Table of contents

1. Introduction .................................................................................................................................................... 03

2. Short-term designs
   2.1 Makeshift shelter, Northeast hub ............................................................................................................. 04
   2.2 Makeshift shelter, Northwest hub ............................................................................................................... 06
   2.3 Bamboo shelter, Rakhine hub ..................................................................................................................... 08

3. Mid-term designs
   3.1 Longhouse shelter, Northeast hub ........................................................................................................... 10
   3.2 Longhouse shelter, Rakhine hub ............................................................................................................... 12
   3.3 Transitional shelter, Northwest hub .......................................................................................................... 14

4. Long-term designs
   4.1 Semi-permanent shelter, Northeast hub ................................................................................................ 16
   4.2 Permanent shelter, Rakhine hub ................................................................................................................ 18

5. Communal spaces ............................................................................................................................................. 20

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The shelter design is contextual considering the response phase, cultural and specific aspects of geographical area and users. It is fundamental that shelter programs consider the use of local materials, skills and building techniques, as well involve the affected communities from the initial stages.

Considering the diversity of Myanmar and complexity of context, the cluster together with partners developed this catalogue compiling in a single document the shelter designs across the country for quick consultation, comparative analysis and support decision making within shelter programs. It was designed for use by cluster partners, nonetheless the information may be relevant to partitioners that are supporting shelter programmes.

Future revision should be consider for upgraded and new designs, thus this catalogue should be consider as a ‘live’ document.

The designs in this catalogue follow three sessions as the response phase and hubs covered:

**SHORT-TERM**
(Up to 1.5 years) solutions with materials that are intended to be removed once the next stage of shelter solution is offered or when the crisis is over and IDPs can return to their homes. Usually, these are constructed with limited costs.

**MID-TERM**
(Up to 5 years) that are made with materials and techniques that are designed to transition into more permanent structures. The shelter should be upgradeable, reusable, resaleable or moveable from temporary sites to permanent locations.

**LONG-TERM**
It is a solution designed with more permanent and durable solution structures/materials. Over 5 years.

**NOTE**
The cluster coordination structure is divide among national cluster and sub-national clusters (hubs) as below:

1. **NE** - Northeast hub covering Kachin State and Northern Shan State.
2. **NW** - Northwest hub covering Sagaing Region, Magway Region and Chin State except Paletwa.
4. **SE** - Southeast hub covering Southern Shan State, Kayah State, Kayin State, Bago Region, Mon State and Tanintharyi Region.
SHELTER DESCRIPTION:
A “makeshift shelter” is an emergency unit design which can be expanded up to five interconnected units according to the available land space. This design was developed for displaced population that potentially will return to the area of origin within six months. It is made of bamboo, which variates in roof material.

LOCATION: NORTHEAST HUB
Kachin State

METHOD OF IMPLEMENTATION:
Delivery of construction material together with shelter toolkits and hire skill labor from existing IDP settlements.

FOR HOW MANY PEOPLE: (1HH = 5people)
1 to 5 households

COST PER SHELTER:
Depending on the size between $240 to $1,200usd

DIMENSIONS & FOOTPRINT:
5 units: 50’x16’ 800 ft² | 74.30m²

LIFESPAN:
6 months to 1 year

TIME TO BUILD:
5 units: 7 days

ADVANTAGES:
The shelter material are locally available, it is relatively light allowing transportation of some items for those facing new displacement.

DISADVANTAGES:
The bamboo is not treated which can significantly reduce the lifespan of the shelter, no protection from the ultraviolet rays is offered by locally purchased tarpaulins.

ENVIRONMENT ACTIONS APPLIED:
Carbon Emission - ACTION 3: Prioritize materials that are locally available to reduce transportation-related emissions.

KEY TAKEAWAYS:
- Promote shelter construction trainings during implementation of the program to enhance capacity and resilience mechanisms of communities.
- Local material and techniques are taking into consideration.
This shelter design has two options varying the roof material.

For the technical drawings and bill of quantities for each option, please access the code below.

The drawings below refers to the five units tarp roof option.

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**FLOOR PLAN**

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**FRONT ELEVATION**

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**SIDE ELEVATION**

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**BACK ELEVATION**

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SHELTER DESCRIPTION:
This shelter was designed for displacement settlements in Chin state to host displaced population. The shelters are made of jungle wood structure, walling and roofing with tarpaulin.

LOCATION:
Chin State

METHOD OF IMPLEMENTATION:
Construction contract with community leaders, and regular monitoring for quality control.

FOR HOW MANY PEOPLE: (1HH = 5people)
1 household

COST PER SHELTER:
$368 usd

DIMENSIONS & FOOTPRINT:
24’x16’ 384ft² | 35.70m²

LIFESPAN:
6 months to 1 year

TIME TO BUILD:
15 days

ADVANTAGES:
Provide privacy and dignity for the family following the minimum space standards. Community engagement to build the unit.

DISADVANTAGES:
Local tarpaulin available has shorter lifespan that can compromise walling shortly. The design do not provide privacy for the family members.

ENVIRONMENT ACTIONS APPLIED:

Carbon Emission - ACTION 3:
Prioritize materials that are locally available to reduce transportation-related emissions.

Consult Cluster Initial Environmental Action Plan

KEY TAKEAWAYS:
- Community engagement for the construction phase.
- Easy to replicate within community.
- Local material availability.
For the technical drawings and bill of quantities, please access the code below.

Scan or click pressing “Ctrl” in the QR code to access the full package of technical drawings and BoQ.
**Bamboo Shelter - Rakhine hub**

with different sizes

**SHELTER DESCRIPTION:**
The “bamboo shelter” was designed for displaced people in displacement sites in land such as monetary, religious building in central Rakhine State. It can be a single unit or multiple units according to the space available. Both structures are comprised with myaw post (local wood), bamboo wall cladding and roof variation among tarpaulin and nipa palm.

**LOCATION:**
Central Rakhine

**METHOD OF IMPLEMENTATION:**
Provision of materials

**FOR HOW MANY PEOPLE:**
(1HH = 5 people)
1 household | 4 households

**COST PER SHELTER:**
Depending on the type, varying between 290 to 572 usd

**DIMENSIONS & FOOTPRINT:**
Single unit: 12’x16’x7’ per HH (192ft² | 17.85m²)
4 units - 10’x16’x7’ per HH (160ft² | 14.85m² per family)

**LIFESPAN:**
Up to 2 years

**TIME TO BUILD:**
15 days

**ADVANTAGES:**
The material used are locally procured and climate appropriate, with construction technique based on traditional methods, making it easier for beneficiaries to build, maintain and repair.

**DISADVANTAGES:**
There is limited space, lack of privacy and it is a solution for a limited period of time.

**ENVIRONMENT ACTIONS APPLIED:**

- **Carbon Emission - ACTION 3:** Prioritize materials that are locally available to reduce transportation-related emissions.

- **Design - ACTION 8:** Design strategies to enhance natural ventilation and lighting.

**KEY TAKEAWAYS:**
- Local techniques using local materials making it easier for beneficiaries to maintain and repair.
- Easy to replicate as the communities already have the technical skills.
This shelter design has two options varying only on the size (1 or 4 HH). For the technical drawings and bill of quantities for each option, please access the code below.

Scan or click pressing “Ctrl” in the QR code to access the full package of technical drawings and BoQ.
SHELTER DESCRIPTION:
The “longhouse shelter” also known as “barrack shelter” at Northeast region was designed to shelter displaced people in 115 formal settlements/protected camp, it can be a single unit shelter or multiple units. Different from Rakhine, the “longhouse” in Northeast has two bedrooms, one kitchen, an attic for storage and lining to increase the thermic comfort. The main structure can variate depending on market availability among timber and metal.

LOCATION: Kachin and Northern Shan

METHOD OF IMPLEMENTATION: Skilled labor through local construction company. Before the tendering process start, the Implementing Partners provide an orientation session to beneficiaries and construction company separately.

FOR HOW MANY PEOPLE: (1 HH = 5-7 people)
1 household | 5 households | 7 households

COST PER SHELTER:
5 units: Depending on the material, varying between $1,720 to $2,620 usd

DIMENSIONS & FOOTPRINT:
5 units: 55’x26’ 1,430 ft² | 132.85m²

LIFESPAN:
Depending on the material 2-4 years

TIME TO BUILD:
5 units: 60 days

ADVANTAGES:
The design promote safety to the families, use of local material in the timber version.

DISADVANTAGES:
Compromised ventilation and natural light in dense settlements. Lack of natural light and ventilation on the second bedroom for multiple units option.

KEY TAKEAWAYS:
- This transitional solution provide minimum space for families, it considers one unit for families of 1-7 members and two units for 8-14 members.
- Local techniques using local materials.

DESIGN OPTIONS

SIZE OPTION:
26’x11’ per HH
(286 ft² | 26.57m²)

FOOTING OPTION:
12”x 12” x 2’ concrete footing

STRUCTURE OPTION:
Timber or Metal

FLOOR MATERIAL OPTION:
6”x1” timber plank

WALL MATERIAL OPTION:
Timber structure with bamboo mat walling
Metal structure with 4 angle Aluzinc exterior wall and Plywood interior wall

ROOF MATERIAL OPTION:
4 angle Aluzinc

PRIVACY (PARTITION)
Two bedrooms

VENTILATION & NATURAL LIGHT
One window per bedroom and half wall hollow element in the kitchen space

COOKING
8’x11’ internal cooking space

ENVIRONMENT ACTIONS APPLIED:

Carbon Emission - ACTION 3:
Prioritize materials that are locally available to reduce transportation-related emissions.

Design - ACTION 9:
Improve structural systems to minimize material use while maintaining technical performance.

Consult Cluster Initial Environmental Action Plan
This shelter design has two structure options and variated sizes.

Technical drawings and bill of quantities for single unit and five units options will be given here, please access the code below.

The drawings below refers to the five units timber option.
The “longhouse shelter” was designed for camps in central Rakhine state to host Rohingya and Kaman displaced population. In central Rakhine there are 16 camps with 2,206 longhouse shelters. The longhouses are made of hardwood structure with bamboo wall cladding and zinc roof to maximize privacy and protect against the weather conditions. The design must be approved by local authorities.

LOCATION:
Central Rakhine

METHOD OF IMPLEMENTATION:
Demolish and reconstruction with skilled labors through a local construction company. During the reconstruction phase the families are relocated to a make-shift shelter located nearby the reconstruction site.

FOR HOW MANY PEOPLE: (1HH = 5people)
8 households | 10 households

COST PER SHELTER:
Depending on the type, variating between $7,800.00 to $8,900.00 usd

DIMENSIONS & FOOTPRINT:
45’x30’x7’-6” 1,350 ft² | 125.5m²

LIFESPAN:
Up to 5 years

TIME TO BUILD:
45 days

ADVANTAGES:
Local materials, livelihood opportunities as people engaged in making the bamboo mats for walls and floor as well in the construction process.

DISADVANTAGES:
The design is lacking in adequate space, internal privacy and natural light. HLP issues to increase the units size.

ENVIRONMENT ACTIONS APPLIED:

Carbon Emission - ACTION 3:
Prioritize materials that are locally available to reduce transportation-related emissions.

Waste Management - ACTION 5:
Improve structural systems to minimize material use while maintaining technical performance.

Design - ACTION 9:
Improve structural systems to minimize material use while maintaining technical performance.

Consult Cluster Initial Environmental Action Plan

KEY TAKEAWAYS:

- Community engagement during the program implementation.
- Local techniques using local materials.
This shelter design has three different options, each of them are in agreement with the local authorities and adjust according to the terrain.

For the technical drawings and bill of quantities of each option, please access the code below.

The drawings below refer to the Option A as the majority of long-houses in Rakhine State.
SHELTER DESCRIPTION:
The “transitional shelter” was designed for displacement in Chin state to host displaced populations. It is made of jungle wood or local hardwood structure with bamboo or CGI sheet wall cladding and CGI roof. The design maximize privacy and protect against the weather conditions.

LOCATION: Chin State

METHOD OF IMPLEMENTATION:
Construction contract with community leaders, and regular monitoring for quality control.

FOR HOW MANY PEOPLE: (1HH = 5people)
1 household

COST PER SHELTER:
Depending on the material, varying between $1,780 to $2,013 usd

DIMENSIONS & FOOTPRINT:
24’x16’ 384ft² | 35.70m²

LIFESPAN:
3-5 years

TIME TO BUILD:
15 days

ADVANTAGES:
Provide privacy and dignity for the family following the minimum space standards. Community engagement to build the unit and the use the local building technics.

DISADVANTAGES:
Lack of improved foundation that can compromise the structure in a shorter period of time

KEY TAKEAWAYS:
- Community engagement for the construction phase.
- Local material and techniques are taking into consideration.

DESIGN OPTIONS

SIZE OPTION:
24’x16’ per HH
(384ft² | 35.70m² per family)

FOOTING OPTION:
No footing design

STRUCTURE OPTION:
Ø 3” Jungle wooden or 5”x5” local hardwood

FLOOR MATERIAL OPTION:
6”x1” jungle wood plank

WALL MATERIAL OPTION:
Bamboo mat or CGI sheet

ROOF MATERIAL OPTION:
CGI sheet

PRIVACY (PARTITION)
Two partition

VENTILATION & NATURAL LIGHT
Six windows, one main door

COOKING
16’x6’ internal cooking space

ENVIRONMENT ACTIONS APPLIED:

Carbon Emission - ACTION 3:
Prioritize materials that are locally available to reduce transportation-related emissions.

Design - ACTION 8:
Design strategies to enhance natural ventilation and lighting.

Design - ACTION 9:
Improve structural systems to minimize material use while maintaining technical performance.

Consult Cluster Initial Environmental Action Plan
For the technical drawings and bill of quantities, please access the code below.

Scan or click pressing “Ctrl” in the QR code to access the full package of technical drawings and BoQ.

FLOOR PLAN

SECTION A-A’

FRONT ELEVATION

SIDE ELEVATION
SHELTER DESCRIPTION:
The “semi-permanent shelter” also known as “transitional solution shelter” was designed for return, resettled, and local integrated population in Kachin and Northern Shan State. Consists of a living room, two bedrooms with lining to improve thermal comfort, a kitchen and a frontal balcony railing.

LOCATION:
Kachin and Northern Shan

METHOD OF IMPLEMENTATION:
Skilled labor through local construction company and regular construction monitoring.

FOR HOW MANY PEOPLE: (1HH = 1-7 people)
1 household

COST PER SHELTER:
Depending on the size and material, variating between 4,050 to 4,290 usd

DIMENSIONS & FOOTPRINT:
18’x27’ + 4’x9’  522 ft² | 48.50m²

LIFESPAN:
5-10 years

TIME TO BUILD:
60 days

ADVANTAGES:
The design is a long-term solution with appropriate space for the families, great ventilation and local techniques. Families with big number of members contribute for extra cost for long leg shelter to create more room at the ground floor.

DISADVANTAGES:
Families still want to customize the design during the construction phase what became a challenge for different organization implementing the project.

KEY TAKEAWAYS:
- The design provide a more long-term solution that can be expanded and easily replicated by community with appropriate training and orientation.
- Local techniques using local materials.

DESIGN OPTIONS

SIZE OPTION:
18’x27’ + 4’x9’ per HH
(522 ft² | 48.50m²)

FOOTING OPTION:
12”x 12” x 2’ concrete footing

STRUCTURE OPTION:
Timber

FLOOR MATERIAL OPTION:
6”x1” timber plank

WALL MATERIAL OPTION:
Bamboo mat walling

ROOF MATERIAL OPTION:
4 angle Aluzinc

PRIVACY (PARTITION)
Two bedrooms

VENTILATION & NATURAL LIGHT
One window per bedroom and half wall hollow element in the kitchen space.

COOKING
9’x18’ internal cooking space

ENVIRONMENT ACTIONS APPLIED:

🌿 Carbon Emission - ACTION 3:
Prioritize materials that are locally available to reduce transportation-related emissions.

Clean Water - ACTION 5:
Improve structural systems to minimize material use while maintaining technical performance.

🌿 Design - ACTION 8:
Design strategies to enhance natural ventilation and lighting.

🌿 Design - ACTION 9:
Improve structural systems to minimize material use while maintaining technical performance.

Consult Cluster Initial Environmental Action Plan
Technical drawings - Northeast hub

For the technical drawings and bill of quantities, please access the code below.

Scan or click pressing "Ctrl" in the QR code to access the full package of technical drawings and BoQ.
Permanent Shelter - Rakhine hub

DESIGN OPTIONS

SIZE OPTION:
23.2’x15.2’ + 7.6’x5’ per HH (390.65 ft² | 36.30m²)

FOOTING OPTION:
1.5’x1.5’x2.5’ concrete footing

STRUCTURE OPTION:
Timber

FLOOR MATERIAL OPTION:
6”x1” timber plank

WALL MATERIAL OPTION:
Interior and exterior bamboo mat

ROOF MATERIAL OPTION:
Timber frame with CGI shingles

VENTILATION & NATURAL LIGHT
At least one window per bedroom and five windows in the common areas

COOKING
7.6’x5’ internal cooking space

ENVIRONMENT ACTIONS CONSIDERED:

Carbon Emission - ACTION 3:
Prioritize materials that are locally available to reduce transportation-related emissions.

Design - ACTION 8:
Design strategies to enhance natural ventilation and lighting.

SHELTER DESCRIPTION:
The “permanent shelter” was designed in 2020 when local authorities confirmed some Rohingya displacement population in northern townships of Rakhine State since 2017 return to their land of origin. The design was conceived through community consultation taking in consideration traditions and cultural aspects. However, majority of families wished their original house design. The design process supported to develop the BoQ for costing. In the implementation phase the project needed to be adjusted to the families need at that time according to the late TA (travel authorization issued by de facto) received.

LOCATION:
Maungdaw Township in Northern Rakhine State

METHOD OF IMPLEMENTATION:
Provision of skill labor and construction materials based on the proposed design followed by regular monitoring.

FOR HOW MANY PEOPLE: (1HH = 5people)
1 household

COST PER SHELTER:
$6,691 usd (labor included)

DIMENSIONS & FOOTPRINT:
23.2’x15.2’ + 7.6’x5’ 390.65ft² | 36.30m²

LIFESPAN:
5-10 years

TIME TO BUILD:
15 days

ADVANTAGES:
Not measurable as the design was not implemented.

DISADVANTAGES:
Not measurable as the design was not implemented.

KEY TAKEAWAYS:

This is a specific situation where the planed design were not implemented as the project design due to a late TA approval and change of needs. Where flexibility of all involved in the project is needed to be able to adjust the new scenario and provide the necessary support.
Technical drawings - Rakhine hub

For the technical drawings and bill of quantities, please access the code below.

[Scan or click pressing “Ctrl” in the QR code to access the full package of technical drawings and BoQ.]

**FLOOR PLAN**

**FOOTING PLAN**

**NORTH EVELATION**

**SOUTH EVELATION**

**EAST EVELATION**

**WEST EVELATION**
Community Center - Rakhine hub

DESCRIPTION:
The community center is originally an innovative negative carbon footprint shelter solution with bamboo-based structures of interlocking small-diameter bundled bamboo counting on an innovational construction approach such as prefabrication and structural optimization. 2 units option were donated to an IDP camp in Rakhine and built to be used as a community center.

LOCATION:
Rakhine State

METHOD OF IMPLEMENTATION:
Donation of an innovative shelter (2 units) to be used as a community center. The Wa gout bamboo were treated and transported to the construction site. Structural bamboo frame were assembled in loco with support of a custom metal formwork. Half of the labor needed were hired and trained in the camp.

FOR HOW MANY PEOPLE:
2 units shelter as community center for 15 people

COST PER UNIT:
Depending on the size, variating between $1,000 to $4,000 usd

DIMENSIONS & FOOTPRINT:
Variating from 129ft² | 12m² to 840ft² | 78m²

LIFESPAN:
6 years

TIME TO BUILD:
Variating from 5 days to 14 days

ADVANTAGES:
Prefabrication construction methodology reduces to a week the construction time. Community engagement during the construction phase. Low cost construction considering lifespan.

DISADVANTAGES:
Applying as shelter: Flexibility to adapt the design to the families need in a long-term period.

KEY TAKEAWAYS:
- The design provide a more long-term solution that can be expanded and easily replicated by community with appropriate training and orientation.
- Community engagement for the construction phase.

DESIGN OPTIONS

SIZE OPTION:
1 unit 129ft² | 12m²
2 units 344ft² | 32m²
4 units 840ft² | 78m²

FOOTING OPTION:
Prefabricated concrete footing

STRUCTURE OPTION:
Bamboo

FLOOR MATERIAL OPTION:
Bamboo shingles or Plywood sheets

WALL MATERIAL OPTION:
Interior and exterior bamboo mat

ROOF MATERIAL OPTION:
Corrugated steel roofing sheets

PRIVACY (PARTITION)
Up to the community to decide

VENTILATION & NATURAL LIGHT
Up to the community to decide

COOKING
N/A for community center

ENVIRONMENT ACTIONS APPLIED:
- Carbon Emission - ACTION 3: Prioritize materials that are locally available to reduce transportation-related emissions.
- Waste Management - ACTION 6: Develop a plan to increase lifespan of materials.
- Design - ACTION 8: Design strategies to enhance natural ventilation and lighting.
- Design - ACTION 9: Improve structural systems to minimize material use while maintaining technical performance.

Consult Cluster Initial Environmental Action Plan
Technical drawings  Rakhine hub

For more information about the social enterprise project, please access the code below.

Scan or click pressing "Ctrl" in the QR code to access more information.
References

Division of Programme Support and Management, Shelter and Settlement Section - Shelter Design Catalogue - UNHCR, 2016


Shelter Designs in the Northern of Mozambique - Mozambique Shelter Cluster, 2021

Shelter and Sustainability / GHG Emission Calculator tool - UNHCR