

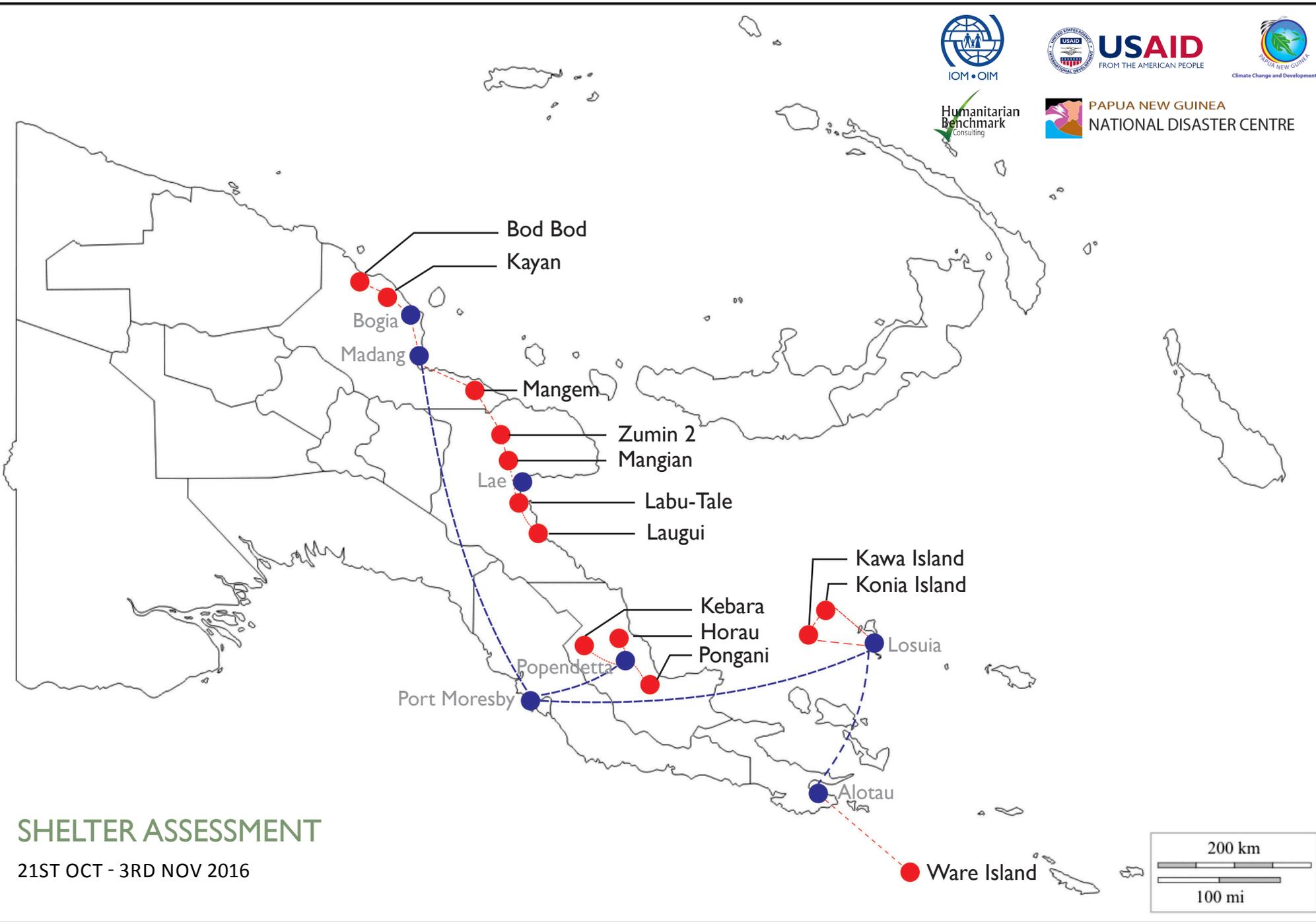
# SHELTER ASSESSMENT REPORT

21ST OCT - 3RD NOV 2016



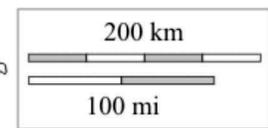
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Horau	
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Pongani	



# SHELTER ASSESSMENT

21ST OCT - 3RD NOV 2016



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## INTRODUCTION / BACKGROUND

In October 2016, Humanitarian Benchmark Consulting (HBC) was contracted by IOM to conduct 10 shelter assessments in the provinces of Madang, Morobe, Oro and Milne Bay, with a focus on communities that have been affected by, or are vulnerable to the effects of, bush-fires, flooding, tidal surges and severe winds / cyclones.

This assessment report details preliminary observations / findings, an overview of existing DRR measures, and perceived risks identified by communities related to housing / shelter. Final technical conclusions from the shelter assessments will be presented as a separate document that will accompany the 10 key messages for safe shelter.

Findings from these assessments will inform a series of guidance documents and training manuals: identifying vulnerabilities in existing rural shelter typologies and providing advice on how to best mitigate risks of extreme weather and natural hazards on shelter and settlements in Papua New Guinea.

Prior to the shelter assessments, meetings were held in provincial centres with provincial works architects, local / national government, the Office of Climate Change and Development (OCCD), and the National Disaster Centre (NDC). Preliminary discussions included:

- Programme objectives, assessment methodology, and types of information to be collected
- Existing shelter programmes, CBDRM plans, and DRR strategies
- Shelter and DRM training
- Land / house ownership information
- Building codes and housing information
- Major issues and trends in housing and settlements
- The role of gender in housing
- Issues of climate change and severe weather, and associated risks on rural communities
- Government aspirations in regards to housing and settlement
- Traditional customs, beliefs and specific considerations within each of the selected provinces
- Evacuation centres and strengthening existing infrastructure
- Vulnerable populations

# SHELTER ASSESSMENT

21ST OCT - 3RD NOV 2016



Humanitarian  
Benchmark  
Consulting



USAID  
FROM THE AMERICAN PEOPLE



Climate Change and Development Authority



PAPUA NEW GUINEA  
NATIONAL DISASTER CENTRE

## ASSESSMENT METHODOLOGY

Community consultation sessions and logistics were coordinated by IOM with 1-2 hours allocated for each location. Community meetings were held prior to individual interviews - to discuss interview methodology, objectives of the assessments, and discussions around existing CBDRM plans and hazard mapping where available.

Albert Milala from the Office of Climate Change and Development (OCCD), Simon Kafu (IOM), Fabian Prideaux (HBC) and Christina Titisari (HBC) were present for the shelter assessments. Kaigabu Kamnanaya from the National Disaster Centre (NDC) accompanied the assessment team in Kawa and Konia Islands, Milne Bay.

Interviews were conducted with individual households / small focus groups in Tok Pisin, English or local dialects (translated). HBC interviewed a range of community members, youths and local carpenters, with Christina (HBC) focusing on vulnerable populations and the role of women in shelter. A small selection of houses from each community was selected, and documented through photos, technical observations and discussions with house owners.

RESPONDENTS:  
DEMOGRAPHIC



7%  
17%  
24%  
14%

AGE

0-17  
17-30  
30-45  
45+

7%  
5%  
14%  
12%



### Assessments seek to identify:

- Risks and impact analysis for shelter, in relation to severe weather and natural hazards
- Existing techniques used within the community to reduce the impact of natural hazards
- Existing housing typologies and construction types
- Traditional knowledge related to shelter
- Housing trends and community / individual aspirations
- Shelter challenges identified by the community
- Existing construction knowledge / capacity
- Gaps in technical understanding
- Construction methods, materials and tools used
- Vulnerabilities identified in existing houses
- Access to materials and tools
- Environmental factors and considerations
- The role of gender in shelter
- Vulnerable groups within communities
- Evacuation points and existing CBDRM plans



## GENERAL OBSERVATIONS

- Population growth, frequent natural disasters, and environmental factors such as logging and palm oil plantations are putting strain on local resources. As a result, communities are using lower quality materials and building methods that are more prone to damage in extreme weather conditions and natural disasters.
- Most people interviewed noted that extreme weather events were happening on a more regular basis and were far less predictable.
- 'Modern' building materials and techniques are being implemented in villages, but without the required tools and technical knowledge. As a result, new style houses are often weaker and more vulnerable to damage than the traditional buildings of the region.
- Communities are often poorly sited in relation to natural hazards, either due to land limitations or other factors
- Buildings are often poorly orientated for winds / natural hazards.
- Most communities identified termites (white ants) as their biggest shelter problem
- There are large quantities of CGI roofing throughout communities, but individuals lack the technical information or resources to correctly fasten the CGI. Most CGI is badly fixed to the structure, and poses a high risk in cyclone areas. If not fastened correctly, CGI roofing has the potential to be much more dangerous than lightweight roofing materials.
- Good overall skills base across all of the communities, but lacking fine carpentry skills.



## GENERAL OBSERVATIONS (CONTINUED)

- People are quick to adapt and change their building style and materials when problems arise, although often don't have the technical skills to fully resolve issues. Partial solutions with inherent weaknesses will then be copied and adopted by individuals within the community.
- Communities often have the solutions to the problems at hand, but aren't able to implement solutions because they have limited time available to spend on their house, or the solution is too costly.
- There is a general lack of maintenance for housing. Often only the roof is maintained.
- People are very receptive to the idea of participating in shelter training that would help them build skills to strengthen their houses.
- Within communities, if a person doesn't have the capacity to build their own house, youths and other community members will assist in the construction of that particular house.
- Areas with abundant resources often neglect / don't maintain buildings. There is the perception that they can easily be reconstructed.
- Most communities only have 1 or 2 types of house construction, and use the same materials and resources for each building, even if there are many different resources available in the local area. As a result, there is a heavy strain put on particular resources, while others are underutilised.

# LABU-TALE MOROBE PROVINCE

SHELTER ASSESSMENT : 21ST OCT 2016

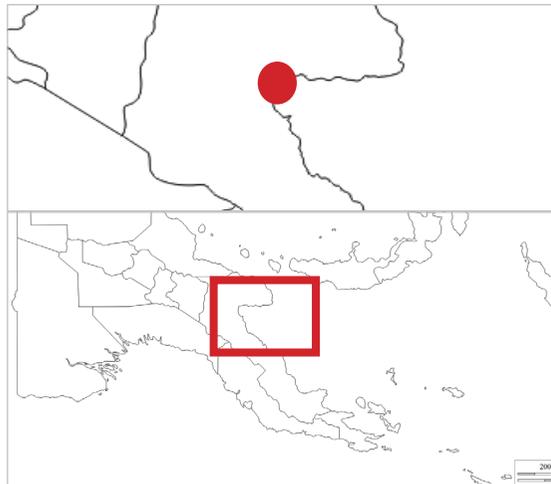


PHOTO : FABIAN PRIDEAUX

## RISKS IDENTIFIED BY COMMUNITY

	<b>RISK</b>	<b>IMPACT</b>
FLOOD	HIGH	HIGH
TSUNAMI	LOW	VERY HIGH
CYCLONE	HIGH	HIGH
HIGH WIND	MEDIUM	MEDIUM
FIRE	LOW	HIGH
KING TIDE	HIGH	HIGH
EARTHQUAKE	MEDIUM	HIGH
VOLCANO	-	-

## Shelter challenges

### Identified by community

- High groundwater, limited post depth
- Termite problems
- Aren't able to protect from wind
- Difficult to find materials for posts
- Land shortage, only beach locations
- Land ownership issues
- High density of housing, fire danger

## DRR measures identified by community

- They changed orientation of buildings for the wind. But now winds are too unpredictable
- Use rope to tie the roof, but only when high winds predicted
- Most buildings are on (low) posts to protect from flooding

## Technical observations

- Construction resources available
- Good overall construction knowledge
- Lots of under maintained buildings with high risk of wind damage
- Timber offcuts are used for construction, while high grade timber is sold
- Occasionally use treated timber

# LAUGUI MOROBE PROVINCE

SHELTER ASSESSMENT: 22ND OCT 2016



## RISKS IDENTIFIED BY COMMUNITY

	RISK	IMPACT
FLOOD	VERY LOW	MEDIUM
TSUNAMI	LOW	VERY HIGH
CYCLONE	HIGH	HIGH
HIGH WIND	MEDIUM	MEDIUM
FIRE	LOW	MEDIUM
KING TIDE	HIGH	HIGH
EARTHQUAKE	MEDIUM	HIGH
VOLCANO	-	-



PHOTO: FABIAN PRIDEAUX

### Shelter challenges

#### Identified by community

- High groundwater, limited post depth
- Termite problems
- Access to materials difficult, only mangrove available for posts
- Land shortage, only beach locations
- Land ownership issues
- High density of housing, fire risk
- Salt spray rusts CGI roofs quickly
- If local carpenters had certified trained, then house owners would listen to them.

### DRR measures identified by community

- Smoke sago roofs to protect them from weathering
- Constructed a coconut leaf barrier to protect from salt-spray
- Most buildings are on (low) posts to protect from flooding
- They paint CGI to make it last longer
- Brace walls and roofs with diagonal timber members.
- Occasionally use concrete footings, but too expensive for most buildings

### Technical observations

- They have carpenters in the community and often build 'modern' style houses
- Buying treated pine for posts
- Lots of under maintained buildings, high risk of damage
- No protection from the ocean
- Lack of tools to mill timber
- Know dangers of CGI roofing, but still don't tie down

# ZUMIN 2 MOROBE PROVINCE

SHELTER ASSESSMENT: 22ND OCT 2016



PHOTO : FABIAN PRIDEAUX

## RISKS IDENTIFIED BY COMMUNITY

	<b>RISK</b>	<b>IMPACT</b>
FLOOD	HIGH	VERY HIGH
TSUNAMI	-	-
CYCLONE	LOW	HIGH
HIGH WIND	HIGH	HIGH
FIRE	HIGH	VERY HIGH
KING TIDE	-	-
EARTHQUAKE	MEDIUM	MEDIUM
VOLCANO	-	-

### Shelter challenges

#### Identified by community

- Extreme flooding often damages houses and is increasing in frequency
- Don't have building materials or posts for additional buildings
- They would like to move locations, but close proximity to other villages means they can't
- Difficult to transport materials

### DRR measures identified by

#### community

- Use very high posts for buildings, but they sink.
- Used to build on the ground, but due to flooding, put on posts.
- Due to flooding, they are forced to shift houses to their garden area, as there is only limited land.

### Technical observations

- CGI not tied to the roof
- The most desirable upgrade of any building is CGI roofing
- Some buildings, such as the church as still built low to the ground.
- Poor material quality
- Older people don't build houses on stilts due to mobility issues

# KAYAN MADANG PROVINCE

SHELTER ASSESSMENT: 24TH OCT 2016



PHOTO : FABIAN PRIDEAUX

## RISKS IDENTIFIED BY COMMUNITY

	RISK	IMPACT
FLOOD	HIGH	HIGH
TSUNAMI	LOW	VERY HIGH
CYCLONE	MEDIUM	MEDIUM
HIGH WIND	MEDIUM	LOW
FIRE	LOW	LOW
KING TIDE	HIGH	VERY HIGH
EARTHQUAKE	HIGH	HIGH
VOLCANO	MEDIUM	MEDIUM

## Shelter challenges

### Identified by community

- Posts increasingly difficult to find
- No more materials in the bush, as the land has been cleared
- Big termite problem
- Posts easily rot in the moist ground
- Big winds a problem, many houses have fully collapsed in the past
- Cost of transport very high

## DRR measures identified by community

- Use coconut palm on roof to weigh down roof
- Large overhangs to protect against the rain
- Build large buildings to shelter multiple (displaced) families
- Use boiling water to kill termites when they are first discovered

## Technical observations

- Very large houses, sometimes one house for 3 families.
- Can quickly communicate between villages using garamut drum
- Use good quality, large posts.
- Well maintained buildings, and well ordered village layout.

# KAWA ISLAND MILNE BAY PROVINCE

SHELTER ASSESSMENT: 26TH OCT 2016



## RISKS IDENTIFIED BY COMMUNITY

	<b>RISK</b>	<b>IMPACT</b>
FLOOD	LOW	LOW
TSUNAMI	LOW	MEDIUM
CYCLONE	HIGH	VERY HIGH
HIGH WIND	HIGH	HIGH
FIRE	LOW	MEDIUM
KING TIDE	LOW	LOW
EARTHQUAKE	MEDIUM	MEDIUM
VOLCANO	-	-



## Shelter challenges

### Identified by community

- Limited resources / materials available on the island.
- Difficulties with transportation
- Land shortage an issue.
- Were given CGI, but not the tools and materials to make it useful.
- Poor soil quality, hard to plant trees
- Not enough nails, and hard to get
- Prefer CGI roofing over coconut leaves. Overuse of coconut leaves can damage the plant.

## DRR measures identified by community

- If strengthened - school and church are possible sites for cyclone evacuation area.
- Youths help PWD and single mothers to build houses.
- Some buildings are built directly into solid rock foundations. These buildings last considerably longer than buildings built in mud.
- Trees stop wind and waves reaching the village.

## Technical observations

- Share tools amongst community
- Use driftwood for construction
- Older people sleep on the ground, younger people generally have houses with posts.
- Very small houses
- Use mostly coconut timber
- Don't connect or tie down the structure, commonly use v-shape joints without any tying element

# KONIA ISLAND MILNE BAY PROVINCE

SHELTER ASSESSMENT: 26TH OCT 2016



## RISKS IDENTIFIED BY COMMUNITY

	<b>RISK</b>	<b>IMPACT</b>
FLOOD	LOW	MEDIUM
Tsunami	LOW	VERY HIGH
CYCLONE	HIGH	VERY HIGH
HIGH WIND	HIGH	HIGH
FIRE	MEDIUM	MEDIUM
KING TIDE	HIGH	VERY HIGH
EARTHQUAKE	MEDIUM	MEDIUM
VOLCANO	-	-



PHOTO : FABIAN PRIDEAUX

### Shelter challenges

#### Identified by community

- Limited materials available
- Difficulties with transportation
- Land shortage an issue
- Were given CGI, but not the tools and materials to make it useful
- Poor soil quality, hard to plant trees
- High water table, unable to use deep posts
- Can't escape king tide or tsunami
- Salt spray damages CGI quickly
- Limited access to kunai and sago

#### DRR measures identified by community

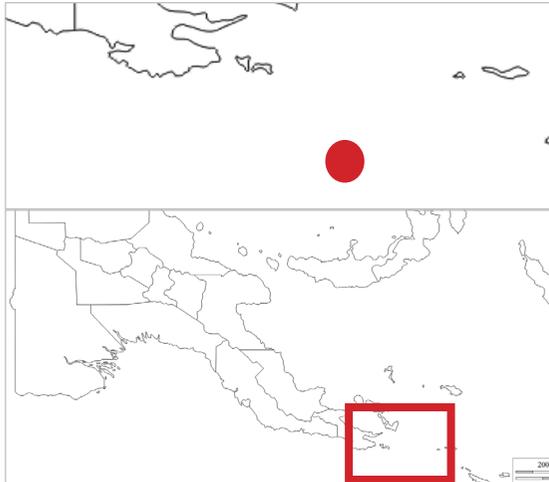
- Put up braces for big winds, and tie roof with rope and timber.
- Church used as evacuation point for the village.
- Very small doors and windows, to reduce the wind and rain from entering the house.
- Use deep foundations where possible.

#### Technical observations

- Generally use coconut leaf roofing, but it only lasts one year
- No apparent have termite problem.
- Don't adequately protect structure from the rain and it quickly rots
- Low maintenance on buildings
- Very small buildings
- No windows in houses
- Low kitchens, very flammable
- Mostly use coconut timbers
- Kwila and bamboo available on their garden island

# WARE ISLAND MILNE BAY PROVINCE

SHELTER ASSESSMENT: 28TH OCT 2016



## RISKS IDENTIFIED BY COMMUNITY

	<b>RISK</b>	<b>IMPACT</b>
FLOOD	LOW	LOW
TSUNAMI	LOW	VERY HIGH
CYCLONE	VERY HIGH	VERY HIGH
HIGH WIND	VERY HIGH	HIGH
FIRE	MEDIUM	HIGH
KING TIDE	HIGH	HIGH
EARTHQUAKE	MEDIUM	MEDIUM
VOLCANO	-	-



PHOTO : FABIAN PRIDEAUX

### Shelter challenges

#### Identified by community

- Not many materials available
- Land shortage issues
- Salt-spray damages CGI quickly
- Transportation issues
- Strong winds and cyclones occur on a regular basis.

### DRR measures identified by community

- They cover posts with dirty oil from Alotau to stop termites
- Are able to quickly recover after strong wind events
- Tie roof with rope in preparation for strong winds
- Lots of skilled workers on the island (although only familiar with one common building style)
- Existing beach front windbreak

### Technical observations

- Same building type throughout the community. Heavy reliance on sago walling and roof. No sago available near the island
- 1 meter deep posts
- Local member fully supports semi-permanent housing on island.
- Have a cyclone reinforced concrete model house in the community,
- No traditional houses in village

# HORAU ORO PROVINCE

SHELTER ASSESSMENT: 31ST OCT 2016



## RISKS IDENTIFIED BY COMMUNITY

	<b>RISK</b>	<b>IMPACT</b>
FLOOD	HIGH	VERY HIGH
TSUNAMI	-	-
CYCLONE	MEDIUM	MEDIUM
HIGH WIND	HIGH	MEDIUM
FIRE	HIGH	HIGH
KING TIDE	-	-
EARTHQUAKE	MEDIUM	HIGH
VOLCANO	MEDIUM	MEDIUM



PHOTO : FABIAN PRIDEAUX

### Shelter challenges

#### Identified by community

- Limited local materials available, most have been destroyed by floods, or replaced with palm oil plantations
- Close proximity to river / flooding
- Termite and carpenter bee problem
- Sandy soil hard to plant anything
- Transportation issues
- Use low quality building materials

#### DRR measures identified by community

- Build on high posts to protect from flooding
- They believe that buildings on tall stilts are potentially dangerous, but build them anyway
- Believe woven buildings are not safe, easy for criminals to break in.
- Put bracing in traditional buildings, but not in modern style houses.

#### Technical observations

- Surrounded by swamp
- Have skilled carpenters
- Use mostly nails, but poor connections.
- Use modern style walling, but bush materials, and butt joints
- Want to move to a modern building style, but cant afford.
- No/not many windows, this is to protect from cold and wind.
- Have materials for aid-post, but lack technical skills

# KEBARA ORO PROVINCE

SHELTER ASSESSMENT: 1ST NOV 2016



## RISKS IDENTIFIED BY COMMUNITY

	<b>RISK</b>	<b>IMPACT</b>
FLOOD	HIGH	HIGH
TSUNAMI	-	-
CYCLONE	VERY HIGH	VERY HIGH
HIGH WIND	VERY HIGH	HIGH
FIRE	MEDIUM	MEDIUM
KING TIDE	-	-
EARTHQUAKE	MEDIUM	MEDIUM
VOLCANO	-	-



PHOTO : FABIAN PRIDEAUX

### Shelter challenges

#### Identified by community

- Material shortage because of constant rebuilding after cyclones
- Cyclones happen 2 times a year
- Termites are a major issue
- Not enough locally available kunai grass / sago leaf. Often have to buy.
- Lack skills on how to make strong sago roofs
- Church is a safe refuge point, but the roof has blown off in the past

### DRR measures identified by community

- Use fire for warmth and to preserve the roof, but not where they sleep
- Planted some big trees for windbreaks, but they fell down and injured a child
- Use bracing in walls and roof
- Using woven palm oil and bamboo for walling

### Technical observations

- Curious about building houses with stones from river
- Only do maintenance after cyclone
- Leave the village when expecting a cyclone - shelter in garden houses
- Use weatherboard style hardwood for walling, cut with an axe and bush-knife.
- 'Men's houses' are usually very tall
- Bad positioning of houses for wind
- Sago roofing connected with bush-rope and cane.
- Don't tie the roof to posts

# PONGANI ORO PROVINCE

SHELTER ASSESSMENT: 2ND NOV 2016



Climate Change and Development Authority



## RISKS IDENTIFIED BY COMMUNITY

	RISK	IMPACT
FLOOD	HIGH	VERY HIGH
TSUNAMI	LOW	HIGH
CYCLONE	HIGH	HIGH
HIGH WIND	HIGH	MEDIUM
FIRE	VERY HIGH	HIGH
KING TIDE	MEDIUM	MEDIUM
EARTHQUAKE	MEDIUM	MEDIUM
VOLCANO	-	-



PHOTO : FABIAN PRIDEAUX

### Shelter challenges

#### Identified by community

- Flooding is a big issue. They are located between the river and the ocean
- Still have some local materials, but getting harder to find with population growth
- Carpenter bee and termite issues
- Houses not built in an organised way - no drainage etc. setup.

### DRR measures identified by community

- Don't have carpenters in village, but have good (base) building skills
- They increased CGI roof eaves to protect timber from rotting
- Use kwila posts to protect from termites.
- Some houses don't have windows. This protects from the rain / cold.
- Understand how to make stronger sago roofs, but don't have time

### Technical observations

- Same building type and materials used throughout the community
- Posts easily damaged from rot
- They wait until buildings fall down rather than maintaining them.
- Each clan had their own style of traditional housing, but this is no longer practiced in the village
- Boys move out and build their own houses when they are teenagers