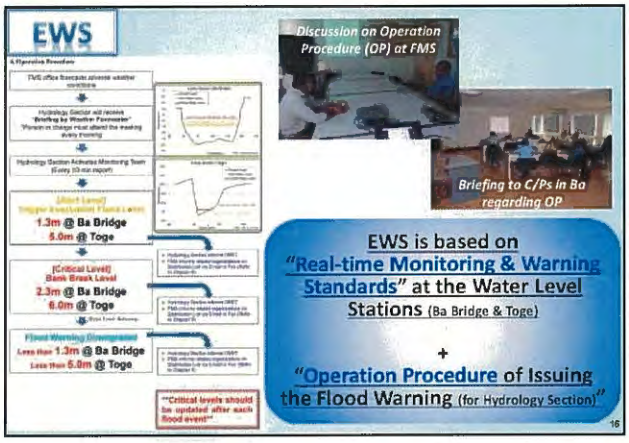


EWS



When the water reaches to 2.30m at Ba Bridge, Ba Mill (right bank) is already in a dangerous situation

EWS

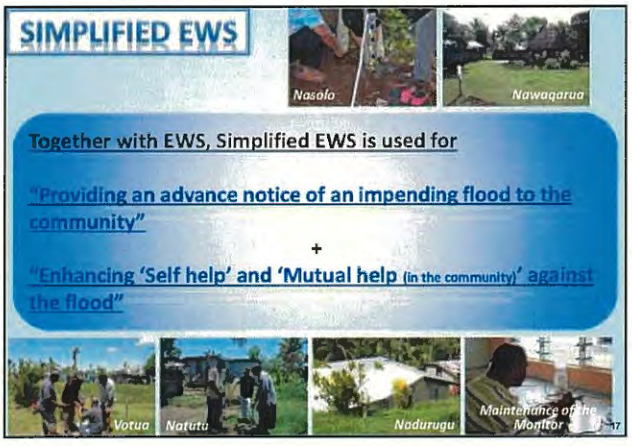


EWS is based on "Real-time Monitoring & Warning Standards" at the Water Level Stations (Ba Bridge & Toge)

+

"Operation Procedure of Issuing the Flood Warning (for Hydrology Section)"

SIMPLIFIED EWS



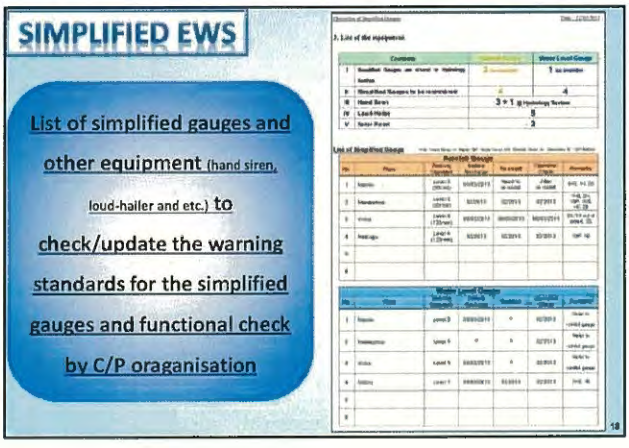
Together with EWS, Simplified EWS is used for

"Providing an advance notice of an impending flood to the community"

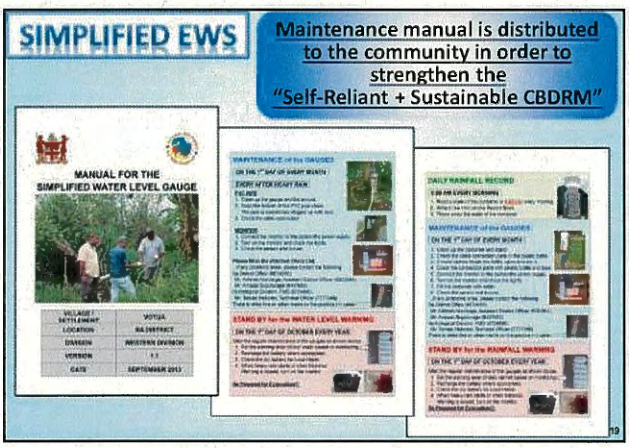
+

"Enhancing 'Self help' and 'Mutual help (in the community)' against the flood"

SIMPLIFIED EWS



List of simplified gauges and other equipment (hand siren, loud-hailer and etc.) to check/update the warning standards for the simplified gauges and functional check by C/P oraganisation


SIMPLIFIED EWS
Maintenance manual is distributed to the community in order to strengthen the "Self-Reliant + Sustainable CBDRM"
MANUAL FOR THE SIMPLIFIED WATER LEVEL GAUGE
VILLAGE / SETTLEMENT
VOTUA
LOCATION
NA DISTRICT
DIVISION
WESTERN DIVISION
VERSION
1.1
DATE
SEPTEMBER 2013
MAINTENANCE of the GAUGES
STAND BY for the WATER LEVEL WARNING
DAILY RAINFALL RECORD
MAINTENANCE of the GAUGES
STAND BY for the RAINFALL WARNING

DISASTER MANAGEMENT PLAN

BA / WESTERN DIVISION

FIJI ISLANDS

Kaie Nawasa
Planning, CWD
kaie.nawasa@govnet.gov.fj
kaienawasa@gmail.com

OUTLINE OF PRESENTATION

- BA DMP / WESTERN DIVISION SOP DEVELOPMENT
- ACTIVITY IN 2013
- WAY FORWARD

DISASTER DOCUMENT SYSTEM

National
- National Act 1998
- National Plan
- National SOP 2010

Ministerial Plan **MPD**

Divisional
- **Divisional SOP Div EOC**

District
- **DISTRICT PLAN**
- **Sector SOP (Stakeholders/Line Ministries)**

NEW FEATURES

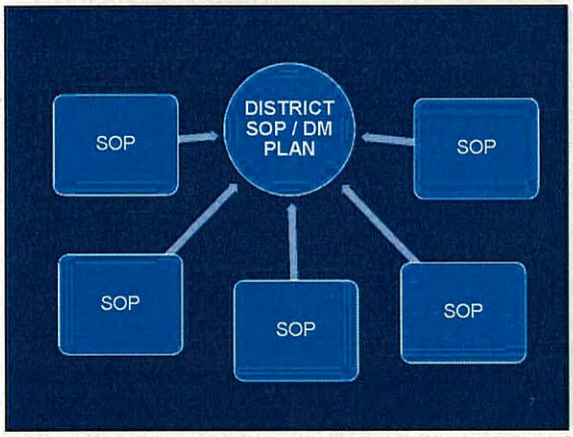
- **FLOOD SPECIFIC PLAN IN BA**
  - Historical flood analysis
  - Flood hazard map
  - Flood early warning
- **EMPHASIS ON PREPAREDNESS**
  - At all level …Citizen, Private, Local government sectors
  - Education & Drill
- **PARTNERSHIP**
  - Civic participation
  - MOU with Private, NGOs
  - Stakeholder

ELEMENTS IN PLAN

- **WHY**
  - Aims, objectives
- **WHEN**
  - Before, during, after, recovery
- **WHO** (Stated In Current Plan But Very Limited)
  - Division, District, Ministry, Lifeline, Community
- **WHAT**
  - Tasks during each phase
- **HOW** *(well described in current plan)*
  - Principle of tasks, Lead / Support agencies

SOP DEVELOPMENT @ DIVISIONAL LEVEL-WEST

- Input material prepared in Jan. - July
- **25 ORGANIZATION** visited & given "input"
- Worked for 2 months internally
- **20 organizations submitted SOPJoint presentation on Oct. 19**
  - Evaluated by audience
- **EVACUATION DRILL** on Oct. 26 in Ba
- Sectoral drill on Nov. 15- (Divisional / District Table Top)



Important Documents District DRM Plan

BA FLOOD DRM PLAN

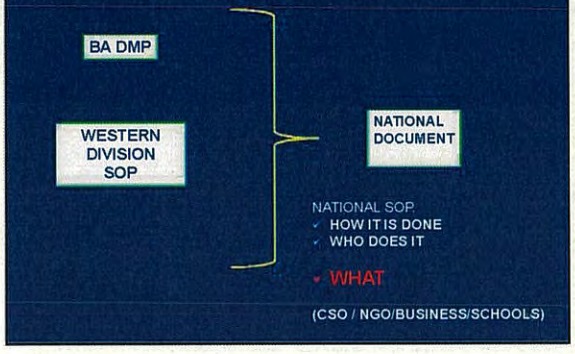
PREPAREDNESS	WARNING	RESPONSE	RECOVERY	
•Prov. Dev.	•Prov. Dev.	•Prov. Dev.	•Prov. Dev.	SOP
•Agriculture	•Agriculture	•Agriculture	•Agriculture	SOP
•Works	•Works	•Works	•Works	SOP
•Education	•Education	•Education	•Education	SOP
•Health	•Health	•Health	•Health	SOP
•....	•....	•....	•....	

Hazard Map | Resource Map/List | MOU/A | Forms

ACTIVITIES 2013

- March 2013 – Review Meeting
- June 2013– Kick Off
- Aug / Sep – SOP Consultation and Way Forward for National Document (SOP and DMP)
- STAKEHOLDERS
  - ✓ AFP
  - ✓ SOPAC
  - ✓ CI
  - ✓ ???

NATIONAL DOCUMENT FORMULATION CONCEPT



MOU FORMATION

- District Level
- Visited 13 NGO's in June July
- Consultation for Standard MOU
- 6 NGO signed MOU with Ba District
- Partnership for Disaster Response
- Regular Meeting in Normal Time

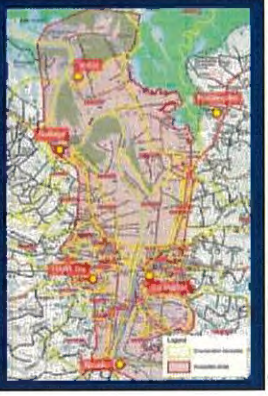
BCP FORMATION

- Business Continuity Plan for Private Sector
- Developed for 1 Shop in Ba
- Conducted Disaster Drill in July

TOT FOR WOMEN

- MINISTRY OF WOMEN AND SOCIAL WELFARE ENDORSEMENT
- BA WOMENS FORUM (LEAD ORG)
- COMPSED OF REPS FROM DIFFERENT ETHINICITY / VILLAGES + SETTLEMENTS (29 Villages / 100 + Settlements)
- TRAIN OTHER WOMENS GROUPS TOWARDS DISASTER PREPAREDNESS
- INCREASE VIGILANCE (REACTION – PROACTIVENESS)

TOT for women



WAY FORWARD

- Continual Updating of Individual SOP
- **Formulation of Joint SOP at Divisional Level (Gov /NGO / Community / etc)**
- **FINALIZATION OF JOINT SOP AND WESTERN DIVISION DMP**
- **ENDORSEMENT FROM NDMO OF JOINT SOP FOR TEMPLATE OR STANDARD FOR REPLICATION IN OTHER DIVISIONS IN FIJI.**

VINAKA VAKALEVU

QUESTIONS.....!

OUTCOME 3

[EVACUATION DRILL]

[GUIDEBOOK For Community Based Flood Risk Reduction]

Alifereti Abenisiga
Assistant District Officer
Ba District Office
aliferetiabenisiga@yahoo.com

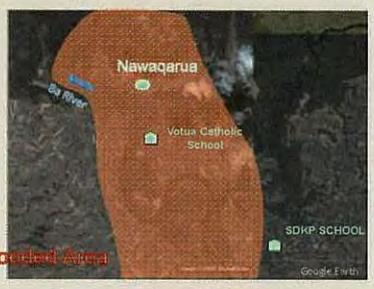
[EVACUATION DRILL]

DATE	VILLAGE	EARLY WARNING/ Transmission Tools	EVACUATION PLACE	COMMENTS
18 Oct 2011 Tue	Nawaqarua	Simplified Gauges/ Hand Siren, Loud Hailer	a house	About 100 villagers participated. JICA Expert facilitated.
19 Oct 2011 Wed	Nasolo	Simplified Gauges/ Hand Siren, Loud Hailer	Community Hall	About 70 villagers participated. JICA Expert facilitated.
26 Oct 2012 Fri	Nawaqarua	Simplified Gauges, Text Message/ Hand Siren, Loud Hailer	St Teresa School, Community Hall	154 villagers participated. ADO and CDC members facilitated. Villagers used buses for evacuation.
23 Nov 2012 Fri	Nasolo	Simplified Gauges/ Hand Siren, Loud Hailer	Community Hall, Hill	40 villagers participated. CDC members facilitated.
26 Aug 2013 Mon	Natutu	Simplified Gauges/ Lali, Loud Hailer	Community Hall	About 200 villagers participated. CDC members facilitated.
14 Sep 2013 Set	Nawaqarua	Simplified Gauges/ Electric Siren, Hand Siren, Loud Hailer	Community Hall	225 villagers participated. CDC members facilitated.

Evacuation Drill in Nawaqarua October 2012

BACK GROUND

- **Village Location**: Low-lying area away from non-inundated area
- **Evacuation Centre**: Lack of capacity of the Votua Catholic School
  - → *How to encourage the villagers to go to safer place in the early stage?*



SCENARIO of the DRILL

The Advisory of text message (SMS)

26th Oct

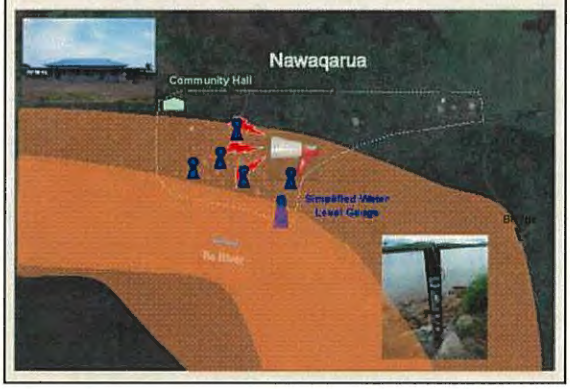
08:30 AM Heavy Rain was monitored in upper stream of Ba river.
Flood was expected in low-lying areas within 2 hours.
1st Advisory of text massage (SMS) was issued by FMS (Hydro unit).

08:45 AM Water level came up to 2m in the Navara Station.
Flood was expected in low-lying areas within 1 hour.
2nd Advisory of text massage (SMS) was issued by FMS (Hydro unit).

09:30 AM Water level came up to danger level in Nawaqarua village.
Simplified Water Level Gauge Alert was issued.

SCENARIO of the DRILL

SCENARIO of the DRILL



Review of Evacuation Drill

Nawaqarua Village

- Turaga ni Koro has been very busy.
  → Work sharing in the village can be enhanced.
- House doors left open when they evacuated.
  → Security should be considered.
- Simplified Gauges should be maintained by Villagers.

Evacuation Drill in Nawaqarua September 2013

Evacuation Plan　Response Plan

BLUE: ALERT

YELLOW: WARNING

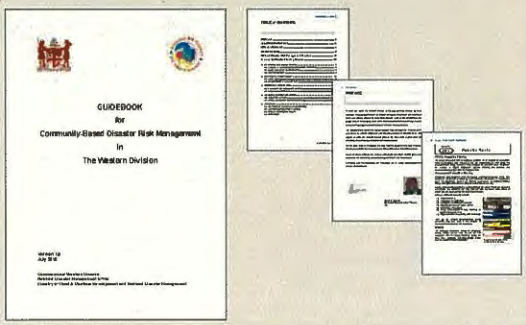
YELLOW: WARNING

Review of Evacuation Drill

Nawaqarua Village

- Villagers have been familiar with the simplified gauges
- The Time required for Evacuation in the village was shortened
  - → 10 minutes in 2012 → 6minutes in 2013
- Villagers played their role properly.
  - → Time Keeper, Rescue Team, Head Counting etc.

Guidebook for
Community Based Flood Risk Reduction in Western Division



Guidebook for
Community Based Flood Risk Reduction in Western Division

Purpose

To provide minimum requirements of the **Community Disaster Planning** which aim to enhance the Community Resilience for multi hazards in Fiji.

Objective

1. To enhance the capacity of Community on DRR
2. To improve the coordination of local agencies
3. To avoid duplication among different organizations

Process for Community Disaster Planning

STEP 1:
INFORMATION COLLECTION

STEP 2:
COMMUNITY WORKSHOP

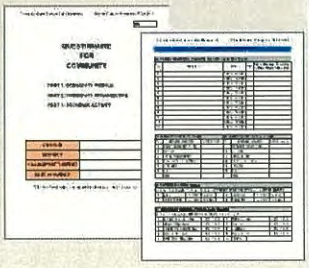
STEP 3:
EVACUATION DRILL
(Simulation Exercise)

STEP 4:
DOCUMENTATION

STEP 1: INFORMATION COLLECTION

Social Survey for Community

"Questionnaire for Community"



STEP 1: INFORMATION COLLECTION

Social Survey for each Household

"Questionnaire for Household"

STEP 1: INFORMATION COLLECTION

Selection of Disaster Committee Members

"CDC Member List" in Community Disaster Plan

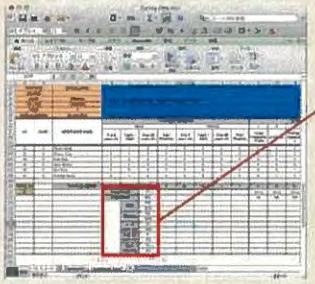
[Members of CDC]

No	NAME	POSITION	CONTACT	SIGNATURE
1		Chairperson		
2		Vice-Chairperson		
3		Secretary		
4		Women's Group Leader		
5		Men's Group Leader		
6		Youth Group Leader		
7		Village Nurse		
8		Totolais (Pastor)		
9		Member (Teacher)		
10		Member		

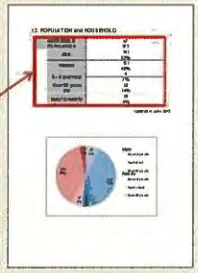
STEP 1: INFORMATION COLLECTION

Community Profiling

"Household" sheet in Excel File of "Survey Data"



"Population and Housing" in Community Disaster Plan



STEP 2: COMMUNITY WORKSHOP

Community Safety Map

Procedure of Safety Mapping

Safety Mapping STEP 1 History of Disaster Event

Safety Mapping STEP 2 Listing Local Risks and Resources

Safety Mapping STEP 3 Safety Mapping

History of Disaster Event

Risks and Resources

Safety Map

STEP 2: COMMUNITY WORKSHOP

Community Response Plan

Procedure of Response Planning

Response Plan STEP 1 National Warning Arrangement

Response Plan STEP 2 Response Planning

Response Plan STEP 3 Evacuation Planning

National Warning Arrangement

Response Plan

Evacuation Plan

STEP 3: EVACUATION DRILL

Procedure of Evacuation Drill

Evacuation Drill STEP 1 Implementation Planning

Evacuation Drill STEP 2 Explanation for Participants

Evacuation Drill STEP 3 Practice and Evaluation

Implementation Plan

Explanation for Participants

Practice and Evaluation

STEP 4: DOCUMENTATION

Signature on Community Disaster Plan

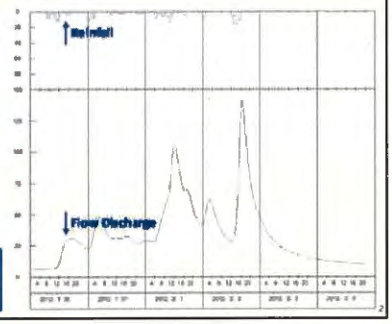
Runoff Analysis is..

To estimate the flow discharge at the various point of the river from the rainfall data

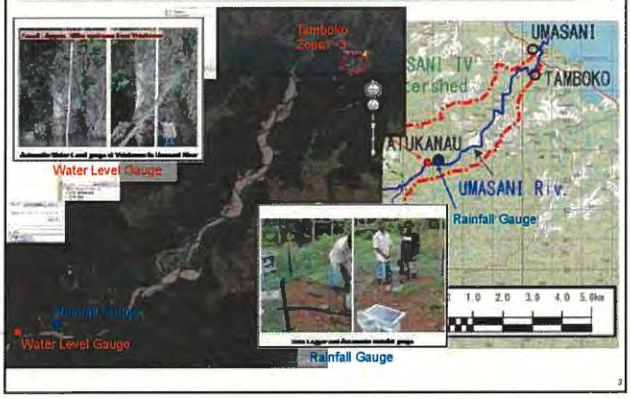
Input :
Rainfall Data [mm]

Runoff Analysis with Flood Runoff Model

Output :
Flow Discharge [m³/s]



Location of Automatic Water & Rainfall Gauges..



Rainfall in Past 3 Years in Tamboko..

2011 (Jul. 15th – Dec. 31st)

Annual Rainfall (mm/year)	Days of Rainfall / Obs.days (day)	Max Rainfall by the Month (mm/month)		Max Rainfall by the Day (mm/day)		Max Rainfall by the Time (mm/h)	
		Rainfall	Accrual Date	Rainfall	Accrual Date	Rainfall	Accrual Date
1327.0	81 / 170	498.5	Dec.	109.0	Oct.11	53.0	Oct.11 19h

2012 (Jan. 1st – Dec. 31st)

Annual Rainfall (mm/year)	Days of Rainfall / Obs.days (day)	Max Rainfall by the Month (mm/month)		Max Rainfall by the Day (mm/day)		Max Rainfall by the Time (mm/h)	
		Rainfall	Accrual Date	Rainfall	Accrual Date	Rainfall	Accrual Date
2934.5	152 / 328	521.5	Jan.	156.5	Dec.28	47.5	May.23 18h

2013 (Jan. 1st – Jul. 17th)

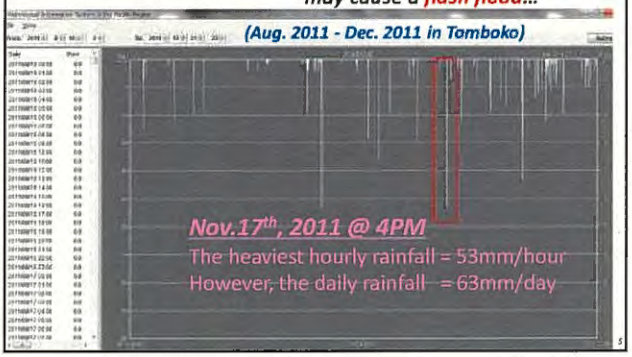
Annual Rainfall (mm/year)	Days of Rainfall / Obs.days (day)	Max Rainfall by the Month (mm/month)		Max Rainfall by the Day (mm/day)		Max Rainfall by the Time (mm/h)	
		Rainfall	Accrual Date	Rainfall	Accrual Date	Rainfall	Accrual Date
2143.0	111 / 196	893.0	Mar.	104.0	Mar.1	49.0	Feb.19 22h

For comparison (Expression in Japan) ...
Hourly Rainfall (30 – 50 mm/hour) : *Bucketing down*
Hourly Rainfall (50 – 80 mm/hour) : *Torrential rainfall*

Rainfall Pattern..

1. "Torrential rainfall (Heavy rain in short term)" may cause a flash flood...

(Aug. 2011 - Dec. 2011 in Tamboko)

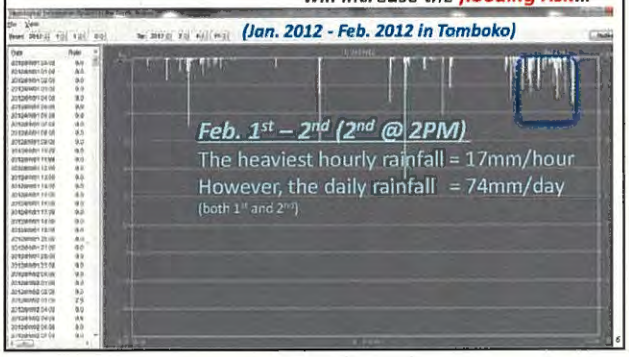


Nov.17th, 2011 @ 4PM
The heaviest hourly rainfall = 53mm/hour
However, the daily rainfall = 63mm/day

Rainfall Pattern..

2. "Long rain (Not heavy but continued in long term)" will increase the flooding risk...

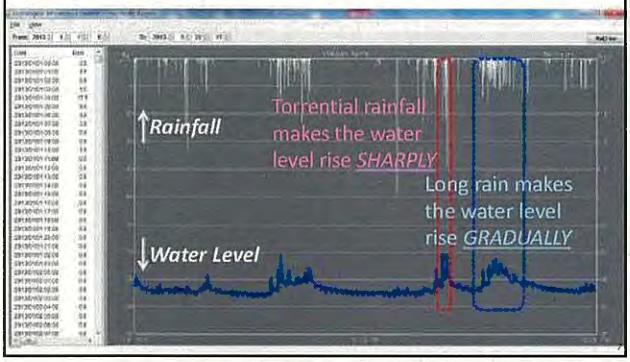
(Jan. 2012 - Feb. 2012 in Tamboko)



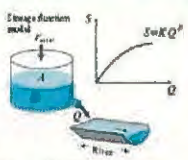
Feb. 1st – 2nd (2nd @ 2PM)
The heaviest hourly rainfall = 17mm/hour
However, the daily rainfall = 74mm/day
(both 1st and 2nd)

Rainfall Pattern..

Recent (Jan. – Mar. 2013) rainfall and water level in Tamboko



Runoff Analysis (using "Storage Function Model")..



$$S = K \cdot Q^{p}$$

$$\frac{dS}{dt} = \frac{1}{3.6} \cdot f \cdot r_{ave} \cdot A - Q$$

f : Runoff coefficient
Kp : Constants for Storage function method
S : Storage in basin area (m^3)
Q : Direct run - off from basin area (m^3/s)
R_{ave} : Average depth of rainfall in basin area
A : Basin areas(km^2)

"Program of Storage Function Model"

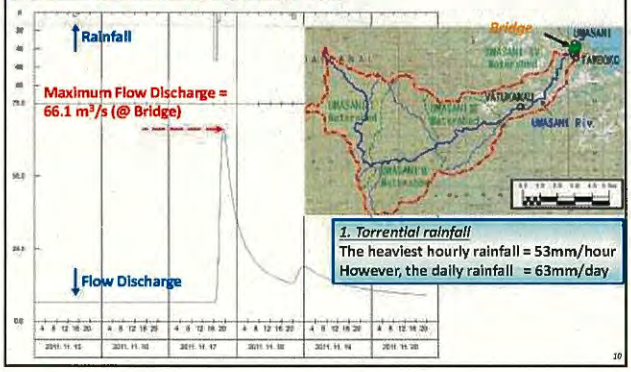
Storage Function Model in Umasani River Basin..

Model Parameter

Model	Catchment Area No.	Catchment Area (km2)	constant	Basin Roughness / Equivalent roughness	Basin Gradient	Highest point at river (m)	Lowest point at river (m)	Length of River Channel (km)	Constants		Delay Time (min)	River Width (m)
		A		C	I			L	K	P	TL	B
Basin	1	17.0	43.400	0.120	1/2877	1/17	777.0	190.0	9.9	29.678	0.333	0.000	-
	2	24.0	43.400	0.120	1/430	1/48	190.0	100.0	4.3	30.730	0.333	0.000	-
	3	14.0	43.400	0.120	1/1900	1/62	100.0	45.0	4.5	37.327	0.333	0.000	-
	4	10.5	43.400	0.120	3/770	1/257	45.0	15.0	7.7	65.357	0.333	0.000	-
River	Umasani I	-		0.035	1/430	1/48	190.0	100.0	4.3	1.847	0.600	1.313	50.0
	Umasani II	-		0.035	1/1900	1/62	100.0	45.0	4.5	2.312	0.600	1.797	50.0
	Umasani III	-		0.035	3/770	1/257	45.0	15.0	7.7	7.642	0.600	5.448	100.0

Result of Runoff Analysis using Observed Data 1..

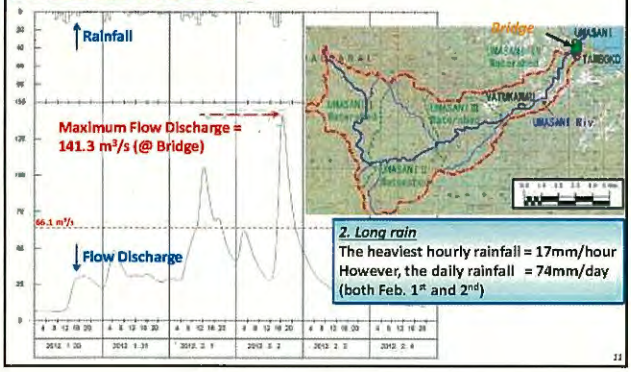
(Using "Torrential rainfall") in 2012



1. Torrential rainfall
The heaviest hourly rainfall = 53mm/hour
However, the daily rainfall = 63mm/day

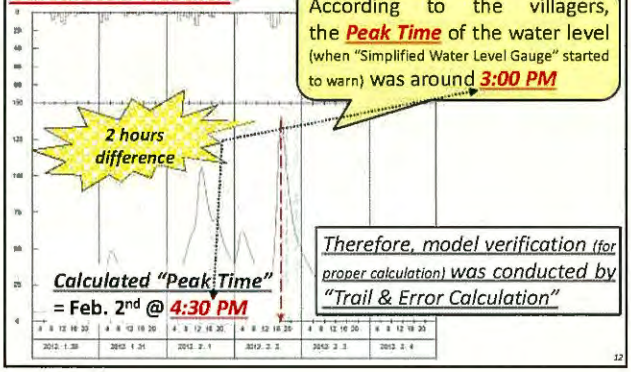
Result of Runoff Analysis using Observed Data 2..

(Using "Long rain") in 2012



2. Long rain
The heaviest hourly rainfall = 17mm/hour
However, the daily rainfall = 74mm/day
(both Feb. 1st and 2nd)

Comparison Between Actual Situation and Calculated Result..

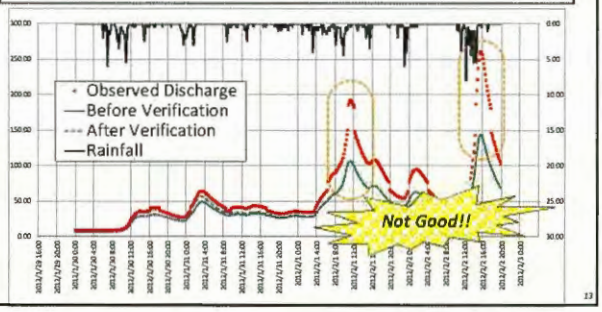


According to the villagers, the ***Peak Time*** of the water level (when "Simplified Water Level Gauge" started to warn) was around ***3:00 PM***

Therefore, model verification (for proper calculation) was conducted by "Trail & Error Calculation"

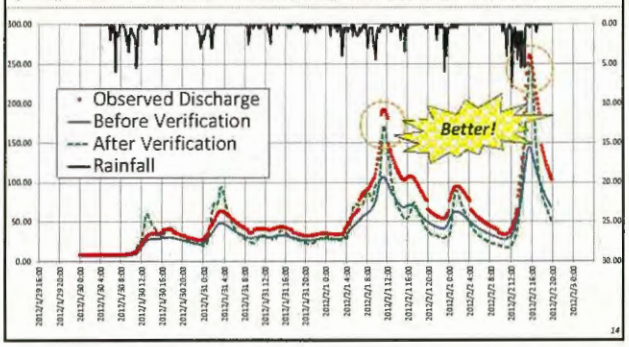
Verification Calculation (Trail & Error Calculation)..

For the ideal flood forecasting..
Calculated "Peak of the Flood (Timing & Volume)" should be the same with the observed value

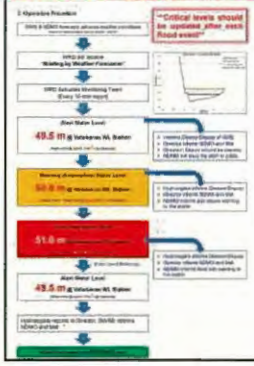


Verification Calculation (Trail & Error Calculation)..

Model parameters has changed to find the best-fit combination
(Runoff Ratio, Saturation Rain, Constant K [Storage of the Basin] and Delay Time)



Moreover, Operation Procedure of Issuing the Flood Warning is Established..



Operation procedure of issuing the flood warning for Water Resource Division was established

When the real-time observation starts to be used, this operation procedure shall be utilized

Warning Standards for Umasani River	
Alert Water Level	49.5m
Evacuation Water Level	50.0m
Flood (Bill) water Level	51.0m

Conclusion..

- ***Model verification using "long term observed data & various type of rainfall patter" is still required.*** *However, it is important for such a model to be developed for the purposes of future flood forecasting.*
- *Because there is no telemetry system available, real-time forecasting is not possible as yet (Hopefully, when we have such a system in place, the outcome might be different fram now).*

Progress in 2013

Regarding Disaster Management Planning

The Strengthening Community-Based Disaster Risk Management Project in the Pacific Region

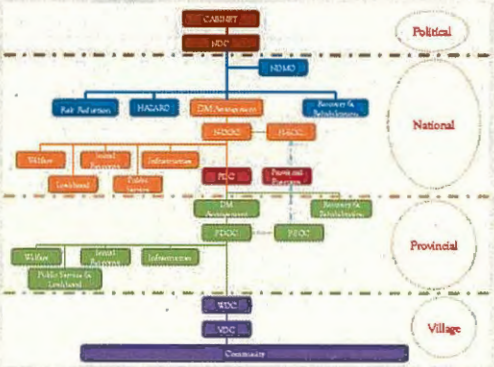
THE SOLOMON ISLANDS — THE REPUBLIC OF FIJI

Thursday 24th October 2013
Mendana Hotel, Honiara, Solomon Islands
Prepared and presented by George Baregamu of the NDMO Operations Section
for SCDRMP International Seminar

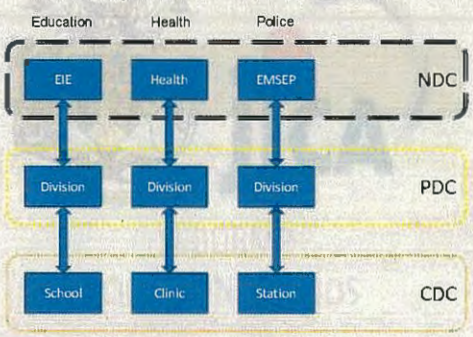
Presentation Outline: Output 2

- DRM Arrangements in the SI
- Achievements in JICA Project
- Issues for Way Forward
- End

DRM Arrangements in the SI



Vertical/Horizontal coordination



No. of stakeholders in clusters

National level

IRA	Welfare	Public service	Liveli-hood	Infra.
7	9	7	8	7

(NGOs are counted as one)

Provincial level

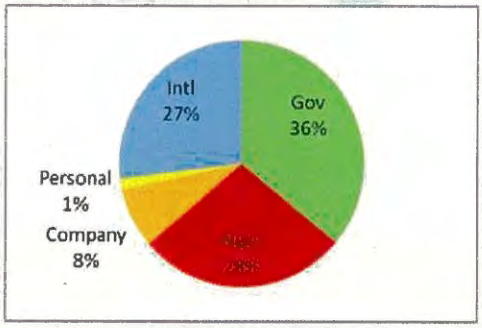
IRA	Welfare	PS&L	Infra.
14	36	15	9

(Workshop in October, 2012)

Agencies and Clusters

Name	IRA	Welfare	PSL	Infra	Sum
Health	1	1	1		3
Education		1	1	1	3
NGOs	1	1	1		3
Private	1	1		1	3
Police	1	1			2
PDMO	1	1			2
Agriculture	1		1		2
Health – Medical		1		1	2
Planning division		1		1	2

Donation for 2013 Tsunami



Data source: NDMO, 2013

Back

Achievements in JICA Project

DRM Plan Revision

Weakness in	Strengthening by
Coordination	Manual development
	Division of role table
	Contact sheet
Dissemination	Manual distribution
	Web site development
	Communication drill
Sustainability	Consistency with cluster system
	Web site development
	Legalization

National and JICA documents

National system	JICA project
How to manage disaster?	What to do for disaster?
Focus on Response	Focus on Preparedness
All hazard	Flood specific
National level	Local level
	Provincial profile
	Flood database
	Resource list map
1987 National DM Plan 1989 National DM Act 2010 National DRM Plan 2012 Provincial Cluster SOP	2012 GP flood DRM plan 2012 Sector SOPs 2013 Manual

Manual Development

- Handy
  - A5 Diary Size
- Compact
  - 32 pages
  - Warning – response – recovery phases
- Practical
  - Division of role table
  - Contact sheet

...Under review & to be distributed to staffs

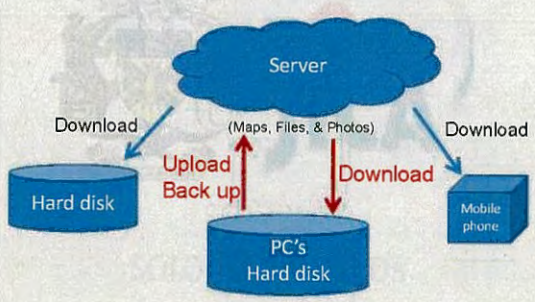
NDRMP – JICA Plan Merging

- Correspond Task & Cluster
- Define Lead-Support Agency/Task
- Define Agency's role/Task

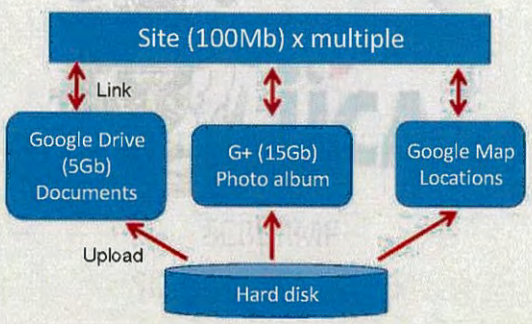
Process of Info. management

Phase	Examples
Search	Field survey, Internet
Input	Watch, Listen, Read
Output	Document, Slide, Photo, Video
Share	Report, Presentation, Media, Internet
Keep	Bookshelf, Library, Internet
Re-use	Lesson, Annual report, Revision

How to share & keep information?



How to development web site?



Web site development

- Home
- About
- Download
- Gadget
- Maps
- News
- Photo Album
- ResourceList
- SituatonReport
- StakeholderList
- Web links
- Sitemap

Training for web site develop for stakeholders.

Communication Drill

Why ?

- Economic
- Fast
- Objectives
- Warning dissemination
- Situation reporting
- Preparation
- Contact list
- Message template

Back

Issues for Way Forward

Issues	Responsible	Term
Annual committee	SIMS, NDMO, GP	Short
Announcement & use of web	GP, NDMO	Short
MoU with private sectors	GP, NDMO	Short
Legalization of plan & SOP	GP, NDMO	Long
Replication to other provinces	NDMO	Long

Back

Tagio Tumas

neocopsndc@ndmo.gov.sb

Honiara, October 24, 2013
Mr. Joseph Tangi
School Inspector
Ministry of education

Progress of Disaster Management in Education Division

The strengthening community-based disaster risk management project in the pacific region
Japan International Cooperation Agency

Outline

- 1. DRM in Ministry of Educations
- 2. Lessons from Training in Japan
- 3. Achievements in 2013
- 4. Way forward

2

1. DRM system in Min. of Education

Level	Framework	Status
Ministry	Education In Emergency	
Division	SOP for education	
School committee		
School management	School DRM Plan	
Teachers		
Students		
Parents		
Community	Committee	

3

SOP for Education division

PROFILE

- All phase of disaster
- Division of role defined
- Contact list
- Map

STAKEHOLDERS

- Education division
- School board
- School management
- Teachers
- Students
- Parents
- Community

4

2. Kamaishi City, Japan

- Population: 37,000
- Household: 17,000
- Area: 441 km²
- Density: 83 pop./km²
- Industry: fishery & steel
- Major Tsunami in 1895,1933, & 2011
- All students survived from Tsunami at Kamaishi Higashi junior high school

http://www.city.kamaishi.iwate.jp/

Disaster education in Kamaishi

- For **all grades** in elementary & junior high
- Taught in **all subjects**
- **Various form of materials** for teachers (movies, photos, slides, maps, books etc.)
- Disaster education **1 hour a week**
- **3 drills** in a year
- Supported by **education board**, disaster management section, & university

Contents of disaster education

Objectives	Contents
Disaster mechanism	How disaster happens, nature of disaster, needs for evacuation
Self protection	How to protect yourself, how to evacuate, evacuation place, after evacuation, psychology of evacuation
Local history & disaster reduction	Understand historical disaster, understand measures to reduce disaster
Story from elders	Listen to survivors, folk tale of disaster, responsibility to keep disaster memory

(Guidebook for Tsunami disaster education in Kamaishi city, 2010)

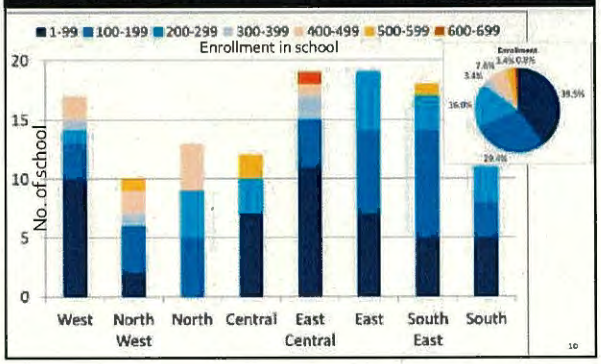
3. Achievements in 2013

- Revision of SOP
- Resource listing
- Info. management
- Video recording
- Communication drill

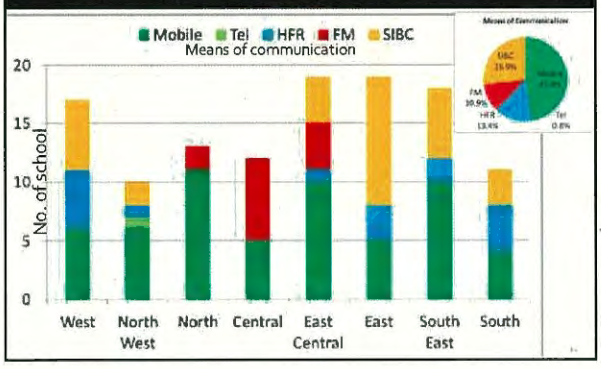
Revision of SOP

- To prepare school list
- To define role of stakeholders in all level
- To harmonize with cluster system

School Enrollment & Zone



Means of Communication



Process of Info. management

Phase	Examples
Search	Field survey, Internet
Input	Watch, Listen, Read
Output	Document, Slide, Photo, Video
Share	Report, Presentation, Media, Internet
Keep	Bookshelf, Library, Internet
Re-use	Lesson, Annual report, Revision

Web site development

Prototype site using Google site

Training for web site develop for stakeholders.

Video recording

Education division | Old Selwyn Collage | Selwyn Collage

Aruligo School | Aruligo Students | New Birao Village

How to apply lessons to SI?

- Use of **video story** for education
- Distribution of **SOP** to schools
- Use of **simplified gauges** for flood warning
- Visiting **pilot place**
- Strengthening **communication means**

Lessons from training in Japan & its application to Tetere Police station

Honiara, October 24, 2013
George Paikai, EMSEP
Ministry of Justice & Police

The strengthening community-based disaster risk management project in the pacific region
Japan International Cooperation Agency

Outline

- 1. Role of police
- 2. Lessons from training in Japan
- 3. Application to Solomon Is.

1. Mandate of Police

- Mission
  - Working in partnership with the community;... for a safe... Solomon Is.
- Goals:
  - Reduce crime & fear of crime
  - Protect natural resources
  - Improve road safety
  - Provide emergency response & management

Role in NDMO's framework

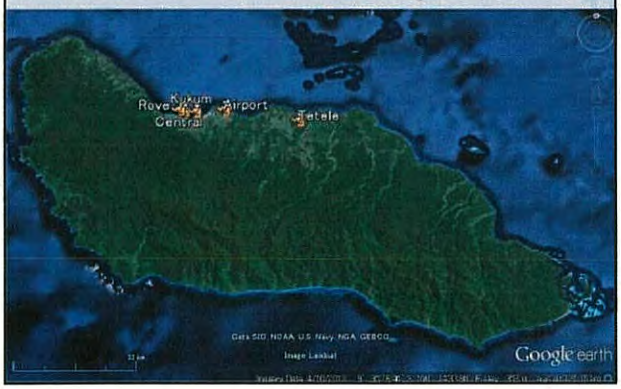
NDRMP

- Police Commissioner: Member of national disaster council
- Police belongs to:
  - AC Police Ops.: Initial Response & Assessment cluster chair
  - Welfare & IDP cluster

Provincial SOP

- Provincial commander: Chair of provincial disaster council
- Police belongs to:
  - Initial Response & Assessment cluster
  - Welfare & IDP cluster

Police stations in G province



Current Police SOP

Features

- All incidents including
  - Earthquake
  - Landslide
  - Flood Storm Tsunami
- Contents
  - Initial report
  - Command & control
  - Consideration
  - Report form
  - Contact list

Limitation

- National level
- Mainly rescue

2. Community DRM team & task

Team	Daily task	Emergency task
Information	Awareness raising	Initial assessment
Fire fighting	Inspection, awareness	Initial fire fighting
Rescue & 1st aid	Prepare equipments	Rescue & aid
Evacuation guidance	Inspection of route	Guide evacuation
Food & water	Inspection of equips.	Ration distribution
Coordination	Arrangements	Coordination
Logistics	Promoting stocks	Ration management
Cleaning	Waste mngmt. plan	Waste management
Sanitation	Prepare temp. toilet	Quarantine, waste mngmt
Safety inspection	Inspection	Avoidance of 2nd damage
Security	Partnership with police	Security patrol
Emergency repair	Partnership with engr.	Support for emrg. repair

A Guide to form community disaster organization: Fire and disaster management agency, 2007

MOU in Sanjo city plan

Partner	Nos.	Contents
Local gov't	4	Staff & goods assistance, refugees' acceptance
Media	2	Broadcasting during disaster
Goods	10	Water, foods, clothes, goods, box, gas provision
Debris removal	1	Road clearance, waste management
Transport	1	Transport of victims, elderly
Communication	1	Information collection from taxi radio
Recovery	4	Emergency works, survey, design, electricity
Welfare	1	Acceptance of elderly

3. Role in manual

Phase	Task	Role	Stake holder
During flood	Op. center	Support	11
	National Coordination	Support	13
Immediately after	**Rescue**	**LEAD**	**10**
	Victim investigation	**LEAD**	**3**
Response	Evac. Center support	Support	26
	IDA	Support	30
	Water	Support	13
	Food	Support	12
	Distribution	Support	20
	Security	**LEAD**	**3**
	Traffic control	**LEAD**	**12**
Recovery	DDA	Support	19
	Debris removal	Support	7
	Documentation	Support	23
	Transport reopening	Support	11
	Price control	Support	4

After consultation meeting in JICA project, 2011

Tetere station

Way forward

- Strengthening partnership with
  - Community
  - School
- Formation of MOU with private sectors
- Replication to other stations

Thank you very much !

geepyks@gmail.com

OUTCOME 3

[EVACUATION DRILL]

[GUIDEBOOK For Village DRM]

Herrick Savusi
Provincial Disaster Officer
Guadalcanal Province / NDMO
guadalcanaldisaster@gmail.com

[EVACUATION DRILL]

DATE	VILLAGE	EARLY WARNING/ Transmission Tools	EVACUATION PLACE	COMMENTS
23 Oct 2011	Tamboko	Simplified Gauges/ Loud Hailer	Community School	About 150 villagers participated. PDO / JICA Expert facilitated.
28 Feb 2013	Tamboko	Simplified Gauges/ Hand Siren, Loud Hailer	Community School	Cancelled due to emergency operation for Temotu Earthquake on 6th Feb
22 Sep 2013	Tamboko	Simplified Gauges/ Hand Siren, Loud Hailer	Community Hall	430 villagers participated. VDRC facilitated.

TAMBOKO VILLAGE

- **Village Location:** along the river. prone to flooding (especially zone 1 to 3)
- **Evacuation Centre:** Lack of capacity of the community School
  → ***How to encourage the villagers to go to safer place in the early stage?***

Community Based Flood Warning System

Simplified Rainfall Gauge

Simplified Water Level Gauge

Monitoring Apparatus

Loud Hailer

Hand Siren

Location of the Gauges

Installation of Gauges

Maintenance

Explanation for Caretakers

Village Disaster Risk Committee (VDRC)

VDRC Members

VDRC Meetings

Evacuation Plan

Response Plan

BLUE: ALERT

YELLOW: WARNING

YELLOW: WARNING

REVIEW of the DRILL

Tamboko Village

- VDRC members played their role properly.
  - → Chairperson, Time Keeper, Head Counting etc.
- Evacuation Procedure were familiarized for villagers
  - → Evacuation Plan, Response Plan
  - → Hand Siren, Loud Hailer, Simplified Gauges

GUIDEBOOK for VILLAGE DRM

Purpose

1. Coordination
2. Dissemination

Principle

1. Village Independency
2. Simple is Best
3. Cover All Villages in SI

How to Use

Public awareness on natural disasters and risks at School, Church, Community WS.

GUIDEBOOK for VILLAGE DRM

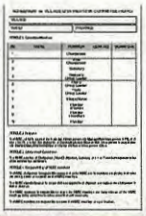
Process for Village DR Plan

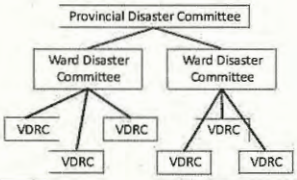
0. ESTABLISH
1. KNOW
2. PREPARE
3. ACT
4. REVIEW & REPEAT

GUIDEBOOK for VILLAGE DRM

0. ESTABLISH

Village Disaster Risk Committee
- Registration Form
- Under Provincial Disaster Committee



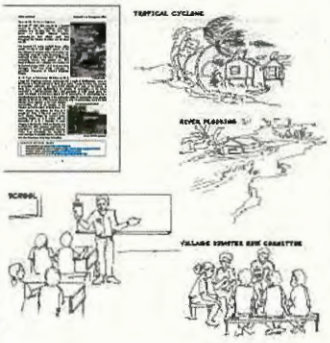


GUIDEBOOK for VILLAGE DRM

1. KNOW

Basic Knowledge of Natural Disasters

1. Tropical cyclone
2. Coastal Flooding
3. River Flooding
4. Tsunami
5. Earthquake
6. Landslide
7. Drought
8. Volcanic Eruption



GUIDEBOOK for VILLAGE DRM

2. PREPARE

Village Disaster Risk Plan
1. General Information
2. Safety Map
3. Response Plan
4. Evacuation Plan

Social Survey with Questionnaire

VDRC Meetings for Safety Map, Evacuation Plan, Response Plan

GUIDEBOOK for VILLAGE DRM

3. ACT

Evacuation Drill

Action Plan for DRR

Road Improvement

Community Hall

Manual for Evacuation Drill

GUIDEBOOK for VILLAGE DRM

4. REVIEW & REPEAT

Annual Activity Plan

	RAINY SEASON				DRY SEASON						RAINY SEASON	
MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
DRR Activity												
Church Activity	New Year		Good Friday	Easter								Christmas
School	holiday			holiday	holiday			holiday				holiday
National Events	New Year		Good Friday	Easter		Queen's Birthday				Qwai		Christmas

No.	First Name	Sir Name	Organization	Position	Telephone No.	Confirm	Attend.
	Government Ministries						
1	George	Baragamu	NDMO	Chief Operation Officer	27603	O	
2	Sipuru	Rove	NDMO	Program Officer	27603	O	
3	Hoto	Alenge	NDMO	Assistant Operation Officer	27603	O	
4	Genta	Kusumi	NDMO	Operation Officer	27603	O	
5	Herrick	Savusi	NDMO	Provincial Disaster Officer	27603	O	
6	Dr. Melchior	Mataki	MECDMM	Permanent Secretary	23032	O	
7	Chanel	Iroi	MECDMM	Under Secretary	23032	O	
8	Lloyd	Tahani	MECDMM	Deputy Director (Met)	24218	O	
9	Freddy	Fera	MECDMM	Chief Forecaster	20332	O	
10	Michael	Siau	MECDMM	Forecaster	747985	O	
11	Michael	Maehaka	MERE - Water Resources	Senior ~~Program Coordinator~~ HYDROLOGIST	26352	O	
12	Jack	Kaobata	MERE - Water Resources	HydroGeologist	26352	O	
13	George	Paikai	MPNSCS	Director, Emergency	22208	O	
14	Nelson	Ari	MDPAC	Chief Planning Officer	38255	O	
15	Jabin	Laedola	MID	Engineer	23428	O	
16	Delton	Hone	MLHS	Chief Cartographer	23365	O	
17	Loretta	Maeohu	MHMS	Radiology Department	23600	O	
18	BENEDICT	ESIBAEA	MEHRD	Director Primary Edu	28803	O	
	International Organization/NGO's						
19	Hitomi	Obata	Embassy of Japan	Reseacher Advisor	22953	O	
20	Usui		JICA	Representative	24170	O	
21	Naoko	Laka	JICA	Project Formulation Advisor	24170	O	
22	John	Norton	Norton Consulting	Consultant	7796156	O	
23	Ann		World Bank	Country Manager	21444	Apologies	
24	Eoghan	Walsh	EU	Charge De Affairs	22765	Apologies	
25	Sarah	Wong	NZAID	Development Councellor	21502	Apologies	
26	Sue	Connell	AUSAID	Minister Councellor	20011	~~O~~	
27	Kang	Yun Jong	UNICEF	Chief of Field Office	28001	O	
28	Stella	Delevairata	UNDP	Programmer	27446	O	

29	Katie	Greenwood	Oxfam	Country Director	23132		
30	Angele	Nkou-deemi	ADRA	Country Director	38656	O	
31	Cameroon	Vudi	SI - Red Cross	Disaster Manager	22682	O	
32	~~Doris~~ Donna	Makini	SIDT	Project Officer	23409	O	
33	Jeremiah	Tabua	World Vision	Disaster Coordinator	23092	O	
34	~~Nerol~~ DURAN	~~Vaekesa~~ TAPO	Save the Children	~~Provincial Coordinator~~	22400	O	
	Church Organizations						
35	Bishop Adrian	Smith	Arch Diocese of Honiara	Arch Bishop of Honiara	22387	O	
36	Joash	Idu	SSEC	Community Dev. Coordinator	20408	O	
37	Willie	Maezama	United Church	Superitendent	7545399	O	
38	George	Bogese	Church of Melanesia	Deputy General Secretary	21892	O	
39	Sam	Ata	SICA	Assistant General Secretary	23350	O	
	Guadalcanal Provincial Government						
40	Joseph	Tangi	GP	Education Officer	7551574	O	
41	Charles	Sisimia	GP	Administration	20041	O	
42	Clement	Totu	GP	Agriculture	20041	O	
43	John MARX	~~Gapu~~ LUKE	GP	Works	20041	O	
44	Francis	Alfred	GP	Planning	20041	O	
45	Priscillar	Oliver	GP	Administration Ext	20041	O	
46	Gabriel Gordon	Vagio/Suramo	GP	Health	20041	O	
47	James	Liasa	GP	Youth	20041	O	
48	~~Ellen~~ Jacinta	~~Joy~~ Koli	GP	~~Women~~ Tourism Dpt.	20041	O	
49	Terry	Vekea	GP	Accounts	20041	O	
50	Donation	Damikura	GP	Sports	20041	O	
	Counterparts from Fiji						
51	Samuela	Kanainaliwa	NDMO	Clerical Officer		O	
52	Kaie	Nawasa	Commissioner Western	Community Dev. Officer		O	
53	Alifereti	Abenisiga	Ba District Office	Assistant District Officer		O	
	JICA Project Team						
54	Tsutomu	Kameyama				O	
55	Tomohiro	Umeki				O	

56	Yoshitaka	Yamazaki				0	✓
57	Masaaki	Kanaya			7575770	0	✓
58	KAIPUA	STEWART	HEALTH	NURSING	7472594	0	✓

JAMES TAGIUA — GPG — PS, GPG — 2444622

JOSHUA Leitavuq — Quad. Ed. — CEO — 7483355

Peter Tinoni — Telekom — Eng Proj — 7495025

Nicholson Donga — Church of Nazarene — 7720817

Frances Revo — MEHRD — EiE Fp — 7712408

TIM Ngele

Samson. Nagato — Paoa Fan — UES/ Sales/marketing — 7774755

McDonnell Huia — MAL (EXT) — CEO — 7682481

Pr. FRASER REUBEN — SDA CHURCH — FAMILY MINISTRIES DIRECTOR — 7442673 / 7540787

Mary Alalo — MECDM — Project Coordinator — 7558110 ✓

添付資料9：水文観測機器の移譲に関する同意書、気象局・水資源局間の水文データ共有に関する同意書及び災害緊急連絡に関する協定書

（成果1関連）

Letter of Consent

July 18th, 2011

We National Disaster Management Office, Water Resources Division and Meteorological Division consent the following equipments, which are procured by Japan International Cooperation Agency Project Team (JICA Project Team) in "The Strengthening Community-Based Disaster Risk Management Project in the Pacific Region" are under the control of each division below.

Contents	Quantity	Administration
Automatic Rainfall Gauge	1	Water Resources Division
Automatic Water Level Gauge	2	Water Resources Division
Weather Sensor	1	Meteorological Division

Loti Yates Director, National Disaster Management Office Ministry of Environment, Climate Change, Disaster Management and Meteorology	for : Charlie Bepapa Director, Water Resources Division Ministry of Mines, Energy & Rural Electrification	Devid Hiriasia Director, Meteorological Division Ministry of Environment, Climate Change, Disaster Management and Meteorology

Letter of Consent

August 1st, 2012

We Water Resources Division and Meteorological Division consent the quarterly hydrological (Water Level and Rainfall data in whole of The Solomon Islands) data exchange between both divisions.

- 1st Quarter : End of Every April
- 2nd Quarter : End of Every August
- 3rd Quarter : End of Every December

Charlie Bepapa Director, Water Resources Division Ministry of Mines, Energy & Rural Electrification	Devid Hiriasia Director, Meteorological Division Ministry of Environment, Climate Change, Disaster Management and Meteorology

NATIONAL DISASTER COUNCIL

Ministry of Environment, Climate Change, Disaster Management & Meteorology
Post Office Box 21
Honiara
Solomon Islands

Phone: (677) 27936, Mobile: 7732369
Fax (677)-24293 and 27060.
e-mail : ndc@solomon.com.sb

Ref:

Date: 05th /11/2013

MEMORANDUM OF UNDERSTANDING

The Strengthening Community Based Disaster Risk Management (CBDRM) Project was funded by the Japan International Cooperation Agency (JICA) and was piloted at Tamboko Village, West Guadalcanal of Guadalcanal Province.

One of the main outcomes of the project was the establishment of the Village Disaster Risk Management Committee (VDRC) which comprises the Chairman, Vice Chairman, Secretary and ordinary members, who are responsible for overseeing the day today management of the community in terms of Disaster Risk Reduction and Management activities at the community level.

Tamboko Village has had in place an Evacuation Plan which was developed by the JICA project team and so far conducted two Evacuation Drills one in October 2011 and the last one in September, 2013.

Communication by mobile phone was identified as one of the main gaps because of the absence of network coverage in the Tamboko area. However, it is understood that Tamboko Clininc is equipped with a HF radio unit and is deemed to be the only reliable mode of communication into Honiara in a disaster event.

We the undersigned therefore would like to institute an understanding that Tamboko Clinic Radio be made available to use for the purpose of communication in any disaster event between the community and responsible Honiara offices.

Herrick Savusi
Provincial Disaster Officer, Guadalcanal

Dr. John Paulsen
Director,
Guadalcanal Health Department

NATIONAL DISASTER COUNCIL

MINISTRY OF ENVIRONMENT, CLIMATE CHANGE, DISASTER MANAGEMENT & METEOROLOGY
PO Box 21
Honiara
Solomon Islands

Phone: (677) 27936/27836, Mobile: 7500837
Fax: (677)-24293
e-mail : directorndc@ndmo.gov.sb

01/11/13

To: The JICA Country Programme Manager
Honiara Headquarters
Honiara

Dear Sir

Re: On-Going JICA Support to Community DRR Programmes

On behalf of the National Disaster Council and the NDMO staff I would like to extend our sincere word of appreciation to the Government and People of Japan who through JICA undertook a Disaster Risk Reduction project with Tamboko Community, Guadalcanal Province on Community level flood early warning system. This project has been successfully completed and the NDMO and its partners; SI Met Service, Guadalcanal Province and Water Resources Dept are very satisfied with its implementation and outcome. The JICA expert team has worked very well with the relevant Government agencies, Water Resources dept, SI Met service, Guadalcanal Province and NDMO in ensuring that this project is implemented according to the JICA Objectives and the needs of the community. For that I would like to say "THANK YOU VERY MUCH".

Having said the above, I write to request your consideration on taking this project to another province hence we are requesting further funding to support its role out under the Japanese Government Grassroots programme – Technical Corporation – 2014 to 2018.

This office has had initial discussions with three Provincial Disaster Committees who had agreed due to the high risk of flooding in their communities that they would like technical support to install simplified rain and flood gauges and establish Village Disaster risk committees in their communities. With the success of the Tamboko pilot project, we would like to take this model to other provinces.

I thank you for your kind consideration and hope to hear from you soon.

Thank you

Yours faithfully

Loti Yates
Director – NDMO
For Permanent Secretary - MECDM

添付資料 10：能力向上ワークショップの実施資料
（成果 2 関連）

Workshops to Strengthen the C/P Organizations' Capacity

in the 2nd Year

Flood Disaster Management Plan Preparedness for Guadalcanal

The strengthening community-based disaster risk management project in the pacific region

September 2, 2011
Yoshitaka Yamazaki
JICA expert

1

Outline

- 1. About JICA project
- 2. Disaster management
- 3. Disaster in Solomon Islands
- 4. Preparedness for Guadalcanal

2

1. Project objectives

- Flood early warning for Umasani river
- Develop capacity of NDMO & local gov't
  - Community flood disaster management plan
  - Operation manual for community
  - Response plan for local gov't
  - Disaster simulation exercise
- Enhance awareness in communities
  - Tamboko village

3

Project members & period

- Team members
  - Team leader...Mr. Kameyama
  - Hydrologist...Mr. Umeki & Imagawa
  - Early warning...Mr. Tsukada
  - Disaster management plan...Yamazaki
  - Community activities...Mr. Kanaya
- Project period
  - Nov. 2010 – Nov. 2013

4

Steps for disaster planning

- Design program
- Form a team
- Understand disaster & district profile
- Assign tasks for before, during, & after
- Prepare map & inventory
- Conduct drill
- Evaluate drill
- Revise plan

5

Weekly meeting schedule

Sep. 2	Preparedness
Sep. 9	Disaster profile
Sep. 16	Early warning & evacuation
Sep. 23	Response & recovery
Sep. 27	International workshop
Oct.	Simulation exercise
Oct.	Plan revision

6

Parallel works

- Resource inventory building
- Mapping resources for disaster
- Mapping vulnerabilities
- Learning from disaster history
- Information management

7

2. Disaster risk reduction plan

- A document prepared by an authority, sector, organization or enterprise that sets out goals and specific objectives for reducing disaster risks together with related actions to accomplish these objectives.
- Source: UNISDR Terminology on disaster risk reduction, 2009

8

Objectives of plan

- To save lives
- To minimize damages
- To recover earlier

9

Legal framework

Solomon Islands	Japan
• National disaster management act • National disaster management plan • Organization's DRM plan – Police, Telekom, Red cross • (Local gov't DRM plan)	• Basic Law on DRM – National DRM plan – Ministerial plan – Province DRM plan – City DRM plan – School DRM plan • River law • Forest law • Sediment disaster prevention law • Flood fighting law • Disaster relief law

10

What's new in the plan

- DM Plan for LOCAL government
  – Reflecting local conditions
- Disaster specific plan with time line
  – Focus on flood disaster
- Better use of information
  – Early warning, hazard map, resource map
- Comprehensiveness
  – Including community, lifelines, business

11

Disaster phase

Period	Task
Normal time	Preparation
Depression & cyclone approaching	Early warning & evacuation
Flood occurs	Response
Flood receded	Recovery

12

Preparation phase

- Understand features of past floods
- Prepare basic information
- Prepare resources
- Prepare for early warning & evacuation
- Public education

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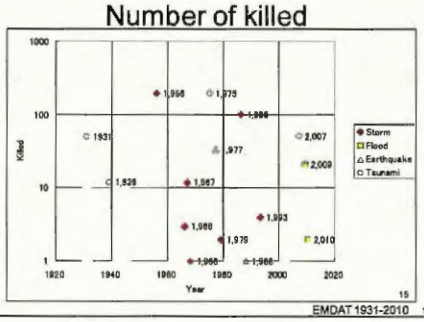
3. Disaster Profile of Solomon Is.

	# of Events	Damage / event: Killed	Damage / event: Total Affected	Damage / event: Damage (000 US$)
Drought	2	-	190	-
Earthquake (seismic activity)	3	11.7	875	-
General Flood	2	11.5	11,509	-
Storm surge/coastal Flood	1	-	-	-
Flood unspecified	1	-	-	-
Tropical cyclone	13	24.8	21,421	1538.5
Tsunami	4	78.5	596	-
Volcano	1	-	6,000	-

EMDAT 1931-2010

14

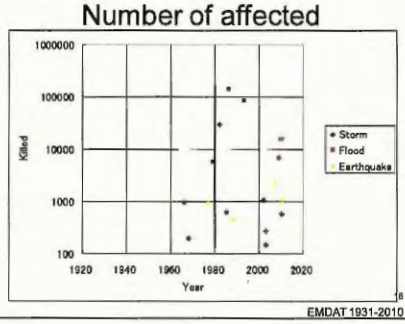
Number of killed



15

EMDAT 1931-2010 16

Number of affected



16

EMDAT 1931-2010 16

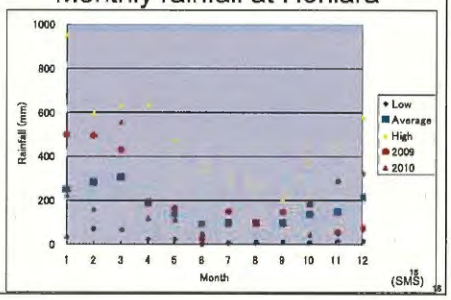
Meteorological Events

Event	Month													Total
	1	2	3	4	5	6	7	8	9	10	11	12	?	
Cyclone	7	6	7	3	3					1	2	9	8	46
Flood	2		2		1	1	1	2	1		1			11
Storm	3	1				1			2			2	1	10
Dought									1				3	4

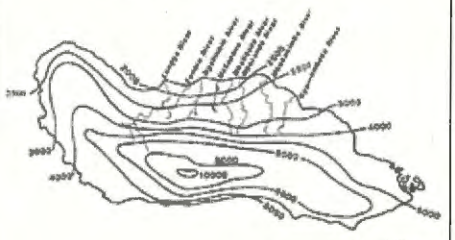
Period: 1568—1990
After Radford et al. 1993

17

Monthly rainfall at Honiara



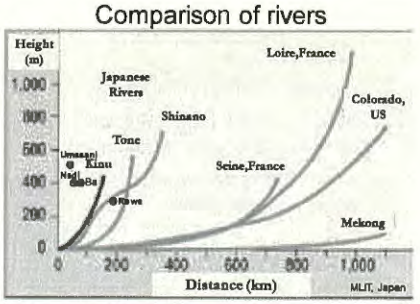
Rainfall distribution



(Curry, 1989)

19

Comparison of rivers



Unasami river: D=20 km, H=500 m ....Even steeper than Japanese rivers

20

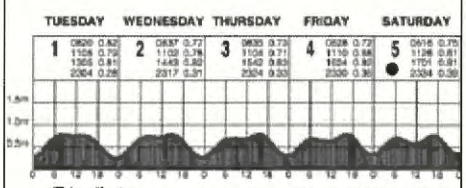
9

4-1. Prepare basic information

- Population in villages
- Get information from FMS, SMS
  - Annual cyclone plan
  - Monthly prediction
  - Tide level prediction

21

Tide at Honiara



...Tide affects flood water level in river mouth.

Bureau of Meteorology, Australia

22

11

Timing for weather update (FMS)

- www.met.gov.fj
- www.met.gov.sb
- Public Weather Bulletins
  - Update at
- Tropical Disturbance Advisories (FMS)
  - 6 to 12 hourly intervals

23

4-2. Prepare resources

- Contact list & communication chain
  - Phone number for reception and command
- List up resources
  - Schools, health, police, fire, road, etc.
  - Vehicle, boat, food, water
- Map...hazard & resource
- Water, food, fuel, battery stock for op. center
- Template for damage assessment
- Agreement with private sectors (Telekom, SIEA, SIWA, & etc.)

24

10

12

Cluster system

N-DOC	P-DOC	RCC
Logistics & support	Response initial assessment & logistics	Damage & hazard mapping
Response & initial assessment		
Welfare/IDP	Welfare/IDP	Shelter & welfare
Livelihood	Public services & livelihood	Livelihood
Public services		Public services & facilities
Infrastructure	Infrastructure	

25

National Disaster Management Plan, 2009

Logistics & support

- Prepare inventory with map
- Contact list
- Communication means
- IDA template
- Storage establishment
- Decide distribution mechanism
- Prepositioning of stocks

26

Response & initial assessment

- Coordination: PDMO, Police
- Information (HF radio, report procedure)
- Usage of SMS
- Define coordination mechanism
- Aerial survey preparation
- Template for Initial damage assessment
- Search & rescue
- Assembly of resources
- Define TOR for assessment

27

Education & awareness

- Coordination: PDMO
- SMS
- MRD
- PDMO
- Education
- Health
- Agriculture
- Churches
- NGOs
- SIBC
- Newspapers
- Gold ridge radio

28

Welfare/IDP

- Coordination: Health, Education
- Women, youth & children...relief
- Education ...Disaster education
- Agriculture...Food stock, security
- Health...disease prevention
- Social welfare...
- Churches...psycho social support
- NGOs...distribution relief good, IDP
- Solomon Islands Red Cross...advocacy, relief
- Social groups...
- Private companies...

29

Early warning & evacuation

- SMS
- NDMO
- WRD
- SIBC (Local radio)
- Provincial radio network
- Telekom
- Health
- Education
- Marine
- Police
- NGOs
- Define procedures
- Prepare message template

30

Public service & Livelihood

- Coordination: Agriculture
- Capacity assessment
- Mobilization of transportation
- Prepare communication measures
- Relief goods preparation
- Medical supply preparation
- Agreement with private sector
- Storage of goods (water containers)
- Recovery tools & kits
- Equipments provision (generator)

31

Infrastructure

- Coordination: Guadalcanal works
- Inventory of infrastructure with map
- Preparation of recovery equipments
- Agreement with private company etc.
  - GPOL, Gold ridge, RAMSI

32

Guadalcanal province

- Planning
- Implementation of prevention
- Emergency gathering
- Coordination of operation
- Logistics support
- Acceptance of external help
- Documentation & reporting
- Alternative operation center (Town council, police)

33

Meteorological Service

- Weather monitoring
- Seasonal prediction
- Daily prognostic
- Cyclone tracking

34

WRD

- Facility listing (potable & sewage)
- Monitoring flood
- Formal early warning
- Storage of water
- Transport of water
- Initial damage assessment
- Detailed damage assessment
- Pipeline recovery (potable & sewage)

35

Police

- Visibility patrol for river water
- Informal early warning
- Communication
- Guidance and evacuation
- Monitoring situation
- Security maintenance
- Security for evacuation centers
- Initial damage assessment
- Detailed damage assessment
- Reporting
- Relief goods distribution center

36

Fire department

- Awareness education
- Training for water rescue
- Siren for evacuation (New tone to be defined)
- Loud speakers
- Evacuation of people
- Communication
- Water distribution
- Clean up of mud

37

Education

- Hazard identification at schools
- Structural inspection of school
- Maintenance of school building
- Evacuation route definition
- Disaster education
- Evacuation center
- Head counts

38

Health

- Assessment of evacuation centers
- Mobile medical team, temporary hospital
- Medical evacuation
- Communication (RT)
- Education on diseases prevention
- Emergency stock & staffing
- Water quality monitoring
- Diseases prevention (mosquito spraying, disinfection, food condemnation)
- Monitoring of diseases outbreak
- First aid
- Reporting to divisional EOC
- Mortuary

39

Agriculture

- Awareness for traditional food, safe keeping
- Food security
- Animal protection from flood
- Initial damage assessment
- Detailed damage assessment
- Rehabilitate short term cropping
- Carcass disposal

40

Infrastructure (road)

- Climate proofing
- Maintenance
- Inspection of vulnerable point
- Initial damage assessment
- Traffic control (+police)
- Emergency recovery
- Detailed damage assessment
- Permanent recovery (build back better)

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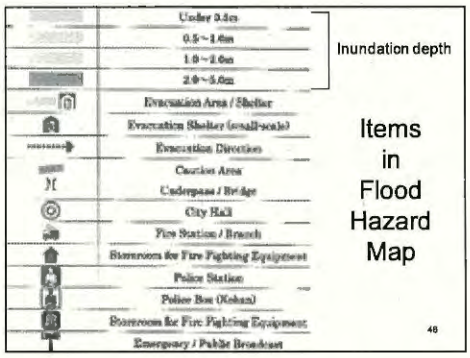
Example in Japan

Honiala Town council

- Awareness to public town boundary
- Development control
- Drainage works
- Evacuation
- Operation center
- Rescue
- Monitoring situation
- Communication
- Clean up
- Rehabilitation
- Environmental health
- Security for infrastructure
- Civil works
- Initial damage assessment
- Detailed damage assessment

42



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21

23

Red cross

- Community & school education
- Evacuation
- Initial damage assessment
- Family restoring link
- Monitoring situation
- Landline, mobile
- Counseling
- First aid
- Emergency response team
- Relief goods distribution (not food)
- Referral
- Temporary shelters

43

Use of flood hazard map

- Display in public places
- Distribute to household

↓

- Disaster management plan
- Evacuation place & route
- Awareness raising
- Land use plan

47

4-3. Prepare flood hazard map

- Basic information
  - Topography, River, Road
- Disaster resources
  - School, hospital, church, mosque
  - Police, Fire station, town council
  - Market, shops
- Inundated area
  - Historical flood
  - Simulation

44

4-4. Prepare for early warning

- Preparation of alert & evacuation message
- Preparation of dissemination route
  - Police, NFA , Mosque, Church, Mill?
- Who & how to inform alert system?
  - Ba or Lautoka, Police, NFA, Mosque
- Operation plan for right bank, left bank ???

45

Elements of Flood early warning

- Monitoring
  - Weather…SMS
  - Rainfall…rain gauge by JICA
  - Water level…water gauge by JICA
- Interpretation
  - When, how much, where ?....WRD+JICA
- Message construction
- Communication
- Protective behavior
  - Listen, understand, decide, act

49

4-5. Public education

- Disaster education to school, churches, & mosque
- Dissemination of alert system to school, churches, & mosque

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Flood Disaster Management Plan
2. Disaster profile

The strengthening community-based disaster risk management project in the pacific region

September 9, 2011
Yoshitaka Yamazaki
JICA expert

Outline

- Disaster profile in Solomon Is.
- Cyclone
- Rain and flood
- Earthquake
- Tsunami
- Volcano

2

1

Disaster Profile of Solomon Is.

	# of Events	Damage / event: Killed	Damage / event: Total Affected	Damage / event: Damage (000 US$)
Drought	2	-	190	-
Earthquake (seismic activity)	3	11.7	875	-
General Flood	2	11.5	11,509	-
Storm surge/coastal Flood	1	-	-	-
Flood unspecified	1	-	-	-
Tropical cyclone	13	24.8	21,421	1538.5
Tsunami	4	78.5	596	-
Volcano	1	-	6,000	-

EMDAT 1931-2010

5

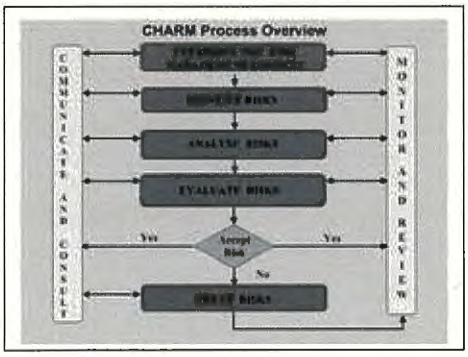
Cyclones which affected Solomon Is.

	Month												
Category	1	2	3	4	5	6	7	8	9	10	11	12	?	Total
1		1	2	4	2						1	1		11
2	2		3		2						1	1		9
3	3	2	2	1							2	1		11
4	1		1									2		4
5	1													1
?	11	4	10	4	3	2					2	5	9	50
Total	18	7	18	9	7	2	0	0	0	0	6	10	9	86

Period: 1586–2010
Source: JTWC, Radford et al. 1993, EMDAT, Reliefweb

6

3

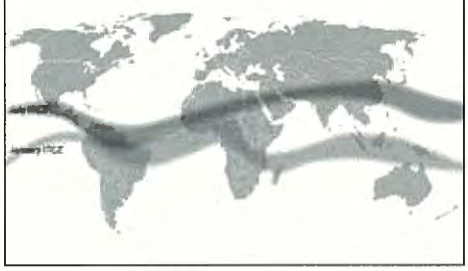


Tropical Cyclone Classifications

Classifications in SW Pacific	Warning type	10-minute mean wind: km/h	10-minute mean wind: knots	Beaufort scale	Central pressure (hPa)
Tropical Depression		<52	<28	0-6	
		52-61	28-33	7	
Tropical Cyclone Category 1	Gale	63-87	34-47	8-9	985+
Tropical Cyclone Category 2	Storm	88-117	48-63	10-11	970-985
Tropical Cyclone Category 3	Cyclone	117-157	64-85	12	945-970
Tropical Cyclone Category 4		157-196	86-106		910-945
Tropical Cyclone Category 5		198-	107-		-910

(FMS, Wikipedia)

SPCZ (Southern Pacific Convergence Zone)



Beaufort scale of wind force

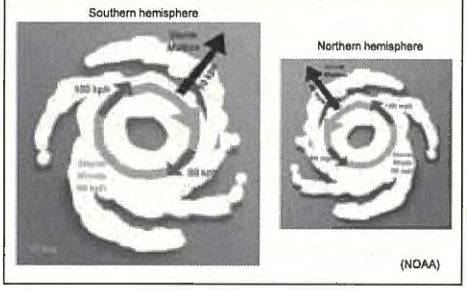
Scale	Knots	Km/h	Specification on land
7	28-	50-	Whole trees in motion; inconvenience felt when walking against the wind.
8	34-	62-	Breaks twigs off tees; generally impedes progress.
9	41-	75-	Slight structural damage (chimney - pots and slates removed).
10	48-	89-	Seldom experience inland; trees uprooted; considerable structural damage.
11	56-	103-	Very rarely experienced; accompanied by wide – spread damage.
12	64-	118-	Severe and extensive damage.

4

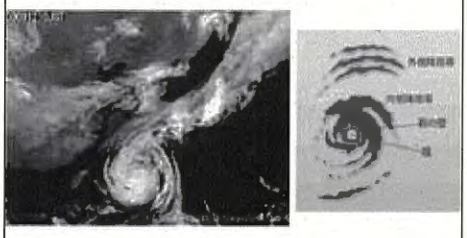
Size of cyclone

(Fiji)		Japan	
Radius (degrees)	Size	Radius (km) of 15 knot+ wind	Size
-2	Very small	-200	(Very small)
2-3	Small	200-300	(Small)
3-6	Medium	300-600	(Medium)
6-8	Large	600-800	Large
8-	Very large	800-	Very large

Cyclone path vs wind



Cyclone & rain

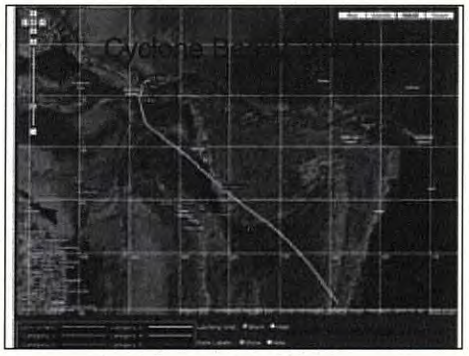


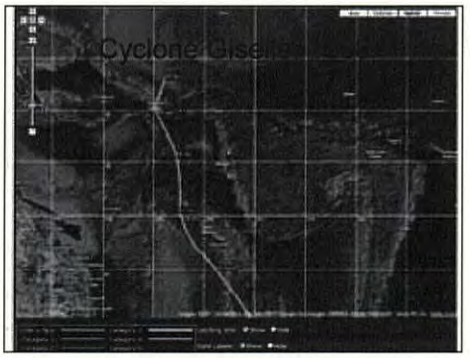
Sea surge mechanism

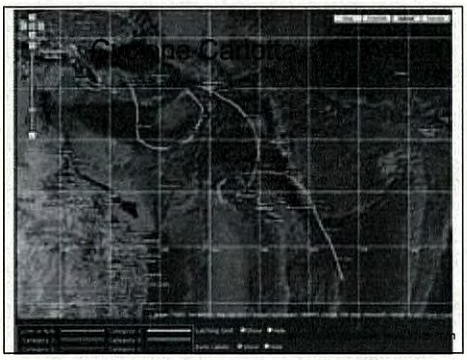
- Low pressure
  - 1Hpa lower = 1cm higher
- High wind
- Topography

Sea surge during cyclone

Year	Place	Cyclone	(m)
1899	Bathurst bay, Australia	Mahina	13
1918	Mackay, Australia		6
1941	Southern Viti Levu, Fiji		1.8
1971	Funafuti atoll, Tuvalu	Bebe	4
1979	Nayau island, Fiji	Meli	2-3
1983	Tikehau atoll, Tuamotu	Veena	4
1983	Beqa island, Fiji	Oscar	3-4
1985	Southern Viti Levu, Fiji	Hina	1
1987	Rarotonga, Cook islands	Sally	5







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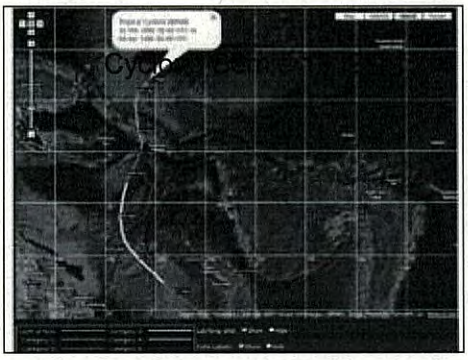

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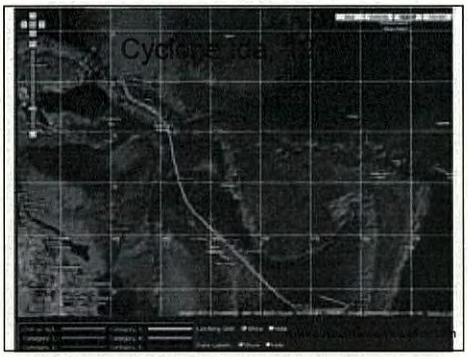

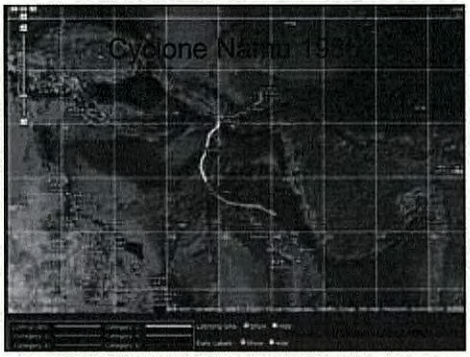

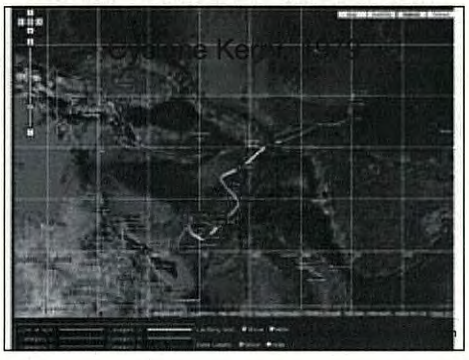

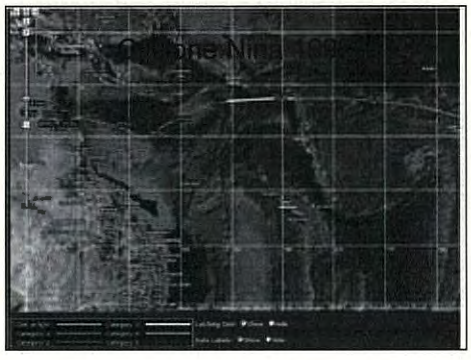

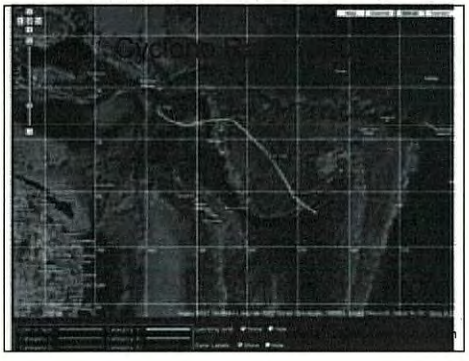

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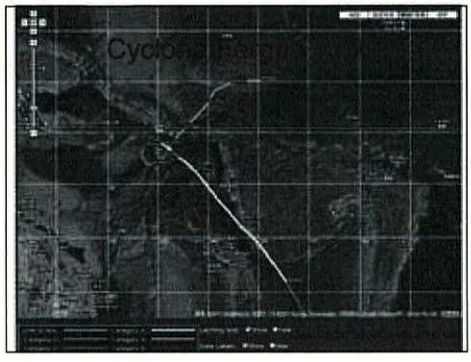

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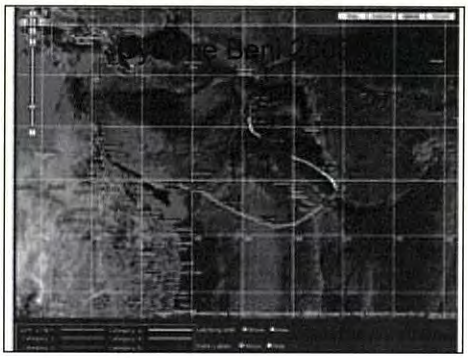
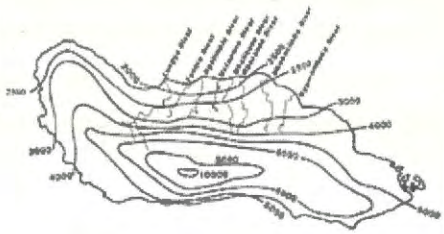


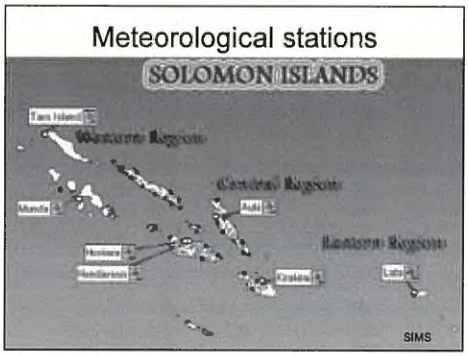
Rainfall distribution



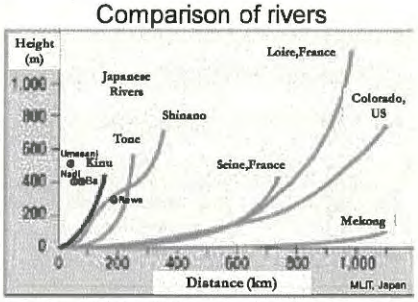
(Curry, 1989)

29

Meteorological stations



Comparison of rivers



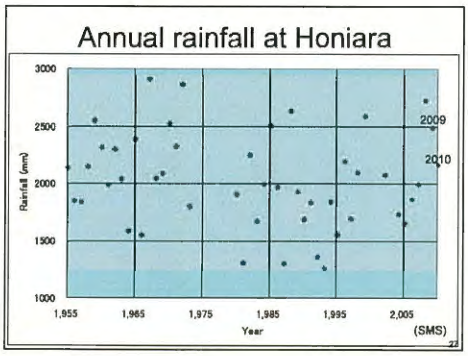
Unasami river: D=20 km, H=500 m ....Even steeper than Japanese rivers

30

13

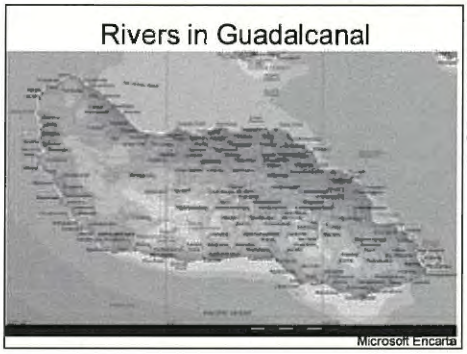
15

Annual rainfall at Honiara

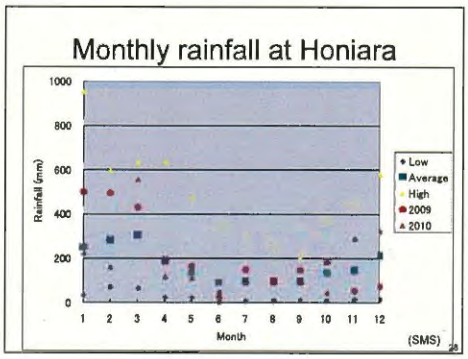


27

Rivers in Guadalcanal

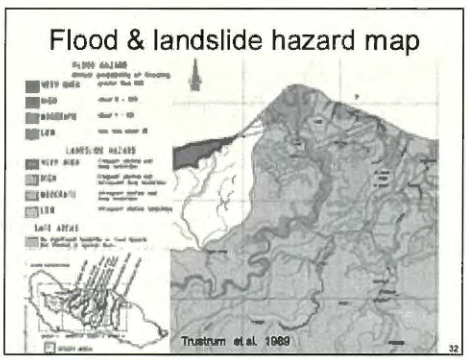


Monthly rainfall at Honiara



28

Flood & landslide hazard map



32

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16

Casualties by Cyclone Namu

- Most of the dead found by the 23 May (total 71) were aged or women and children unable to escape landslides and floods. [The Age, May 23 1986.]
- These mud slides caused major damage and were the major contributing factor in the death of over 100 people, the injuries of more than 1,000 people and the 90,000 homeless people. Only minor damage was caused by wind. [Kingston, G. 1986.]

33

Who were victims ?

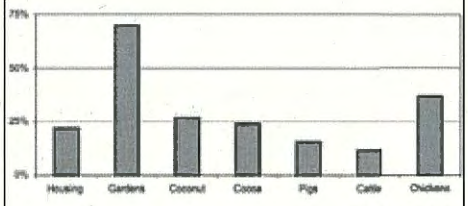
Age	Female	Male	Total
0–18	6	2	8
19–40	4	3	7
41–	2	2	4
	12	7	19

Source: "Report on tropical cyclone Ami", NDMO, March, 2003

Age	Female	Male	Total
0–18	1	2	3
19–40	1	2	3
41–	1	0	1
	3	4	7

Source: "Report on January 2009 Flood ", NDMO, 2009

Loss by Cyclone Namu



Provincial profile 2001

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Flood Disaster Management Plan
3. Early warning

The strengthening community-based disaster risk management project in the pacific region

September 16, 2011
Yoshitaka Yamazaki
JICA expert

1

Elements of Flood early warning

- 1. Monitoring
- 2. Interpretation
- 3. Message construction
- 4. Communication
- 5. Protective behavior

2

Organizational responsibilities in Australia

	Prediction	Interpretation	Dissemination	Response
Tas	BoM	LC/SES	BoM/SES	SES/LC/Police
SA	BoM	SES/Police	BoM/SES/Police	SES
WA	BoM	LC/FESA	BoM/Main Roads/road closures	FESA/LC
NT	NRETAS/ BoM	NTES/Police	BoM/NTES/Police/DPI/road closures	Police/NTES
NSW	BoM	SES	BoM/SES	SES
Qld	BoM	DCS/LC	BoM/DCS/LC	DCS/Police/LC
ACT	BoM	ACTES/Police	BoM/ACTES	ACTES/Police
Vic	BoM/MW	SES/LC/CMA	BoM/SES/LC/MW	SES/LC/Police

(Australian Emergency manuals series No. 21, 2009)

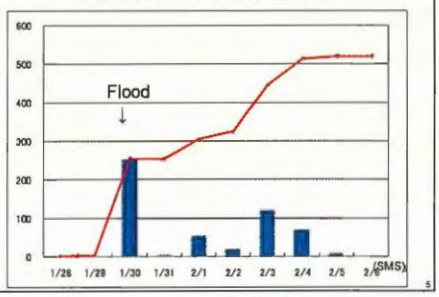
3

1. Monitoring

- Weather…SMS
- Rain
  - National…SMS, WRD
  - Local…Tamboko new stations
- Water level
  - National…WRD
  - Local…Tamboko new stations

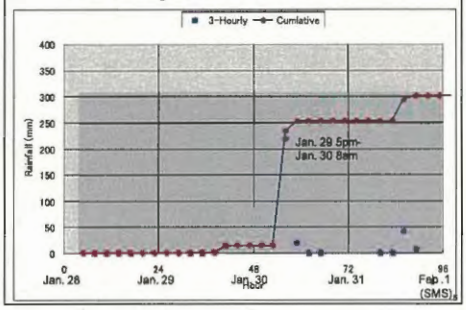
4

Rainfall in Jan. 2009



5

3-Hourly rainfall at Honiara



1

3

Hourly rainfall at WRD Honiara

Date	Time	Hourly	Cumulative
29-Jan-09	12:00:00	0	
29-Jan-09	14:00:00	1	1
29-Jan-09	15:00:00	12	13
29-Jan-09	16:00:00	3	16
29-Jan-09	17:00:00	0	16
29-Jan-09	18:00:00	1	17
29-Jan-09	19:00:00	0	17
29-Jan-09	20:00:00	4	21
29-Jan-09	21:00:00	11	32
29-Jan-09	22:00:00	40	72
29-Jan-09	23:00:00	50	122
29-Jan-09	24:00:00	39	161
30-Jan-09	1:00:00	39	200
30-Jan-09	2:00:00	19	219
30-Jan-09	3:00:00	9	228
30-Jan-09	4:00:00	6	234
30-Jan-09	5:00:00	0	234
30-Jan-09	6:00:00	7	241
30-Jan-09	7:00:00	1	242
30-Jan-09	8:00:00	1	243
30-Jan-09	9:00:00	5	248
30-Jan-09	10:00:00	11	259
30-Jan-09	11:00:00	2	261

Heavy rain ←started

←Flood happened

7

7

Interim arrangement of flood warning

Warning stage	Indicator	Monitoring organisation	Media for dissemination
Readiness	Cyclone season	NDMO	National Disaster Awareness Week
Alert	Cyclone/depression nearing	PMB	Radio, television, newspaper
Warning I	Rain 100 mm/day	Police, PWD Water Supply, P&C	Radio, telephone
Warning II	Rain 25 mm/hour	Police, PWD Water Supply	Radio, telephone
Warning III	Nadirau bridge flooded	P&C	Radio, telephone, siren
Warning IV	Old Bai bridge flooded	District DISMAC, Police, Town Council	Radio, telephone, siren
Action	Flooding of Town imminent	District DISMAC, Police, Town Council	Siren

(Yeo, 2000)

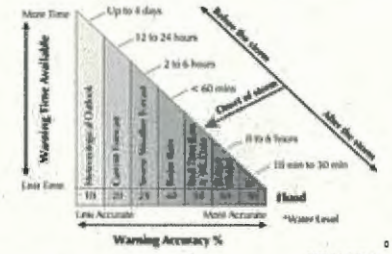
8

2. Interpretation

- When
- How much
- Where

9

Trade-off between warning time & flood forecast accuracy for flash flood situations



(Wright, 2001)

10

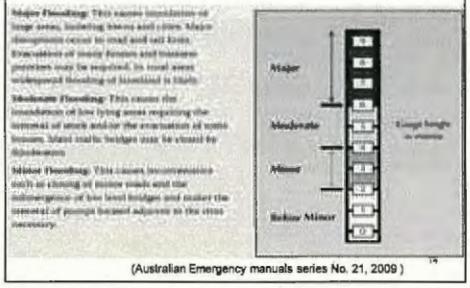
5

Flood warning levels in Japan

Level	Contents	Action
1		Flood fighting team stand by
2	Flood precaution	Gov. decides to issue evacuation preparation Flood fighting team gather
3	Flood alert information	Gov. decides to issue evacuation order Residents decide evacuation
4	Flood warning	Evacuation completed
5	Flood happening	Flood in progress

13

Flood classifications in Australia



(Australian Emergency manuals series No. 21, 2009)

14

7

Rainfall intensity

Rainfall (mm) /hr.	Term used in forecast	Public perception
10-20	Rather strong rain	Noisy rain
20-30	Strong rain	Cats and dogs
30-50	Heavy rain	Bucket overturned
50-80	Very heavy rain	Like a waterfall
80-	Violent rain	Horrible, oppressive

(Japan Meteorological Agency)

11

3. Message construction (sample)

CHIME and SIREN:
"This is your local Toyooka City Disaster Warning Main Office"
Announce on the_____ time_____.

This is your "Evacuation Preparedness Information".
Please prepare to evacuate. To people in_____block and_____block, please prepare to evacuate now. Please evacuate to higher locations of safety with your radio.
Please take clothes, medicine, food, drinks and other necessary items as you evacuate.
Evacuation places are Kominkans (community centers) etc. which are near your house.
SENIOR CITIZENS who need some time to evacuate, please evacuate NOW.

(Flood summit committee, 2007, Japan)

15

Alert level of rainfall in Okinawa pref.

Rainfall	Alert level for rain	Alert level for flood
1 hour	40 – 60 mm	40 – 50 mm
3 hours	60 – 100 mm	60 – 80 mm
24 hours	100 - 210 mm	100 - 160 mm

Note: Level varies by regions in prefecture.
(Okinawa prefecture disaster management plan)

12

Example warning message (minor flooding)

Warning of Minor Flooding at Mackaville and in Nearby Areas

The Bureau of Meteorology has predicted that flooding will reach/exceed [delete one] [1.7-2.0] metres [insert predicted height] at the Princess St gauge, Mackaville, at [time, day]. This will cause minor flooding along the Nambucca River. At this height, low-lying areas near the river will be inundated from about Waterside and Congarinni to Nambucca Heads and along Warrell Creek. The consequences are likely to be as follows:

- Farmland near the river will be inundated. Farmers should take the necessary action to protect pumps and other equipment and move livestock.
- Road surfaces may be damaged, and people should avoid driving through floodwaters. Entering floodwaters is the most common cause of death during floods.
- Water may flood yards and under-floor areas in Kings Point and North Mackaville. Residents should secure items in garages and outdoors to prevent them from floating away.

[Note for Operations centre staff: a short section here on known current effects, including road closures, would be appropriate. Care should be taken not to predict effects which have already occurred]

(Australian Emergency manuals series No. 21, 2009)

16

Example warning message (major flooding)

ibid

FLASH FLOOD STATEMENT NATIONAL WEATHER SERVICE, USA

- FLASH FLOOD STATEMENT NATIONAL WEATHER SERVICE TOPEKA KS 210 PM CDT SAT JUN 30 2007
- A FLASH FLOOD WARNING REMAINS IN EFFECT UNTIL 530 PM CDT FOR ANDERSON COUNTY...
- A FLASH FLOOD EMERGENCY FOR ANDERSON COUNTY...
- AT 200 PM CDT...TRAINED WEATHER SPOTTERS AND PUBLIC REPORTED WIDESPREAD FLOODING OVER ANDERSON COUNTY. KNOWN WATER RESCUES ARE ONGOING WEST OF GARNETT. EMERGENCY CREWS ARE UNABLE TO FIND A ROUTE FROM WESTPHALIA TO GARNETT. NUMEROUS PAVED AND GRAVEL ROADS HAVE BEEN REPORTED TO BE UNDER WATER ACROSS THE COUNTY....SEVERAL AREAS 1 TO 2 FEET DEEP. MEASURED STORM TOTAL PRECIPITATION AMOUNTS RANGE FROM 14 TO 16 INCHES OF RAINFALL DURING THE PAST THREE DAYS. WITH ONGOING RAINFALL AMOUNTS ON THE ORDER OF 1 TO 2 INCHES PER HOUR...ANY ADDITIONAL RAINFALL WILL CONTINUE TO AGGRAVATE THE FLOODING SITUATION.
- LOCATIONS IMPACTED INCLUDE... WESTPHALIA...COLONY...HARRIS...GREELEY AND GARNETT.
- RUNOFF FROM THIS STORM WILL CAUSE FLASH FLOODING OF CREEKS AND STREAMS...HIGHWAYS AND UNDERPASSES. ADDITIONALLY ROADS AND FARMLANDS ALONG THE BANKS OF CREEKS AND STREAMS AND LOW LYING AREAS ARE LIKELY TO CONTINUE OR QUICKLY BEGIN TO FLASH FLOOD. DO NOT DRIVE INTO AREAS WHERE THE WATER COVERS THE ROAD.
- A FLASH FLOOD WARNING MEANS THAT FLOODING IS IMMINENT OR OCCURRING. IF YOU ARE IN THE WARNING AREA MOVE TO HIGHER GROUND IMMEDIATELY. RESIDENTS ALONG STREAMS AND CREEKS SHOULD TAKE IMMEDIATE PRECAUTIONS TO PROTECT LIFE AND PROPERTY.

Elements of message (Japan) 1/2

- **Title**
  - Indicate level of flood warning
- **Summary**
  - Simplified notice or warning message in 40 characters.
- **Contents**
  - Announcement or change or lift of flood warning
  - Announcement of flood information
- **Main text**
  - Change between alarm & warning
  - Caution & warning at observation station
  - Lift warning as water level decreased level **

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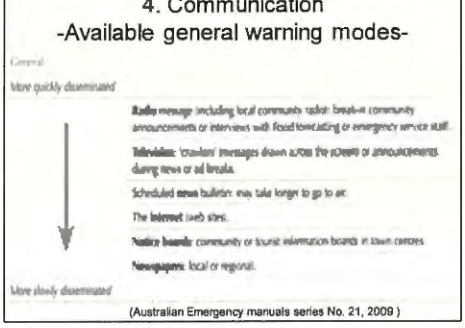
Elements of message (Japan) 2/2

- **Status text**
  - Averaged cumulative rainfall in basin
  - Present hourly rainfall
  - Water level at observation station
  - Tendency of water level at observation station
- **Prediction text**
  - Outlook for rain
  - Estimation of averaged rainfall in basin
  - Estimated water level at station
  - Estimated peak water level and its time
- **Caution**
  - Estimated inundation area & its time
  - Comparison with historical flood disaster
- **Reference**
  - Height of river bank
  - water level for warning, alert, and normal time

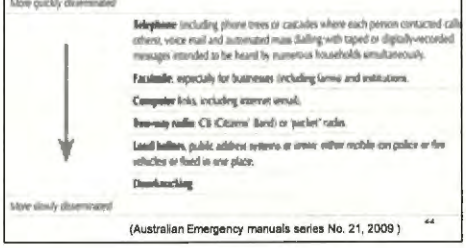
20

4. Communication -Available general warning modes-



(Australian Emergency manuals series No. 21, 2009)

Available specific warning modes



(Australian Emergency manuals series No. 21, 2009)

Communication

- Formal warning
  - WRD
  - SMS
  - NDMO
  - SIBC
  - PDMO ?
  - Depts.
  - Village head
- Informal warning
  - Residents/schools in upstream
  - Gold ridge
  - Schools in lower stream
  - Residents in lower stream

23

Issues

- Installation of rain gauge at upstream?
- Gold ridge, PAOA FM, Z FM ?
- Message template
- SMS template
- Communication chains establishment
- Communication chains update
- Training

24

5. Protective behavior

- Listen
- Understand
- "Bias for normalization"
- Decide
- Act

25

Evacuation principle

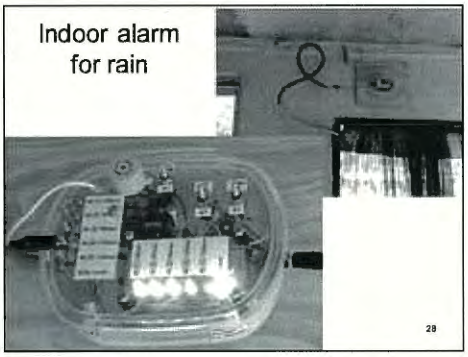
- People take time to start evacuate
- Warning should be
  - In advance
  - Many times
  - By many channels
  - Clearly stated

26

Simplified rain gauge

27

Indoor alarm for rain



28

Simplified water gauge

29

Indoor alarm for water level

30

1. Condition for gathering

- Gathering of skeleton staffs to PDMO
  – ?
- Gathering of government staffs to PDMO
  – ?

31

2. Monitor weather update

- Track cyclone by radio, web, or phone.
- Check daily rain daily by SMS
- Check rain gauge daily by JICA project
- Check water level meter by JICA project
- Refer tide level information
- Receive visual observation from police

32

3. Issuing alert & evacuation

- Prepare message template.
- Water level and rainfall to issue alert will be defined by hydrological analysis conducted by WRD and JICA project team.
- Timing for issuing alert should be well in advance, as people needs time to take action.
- Communication method shall be by radio, mobile phone, TV, and fax.
- Police, fire station, laud speaker at mosque, bell at church can be used.
- Signal for alert & evacuation order shall be defined and informed.

33

4. Issuing evacuation order

- Prepare warning message template
- Residents, goods, animals

34

17

Schools in Central Guadalcanal

Schools in West Guadalcanal

19

Difficulties in Flood EWS

- Appropriate index for flood ???
  - Hourly rainfall
  - Daily rainfall
  - Cumulative rainfall
- Condition differs by case …
  - River topography
  - Geology
  - Vegetation

35

Questions for flood warning

- When to issue ?
  - Threshold level
  - Warning stage
  - Evacuation stage
- Who will issue ?
  - Honiara ? G-Province ? Tamboko ?
  - NDMO ? SMS ? WRD ?
- How to disseminate ?
  - Radio, TV, mobile, Police, School, Church etc…
- Informal warning ?

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Schools in East Guadalcanal

18

20

Flood Disaster Management Plan
4. Response & Recovery

The strengthening community-based disaster risk management project in the pacific region

September 23, 2011
Yoshitaka Yamazaki
JICA expert

Outline

- Time line after flood
- To Do's
- Actors
- Inter agency task

2009 January Flood

- First two weeks are the busiest period.
- Pfnet was the major source.
- SIBC blackout from day 5 to day 11.
- Disaster declared on day 7.
- Governor "Be patient.' on day 23.
- Food relief distribution began day 48.

Time line

Week 1	Evacuation
Week 2	Damage assessment
Week 3	Relief work
1 month	Recovery starts
3 months	Recovery plan
1 year	Recovery in progress
3 years	Recovery completes

To Do 1/2

- Op. center
- National Coordination
- Int'l coordination
- Civic coordination
- Stand down
- Communication
- Aerial survey
- Rescue
- Landslide
- 1st aid
- Victim investigation
- Mortuary
- Head counts
- IDA
- Water procurement
- Food procurement
- Transportation
- Distribution
- Evac. Center support
- Health cares

To Do 2/2

- Traffic control
- Security
- DDA
- Debris removal
- Clean up
- Waste management
- Carcass disposal
- Emergency recovery
- Documentation
- Shelter
- Reconstruction program
- Fund raising
- Fund management
- Permanent recovery
- School reopening
- Transport reopening
- Victims' support
- Monitoring
- Public relation
- Price control

Actors 1/2

- NDMO
- SMS
- WRD
- Agriculture
- Works
- Education
- Health
- Foreign aff.
- Finance
- Police
- Fire
- RAMSI
- G province
- Honiara city
- Red cross
- Caritas
- Save The Children
- YWCA
- Oxfam
- ADRA
- Churches
- UNICEF

Actors 2/2

- FBCL
- Solomon Star
- Solomon Times
- Telekom
- Be Mobile
- Bus company
- Post office
- Air Solomon
- Soltai
- Teacher
- Pastor
- Village head
- Community

Inter agency coordination

- Communication
  - NDMO SIBC Police RAMSI Telekom
- Rescue
  - Police
  - RAMSI?
- Traffic control
  - Public Works
  - Polices

Damage assessment

- Aerial survey at early stage
- Families
- Road
- Lifelines
- Infrastructure
- Agriculture
- Education

5

Rescue

- Rescue from flooded areas
  - Procurement of boats & vehicle
  - Children, women, aged first.
- Rescue from landslides
  - Procurement of heavy machines
  - Accessible road ?
- Hospitalization

Operation of evacuation centers

- Evacuation center operation
- Head count & report to NDMO
- Estimate needed water & food
- Procurement of relief goods
- Relief goods distribution
- Protection of children & women
- Sanitation, Hygiene, Quarantine

6

Avoidance of secondary damage

- Landslide...NDMO, MRD
- Looting...police
- Waterborne diseases...health
- Public information

Health, Treatment of dead body

- Identify name, age, sex, race, and cause of death of victims.

7

Maintenance of social order and price of goods

- Curfew
- Price watch

Garbage clearance & disposal

- Clearance of woods...Works
- Clearance of sediment... Police, Fire
- Disposal of perished goods...Health
- Bury contaminated food...Health

8

Emergency repair of infrastructure

- Roads
- Electricity
- Telephone
- Water
- Sewage

Management of accepting external help

- International
- Other division, districts
- Private sectors...Soltai, Rotary, etc.
- NGO

Issues

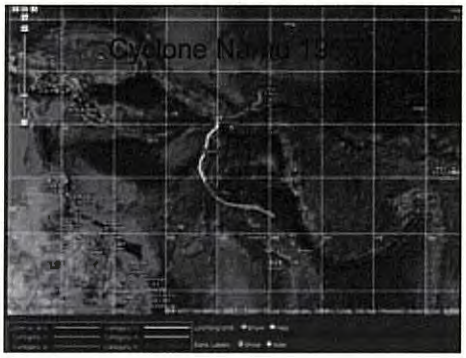
- Inter agency coordination
- Bottom up reporting
- Fast damage assessment
- International appeal
- Food security
- Private sector partnership
- Shelter management

Development of Flood Disaster Management Plan for Guadalcanal Province

The strengthening community-based disaster risk management project in the pacific region

October 7, 2011
Joseph Tangi (tangi.joseph4@gmail.com)
Guadalcanal Education Department

1



Outline

- 1. Hazard in Guadalcanal
- 2. Disaster planning meeting
- 3. Disaster resource inventory

2

Casualties by Cyclone Namu

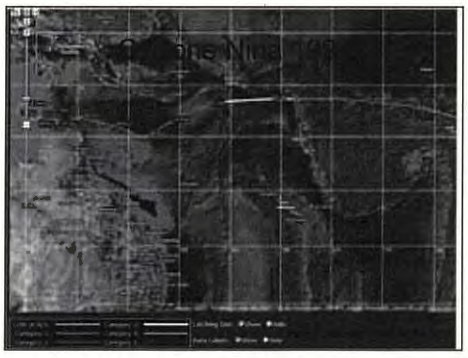
- Most of the dead found by the 23 May (total 71) were aged or women and children unable to escape landslides and floods. [The Age, May 23 1986.]
- These mud slides caused major damage and were the major contributing factor in the death of over 100 people, the injuries of more than 1,000 people and the 90,000 homeless people. Only minor damage was caused by wind. [Kingston, G. 1986.]

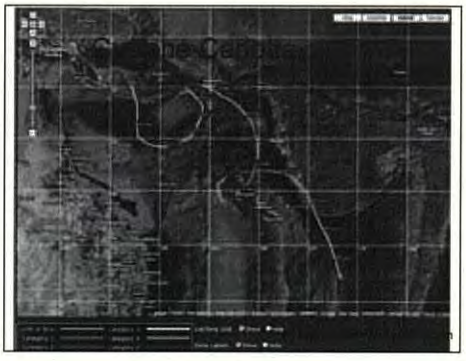
6

1. Disaster in Guadalcanal

Date	Type	Killed	Affected
1931/10/03	Tsunami	50	
1966/11/14	TC Angela	3	1,000
1977/04/20	Earthquake	34	1,000
1986/05/19	TC Namu	101	150,000
2009/01/29	Flood	21	7,000
2010/01/12	Flood	2	16,017
2010/03/15	TC Ului		590

Source: www.emdat.be 3



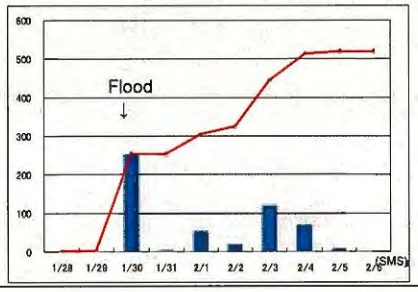


Rainfall monitoring

	Meteorology service	Water resource department
Monitoring	Manual	Automated
Frequency	Every 3 hours	Every hour
Communication	Manual reading	Off line
No. of stations	2 stations	?
Available data	1960-	?

8

Rainfall in Jan. 2009



9

Hourly rainfall at WRD Honiara

Date	Time	Hourly	Cumulative
29-Jan-09	13:00:00	0	
29-Jan-09	14:00:00	1	1
29-Jan-09	15:00:00	12	13
29-Jan-09	16:00:00	3	16
29-Jan-09	17:00:00	0	16
29-Jan-09	18:00:00	1	17
29-Jan-09	19:00:00	0	17
29-Jan-09	20:00:00	4	21
29-Jan-09	21:00:00	11	32
29-Jan-09	22:00:00	40	72
29-Jan-09	23:00:00	50	122
29-Jan-09	24:00:00	59	181
30-Jan-09	1:00:00	19	200
30-Jan-09	2:00:00	19	219
30-Jan-09	3:00:00	9	228
30-Jan-09	4:00:00	6	234
30-Jan-09	5:00:00	0	234
30-Jan-09	6:00:00	7	241
30-Jan-09	7:00:00	1	242
30-Jan-09	8:00:00	1	243
30-Jan-09	9:00:00	5	248
30-Jan-09	10:00:00	11	259
30-Jan-09	11:00:00	2	261

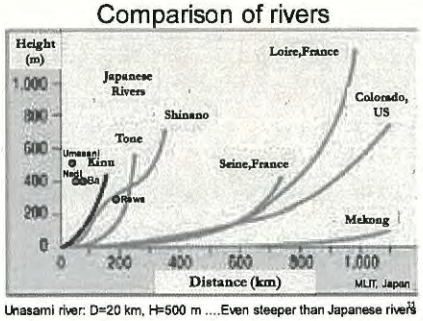
Heavy rain ←started

←Flood happened

10

10

Comparison of rivers



Unasami river: D=20 km, H=500 m ....Even steeper than Japanese rivers

11

11

2. Weekly meeting @NDMO

4 meetings were held at NDMO office with stakeholders.
Topics:
Preparedness task for clusters.
Possible early warning system.
Tasks & lead agency for disaster response.

12

Potentials of Solomon Is.

- Observation & historical data
  - Russell catalog 1586-1990
  - Meteorology data since 1960
  - 1986 Namu flood & landslide map
- Disaster management system
  - Cluster system & SOP
  - Provincial DM plan drafted
  - Disaster awareness radio program
- Communication infrastructure
  - HF radio @ health facilities
  - Mobile phone & radio @ school
  - Radio stations in Guadalcanal

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Weakness of Guadalcanal

- No disaster operation room.
- No evacuation centers defined.
- Only two rainfall stations by SMS.
- No mobile phone in west - south.
- No traffic road in southern coast.

14

3. School Inventory development

- Location
- No. of class room
- Structure type
- No. of floor
- Established year
- No. of teachers
- No. of students
- Communication
- Water source
- Food garden
- Kitchen
- Electricity
- Disaster experience
- Preparedness

15

Schools in East Guadalcanal

School in flood prone area (Mercy)

21

Safe school (Kulu)

18

Schools in West Guadalcanal

9

11

Radio at school (Turarana)

Turarana school was built by relocated residents affected by 1977 earthquake. They have working experience of disaster response. They have radio in teachers' room.

19

Safe school (Lambi)

23

Schools in Central Guadalcanal

Selwyn Collage

Selwyn collage was destroyed by the 1986 Cyclone Namu. It was rebuilt in western Guadalcanal in 1991.

24

10

12

Teacher at Selwyn collage

- "I teach disaster to students in the beginning of my geography class, because our school was destroyed by cyclone Namu in 1986."

25

Disaster Songs (Aruligo)

- Flood, cyclone, earthquake, Tsunami are considered.
- Target: Kinder garden
- Developed by Caritas, NDMO, & teachers.

26

Summary

- Guadalcanal has been frequently affected by floods, landslide, besides earthquake & Tsunami.
- Children & women are most victims by disaster.
- Provincial disaster plan is developing.
- Safe schools can be evacuation centers.
- More school inventory survey in future.

Thank you ! Your comments to: tangi.joseph4@gmail.com 29

HF radio in clinics

- Most clinics has radio.
- Some are close to school.
- However...
  - Station code to be informed.
  - Operation manual needed.
  - Operator in HQ needed.

Commercial radio

Station	Wave	Coverage	Operation	Generator
SIBC	AM/FM	National	6am-11pm	(Yes)
BBC	FM	Guadalcanal	24 hr.	No
ABC	FM	Guadalcanal	24 hr.	No
PAOA	FM	Guadalcanal	24 hr.	Yes
GFM	FM	Guadalcanal	24 hr.	Yes
ZFM	FM	Honiara	?	?

28

Flood Disaster Management Plan Preparedness for community

The strengthening community-based disaster risk management project in the pacific region

October 9, 2011
Yoshitaka Yamazaki
JICA expert

1

Outline

- 1. About JICA project
- 2. Disaster management
- 3. Disaster in Guadalcanal
- 4. Early warning

2

Project members & period

- Team members
  - Team leader…Mr. Kameyama
  - Hydrologist…Mr. Umeki & Imagawa
  - Early warning…Mr. Tsukada
  - Disaster management plan…Yamazaki
  - Community activities…Mr. Kanaya
- Project period
  - Nov. 2010 – Nov. 2013

3

Weekly meeting schedule

Oct. 7	Disaster profile & Early warning
Oct. 14	Preparedness & Response
Oct. 21?	Wrap up

4

Disaster in Guadalcanal

Date	Type	Killed	Affected
1931/10/03	Tsunami	50	
1966/11/14	TC Angela	3	1,000
1977/04/20	Earthquake	34	1,000
1986/05/19	TC Namu	101	150,000
2009/01/29	Flood	21	7,000
2010/01/12	Flood	2	16,017
2010/03/15	TC Ului		590

Source: www.emdat.be

5

Floods in Guadalcanal

Date of Flood	Cause of flood	Location
1961/7/20	Flood	Avuavu
1964/3/25	Flood	Central, Savo
1965/3/31	Flood	Honiara
Jun-65	Flood	G. Isabel
Nov-66	Flood	Honiara
1966/11/14	Cyclone Angela	Malaita, G.
1967/3/28	Cyclone Glenda	Honiara
1968/4/3	Cyclone Giselle	Western G.
1968/12/2	Cyclone Becky	G. Malaita
1971/1/11	Cyclone Carlotta	1972?
1972/5/30	Cyclone Ida	Tulagi, Rere, Aola, Marau
Jan-73	Flood	East
Sep-73	Flood	Botomulu (east)
1979/2/17	Cyclone Kerry	Makira, Central, G.
1980/2/4	Cyclone Rae (Fae)	Honiara
1980/8/8	Flood	Kuma
1982/1/23	Flood	
1982/4/3	Cyclone Bernie	G., Isabel, Savo
1986/5/16	Cyclone Namu	G., Malaita, Makira

1568—1990
After Radford et al. 1993

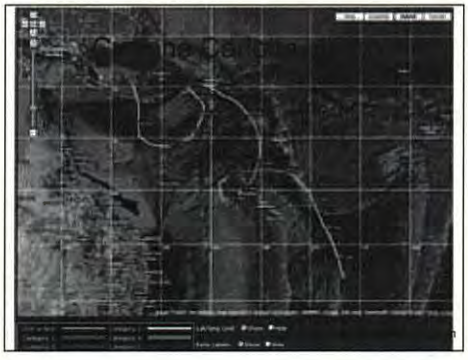
6

Meteorological Events

	Month													
Event	1	2	3	4	5	6	7	8	9	10	11	12	?	Total
Cyclone	7	6	7	3	3					1	2	9	8	46
Flood	2		2		1	1	1	2	1		1			11
Storm	3	1				1			2			2	1	10
Dought									1				3	4

Period: 1568—1990
After Radford et al. 1993

7



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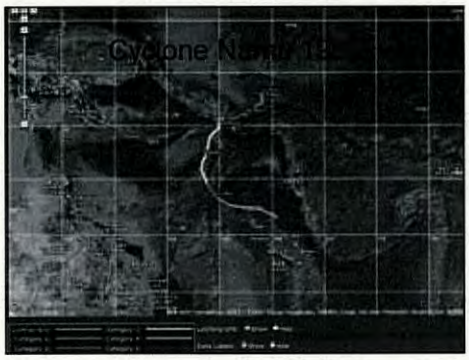

Rain gauges in Guadalcanal

Casualties by Cyclone Namu

- Most of the dead found by the 23 May (total 71) were aged or women and children unable to escape landslides and floods. [The Age, May 23 1986.]
- These mud slides caused major damage and were the major contributing factor in the death of over 100 people, the injuries of more than 1,000 people and the 90,000 homeless people. Only minor damage was caused by wind. [Kingston, G. 1986.]

10

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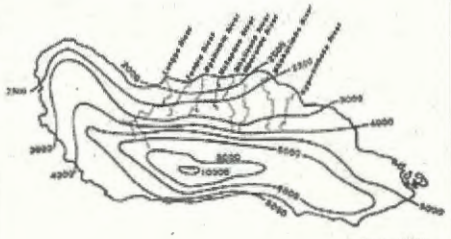
Rainfall distribution



(Curry, 1988)

14

5

7

Who were victims ?

Age	Female	Male	Total
0–18	6	2	8
19–40	4	3	7
41–	2	2	4
	12	7	19

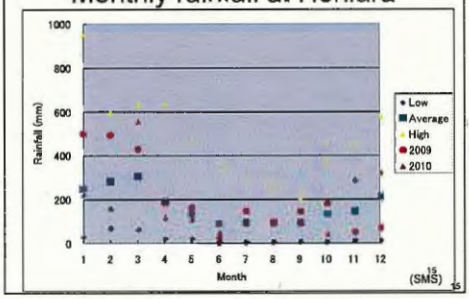
Source: "Report on tropical cyclone Ami", NDMO, March, 2003, Fiji

Age	Female	Male	Total
0–18	1	2	3
19–40	1	2	3
41–	1	0	1
	3	4	7

Source: "Report on January 2009 Flood ", NDMO, 2009, Fiji

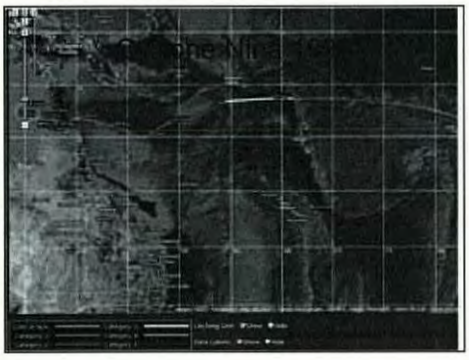
11

Monthly rainfall at Honiara

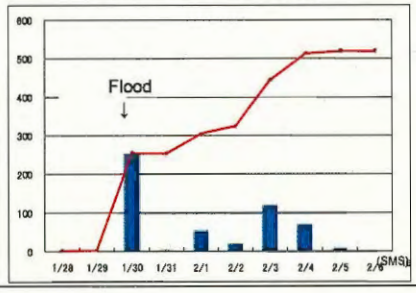


15 (SMS)

15



Rainfall in Jan. 2009



(SMS)

16

6

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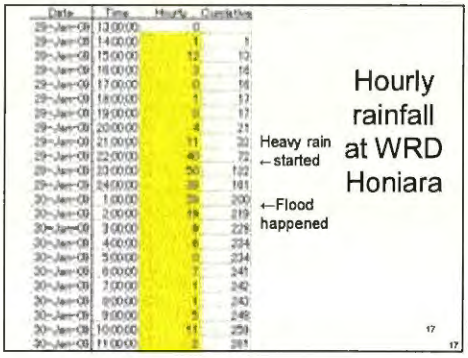


Cluster system

National	Province	Recovery
Logistics & support	Response initial assessment & logistics	Damage & hazard mapping
Response & initial assessment		
Welfare/IDP	Welfare/IDP	Shelter & welfare
Livelihood	Public services & livelihood	Livelihood
Public services		Public services & facilities
Infrastructure	Infrastructure	

National Disaster Management Plan, 2009

Alert level of rainfall in Okinawa pref.

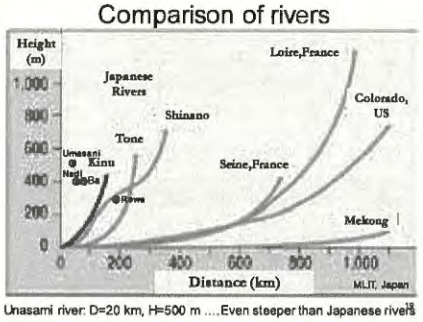
Rainfall	Alert level for rain	Alert level for flood
1 hour	40 – 60 mm	40 – 50 mm
3 hours	60 – 100 mm	60 – 80 mm
24 hours	100 - 210 mm	100 - 160 mm

Note: Level varies by regions in prefecture.
(Okinawa prefecture disaster management plan)

Village DR planning

Warning Codes	Flooding/Wave surge – Features/Characteristics
[redacted]	Heavy rain warning - flooding **may follow in 24 – 48 hours** Heavy swell warning – high waves **may occur in 24 – 48 hours** Start taking pre-cautionary measures
YELLOW ALERT Likely within 12 hours	Heavy rain warning - flooding **likely in next 12 hours** Heavy swell warning – high waves **likely in next 12 hours** Take action to secure gardens, property and canoes
[redacted]	**Heavy rain warning** – flooding **expected within 3 – 12 hours** Heavy swell warning – 3.5m+ waves **expected within 3 – 12 hour hours** Complete preparations urgently and move to a secure place

Comparison of rivers



Unasami river: D=20 km, H=500 m ....Even steeper than Japanese rivers

Extension of plans

	Normal	Warning	Response	Recovery
National			Cluster	Cluster
Province (JICA)	Cluster	Cluster	Cluster	Cluster
Village DR plan		Blue, Yellow, Red		
Community (JICA)	White	Blue, Yellow, Red	Purple	Green

Disaster phase

Period	Task
Normal time	Education, preparation
Depression & cyclone approaching	Early warning & evacuation
Flood occurs	Response
Flood receded	Recovery

Annual SOP

	Month	Gov't	Community
Normal	Jun.-Aug.	Update info.	Update info.
Before	Sep.	Drill	Drill
During	Oct.-Apr.	Cyclone season	Cyclone season
After	May	Report, revise plan	Revise plan

Elements of Flood early warning

- 1. Monitoring
- 2. Interpretation
- 3. Message construction
- 4. Communication
- 5. Protective behavior

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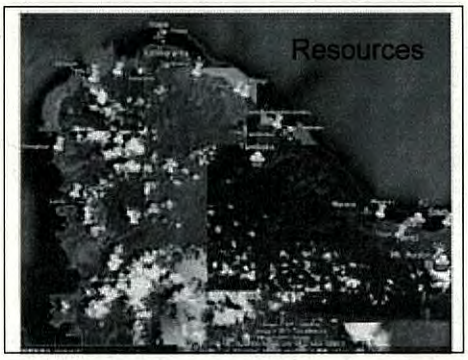
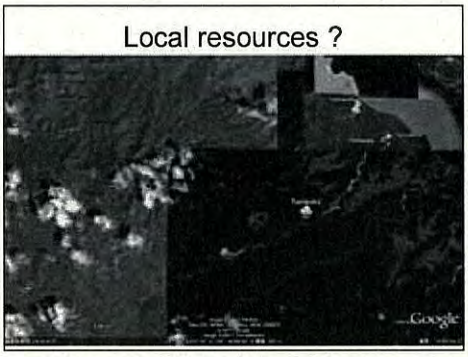


Early Warning dissemination

- Formal warning
- SIMS
- NDMO
- WRD
- ↓
- Radio, TV, web
- PDMO
- ↓
- Public

- Informal warning
- School, Clinic
- Residents, Police
- ↓
- PDMO
- ↓
- Radio, School
- Police, Clinic
- ↓
- Public

26



13

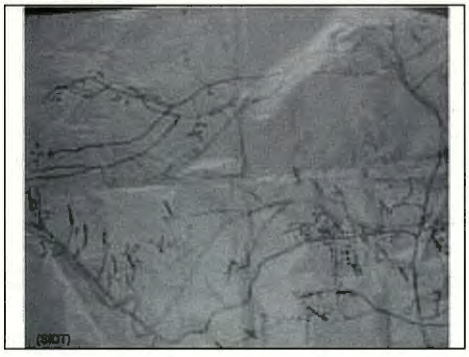
15

Communication chain

- Zone 6 > 5 > 4 > 3 > 2 > 1
- Zone 6 >SIBC, FM, NDMO

- School > Education dept > NDMO
- Clinic > Areal HC (Marara) > G province
- Police > Rove >NDMO

27



Commercial radio

Station	Wave	Coverage	Operation	Generator
SIBC	AM/FM	National	6am-11pm	(Yes)
BBC	FM	Guadalcanal	24 hr.	No
ABC	FM	Guadalcanal	24 hr.	No
PAOA	FM	Guadalcanal	24 hr.	Yes
GFM	FM	Guadalcanal	24 hr.	Yes
ZFM	FM	Honiara	?	?

28

Resources

- School
- Clinic
- Police
- Radio
- Mobile phone
- Solar panel
- Shop
- Truck

32

Emergency numbers

- HF radio

- NDMO
- SMS
- Police
- WRD
- Works
- Health

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Information management in Disaster Management

The strengthening community-based disaster risk management project in the pacific region

October 14, 2011
Yoshitaka Yamazaki
JICA expert

Outline

- Disaster & information
- Basic PC skills
- Proposal for common Blog

Who needs Info. Tech. skills?

- Disaster managers
- Local government
- Media
- NGOs
- Schools
- Churches

Why Info. Tech. ?

- Information floods during disaster.
- Information sharing needed.
- Many useful information & tools for free.
- Skills to search, analyze, & publish
- Technology & trend develops rapidly.

↓

- Familiarize with IT in daily life.

What to Manage?

- Time
- Human resources
- Goods
- Money
- Information

Info. management process

- Set Keyword
- Search
- Collect
- Evaluate
- Analyze
- Organize
- Output

Information issues in DRM

- Community
  - Repeated survey but no (or) late response
- Stakeholders
  - IDA data sharing among stakeholders
- National
  - Link with media in response & recovery
  - Disaster documentation for lessons
- International
  - Efficient appeal for help

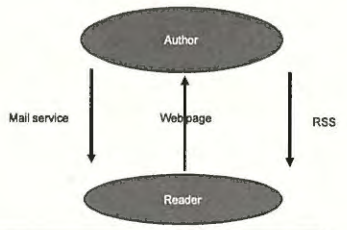
What are your "key words" ?

- Disaster
- Flood
- Cyclone
- Tropical depression
- Rain
- Earthquake
- Tsunami
- Volcano
- Solomon Islands
- Guadalcanal
- Disease
- NDMO
- ...etc

Contents

- Disaster management
- Scientific knowledge
- Historical disaster
- Map
- Disaster alert
- Disaster response
- Mass media
- Social media

How to get/disseminate information ?



DRM

- Reliefweb
- Preventionweb
- EMDAT
- INEE
- Pacific Disaster Net
- SOPAC

News

- SIBC
- Solomon Times
- Solomon Star
- Island Sun
- ABC
- BBC
- Wikipedia

Disaster alert

- FMS
- USGS
- NOAA
- BOM
- JTWC

Learning from other countries

- Disaster
  - Why it happened?
  - How much damage?
  - Lessons?
- Disaster management
  - How they respond & manage?
  - How to support?

Tools ?

- PC
  - Mail program…Thunderbird
  - Internet browser…Firefox
  - RSS reader…RSSowl
  - Map…Google earth + kmz
  - Utility software…www.download.com
- On line
  - Blog, Web site
  - Social network service…Facebook, twitter
  - On line storage… Dropbox, Google document

Social Network Service

- Facebook
- Twitter
- Skype
- Ustream
- Youtube
- Wikipedia
- Dropbox
- Google document

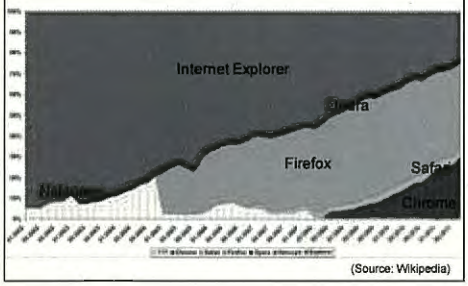
How to search ?

- Where to search
  - News
  - Blog
  - Twitter, Facebook, Youtube
  - Book…Amazon.com
  - Paper…Google scholar
- Search options
  - Date, Site, File type

Internet browser

Name	Developper	Pros	Cons
IE	Micro$oft	Win. update	Insecure
Firefox	Mozilla	Many add on	
Chrome	Google	Fast	Few add on
Safari	Apple	Fast	Few add on
Opera	Opera		
Netscape	Netscape		

Browser share



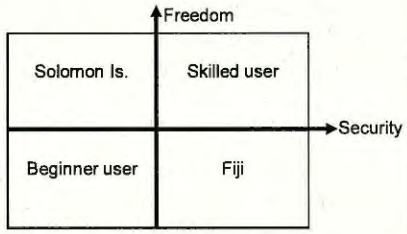
(Source: Wikipedia)

IE version

Version	Release	Share	Windows
IE6	2001/8/27	9.22 %	Win. 98 -
IE7	2006/10/18	6.25 %	XP -
IE8	2009/3/20	29.23 %	XP -
IE9	2011/3/15	6.80 %	Vista -
Total		52.71 %	

(Source: Wikipedia)

Freedom & Security



Data protection

- PC Virus
  - Install anti-virus software
  - Update virus update data
  - Check USB drive before open it
- System crash
  - Get external disk (Hard disk, flash drive, CD)
  - Use online storage
  - Back up regularly (once a week)

Software update

- Software are updated frequently
- To keep your system updated,
  - Windows update to protect system
  - Anti-virus software data update
  - Application software update

File management

- Clean up & organize desktop… "Fence"
- Organize "My document" folder
  - Classify…Subject, user, date, file type
- Use Tool bar
- Use file search
  - Menu
  - Google desktop
  - Super finder
- Use understandable file name
- Use "file view"

Common blog for stakeholders

- Common blog & email prepared.
- Contents…news, event, report, ideas, damage assessment & etc.
- Tag for articles needs to be defined.
- IDA format needs to be defined.
- Data, photos, Videos, Maps, Links
- Table for data sharing…google docs.

Possible tags

- Location…province, village name
- Type of disaster
- Hazard information…Rain, Cyclone, Eq. epicenter, Magnitude, Tsunami.
- Type of report…IDA, DDA, appeal, map
- Category of damage…human, house, agri., infra & etc.
- Author of article

Summary

- Familiarize IT during normal time
- Source, tools, & skills.
- Blog for disaster management
- Protect & organize data, update system

Flood Disaster Management Plan Preparedness & Response

The strengthening community-based disaster risk management project in the pacific region

October 16, 2011
Yoshitaka Yamazaki
JICA expert

1

Outline

- 1. Situation after flood disaster
- 2. Preparedness
- 3. Response
- 4. Recovery

2

2009 January Flood

- Disaster declared on day 7.
- First two weeks are the busiest period.
- Governor "Be patient.' on day 23.
- Food relief distribution began day 48.

3

Time line

Week 1	Evacuation
Week 2	Damage assessment
Week 3	Relief work
1 month	Recovery starts
3 months	Recovery plan
1 year	Recovery in progress
3 years	Recovery completes

4

Village DR planning (flood)

Warning Codes	Flooding/Wave surge – Features/Characteristics
[redacted]	Heavy rain warning – flooding **may follow in 24 – 48 hours** Heavy swell warning – high waves **may occur in 24 – 48 hours** Start taking pre-cautionary measures
YELLOW ALERT Likely within 12 hours	Heavy rain warning – flooding **likely in next 12 hours** Heavy swell warning – high waves **likely in next 12 hours** Take action to secure gardens, property and canoes
[redacted]	**Heavy rain warning** – flooding **expected within 3 – 12 hours** Heavy swell warning – 3.5m+ waves **expected within 3 – 12 hour hours** Complete preparations urgently and move to a secure place

NDMO, Solomon Islands

5

Extension of plans

	Normal	Warning	Response	Recovery
National			Cluster	Cluster
Province (JICA)	Cluster	Cluster	Cluster	Cluster
Village DR plan		Blue, Yellow, Red		
Community (JICA)	White	Blue, Yellow, Red	Purple	Green

6

Bottom up damage report

Community	Province	National
Village chief	PDMO	NDMO
Health facility	Health dept.	Min. health
School	Ed. dept.	Min. Ed.
Police	Police dept.	RSIPF
Church	Church	SICA

7

Tasks after evacuation

- Head count
  - Injured, missing, dead
  - First aid
- Food
- Safe water
- Sanitation
- Damage assessment
  - House
  - Food garden, livestock
  - Road, bridges
- Report

8

School (pre disaster)

- Hazard identification at schools
- Structural inspection of school
- Maintenance of school building
- Disaster education
- Display hazard map & evacuation route
- Conduct disaster drill

9

School (post disaster)

- Opening school for evacuation
- Head counts
- Evacuation center management
- Report to provincial department
- Prepare to reopen school
- Reopen school

10

Clinic (pre disaster)

- Education on diseases prevention
- Maintenance of HF radio
- Emergency stock & staffing
- Protection of HF radio ?

11

Clinic (post disaster)

- First aid
- Diseases prevention
  - Mosquito spraying
  - Disinfection
  - Food condemnation
  - Water quality monitoring
  - Monitoring of diseases outbreak
- Report to provincial department
- Mortuary

12

5

6

Protect food

- Ensure that foods are clean, cooked well and covered to protect from flies, cockroaches, rats and other insects.
- When you eat raw fruits or vegetables that can be peeled, wash your hands thoroughly and peel them yourself. Do not eat peelings.
- Avoid raw fruits and vegetables that cannot be peeled.

Ministry of health, Fiji 13

Protect water

- Ensure that water source is protected from human and animal contamination.
- Ensure that stored water is kept in a clean and covered or closed container.
- Boil all drinking water.
- Bottled carbonated water is safer than uncarbonated water.
- Only use safe clean water for drinking.

Ministry of health, Fiji 14

Wash hands

- Ensure that you wash your hands with soap and clean water before having meals as well as after using toilet.
- Do not reuse water that has been used for washing hands.

Ministry of health, Fiji 15

Protect your family

- Always wear shoes while walking or working outdoor.
- Ensure that any member of your family who has fever, vomiting, diarrhea, generalized body weakness or any medical complain is seen by a nurse or doctor.

Ministry of health, Fiji 16

7

8

Get rid of mosquitoes

- Protect yourself from dengue by using insect repellants and mosquito nets
- Fill all tyres with soil or place them under proper shades and in dry areas.
- Bury all empty containers that can breed mosquitoes.
- Ensure water storge drums are covered well.

17
Ministry of health, Fiji

When water recedes

- Clean up debris
- Clean up mud
- Repair bridge

21

Police (pre disaster)

- Visibility patrol for river water
- Informal early warning
- Guidance and evacuation

18

9

11

Police (post disaster)

- Security maintenance
- Security for evacuation centers
- Initial damage assessment
- Report to provincial department
- Monitoring situation
- Detailed damage assessment
- Relief goods distribution support

19

Church

- Pre disaster
  - Awareness
- Post disaster
  - Psychological support
  - Disaster relief

20

10

Workshops to Strengthen the C/P Organizations' Capacity

in the 3rd Year

Activities during 2012-13 in S.I. -DRM planning & simulation-

The strengthening community-based disaster risk management project in the pacific region

August, 2012
Yoshitaka Yamazaki
JICA expert

So far,

- Consultation meetings
- Flood DRM plan for G province
- Scholl, clinic station visiting
- Table top exercise
- International Workshop
- Proposal for informal warning system
- Common blog debelopment

Tasks in 2012-2013

- 2012 Flood review
- Disaster Committee for DRM plan review
- SOP development for key organizations
- Installation of simplified gauges
- Training to Niigata, Japan

2012 Flood review

- Good
  - Rapid aerial survey & disaster declaration
  - Proactive health care for disease prevention
  - Tide calendar fully used
- Problem
  - Warning unnoticed for march flood ?
  - Damage survey
  - Water & food distribution to remote area
  - Information dissemination from NDMO

Major organizations?

- Education
- Health
- Agriculture
- Police
- Fire station
- Red cross, NGO, Churches
- Schools (where simplified gauge installed)

Installation of informal gauges

School	Loca-tion	Height	Rain gauge	Water gauge	Note
Kulu	East	5m	x		
Tulalana	East	140m	x	x	HF radio
Rate	East	60m	x	x	WRD rain gauge
Betivatu	East	32m		x	
Selwyn	West	3m	x	x	

Post season committee

- Disaster review
- DRM plan revision
- Flood hazard map discussion

Task schedule

7	Fiji	1	
8	Solomon	2	
9		3	Report
10	Training in Japan	4	
11	Fiji, Int'l WS	5	Yearly Planning
12	Solomon	6	

SOP Joint Presentation

17th December 2012

GUADALCANAL PROVINCE

Agriculture Extension
Standard Operating Procedures (SOP)

Purpose:

The purpose of the Agriculture sector Cluster is to ensure that people who are significantly affected by a disaster are supported in terms of food security for the period prior to, during and after the disaster until such time self-help measures are re-established.

The roles of the Agriculture Sector include:

1.0 Preparedness Phase:

- Establishment of ward and village committee
- Training of staff & ward/village committee on disaster Risk Management
- Educate communities on disaster preparedness, Emergency, & Recovery Plan
- Encourage establishment of hill side Farming
- Stocking seeds & planting materials
- Encourage Farming of flood , tolerated/ indigenous root crops & vegetables

2.0 Emergency Management (Immediate Response)

- Coordination of agencies with roles to provide for financial and humanitarian support to cater for relief food supplies at times of Disaster emergency.
- Strategic assessment on impact of damages and submit reports to P-DOC
- Assessment and evaluation of the level of support needed for affected people and communities to return to a state of self help;
- Monitoring the effectiveness of the support being provided;

2.0 Recovery & Rehabilitation

- Work closely with the Recovery Coordination Committee (RCC) of the council and advise provincial priorities for recovery and rehabilitation.
- Provision of early matured food crops for quick recovery of vulnerable groups and areas..
- Implement and coordinate the rehabilitation program until such self-help measures are re-established.

While not all groups will be particularly vulnerable, it is important that these groups be considered as priorities in any assessments that are carried out.
The Guadalcanal Province. The Agriculture sector is responsible to (P-DOC) and will liaise with the other sectors under the P-DOC to provide a complete response to the disaster.

Responsible to:

The Agriculture sector Cluster is responsible to the P-DOC through the Cluster Chair.

Scope:

The Agriculture sector Clusters operates within Guadalcanal province, . The cluster will support the Province in the provision of food security services in an event of a disaster. It is required to perform its duties on both declared and undeclared disaster events as per Sections 17 and Section 96 – 97 (Fig 5) of the National Disaster Risk Management (N-DRM) Plan. The cluster is expected to be activated within 7 days immediately after the impact of a disaster and shall continue all though Recovery stage for a period of three (3) months until self-help measures is re-established. The Agriculture Sector Cluster has the main responsibility of ensuring that food security is maintained all through period of disaster of the affected communities and subjected to take directives from the P-DOC.

Principles:

- Key principles guiding the mode of operation include partnership, preparedness,recovery, accountability, leadership, respect and commitment.
- The response includes supporting communities to understand and manage hazards and disasters – safeguarding lives, food security and livelihoods.
- The involvement of all agencies, sectors, NGOS, politicians, churches, business houses, village chiefs and women is essential.
- The Agriculture sector will be a member of the other main clusters and in combination set up plans Preparedness, response and recovery..
- The mode of operation includes a human-survival based approach which provides the framework and necessary standards for humanitarian assistance activities.

Members of the Agriculture sector Cluster:

The Agriculture sector is chaired by the chief Field Officer

Members of the GP Agriculture Cluster

- All the Agriculture Extension staff – Guadalcanal Province

Other representatives may include:

- Provincial disaster coordinator
- Provincial Minister for Agriculture
- Red cross
- Church groups
- Women's Associations(YWCA)

- Other Non-Government Organisations (NGOs)
- Gold ridge representative
- GIPOL representative
- Ward/Village Committee Reps

Members of the affected communities may have a part to play ; however this would best be done at community level.

Functions:

Preparedness Functions

- Participate in initial impact assessment (which is undertaken by Response and Initial Assessment cluster) for relief purposes (village by village or by sample village) followed by a more detailed household needs assessment where necessary for targeted relief
- Prepare the Agriculture sector cluster preparedness, response and recovery Plan
- Maintain and improve SOP in line with the SOP of its P-DOC Cluster equivalent/counter parts
- Initiate recovery planning
- Ensure that once activated during declared and non-declared disaster events, it is a prime function that the Cluster implements what is required to do.
- Establish communications arrangements across all levels
- Facilitate and conduct trainings to promote capacity building for sector members and community elders and leaders on plans and activities on disaster preparedness, response and recovery.

Response Functions

- Coordinate briefing with P-DOC and Agriculture sector members.
- Attend meetings for operational Functions
- Mobilising Resources
- Provide personnel to be part of the Provincial Disaster Rapid Assessment team as appropriate on sectors being impacted particularly for the purpose of carrying out initial impact assessments
- Deployment of personnel as member (s) of the purpose of The DSA Team (s) for the purpose of sector specific detail assessment.
- Carry out damage and needs assessments for relief and recovery purposes.
- Initiate and establish state of self-help in relation to food security early recovery.
- Compile and submit impact assessment Reports to P-DOC
- Coordinate the processes for the distribution of relief.

- Tabulated below are the cluster members with their responsibilities identified

Arrangements:

Call out and activation

- The Agriculture sector cluster is to be activated by the P-DOC on the advice of the N-DOC both during a declared disaster event or non-declared events
- On advice of P- DOC, the Agriculture sector members are called to meet to ensure effective immediate response and preparedness are in place.

Briefing

The sector chair briefs members on:

- **Situation:** (threat, possible areas of impact, time of impact, estimated population affected critical food shortage situation.)
- **Resources:** (Available/not available, needs and issues of cluster members, budget etc.)
- Inform Women's Association, Youth Groups, Church Groups and Private Sector
- Develop TOR and team composition
- Contact authorities concerned about possible use of their facilities
- Advise of the possible need to use facilities
- Assist Carry out relief activities with N-DOC or P-DOC

Deployments

The Agriculture sector team may be deployed to the affected areas if and when required

Operation

- ***Meeting place***

Guadalcanal Agriculture Head Office – China town

- ***Frequency***

During emergency Daily, to be adjusted according to situation

- ***Support***

NEOC and PEOC will provide information on the situation on the ground.

Stand down

The National Disaster Coordinator through the Provincial Disaster Coordinator will advise the Sector to stand-down when deemed appropriate. This is most likely to be once the situation that caused the disaster has dissipated and the needs of affected persons have been satisfactorily addressed.

Essential Equipment

Phone /Stationery / HF Radio /Vehicle /OBM & Canoe/ Fuel//GPS

Information Access Management

PEOC Maps/Forms

Required:

- Maps of all of the Solomon Island including possible impacted areas
- Initial Damage Assessment form including Data Entry Matrix Tamplate
- Templates for information Management, Minutes of meetings etc.

Responsible to Produce

- SITREPs for initial Damage/impact Assessment information (food gardens)
- Meeting Minutes
- Other relevant information for dissemination to other agencies, clusters, and humanitarian communities.

Resources available

Resources Matrix

Guadalcanal Province November 2012

Item	No	Description	Location	Status	Capacity/Capacity
Human Resources	5	HR	Honiara	Active	Guadalcanal
	1		Tandai		
	1		Aruligo		
	1		Lambi		
	1		Tangarare		
	1		Avuavu		
	2		Marau		
	1		Totongo		
	1		Aola		
	1		Reko		
	1		E/ Tasimboko		
	1		G/Plains		
	1		Malango		
Vehicle	3	2 Land Cruiser 1 Hilux	Honiara	In good condition	MAL/GP
OBM	1	40 HP Yama	Honiara	In good condition	RDP/GP
	1	40 HP Suzuki	Marau	"	MAL/GP
	1	15 HP Suzuki	Lambi	"	"
	1	30 HP Suzuki	Tangarare	"	"

Canoe	1	Round carbin	Marau	Need repair	Ex-CSP
	1	Yamaha	Marau	Sea worthy	Rice prog.
	1	Round carbin	Tangarare	Sea worthy	Ex- CSP
	1	New (RDP)	Lambi	Newly Issued	RDP
	1	Yamaha	Honiara	In good condition	Rice Prog.
	1	New (RDP)	Honiara	New	RDP
	1	Aluminium	Kakabona	Need repair	MAL/GP
Communication	1	Phone	HQ Office	Working	No.26043
	1	Internet		Reliable	

GUADALCANAL PROVINCE EDUCATION DEPARTMENT- SOP 2012-2015

1. Education Authorities
Education Authorities are responsible for
1 overseeing the implementation of this policy in all schools under their authority;
2 supporting the Policy Framework and Strategic Action Plan for implementation;
3 coordination with school committee or board in the planning and implementation of EIE;
4 coordination with PDMO in implementing the policy;
5 recruiting volunteer teachers, if required, for the Temporary Learning and Teaching Space.

2. School Committee or Boards
The School Board or Committee is responsible for
1 ensuring that the policy is implemented at their respective schools and centres;
2 ensuring the schools and centres are safe, secure and learner friendly;
3 ensuring that the school management implements disaster drills;
4 ensuring that the school disaster management plan is available and implemented;
5 ensuring that EIE is included in the whole school development plan;
6 working with community members to advocate support for EIE activities of the school.

3. The School Management
The School Management team is responsible for
1 leading the development of the school's disaster management plan
adapting it to the school's context;
2 ensuring the Education in Emergency policy is implemented at the school
and centres;
3 providing support and encouragement to teachers where necessary in implementing the policy;
.4 co-ordinating in-service workshops necessary for providing the knowledge and skills to assist teaching staff in emergency preparedness;
5 ensuring school emergency drills are outlined in the school's yearly programmes and are carried out at least twice a year;
6 ensuring that the school must install basic safety equipments on its premises and have proper storage for emergency resources;

7 making sure that all buildings within the school must have clearly displayed evacuation maps;
8 ensuring that the school's disaster management plan is constantly updated
each year;
9 ensuring that constant routine checks are carried out on the school's basic safety equipment and replacement is done of any faulty equipment.

4. Teachers
The Teachers are responsible for
1 working together as members of school community in implementing the school disaster management plan in the school;
2 ensuring knowledge on disasters is taught where relevant and appropriate during official lessons;
3 encouraging the wider community members to participate in the EIE day-to-day activities of the school or centre;
4 supporting the school head teacher/principal in organizing and implementing emergency drills at the school level;
5 providing support for the annual updating of the school's disaster preparedness plan;
6 making sure that students are aware of the schools evacuation assembly points and the safest escape routes and the location of the Temporary Teaching and Learning Space;
7 instructing students on the proper use and care of the school's safety equipment;
8 ensuring that any faults to safety equipments are immediately reported to the focal point.

5. Students
The Students are responsible for
1 understanding and being aware of the school's Emergency and Evacuation plans, assembly points and the proper uses and maintenance of school's basic safety equipments and their care;
2 participating in the disaster drills and other EIE-activities organized by the school;
3 reporting to the school management and the duty teacher any faults to the safety equipments;
4 reporting to the school management and the duty teacher any incidents which may lead to an emergency situation in the school.

6. Parents
The Parents are responsible for
1 advising their children when travelling to and from the school and to take
heed of warnings given by responsible authorities of any emergency situations;
2 passing on local and practical knowledge about disaster risk management practices to their children;
3 accessing, understanding and being aware of the school's emergency and
evacuation plan;
4 working in partnership with the school management and the school committees or board in the implementation of the plan and to provide support for the EIE activities organized by the school.

7. Communities
The Communities are responsible for
1 providing support to the school committees, boards and management;
2 participating in awareness of the school disaster management plan;
3 participating in school based disaster drills;
4 providing support to teachers and children in times of emergencies;
5 providing land that is safe and secure from natural disasters for the school's use;
6 providing safe learning and teaching spaces during times of disasters;
7 understanding their roles in ensuring the safety of children in the learning and teaching spaces.

GUADALCANAL HEALTH & MEDICAL SERVICES

PROVINCIAL DISASTER RISK MANAGEMENT PLAN
2012

ORDER OF PRESENTATION

1. PART 1: INTRODUCTION
- Geographical Location-Map of Guadalcanal
- General Health Profile
- Disaster Risk Management Plan
- Background
- Aim
- Objectives

Part Two: Health Planning & Risk Reduction

- Important Risks Identified
- Provincial Health Sector Arrangements
- Reduction of risks Identified
- Resource Arrangements

Part Three: Disaster Risk Reduction

- Preparedness Management
- Early Warning Management
- Response Management
- Recovery and Rehabilitation Management

Part Four: Sustainability Management

- Post Disaster Reviews
- Monitoring and Evaluation
- Plan Improvement & Strengthening

Guadalcanal Province Health Disaster Management

- PART 1: INTRODUCTION
- There is a need for the production of this plan in order to set in place a provincial platform for Disaster Risk Management.
- It adopts a systemic approach to identifying, assessing and reducing all kinds of risks associated with hazards and human activities

Introduction

- Furthermore this is the first copy of its kind and not final and that further improvement to this document will happen as the health sector seeks to strengthen this important area of engagement to better serve the people of Guadalcanal Province and the Country.

Guadalcanal Province Map

General Health Profile

- Health Sector deliver service to more than 93,000 population.
- There are a total of about 89 established staff
- There are 37 functional clinics from lowest level of care Rural Health Centre level 1&2 to Area Health Centre level 1& 2 only. No General Hospital which is the highest level of care in the provincial level.

Disaster Risk Management

- Disaster -catastrophic event that can bring great sufferings to those affected with loss of lives and damage to the environment.
- There is need for development of a multi-sectorial strategic plan at the provincial level to address this.
- Therefore the health sector puts forward this plan called Guadalcanal Province Health & Medical Service Disaster Risk Management Plan(GPHMSDRMP)

Aim

To provide the Guadalcanal Provincial Health & Medical Service (GPHMS) with a Disaster Risk Management Plan to manage disasters before and when they happen in order to reduce their significant threats and disastrous effects with effective recovery, rehabilitation and sustainability process.

Main objectives

1. To develop and complete a Provincial Health Disaster Risk Management Plan (DRMP) for Guadalcanal Health Sector by 2013.
2. To implement the DRMP by the provincial health sector with the available resource provided upon completion.

Main objectives

3. To plan and provide resource for the DRMP where required for successful implementation
4. To implement sustainability measures for further improvement and strengthening of the plan.

Health Planning & Risk Reduction

- 1. Tropical cyclones & windstorms
- 2. Floods
- 3. Earthquakes
- 4. Landslides
- 5. Volcanic eruptions
- 6. Tsunamis and wave surges
- 7. Droughts
- 8. Pandemics
- 9. Agriculture Pests and Disease

Health Planning & Risk Reduction

- 10. Aviation & Maritime Disasters
- 11. Fires
- 12. Industrial Accidents
- 13Marine Pollution
- 14. Other man made threats including civil impacts of conflicts

Reduction of risks Identified

- 1. Build strong homes and strengthen old homes against tropical cyclones and windstorms
- 2. Build homes in safe areas away from flood prone areas and near rivers.
- 3. Build homes on higher grounds both along the coastal and inlands.
- 4. Do not build on areas where landslide can happen during heavy rain and especially earthquakes.

Reduction of risks Identified

- 5. Do not allow destructive human activities such as logging operations and choose only environmental friendly operations such as portable milling of timbers.
- 6. Build homes safe distance away from active volcanoes
- 7. Strengthen and enforce health and occupational safety measures in all work and industrial areas.
- 8. Strengthen disease surveillance system for early detection and prevention of pandemics

Reduction of risks Identified

- 9. Strengthen Agricultural capacity in pest and disease prevention and control
- 10. Strengthen and enforce Maritime Safety Rules and Regulations
- 11. Strengthen and enforce Aviation safety rules and regulations
- 12. Formulation of policy driven strategies and plans to address disasters

9

Resource Arrangements

- The provincial health sector needs to set its resource arrangement in place and request and provide for additional resources now including funds to assist in the preparatory phase before any disaster occurs. Resources can be accessed through number of ways including

Resource Arrangements

- 1. Fund raising drives and appeals for donation in kind or cash
- 2. Provincial Government Budgetary Support
- 3. SIG Service Grants
- 4. Health Sector Support Program (HSSP)
- 5.Request for international or regional support.

10

Disaster Risk Reduction Management

- In this plan applies to a systemic approach to identifying, assessing and reducing all kinds of risks associated with hazards and human activities with special emphasis on the recovery and rehabilitation phase of disaster and sustainability

Preparedness Management

1. Health division shall
- Create a Post for Coordinator in DRM
- Establish a DRM Unit(office space)
- Form a disaster committee in the health sector for internal coordination
- Delineate & document roles of this committee and different units.
- Established a standard operating procedures for each unit involved in DRM.

11

Preparedness Management

- Identify & understand roles of NGO's and civil societies for inter-sectoral coordination
- Establish close working relationships within the sector through MOU/MOA and relevant partners.
- Prepare general health profile
- Plan and prepare resources (human, finances), resource mobilizations including transport logistics and community support.

Preparedness Management

- Provide training and capacity building for all health workers.
- Oversee the procurement, storage, distribution of drugs, medical supplies, consumables, PPEs & ER related supplies to all health facilities with pharmacist.
- Formulate a standard or uniform assessment questions (questionnaires). Prepare forms of communication.

12

Preparedness Management

- Produce IEC materials on disaster related diseases, proper hygiene practices relating to natural disasters.
- Undertake community awareness & education programs with appropriate materials and information.
- Conduct simulation & mock exercise training & rehearsals or drills implementation at least on a yearly basis.

Preparedness Management

- Know what to do when set declaration and activation procedures are activated.
- Prioritize or triage victims and refer to the clinics/hospital
- Ensure that there is allocation of budget for disaster activities

Early Warning Management

- Receive, interpret and verify warnings from source, type, nature (Place, date and time), etc.
- Identify scope and scale of event ("fly-over" type of assessment)
- Manage communications and public information
- Important to tell people not to panic.

Response Management

1.Health division shall

- Carry out damage and needs assessment
- Provide services where affected as follows;
- Provide and deploy medical team to attend to the site.
- Give free clinic and assess health situation
- Assess victims fatalities, injuries and treat and refer when need further and proper management at clinics or hospital.

Response Management

- Carry out initial impact assessment for relief purposes (village by village or by sample village) followed by a more detailed household needs assessment where necessary for targeted relief
- Provide advice to use clean and provide safe drinking water and proper sanitation
- Fumigate inundated houses before re-entry
- Monitor health situation by screening or giving free clinic.

Response Management

2.Welfare &IDP

Health division shall

- Provide treatment and nurse victims in the tents and refer to clinics, or hospitals.
- Continue to provide enough medical supplies to the relief sites, clinics and hospitals.
- Provide gender and child specific issues of welfare and safety
- Provide psychological care including counseling for the affected

Response Management

Health division medical unit shall

- Provide and ensure that essential medical supplies are sufficient at the clinics and hospitals.

Response Management

Health division CBR unit shall

- Assess the disable people and internally displaced people
- Assist to visit the disable and attend to their needs

Response Management

Health division Environmental Health(RWSS) unit shall

- Assessment of water supply facilities
- Implement water and sanitation measures
- Provide water purification tablets to communities affected.
- Fumigate inundated houses before reentry
- Provide mosquito coil and rat traps to avoid diseases where required
- Recommend communities to use clean water
- Advice to use and supply of purification and safe drinking water

Response Management

3. Public Service & Livelihood

- Health division shall
- Appropriate public officers are release and deployed to the sites needed.

Response Management

4.Infrastructure

- Health division medical unit shall
- Assess critical infrastructure damages on shelter, communication and transport
- Initiate relief activities by provision of tents, temporary shelter and repair damages.
- Ensure and established communication and networking with other members
- Ensure availability of transport - OBM and motor vehicle to transport relief teams and those injured with distribution of relief supplies

Recovery and Rehabilitation Management

1.Health division shall

- Provide on- going health care services and continue assess victims and educate them to look after themselves.
- Deploy surveillance team to assess for any outbreak of diarrhoea, flue, and other pest like rats, etc.
- Provision of psychological counselling (post traumatic stress).
- Development of a medium and long term Recovery Plan for the health sector

Recovery & Rehabilitation

- Issue guidance or directives for the avoidance of future risk in recovery activities
- This will be submitted to the Recovery and Rehabilitation Arrangements Committee at the provincial level
- Re-establishment of livelihood activities and practices

Recovery & Rehabilitation

2.Welfare & IDP

- Health division shall
- Ensure victims are secure from sexual harassment and assaults.
- Ensure community welfare and the safety and protection of women and children
- Essential drugs available to management any outbreak

Recovery & Rehabilitation

- Health division medical unit shall
- Continue follow up with the clinics and hospital to ensure that essentials drugs are available at their dispose.
- Health division CBR unit shall
- Provide counselling especially to disable population.
- Assess the disability and do proper referrals

Recovery & Rehabilitation

- Health division Environmental Health(RWSS) unit shall
- Repair and maintenance of clean water supply and sanitation systems

Recovery & Rehabilitation

3.Public Service & Livelihood

- Health division shall
- Ensure children and women are immunized against infectious diseases.
- Ensure that food supplied are of good quality
- Maintained quality of water supply and sanitation

Recovery & Rehabilitation

4.Infrastructure

- Health division medical unit shall
- Established centre and renovation of health facility for the provision of health care services.
- Repair and maintained communication and transport system.

Recovery & Rehabilitation

Health division environment unit shall

- Mapping and assessment of hazard and environmental impacts
- It is important to a recovery and rehabilitation program following a disaster
- Identify the needs from the impact assessment for rehabilitation and construction.

4. Sustainability Management

a) Post Disaster Reviews

- This is an important task to be carried out following the disaster and is aimed at capturing an overall initial assessment of the disaster as contained in this document and set the baseline for further evaluation of the PDRM at later stages

4. Sustainability Management

B) Monitoring and Evaluation

- This is important and therefore an appropriate framework needs to be set up for use in the health sector at the provincial level.

C) Plan Improvement and Strengthening

- Based on the findings and indications recommendations for further improvements and strengthening of the PDRM plan can be implemented.

5. Conclusion

- In brief the completion of this PDRM Plan is an important step towards accomplishing and effective tool to manage disasters. The successful implementation of this plan requires clear understanding of the above processes with a proper arrangement in place for effective coordination with resource allocation and strengthening, financing, accountability and sustainability.

6. Recommendations

1. There is a need to create a permanent post for a Provincial Representative in the health sector with clear term of reference as Coordinator in Disaster Risk Management.

2. There is a need to form a Health Sector Committee to be chaired by the Provincial Coordinator in Disaster Risk Management.

3. There is a need to form a Health Sector Disaster Risk Management Unit to be coordinated by the Provincial Health Representative.

Recommendation

- 3. The health sector needs to prepare a complete Standard Operation Procedures to set out its membership, terms of reference, mode of activation and operation.
- 4. The SOP needs to be approved by the Provincial Disaster Committee.
- 5. There is a need to assess overall resource capacity of the provincial health sector, plan and allocate resources for Disaster Risk Management
- 6. There is a need to produce an appropriate M& E Framework at Provincial Health Sector level for PDRM.

Recommendation

- 6. There is a need to produce an appropriate M& E Framework at Provincial Health Sector level for PDRM.

ITS JUST THE BEGINNING

THANK YOU

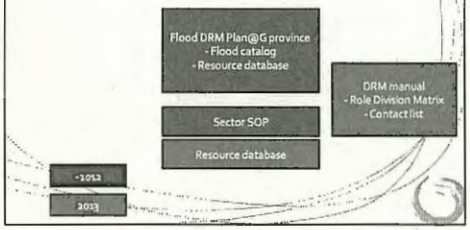
Workshops to Strengthen the C/P Organizations' Capacity

in the 4th Year

Kick off Meeting for 2013

August 2013, Honiara
Yoshitaka YAMAZAKI
JICA Expert for
Disaster Management Plan,
Strengthening Community Based Disaster Management in Pacific Region

DRM document system



1

Training for staffs

- Task management
- Information management
  - Collection
  - Analysis
  - Sharing
  - Keeping

MOU/A with NGOs

- Partners
  - NGOs
  - Private companies?
- Contents of cooperation
  - Goods, Cash, Staffs, Space, Logistics, & etc.
- Discuss contents of cooperation

3

DRM plan revision

- Sufficient items?
- Sufficient stakeholders?
- Task allocation?
- Procedures?
- Report forms?

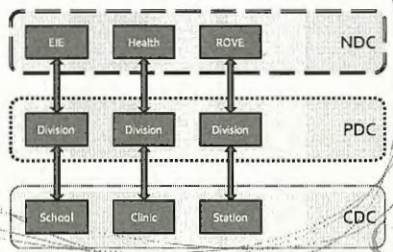
Activities in 2013

- Improvement of flood DRM plan
  - Consultation with stakeholders
  - Promotion of MoU
  - Resource map
- Revision of Sector SOP
  - Localization
  - Harmonization with current system
  - Sustainability
- Business Continuity Plan
- Disaster drill
- Workshop

DRM manual

- For staffs on the ground
- Possible contents
  - Contact list
  - Information sources
  - Resource list
- Size
  - A5 paper to fit in diary
  - List at a glance in A4 paper

Vertical/Horizontal coordination



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4

Planning process

- Plan
  - Form a team
  - Identify problem
  - Analyze problem
  - Find solution
- Do...Implement solution
- Check...Monitor action
- Act...Revise solution

Schedule

Month	Location	Plan/Manual	SOP	Events
Aug.	SI	Consultation & Revision	Sector meeting Revision	Evaluation
Sep.	(Fiji)		Revision	
Oct.	SI	Distribution	Presentation	Disaster drill Int'l WS

Training on Info. Management

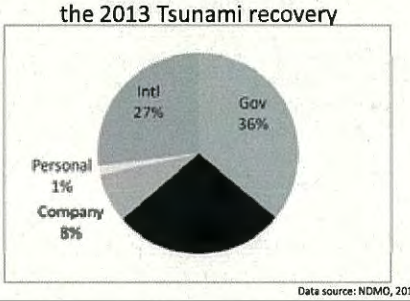
August 21, 2013, Honiara
Yoshitaka Yamazaki
JICA Expert

1

Outline

- 1. Needs for Information Management
- 2. Demonstration of prototype site
- 3. Exercise of prototype site

Sources for Donation for the 2013 Tsunami recovery



Data source: NDMO, 2013

3

Roles of NGO in SI

Name	IRA	Welfare	PSL	Infra	Sum
Health	1	1	1		3
Education		1	1	1	3
NGOs	1	1	1		3
Private	1	1		1	3
Police	1	1			2
PDMO	1	1			2
Agriculture	1		1		2
Health – Medical		1		1	2
Planning division		1		1	2

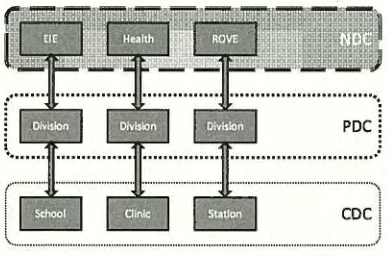
No. of stakeholders in provincial DRM plan

IRA	Welfare	PSL	Infra
14	36	15	9

Tools for coordination

- DRM Plan
  - Manual
  - Contact list
  - Division of roles table
- Internet
- Regular meeting
- MoU

Vertical/Horizontal coordination



2

MOU in DRM plan in Japan

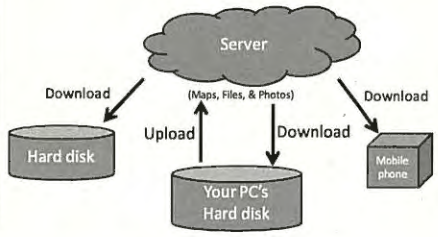
Partner	Nos.	Contents
Local gov't	4	Staff & goods assistance, refugees' acceptance
Media	2	Broadcasting during disaster
Goods	10	Water, foods, clothes, goods, box, gas provision
Debris removal	1	Road clearance, waste management
Transport	1	Transport of victims, elderly
Communication	1	Information collection from taxi radio
Recovery	4	Emergency works, survey, design, electricity
Welfare	1	Acceptance of elderly

4

Information Process

Phase	Examples
Search	Field survey, Internet
Input	Watch, Listen, Read
Output	Document, Slide, Photo, Video
Share	Report, Presentation, Media, Internet
Keep	Bookshelf, Library, Internet
Re-use	Lesson, Annual report, Revision

Upload / Download



5

Why Google ?

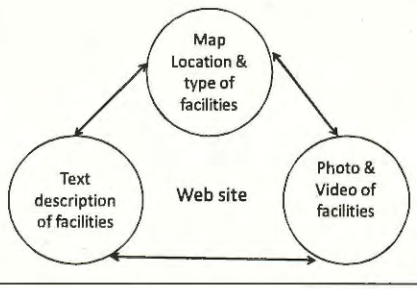
- Crisis response...30 disasters since 2005
- Google earth
- Various services
  - Input...News, Alert, Youtube
  - Output...Site
  - Social...Plus, Survey, Hang out, Blog
- Android phones

7

What you can share

- Document
- Picture
- Video
- Map

Linking information



6

Training on Info. Management 2

October 29, 2013, Honiara
Yoshitaka Yamazaki
JICA Expert

1

Services

Types of web page

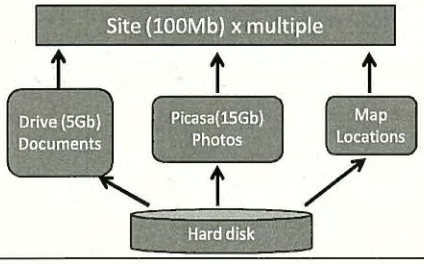
Type	Purpose
Standard page	Fixed information such as "About us"
Announcement	Update of site, News, Situation update
Table	Resource database, Disaster & Response situation
Cabinet	Report, Template download & Upload

3

Google site

- Target screen
  - PC
  - Mobile phone
- File size
  - 100 MB/site...Link with Google drive etc.
- Site numbers
  - Unlimited ?

Site development



2

Google Earth

Google Earth/Map

- Go to site of interest
- Enlarge map
- Create "My Map"
- Click "Place mark"
- Locate "place mark" on map
- Change Icon of "place mark"
- Type descriptions in "place mark"
- Set access control
- Send invitation to friend or
- Copy "map address" and paste to email text

Geo tagged photo

- Turn on GPS on (phone or Camera with GPS)
- Take picture
- (Check coordinate on phone or camera)
- Copy photo to PC
- See properties of photo
- Upload to album in "Google plus"

4

Google drive

- Download "Google drive" software or
- Select files to upload
- Upload files
- Use folders to classify documents
- Set access control of files
- Send invitation to friends

How to work on ?

- Create "Gmail account"
- Create "My map"
- Upload files to "Google drive"
- Join "Google plus"
- Upload photos to "Google plus album"
- Create "Google site"
- Link information
- Control "information access"
- Send "invitation" to friends

On line drives

Name	Capacity	Brand	Office soft	Notes
Google drive	5 GB	Google	Google Docs	Works with Google
Drop box	5-20GB	Drop box		Upgrade by invitation
Sky drive	5 GB	Microsoft	MS Office	
Sugar sync	5 GB	Sugar sync		
iCloud	5GB	Apple	iWorks	Works with iPhone

Typical web site structure

- Home
- Announcement
- About
- Table
  - Resource
  - Situation
- File cabinet
  - Template
  - Reports
- Links

What do you need ?

Software	Use	
Gmail account	Must	
Google Drive	On line disk	
Google Earth	Map	
Picasa	Picture	
Chrome	Browser	
Thunderbird	Gmail	
...and Curiosity		

Table

- Columns
  - Text
  - Date
  - URL (link address)
- Sort

Access control

Permission	Edit	Logon
Yourself	Yes	Needed
Friend with Gmail	Yes	Needed
Friend without Gmail	View only	None
Every body	View only	None

添付資料 11：訓練シミュレーションの実施資料
（成果 2 関連）

1st Simulation Exercises

11th March 2011

Flood DRM plan for Guadalcanal Province

March 11, 2011, Honiara

Janet Prakash
NDMO

1

Outline

- Needs for local flood plan
- Plan contents by time line
- Tools for preparedness
  - 1. Flood hazard map
  - 2. Flood early warning
  - 3. Evacuation center
  - 4. Communication network
  - 5. Disaster resource database

2

Why local flood plan ?

- Disaster is local phenomena
  - Disaster happens locally
  - Damage reflects local conditions
- Local gov't is primary responder
  - Organized & bottom up approach needed
  - Communication disruption in initial stages
- Different response for different disaster

3

Issues & solutions

Issues	Solutions
Weak local government	NGOs & churches
Limited communication	HF radio
No evacuation center	Schools & churches
Limited disaster records	International resources
Limited resource data	Existing data collection
Slow top down approach	Bottom up approach

4

Cluster system

N-DOC	P-DOC	RCC
Logistics & support	Response initial assessment & logistics	Damage & hazard mapping
Response & initial assessment		
Welfare/IDP	Welfare/IDP	Shelter & welfare
Livelihood	Public services & livelihood	Livelihood
Public services		Public services & facilities
Infrastructure	Infrastructure	

National Disaster Management Plan, 2009 5

Relation to Current DRM plan

- National DRM plan
  - Tsunami disaster plan
  - (Flood disaster plan)
- Guadalcanal Provincial DRM plan
  - Annex 1 Flood disaster plan

6

Preparation phase (White)

- Understanding features of past floods
- Preparation of basic information
- Preparation of resources
- Preparation of early warning & evacuation
- Public education

7

Stand by phase（Yellow）

- Condition for gathering
- Monitor weather update
- Issuing alert
- Issuing evacuation order

8

Emergency response phase (Red)

- **Response initial assessment & logistics cluster**
  - **Gathering initial information**
  - **Rescue**
  - **Avoidance of secondary damage**
  - **Operation of evacuation centers**
  - **Maintenance of social order and price of goods**
  - **Damage assessment**
  - **Management of accepting external help**
  - **Treatment of dead body**

9

Emergency response phase (Red)

- **Welfare/IDP cluster**
  - Operation of evacuation centers
- **Public services & livelihood cluster**
  - Health care for victims
  - **Garbage clearance & disposal**
- **Infrastructure cluster**
  - Emergency repair of infrastructure

10

Stand down phase (Green)

- Defining principle of recovery
- Set priority of recovery
- Receiving support from government
- Receiving support from external help
- Supporting recovery of community
- Supporting recovery of business
- Documentation & reporting

11

1. Flood hazard map

- Basic information
  - Topography, River, Road
- Disaster resources
  - School, health facility, police, church
  - Police, Fire station
  - Market, shops
- Inundated area
  - Historical flood
  - Simulation

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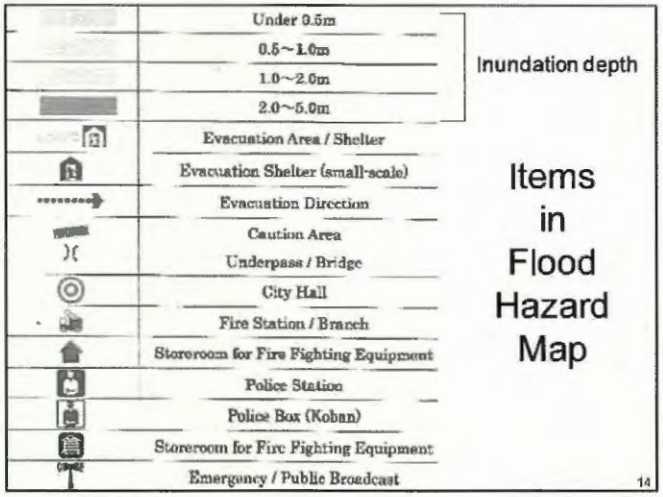
Example in Japan

Hino city

2. Flood early warning

- Monitoring
  - Weather…SIMS
  - Rainfall…rain gauge by JICA
  - Water level…water gauge by JICA
- Interpretation
  - When, how much, where ?....WRD+JICA
- Message construction
- Communication
- Protective behavior
  - Listen, understand, decide, act

15



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Sample message

CHIME and SIREN:
"This is your local Toyooka City Disaster Warning Main Office"
Announce on the_____, time_____.

This is your "Evacuation Preparedness Information".
Please prepare to evacuate. To people in_____block and_____block, please prepare to evacuate now. Please evacuate to higher locations of safety with your radio.
Please take clothes, medicine, food, drinks and other necessary items as you evacuate.
Evacuation places are Kominkans (community centers) etc. which are near your house.
SENIOR CITIZENS who need some time to evacuate, please evacuate NOW.

(Flood summit committee, 2007, Japan)

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Interim arrangement of flood warning

Warning stage	Indicator	Monitoring organisation	Media for dissemination
Readiness	Cyclone season	NDMO	National Disaster Awareness Week
Alert	Cyclone/depression nearing	FMS	Radio, television, newspaper
Warning I	Rain 100 mm/day	Police, PWD Water Supply, FSC	Radio, telephone
Warning II	Rain 25 mm/hour	Police, PWD Water Supply	Radio, telephone
Warning III	Nadrau bridge flooded	FSC	Radio, telephone, siren
Warning IV	Old Ba bridge flooded	District DISMAC, Police, Town Council	Radio, telephone, siren
Action	Flooding of Town imminent	District DISMAC, Police, Town Council	Siren

(Yeo, 2000)

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Evacuation principle

- People take time to start evacuate
- Warning should be
  - In advance
  - Many times
  - By many channels
  - Clearly stated

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Difficulties in Flood EWS

- Appropriate index for flood ???
  - Hourly rainfall
  - Daily rainfall
  - Cumulative rainfall
- Condition differs by case ...
  - River topography
  - Geology
  - Vegetation

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Questions for flood warning

- When to issue ?
  - Threshold level ?
  - Warning stage
  - Evacuation stage
- Who will issue ?
  - NDMO ? PDMO ? Community ?
  - SIMS ? NDMO ? WRD ?
- How to issue formal warning ?
  - Radio, TV, mobile, Police
- Informal warning ?
  - Church, NGO etc ...

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3. Evacuation center

- Designate in safe place from flood
- List up contact person for emergency
- Register to Provincial DMO
  - Contact person
  - Contact number
  - Capacity
- Define teams in communities

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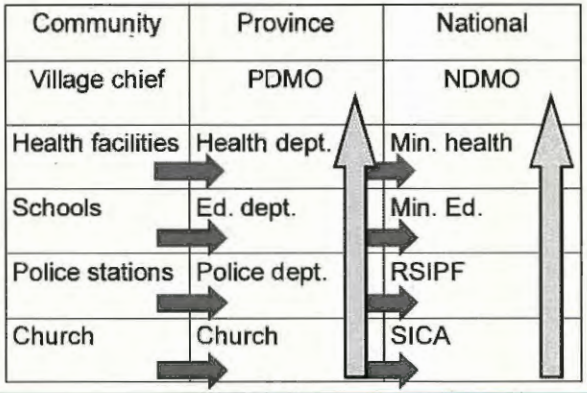
4. Information collection



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Teams in community

- Early warning & communication
- Evacuation & rescue
- First aid & health
- Shelter management & logistics
- Relief & rehabilitation

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Disaster info. management

- Monitoring
- Information collection (upstream)
- Information sharing
- Information dissemination (down stream)
  - Bulletin board ? Media ? Internet ?
- Information storage
  - NDMO, each organization

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5. Resource database

Source	Resources
Health	Health facilities
Education	Schools
Police	Stations
Works	Road, bridge, port database
Churches	Schools, health facilities
NGO	Linkage with communities
MWYC	Community organizations

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2nd Simulation Exercises

21th October 2012

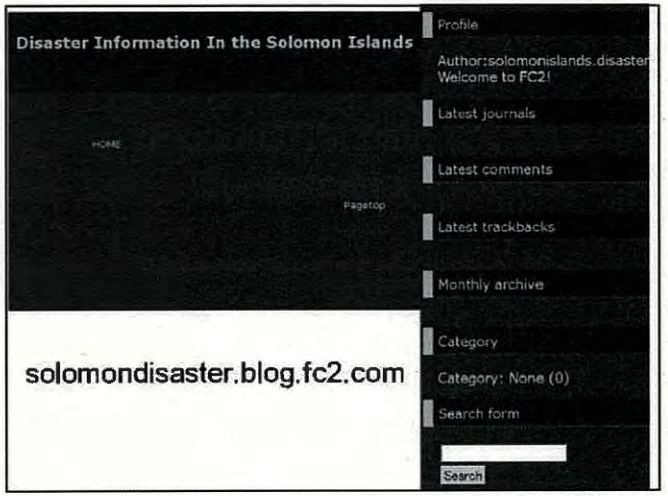
Flood DRM plan (2011) for Guadalcanal Province

The strengthening community-based disaster risk management project in the pacific region

October 21, 2011, Honiara

Yoshitaka Yamazaki
JICA expert

1



Why common blog ?

- Information floods during disaster.
- Information sharing needed.
- Blog is easy to use to publish daily events.

↓

- Start using Blog among stakeholders.
- Learning by using.

2

Log in Page for owner

fc2.com/en

Schedule

Nov. 3	What is Blog ?
Nov. 10	How to write article ?
Nov. 17	How to manage blog ?

9am- 11am on Thursday
At NDMO, Vavaya ridge

5

Outline

- Framework of plan
- Plan contents
- Tools for plan
  - 1. Flood hazard map
  - 2. Flood early warning
  - 3. Evacuation center
  - 4. Communication network
  - 5. Disaster resource database

6

Cluster system

N-DOC	P-DOC	RCC
Logistics & support	Response initial assessment & logistics	Damage & hazard mapping
Response & initial assessment		
Welfare/IDP	Welfare/IDP	Shelter & welfare
Livelihood	Public services & livelihood	Livelihood
Public services		Public services & facilities
Infrastructure	Infrastructure	

7

National Disaster Management Plan, 2009

Village DR planning

Warning Codes	Flooding/Wave surge – Features/Characteristics
BLUE ALERT May occur within [illegible] hours	Heavy rain warning - flooding **may follow in 24 – 48 hours** Heavy swell warning – high waves **may occur in 24 – 48 hours** Start taking pre-cautionary measures
YELLOW ALERT Likely within 12 hours	Heavy rain warning - flooding **likely in next 12 hours** Heavy swell warning – high waves **likely in next 12 hours** Take action to secure gardens, property and canoes
	Heavy rain warning – flooding **expected within 3 – 12 hours** Heavy swell warning – 3.5m+ waves **expected within 3 – 12 hour hours** Complete preparations urgently and move to a secure place

8

Extension of plans

	Normal	Warning	Response	Recovery
National / Province			Cluster	Cluster
Province (JICA)	Cluster	Cluster	Cluster	Cluster
Village DR plan		Blue, Yellow, Red		
Community (JICA)	White	Blue, Yellow, Red	Purple	Green

9

Annual SOP

	Month	Gov't	Community
Normal	Jun.-Aug.	Update info.	Update info.
Before	Sep.	Drill	Drill
During	Oct.-Apr.	Cyclone season	Cyclone season
After	May	Report, revise plan	Revise plan

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Preparation phase

- Understanding features of past floods
- Preparation of basic information
- Preparation of resources
- Preparation of early warning & evacuation
- Public education

11

Stand by phase

- Condition for gathering
- Monitor weather update
- Issuing alert
- Issuing evacuation order

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Emergency response phase

- **Response initial assessment & logistics cluster**
  - **Gathering initial information**
  - **Rescue**
  - **Avoidance of secondary damage**
  - **Operation of evacuation centers**
  - **Maintenance of social order and price of goods**
  - **Damage assessment**
  - **Management of accepting external help**
  - **Treatment of dead body**

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Emergency response phase

- **Welfare/IDP cluster**
  - Operation of evacuation centers
- **Public services & livelihood cluster**
  - Health care for victims
  - **Garbage clearance & disposal**
- **Infrastructure cluster**
  - Emergency repair of infrastructure

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Stand down phase

- Defining principle of recovery
- Set priority of recovery
- Receiving support from government
- Receiving support from external help
- Supporting recovery of community
- Supporting recovery of business
- Documentation & reporting

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1. Flood hazard map

- Basic information
  - Topography, River, Road
- Disaster resources
  - School, health facility, police, church
  - Police, Fire station
  - Market, shops
- Inundated area
  - Historical flood
  - Simulation

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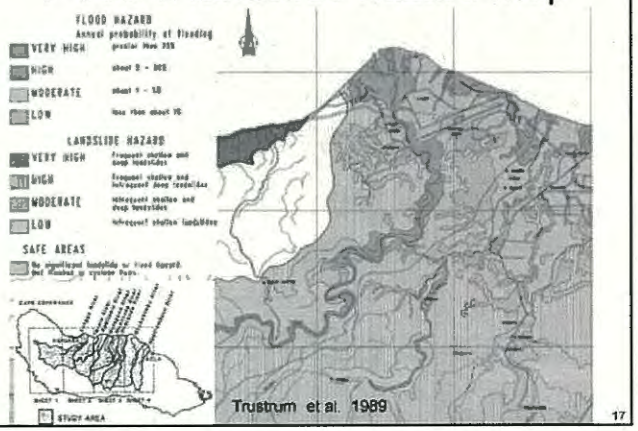
Flood & landslide hazard map



17

2. Flood early warning

- Monitoring
  - Weather…SIMS
  - Rainfall…rain gauge by JICA
  - Water level…water gauge by JICA
- Interpretation
  - When, how much, where ?....WRD+JICA
- Message construction
- Communication
- Protective behavior
  - Listen, understand, decide, act

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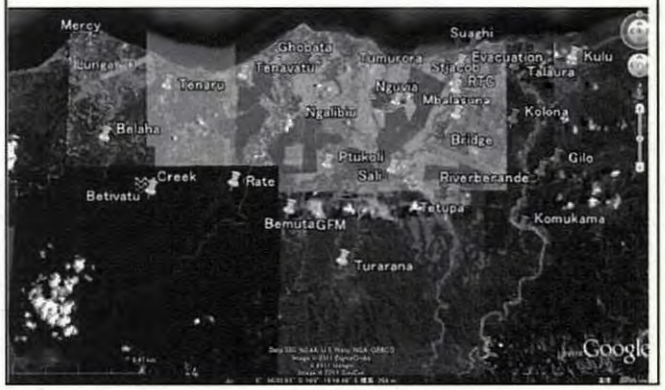
Rain gauges in Guadalcanal

Rainfall monitoring in G-prov.

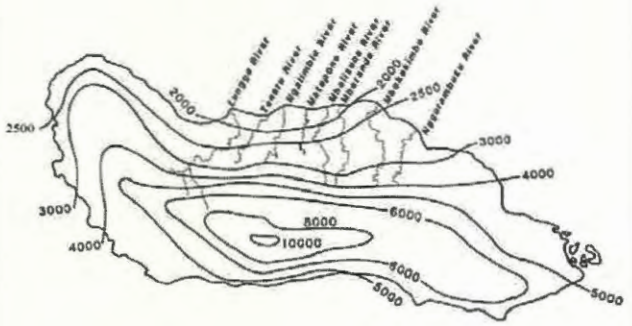
	Meteorology service	Water resource department
Monitoring	Manual	Automated
Frequency	Every 3 hours	Every hour
Communication	Manual reading	Off line
No. of stations	2	5
Available data	1960-	1965-

21

Schools in East Guadalcanal



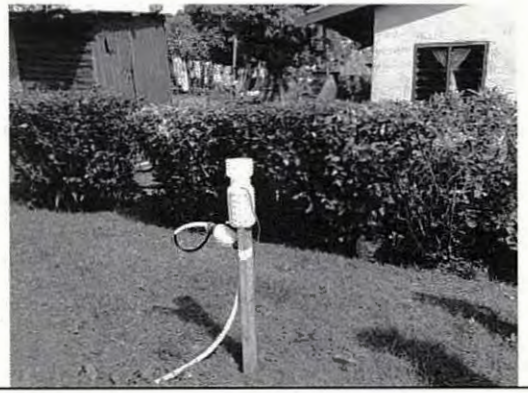
Rainfall distribution



(Curry, 1982)

22

Simplified rain gauge



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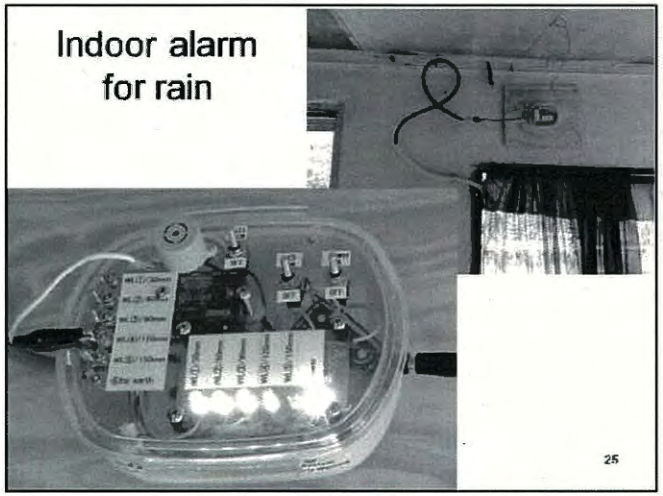
Indoor alarm for rain

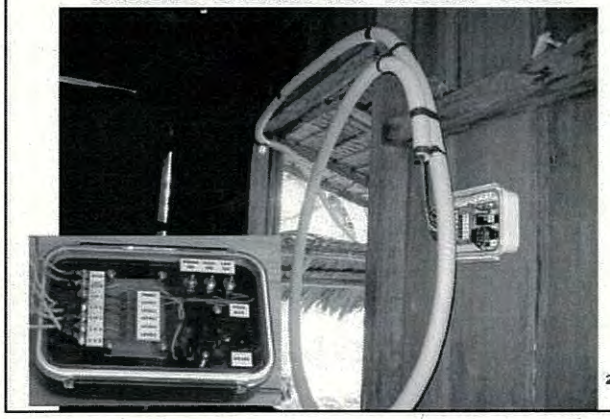


25

Simplified water gauge

26

Indoor alarm for water level



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Alert level of rainfall in Okinawa pref.

Rainfall	Alert level for rain	Alert level for flood
1 hour	40 – 60 mm	40 – 50 mm
3 hours	60 – 100 mm	60 – 80 mm
24 hours	100 - 210 mm	100 - 160 mm

Note: Level varies by regions in prefecture.
(Okinawa prefecture disaster management plan)

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Flood warning levels in Japan

Level	Contents	Action
1		Flood fighting team stand by
2	Flood precaution	Gov. decides to issue evacuation preparation Flood fighting team gather
3	Flood alert information	Gov. decides to issue evacuation order Residents decide evacuation
4	Flood warning	Evacuation completed
5	Flood happening	Flood in progress

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Sample message

CHIME and SIREN:
"This is your local Toyooka City Disaster Warning Main Office"
Announce on the_____, time_____.

This is your "Evacuation Preparedness Information".
Please prepare to evacuate. To people in_____block and_____block, please prepare to evacuate now. Please evacuate to higher locations of safety with your radio.
Please take clothes, medicine, food, drinks and other necessary items as you evacuate.
Evacuation places are Kominkans (community centers) etc. which are near your house.
SENIOR CITIZENS who need some time to evacuate, please evacuate NOW.

(Flood summit committee, 2007, Japan)

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Early Warning dissemination

- Formal warning
  - SIMS
  - NDMO
  - WRD
  - ↓
  - Radio, TV, web
  - PDMO
  - ↓
  - Public
- Informal warning
  - School, Clinic
  - Residents, Police
  - ↓
  - PDMO
  - ↓
  - Radio, School
  - Police, Clinic
  - ↓
  - Public

31

Evacuation principle

- People take time to start evacuate
- Warning should be
  - In advance
  - Many times
  - By many channels
  - Clearly stated

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3. Evacuation center

- Designate in safe place from flood
- List up contact person for emergency
- Register to Provincial DMO
  - Contact person
  - Contact number
  - Capacity
- Define teams in communities

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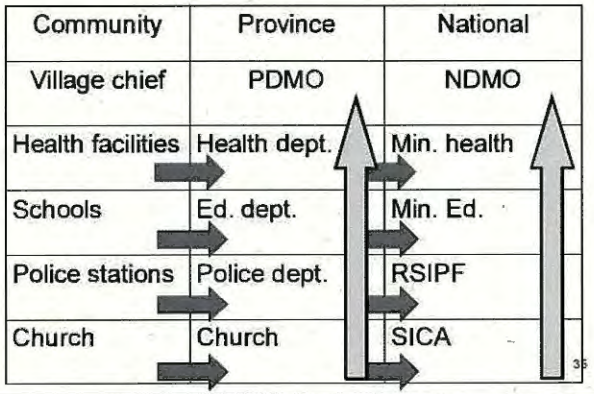
4. Information collection



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Teams in community

- Early warning & communication
- Evacuation & rescue
- First aid & health
- Shelter management & logistics
- Relief & rehabilitation

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For faster response

- Check International response news.
  - www.reliefweb.int
- Check national media.
  - SIBC, Star news, Times, Island sun, etc.
- Use of aerial survey at early stage.
- Bottom up reporting from police, village, school, health facilities.
- Use Blog to share information.

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Disaster info. management

- Monitoring
- Information collection (upstream)
- Information sharing
- Information dissemination (down stream)
  - Bulletin board, Media, Blog
- Information storage
  - NDMO, each organization

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5. Resource database

Source	Resources
Health	Health facilities
Education	Schools
Police	Stations
Works	Road, bridge, port database
Churches	Schools, health facilities
NGO	Linkage with communities
MWYC	Community organizations

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Table top exercise for Guadalcanal Province

The strengthening community-based disaster risk management project in the pacific region

October 21, 2011, Honiara

Yoshitaka Yamazaki

JICA expert

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Why exercise ?

- Disaster does not happen every year.
- Officers changes position time to time.
- People forget disaster experience.
- Each disaster is different.

↓

- Exercise to keep memory.
- Exercise with different scenario.

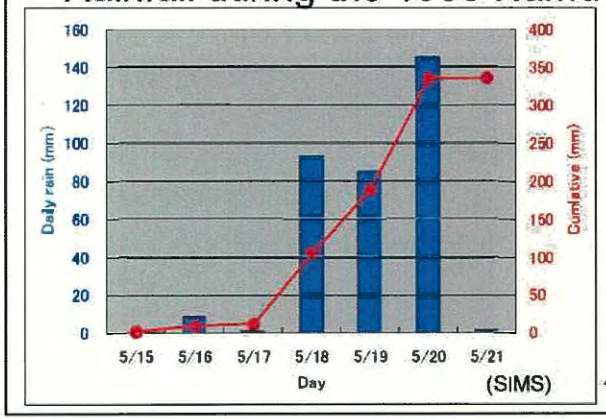
40

Cluster in province

- Response initial assessment & logistics
- Welfare/IDP
- Public services & livelihood
- Infrastructure

41

Rainfall during the 1986 Namu



42

Cyclone Namu 1986

43

Scenario 1986 Namu

Date	Situation	Phase
5/16 18h	TC Namu formed	Stand by
5/18 9am	Daily rain 93mm	Warning
5/19 9am	Cumulative rain 188mm	Evacuation
5/21 9am	Rainfall stopped	Response
5/28	1 week after	Recovery

44

Contact list for community

- FMS
- District
- Police
- School (evacuation center)
- Health center
- Red cross
- FBCL, Newspaper

45

3rd Simulation Exercises

12-13th December 2012

Table top exercise for Guadalcanal Province

The strengthening community-based disaster risk management project in the pacific region

December 12, Honiara

Yoshitaka Yamazaki

JICA expert

1

Why exercise ?

- Disaster does not happen every year.
- Officers changes position time to time.
- People forget disaster experience.
- Each disaster is different.

↓

- Exercise to keep memory.
- Exercise with different scenario.

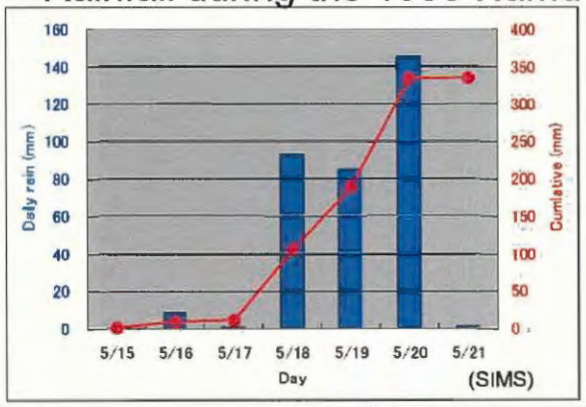
2

Cluster in province

- Response initial assessment & logistics
- Welfare/IDP
- Public services & livelihood
- Infrastructure

3

Rainfall during the 1986 Namu



4

Cyclone Namu 1986

5

Scenario 1986 Namu

Date	Situation	Phase
5/16 18h	TC Namu formed	Stand by
5/18 9am	Daily rain 93mm	Warning
5/19 9am	Cumulative rain 188mm	Evacuation
5/21 9am	Rainfall stopped	Response
5/28	1 week after	Recovery

6

Contact list for community

- FMS
- District
- Police
- School (evacuation center)
- Health center
- Red cross
- FBCL, Newspaper

7

4th Simulation Exercises

1st November 2013

November 1, 2013
NDMO
JICA SCBRDM project

DISASTER COMMUNICATION DRILL

Types of disaster drill

- Table top exercise…2010-2011
- Evacuation drill…2012
- Fire extinguishing (2013, Hart home)
- Emergency catering (2013, Hart home)

- **Emergency communication…2013**
- **Equipment operation…2013**
- Life saving
- Evacuation Center operation

Why disaster drill ?

- Familiarize with disaster before season
  - Disaster does not occur every year
  - Officers change frequently
- Learn disaster management by experience
- Prepare for unexpected situations
- Find pitfalls in disaster management

Outline of communication drill

- Objectives
  - Disseminate DRM plan & manual
  - Test Early Warning System
  - Test bottom up situation report
  - Test Web based information system
  - Find weakness in communication
- Evaluation
  - Time required for warning & reporting
  - Number of responders
  - Quality of communication

SMS basics

- 160 characters/mess.
- $0.50/message
- USB Modem can receive SMS in PC
- Android can send/receive SMS from PC

Tips for SMS

- Shorten word
  - You > U
  - See > C
  - To > 2
  - For > 4
  - And > N
- Long message can be divided into multiple messages
- Keep template in "template" folder
- Make list in "mail list"

Drill details (EWS dissem.)

No.	From	To	Mob. #	Nos.	Note
1	PDMO	Premier		1	
2	PDMO	Police		1	
3	PDMO	Education		1	
4	PDMO	Health		1	
5	PDMO	Road		1	
6	PDMO			1	
				1	

Drill details (EWS dissem.)

From	To	Means	Nos.	Cost
School principal	Education	Mobile/SMS		
Nurse	Health	Mobile/SMS		

添付資料 12：村落防災委員会の開催資料
（成果 3 関連）

2011 年 7 月 27 日

活動記録

日時：2011 年 7 月 27 日（火）　午前 10:30 - 12:00			
内容：第 1 回　村落防災委員会（Village Disaster Risk Committee）会議			
	所属	役職	氏名
参加者	（別添：参加者リスト参照）		
場所：タンボコ（Tamboko）村　青年会館（Youth Hall）			

（敬称略）

概要：村落防災委員会（以下、VDRC）の初会議。各委員による自己紹介の後、金谷専門家が、今後のコミュニティ防災活動の予定を説明（別添、Community Work Plan 参照）。その後、草の根プロジェクト申請に係る説明と質疑応答を行った（別添、草の根概要図参照）。特記事項は、以下のとおり。

【特記事項】

- VDRC のメンバーは、タンボコ村の各ゾーンの代表として、今後の防災活動を進める上で、各ゾーンの住民たちを主導していく立場であることを確認。
- ベースライン調査や、これまでのワークショップや村歩きなどの活動結果も踏まえ、8 月末の第 2 回 VDRC 会議では、避難路、避難場所、および村内の危険箇所を記したリスクマップ、および避難計画（案）を作成する。
- 道路改良のための土のう工法を紹介。住民たちには、改良が必要な道路区間、および護岸範囲を特定し、必要な資機材および労働力などの積算をしてもらう。8 月 24 日に、総費用の見積書を提出してもらう予定。草の根プロジェクトとして、申請予定。
- 8 月～9 月にかけて、簡易雨量計・水位計の設置を行う予定。
- リスクマップ、避難計画、簡易型雨量計・水位計を使い、9 月に避難訓練を実施予定。避難訓練には、多くの住民に参加して欲しい旨、委員に伝えた。

以上

別添資料

- 参加者リスト
- Community Work Plan
- 草の根概要図

会議の様子。

ﾀﾝﾎﾞｺ村 Zone3 にある Youth Hall。未完成。

大洋州地域コミュニティ防災能力強化プロジェクト
2011年9月1日

活動記録

日時：2011年8月30日（火）　午前10:00 - 12:00			
内容：第2回　村落防災委員会（Village Disaster Risk Committee）会議			
	所属	役職	氏名
参加者	（別添：参加者リスト参照）		
場所：タンボコ小中学校（Tamboko Community School）			

（敬称略）

概要：村落防災委員会（以下、VDRC）の第2回会議。各ゾーンにおける、避難のタイミングおよび避難場所などについて協議したあと、草の根プロジェクトに係る打ち合わせを行った。特記事項は、以下のとおり。

【特記事項】

- 過去の洪水時には、学校や教会にあるベル（古い金属製のガスタンクを、石などでたたいて音を出す）を鳴らして、避難の合図を出していた。
- 主な避難場所は、教会、学校、そしてゾーン4～6内の高台。
- 上流部に位置するゾーン4～6の高台へは、氾濫水でアクセスが寸断される前に、避難する必要がある。
- ぬかるみや、轍の多い道路の改良、および浸食の激しい河岸補強に加え、上記避難場所から最も遠いゾーン1の住民のために、コミュニティセンター兼緊急避難所となる建物を、草の根プロジェクトとして建設することを提案。住民協議を開催する予定。
- 本会議の結果をもとに、専門家およびカウンターパートが、次回会議（9月21日予定）までに避難計画（案）を作成する。避難訓練は、10月に実施予定。

以上

別添資料

- 参加者リスト

会議の様子。土嚢工法のビデオを鑑賞中。

コミュニティ防災委員会のメンバー。

大洋州地域コミュニティ防災能力強化プロジェクト

2011 年 9 月 21 日

活動記録

日時：2011 年 9 月 21 日（水）　午前 10:00 - 12:00			
内容：第 3 回　村落防災委員会（Village Disaster Risk Committee）会議			
	所属	役職	氏名
参加者	（別添：参加者リスト参照）		
場所：診療所横の集会所（ゾーン 3）			

（敬称略）

概要：村落防災委員会（以下、VDRC）の第 3 回会議。避難訓練、および草の根プロジェクトに係る打ち合わせを行った。特記事項は、以下のとおり。

【特記事項】

- ラジオ放送によるサイクロン警報、教会や学校の鐘、簡易水位計、およびハンドサイレンを使用した避難合図の手順を図式化した避難計画（Evacuation Plan）（案）を説明し、委員の理解を得た。
- 避難計画（案）をベースにした避難訓練は、より多くの住民が参加できるように、10 月 23 日（日）の教会礼拝後に実施する。
- 避難訓練に係る住民説明会を、10 月 9 日（日）の教会礼拝後に開催する。
- 草の根事業で建設予定のコミュニティホール（避難所）（案）を提示し、委員の了承を得た。委員からは、高床式である必要性、および建物の平面形状（より長方形に近い形が、安定するとのこと）、設置する水タンクの大きさ等につきコメントがあった。
- コミュニティホールの建設予定地は、ゾーン 3 のクリニックの横とする（土地管理者：Mr. Ben Tovo）ことで、委員たちの了承を得た。

以上

別添資料

- 参加者リスト

今回は、Mr.Ben 宅の炊事場（屋外）で開催。

ｺﾐｭﾆﾃｨﾎｰﾙ建設予定地（右）と、設置要望があった容量 5000 ﾘｯﾄﾙの水タンク（左上）。

大洋州地域コミュニティ防災能力強化プロジェクト
2012年3月1日

活動記録

日時：2012年2月29日（水）　午前10:00 - 12:00			
内容：第5回　村落防災委員会（Village Disaster Risk Committee: VDRC）会議			
	所属	役職	氏名
参加者	（別添：参加者リスト参照）		
場所：タンボコ（Tamboko）村　青年会館（Youth Hall）			

（敬称略）

概要：村落防災委員会（以下、VDRC）の第4回会議。村落防災計画（Village Disaster Response Plan）案の作成、および草の根プロジェクト署名式に係る打ち合わせを行った。特記事項は、以下のとおり。

【特記事項】

- ガダルカナル州防災担当官（Provincial Disaster Officer）のMr. Herrick Savusiの主導により、VDRC委員たちとともに村落防災計画（案）を作成。村内の男性（Men）、女性（Women）、青年（Youth）グループの代表者を選出し、警報段階（Blue、Yellow、Red Alert）に応じたそれぞれの役割について協議した。
- 今後、同計画を最終化し、各グループおよび住民たちに内容を周知していく。
- 署名式は、3月19日（月）に、タンボコ小中学校前で開催予定。
- 署名式の主な参加者は、在ソロモン日本大使、JICA支所長、国家災害管理局長。
- 署名式にあわせて、Mr. Francis Pulo（ゾーン6）所有の「鎮魂の鐘」を、ビル戦争資料館（Vilu War Museum）に返還することを提案した。Mr. Francisは、家族などと話し合ってから、最終決定するとの返答。

以上

別添資料

- 参加者リスト

委員たちに村落防災計画を説明するMr. Herrick（左）。

洪水時の水位を説明する村の青年。材木など浸水から防ぐために、台の上に置くとのこと。

2012年3月31日

活動記録

日時：2012年3月30日（金）　午前10:00 - 13:00			
内容：第5回 村落防災委員会（Village Disaster Risk Committee: VDRC）会議			
	所属	役職	氏名
参加者	（別添：参加者リスト参照）		
場所：タンボコ小中学校（Tamboko Community School）			

（敬称略）

概要：村落防災委員会（以下、VDRC）の第5回会議。草の根無償のスケジュールおよび役割分担に係る打ち合わせを行った。特記事項は、以下のとおり。

【特記事項】

- 4月中にｺﾐｭﾆﾃｨﾎｰﾙ（草の根無償）の材木準備、建設場所の整地等を行う。
- 5月8日～10日に、外部講師を招いて土のうワークショップ開催予定。
- ガダルカナル州防災担当官（Provincial Disaster Officer）のMr. Herrick Savusiの主導により、VDRC委員たちと以下の項目を協議。
  - ｺﾐｭﾆﾃｨﾎｰﾙ用材木を切り出す大工の選定（工賃、および燃料費提示済み）
  - 土のう工法に必要な道具（土のう圧搾棒など）の製作、および調達
  - 改良する道路区間、護岸の範囲を選定 →現地視察してから最終決定
  - 砂と砂利の確保
  - ｺﾐｭﾆﾃｨﾎｰﾙ建設予定地を整地する作業員の確保（ボランティア）
  - 土のう工法に従事する作業員の確保（日当支払い、昼食付き）→男女比率に留意
- 前日から続いた強雨のため、村長や大工など、主要メンバーが参加できなかった。上記協議内容を住民に預け、来週木曜日（4月5日）に結果を聞くことになった。

以上

別添資料

- 参加者リスト

協議する村落防災委員たち。

QUESTIONNAIRE

FOR

THE SOCIO-ECONOMIC SURVEY

Part 1: GENERAL INFORMATION
Part 2: FLOOD EXPERIENCES
Part 3: FLOOD PREPAREDNESS

Village Name : Tamboko Village

Date of Interview : June 2012

Interviewee Name :

Zone Number :

Area Name :

PART 1: GENERAL INFORMATION

1. FAMILY MEMBERS				
	NAME	SEX	AGE	OCCUPATION
1		M / F		
2		M / F		
3		M / F		
4		M / F		
5		M / F		
6		M / F		
7		M / F		
8		M / F		
9		M / F		
10		M / F		
11		M / F		
12		M / F		

2. FAMILY INCOME			3. FAMILY EXPENSES		
	INCOME SOURCE	SBD$ / month		EXPENSE ITEMS	SBD$ / month
1	Crops (Copra & Cacao)		1	Electricity Bill	
2	Crops (Banana & Vegetables)		2	Water Bill	
3	Fish, Crab & Lobster		3	Foods	
4	Labor / Worker Wages		4	Education	
5	Others:		5	Others:	
	Total			Total	

4. IMFORMATION TOOLS			
ITEMS	How Many Do You Have?	ITEMS	How Many Do You Have?
Television	0, 1, 2, 3, more	Radio	0, 1, 2, 3, more
Mobile Phone	0, 1, 2, 3, more		

5. IMPORTANT ISSUES in the VILLAGE					
What is the most important issue in your village? (please select only one)					
Education of Children	Village / Church Obligation	Flooding	Income	Electrification	Others

PART 2: FLOOD EXPERIENCE

6. DAMAGES on the FLOODING in January and February 2012	
ITEMS	Damaged?
House, Kitchen, Toilet	Yes / No
Belongings / Cooking Tools	Yes / No
Farmlands	Yes / No
Boats	Yes / No
Others:	

7. FLOOD EARLY WARNING on the FLOODING in January and February 2012	
Did you get any warnings or forecast information before the flood occurred?	
INFORMATION SOURCE	Heard the EARLY WARNING?
Radio	Yes / No
Mobile Phone	Yes / No
Television	Yes / No
Hand Siren / Electric Siren	Yes / No
Villagers	Yes / No
Others:	

8. EVACUATION PLACE on the FLOODING in January and February 2012	
Where did you evacuate?	
Stay at House	Yes / No
School	Yes / No
On the Hill	Yes / No
Church	Yes / No
Others:	

9. EVACUATION TIMING on the FLOODING in January and February 2012	
When did you evacuate? (please select only one)	
Not evacuated	
Immediately after Flood Warning	
After flood water came into your house	
Others:	

PART 3: FLOOD PREPAREDNESS

10. FLOOD MITIGATION MEASURES	
How can we mitigate the flooding damages? What do you expect?	
Structural Measures (River Bank Protection, etc)	Yes / No
Flood Early Warning System	Yes / No
Dredging the River	Yes / No
Nothing can be done	Yes / No
Others:	

11. FLOOD PREPAREDNESS	
What should we do for future flooding?	
Stock food, water, emergency items	Yes / No
Building houses on higher ground (Relocation)	Yes / No
Rising of the floor or reinforcement of the pillars	Yes / No
Listen to the news & Always be prepared	Yes / No
Nothing can be done	Yes / No
Others:	

12. FLOOD EVACUATION	
Will you evacuate if flood occur next time?	
Yes	No: (Why?)

13. FLOOD AWARENESS ACTIVITIES	
Have you ever participated any activities for disaster risk reduction?	
Workshops for Disaster Risk Reduction	Yes / No
Evacuation Drills	Yes / No
Others:	

14. FLOOD EARLY WARNING SYSTEM			
Are you satisfied the existing early warning information of flooding? (please select one)			
Quite Satisfied		Partially Satisfied	Unsatisfied
Comment			

TAGIO TUMAS.

2012 年 4 月 29 日

2)

活動記録

日時：2012 年 4 月 29 日（日）　午前 10:30 - 11:30			
内容：草の根無償の活動に係る住民説明会			
	所属	役職	氏名
参加者	タンボコ（Tamboko）村	Head of Chief (Zone 2)	Ludovic Kaulake (Mr)
	〃	Zone 1	Ernest Kale (Mr)
	〃	Zone 1	Paulino Sodo (Mr)
	〃	Zone 1	Rex Mae (Mr)
	〃	Zone 3 (Truck Driver)	Aniseto Taha (Mr)
	〃	Disaster Committee (Zone 3)	Ben Tovo (Mr)
	〃	Disaster Committee (Zone 5)	Charles Tada (Mr)
	〃	Disaster Committee (Zone 5)	Leonsio Chia (Mr)
	〃	Disaster Committee (Zone 5)	Polyn Chia (Ms)
	JICA SCBDRM ﾌﾟﾛｼﾞｪｸﾄ (他、タンボコ村住民多数)	専門家（ｺﾐｭﾆﾃｨ防災/業務調整）	金谷 祐昭 (Mr)
場所：タンボコ小・中学校（Tamboko Community School）			

（敬称略）

概要：タンボコ村にて、草の根・人間の安全保障無償資金協力「タンボコ村災害対応能力強化計画」（以下、草の根無償）の活動計画に係る説明会を開催した。特記事項は、以下のとおり。

【特記事項】

- 土のう工法による道路補修について
  - 各ゾーン（1～6）で、約 100m の補修区間を選定してほしい。
  - 各ゾーンで、100m を上限に、SBD$1,000 を作業賃として支払う（出来高払）。各ゾーン住民の意欲、および予算状況により、作業区間を延長することも検討する。
  - 5 月 8 日～10 日に、講師を招いて「土のう工法ワークショップ」を開催する。ワークショップでは、ゾーン 1 内の道路を対象に、実地訓練を行う予定なので、各ゾーンの代表者（2～3 名）に参加してほしい。
  - ワークショップまでに、「コンパクター」を各ゾーンで 2～3 個作製してほしい。
- コミュニティ・ホール（避難所）について
  - コミュニティ・ホール建設予定地の変更を提案。理由は、周囲が開けていることと、古い貯水タンクが設置されており、その再利用の可能性も検討できることなど。住民から、土地所有者に相談してみることを承諾。

以上

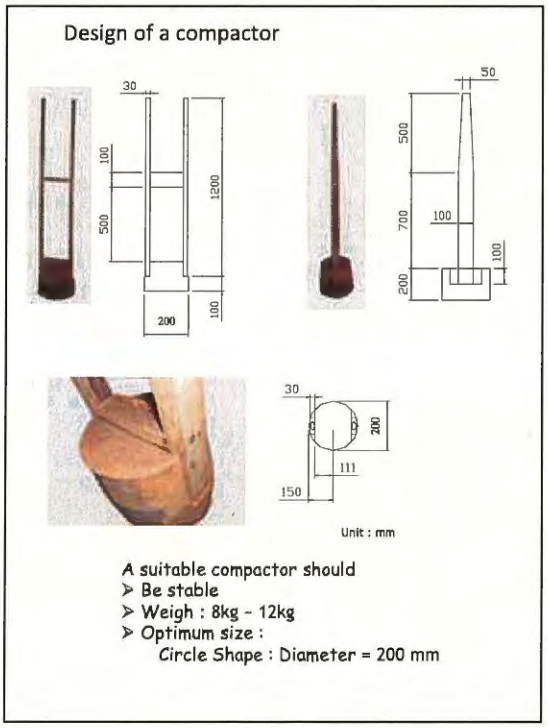
【別添資料】

- 「コンパクター」設計図

説明会の様子(タンボコ小中学校の校庭)。

草の根事業活動計画と、住民側で実施する作業を説明する Mr. Ludovic(左)と、Mr. Ben(右)。

当初予定地から約 20m 離れた場所を、新規予定地として提案。既存の貯水タンク(故障中)の再利用の検討も可能(ゾーン 3)。



土のう袋を押し固めるためのコンパクター(Compactor)設計図。

2013年1月6日

12)

活動記録

日時：2013年 1月6日（日）　午前10:30 - 12:00			
内容：村落防災委員会（第6回）草の根無償進捗、および避難訓練の日程等について			
	所属	役職	氏名
参加者	タンボコ（Tamboko）村	Head of Chief (Zone 2)	Ludovic Kaulake (Mr)
	〃	Zone 1	Albert Tanimana (Mr)
	〃	Zone 1	Maria Tanimana (Mrs)
	〃	Zone 1	Selerino Tabasoe (Mr)
	〃	Zone 1	Peter Pali (Mr)
	〃	Zone 1	Renisto Kalebao (Mr)
	〃	Disaster Committee (Zone 2)	Cliford Tova (Mr)
	〃	Zone 2	Resina Tova (Mrs)
	〃	Zone 3	Alfred Chui (Mr)
	〃	Zone 3 (Truck Driver)	Aniseto Taha (Mr)
	〃	Zone 4	Melneo Loke (Mrs)
	〃	Disaster Committee (Zone 5)	Leonsio Chia (Mr)
	〃	Disaster Committee (Zone 5)	Polyn Chia (Ms)
	〃	Zone 5	Ben Misu
	〃	S-Water Gauge (Zone 5)	Vincent Tome (Mr)
	〃	Disaster Committee (Zone 6)	Francis Pulo (Mr)
	〃	Zone 6	Alex Bina (Mr)
	JICA SCBDRM ﾌﾟﾛｼﾞｪｸﾄ	専門家（ｺﾐｭﾆﾃｨ防災/業務調整）	金谷 祐昭 (Mr)
場所：タンボコ小・中学校（Tamboko Community School）			

（敬称略）

概要：タンボコ村にて、第6回村落防災委員会を開催した。特記事項は、以下のとおり。

【特記事項】

- コミュニティ・ホール建設準備について
  - Mr. Ludovic（村長）が、木材切り出し、および運搬作業の進捗を説明し、引き続き住民の理解と協力を求めた。
  - 学校敷地内にある古い診療所を解体し、その跡地をホール建設用地とすることで参加者は合意した。住民たちも了承済みとのこと。新しい診療所がTomba地区に建設済み。
  - 診療所の解体は、Mr. Kalebaoを中心に行う。作業は1～2日で完了見込み。
- 避難訓練の日程について
  - 来週日曜日（1月13日）に、住民集会を開催し、Village Response Plan、および避難計画の見直し、並びに避難訓練の日程を協議することになった。

以上

委員会の様子。タンボコ小中学校の校庭にある大きなマンゴーの木の下で開催されました。

コミュニティ・ホール用の資材の準備状況について説明する Mr. Ludovic。

Tomba 地区(タンボコ村から約 1km)に新設されたクリニック。看護師家族用の住居も隣りにあります。

同じく Tomba 地区に建設された小・中学校。タンボコ村の小学校高学年、および中学生の校舎になります。2013 年 1 月に開校予定です。

2013 年 1 月 27 日

15)

活動記録

日時:2013 年 1 月 27 日（日） 午前 10:30 - 12:00			
内容:草の根進捗、および避難訓練について			
	所属（Organization）	役職（Position）	氏名（Name）
参加者	ガダルカナル州政府	教育局調査官（Inspectorate）	Joseph Tangi（Mr）
	タンボコ村（Tamboko）	Chief（Tamboko village）	Ludavic Kaulake（Mr）
	〃	Chief	Leonsio Chia（Mr）
	〃	Teacher	Sebastian Lumale（Mr）
	〃	Teacher	Francis Gonikibo Jnr（Mr）
	〃	Teacher	Jeffrey Nahu（Mr）
	〃	Vice Chairman	Albert Tanimana（Mr）
	〃	House wife	Maria Tanimana（Ms）
	JICA SCBDRM Project	専門家（コミュニティ防災/業務調整）	金谷 祐昭（Mr）
	〃	Project Assistant	Julia Garina'au（Ms）
場所（Place）:タンボコ村コミュニティ学校（Community School, Tamboko）、ガダルカナル州			

（敬称略）

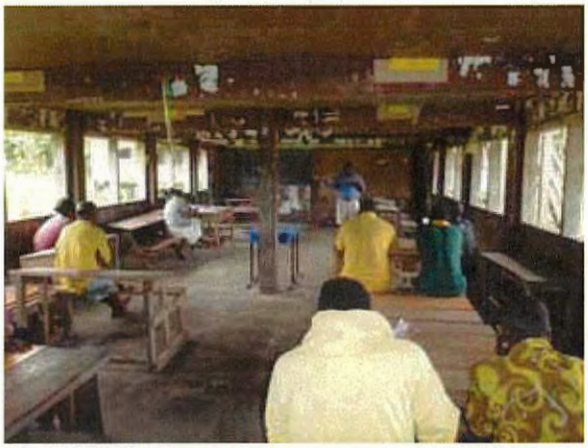
概要：タンボコ村で、住民会議を開催した。特記事項は、以下のとおり。

【発言要点】

- 避難訓練について
  - 今年の避難訓練は、州防災担当官の支援の下、住民主導で行ってほしい（金谷）。
  - 新しい「村落防災ガイドブック（Village DRM Guidebook）」を利用して、タンボコ村の避難訓練を実施し、関係者にその様子を見学してもらうことを検討している（金谷）。
  - タンボコ村の避難訓練を 2 月 28 日に実施し、関係者に見学してもらうことで一同合意。
- 防災教育について（Mr. Joseph）
  - 各学校で、防災教育時間を確保する必要がある。
  - 地域に応じた災害対応教育が必要。ソロモンで最も良く起こる災害は洪水。
  - JICA や草の根プロジェクトの対象村となっていることに、村人は誇りを感じるべき。
- 草の根プロジェクトおよび避難訓練について（Mr. Ludovic）
  - 木材伐採の遅れを深刻に捉えている。2 月中に準備できるよう、引き続き対応する。
  - 避難訓練日程について、次週日曜日に、住民に周知する。
  - フィジー出張後に、木材準備状況確認のため、大使館の宗像氏と一緒に、タンボコ村を再訪する予定である（金谷）。

以上

添付資料：**Meeting on the Disaster Evacuation Drill at Tamboko**



住民会議の様子。タンボコ小中学校の教室で行われました。

学校の防災教育について説明する Mr. Joseph。

コミュニティホール用木材の準備状況、および避難訓練の実施準備について説明する Mr. Ludovic（村長）。

前週（1 月 20 日）の会議において、コミュニティホールの重要性と木材準備の必要性を説明し、住民に協力を求める Mr. Ludovic（村長）。

（添付資料）

Minutes of Meeting on the Disaster Evacuation Drill at Tamboko

Tamboko primary school classroom
26th January 2013
Time: 11am – 12am

- **Meeting Attendees**
  - Masaaki Kanaya - JICA Expert
  - Julia Garina'au – Project Assistant
  - Joseph Tangi – Chief Education Officer for G-Province
  - Ludovic Kaulake - Chief (Tamboko village)
  - Leonsio Chia – Chief
  - Sebastian Lumale – Teacher
  - Francis Gonikibo Jnr – Teacher
  - Jeffrey Nahu – Teacher
  - Albert Tanimana -Vice Chairman
  - Maria Tanimana – House wife

- **PROVISIONAL AGENDA:**

1. **Welcome and opening remarks from Mr. Kanaya**
   - The Chair welcomed all to the meeting before going into the discussions of the proposed agenda.

2. **AGENDA**

Agenda 1- Evacuation Drill for February 2013

- Kanaya: Stated that there will be an Evacuation Drill on February this year that is next month.
- Asked the attendees to put a suitable date for the Evacuation Drill.
- This year's Evacuation must be improved because JICA project will be ended in October this year and villagers must take an initiative.
- Villagers are encouraged to be serious about the Evacuation Drill.
- Suggestion: NDMO will be having a week meeting on the annual work plan from the 25th of February and will present the progression of JICA project. New Village Disaster Risk Management Guidebook will be introduced in the meeting program.
- Model case: The guideline will be tested. Tamboko can be a good model to demonstrate an evacuation drill in line with the guidebook.
- Ludovic and the other attendees agreed that 28th of February will be the date for the Evacuation Drill and morning is the best time for Evacuation Drill.
- A meeting will be held with the villagers by Mr. Ludavic, to inform them of the date and the time for the Evacuation Drill.
- NDMO staffs, Local Partners, NGO's and other international Donors will be also invited to the Evacuation Drill.

Agenda 2- Current Curriculum

- Tangi: Actually there are many activities in saving lives.
- Simple plan and effective activity are necessary.
- Make curriculum/trial curriculum in cooperation with JICA Project for Solomon Islands.
- Education Emergency a curriculum teaching on flooding because flooding is the main disaster affecting us here.
- Head teacher or focal teachers are called to teach students about disasters on how to evacuate and save lives during disasters.
- School base curriculum is teaching and talking about disasters.
- JICA/NDMO has done their part on teaching us on disaster.
- People of Tamboko must proud of JICA and Grassroots Project because Tamboko is the only Pilot place/village in Solomon Islands. Be serious about it.
- If the villagers in Tamboko don't want, they should give the opportunity to other villages and places in the country that need such project.

Agenda 3- Current Situation in Tamboko

- Ludovic: agreed that everything being said is very true.
- People are slow to move and there's also a misunderstanding between the villagers but the community hall funded by Grassroots project is very important.
- Some timbers have been ready and mill is also ready to cut the available logs.
- Hope timbers will ready in two weeks time and the hall should be build in February.
- Kanaya: stated that people in Tamboko are very potential and Mr. Teppei and I will visit on 10th February after my return from Fiji.
- Addition from Mr. Albert: Misunderstanding between projects is the main reason for slowing down this project, there are also some NGO's doing there projects here and people only go for projects that earn money they put as their priority other than saving lives.
- Comment from one attendee: people must concern about the importance of the evacuation drill and must not play round with during the evacuation drill, more awareness about disasters must be done with the villagers, need to inform people about the detailed program to the villagers.
- Need to have a good plan with the community.
- Community must take up responsibility to participate.
- Some chiefs didn't do their job in their zones.
- Chief will announce the evacuation drill this coming Sunday.

➢ **Closing Remarks from: Mr. Ludavic, Mr. Kanaya**

Both thanked all for attending the meeting and the meeting was closed.

END

Minutes by Julia Garina'au

2013 年 4 月 28 日

1)

活動記録

日時：2013 年 4 月 28 日（日）　午前 10:30 - 11:30			
内容：草の根無償の活動（ｺﾐｭﾆﾃｨ・ﾎｰﾙ建設）に係る住民説明会			
	所属	役職	氏名
参加者	タンボコ（Tamboko）村	Head of Chief (Zone 2)	Ludovic Kaulake (Mr)
	〃	Zone 1	Renisto Kalebao (Mr)
	〃	Zone 1	Rex Mae (Mr)
	〃	Zone 3 (Truck Driver)	Aniseto Taha (Mr)
	〃	Disaster Committee (Zone 3)	Ben Tovo (Mr)
	〃	Disaster Committee (Zone 5)	Charles Tada (Mr)
	〃	Disaster Committee (Zone 5)	Leonsio Chia (Mr)
	〃	Disaster Committee (Zone 5)	Polyn Chia (Ms)
	レンネル州	Carpenter	Anis Hautahi (Mr)
	JICA SCBDRM ﾌﾟﾛｼﾞｪｸﾄ （他、タンボコ村住民多数）	専門家（ｺﾐｭﾆﾃｨ防災/業務調整）	金谷 祐昭（Mr）
場所：タンボコ小・中学校（Tamboko Community School）			

（敬称略）

概要：タンボコ村にて実施中の「コミュニティ・ホール建設作業（草の根・人間の安全保障無償資金協力）」について、Mr. Ludovic が現状を説明し、必要な住民の協力を求めた。特記事項は、以下のとおり。

【特記事項】

- コミュニティ・ホール（避難所）について
  - ホール建設作業が進行中。木材の準備、マンパワー提供などで、引き続き住民の協力が必要であることを伝えた。

以上

説明会の様子（タンボコ小中学校の校庭）。状況説明する Mr. Ludovic（左）。

基礎工事が始まっているホール建設現場。

2013年8月11日

7)

活動記録

日時：2013年 8月11日（日）　午前15:00 - 15:50			
内容：村落防災委員会（第7回）避難訓練実施計画作成等			
	所属	役職	氏名
参加者	タンボコ（Tamboko）村	Head of Chief (Zone 2)	Ludovic Kaulake (Mr)
	〃	Zone 5	Charles Tada (Mr)
	〃	VDRC Member/Zone 1	Ben Tovo (Mr)
	〃	Zone 2	Colman Tovo (Mr)
	〃	Villager	John Tuna (Mr)
	〃	Villager	Luke Rade (Mr)
	〃	Villager	Francis Pero (Mr)
	〃	Villager	Renisto Kalebao (Mr)
	〃	Villager	Iklson (Mr)
	〃	Villager	Anisie Hautahi (Mr)
	〃	Villager	Joseph Penele (Mr)
	〃	Villager	Francis Conikiko (Mr)
	〃	Villager	Alfred Tsui (Mr)
	〃	Villager	Boniface Voulonga (Mr)
	〃	Villager	Paul Solo (Mr)
	〃	Villager	Bernard Oro (Mr)
	〃	Villager	Marcel Toda (Mr)
	〃	Villager	Angelica Lumukulo (Ms)
	〃	Villager	Nelson Angisi (Mr)
	Guadalcanal Province	Inspector, Dept of Education	Joseph Tangi (Mr)
	終了時評価調査団	評価コンサルタント	奥田　浩之（Mr）
	JICA SCBDRM ﾌﾟﾛｼﾞｪｸﾄ	専門家（ｺﾐｭﾆﾃｨ防災/業務調整）	金谷 祐昭（Mr）
場所：タンボコ小・中学校（Tamboko Community School）			

（敬称略）

概要：タンボコ村で、第7回村落防災委員会が開催された。特記事項は、以下のとおり。

【特記事項】

➢ 避難訓練準備について

・ VDRC委員長が避難訓練実施計画に沿って内容を確認し、以下の事項を決定した。

避難訓練日時：9月22日　教会礼拝後（11時頃から）

Evaluator: Mr. Nelson Angisi　　Timekeeper: Mr. Ben Tovo

「災害対応計画（Response Plan）」に沿い、各グループの担当行動を確認。

➢ 終了時評価に係る住民インタビュー

・ プロジェクト活動について、終了時評価調査団から住民へインタビューが行われた。

以上

委員会の様子。タンボコ小中学校の校庭にある大きなマンゴーの木の下で開催されました。

避難訓練実施計画に沿って、内容をを説明する村落防災委員会の委員長 Mr. Ludovic。

委員会終了後、終了時評価調査団員から住民に対して、プロジェクト活動についてのインタビューが行われました。

2013 年 10 月 23 日

11)

活動記録

日時：2013 年 10 月 23 日（水）　午前 10:30 - 12:00			
内容：村落防災委員会（第 8 回）「安全地図」作成			
	所属	役職	氏名
参加者	タンボコ(Tamboko)村	Head of Chief (Zone 2)	Ludovic Kaulake (Mr)
	〃	Zone 1	Albert Tanimana (Mr)
	〃	Zone 1	Renisto Kalebao (Mr)
	〃	Disaster Committee (Zone 3)	Ben Tovo (Mr)
	国家災害管理局(SI)	Provincial Disaster Officer	Herrick Savusi (Mr)
	ｶﾞﾀﾞﾙｶﾅﾙ州政府(SI)	Inspector, Dept of Education	Joseph Tangi (Mr)
	国家災害管理局(FJ)	Clerical Officer	Samuela Kanainaliwa (Mr)
	西部地域事務所(FJ)	Community Development Officer	Kaie Nawasa (Mr)
	バ地区事務所(SI)	Assistant District Officer	Aliferetei Abenisiga (Mr)
	JICA SCBDRM ﾌﾟﾛｼﾞｪｸﾄ	専門家（ｺﾐｭﾆﾃｨ防災/業務調整）	金谷　祐昭(Mr)
	その他、タンボコ村住民		
場所：タンボコ小・中学校（Tamboko Community School）			

（敬称略）

概要：タンボコ村で、第 8 回村落防災委員会が開催された。特記事項は、以下のとおり。

【活動内容】

➢ 「安全地図」作成

- Mr. Herrick が主導し、村落防災委員を中心とする住民たちをを 3 つのグループに分け、それぞれが「安全地図」を作成した。
- タンボコ村の地形を模造紙にスケッチしてもらい、その上から村内のリスク、リソースを強調して描いてもらった。その後、各グループがプレゼンテーションした。

➢ 村落防災委員会について

- 村落防災委員会がコミュニティ・ホールの管理を担当することが提議された。今後、住民会議で承認を得ることとなった。
- 村落防災委員について、メンバーの入れ替えが提議された。候補者が挙げられ、今後、住民会議で承認を得ることとなった。

【特記事項】

- Mr. Herrick は、「村落防災ガイドブック（Guidebook for Village DRM)」に記載の「安全地図作成マニュアル」に沿って、問題なくグループワークを主導した。
- フィジーの C/P たちも、村落防災委員会の活動現場を視察した。ソロモン側にとっても、視察されることで緊張感を持って取り組むことができ、副次的な効果があった。

以上

グループワークの説明をする Mr. Herrick。

Mr. Herrick(左)に質問する Mr. Ludovic(右手前)など参加者たち。

安全地図を作成する参加者たち。

安全地図作成の様子を視察するフィジーC/P たち(左から2人目と3人目)。

作成した安全地図の内容を説明する参加者。

作成した安全地図の内容を説明する Mr. Ludovic(村落防災委員長)。

添付資料 13：社会調査結果報告
(成果 3 関連)

平成 25 年 11 月 11 日

大洋州地域コミュニティ防災能力強化プロジェクト
社会調査結果報告

1　社会調査の概要

(1) 調査目的

本調査は、ソロモン諸島／フィジーのパイロット事業対象コミュニティにおける一般情報、過去の災害経験、および災害対策意識などを把握することを目的に実施した。

(2) 調査対象

[ソロモン諸島]　タンボコ村（118 世帯、696 人）
*出典：ソロモン統計局（Solomon Islands Statistic Office） 2009 年センサス

[フィジー]　ナワンガルア村（52 世帯、263 人）、ナソロ村（38 世帯、130 人）
*出典：バ地区事務所（Ba District Office） Village Profile 2012

(3) 調査期間

[ソロモン諸島]	[フィジー]
第 1 回：2011 年 02 月 04 日 ～ 07 日	第 1 回：2010 年 12 月 15 日 ～ 16 日
第 2 回：2012 年 06 月 27 日 ～ 29 日	第 2 回：2012 年 06 月 18 日 ～ 20 日
第 3 回：2013 年 10 月 07 日 ～ 11 日	第 3 回：2013 年 10 月 09 日 ～ 14 日

(4) 調査方法

- 訪問型インタビュー調査（質問票を用いた戸別インタビュー）（第 1 回、第 2 回）
- アンケート調査（質問票配布、訪問回収）（第 3 回）

(5) 実施体制

- 現地再委託（第 1 回）
- カウンターパートおよび関係者（第 2 回、第 3 回）

(6) 調査内容

【一般情報】 人口構成、情報通信ツール保有数、村の重要事項／課題
【災害経験】 被災（サイクロン／洪水）経験
【災害対策意識】 洪水被害軽減策／備え、防災活動経験、避難行動、早期警報システム評価
【プロジェクトについて】 プロジェクトの効果、プロジェクトのインパクト

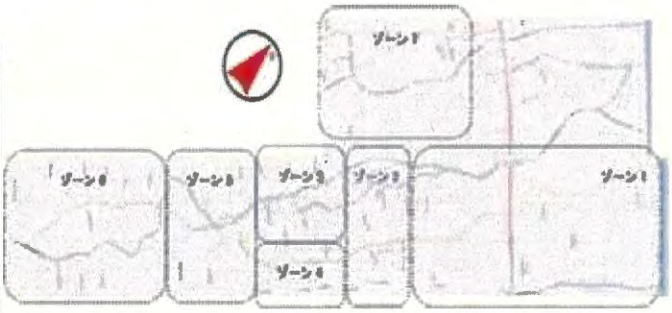
(7) 調査結果　目次

2　調査範囲

[ソロモン諸島]

タンボコ村

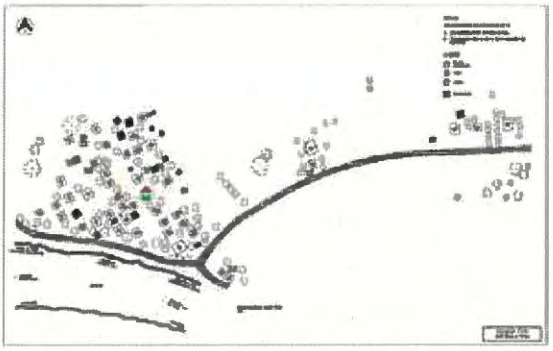
村を貫流するウマサニ川沿いのゾーン 1～6(下流域:ゾーン 1～3、中流域:ゾーン4～6)を調査対象とした。ゾーン7は、タンボコ村から 5 キロほど離れたトンバ川沿いにある、元タンボコ村住民たちが移住した地域であり、調査対象から除外した。



[フィジー]

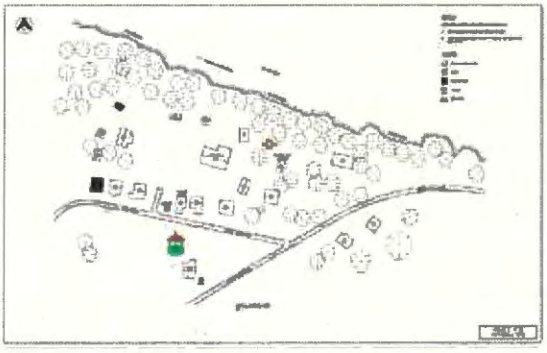
ナワンガルア村

バ川沿いの低地に位置する村全域を調査対象とした。



ナソロ村

バ川沿いの低地に位置する村の中心部を調査対象とした。村の各世帯が避難用に建設した住居群がある南東部の高台は調査対象から除外した。



3 調査結果

3.1 基礎情報・災害経験・災害対策意識 [ソロモン諸島 タンボコ村]

(1) 調査対象者

第1回(2011)調査は、下流域(ゾーン1～3)および川沿いにある住居を中心に60世帯を抽出して、訪問インタビューを実施した。調査した世帯の割合は、下流域が60%、中流域(ゾーン4～6)が40%となり、川から離れた高台のゾーン4に属する世帯は含まれなかった。第2回(2012)調査では、全ゾーン(下流域 47%、中流域 53%)を訪問してインタビューを実施した。そして第3回(2013)調査では、全戸を対象に質問票を配布し、後日訪問回収した。質問票回収率は 90%(調査世帯数／全世帯数)で、調査世帯の割合は、下流域61%、中流域39%であった。

表 3.1-1 調査対象者(世帯数、人口)

タンボコ村		ゾーン1～6		
基礎データ		出典:統計局 2009年センサス		
世帯数		118		
人口		696		
人口内訳(人数、比率)	男性	374	54%	
	女性	322	46%	
調査実施年		2011	2012	2013
調査世帯数(調査率:調査世帯／全世帯)		60	57	106
		51%	48%	90%
調査人口(調査率:調査人口／全人口)		420	320	623
		60%	46%	90%
世帯平均人数(人口／世帯数)		7.0	5.6	5.9

表 3.1-2 調査対象者(ゾーン別)

調査対象村		タンボコ村		
調査実施年		2011	2012	2013
調査世帯数		60	57	106
調査世帯内訳(上:世帯)(下:比率)	ゾーン1	16	15	27
		27%	26%	25%
	ゾーン2	15	6	18
		25%	11%	17%
	ゾーン3	5	6	20
		8%	11%	19%
	ゾーン4	0	13	7
		0%	23%	7%
	ゾーン5	13	2	13
		22%	4%	12%
	ゾーン6	11	15	21
		18%	26%	20%
調査人口		420	320	623
調査人口内訳(上:人数)(下:比率)	ゾーン1	85	84	138
		20%	26%	22%
	ゾーン2	129	38	112
		31%	12%	18%
	ゾーン3	32	33	127
		8%	10%	20%
	ゾーン4	0	77	41
		0%	24%	7%
	ゾーン5	92	16	84
		22%	5%	13%
	ゾーン6	82	72	121
		20%	23%	19%

ゾーン 1～3 (下流域)		
2011	2012	2013
調査世帯数 合計		
36	27	65
比率(調査世帯数中)		
60%	47%	61%
ゾーン 4～6 (中流域)		
2011	2012	2013
調査世帯数 合計		
24	30	41
比率(調査世帯数中)		
40%	53%	39%
ゾーン 1～3 (下流域)		
2011	2012	2013
調査人口 合計		
246	155	377
比率(調査人口中)		
59%	48%	61%
ゾーン 4～6 (中流域)		
2011	2012	2013
調査人口 合計		
174	165	246
比率(調査世帯数中)		
41%	52%	39%

世帯とは、「同一の住居で起居し、生計を同じくする者の集団（親族以外の者でも含む）」とし、同じ住居で生活していても、生計を別にしている場合は別世帯とした。ただし実際は複雑な状況も多く、世帯の定義を厳密にあてはめることは困難であったが、調査時、および集計時には、違う世帯で構成員が重複しない（ダブルカウント）ように心がけた。

対象村の各世帯平均人数は 7.0 人（2011）、5.6 人（2012）、5.9 人（2013）となり、対象村が属するガダルカナル州タンダイ（Tandai）区の各世帯の平均人数 6.0 人[1]と、ほぼ一致している。

(2) 人口構成

対象村の男女比率（男性：女性）は、53：47（2011）、52：48（2012）、52：48（2013）となり、『2009 年センサス』による同村のデータ（54：46）、およびガダルカナル州のデータ（52：48）とほぼ一致している。また、対象村の年齢構成については、学齢期以前の 0-5 歳人口が 12%（2011）、18%（2012）、15%（2013）、60 歳以上が 2%（2011）、1%（2012）、2%（2013）となっており、ガダルカナル州のデータ（0－4 歳：16%、 60 歳以上：4%）に比べて若干少ない結果となっている。これは、年齢区分の違い（調査では 0-5 歳、ガ州データでは 0-4 歳）と、質問票に年齢が記載されてない構成員は、「Youth/Adult」に分類したことに起因すると考えられる。この点で、調査結果は誤差を含んでいる。

表 3.1-3 調査人口の構成（男女比、5 歳以下、60 歳以上）

調査対象村		タンボコ村		
調査実施年		2011	2012	2013
調査世帯数		60	57	106
調査人口		420	320	623
調査人口構成（上:人数）（下:比率）	男性	222	166	324
		53%	52%	52%
	女性	198	154	299
		47%	48%	48%
	5 歳以下	51	57	95
		12%	18%	15%
	60 歳以上	9	4	15
		2%	1%	2%

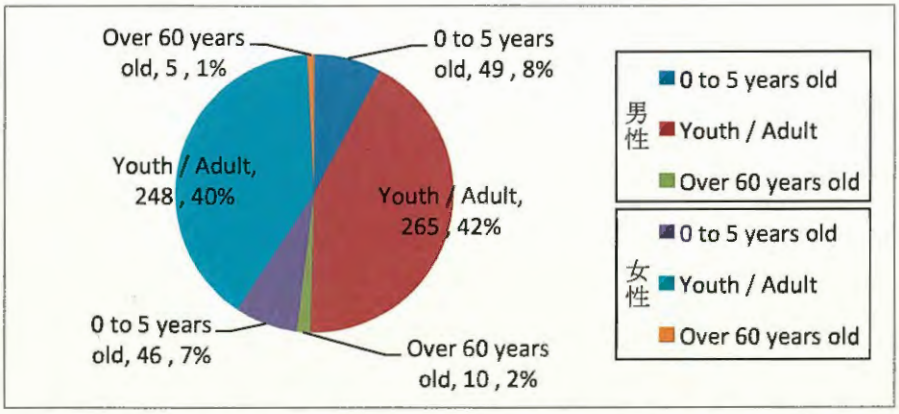


図 3.1-4 調査人口の構成（2013）（男女比、5 歳以下、60 歳以上）

[1] 『2009 年センサス』より。ガダルカナル州（ホニアラ市除く）の各世帯平均人数は 5.4 人。

(3) 情報通信ツール

保有率(世帯)とは、「各通信ツールを一つでも保有している世帯数／調査世帯数」である。

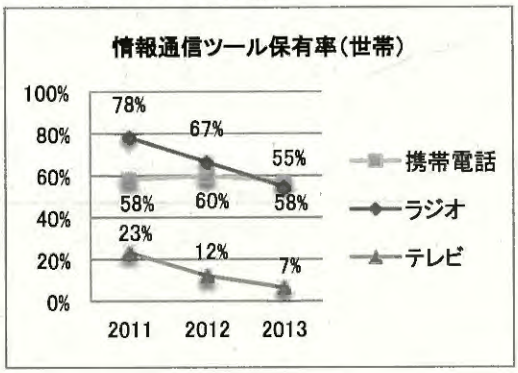
年々下がるラジオの保有率(55%)に対し、携帯電話の保有率(58%)が 2013 年に上回った。また保有台数(100 人あたり)とは、「100 人あたりの各通信ツールの保有台数」で、第 3 回(2013)調査で携帯電話は 19.42 台、ラジオは 10. 27 台、テレビは 1.12 台という結果となった。

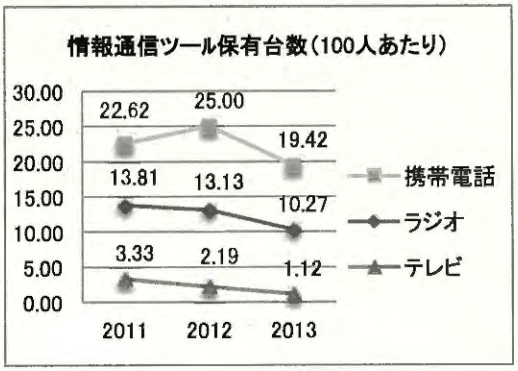
参考データによると、ソロモン諸島における100 人あたりの携帯電話登録者数は、9.54(2009)、21.46(2010)、49.77(2011)、53.34(2012)となっており、近年急増している(図 3.1-6 参照)。対象村の携帯電話保有数も、今後伸びてくることが予想される。

また対象村の通信環境について、携帯電話は、国内携帯電話サービス会社大手 2 社(Telekom、bemobile)のうち、bemobile のみ、村内の限られた場所(ゾーン 2 付近)で受信可能である。テレビ放送は、高い位置にアンテナを設置することでようやく視聴できる。一方、ラジオ放送は、村の最深部(ゾーン6)でもポータブルラジオで受信可能である。

表 3.1-5 情報通信ツールの保有状況(保有世帯数、保有台数)

調査対象村		タンボコ村		
調査実施年		2011	2012	2013
調査世帯数		60	57	106
調査人口		420	320	623
保有世帯数(世帯)(保有率)	ラジオ	47	38	58
		78%	67%	55%
	携帯電話	35	34	61
		58%	60%	58%
	テレビ	14	7	7
		23%	12%	7%
	インターネットデバイス	-	-	1
		-	-	1%
保有台数(総数)(100 人あたり保有台数)	ラジオ	58	42	64
		13.81	13.13	10.27
	携帯電話	95	80	121
		22.62	25.00	19.42
	テレビ	14	7	7
		3.33	2.19	1.12
	インターネットデバイス	-	-	2
		-	-	0.32





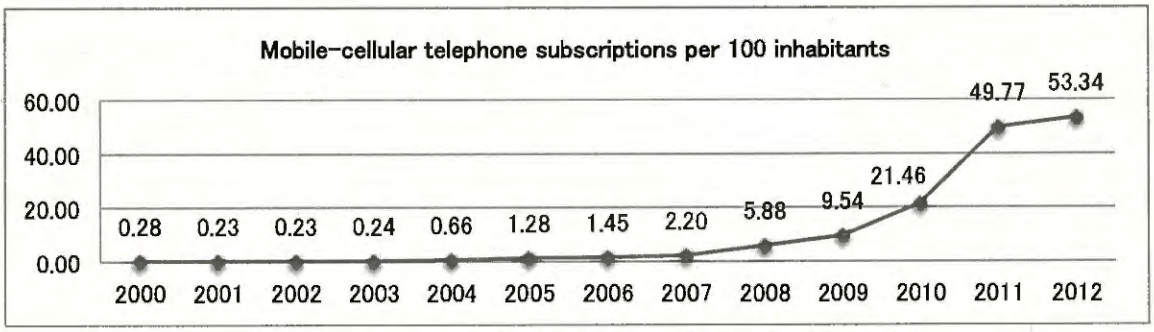


図 3.1-6 ソロモン諸島における携帯電話登録者数の推移

International Telecommunication Union (ITU) – Mobile-cellular subscriptions より作成

(http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx)

(4) 村の重要事項／課題

村における一般的な関心事項を調査し、その中での「自然災害」の位置付けを確認した。

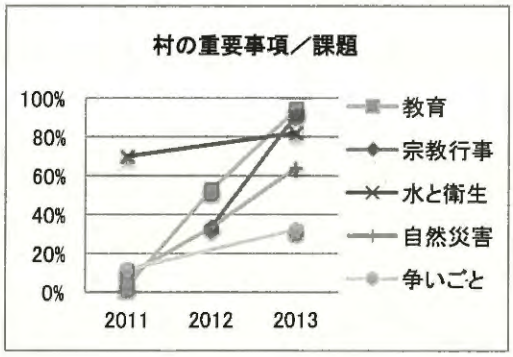
第 1 回(2011)調査では、本設問に対する回答を自由に記載してもらい、第 2 回(2012)以降は、第 1 回の結果を踏まえて抽出した代表的な事項／課題(Important Matter/issue)をいくつか選択肢として挙げておき、その中から複数選ぶ形式とした。

第 1 回調査で、「水と衛生」が突出して高い(70%)ことがわかったため、第 2 回の選択肢からは外し、他の事項についての関心を比較した。その結果、第 2 回は「その他」の選択率がかなり高くなったが、おそらく「水と衛生」と回答したかった村人が多かったためと推察される。 第 3 回(2013)調査では、「水と衛生」も含めて選択肢を増やした。結果は、「教育」(94%)、「宗教行事」(92%)、「健康／病気」(84%)、「水と衛生」(82%)、「自然災害」(64%)の順で村人の関心が高くなった。

第 3 回調査で選択肢を設けた結果、「教育」や「宗教行事」を選ぶ世帯が急増したが、自由記述であった第 1 回の結果を見ても、村人にとって日常的に関心が高い事項は、一貫して「水と衛生」であったと言える。一方で、**「自然災害」の比率が高まってきた(8%→33%→64%)**ことは、調査自体が及ぼす影響(村人は、JICA プロジェクトが実施している社会調査であることを知っている)などを考慮しても、**プロジェクト活動を通じて、より多くの村人たちが災害対策に関心を持つようになった**ことの表れだと考えられる。

表 3.1-7 村の重要事項／課題

調査対象村		タンボコ村		
調査実施年		2011	2012	2013
調査世帯数		60	57	106
村の重要事項/課題回答数(世帯)(比率)	宗教行事	–	19	97
		–	33%	92%
	教育	2	30	100
		3%	53%	94%
	健康/病気	–	–	89
		–	–	84%
	水と衛生	42	–	87
		70%	–	82%
	電化	–	0	35
		–	0%	33%
	争いごと	7	–	34
		12%	–	32%
	自然災害	5	19	68
		8%	33%	64%
	その他	4	25	5
		7%	44%	5%



(5) 被災(サイクロン／洪水)経験

a. **被災世帯数**

対象村における過去の被災経験(サイクロン／洪水)として、被害状況(被災世帯数、被害の内容)を確認した。

第1回(2011)から第3回(2013)調査まで、複数選択式の設問とした。また、第1回の結果を踏まえて、第2回は選択肢を追加した。なお、2012年末から2013年前半にかけて、対象村では特定の災害(サイクロン／洪水)被害が発生しなかったため、第 3 回調査では本設問を省略した。

対象村の洪水被災率は 62%(2011)、89%(2012)と高く、特に**畑(耕作地)への被害が突出している**ことがわかる[2]。日々の食料かつ収入源となる農作物が被害を受けると、蓄えもない多くの世帯は、即座に困窮状態に追い込まれる。そのため国家災害管理局は、災害発生後の緊急支援として、食料と水の配布を最優先している[3]が、安全な耕作地の開墾や、水害に強い作物など含めた多品種を栽培するなど、住民たちが被害軽減に取り組まない限り、農作物被害の増加に伴う食料支援の増加は今後も続くと予想される。

表 3.1-8 過去の被災経験(被害状況)

調査対象村		タンボコ村		
調査実施年		2011	2012	2013
調査世帯数		60	57	106
対象災害		洪水 2010年 1月	洪水 2012年 1月	全般
被災世帯数		37	51	−
		62%	89%	−
被害内訳 (世帯) (比率)	人的被害	8	−	−
		22%	−	−
	家屋	15	13	−
		41%	25%	−
	調理器具	−	18	−
		−	35%	−
	畑	18	50	−
		49%	98%	−
	ボート	−	1	−
		−	2%	−
	その他	12	4	−
		32%	8%	−

[2] 『TC Jasmine Damage Assessment Report』(2012, NDMO)では、ガダルカナル州北部及び西部で364カ村が被災しており、特に耕作地の被害は大きい(70〜80%が壊滅したと記載されている)ことが報告されている。同レポートでも、中長期的な被災者支援策として、災害用畑(disaster garden)を開墾して、過酷な環境に強い作物(wild taro、wild yam、kakake、banana が挙げられている)の栽培を提言している。

b. 早期警報受信世帯数

被災時における早期警報受信状況(受信世帯数、受信手段)を確認した。

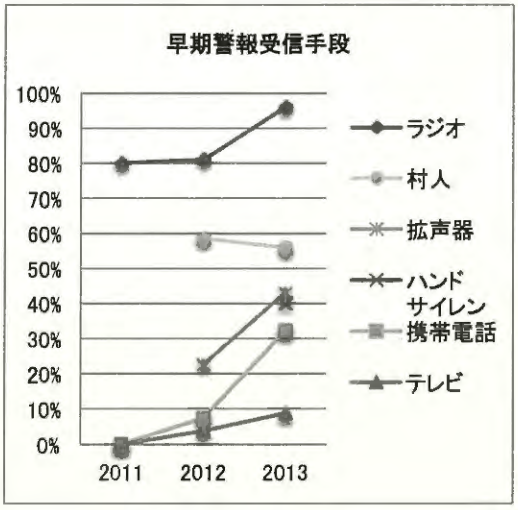
第1回(2011)から第3回(2013)調査まで、複数選択式の設問とした。プロジェクトで導入した「ハンドサイレン」や「拡声器(Loud-Hailer)」については、第2回以降に選択肢として追加した。なお、2012 年末から 2013 年前半にかけて、対象村では特定の災害(サイクロン/洪水)被害が発生しなかったため、第3回調査では過去の災害全般を対象とした。

第1回から第2回調査にかけて、「早期警報受信世帯数」が急増している(17%→93%)。これはプロジェクトによって、簡易型水位計/雨量計を利用したコミュニティレベルの洪水早期警報体制が構築されるなど、**早期警報に対する村人の認知/理解が深まったことに起因すると考えられる**。

「早期警報受信手段」は、警報を受信した世帯における受信手段(複数回答)を表している。警報を「ラジオ」で受信した世帯は、全ての調査で 80%を超えており、**「警報=ラジオ放送」という認識は浸透している**。実際に国からの警報を受信する手段は、ラジオ以外、ほとんど機能していない[4]。そのような中、**「ハンドサイレン」や「拡声器」、また「村人」どうしによる伝達などが、早期警報手段として認知されつつある**。簡易型水位計/雨量計などを利用したコミュニティレベルの洪水早期警報は、国レベルの警報を補完する意味でも必要である。

表 3.1-9 過去の被災経験(早期警報受信状況)

調査対象村		タンボコ村		
調査実施年		2011	2012	2013
調査世帯数		60	57	106
対象災害		洪水 2010 年 1 月	洪水 2012 年 1 月	全般
早期警報受信世帯数		10	53	102
		17%	93%	96%
早期警報受信手段内訳(世帯)(比率)	ラジオ	8	43	98
		80%	81%	96%
	携帯電話	0	4	33
		0%	8%	32%
	テレビ	0	2	9
		0%	4%	9%
	新聞	-	-	31
		-	-	30%
	ハンドサイレン	-	-	41
		-	-	40%
	拡声器	-	12	44
		-	23%	43%
	村人	-	31	57
		-	58%	56%
	公共スピーカー	-	-	27
		-	-	26%
	パトロールカー	-	-	6
		-	-	6%
	その他	2	2	3
		20%	4%	3%



4 訓練では、携帯電話のショートメッセージ(SMS)を利用して警報を発信した経験(全国レベルの津波訓練 PACWAVE 2011 など)があるが、実際の警報発信では、SMS は活用できていない。

c. 避難世帯数

被災時における避難状況(避難世帯数、避難場所、避難のタイミング)を確認した。

第1回(2011)から第3回(2013)調査まで、複数選択式の設問とした。また、第1回の結果を踏まえて、第2回以降は選択肢を追加した。なお、2012年末から2013年前半にかけて、対象村では特定の災害(サイクロン／洪水)被害が発生しなかったため、第3回調査では過去の災害全般を対象とした。

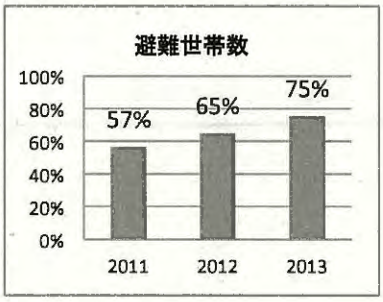
第1回から第2回調査にかけて、「避難世帯数」が増加している(57%から65%)。プロジェクトを通じて村人の避難意識が高まったことが、理由の一つとして考えられる。また、避難した世帯中、**最多の避難場所は「高台」**(第3回:90%)であり、次いで「教会」(同55%)、「学校」(同53%)が続いている。

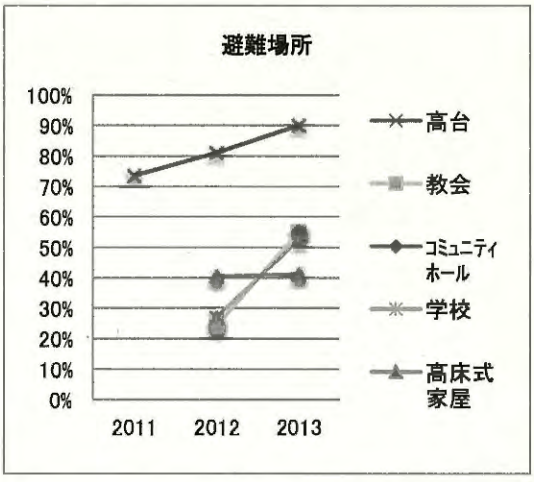
同様に「避難のタイミング」については、「早期警報直後」と回答した世帯が急増した(21%→65%)。早期避難の意識が広まった結果と考えられる。

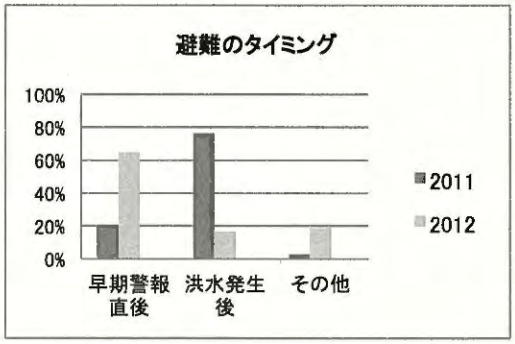
なお、第3回調査の「コミュニティ・ホール」という選択肢は、2013年9月に対象村で実施した「避難訓練」の経験に基づいている。

表 3.1-10 過去の被災経験(避難状況)

調査対象村		タンボコ村		
調査実施年		2011	2012	2013
調査世帯数		60	57	106
対象災害		洪水 2010年1月	洪水 2012年1月	全般
避難世帯数		34	37	80
		57%	65%	75%
避難場所内訳(世帯)(比率)	コミュニティホール	–	–	44
		–	–	55%
	教会	–	9	44
		–	24%	55%
	高床式家屋	–	15	33
		–	41%	41%
	高台	25	30	72
		74%	81%	90%
	学校	1	10	42
		–	27%	53%
	その他	8	2	1
		24%	5%	1%
避難のタイミング内訳(世帯)(比率)	早期警報直後	7	24	–
		21%	65%	–
	洪水発生後	26	6	–
		76%	16%	–
	その他	1	7	–
		3%	19%	–







(6) 洪水被害軽減策

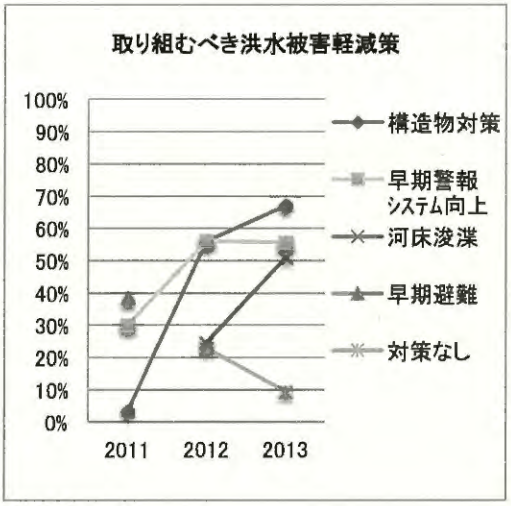
「洪水被害軽減策(Mitigation)」についての一般的な考えを確認した。

第 1 回(2011)調査では、「構造物対策」、「早期警報システムの向上」、「早期避難」、「その他」から複数選択式の設問とした。結果、「早期避難」が 38%で最多となり、村人の自助意識は比較的高いことが確認できた。第 2 回(2012)以降は、「外部からの支援を受けて実施可能な対策(公助)」に範囲を絞った設問としたため、選択肢の中から「早期避難」を外して、「河床浚渫」と「対策なし」を加えた。

第 1 回調査では、村人は「構造物対策」よりも、「早期警報システムの向上」や「早期避難」によって被害を軽減するべきという傾向があった。これは、より現実的な判断の表れと言える。一方で「早期避難」を除外した第 2 回以降は、「構造物対策」、「早期警報システム」、および「河床浚渫」(第 3 回のみ)の 3 項目が 50%を超えた。特に「構造物対策」への期待は毎回上昇し、67%まで達した。「河床浚渫」は手間と費用がかかる割に、その効果は一時的に過ぎないと考えられるが、「溜まった土砂を取り除く」という対症療法は、その分かりやすさのためか、村人の期待感は高い。そんな中、「早期警報システムの向上」を望む世帯が 56%(第 3 回)いることは、早期避難の意識も高まっていると考えられるが、実際のところ**村人は、「誰かがやってくれるのなら、何でもやってほしい」のが本音**だと思われる。

表 3.1-11 取り組むべき洪水被害軽減策

調査対象村		タンボコ村		
調査実施年		2011	2012	2013
調査世帯数		60	57	106
取り組むべき洪水被害軽減策内訳(世帯)(比率)	構造物対策	2	32	71
		3%	56%	67%
	早期警報システム向上	18	32	59
		30%	56%	56%
	早期避難	23	–	–
		38%	–	–
	河床浚渫	–	14	54
		–	25%	51%
	対策なし	–	13	10
		–	23%	9%
	その他	16	2	6
		27%	4%	6%
	無回答	1	5	8
		2%	9%	8%



(7) 洪水への備え

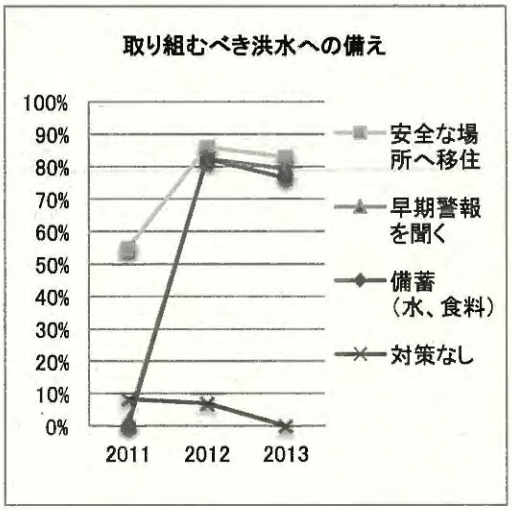
「洪水への備え(Preparedness)」についての一般的な考えを確認した。

第 1 回(2011)調査では、本設問に対する回答を自由に記載してもらい、第 2 回(2012)以降は、第 1 回の結果を踏まえて複数選択式とした。第 1 回調査で「避難所建設」が 20%あったが、第 2 回以降は、「自分で実施可能な対策(自助・共助)」に範囲を絞ったため、選択肢の中には入れなかった。「避難所建設」は、前設問の「構造物対策」に分類されるべき回答であった。

3 回の調査を通じて「安全な場所へ移住」が最多となっており、実際に「移住した」とコメントした世帯もあった。また「早期警報を聞く」ことや「備蓄(水、食糧)」も 80%近くに達しており、これは複数選択式としたことで容易に選びやすくなったことも影響しているが、プロジェクト活動で伝えてきたことを住民が素直に反復してくれている現れでもあり、一定の効果があったと考えられる。

表 3.1-12 取り組むべき洪水への備え

調査対象村		タンボコ村		
調査実施年		2011	2012	2013
調査世帯数		60	57	106
取り組むべき備え内訳(世帯)(比率)	備蓄(水、食料)	–	47	81
		–	82%	76%
	安全な場所へ移住	33	49	88
		55%	86%	83%
	早期警報を聞く	1	47	84
		2%	82%	79%
	避難所建設	12	–	–
		20%	–	–
	対策なし	5	4	0
		8%	7%	0%
	その他	6	4	6
		10%	7%	6%
	無回答	3	1	8
		5%	2%	8%



(8) 防災活動への参加経験

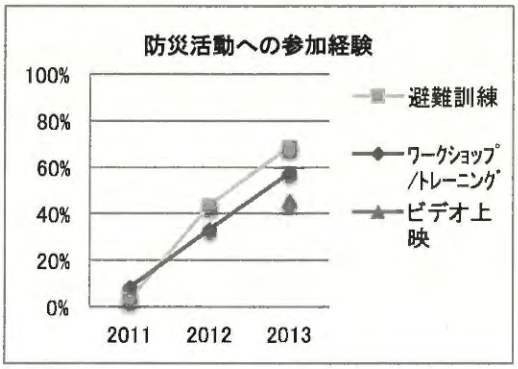
防災関係の活動／イベントへの参加経験を確認した。

第 1 回(2011)から第 3 回(2013)調査まで、「ワークショップ／トレーニング」、「避難訓練」、「その他」からの複数選択式の設問とした。なお、プロジェクトによる啓発活動で「ビデオ上映」を実施したことや、教会や他ドナーも「啓発ムービー」などを活用しているとの情報もあり、第 3 回調査から「ビデオ上映」を選択肢に追加した。

「ワークショップ／トレーニング」および「避難訓練」の参加経験率が高まってきたことは、プロジェクト活動によるところが大きいと言える。特に PDM の指標にもなっている「避難訓練」への参加経験率については、避難手順を体で覚えてもらうために、できるだけ多くの住民参加を目指して呼びかけなど行ってきた結果、第 3 回調査で 69%にまで達した。

表 3.1-13 防災活動への参加状況

		タンボコ村		
調査実施年		2011	2012	2013
調査世帯数		60	57	106
参加した防災活動内容（世帯）（比率）	ワークショップ/トレーニング	5	19	61
		8%	33%	58%
	避難訓練	2	25	73
		3%	44%	69%
	ビデオ上映	-	-	48
		-	-	45%
	その他	2	2	6
		3%	4%	6%



(9) 将来の避難行動

「次回の洪水発生時に、避難するかどうか」の意思(Yes/No)、また、「避難しない」と回答した場合の理由を確認した。

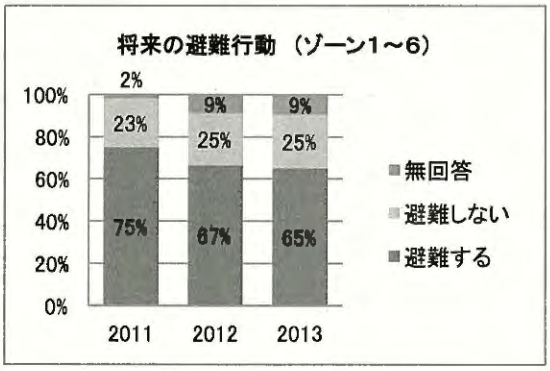
対象村全域(ゾーン 1～6)では、第 1 回(2011)から第 3 回(2013)まで、7 割近くが「避難する」と回答する一方で、「避難しない」世帯も毎回 23～25%存在した。「避難しない」と回答した世帯のほとんどが、高所に位置する中流域(ゾーン 4～6)に住んでおり、その理由は「自宅が安全な場所にある」ことが大半をしめた。そこで中流域を除き、下流域(ゾーン 1～3)だけの回答を集計すると、「避難しない」世帯の割合は 0%(2011)、11%(2012)、8%(2013)まで下がった。ちなみに第 3 回調査で、下流域ながら「避難しない」と回答した 5 世帯の理由は、「高所へ家を建てた(2 世帯)」、「十分に準備ができている(1 世帯)」、「避難場所が足りない(1 世帯)」、「ノーコメント(1 世帯)」であった。

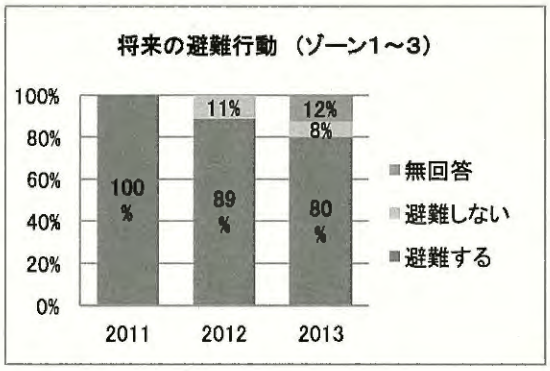
安全な場所に住む世帯や移住した世帯が「避難しない」と回答している点を考慮すれば、全調査を通じて住民の避難意識は高いと言える。また、「避難しない」理由として、「家財を守るため」と回答した世帯がいなかったことは、低所得で、特に守るべき家財がないという対象村の現状を反映していると考えられる。

なお、第 3 回(2013)調査で無回答が 10 世帯あるが、そのうち 8 世帯が下流域(ゾーン 1～3)となっているのは、調査時の不手際も影響している[5]。本来は「避難する」と回答する世帯が、「無回答」に含まれていると思われる。

表 3.1-14 将来の避難行動

調査対象村		タンボコ村全域(ゾーン 1-6)			下流域(ゾーン 1-3)		
調査実施年		2011	2012	2013	2011	2012	2013
調査世帯数		60	57	106	36	27	65
避難する意思(世帯)	避難する	45	38	69	36	24	52
(比率)		75%	67%	65%	100%	89%	80%
	避難しない	14	14	27	0	3	5
		23%	25%	25%	0%	11%	8%
	無回答	1	5	10	0	0	8
		2%	9%	9%	0%	0%	12%





5 調査初日、ゾーン 1～3 まで質問票(Part1～4 までの 4 ページ)を配布したが、本設問が含まれるページ(Part4)が抜けていた。翌日、配布済み世帯に Part4 だけ追加で配布したが、無回答のままだった世帯が増えてしまった。

(10) 早期警報システムに対する評価

国レベレル、コミュニティレベルを含めた早期警報システムに対する住民の満足度を確認した。

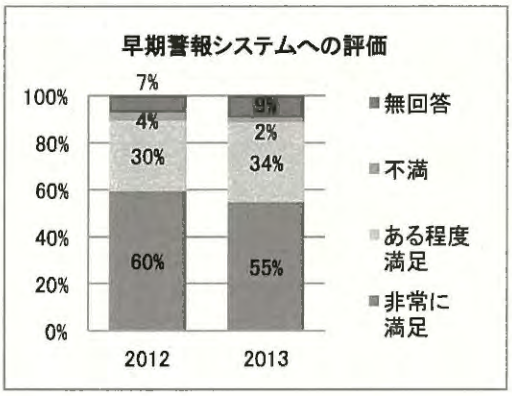
第2回(2012)、第3回(2013)調査とも、「非常に満足」と「ある程度満足」を合わせて9割近くに達している。「不満」と回答した世帯は両調査とも2世帯のみにとどまった。

プロジェクトで導入した簡易型水文観測機器を利用した早期警報システムに対しても、おおむね良い評価がされていると考えられる。

なお、前設問(9)と同じ理由で、第3回の「無回答」が多く(9%)なってしまった。

表 3.1-15 早期警報システムへの満足度

調査対象村		タンボコ村		
調査実施年		2011	2012	2013
調査世帯数		60	57	106
早期警報システムへの満足度（世帯）（比率）	非常に満足	−	34	58
		−	60%	55%
	ある程度満足	−	17	36
		−	30%	34%
	不満	−	2	2
		−	4%	2%
	無回答	−	4	10
		−	7%	9%



3.2 基礎情報・災害経験・災害対策意識 [フィジー ナワンガルア村]

(1) 調査対象者(世帯数／人口)

全世帯を対象に、第 1 回(2010)、第 2 回(2012)調査は訪問インタビュー、第 3 回(2013)は質問票を戸別配布し、後日訪問回収した。

下表(表 3.2-1)では、バ地区事務所(Ba District Office)から入手した 2012 年の Village Profile を基礎データとしている。一方、フィジー統計局(Bureau of Statistics)の『2007 年センサス』によれば、対象村は 40 世帯、231 人となっている。

ソロモンでの調査同様、世帯の定義を「同一の住居で起居し、生計を同じくする者の集団(親族以外の者でも含む)」とした。都市部の学校に通うために親戚などの家に住み込んでいる子どもたちや、サトウキビ収穫のためプランテーション近くへ乾期の間だけ移住する世帯など、対象村の世帯数および人口は常に流動的であった。

また、対象村の各世帯平均人数は 6.0 人(2010)、5.8 人(2012)、6.1 人(2013)となり、対象村が属する西部地域(Western Division)の各世帯の平均人数 5.1 人[6]に比べて、若干高くなっている。

表 3.2-1 調査対象者(世帯数、人口)

ナワンガルア村				
基礎データ		出典:バ地区事務所ﾌﾟﾛﾌｧｲﾙ 2012 年		
世帯数		52		
人口		263		
人口内訳(人数、比率)	1－16	34	13%	
	17－	229	87%	
調査実施年		2010	2012	2013
調査世帯数		41	47	39
(調査率:調査世帯／全世帯)		79%	90%	75%
調査人口		246	272	237
(調査率:調査人口／全人口)		94%	103%	90%
世帯平均人数(人口／世帯数)		6.0	5.8	6.1

[6] 『Fiji Facts and Figures as at 1st July 2010』フィジー統計局(Bureau of Statistic)より。

(2) 人口構成

対象村の男女比率(男性:女性)は、54:46(2010)、52:48(2012)、53:47(2013)となり、『2007年センサス』によるバ県(Province)の地方(Rural)部のデータ(52:48)とほぼ一致している。

また、対象村の年齢構成については、学齢期以前の0-5歳人口が15%(2010)、14%(2012)、14%(2013)、60歳以上が6%(2010)、7%(2012)、6%(2013)となっており、バ県(Province)のフィジー人(iTaukei)のデータ(0－4歳:12%、 60歳以上:6%)とほぼ一致している[7]。

表 3.2-2 調査人口の構成(男女比、5歳以下、60歳以上)

調査対象村		ナワンガルア村		
調査実施年		2010	2012	2013
調査世帯数		41	47	39
調査人口		246	272	237
調査人口構成(上:人数)(下:比率)	男性	132	141	125
		54%	52%	53%
	女性	114	131	112
		46%	48%	47%
	5歳以下	38	37	32
		15%	14%	14%
	60歳以上	15	18	15
		6%	7%	6%

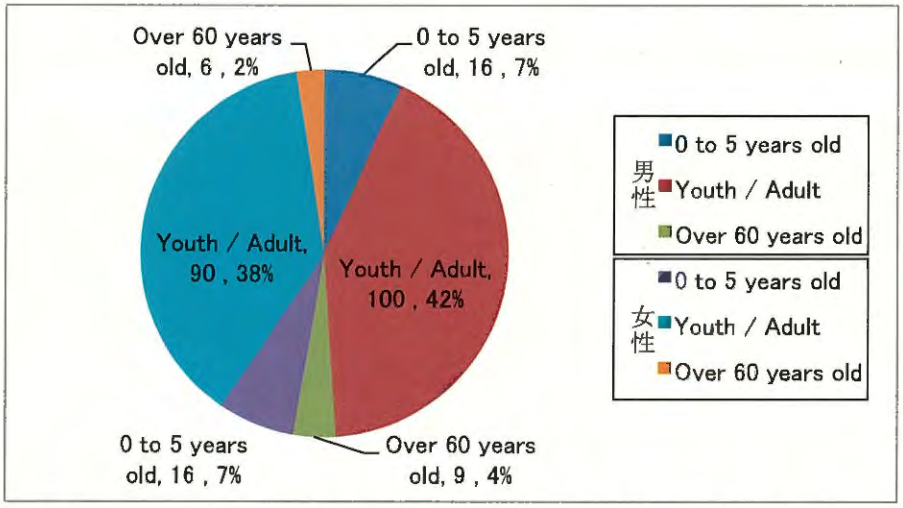


図 3.2-3 調査人口の構成(2013)(男女比、5歳以下、60歳以上)

[7] 幼少人口の年齢区分の違い(調査では0-5歳、バ県データでは0-4歳)を考慮している。

(3) 情報通信ツール

保有率(世帯)とは、「各通信ツールを一つでも保有している世帯数／調査世帯数」である。

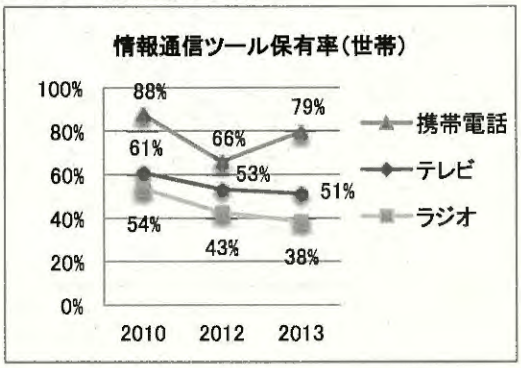
全調査で携帯電話の保有率は8割近くあった。ラジオとテレビの保有率は、第3回(2013)調査でそれぞれ38%、51%だったが、保有率は徐々に下がってきている。

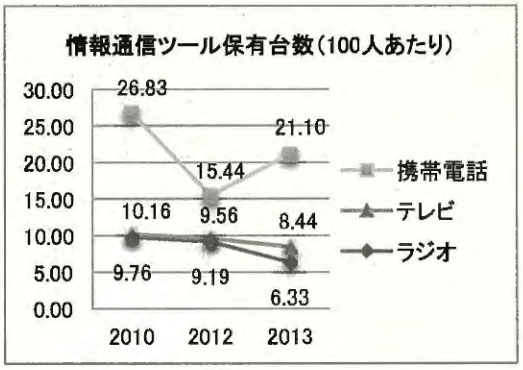
保有台数(100人あたり)は、第3回調査で携帯電話21.10台、テレビ8.44台、ラジオ6.33台となった。参考データでは、フィジーにおける100人あたりの携帯電話登録者数は、75.09(2009)、81.09(2010)、83.72(2011)、98.06(2012)となっており、近年ではほぼ1人1台に近づいている(図3.2-5参照)。対象村の携帯電話保有数も、今後伸びてくると予想される。

また対象村の通信環境について、携帯電話は、国内携帯電話サービス3社(Vodafone、Digicel、Inkk)が受信可能である。また、テレビ放送およびラジオ放送ともに問題なく受信できる。

表 3.2-4 情報通信ツールの保有状況(保有世帯数、保有個数)

調査対象村		ナワンガルア村		
調査実施年		2010	2012	2013
調査世帯数		41	47	39
調査人口		246	272	237
保有世帯数(世帯)(保有率)	ラジオ	22	20	15
		54%	43%	38%
	携帯電話	36	31	31
		88%	66%	79%
	テレビ	25	25	20
		61%	53%	51%
	インターネットデバイス	-	-	0
		-	-	0%
保有人口(総数)(100人あたり保有台数)	ラジオ	24	25	15
		9.76	9.19	6.33
	携帯電話	66	42	50
		26.83	15.44	21.10
	テレビ	25	26	20
		10.16	9.56	8.44
	インターネットデバイス	-	-	0
		-	-	0.00





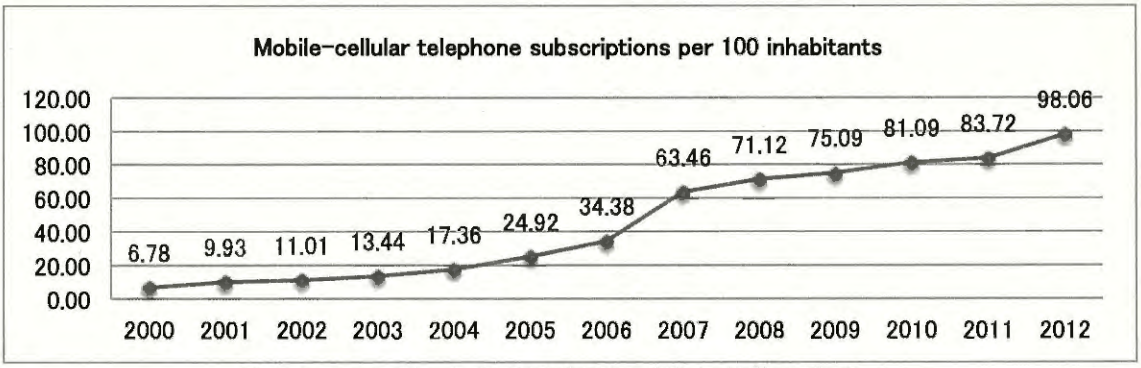


図 3.2-5 フィジーにおける携帯電話登録者数の推移

International Telecommunication Union (ITU) – Mobile-cellular subscriptions より作成

(http://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx)

(4) 村の重要事項／課題

村における一般的な関心事項を調査し、その中での「自然災害」の位置付けを確認した。

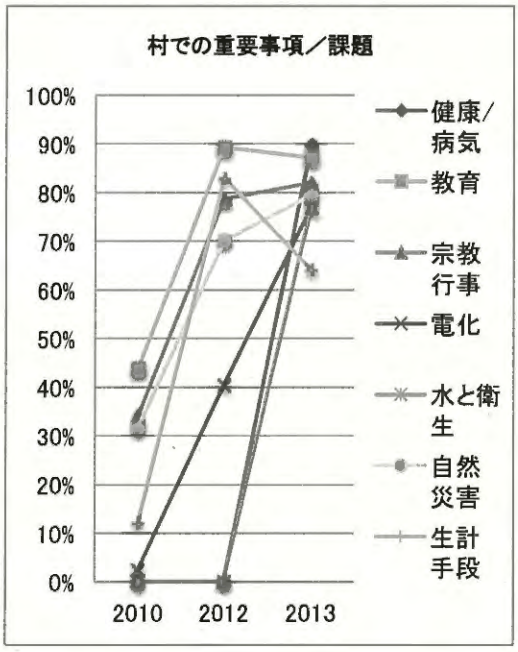
第 1 回(2010)調査では、本設問に対する回答を自由に記載してもらい、第 2 回(2012)以降は、第 1 回の結果を踏まえて抽出した代表的な事項／課題(Important Matter/issue)をいくつか選択肢として挙げておき、その中から複数選ぶ形式とした。

第 1 回調査で、「教育」(44%)、「宗教行事」(34%)、「自然災害」(32%)の 3 項目が主な重要事項であることが分かった。第 3 回(2013)調査では、3 項目に加えて「電化」、および新たに選択肢に加えた「健康／病気」、「水と衛生」が 7 割を超えた。

第 3 回調査で選択肢を設けた結果、「健康／病気」、「水と衛生」を選ぶ世帯が急増したが、自由記述であった第 1 回の結果を踏まえると、村人にとって日常的に関心が高かった事項は、一貫して「教育」、「宗教行事」、「自然災害」であったと言える。

表 3.2-6 村の重要事項／課題

調査対象村		ナワンガルア村		
調査実施年		2010	2012	2013
調査世帯数		41	47	39
村の重要事項/課題回答数（世帯）（比率）	宗教行事	14	37	32
		34%	79%	82%
	教育	18	42	34
		44%	89%	87%
	健康/病気	0	0	35
		0%	0%	90%
	水と衛生	0	0	30
		0%	0%	77%
	電化	1	19	30
		2%	40%	77%
	生計手段	5	39	25
		12%	83%	64%
	自然災害	13	33	31
		32%	70%	79%
	その他	0	3	2
		0%	6%	5%



(5) 被災(サイクロン／洪水)経験

a. 被災世帯数

対象村における過去の被災経験(サイクロン／洪水)として、被害状況(被災世帯数、被害の内容)を確認した。

第1回(2010)から第3回(2013)調査まで、複数選択式の設問とした。また、第1回の結果を踏まえて、第2回以降は選択肢を追加した。

対象村の洪水／サイクロン被災率は高く(95%、100%、100%)、過去の洪水(2009、2012)およびサイクロン(2012)では、「畑(耕作地)」への被害が突出しており、次に「調理器具」と「家屋」となっている。バ川の河口部に位置する対象村は、周囲に高台がほとんどなく、洪水が発生すると住民たちの「畑」もすべて水没してしまう状況が伺える。

「畑」への被害対策としては、安全な耕作地の開墾や、水害に強い作物など含めた多品種の栽培、また災害前の適切な作物管理[8]などが考えられる。実際に適切な作物管理によって、災害前に根菜類を収穫し、洪水発生後の避難期間にも地方政府からの食糧配給に頼らずに乗り切ったコミュニティもあった[9]。また、「家屋」や「調理器具」への被害対策としては、強風に耐える屋根(素材、補強、施工方法など)、高床式、また水没しない高さの棚を作るなど、家屋構造の改善が有効である。

表 3.2-7 過去の被災経験(被害状況)

調査対象村		ナワンガルア村		
調査実施年		2010	2012	2013
調査世帯数		41	47	39
対象災害		洪水 2009年 1月	洪水 2012年 1月／3月	サイクロン 2012年 12月
被災世帯数		39	47	39
		95%	100%	100%
被害内訳 (世帯) (比率)	人的被害	0	−	−
		0%	−	−
	家屋	17	32	26
		44%	68%	67%
	調理器具	−	40	26
		−	85%	67%
	畑	28	46	38
		72%	98%	97%
	ボート	−	3	1
		−	6%	3%
	その他	26	3	5
		67%	6%	13%

[8] サイクロン／洪水が予想された時点で作物を収穫したり、枝葉を刈り込んで倒れにくくしたりするなど。

[9] カウンターパートからの聞取りによる。バ県ナダリバツ(Nadarivatu)地区の村であった事例。

b. 早期警報受信世帯数

被災時における早期警報受信状況(受信世帯数、受信手段)を確認した。

第1回(2010)から第3回(2013)調査まで、複数選択式の設問とした。プロジェクトで導入した「ハンドサイレン」や「拡声器(Loud-Hailer)」については、第2回(2012)調査以降に選択肢として追加した。

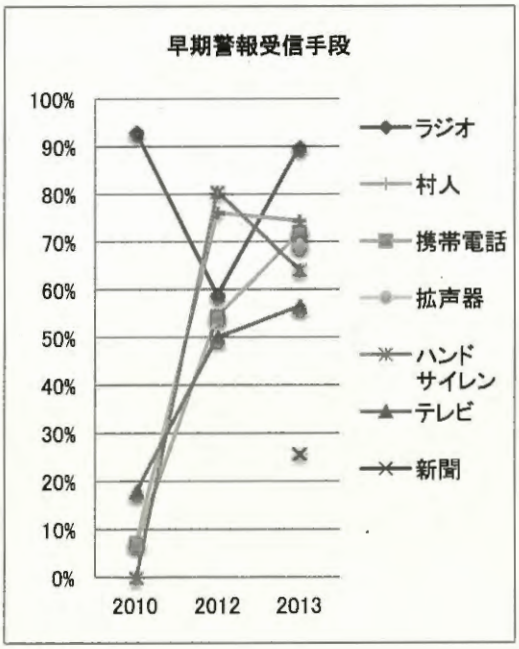
毎回「早期警報受信世帯数」は増加し、第3回で100%に達している。これは、プロジェクトによって、簡易型水位計/雨量計を利用したコミュニティレベルの洪水早期警報体制が構築されるなど、早期警報に対する村人の認知/理解が深まったことに起因すると考えられる。

「早期警報受信手段」は、警報を受信した世帯における受信手段(複数回答)を表している。第1回、第3回で「ラジオ」が90%を超えており、政府からの警報受信手段として最も重要である。また近年、携帯電話のショートメッセージ(SMS)を使った警報発信が試みられていたり、災害時に地方政府事務所から直接村長へ安否確認や避難勧告の連絡をしていたり、「携帯電話」で警報などを受信する機会が増加していることが結果に表れている。

一方でハンドサイレンや拡声器、また村人どうしによる伝達も、早期警報手段として認知されつつある。今後も簡易型水位計/雨量計などを利用したコミュニティレベルの洪水早期警報は、国レベルの警報を補完する意味でも必要である。

表 3.2-8 過去の被災経験(早期警報受信状況)

調査対象村		ナワンガルア村		
調査実施年		2010	2012	2013
調査世帯数		41	47	39
対象災害		洪水 2009年 1月	洪水 2012年 1月/ 3月	サイクロン 2012年 12月
早期警報受信世帯数		28	46	39
		68%	98%	100%
早期警報受信手段内訳(世帯)(比率)	ラジオ	26	27	35
		93%	59%	90%
	携帯電話	2	25	28
		7%	54%	72%
	テレビ	5	23	22
		18%	50%	56%
	新聞	-	-	10
		-	-	26%
	ハンドサイレン	-	37	25
		-	80%	64%
	拡声器	-	-	27
		-	-	69%
	村人	2	35	29
		7%	76%	74%
	公共スピーカー	-	-	6
		-	-	15%
	パトロールカー	-	-	1
		-	-	3%
	その他	0	2	0
		0%	4%	0%



c. 避難世帯数

被災時における避難状況（避難世帯数、避難場所、避難のタイミング）を確認した。

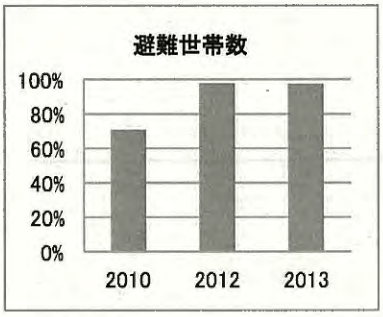
第 1 回（2010）から第 3 回（2013）調査まで、複数選択式の設問とした。また、第 1 回の結果を踏まえて、第 2 回以降は選択肢を追加した。

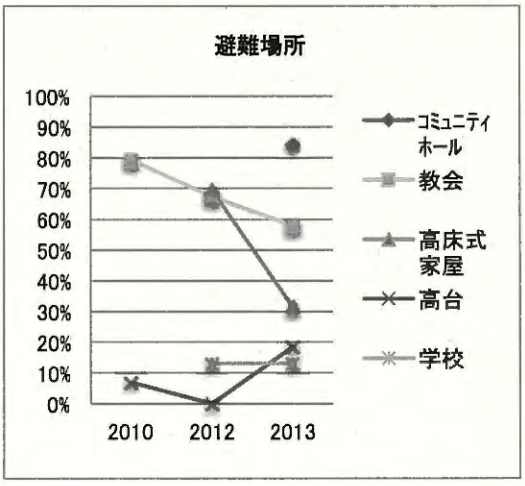
第 1 回から第 2 回調査にかけて、「避難世帯数」が増加している（71%から 98%）。第 3 回でも 97%に達している。これはプロジェクトを通じて村人の避難意識が高まったことが、理由の一つとして考えられる。また、避難した場所については、「教会」（第 1 回:79%）→「高床式家屋」（第 2 回:70%）と「教会」（同 67%）→「コミュニティ・ホール」（第 3 回:84%）と変遷している。プロジェクトで資材提供した「コミュニティ・ホール」は、多くの村人を収容できる避難場所となっている。

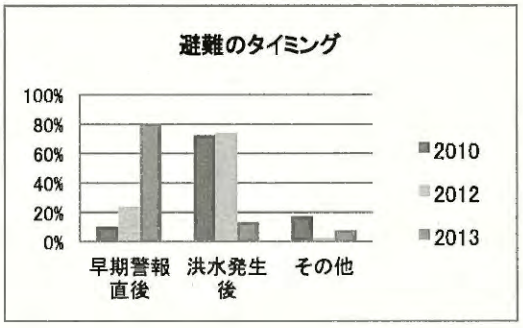
「避難のタイミング」については、「早期警報直後」と回答した世帯が年々増加し（10%→24%→79%）、「洪水発生後」は減少した（72%→74%→13%）。早期避難の意識が高まった結果と考えられる。

表 3.2-9 過去の被災経験（避難状況）

調査対象村		ナワンガルア村		
調査実施年		2010	2012	2013
調査世帯数		41	47	39
対象災害		洪水 2009 年 1 月	洪水 2012 年 1 月／3 月	サイクロン 2012 年 12 月
避難世帯数		29	46	38
		71%	98%	97%
避難場所内訳（世帯）（比率）	コミュニティホール	–	–	32
		–	–	84%
	教会	23	31	22
		79%	67%	58%
	高床式家屋	–	32	12
		–	70%	32%
	高台	2	0	7
		7%	0%	18%
	学校	0	6	5
		–	13%	13%
	その他	4	9	1
		14%	20%	3%
避難のタイミング内訳（世帯）（比率）	早期警報直後	3	11	30
		10%	24%	79%
	洪水発生後	21	34	5
		72%	74%	13%
	その他	5	1	3
		17%	2%	8%







(6) 取り組むべき洪水被害軽減策

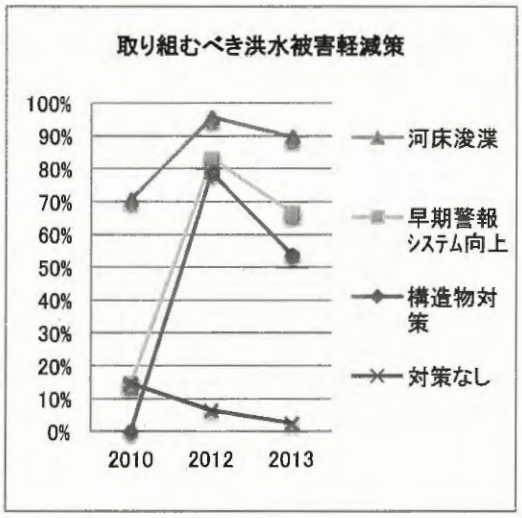
「洪水被害軽減策(Mitigation)」についての一般的な考えを確認した。

第 1 回(2010)調査では、「構造物対策」、「早期警報システムの向上」、「早期避難」、「その他」から複数選択式の設問とした。結果、選択肢にはなかった「河床浚渫(Dredging)」という回答が71%で最多となった。村人によれば、政府の支援によって 1990 年代から幾度か河床浚渫が行われており、河床から撤去した土砂は村の北側に盛り土され、人工的な高台[10]が造成された。第 2 回(2012)以降は、「外部からの支援を受けて実施可能な対策(公助)」に範囲を絞った設問としたため、選択肢の中から「早期避難」を外して、「河床浚渫」と「対策なし」を加えた。

全調査を通じて、「河床浚渫」に対する村人の期待は高い。費用がかかる割に、その効果は一時的に過ぎないと考えられるが、撤去した土を盛り土や売却に利用できるので、一石二鳥の対策と受け止められているのであろう。事実、2013 年に中国の支援でバ川下流の「河床浚渫」が実施され、同村では、村の南側に盛り土された土砂を建設業者へ売却する話しが進んでいた[11]。そんな中、「早期警報システムの向上」を望む世帯も増加していることは、早期避難の意識も高まっていると考えられる。

表 3.2-10 取り組むべき洪水被害軽減策

調査対象村		ナワンガルア村		
調査実施年		2010	2012	2013
調査世帯数		41	47	39
取り組むべき洪水被害軽減策内訳(世帯)(比率)	構造物対策	0	37	21
		0%	79%	54%
	早期警報システム向上	6	39	26
		15%	83%	67%
	早期避難	0	–	–
		0%	–	–
	河床浚渫	29	45	35
		71%	96%	90%
	対策なし	6	3	1
		15%	6%	3%
	その他	0	1	2
		0%	2%	5%
	無回答	0	0	0
		0%	0%	0%



[10] 村の地盤高より 1～2m 高く、村が浸かった 2012 年 3 月の洪水では、高台の上は浸水を免れた。コミュニティ・ホールは、この高台に建設されている。

[11] 村長 (Turaga ni Koro) からの聞取りによる。

(7) 洪水への備え

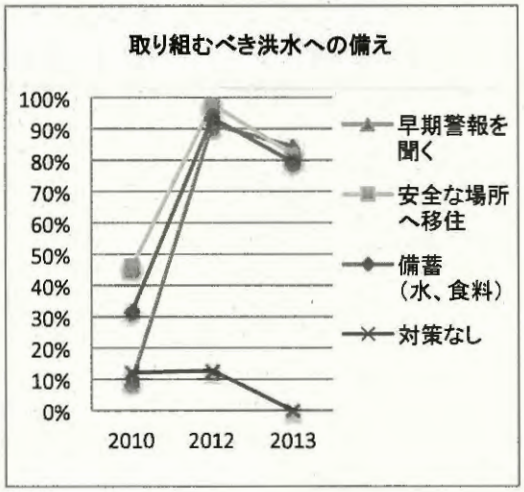
「洪水への備え(Preparedness)」についての一般的な考えを、特に「自分たちで実施可能な対策(自助・共助)」に範囲を絞って確認した。

第 1 回(2010)調査では、本設問に対する回答を自由に記載してもらい、第 2 回(2012)以降は、第 1 回の結果を踏まえて複数選択式とした。

第 1 回と第 2 回調査で最多(46%、98%)だった「安全な場所へ移住」は、第 3 回でも 82%に達している。これは村の北側の高台へ、将来的には全世帯が移住する計画を持っていることも背景にあると考えられる。2013 年には、宗教団体の支援により、高台に 5 つの家屋が建設されており、移住計画の一部が実現している。また「備蓄」や「早期警報を聞く」についても、第 2 回と第 3 回調査で 8 割～9 割が選択しており、自助意識の高まりが伺える。一種の「諦め」とも言える「対策なし」と回答した世帯が、第 3 回では 0 になったことも、住民たちの前向きな姿勢の現れであり、プロジェクトの効果と考えられる。

表 3.2-11 取り組むべき洪水への備え

調査対象村		ナワンガルア村		
調査実施年		2010	2012	2013
調査世帯数		41	47	39
取り組むべき備え内訳(世帯)(比率)	備蓄(水、食料)	13	44	31
		32%	94%	79%
	安全な場所へ移住	19	46	32
		46%	98%	82%
	早期警報を聞く	4	43	33
		10%	91%	85%
	対策なし	5	6	0
		12%	13%	0%
	その他	0	0	3
		0%	0%	8%
	無回答	0	0	0
		0%	0%	0%



(8) 防災活動への参加経験

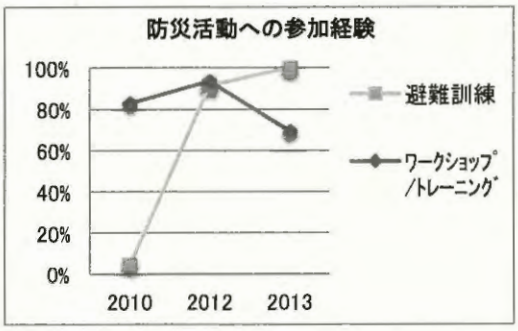
防災関係の活動／イベントへの参加経験を確認した。

第 1 回(2010)から第 3 回(2013)調査まで、「ワークショップ／トレーニング」、「避難訓練」、「その他」からの複数選択式の設問とした。

対象村では、Red Cross(2009 年)や ADRA(2010 年)の活動実績があり、「ワークショップ／トレーニング」は第 1 回調査から参加経験率が高かった(83%)。一方で、第 1 回は参加経験率が低かった「避難訓練」(5%)が、プロジェクト活動を通じて参加率が高まり、第 3 回では 100%に達した。

表 3.2-12 防災活動への参加状況

調査対象村		ナワンガルア村		
調査実施年		2010	2012	2013
調査世帯数		41	47	39
参加した防災活動内容（世帯）（比率）	ワークショップ/トレーニング	34	44	27
		83%	94%	69%
	避難訓練	2	43	39
		5%	91%	100%
	その他	1	0	0
		2%	0%	0%



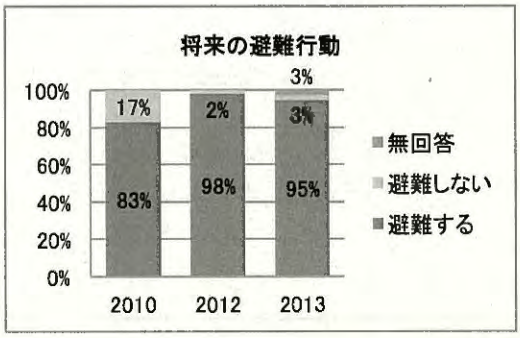
(9) 将来の避難行動

「次回の洪水発生時に、避難するかどうか」の意思(Yes/No)、また、「避難しない」と回答した場合の理由を確認した。

第 1 回(2010)調査では 83%が「避難する」と回答した一方で、「避難しない」が 7 世帯(17%)いた。その理由は「自宅は安全な場所にある」(3 世帯)、「洪水はそれほど深刻ではない」(2 世帯)、「家財を守るため」(2 世帯)であった。その後、プロジェクト活動を通じて早期避難の意識を高めてきた結果、第 2 回(2012)、第 3 回(2013)調査では、それぞれ 98%、95%が「避難する」と回答した。そして「避難しない」という回答は、それぞれ 1 世帯にとどまった。

表 3.2-13 将来の避難行動

調査対象村		ナワンガルア村		
調査実施年		2010	2012	2013
調査世帯数		41	47	39
避難する意思(世帯)(比率)	避難する	34	46	37
		83%	98%	95%
	避難しない	7	1	1
		17%	2%	3%
	無回答	0	0	1
		0%	0%	3%



(10) 早期警報システムへの評価

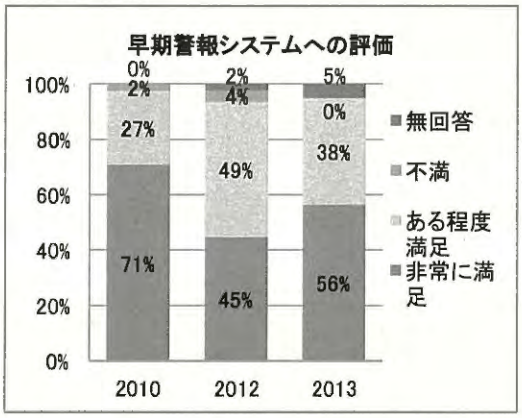
国レベレル、コミュニティレベルを含めた早期警報システムに対する住民の満足度を確認した。設問は「非常に満足」、「ある程度満足」、「不満」の中から択一式とした。

全調査で、「非常に満足」と「ある程度満足」を合わせると 9 割以上(98%、94%、94%)となっており、高い評価を得ている。第 1 回(2010)調査では、3 つの選択肢を「a. 非常に満足」、「b. ある程度満足」、「c. 不満」と設け、その中から一つを選択する方式で、回答に混乱はなかった。しかし第 2 回(2012)から各選択肢について「Yes/No」で回答する方式としたため、複数で「Yes」と答えるケースが出てしまった。具体的には、第 2 回調査で「満足」と「ある程度満足」の 2 項目ともに「Yes」を選択している回答が 18 世帯あり、全て「ある程度満足」に分類した。第 3 回調査では、質問欄に「択一式」と明記し、また質問票配布時に、本設問では一つだけ「Yes」を選ぶように注意を促したが、やはり 2 項目で「Yes」を選択した重複回答が 9 世帯あった。重複回答は「ある程度満足」に分類した。

選択肢から選ぶ方法の場合、「択一／複数選択」と明記しても理解されない可能性がある。設問は複雑にせず、自然に回答していけば成り立つように構成する必要がある。

表 3.2-14 早期警報システムへの満足度

調査対象村		ナワンガルア村		
調査実施年		2010	2012	2013
調査世帯数		41	47	39
早期警報システムへの満足度(世帯)(比率)	非常に満足	29	21	22
		71%	45%	56%
	ある程度満足	11	23	15
		27%	49%	38%
	不満	1	2	0
		2%	4%	0%
	無回答	0	1	2
		0%	2%	5%



3.3 基礎情報・災害経験・災害対策意識 [フィジー ナソロ村]

(1) 調査対象者(世帯数／人口)

バ川沿いの低地に位置する村の中心部を調査対象とし、第1回(2010)、第2回(2012)調査は訪問インタビュー、第3回(2013)は質問票を村長(Turaga ni Koro)へ一括配布し、後日訪問回収した。村の各世帯が避難用に建設した住居群がある南東部の高台は調査対象から除外した。

下表(表3.2-1)では、バ地区事務所(Ba District Office)から入手した2012年のVillage Profileを基礎データとしている。一方、フィジー統計局(Bureau of Statistics)の『2007年センサス』によれば、対象村は30世帯、125人となっている。

前述のとおり、対象村の全世帯は南東部の高台に避難用の別宅を持っており、家族や親族が移住している。また町での賃労働、プランテーション、河口部へ農作業や漁業に出かけている住民も多く、中心部の集落は普段から閑散としていた。毎年、徐々に高台に住む人口の方が増えてきているように感じた。

事実、対象村の各世帯平均人数は5.4人(2010)、4.6人(2012)、4.2人(2013)と、年々少なくなっている。対象村が属する西部地域(Western Division)の各世帯の平均人数5.1人[12]に比べて、近年は若干低くなっている。これは家族の構成員が、中心部の集落と高台の別宅で分かれて暮らしていることも影響していると考えられる。

表 3.3-1 調査対象者(世帯数、人口)

ナソロ村				
基礎データ		出典:バ地区事務所ﾌﾟﾛﾌｧｲﾙ 2012 年		
世帯数		38		
人口		130		
人口内訳(人数、比率)	1－16	38	29%	
	17－	92	71%	
調査実施年		2010	2012	2013
調査世帯数(調査率:調査世帯／全世帯)		15	23	13
		39%	61%	34%
調査人口(調査率:調査人口／全人口)		81	106	55
		62%	82%	42%
世帯平均人数(人口／世帯数)		5.4	4.6	4.2

[12] 『Fiji Facts and Figures as at 1st July 2010』フィジー統計局(Bureau of Statistic)より。

(2) 人口構成

対象村の男女比率(男性:女性)は、48:52(2010)、58:42(2012)、55:45(2013)となり、調査毎にばらつきがあった。これは、前述のとおり、村の居住形態(家族・親族が、低地の中心部と、高台に分かれて生活している)に起因していると考えられる。ちなみに『2007 年センサス』によるバ県(Province)の地方(Rural)部のデータでは 52:48 となっている。

また、対象村の年齢構成については、学齢期以前の 0-5 歳人口が 14%(2010)、13%(2012)、11%(2013)、60 歳以上が 4%(2010)、6%(2012)、7%(2013)となっており、バ県(Province)のフィジー人(iTaukei)のデータ(0－4 歳:12%、 60 歳以上:6%)とほぼ一致している[13]。

表 3.3-2 調査人口の構成(男女比、5 歳以下、60 歳以上)

調査対象村		ナソロ村		
調査実施年		2010	2012	2013
調査世帯数		15	23	13
調査人口		81	106	55
調査人口構成(上:人数)(下:比率)	男性	39	62	30
		48%	58%	55%
	女性	42	44	25
		52%	42%	45%
	5 歳以下	11	14	6
		14%	13%	11%
	60 歳以上	3	6	4
		4%	6%	7%

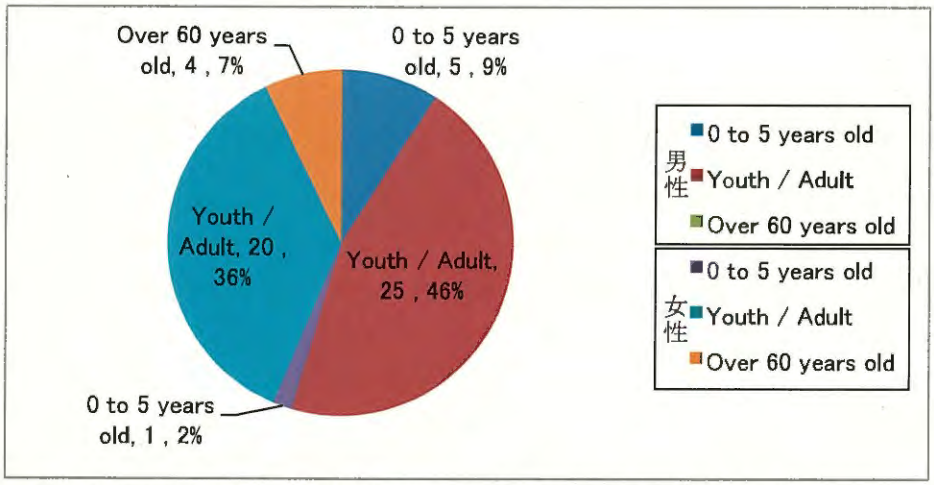


図 3.3-3 調査人口の構成(2013)(男女比、5 歳以下、60 歳以上)

[13] 幼少人口の年齢区分の違い(調査では 0-5 歳、バ県データでは 0-4 歳)を考慮している。

(3) 情報通信ツール

保有率(世帯)とは、「各通信ツールを一つでも保有している世帯数／調査世帯数」である。

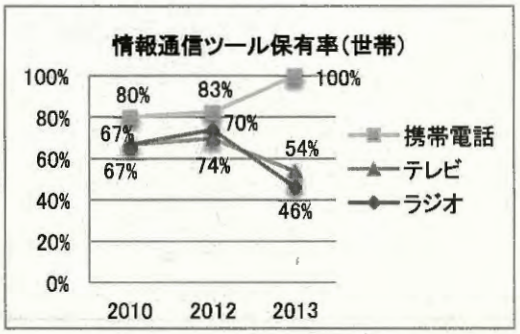
全調査で携帯電話の保有率は 8 割以上あり、第 3 回(2013)調査では 100%(全世帯が所有)に達した。ラジオとテレビの保有率は、第 3 回(2013)調査でそれぞれ 46%、54%だったが、保有率は徐々に下がってきている。

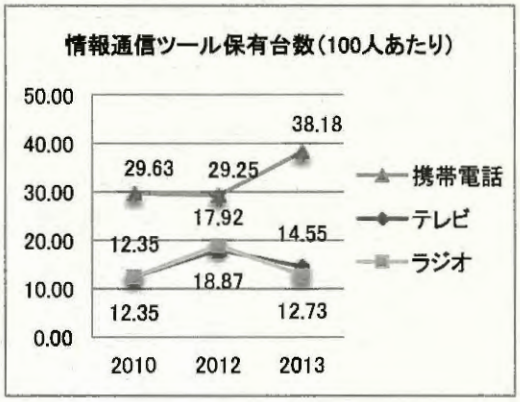
保有台数(100 人あたり)は第 3 回調査で携帯電話が 38.18 台、テレビは 14.55 台、ラジオは 12.73 台となった。いずれもナワンガルア村に比べて倍近い数値となっている。

また対象村の通信環境について、携帯電話は、国内携帯電話サービス 3 社(Vodafone、Digicel、Inkk)が受信可能である。また、テレビ放送およびラジオ放送ともに問題なく受信できる。

表 3.3-4 情報通信ツールの保有状況(保有世帯数、保有個数)

調査対象村		ナソロ村		
調査実施年		2010	2012	2013
調査世帯数		15	23	13
調査人口		81	106	55
保有世帯数(世帯)(保有率)	ラジオ	10	17	6
		67%	74%	46%
	携帯電話	12	19	13
		80%	83%	100%
	テレビ	10	16	7
		67%	70%	54%
	インターネットデバイス	-	-	0
		-	-	0%
保有人口(総数)(100 人あたり保有台数)	ラジオ	10	20	7
		12.35	18.87	12.73
	携帯電話	24	31	21
		29.63	29.25	38.18
	テレビ	10	19	8
		12.35	17.92	14.55
	インターネットデバイス	-	-	0
		-	-	0.00





(4) 村の重要事項／課題

村における一般的な関心事項を調査し、その中での「自然災害」の位置付けを確認した。

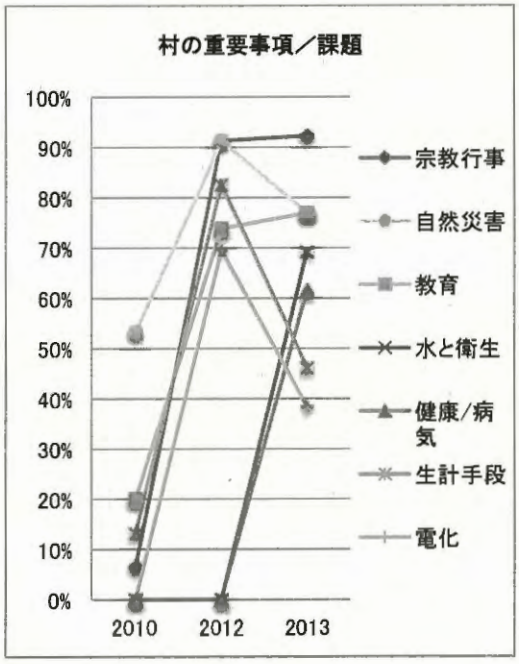
第1回(2010)調査では、本設問に対する回答を自由に記載してもらい、第2回(2012)以降は、第1回の結果を踏まえて抽出した代表的な事項／課題(Important Matter/issue)をいくつか選択肢として挙げておき、その中から複数選ぶ形式とした。

第1回調査では、「自然災害」が53%で最多となり、次いで「教育」(20%)、「生計手段」(13%)となった。複数選択式とした第2回でも「自然災害」(91%)は、「宗教行事」(91%)と並んで最多となったが、他の選択肢である「生計手段」(83%)、「教育」(74%)、「電化」(70%)も高い比率となった。第3回(2013)調査では、「宗教行事」(92%)が最多で、次に「自然災害」(77%)と「教育」(77%)、新たに選択肢に加えた「水と衛生」(69%)、「健康／病気」(62%)が続いた。一方で「生計手段」(46%)と「電化」(38%)が減少した。

全調査を通じて、**「宗教行事」、「教育」、「自然災害」が村人にとって最大の関心事項**であったと言える。

表 3.3-4 村の重要事項／課題

調査対象村		ナソロ村		
調査実施年		2010	2012	2013
調査世帯数		15	23	13
村の重要事項／課題回答数(世帯)(比率)	宗教行事	1	21	12
		7%	91%	92%
	教育	3	17	10
		20%	74%	77%
	健康/病気	0	0	8
		0%	0%	62%
	水と衛生	0	0	9
		0%	0%	69%
	電化	0	16	5
		0%	70%	38%
	生計手段	2	19	6
		13%	83%	46%
	自然災害	8	21	10
		53%	91%	77%
	その他	1	1	0
		7%	4%	0%



(5) 被災(サイクロン／洪水)経験

a. 被災世帯数

対象村における過去の被災経験(サイクロン／洪水)として、被害状況(被災世帯数、被害の内容)を確認した。

第1回(2010)から第3回(2013)調査まで、複数選択式の設問とした。また、第1回の結果を踏まえて、第2回以降は選択肢を追加した。

対象村の洪水／サイクロン被災率は高く(93%、100%、77%)、過去の洪水(2009 年、2012 年)では、被災世帯の 9 割以上が畑(耕作地)、家屋、および調理器具へ被害を受けている。特に全世帯が被災した 2012 年洪水では、畑への被害は被災世帯の 100%、さらに家屋と調理器具への被害も 96%に達しており、村の中心部では、ほとんどの世帯が浸水した状況を物語っている。また強風による被害が多数報告されているサイクロン(2012)では、畑と家屋への被害が 80%で最大となっている。実際に、飛んできた木がコミュニティ・ホールのドアのガラスを破損している。

前述のとおり、「家屋」や「調理器具」への被害対策としては、強風に耐える屋根(素材、補強、施工方法など)、高床式、また水没しない高さの棚を作るなど、家屋構造の改善が有効である。

表 3.3-5 過去の被災経験(被害状況)

調査対象村		ナソロ村		
調査実施年		2010	2012	2013
調査世帯数		15	23	13
対象災害		洪水 2009 年 1 月	洪水 2012 年 1 月／3 月	サイクロン 2012 年 12 月
被災世帯数		14	23	10
		93%	100%	77%
被害内訳 (世帯) (比率)	人的被害	0	−	−
		0%	−	−
	家屋	9	22	8
		64%	96%	80%
	調理器具	−	22	4
		−	96%	40%
	畑	14	23	8
		100%	100%	80%
	ボート	−	0	0
		−	0%	0%
	その他	12	0	2
		86%	0%	20%

b. 早期警報受信世帯数

被災時における早期警報受信状況(受信世帯数、受信手段)を確認した。

第1回(2010)から第3回(2013)調査まで、複数選択式の設問とした。プロジェクトで導入した「ハンドサイレン」や「拡声器(Loud-Hailer)」については、第2回(2012)調査以降に選択肢として追加した。

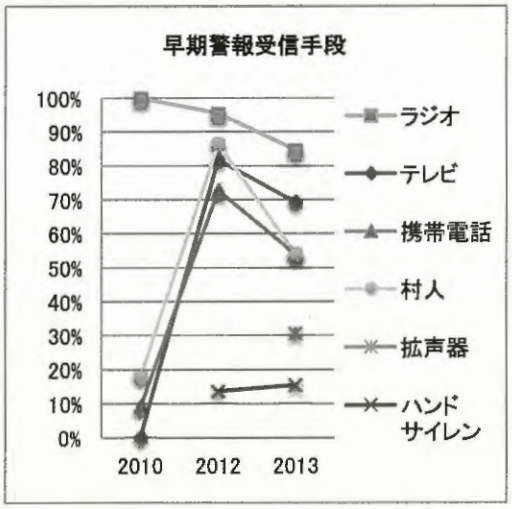
毎回、「早期警報受信世帯数」は増加し、第3回で100%に達している。これは、プロジェクトによって、簡易型水位計／雨量計を利用したコミュニティレベルの洪水早期警報体制が構築されるなど、早期警報に対する村人の認知／理解が深まったことに起因すると考えられる。

「早期警報受信手段」は、警報を受信した世帯における受信手段(複数回答)を表している。第1回から第3回まで、「ラジオ」による警報受信が最多となっている。次いでテレビとなっており、テレビ所有率が比較的高い対象村の特徴が表れている。

一方でハンドサイレンや拡声器、また村人どうしによる伝達も、早期警報手段として認知されつつある。今後も簡易型水位計などを利用したコミュニティレベルの洪水早期警報は、国レベルの警報を補完する意味でも必要である。

表 3.3-6 過去の被災経験(早期警報受信状況)

調査対象村		ナソロ村		
調査実施年		2010	2012	2013
調査世帯数		15	23	13
対象災害		洪水 2009年1月	洪水 2012年1月/3月	サイクロン 2012年12月
早期警報受信世帯数		11	22	13
		73%	96%	100%
早期警報受信手段内訳(世帯)(比率)	ラジオ	11	21	11
		100%	95%	85%
	携帯電話	1	16	7
		9%	73%	54%
	テレビ	0	18	9
		0%	82%	69%
	新聞	-	-	2
		-	-	15%
	ハンドサイレン	-	3	2
		-	14%	15%
	拡声器	-	-	4
		-	-	31%
	村人	2	19	7
		18%	86%	54%
	公共スピーカー	-	-	1
		-	-	8%
	パトロールカー	-	-	0
		-	-	0%
	その他	0	0	0
		0%	0%	0%



c. 避難世帯数

被災時における避難状況(避難世帯数、避難場所、避難のタイミング)を確認した。

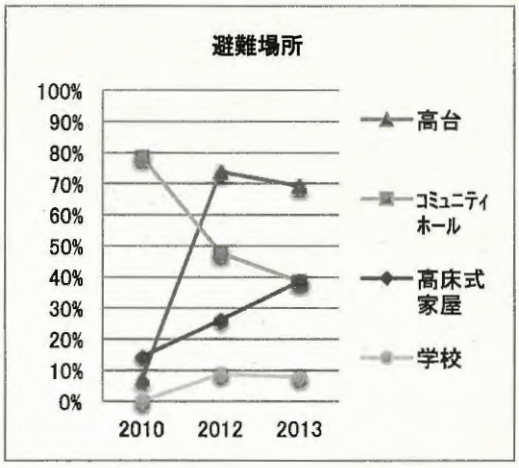
第1回(2010)から第3回(2013)調査まで、複数選択式の設問とした。また、第1回の結果を踏まえて、第2回以降は選択肢を追加した。

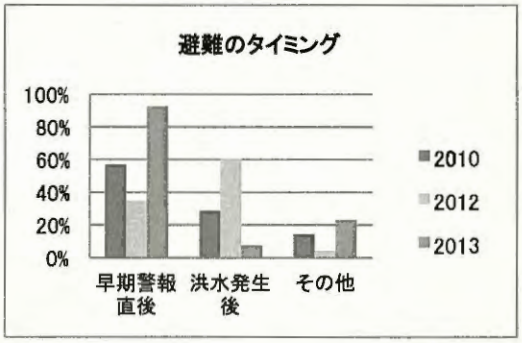
全ての調査で、「避難世帯数」は非常に高い(93%～100%)。村のすぐ近くに高台がある対象村では、避難行動は定着している。また、避難した場所については、2009 年洪水では「コミュニティ・ホール」が8割を占めたが、2012年洪水では「高台」が74%で最多となっている。対象村で洪水が発生した場合、中心部の世帯はまず「コミュニティ・ホール」へ集まり、状況を見て「高台」へ異動するという二段階避難の方法をとっている。2012 年洪水は、「コミュニティ・ホール」も浸水しており、多くの世帯が「高台」へ移動せざるを得なかったと考えられる。

「避難のタイミング」については、「早期警報直後」と回答した世帯の比率が中(57%)→低(35%)→高(92%)と変遷している。2012年3月の洪水は未明に発生しており、眠っていた住民たちは避難が遅れたという。一方でサイクロン(2012)の場合、早い段階で警報が出ており、92%の早期避難につながったと考えられる。

表 3.3-7 過去の被災経験(避難状況)

調査対象村		ナソロ村		
調査実施年		2010	2012	2013
調査世帯数		15	23	13
対象災害		洪水 2009 年 1 月	洪水 2012 年 1 月／3 月	サイクロン 2012 年 12 月
避難世帯数		14	23	13
		93%	100%	100%
避難場所内訳(世帯)(比率)	コミュニティホール	11	11	5
		79%	48%	38%
	教会	0	0	0
		0%	0%	0%
	高床式家屋	2	6	5
		14%	26%	38%
	高台	1	17	9
		7%	74%	69%
	学校	0	2	1
		0%	9%	8%
	その他	0	1	0
		0%	4%	0%
避難のタイミング内訳(世帯)(比率)	早期警報直後	8	8	12
		57%	35%	92%
	洪水発生後	4	14	1
		29%	61%	8%
	その他	2	1	3
		14%	4%	23%





(6) 取り組むべき洪水被害軽減策

「洪水被害軽減策(Mitigation)」についての一般的な考えを確認した。

第 1 回(2010)調査では、「構造物対策」、「早期警報システムの向上」、「早期避難」、「その他」から複数選択式の設問とした。結果、ナワンガルア村と同様に、選択肢にはなかった「河床浚渫(Dredging)」という回答が 60%で最多となった。村人によれば、政府の支援によって 1990 年代からバ川で幾度か河床浚渫が行われているとのこと。第 2 回(2012)以降は、「外部からの支援を受けて実施可能な対策(公助)」に範囲を絞った設問としたため、選択肢の中から「早期避難」を外して、「河床浚渫」と「対策なし」を加えた。

全調査を通じて、「河床浚渫」に対する村人の期待は高い。また第 2 回は、「早期警報システム向上」(87%)、「構造物対策」(78%)もかなり高くなっている。前述のとおり、2012 年洪水では避難が遅れた住民が多かったこと、また、2012 年洪水によって川沿いの法面が一部崩れるなどの被害が出ていたことが、調査結果に表れたと考えられる。

表 3.3-8 取り組むべき洪水被害軽減策

調査対象村		ナソロ村		
調査実施年		2010	2012	2013
調査世帯数		15	23	13
取り組むべき軽減策内訳(世帯)(比率)	構造物対策	4	18	8
		27%	78%	62%
	早期警報システム向上	6	20	7
		40%	87%	54%
	早期避難	0	−	−
		0%	−	−
	河床浚渫	9	20	9
		60%	87%	69%
	対策なし	0	1	1
		0%	4%	8%
	その他	0	0	0
		0%	0%	0%
	無回答	0	0	0
		0%	0%	0%

(7) 洪水への備え

「洪水への備え(Preparedness)」についての一般的な考えを、特に「自分たちで実施可能な対策(自助・共助)」に範囲を絞って確認した。

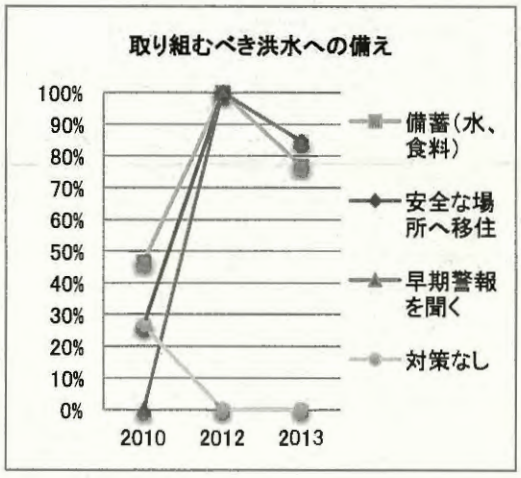
第1回(2010)調査では、本設問に対する回答を自由に記載してもらい、第2回(2012)以降は、第1回の結果を踏まえて複数選択式とした。

第1回では、「備蓄」(47%)が最多で、次に「安全な場所へ移住」(27%)と「対策なし」(27%)が同率であった。第2回では、主な選択肢3つとも全世帯(100%)が選んでいる。早期避難のための基本事項である「備蓄」と「早期警報を聞く」について、全世帯が理解している。また対象村の特徴(すでにほとんどの世帯が近くの高台に別宅を所有している)から、「安全な場所へ移住」は、現状に沿った対策として全世帯が選択したと考えられる。

「対策なし」と回答した世帯が、第2回、および第3回では0になったことも、住民たちの前向きな姿勢の現れであり、プロジェクトの効果と考えられる。

表 3.3-9 取り組むべき洪水への備え

調査対象村		ナソロ村		
調査実施年		2010	2012	2013
調査世帯数		15	23	13
取り組むべき備え内訳(世帯)(比率)	備蓄(水、食料)	7	23	10
		47%	100%	77%
	安全な場所へ移住	4	23	11
		27%	100%	85%
	早期警報を聞く	0	23	11
		0%	100%	85%
	対策なし	4	0	0
		27%	0%	0%
	その他	0	1	0
		0%	4%	0%
	無回答	0	0	0
		0%	0%	0%



(8) 防災活動への参加経験

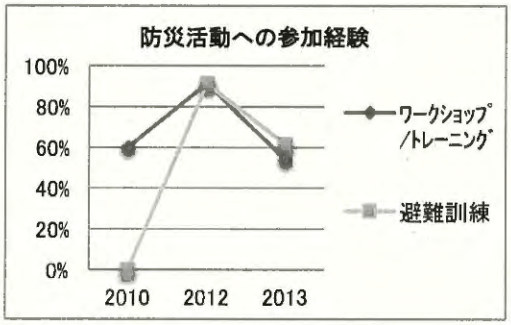
防災関係の活動／イベントへの参加経験を確認した。

第 1 回(2010)から第 3 回(2013)調査まで、「ワークショップ／トレーニング」、「避難訓練」、「その他」からの複数選択式の設問とした。

対象村では、Red Cross(2009 年)などの活動実績があり、「ワークショップ／トレーニング」は第 1 回調査から参加経験率が高かった(60%)。一方で、第 1 回は参加経験世帯がいなかった「避難訓練」(0%)が、プロジェクト活動を通じて参加率が高まり、第 2 回で 91%、第 3 回で 62%に達した。

表 3.3-10 防災活動への参加状況

調査対象村		ナソロ村		
調査実施年		2010	2012	2013
調査世帯数		15	23	13
参加した防災活動内容（世帯）（比率）	ワークショップ/トレーニング	9	21	7
		60%	91%	54%
	避難訓練	0	21	8
		0%	91%	62%
	その他	0	0	0
		0%	0%	0%



(9) 将来の避難行動

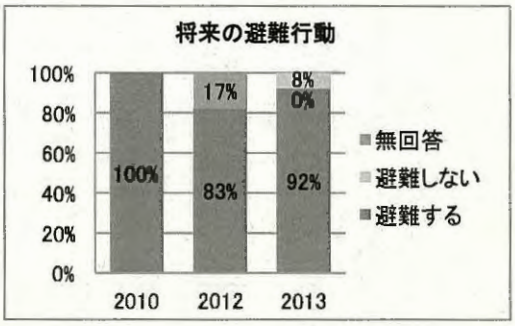
「次回の洪水発生時に、避難するかどうか」の意思(Yes/No)、また、「避難しない」と回答した場合の理由を確認した。

「避難する」と回答した世帯は、第 1 回(2010)調査で 100%、第 2 回(2012)は 83%、第 3 回(2013)が 92%と、いずれも高い比率となっている。

3 回の調査を通じて「避難しない」と回答したのは、第 3 回の 1 世帯のみであった。その理由は「安全な場所に自宅を建てた」ことであった。

表 3.3-11 将来の避難行動

調査対象村		ナソロ村		
調査実施年		2010	2012	2013
調査世帯数		15	23	13
避難する意思(世帯)(比率)	避難する	15	19	12
		100%	83%	92%
	避難しない	0	0	1
		0%	0%	8%
	無回答	0	4	0
		0%	17%	0%



(10) 早期警報システムへの評価

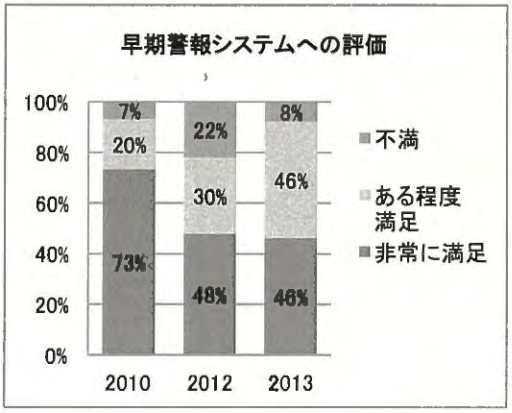
国レベレル、コミュニティレベルを含めた早期警報システムに対する住民の満足度を確認した。設問は「非常に満足」、「ある程度満足」、「不満」の中から択一式とした。

第 1 回(2010)調査で、「非常に満足」と「ある程度満足」を合わせると 93%あったが、第 2 回(2012)では 78%に下がり、逆に「不満」が 7%から 22%に上昇した。そして第 3 回(2013)には「非常に満足」と「ある程度満足」を合わせて 92%へ再上昇し、「不満」は 8%へ減少した。

ちなみにナワンガルア村の本設問で説明した「複数で『Yes』と答えるケース」については、第 2 回、第 3 回ともに、1 世帯のみであった。どちらも「ある程度満足」に分類した。

表 3.3-12 早期警報システムへの満足度

調査対象村		ナソロ村		
調査実施年		2010	2012	2013
調査世帯数		15	23	13
早期警報システムへの満足度(世帯)(比率)	非常に満足	11	11	6
		73%	48%	46%
	ある程度満足	3	7	6
		20%	30%	46%
	不満	1	5	1
		7%	22%	8%
	無回答	0	0	0
		0%	0%	0%



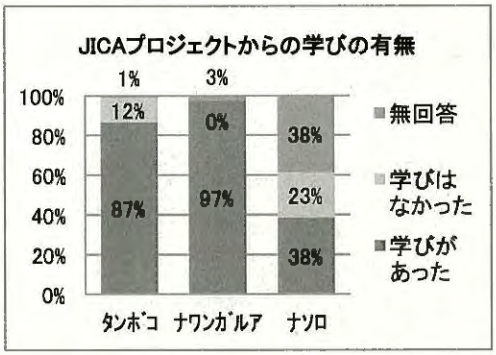
3.4 JICA プロジェクトについて [ソロモン諸島・フィジー]

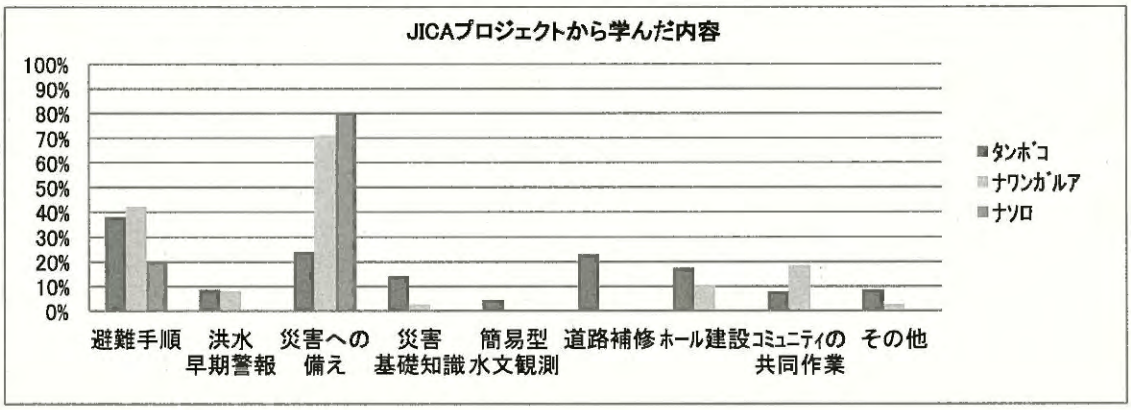
(1) JICA プロジェクトの効果

a. プロジェクトからの学び

表 3.4-1 JICA プロジェクトからの学び

調査実施年		2013		
調査対象村		ソロモン諸島	フィジー	
		タンボコ村	ナワンガルア村	ナソロ村
調査世帯数		106	39	13
学びの有無（世帯）（比率）	学びがあった	92	38	5
		87%	97%	38%
	学びはなかった	13	0	3
		12%	0%	23%
	無回答	1	1	5
		1%	3%	38%
学びがあった世帯		92	38	5
		87%	97%	38%
学んだこと内訳（世帯）（比率）	避難手順	35	16	1
		38%	42%	20%
	洪水早期警報	8	3	0
		9%	8%	0%
	災害への備え	22	27	4
		24%	71%	80%
	災害基礎知識	13	1	0
		14%	3%	0%
	簡易型水文観測	4	0	0
		4%	0%	0%
	道路補修	21	0	0
		23%	0%	0%
	ホール建設	16	4	0
		17%	11%	0%
	コミュニティの共同作業	7	7	0
		8%	18%	0%
	その他	8	1	0
		9%	3%	0%

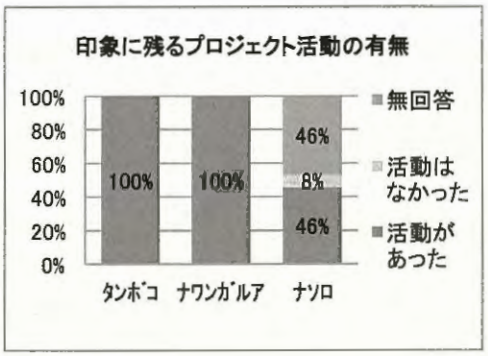


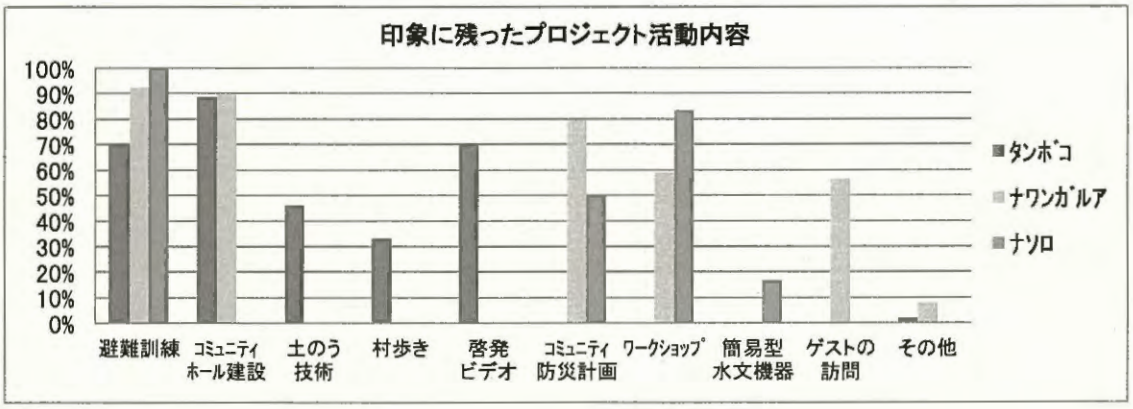


b. 印象に残る活動

表 3.4-2 JICA プロジェクトで印象に残る活動

調査実施年		2013		
調査対象村		ソロモン諸島	フィジー	
		タンボコ	ナワンガルア	ナソロ
調査世帯数		106	39	13
印象に残る活動の有無（世帯）（比率）	活動があった	106	39	6
		100%	100%	46%
	活動はなかった	0	0	1
		0%	0%	8%
	無回答	0	0	6
		0%	0%	46%
印象に残る活動があった世帯		106	39	6
		100%	100%	46%
印象に残った活動内訳（世帯）（比率）	避難訓練	74	36	6
		70%	92%	100%
	コミュニティホール建設	94	35	–
		89%	90%	–
	土のう技術	49	–	–
		46%	–	–
	村歩き	35	–	–
		33%	–	–
	啓発ビデオ	74	–	–
		70%	–	–
	コミュニティ防災計画	–	31	3
		–	79%	50%
	ワークショップ	–	23	5
		–	59%	83%
	簡易型水文機器	–	–	1
		–	–	17%
	ゲストの訪問	–	22	0
		–	56%	0%
	その他	2	3	0
		2%	8%	0%





(2) JICA プロジェクトのインパクト

表 3.4-3 JICA プロジェクトを通じた考え・行動の変化

調査実施年		2013		
調査対象村		ソロモン諸島	フィジー	
		タンボコ	ナワンガルア	ナソロ
調査世帯数		106	39	13
考え・行動の変化の有無（世帯）（比率）	変化があった	82	15	3
		77%	38%	23%
	変化はなかった	22	22	3
		21%	56%	23%
	無回答	2	2	7
		2%	5%	54%
考え・行動が変わった世帯		82	15	3
		77%	38%	23%
変化した考え・行動内訳（世帯）（比率）	災害対策意識向上	29	11	2
		35%	73%	67%
	共同作業への参加	30	3	0
		37%	20%	0%
	助け合う意識向上	5	2	0
		6%	13%	0%
	生活態度	5	1	0
		6%	7%	0%
	移住	3	0	0
		4%	0%	0%
	耕作地の選定	2	0	1
		2%	0%	33%
	その他	8	0	0
		10%	0%	0%