الشبكة التونسية
للسياسات العمومية

Tunisian Public Policy Consortium

من المعرفة إلى السياسات العمومية في خدمة المواطن

From knowledge to public policy in the service of citizens

# INTRODUCTION OF PDIA IN TUNISIA:
## AN ITERATIVE AND ADAPTIVE TOOL FOR THE EFFECTIVE MANAGEMENT OF HOUSEHOLD AND SIMILAR WASTE

SEPTEMBRE 2024


www.tppc.tn

# INTRODUCTION OF PDIA IN TUNISIA:
## AN ITERATIVE AND ADAPTIVE TOOL FOR THE EFFECTIVE MANAGEMENT OF HOUSEHOLD AND SIMILAR WASTE

# Table of contents

# Executive Summary

This case study addresses the critical issue of household and similar waste management in Tunisia, particularly within the framework of the Problem-Driven Iterative Adaptation (PDIA) Project. Upon the launch of this initiative, Solidar Tunisie convened a consortium in Tunis that brought together a wide array of stakeholders. Following comprehensive PDIA training, participants engaged in workshops aimed at identifying the core issues, ultimately culminating in the establishment of the inaugural Tunisian PDIA team.

Comprising nine members representing various stakeholders (including centralized and decentralized state bodies, civil society, experts and academics), this highly-skilled team was tasked with implementing the PDIA approach. Their focus was on conducting further research into the pressing challenge of "Tunisia being inundated with waste," a complex and multifaceted matter.

Despite the challenges associated with this novel experimentation of the PDIA approach, the team achieved notable successes over 57 weekly meetings. These accomplishments can be attributed to the commitment and enthusiasm of its members, the methodological guidance provided by international experts and facilitators, and the steadfast support from Solidar Tunisie. Collectively, these efforts have contributed to mitigating the waste crisis in Tunisia.

To this end, upon identifying the problem, the team embarked on a thorough dissection during the second stage of the process. Through collaborative efforts with local authorities, experts, and stakeholders -facilitated by extensive consultations and organized workshops- the team illuminated the various institutional, behavioral, legal, practical, and governance factors that impede effective waste management.

The initial analysis revealed five fundamental root causes and 26 sub-causes, paving the way for the creation of a detailed cause-effect (fishbone) diagram. This diagram was subsequently presented to a diverse array of stakeholders, whose insightful feedback catalyzed several iterations, resulting in a refined version. However, given its inherently dynamic nature (subject to potential fluctuations in context, textual interpretation, and other critical data), further modifications are anticipated.

The subsequent phase involved a meticulous examination of the space for change through the prism of three essential parameters: Authority, Acceptability and Ability. This analytical framework enabled the identification of pivotal entry points distinguished by elevated levels of all three dimensions, which are crucial for devising viable solutions with a robust likelihood of successful implementation and iterative refinement.

Among these pivotal entry points was the pressing issue of "Waste management financing mechanisms that inadequately address existing needs" (from Cause C 05). The team aimed to tackle this challenge by enhancing the effectiveness of these mechanisms, thereby directing additional resources to municipalities responsible for the collection of household and similar waste. This initiative aspires to elevate waste management practices and improve cleanliness standards across Tunisian cities, ultimately contributing to a progressively cleaner Tunisia, less burdened by waste.

The team capitalized on the institutional openness of the municipal authorities in Sidi Bou Saïd (SBS), located north of the capital, to collaborate on designing, implementing and refining solutions.

The mayor, enthusiastic about the initiative, partnered with the PDIA team to move forward with these proposals. Due to a lack of resources to maintain cleanliness in the city, particularly for waste collection from establishments open to the public (EOP), the municipal leader observed that many of these establishments typically refused to pay the required fees for the municipality's waste collection services. The annual fee, based on the volume of waste produced, is determined by an agreement between the EOP and the municipality, with rates set per liter by local regulation.

Several key objectives were identified by the team to improve the management of waste collection for EOPs in SBS. The main goal was to expand the number of businesses willing to participate in waste management agreements. This increased participation would bring multiple win-win benefits: businesses could reduce their costs by opting for waste sorting, which would lower the volume of waste subject to fees, while providing a collection system tailored to their needs. The municipality would see a boost in revenue without raising fees, offsetting losses from non-participation. Additionally, citizens would enjoy a cleaner environment; rag pickers

would gain access to more valuable recyclable materials; and waste recovery companies would benefit from higher-quality and pre-sorted waste, making recycling more efficient.

A detailed action plan was crafted for the first iteration in Sidi Bou Saïd, encompassing a comprehensive assessment of the current waste management system, a census of establishments open to the public (EOPs) (gathered through questionnaires to collect data on their activities, waste volumes and adherence to selective sorting) along with waste characterization and the modeling of a new selective collection system. Additionally, communication campaigns were scheduled to raise awareness among both, EOPs and the broader public, about the importance of selective sorting.

The study concludes that, despite challenges, especially in terms of coordination and support from local authorities, the persistent efforts and participatory methods have led to significant advancements. Performance indicators reflect notable improvements in waste management practices, encouraging other municipalities to explore adopting similar approaches. However, the results have been uneven, reflecting the unique conditions and characteristics of each municipality. This is where the PDIA (Problem-Driven Iterative Adaptation) approach demonstrates its strength, enabling tailored solutions that adapt to the specific context of each case.

In conclusion, this case study underscores the critical importance of an iterative and adaptive methodology in tackling complex waste management issues. It also highlights the essential need for sustained commitment and collaboration from authorities and stakeholders alike to ensure the long-term sustainability and effectiveness of the solutions being implemented.

# The launch of the PDIA in Tunisia: An iterative and adaptive tool for good management of household and similar waste in Tunisia

## 1- Background to the First Launch of the PDIA Approach in Tunisia

In response to the urgent need for improved management of household and similar waste, Solidar Tunisie[1] has proposed a groundbreaking process that will introduce a novel approach for the first time in Tunisia.

Advocating for a participatory approach that engages all relevant stakeholders, Solidar Tunisie convened a consortium on March 14, 2024, in Tunis. This event brought together key Tunisian waste management authorities to initiate an active, persuasive and collaborative process, following a training led by an international expert[2] in the PDIA (Problem-Driven Iterative Adaptation) approach, which is specifically designed to tackle complex challenges.

The PDIA framework aims to strengthen the capacity of public authorities to implement strategies that address intricate issues through sustainable and pragmatic solutions, thereby facilitating transformative changes in public policy.

The transition from research to practical application within the PDIA framework is a lengthy, logical and multifaceted journey. This approach transcends mere diagnosis or early-stage problem definition; it involves an in-depth exploration of the issue (dissecting it into its fundamental causes and sub-causes), followed by rigorous analysis and the development of viable solutions. The ultimate goal is to execute concrete and targeted actions utilizing a diverse array of tools grounded in evidence, thorough analysis and actionable insights.

Unlike traditional methodologies, the hallmark of PDIA lies in its deliberate avoidance of preconceived or predetermined solutions that are directly applied to complex problems. Instead, it defers the identification of a comprehensive, overarching solution to a later and ultimate stage in the process. This strategy allows for iterative adaptations tailored to the specific contextsat hand, facilitating the extraction of valuable lessons and promoting a culture of learning through the evaluation of the solutions implemented.

The originality of this innovative method, as suggested by its name, resides in its iterative and adaptive framework. It endeavors to tackle complex problems incrementally, adhering to a structured process that aids in dissecting the issue (analysis), identifying entry points, exploring potential solutions, taking action and reflecting on the lessons learned from the undertaken actions (constructive failure). This approach allows for adjustments to different contexts, ensuring effective implementation and enabling further experimentation with alternative solutions.

The PDIA approach is underpinned by three pivotal concepts: research, readingand learning. Through iteration (often described as the lifeblood of PDIA), this method guarantees the flexibility and agility necessary to correct errors and deficiencies, refine proposals and customize solutions to fit their specific contexts. Additionally, it promotes the idea of 'small wins' or minor successes' that can be adapted to any changes that may occur during the process.

During the consortium, participants not only

1- Solidar Tunisie is a Tunisian think tank that analyzes and evaluates public policies and contributes to improving performance and sustainability through an integrated approach based on human rights, equity, equality, good governance and the rights of future generations.

2- Peter Harrington is an expert from Harvard University (Building State Capability program) specialized in the PDIA (Problem-Driven Iterative Adaptation) approach.

3- Initially scheduled between March and December 2023, the project was then extended until June 2024, with the possibility of continuing monitoring beyond this date in order to measure, in the medium term, the impact of the implemented solutions. This requires, in fact, an evaluation over a longer period than the project itself. At the outset of the project, the team had doubts about the timeline allocated to them, given the complexity of the problem, the numerous stakeholders involved, the multiple and different causes and the many unknown data or factors (especially regarding what was necessary to address the problem, not partially but on a large scale). Team members did not believe that it was possible to accomplish much regarding this type of issue, particularly within six months.

familiarized themselves with this innovative framework, but also actively engaged in focus groups aimed at pinpointing issues related to the management of household and similar waste. In this collaborative setting, they worked to compile a comprehensive list of root causes associated with these challenges.

Consequently, this meeting led to the establishment of the first PDIA work team in Tunisia, tasked with conducting an in-depth examination of the subject over a six-month period, which may be extended as needed[3].

## 2- Creating a Tunisian PDIA Team: Structured Organization and Training in the PDIA Approach

The distinctive nature of the PDIA experimentation in Tunisia is underscored by a methodology that diverges from the conventional practices observed in most global PDIA initiatives. Typically, teams are formed only after the relevant authority has identified the problem to be addressed. In Tunisia, however, this sequence was reversed: the team was established prior to the identification of the problem, marking a significant first step in the PDIA process.

The following noteworthy aspect of the inaugural PDIA team in Tunisia was its composition, meticulously adapted to align with the specific context of the country. According to PDIA standards, effective team management is ideally achieved with a compact formation of between 5 and 7 members (as seen in various comparative experiences). This limited size fosters greater efficiency in the work conducted within a relatively short timeframe, as opposed to larger teams that often require more time for decision-making and can complicate consensus-building.In Tunisia, however, traditional committees formed to address specific issues typically comprised a larger membership, stemming from a cultural inclination to ensure comprehensive stakeholder representation. This phenomenon was evident during the consortium, where numerous participants expressed a keen interest in the process and a desire to join the team.

Nevertheless, in adherence to the tenets of the PDIA approach, and driven by the voluntary convictions of several participants (many of whom belonged to organizations with multiple nominees), a number of individuals opted to withdraw their candidacies. This led to a more rational and effective composition of the team without compromising its representational balance. As a result of this deliberative process, the initial team, as established by the consortium, comprised 9 members distributed as follows :

- 6 representatives from public institutions: 2 from Central Government (the Presidency of the Government and the Ministry of the Environment); 3 from supervisory bodies (2 representatives from ANGED[4] and only 1 from ITES[5] ); and 1 from decentralized entities (Municipalities).
- 3 representatives from civil society: 1 each from the UGTT (the Tunisian General Labor Union), UTICA (the Tunisian Confederation of Industry, Trade and Handicrafts), and the Sfax Waste Crisis Management Committee.

The team, specifically composed to reflect the Tunisian context, convened for its inaugural meeting on March 15, 2023. Their enthusiasm and motivation were palpable, fostering a collaborative environment that encompassed a diverse array of stakeholders.

This diversity ensured a comprehensive understanding of the problem at hand, facilitated shared learning regarding the methodology and process and enriched the participatory and iterative nature of their collective work, with all members being experts and professionals in their respective fields.This enrichment process enabled in-depth and adversarial debates, where opinions and counter-opinions could be voiced and grounded in reliable data and the collective expertise of team members. The complementary and balanced composition of the team also contributed to a varied representation (including public and private sectors, centralized and decentralized entities, as well as a gender balance of women and men), all possessing substantial field knowledge. This diversity was essential for ensuring the viability, legitimacy and relevance of the reforms being proposed.

As the linchpin of a lengthy and complex process, the team has engaged in periodic and flexible work since its formation, conducting a total of 57 meetings at an average rate of one meeting per week, with some weeks featuring additional sessions. These meetings spanned from March 1, 2023, the date of the first meeting, to June 7, 2024, the date of the last meeting in this ongoing process, facilitating the exploration of appropriate solutions to the identified problem and

4- Agence Nationale de Gestion des Déchets (National Waste Management Agency)

5- Institut Tunisien des Études Stratégiques (Tunisian Institute of Strategic Studies)

enhancing learning outcomes.

From the outset, the team faced the challenge of implementing this method, which was being trialed for the first time in Tunisia. They were supported by a methodological framework provided by an international expert, particularly during the initial weeks, along with a team of trained facilitators tasked with offering technical assistance and guidance.

All team members demonstrated significant commitment, not only during regular meetings but also in their preparatory efforts. Each week, they dedicated themselves to specific tasks identified for them, which included researching bibliographical references, gathering information from various readings, sharing work and completing assignments related to the stages of the PDIA process. These tasks encompassed stakeholder consultations, identifying opportunities for change, proposing solutions, meetings with relevant authorities and evaluating progress.

As the project advanced, the team became increasingly adept in the PDIA approach, enhancing their expertise and motivation, despite facing challenges at various stages. These hurdles occasionally necessitated the intervention of the international expert and the team of facilitators to realign their methodological focus.

The strong sense of ownership exhibited by the team members facilitated a thorough evaluation of their commitment to delivering exceptional results throughout the different phases of the PDIA process. Initially, the team concentrated on articulating the problem within the context of household and similar waste management policy, which constituted the first stage of the PDIA process. Subsequently, in adherence to PDIA principles, they deconstructed the problem into its sub-causes during the second phase.

Following this analysis, the team transitioned into the sequencing phase within the space for change (3rd phase), where they identified priority entry points for potential solutions to be implemented within the design space (4th phase). Their next task was to establish the necessary authority equipped with the legal mandate to enact decisions, thereby transforming the proposed solutions into enforceable actions (5th phase).

With this foundation in place, the team embarked on designing the first iteration by implementing specific solutions within a targeted focal point, namely the Municipality of Sidi Bou Said (SBS) (6th phase). This phase also involved a rigorous evaluation of the implemented solutions, enabling the team to extract vital lessons for subsequent trials, further iterations and potential expansion to additional municipalities (7th phase).

Throughout this comprehensive process, the team remained dedicated to tackling the waste management issue through incremental interventions. They systematically implemented additional solutions across various focal points related to alternative entry points (8th phase). This iterative approach aimed to progressively dismantle obstacles and contribute substantively to the resolution of the waste management challenge.

## The steps of the Problem-Driven Iterative Adaptation (PDIA) approach

## 3- Problem analysis/construction: "Tunisia is inundated with waste".

Despite the participatory approach employed during the Consortium, the various workshop teams were unable to reach a consensus on the identification of the problem after analyzing the five questions outlined in the first phase of the PDIA approach, which focuses on problem diagnosis.[6] Drawing on the results of the Consortium, team members revisited this exercise, thoughtfully addressing the five questions once more. Through in-depth analysis and discussion, they successfully pinpointed the core issue facing Tunisia regarding household and similar waste management. This synthesis of their collective efforts culminated in the articulation of the problem as follows: "Tunisia is inundated with waste."

For several decades, particularly in the wake of the 2011 revolution, Tunisia has faced a profound crisis in waste management, especially concerning household and similar waste. Despite the formulation of national strategies, the establishment of legal frameworks to regulate this sector, the initiation of several pilot projects and the involvement of multiple agencies, the effectiveness of waste management remains strikingly inadequate. This ongoing challenge complicates the responsibilities of authorities, making an already complex situation even more challenging.The waste management system itself is burdened by intrinsic issues related to internal governance and operational management. Effective waste managementimplies navigating several layers of complexity: institutional (the multitude of stakeholders engaged in waste management complicates coordination and implementation efforts)[7] ; strategic (there is a pervasive lack of guarantees regarding the efficacy of waste management practices, leading to uncertainty in outcomes); practical (the execution of decisions is frequently hampered by insufficient resources or weak enforcement); and financial (a critical shortfall in investment further exacerbates the situation, limiting the capacity for necessary improvements.)

To gain a more comprehensive understanding of these challenges, the team aimed to address a crucial question as prescribed by the PDIA approach: Why is Tunisia struggling to avoid being inundated with waste? And what viable solutions can be devised to alter this trajectory? Understanding the factors that contribute to this pressing issue is essential for developing effective interventions. Thus, the team embarked on a systematic process to deconstruct the identified problem by meticulously exploring its root causes, aiming to lay the groundwork for meaningful and sustainable solutions.

## 4- Problem deconstruction: The Imperative for a comprehensive understanding of its causes

After articulating the problem, it became essential for the team to deconstruct it (breaking down the overarching statement, "Tunisia is inundated with waste,") into several derived ideas that represent root causes. Each root cause, in turn, can lead to sub-causes (and, subsequently, to sub-sub-causes), creating a complex network of interconnected issues. The generality of the problem, as initially expressed, limited the team's ability to gain a deep and detailed understanding.

By its second session, the PDIA team had begun to construct a fishbone diagram, also known as the "Ishikawa Diagram," to illustrate the causes and sub-causes of the problem. To deepen their understanding of the problem and its causes, as well as to appreciate the significance of the challenge, the team engaged in extensive consultations with stakeholders to

6- This diagnostic phase depends on the answer to the following five key questions 1) What is the problem (key symptom)? 2) Why does it matter (to others, to you)? 3) Who cares? 4) What does the solution look like? 5) What does success look like in a few months? And how would you measure it?

7- This is a shared responsibility among several public and private institutions/ bodies, namely the Presidency of the Government, the Ministry of the Interior, the Ministry of Environment and Sustainable Development, the National Waste Management Agency (ANGED), the National Agency for Environmental Protection (ANPE), governorates, municipalities and private companies, not to mention the new data expected with the creation of Local Councils, which could play a role in this matter depending on any changes to the Local Authorities Code. Such a dispersion of responsibilities risks creating competition among these various actors over their respective prerogatives, as well as overlapping or intertwining of their missions, leading to a potential deadlock. This could either result in a negative conflict of competencies (where no institution considers itself responsible) or a positive conflict of competencies (when two or more institutions consider themselves competent). This situation of dispersion, and in some cases, fragmentation of responsibilities, does not facilitate the work of the involved institutions. There is also a concern of diluted responsibility due to this institutional architecture. Effective waste management, on the contrary, requires continuous and efficient coordination between these various institutions to ensure sustainable waste management in the country.

complete and enrich the fishbone (thus ensuring, through a participatory approach, a necessary and desirable knowledge of the opinions of the various stakeholders and interested parties, especially those most influential in the decision-making process).[8]

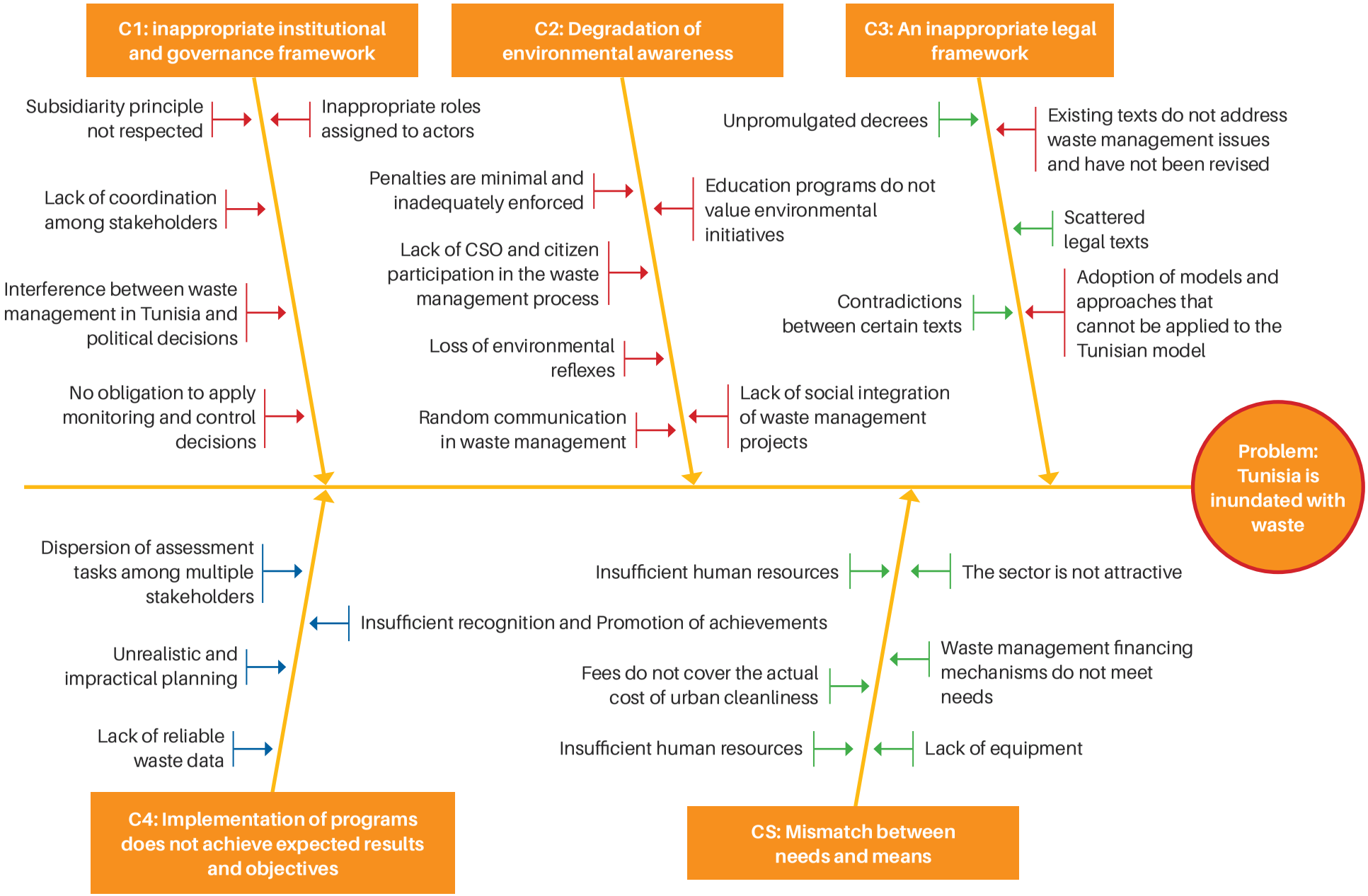
The data gathered from these consultations allowed the team to enrich their understanding of the topic of household and similar waste management in Tunisia, by incorporating the insights and opinions of those consulted regarding its root causes.

Besides the aforementioned consultations, the team prioritized establishing connections with political decision-makers to bolster their advocacy efforts. On May 5, 2023, they presented the fishbone diagram to the Minister of the Environment during a meeting at the Ministry's headquarters, attended by all team members. The Minister provided both encouragement and constructive written feedback on the fishbone diagram, recommending modifications to align with her observations.

Following these engagements, the team dedicated itself to refining the quality of the fishbone diagram in each subsequent meeting. They recognized that this document was not merely a static tool, but a flexible working resource that would evolve in response to changing circumstances. Consequently, periodic revisions were necessary to ensure it remained relevant and up-to-date with new data and insights. Ultimately, after multiple iterations and thoughtful revisions, the team arrived at the finalized version of the fishbone diagram:[9]

8- The groups of people consulted by the team members were multiple and diverse: 1. Municipalities/ 2. Experts/ 3. CSOs/ 4. Media/ 5. Administration (ministries, agencies, etc.)/ 6. The private sector/ 7. Parliament and judges.

9- (Version 05) with the latest sub-causes highlighted in green, indicating modifications compared to the previous version.


C1: inappropriate institutional and governance framework
C2: Degradation of environmental awareness
C3: An inappropriate legal framework
Subsidiarity principle not respected
Inappropriate roles assigned to actors
Lack of coordination among stakeholders
Interference between waste management in Tunisia and political decisions
No obligation to apply monitoring and control decisions
Penalties are minimal and inadequately enforced
Education programs do not value environmental initiatives
Lack of CSO and citizen participation in the waste management process
Loss of environmental reflexes
Random communication in waste management
Lack of social integration of waste management projects
Unpromulgated decrees
Existing texts do not address waste management issues and have not been revised
Scattered legal texts
Contradictions between certain texts
Adoption of models and approaches that cannot be applied to the Tunisian model
Problem: Tunisia is inundated with waste
Dispersion of assessment tasks among multiple stakeholders
Insufficient recognition and Promotion of achievements
Unrealistic and impractical planning
Lack of reliable waste data
C4: Implementation of programs does not achieve expected results and objectives
Insufficient human resources
The sector is not attractive
Waste management financing mechanisms do not meet needs
Fees do not cover the actual cost of urban cleanliness
Insufficient human resources
Lack of equipment
CS: Mismatch between needs and means

A review of this version reveals that the team identified 5 root causes and 26 derived sub-causes, which are distributed across the five primary categories: institutional, behavioral, legal, practical and governance causes. Each of these categories exerts varying degrees of influence on the waste management problem at hand.

The above-mentioned fishbone diagramretains its dynamic character and remains open to potential modifications, particularly as new insights emerge from the analysis of the space for change. Approximately three weeks into their detailed and in-depth work on the fishbone, the team allocated time for its provisional finalization, paving the way for the subsequent stage: the "Space Change Analysis" and itsTriple A analysis, which serves as a transitional phase within the PDIA framework, facilitating the shift from diagnosing the problem to exploring one or more actionable solutions.

The team conducted this analysis by systematically sequencing the space for change, measuring certain critical elements that would inform their selection of priority entry points.

## 5- Sequencing within the "space for change" to determine priority entry points

The team initially focused on grasping the intricacies of this third step in order to master it. They, then, proceeded to analyze the fishbone diagram's space for change, focusing on the measurement of its 3 A's: Authority[10], Acceptability[11], and Ability[12].

These 3 elements serve as contextual measurement parameters[13], guiding the team in identifying the priority entry points necessary for designing future solutions. The Triple A analysis provided the team with a clearer understanding of the opportunities and potential pathways for prioritizing specific sub-causes, thereby determining which would serve as viable entry points for intervention.

The following table summarizes the evaluation of the 3 A's for each sub-cause at the time of the analysis, highlighting their relative strengths and weaknesses.

| | 3 A's analysis: Authority / Acceptability / Ability |
|---|---|
| C1- Inadequate institutional and governance framework | |
| Subsidiarity principle not respected | H / L / L |
| Inappropriate roles assigned to actors | H / L / H |
| Lack of coordination among stakeholders | H / H / H |
| Interference between waste management in Tunisia and political decisions | H / L / L |
| No obligation to apply monitoring and control decisions | H / M / L |

10- Authority refers to the actors or entities that have the power and legitimacy to authorize and implement changes. This assessment of authority is inherently dynamic (and not necessarily fixed) due to potential institutional and political changes during the PDIA process, which could alter the measurement of this parameter.

11- Acceptability refers to the willingness and support of various stakeholders to embrace change: individuals who will be affected (or impacted) by a particular cause or sub-cause of the problem and its solutions. These stakeholders can be either inside or outside the system, within or outside the government. This means that, in some cases, they may also overlap with the authority figures responsible for authorizing change.

12- Ability refers to the ability of the PDIA team and stakeholders to effectively implement the proposed changes. This involves assessing whether the necessary skills, resources, infrastructure, time and institutional arrangements are in place or can be developed to support the desired changes.

13- By assigning each parameter an evaluation that varies according to its degree: High, Medium, or Low.

| | |
|---|---|
| **C2- Deteriorating environmental awareness** | |
| Penalties are minimal and inadequately enforced | H / M / H |
| Education programs do not promote environmental stewardship | H / H / H |
| Education programs do not promote environmental stewardship | H / H / M |
| Loss of environmental reflexes | L / L / L |
| Lack of Civil Society and citizen participation in the waste management process | H / H / M |
| Poor social integration of waste management initiatives | H / M / L |
| **C3- Inappropriate legal framework** | |
| Unpromulgated decrees | H / H / H |
| Current legal texts do not adequately address contemporary waste management challenges and have not been revised | H / M / M |
| Fragmented legal texts | H / H / M |
| Contradictions between certain legal texts | H / H / M |
| The models and approaches being adopted do not fit the Tunisian context | M / M / L |
| **C4- Program implementation fails to achieve expected results and objectives** | |
| Dispersion of assessment tasks among multiple stakeholders | H / M / M |
| Unrealistic and impractical planning | H / M / M |
| Lack of reliable waste data | H / H / M |
| Insufficient recognition and promotion of achievements | M / M / M |
| **C5-Mismatch between needs and resources** | |
| Insufficient financial resources | H / M / H |
| Inadequate fees relative to urban cleanliness costs | H / M / H |
| Lack of sector attractiveness | H / H / H |
| Insufficient human resources | H / M / H |
| Insufficient equipment | H / M / H |
| Failure of waste management financing mechanisms to meet needs | H / H / H |

A statistical analysis of this table reveals the distribution of the various levels of analysis (H/M/L) across the 25 sub-causes examined in the assessment of the space for change:

**Sub-Cause Prioritization Table Based on 3A Analysis**
**(From 1 to 4: with 1 indicating the greatest potential for favorable change and 4 indicating the least.)**

| | H= High | M= Middle | L= Low | Total |
|---|---|---|---|---|
| Authority | 24/27 | 02/27 | 01/27 | 27/27 |
| Acceptance | 11/27 | 12/27 | 04/27 | 27/27 |
| Ability | 12/27 | 09/27 | 06/27 | 27/27 |
| **Total** | 47/81 (58%) | 09/27 (28%) | 11/81 (14%) | 81/81 |

Having excluded the sub-cause "Unpromulgated decrees" from Cause 03, as it fell solely under the jurisdiction of the authorities, the team ended up giving priority to 4 out of the 5 sub-causes that received a "Triple H" rating, based on the results of the "Triple A" analysis. They, then, prioritized these 4 sub-causes according to the potential for favorable change, as determined through a voting process among its members, summarized in the table below:

| | Triple Aanalysis : PDIA TEAM Autheité/ Acceptabilité / Capxité | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lack of coordination among the various stakeholders | **G / G / G-** | 2 | 2 | 2 | 1 | 2 | 3 | 2 | 1 | 1 | 17 | 1 |
| Education programs do not value environmental initiatives | **G / G / G-** | 3 | 3 | 1 | 2 | 3 | 1 | 3 | 4 | 3 | 23 | 3 |
| The sector is not attractive | **G / G / G** | 4 | 4 | 3 | 4 | 4 | 2 | 4 | 2 | 4 | 31 | 4 |
| Failure of waste management financing mechanisms to meet needs | **G / G / G** | 1 | 1 | 4 | 3 | 1 | 4 | 1 | 3 | 1 | 19 | 2 |

An examination of the voting results indicates that the first item in the table, "Lack of Coordination" (from Cause C 01), was not selected as the top priority, despite its leading position in terms of favorable change potential. Conversely, the fourth item, "Failure of waste management financing mechanisms to meet needs" (from Cause C 05), although not the highest ranked in the Triple A analysis, was ultimately deemed by the team to represent the most viable entry point for swift implementation. This decision stemmed from extensive discussions, where team members recognized that the opportunities for success with this entry point were greater, making theoretical gains more readily attainable.

This assessment, while appearing counterintuitive at first glance, may be explained by the fact that the top-ranked entry point necessitated the involvement of multiple stakeholders and the fulfillment of several conditions, likely rendering it more time-consuming and less reliant on the team's immediate capacity. In contrast, the entry point selected as a priority was more accessible, allowing the team to begin taking action and experimenting with small-scale solutions that could be implemented quickly, within the relatively short timeframe (06 months) given to them, with a view to solving (in line with the PDIA approach) at least part, however small, of the complex problem, such as the one they ended up selecting[14].

The challenge faced by the team was arduous, especially because they lacked clear scientific methods or precise parameters for determining which entry points exhibited high 3A scores. Evaluating these options proved difficult, and making decisions was even more challenging. In fact, assessing the priority or "critical or accessible" nature of an entry point was a tough task. Thereby, the team opted for a strategic shift after thorough deliberation. They concluded that the sector attractiveness could be enhanced in the medium to long term, while the financing mechanisms for waste management considered inadequate (at the time of the analysis) could be developed to better meet needs. The team of experts, many of whom were officially designated representatives from their respective administrations, had the capability to motivate both centralized and decentralized managers to act on these mechanisms, making them relevant and appropriate. By doing so, they aimed to make the sector more appealing, thus addressing, at least partially, Cause C 05 by bridging the "mismatch between needs (reducing waste for

14- Complex problems generally require such a strategy (according to the PDIA approach), because the strategy itself is more critical than the solution. The central and crucial question that repeatedly arises within different PDIA teams is "how should they organize the work (and especially, where should they start?) given that many political efforts crash, because they either fail to start or start poorly, due to the complexity of the challenge." For more on this, see Matt ANDREWS, Finding Entry Points and Sequencing Adaptive Work: Structuring an Adaptive Implementation Process, a constructed narrative to teach about adaptive methods, based on and to be used with the case An Adaptive Recycling Policy, Case study, Harvard Kennedy School, Building State Capability (BSC), 2024. Blueville-Case-3_Final-25a920db4dd435db.pdf (bpb-us-e1.wpmucdn.com)

improved cleanliness) and means (adequate financial mechanisms)."

Upon their identification, the team started addressing the 4 priority entry points simultaneously. However, this did not imply overlooking the rest of the Ishikawa Diagram, as the team planned to revisit other entry points in a subsequent phase (the 2nd focus). Indeed, this strategy unfolded as they continued to seek additional entry points. Once the team finalized its priorities, they entered a reflective phase, exploring potential solutions. This progress invigorated and inspired them, as identifying these entry points felt akin to "finding a key to unlock the door between policy diagnosis and action."

## 6- Seeking solutions with regards to entry points into space design

This phase focuses on exploring the design space in order to identify potential, realistic and feasible solutions for initial implementation. Before diving into this phase, the team received training on the design space from the facilitators, as this topic was complex and critical to the overall process. The exploration was guided by two primary themes,[15] enabling the team to differentiate the specific characteristics of effective potential solutions and classify them according to a defined typology. The exploratory field of possible solutions comprises 4 types: existing or current practices,[16] latent practices,[17] best practices[18] and positive deviations.[19]

Having acquired a thorough understanding of each type of solution, the team moved forward to identify, explore, implement and evaluate various solutions. The objective was to learn from the strengths and weaknesses of each approach, ultimately aiming to develop a hybrid solution that integrates the most effective elements of both best practices and positive deviations. Drawing from the successes of diverse ideas, the team generated solutions that were quick to implement, concrete, relatively low-cost and adaptable, based on the context and the evolving nature of the Triple A.

For the team, the true challenge of the "design space" lies not in the abundance of potential solutions (this diversity is a source of richness and choice), but in the uncertainty surrounding the best approach. No one possesses an ultimate solution and the right answer remains unknown. The team can draw inspiration from the 4 categories of solutions, iteratively improving upon one to assess its effectiveness.

The team's aspiration was to identify a small, targeted and highly practical solution (empirical in nature) that is easily implementable, relevant and ideally innovative. These solutions should deliver quick, operational, and visible impacts, motivating both the PDIA team and authorities to persist in addressing other solutions related to sub-causes. This approach would gradually expand the coverage of the fishbone analysis, addressing multiple root causes in the process.

However, the team encountered a significant challenge when their initial, fairly ambitious analysis of the space for change (which included an overestimation of "high" scores, especially in the Authority aspect of the Triple A analysis, 47 out of 81 times) appeared to be flawed. This became evident as only a small number of priority sub-causes were identified as suitable for actionable solutions. Additionally, several team members consistently raised concerns about the difficulty of implementing certain solutions, particularly those tied to multiple sub-causes. These difficulties were primarily due to a lower-than-anticipated level of authority (which did not align with the assessment outlined in the Triple A summary table). Some team members noted that it was challenging, if not impossible, to move forward with specific solutions due to a lack of commitment from the authorities. For instance, proposed solutions linked to institutional aspects of the legal framework proved difficult to implement because the Ministry of Environment had decided to defer these matters to a future amendment of the new Environmental Code, pending its adoption and enforcement. This effectively

15- This refers to the administrative and political feasibility of the solutions in the targeted context and their technical capacity to effectively address the problem

16- Existing approaches, policies, or methods that are known and implemented to address a particular problem within the local context.

17- Potential innovative ideas or approaches (not yet common) and possible government capabilities within the context that require special attention to emerge and are not yet widely known or recognized, despite their potential to effectively address the problem.

18- Good or best external practices referring to effective approaches or methods widely recognized as such for addressing the issue in question, provided they are properly translated into the relevant context.

19- Ideas that have already been implemented in the context of change and yielded positive results, without being the norm (hence the notion of deviation).

meant that the institutional aspect (captured in the fishbone analysis) was not a priority for the Ministry, and thus lacked the necessary authority for immediate action.

Given this fluctuating dynamic in the Triple A assessment, and after hours of intense individual and collective reflection, the team finally began considering what adjustments could improve or address the selected sub-causes tied to the identified priority entry points:

### A- Point of entry: Lack of coordination among stakeholders

In this exercise, the team focused on developing alternative coordination structures aimed at enhancing both technical and decision-making efficiency. The key considerations are presented in the table below, with negative aspects highlighted in red and positive aspects in green:

| | Regulated | Scope/activity | Notice |
|---|---|---|---|
| Ad-hoc committee | Yes | Central and regional<br>Accelerates decision-making | Effective in the presence of decision-makers + follow-up |
| Crisis Management Committee | No | Punctual in time and space | Lack of experience capitalization |
| Monitoring and coordination committee (at the start of operation) | Yes | Regional<br>• Municipality<br>• ANGED<br>• Local authority | Without procedure<br>Never functional |
| Regional cleanliness commission | Yes | Occasional action | Lack of continuity<br>Limited effectiveness<br>Topics are too vague |
| Occasional meetings | No | Informal, improvised.<br>No attendance requirement | If they Sign minutes: decision<br>Sometimes there is No minutes |
| Ministerial Council | Yes | Transverse<br>Presidency of the government + ministries | Effective in filling gaps |
| COPIL | Yes | Good organization / Obligation of presence<br>Pointed Technical and specific aspect for a project | Does not replace regulations |
| Special, specific, isolated initiatives (Pilot project within the framework of international cooperation) | Yes | Limited in time and space<br>Random | Doesn't align with strategy and national framework |

The team ultimately identified a list of existing practices for the first entry point and proposed various solutions: creation of a coordinating body; establishment of a high authority for integrated waste management; development of coordination mechanism standards; establishment of a national coordination agency; stakeholder restructuring; and establishment of a national coordination commission made up of key decision-makers.

### B- Entry point: Inadequate waste management financing mechanisms

| |
|---|
| **Sub sub-cause:** Low local tax collection rate (<= 20%) |
| **Sub sub-cause:** Insufficient local tax level |
| **Sub sub-cause:** Lack of data for cost structure calculations |
| **Sub sub-cause:** Insufficient data for accurate cost structure analysis |
| **Failure to enforce:** the "Polluter Pays" principle at the local level |

On this item, a range of solutions has been proposed, including: the separation of collection cycles for commercial and household waste, the updating of the database for waste-generating companies, and the precise calculation of the actual costs associated with waste management.

| |
|---|
| **Sub sub-cause:** Underestimation of costs |
| **Sub sub-cause:** Internal waste transfer (post-collection phase) |

### C- Entry point: Link between municipal services and payment of municipal taxes

Proposed solutions for enhancing service provision in exchange for municipal tax payments include: implementing electronic payment options for certain municipal taxes; developing a mobile application for waste sorting; creating apps to locate collection points; and launching initiatives to raise awareness and encourage community participation.

| |
|---|
| **Sub sub-cause:** Remote electronic payment options for certain taxes. |
| **Sub sub-cause:** Collaboration with the private sector to develop a mobile app that facilitates waste sorting during collection. |
| **Sub sub-cause:** Apps designed to locate collection points and raise awareness while encouraging community participation. |

It was therefore necessary to reassess the space for changethrough a more realistic Triple A analysis. The PDIA approach emphasizes that if the team fails to identify a space for change for certain sub-causes, the authority index might improve in a few months, allowing the team to achieve "small victories." To enhance the chances of implementing specific solutions, the team, in consultation with the decision-makers, needed to consider how to better establish authority.

## 7- Building authority: A prerequisite for implementing solutions

It was imperative (as dictated by the PDIA approach) and critical to the team's success that they carefully strategize the involvement of the authority before implementing the selected solutions, positioning it as a partner, or even a leader, in the proposed initiatives. No decision can be made without prior approval from the relevant authorities, whether primary or secondary. Building and consistently seeking to consolidate or strengthen authority (an ongoing endeavor) is crucial for ensuring potential acceptance and greater involvement from the authorities, thereby increasing the likelihood of implementing the proposed solutions.

The aim is not to seek immediate endorsement of the proposed solutions (which need not be flawless, as they will inevitably undergo further discussion and refinement). Instead, the team should practice patience and acceptance (as encouraged by the PDIA approach), allowing for small victories in the initial stages. This approach will facilitate buy-in from decision-makers after assessing the feasibility of solutions in complementary areas, thereby

contributing incrementally to the overall resolution of the problem. Their exponential confidence in the process will automatically elevate the authority index, motivating them to engage more deeply, particularly after evaluating the outcomes of the first experiment. This significantly reduces the risk of opposition to the solutions adopted by the authorities and enhances their likelihood of appropriation. The solution itself should not present an obstacle; rather, the true challenge lies in achieving these "small wins."

The team thus needed to work diligently to achieve an almost perfect alignment between the analysis of the space for change (particularly its "authority" component) and the actual involvement and commitment of that authority in the process of designing and implementing the proposed solutions. In this regard, the team had successfully convinced and collaborated with the managers they engaged with, recognizing the project's significance and its genuine potential for success. Most managers praised the team's initiative and efforts, pledging their support for the project[20].

Moreover, during the second Consortium, after a rich and constructive debate across various workshops, a number of solutions proposed by the team were discussed, evaluated, and enriched by participants. It became apparent that some of these solutions could potentially be implemented (albeit at varying rates over time) relatively quickly and adaptable to the national context, as well as regional and even local levels. Several participants expressed, to varying degrees, their desire and willingness to engage in this process of "small, concrete achievements" that would enable gradual, yet steady progress.

Notably, the Secretary General of the Municipality of Sidi Bou Saïd showed openness to immediate implementation.

## 8- Implementation of solutions, lessons learned and potential iterations

Having completed the first and second phases of the PDIA process (problem construction and root cause deconstruction into sub-causes), the PDIA team moved on to the third stage: sequencing the sub-causes through an analysis of the space for change (and its 3A framework) to determine whether the environment was favorable for changes at certain entry points. The team, then, shifted its focus to exploring the "design space," aiming to identify various potential solutions (both internal and external) that could inspire the proposed interventions, while also working to build the necessary authority for implementation.

With this groundwork laid, the team was ready to iterate and test the implementation of the proposed solutions. They began with a first batch of prioritized, feasible solutions (first focal point) (a), while keeping additional solutions in view for a second focal point (b).

20- In this regard, the following meetings with influential decision-makers can be mentioned as indicative:

1- Meeting with the Minister of Environment on May 5, 2023, at the Ministry's headquarters in Tunis. In addition to her comments on the fishbone diagram, she confirmed her interest in the project and her willingness to contribute to the development and application of a strategy in collaboration with the team, considering its work complementary to that of the Ministry, particularly regarding the implementation of certain solutions. The Minister also expressed openness to all proposals made by the team, especially concerning the draft of the new environmental code.

2- Meeting with the Advisor to the Head of Government on May 18, 2023, at the Presidential Palace, which accelerated the authority's process by involving the Presidency of the Government, notably through the appointment of a representative from the Presidency.

3- Meeting with the Secretary-General and Manager of Affairs of the Municipality of Sidi Bou Saïd on July 12, 2023, at the Sidi Bou Saïd municipal headquarters.

4- Meeting with the President of the General Authority for Decentralization and Process Support (an entity affiliated with the Ministry of the Interior responsible for overseeing municipalities) on October 10, 2023, at the authority's headquarters in Tunis. In addition to appointing a representative from the authority to the PDIA team, the official expressed strong support for the approach and work carried out by the team and endorsed the initiation of the implementation of certain solutions, focusing particularly on the actions taken with the Municipality of Sidi Bou Saïd.

5- Various workshops were organized by Solidar, bringing together all stakeholders, particularly the authorities, with significant contributions from team members in organizing, presenting, and facilitating discussions, as well as meeting with various authorizers. These workshops served as an opportunity to propose ideas and seek their feedback and acceptance within the framework of "Building Authority."

### → A Priority solutions currently being implemented (First focal point)

To avoid potential reluctance on the part of certain authorities, some team members suggested focusing on a sub-cause where the proposed solutions would not conflict with the interests of specific ministries.

As a result, the team began working on several priority actions aimed at addressing multiple sub-causes. The first solution focused on waste management in establishments open to the public (EOP) within the municipality of Sidi Bou Saïd. The second addressed improvements to the municipal information system (data management), while the final solution tackled several aspects related to the new draft environmental code.

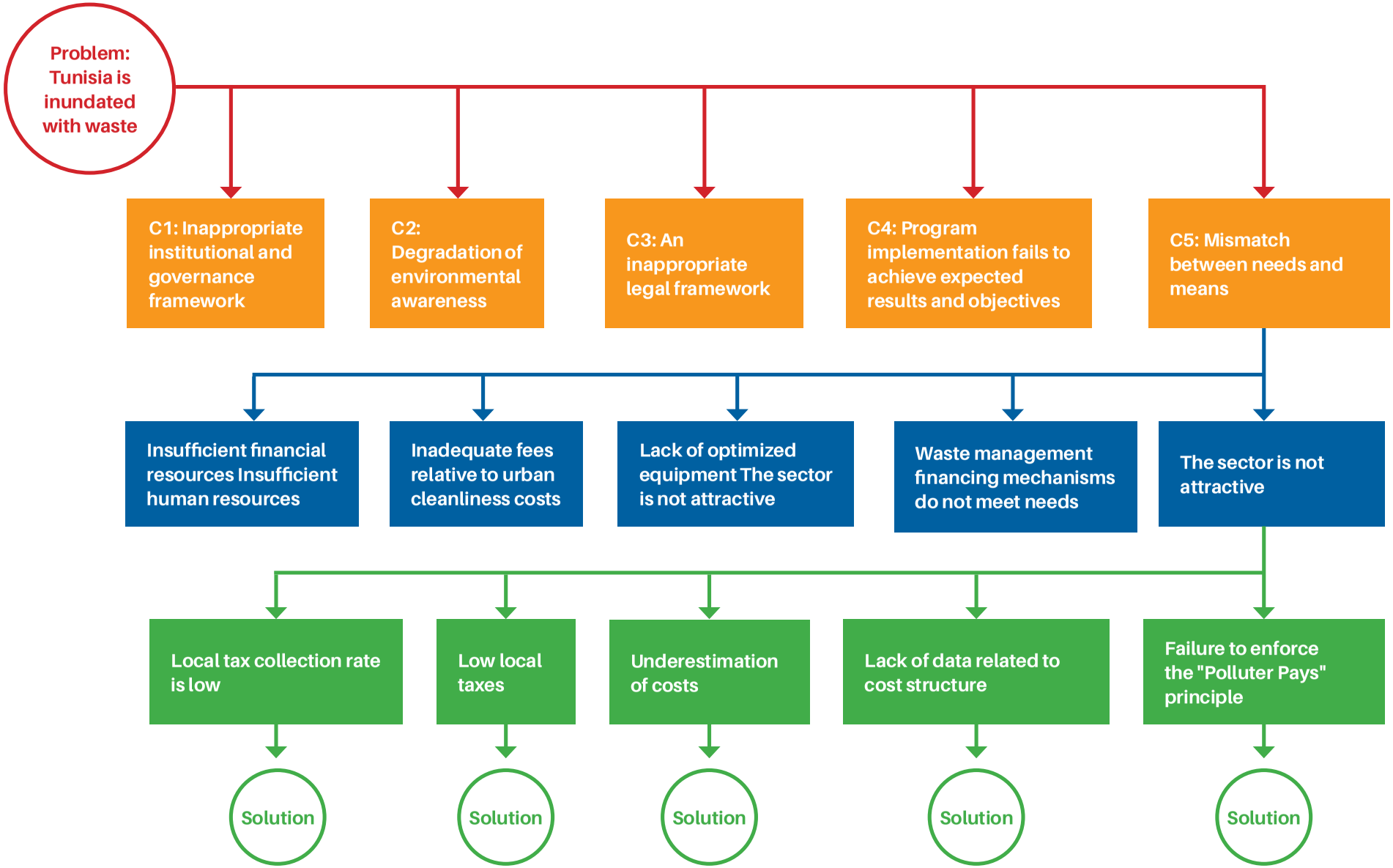
# SBS's initiative as a first implementation

This initial iteration warrants a detailed description of its general framework (or foundation) before delving into its content, the process involved, the arguments put forth, the preparation and implementation phases and any necessary reframing. It is also essential to explain the reasoning behind extending the proposed solution beyond the municipality of Sidi Bou Saïd to explore its potential for broader application.

## 1- Basis of the Sidi Bou Saïd action proposal, subject of first iteration

The proposed solution for this iteration is methodologically integrated into Cause 05 (C5) of the fishbone, which addresses the "Mismatch between needs and means." More specifically, it focuses on sub-cause 6, "Failure of waste management financing mechanisms to meet needs", particularly sub sub-causes 3 and 6, related to the "Inadequate fees relative to urban cleanliness costs" and "Failure of waste management financing mechanisms to meet needs." Additionally, it encompasses sub-cause 6.5 "Failure to enforce the "Polluter Pays" principle", and sub-cause 6.3, "Underestimation of costs." The goal is to transform the current polluter (who either does not pay or pays minimally) into a true polluter-payer by ensuring that charges reflect real costs, calculated based on appropriate parameters to avoid the current underestimation of expenses. Thus, the content of the solution to be iterated will center on this objective.

Phase 4 :Exploration of possible solutions concerning a single sub-cause



## 2- Foundational substance of the proposed solution for Sidi Bou Saïd, covered by the first iteration

The process for the Sidi Bou Saïd (SBS) solution was initiated in an open and collaborative manner during the 2nd Waste Management Consortium Workshop organized by Solidar Tunisie on June 19, 2023, in Tunis. The event saw the participation of all key stakeholders, including representatives from influential authorities.

### A- Solutions proposed by the team and presented to participants before the workshops

The team members had explored various potential problem-solving actions, grounded in the previously analyzed space for change (3A). Before the Consortium workshops, they presented concrete proposals to the participants, identifying those they deemed priorities (as part of the first focal point). These proposals rested upon pilot projects already implemented or best practices evaluated, in alignment with the PDIA approach, specifically in its fourth phase focused on the design of the space for change.

#### Updating the database of public utilities producing waste

- List all the types of EOP (shopkeepers / restaurants / university / craft workshops, etc.) within the municipal perimeter;
- Determine the amount of waste produced by the EOP;
- List waste according to their types;
- Measure the frequency of waste production (in order to adapt collection routes).

#### Separating commercial and household waste collection routes

- Allocate dedicated human and material resources to separate waste collection routes (The success of separate waste routes in Tunis, serving as a positive exception, is a model that can be emulated).
- Adjust waste collection times to accommodate the needs of specific producers (the experience of the town of La Goulette for restaurants is a good example in this context).
- Remove public bins from commercial streets: The removal of voluntary bins on busy streets (as successfully implemented in Tunis's rue de Marseille) can reduce clutter and promote cleaner public spaces.
- Require merchants to provide their own waste bins (some municipalities are facing challenges in doing so).
- Mandate that merchants sort waste at the source (drawing inspiration from the French decrees (5 flux in 2016, 8 flux in 2021) and Sousse's efforts in the old town).
- Encourage source sorting by offering reduced fees for pre-sorted recyclable waste collection.

#### Calculating the actual cost of waste management

- Support municipalities in cost accounting by implementing a cost calculation software and providing training for staff in this area.

Following the discussions in workshops 3 and 5, the team received several comments from participants that were deemed particularly valuable and worthy of further consideration.

### B- Data collected by the team during the workshops

Based on the sub-causes identified in the fishbone analysis, five workshops were organized:

**Group 1:** Low local taxes

**Group 2:** Lack of data relating to cost structure

**Group 3:** Underestimation of costs

**Group 4:** Low rate of collection of local taxes

**Group5:** Failure to enforce the "Polluter Pays" principle, accompanied by a case study on "Positive Deviance" related to the Municipality of Sidi Bou Saïd.

### C- Comments made by the Workshop Teams regarding the proposed solutions

Solutions proposed by the working groups were as follows:

#### For group 3: Underestimation of costs

- Conduct a survey of commercial establishments in the city by the cleanliness department officers.

- Determine the quantities of waste actually produced by commercial establishments.
- Calculate the actual cost of waste management for these establishments.
- Set up a tool to identify the true costs of commercial waste management.
- Digitize the above operations.
- Remove voluntary containers from commercial streets and require traders to provide their own waste containers.
- Implement a comprehensive cost assessment matrix that encompasses collection, transport, treatment, recovery operations, as well as environmental costs and failures.
- Perform a comparative study of various household waste management systems, focusing on technical aspects, financing mechanisms, governance, etc.

These actions encompass a range of solutions with technical, infrastructural, statistical, mathematical, and technological dimensions, which appear to be feasible for implementation (at least for some of them).

For Group 5: Positive Deviance 'Municipality of Sidi Bou Saïd' (waste collection agreement)

- Update the database of waste producers within economic activities to ensure accurate tracking.
- Monitor waste production for each business or income-generating activity.
- Revise the waste collection agreement to align with waste production and to ensure that the payment is proportional to the amount of waste generated.

## D- The municipality of SBS's voluntary expression of official interest in most of the solutions proposed by the team

In response to the solutions proposed by the PDIA team during the consortium and the subsequent work of Group 3, which focused on the sub-cause of "underestimation of costs," as well as Group 5, the Secretary General responsible for managing the affairs of Sidi Bou Saïd municipality expressed interest in the alternatives presented. He proposed the immediate implementation of a solution that had already been tested by the municipality as a "positive deviation," albeit in need of updates.

This official initiative has elevated the commitment level of the local authority to the SBS initiative, significantly increasing its chances of success. This aligns seamlessly with the PDIA approach, which emphasizes the importance of support from authorities for the proposals made by the PDIA team.

According to the same official:

- It is essential for the municipality to calculate the shortfall between the actual costs of services provided by its agents and the amounts paid by the establishments open to the public (EOP). There is a considerable discrepancy between the actual waste collection and the false declarations made by these establishments (with hotels being the sole exception due to their exemption system).
- It is advantageous for the municipality to transition to double-entry accounting, a stepping stone toward analytical accounting, which is essential fora rigorous analysis of real collection costs, by taking into account all the variables and constants.
- It would be prudent for public authorities to implement differentiated pricing for waste collection, depending on whether or not the waste is sorted.
- These authorities should also adjust the charges based on seasonal variations.
- The EOP emphasized that it is high time stakeholders optimized the waste cycle towards a circular economy, particularly given the municipality's current mismanagement of waste issues.

The team seized the opportunity to evaluate the results of the consortium with a view to initial implementation.

## E- Evaluation of the proposed solutions introduced and discussed during the 2nd consortium meeting.

The team recognized that these solutions were overly broad and resolved to refine them further.

Additionally, the PDIA team emphasized the significance of capitalizing on the institutional opportunity presented by the Sidi Bou Said municipality to initiate the implementation of several proposed solutions from the consortium workshops. To facilitate this, a preliminary draft action plan was created and presented for discussion and validation at

a scheduled meeting with municipal officials, held at the SBS municipality headquarters on July 12, 2023.

The action plan encompasses the following points:

- An assessment of the existing waste collection system for EOPs, including human resources, equipment, collection routes, and the calculation of current actual waste collection costs.
- An inventory and an update of the list of waste producers among EOPs.
- A characterization of the types of waste generated by these establishments.
- A design of a new selective collection system incorporating source sorting for merchants.
- A revision of the costs associated with the collection and treatment of waste produced by EOPs.

| Proposed solutions for implementation | Actions | Objectives | Results + Performance indicators | Responsible person(s) + respective roles and tasks | Other stakeholders + influences | Start | End | Execution rate | Means Required Budget/ Human resources/ Equipment |
|---|---|---|---|---|---|---|---|---|---|
| 1. Assessment of the current household and similar waste collection system | 1.1 | | | | | | | | |
| | 1.2 | | | | | | | | |
| 2. Census of producers of waste similar to household refuse and update of the current list | 2.1 | | | | | | | | |
| | 2.2 | | | | | | | | |
| 3. Characterization of the deposit of waste similar to household waste | 3.1 | | | | | | | | |
| | 3.2 | | | | | | | | |
| 4. Modeling of a new selective collection system with sorting at source for merchants and restaurants | 4.1 | | | | | | | | |
| | 4.2 | | | | | | | | |
| 5. Update of collection and treatment costs of waste similar to household refuse | 5.1 | | | | | | | | |

To enhance the likelihood of successfully implementing specific solutions, a comprehensive set of actions was planned for this iteration.

### → Stages of the proposed solution for Sidi Bou Saïd in the initial iteration

The process would be structured into three phases: the first being an analytical phase, followed by a modelling phase, and finally, an optimization phase.

#### The analytical phase

The process starts with an initial analytical phase that aims to assess the current system for collecting waste from merchants. This includes examining key indicators, such as human resources, equipment, collection routes, and calculating the actual costs of waste collection.

The first step of the analysis is to conduct a thorough inventory of EOPs, led by the Waste Management Department staff at the Municipality of Sidi Bou Saïd, and update the database of waste producers.

This stage will lay the groundwork for the team to measure and analyze the actual quantities of waste produced by these establishments to accurately determine the true costs of waste management.

#### The modelling phase

The second phase would focus on developing a new selective waste collection system with source separation for commercial entities, ultimately leading to an overhaul of waste collection and treatment costs. This recalibration would involve revising or establishing waste management agreements based on the actual waste production volume. Fees would be proportionate to the amount of waste generated, distinguishing between those entities that sort their waste and those that do not.

It is crucial to highlight that article 93 of Law No. 97-11, dated 3 February 1997, enacting the local taxation code[21], provides that public enterprises should remit fees for waste removal to the municipality. The article stipulates: "The rate of charges for the removal of non-household waste, as referenced in paragraph 4 of article 91 of this code (concerning waste removal from commercial, industrial, or professional establishments, where the recipient of the service is liable), is determined by the local authority, subject to approval by the supervising body." An annual agreement should be concluded between the beneficiaries of the service and the local authority, in accordance with the prevailing regulations governing hazardous waste management. Non-compliance with this obligation could result in the municipality refusing to collect their waste, potentially incurring additional tax penalties.

According to municipal officials at Sidi Bou Saïd, the primary task is to update these agreements, revising current data and rectifying any information gaps.

This revision would be governed by the rule of differentiation. To accommodate varying degrees of commitment to selective sorting among commercial entities, the municipal manager suggested the creation of two distinct types of agreements: one for establishments that voluntarily implement selective sorting, thereby benefiting from reduced charges; and another for those opting out of sorting, who would be subject to higher fees.

#### The optimization phase

If the process proves successful in the initial two phases, the third phase would focus on optimizing waste management by promoting a circular economy, made feasible through the widespread adoption of selective sorting at the source. The municipality of Sidi Bou Saïd can look to several "positive deviances" for inspiration in this regard.

According to the team, this three-phase approach is well justified, given the numerous advantages it could yield.

## 3- The case for the Sidi Bou Saïd initiative

This imperative for justification enables the assessment of the potential impact of the initiative and its relationship to the overarching problem identified at the outset. How do these solutions contribute to mitigating waste and alleviating Tunisia's waste crisis?

The team expressed confidence in the proposed solution's potential to positively influence change in public policy on household and similar waste management.

21- Local Taxation Code enacted by Law No. 97-11 of February 3, 1997, as amended or supplemented by subsequent texts, particularly Law No. 2015-53 of December 25, 2015, concerning the finance law for the year 2016, especially Article 92.

The proposed solution adopts a holistic approach, addressing multiple sub-causes of the waste management dilemma (perfectly aligning with the logic of priority focal points derived from the PDIA approach). In so doing, it aspires to indirectly resolve a significant portion of the initial challenge.

The proposed solution takes a comprehensive approach, addressing multiple sub-causes of the waste management issue, which aligns well with the logic of priority focal points derived from the PDIA approach. In doing so, it seeks to indirectly address a substantial portion of the initial problem.

### Advantages for the municipality (ies)

#### + Financial advantages

- Reduction of waste management (and collection expenses): This reduction will be contingent upon the volume of waste produced and the amount sorted. Therefore, waste measurement and characterization processes are crucial to optimizing management practices.
- The municipality's financial resources are likely to increase following the revision of agreements to reflect actual costs, and after quantifying and characterizing the waste (in line with commitments made by the EOPs).

#### + Environmental advantages

- Establishment of separate collection circuits (household/EOP).
- Reduction of glass waste: Glass, which is highly polluting due to its long environmental persistence, can be reduced, as it has a high market value and attracts buyers (such as rag pickers or "berbechas" in Tunisian dialect)..
- Through selective sorting, there is potential to reduce not only the total amount of waste but also the volume of transported assimilated waste (leaving a smaller residue after sorting).

The municipality of Sidi Bou Saïd has pledged to sustain the process beyond the current project with Solidar, marking a significant achievement in public policy.

### Advantages for local residents and citizens

#### + Service delivery

- Enhanced public services delivered by the municipality to its residents through an increased budget, achieved by conducting a comprehensive census EOPs and revising their agreements.

#### + Environmental advantages

- Reduction of street waste through the adoption of a circular economy. Following selective sorting, waste will acquire value, facilitating its collection and integration into this new approach (which has been set as a strategic priority by the Tunisian government as part of a new public policy on the environment, outlined in the draft of the new Environmental Code, along with the draft decree on selective sorting, both currently under preparation).

#### + Behavioral advantages

- Positive influence on citizen behavior, as they would in turn advocate for the adoption of selective sorting at the source for household waste.

### Advantages for other stakeholders

These include waste processing companies, rag pickers and EOPs.

#### + Advantages for companies processing collected waste

These companies will benefit from clean, high-quality waste in substantial quantities, thereby facilitating their processing at a lower cost within the framework of a circular economy. This concept of circular economy aims to encourage these companies to engage in selective sorting practices.

#### + Advantages for rag pickers

Rag pickers will find more abundant and valuable waste, which they will be able to collect in good conditions, preserving their health and dignity, while ensuring a respectable and relatively stable income. In doing so, they will also protect the environment, as they will no longer need to scavenge through garbage bins.

#### + Advantages for EOPs

They will, in turn, benefit from the ability to utilize the sorted waste for their own purposes, paying the municipality an amount that takes into account both high and low seasons relative to their respective activities. The positive outcomes of this approach may lead some of them to generate solely organic waste, thereby alleviating the municipality's waste management burden. The municipality could extend support to those willing to adopt selective sorting, thereby encouraging their participation.

Furthermore, the solution necessitates a close collaboration between the municipality and economic operators, involving the assessment of waste production by each participating establishment. By promoting waste sorting, the municipality would

implement variable tax rates (higher rates for non-compliant establishments and lower ones for those adopting waste sorting practices).

In addition to these arguments, the initiative in Sidi Bou Saïd will undoubtedly be pioneering, marking a first in Tunisia. While there have been previous studies (such as the GIZ study in 2016) that provide comparative data and analyses on the issue, the uniqueness of the PDIA's proposed solution lies in its comprehensive package (census/collection/characterization/determination of actual costs/selection of collection circuits/revision of agreements between traders and the municipality based on seasonal averages) concerning the waste produced by economic operators in a municipality, while aiming to demonstrate through experimentation that waste reduction is indeed achievable.

Despite the potential benefits of this initial programmed iteration, the team conducted a preliminary analysis of the action to thoroughly prepare for its implementation in advance.

## 4- Preparation for the iterative action of Sidi Bou Saïd

### Establishing performance parameters before the implementation of the SBS initiative

In preparation for effectively implementing its action during the pre-implementation phase, the PDIA team decided to conduct a preliminary evaluation of its action through a set of general,[22] global,[23] and technical[24] key performance indicators (KPIs). These various indicators thus allow for measuring the viability of the action undertaken and the likelihood of its success, enabling the team to determine whether to maintain, modify, or adjust the initiative in accordance with the iterative approach of the PDIA approach, which is based on dynamic decision-making informed by the results of each iteration. Moreover, the same indicators established prior to the action will be utilized to evaluate the initiative after its implementation.

### Recruitment of two experts in support of the Sidi Bou Said action team

To ensure the success of the first iteration and to provide the team and the Municipality of Sidi Bou Saïd with technical assistance through a reliable scientific study, the team, in collaboration with Solidar Tunisie, agreed to hire a national expert to diagnose and assess the recyclable fraction of waste generated by the EOP in Sidi Bou Saïd. Subsequently, a second expert would be brought on board to focus on calculating the actual costs. A timeline was established, outlining specific tasks for each expert.

### Working guidelines for the Sidi Bou Saïd action team

To establish optimal conditions for the planned initial iteration, the team, in collaboration with municipal officials and in harmony with the PDIA approach, decided to implement several general guidelines to direct its actions: initiate work on proposed actions that do not necessitate prior state authorization, thereby circumventing any potential delays; ensure that the waste management working group is actively and closely engaged in all facets of the proposed action plan; organize regular follow-up meetings with the Municipality to periodically review the implementation of the action plan; involve the expert in brainstorming sessions to facilitate comprehensive planning; promptly acquire and consolidate the necessary studies for waste characterization (notably, the GIZ study) and data analysis to accelerate the action plan; prioritize feasible actions and consistently (on a monthly basis) monitor the progress of the various key performance indicators mentioned earlier, in collaboration with municipal officials, to evaluate the impact of the implemented solutions on addressing the issue; and ascertain the relevance of these solutions, as well as the necessity for further evaluation, to determine the potential for a new iteration should the results not meet the anticipated objectives during the implementation process.

22- Objectives pursued / adherence to deadlines / start and end of action / execution rate for each task or action, etc.

23- Action visibility, ownership, impact on problem-solving and the daily lives of citizens or the target public, legitimacy, legality, sustainability, capacity to bring about change, and to eradicate or diminish the negative effects of previous solutions, etc.

24- Number of agreements signed / Number of EOPs opting for selective sorting / Reduction in the waste collection budget managed by the Municipality / Additional funds recorded after the revision or signing of agreements, adhering to the "polluter pays" principle / Reduction in the quantities of waste collected with the implementation of selective sorting / etc.

## 5- Implementation of the Sidi Bou Saïd project: Progressing at a relatively acceptable rate

The overall assessment appears largely positive, and the implementation processes are progressing at a commendable pace, with a clear commitment from the team to advance matters in collaboration with all relevant stakeholders. The cooperation between the team and the municipality of Sidi Bou Saïd has shown significant improvement, culminating in an agreement on an action plan comprising 11 initiatives (of which 6 are the sole responsibility of the expert or in collaboration with another party), proposed by the national expert recruited for this purpose.

This promising progress indicates that the project is moving in the right direction. Gradually but steadily, the actions outlined in the action plan are beginning to be implemented. Following the collection and analysis of data conducted by the expert, the focus shifts sequentially to preparing and training municipal agents for the census and sensitization campaigns, followed by the enumeration of merchants, and then the characterization of waste, to accurately identify the real costs of waste collection and the fees to be borne by EOPs. Ultimately, this will lead to the proposal of optimized collection circuits and the communication of a new waste management approach centered on source sorting.

### A- Pre-census training and awareness raising for municipal staff involved in the project

Before undertaking the census of economic operators, it was crucial to first train the municipal agents responsible for this initial action. This training encompassed not only technical aspects (fundamental issues), but also emphasized communication strategies to ensure a seamless census process with the involved establishments.

### B- Census of EOPs in Sidi Bou Saïd

The objective of the census was to update the list of EOPs in Sidi Bou Saïd through a simple questionnaire prepared by the team[25] to collect specific information.[26]

In total, 165 EOPs in Sidi Bou Saïd produce approximately 36,000 liters of waste per day.[27] These establishments are classified into 9 categories, each generating varying quantities of waste, as illustrated in the table below. Among the 165 EOPs, only 65 (representing 39.39%) have agreements with the municipality of Sidi Bou Saïd. Furthermore, 31% of the registered establishments engage in waste sorting.

Statistics indicated that 30% of the waste in Sidi Bou Saïd originates fromEOPs, while the remaining 70% consists of household waste.

Regarding waste distribution, the results showed that approximately two-thirds (70%) of the waste is produced by three main components: fast-food establishments, coffee shops and restaurants and educational institutions.

| Categories of surveyed EOPs | Number | Quantity L/d |
|---|---|---|
| 1- Cafés-restaurants | 27 (16%) | 8680 (24%) |
| 2- Educational institutions | 07 (04%) | 6760 (19%) |

25- Thus avoiding wasting the expert's time and EOPs' reluctance. This simplification was left to the discretion of the expert in collaboration with the Municipality of Sidi Bou Saïd, based on their needs. This decision is beneficial as it adheres to the adaptability principle required by the PDIA approach.

26- Such as those related to: (general information regarding the establishment/address) - (Type of main commercial activity/ scope of activity) - (Types of sorted waste inside the premises: paper, glass, cardboard, plastic, organic, etc. /daily volume of waste in kilograms and liters) - (Collection times) - (challenges, problems, and other suggestions).

27- If we assume a density value of 0.13, the maximum amount of waste reaching 4,680 kg per day seems reasonable when compared to the amount of waste collected on the ground, which is 3,460 kg, given that the schools and the nautical club are closed.

| | | |
|---|---|---|
| 3- Pastry shops | 09 (06%) | 1650 (05%) |
| 4- Service and office equipment | 22 (13%) | 1460 (04%) |
| 5- Small shops | 46 (28%) | 2270 (06%) |
| 6- Hotels and tourist establishments | 10 (06%) | 3560 (10%) |
| University restaurants | 01 (01%) | 1440 (04%) |
| Fast Food | 37 (22%) | 9880 (27%) |
| Pharmacies + health care stores | 06 (04%) | 300 (01%) |
| **Total** | **165** | **36.000** |

The table below is a summary of the survey results from the questionnaires.

| | Before PDIA | After PDIA (As at june 7, 2024) |
|---|---|---|
| Nb of EOPs covered by the survey | 65 | 165 |
| Nb of EOPs with an agreement | 65 | - |
| Convention Revenues/Year in MD | 52.908 | - |
| Quantity of waste generated by EOPs and collected by the municipality T/ day | 4.680 | - |
| Waste collection tax | 40 Millimes/ litre | - |
| Optimized circuit for commercial waste collection | 00 | 1 |
| Nb of EOPs adopting selective sorting | 31 | - |

Upon census completion, the focus shifted to waste characterization, which allowed for the separation of available waste streams by category and the measurement of their respective quantities and volumes. The team emphasized the importance of this step, deciding to conduct two characterizations to account for the seasonality factor.

### 3- Dual qualitative and quantitative waste characterization

Two waste characterizations were carried out: the first during peak season and the second during the off-season, to account for variations in waste volumes when calculating the true cost. The ultimate objective of this dual waste characterization was, among other things, to identify the distinct recyclable waste fractions and their respective quantities, thus assessing the feasibility of potential valorization within the scope of a circular economy. Insignificant waste streams may hinder the successful execution of the aforementioned third phase of optimization.

#### + Initial waste characterization during peak season

The waste characterization process commenced on 07/09/2023 and spanned four days. The municipal official mobilized community agents to gather waste from the surveyed establishments.[28]

The waste characterization revealed that organic waste represented the highest percentage at 52.7%.

28- Study area: Circuit of EOPs. / Sample size: The collected quantity of 3,380 kg was divided into 4 piles. / The selected pile weighs 469.6 kg. / Equipment and materials: Scale, 8x8 m tarpaulin, sorting table, trash bags, shovels and forks, gloves, masks, and boots, 120L bins, and galvanized containers for depositing sorted waste.

Conversely, the volume of collected cans was the smallest among the various types of waste, constituting only 1.59%, as detailed in the table below.

| Sorted fractions [29] | Weight ( Kg ) | % |
|---|---|---|
| Putrescibles (organic waste) | 247,5 | 52,7 |
| Cardboard | 20 | 4,25 |
| Textile | 11,5 | 2,44 |
| Composites (yoghurt pots, tetra packs, etc.) | 14,5 | 3,11 |
| Plastic packaging +Sachets, etc. | 36,2 | 7,7 |
| Plastic film for packaging | 31 | 6,6 |
| Glass | 25,5 | 5,49 |
| Tin cans | 19,5 | 4,15 |
| P.E.T (Plastic bottles) | 37 | 7,87 |
| HDPE (High Density Polyethylene) | 10,5 | 2,23 |
| Cans | 7,5 | 1,59 |
| Paper | 8 | 1,7 |

Following the initial waste characterization, the expert executed a subsequent analysis during the off-season. This additional assessment was not originally anticipated but was deemed imperative by the team and other stakeholders, subsequently leading to its logical integration into the action plan.

- Second waste characterization during the off-season

This second characterization, conducted on 11/10/2023, proved crucial for ensuring that the calculation of real costs was genuinely reflective of reality by taking seasonality into account. This involved acknowledging the regression of commercial activity or similar enterprises during the low season, consequently leading to a reduction in the volume of waste produced. The comparison of figures between the two characterizations would serve for calculating an arithmetic mean, resulting in a final characterization that reconciled both seasons. To deepen the analyses from the first characterization and gather supplementary behavioral and cultural insights, a questionnaire was crafted for the purposes of the second characterization, aiming to ascertain, among other factors, the motivations driving traders and other establishments to engage in waste sorting.[30]

The survey conducted during this second characterization focused on three parameters:

- The collectors of recyclable waste (Municipality + Berbechas: 43% / Rag pickers: 22% / Municipal workers: 22% / Internal workers: 8% / Private sector: 5%);
- La répartition des E.O.P. par ancienneté (2 ans et plus 33 % / Entre 1 et 2 ans 51% / Moins d'un an 16%) ;
- The distribution of EOPs by seniority (2 years and older: 33% / Between 1 and 2 years: 51% / Less than a year: 16%);
- The distribution of EOPs by category (Cafés: 33% / Restaurants: 19% / Educational institutions: 5% / Healthcare establishments: 5% / Hotels: 03% / Miscellaneous: 35%).

29- One of the team members suggested adding another column for household waste.

30- This second questionnaire contains four questions: 1) How long have you been sorting? 2) Why do you do it? 3) Who is responsible for sorting in your establishment? 4) Who collects your sorted waste? Aimed at obtaining details regarding the results of this second questionnaire covering 38 EOPs.

The analysis of the data collected during both characterizations yielded the following overall results, based on the quantity distribution criterion: ⋆ Quantity of waste from EOPs amounting to 3,460 kg, representing a rate of 37.52%; ⋆ Total quantity of waste in the SBS municipality is approximately 9,220 kg, accounting for 62.48%; ⋆ The percentage of waste from EOPs represents 35.73% of this waste, which consists of sellable recyclable materials amounting to 1,298 t; ⋆ The density is around 0.13.

The juxtaposition of the results from the two characterizations culminated in the following summary table and diagram pertinent to the final characterization:

| Sorted fractions | Weight | 2nd Characterization | 1st Characterization | Average |
|---|---|---|---|---|
| Putrescibles (organic waste) | 171,5 | 51 | 52,7 | 51,85 |
| Bread | 8 | 2,37 | 0 | 1,185 |
| Cardboard | 13 | 3,86 | 4,25 | 4,055 |
| Textile | 7 | 2 | 2,5 | 2,25 |
| Composites (yoghurt pots, tetrapacks, etc.) | 12,5 | 3,7 | 3,13 | 3,415 |
| Plastic (packaging film and bags) | 46,5 | 14 | 14,26 | 14,13 |
| Glass | 7,5 | 2,22 | 5,43 | 3,825 |
| Metal (cans, etc.) | 9 | 2,67 | 4,15 | 3,41 |
| Paper + Light soiled cardboard | 35,5 | 10,5 | 1,7 | 6,1 |
| Cans | 3,5 | 1 | 1,59 | 1,295 |
| Wood | 0 | 0 | 0,19 | 0,095 |
| P.E.H.D | 4,5 | 1,34 | 2,23 | 1,785 |
| P.E.T | 18 | 5,34 | 7,87 | 6,605 |
| TOTAL | 336,5 | 100 | 100 | 100 |

In light of these various results, both experts presented the financial analysis aimed at identifying the cost of waste collection.

### D- Identification of the two actual costs (Initial Cost "Mixed Quantity" / Cost with Sorting) and fees

Building on the initial conclusions of both experts, the team undertook their own analysis of the expert reports, deriving preliminary insights while incorporating suggestions and proposals.

- **Presentation of initial conclusions and recommendations by the two experts**

→ **Conclusions of the second expert responsible for calculating costs.**

During coordination meetings with the Sidi Bou Saïd team, the second expert, in collaboration with the first, presented his preliminary conclusions regarding the analysis of costs and municipal expenses associated with waste collection. Several parameters contributed

31- The costs were accounted from January 1, 2022, to January 1, 2023.

to the calculation of the actual cost,[31] leading to insightful results.

### Actual cost calculation parameters

The expert utilized three critical elements in the process of calculating the actual costs which are as follows:

1- An inventory of technical resources dedicated to cleanliness: Listing the technical resources available to the municipality, describing the condition of the equipment, calculating depreciation, and determining maintenance costs.

2- An assessment of fuel expenses for collection vehicles: Calculating fuel expenses per vehicle, determining average fuel consumption, identifying avenues for cost improvement, and calculating land maintenance costs (insurance, fleet management).

3- An inventory of human resources allocated to the municipality: Identifying human resources and their respective tasks, calculating the costs associated with direct and indirect human resources, identifying potential avenues for reducing human resource costs, exploring possibilities for reassignment and proposing a targeted recruitment plan for cleanliness services.

### Results of cost determination

The study of the analytical report by the expert responsible for calculating waste costs reveals that:

- The analysis of waste costs encompasses more than just waste collection expenses, as cleanliness also includes street sweeping, garbage collection, and maintenance of green spaces.
- The cost and expense table for cleanliness comprises several factors (salaries, management fees, insurance, etc.). The burden of collection is particularly high. The 2,525 tons of waste incur a charge of 332 TND per ton for household waste removal.
- Machinery constitutes a significant portion of the cleanliness expenses, primarily due to maintenance costs for engines (including repairs or servicing rather than replacement) to extend their lifespan. Team members did not grasp the distinction between servicing and replacing an engine.
- The effort exerted by workers during collection is substantial, as they engage in this task three times a day.
- The municipal budget does not clearly reflect the precise and actual amounts allocated to waste management, diminishing the impact of this ambiguous parameter in the calculation of the actual cost.
- The costs for private companies are comparatively lower since they do not cover maintenance, upkeep, or fuel expenses, especially considering the price increases from 2022 to 2023.
- The calculation of costs must consider privatization, as the collection by private companies does not provide an accurate comparison with municipal cost calculations.

Moreover, the expert (who worked according to a precise accounting methodology) noted that the results of tax evasion are alarming. Thus, it is imperative to devise a communication/sensitization strategy to ensure the success of the initiative in Sidi Bou Saïd and assess its real impact. The primary proposal is for the project team to conduct rounds at the EOPs, particularly focusing on the 100 uncontracted establishments, to encourage them to sign agreements based on actual costs and to implement sorting practices.

Some of these recommendations overlap with several suggestions proposed by the first expert.

### → Conclusions of the first expert responsible for surveying merchants and collection circuits.

On his part, the first expert discussed the study regarding simplified waste costs and detailed costs, aimed at optimizing collections in Sidi Bou Saïd. The significance of such an analysis lies in reducing both the cost of waste collection for the Municipality and the waste itself, ultimately leading to a cleaner (or less polluted) municipality. This would necessitate the fulfillment of two conditions.

To achieve the primary objective of reducing collection costs, it is imperative to strongly encourage EOPs to sign or revise their agreements with the Municipality, thereby increasing its revenues while reinforcing the principle of "the polluter pays" through real costs.

Regarding the pursuit of the second objective of waste reduction, promoting sorting could facilitate the Municipality's efforts by encouraging recycling and the valorization of waste as a sellable and profitable product, thus motivating the sorting process.

Finally, the expert conducted a comprehensive calculation of the global cost of waste management. This delineation of waste collection costs allows for the adjustment of agreements (the fees to be paid by new signatories and the revision of those applicable to already-contracted EOPs). This revision does not necessarily imply an increase.

He also prepared, based on the diagnosis, data and

analyses, a proposal for improvement avenues through a comprehensive package of recommendations aimed at assisting the Municipality in enhancing its resource management in waste management. The expert cited the example of the Municipality of Tunis and its implementation of GPS technology as a means to monitor collection circuits.

Following all these conclusions and recommendations, the PDIA team commenced its own analysis.

**The team's analysis of the initial conclusions from the experts and the lessons learned**

Several questions captured the attention of the team members. The first pertained to the mandatory or optional nature of waste sorting, while the second concerned the method to be adopted for calculating the real costs.

### → Debating mandatory sorting

The team identified a significant obstacle concerning communication related to sorting and its implications. Is sorting mandatory or not according to the agreement?

The debate surrounding this question was rich. One member noted that the Municipality could compel the EOPs to sort their waste; otherwise, it would refrain from collecting unsorted commercial waste. However, other members opposed this notion, arguing that, according to the law, sorting is a responsibility that falls to the Municipality without any obligation placed upon the EOPs. Furthermore, the existing agreements are of a standard type and do not contain provisions related to mandatory sorting by the EOPs. According to another member of the team, it is possible to act implicitly without waiting for legal interventions. Another member specified that the Municipality could indirectly mandate sorting by making the signing of the agreement compulsory, especially since correspondence from the Ministry of the Interior requires EOPs to sign an agreement.

It remains to clarify how the EOPs will be encouraged to sort when it is not mandatory in the agreement. How can the agreement thus serve as an implicit pressure mechanism to adopt selective sorting without becoming an obstacle that delays the process? It is therefore crucial to expedite the work, and the Municipality should take responsibility by legally compelling (in a certain manner) the EOPs to sort their waste.

For some members, the real issue does not actually lie in the EOPs' reluctance to sort, but rather appears to stem from the fact that the polluters do not pay their dues or that the amounts to be paid under the agreements are very low and disproportionate compared to the services provided by the Municipality. This should not be revised at the local level but rather at the central level, through legislative channels (as was the case with the finance law of 2016 regarding waste sorting). A similar law concerning sorting, according to the representative of the Ministry of the Environment, is currently in preparation. It remains to specify the impact of adopting sorting on the compensation for the benefit of the EOPs, thereby leveraging real costs within this framework, which should be calculated following a specific method..

### → Debating the method to be used to determine actual cost

An important discussion regarding the methods for calculating real costs adopted by the two experts took place within the team. While the second expert utilized the analytical cost method,[32] the first expert, on the other hand, employed a simplified one.[33] After reviewing the figures in the reports, the team observed a significant discrepancy in the costs between the two calculations. Consequently, the team decided to organize a meeting with both experts to better understand this difference and compare the two accounting methods in order to determine which approach to adopt for calculating the real cost, upon which the agreements would be established.

The significance of this decision extended beyond the case of Sidi Bou Saïd. Its importance lays in its potential effect when duplicating the solution to other municipalities. The fundamental question was to ascertain the utility of the details of the cost calculations for such duplication.

On this matter, the team divided into two factions: those who agreed on the importance of considering the detailed cost calculations presented in the experts' reports (indispensable data that aligns perfectly with the PDIA approach and serves as a guarantee of

32- The analytical method includes "indirect expenses," particularly the social security contributions and salaries of sanitation workers.

33- The analytical method includes "indirect expenses," particularly the social security contributions and salaries of sanitation workers.

34- Starting from the root cause C5, which relates to the inadequacy of resources compared to the operational costs, it is essential to increase the municipality's resources by reducing the volume of waste and, subsequently, lowering collection costs. This would allow the municipality to better manage waste collection. However, this can only be achieved through detailed data and analysis, without which it would be difficult to calculate the actual costs.

transparency),[34] and those who saw no utility in this (viewing it as a source of complexity and additional burdens, thus diminishing the chances of duplication due to the disparity of resources among municipalities).

The final consensus solution regarding the use of the figures from the reports involved utilizing the figures from the simplified report of the first expert for matters subject to duplication, while appending the detailed calculation report of the second expert for all relevant purposes.

**Comments from the Sidi Bou Saïd team on the experts' reports**

After the presentation of both reports, the team split into two groups. The first group found the reports to be incomprehensible and incompatible with the PDIA approach (not demonstrating that 30% of the waste is recyclable and failing to indicate that registering for selective sorting and agreements with the Municipality serves to reduce tax rates while simultaneously decreasing the volume of waste generated. There was a lack of correlation between the objectives of the method and the content of the reports, as well as an absence of "Before"/"After" comparisons and neglecting to demonstrate visible changes in waste reduction).

Conversely, the second group favored a pragmatic view (arguing that the reports primarily served the objective of calculating real costs with the aim of emphasizing the importance of selective sorting. The analytical calculations contained in one of the reports were therefore deemed sufficient).

Based on these observations, the team decided to filter the reports and retain what they deemed relevant, establishing a number of suggestions.

**Suggestions and proposals from the Sidi Bou Saïd team on the experts' reports**

Following an extensive discussion of the two reports, the following proposals were agreed upon by the team:

- Preparation of an executive summary of the experts' reports, accompanied by photos and links to "before-and-after" videos to showcase the outcomes of the work.
- Development of a summary document of outputs and results (state of affairs) to be presented during the third Consortium meeting.
- Integration of the results achieved by the PDIA team into the report (census, new circuits, selective sorting, agreements).
- Optimization of human and material resources according to the municipality's needs.
- Estimation of the loss of revenue (135 M.D.).
- Detailed modeling of the collection circuit.
- Highlighting bins for passengers and the new circuits for collecting waste from merchants as results and outputs.
- The necessity to include in the report a roadmap that details the newly identified adapted collection circuits (itinerary, schedule, and location). It is essential to have a clearer and more detailed plan that includes street names and collection circuit frequencies to observe the concrete impact, as well as the need for GPS in the equipment to track the collection circuit performed.
- The importance of demonstrating in the report the impact of optimizing waste management costs through the newly identified collection circuits.

## E- Suggestion of a new, optimized collection route

This pertains to the tangible change regarding the specific circuit for EOPs, which would concretely impact the reduction of waste collection costs. The actual transformation of the circuits should enable a decrease in waste production. Priority should be given to the establishment of new operational circuits rather than postponing the revision of agreements with the Municipality. Consequently, the Municipality has identified a new collection circuit for the waste generated by EOPs in comparison to the previous circuit. The optimization of these new circuits hinges on the experimentation with selective sorting, in alignment with the solution based on the calculation of real costs and the adherence of EOPs to the agreements with the Municipality. This adherence necessitates the implementation of an appropriate communication strategy.

35- The team expressed sincere thanks to the municipality of Sidi Bou Saïd (SBS) for its cooperation in providing the necessary data.

## F- Communication on the introduction of a new waste management system, with a specific collection system that focuses on the sorting of waste at source

+ Such communication is paramount. Its implementation necessitates the selection of one or several appropriate awareness-raising methods.

- The importance of raising awareness through appropriate communication

The team members underscored the importance of raising awareness among the conventioned EOPs regarding the necessity of sorting, given that only 31% of the 165 surveyed EOPs engage in waste sorting.

Following the analysis of the cost results, the figures[35] reveal that the municipal shortfall in SBS, attributable to merchants who neglect to pay their waste management fees, amounts to 118,440,000 dinars annually. This represents a substantial impediment for the municipality. Therefore, optimizing costs and expenditures is essential. This should ideally be achieved through a robust communication campaign, which ought to be developed and implemented by the various stakeholders involved.

- Implementation of awareness initiatives:

The team established two focal areas upon which the communication strategies will be predicated. The first is an awareness initiative aimed at the EOPs, while the second targets the citizens of SBS, both oriented towards promoting selective sorting.

→ Raising awareness among EOPs.

With the technical assistance of Solidar, the team resolved to organize communication campaigns focused on the following objectives: encouraging EOPs to sign the agreements; exploring potential new agreements with the 100 EOPs that are not yet conventioned; and revising the existing 65 agreements based on the actual cost of waste collection prepared by the expert. The awareness efforts should prioritize the engagement of EOPs (who are the primary polluters) in a sustainable waste management chain, through incentives to sign agreements (adopting the "polluter pays" principle) and reducing fees based on measurable outcomes to facilitate the assimilation of real change. Therefore, the success of this initiative hinges on effectively promoting the agreements to EOPs, ensuring their active participation in the signing process.

A preliminary category of EOPs has been identified, primarily encompassing educational institutions and universities, which are significant waste generators in Sidi Bou Saïd (accounting for 51% of organic waste and 31% of recyclable materials). Such encouragement for waste sorting would contribute to the reduction of the municipal fiscal burden[36].

However, EOPs may opt not to engage in sorting for various reasons, including the limited volume of recyclable waste, restricted spaces that inhibit sorting, or a lack of time to carry out the process. Consequently, the pursuit of waste volume reduction should focus on promoting awareness on waste sorting, convincing and motivating EOPs to embrace this option. Once they are persuaded to sort their waste through an effective communication campaign, they may consequently enter into agreements that will be advantageous for them. However, prior to this, it is essential to encourage them to sort their waste by providing separation bins. This same logic could be applied during the awareness campaign directed at the citizens.

→ Raising public awareness: complementing the scope of intervention

This awareness campaign should be implemented operationally by the Municipality through the installation of two distinctly colored waste bins (white for non-organic recyclable waste and blue for non-recyclable waste) for citizens, thereby encouraging sorting while awaiting the participation of merchants in the separation process. Consequently, the team, in collaboration with the Municipality and upon receiving its approval,[37] identified six locations for the installation of these bins, encompassing both recyclable and non-recyclable waste. Although their limited number (for this initial pilot) may appear modest, the installation of these bins would significantly enhance communication and raise awareness among citizens regarding the importance of waste sorting.

The representative from the Ministry of the Interior (a member of the PDIA team) granted preliminary approval for the financing of the implementation of these waste separation bins. She further indicated that GIZ could also collaborate on this initiative. She proposed initiating this pilot project while awaiting approval from the Instance Générale de Prospection et d'Accompagnement de Processus Décentralisé

36- For instance, a testimonial from a merchant, who had signed the waste collection agreements, highlighted that he only paid fees for 100 liters of waste, instead of 500 liters, after implementing waste sorting.

37- After a meeting with the municipal manager of SBS, held on November 17, 2023 to validate his agreement for the installation of the bins.

(General Authority for Decentralized Process Prospecting and Support) for funding.

## 6- Evaluation of the Sidi Bou Saïd initiative

The evaluation of the SBS initiative encompasses two axes: external and internal.

+ External evaluation of the SBS initiative: assessment of the efforts made and the multifaceted support for the Sidi Bou Said initiative.

This first aspect of the evaluation primarily focuses on assessing the SBS process from the perspective of various stakeholders, including official institutions and partner organizations.

- Support from certain political decision-makers bolstering the authority overseeing the Sidi Bou Said initiative and promoting selective sorting, in particular.

### ∞ Ministerial support from the Ministry of the Environment

Beyond the commendations from the international expert regarding the work of the PDIA team,[38] support for the process has been demonstrated multiple times by various authorities.

Throughout the SBS process, the Ministry of the Environment expressed a keen interest in the team's efforts on several occasions:

- Firstly, the Minister of the Environment conveyed to her advisor, a member of the team focused on selective sorting, the significance of the contributions made by its members, which align seamlessly with the Ministry's ongoing efforts in this domain.
- Secondly, during an unofficial meeting with one of the team facilitators at a university event, the Minister reiterated her support and requested additional information to stay updated on the progress of the process.
- Thirdly, the General Manager the Quality of Life Department at the Ministry of the Environment acknowledged the team's work during the third Consortium held in Tunis.

### ∞ Ministerial support from the Ministry of the Interior

The Ministry of the Interior reiterated the obligations of municipal authorities concerning waste collection through an official communication. This reminder was issued in a correspondence from the Minister of the Interior, reference number 00014868, dated October 23, 2023, and addressed to the Secretaries General responsible for managing municipalities, under the authority of the governors. The governors subsequently forwarded the Minister's correspondence to the municipal Secretaries General.

In the case of the Municipality of Sidi Bou Saïd, the Governor of Tunis sent a directive to all municipalities within the Governorate of Tunis, including SBS. This communication, reference number 017289, dated October 31, 2024, and received by SBS on November 2, 2023, under number 3088, pertained to the "Conclusion of specific agreements ensuring the provision of collection and transportation services for waste analogous to household waste generated by industrial, commercial, and professional establishments."[39]

The competent authorities appeared to have responded positively by incorporating several measures and procedures proposed by the PDIA team[40] directly into the content of the correspondence. This reflects an acknowledgment and validation of the solutions presented by the team. The correspondence from the Ministry of the Interior serves as concrete evidence of the impact of this activity on both centralized and decentralized political decision-makers.

### ∞ Local support from the municipality of SBS

The chief official of the municipality of SBS praised the team's work and the anticipated positive impact on the municipality's tax revenues. He committed to updating the agreements with the EOPs, thus contributing to the implementation of the "polluter pays" principle.

38- He was impressed by the work carried out by the PDIA team and the progress they are making. He emphasized the importance of maintaining serious efforts, focusing on practical and tangible solutions and results.

39- The title of the correspondence is expanded to include administrative establishments.

40- These various measures will be reviewed later in the section related to the internal evaluation of the SBS initiative.

41- Particularly noteworthy is one of the members who provided the necessary equipment for carrying out the two waste characterizations.

42- The details regarding the number of conventioned EOPs (new or revised agreements), those engaging in selective sorting, and the municipality's revenue gains will be analyzed in a later section.

Additionally, the Secretary-General of the SBS Municipality expressed gratitude to the PDIA team[41] during one of the weekly meetings, noting that this was the first time a waste characterization had been conducted in a Tunisian municipality in such a methodical manner.

- **The support of certain stakeholders for the Sidi Bou Saïd initiative, particularly for selective sorting**

### ∞ Support shown by several EOPs in Sidi Bou Saïd

For illustrative purposes,[42] the Laghamni School in Sidi Bou Saïd expressed its firm commitment to fully participate in the SBS process by deciding to sign a convention with the municipality. One of the key factors that influenced this decision is that their commitment to waste sorting will allow them to pay a reduced service fee. Similarly, the National School of Architecture and Urbanism of Tunis has shown willingness to engage in waste sorting for the same reason— a sentiment echoed by other stakeholders as well.

### ∞ Support shown by other stakeholders

During the 3rd Consortium held in Tunis, several stakeholders, including representatives from civil society and other municipalities, praised the PDIA approach, highlighting the significance of the solutions implemented in Sidi Bou Saïd. Most were pleasantly surprised by the process and its originality, as well as the work carried out by the team. Some participants, during their remarks in the discussion, expressed their enthusiasm for discovering this new methodology based on pragmatism and iteration, which seeks solutions to problems through experimentation rather than imposing pre-packaged ones.

In contrast to this generally positive external evaluation of the SBS initiative, the internal assessment of the process appears to be less favorable.

### + Internal assessment of the SBS initiative

This assessment, which primarily focuses on the content and substance of the proposed solutions during implementation, reveals that some successes have been achieved in certain areas, while others require improvements in their implementation.

- **Positive outcomes of the assessment of the SBS initiative**

### ∞ Relatively acceptable overall progress

Overall, the team has adequately fulfilled its responsibilities regarding the Sidi Bou Saïd initiative. Despite some delays due to various reasons, the action plan has been largely adhered to. The subsequent achievements attest to this.

### ∞ Interesting achievements in specific areas[43]

This is evident in the similarities between the procedures and mechanisms established by the authorities in the two aforementioned correspondences and several proposed solutions from the PDIA team. These correspondences were sent approximately 13 and 21 days, respectively, after the PDIA team's meeting with the President of the General Authority for Prospecting and Supporting Decentralization Processes, held at the authority's headquarters in Tunis on October 10, 2023.[44] The head of the authority, convinced of the significance and relevance of the team's work, promptly made several swift decisions, proposed by the PDIA team, through his Minister. These decisions addressed the project's objectives, its justification, and certain of its procedures

#### © The centralized authorities' commitment to enhancing environmental conditions and strengthening the financial resources of municipalities (decentralized authorities)

It is crucial to first place this correspondence in its context. Indeed, it serves as a reminder to the municipalities of their obligation to collect fees, as

43- The international expert expressed satisfaction with the team's progress and activities. He highlighted the visible results and emphasized the importance of the impact on the space for change, as well as its expansion on local, regulatory, and legislative levels. He noted that these outcomes are key to gaining the trust of stakeholders.

44- It is worth mentioning that the representative of the Authority was present at the team meeting on October 12, 2023, two days after this initial encounter.

45- The article stipulates that "The rate of fees for the removal of non-household waste referred to in paragraph 4 of Article 91 of this code (removal of waste generated by commercial, industrial, or professional establishments, where the fee is borne by the recipient of the service, as indicated in the same paragraph) is set by decree of the relevant local authority, subject to approval by the supervisory authority. An annual agreement is concluded to this effect between the service beneficiaries and the relevant local authority, in compliance with existing legislation related to the management of hazardous waste." Any failure to comply with this obligation would result in the municipality's refusal to collect their waste, potentially leading to additional tax penalties.Tout manquement à se conformer à cette obligation entrainerait le refus de la municipalité de collecter leurs déchets, ce qui pourrait entrainer des pénalités fiscales supplémentaires.

46- We carried out the translation.

stipulated by article 93 of Law No. 97-11 of February 3, 1997 promulgating the local tax code, which mandates that merchants pay a fee to the municipality.[45] Thus, the correspondence does not create new obligations but merely reminds municipalities to ensure this collection through agreements in order to achieve two major objectives: to ensure a healthier environment with less waste and to promote effective management by municipalities, as well as to guarantee and increase their financial resources. This contributes to ensuring waste collection and transport services.

The correspondence from the Governor of Tunis, received by the SBS municipality, clarifies that "these establishments (EOPs) are a fundamental source in the financial structure of municipal budgets, especially with the rising cost of cleanliness services that heavily burden many municipalities and have contributed to their financial imbalances."[46] The same text further states that the reasons justifying this reminder include both "the limits of collecting these fees and the integration of the costs of collecting and transporting waste from these establishments within the municipal activities related to household waste."[47] The ultimate goal, according to the same correspondence, is "to improve the level of cleanliness services in the cities."[48]

In addition to the impact of the team's work illustrated by the objectives of the correspondence, the latter has adopted a new procedure directly derived from the action plan for SBS developed by the PDIA team.

© The endorsement of census as a standard procedure by authorities across all municipalities

The correspondence directly ordered the municipalities (including that of Sidi Bou Saïd) to conduct a "census of all EOPs (of all types) that produce waste,[49] following an attached model. This summary table consists of six sections: 1. Identification of the concerned establishment; 2. Date of signing the agreement; 3. Types of waste covered by the agreement; 4. Monthly quantities of waste as per the agreement; 5. Monthly removal amount per cubic meter; 6. Issues and proposals.

The correspondence also instructs the municipalities to conclude "specific agreements" with EOPs (according to the model attached to the correspondence)[50] to guarantee the services of waste collection and transportation. It mandates that EOPs must provide appropriate bins (in number and volume), apply the fee rates to cover the costs of the services provided, issue a municipal order determining the cost of collecting and transporting the waste produced by these establishments in accordance with Government Decree No. 2016/805 of June 13, 2016, concerning the establishment of tax rates that local authorities are authorized to collect, and develop[51] and implement the necessary measures to ensure compliance with environmental regulations.

© Installation of numerous waste bins at SBS to raise awareness

The team, in collaboration with the municipality, installed 6 waste bin points in various locations within the commune. However, certain areas still require additional efforts from the team to complete the installations.

- **Areas to improve in the rest of the SBS initiative**

The team identified several points that warrant particular attention for the remainder of the SBS action process. These include the selected options, the expected impact, the desired outcomes of the action, and the necessary coordination with municipal authorities.

### → Final assessment of the solution proposed for Sidi Bou Saïd

The evaluation of the activity in Sidi Bou Saïd will highlight the difference in waste management reality before and after the implementation of the new method. This will serve to affirm the success of the PDIA approach in reducing waste in the city. Such a comparative approach will allow for the measurement of the effectiveness of the PDIA activities, including the establishment of waste collection circuits and

47- We carried out the translation.

48- We carried out the translation.

49- We carried out the translation.

50- We carried out the translation.

51- Article 1 states that "The tax rates referred to in sections one, two, three, four, and five of Chapter VIII of the Local Tax Code are set in accordance with the table attached to this governmental decree." The attached table concerning "The Tax Rates that Local Authorities are Authorized to Collect" specifies in point 5 ("Collection of waste resulting from the activities of commercial, industrial, or professional establishments") under section V ("Fees for Public Services") that "The rate is determined by order of the relevant local authority, subject to the approval of the supervisory authority."

the integration of innovative strategies like selective sorting.

The evaluation focuses on presenting the actions taken, along with the recorded key performance indicators (KPIs) and their analysis.

### → Inventory of actions carried out on SBS

The team noted the following:

- Census of establishments open to the public (EOPs): A total of 165 establishments were identified, revealing the existence of 100 unregistered EOPs that do not pay local taxes.
- Waste characterization and volume assessment: Identification of waste sources.
- Calculation of the actual cost of waste collection: Based on characterization and taking into account seasonal variations.
- Creation of waste collection routes: Two separate routes were set up, one for EOP waste and the other for household waste.
- Data transparency: Actual figures for EOP waste and the total quantity of waste collected have been obtained.
- Payment agreements: Agreements are calculated on the basis of the volume of non-recoverable waste.
- Integration of waste pickers: The involvement of waste pickers in the waste management process is planned.
- Emphasis on communication: The team stressed the importance of effective communication to encourage business owners to sign the agreements.
- Detailed summary report: A comprehensive report detailing all numerical aspects will be prepared, including performance indicators.

### → Key performance indicators (KPI) for the Sidi Bou Said initiative

One of the team members presented the key results obtained nine months into the SBS project. In addition to identifying 165 establishments open to the public (EOP), all of which will be linked to the municipality through a fee agreement for waste collection services, the team highlighted the following indicators, which will be compiled in a summary report illustrating the evolution of various selected parameters:

- Number of establishments open to the public (EOP) not yet registered: This revealed that there are 100 EOPs not registered with the municipality and not paying local taxes (out of 165). Consequently, there is an acceptability issue that makes EOPs reluctant to join the waste collection agreement; however, a target of 100 new agreements has been set for after Eid al-Fitr. The municipality will condition the collection of non-recoverable waste on the EOPs' adoption of the agreement.
- Municipal agreements encouraging EOPs to pay waste collection fees: This initiative has helped to boost the municipality's revenues, as the number of EOPs with agreements has increased. This growth has alleviated the municipality's revenue shortfall that existed prior to the agreements being signed.
- Correspondence from the minister of the interior to the governors: This communication encouraged EOPs to pay fees as a prerequisite for waste collection. It has reinforced the impact and authority of the activity.
- The sorting efforts implemented by EOPs will contribute to reducing the total amount of waste collected by the municipality. Consequently, these establishments will incur lower fees due to the decreased waste quantities resulting from their commitment to selective sorting. However, many establishments lack adequate space for selective sorting, particularly for the placement of sorting bins. This selective sorting approach aligns well with the directives of the relevant authorities, which emphasize sorting through open consultations with

52- Submitted, among others, to UTICA.

53- This included inviting the head of the municipality to assess the situation.However, due to the refusal of the municipal authorities, some members suggested directly contacting the ANGED (represented in the team) for potential collaboration aimed at collecting municipal data regarding waste management. Another alternative would be to go through the General Authority for Prospecting and Supporting Decentralized Processes (Ministry of the Interior), which is also represented in the PDIA team.

54- About two weeks before the completion of the activity, during the project's closing ceremony scheduled for June 27, 2024.

social partners and other stakeholders regarding the draft decree for selective sorting.[52] This regulatory text will mandate adherence to municipal conventions, as well as the collection and sorting of waste.

To expedite the process in Sidi Bou Saïd, the team discussed potential strategies,[53] while maintaining a strong collaborative relationship with the municipality, especially given the political will and substantial resources (tools, funding, capacity, and methods) available to reduce waste.

- **Pending the final evaluation scheduled for mid-June 2024,[54] a summary of results was presented to the team by one of its members as of March 31, 2024:**

- There are 165 EOPs, of which only 65 have adhered to municipal waste collection agreements.
- 9 new agreements have been signed with the largest waste producers, and 13 are currently in progress.
- 22 EOP owners are implementing selective sorting without signing an agreement.
- 29 draft agreements have been sent by the municipality, with no responses received.

Further results were forwarded and presented to the team about a month after the evaluation conducted at the end of March.

- **On May 8, 2024, new data were communicated to the team following a coordination meeting that brought together the team's focal point, the expert and municipal officials. The evolution of the figures reveals:**

- 2 skips have been positioned: one designated for recoverable waste and the other for non-recoverable waste.
- The volume of non-recyclable waste has decreased due to selective sorting.
- 10 new agreements have been signed to date.
- 22 EOP owners are implementing selective sorting.

The team welcomed the new figures and indicated that the momentum of the activity should accelerate at SBS, particularly through enhanced communication regarding selective sorting, even beyond the scope of existing agreements.

The team has received information from local authorities indicating that the Municipality of SBS may condition the collection of waste from EOPs on their formal enrollment in the agreements. The EOPs would be required to sign up and declare the volume of waste generated following sorting. The municipality has also established a dedicated team to increase the number of agreements signed by EOPs, with the objective of doubling this number from 10 to 20 within a week.

During the team meeting, Mr. Fraj BLEL, the expert recruited to monitor the SBS operation, committed to defining the Key Performance Indicators (KPIs) for the PDIA activity at SBS,[55] aimed at optimizing waste management costs through the establishment of new waste collection routes, assessing waste collection expenses, and analyzing the volume of non-recoverable waste. The expert also underscored the necessity of engaging municipal staff in the field to persuade EOPs to adhere to the convention, emphasizing the importance of facilitating citizen action in collaboration with civil society in SBS (a pilot initiative in a designated neighborhood), thus contributing to amplifying the impact of the initiative on households for a cleaner city and a Tunisia less inundated with waste.

- **On May 17, 2024, a month and a half prior to the fourth evaluation workshop, the expert presented the latest updates of data and KPIs available up to that date at the team meeting, demonstrating the following evolution for some indicators:**

- The municipality's administration is currently applying the old rate of 40 millimes per liter, which remains in effect (pending an adjustment to 60 or 70 millimes per liter, corresponding to the actual costs

55- According to the table template prepared by one of the facilitators and validated by the team.

56- Before the dissolution of the municipal councils (from 2016 to 2023), the amount of the fee was set by a municipal order, which took effect immediately after its publication in the official journal of the local authority, specifically the journal of the elected municipal council of Sidi Bou Saïd. After the dissolution in 2023, the amount is still determined by a municipal order issued by the Secretary-General in charge of managing the municipality's affairs (based on a proposal from a municipal commission tasked with recommending modifications to certain fees). This order is then submitted for approval to the governor (in the case of Sidi Bou Saïd, the governor of Tunis), who forwards it to the Ministry of the Interior, which in turn sends it to the Ministry of Finance for financial implications.

57- It is worth recalling that the relevant legal texts place the obligation on municipalities to collect the amounts of fees (which constitute a part of their fiscal resources) and require establishments and organizations to pay their respective contributions in exchange for the waste collection services provided by the municipality, either directly or indirectly through subcontracting.

58- The municipality can issue a sanitary fine of 60 TND against the defaulting establishment or organization, and if payment is not made within three days, it will proceed to the immediate closure of the establishment without further notice.

calculated by the expert, based on characterization and other pertinent factors, knowing that this amount will only be implemented after final validation by the Governor of Tunis).[56] It is crucial to note that the Municipality aims to reach 52 millimes per liter in the medium to long term, but not immediately. Indeed, an increase in the fee during an election year is challenging to envision. If the Municipality chooses to pursue this course, it could diminish the level of authority and acceptability of the action among EOPs. However, to address the potential reluctance and refusal of EOPs to sign the agreements, the Municipality has several legal means of pressure at its disposal, each with varying degrees of effectiveness and enforcement.

Two procedures can be employed by the municipality to exert pressure on EOPs to sign the agreements.[57] The first, the least restrictive and least effective, involves the municipal refusal to collect waste from reluctant EOPs.[58] Such a "sanction" would indeed be the least effective approach to compel EOPs to sign the agreement. However, this measure could lead to a more severe risk: exacerbating the city's waste crisis (which contradicts the objective of addressing the issue of a Tunisia overwhelmed by waste). Additionally, the municipality's refusal to collect waste could provoke discontent among citizens (local voters) amidst a critical environmental and health crisis. The second procedure, which is more restrictive and theoretically more effective, entails refusing to allow the EOP to continue or renew its authorization for temporary occupancy of municipal public space if it does not comply with the agreements. In this manner, the Municipality retains legal avenues to address this issue if necessary. It is vital to note that resorting to these pressure tactics will likely be a last resort. By adhering to the principle of proportionality and adopting a flexible communication strategy aimed at EOPs, the municipality could achieve favorable outcomes by encouraging all or most establishments to sign their agreements and fulfill their contributions within a "win-win" framework.

- The number of registered EOPs (165) is projected to increase to 168 with the opening of new establishments, which will enhance the Municipality's resources if all or most EOPs enter into agreements.
- Currently, there are 22 signed agreements (including 13 new ones, all incorporating selective sorting) out of a potential 167.[59] This number appears to fall short of the Municipality's and the team's expectations.[60] Contributing factors include a lack of awareness, the flexibility granted to EOPs for signing, and the requirement for a legalized signature on the agreement, which partly accounts for some EOP categories paying other taxes[61] and the slow progression of membership. To expedite the signature rate and introduce some flexibility (by simplifying procedures) to encourage EOPs to adhere more readily to the conventions and reduce the likelihood of reluctance on their part, municipal officials have decided to eliminate the requirement for legalizing the signature of the agreement. On the ground, municipal officials visit EOP premises[62] and provide draft agreements for signature. If the representatives of the EOP concur with the waste volume indicated in the agreement (which, it should be noted, is based on the declaration made by the EOP during the questionnaire survey), the stated volume is upheld. Conversely, if the establishment disputes or rejects the indicated waste volume, a discussion may be initiated to ascertain both the volume of non-recyclable waste collected by the Municipality (which is the subject of contention between the two parties) and the volume of recyclable waste produced by the establishment (after the sorting operation conducted on its premises), which would be deducted from the total volume of waste declared.[63] These establishments are afforded an open timeframe in which to sign and submit the signed agreements to the pertinent local

59- The number of EOPs increased from 165 to 167 following the opening of two new establishments.

60- By way of comparison, a number of municipalities have signed up to agreements at a rate of around 80%.

61- For example, those paying the hotel tax or the TCL. However, these taxes or duties on revenue are unrelated to the waste collection fee, which is a fiscal amount payable in exchange for a service provided to the establishments or organizations by the municipality.

62- The monitoring team established by the Municipality set a challenge of 10 signing EOPs per day. This could cover nearly all remaining non-signatory establishments within a timeframe of 10 to 15 days from the date the municipality decided to monitor the progress of the signatures daily.

63- The agreement does not actually include a clause related to this type of waste. It merely specifies the overall volume of waste produced by the establishment. However, the discussions between the municipal team and the concerned establishment regarding the volume of recyclable waste sorted lead to an agreement on this volume, which will be noted in pen at the top of the first page of the agreement. The Municipality takes this volume into account and deducts it from the total volume, which consequently reduces the latter and, in turn, lowers the total final fee to be paid by the concerned establishment.

authority department.

- The 65 EOPs that signed prior to the SBS initiative contribute a total fee amounting to approximately 52,000 TND (a modest sum), compared to the fees collected from the initial 13 EOPs that signed their agreements during the SBS PDIA action process (approximately 43,000 TND). The disparity is substantial and can be attributed not to any increase in the cost or amount of the waste collection fee, but rather to the upward revision of the waste volume collected, in relation to the EOPs' inaccurate declarations made prior to the implementation of the SBS solution.
- The evaluation of these parameters prompted the team to contemplate revising objectives and establishing action priorities in Sidi Bou Said. Given that the PDIA team does not oversee the Municipality and operates within a specific context, it is not the team's role to substitute for the Municipality in defining objectives and strategies. The team's responsibility is not to compel EOPs to pay their fees, nor to augment the municipality's financial resources, but rather to identify effective solutions to broaden EOP adherence to conventions and promote selective sorting. The PDIA's role, and that of its team, is primarily confined to assisting public authorities in a process of iteration, supporting them in effectively addressing their specific challenges.

The team should facilitate the authorities' task by exploring alternative solutions and embracing the principle that any authority is free to adjust its objectives and priorities. Given the data indicating delays in the implementation of the action and a relative reluctance among EOPs to sign, the team believes that the primary objective of the initiative is no longer the application of the actual cost, nor the enhancement of the Municipality's resources. The new objective appears more clearly defined. At this stage, the most critical and urgent task is to expand the base of EOPs willing to adhere to the agreements (even with self-assessment and self-declaration of the quantities of waste produced, particularly as we are in the off-season).

This objective can be achieved through a participatory, inclusive, and incentive-based approach, rather than a coercive one, which seems inappropriate given the current conditions. Preparing the EOPs, contributing to shifting their mindset, and familiarizing them with the benefits of voluntary adherence to agreements, particularly the advantages of selective waste collection,[64] is, in the team members' view, more vital at this juncture than imposing sanctions for non-compliance.

Especially during the bustling summer season (peak season), the municipality will have ample flexibility to review and adjust the declared quantities of waste and the corresponding fees payable by the EOPs, after ensuring substantial adherence to the agreements. Indeed, the agreement contains a clause (Article 6) stipulating that "in the event of a revision of the (municipal) decree setting the fees (amount of fees in millimes/liter of waste) or (in the event of) an increase in the volume of waste, the amount of their collection will be automatically revised."[65] This provision would facilitate the EOPs' acceptance of adjustments to the fees owed and the volumes of waste accounted for. Consequently, the municipality could witness an increase in its resources (through elevated fees), a reduction in its waste collection costs (due to a decrease in waste to be collected and transported after sorting, resulting in less cumbersome and, therefore, less expensive collection routes), and the achievement of its objectives in contributing significantly to the circular economy.

The final KPI evaluation yielded the following results (with comments), summarized in the table below:

64- However, EOPs that have opted for selective sorting must provide two bins according to the nature of the waste (recyclable or non-recyclable) and in the appropriate volume, as specified in the signed agreements.

65- We are the ones translating and clarifying here.

**EOP Key Performance Parameters (KPIs)**
**Table 1: Monthly evolution of the number / percentage[66] of EOP in relation to the waste collection agreements signed with the Municipality of Sidi Bou Saïd and the evolution of the amount of revenue after the implementation of the solution based on the census of EOP and the calculation of the real cost of waste collection produced by these EOP**

**Preliminary remarkss :**
1- Total number of establishments open to the public (EOP) surveyed in September 2023: 165[67]
2- Target for new agreements to be signed in 2024: 100 (to cover all SBS EOPs, of which there are 165).

| | Août 2023 | Sept. 2023 | Oct. 2023 | Nov. 2023 | Déc. 2023 | Jan. 2024 | Fév. 2024 | Mars 2024 | Avril 2024 | Mai 2024 | Juin 2024 | Jul 2024 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nb E.O.P. conventionnés | 65 (39,39%) | 65 (39,39%) | 65 (39,39%) | 65 (39,39%) | 65 (39,39%) | 65 (39,39%) | 65 (39,39%) | 65 (39,39%) | 13 (7,7%) | 33 (19,7%) | 53 (31,7%) | 96 (56.47%) |
| Nb E.O.P. non encore conventionnés | 100 (60,61%) | 100 (60,61%) | 100 (60,61%) | 100 (60,61%) | 100 (60,61%) | 100 (60,61%) | 100 (60,61%) | 100 (60,61%) | 154 (92.3%) | 134 (80.3%) | 114 (68.3%) | 74 (43.53%) |
| Nb E.O.P. dont les Conventions sont en cours de signature | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 20 | 20 | 10 |
| Nb E.O.P. Conventionnés sans choix du tri sélectif | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 65 | 3 | 23 | 43 | 86 |
| Nb E.O.P. Conventionnés avec choix du tri sélectif | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 | 10 | 10 | 10 |
| Montant des revenus de la Municipalité | 52.908 MD | 52.908 MD | 52.908 MD | 52.908 MD | 52.908 MD | 52.908 MD | 52.908 MD | 52.908 MD | 58.366 MD | 58.366 MD | 208.600 MD | 250.000 MD |

66- This percentage is relative to the total number of EOPs listed (165).

67-The number of EOPs rose from 165 to 167 following the opening of two new establishments.

These performance indicator results could motivate other municipalities to engage in the PDIA process and utilize them as a benchmark for evaluation. Naturally, the results will vary across municipalities due to their unique characteristics (such as surface area, population size, cultural traditions, volume and types of available and recoverable waste, degree of openness to change, and the political, economic, and social context, as well as the presence of a culture of ecological transition and environmental respect).

The promising success of the SBS initiative[68] prompted the team to contemplate extending the activity to other municipalities to evaluate and verify the effectiveness and relevance of the project, which aims to enhance waste management practices in municipalities and explore the potential dissemination of the iterative solution. Consequently, the team needed to identify other contexts for application.

Therefore, based on the team's proposal (validated by the international expert) and/or the recommendation of the Minister of the Environment during one of his meetings with the team (a recommendation later corroborated by a representative from the same Ministry during his presentation at the 3rd Consortium held in Tunis on February 2, 2024) several municipalities expressed their interest in this replication initiative.

# Extending the implementation of the Sidi Bou Saïd solution proposal: Potential for Replication and further experimentation in other Municipalities with different contexts

The decision to expand the implementation scope of the SBS solution was a judicious choice made by the team, grounded in clearly defined selection criteria and constructive discussions. These deliberations enabled the team to compile a list of new candidate municipalities for the replication of the Sidi Bou Saïd solution. Subsequently, the team developed a draft procedural manual (a comprehensive guide outlining the strategies for implementing the SBS solution in the chosen municipalities) before engaging with their respective managers.

Following the results of these meetings, which were generally productive, the next phase involved taking action and monitoring the progress of implementations tailored to the distinct municipal contexts. This culminated in a final evaluation of the expansion, allowing for the extraction of lessons learned, particularly through the KPIs specific to each municipality. These indicators would be compared with those of SBS to produce a methodological guide that could be utilized by other municipalities interested in participating in this project.

## 1- The principle of replication in other municipalities: a judicious decision by the team

Team members were virtually unanimous in their conviction that the SBS experience could be replicated in other municipalities, provided that the unique context of each is considered and approached adaptively, as advocated by the PDIA approach (rather than through systematic imposition). This strategy could foster a broader and more enduring impact. The modest successes achieved thus far in waste management could serve as a model for other municipalities, contributing to the enhancement of waste management practices and the development of circular economy strategies through positive institutional and behavioral transformations.

This adaptability, which is a hallmark of the PDIA

68- Encouraging progress has been made in establishing waste collection loops and integrating innovative approaches, such as selective sorting.

69- Specifically, addressing the fundamental challenges of waste management, from legislative considerations to practical implementations in municipalities. Effective waste management is not only a regulatory necessity but also a crucial aspect of environmental sustainability, public health, and the overall socio-economic landscape.

approach, necessitates the selection of municipalities based on specific criteria tailored to their distinct circumstances.

### → Criteria for the selection of the other municipalities: in-depth analysis by the team

With similar needs and objectives,[69] municipalities eligible for replication must be selected based on objective criteria. This posed a genuine challenge for the team, given the diverse contexts, varying resources, and differing behaviors involved.

Several parameters were utilized in this selection process. These encompassed general criteria, such as the geographical criterion, aimed at ensuring that the municipalities were distributed across and represented a significant portion of Tunisian territory, as well as the temporal criterion, which assessed the feasibility of implementation within the project's timeframe. Additionally, specific criteria included the results of the Triple A analysis and the outputs of the design space analysis.

After thorough deliberation, the team identified seven criteria, which are not necessarily cumulative: the size of the municipality, the availability of means and resources necessary for the activity, the presence of commercial activities generating a quantifiable amount of waste, the acceptability and commitment of the municipality's staff, along with their technical and administrative collaboration, and the diversification of the characteristics of the selected municipalities—considering factors beyond mere tourism and existing waste collection agreements between EOPs and the respective municipality.

With these criteria in mind, the team commenced discussions on which municipalities would qualify for eligibility.

### → The debate over which new municipalities to be involved in the replication of the Sidi Bou Saïd solution: an argument developed by the group

Before finalizing the list, the team debated the nature of the new communities and tried to answer the following questions: Would it be appropriate to work in an area similar to Sidi Bou Saïd, with the same characteristics, or would it be better to choose a community with different characteristics? Would the team limit itself to EOP waste, or would it broaden its scope to include other areas? And finally, would the choice of content be to copy the Sidi Bou Saïd solution or to work on a new solution from scratch?

The team members' discussions on the various proposals led to the following results:

| Municipalities | Challenges | Opportunities |
|---|---|---|
| **Mjez el Beb** | • Need for commitment from the entire community.<br>• No permanent sorting experiments (just a start and then it stops). | • Interest in the project.<br>• Proposed by Mr. Habib KHELIFI[70].<br>• The people in charge are working on it. They want to implement it for large merchants.<br>• The staff are very interested and the Secretary General will approach the team. |

70- The team had also suggested holding a meeting with the senior official from the Ministry of the Interior to discuss the selection of the new municipalities, which are the subject of the replication of the SBS exercise, and to obtain the official approval from the decentralization authority he leads.

| Municipalities | Challenges | Opportunities |
|---|---|---|
| **Kairouan** | • A very large city.<br>• Has already been approached by several donors and benefited from so many projects.<br>• Has already done a lot of work on waste management and sorting in particular. | • Conduct a study using municipal data to analyze human and material resources: how are they allocated for optimization? |
| **Sfax** | • A very large city | • Interest in communication<br>• Project by ANGED that promotes selective sorting in a neighborhood of the municipality of Sfax. |
| **Fahs** | • Away from the Governorate center | • Strong commercial activity |
| **Msaken** | - | • Extensive commercial activity generating large quantities of waste.<br>• Waste management activity already underway, similar to that carried out at SBS. |
| **Hammam Jedidi** | - | - |
| **Hammam Sousse** | - | • Has already done a lot of work on waste management and sorting in particular.<br>• Can be cooperative about the census activity.<br>• The implementation of the activity proves its feasibility in different contexts with various sub-causes. |
| **Siliana**[71] | • EOP waste collection in the absence of agreements. | • Presence of a dedicated team capable of providing assistance.<br>• Initiated a census to promote agreements.<br>• Conducts collection twice.<br>• Implemented selective sorting at two distinct waste collection centers.<br>• Most EOPs are willing to settle their fees.<br>• The execution of the activity demonstrates its viability across diverse contexts with various sub-causes. |
| **Radès** | • Difficult to be implemented in the current context (more details). | |

71- Also recommended by Mr. Habib Khelifi.

| Municipalities | Challenges | Opportunities |
|---|---|---|
| **Djerba** | • Specificity (island) with a management problem dating back several years. | • Reach out to Mrs. Thouraya from the Ministry of the Interior to see if she has any suggestions regarding this matter.<br>• Distinct and significant insular nature for the project. |
| **Kerkena** | • Terrain specificity (island) with a management problem dating back several years.<br>• Difficulty of implementing the experiment in 2 months, given that the activity deadline is set for June-July, taking into account the month of Ramadan during which work slows down. | • Reach out to Mrs. Thouraya from the Ministry of the Interior to see if she has any suggestions regarding this matter.<br>• Distinct and significant insular nature for the project.<br>• Project by ANGED that promotes selective sorting in a neighborhood of the municipality of Sfax and in another region (hence the choice of Kerkennah). |
| **Menzel Bourguiba** | | • Readiness and interest expressed by municipal officials to participate in the project. |
| **Jemna** | • The existence of specific recyclable waste (palm waste) in addition to that from EOPs and households. | • Willingness of the officials to participate in the project.<br>• The municipality is located in the South, thus allowing coverage of southern Tunisia.<br>• Importance of working on ships (ensuring the routes from Kerkennah to Sfax). This generates a huge volume of waste: plastics that can be recovered. |

Whether to maintain the detailed table or simply limit the presentation to naming the proposed municipalities became a focal point of discussion. The evaluation of the various proposals led the team to choose among the proposed municipalities.

### → List of new municipalities where the Sidi Bou Saïd solution is being replicated

After several meetings dedicated to the extension of the scope of the SBS solution, the team decided to select a few municipalities based on the criteria described above.

| Municipality | Decision | Approach |
|---|---|---|
| **Mjez el Beb** | • Duplication of the SBS activity under the sub-cause of "optimization of resources." | • Workshop to be held in late January. |
| **Kairouan** | • Selection of a new solution.<br>• Work confined to one district in the region. | |

72- Also recommended by Mr. Habib Khelifi.

73- Dismissed for lack of responsiveness on the part of municipal officials and replaced by the municipality of Sfax.

| Municipality | Decision | Approach |
|---|---|---|
| **Sfax** | | |
| **Fahs** | • Duplication of the SBS activity | |
| **Hammam Sousse**[72] | • Endorsement of the SBS activity | |
| **Siliana** | • Endorsement of the SBS activity | • Census of EOPs.<br>• Encouragement of commercial waste sorting.<br>• Inclusion of plastic waste. |

Following extensive deliberations, the team ultimately resolved to initiate the project concurrently in three municipalities, namely Hammam Sousse, Siliana and Medjez el Beb.[73]

In doing so, the team pledged to undertake several key steps in each of the selected municipalities. First and foremost, this involved engaging with municipal officials to assess their willingness to participate in the initiative. Once this interest was confirmed, formal correspondences would be dispatched to the respective municipalities, thereby formalizing relations with the relevant oversight authorities. Subsequently, the team aimed to convene an official on-site meeting with the municipality's Secretary-General, during which the PDIA methodology would be presented, and the terms for the activity's launch would be solidified. A field visit would then follow, aimed at gaining a deeper understanding of the region's specific conditions. To ensure effective coordination, one or two focal points from the team would be designated to monitor the project's progress. The initiative would be guided by an action plan and an orientation note, which would set the framework for its execution. Finally, the project would be launched in accordance with a specially prepared procedural manual designed for this occasion.

## 2- The development of a procedural manual to guide the newly selected municipalities

The team resolved to develop a procedural manual to be disseminated to the selected municipalities. A preliminary version was submitted to the team, encapsulating the key stages undertaken by the municipality of Sidi Bou Saïd in waste management. This document is designed to aid municipalities in precisely determining the actual costs associated with waste collection from the EOPs, as outlined in the earlier correspondence from the Ministry of the Interior. It also elucidates the calculation methodology (analytical accounting) and the procedural steps implemented within the SBS model, enabling their adaptation across various municipalities, while preserving the inherent flexibility of the PDIA's adaptive approach. The team advocated for the simplification of the manual standards to ensure adaptability to the distinctive characteristics of each selected municipality. A second, more refined, accessible, and updated version of the manual has since been completed, offering a sophisticated yet flexible framework for broader implementation.

**Waste collection from establishments open to the public (EOPs)**

**1. Sensitization / Census of EOPs**

- Train a team to conduct an EOP census that serves as an awareness campaign and a reminder o the obligation to make agreements for waste removal at cost price.
- Prepare a questionnaire mentioning the volume of waste generated.

**2. Estimation of recoverable waste percentage**

- Choose a sample of waste from a few EOPs representative of the categories listed in the census in order to estimate the percentage of recoverable waste (packaging, plastic, cardboard, etc.) as compared to other waste.
- Estimation of waste density.

**Cost Determination Manual Version 0.2**

**3. Cost calculation**

- Account for all direct and indirect expenses relating to waste management: salaries, fuel, reductions in landfill expenditure, investments, depreciation, maintenance costs, management costs, collection contracts, landfill in collection costs (circuit costs, awareness campaigns, etc.
- Determine the cost per tonnen as well as the cost per $m^3$ to be invoiced at the level of the agreements.

**4. Cost optimization**

- In light of the data collected, projections will be made regarding possible revenues from recyclable or recoverable materials, variations frequencies and selective collection equipment)
- Calculate the loss of income and the updated waste collection fees.

In addition to the manual, the team opted to establish a set of "guidelines" that would delineate the strategic direction to be followed in implementing the project within the selected municipalities.

### → Guidelines directing the implementation of the SBS solution in the selected municipalities

The team deliberated on the regions to be selected and reached the following decisions: to opt for municipalities where the impact and change could be visibly manifested; to dispatch official correspondence to the secretaries general of the chosen municipalities, informing the relevant Ministry; to support the partner municipalities by designating team members as focal points for each municipality to

74- The municipalities will conduct their feasibility study, and based on their respective feedback, the team will send them a final action plan.

75- Work by region, or on a smaller district basis, focusing on specific sectoral issues (e.g. used tire recycling) with PDIA teams, in collaboration with key stakeholders.

76- Most of which are not bound by such acts, due to Government Decree No. 2016-805 of June 13, 2016, concerning the setting of the rates of taxes that local authorities are authorized to collect, which repeals previous provisions contrary to those of this government decree, particularly Decree No. 98-1998 of July 13, 1998, related to the setting of the rates of taxes that local authorities are authorized to collect. http://www.iort.gov.tn/WD120AWP/WD120Awp.exe/CTX_5020-45-DQMTxCCSWT/RechercheTexte/SYNC_1598965767 The decree grants some freedom to the municipality. In fact, in its section V - Fees for paid public service provision: 5 - Removal of waste from commercial, industrial, or professional establishments, the rate is set by an order from the relevant local authority, subject to the approval of the supervising authority. However, this text is generally applied infrequently in practice.

77- The team emphasized that the initiative in Sidi Bou Saïd is a pilot experience and cannot serve as a reference, in the sense that the team spent a significant amount of time exploring and reflecting on the design space. For future experiences, the team will save time as they will not start from scratch, thanks to the lessons learned from the Sidi Bou Saïd experience, which aligns perfectly with the logic of the PDIA approach.

ensure the necessary coordination and oversight for the successful execution of the planned activities; to engage an expert (as specialized support) responsible for accurately calculating the actual costs of waste management in accordance with the procedural manual; to effectively communicate the results of the SBS activity to evaluate the experience and glean lessons related to the anticipated outcomes for the municipalities in question; to organize joint meetings with neighboring municipalities within the same governorate to disseminate information regarding the potential voluntary extension of the approach to other municipalities; to provide the procedural manual (the guide), the action plan, and the two questionnaires to the newly selected municipalities;[74] to establish objectives for the selected municipalities;[75] to consider the season during the census, waste characterization and waste volume (noting that this may vary from one region to another according to its specificities and the objectives of the action); and to invite representatives from the selected municipalities to introduce them to the work and present the procedural manual, along with the approach for initiating the activity.

### → Welcoming representatives from selected municipalities

During these meetings with municipal officials from the selected municipalities, team members presented the activities undertaken in Sidi Bou Saïd, which are to be adopted and implemented by the attending municipalities. They outlined the action plan and the expected objectives, notably the updated census of the registered establishments (EOP); the quantification and characterization of their waste (both in terms of quantity and density); the determination of the actual cost of waste collection; and the implementation of selective sorting to reduce the volume of waste. This approach aims to decrease the fees payable by the EOP Furthermore, they identified two waste collection circuits and elucidated the calculation of fees based on the amount of residual waste after sorting, along with the signing of agreements with the EOP.[76] Finally, they discussed the potential establishment of a circular economy circuit.

In their turn, the municipal officials spoke to introduce their respective municipalities, allowing the team to discover their unique characteristics and gather several insights, from which the team derived valuable lessons.

### → Outputs from meetings with selected municipalities

Following the various meetings with municipal officials from the selected municipalities, the team recommended the following: the identification of two distinct waste collection circuits; consideration of the unique characteristics of each municipality when preparing action plans to estimate the necessary timeframe for implementing the activities, while striving to compress the timelines;[77] the preparation of data that the new municipalities will need to adopt the initiative; adherence to the subsequent process during the implementation of the solution (census of registered establishments, cost calculation, signing of agreements, and finally sorting); consolidation of coordination between each municipal team and the various PDIA coordinators; the listing of challenges and potential obstacles that future teams may encounter,

78- A strategic planning based on these lessons would be highly beneficial for new experiments. In this regard, the team proposed a meeting between the head of the Sidi Bou Saïd municipality and the selected municipalities for an experience-sharing session.

79- The option of having a single expert seems, at first glance, to be the most suitable for maximizing efficiency and maintaining the same approach. Mr. Slim BOUSABBAH has been hired for this task.

80- The meeting took place on January 16, 2024. The municipal officials committed to sharing a general overview of the municipality (separate waste collection routes for cardboard and perishable waste) and encouraging EOPs to sign agreements and adopt selective sorting. Furthermore, the municipal officials requested the engagement of an expert to verify the calculation of collection costs applied in Hammam Sousse.

81- The meeting took place on January 23, 2024. The team proposed to select an area of the municipality to start with and then generalize the experience. Regarding the waste pickers, they will be included in the entire action, as it will be easier for them to recover recyclable waste directly from EOPs after their adherence to selective sorting. As for the needs of the municipality, the two municipal officials specified that they required support from the teams for waste characterization, the actual calculation of costs, and especially to engage EOPs to sign agreements and adopt selective sorting. In return, the two officials expressed their commitment to facilitating the recruitment of the expert and providing the necessary documents for the project's implementation. However, coordination with this municipality was abandoned due to a lack of responsiveness and was replaced by the municipality of Sfax.

drawing lessons learned from the implementation of the solution in Sidi Bou Saïd;[78] organization of site visits to the municipalities in question and meetings with municipal officials; providing clear guidance to municipalities on what they need to do to effectively integrate into the process; proposing the simplification of sorting by distinguishing between recyclable and non-recyclable waste; engaging one or more experts with clearer terms of reference;[79] utilizing the procedural manual while considering the specificities of each action in the different municipalities; and finally, conducting an evaluation of this extension of the SBS solution to partner municipalities, particularly through the specific KPIs for each municipality, comparing them with those from Sidi Bou Saïd, in order to develop a methodological guide that could be utilized by other municipalities interested in joining this project.

Each municipality should select its own approach to optimizing waste management by focusing on areas with a favorable space for change (Triple A). Thus, experimentation and monitoring should be prioritized within the various contexts of the concerned municipalities.

## 3- Monitor implementation progress in selected municipalities

Implementation encompasses common actions applicable to all municipalities as well as specific actions tailored to each one.

### A- Common actions applicable to all municipalities

Initially, the responsiveness of the selected municipalities was partially lacking, as none exhibited a particular interest in commencing the execution of the project. The team encountered a significant challenge of authority; the municipalities of Hammam Sousse and Siliana made no strides in implementing the activity, while Medjez El Beb showed no signs of engagement whatsoever. To address this issue, the team resolved to establish a timeline for the municipalities to seriously articulate their interest in adopting the initiative, requiring them to confirm their commitment via email and provide an estimated schedule of actions. Additionally, the team undertook urgent site visits, represented by one or more of its members alongside delegates from Solidar Tunisie. This presence effectively galvanized and motivated most municipal partners to respond promptly and act decisively.

This formalization made it possible to clarify the objectives (in particular, to increase the number of agreements signed, to set up the ecosystem) by recognizing the need to tailor the actions to the specific circumstances, needs and challenges of each municipality and to discuss the effective support and backing that the team and Solidar Tunisie should provide to the actions of the three municipalities.

After several postponements due to various impediments, three visits took place in Hammam Sousse,[80] Medjez El Beb[81] and Siliana.[82] The three meetings began with a presentation of the PDIA approach, then the importance of the project initiated in SBS, and finally the importance of advocating for the testing and adaptation of the project's principles in the different community contexts.

Following these three on-site meetings and the resulting consolidation of collaboration, the team

82- The meeting took place on January 24, 2024. The Secretary General stated that the municipality is currently using the collection cost applied by the private company responsible for waste collection in certain areas, considering it not to be the correct method of calculation, as it does not reflect the actual true cost of waste collection. Indeed, the currently calculated cost is merely the result of dividing the total expenses paid by the municipality to the private company by the total volume of waste. The official believes that waste characterization is necessary, not only for calculating the true cost but also for determining the quantity of recyclable waste for the waste pickers and EOPs wishing to work with these recyclable materials. Regarding the municipality's needs, the municipal officials indicated that they had already conducted a census of EOPs. What the team needs is support for waste characterization, calculating the actual cost, optimizing routes, and especially training municipal agents to engage EOPsin selective sorting and signing agreements with the municipality. In return, the municipality can provide data related to the number of EOPs, the quantity of waste, and the routes currently adopted for waste collection. The officials also expressed their commitment to facilitating the recruitment of the expert and providing the necessary documents for the project's implementation.

83- Few EOPs had signed the agreements (except for the 8 largest merchants) even though it is the municipality that takes responsibility for collecting their waste, at a cost of 18 millimes / liter (according to the last update, made in 2016).

proceeded to recruit the expert, present a written summary of the week's work at team meetings, and initiate specific follow-up for each municipality.

### B- Specific monitoring of implementation progress for each municipality concerned

- The Municipality of Hammam Sousse

The officials reaffirmed their commitment to the project, as evidenced by their provision of certain data and their request for specific support. The team, for its part, outlined the details of the mission in Hammam Sousse before proceeding with its implementation and subsequent evaluation.

#### ∞ A clear municipal commitment to the project

Notwithstanding the fact that it already had a census of EOPs and several specific collection routes for different types of waste, the objective of the municipality was clear. On the one hand, it aimed to increase the number of agreements by encouraging EOPs to adhere thereto in order to optimize their costs;[83] and, on the other hand, to increase the quantity of recoverable waste for improved valorization.

#### ∞ An updated assessment presented by the Municipality of Hammam Sousse

- Data preparation: The Municipality of Hammam Sousse has compiled data on waste and cost calculations for waste management, including a list of primary waste producers.
- Census of establishments: The municipality has identified 32 hotels, 26 tourist restaurants, 100 fast-food outlets, 134 cafeterias, and 100 garages.
- Challenges in agreement adherence: Despite a dedicated circuit for waste from economic operators (EOP), very few contribute to waste collection costs. There is a significant opportunity for the municipality in this regard.
- Selective sorting bins: The possibility of purchasing selective sorting bins was discussed, with potential for the municipality or waste producers to deduct the cost from the tax base.
- Financial constraints: Mrs. Hafidha emphasized the financial constraints faced by municipalities, highlighting their focus on generating additional resources rather than incurring further expenses.

#### ∞ The assistance needs of the Municipality of Hammam Sousse

The municipality, already advanced in waste management, expressed the need for:

- Technical assistance: Support from Solidar to train personnel on verifying cost calculations and preparing reports, as well as enhancing communication efforts to persuade waste producers (EOP) to adhere to municipal conventions.
- Questionnaire sharing: Access to the questionnaire used in Sidi Bou Saïd for EOPs to enable Hammam Sousse Municipality to enhance its strategy for gathering extensive data.
- Cost calculation update: An update and validation of the cost calculations already conducted by the municipality since 2021.
- Communication strategy: Development of a communication strategy aimed at encouraging and convincing EOPs to sign agreements and pay their fees. In this regard, the team revised the terms of reference for the expert to align with Hammam Sousse's needs by adding "the development of a communication strategy to engage EOPs in signing agreements based on the accurately calculated cost of waste collection."
- Expert recruitment: The recruitment of an expert to assist the municipality in implementing the ongoing project. Mr. Wahid JENHANI was proposed by the municipality for this mission.

#### ∞ Temporary reluctance on the part of the Municipality, quickly overcome by consolidation of authority

Due to delays in recruiting the expert (publication of the terms of reference and the selection process), the deadline established by the team for project completion (end of April 2024) and the absence of a formal collaboration agreement with Solidar, the municipality of Hammam Sousse expressed uncertainties about its future and opted to hold off until matters were clarified. Municipal officials requested a correspondence reaffirming Solidar's commitment to work in Hammam Sousse to implement the PDIA waste management initiative. Consequently, an email

84- This meeting took place at Solidar's offices on April 17, 2024.

was dispatched to the municipality to formalize the action, and the team suggested commencing without further delay, advocating for the swift recruitment of the expert, as anticipated by municipal officials. The reinforcement of authority was crucial to prevent the cessation of collaboration.

In this context, Mr. Wahid JENHANI was designated as the expert to oversee the initiative in Hammam Sousse. The expert coordinated with Mr. Tarek Ben Amor at the municipality to initiate the project, and the team recommended a personal meeting with the expert at Solidar to facilitate a clearer understanding of the mission.[84] This meeting served as a vital forum for dialogue between the Solidar team, acting as a support entity, and the expert. It was instrumental in clarifying the expert's mission: to formulate an action plan for waste management activities in Hammam Sousse, employing the PDIA approach to achieve precise calculations of the real costs associated with waste collection, drawing inspiration from the SBS iteration.

To augment municipal revenues, the municipality should actively encourage EOPs in Hammam Sousse to enter into covenants. However, the expert's work must be tailored to the municipality's needs, necessitating an on-site assessment to verify existing data, establish waste collection routes, determine container zoning, and ascertain whether collection is managed by the municipality or the private sector, as well as to calculate the cost of waste collection per ton for optimizing expenses.

The expert highlighted the dynamic role of civil society in Hammam Sousse, emphasizing its importance as a bridge between the municipality and citizens, which can foster greater acceptance of the initiative. Additionally, the expert underscored the necessity of characterizing waste to analyze its composition, while also stressing the modernization of sorting infrastructure and the implementation of a questionnaire aimed at encouraging EOPs to adhere to municipal conventions. This approach aligns with the aspirations of Hammam Sousse to ensure the effective commencement of the initiative.

### ∞ Initiative implementation in Hammam Sousse

The municipality was eager to swiftly initiate the implementation of the initiative, particularly following the official recruitment of the expert. The prospects for success were promising for at least two reasons. Firstly, the municipality's experience in waste management was notably advanced, exemplified by the application "Hammamia," which tracks waste collection routes. Secondly, the perceived high level of authority within the Hammam Sousse municipalities suggested a favorable progression for the project. Indeed, municipal officials have repeatedly expressed their strong commitment to adopting this initiative to enhance waste management in the city. To this end, they established clear objectives and priorities.

#### © Objectives of Hammam Sousse Municipality: Bring the biggest polluters on board

Before submitting his initial report and the proposed action plan, the expert visited the site and identified the relevant establishments (100 in total, all significant waste producers) along with the areas where the activity would be implemented. The preliminary objective is to sign 100 agreements and subsequently extend this to all establishments. The expert also identified the municipal working team responsible for conducting the questionnaire among the establishments over the course of a week to collect the necessary data.

#### © Priority action choices of Hammam Sousse: Encourage massive, yet gradual, EOP enrollment on the basis of current, rather than actual, costs, with the involvement of civil society.

The municipality has decided to encourage EOPs to sign the agreements by reducing collection charges based on the volume of recoverable waste generated through selective sorting. The goal is to have 100 EOPs sign the municipal waste collection agreement.

To this end, the municipality opted not to establish the waste collection fees included in the agreements based on actual cost calculations.[85] Instead, they chose to implement acceptable fees (18 millimes per liter, as opposed to the previous rates of 8 and 9 millimes) that will increase gradually over time. This decision aligns with the municipality's prioritized objectives. Initially, the most critical aspect for the municipality is to secure adherence to the agreements with a minimum volume of waste, rather than focusing on immediate revenue increases. In fact, a high level of adherence to the agreements (without any changes in fee amounts) would enable the municipality to ensure a significant number of EOP members, thereby leading to substantial additional resources compared to the

85- The team discussed the amount of the convention fees. The members decided to maintain the fees set by the municipality if they are deemed acceptable. There is no need to wait for the determination of the actual cost of waste collection (as was the case in Siliana).

86- Originally scheduled for May 12, 2024.

previously collected amounts from a minimal number of members.

To reach the target of 100 EOP members, the municipality is counting on the support of local associations in Hammam Sousse, including the "AL-FELL" association, JCI, and the Hammam Sousse Scouts. To facilitate this, on May 11, 2024,[86] the municipality organized a major meeting at its premises, attended by representatives from 3 EOPs, 4 associations and the municipality's survey team. The aim of this initiative was to raise awareness about and communicate the benefits of joining the municipal agreement, thereby reinforcing municipal support for waste management. The team emphasized the importance and necessity of mobilizing partner civil society associations to implement awareness-raising efforts as soon as possible.

The meeting was co-chaired by Mr. Tarek Ben Amor, Director of Cleanliness for the municipality of Hammam Sousse, and Mr. Wahid JENHANI, the recruited expert. The participants opted for a door-to-door approach to persuade EOPs to sign the agreements and pay local fees. Civil society in Hammam Sousse participated alongside the team in this communication effort, assisting the municipality in promoting awareness of selective sorting through the distribution and collection of the questionnaire. This will help monitor the adoption of the agreements and strengthen the relationship between citizens, civil society, and the municipality. The action aims to influence the largest waste producers in Hammam Sousse, including cafés, restaurants, bakeries, pastry shops, and party halls.

In preparation for the event, the team reviewed and discussed the questionnaire to be distributed on the day of the meeting, suggesting a few adjustments regarding waste management and commercial waste collection. They aimed to simplify the questionnaire by reducing the number of questions to no more than 20 and avoiding technical jargon to ensure it remains accessible to the target audience.

### ∞ Evaluation of the Hammam Sousse initiative

The expert prepared tables presenting the key performance indicators (KPIs), illustrating the impact of the activity "before and after" its implementation.

This work significantly influenced the policy on household waste management and similar waste. However, this achievement was not easily attained. The team faced an operational challenge in experimenting with this new method to drive change by presenting solutions to policymakers, especially those with significant influence over decision-making, such as authorities, institutions, or individuals whose weight or advocacy can sway outcomes. They aimed to convince these authorities of the validity of the proposed alternatives by articulating compelling arguments in favor of such solutions. Their task was further complicated by the need to persuade these same authorities of the importance of iteration and the lessons learned, which are essential for evaluating the actions taken and revising them as necessary.

# Conclusion

Throughout this case study, we observed a series of interventions and measures implemented to enhance waste management in Tunisia. Several workshops were organized to raise awareness and engage various stakeholders. The results from the initial iteration at the municipality of Sidi Bou Said reveal a degree of initial reluctance among EOPs to adhere to selective sorting agreements. However, a participatory and incentive-driven approach proved to be more effective than a coercive method.

Ministerial support from both the Ministry of Environment and the Ministry of the Interior, along with the commitment of local authorities, played a crucial role in advancing the project. The Ministry of Environment showed sustained interest in the initiative, while the Ministry of the Interior reaffirmed the importance of waste management by municipal authorities.

Final results indicate a positive evolution, marked by an increase in EOPs' adherence to agreements and improved tax revenues for the municipality. Nevertheless, it is essential to continue optimizing collection routes and strengthening communication and awareness efforts to ensure effective and sustainable waste management for a cleaner Tunisia.

The efforts made have laid the groundwork for more efficient waste management, but ongoing improvements and adaptations to emerging challenges remain necessary to sustain the gains achieved and meet sustainable development goals.

CONCEPTION ET RÉALISATION : OCTOPUS STUDIO 23 355 926

www.solidar-tunisie.org

Solidar سوليدار تونس Tunisie

HEINRICH BÖLL STIFTUNG
TUNISIE
Tunis

14 Rue Mohamed el Gharbi manar 2, Tunis Tunisie
**E-MAIL :** contact@solidar-tunisie.org

SolidarTUNISIE @Solidartn