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Enhancing waste collection in municipalities through digitalisation: Implementation of the digital solution “Clean 8” in Djerba Midoun, Gabès and Kairouan

Circular economy and waste management

Integrated waste management is a major challenge for local authorities in the context of rapid population growth. International initiatives focus on sustainable practices that encourage waste reduction and sorting at the source, recycling and responsible waste disposal. In Tunisia, waste management has become a strategic priority for the government. The country is committed to adopting an approach based on sustainability and the promotion of circular economy, including innovative awareness-raising strategies and incentive 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 factsheet have been developed by the partner cities of Midoun and Fürth, Kairouan and Darmstadt, as well as Gabès in partnership with the Region of Hanover. These practices will be scaled up as part of the follow-up regional project “Urban Adaptation to Climate Change in the Maghreb”, running from March 2024 to February 2027.

Implementation of Clean 8 activities in Midoun, Gabès and Kairouan

In Tunisia, the regional project KWT II was implemented in collaboration with the Directorate-General of External Relations and Decentralised International Cooperation of the Ministry of the Interior.

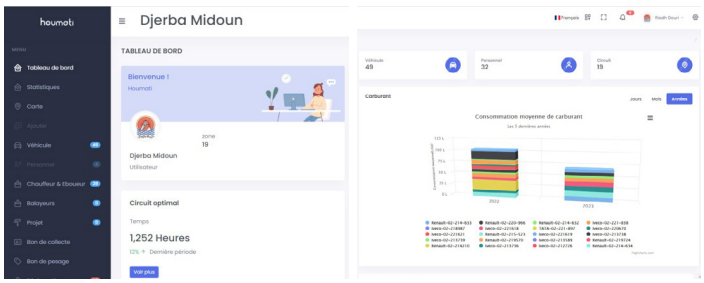
The Clean 8 actions were implemented as part of the project partnerships established by the regional project KWT in 2016 between the Tunisian municipalities of Midoun, Gabès, Kairouan and their respective German partners, Fürth, the Region of Hanover and Darmstadt. The objective was to enhance the operations of the hygiene and environment departments in these municipalities by adopting a digital approach to the waste collection process.

Developed by the regional project KWT II, Clean 8 is an interactive application designed to serve various stakeholders, including citizens, waste collection truck drivers, as well as the municipal staff and supervisors. This application allows citizens to access information on municipal waste collection and submit complaints. For garbage truck drivers, it optimizes their workflow by providing real-time visibility of issues reported during waste collection rounds. Clean 8 also facilitates the organisation and supervision of waste collection operations for the local authority’s staff. Additionally, it makes it possible to manage the monitoring of human and material resources and to dispatch targeted notifications by address, effectively dealing with citizens’ complaints.

Approaches and actions

During the technical exchanges on waste management, the partner municipalities identified significant malfunctions and deficiencies in waste collection and transport activities. These included inefficient deployment of teams and equipment, limited availability of information on the various inputs used in these processes and a lack of accurate data on the quantities of waste generated, collected and informally disposed of, as well as their locations. The municipalities of Kairouan, Gabès and Midoun expressed the need to remedy these shortcomings by adopting a digital solution to optimise these processes.

As a first step prior to the development of Clean 8, an on-site assessment was carried out in the municipalities by an IT engineering company in collaboration with the relevant municipal teams.



Overview of the management dashboard of the municipality of Midoun, showing the time saved according to the optimal waste collection route and average fuel consumption.

Photos: © GIZ / Hatem Bouden

This assessment included an inventory of the components of the waste collection and transport service, its organisation and the allocation of resources. The main findings from this assessment served as the basis for developing the digital solution (diagram 01).

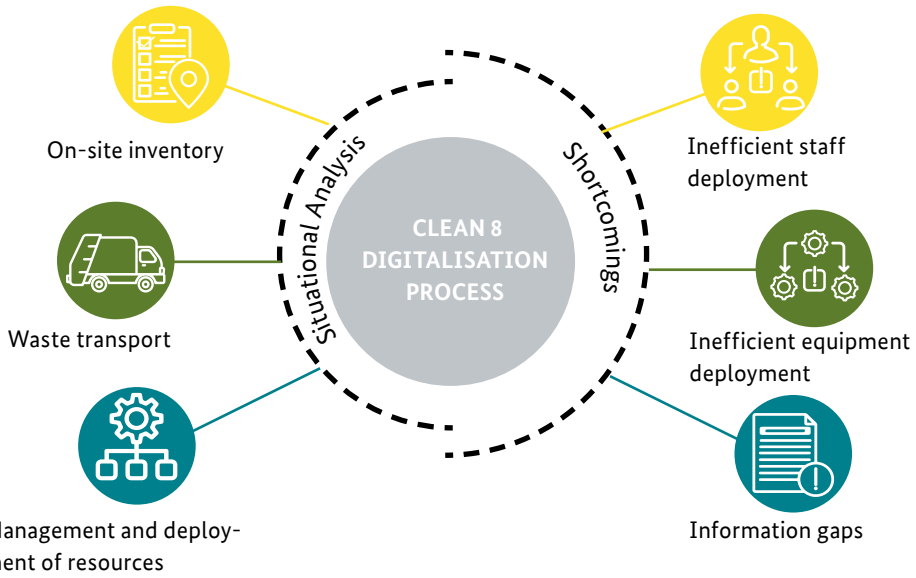


Diagram 01: *Methodological approach. © GIZ*

Achievements

The Clean 8 measures in Midoun, Gabès and Kairouan have achieved the following results (diagram 02):

Implementation of a comprehensive dashboard: A detailed dashboard of human and material resources controlling all fleet-related operations, has been implemented. It provides an overview of citizens' complaints and facilitates interactive communication between citizens, drivers and municipal staff. This feature enhances transparency by providing digital traceability of operations.

Digitalisation of waste collection routes: The system records and installs GPS positions for garbage skips, identifying blackspots, truck stops and red lights. This allows for real-time tracking of the routes taken by garbage trucks.

Significant reduction in fuel costs: Data from local authorities, cross-referenced with the GPS system, indicated an average fuel cost saving of 15 %. These figures are based on an assessment carried out during the first four months of tool usage, representing a significant gain for local authorities.

Capacity development in waste collection and digitalisation:
- **Managers and decision-makers**: 8 trained in Midoun, 7 in Gabès and 6 in Kairouan.
- **Monitoring officers/supervisors**: 5 trained in Midoun, 4 in Gabès and 4 in Kairoan.
- **Cleanliness officers/drivers:** 15 trained in Midoun, 18 in Gabès and 8 in Kairouan.

Citizen participation in waste collection operations: Clean 8 enables citizens to submit geolocated complaints to municipalities with just two clicks, including a photo and location. They can also participate in surveys tailored to their specific geographical area.

Diagram 02: *Achievements. © GIZ*

Challenges

A host of challenges were encountered, necessitating tailored solutions. These challenges are detailed in diagram 03:

STAKEHOLDER COMMITMENT:

Due to changes in the decision-making teams within the partner municipalities, it was necessary to raise awareness among new decision-makers to convince them of the importance of the Clean 8 system.

CONNECTIVITY ISSUES:

The absence of internet connectivity posed a significant challenge, particularly for municipal supervisors and drivers who required real-time access to the dashboard and digital map. This issue has been resolved in Gabès and Midoun by providing internet connections in municipal parks and data packages for supervisors.

INITIAL DIFFICULTIES FOR CITIZENS USING THE CLEAN 8 DIGITAL TOOL:

Citizens initially faced challenges in using the Clean 8 digital tool, requiring time to learn and adapt to the new system.

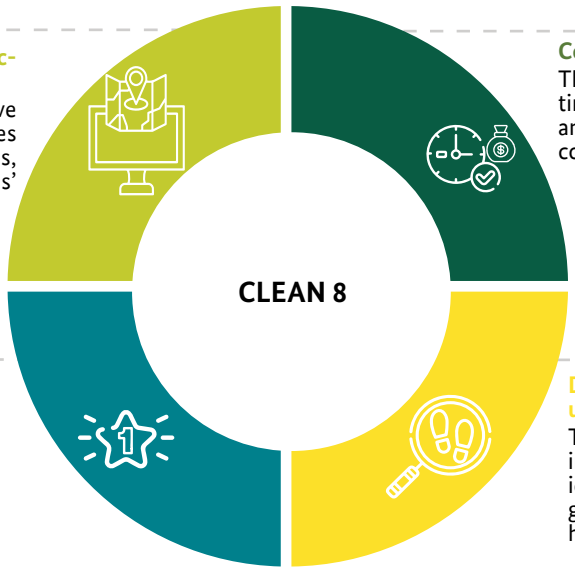
Diagram 03: *Challenges encountered during the implementation. © GIZ*

Innovative aspects and strengths

The Clean 8 measures stood out for their strengths, reflecting a commitment to sustainable waste management and circular economy (diagram 04):

Detailed digital mapping of waste collection activities:
The system includes a comprehensive dashboard and a smart map that provides data on the locations of garbage skips, truck routes, blackspots and citizens' complaints.

Considerable time and cost savings:
The application significantly reduces time spent on waste collection and decreases, in particular, fuel consumption.

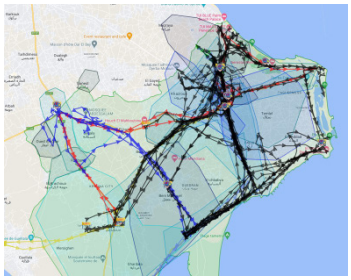


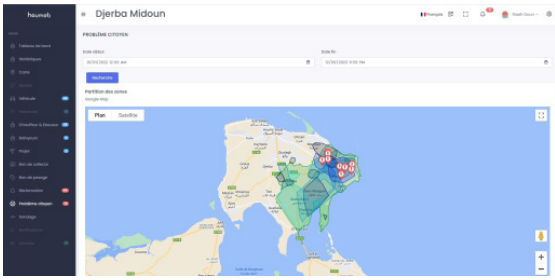
Pioneering experiment in Tunisia:
Clean 8 is the first application in Tunisia dedicated to reporting problems and optimizing waste collection in collaboration with municipalities.

Digital traceability of flows and usage frequency
The system enhances transparency in waste collection operations by identifying shortcomings and irregularities in the deployment of human and material resources.

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

Photos: © GIZ / Hatem Bouden





Left: Overview of the real-time tracking of waste collection routes, categorized by zone and route.

Right: Overview of the precise geolocation of all requests.

Contact person

Anita Sebio Kouhè
Project Manager
anita.sebio-kouhe@giz.de
T +49 6196 79 - 1068
Dag-Hammarskjöld-Weg 1-5
65760 Eschborn
Germany

Best practices, lessons learnt and recommendations

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

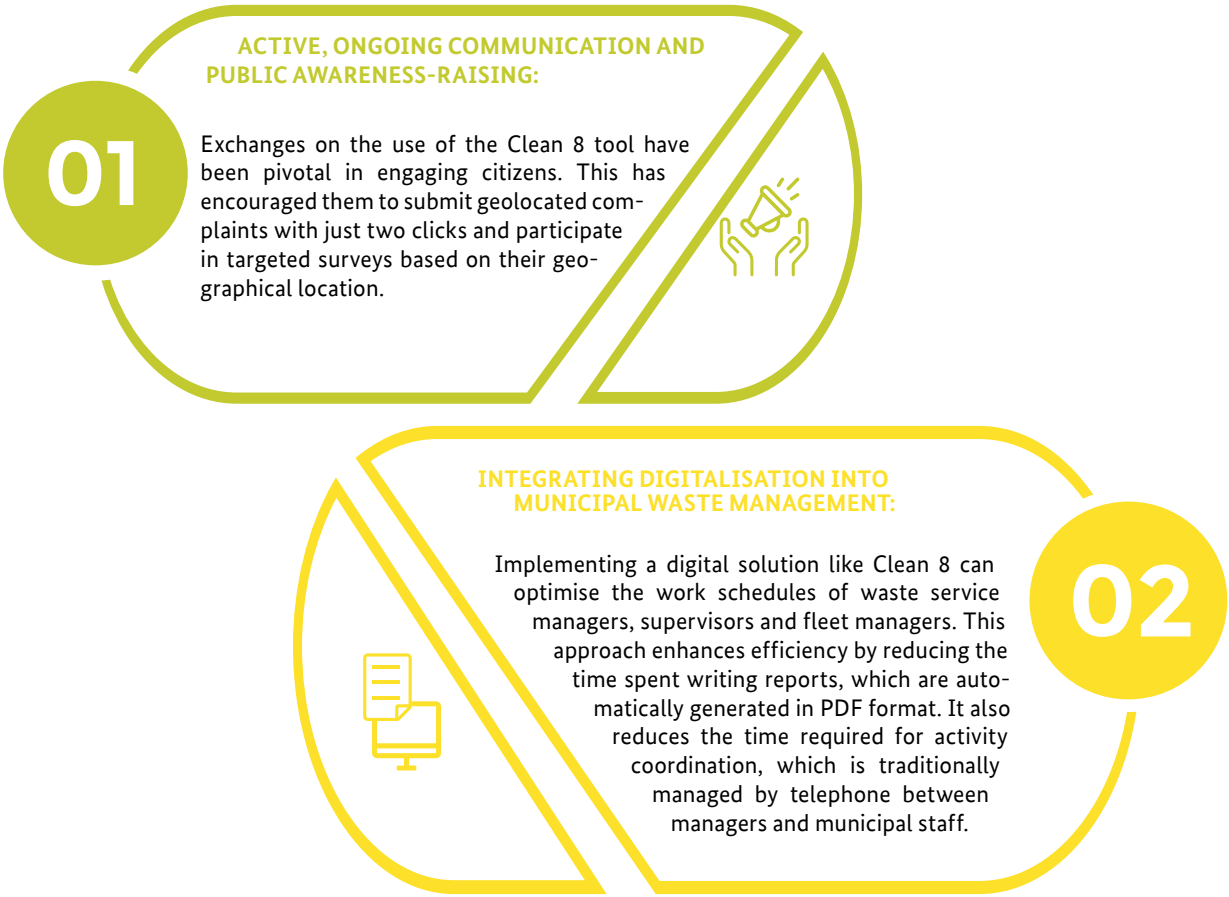


Diagram 05: *Best practices, lessons learnt and recommendations. © GIZ*

Published by
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Registered offices Bonn and Eschborn, Germany

Regional project City-to-City Cooperation Maghreb-Germany (KWT II)
Dag-Hammarskjöld-Weg 1-5
65760 Eschborn, Germany
Tel +49 (0)6196 79 1068
info@giz.de
www.giz.de

As at
October 2024

Text
Samah Flissi, Hatem Bouden, Philip Jain, Essodom Loufaï

Design
Narimane Boucena, Essodom Loufaï

On behalf of
Federal Ministry for Economic Cooperation and Development (BMZ)

In cooperation with
Directorate-General for External Relations and Decentralised International Cooperation within the Ministry of the Interior in Tunisia