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Rapid Shelter Assessment Report
Sambava and Antalaha

Date: 21/03/2017

By: Joseph Ashmore (IOM Geneva), Giacomo Dei Rossi (IOM Madagascar)

This report is written one week after landfall of cyclone Enawo, following a rapid emergency assessment over three days in SAVA region, focusing around Antalaha where wind damage was highest. Field assessments were made along the road from Sambava to a point 20km south of Antalaha, and 15km inland to the Southest of Antalaha. During the course of this mission, meetings were held with UNDAC, OCHA, CARE, Red Cross, private sector, national authorities, and informal key informant interviews were held with cyclone affected people.

The objective of this assessment was to gain a deeper understanding of shelter needs and coping strategies and to inform IOM emergency programmes and shelter sectoral response.

All numbers are estimates unless source is stated

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Executive summary:

The cyclone made landfall to the north of Antalaha and caused significant damage to shelter, built infrastructure and to agricultural crop production (both food and cash crops – up to 50% of the 2017 vanilla crop is damaged). Although this report focuses on shelter, any response needs to be seen in the broader needs of cyclone affected people.

Emergency Shelter Needs

- **No families are sleeping in the open in SAVA.** However, **there remain significant shelter needs.**
- Along coast road, observed numbers of housing structures severely damaged between Samabava and Antalaha varied between less than 1% (in Samabava town) and 50% (within 20km North of Antalaha). Estimate average observed was around 20%.
- **The overall sector target** of 20,000 households combined lightweight and robust support packages **appears realistic** in relation to the needs.
- Damage to trees is localized. Although some plantations are heavily damaged. For most locations visited, less than 5% of trees had fallen.
- **Improved damage and needs data is required.** An improved understanding of "household" needs to be developed, particularly in more rural areas, to cope with the structure of family plots: with multiple structures used by different generations at a site.
- **Damage is primarily due to wind** (direct or falling objects). Some areas were flooded (primarily riverbanks). There were some stories of landslides but we did not observe any of these sites.
- **Evacuation centres in Antalaha are all officially closed.**

Self Recovery

- **Self recovery is taking place at a rapid pace**, (estimated 30-50% of houses) giving the external appearance of limited initial damage. However **many vulnerable households remain with inadequate shelter.**
- **Coping mechanisms for shelter resilience and recovery are strong**, however deep rooted shelter vulnerabilities exist and were exacerbated by the cyclone.
- **Markets appear functional along the coast road.** Inland access is still reduced.
- **Materials prices (natural and CGI) are around 25% higher than pre cyclone.**
- **Most of the fallen trees are not usable for construction purposes**. Timber salvage projects would be very challenging to implement given the negative experiences following the previous cyclone

Operating environment

- **Care needs to be taken with targeting households** for assistance and validating needs.
- Different shelter agencies should work in different valleys to avoid causing conflicting levels of assistance. They should also provide consistent support packages (ie the same number of tarpaulins per household)
- Transparent **feedback and complaints systems** will enable better targeting.
- In the longer term: **enhanced initial data collection is required** with formats that give more precision on housing damage, and better training and definitions for completing the forms.

- Shelter **programme implementation capacity is largely limited to two organisations** who are also providing assistance in multiple sectors. Agencies need to take care to ensure that these organizations do not become over-burdened.

Damage Estimates:

Data collected from 161 (out of 182) community disaster committees indicated 46,732 housing units were destroyed, 45,905 have lost their roofs, and 8,989 housing units flooded in the district (19/03/2017). However, this data is recognized to have limitations due to the data collection process and lack of clarity of housing damage definitions. Commonly, there are up to 4 housing units per household, and so damage data may mean that there is multiple counting at household level. Lack of definition means that a destroyed house can also be recorded as both damaged and flooded.

The Red Cross is currently conducting a registration, but the categories lack definitions and do not differentiate number of houses damaged / destroyed from households affected. The registration is only partial, in 8 out of 16 districts and only in selected Fucutanis.

Family structure

Example of a family grouping of houses: the main house is on the right, a roof that was removed before the cyclone is on the left, a house for older chidren (centre), kitchen/granary (centre back), structure being rebuilt (behind the kitchen). Household size is 6 people.

Families, including parents, children and grandparents often live in the same housing area which is often composed of three or more “houses”. This is particularly the case of rural areas, where the primary house contains parents and children under 15, and elders. Secondary structures house children over 15, girls over 13, for guests, as kitchens or a granaries.

In most cases families focused on trying to preserve the main house, and rebuild this first. Often one of the houses is rebuilt rapidly, and other structures will be rebuilt later or as resources become available.

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Observed Cyclone Resistance Details and failure points.

Several design details and strategies were identified that people use to reduce the vulnerability of their houses to cyclones. Projects looking to improve shelter resilience to future cyclones should look at numbers of households who are able to adapt these measures, and reasons why some people are not able to adapt them.

Removing walls and panels

Above: Roof and wall materials have been removed to safeguard the materials and provide shelter during the storm

Before the cyclone, many people removed roof and walls panels, putting them on the ground. In many cases the roofs were then used to make low level A-frame shelters under which people could survive the cyclone. After the cyclone roofs and wall panels are put back on the frame and damaged elements replaced. Several households are awaiting the end of the cyclone season before re-erecting their shelters.

Ability to make this adaptation depends on age of the materials – older materials will less likely be re-usable and less able bodies people will find the work harder. Given that many households have multiple structures, only one or two structures were prioritized.

Sandbags on the roof

Sacks of soil or sand are often put on top of corrugated iron roofs to weigh down the sheets and prevent them from blowing away.

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Bamboo battening on thatched roofs


As in the photographs above, often some external bamboo battening was fixed along the eaves

Tying roof sections down



Left: pegged joint joining the eaves to the post. Centre: tying down to a vertical post. Right: using netting to tie roofing battens to the eaves.

Tying roof sections down to the vertical columns with string or netting. Often however, the tie downs were not consistent across all joints that would experience force or were of inadequate materials.
In some cases people used wooden pegs.

Holding the roof down and maintenance during the cyclone

Often people remained in their houses and held the roof down with rope manually during the cyclone. However as families often have several housing structures, it is not possible for families to do this for all structures. One person we spoke with was staying with his brother in another village during the cyclone and cited this as a reason why his house failed.

Diagonal bracing in the roof

A minority of structures had internal diagonal roofing bracing. This is a good practice and should be replicated.

Bracing the walls structures

Shelter failure showing racking

Many of the shelters used bamboo or wooden cladding to make rigid walls reducing the need for bracing in the walls. However, often posts are buried insufficiently or rotten, and the cladding old or insufficiently fixed to create rigid walls.

Poor nailing of CGI

Failure of corrugated iron roofing

Many of the Corrugated Iron roofs – particularly verandas were poorly nailed down and hence failed. Additionally failure of Corrugated Iron roofs was caused by old sheets and lack of timber framing.

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Flooding

A village that floods regularly with heavy rains. To some degree raised floors mitigate this hazard.

Flooding was primarily due to locations of shelters, and mitigation was conducted by the construction of raised plinths or floors. In many case rain water could be drained quicker by construction of simple drainage and improved plinths. In many cases this is an annually recurring issue.

Local geography and danger of falling trees

Wind damage was higher in some locations than others, mainly due to orientation of the site. Although Only a few houses were seen to be have damaged by fallen trees, maintenance of trees near houses could reduce the risk of life threatening injuries due to falling trees in storms.

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Housing typologies

The vast majority of rural housing structures are timber framed, and construction quality is variable.

Below are some summary notes on common construction types observed. Houses are made from made from the locally available local materials, resources, and means. This can vary between villages as well as between families and individuals. In rural areas more construction is from locally harvested materials than in towns. A fuller assessment of housing damage by typology would help with programme design if corrugated iron is to be provided.

Floor
Flooring is either made of:

- Raised timber floor (this is the majority of rural houses)
- Concrete plinth (for those with additional resources);
- No flooring

Structure

- Rural areas more than 95% over private houses have timber frame with poles directly into the ground / plinth
- In urban areas there is a higher percentage of reinforced concrete / cement blocks
- In general the structure is reinforced by cladding that acts as a structural element when well built.

This house has a concrete plinth and uses solid panel made from Ravanales for the walls. These were well tied in and lead to lateral stability. However lack of maintenance or old timbers would lose the stability and the structure would risk racking.

Cladding

- For timber structures, wall cladding varies in quality depending on resources available: (expensive) milled hardwood timber (Palissandre) from Sambava in minority of houses to woven bamboo mats to palm poles (Ravenales).
- Some use corrugated iron.
- Block (low percentage in rural areas, more common in urban areas)

Roofing

- Corrugated iron, or thatch made from leaves of Ravanales.

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Annex 1: Direct observations:

Sambava Airport

From flight in (from southwest with limited visibility), visible tree and housing damage seemed to be limited.

Despite a few localized areas of higher impact, the area in the immediate vicinity of the airport showed limited destruction of trees or structures.

Damage to trees visible: fallen trees fell west to east, consistent with being North of the eye of the storm

Farahalana (54km N Antalaha, S14^{0}25.129, E 50^{0}09.978)

Visible housing structures damaged 30%

Road Bridge of River (53 km North Antalaha S14^0.26.188 E 50^{0}09.353)

15% housing structure severely damaged. Flood marks observed along banks and had affected houses, but water levels now lower. Bridge intact.

Charcoal and leaves for sale by road (S14^{0}34.387 E 50^{0}09.930):

Leaves for thatching roofs are available, but very locally and in limited volumes

Cost of bag of charcoal 25,000 Ariary.

Cost of bunch of 100 leaves 5000 Ariary.

At other locations: palm leaf poles 200 Ariary each.

During the drive, some charcoal burning was observed. Also on skilled craftsmen with chainsaw making planks (for furniture) with a chainsaw from fallen trees.

Antalaha:

Damage in Antalaha localized. According to NGOS some areas remain flooded.

In Antalaha, small shops were selling nails by weight.

South of Antalaha:

Powerlines down (8m south of Antalaha S14^{0}58.404 E05^{0}018.276).

Households visited to 15km south of Anatala. Houses destroyed 20%.

South East of Antalaha – field assessment with UNDAC and OCHA

Road starts S14^{0}54.583 E 050^0 16.887.

Access through sections of the town with limited damage and over a river used as a washing area.

Dumping area for refuse
S14^0 55.507 e 050^0 16.167
10 trees down. Locally high damage. Site used for dumping refuse from town into ravine, upstream f the river into Antalaha. As confirmed by the chef de district, dumping and waste disposal sites for debris are a challenge for Antalaha.

Small settlement
S14^0 57.772 E50^0 13.522
Estimated 10% housing damage

Small Market with unmaintained market stalls
S14^0 58 039 E50^0 13.564
Stalls are made from basic structures of 3-5cm poles and basic thatched roofs. Highly damaged, but repair times would be short. Housing damage significantly lower.

Well
S14^0 58.069 e 50^0 13.538
Well inspected water with high turbidity. Apparently this is a seasonal issue. Discussions showed no heightened incidence of Diarrhea

Village
S14^0 58.517 e 50^0 13.179
Approx. 20% damage. Site of semi structured interviews with two households beside the road. One elderly gentleman with significantly damaged shelter as a key informant.

Village
S14^0 59.236 e 50^0 11.400
Site of sets of multiple key informant interviews
60 houses severely damaged. 20 have been rebuilt.

Road blocked
S14^0 59.419 e 50^0 11.175
The road was only passable by pirogue beyond this point. The road floods regularly and had been open the day before. The heavy rains of the night before had cause the road closure. Peak flood level due to the cyclone was approximately 4m above the base river level

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Annex 2 people met:

Day 1	Dasy IBRAHIM	CARE Madagascar	Chef du Projet Zone Nord
	Philip Upson Benedicte Lindland	UNDAC	
	Christian …	OCHA	Team Antalaha
	RAMMOLARSON Charles	BNGRC	Général de Division , Secretaire Exécutif Adjoint
	Alexandre Quiblier	Planifolia (Vanille)	Consultant for Planifolia in Antalaha
Day 2	BEVAZAHA Marie Annick	District Antalaha	Chef de District Antalaha
Day 3	DR RAVESON HARIZAKA Vonjy Izaka	CRM	Specialiste en Gestion des risques naturels/Coordonnateur Programme Gestion des Risques et Catastrophes
	VELOMARO L'Faustin	Ministere de l'interieur – Region SAVA	Chef de Region SAVA
	BNGRC	Sambava	