RE-CORKING THE MAÂMORA

Designing a Regional Landscape Framework for Spatial Development and Forest Conservation

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Delft University of Technology

Msc Landscape Architecture

2025-2026

Responsible supervisor: Steffen Nijhuis

Second supervisor: Sophia Armpara





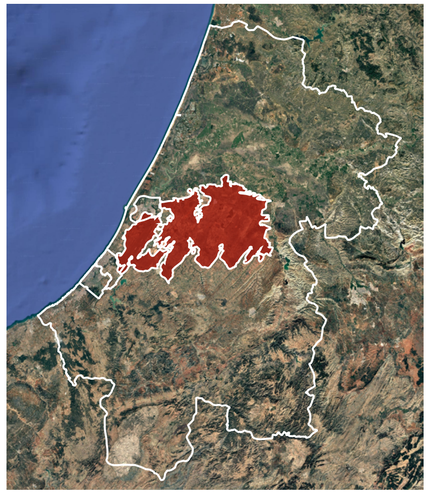
INTRODUCTION

01

The Maâmora forest



Location of the RSK region in Morocco
Map created using Google Satellite imagery.



Location of the Maâmora forest in the RSK region
Map created using Google Satellite imagery.









Source: Hespress Français.

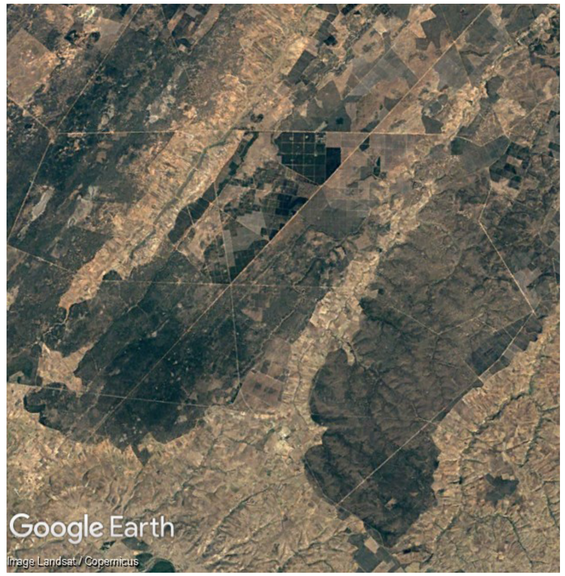


- The largest contiguous cork oak forest in the world
- Supports a high level of biodiversity
- Provides a wide range of resources
- Important for the region and the country

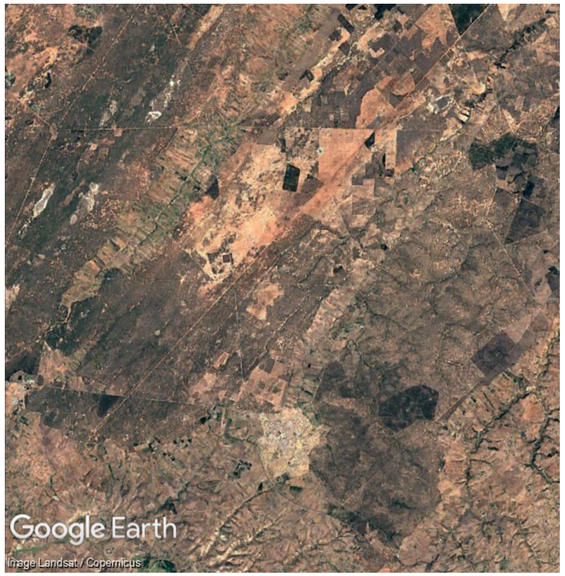
The decline of the Maâmora forest

- From a potential extent of 300,000 hectares to only 60,000 hectares
- Overexploitation of forest resources
- Replacement of cork oak with tree plantations





Forest cover in December 1984



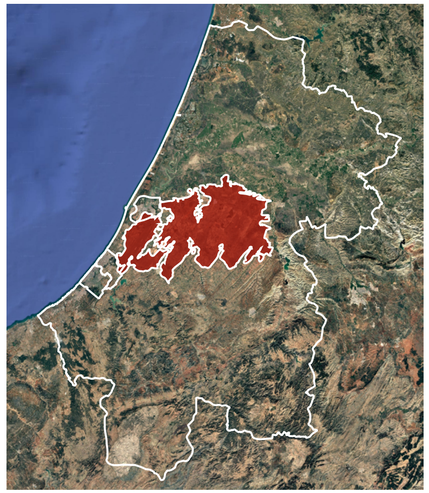
Forest cover in December 2020

Source: Google Satellite imagery.

Urbanization in the RSK region



Location of the RSK region in Morocco
Map created using Google Satellite imagery.



Location of the Maâmora forest in the RSK region
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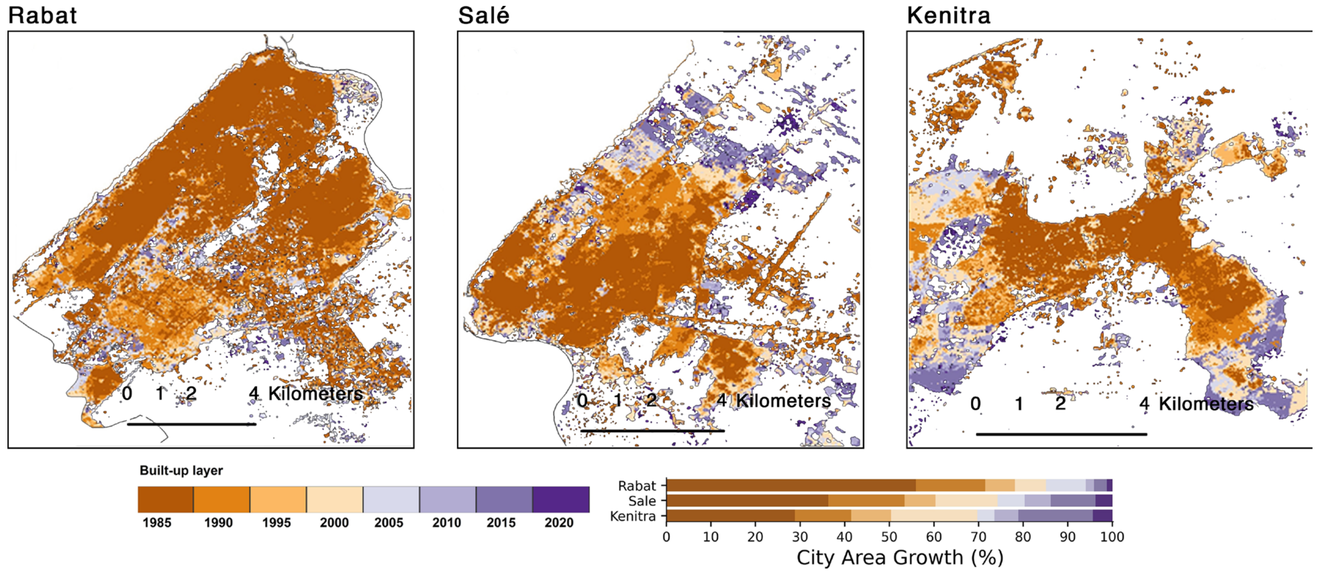


Spatial evolution of the built-up area for Rabat, Salé, and Kenitra from 1985 to 2020.
Adapted from Loulad et al. (2023).

- The Rabat–Salé–Kénitra (RSK) region is one of the fastest growing regions in Morocco
- Urban expansion has large impact on surrounding agricultural and natural landscapes





New urban development encroaching on the forest
Source: Esri satellite

Drivers of the decline



Land conversion

Eucalyptus plantation
Source: Urvara Krsi



Resource exploitation

Sheep grazing on eroded soils



Groundwater extraction

Well in the forest



Unregulated recreation

Cars parked eveywhere throughout the forest



Dumped waste in the forest



Management practices

Reforestation notice

Research and design goals

This thesis:

- Looks at the degradation of the Maâmora forest in relation to the development of the surrounding RSK region
- Aims to develop a regional strategy for the spatial development of the RSK area and the conservation of the Maâmora forest
- Uses a landscape-based approach to develop a strategy that works across different scales

Main research question:

How can a landscape-based approach guide the spatial development of the Rabat–Salé–Kénitra region while supporting the protection and restoration of the Maâmora forest?



RESEARCH APPROACH

02

Landscape-based urbanism

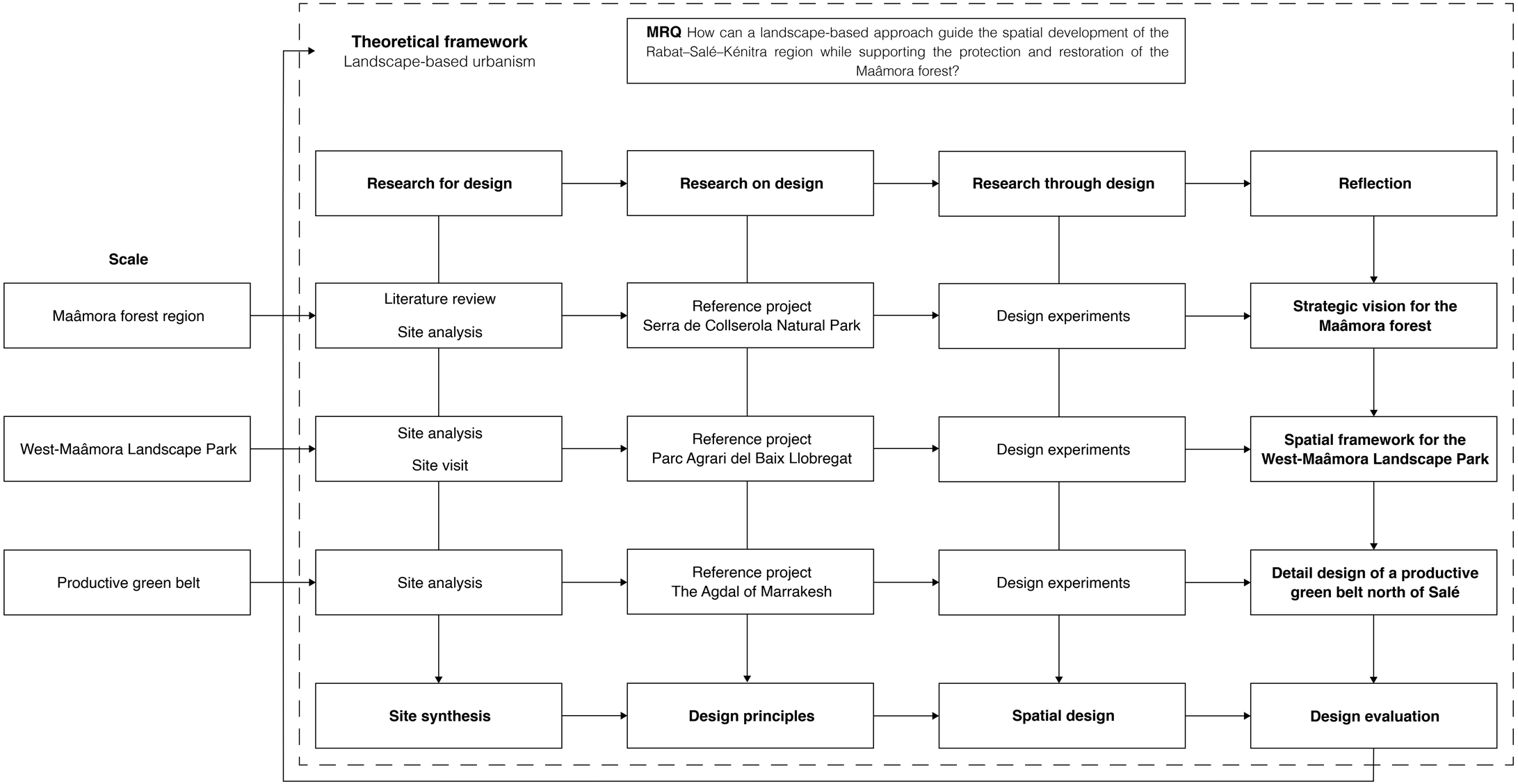
- Takes the existing landscape as the starting point for sustainable development
- Long-term spatial framework through robust landscape structures
- Uses adaptable design principles to work across different scales

Design:
A spatial framework for the Maâmora region in the form of a regional park

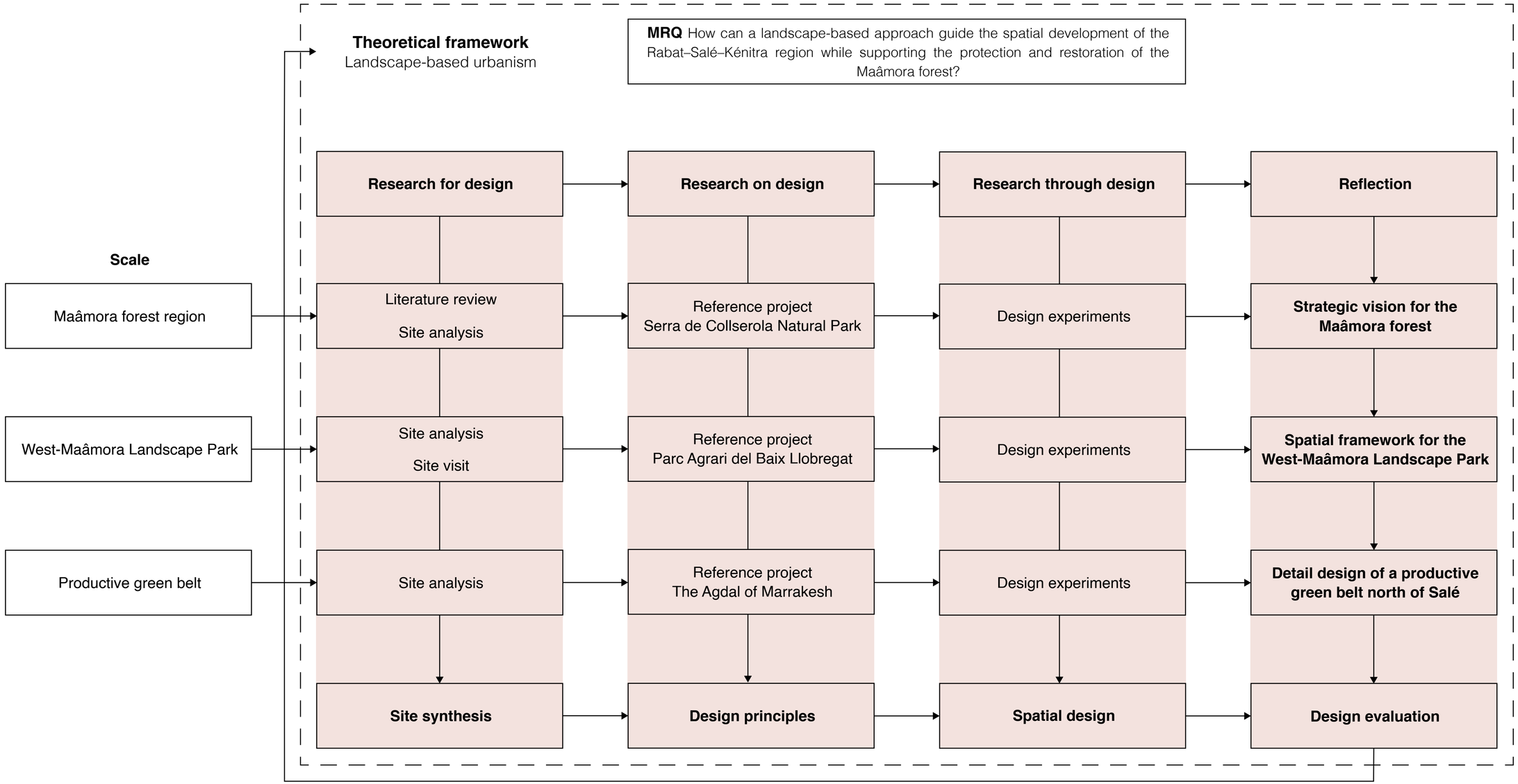


Regional landscape framework
Image credits: H+N+S

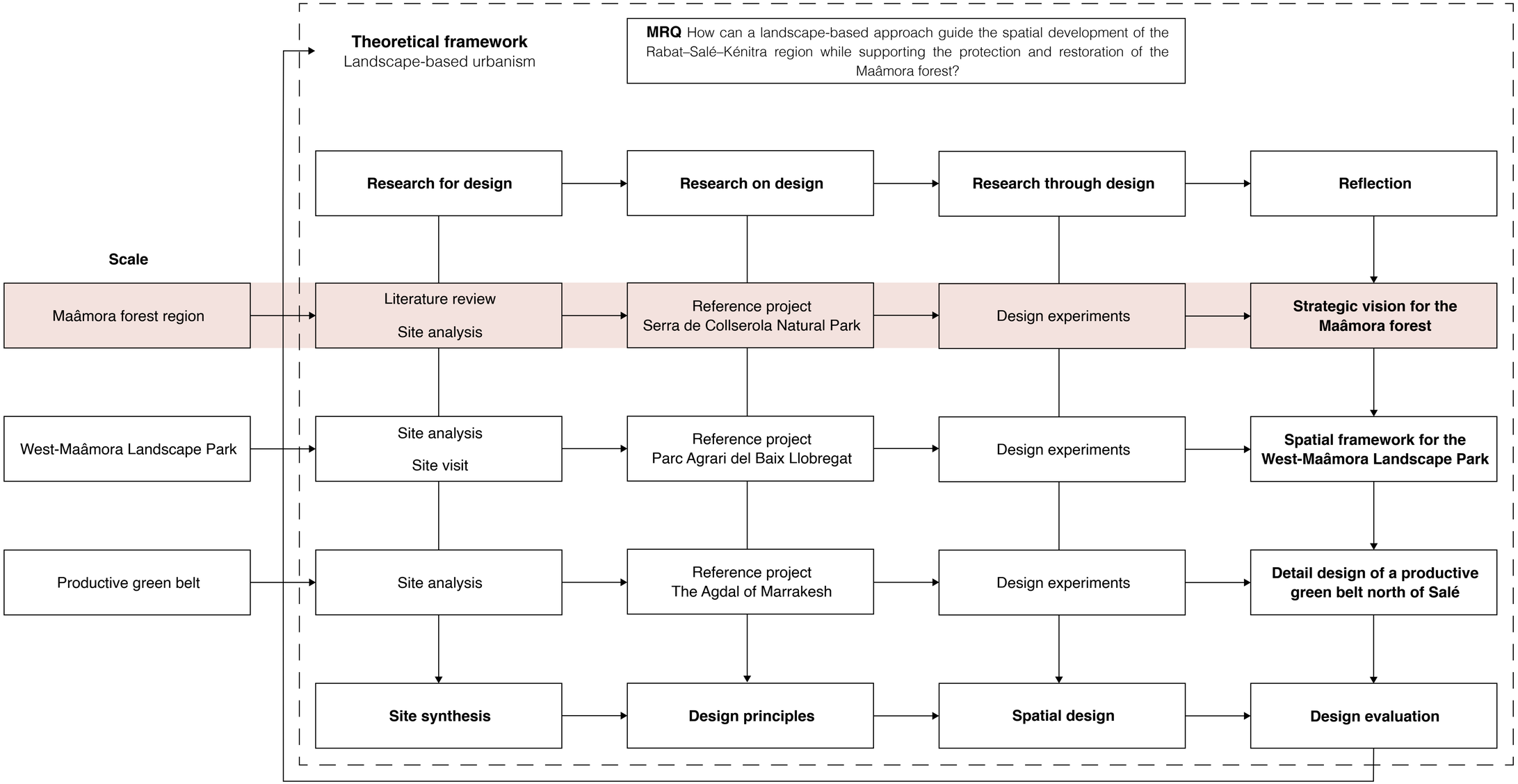
Research approach



Research approach



Research approach

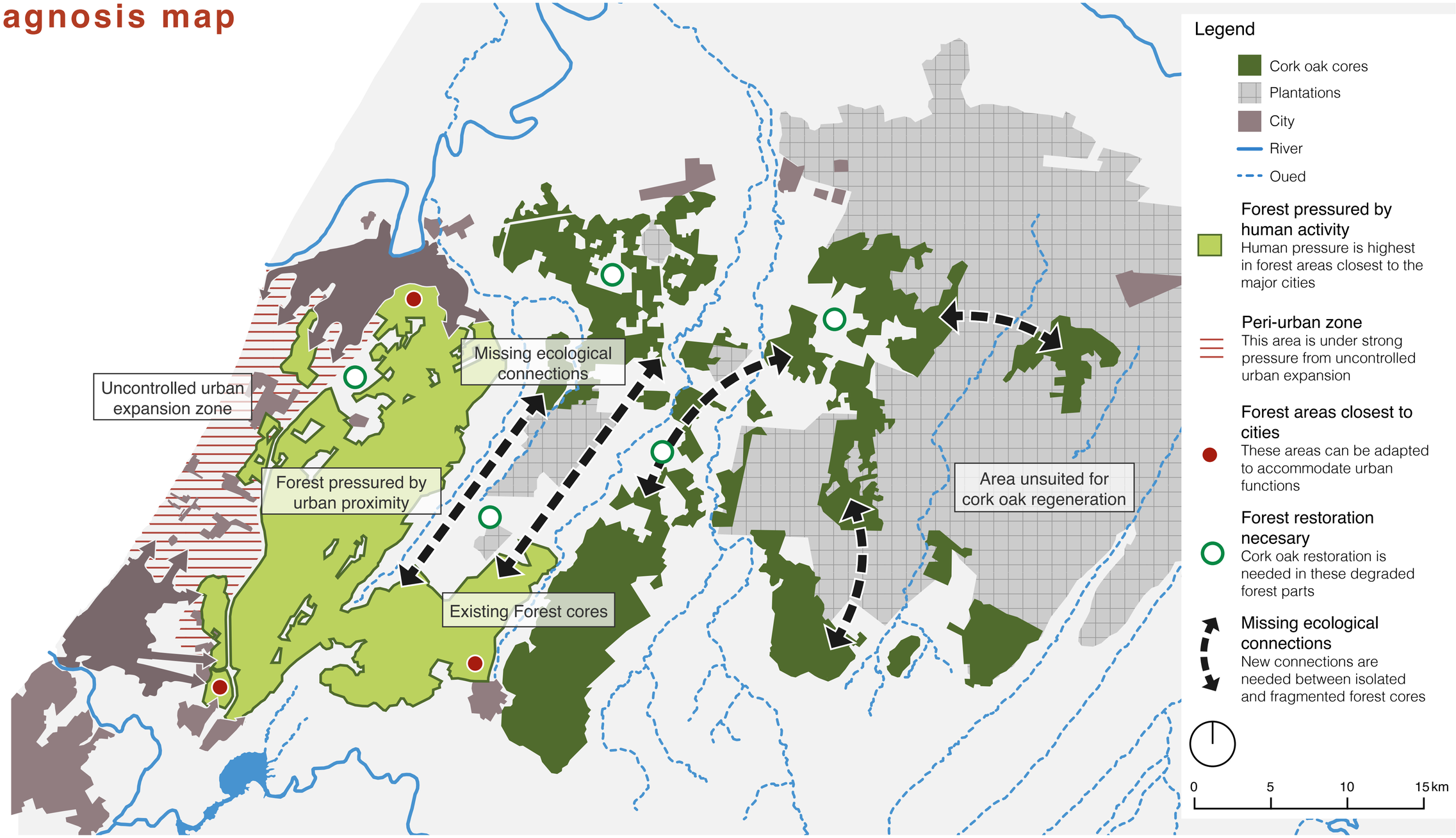




THE MAÂMORA FOREST

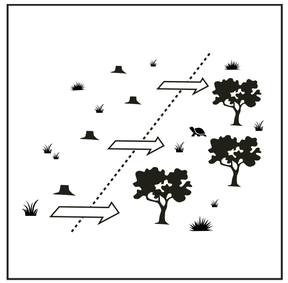
03

Diagnosis map

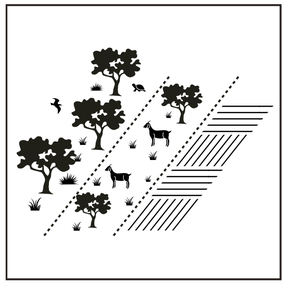


Strategic vision

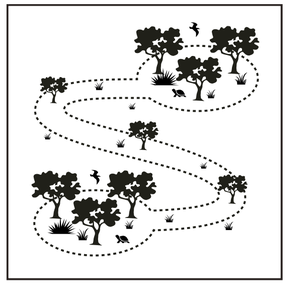
Design principles



Regenerate suitable cork oak areas



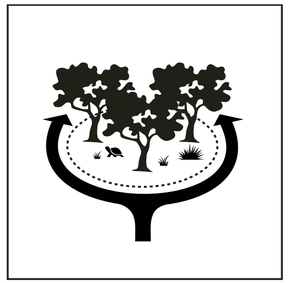
Create a silvopastoral forest buffer



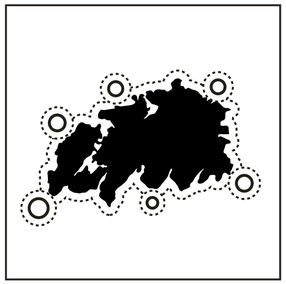
Reconnect ecological cores



Concentrate agriculture around oueds

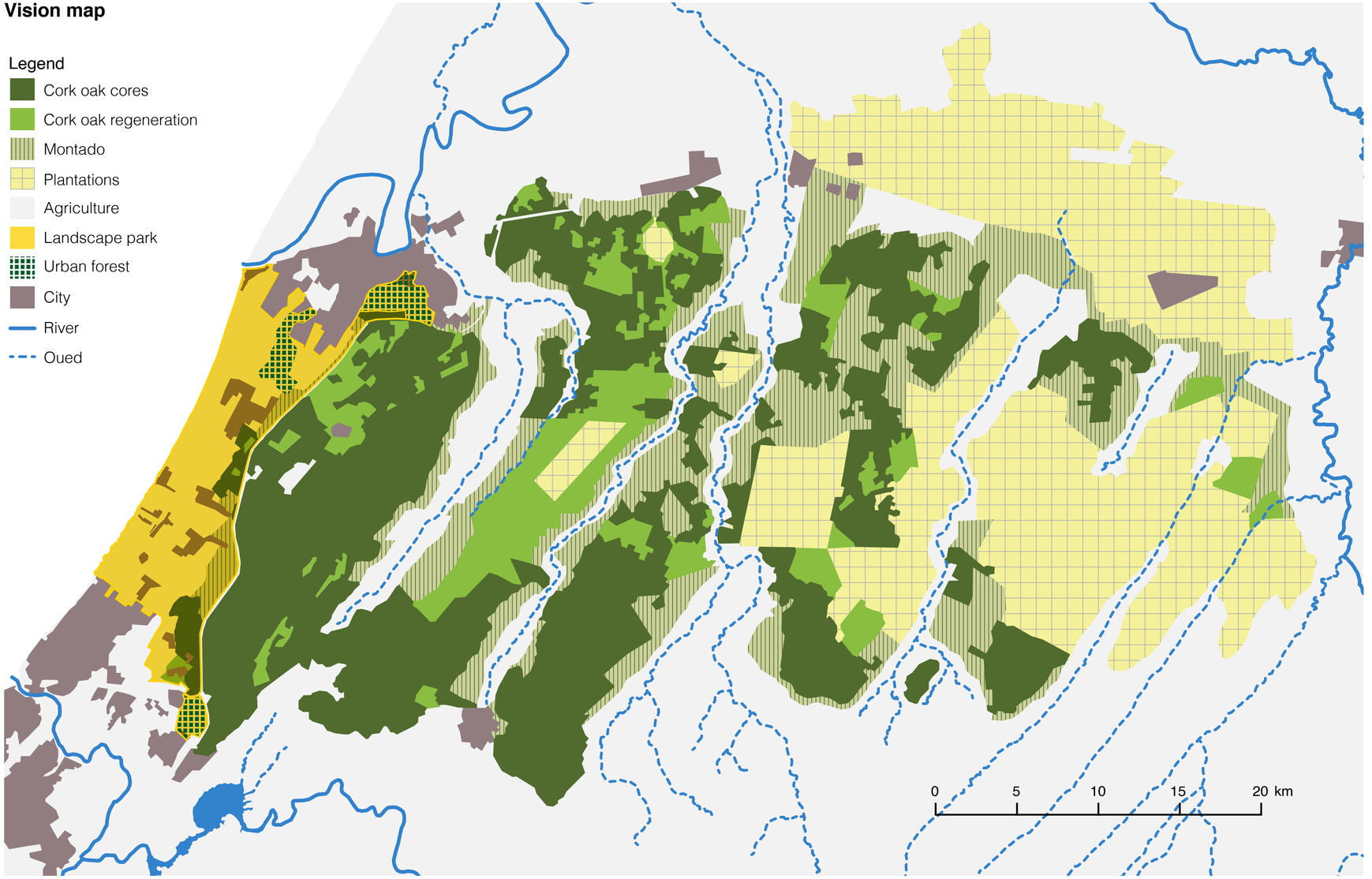


Implement zoned accessibility



Design the forest edges as functional space

Vision map



Silvopastoral buffers



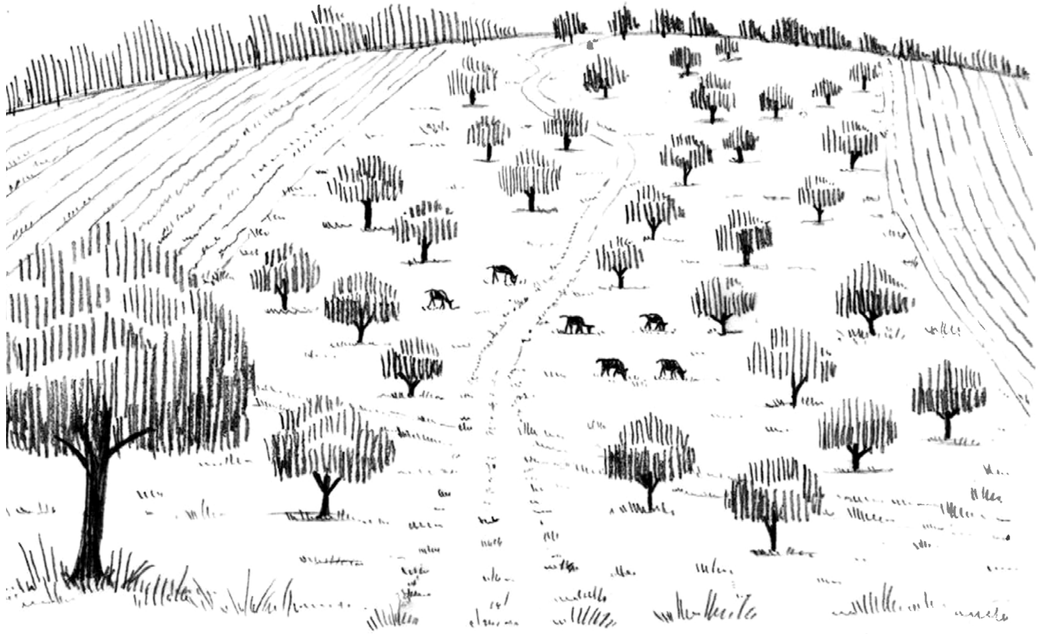
A sheperd and his sheep in a dehesa
Source: Verdehesa.



Pig Dehesa in Spain
Source: Origen.



Cow Montado in Portugal
Source: Carne Mertolenga.



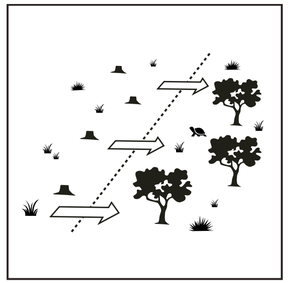
Silvopastoral corridor between agricultural fields



Landscape transitions from oued to cork oak forest

Strategic vision

Design principles



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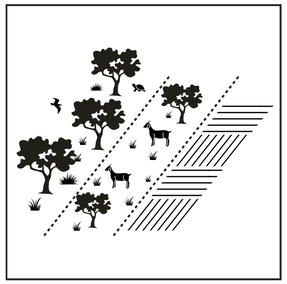

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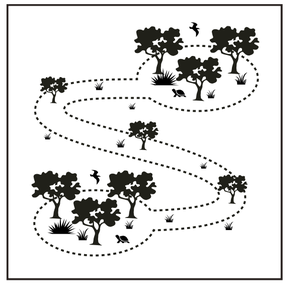

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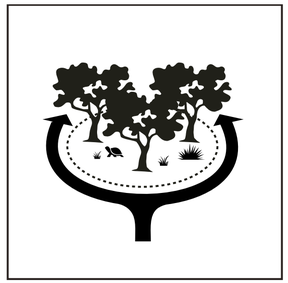

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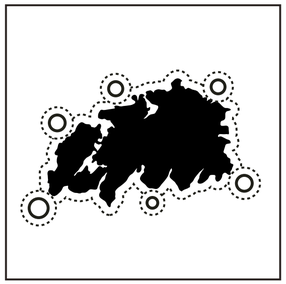

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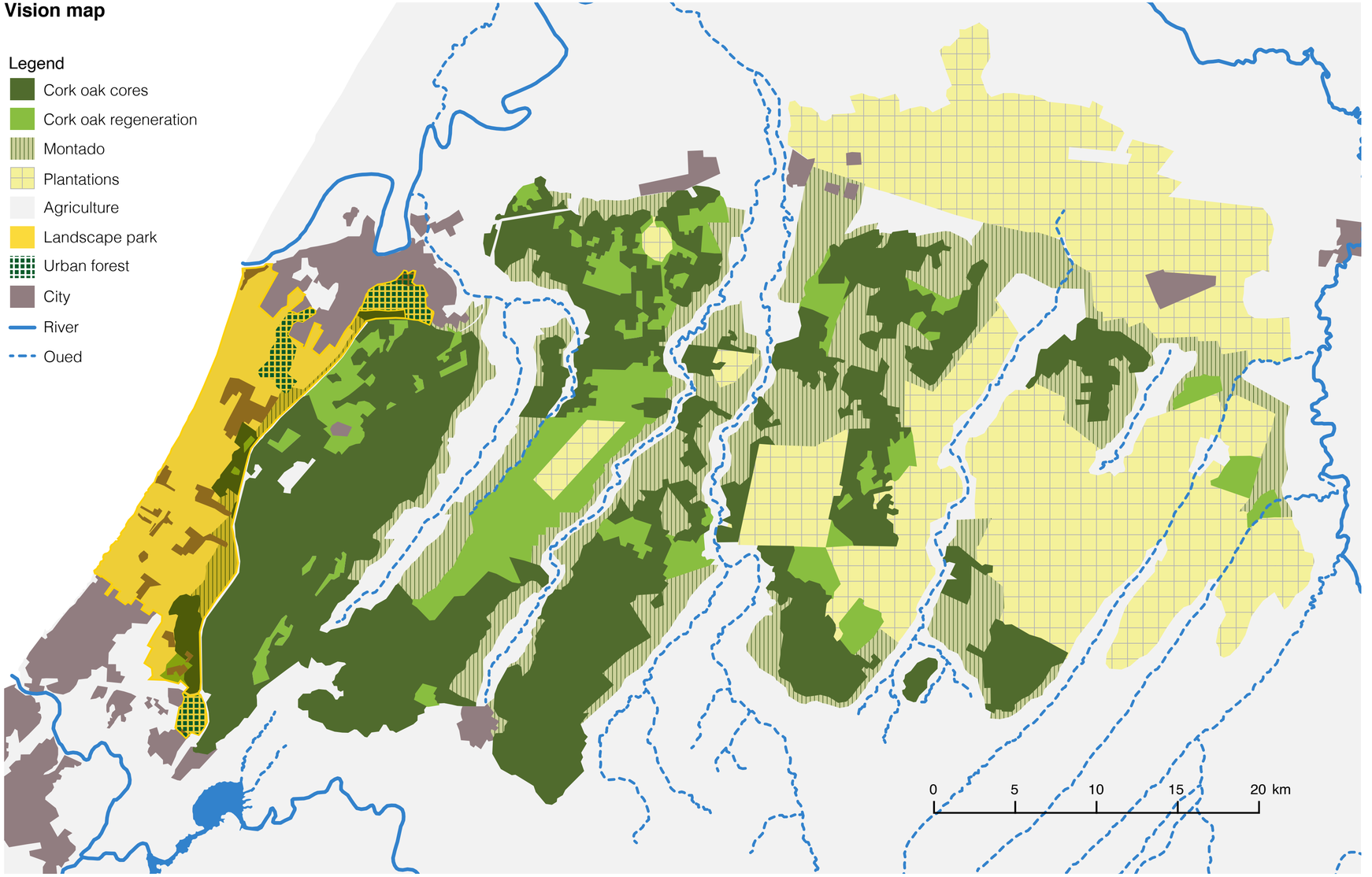
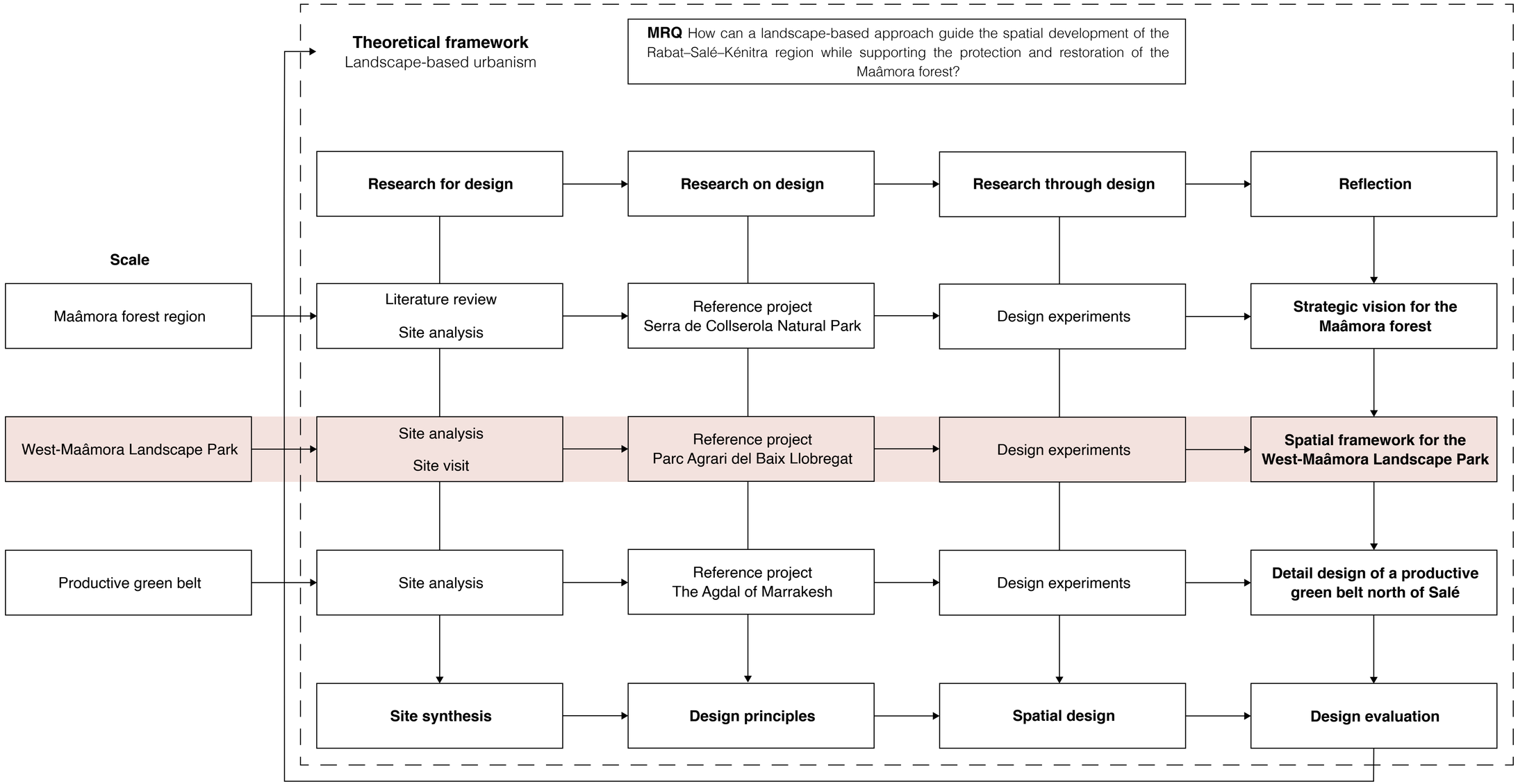




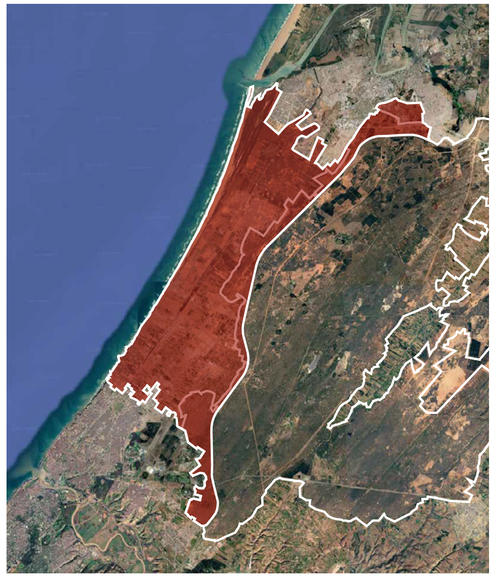
THE WEST-MAÂMORA LANDSCAPE PARK

04

Research approach



Site analysis



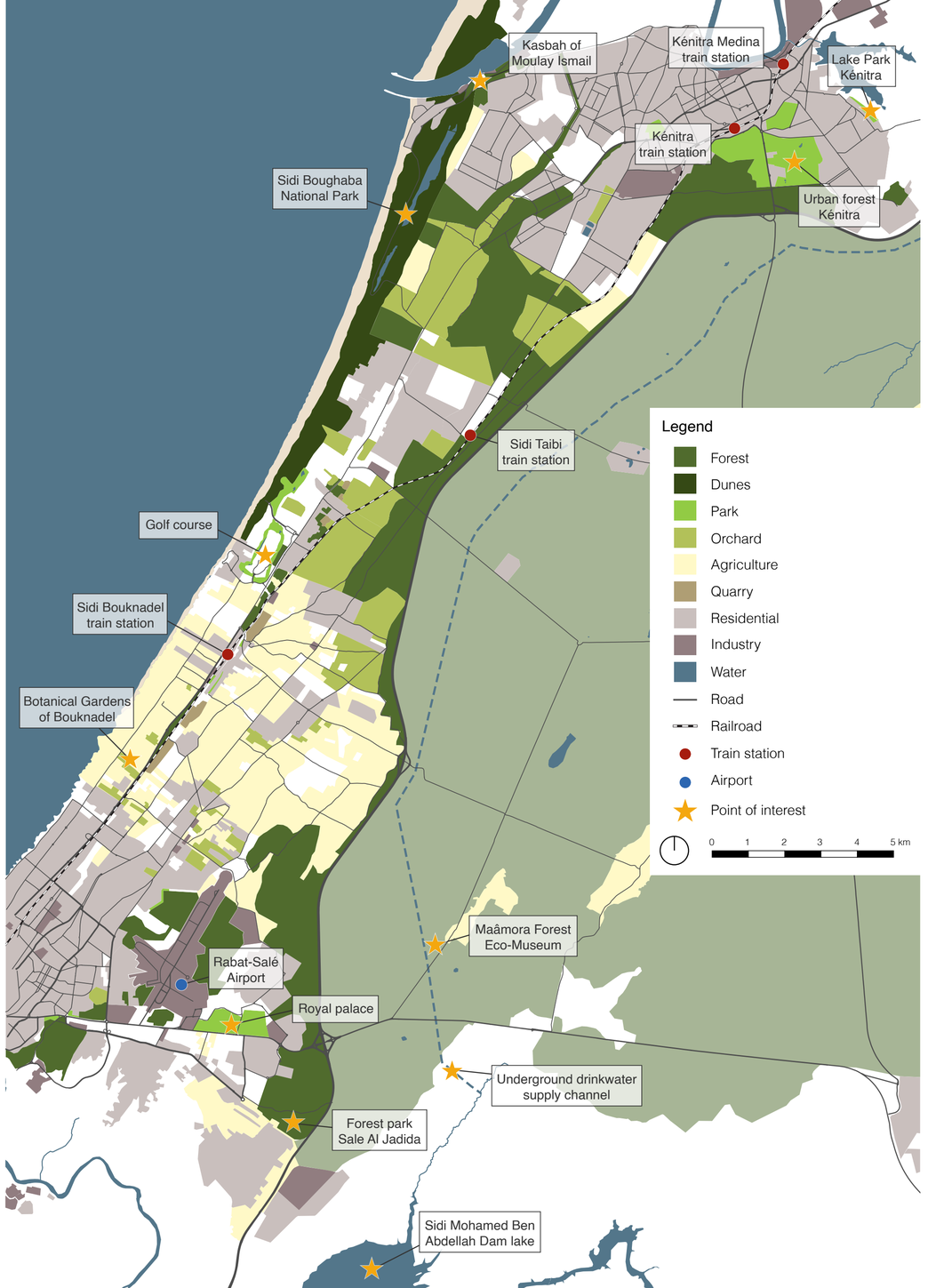
Landscape zone along the western Maâmora edge

Map created using Google Satellite imagery.



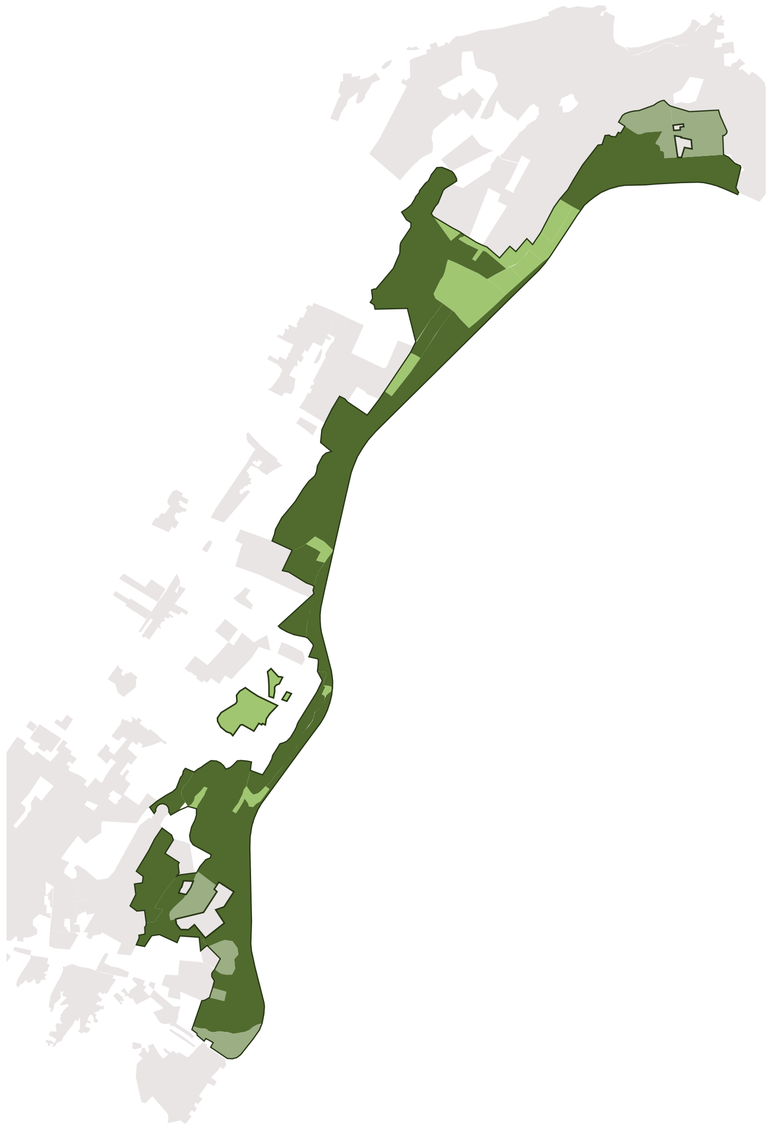
Direction of the urban expansion of the big cities

- Fragmented peri-urban landscape
- Agricultural land under pressure from urban expansion
- Strong north–south infrastructure, but limited east–west connectivity
- Remaining open spaces could be the basis for the regional landscape park

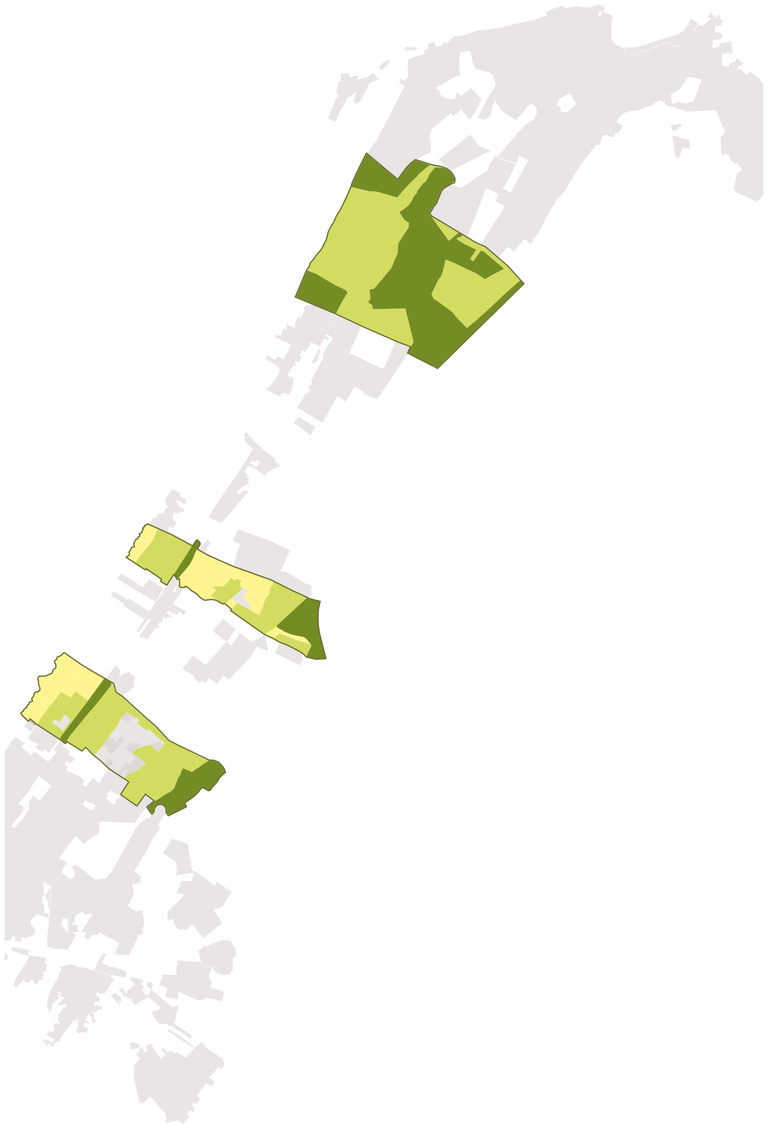


Three layers of the framework

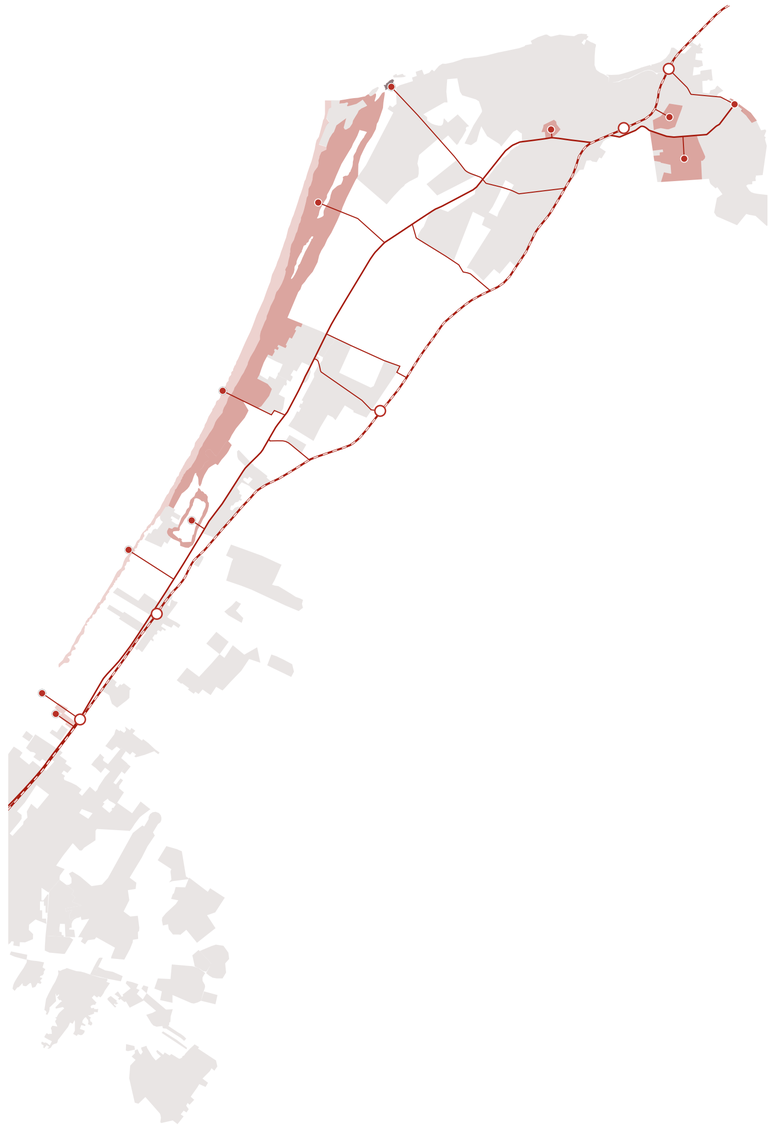
The forest buffer zone



The productive green belts



The recreational route



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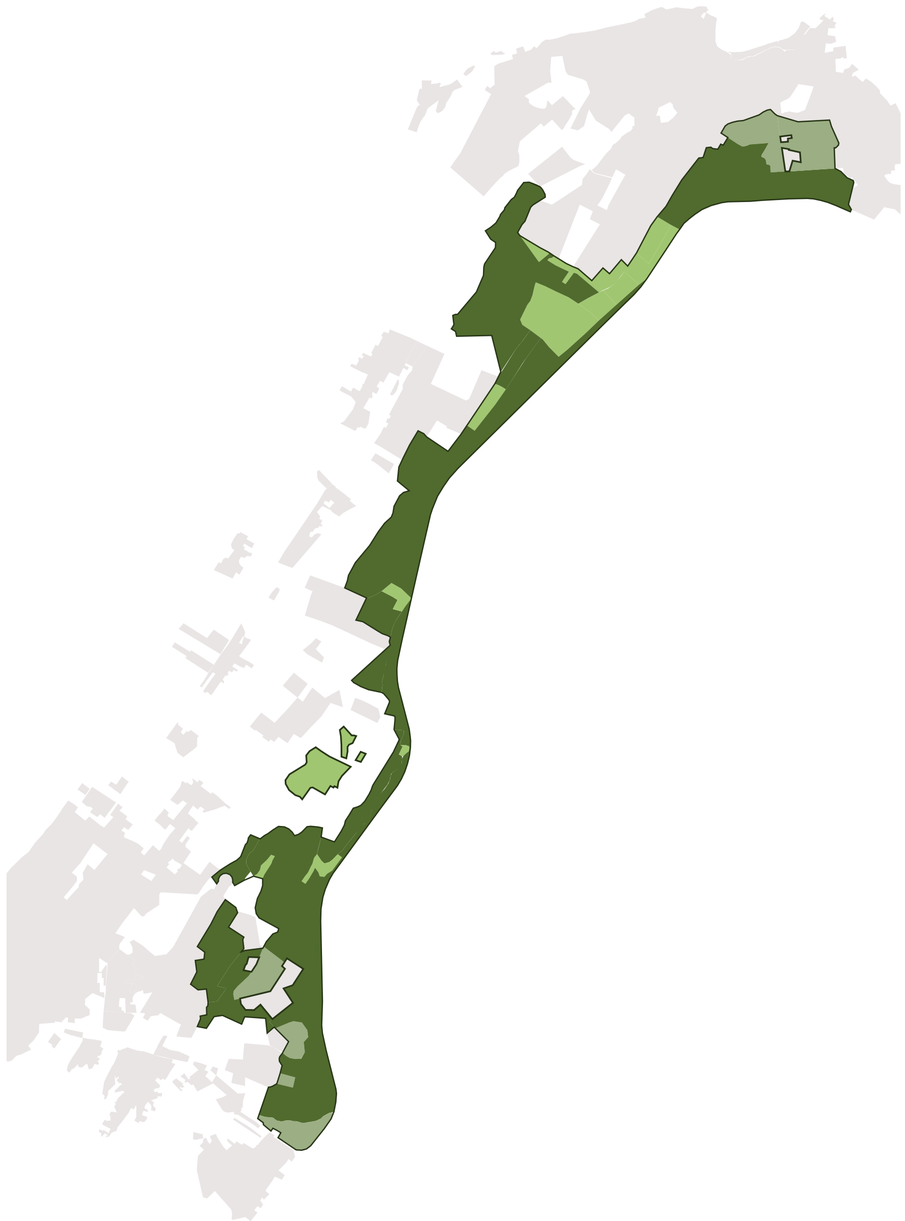
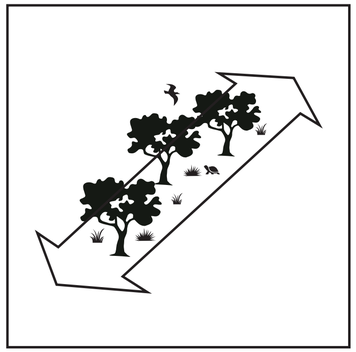
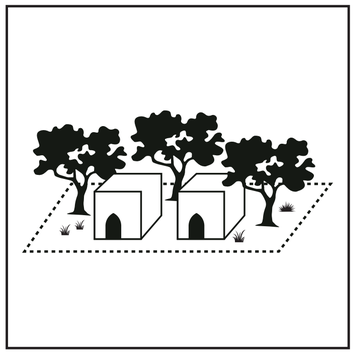




Create a continuous forest structure along the Maâmora edge

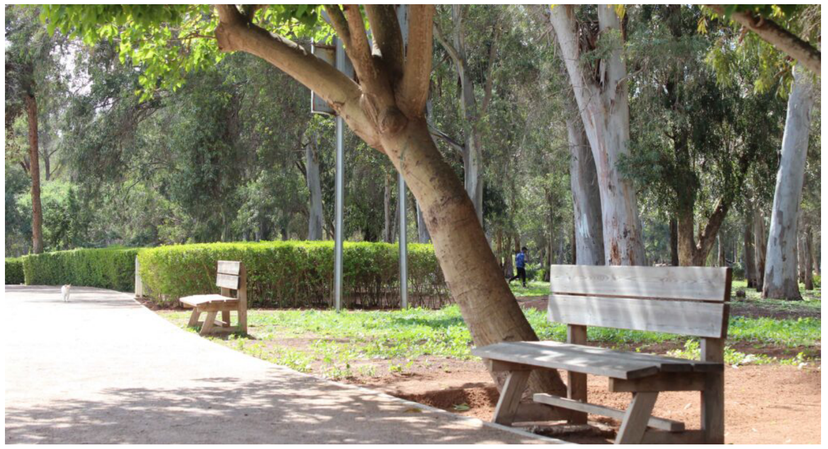


Integrate urban functions into the forest edge

Objectives:

- Connecting fragmented forest patches into a continuous structure
- Creating a gradual transition between the urban landscape and the forest core
- Concentrating recreation near cities to reduce pressure on ecologically sensitive areas





Source: Rabat Ville Verte.





Source: Carne Mertolenga.



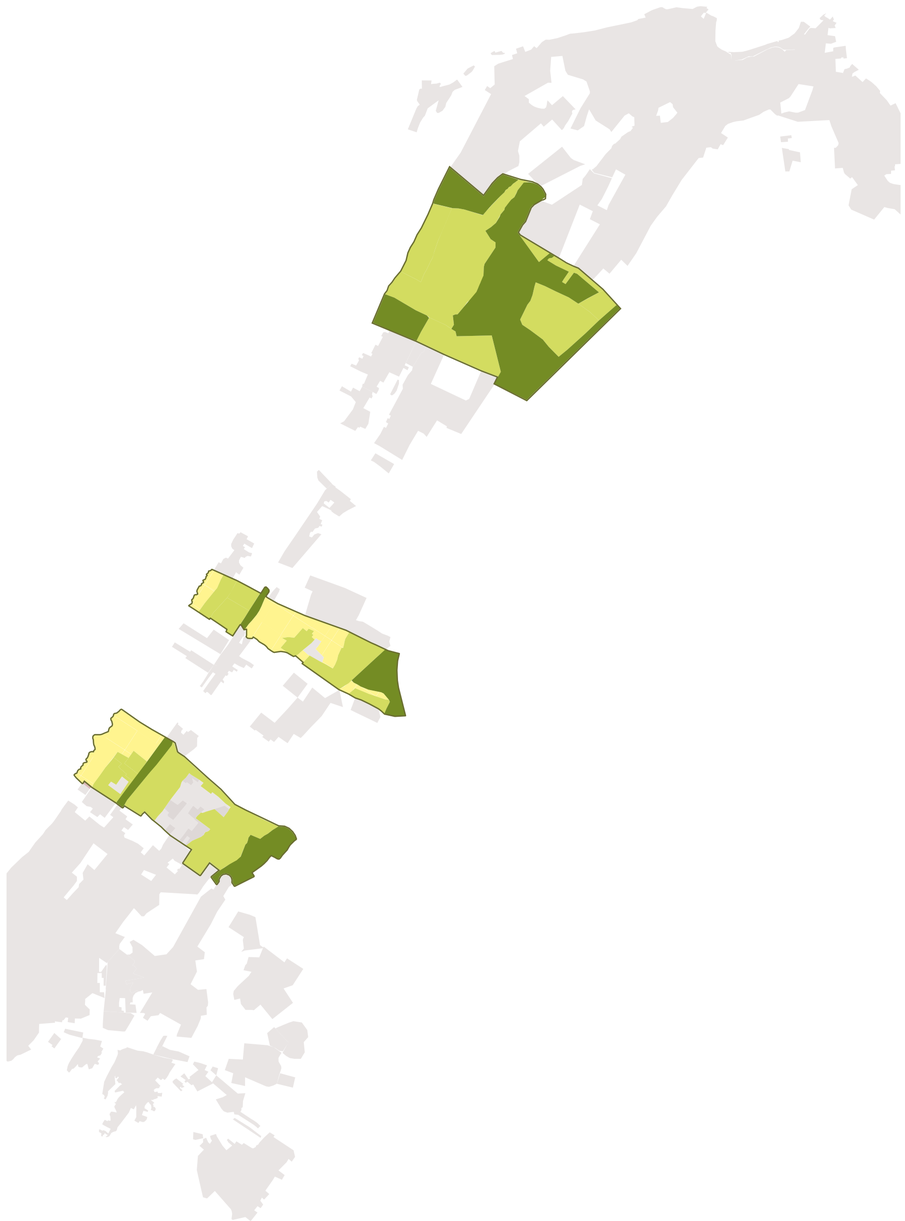


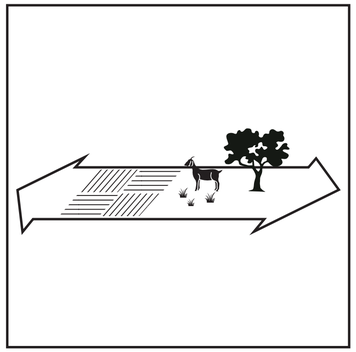




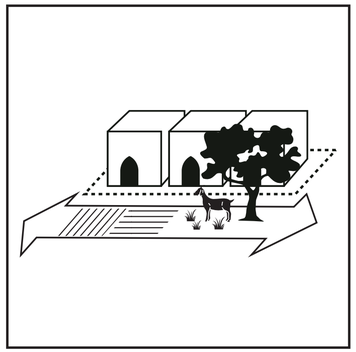


The productive green belts





Strengthen east-westl connections through productive corridors



Structure urban growth with clear urban-rural transitions

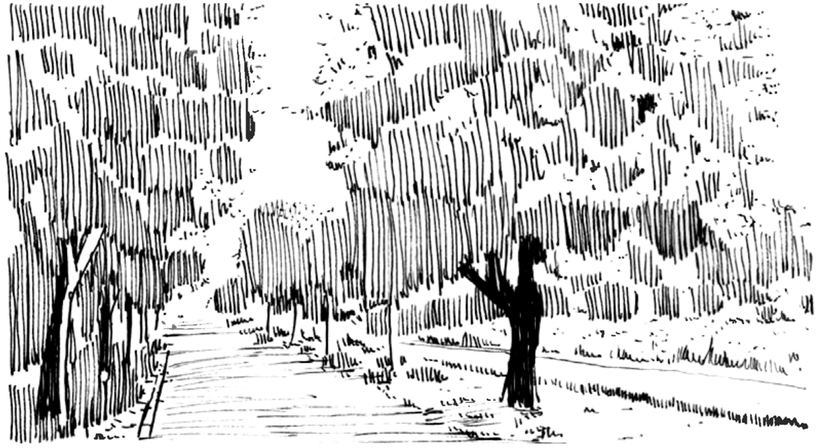
Objectives:

- Combining agricultural production with ecological and recreational functions
- Strengthening east–west connections throughout the landscape
- Protecting the open agricultural landscapes from urban expansion





Source: Vega Baja.





Source: The Olive Oil Source.



Source: El Mundo CR.



Source: More Natural Wine.



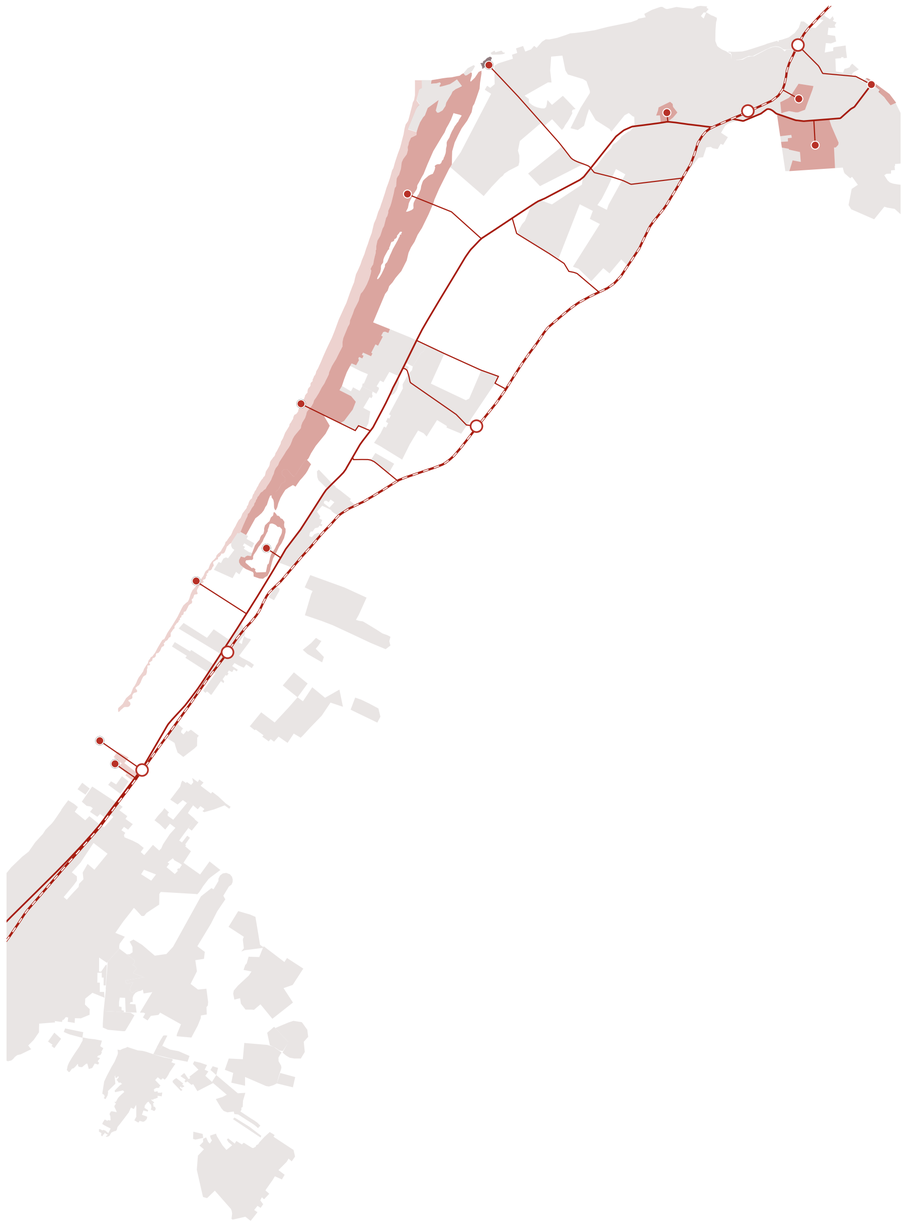
Source: Wikifarmer.

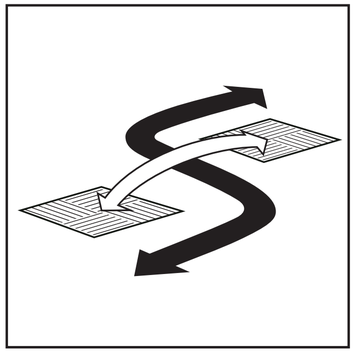




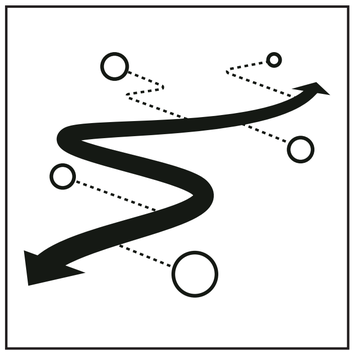
Source: Biolandes.

The recreational route





Improve public access within and to the rural landscape



Activate strategic locations as recreational destinations

Objectives:

- Connecting the main cultural, natural, and recreational destinations
- Improving accessibility and strengthening connectivity between urban and rural areas
- Supporting different types of mobility



Source: kimkim.



Photograph by Rand-Horizon. Source: Facebook.



Photograph by Jaro Varga. Source: Wikipedia.



Source: Essaouira Tour.



Source: Rabat Ville Verte.



Photograph by Takuji Shimmura. Source: Archello.



Source: Story Le Carrousel Rabat.



Photograph by Victoria Khanfar Source: Threads.

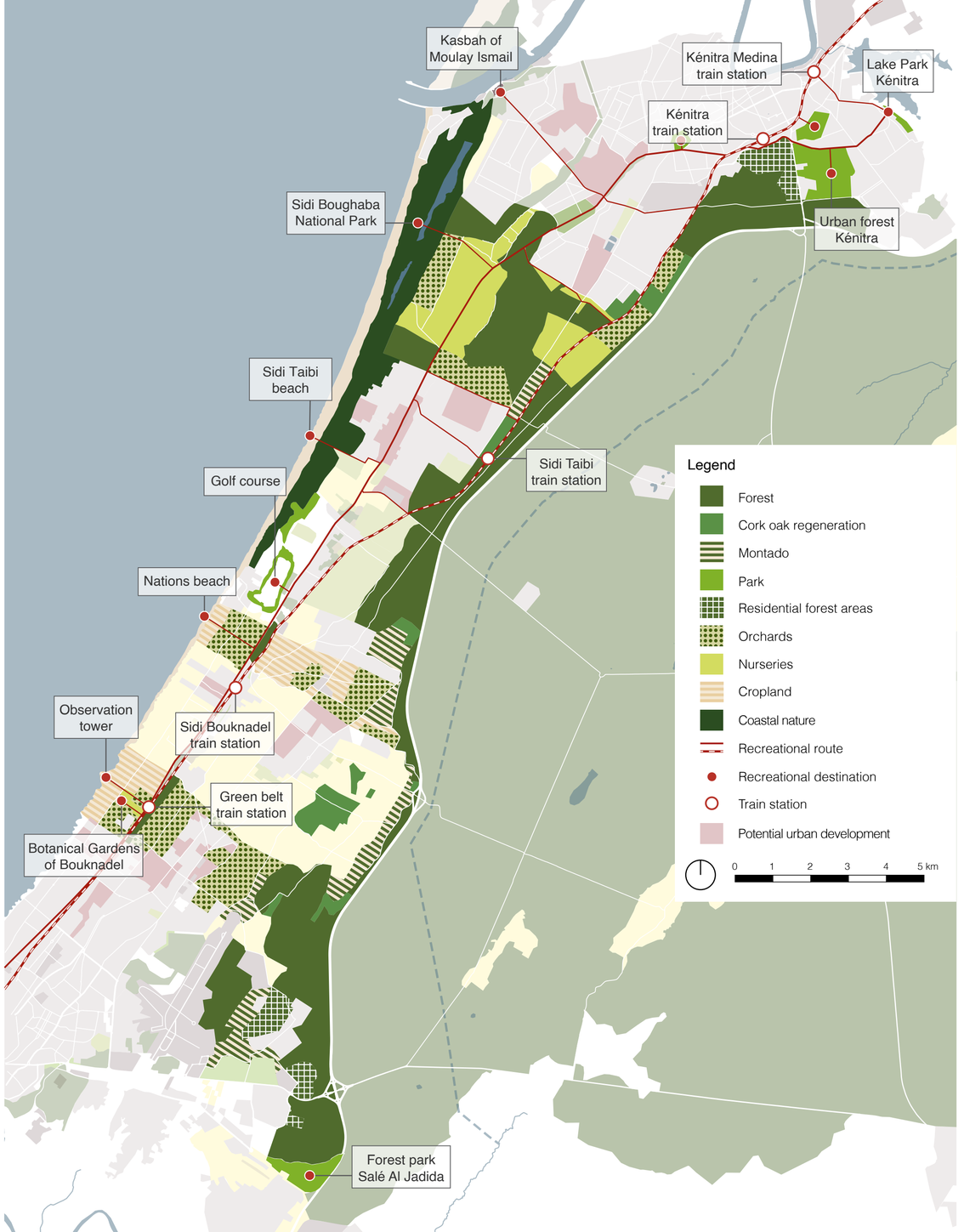


Source: Prestigia.

Application of the framework

The framework:

- Provides a long-term spatial direction without prescribing a fixed end result
- Establishes long-term landscape structures that guide spatial development
- Allows for flexible development of the surrounding space
- Identifies areas where urban expansion should be restricted and indicates potential locations for development

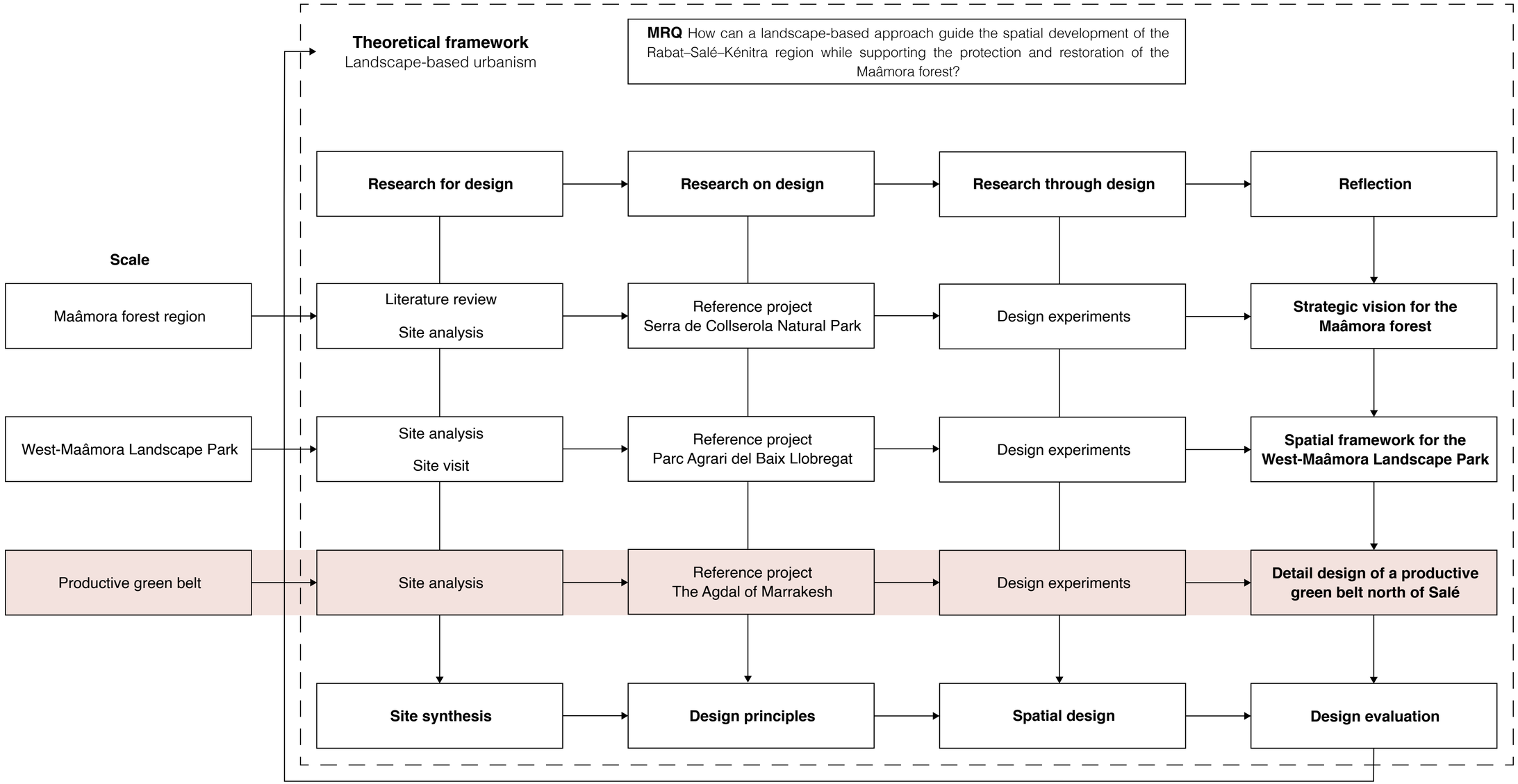




THE PRODUCTIVE GREEN BELT

05

Research approach



Reference project

The Agdal of Marrakech

Marrakech, Morocco



Satellite image of the Agdal of Marrakech
Source: Bing



Fruit trees surrounded by olive tree windbreaks
Source: Navarro Palazón et al. (2013, p. 17).



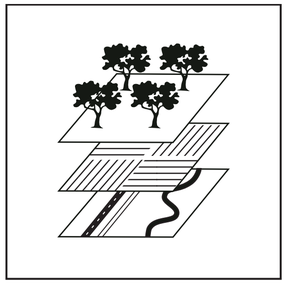
The central water reservoir
Photograph by Jen K. Source: Gardenvisit



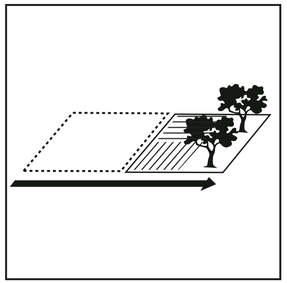
Dar al-Hanaʾ enclosure.
Source: Navarro et al. (2018, p. 37).

Design of the productive green belt

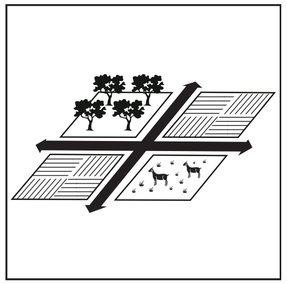
Design principles



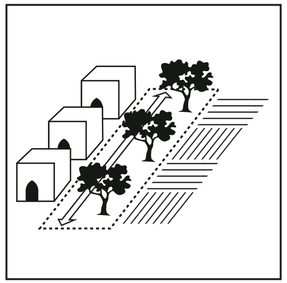
Build on existing landscape structures



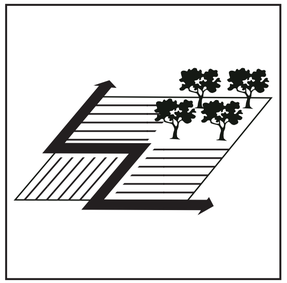
Transform undeveloped land into productive land



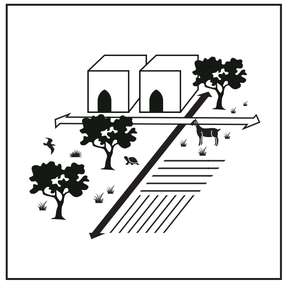
Use the water system to structure the productive landscape



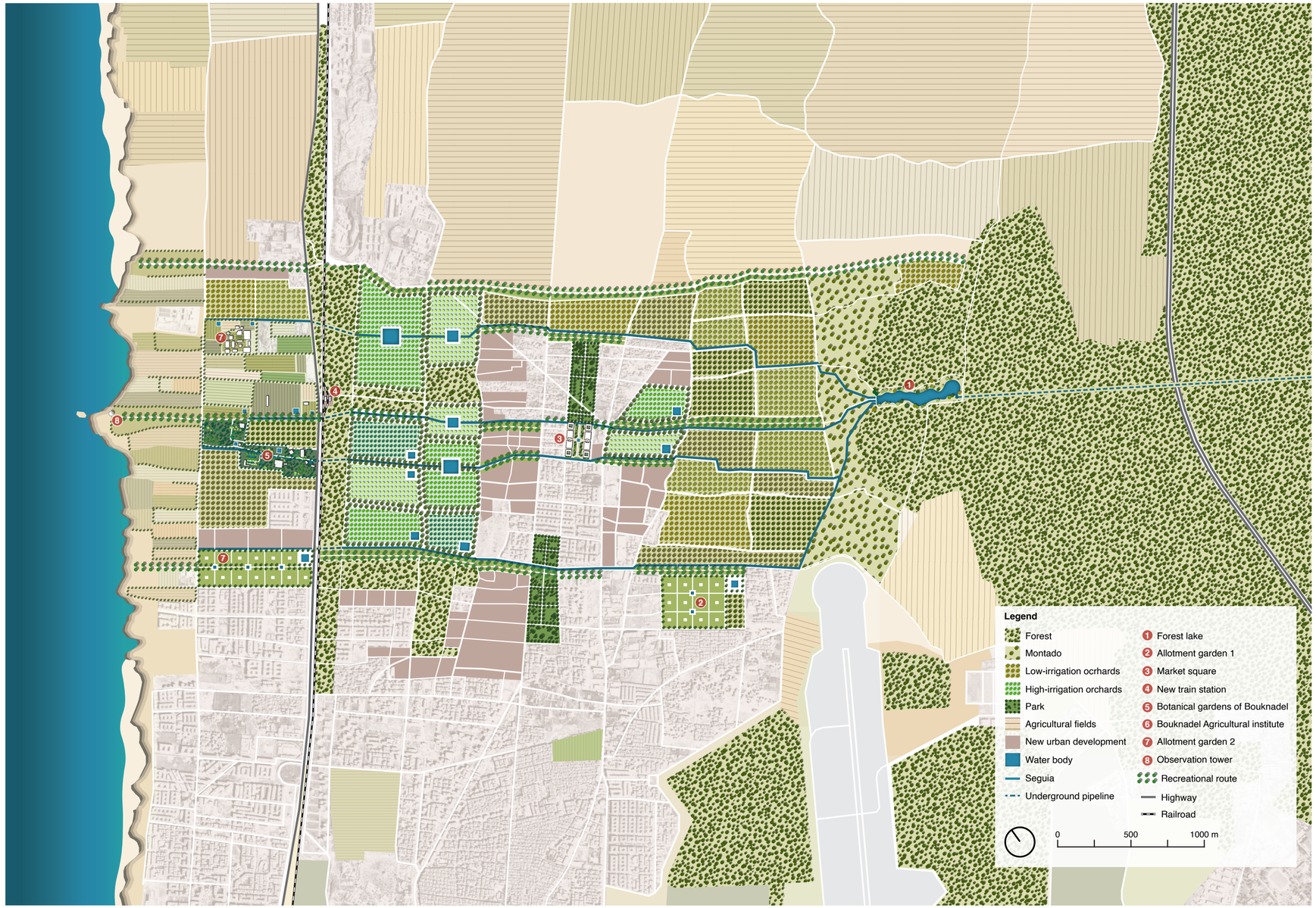
Design a clear and functional edge zone



Adapt crop selection to local water availability



Create a multifunctional productive landscape

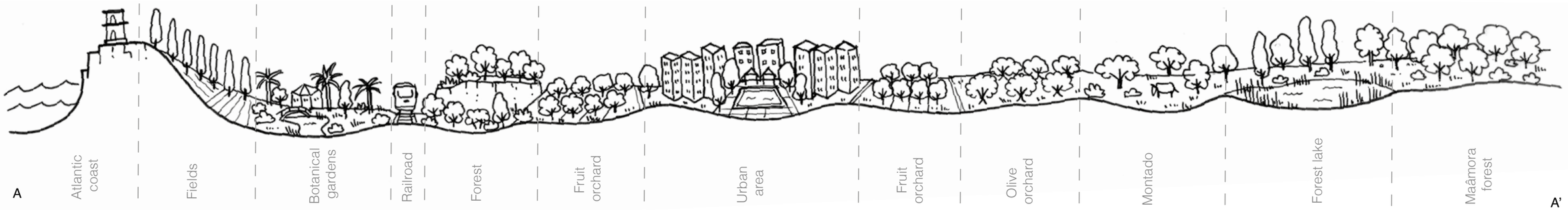


Before and after

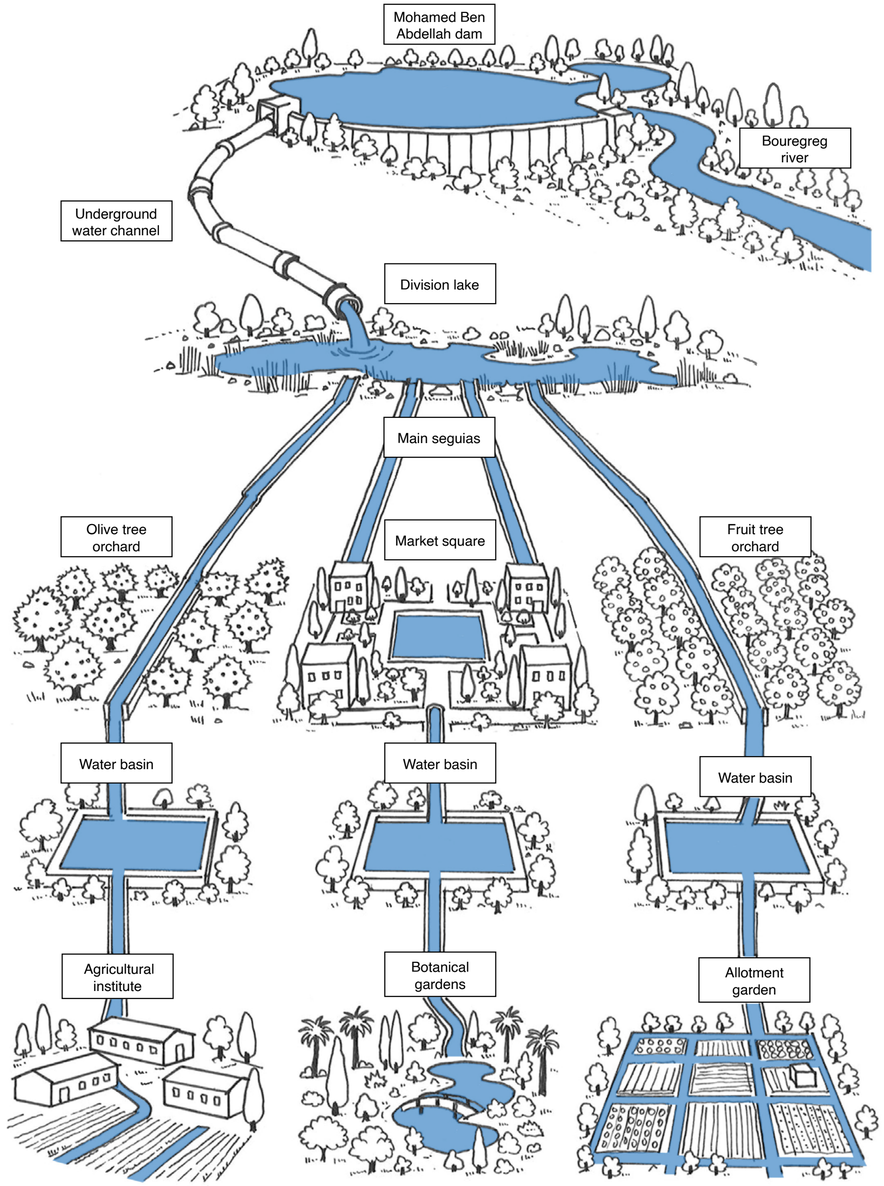
Current situation



Proposed situation



The water system



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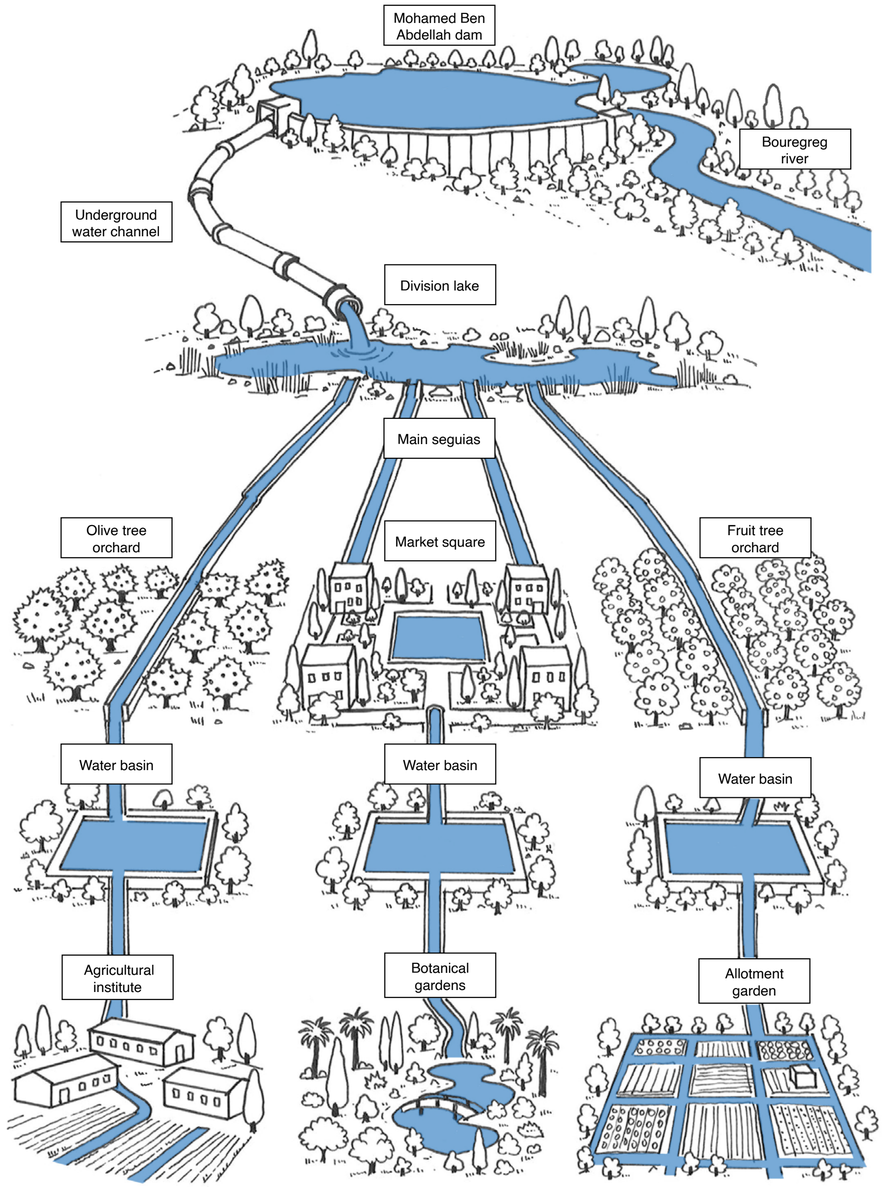
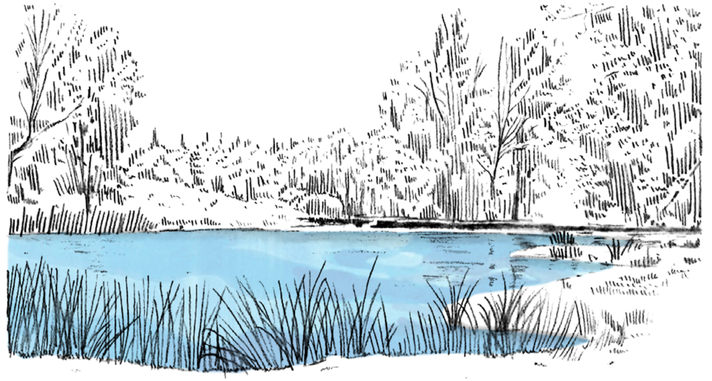
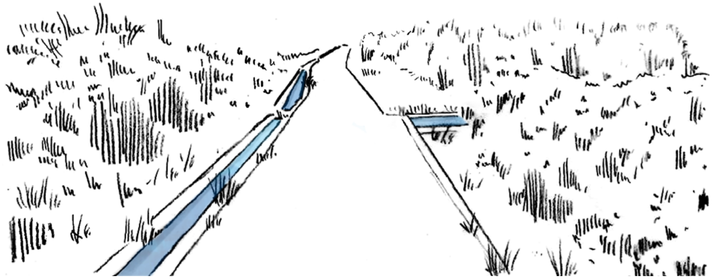
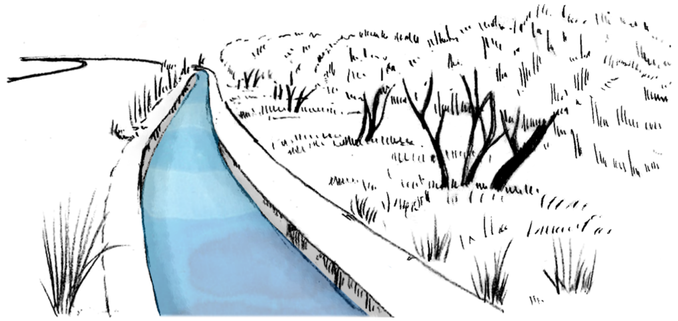


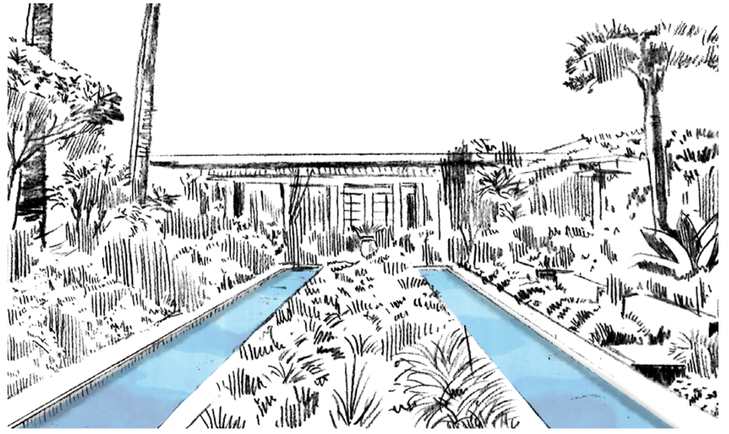




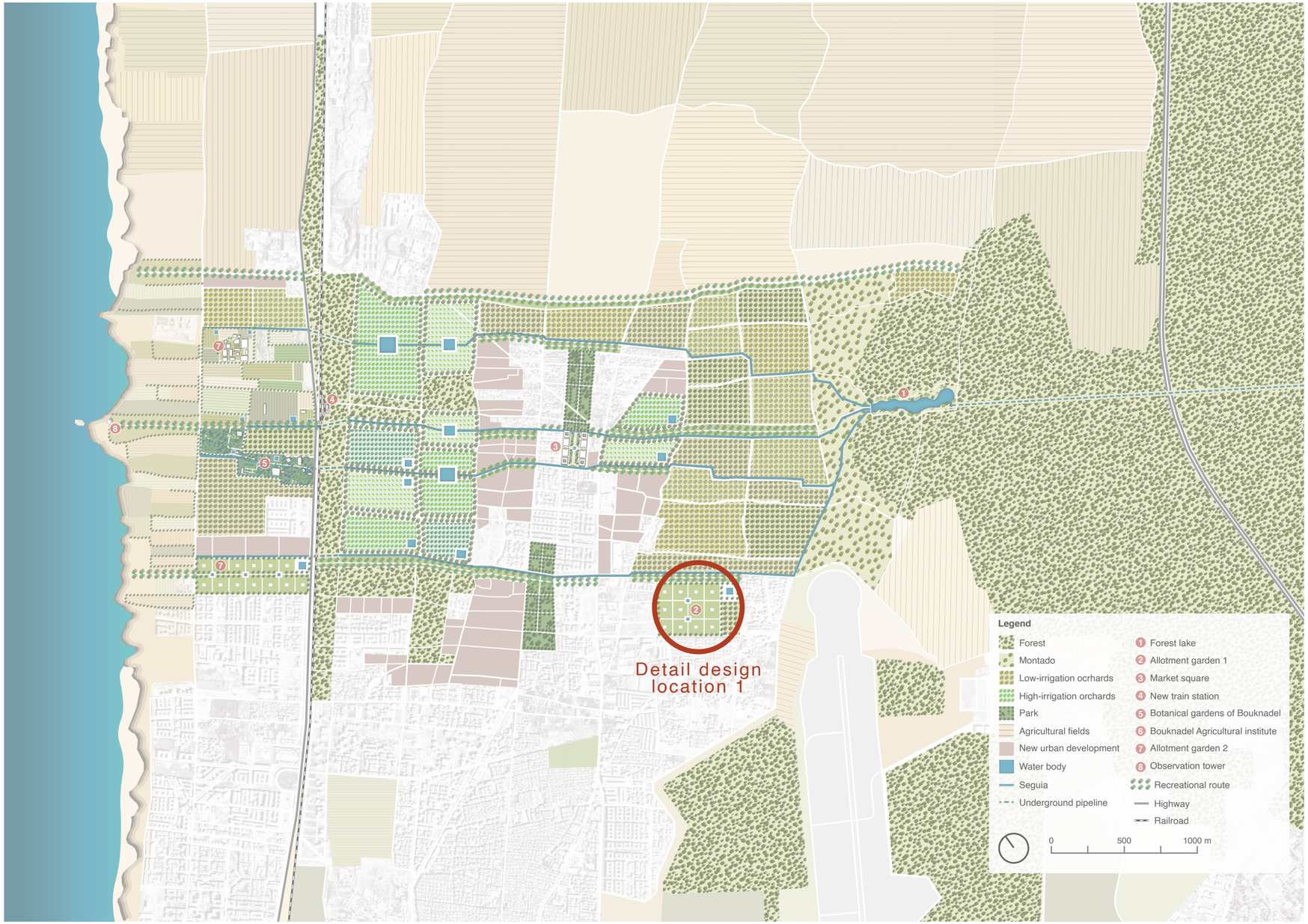




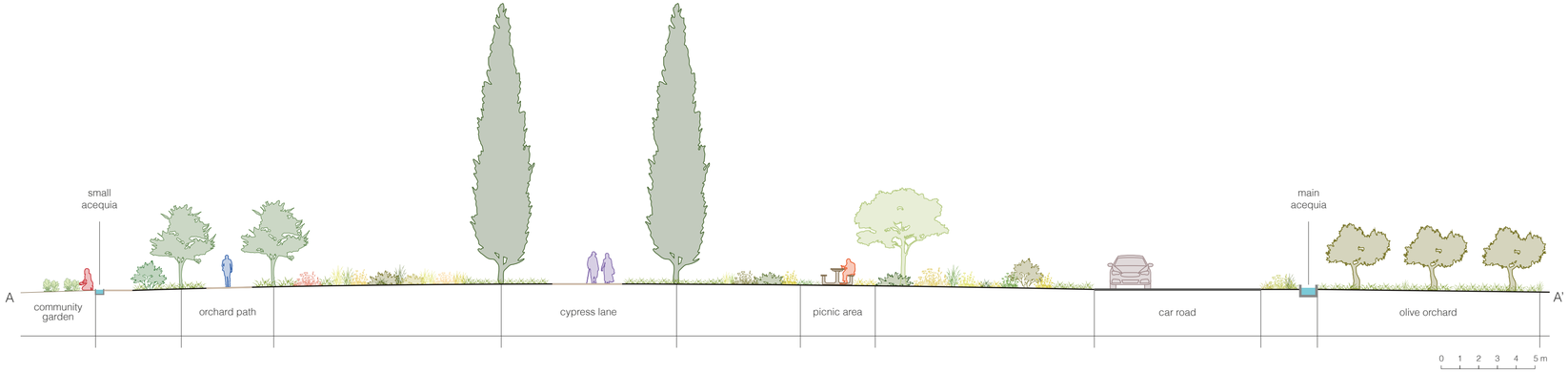




Detail design location



Detail design 1. Allotment garden







Small seguia running along garden plots.
Source: El Mundo CR.



Irrigation channel within the Andalusian Gardens in Rabat.
Source: Maroc Lovers.



Women at work in the Ourika Community Gardens
Photograph by YSL Beauty. Source: Wallpaper

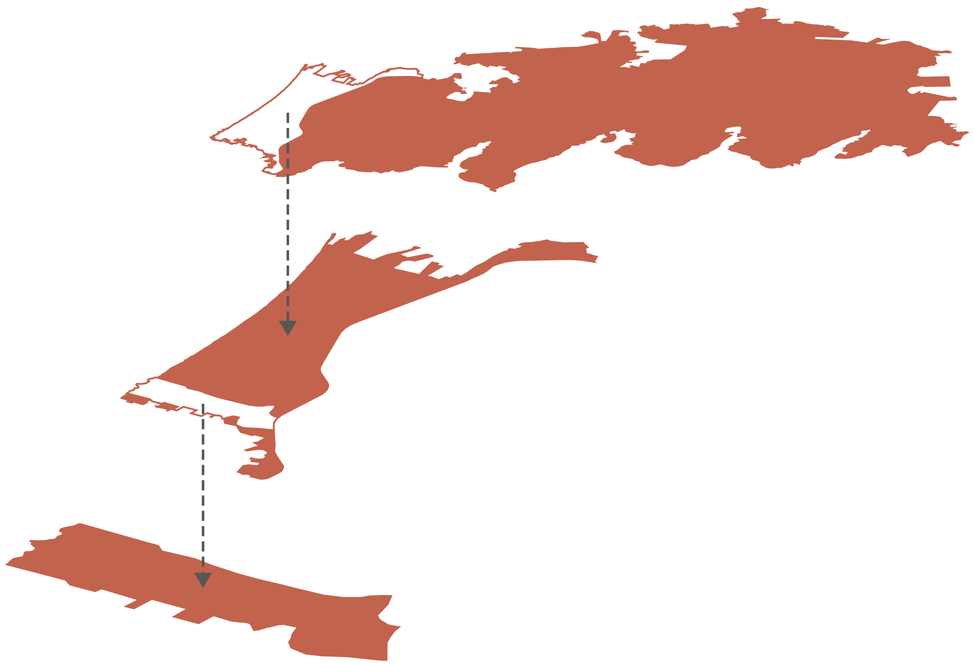


CONCLUSION

06

Conclusion

- The thesis uses an integrated approach for the conservation of the Maâmora forest
- Three different design outcomes across three scales
- Ecological conservation and urban development should not be approached as separate challenges
- Prioritize protecting ecological and productive areas before determining where urban development can take place



Overall conclusion

The surrounding peri-urban landscape should become part of the strategy for protecting and restoring the Maâmora forest, rather than continuing to contribute to its decline

RE-CORKING THE MAÂMORA

Thank you for listening!

