

## A.4 Cuba – 2012 – Hurricane Sandy

### Case study

**Keywords:** Household items; Construction materials; Tools; Support for host families; Housing repair and retrofitting; Training; Guidelines / materials / mass communications.

**Emergency:** Hurricane Sandy, Cuba.

**Date:** 25-26 October 2012.

**Damage:** 220,000 homes damaged and 22,600 destroyed.

**People affected:** 3,000,000 affected (27% of Cuba's population).

**Project location:** Org. A: Holguín province. Org. B: Holguín, Guantánamo and Santiago provinces.

**Beneficiaries:** Org. A: 7,952 people.  
Org. B: 10,967 families.

**Outputs:** Org. A: 320 roofing kits, 400 toolkits, 1390 family NFI kits.  
Org. B: 4,949 shelter kits.

**Occupancy rate:** Org. A: 100%. Org. B: 95% due to some families choosing other options.

**Shelter size:** Repaired houses averaged 70m<sup>2</sup>.

**Cost per shelter / household:** Org. A: US\$ 1,650 (US\$ 1,100 for materials plus training and technical assistance costs).  
Org. B: US\$ 815 per shelter kit.

### Project description:

Two organisations delivered a standardised roofing kit to families whose homes had been damaged.

The organisations, in partnership with the government, provided materials tailored to the needs of each household. Organisation A provided technical assistance, trainings on DRR and a WASH component, whilst Organisation B implemented a Participatory Approach for Safe Shelter Awareness which included construction workshops.



### Emergency timeline:

[a] October 2012: Hurricane Sandy hits.

### Project timeline (number of months):

[1] Nov. 2013: Planning phase begins.

[4] Organisation B detailed assessment. Organisation A distributes all hygiene kits. [5] Government and community meetings, sensitisation. [6] Organisation B begins implementation.

[7] Organisation A finishes NFI distribution, roofing kit installation begins. [8] Organisation B begins PASSA training. [10] Organisation A capacity-building training.

[13] Organisation B handover.

[14] Organisation A handover.

Emergency

Years

2012

a

2013

2014

Project (months)

1 2 3 4 5 6 7 8 9 10 11 12 13 14

### Strengths

- ✓ As many houses were smaller than the average of 70m<sup>2</sup>, providing tailored, rather than standard, kits meant that more households could be assisted.
- ✓ The two projects complemented the government response by providing materials that were not available in-country.
- ✓ Organisation A's tailored technical assistance meant safe repairs and correct installation of most roofs.
- ✓ Organisation B's community-led DRR approach has built communities' capacities to cope with disaster.
- ✓ Organisation A found that 94.5% of respondents to an evaluation survey were fully or extremely satisfied with the technical assistance and materials received.

### Weaknesses

- ✗ Import regulations meant materials arrived slowly, delaying the implementation of the projects.
- ✗ Not all structures were strong enough to support a roofing kit. In these cases some families received government support, though the waiting list was long as destroyed houses were prioritised first.
- ✗ The total number of beneficiaries reached by the international community was only a small proportion of those in need, something beneficiaries themselves raised as an issue.

### Observations

- Houses with 45-degree roof inclinations had to be modified to 30 degrees. Salvaged wood was used for some of the extra purlins due to timber shortages.

Organisation B introduced the new technology of Hurricane straps to Cuba. The straps were not always folded down correctly so training and site inspections were organised to reduce incorrect application. Photos: Santiago Luengo/IFRC



### Situation before the disaster

Cuba is unusual as the vast majority of houses are state-owned. Many of these buildings, and related infrastructure, are in decay.

Urban areas, such as the cities of Santiago and Holguín, have building codes, but in rural areas houses are self-built and codes are rarely enforced.

Houses are built with wood and/or cement with thatched or, more commonly, corrugated iron sheet roofs. As local construction techniques do not involve the secure fastening of roofs, many were blown away by the hurricane.

### Situation after the disaster

During the storm itself, most of the population was evacuated to safer areas (either collective centres or hosted by relatives with durable houses). Affected families were then divided into two groups:

#### *Group 1 – Complete housing collapse*

After the initial evacuation, some of the families in this group continued living with host families (often relatives), creating additional pressure on the hosts, who struggled with their own recovery.

Some families built makeshift shelters on the sites of their destroyed homes, using salvaged materials.

These families faced very poor hygiene conditions, had no access to drinking water, and were unable to protect themselves from the heavy rains that followed Sandy. Both agencies distributed NFIs, including to host families in order to relieve some of the pressure of hosting.

#### *Group 2 – Partial collapse or roof damage*

Most of these families remained living in their homes, making repairs from salvaged materials. They also faced very poor housing and hygiene conditions.

### Shelter strategy

Emergency response in Cuba is coordinated by the Government through Civil Defence Committees and the military. International NGOs, donors and UN agencies can only act with approval from the government.

The national shelter strategy had two stages:

Immediate emergency response: evacuation and the provision of temporary shelter solutions, whilst basic services were restored (led by the Cuban Government).

Recovery: risk and vulnerability were reduced through support for sustainable housing recovery and improved capacity for planning and risk-management (led by the Cuban Government with support from the international community).

All houses were repaired on their original plots and no households were relocated as part of the project.

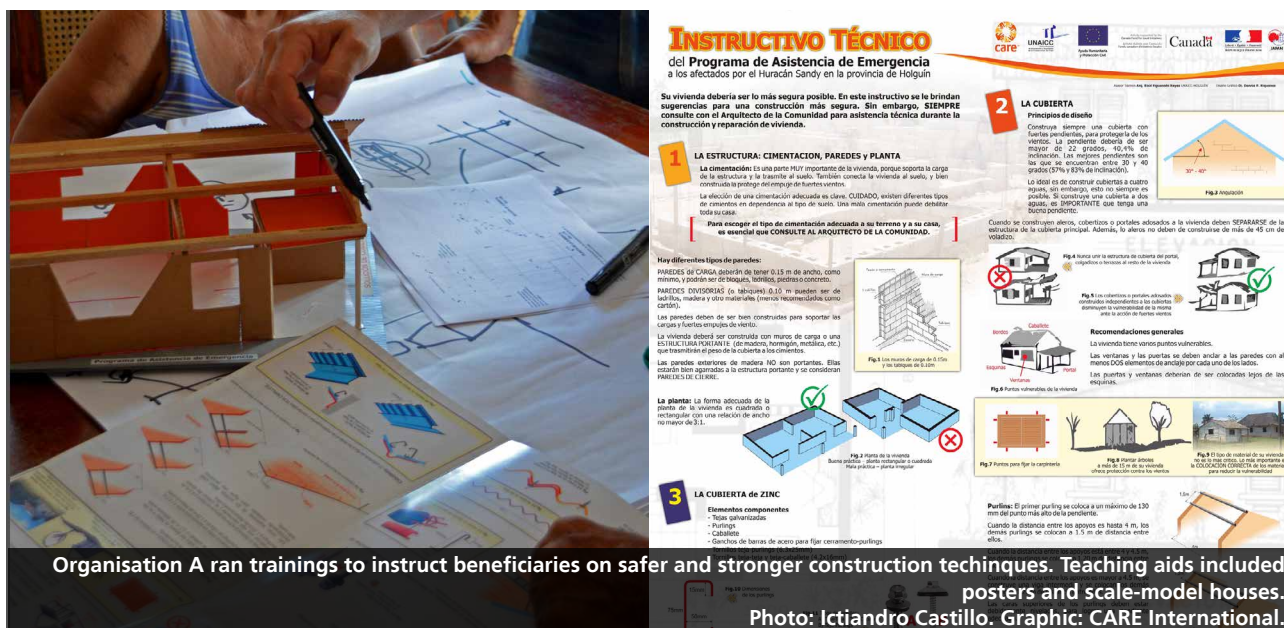
### Project implementation

Organisation A implemented its project as a consortium of Cuban and international agencies – including the Cuban Civil Defence Committee, municipal governments, the National Housing Institute (Instituto Nacional de la Vivienda - INV) and its municipal offices (UMIV - Unidad Municipal de Inversion de la Vivienda), the National Association of Architects and Engineers (UNAICC) and an international NGO. Organisation B implemented as a single organisation, coordinating with relevant partners.

The two organisations had slightly different approaches to implementation. Organisation A provided direct technical support to families and supported the government's DRR messaging. Organisation B, which has a permanent presence in the country and a large network of volunteers, chose to focus on applying its Participatory Approach for Safe Shelter Awareness (PASSA - see *Shelter Projects 2011-12*, A.13) at the community level.

Moving into the recovery phase, each home was assessed for damage by UNAICC and UMIV. Following the technical surveys, individual repair plans were drafted for each home.

The local government provided subsidies for families to purchase



Organisation A ran trainings to instruct beneficiaries on safer and stronger construction techniques. Teaching aids included posters and scale-model houses. Photo: Ictiandro Castillo. Graphic: CARE International.

construction materials at reduced prices, and to be able to repair their homes with the receipt of the roofing kit.

Both organisations trained community brigades, masons, carpenters and volunteers on safe roof installation. Community brigades were made up of groups of between 2-10 people with construction skills, who supported the community as volunteers. They worked with close supervision and support from specialists in roof installation from UNAICC and UMIV. Monitoring visits were conducted, as well as satisfaction surveys and evaluations.

### Beneficiary selection

Organisation A's area of intervention was selected in coordination with government and other agencies, with Baguano and Cueto municipalities in Holguín province chosen on the basis that they were two of the most severely affected areas.

Organisation B's area of intervention was selected after the initial emergency assessment. Organisation A's caseload was mostly rural while Organisation B's beneficiaries were more likely to be in urban areas.

Organisation A's list of beneficiaries was provided by the Cuban Civil Defence Committee and municipal governments, with the organisation double-checking that beneficiaries met the following criteria:

- Social vulnerability – priority was given to female-headed households, single mothers, the elderly, and the disabled.
- Economic vulnerability – those facing severe economic difficulties received government subsidies (bonds) to purchase construction materials.
- House collapsed – prioritised for NFI and hygiene kit distribution.
- House partially collapsed and roof lost – prioritized for roof replacement and home repair (if the house structure could support the roof).

Organisation B used similar criteria but selection was made together with the community through neighbourhood meetings.

### Coordination

The government took the lead in the response. No Shelter Cluster was

**“We learned that a joint voice and message is more powerful, and that national and international organisations can work together towards common goals.”**  
 Technical specialist from Cuban partner organisation

initiated and the few coordination meetings that did occur took place in Havana and not in the affected region. Both agencies implemented a standard roofing kit designed and approved by the INV.

Common messaging on DRR capacity building and Building Back Safer messages was developed amongst the agencies for Information, Education and Communications (IEC) materials which were then disseminated by NGOs and international agencies.

Organisation A's messaging included hygiene promotion, safe and correct use of NFIs (including mosquito nets) and Build Back Safer techniques and safe roof installation.

### Technical solutions

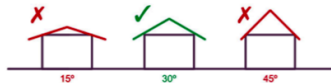
By tailoring technical assistance to the needs of each individual household, the risk of inappropriate construction was minimised.

Organisation B implemented hurricane strapping, and this was the first time the straps had been used in Cuba. The organisation used examples from intervention in Haiti to advocate for government acceptance of their usage.

Organisation B found that house typologies varied greatly and consequently the straps had to be adapted to different constructions. This led to delays, but also improved understanding of the technique.

El primer paso para la instalación de techos reforzados contra huracanes consiste en instalar cintas de refuerzo mecánicas en las estructuras o armazones de madera de las casas.

A continuación presentamos algunos ejemplos de la instalación de estas cintas.



Para reducir los efectos de succión y desprendimiento cuando hay fuertes vientos, trate de construir su techo con un mínimo de 30 grados de inclinación y un máximo de 40 grados.

**Organisation B developed training material that included messages such as how to improve joining and the optimum slope for roofs.**  
Graphics: IFRC/Cruz Roja Cubana

## Disaster Risk Reduction (DRR)

High winds and tropical storms are significant hazards in Cuba and roofs are frequently lost during storms.

Given that only a small quantity of iron sheets are produced in Cuba, the loss of a CGI sheet roof is an extremely expensive one. It is important that investment in CGI sheeting is long-term and that roofs are secure so that investment in costly CGI sheeting is not wasted.

Advice on safer home repair and roof installation included:

- Roof slopes of 30-40 degrees;
- Veranda roofs should be separate from main roofs;
- CGI sheets must overlap by at least 1.5 ridges
- Purlins every 1.2 m, fixed to the structure;
- Purlins should be installed with the widest dimension of the section extending away from the roof-frame (the opposite is a common mistake in Cuba).

Organisation A provided DRR messaging at different project stages. When the individual repair plan for each household was developed by UNAICC and UMIV, Organisation A's poster on safe reconstruction was used as the basis for discussions with each household.

Training workshops with brigades were conducted by UNAICC and UMIV on how to safely install roofing

kits, using posters and scale models to illustrate the techniques.

Once the training was complete, UMIV and UNAICC organised practical sessions where brigades installed an actual roof kit, which then became a "model home" example in each community.

Organisation B used its PASSA to reinforce messages within the community. Members of the local authorities participated in the training to gain ownership of the tool and eventually apply this Shelter DRR tool in other areas as well, though unfortunately it was not possible to complete the implementation during the project's emergency response phase.

## Materials

Most materials, including all CGI roofing materials, had to be imported, and import regulations lengthened the delivery process. Only timber was available in sufficient quantities to be sourced locally, although in some instances salvaged timber was used by Organisation B in place of more expensive purlins to make it easier to implement the hurricane strapping.

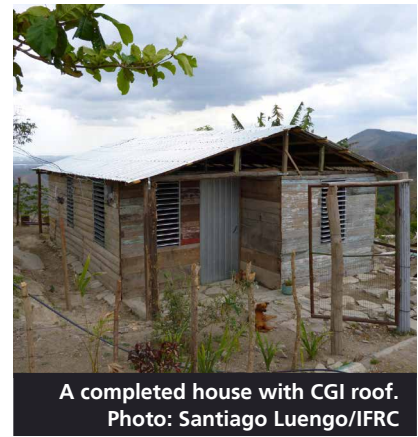
Once the roofing materials had been cleared by the authorities, they were transported to the project site by the government.

The two shelter kits differed in materials cost. Organisation A used 0.55mm thick CGI, the painting of which added to the final cost, making it slightly more expensive per shelter than Organisation B. Organisation B also benefitted from economies of scale.

## Wider project impacts

The introduction of hurricane roofing straps by Organisation B was a significant improvement to construction techniques in Cuba. The straps were not available on the local market.

The official roof kit design developed and validated by the INV was for gable roofs, rather than the hip-roofs found locally in rural areas, particularly Bagunos and Cueto. As a lesson learned, Organisation A and UNAICC jointly advocated for the adoption of a new technical specification for houses with four-sided



**A completed house with CGI roof.**  
Photo: Santiago Luengo/IFRC

hip-roofs, and this is currently being considered by INV and a new design should be developed in time for the next emergency response.

Cuban authorities are considering building on the approach of using local resources for technical assistance. UNAICC, for example, is present in all provinces and could be mobilised to provide technical assistance in times of emergency.

Both organisations raised their profiles as credible counterparts of the government in both emergency response and capacity building.

## Organisation A's roof kit

Item	Quantity
CGI roofing Gauge 26, 1.07m x 3.70m, anti-siphon.	20 sheets
Galvanised steel purlin,	
3" x 2" x 7m	12 pcs
Roof ridging 45cm x 183cm x 26m	6 pcs
Galvanised screws (4.2mm x 16mm)	220 pcs
Galvanised screws (6.3mm x 25mm)	320 pcs
Electric drill (750W)	1 pc