SMART WASTE, CLEANER CITIES: How Tunisia's Coastal Communities Are Outsmarting the Trash Crisis (Cases of Sousse & Kerkennah)

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When the Mediterranean Sends an SOS

Tunisia's cities can be pioneering sustainable and smart solutions that turn. Despite that fact, most of its coasts, facing immense pressure from tourism, plastic pollution, and limited resources, are emerging as unexpected pioneers of urban innovation. In some neighborhoods, in few areas of the coastal cities Sousse and Kerkenah, stench of rotting waste hits visitors before the sea breeze does."

On Kerkennah's postcard-perfect shores, a global tide of plastic pollution - bottles from Europe, packaging from Asia, fishing gear from Africa - transforms some parts of the coastline and beaches into landfills. Just 150km north in Sousse, overflowing bins near the ancient Medina sometimes assault the senses of some tourists drawn to its rich history. This isn't merely an aesthetic crisis - it's an economic emergency. In these communities where tourism provides moste of time about 1 in 3 jobs, dirty streets directly threaten livelihoods. But an unlikely hero is emerging: digital innovation. Can transform citizen behavior into actionable data, enabling industries to implement targeted, sustainable solutions that reduce waste and plastic pollution at scale. By pragmatically blending digital technology with local context, they are developing a powerful playbook for the developing world. These initiatives demonstrate that advanced technology can deliver the greatest impact when it is tailored to local realities and integrated into the community's social and economic fabric.

While both Sousse and Kerkennah face the urgent challenge of coastal waste management, their adoption of smart technologies reveals a telling contrast shaped by resources and context. Inspired by smart city models from Europe and Asia, the municipality of Sousse has implemented an integrated digital system featuring GIS-enabled "talking trash cans." These system-equipped bins provide real-time alerts to collection teams, drastically reducing overflowing waste and improving urban hygiene. This system is further optimized by GIS system that analyze data from GPS-tracked trucks and bin devices to design highly efficient collection routes, slashing fuel consumption and operational costs and creating a virtuous cycle of re-investment into urban services. In stark contrast, the island community of Kerkennah, lacking the budget for such advanced infrastructure, has pioneered a context-driven, low-tech ingenuity. Without GPS or any GIS networks, Kerkennah's solution lies in a powerful blend of community mobilization and circular economy principles, such as upcycling discarded fishing nets into marketable products. This divergence underscores the central lesson of their collective playbook: whether high-tech or high-touch, the most sustainable solutions are not merely imported but are profoundly tailored to

local economic realities and social fabrics, proving that effectiveness is not solely defined by the complexity of the technology but by its appropriateness to the community it serves. From fishermen upcycling nets into fashion to hotels funding smart bins through taxes, these communities are writing a playbook for the developing world. Their lesson?

Advanced technology works best when tailored to local realities.

As climate change intensifies Mediterranean pollution, Tunisia's cities digital waste revolution offers hope - proving that innovation can flourish even in resource-constrained environments. The question isn't whether this model can work elsewhere, but how quickly it can spread : *"We're not just cleaning streets - we're rebuilding pride in our communities,"* says a Sousse sanitation worker. In the global fight against urban waste, Tunisia's coasts have become unexpected laboratories for the future.

The Invisible Heroes – How Tech Works Behind the Scenes

The contrasting approaches of Sousse and Kerkennah perfectly illustrate how digital innovation must be tailored to local realities to be effective. Sousse, a large tourist hub, has implemented a comprehensive municipal system leveraging GPS localization in "talking" smart bins, and GIS-powered route optimization. This tech-driven approach has slashed fuel costs, reduced overflowing bins , and created a gamified recycling process that tried engages some citizens. Meanwhile, the island community of Kerkennah, facing geographic isolation and budget constraints, has pioneered ingenious, low-tech hybrids instead. Their solutions—like GPS- to prevent theft and using traditional tools to transport waste—forego expensive city-wide networks for resilience and practicality. Together, they prove a powerful lesson: success isn't defined by the level of technology itself, but by its smart adaptation to local needs, budgets, and community contexts, offering a scalable blueprint for cities worldwide.

Islands vs. Cities – Two Labs for Innovation

Facing no landfill space and costly waste shipments to the mainland, Kerkennah developed creative solutions:While the city of Sousse has pursued a tech-forward strategy, implementing a municipal waste system using GPS localization to optimize collection, the island of Kerkennah has forged a different, context-driven path out of necessity. Without the same resources, Kerkennah exemplifies how island ingenuity can overcome geographic limits through creative, circular solutions. There, abandoned fishing nets are upcycled into high-end accessories by local designers, transforming an environmental hazard into a source of jobs and artistic opportunity. Furthermore, the community has innovated by blending tradition with innovation, pairing waste compactors with traditional tools to reduce volume and transport costs efficiently. In contrast, Sousse leverages its tourism economy to fund its digital green transition, using a " tax" on hotels to finance smart infrastructure and incentivize volunteer cleanups, a strategy that has already boosted its cleanliness ratings and proven that sustainability attracts tourists. Together, these cases demonstrate that the most effective and resilient urban solutions are not universally high-tech but are tailored and hybrid, successfully blending local practices, cultural assets, and modern technology to turn unique waste challenges into sustainable community assets.

Policy Wins (and What Still Keeps Mayors Awake)

Tunisia's coastal cities demonstrate a powerful contrast in waste management: Sousse has

successfully implemented a municipal system using GPS localization to optimize collection routes and reduce operational costs, while Kerkennah, lacking such advanced tools, has instead pioneered context sensitive solutions that turn constraints into opportunities—such as creating green jobs training youth to maintain and introducing the "FreePlastic " program, which incentivizes recycling across generations by offering discounts at local fish markets. Despite challenges low smartphone usage among elders, Kerkennah adapted with local community engagement, proving that successful sustainability initiatives hinge not on technology alone, but on designing systems that generate local jobs, align with cultural practices, and adapt to community realities—offering a scalable model of inclusive, pragmatic innovation for regions worldwide.

The Big Picture: Why the World Should Watch

Tunisia can offer a powerful model for cities worldwide, demonstrating that high-impact smart waste management doesn't require high-cost systems. As highlighted in the Tunisian government's recent decisions (Small Cabinet, March 2025), projects like biogas valorization in Sousse and new waste treatment units not so far from Kerkenah in Sfax region show how strategic, cost-effective technology deployment—coupled with community engagement like involving religious leaders in recycling campaigns—delivers tangible results. The Tunisian playbook proves that blending cultural intelligence with appropriate technology creates more sustainable impact than expensive systems alone. This approach is particularly valuable for European cities facing budget constraints, developing nations seeking affordable solutions, and communities worldwide needing adaptable, inclusive systems that bridge traditional practices and smart innovation.

A Vision for the Future , From Trash to Treasure

According to civic society, , children collected in last month in Kerkennah an important number of tons of plastic waste - not just for cleanup, but to literally "purchase" a new football field for their community through a recycling rewards program. Meanwhile in Sousse, a French tourist's video of a smart bin automatically alerting a garbage truck became a viral sensation under #WasteGoals, showcasing Tunisia's innovative spirit to the world.

These stories capture the heart of true sustainability: It's not about flawless technology or unlimited budgets, but about empowering people to be part of the solution. As a Sousse waste collector poignantly shared: *"We're not just moving trash anymore. We're moving minds."*

This grassroots transformation proves that when communities see tangible benefits - whether a football field or global recognition - environmental action stops being a chore and becomes a source of pride. Tunisia's waste revolution reminds us that the most powerful sustainability solutions are those that connect directly to people's lives and aspirations.

Why This Matters:

The immense potential of digital waste as a resource remains largely untapped, as highlighted by the reality faced by informal collectors, or "barbechas," —[processing up to 6,000 tonnes annually](#) — who hand-collect waste from many Tunisian cities streets like Sousse and Kerkenah islandwhile the state spends significant sums on landfilling instead of recognizing waste as a financial asset, as seen in Europe.

This underscores a crucial lesson: true sustainability centers on people, not just infrastructure. By integrating technology—such as gamified recycling apps and smart devices—Sousse and Kerkenah can catalyze behavioral change, turning citizen actions into impactful habits. These community-driven, tech enhanced models not only **humanize sustainability but also offer replicable blueprints for cities worldwide**, demonstrating how aligning local culture with innovation can transform waste from a burden into an opportunity for inclusive and lasting environmental progress…

ACKNOWLEDGEMENTS

SUPPLEMENTAL MATERIALS

1. Voices from the Field *(Audio snippets available via QR code)*
- A Kerkennah fisher demonstrating net recycling
- Sousse app developer explaining gamification

2. By the Numbers (using interviews analysis results)

3. Further Exploration
- **Watch**: *"The Bin That Changed Our Town"* (Al Jazeera short doc)
- **Try**: Sousse's recycling app demo (iOS/Android)