

Towards rational and sustainable management of water resources: The design of watering systems adapted to green spaces in Tétouan

Climate and environment

Climate and environment have become global issues as the impacts of climate change and ecosystem degradation intensify. International agreements, such as the Paris Agreement, witness the efforts to attenuate these problems and to encourage the transition to more environment-friendly practices. In Morocco, environment is an important and complex subject, involving multifaceted aspects of sustainability, of natural resource management and of ecosystem protection. Consequently, significant measures are being implemented, such as developing hydraulic infrastructure, the setting up of educational programs and awareness campaigns. These initiatives reflect the State's commitment and the integration of environmental concerns into its economic and social policies.

The regional project "City-to-City Cooperation Maghreb-Germany" (KWT II), commissioned by the Federal Ministry for Economic Cooperation and Development (BMZ), was implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in cooperation with the Service Agency Communities in One World (SKEW) of Engagement Global gGmbH, from March 2020 to February 2024. Among other activities, the regional project supported project partnerships between German and Maghreb cities. The good practices highlighted in this fact sheet have been developed by the partner cities of Tétouan and Trier. These practices will be scaled up as a part of the follow-up regional project "Urban Adaptation to Climate Change in the Maghreb", running from March 2024 to February 2027.



Designing watering systems adapted to green spaces in Tétouan

In Morocco, the regional project KWT II was implemented in collaboration with the Directorate-General of Territorial Communities (DGCT) of the Ministry of the Interior. One of the participating cities was the urban municipality of Tétouan in the north of the country.

The city's urban expansion has led to a significant increase in the area of green spaces, which in turn has led to a sharp increase in daily water consumption for irrigation, from 12,655 m³ in 2015 to 46,750 m³ in 2020. In addition, the recurrent droughts and rainfall reductions that the region has experienced in recent years have led to the overexploitation of water resources. In this context, the urban municipality of Tétouan has embarked on a project to design new irrigation systems adapted to each type of green space. This project took shape thanks to a partnership established in 2016 with the German city of Trier and benefited from the technical expertise provided by the regional project KWT II.

The aim was to propose a range of plants appropriate to each green space and adapted to the local climate. In addition, the

project aimed to reform the practices and organisational aspects of the maintenance and watering of green spaces in the city of Tétouan by opting for the design of new adapted facilities and the use of alternative resources to drinking water.



Approaches and actions

The project to design watering systems adapted to green spaces in Tétouan followed the approach illustrated in diagram 01, and is presented as follows:

1. Assessment of the current situation and needs analysis: This was a study that was carried out using various research tools, such as documentary research, cartographic analysis and qualitative surveys using questionnaires and interviews. The study focused on the following aspects:

- Carrying out an inventory of green spaces, urban natural areas and water resources in the municipality of Tétouan, followed by the development of a corresponding map.
- Analysing the municipality's green infrastructure and identifying its specific characteristics in terms of plant diversity and watering.



Left: A German delegation from Trier visits the municipality of Tétouan in the framework of the project to design watering systems.

Right: Framing meeting for the mission to support the design of watering systems adapted to the green spaces of the municipality of Tétouan with the elected representatives, the managers of the municipality and the consulting firm.

- Identifying plant species best suited to the region's climatic conditions.

2. Rationalisation of water resources and green spaces for a potential watering system: This involved formulating methodological and technical recommendations in the form of a set of guidelines for the rigorous and sustainable design and management of Tétouan's urban green spaces.

3. Budget estimation and implementation: Proposal of a layout plan for irrigation installations within green spaces, including the type of irrigation equipment, the cost per square metre, the installation method, and the budget allocation for implementation.

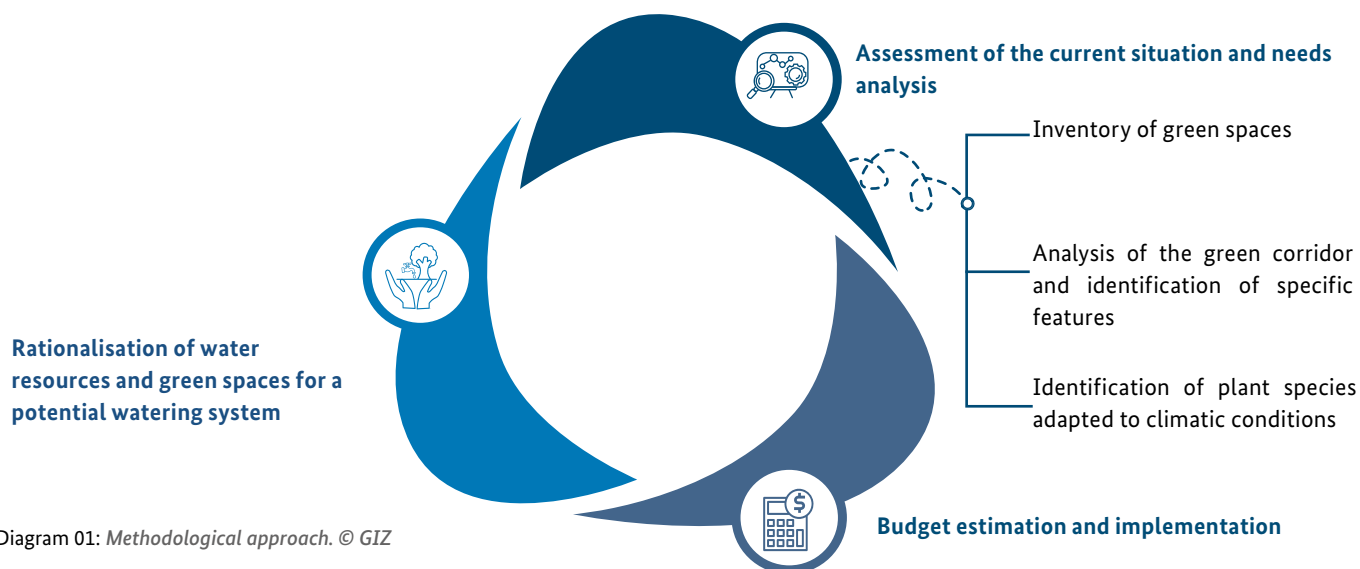


Diagram 01: Methodological approach. © GIZ



Achievements

The project has achieved the following results (diagram 02):

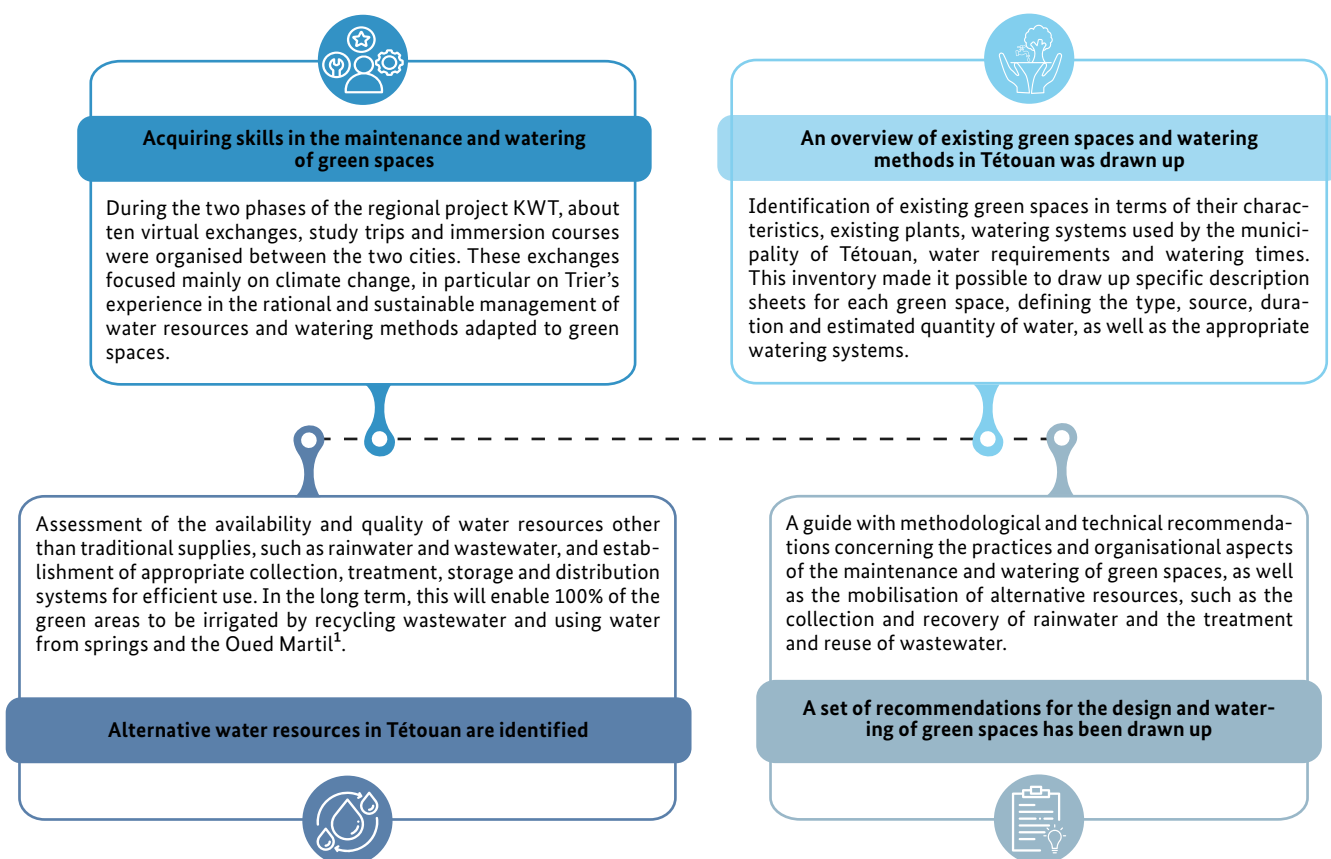


Diagram 02: Achieved and expected results. © GIZ

¹Oued Martil is a river located in the north of Morocco, in the region of Tétouan.



Challenges

Multiple challenges were encountered, requiring specific solutions. These are detailed in diagram 03:

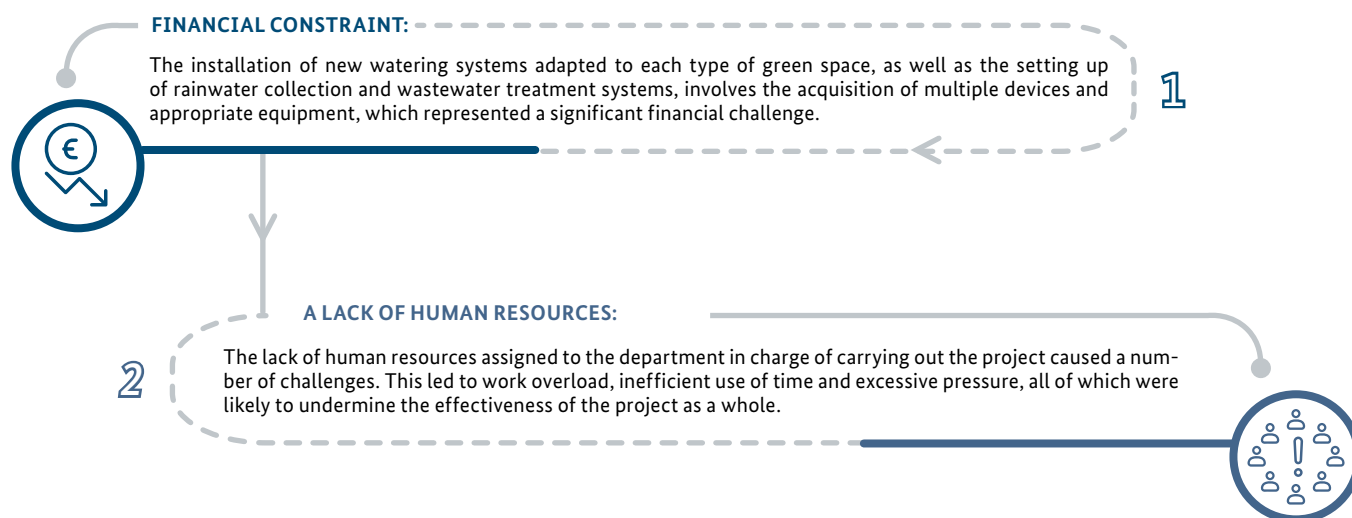


Diagram 03: *Challenges overcome.* © GIZ



Innovative aspects and strengths

The project to design watering systems for green spaces in Tétouan stood out for its strengths, reflecting a commitment to sustainable and rational management of water resources (diagram 04):

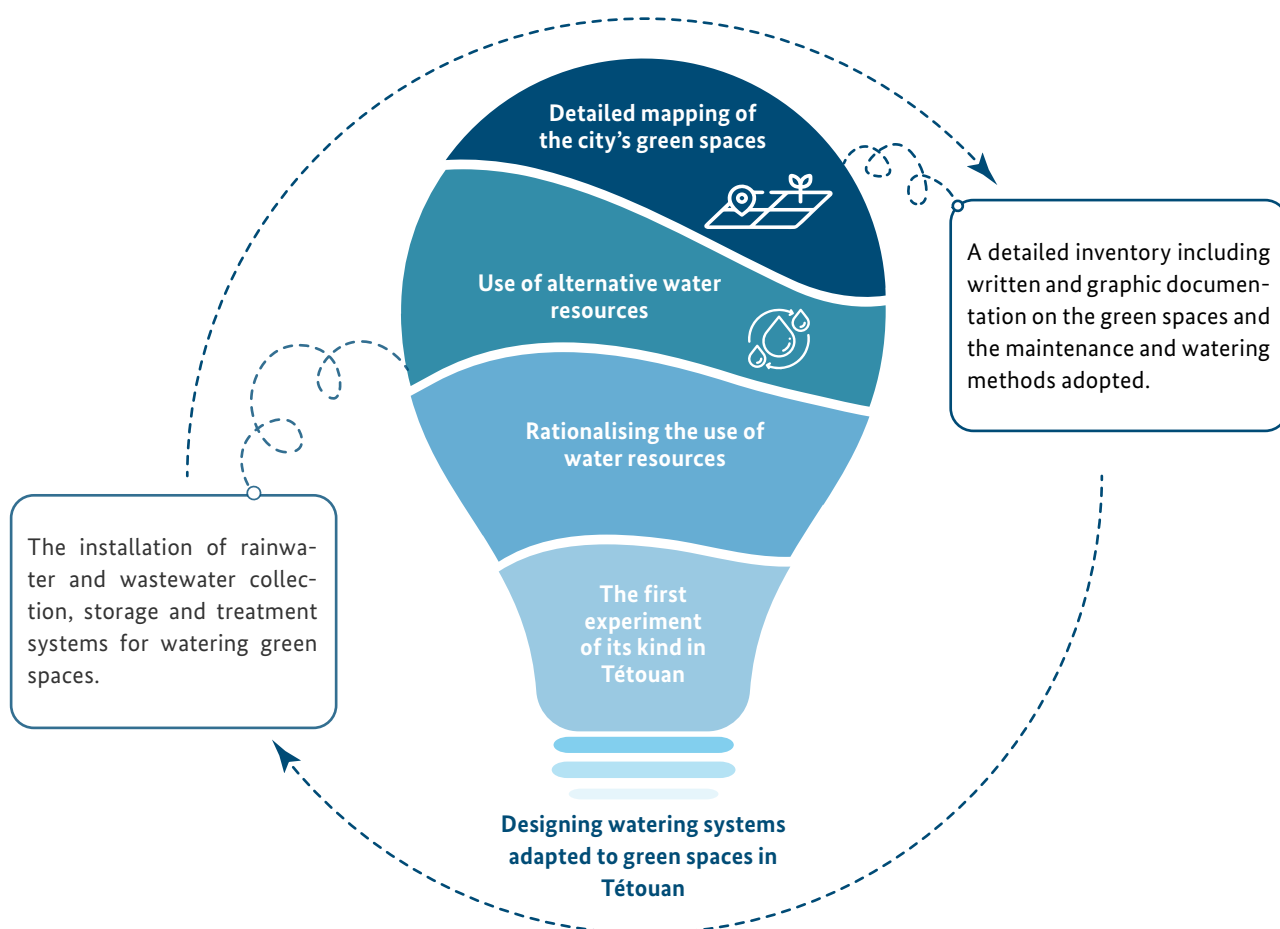


Diagram 04: *Innovative aspects and strengths.* © GIZ



Left: Inventory and diagnosis of urban green spaces - Jardin historique Moulay Rachid in the municipality of Tétouan. Photos taken in 2023.

Right: Inventory and diagnosis of urban green spaces - Oued Martil Promenade, Tétouan. Photos taken in 2023.

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Best practices, lessons learnt and advice

Several important lessons have been learnt and best practices identified from the experience in Tétouan, which should be considered when implementing similar projects (diagram 05):



1 REDUCING CONSUMPTION OF WATER RESOURCES

This has become a key consideration in any landscaping project or when designing a watering system for green spaces. With this in mind, particular attention has been paid to the problem of water wastage and to reducing the energy consumption required to operate the system.



2 ADAPTING THE WATERING SYSTEM TO THE DIFFERENT NEEDS OF EACH GREEN SPACE

It is essential to adopt specific watering methods for different types of vegetation. The choice of components must meet these requirements to ensure optimum watering, taking into account the particular features of each area of the green space. The aim is to ensure even water distribution and optimise the use of water resources efficiently.



3 ENRICHING THE EXISTING RANGE OF PLANTS RATHER THAN OPTING FOR A COMPLETE OVERHAUL

The idea is to complement the existing range of plants in the city's green spaces with the judicious introduction of new species that require little water. This approach aims to increase plant diversity without disturbing the existing landscape.



4 SETTING UP A "MIXED SOURCES" WATER SUPPLY SYSTEM

The aim is to reduce the pressure on existing water supplies. In the case of Tétouan, this approach was based on making the best use of spring water, reinforcing the network of the wastewater treatment plant and using water from Oued Martil.

Diagram 05: Best practices, lessons learnt and advice. © GIZ

Published by

Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices Bonn and Eschborn, Germany

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As at

October 2024

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On behalf of

Federal Ministry for Economic
Cooperation and Development (BMZ)

In cooperation with

Directorate-General of Territorial Communities (DGCT)
within the Ministry of the Interior in Morocco