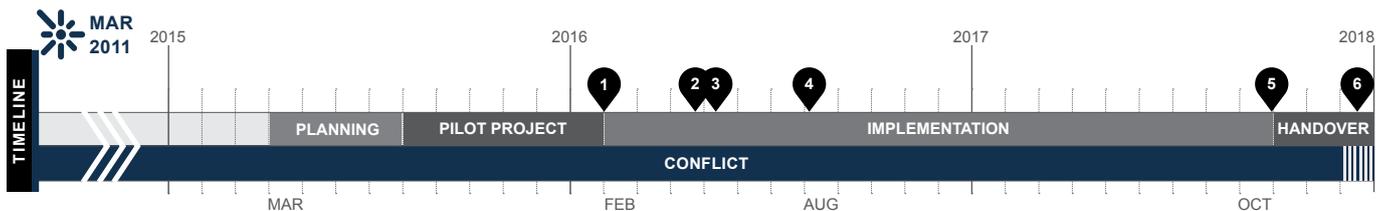


# CASE STUDY SYRIAN ARAB REP. 2015–2017 / CONFLICT

**KEYWORDS:** Adobe houses, Local construction techniques, Capacity-building

<b>CRISIS</b>	Syrian conflict, 2011–onwards	<p><small>This map is for illustration purposes only. The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the Global Shelter Cluster.</small></p>
<b>TOTAL PEOPLE IN NEED*</b>	13.5 million as of October 2015	
<b>TOTAL PEOPLE DISPLACED*</b>	6.5 million internally displaced	
<b>TOTAL SHELTER NEEDS*</b>	2.3 million individuals within Syria	
<b>PROJECT LOCATIONS</b>	Five locations in Harem and Idleb districts, Idleb governorate	
<b>PROJECT BENEFICIARIES</b>	1,100 households (7,219 individuals) 3,500 workers with access to job opportunities (40% from the above group)	
<b>PROJECT OUTPUTS</b>	1,100 houses built 3,500 individuals trained 450 mud toolkits distributed to workers Public facilities and infrastructure built in five villages	
<b>SHELTER SIZE</b>	60m <sup>2</sup> (525 units), 36m <sup>2</sup> (309 units), and 24m <sup>2</sup> (266 units)	
<b>SHELTER DENSITY</b>	6.8m <sup>2</sup> per person on average	
<b>MATERIALS COST</b>	USD 2,685 per house on average (USD 60 per m <sup>2</sup> )	
		<p><b>PROJECT COST</b> USD 3,270 per household on average, incl. infrastructure (USD 73 per m<sup>2</sup>)</p>

\* Figures as of October 2015. Syria Humanitarian Needs Overview 2016.



- 1 1 Feb 2016: Pilot project completed.
- 2 25 Apr 2016: Training of Trainers in Turkey with international consulting partner.
- 3 10 May 2016: Training of Trainers in Syria with local partner.
- 4 1 Aug 2016: Four model houses built, with upgrades based on lessons learned in the pilot.
- 5 31 Oct 2017: Project 1 completed and houses handed over.
- 6 31 Dec 2017: Projects 2, 3 and 4 completed and handover conducted.

**STRENGTHS**

- + The pilot mobilized funds and scaled up successfully.
- + Several advantages of adobe construction compared to other shelter options.
- + The project enhanced skills and generated income opportunities.
- + Women were involved in most stages of works.
- + Low environmental impact.
- + The settlements can be dismantled or reused after the conflict.

**WEAKNESSES**

- Implementing in the wet season caused delays and extra costs.
- Adobe construction requires space and plenty of water, is not portable and needs frequent maintenance.
- The project did not conduct proper market assessments.
- Contractors and local partners were not properly identified and trained.
- A site was attacked due to limited risk assessments and poor communication.
- Poor site selection in some cases increased transport costs.



SHELTER PROJECTS 2017–2018

For more information on the crisis and regional response, see A.29 in *Shelter Projects 2015–2016*.

### PROJECT GOALS AND APPROACH

The project aimed to provide a more durable alternative to camps and contribute to social cohesion between displaced and host communities, create job opportunities, build capacities and revitalize local markets. For this reason, housing construction was chosen as the main intervention modality.

The organization chose to use a traditional building method (mud housing) to address the limited availability of construction materials inside the Syrian Arab Republic (Syria), while maintaining cultural appropriateness. The materials and design adopted were the result of hundreds of years of adaptation to the local context (including climate, social and cultural way of life). Though this approach had declined due to urbanization, the local knowledge remained readily available. This technique suited both contextual challenges (e.g. limited power supply and machinery) and shelter standards (including privacy, thermal comfort and adequate covered living space).

Another reason for choosing adobe was to allow for an easy dismantlement of the buildings after the conflict, as the local authorities and public opinion would not permit the building of permanent settlements.

As most of the targeted communities were from rural areas and were used to living in this type of housing, the solution was generally well received.

### PROJECT IMPLEMENTATION

Five projects were conducted in non-government-controlled areas between 2015–2017 by a lead organization operating from Turkey, together with an implementing partner in Syria.

Although the selected technique was traditionally used in the area, local expertise was limited at the time the project started. This led to an extensive search for an experienced consultant on earth construction who could support the process.

**PILOT PHASE.** A pilot project was conducted from April 2015 in consultation with the selected international consulting organization, which provided technical guidance, developed a preparatory study and supported project implementation. As the consultants worked remotely, some challenges in communication arose and this limited the level of technical support that could be provided. The local implementing partner subsequently engaged in the construction of 90 houses and their service infrastructure (drinking water system, drainage, roads and a mosque). The consulting partner then conducted an evaluation to provide recommendations for future projects. These included:

- Selecting a technique coherent with local materials;
- Identifying local organizations or contractors with experience in the technique;
- Starting activities with model houses before scaling up;
- Adopting a training of trainers (ToT) approach.

**TRAINING OF TRAINERS.** The international partner conducted a ToT on local building cultures to the lead organization and its implementing partner's technical staff, to analyse the construction techniques and architectural designs available. This training was held in Turkey to allow all partners to attend and was then replicated inside Syria for the local partner's engineers. After the training, samples of the mud units with three

different methods of earth building (adobe, cob and rammed earth) were tested. Adobe was adopted for the projects.

**IMPLEMENTATION PHASE.** Starting from spring of 2016, an additional 1,000 houses were built in four different locations. The team was composed of two engineers (project manager and quality control engineer). Construction was conducted by local workshops and labourers under supervision of the local partner team (one field engineer and two assistants). Approximately 3,500 job opportunities were created and 450 toolkits were distributed to the most efficient workers, to help them start their own businesses. These included light tools needed for adobe construction, such as shovel, wheelbarrow, sieve, metallic mould, etc. The toolkits were procured by another international organization, which also provided vocational training and covered some of the workers' fees.

### SECURITY AND RISK MITIGATION

One of the major challenges to implementation was security. Both the first and second location selected for the pilot project were attacked by air strikes, killing and injuring several people and destroying a school which was hosting displaced families. This led the organization to relocate the project to a safer and scarcely populated area, away from schools, delaying the implementation period for three months. Security challenges led the organization to reconsider the project feasibility, as it proved complex to identify safe zones within the conflict area.

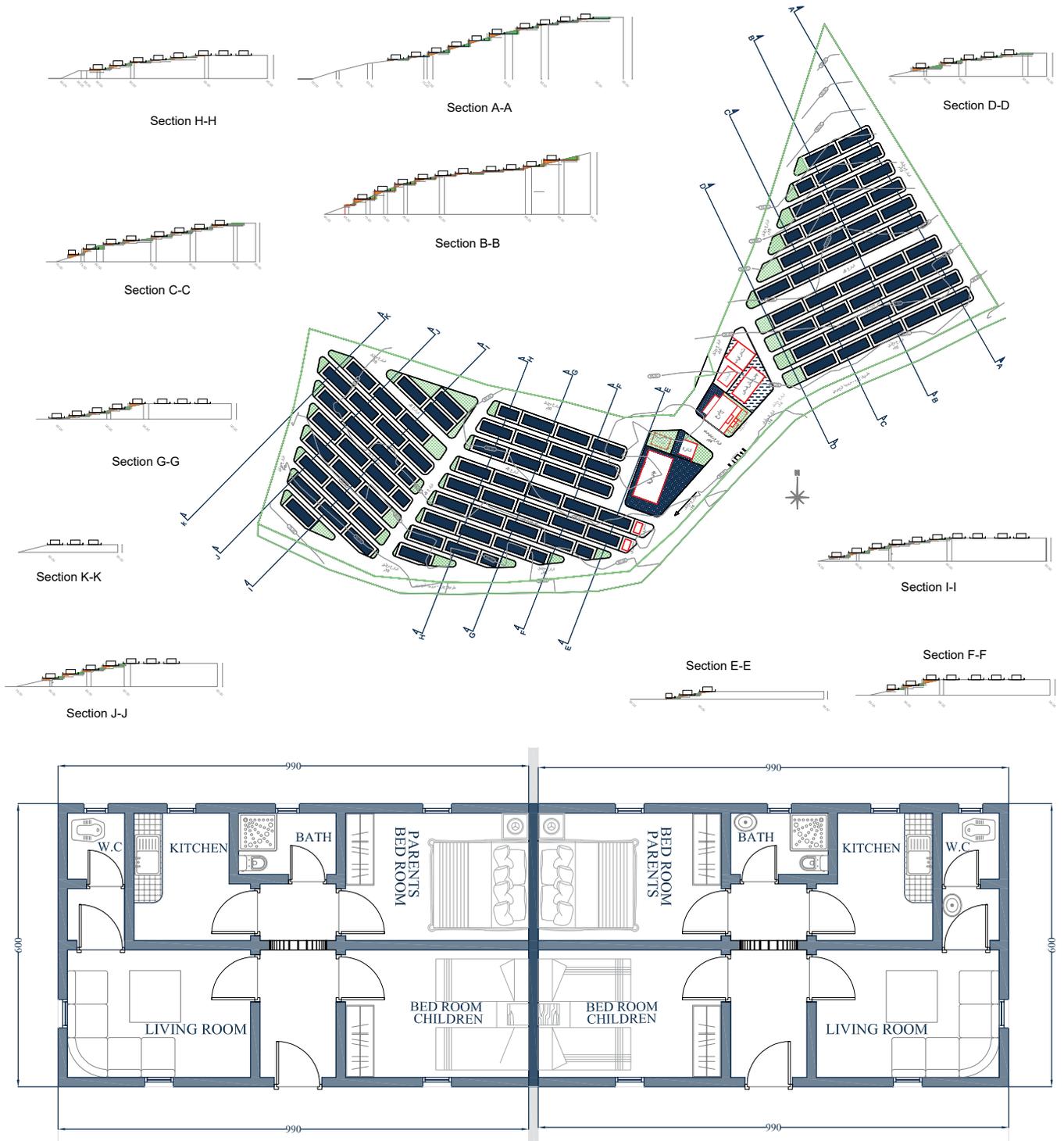
A risk mitigation plan was developed to include the following:

- Continuous monitoring of developments in and around project sites, to anticipate any intensification of conflict;
- Communication with local councils and stakeholders to maintain their support for the projects;
- A preparedness plan for rapid evacuation of workers in the case of artillery or air strikes;
- Whenever possible, small quantities of raw material were procured and stored to reduce the effects of market fluctuations and border closures.

Areas close to the Turkish border were finally selected, as these seemed to offer more safety due to their proximity to Turkish communities. While this led to additional challenges to finding suitable land, it proved to be the right decision.



A ToT on local building cultures was organized in Turkey in partnership with an international consultant. Adobe was selected as the material for the houses.



A ToT was also conducted in Syria for the local partner staff. It consisted of a class-based module and practical tests in the field, such as testing bricks made with different mixtures and analysing different samples of soil.



Adobe brick production required very large spaces and could only be conducted during the dry season. This caused some implementation challenges.

## TARGETING

The locations were targeted primarily due to their proximity to IDP camps. Implementation sites were chosen in consultation with local councils and municipalities, who provided information and documents relating to land ownership, to ensure that the plots were publicly owned and were not subject to any legal dispute.

The organization contracted local partners to conduct surveys to identify IDP communities close to each project location and propose selection criteria. Partners also conducted a mapping of existing manpower and defined selection criteria for the vocational training and income-generating opportunities, depending on the workers' profession and background.

Firstly, the organization received lists from local councils based on three criteria: displaced households, unable to return, with six or more family members.

The second selection depended on whether the family did not possess any habitable and accessible property, nor had received any shelter-related assistance from other actors.

Additional vulnerability criteria were used only if the number of eligible beneficiaries according to the first and second thresholds was higher than the number of housing units available.

These included: women-headed households; child-headed households (under 18 years); elderly-headed households (older than 60 years); and households headed by persons with special needs or with permanent disability due to conflict.



Sample buildings were tested in the ToT. Close coordination and cooperation with local organizations ensured knowledge transfer and allowed them to go on and implement similar projects in the future.



The project was implemented in five different locations close to the Turkish border in Syria. Soil for bricks was sourced in abandoned hills and holes refilled after extraction.

## COMMUNITY ENGAGEMENT

In the planning phase, displaced households were consulted on the size and internal divisions of the houses. The house plan was modified as per their requests and taking into consideration cultural customs, such as having two rooms to separate women and men or give privacy for elder household members. A small front garden was also added to allow for social interactions between neighbours. The local authorities and host community dignitaries were consulted on the pros and cons of the projects for their communities. Some of the beneficiaries also participated as construction workers.

As mud-housing construction was in use in the host communities in the past, elders followed the construction process and shared their knowledge. This helped the implementation team to overcome challenges such as finding alternative sources for local materials when the Turkish-Syrian border was closed.

A feedback mechanism was set up and complaints sent to the field offices and communicated via phone to the relevant departments in the main office in Turkey.

## WOMEN'S PARTICIPATION

Traditionally, mud housing techniques were used in rural areas as a communal activity, where all family members would participate. However, during the crisis, the view of women's role in public life had taken a conservative turn (e.g. armed groups preventing women to work). It was also very difficult to find skilled women in the targeted communities. Nonetheless, a few women did assist their husbands in building their homes out of necessity and, though it was frowned upon at first, this was eventually accepted.



The project had a low environmental impact thanks to the use of mud bricks. Settlements were built as transitional and could be dismantled after the conflict.

## MAIN CHALLENGES

**MATERIALS AND LABOUR.** Border closures and the instability of domestic markets (affecting both availability and quality of materials and labour) led to delays and an increase of the total project cost by 25 per cent.

**CONTRACTORS SHORTAGES.** The limited local expertise in the selected technique also affected the project. This was due to the migration of many professionals and the inability to advertise the project owing to security issues. Additionally, many armed groups with no prior experience or permits to conduct construction works tried to be involved in the projects, as they had several trucks and other machinery. These factors led to the direct engagement of the organization in technical planning and implementation.

**UNFORESEEN WEATHER CONDITIONS.** During implementation, the project area went through long bouts of harsh winter weather (including heavy rain and snow), resulting in the suspension of work. Mud bricks and walls were covered and the rainwater was discharged from the villages through makeshift tunnels, leading to additional costs.

**DISPUTES WITH NEW IDPS.** Due to the multiple waves of displacement in the area and the relatively long implementation timeframe, there were issues with newly displaced households occupying houses that were intended for others. This caused disputes that could have been avoided through more direct engagement of the intended beneficiaries throughout the construction process.

**HLP ISSUES.** Due to the limited experience of the organization in Housing, Land and Property (HLP), as well as a lack of contextualized HLP standards in northern Syria at the time the project started, HLP issues were not adequately considered. Houses could only be built over public land and owned by the local councils, while beneficiaries had the right to occupy the houses for one year, as per contracts signed with the organization and the councils (renewable for another year if the situation of the household did not change).



The project provided skills development and job opportunities in the targeted areas.

## SOIL SOURCING

Adobe does not need a lot of energy to be produced. The process (extraction/transport/mixing/production) is manual and has a low environmental impact and embedded energy level. The soil used in this project was not organic, so there was no competition with agricultural usage. It was extracted from abandoned hills in collaboration with the local councils, without leaving any holes or caves. When extraction works were finished, the sites were always levelled, and the local community started to rehabilitate them into agricultural land.

## EXIT STRATEGY

To ensure a smooth exit, a local council was established by the beneficiaries for each location, with all related records of built houses and infrastructure designs, list of occupants and a manual for the annual maintenance. Members of these local councils received training on the basic principles of technical project management and governance; financial management of the project, including the collection of symbolic fees for the continuation of municipal services and the continuous maintenance of the facilities; training on managing beneficiary contracts and criteria to identify new beneficiaries if any of the current beneficiaries left. They were also trained on beneficiary feedback through establishing a complaints mechanism.

## WIDER IMPACTS OF THE PROJECT

The projects provided vocational and skills training and distributed light building tools to support workers in establishing their businesses. Many local contractors were used and workshops were established by the displaced and local community to work on the projects. On average, there were 500–600 workers on site every day. This generated income and had a positive impact on the transportation system and local markets more broadly. The use of locally available materials boosted the local economy. Finally, partner organizations were strengthened to implement similar projects in the future.



Displaced households were involved in the design of the houses.



It was challenging to identify contractors, also due to a lack of proper training and selection. This meant that the organization often had to conduct activities directly.

## STRENGTHS, WEAKNESSES AND LESSONS LEARNED

### STRENGTHS

- + **The pilot was successful in mobilizing funds and scaling up** from 90 to over 1,000 houses plus infrastructure.
- + **The adobe construction technique had several advantages** compared to other options (such as concrete buildings or caravan units). These included ease of building with manual tools; traditional technique allowing community buy-in; lower costs; high thermal insulation; and privacy (solid walls and sound proof).
- + **The project enhanced skills and generated income opportunities** for local host communities and displaced people, contributing to social cohesion. Many workshops were established and the projects helped to partially revive the economy in the in the area.
- + **Women were involved in most stages of works**, although this was challenging due to social norms.
- + **Low environmental impact.** The raw building materials (soil and straw) were locally available and sourced sustainably; buildings were also easy to dispose compared to other shelter options.
- + **The settlements were intended as transitional and could be dismantled or reused** after the conflict. For instance, these could be occupied by the local communities or converted to other uses, such as tourist resorts.



It was challenging to involve women in the construction, but the project succeeded in engaging some of them throughout implementation.

### WEAKNESSES

- **Affected by cold and rain, this construction technique can only be executed during the hot and dry season**, since the mud should cure and dry properly. Because of limited time, the project was carried out through the winter and – although most elements were covered – the rain affected parts of the construction. Rebuilding some wet walls had an impact on the overall budget.
- **Some disadvantages of adobe construction** include: a very large space and plenty of water are needed for mixing the mud and drying the bricks; portability is impossible; it requires annual maintenance, so users should be trained, and this maintenance can represent a burden especially for poorer households; the implementation time is much longer compared to tents and caravan units.
- **The project failed to conduct proper market assessments**, leading to an increase in costs as some materials, such as timber, were not available in local markets and had to be imported.
- **The organization did not properly identify and train contractors and local partners** before implementation. As a result, it often had to implement activities with its own staff.
- **The site for the pilot project was targeted by aerial bombardment**, killing and injuring several people. This was partly due to the limited risk assessments and partly to the failure to adequately announce the beginning of construction to the warring factions (also compounded by the lack of communication between these).
- **Poor site selection for two projects** in a mountainous area, where water and the right type of soil for making bricks were not easily accessible, **increasing transport costs significantly**.



One site was hit by an air strike, highlighting the security risks in the project areas.

### LESSONS LEARNED

- **Site selection is essential.** The project site should be in a low-rainfall area due to the mud being affected by water and thus the constant need for maintenance work. It must also be located close to main roads, water sources and near or over a soil type suitable for making adobe. When selecting locations, neighbouring local communities should be assessed to avoid building close to poorly serviced communities, which might cause friction with the IDPs. In one instance, this issue caused the project to change location.
- **Beneficiary selection should be conducted before the start of construction activities, and the selected households should be more actively engaged in building their houses.** This would mitigate the issues faced when newly displaced households arrive to the area and make claims over the houses, as well as limit the intervention of armed groups.
- **The projects should be implemented in stages**, each including about 100 houses, which facilitates the management, monitoring and evacuation from the site in the event of any security threat.