User Identification Number : 691829057d448

Architecture in the Aftermath of Disasters Towards Sustainable and Community-Based Reconstruction in Post-Earthquake Morocco

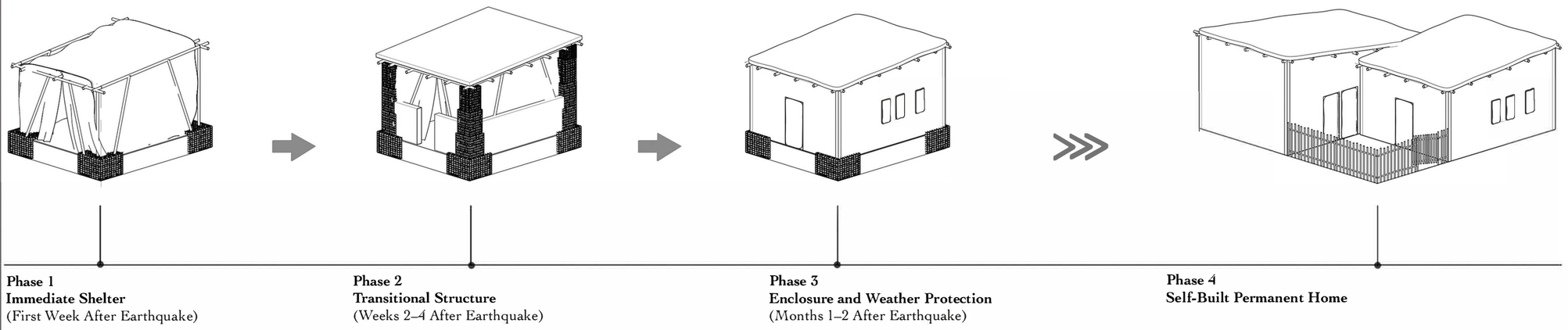
Resurge

from Shelter to permanence

This project proposes a three-phase housing strategy that allows communities to rebuild progressively after disaster. Designed to be constructed by residents themselves, the system relies on local materials and simple building techniques rooted in vernacular knowledge.

Its modular logic enables incremental growth and replication across the village, transforming emergency shelter into a permanent and expandable settlement framework. By integrating community participation with locally sourced materials, the proposal establishes a resilient and context-responsive housing system.

This project proposes a prefabricated housing system based on local materials and incremental construction. Designed to evolve in three phases, the unit transforms from an emergency shelter into a permanent home through active participation of residents. The system is modular, expandable within the village fabric, and structurally responsive to seismic conditions.



Phase 1
Immediate Shelter
(First Week After Earthquake)

Self-built emergency shelter constructed by residents using a lightweight timber post-and-beam structure and fabric enclosure. Designed for rapid assembly, minimum tools, and immediate protection during the first days after the disaster.

Phase 2
Transitional Structure
(Weeks 2–4 After Earthquake)

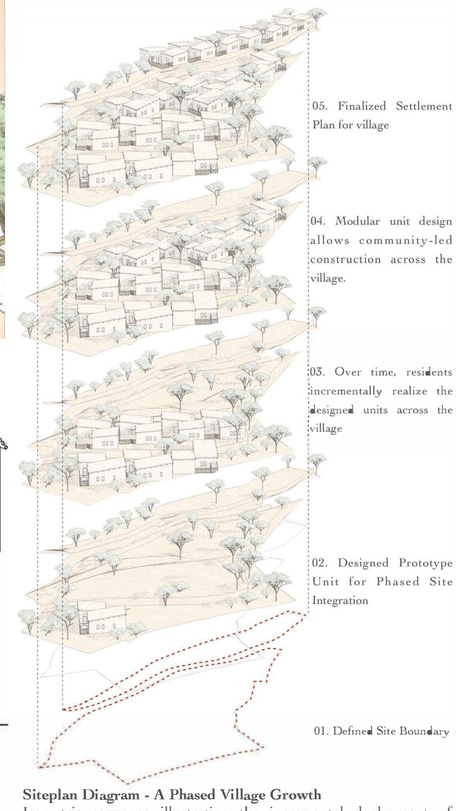
Residents begin constructing permanent structural elements using stacked cubic gabions filled with local stone. These stone-filled gabion columns form the primary vertical structure, while dry-stacked stone walls are built between them, gradually replacing the initial fabric enclosure.

Phase 3
Enclosure and Weather Protection
(Months 1–2 After Earthquake)

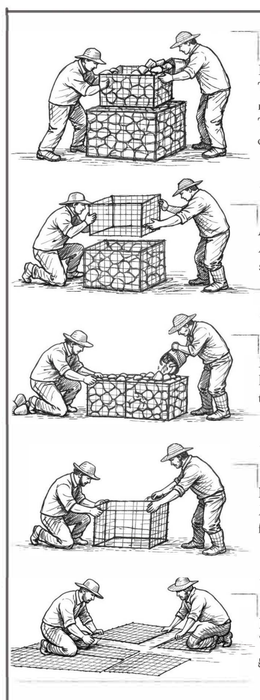
Stone walls and the roof are fully enclosed and protected with a traditional earth-and-straw plaster. Doors and windows are installed, improving thermal comfort, privacy, and long-term habitability.

Phase 4
Self-Built Permanent Home

Through an incremental process, residents expand the house by adding bedrooms and a stable, using simple construction techniques and local materials. The system is accessible, adaptable, and replicable in diverse post-disaster rural settings.



Siteplan Diagram - A Phased Village Growth
Isometric sequence illustrating the incremental deployment of residential units within the site. Starting from a single prototype, additional units are progressively introduced across multiple elevation levels, demonstrating a phased construction strategy. This approach enables organic village growth, integrating with the site's topography while avoiding a single, simultaneous build, and reinforcing the adaptability of the overall settlement pattern.



Filling Top Gabion with Stones
The upper gabion is filled and compacted in the same manner.
This process can be repeated to achieve the required column height or wall elevation.

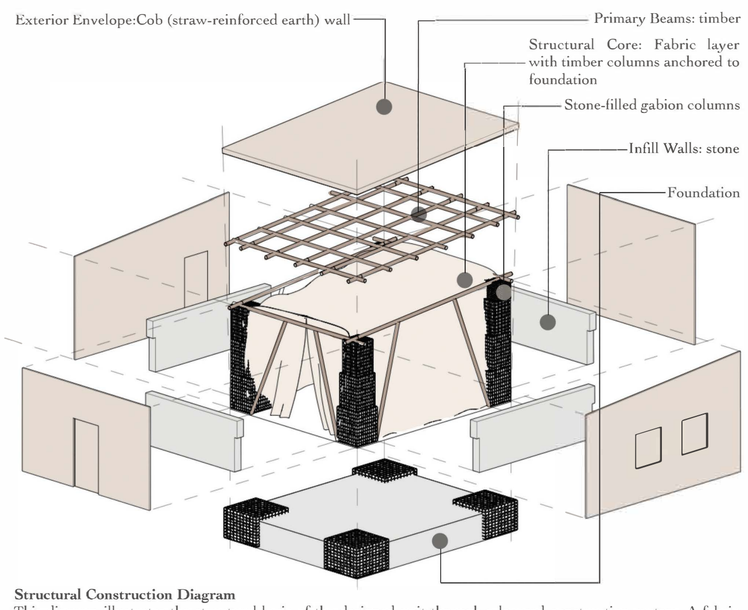
Adding Second Gabion
A second empty gabion is assembled and positioned securely on top of the filled base unit.

Filling with Stones
Durable stones are placed and tightly packed inside the gabion to ensure strength and stability.

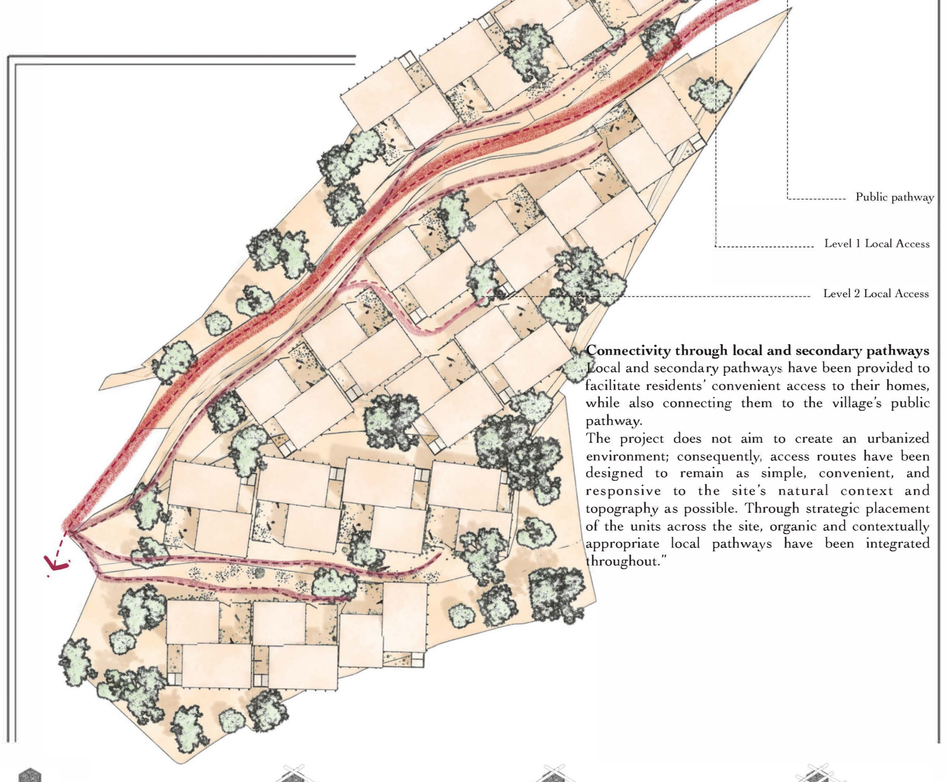
Building the Gabion
Mesh panels are connected to form cubic gabion frame, securely fastened at all edges.

Preparing Gabion Materials
Wire mesh panels are laid out and aligned on level ground, ready for assembly.

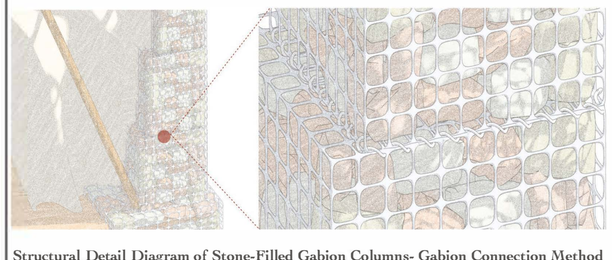
Construction Diagram of Stone-Filled Gabion Columns
This diagram illustrates the construction process of gabion columns and highlights the active participation of local villagers in building their homes.



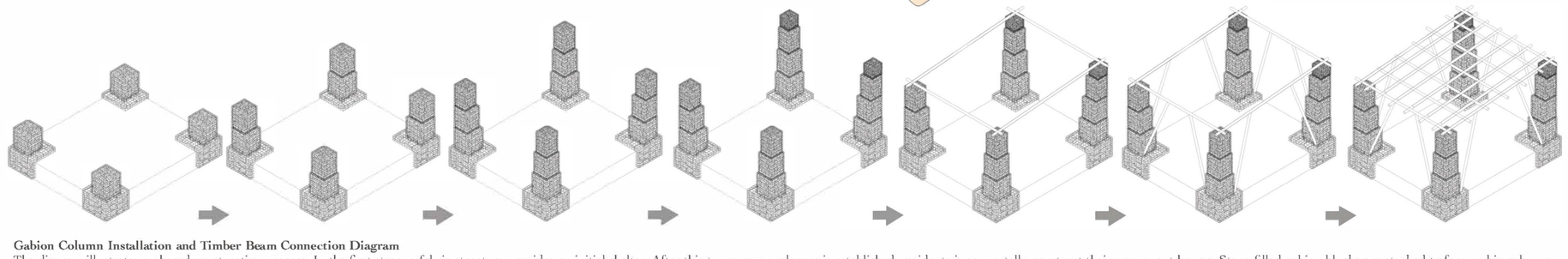
Structural Construction Diagram
This diagram illustrates the structural logic of the designed unit through a layered construction system. A fabric layer anchored to the foundation forms the primary base, through which timber columns are fixed as the main load-bearing elements. Stone-filled gabion columns are then placed individually on the foundation, enabling a participatory construction process. Infill walls are constructed between the columns and rest on the same fabric layer, which functions as thermal and moisture insulation. The system is completed with a mud-and-straw finish, reinforcing the use of local materials and techniques.



Connectivity through local and secondary pathways
Local and secondary pathways have been provided to facilitate residents' convenient access to their homes, while also connecting them to the village's public pathway.
The project does not aim to create an urbanized environment; consequently, access routes have been designed to remain as simple, convenient, and responsive to the site's natural context and topography as possible. Through strategic placement of the units across the site, organic and contextually appropriate local pathways have been integrated throughout."



Structural Detail Diagram of Stone-Filled Gabion Columns- Gabion Connection Method
This diagram illustrates the method of connecting and stacking individual gabion cubes, which collectively form the primary structural columns of the building system. The assembly process allows the columns to be constructed incrementally while maintaining structural stability and alignment.



Gabion Column Installation and Timber Beam Connection Diagram
The diagram illustrates a phased construction process. In the first stage, a fabric structure provides an initial shelter. After this temporary enclosure is established, residents incrementally construct their permanent homes. Stone-filled gabion blocks are stacked to form cubic columns, followed by the addition of timber posts and beams to complete the structure. All stages are conceived to be easily carried out by the inhabitants themselves, using local materials and simple building methods.

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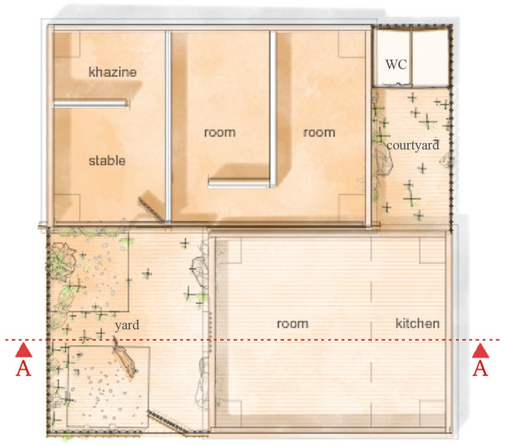
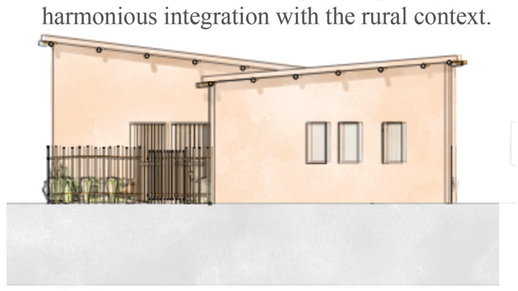


Plan

Scale 1:100

0 2.00 m 4.00 m 10.00 m

The housing units have been designed with simplicity and functionality in mind, integrating all essential spaces required for daily life. The southern building, constructed first, accommodates cooking and resting areas, while the northern section, added later, completes the program with bedrooms, a storage, a stable and Toilet is located in the courtyard due to cultural and traditional consideration. The form of the units follows a simple yet visually coherent pattern, enhancing the overall aesthetic quality of the village. Strategic placement of the houses creates two distinct courtyards, to the north and south, generating a thoughtful interplay of solid and void within the site while providing each unit with its own functional outdoor space. Openings and material choices have been carefully considered in response to the local climate, ensuring both environmental comfort and a harmonious integration with the rural context.



South Elevation

Scale 1:100

0 2.00 m 4.00 m 10.00 m

East Elevation

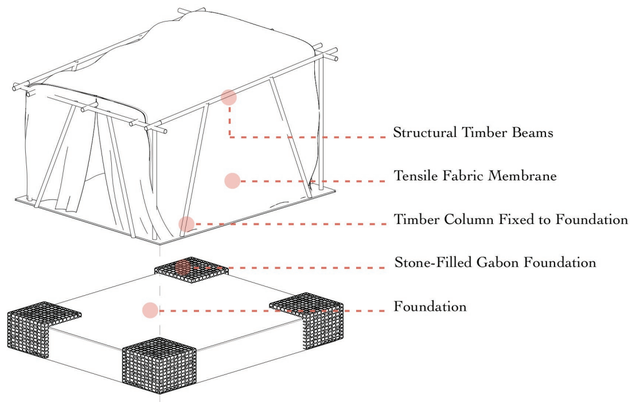
Scale 1:100

0 2.00 m 4.00 m 10.00 m

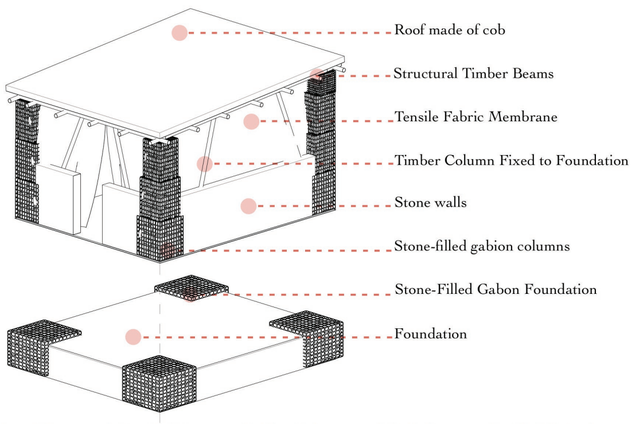
Section AA

Scale 1:100

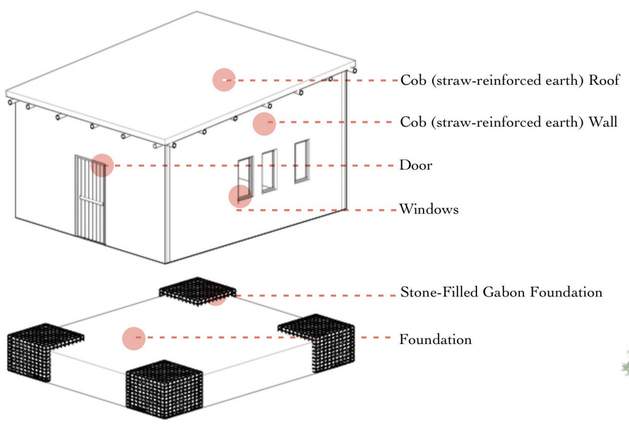
0 2.00 m 4.00 m 10.00 m



Phase 1 Structural Detail Diagram - Fabric Structure With Timber Beams
Structural stability is achieved through vertical columns anchored to a gabion foundation and diagonal braces connected to beams, ensuring seismic design compliance.



Phase 2 Structural Details Diagram - Gabion Columns and Walls Integrated with Fabric Structure
Following the erection of the initial timber-and-fabric framework, residents progressively assemble cubic gabion columns filled with stones. Interspersed between the gabions, stone walls built from local materials define the spatial structure, illustrating the phased development of the resilient village.

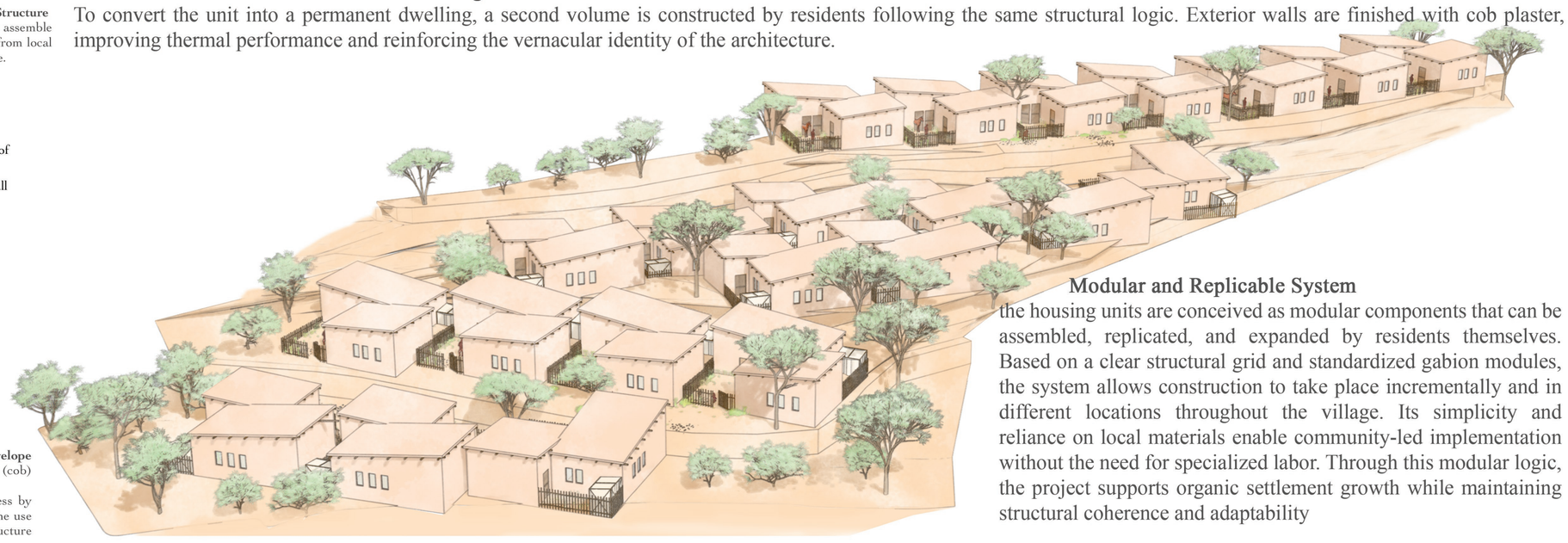


Phase 3 Structural Details Diagram - Earthen Plaster Application to Walls and Roofs Envelope
In the final phase, the building envelope is clad with a layer of locally sourced straw–clay (cob) plaster applied to both walls and roof surfaces.
This earthen layer enhances the thermal performance of the envelope, improves airtightness by limiting undesirable air infiltration, and contributes to climatic responsiveness. In addition, the use of indigenous materials strengthens the visual identity and contextual integration of the structure within its rural setting.

Phase 01 — Emergency Fabric Shelter
In the immediate post-disaster phase, the unit functions as a lightweight fabric shelter for temporary accommodation. Timber beams and diagonal bracing members are anchored to a gabion foundation. A fabric membrane is stretched over the timber frame, providing rapid, low-cost enclosure while establishing the structural grid for future development.

Phase 02 — Construction of Gabion Columns
Once residents are settled, they begin constructing the permanent structural system. Gabion modules are fabricated as cubic units in predefined dimensions. The first gabion is placed on the foundation and filled with stone; subsequent gabions are stacked above, filled, and mechanically connected to the lower units until the desired height is achieved. These stacked stone-filled gabions form the primary structural columns. Between them, stone masonry walls are built and additional timber beams are integrated for reinforcement. During this phase, the fabric shelter remains operational while the permanent structure gradually consolidates.

Phase 03 — Transition to Permanent Housing
To convert the unit into a permanent dwelling, a second volume is constructed by residents following the same structural logic. Exterior walls are finished with cob plaster, improving thermal performance and reinforcing the vernacular identity of the architecture.



Modular and Replicable System
the housing units are conceived as modular components that can be assembled, replicated, and expanded by residents themselves. Based on a clear structural grid and standardized gabion modules, the system allows construction to take place incrementally and in different locations throughout the village. Its simplicity and reliance on local materials enable community-led implementation without the need for specialized labor. Through this modular logic, the project supports organic settlement growth while maintaining structural coherence and adaptability