

EMERGENCY SHELTER AND COLLECTIVE SHELTERING WORKING PAPER



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BACKGROUND

Papua New Guinea is exposed to a range of natural hazards - cyclones, floods, landslides, droughts, frost, earthquakes, tsunamis, king tides, volcanoes and seasonal fires. Climate change is expected to further exacerbate the risk of natural hazards by increasing the frequency and severity of extreme weather events. IOM has identified the quality and safety of *Shelter and Settlements* as a major factor in ongoing Disaster Risk Reduction (DRR) and preparedness strategies. This includes strengthening the capacity of member states to prepare for, respond to and recover from disasters and enhance the resilience of communities affected by natural disasters.

Due to the high frequency and impact of natural disasters in Papua New Guinea, many communities already have informal emergency shelter and evacuation strategies in place. It is important to identify and recognise these existing disaster management and evacuation procedures, and ensure that any ongoing emergency shelter strategies compliment and strengthen these local solutions.

IOM has been working in collaboration with the National Disaster Centre (NDC) and Provincial Disaster Centres (PDCs) to develop Community Based Disaster Risk Management (CBDRM) strategies for communities across 5 provinces. In addition to these activities, IOM and Humanitarian Benchmark Consulting (HBC) have conducted shelter assessments, and interviews with various community members, house owners and carpenters / builders. Assessments looked at; the disaster resistant characteristics of vernacular housing, community disaster preparedness, changing housing trends and how this may potentially affect household safety, community construction skills and capacity, and identification of safe and unsafe construction practices. Houses and community shelters were assessed on their capacity to provide safe shelter in the event of a natural disaster. Following these assessments, a series of safe shelter workshops and community participatory safe shelter awareness workshops were held in Morobe, Milne Bay, Oro and Bougainville, working with community members and their representatives to develop best practice examples of housing and settlement improvements for safer sheltering.

OVERVIEW

This paper explores emergency shelter and collective sheltering solutions in rural areas of PNG. It also investigates the challenges and risks associated with emergency collective centres / evacuation centres in the immediate aftermath of natural disasters.

Strategies for emergency sheltering should be developed in collaboration with key stakeholders; relevant government agencies and community level groups. Activities should align with CCCM and Shelter and Settlement strategies, improvement programmes and safe shelter awareness initiatives. Any purpose built evacuation structures should adhere to all relevant Building Regulations of Papua New Guinea, construction standards, rules and regulations.

Construction materials, techniques and technical capacity vary considerably across Papua New Guinea. Emergency sheltering strategies should always take into consideration and incorporate local customs, culture and architecture and build upon existing context specific knowledge. A participatory approach will maximise community involvement and promote the development of locally developed solutions that are resilient to local hazards, use locally available resources and knowledge.

When using schools, churches or infrastructure as evacuation centres, in addition to ensuring that structures are safe, it is essential that comprehensive, context specific planning be carried out, that ensures any measures put in place are appropriate to the context and location and that there is a clear schedule for closure. Refer to *THE MEND GUIDE: Comprehensive Guide for Planning Mass Evacuations in Natural Disasters*.

This paper should be read in conjunction with the following documents:

- *Shelter and Settlements – Concept Note (IOM/HBC, 2017)*
- *Community-Based Disaster Risk Management - Working Handbook (IOM, 2015)*
- *Vernacular Architecture Overview (HBC, 2016)*
- *Shelter Assessments - Technical Observations (HBC, 2016)*
- *Consultancy Inception Report (HBC, 2016)*
- *CCCM – Collective Centre Guidelines*
- *THE MEND GUIDE – Comprehensive Guide for Planning Mass Evacuations in Natural Disasters*

EMERGENCY SHELTER AND COLLECTIVE SHELTERING RECOMMENDATIONS

The following recommendations have been prepared by Humanitarian Benchmark Consulting (HBC), and are based on shelter assessments conducted by HBC and IOM in October / November 2016 and outcomes from community based participatory safe shelter awareness workshops conducted in early 2017. These are initial observations only, based on preliminary findings and reports in discussion with the IOM Emergency Response Coordinator and interviews with provincial and national disaster management authorities.

Four pillars have been identified for emergency shelter and collective sheltering solutions:

- I. CCCM and MEND training and capacity building of agency staff, national authorities and relevant stakeholders
- II. Assessments of existing community buildings, schools etc. Implementation of safe-construction principles, and establishment of ongoing monitoring and maintenance systems.
- III. Gender inclusive technical training for communities, and participatory safe shelter awareness programs that encourage youth involvement and empowerment of vulnerable populations
- IV. Identification of emergency sheltering solutions on a case-by-case basis

I. CCCM and MEND training and capacity building of agency staff, national authorities and relevant stakeholders

- **Capacity building and technical training** of IOM staff, shelter cluster members, government agencies and relevant stakeholders to increase awareness around CCCM and MEND activities

II. Assessments of existing community buildings, schools etc. Implementation of improvements and establishment of ongoing monitoring and maintenance systems

- **Assessments of community buildings and schools** through safe shelter workgroups; using a community based, participatory approach for the identification of unsafe practices. This should include identification of maintenance / monitoring activities.
- Provide support for **community driven implementation of improvements for community structures**; based on outcomes from safe shelter workgroups.
- **Establish monitoring and maintenance strategies for community buildings** at a community and local / national level, to ensure community buildings and schools remain safe and usable for the duration of their lifespan. This should involve community, local or national authorities where appropriate.

III. Gender inclusive capacity building and technical training for communities that encourage youth involvement and empowerment of vulnerable populations

- **Gender inclusive vocational technical training for communities**, using trainers from PASSA TOTs. Pilot the 10 key safe construction principles in relation to safe community buildings and schools. Key messages would act as a set of construction principals only, intended to complement existing Building Regulations and Codes

IV. Identification of emergency sheltering solutions on a case-by-case basis

Identification of community evacuation procedures and emergency sheltering strategies through community based participatory workgroups. Strategies should build upon existing systems and knowledge within the community. Ensure that proposed measures follow MEND and CCCM guidelines, and don't increase the risks and pressures placed on communities in the aftermath of a natural disaster event.

- If emergency collective centres / evacuation centres are proposed; ensure that solutions are appropriate for the local area, and there are suitable management systems and protocols in place.

EVACUATION CENTRES

Using CBDRM activities, communities are able to identify evacuation procedures and emergency shelter solutions relevant to the local area and context. Community hazard mapping and assessments should include a case-by-case analysis of existing emergency shelter responses to determine whether emergency collective shelters (evacuation centres) are needed. Evacuation centres need to be close enough to people's homes to be readily accessible in times of need, adequately cater for protecting essential household and livelihood assets and have clear plans in place to address potential risks from high density collective sheltering.

It is important to recognise that evacuation centre solutions aren't always suitable for the context, and if not properly planned, can result in a negative affect on the community, and delayed return to normality following a disaster event.

When selecting a building for use as an evacuation centre, it is crucial that a comprehensive management structure and strategy is in place that includes the planned closure of the evacuation centre. The following list outlines some of the major considerations when selecting a building for use as an evacuation centre:

- Ensure there is a clear plan for the closure of the evacuation centre
- Impact on current use should be considered (functioning school, church, etc)
- Disruption, reduction or cancellation of use or services should be avoided
- Dual use of educational facilities can cause serious protection risks for children and youths; these risks must be mitigated
- May cause damage to building property
- Coordination mechanisms for management and services should be in place prior to activation
- Structures must be safe, and must meet national and international construction standards
- Structures must be able to withstand the impact of natural hazards or other threats
- Accessible water and sanitation solutions within or outside the building (taking into consideration estimated capacity of the evacuation centre)
- Cooking facilities and accessibility to food crops
- Issues of displacement, distance from original house and food crops
- Considerations around gender, security, privacy and protection

Please refer to the *Collective Centres Guidelines* and CCCM Global Cluster website for a comprehensive list of considerations:

<http://www.globalccmcluster.org/system/files/publications/doc18990-contentido.pdf>

KEY SHELTER MESSAGES:

These messages are not immediately appropriate for vernacular housing styles with sacrificial building elements (found commonly throughout PNG). In these situations, strengthening certain structural elements could compromise the disaster resistance of the structure. Community developed, participatory safe shelter solutions will provide a more robust, appropriate and context specific housing / shelter solution.

In situations where corrugated iron, cement sheeting and plywood construction are used, a completely different construction methodology is required, with a strong structure to withstand additional wind loads placed on the building. In these scenarios, the key messages for safe construction provide a set of principles that can guide communities to develop their own context specific shelter solutions. These messages are based on perceived risks related to shelter identified during the shelter assessments. They do not encompass every technical issue identified, but rather try to generalise some of the major issues.

1. Be prepared
2. Choose a safe location
3. Use strong posts and deep foundations
4. Protect your structure and keep it maintained
5. If building with corrugated iron, plywood or cement sheeting, your building must be extra strong (see additional messaging)
6. ALWAYS tie down roofing iron as it is dangerous in a storm
7. Tie down from the bottom up
8. Brace against the storm
9. Make strong joints

1. BE PREPARED

- Understand the changing risks in your area and how they could affect your house. These might include: tsunamis, landslides, cyclones, strong winds, king tides, flooding, earthquakes or volcanoes.
- Minimise these risks, and start preparing your house now.
- Have a clear plan for safe shelter. Make sure there is a safe room / place to shelter in case of emergency – protected from strong winds and flying objects.
- Think carefully about each material used in your construction. Try to use materials that are abundant in your local area. Make sure there are enough local materials available for future houses. Plan for the future, and plant new trees if needed.
- Communication is vital: know the early warning signals, and follow emergency advice.

2. CHOOSE A SAFE LOCATION

- If possible, build your house away from known risks such as: bushfire prone areas, riverbanks, cliffs, unstable ground, flood areas and tidal zones.
- If your area has a history of flooding, make sure houses are built on stilts with deep footings, so that water can easily pass underneath.
- Protect your house from the wind using plants, trees and wind barrier structures.
- Ensure your house is safe from falling trees and blowing objects.
- Make sure your house is above the height of tidal surges / king tides.

3. HAVE STRONG POSTS AND DEEP FOUNDATIONS

- Use strong termite (white ant) resistant timbers for posts. Kwila and Garamut timber is commonly used, although other suitable timbers may be available locally.
- Posts should be deep enough in the ground to brace against being pushed over. Attach horizontal members to the bottom of your post (underground) to resist being pulled out or pushed over.
- If using concrete, steel or stone foundations, make sure they are buried deep for strength and tightly attached to the posts. Refer to building regulations for suggested depth.

4. PROTECT YOUR STRUCTURE AND KEEP IT MAINTAINED

- A well maintained building will last longer, and be better able to withstand severe weather.
- Ensure that your roof covers the entire structure from the weather. Direct sun and rain can quickly destroy materials. Replace damaged roofing before rain damages your structure.
- Check for water leaks and rot in your structure.
- Create drainage that leads away from your building, and make sure that rain doesn't run down your posts.
- Regularly check for termite (white ant) trails leading up from the ground. Remove infected timber and replace with new timber.

5. IF BUILDING WITH CORRUGATED IRON, PLYWOOD OR CEMENT SHEETING, YOUR BUILDING NEEDS TO BE EXTRA STRONG

- Most traditional walling and roofing allows wind to move through the structure. This reduces the amount of force placed on your structure. Corrugated iron, cement sheeting and plywood require a completely different construction style, with a very strong structure to withstand additional wind loads placed on the building. If using these materials, ensure adequate ventilation within the building.
- Make sure you have a good understanding of how to use corrugated iron, cement sheeting and plywood before starting construction. Understand the potential risks of using them in your structure.

6. ALWAYS TIE DOWN ROOFING IRON AS IT IS DANGEROUS IN A STORM

- Roofing iron can be much more dangerous than thatched roofing, and can cause damage if allowed to blow away in a strong wind or storm. Because of this, corrugated roofing iron should be properly tied down, with a strong structure that can handle increased forces.
- If you are using CGI on a temporary structure, it is important that it is securely tied down all the way to the ground. The structure should be braced, with strong joints, so that it is unable to blow away in the case of a strong storm.

7. TIE DOWN FROM THE BOTTOM UP

- In a strong wind, your house can be sucked apart or blown away by the wind. Tie every part of your building right through to the ground. Start thinking about this from the bottom up.
- Tie post down to the foundations, the floor joists down to the frame, the roof beams down to the posts and the roof battens down to the roof frame
- If a storm is approaching, use extra tie downs.

8. BRACE AGAINST THE STORM

- Bracing stiffens your structure, reducing the risk that it will collapse.
- Brace between posts and for each wall and roof element. Provide additional bracing around doors, windows and between roofing trusses or rafters. Brace as close to 45% as possible.
- Use galvanised steel strips, nailed timber, old rebar or thick galvanised steel wire. Ensure that it is securely fixed in multiple locations and provides a strong brace from pulling and pushing forces.

9. MAKE STRONG JOINTS

- Your house is only as strong as the weakest joint. Build every joint so that it can't be pushed or pulled apart. Be careful of nails that can pull upwards in a strong wind.
- Extend timber past the joints to stop nails splitting the timber
- Use multiple nails for each joint (on a skewed angle), screws, bolts or tied connections. Interlocking joints will also provide additional strength

FURTHER RESOURCES

The list below is a short selection of relevant resources, but is by no means comprehensive. Any activities should always adhere to humanitarian standards, and international best practice in Shelter and Settlements and Camp Management practices. There are a range of guidelines and standards that can be accessed through the Global Shelter Cluster and Global CCCM Cluster website. In addition these resources, a PNG Shelter Cluster dropbox has been created with relevant assessments, reports and resources. Please contact pmurorera@iom.int for access to the dropbox account.

- Organisation:** Global CCCM Cluster
Resource: MEND Guide
Link: http://www.globalccmcluster.org/system/files/publications/MEND_download.pdf
Description: A comprehensive guide for planning mass evacuations in natural disasters
- Organisation:** Global CCCM Cluster
Resource: Camp Management Toolkit
Link: <http://cmtoolkit.org>
Description: Camp Coordination and Camp Management tools and guidance documents
- Organisation:** IFRC
Resource: PASSA Manual and Toolkit
Link: www.ifrc.org/PageFiles/95526/publications/305400-PASSA%20manual-EN-LR.pdf
Description: Facilitation guide, PASSA activities, guide for managers, guide for volunteers and guide for artists.
- Organisation:** IFRC
Resource: PASSA Youth Manual and Toolkit
Link: <http://media.ifrc.org/ifrc/document/passa-youth-manual-and-toolkit/>
Description: Specifically designed for youth involvement. Facilitation guide, PASSA activities, guide for managers, guide for volunteers and guide for artists.
- Organisation:** IFRC
Resource: Shelter safety handbook
Link: www.ifrc.org/PageFiles/95526/publications/305400-Shelter%20safety%20handbook-EN-LR.pdf
Description: Basic information on safe construction practices
- Organisation:** Humanitarian Benchmark Consulting
Resource: Vernacular architecture overview
Description: A brief overview of vernacular architecture in PNG, to provide an introduction / overview for technical observations.
Link: www.dropbox.com/s/mx4e5fjztakt9t7/120216_vernacular%20architecture_report.pdf?dl=0
- Organisation:** Humanitarian Benchmark Consulting
Resource: Technical observations
Description: Shelter technical observations from the 2016 shelter assessments conducted by HBC and IOM.
Link: www.dropbox.com/s/nruimc2fyhclub1/161212_Technical%20Observations%20and%20Key%20Messages.pdf?dl=0