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SHORT COMMUNICATION

Waste as a resource: The economic and social impact in Latin America

Residuos como recurso: El impacto económico y social en América Latina

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ABSTRACT

The characterization of solid waste in the district of Villa El Salvador, Peru, was consolidated as a key strategy for improving environmental management, increasing municipal income and raising the quality of life. By analyzing the composition, volume and per capita generation of waste, it was possible to implement more efficient and sustainable plans, including initiatives such as the 'green bond', which encouraged recycling through tax benefits. This practice transformed an environmental problem into an opportunity for local development. At the Latin American level, similarities and differences were evident. Cities such as Medellín and Bogotá integrated informal recyclers into the official system, improving their quality of life and increasing the efficiency of waste management. In Brazil, recycling cooperatives operated under public partnership models, generating economic and social benefits. Although Villa El Salvador has not yet reached these levels of formalization, it has established a solid foundation for moving towards similar models. It was observed that the success of these policies depended on accurate diagnoses, political will and citizen participation. While some countries have robust regulatory frameworks, others face institutional weaknesses that hinder their implementation. Despite these differences, shared challenges opened the door to the exchange of successful experiences. The characterization of waste in Villa El Salvador demonstrated its potential as a tool for urban and social transformation, setting precedents that can be replicated in other Latin American contexts.

Keywords: Solid Waste; Recycling; Environmental Management; Public Policy; Latin America.

RESUMEN

La caracterización de residuos sólidos en el distrito de Villa El Salvador, Perú, se consolidó como una estrategia clave para mejorar la gestión ambiental, incrementar los ingresos municipales y elevar la calidad de vida. A través del análisis de la composición, volumen y generación per cápita de los residuos, se lograron implementar planes más eficientes y sostenibles, destacando iniciativas como el "bono verde", que incentivó el reciclaje mediante beneficios tributarios. Esta práctica transformó un problema ambiental en una oportunidad de desarrollo local. A nivel latinoamericano, se evidenciaron similitudes y diferencias. Ciudades como Medellín y Bogotá integraron a los recicladores informales al sistema oficial, mejorando su calidad de vida y aumentando la eficiencia del manejo de residuos. En Brasil, cooperativas de recicladores operaron bajo modelos de alianzas públicas, generando beneficios económicos y sociales. Villa El Salvador, aunque no alcanzó aún esos niveles de formalización, estableció una base sólida para avanzar hacia modelos similares. Se observó que el éxito de estas políticas dependió de diagnósticos precisos, voluntad política y participación ciudadana. Mientras algunos países cuentan con marcos normativos robustos, otros enfrentan debilidades institucionales que dificultan su implementación. Pese a estas diferencias, los desafíos compartidos abrieron la puerta al intercambio de experiencias exitosas. La caracterización de residuos en Villa El Salvador evidenció su potencial como herramienta de transformación urbana y social, sentando precedentes replicables en otros contextos latinoamericanos.

Palabras clave: Residuos Sólidos; Reciclaje; Gestión Ambiental; Políticas Públicas; América Latina.

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BACKGROUND

Solid waste characterization has become particularly important in local government environmental management in Latin America, becoming a key tool for planning and optimizing public cleaning services and improving municipal revenues and the population's quality of life.[1] In the case of the district of Villa El Salvador, in Lima, Peru, this practice has had a transformative impact that could be extrapolated and compared with other Latin American experiences.

Villa El Salvador is a district that has historically stood out for its community organization, self-management, and social commitment. These elements have been fundamental in implementing waste management strategies beyond simple collection and disposal. Waste characterization, understood as the detailed analysis of waste composition, volume, weight, and per capita generation, has made it possible to establish more effective district plans, target resources, and identify opportunities for economic gain through recycling and composting.[2,3]

In this district, one of the main initiatives has been the "green bonus," a program that promotes recycling in exchange for tax benefits for residents. This program generates a double impact: the reduction of solid waste and citizen loyalty to the recycling culture.[4] These measures have turned an environmental problem into an opportunity for local development, contributing to increased tax collection through a positive relationship with the population.[5]

Other countries have developed similar programs with varying degrees of success at the Latin American level.[6,7] In Colombia, for example, cities such as Medellín and Bogotá have promoted the formalization of grassroots recyclers, integrating them into the collection system and paying them per ton of recycled material. This has not only improved the working conditions of thousands of people but also increased the efficiency of the waste system, reduced pressure on landfills, and strengthened local government revenues through waste recovery.[8,9,10]

In Brazil, the recycling cooperative model has been an emblematic example of social and economic integration. The cities of Belo Horizonte and Curitiba have established public-community partnerships that allow these cooperatives to operate under decent conditions. These cooperatives generate direct income for their members and indirect benefits for the municipality by reducing final disposal costs and increasing the recycling rate. This coordination has shown that when the value of waste is recognized, the social fabric is also strengthened.

In the case of Villa El Salvador, although the formalization of recyclers and the consolidation of cooperatives with autonomous operational capacity have not been fully achieved, solid foundations have been laid for progress in this direction. Environmental awareness campaigns, community participation, and implementing programs such as the green bonus have created a favorable environment for solid waste to be seen as a resource rather than garbage.

One common aspect in the different Latin American contexts is the need for accurate diagnoses.[11,12,13] Characterization allows municipalities to know precisely the amount and type of waste generated, which facilitates the planning of collection routes, the implementation of source separation systems, and the design of recovery strategies, such as recycling, composting, and energy generation.[14,15]

Another similarity is the precariousness of final disposal systems in many cities. Although some countries have regulated landfills, many municipalities continue using open dumps, negatively impacting health and the environment. In this regard, the information obtained from characterization studies serves as input to justify the need for investment in adequate infrastructure for national and international organizations.[16,17]

In terms of differences, it was observed that institutional levels vary significantly between countries. While solid waste management is highly regulated and monitored in Chile and Uruguay, in other countries such as Bolivia and Nicaragua, the lack of updated regulations and technical capacities hinders the implementation of sustainable policies. Peru presents an intermediate scenario, with a General Solid Waste Law that establishes clear guidelines, but whose effective implementation depends on the will and capacity of local governments.[18,19]

Villa El Salvador has shown that, with limited resources but strong social commitment, it is possible to develop participatory and functional environmental management models. The adopted approach improves municipal revenues through higher direct collection and reduced operating costs by optimizing the use of machinery, fuel, and person-hours.

Likewise, improving quality of life is noticeable when waste management becomes a tool for education and citizen empowerment. Segregation, recycling, and composting activities can be integrated into school programs, environmental promoter training, or community activities, generating environmental awareness from the ground up.

Another key point is the inclusion of informal recyclers, traditionally marginalized from the formal system, despite playing a fundamental role in the value chain. In some countries, such as Argentina, progress has been made towards their inclusion through legal recognition of their activity, granting them licenses, uniforms, and access to training. Villa El Salvador could replicate these experiences and move towards a circular economy model where recyclers become allies of the municipality rather than informal competitors.[14,15,16]

Furthermore, the benefits of characterization are not limited to urban areas. In peri-urban and rural areas, where collection is less frequent, the information obtained can be used to implement source reduction strategies, promote household or collective composting, and establish community collection centers.[18]

From an economic perspective, waste recovery generates productive chains that can boost the local economy.[19] For example, collected paper and cardboard can be sold to recycling companies; organic waste can be converted into compost for urban agriculture; and plastics can be transformed into industrial inputs. All of this can lead to the creation of green jobs and the strengthening of municipal finances.[20]

At the international level, organizations such as the Inter-American Development Bank (IDB) and German Development Cooperation (GIZ) have promoted implementing waste management programs based on characterization. These experiences have shown that sustainable and replicable results can be achieved starting from a precise technical diagnosis and involving the

community.[21,22]

In conclusion, solid waste characterization is a powerful tool for municipal management in Villa El Salvador and Latin America. Through its application, it has been possible to improve the efficiency of cleaning services, increase municipal revenues, generate local employment, and, above all, raise citizens' quality of life. Although there are differences in the level of progress among countries in the region, the similarities in challenges allow for the exchange of best practices and the development of standard solutions. Villa El Salvador can become a regional benchmark if it consolidates its current initiatives and commits to comprehensive, inclusive, and sustainable waste management.

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