A.3 Kenya - 2007- Flooding

Shelter and disaster mitigation

Project type:
Construction of self-build new shelters for refugees
Community mobilisation, disaster mitigation

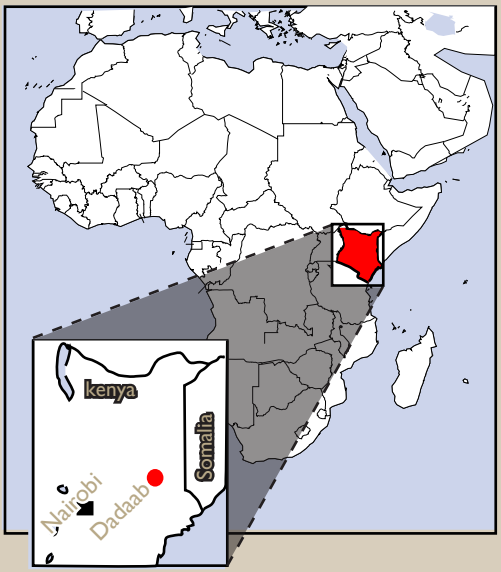
Disaster:
Ifo refugee camp flood response, Dadaab, Kenya, 2007

No. of people displaced:
Approximately 6,000 households displaced, mostly from the Ifo camp

Project target population:
500 households in the Ifo camp

Occupancy rate on handover:
100% (based on visual assessment)

Shelter size
18m² (6m x 3m)



Summary

Through a combination of upgrading and emergency response funding, 500 families were assisted in making bricks and building shelters through a community-based construction programme following flooding in a large refugee camp.

Project timeline

Strengths and weaknesses

X Strong community participation through the training of beneficiaries to construct their own shelters meant project costs were low and construction standards were high.

X A sense of ownership and pride in their shelters was demonstrated by the wide variety of self-implemented modifications, raising living conditions.

X Mud brick production has become a major income-generating activity even though the project has finished.

X Deforestation in the Dadaab area was reduced by replacing stick walls with mud bricks.

X The use of a thick foundation and lower wall reduces the possibility of collapse in heavy rains.

X Broken bricks were recycled to demarcate plots, build furniture or were remixed with water to be remoulded.

W Soil quality was variable outside of the camp, so many used soil from their own plots. This created hazardous holes that may create mosquito breeding grounds. Sourcing soil from outside the camp required negotiations with the host community to avoid conflict.

W Water consumption was high. Water meant for domestic consumption was used in brick production. Rainwater catchment systems will help to avoid this in the future.

W Though foundations increase the structure's strength, they can still degrade through contact with water. Stabilising the soil with cement will help to make them stronger.

W The inclusion of people from minority groups, such as the disabled, was not fully realised.

- The agency needs to use the refugee initiatives that emerged from this project to help redesign its strategy. Supporting livelihood activities may accelerate the construction pace and decrease costs.

- Opportunities for income-generation activities and broad environmental concerns require joint agency solutions. This kind of shelter project requires coordination among agencies working in different sectors.

Village constructed through community-based project

Brick production

Situation before emergency

Three refugee camps (Ifo, Hagadera and Dagahaley) sheltering mainly Somali refugees were established close to the town of Dadaab, in Northern Kenya, in 1991 and 1992. By 2007 they had a population of around 173,000 people.

Dadaab is an area with little vegetation and refugees' access to natural resources (including building materials) is limited. The government of Kenya does not encourage activities that are 'permanent', so refugees rely on aid agency support rather than self-sufficiency through agriculture or other livelihoods.

The camps are highly congested, creating sanitation problems and fire safety issues. The majority of shelters in the camp are of two types, both employing highly flammable roofing materials: traditional tukuls – 3.5m diameter dome structures made of wooden sticks, covered in fabric; and adobe huts – 6m x 3m shelters using a large number of sticks for walls with a roof made of local vegetation.

After the emergency

The severe flooding in the Ifo camp destroyed over 2,000 shelters and left more than 10,000 people homeless. This meant that many refugees had to move to a new camp neighbourhood, 'Section N'.

Section N was not a popular choice for many refugees. Although the ground was higher and less affected by floods, the site was further away from the market and its lack of trees meant little natural shade.

Selection of beneficiaries

Beneficiaries had been preselected by a UN agency, following standard vulnerability criteria that was verified through door-to-door checks.

Implementation

The agency faced two main challenges: convincing refugees that Section N could become a nice place to live and that improved mud-brick constructions would be stronger than the previous buildings that the refugees had seen washed away.

It was decided that the agency would follow the idea of previous shelter programmes in building mud-brick houses, but would improve the durability of the design, increase the involvement of the communities and reduce the need to pay beneficiaries for construction.

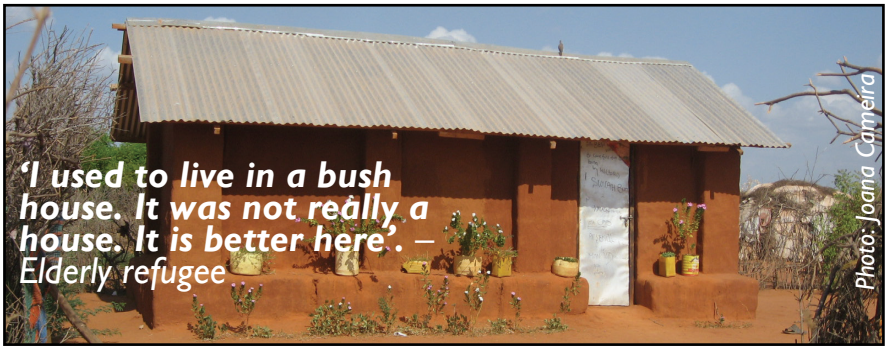
The aims of the programme and the implementation of the strategy were explained to camp leaders who disseminated the information. As well, community mobilisers (agency staff who were based in the blocks for eight hours per day) ensured that the right information was reaching everybody.

A public demonstration of 'brick throwing' to test the strength of bricks made from different soils ignited the interest of potential beneficiaries and addressed the fears of mud-brick houses being weak. The agency constructed some prototype shelters that were then used as classrooms for the construction trainees.

The agency then provided a 'training of trainers' to a small group of refugees on construction techniques and brick-making. Efforts were made to ensure

that training teams included women and the elderly. Each trainer supervised around four families per month, assisting them with layout, foundations, walling and plastering. Carpenters were deployed to give technical support on roof and latrine construction.

'It was my first job! It allowed me to support my family'. *– Female refugee construction trainer*



Completed house

Soil-sourcing sites, both within and outside of the camp, were identified by the agency, which also supplied brick moulds, pangas (knives), wheelbarrows and plastic sheeting to cover completed bricks during the rain. Tools were shared among the community groups and returned to the agency when not in use. Water storage was provided near the soil-sourcing sites.

Agency staff maintained quality-control checks on all the constructions to ensure the safety of the houses, particularly as previous mud brick failures had been mostly due to poor construction rather than design.

Upon completion of the mud-brick structures, the agency supplied the construction materials that the beneficiaries could not produce or purchase themselves, such as roofing sheets and doors.

The combination of a team of trainers able to transfer skills to the community and beneficiaries willing to participate in the construction of their own shelter at no cost led to full engagement of the community and guaranteed that people would maintain their properties themselves.

Technical solutions

The 6m x 3m houses required 1,700 bricks, considerably more than previous designs implemented in the camp. While disaster mitigation was primarily achieved by relocating refugees to the higher ground of Section N, extra bricks were necessary to build a thick foundation and lower wall to improve the structure's performance in heavy rains.

Eight pillars provided support for the walls and roof trusses, increasing the stability of the roof itself. Mud-brick walls were plastered with mortar or cow dung and the roof was covered with iron sheeting. Improvements were made to ventilation to decrease the high internal temperature of previous designs.

A change in the position of the house on the plot improved sanitation. Latrines were moved to the front of the plot next to the street and the house was positioned at the back of the plot. This left space for more construction inside the plot and prevented the problems of a dirty backyard blocked by wastewater runoff.

Beneficiary modifications

Beneficiaries made a number of modifications to the new structures. These included:

- Aesthetic: Painting and decorating.
- Windows: The size was adjusted. Sometimes they were partially closed with other bricks or sticks to increase security and reduce sunlight but maintain ventilation.
- Furniture: Some families constructed beds and tables out of the mud bricks, which helped to demarcate the internal living space.
- Plot boundary: Small walls to define the extent of a plot were often built with spare or broken bricks.
- Plastering: Some families plastered their house with cement mix, making the walls impermeable.
- Gutters were made out of waste tin sheet and tin cans.
- Livelihoods: Market stalls were built as extensions onto or between houses, increasing the income of the families and providing more options for other residents to shop locally.

About 30% of the beneficiaries employed other refugees at some stage of the construction. This increased the income generated in the housing industry in the camp. Such initiatives inspired the agency to look into the next stages of the implementation strategy, to increase the supply at lower costs and in a shorter timeframe.

Logistics and materials

Families originally used soil from planned and unplanned areas within the camp. A project to dig new garbage pits outside the camp presented an opportunity for a new soil source.

To reduce the water consumption necessary for brick production, 'spilled water' from tap stands was collected. The rest of the water was supplied by truck and stored in oil drums distributed around Section N or in water tanks if the bricks were being produced outside the camp.

Roofing and door materials were procured in the capital with support from a UN agency, while other materials were procured in the nearest large town.

The total cost of materials, including transport, was around US$ 440 if the soil was sourced within the camp, rising to US$ 480 if soil was sourced outside the camp. Labour costs for each shelter were around US$ 30.

Quantity	Unit
Iron sheets (2.5m length)	20 pieces
Timber - cypress (2mx2m)	120 m
Plain sheet (2.4m x 1.2m)	1 piece
Nails 4"	4 kg
Nails 3"	1 kg
Nails 1"	0.5 kg
Roofing nails	5 kg
Butt hinges 4"	3 pieces
Padbolt 6"	1 piece
Tower bolt	1 piece
GI Ridges (1.8m length)	4 pieces
Binding wire	5 kg
Wood preservative	8 l