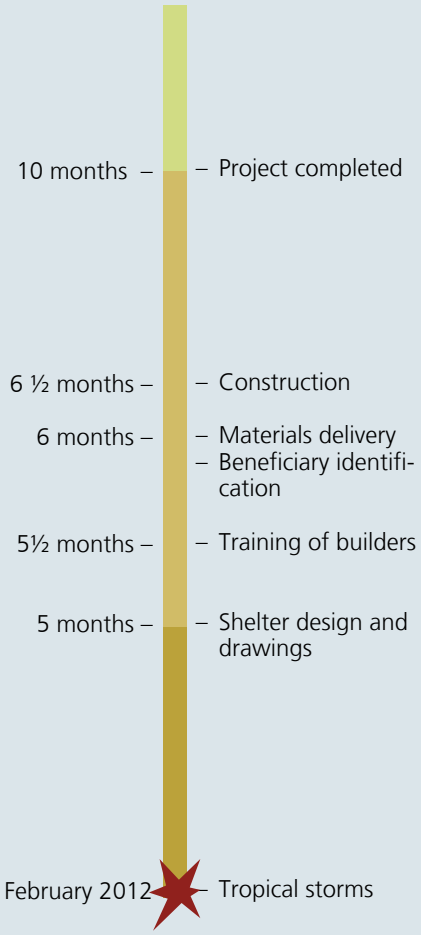
A.18 Madagascar – 2012 – Tropical Storm

Case Study: **Keywords:** Construction materials, Core housing construction, Training, Guidelines and training materials.

Country:
Madagascar
Project location:
east and south east Madagascar
Disaster:
Intense tropical storm Giovanna and moderate tropical storm Irina
Disaster date:
February 2012
Number of houses damaged/ destroyed:
45,500
Number of people displaced:
332,204 affected
55,060 people displaced
Project outputs:
Construction of 598 shelters
Training of builders and beneficiaries
Shelter size:
12m²
Materials cost per shelter:
US$ 128
Project cost per shelter:
US$ 250

Project timeline



Project description

This project formed community committees to select beneficiaries and monitor the building of 599 houses in rural locations. Close monitoring by beneficiaries allowed a degree of remote management of the project to improve quality in a difficult to access area. The project aimed to build safer shelters using local materials.

Strengths and weaknesses

✓ To reduce overheads whilst maintaining quality, the project used remote management with community committees to monitor and ensure material and construction quality.
✓ The project used a committee to select beneficiaries and improve transparency.
✓ Ther project was accompanied by an education programme on safer building practices to increase project reach and support people who were not directly supported by the project.
✓ Municipal authorities were involved in issuing land certificates for landless households.
✓ The design process involved beneficiaries and local craftsmen from the start to ensure that shelters were culturally acceptable and adapted to local environmental conditions.
× Illiterate community members had difficulties using the quality-control checklist. However, they were assisted by committee members in each village.
× Different approaches between organisations meant that beneficiaries did not always accept solutions, making implementation problematic..
× Not enough consideration was given to other local materials such as bamboo.
× Shelters should have varied according to materials used.
× Due to budgetary constraints shelter dimensions were not adapted to household size.
× Increasing prices of materials led to a reduction in the number of households supported from 680 to 598.
- The project only received two-thirds of the funds required for its original budget. Cost savings were made by reducing staff and the number of beneficiary households.
- Problems with local suppliers caused a month long delay in project implementation.

Shelter under construction (left) and completed (right). The project used remote management through community committees to build 599 houses in difficult to access villages and conduct trainings. Photo: CRS

Before the cyclone

The island of Madagascar is prone to cyclones, floods, droughts, epidemics and pandemics, fire and locust swarms. Previously, in 2007, a major cyclone directly affected about 525,000 people.

Over the past 35 years, Madagascar has experienced 46 natural disasters affecting a cumulative total of more than 11 million people. Government studies from 2008 indicate that there will be a greater intensification of cyclones and increased rainfall over the next 50 years.

After the cyclone

Tropical cyclone Giovanna hit eastern and central Madagascar in February 2012, causing significant damage. Winds peaked at 230km/h. It was followed by the severe tropical storm 'Irina' and there were subsequent floods and landslides in the south-east.

The two disasters caused significant damage to housing, agriculture, livelihoods, health and schools. Less than 5 per cent of the population had access to rice stocks and less than 50 per cent had access to staple foods. Approximately 80 per cent of mixed-crop farmland and rice fields were destroyed by the storms or resulting flooding. The storm season coincided with the seasonal 'lean period' for farming families.

Many affected households sought refuge in welfare centres or with relatives and neighbours. One month after the storm, only 15 per cent of households had managed to rehabilitate their shelters.

Many households headed by women, the elderly or disabled people were often not able to rehabilitate their homes within 6 months of the cyclone.

Materials to repair shelters were hard to come by, and many families were too poor to buy them.

Selection of beneficiaries

During national coordination meetings, organisations were allocated different communes to work in. A commune is made up of several villages and each organisation selected beneficiary villages based on damage reports.

The organisation established a community committee in each village (see below), and households who had lost their homes and who were unable to rebuild, were the target beneficiaries. The focus was mainly on the disabled, the elderly, pregnant women and large households.

Implementation

The shelters were built on land belonging to the households before to the cyclones. In only one case, where the household had rented their accommodation prior to the storm, was it necessary for the authorities to allocate a new plot of land.

The organisation began by reviewing the government shelters that were built in response to the 2004 cyclone. It replicated the design components of the shelters which survived the cyclone and established a checklist for construction.

A funding shortfall of nearly a third meant planned staff numbers were cut and responsibility for monitoring construction quality was passed onto the community committees.

The project was implemented in 83 villages across three districts. Each district was supported by three field workers, a technician and a project coordinator.

A typical construction required two carpenters and eight labourers, paid through food-for-work. At least two of the labourers in each team were women. Once materials were available, a house could be built in five days.

Committees

The project was implemented through the village committees. Committees were responsible for identifying beneficiaries and monitoring the quality of materials and construction. Representatives included:

- the village chief
- the mayor of the commune
- a church representative
- a beneficiary representative.

One or two members of the committee monitored housing construction using the construction checklist. These individuals were usually teachers or other literate people.

The community committee worked with a community mobiliser from a partner organisation and with the local government office responsible for facilitating the emergency response.

One person in each village was nominated as a communications focal point to provide two-way communication between beneficiaries and responding organisations.

Technical capacity

The committees provided technical training to people living in the village. This allowed the households to monitor the construction quality themselves and allowed technical staff to provide more targeted assistance.

Staff members and committee members were provided with detailed plans to ensure quality in construction. Home owners and committee members were supplied with a simplified construction checklist that helped them to follow the progress of construction at a number of key stages.

DRR components

The shelter design was an adaptation of traditional houses in Madagascar with the following improvements to ensure better resistance to future cyclones and flooding:

Foundations

- Pillars were buried to a depth of at least 750mm.
- A mix of stones (5-10cm in size) was compacted beneath and around the pillars.
- Pillars needed to be dry before sinking them into the ground.

Walls

- Walls were all reinforced with diagonal bracing.
- The floor beam was strengthened with corner bracing.
- A wall plate tied the wall and roof structure together.
- All connections were strengthened with metal straps or strong rope. The roof was securely connected to the wall.
- Mortice and tenon joints were used to connect timbers.

Roof frame

- Corner bracings were added.
- A cross-beam was added to strengthen the roof and to create a storage area.
- Corners were connected with strong ropes or metal straps.

Roof covering

- For a thatched roof, wire or strong ropes were used to connect the roofing to the ground with heavy rocks.
- For corrugated iron roofs, 26 to 29 gauge sheets were used, and the roof structure was secured with wood battens.

Training

The organisation produced a poster that illustrated key points on strengthening houses against cyclones and storms. The aim was to improve the understanding of those who did not receive a house from the project.

One month after the project had been completed, eight additional families had built new houses following the project design using their own resources.

Logistics

The organisation purchased materials, on behalf of beneficiaries, from local suppliers. The suppliers delivered materials directly to the villages. Contingency material suppliers were also identified in case of a delivery failure.

The beneficiaries made and provided rope for the roof. Beneficiaries also contributed to the cost of the shelters by sourcing wood for the roof supports. The wood was commonly available, and could be found or purchased at low cost.

Construction Checklist	
Storage & quality 	• Are all the materials stored safely from storm, rain and flood and are secured to prevent theft? • Are the quality of materials good?
Foundation 	• Is the wood dry? • Has the wood been treated with oil? • Have you buried the footing to 75 cm? • Have you used broken rocks in the foundation? • Does the floor have corner bracings?
Structure 	• Are diagonal bracings used at columns? • Are diagonal corner bracings used at corners to connect the diagonal bracings? • Are all joints between the columns and beam made using timber joints and not nails? • Are connections between beams and columns fixed with nailed metal straps?
Roof 	• Are corner bracings used at all corners? • Are metal straps used to connect the roof truss to the beam? • Are all connections between members made with mortise and tenon joints? • Is the joint of the ridge and the truss diagonally reinforced with bracings? • Are all four corners of the roof beams braced with diagonal timbers?
Upgrade items 	• Are metal straps used for wooden connections? • Are ropes used for connections? • Is wood in contact with the ground treated with an oil and petrol mixture?