Architecture in the Aftermath of Disasters 693e4fcd64631

THE KASBAH WITHIN

Historically, the **kasbah outside** functioned as a fortified structure protecting settlements from harsh climate, conflict, and uncertainty. In today's Atlas Mountains, new challenges - earthquakes, economic migration, and cultural change - demand a different form of protection. Rather than building another defensive wall, this project proposes a **kasbah within**: a resilient structural framework integrated into houses and the village fabric. The modular system strengthens homes against seismic risks while allowing gradual expansion, echoing the local tradition of incremental building. Over time, this adaptable structure helps families secure safety, accumulate resources, and sustain Amazigh culture while improving everyday living conditions.

from **kasbah outside** *to* **kasbah within**

Context

Earthquakes

Izloulen lies in a seismically vulnerable region of Morocco. The 2023 earthquake exposed fragile housing and infrastructure, reminding communities that future seismic risks remain real and must shape **resilient** architectural responses.

Climate

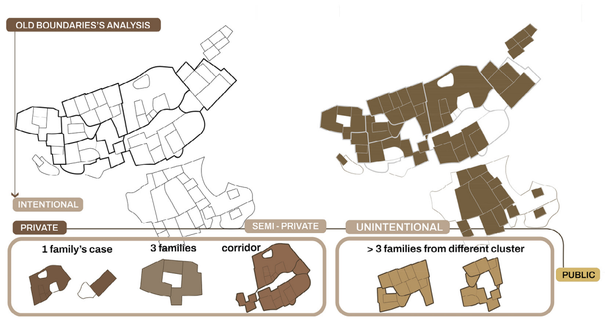
Located in the Atlas Mountains, Izloulen experiences strong sun, cold winters, and seasonal winds. Architecture must buffer temperature extremes, reduce heat loss, and create **protective spaces** that shelter daily life.

Livelihoods

Many young residents migrate to major cities for work, sending income home but gradually reducing the local labor force. Villages face aging populations and weakened capacity for local production and construction.

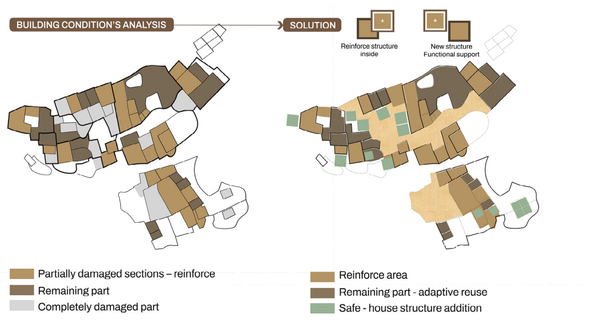
Amazigh Culture

The Amazigh communities hold a **rich heritage** of language, craft, and mountain traditions that attract tourists. Yet increasing exposure to mass culture risks diluting local identity and everyday practices.



Existing Village

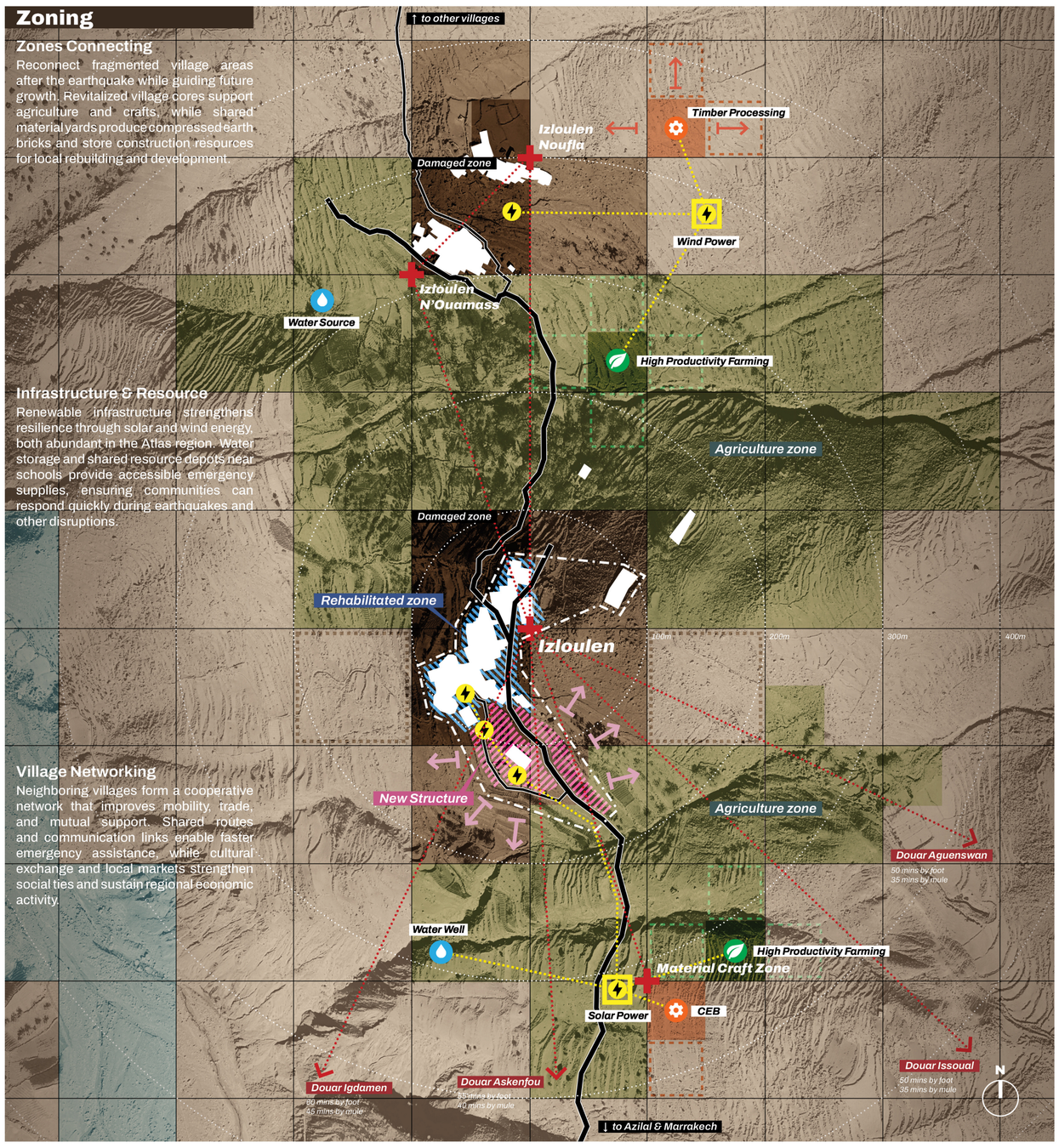
The current state of Izloulen village after the earthquake needs to be assessed in terms of the extent of damage and the usable interior and exterior public spaces in order to develop spatial strategies that optimize the labor, cost, and time of the local people.



Proposal

Only a simple construction method will be used to ensure that people can easily access and renovate their homes themselves.

Zoning



Infrastructure & Resource

Renewable infrastructure strengthens resilience through solar and wind energy, both abundant in the Atlas region. Water storage and shared resource depots near schools provide accessible emergency supplies, ensuring communities can respond quickly during earthquakes and other disruptions.

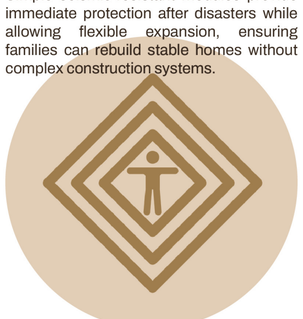
Village Networking

Neighboring villages form a cooperative network that improves mobility, trade, and mutual support. Shared routes and communication links enable faster emergency assistance, while cultural exchange and local markets strengthen social ties and sustain regional economic activity.

Strategy

Human first : Safe Module

Simple seismic-resistant modules provide immediate protection after disasters while allowing flexible expansion, ensuring families can rebuild stable homes without complex construction systems.

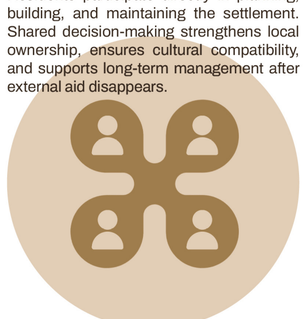


Reuse: Damaged Structure & Ruins Material

Collapsed structures and local stone are reused as building material. This approach reduces waste, lowers reconstruction costs, and preserves the memory and identity embedded in the village landscape.

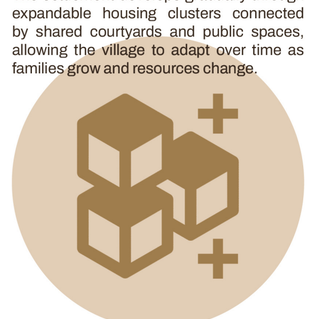
Co-Design & Co-Management

Residents participate directly in planning, building, and maintaining the settlement. Shared decision-making strengthens local ownership, ensures cultural compatibility, and supports long-term management after external aid disappears.



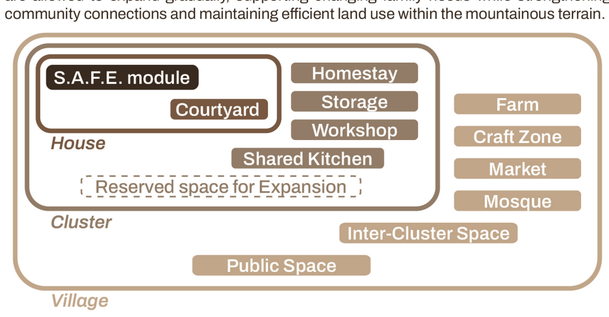
Incremental: Housing & Public spaces

The settlement develops gradually through expandable housing clusters connected by shared courtyards and public spaces, allowing the village to adapt over time as families grow and resources change.



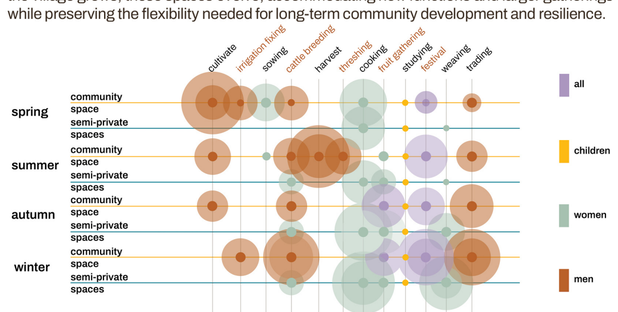
Spatial Strategy : Shared Resources and Expandable Living

Both tangible and intangible resources are shared. Housing clusters are organized around collective spaces where water, tools, knowledge, and social life are exchanged. Houses are allowed to expand gradually, supporting changing family needs while strengthening community connections and maintaining efficient land use within the mountainous terrain.

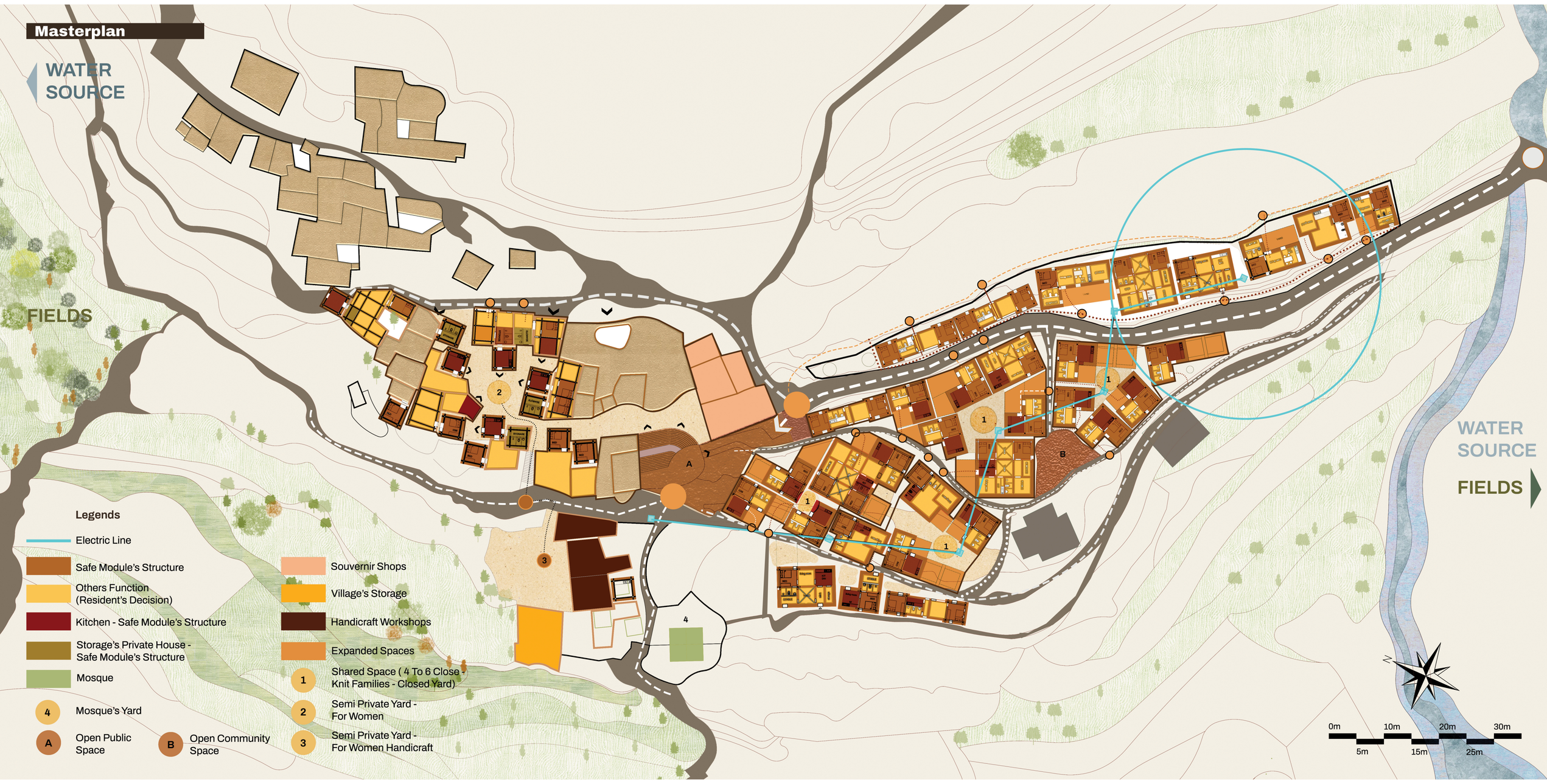


Temporal Strategy : Seasonal and Event-Based Spaces

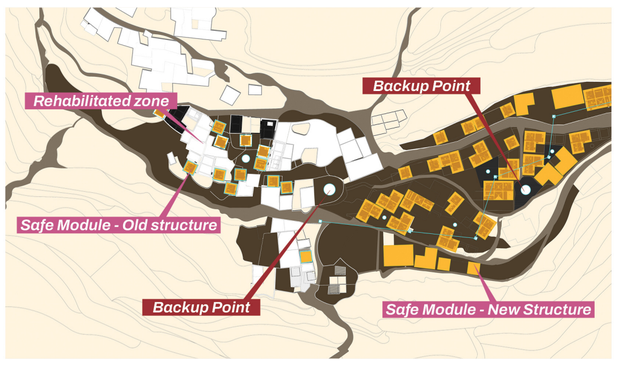
Spaces are designed to adapt over time and respond to seasonal rhythms. Courtyards and shared platforms support daily activities, agricultural cycles, markets, and cultural events. As the village grows, these spaces evolve, accommodating new functions and larger gatherings while preserving the flexibility needed for long-term community development and resilience.



Masterplan

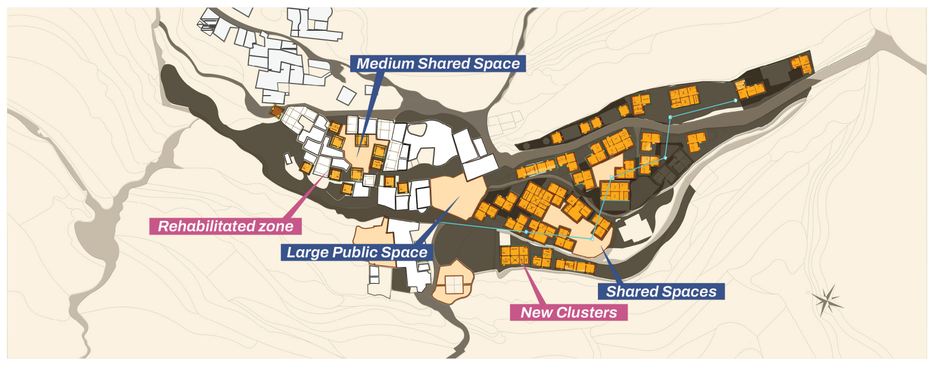


Timeline



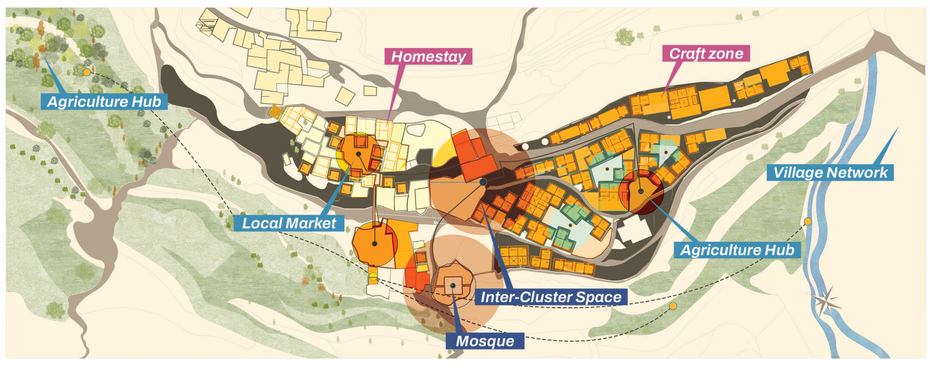
1st year: Stabilization and Emergency Support

Damaged areas are stabilized and essential repairs begin. Safehouse modules are installed to protect residents from seismic risks, while emergency backup points provide accessible storage for tools, materials, and disaster-response supplies.



5 years: Reconstruction and Infrastructure

Reconstruction expands beyond emergency repair toward long-term settlement recovery. Damaged neighborhoods are rebuilt and new housing clusters appear around shared courtyards. Renewable energy systems, material production yards, and improved paths organize village infrastructure, supporting agriculture, crafts, and everyday community life.



10 years - Organic Village Growth

After a decade, the village develops into a resilient and interconnected settlement. Housing clusters grow organically while inter-cluster structures strengthen spatial continuity. Shared public spaces, workshops, and markets support economic activity, enabling the community to evolve gradually while preserving Amazigh cultural identity and adapting to future environmental challenges.

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THE KASBAH WITHIN

Module S.A.F.E.

Shelter - Animals - Food - Essentials

Safe Module 1: Bedroom

Reinforced structure ensures safety during earthquakes, providing secure shelter while maintaining comfort and dignity in everyday life.

Safe Module 2: Livestock room

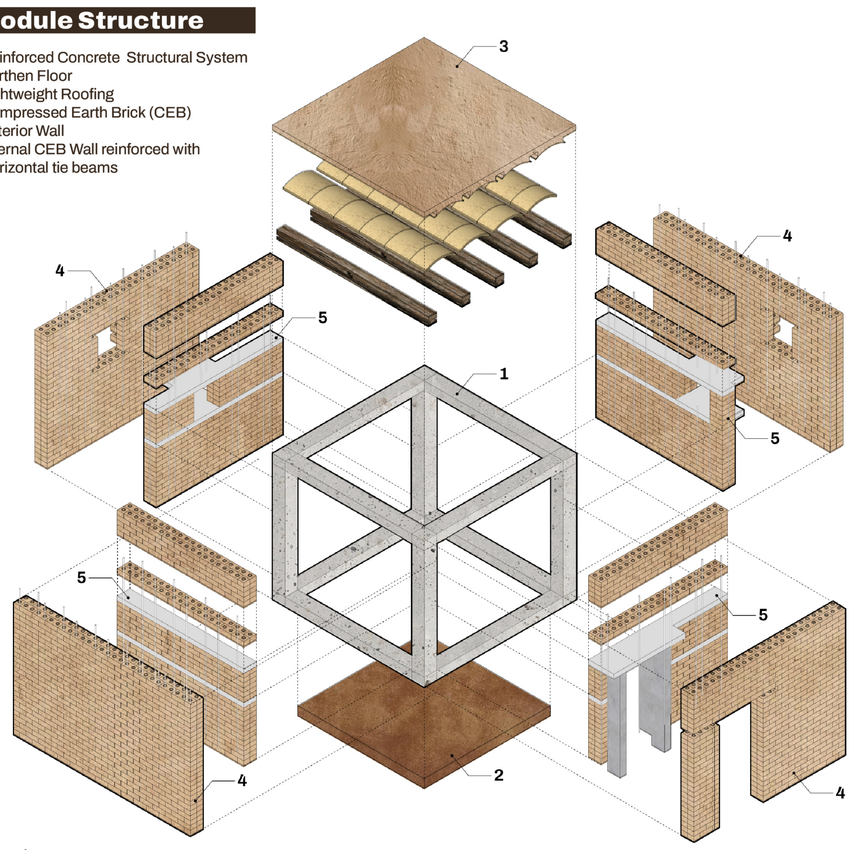
Protecting animals during earthquakes, safeguarding vital livelihoods while improving hygiene, organization, and daily care within the household compound.

Safe Module 3: Kitchen + WC

Access to food preparation, clean water, and sanitation, supporting survival during emergencies while improving health, hygiene, and daily living standards.

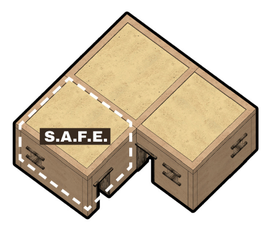
Module Structure

1. Reinforced Concrete Structural System
2. Earthen Floor
3. Lightweight Roofing
4. Compressed Earth Brick (CEB) Exterior Wall
5. Internal CEB Wall reinforced with Horizontal tie beams



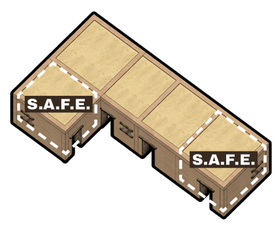
9m2
1-2 people

New House Develop



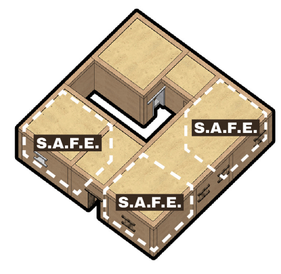
Phase 1: Young Family house

27m2
2-3 people
1 SAFE module



Phase 2: Expansion

45m2
3-4 people
2 SAFE modules



Phase 3: Module Complete

63m2
4-5 people
3 SAFE modules

Phase 4: Cell Division

45m2
3-5 people
3 SAFE modules

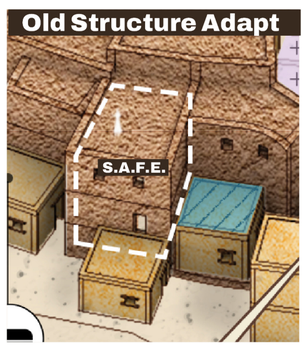
+

27m2
1-2 people
1 SAFE module

Phase 5 : Cluster

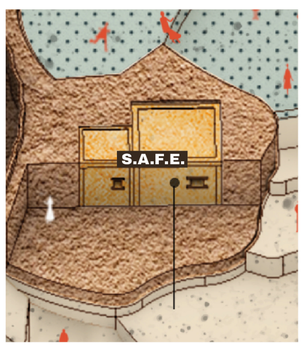
4-5 families
20 people
2-3 SAFE modules/familiy

Old Structure Adapt



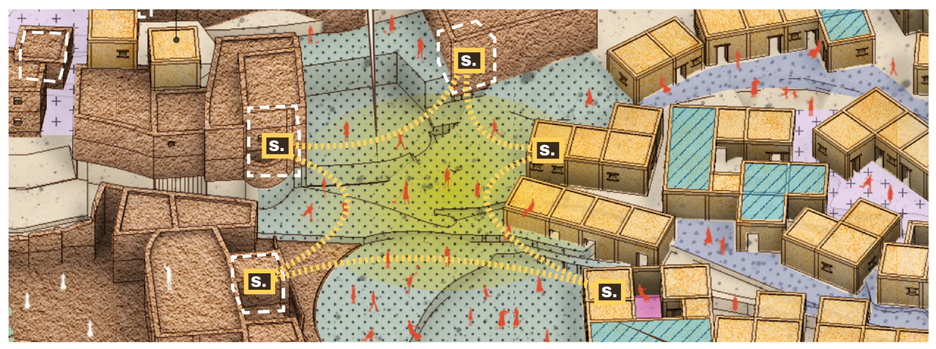
Old structure Retrofit

Insert within existing houses, the module stabilizes weakened walls, providing immediate seismic support while preserving the original structure and spatial layout.



Old structure Expansion

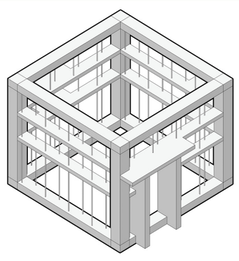
Placed beside existing houses, the module expands living space, improves safety and daily comfort, while subtly supporting and relieving stress on aging structures.



Inter - Cluster Modules

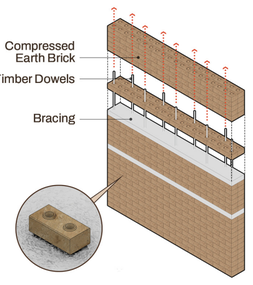
Amazigh communities traditionally share resources and support each other. Expanding SAFE modules into inter-cluster spaces - shared kitchens, grain storage, tools, and materials - reinforces this culture. The network improves disaster resilience while strengthening cooperation and everyday collective life.

Structure Solution



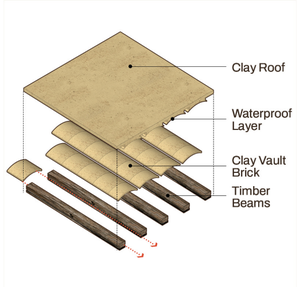
Ring beams & bracings

Continuous ring beams tie walls into a single loop. Bracing system stabilizes corners and openings, distribute seismic forces, and prevent wall separation during earthquake.



Interlocking CEBs

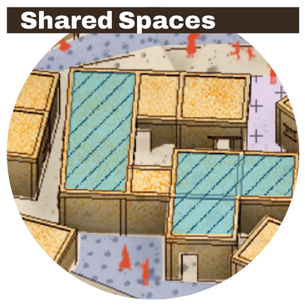
Interlocking CEBs form precise dry joints with minimal mortar. Mechanical interlock improves wall integrity and allows the structure to act as a unified mass.



Lightweight Roofing

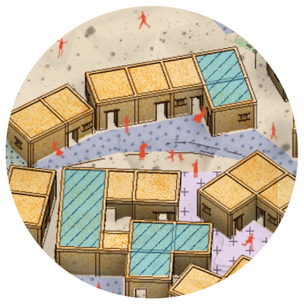
Timber beams support clay tiles with a thin clay layer, forming a lightweight, flexible roof that reduces seismic load and allows controlled movement during earthquakes.

Shared Spaces



Small Shared Space

9-15m2
Family courtyard
Private space

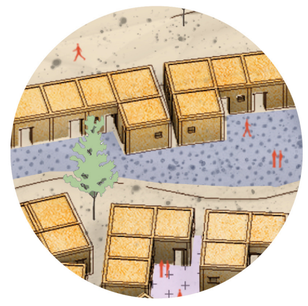


Medium Shared Space

15-30m2
Common yard between families
Semi-public space

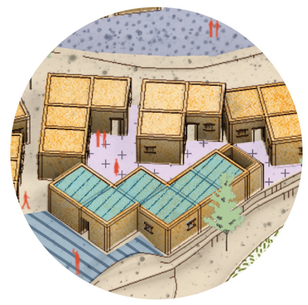
Large Shared Space

>100 m2
Village events, Religion uses
Public space



Corridor Shared Space

Traffic space
Daily uses
Public space



Roof Shared Space

Common yard between families
Agriculture uses, Daily uses
Semi-public space