MADAGASCAR

Build Back Better: Adapting Design

HUMANITARIAN RESPONSE CASE STUDY 47

CRS
CATHOLIC RELIEF SERVICES

PROJECT DESCRIPTION

Country: Madagascar

Project location: Brickaville

Disaster: Tropical Cyclone Enawo, resulting in widespread flooding

Disaster date: March 2017

Project timescale: May 2017 to February 2018

Project Budget USD: 300,764

Cost per household (USD): House on stilts - $500, house on the ground - $400

Donor(s): Bill & Melinda Gates Foundation (BMFG)

Partner(s): Organe de Développement du Diocèse de Toamasina (ODDIT)

What did CRS do?

This project was aimed at strengthening the resilience of families through:

- Reconstruction of 200 homes using local materials and improved techniques that would resist future natural disasters. By completion, 83 homes were built at ground level and 117 on stilts
- Improved access to potable water through the rehabilitation of 29 water points damaged by the cyclone.
- Improved household access to agricultural seeds and tools, as well as improved technical skills.

Background

The government of Madagascar declared a national emergency on March 14, 2017 due to Cyclone Enawo, which affected 64,566 people and destroyed 2,727 homes. As many as 14,913 people became homeless in an instant; of them, 7,423 people found refuge in shelters. In the district of Brickaville, where CRS already had a long-term Food for Peace (Fararano) program, 28 people died in the cyclone. The loss to crops was estimated at 58 percent, and floods contaminated water sources and severely damaged at least 99 water points (wells, hand pumps, water systems).

Problem Statement, including core questions

In Madagascar, 78% of people live under the poverty line [1]. Atsinanana is among the poorest regions, with 53% of the population living in the lowest economic quintile (DHS 2018).

Many families live along riverbanks and in areas regularly hit by extensive flooding, which only perpetuates the cycle of poverty. Following the floods in March 2017, most organizations responded in different areas in the north (notably Maroantsetra) and not in Brickaville. CRS had been working in the area for more three years before the floods, specifically with communities on Disaster Risk Reduction (DRR) activities—helping them to create evacuation plans and ensure that families knew to move to higher ground. Thanks to this work, loss of life was not as high as it might have been. Because of this previous presence, the opportunity and responsibility existed to respond in a way that we could ensure that the gains of this programming, as well as food security programming, were not undone by this natural disaster.

[1] *Source: UNDP, Madagascar, 2018*

Building materials arriving on boats.
Photo: CRS

Project Process

Following the initial distributions of household and Hygiene items, CRS focused recovery assistance in an area where an established USAID-funded food security program, 'Fararano,' was taking place. The existing resources from the program allowed CRS to access local committees established for both DRR and community development. These community structures helped to target people most in need and identify local carpenters who could implement the construction aspects of the intervention. These committees worked with CRS' field agents to receive materials and monitor the project's progress.

An existing house design that was intended for non-flood zones required research to be adapted for flood prone areas, especially because many affected families had constraints on the amount of land available to them. To address this, CRS held a participatory design workshop with local carpenters, during which they collectively developed a house model that would be acceptable to participating beneficiary families at a cost that could be made replicable by non-beneficiaries, and that was easy to build for the local carpenters. After this participatory design, CRS conducted field visits to monitor the technical quality of the homes.

Depending on the elevation of the plot above river levels, houses in non-flood-prone areas were built at ground level, with floors elevated to just 60 cm. For the low-lying and flood-prone lands, the community adopted the stilts design: elevating the floor to approximately 2 meters above ground, with a staircase for access. This second option was significantly more expensive than the first, as the super-structure is more like a two-story house.

The participation of stakeholders ensured their engagement in project activities. CRS implemented this project with its diocesan partner (ODDIT) and collaborated with various regional departments. For shelter construction, the collaboration with the regional department of environment, ecology, marine and forestry was required to ensure that local materials used were not illegally sourced or contributing to environmental risks. CRS rehabilitated the water points in collaboration with the regional department of water.

An after-action review conducted by CRS gathered feedback from the families on the project's implementation and lessons captured.

Technical Details

CRS has been building on lessons learned and improved techniques since 2013 to ensure the stability of the super-structure against strong winds and floods. Because of the potential height of the flooding, plinth foundations are inadequate to protect homes from the water. Houses constructed on stilts also have other advantages: giving some protection from insect infestation, providing protection of crops and using the area under the house for storage and to keep livestock.

Existing stilt homes in the area had structural poles embedded in the ground and extended 5 metres vertically to roof height. However after surveying the vendors it was found that the required wood was not available in the local market, so the design had to be adapted to ensure adequate flood protection and ensure stability of the structure.

Different techniques adopted for houses on stilts:

Hard woods are used for posts, dug 1 meter into the ground, and protected with a coating of motor oil.

The stilts are reinforced with cross-bars on all sides.

The connections of the four main stilts of the cross-bars that support the stilts of the superstructure are reinforced with bolts.

Wood trusses are reinforced with a diagonal bar attached to the top rafter.

The top frame and beams are structurally stabilized by introducing horizontal reinforcement bars in the 4 top angles.

Diagonal bracing in all wall angles.

The families so devastated by the 2012 flooding and repeated flood hazards now live in safe homes and can even host their neighbors in case of a cyclone or flood, such as one that took place in January 2018. In that event, the houses became proven models for the community. Some people have **now independently adopted the techniques**, using skilled workers thanks to the strengthened capacity of the local carpenters.

Participant Selction

The project aimed to reach especially vulnerable families that had not been able to reconstruct 2-3 months following the Cyclone. Beneficiary criteria included:

- Families whose home were destroyed during the flood/cyclone and who hadn't already rebuilt.
- Families who are still housed by neighbors or live in temporary housing.
- Families who had an area to build a house with minimal risk of flooding.
- Families registered in Fararano's database.
- Families considered extremely vulnerable, including those with an elderly family member, a person with a disability and female-headed households.

After identification of beneficiaries by the field agents, social mobilization agents and members of the village development committee, 412 families were identified. After re-analyzing these beneficiaries using the above criteria, CRS selected 314 families, but the project was only able to respond to 200 families. Therefore, meetings with village development committee were organized to validate the final list of 200 families.

Learning & Recommendations

- Working within the existing structures of the USAID Fararano Food for Peace project, CRS/partners facilitated the implementation of activities in relation to beneficiary targeting, monitoring of activities as well as trainings on improved agricultural techniques.
- CRS and partner presence in the affected areas allowed for quicker, more coordinated and complimentary interventions.
- Each house owner understood the frames that made up his/her house, and the actions necessary to ensure maintenance.
- The selected house design was the result of collaboration among the local authorities, local carpenters and the project technicians. The style was adapted to be cyclone-resistant using innovative techniques.
- The collaboration with the Water, Hygiene and Sanitation Department made it possible to identify the water points to be rehabilitated, and validated the estimates submitted by the workers. It was also an opportunity to train water point committees.
- The houses constructed using the cyclone reinforcement were tested by Cyclone Ava in January 2018. All of them withstood the storm and, as a result, BMGF and new donors funded the reconstruction of additional homes damaged by Ava, both in the Brickaville zone and another affected zone in the southeast.

Solo Berthine in front of her house.
Photo credit: CRS

Family Story

Solo Berthine, 50, is nicknamed "Tchang mom" and is a single parent with five children.

During Cyclone Ava in January 2018, she was proud to have been able to host her neighbours in her new house, rescuing them from the storm. She says that her house was not shaken by the wind brought by Ava.

"The various diagonal bracing techniques and the tie wiring are new to me, even if the quantity of wood is very similar and close to that used in conventional practice," says Jaonarison De L'Andrick, a carpenter.

The house took Jaonarison, the carpenter, seven days to build. He acknowledges acquiring a "new style" because of the collaboration, and is proud to have received a "duly completed service" certificate, which will help him build new relationships in the community.

Local carpenters measuring the timber.
Photo credit: CRS

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