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Scientific articles

**Propuesta de gestión de residuos de manejo especial como parte
de la Economía Circular en el Estado de Jalisco, México**

***Proposal for special waste management as part of the Circular Economy in
the State of Jalisco, Mexico***

***Proposta para a gestão de resíduos de manuseio especial como parte da
Economia Circular no Estado de Jalisco, México***

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Resumen

Los efectos de la Economía Lineal en Jalisco representan una alta generación de residuos que ubican a la entidad como la tercera generadora de residuos a nivel nacional derivado de un marco jurídico limitado y de una política pública que, si bien incluye la Economía Circular, esta es orientativa y no obligatoria. El objetivo de la investigación fue generar una propuesta normativa de gestión de residuos de manejo especial (RME) de acuerdo con los principios de la Economía Circular en el Estado de Jalisco, México. En este contexto, la investigación fue de tipo cualitativa con alcance descriptivo, delimitando el estudio al año 2025, partiendo de la pregunta: ¿Cómo se pueden incluir los postulados de la Economía Circular a nivel normativo en Jalisco en la gestión de residuos de manejo especial? Los resultados arrojaron que Jalisco tiene la voluntad y el potencial para transitar a la Economía Circular; sin embargo, su implementación debe robustecerse con normas específicas que la contemplen expresamente; también se observó que es necesario fijar objetivos mínimos de reciclaje y reúso de los residuos. Se concluye con una propuesta de modificación de la Ley de Gestión Integral de los Residuos del Estado de Jalisco para integrar los postulados expuestos y se propone integrar al registro de plan de manejo de residuos de manejo especial el porcentaje de reutilización del residuo en el mismo tipo de productos o en distintos productos o subproductos para determinar el impacto de la reutilización de residuos en la Economía Circular del Estado de Jalisco.

Palabras clave: Economía circular, gestión integral de residuos, residuos de manejo especial, desarrollo sostenible.

Abstract

The effects of the linear economy in Jalisco represent a high level of waste generation, placing the state as the third largest waste generator nationwide. This is due to a limited legal framework and a public policy on the circular economy that is advisory and not mandatory. The research objective was to generate a regulatory proposal for special waste management (SWM) in accordance with the principles of the circular economy in the State of Jalisco, Mexico. The study was qualitative with a descriptive scope, and was limited to the year 2025. The study was based on the question: How can the postulates of the circular economy be included in the legal framework in Jalisco regarding special waste management? Results showed that Jalisco has the will and potential to transition to the circular economy; however,



the implementation of this economic model must be strengthened with specific regulations that expressly address it. It was also observed that it is necessary to set minimum targets for recycling and reusing waste. It is concluded that there is a need to modify the *Ley de Gestión Integral de los Residuos del Estado de Jalisco* to incorporate the postulates of the circular economy. It is also proposed that the special waste management plan registry include the percentage of waste reused either in the same product type or different products or byproducts to determine the impact of waste reuse on the circular economy of the State of Jalisco.

Keywords: Circular economy, integrated waste management, special waste management, sustainable development.

Resumo

Os efeitos da economia linear em Jalisco resultam em uma alta geração de resíduos, colocando o estado como o terceiro maior gerador de resíduos do México. Isso se deve a um arcabouço legal limitado e a uma política pública que, embora incorpore princípios da economia circular, apenas fornece diretrizes e não os impõe. O objetivo desta pesquisa foi desenvolver uma proposta regulatória para a gestão de resíduos de tratamento especial (RTE) de acordo com os princípios da economia circular no estado de Jalisco, México. Nesse contexto, a pesquisa foi qualitativa, com escopo descritivo, limitando o estudo ao ano de 2025. Iniciou-se com a seguinte questão: Como os princípios da economia circular podem ser incorporados ao marco regulatório para a gestão de RTE em Jalisco? Os resultados mostraram que Jalisco tem a vontade e o potencial para a transição para uma economia circular; no entanto, sua implementação deve ser fortalecida com regulamentações específicas que a abordem expressamente. Observou-se também a necessidade de estabelecer metas mínimas para a reciclagem e reutilização de resíduos. O estudo conclui com uma proposta de emenda à Lei de Gestão Integrada de Resíduos do Estado de Jalisco para incorporar os princípios descritos acima. Propõe-se ainda a inclusão no cadastro do plano de gestão de resíduos especiais da porcentagem de reutilização de resíduos no mesmo tipo de produto ou em produtos ou subprodutos diferentes, para determinar o impacto da reutilização de resíduos na Economia Circular do Estado de Jalisco.

Palavras-chave: Economia circular, gestão integrada de resíduos, resíduos especiais, desenvolvimento sustentável.



Introduction

Currently, business organizations are responsible for generating products (goods and services) that satisfy a need or desire of their consumers with the purpose of generating well-being. However, due to these mass production processes, there has been environmental degradation and a decrease in resources; conversion into polluting waste and waste management problems (Mora et al., 2022).

Consequently, the planet is in a crisis situation in various sectors, such as the economic, social, health and ecological sectors, because the current Linear Economy model puts human needs above environmental limits so that its vision is completely anthropocentric (Da Costa, 2022).

At the local level, the effects of the Linear Economy in Jalisco represent a high generation of waste, since as Serrano (2023) mentions, a person in the state produces around 1 kilogram of garbage per day, which places Jalisco as the third state with the highest generation of waste in the country.

Additionally, according to calculations by the Ministry of Environment and Territorial Development ([SEMADET], 2022), “an estimated generation of 21 million 164 thousand tons of RME annually; that is, a generation of 57 thousand 983.57 tons per day” (p. 56), with the construction and demolition industry, retail trade, livestock establishments, as well as the tequila and manufacturing industries as sources of waste (SEMADET, 2022).

In this context, this article aims to generate a regulatory proposal for the management of special handling waste (SWW) in accordance with the principles of the Circular Economy in the State of Jalisco, Mexico; for which, the study was qualitative with a descriptive scope and limited to the year 2025. The research question was: How can the postulates of the Circular Economy be included at the regulatory level in Jalisco in the management of special handling waste?

The study of waste at the local level is socially relevant because many of these wastes derive from a production model based on a Linear Economy that is only concerned with the exploitation of natural resources for the manufacture of consumer products, their use and their subsequent disposal (Mendoza-Rangel & Díaz-Aguilera, 2023); mainly it has been responsible for generating more pollution and a waste of natural resources (Rodríguez & Rivera, 2022).



In this line of thought, the implementation of proposals at the local level could result in better use of waste to prevent its generation and, if it does occur, reduce the creation of new waste, since according to SEMADET (2022) of the 1,272 companies authorized for waste management in the State, the vast majority (58%) are focused on collection and transportation; in contrast, 6% focus on recycling and only 1% of them focus on reuse.

It is also worth noting that the practical relevance of the research lies in generating a formal proposal for incorporating the Circular Economy into the State's regulations, since, although there is a document entitled "Design of a roadmap for the establishment of a circular economy model for strategic sectors in the industry of Jalisco" by the International Consulting Firm DEUMAN (2023) prepared for SEMADET and the Ministry of Economic Development (SEDECO), it is only a consultative document, not binding on the authority.

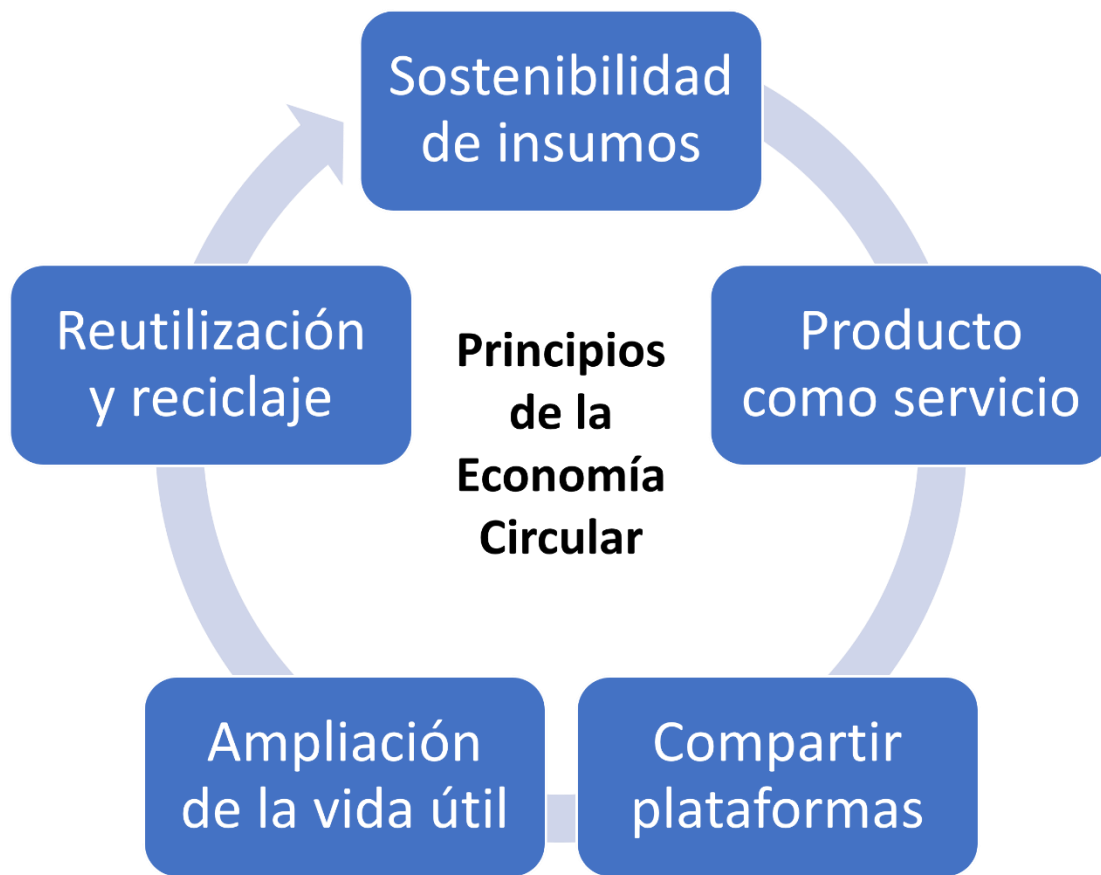
Literature review

Concept of Circular Economy

The concept of Circular Economy emerged from the publication “ *Economics of Natural Resources and The Environment* ,” developed by environmental economists David W. Pearce and R. Kerry Turner, is based on a fundamental principle: “Everything is an input for everything else” (Espinoza, 2023; Núñez-Tabales, Del Amor-Collado & Rey-Carmona , 2021). However, McDonough and Braungart (as cited in Núñez-Tabales, Del Amor-Collado & Rey-Carmona , 2021) expanded this new concept by applying it to various production processes, taking into account all the phases involved in their manufacture, such as the extraction of natural resources as raw materials, their processing into consumer products, their use, and subsequent disposal.

Ruiz (2022) summarizes the principles of the World Economic Forum for the Circular Economy as shown in Figure 1.

Figure 1. Principles of the Circular Economy



Source: Prepared by the author based on Ruiz (2022)

Thus, the Circular Economy is based on the 6Rs, which have the main objective of managing waste so that it can be used in the future creation of new consumer products, through recycling , *repair* , *refurbishment* , *remanufacturing* , reduction , and reuse (Ortíz - Palomino & Fernández-Bedoya, 2021).

According to Gómez-García (2024), the 6R methodology is applied to understand the product life cycle:

- 1) Recycling: the recovery of inputs and components from products that have already been discarded for use as raw materials in new consumer products.
- 2) Repair: is the restoration of some parts of products that have reached the end of their life cycle, so that they have a second life.
- 3) Renewal: is the updating of new processes derived from the previous life cycle with the purpose of making efficient use of the products and their components.
- 4) Remanufacturing : is the disassembly of used products to replace worn components and then reassemble them.

- 5) Reduction: is the decrease in the use of materials, energy and any resource necessary to produce and/or consume.
- 6) Reuse: is the use of products after their first life cycle.

According to Mora et al. (2022), the Circular Economy is based on three fundamental principles:

- 1) Preserving natural capital through the management of its resources, in such a way that controls are carried out on non-renewable resources and the use of renewable resources is balanced.
- 2) Optimize the reuse of resources through their technical and biological cycles.
- 3) To make the system more efficient through patents that in the long term reduce the damage that could be caused to the environment.

Some of the main characteristics of the Circular Economy are:

- Minimize the extraction of natural resources (González-Sánchez et al., 2023).
- Designing products for reuse, with the aim of eliminating waste, through the readaptation and recycling of their components (Rodríguez & Rivera, 2022; Soria et al., 2023).
- Extending the reuse time of raw materials, as well as improving production processes (González-Sánchez et al., 2023).
- Focus on the production chain (Rodríguez & Rivera, 2022).
- To reduce the negative impact that humans have on the environment, through awareness of the use made with natural resources (González-Sánchez et al., 2023).
- Imitating nature's reproductive processes to regenerate resources used by humans (González-Sánchez et al., 2023).
- Transforming products into services, thus avoiding the unnecessary use of materials (Rodríguez & Rivera, 2022).
- Make use of renewable energy sources (Soria et al., 2023).
- Balancing the flows of renewable resources, controlling finite stocks (Rodríguez & Rivera, 2022).
- Optimize the use of resources through the rotation of components and materials of maximum utility (Rodríguez & Rivera, 2022).
- Develop a cascading thinking approach that focuses on generating additional value from products and their materials as they cascade through other applications (Soria et al., 2023).



The Circular Economy as a production and economic model has a cross-cutting character, as it has been responsible for integrating different disciplines and very varied areas of knowledge from all sectors, such as biomimicry , new business models, bioeconomy, entrepreneurship, citizen science, nanotechnology, 3D printing, social innovation, Internet of Things, *blockchain technology* , artificial intelligence, intelligent systems, education and finance, renewable energies and biotechnology among other fields. (Imbernó & Souto, 2023; Martínez, 2020).

Furthermore, the Circular Economy also combats greenhouse gas emissions that are harmful to the ozone layer, since product development is carried out through sources that do not pollute the environment, thus seeking to reduce energy consumption and becoming an eco-friendly system (Nieto-Salas, 2021).

In the State of Jalisco, the Circular Economy is part of the Jalisco State Governance and Development Plan 2018-2024, Vision 2030, as updated in 2021 (Government of Jalisco, 2021), under the heading of environmental protection and management. This document identified the weak legal framework of the state and the deficient comprehensive management of waste as problems in this area, anticipating specific results such as waste management with a focus on the Circular Economy and the promotion of sustainable practices aligned with the Circular Economy in the state's production processes.

The management of Special Handling Waste in Jalisco

To understand waste management in the State of Jalisco, it is necessary to first identify the legal framework for waste management at the federal level, which is contained in the General Law for the Prevention and Comprehensive Management of Waste. ([LGPGIR], 2003) , which is a legal provision regulating the Political Constitution of the United Mexican States regarding environmental prevention and protection and waste management in national territory and its Regulation of the General Law for the Prevention and Comprehensive Management of Waste (RLGPGIR, 2006) , both regulations provide the framework for waste management, its classification and competence according to the level of government.

In this regard, the regulations in question provide both criteria that must be observed in the generation and management of waste in an integrated manner to prevent environmental pollution and protect human health, as well as the formulation of a basic and general

classification of waste, and the promotion of preventing its environmental generation and waste management in the national territory and at the federal, state and municipal levels.

The LGPGIR (2003) contains in its article 5 the relevant definitions on waste management, among which the following stand out: waste recovery, final disposal, generation, the generator, the manager and the large generator; among these, the integrated waste management stands out, which is defined in section X as

Article 5.- For the purposes of this Law, the following definitions apply:...

X. An articulated and interrelated set of normative, operational, financial, planning, administrative, social, educational, monitoring, supervision and evaluation actions for the management of waste, from its generation to final disposal, in order to achieve environmental benefits, the economic optimization of its management and its social acceptance, responding to the needs and circumstances of each locality or region;... (LGPGIR, 2003).

In other words, waste management always operates under a regulatory framework and has cross-cutting consequences, since it involves the operation of resources, their social use, their monitoring and, above all, the use of waste to generate an environmental benefit for the local or regional environment.

The LGPGIR (2003) also defines that a commercial or industrial establishment that generates up to 400 kg of hazardous waste is classified as a micro-generator ¹, and that one that generates an amount equal to or greater than four hundred kilograms and less than ten tons in total gross weight is considered a small generator ²; likewise, a management plan is contemplated to minimize the generation of urban solid waste (MSW) and special handling waste, as well as hazardous waste ³.

Similarly, Article 5, Section XXX of the aforementioned law defines Special Handling Waste (SWW) as “waste generated in production processes that does not meet the characteristics to be considered hazardous or municipal solid waste, or that is produced by large generators of municipal solid waste...” (LGPGIR, 2003), specifying that it is neither hazardous nor household waste. Furthermore, the regulation and legislative authority for special handling waste falls under the jurisdiction of the federal entities ⁴.

¹ Article 5, section XIX of the LGPGIR (2003).

² Article 5, section XX of the LGPGIR (2003).

³ Article 5, section XXI of the LGPGIR (2003).

⁴ Article 8 of the LGPGIR (2003).



In this regard, at the state level, the Comprehensive Waste Management Law of the State of Jalisco ([LGPGIREJ], 2007) is the most important source of public order and applicable regulations in Jalisco . The general objectives of this law are to establish public policies related to waste management in Jalisco ⁵; to promote compliance by individuals and legal entities that generate waste with measures to prevent and manage waste in order to mitigate the risks that such waste poses to health and the environment ⁶; to link waste-related activities between the State of Jalisco and its municipalities ⁷; and to promote the reuse and recovery of materials contained in the waste generated in the State of Jalisco ⁸.

The LGPGIREJ (2007) adopts the definition of Special Handling Waste (SWW) from federal legislation and adds that SWW are those wastes not considered municipal solid waste produced by large generators. SEMADET (2022) lists SWW based on the generation of less than 10 tons per year, including the industries and industrial processes listed in Figure 2.

Figure 2. Industries and processes generating RME in the State of Jalisco



Source: Prepared by the author based on SEMADET (2022).

⁵ Article 1, section I of the LGPGIREJ (2007).

⁶ Article 1, section IV of the LGPGIREJ (2007).

⁷ Article 1, section VII of the LGPGIREJ (2007).

⁸ Article 1, section IX of the LGPGIREJ (2007).

The law also includes the State Program for the Prevention and Comprehensive Management of Waste, whose most relevant points applicable to this study are (LGPGIREJ, 2007):

- a. Carry out actions that allow the reintegration of inputs or substances that can be reused or are reusable, or that are susceptible to revaluation as by-products of industrial processes;⁹
- b. Promote the proper management of waste in areas and under conditions authorized for this purpose;¹⁰
- c. Promote co-responsibility between the private sector, the public sector and waste generators in the generation of MSW and RME, as well as internalize the cost generated by its proper management;¹¹
- d. Promote the revaluation of by-products;¹²
- e. Promote the dissemination of information on the correct management of solid waste in order to undertake informed actions regarding it .¹³

Furthermore, the LGPGIREJ (2007) in its article 7 establishes the powers of the Ministry of Environment and Territorial Development (SEMADET) and below are the powers that pertain to the present investigation:

Article 7. The Secretariat, in addition to those conferred in the Organic Law of the Executive Branch, shall have the following powers:

- I. To formulate, conduct and review the state policy on special handling waste;
- II. Formulate the State Program for the Comprehensive Management of Special Handling Waste;
- III. Authorize the comprehensive management of special handling waste... (LGPGIREJ, 2007).

Therefore, SEMADET is the competent state authority to direct and evaluate whether the public policy for managing RME is correct or needs changes; in addition, it will be in charge of issuing authorizations for individuals who generate RME according to the program that the agency itself generates; according to the above, the role of this state agency is fundamental for the management of RME.

⁹ Article 11, section III of the LGPGIREJ (2007).

¹⁰ Article 11, section IV of the LGPGIREJ (2007).

¹¹ Article 11, section VIII of the LGPGIREJ (2007).

¹² Article 11, section XII of the LGPGIREJ (2007).

¹³ Article 11, section XIV of the LGPGIREJ (2007).

Materials and methods

The research was qualitative with a descriptive scope (Hernández et al., 2010) because it analyzed the management of RME in light of the Circular Economy, with the purpose of identifying common points that allow the reduction of waste generated and promote sustainable development in Jalisco.

The research was limited temporally to the regulations applicable to the management of RME in 2025 and territorially to the State of Jalisco. The study of the Official Mexican Standards of a federal administrative nature applicable to RME was excluded in order to focus the study on the regulations applicable at the state level, and therefore their analysis was not addressed.

The legal methodology for applying the law to specific cases was employed according to Ponce de León (2020) through the comparative, deductive, and systematic methods, in accordance with the methodological systematization of López (2021). The research technique was documentary.

First, relevant literature related to the topic was searched, as well as the regulations applicable to the management of special handling waste in the State of Jalisco; subsequently, the regulations were classified according to their scope of application.

It was also noted that, based on the regulations in force in 2025, the government of the State of Jalisco established an application form for registration of RME management plan, which was classified as an administrative provision of lower hierarchy.

Subsequently, the regulations applicable to the State of Jalisco were analyzed in accordance with the principles of the Circular Economy identified in the literature, applying the comparative and deductive methods; in this way, the principles of the Circular Economy were compared with the content of the LGPGIREJ and with the RME administrative format, from which the deductions and regulatory proposals derived from said comparison were formulated.

Results

In Jalisco, waste management is defined and regulated by the LGPGIREJ (2007), although to understand its scope and limitations it is necessary to refer to the federal law (the LGPGIR, 2003). In this regard, the federal law establishes the competence of the government

regarding waste, provides the main definitions applicable to the subject, and stipulates the obligation of a waste management plan.

Based on this legal framework, the Government of the State of Jalisco is competent to regulate special handling waste. To this end, it established the “Application Form for Registration of a Special Handling Waste Management Plan” (Government of Jalisco, 2025). Currently, this form includes the following tables:

Figure 3. Stages of management of “Recoverable” Waste

Nombre del residuo (sub-clasificado).	Cantidad <u>únicamente</u> En toneladas año.	Razón social del recolector No Autorización.	Razón social del acopiador No autorización. <i>(Si su recolector lleva sus residuos directo al destino final omitir este apartado).</i>	Razón social del destino final No Autorización.
Cantidad total en toneladas año de residuos valorizados:				

Source: Government of Jalisco (2025).

Figure 4. Stages of management of “Non-Recyclable” Waste

Nombre del residuo (sub-clasificado).	Cantidad <u>únicamente</u> En toneladas año.	Razón social del recolector No Autorización.	Razón social del traslado N° Autorización. <i>(Si su recolector lleva sus residuos directo al disposición final omitir este apartado).</i>	Razón social disposición final No Autorización.
Cantidad total en toneladas año de residuos no valorizados:				

Source: Government of Jalisco (2025).

It was also found that neither the regulations nor the local formats explicitly mention the Circular Economy. It was discovered that the State of Jalisco does not have a specific regulation governing the incorporation of the Circular Economy into waste management processes, despite the fact that the Circular Economy is included as part of the public policy in the Jalisco State Governance and Development Plan 2018-2024, Vision 2030, as updated in 2021 (Government of Jalisco, 2021) .

A roadmap related to the Circular Economy was also found (DEUMAN International Consulting, 2023) which lacks regulatory support and is merely indicative and non-binding.

In this sense, it was found that Jalisco has the will and the potential to transition to a Circular Economy as evidenced in the study by the International Consulting Firm DEUMAN (2023); however, there are still regulatory and operational gaps that limit the effective integration into circular models.

Therefore, strengthening regulations to integrate the Circular Economy into the management of RME and improving the formats of the RME management plan were seen as

areas for improvement in the entity, since the principles of the Circular Economy could be incorporated within them by inserting the percentages of inclusion of reuse or recycling of RME.

Discussion

The implementation of the Circular Economy must be strengthened with specific regulations that expressly include this model in their content, which complements the studies of Canals & Estenssoro (2022) and Trejo (2024), contributing to the discussion the need for the law to incorporate provisions aimed at reducing both waste production and the depletion of natural resources.

Similarly, the area of opportunity for operational improvement with the introduction of the Circular Economy to the management of RME reinforces the conclusion of Canals & Estenssoro (2022) under which it is necessary to set minimum targets for recycling and reuse of waste.

Furthermore, the results contrast with the study by Bottausci et al. (2022) since the authors postulate the importance of integrating waste reduction and valuation into public and private policies

According to the results, it is possible to have a state policy with a Circular Economy perspective, but if a legal basis is not found that makes its incorporation into production processes and the comprehensive management of waste mandatory, it will only remain as an agenda of good corporate practices or a political idea of the administration, but it will not materialize in social and legal reality.

Thus, the proposal to include the Circular Economy in the “Application Form for Registration of a Special Handling Waste Management Plan” (Government of Jalisco, 2025) contributes to the fulfillment of the SEMADET waste reduction plan (2022). These actions are aligned with Strategic Objective 1.1, which addresses the reformulation of waste-related procedures, and Strategy 1.1, which focuses on strengthening the design of instruments to improve the reuse, recycling, and traceability of special handling waste, and with action line 1.1.4, which relates to modifying how special handling waste information is collected.

On the other hand, the limitations of the study relate to the cross-cutting nature of waste management among the different levels of government; because if the aim is for this management to be comprehensive based on a Circular Economy approach, it is necessary to

incorporate the perspectives and competencies of the three levels of government and start from a collaborative federal policy based on the competencies and powers of each authority.

Conclusions

The adoption of the Circular Economy in the State of Jalisco is a clear necessity, given the state's position in national waste generation. In this regard, the volume, composition, and production sectors of the state's waste (agribusiness, construction, manufacturing, and retail) have the potential to be recycled, repaired, refurbished, remanufactured, reduced, or reused according to the principles of the Circular Economy. However, the lack of a robust public policy on the subject and the limited number of companies authorized in the state to carry out these processes result in their limited utilization.

It is concluded that, in the specific case of Mexico, waste management cannot be analyzed or studied in isolation under a single standard, but it is necessary to understand the legislative and administrative capacities of the federation, the entities and the municipalities and to start from the powers and obligations of each level of government in order to implement the Circular Economy in accordance with its regulatory framework.

Thus, it is necessary that the regulatory framework and administrative formats relating to RME be harmonized with the principles of the Circular Economy, since, as the State Development Plan of the entity pointed out, there are legislative gaps on the subject, the regulation is oriented towards the prevention and valorization of waste, not towards the replacement of the production model of the Linear Economy.

Therefore, the research question consisting of: “ How can the principles of the Circular Economy be included at the regulatory level in Jalisco in the management of special handling waste? ” was answered by proposing the modification of the objectives of the LGPGIREJ in force in 2025 to be as follows:

Table 1. Proposed legislative amendment to the LGPGIREJ to include the principles of the Circular Economy

Current text	Proposed legislative amendment
<p>Article 2.- The objectives of this Law are:</p> <p>...</p> <p>VI. To guarantee the right of every person to a suitable environment and to promote sustainable development, through the application of principles of recovery, regulation of generation and integrated management of municipal solid waste and special handling; ...</p> <p>IX. To promote the reuse and recovery of materials contained in waste generated in the State, through the promotion, development and establishment of voluntary and flexible schemes and instruments for integrated management; and ...</p>	<p>Article 2.- The objectives of this Law are:</p> <p>...</p> <p>VI. Guarantee the right of every person to a healthy environment and promote sustainable development through the application of principles of recycling, repair, renewal, remanufacturing, reduction, reuse, recovery, regulation of waste generation and comprehensive management of municipal solid waste and special waste; ...</p> <p>IX. To promote the reuse, recycling, repair, renewal, remanufacturing, reduction, reuse and recovery of materials contained in waste generated in the State, through the promotion, development and establishment of voluntary and flexible schemes and instruments for integrated management; and...</p>

Source: Own elaboration.

Additionally, as part of the operational improvements for the Circular Economy in the management of Solid Waste Management (SWM) in the State of Jalisco, it is proposed to include circularity indicators to complement Figures 3 and 4 of the form used to register the SWM management plan. It is proposed to add a cell on the right side of the aforementioned plan form to establish the percentage of waste reuse in the same type of product or a different type of product or byproduct, in order to determine the impact of waste reuse on the Circular Economy of the State of Jalisco.

Finally, the proposed future lines of research are:

- 1) Study of the cross-cutting management (federation, federative entities and municipalities) of waste based on the Circular Economy.
- 2) Study of municipal management public policies for the adoption of the Circular Economy in the management of MSW.
- 3) Successful case studies of the application of the Circular Economy in specific industries in Mexico that serve as a reference and examples to follow for entrepreneurs, decision-makers and public administrators, among others.

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