

# Material Culture, Water and Heritage in the Huerta of Valencia

# CONTENTS:

- Huerta in The Mediterranean Scale
- Water Integrated Management and Irrigation Systems
- Buildings in Gardens and Water Management Systems in Mediterranean Basin Context

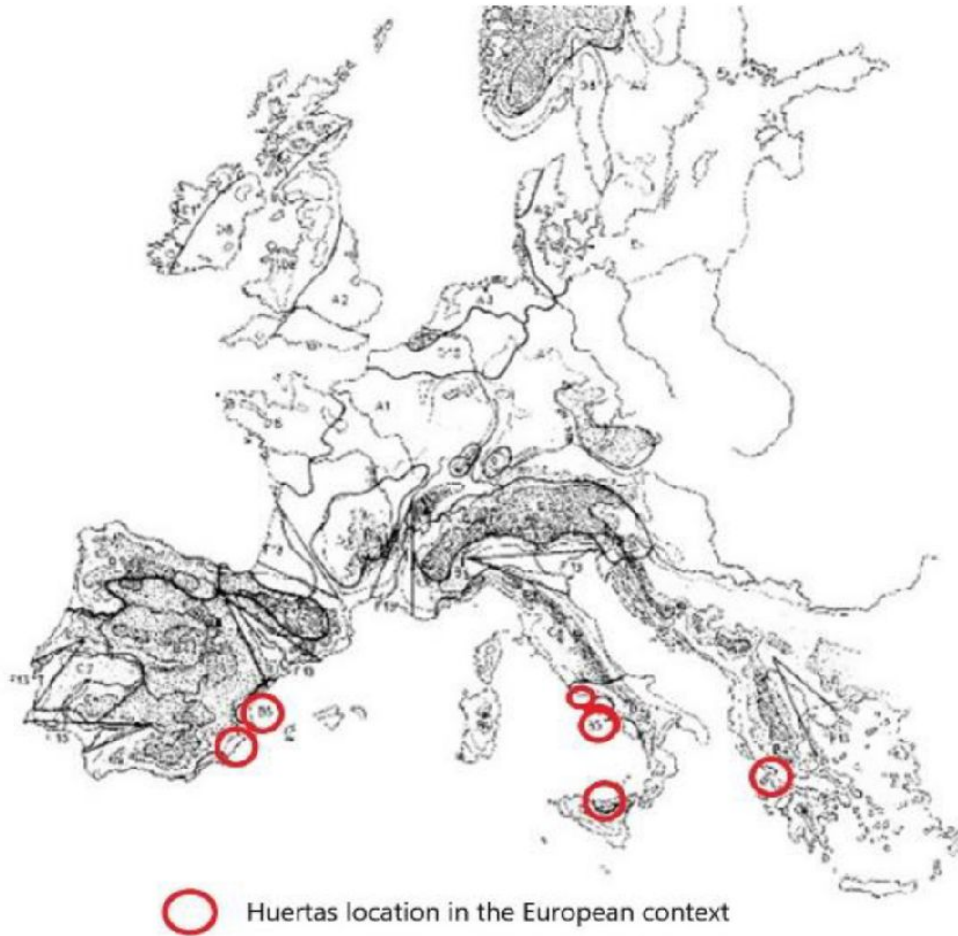
**Material Culture** refers to the physical objects, materials, and built elements used to shape and interact with outdoor spaces

# MEDITERRANEAN BASIN CONTEXT

**six historical Mediterranean huerta landscapes remaining in Europe**

**The defining tangible elements of the huerta landscape**

- Irrigation mesh
- Path network for mobility
- Settlements and production buildings
- Crops and vegetation



# Case comparisons of Valencian huerta with 3 mediterranean agricultural landscapes in Turkiye and Cyprus



## The aspects for analysis

1. Typologies of irrigation and related structures
2. Relation with the urbanization, how does it change the city, the current situation?
3. Crops, agriculture, vegetation
4. Water Systems Management
5. Building typologies and construction-parissa

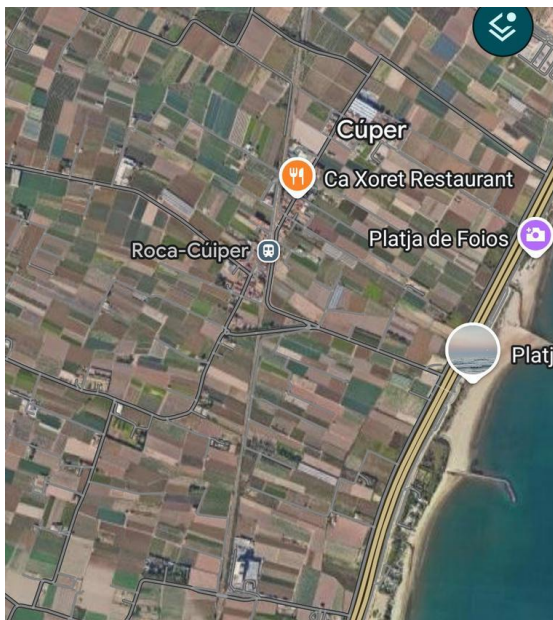
| Topic                                               | L'Horta de València (Spain)                                                                                                                                                                                        | Gediz River Delta Agricultural Landscape (Turkey)                                                                                                                                                      | Ayia Napa / Kokkinochoria Agricultural Plain (Cyprus)                                                                                                                                              | Düden River Antalya (Turkey)                                                                                                                                                                                                                                                     |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Landscape type                                      | <ul style="list-style-type: none"> <li>• Historic irrigated huerta</li> <li>• Small-scale agricultural mosaic</li> <li>• Fields + canals + villages + paths</li> <li>• Water shapes landscape structure</li> </ul> | <ul style="list-style-type: none"> <li>• River delta / alluvial agricultural plain</li> <li>• Large productive landscape</li> <li>• Agriculture connected with river ecology and wetlands</li> </ul>   | <ul style="list-style-type: none"> <li>• Dry Mediterranean agricultural plain</li> <li>• Open fields and seasonal landscapes</li> <li>• Adapted to drought and limited water</li> </ul>            | <ul style="list-style-type: none"> <li>• River-fed agricultural landscape</li> <li>• Irrigation canals + springs + karst water system</li> <li>• Agriculture, settlements and tourism overlap</li> <li>• Water shapes urban and rural development</li> </ul>                     |
| Irrigation type                                     | <ul style="list-style-type: none"> <li>• Gravity irrigation</li> <li>• Turia River → acequias → fields</li> <li>• Open canals visible in landscape</li> <li>• Community water management</li> </ul>                | <ul style="list-style-type: none"> <li>• River-based irrigation</li> <li>• Canals, reservoirs, pumping systems</li> <li>• Large-scale water infrastructure</li> </ul>                                  | <ul style="list-style-type: none"> <li>• Groundwater + reservoirs + pumped irrigation</li> <li>• Modern pipe/drip systems</li> <li>• Water infrastructure mostly invisible</li> </ul>              | <ul style="list-style-type: none"> <li>• Gravity irrigation + canal system</li> <li>• Düden/Kırgöz waters distributed through irrigation canals</li> <li>• Open canals historically visible in landscape</li> <li>• Collective and state-managed water infrastructure</li> </ul> |
| Settlement structure and relations with urban zones | <ul style="list-style-type: none"> <li>• Dense peri-urban agricultural settlements</li> <li>• Farmhouses and villages integrated with fields</li> <li>• Water network organizes settlement pattern</li> </ul>      | <ul style="list-style-type: none"> <li>• Villages separated from large agricultural fields</li> <li>• Settlements follow transport and river corridors</li> <li>• Less fine-grained pattern</li> </ul> | <ul style="list-style-type: none"> <li>• Compact villages</li> <li>• Agriculture outside settlements</li> <li>• Tourism pressure on rural land</li> </ul>                                          | <ul style="list-style-type: none"> <li>• Villages and agricultural areas historically organized around canals</li> <li>• Rapid urbanization transformed water–settlement relations</li> <li>• Irrigation network influenced spatial growth</li> </ul>                            |
| Crops                                               | <ul style="list-style-type: none"> <li>• Vegetables</li> <li>• Citrus orchards</li> <li>• Rice near Albufera</li> <li>• Diversified small plots</li> </ul>                                                         | <ul style="list-style-type: none"> <li>• Cotton</li> <li>• Grapes/vineyards</li> <li>• Vegetables</li> <li>• Fruit orchards</li> </ul>                                                                 | <ul style="list-style-type: none"> <li>• Potatoes</li> <li>• Vegetables</li> <li>• Cereals</li> <li>• Olives/carob</li> <li>• Seasonal crops</li> </ul>                                            | <ul style="list-style-type: none"> <li>• Citrus orchards</li> <li>• Pomegranates</li> <li>• Vegetables</li> <li>• Greenhouses</li> <li>• Mixed Mediterranean crops</li> </ul>                                                                                                    |
| Mills                                               | <ul style="list-style-type: none"> <li>• Hydraulic mills integrated into acequia network</li> <li>• Water used for irrigation + energy</li> <li>• Mill as a node in water landscape</li> </ul>                     | <ul style="list-style-type: none"> <li>• Historic river mills along streams/channels</li> <li>• Depended on natural river flow</li> <li>• Less connected to irrigation structure</li> </ul>            | <ul style="list-style-type: none"> <li>• Few water mills</li> <li>• Traditional systems relied more on wells, wind pumps and dry farming</li> <li>• Energy systems separate from fields</li> </ul> | <ul style="list-style-type: none"> <li>• Historic water mills along irrigation canals and streams</li> <li>• Water used for irrigation and local production</li> <li>• Mills functioned as nodes in the irrigation landscape</li> </ul>                                          |

## Why not every Mediterranean river basin agricultural landscape is a huerta?



Huertas represent an intensive, irrigated “garden-like” system, while many other areas rely on dry farming, terraces, or large-scale monocultures such as olives, vineyards, and cereals.

They developed only in places where **several conditions came together**: suitable river hydrology, fertile soils, long-term irrigation governance, fragmented small-scale ownership, and strong demand from nearby urban populations.



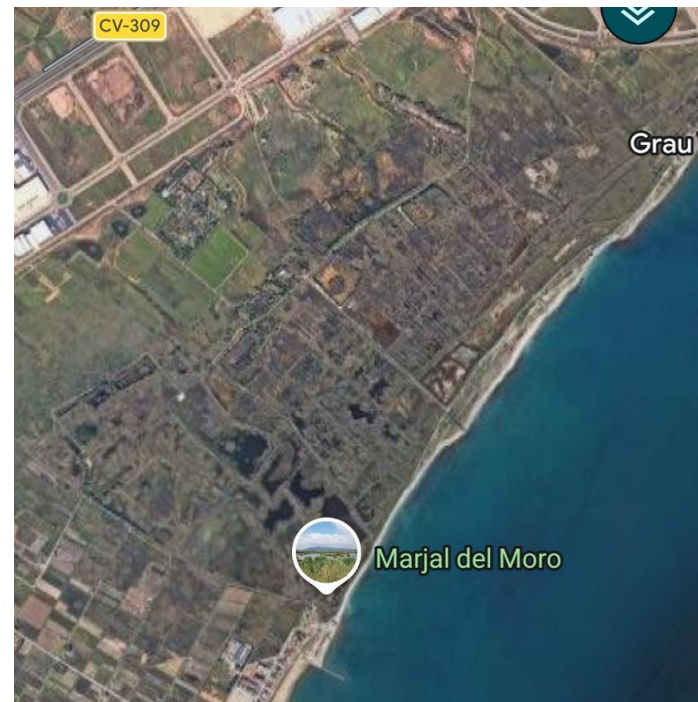
## What is the natural landscape of the Huerta?

The lowest zones of the alluvial plain, closest to the sea and river, were permanently wet.

This area was not a freshwater lake yet, but a brackish, swampy coastal marshland.

The table below shows how human engineering radically altered the physical space of the original landscape:

| Pre-Agricultural Habitat | Natural Climax Plants         | Modern Huerta Equivalent                    |
|--------------------------|-------------------------------|---------------------------------------------|
| River Floodplain         | Poplars, Ashes, Willows, Ivy  | Chufa fields, Tomato orchards, Acequias     |
| Inland Terraces          | Holm Oak, Wild Olive, Carob   | Orange groves, Paella bean (Garrofó) fields |
| Coastal Lagoons          | Reeds, Sedges, Brackish Water | Flooded Rice Paddies (Tancats)              |



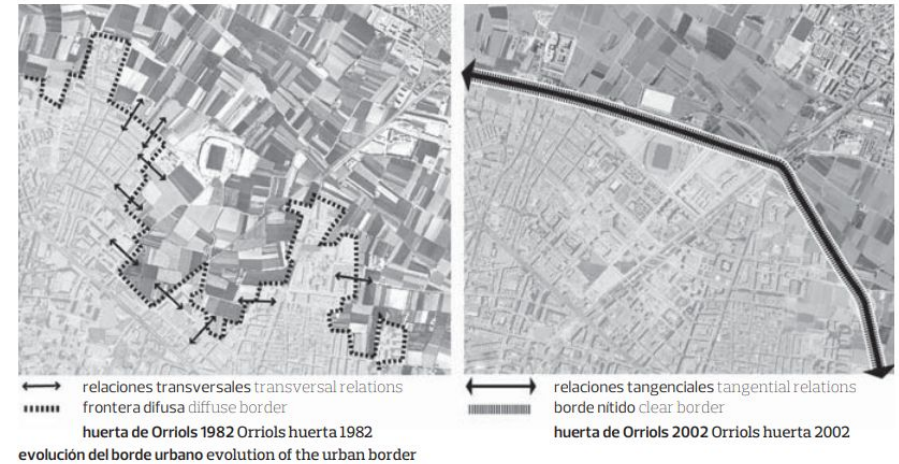
## Why huertas are not dominant today (from the agricultural perspective)

Even if huertas are:

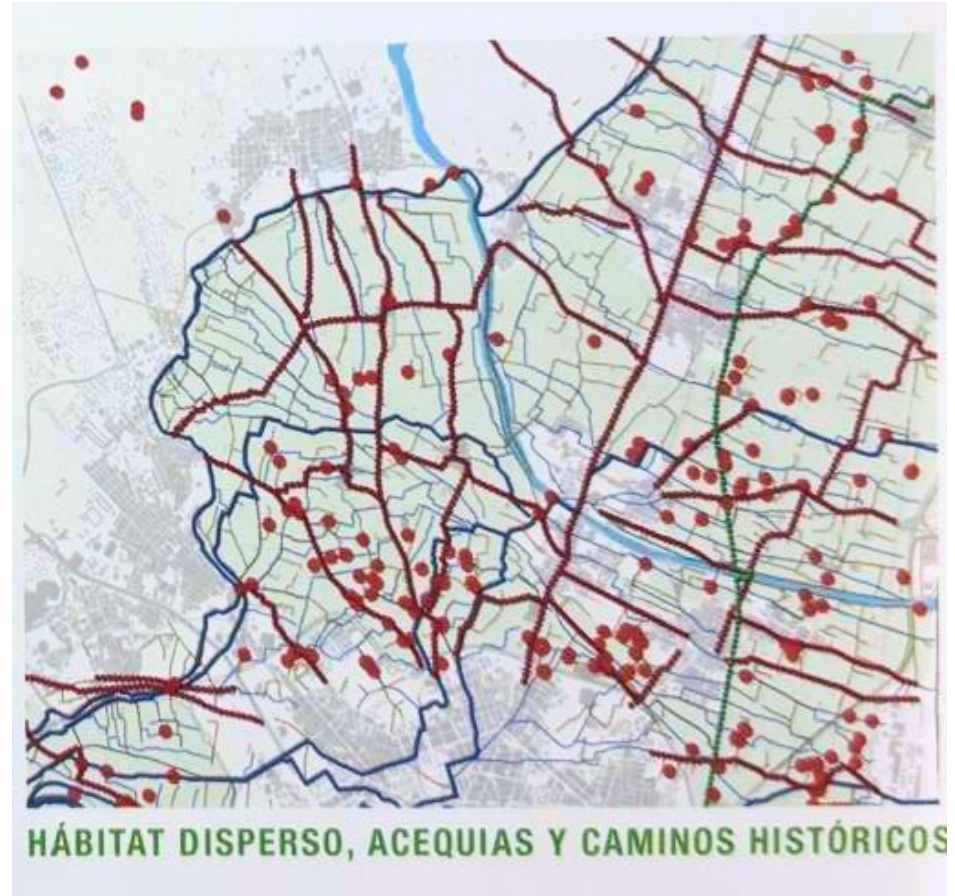
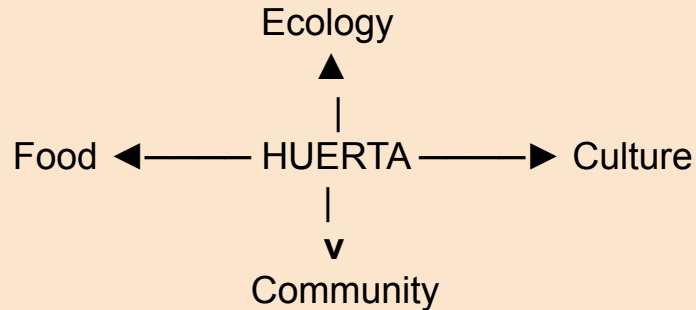
- very productive per hectare
- ecologically efficient
- culturally valuable

they are disadvantaged because:

- land fragmentation prevents scaling
- urban expansion eats agricultural land
- global food systems favor standardized monocultures
- labor costs are high
- logistics are less optimized

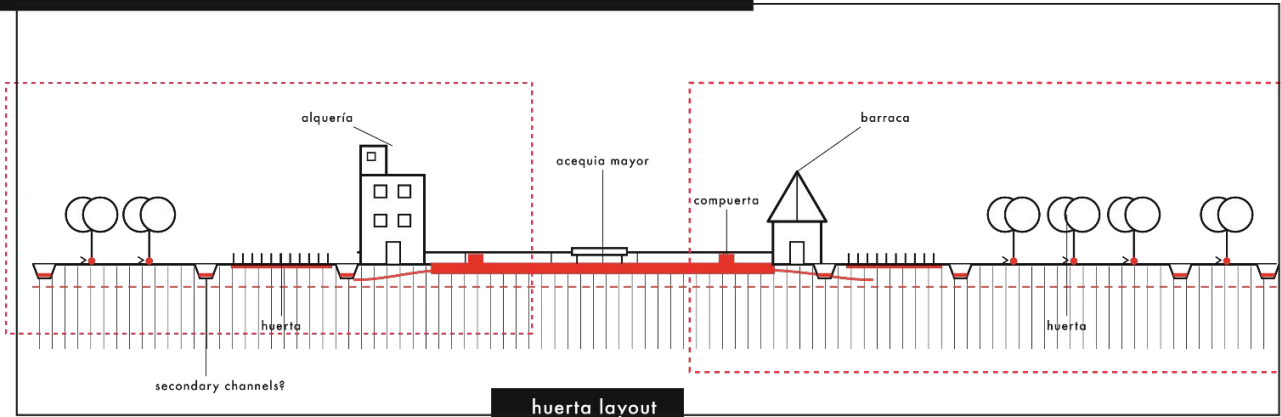


The Huerta can be understood as **human-made ecological system**: a landscape where water, agriculture, and urban communities have **co-evolved over centuries**.



## **\*Water, fields, roads, and dwellings form one connected whole.**

### urban - agriculture - water relation in Valencia

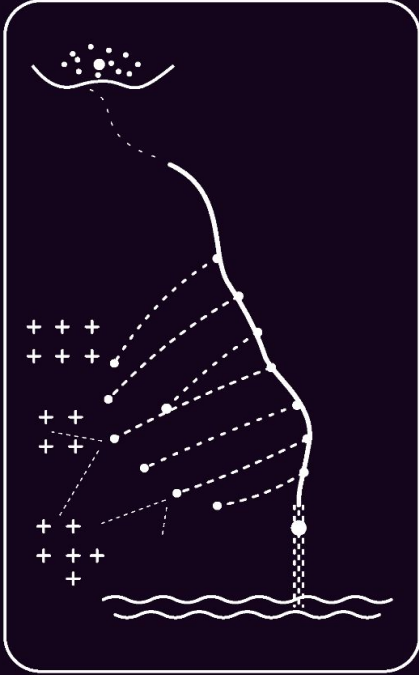


water · structure · field — one continuous agro-hydro settlement

– The huerta is the combination of the network of channels that distribute water, the network of rural roads, and the scattered agricultural settlements. The canals, the crop mosaic, the farmhouses, alquerías, barracas, and the paths are not separate things — they are one integrated landscape that grew together.

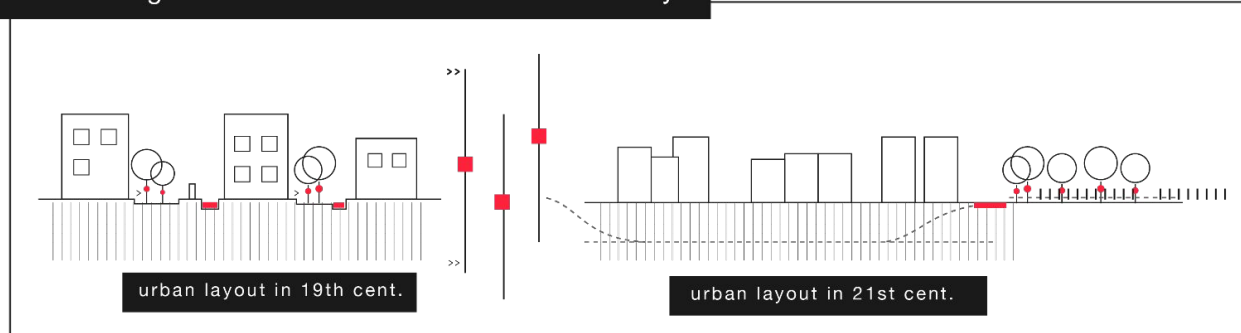


— irrigation, mills, drainage, domestic use carried together; the infrastructure stays integrative.



Fragmented  
Water–Settlement  
Relationship in  
Antalya, Turkey

## urban - agriculture - water relation in Antalya



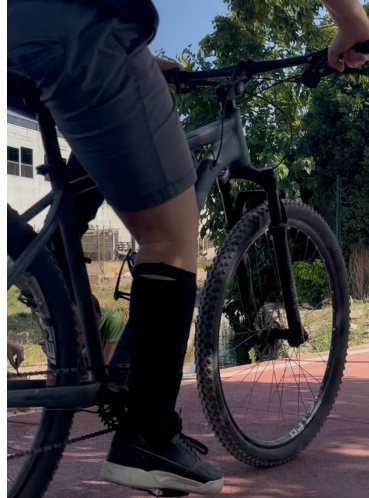
\*Purification and Regimes of Visibility

\*Nature–Culture Separation



## Water, farming, and everyday recreation share a single line in the landscape.

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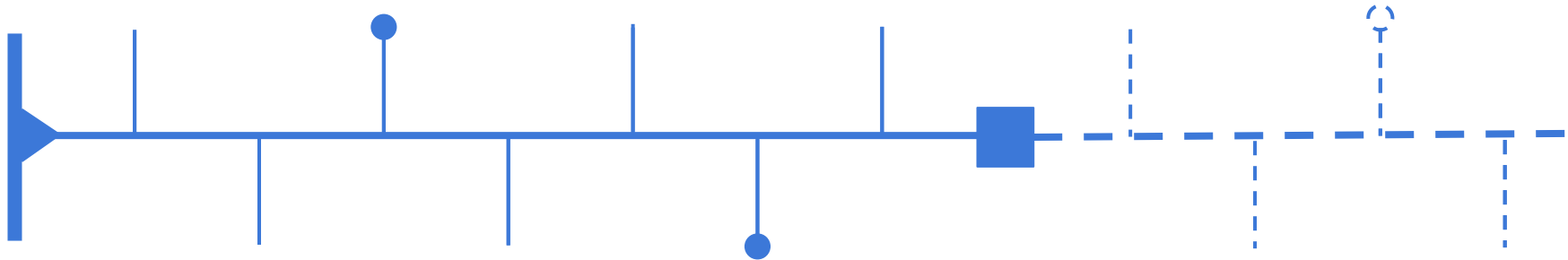
\*Beyond farming, the huerta works as an everyday open-air space for the city — walking, cycling, agro-tourism tours, workshops and restaurants in the old farmhouses etc. are the everyday urban activities continue to coexist

\*These activities transform the Huerta into a sensory landscape characterized by the flowing water, shaded paths, cultivated fields, seasonal changes, and the presence of traditional architecture, offering an experience that contrasts sharply with the dense urban environment.

# **WATER INTEGRATED MANAGEMENT**

# WATER SYSTEMS - FUNCTIONAL DIAGRAM

- **Natural sources:** Rivers, streams, lakes, aquifers etc.
- **Capture:** This initial step consists of the controlled withdrawal of water from natural sources, such as rivers, lakes, or aquifers, ensuring a safe and constant supply.
- **Channel:** The captured water is efficiently transported toward treatment plants or consumption centers through a network of channels, pipelines, and aqueducts.
- **Distribute:** Thanks to branching and pumping systems, water resources are meticulously delivered to end-users for drinking, agricultural, or industrial purposes.
- **Collect:** This step involves gathering wastewater and stormwater through sewer networks, directing them to purification systems before their release back into the environment.



## LEGEND

- natural source    ► capture    — primary channel    - secondary channel    ● distribute    ■ collect

# SAIDA, LEBANON



Natural source:  
Al Awali River

Capture:  
Maksar

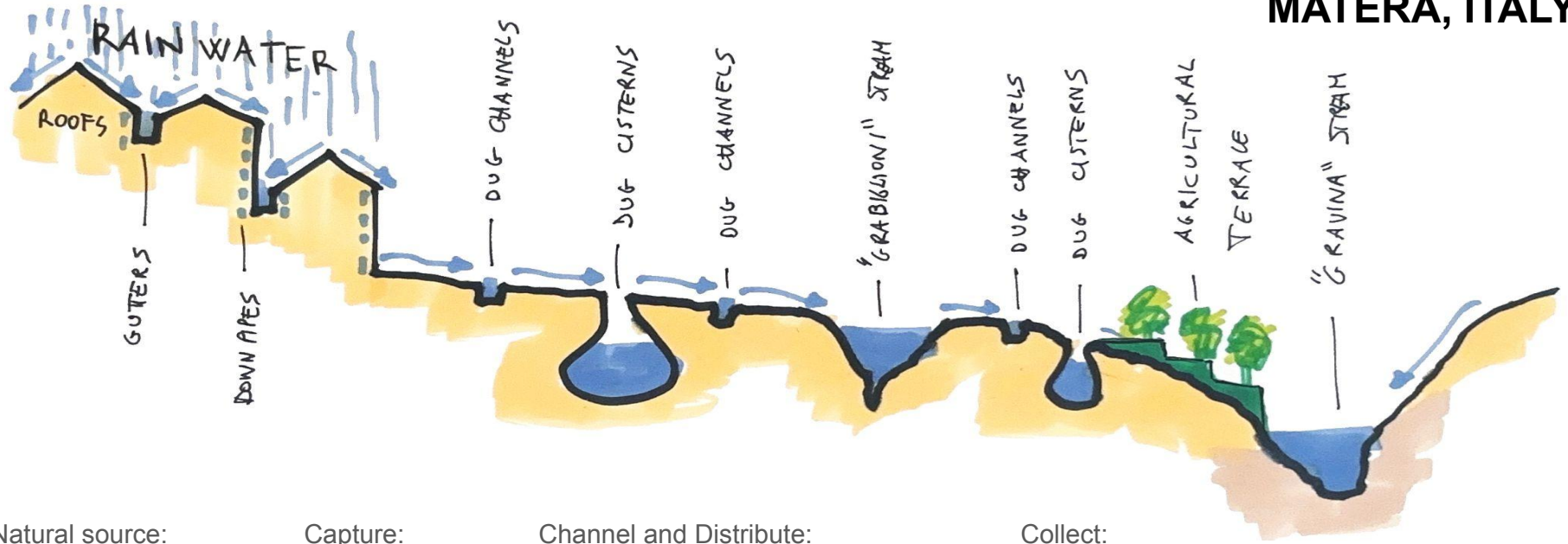
Channel and Distribute:  
Canals

Collect:  
Collection Pools

repeat



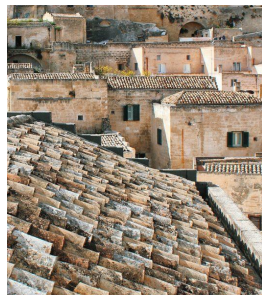
# MATERA, ITALY



Natural source:  
Rainwater



Capture:  
Roofs



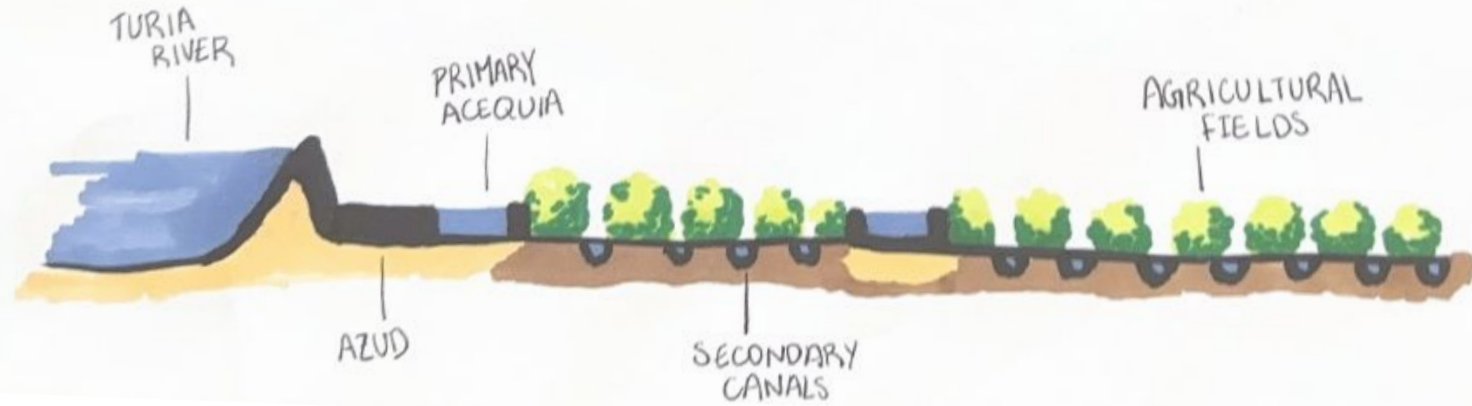
Channel and Distribute:  
Dug channels



Collect:  
Dug and semi-built cisterns repeat



# VALENCIA, SPAIN



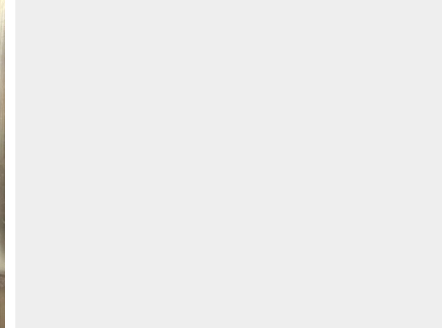
natural source:  
Turia River

Capture:  
*Azud* (weir)

Channel and Distribute:  
*Acequia* (canal), secondary channels

Collect:  
Not applicable for agriculture

repeat



**BUILDINGS**

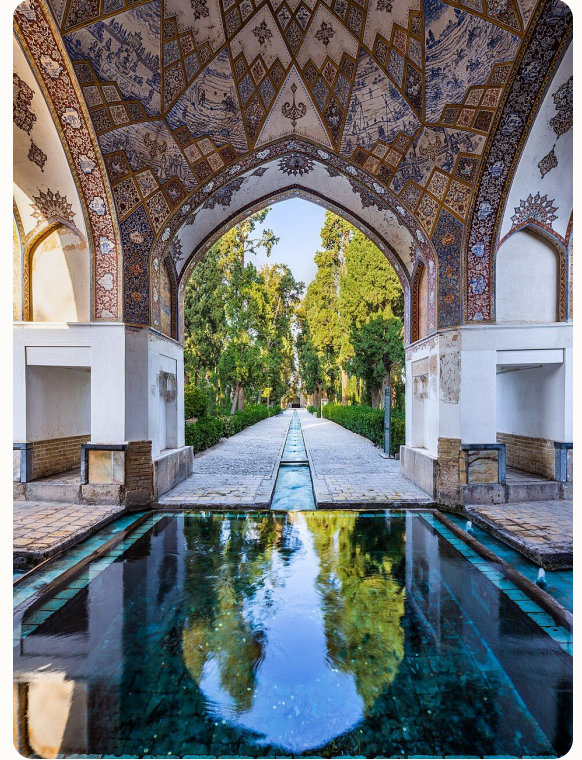
# **BUILDINGS** IN GARDENS AND WATER MANAGEMENT SYSTEMS IN MEDITERRANEAN BASIN CONTEXT

# The Koshk Experience: Persian Garden Architecture



## Key Architectural Elements:

- Semi-Open Spaces
- Water Integration
- Climate-Adaptive Materials



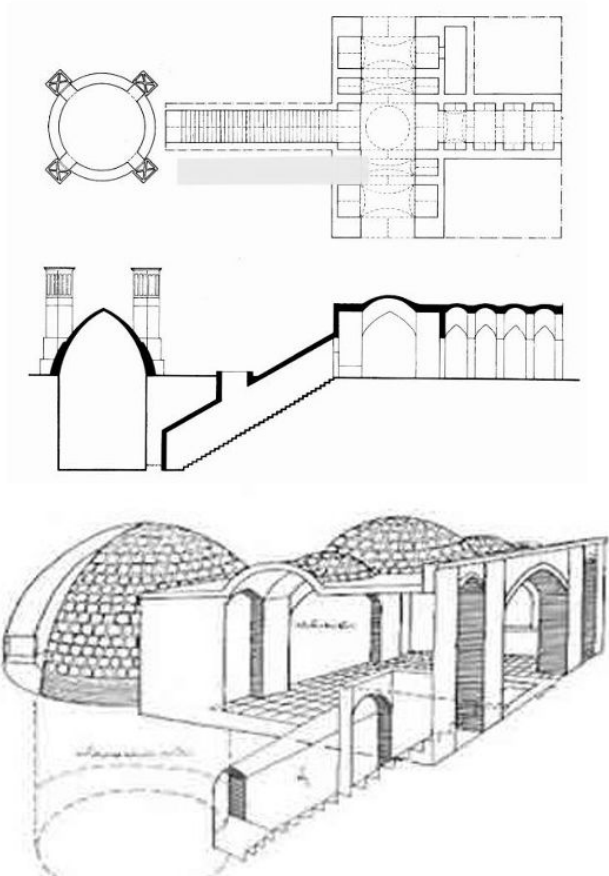


## Key Spatial Elements

- **Air Flow:** Natural ventilation integrated into the structure.
- **Perspective:** Strategic cross-visual effects and framed views.
- **Water Effects:** Reflective pools and channels for cooling and aesthetics.
- **Shadow Play:** Architectural forms designed for cooling shade.



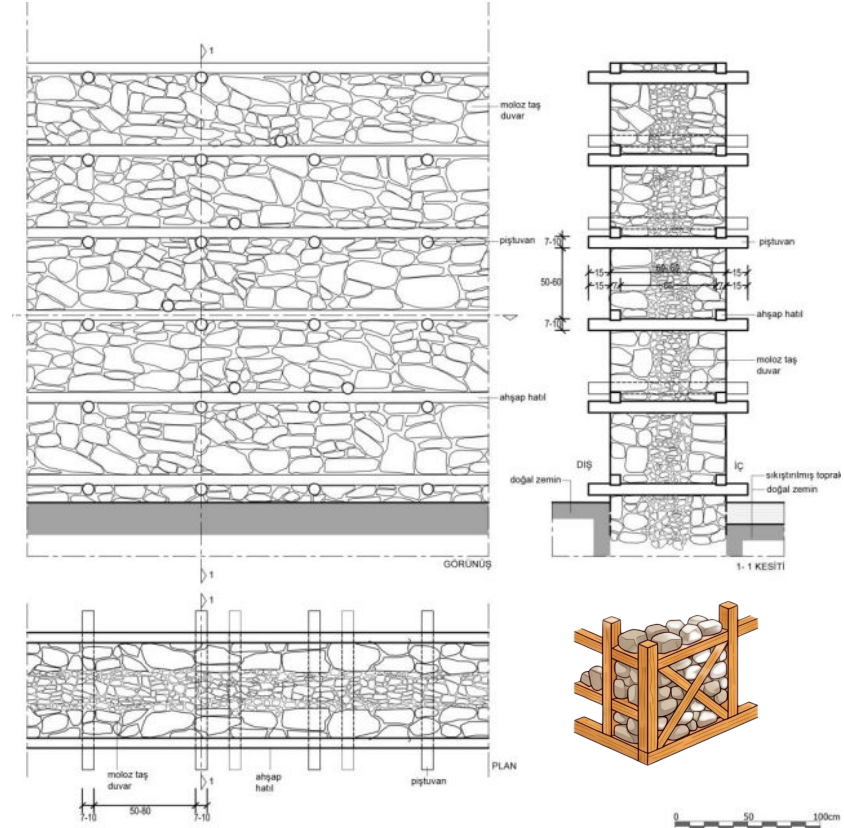
# Iranian cistern: Ab-anbar



## Key Architectural Elements:

- Windcatchers (*Badgir*)
- The Staircase and *Pashir*
- Waterproof Materials

# Traditional Dügmeli Houses in TURKIYE



# The Essence of Lebanese Architecture: Tradition, Stone, and Style

## Pitched Red-Tiled Roofs

Terracotta tiles symbolize prosperity and provide essential drainage for mountain rainwater.

## Durable Local Stone Construction

Local limestone and sandstone provide thermal insulation and a visual connection to the mountains.

## The Triple-Arched Window (Trifora)

An iconic symbol of Lebanese houses, typically located on the central facade for panoramic views.

## The Mandaloun & Liwan

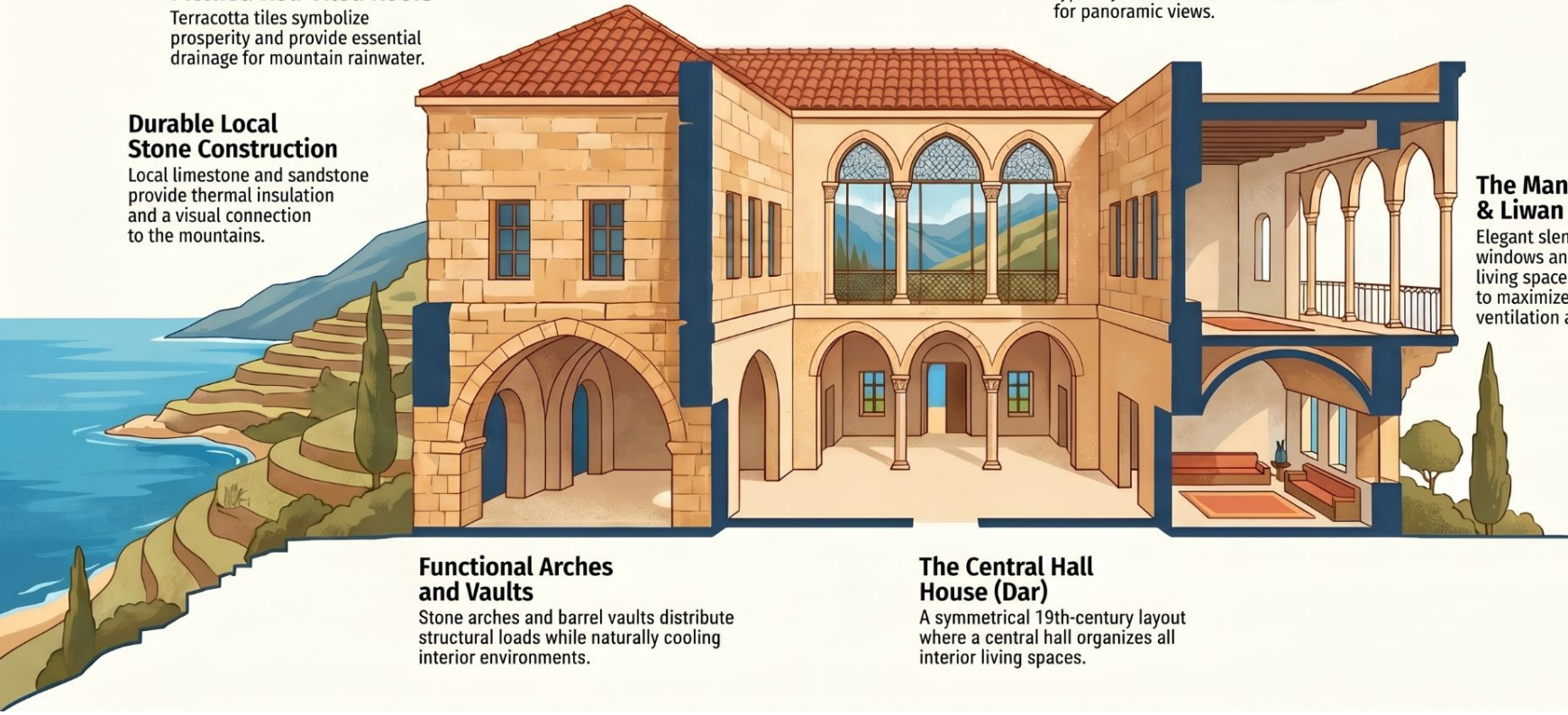
Elegant slender-columned windows and semi-open living spaces designed to maximize ventilation and shade.

## Functional Arches and Vaults

Stone arches and barrel vaults distribute structural loads while naturally cooling interior environments.

## The Central Hall House (Dar)

A symmetrical 19th-century layout where a central hall organizes all interior living spaces.



**Water-related material culture in Lebanon reflects centuries of adaptation to the Mediterranean climate and terrain. Through structures such as cisterns and water mills, communities developed systems to collect, distribute, and utilize water efficiently. These elements not only supported daily life and agriculture but also shaped the cultural landscapes and architectural heritage of the country.**

**STONE CISTERNS (BIRKEH)**



**Sidon**

Stone cisterns are underground water-storage structures traditionally used to collect and preserve rainwater for domestic use. In Sidon, they were often built below courtyards or public spaces using limestone masonry and coated with waterproof mortar to prevent leakage. Water was collected through openings connected to roofs and paved surfaces, allowing communities to store water throughout the dry Mediterranean summer. Characteristics: Underground, stone-lined, vaulted or rectangular chambers, rainwater harvesting system, waterproof interior coating.



**WATER MILLS**



**Shebaa**

The traditional water mill of Shebaa uses the force of flowing water to power a wheel connected to grinding stones. Water is diverted from nearby streams through a channel and directed onto the wheel, generating mechanical energy for milling grain. Built primarily from local stone with wooden and metal mechanical components, the mill represents the close relationship between natural water resources and food production in rural Lebanon.

Characteristics: Stone building, waterwheel mechanism, diverted stream channel, grain-grinding function, reliance on continuous water flow.

# TPOLOGY OF BUILDINGS IN HUERTA DE VALENCIA

1. THE BARRACA
2. THE ALQUERIA
3. TRADITIONAL FARMER'S HOUSE
4. HERMITAGES, MONASTERIES
5. PRODUCTIVE SPACES :
  - Mills
6. Contemporary buildings:
  - 20th industrial warehouses
  - Motor Wells

Alquería vs. Masía



**MASÍA** (Dry Farming)  
Serves dry farming.

The "Casa" vs. the "Barraca"



**BARRACA**  
Distinguished by their vegetal roofs.

Historical Evolution



**MUSLIM RAFALS**  
Originated as Muslim rafals.



**CHRISTIAN NOBLE ESTATES**  
Became Christian noble estates after reconquest.

# 1. THE BARRACA

## Material Evolution in Buildings of the Valencian Barraca



Constructed from cane bundles tied with reeds and coated with mud. A single-space dwelling adapted to the wetland environment of the Huerta.

Hard timber branches replace cane, increasing structural stability, while the roof evolves into a reed-covered system for greater durability.

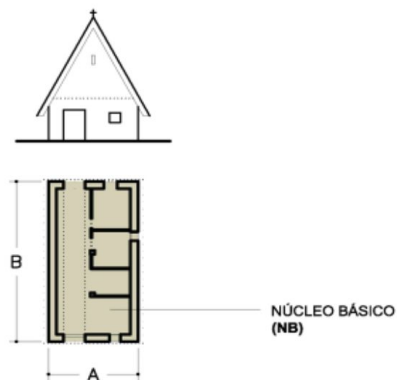
Lime whitewashing is introduced to improve hygiene, weather protection, and sunlight reflection, creating a more comfortable interior environment.

The introduction of mud-straw cob walls and later adobe brick construction marks the final evolution of the barraca. These techniques produced stronger, more durable, and better insulated buildings, culminating in the mature Valencian barraca finished with protective lime whitewash.

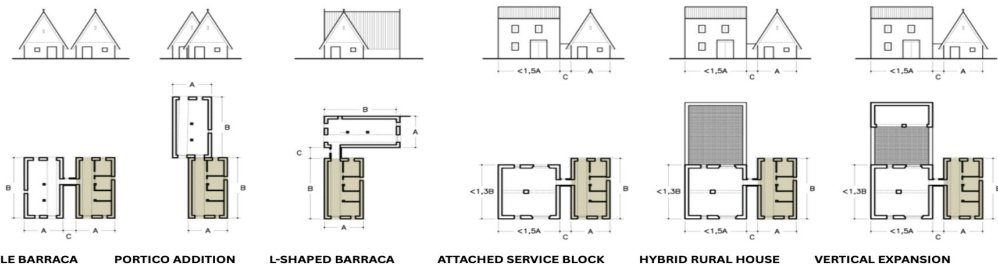
## DIFFERENT TYPES OF BARRACA TYPOLOGIES NOW

Valencian barraca originated as a simple rural dwelling built from locally available materials. Over time, changing functional needs, family growth, and agricultural activities led to the development of multiple typological variations. While preserving the characteristic gabled form, these adaptations expanded the original barraca nucleus through additions, extensions, and spatial transformations.

## MAIN BARRACA TYPOLOGY



This type of structure is found exclusively on farmland, mainly around l'Albufera and its surrounding area, as well as in the l'Horta Nord area. They generally did not form clusters (although in areas such as El Cabanyal or Canyameler they did, and even dominated the neighborhood), given the fire hazard posed by their roofing. Occasionally, they did appear in pairs, one serving as a residence and the other as a kitchen and stable. They generally had a similar structure, with a large side corridor along which the various rooms (bedrooms) were arranged. Daily life took place in the large entrance hall. On the upper level, as in the alquerías, was the andana. They were built with materials available in the surrounding area: roofs made of sand grass (*Ammophila arenaria*) and rice straw; walls made of clay soil, reeds, and esparto rope; and wooden planks and beams from nearby trees. The roof structure is gabled, with a steep slope, supported by whitewashed mud-brick walls.



Two barraca units are connected side by side, increasing interior space while maintaining the traditional form.

A covered front porch is added, creating a transitional outdoor-indoor living space.

Additional volumes are attached to the original nucleus, allowing functional expansion around a courtyard.

Storage, agricultural, or service spaces are integrated alongside the main dwelling.

The traditional barraca is combined with contemporary masonry volumes while retaining its original identity.

A second-storey volume is introduced to accommodate changing spatial requirements.

## 2. THE ALQUERIA

**Functional Stratification:** Features a rectangular block layout with a task-oriented ground floor and private residential quarters on the upper floor.

**Specialized Wing & Outbuildings:** Includes a dedicated wing for storage or silkworm rearing, surrounded by stables, pens, an oven, and a well.

**Symmetric Facade Design:** Traditional entries feature a centered semicircular brick arch flanked by two large windows, with three intermediate and three upper-level windows.

**Material Adaptation:** Built using stone and mud *tobes* (adobe) reinforced with brick at corners/pillars, evolving into modern full-brick builds with Moorish tiles.

**Contemporary Changes:** Recent decades have introduced modern utility alterations using modern, non-traditional materials like concrete blocks and asbestos sheets.

### Alquería de Lleonart' in Campanar

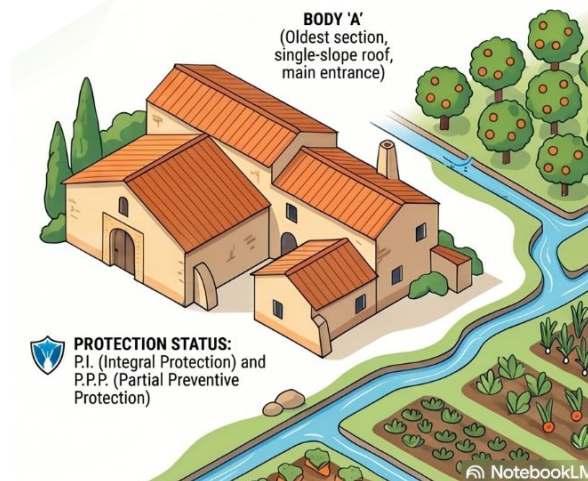


Fig. 48 Vista de la Alquería de Lleonart' desde el interior de su propia parcela. Fuente: Propio autor.



Fig. 49 Vista de la Alquería de Lleonart' desde el interior de su propia parcela. Fuente: Propio autor.



Fig. 45 Vista de la Alquería de Lleonart' desde el camino Partida de Arriba. Fuente: Propio autor.



Fig. 46 Vista de la Alquería de Lleonart' desde el camino Partida de Arriba. Fuente: Propio autor.

### 3. TRADITIONAL FARMER'S HOUSE

#### Characteristics

- \* Rectangular masonry building
- \* Clay tile pitched roof
- \* Built around agricultural production
- \* Larger than a barraca but smaller than many alquerías
- \* Constructed from brick, stone, lime plaster, timber, and ceramic roof tiles
- \* Included storage areas for crops and farming tools
- \* Often accompanied by courtyards, wells, and agricultural structures

#### Structural Features

- \* Load-bearing masonry walls
- \* Timber roof structure
- \* Gable roof
- \* Courtyard-oriented organization
- \* Storage and agricultural annexes

#### Material Analysis

- \* Brick masonry
- \* Stone foundations
- \* Lime plaster
- \* Timber beams
- \* Terracotta roof tiles



### 4. HERMITAGES, MONASTERIES

#### Characteristics

- \* Religious and agricultural complexes
- \* Large enclosed courtyards
- \* Organized around cloisters
- \* Served as spiritual, social, and productive centers
- \* Closely linked to irrigation networks and farmland

#### Material Analysis

- \* Stone masonry
- \* Brick
- \* Lime plaster
- \* Timber beams
- \* Terracotta roof tiles

#### Structural Features

- \* Thick load-bearing masonry walls
- \* Vaulted and arched spaces
- \* Courtyard and cloister organization
- \* Timber or vaulted roof systems
- \* Monumental entrances and bell towers



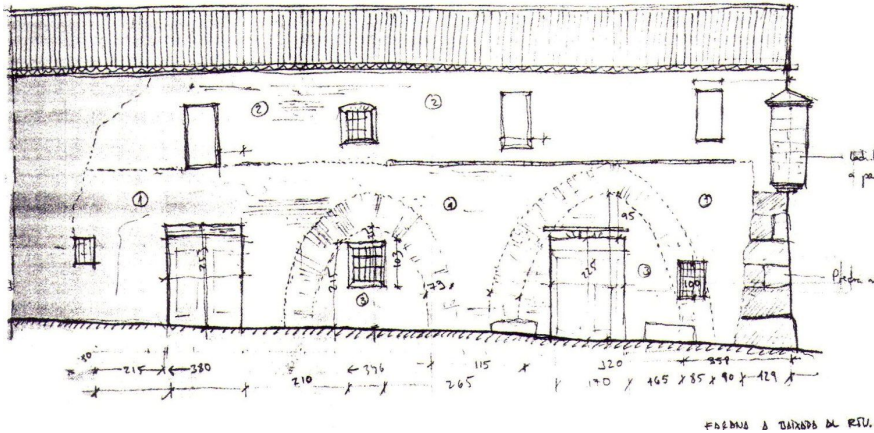
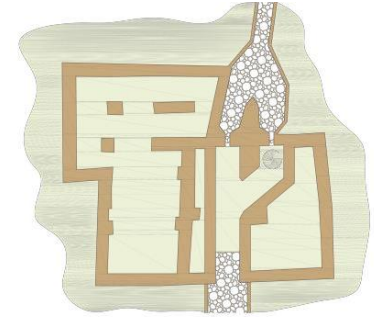
## 5. PRODUCTIVE SPACES

FASE I: S.XI—XII

FASE II: S.XIII—XVIII

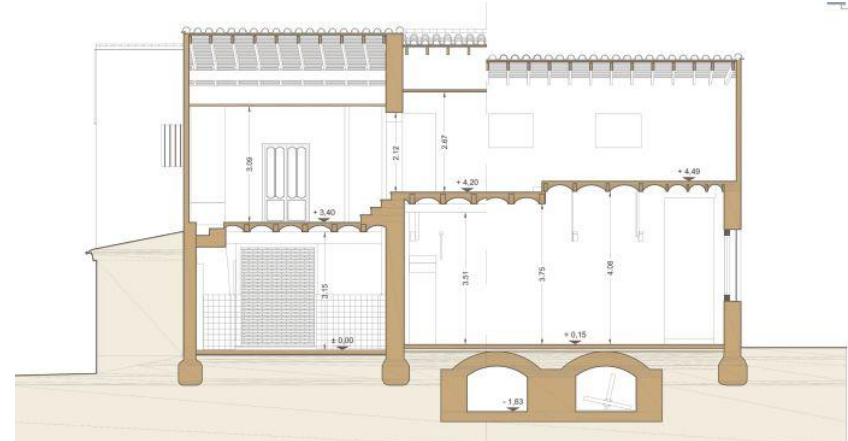
FASE III: S.XIX—XX

FASE IV: S.XIX—XX



## Molino de los Frailes

MOLÍ DELS FRARES O DE SANTO DOMINGO, REVISIÓN SIMPLIFICADA DEL PLAN GENERAL DE VALENCIA, CATÁLOGO DE BIENES Y ESPACIOS PROTEGIDOS DE NATURALEZA RURAL



## 6. Contemporary buildings





# The environmental, socio-cultural and socio-economic sustainable principles



1

to respect environmental context and landscape



2

to benefit of natural and climatic resources



3

to reduce pollution and waste materials



4

to ensure human indoor comfort



5

to mitigate the effects of natural hazards

**ENVIRONMENTAL PRINCIPLES** *The habitat is a result of a virtuous integration into its natural environment*



6

to protect the cultural landscape



7

to transfer construction cultures



8

to enhance innovative and creative solutions



9

to recognise intangible values



10

to encourage social cohesion

**SOCIO-CULTURAL PRINCIPLES** *The habitat helps to preserve and transfer inherited values.*



11

to support autonomy



12

to promote local activities



13

to optimise construction efforts



14

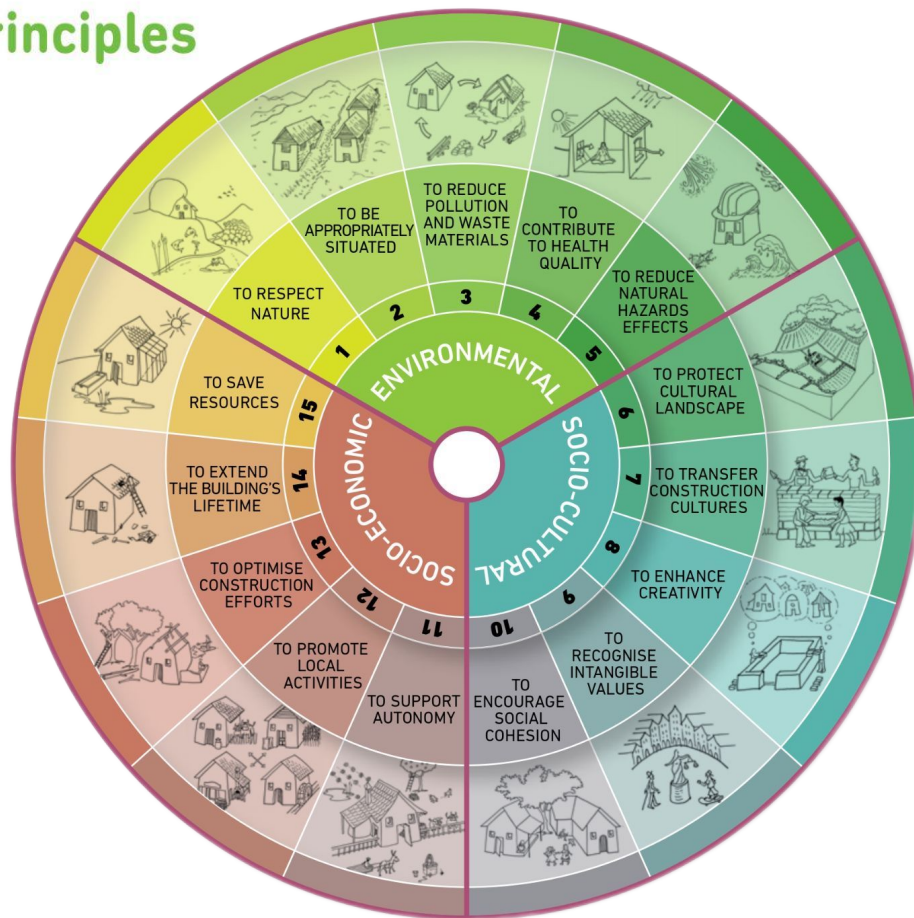
to extend building's lifetime



15

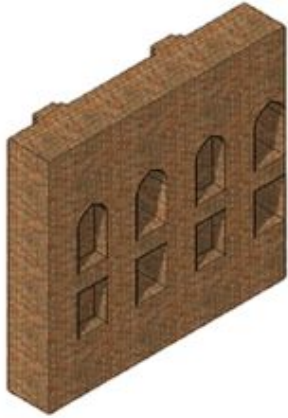
to save resources

**SOCIO-ECONOMIC PRINCIPLES** *The habitat empowers communities and optimizes local resources.*

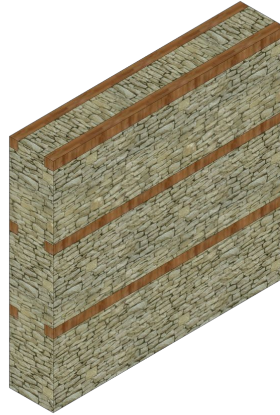


# Common points in construction of walls:

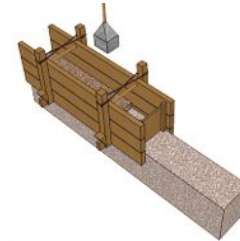
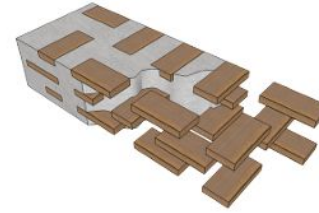
- Local material
- Natural material
- Seismic solutions logic



Walls in Iran



Walls in Turkiye  
and Lebanon



Walls in Huerta Valencia