Geoforum 161 (2025) 104243

Contents lists available at ScienceDirect

Geoforum

journal homepage: www.elsevier.com/locate/geoforum

Defending the territory by the rules: The role of environmental law in Yucatan's renewable energy conflicts

Antonio Bontempi [a,*], Ivet Reyes Maturano [b], Jazmín Sanchéz Arceo [b], Rodrigo T. Patiño Díaz [b,c]

[a] Geography Department, Universitat Autònoma de Barcelona, Catalunya, Spain
[b] Articulación Yucatán, Yucatan, Mexico
[c] CINVESTAV Unidad Mérida, Yucatan, Mexico

ARTICLE INFO

Keywords:
Law
Policy
Litigation
Extractivism
Yucatan
Renewable energy
Environmental justice

ABSTRACT

To what extent do environmental laws and policies aid in the pursuit of territorial defense and environmental justice? This article contributes to ongoing discussions on the environmental justice implications of existing institutions mobilized in the context of extractivism. It focuses on the legislative and policy frameworks and instruments influencing the development of industrial-scale renewable energy projects in the Mexican State of Yucatan. Through the analysis of nine environmental conflicts related to wind and solar parks in the region, we problematize the role of environmental laws and policies in governing Yucatan's renewable energy deployment as 'double-edged swords', disproportionately disadvantaging those defending their own territories. Controversial projects are frequently legitimized by the law, yet the procedures that authorities and developers follow are tendentially flawed. At the same time, local and Indigenous communities, along with environmental defenders, face limited access to legal recourse. We frame this analysis within critical environmental justice debates and explore how a fairer allocation of institutional power to local authorities, peoples and Indigenous communities could address environmental injustice in Yucatan.

1. Introduction

"It is clear that without environmental rule of law, development cannot be sustainable". With these words, the former Acting Executive Director of the United Nations Environment, Joyce Msuya, opens the First Global Report on Environmental Rule of Law (UNEP, 2019, vii). While the report highlights the exponential growth of environmental laws, regulations and policies implemented globally in the last half-century, it also emphasizes the need for significant efforts to ensure their effectiveness.

Indeed, if environmental laws are growing at an exponential pace, there is simultaneous ecosystem degradation and environmental injustices which are increasingly manifesting. This corresponds with the advance of what Moore (2000) first defined as 'commodity frontiers', namely the new territories capitalized by industries dedicated to resource extraction and transport, goods and energy production, and waste disposal (Martinez-Alier, 2021). In these territories, public and private investors try to secure access to environmental resources as industrial inputs, often in rural areas, for the sake of profit, frequently leveraging on discourses purporting the need for more '(sustainable) development' (Escobar, 1995; Gudynas, 2015). Consequently, local communities, which are often Indigenous people or rural populations, are commonly found to be amongst those who unjustly bear the higher share of negative implications following profit-driven developments (Gustafsson and Schilling-Vacaflor, 2022; Scheidel et al., 2023, 2020). Increasingly, individuals and collectives respond in protest against unjust environmental burdens, aiming to protect their livelihoods and territories (Scheidel et al., 2020).

The question of why a growing assortment of environmental protection laws and policy instruments cannot fully tackle environmental injustices in the context of controversial development projects has no straightforward answers. For instance, while environmental justice organizations and environmental defenders often pursue litigation as a mobilization strategy in their struggles, they may also get criminalized for their actions (*ibid.*). Meanwhile, legal frameworks are found to be used either to block or to benefit controversial development projects

* Corresponding author at: Campus de la UAB, 08193 Bellaterra (Cerdanyola del Vallès), Barcelona, Spain.
E-mail addresses: antonio.bontempi@uab.cat, antoniobontempi88@gmail.com (A. Bontempi).

https://doi.org/10.1016/j.geoforum.2025.104243
Received 12 March 2024; Received in revised form 10 February 2025; Accepted 18 February 2025
Available online 28 February 2025

(Bocanegra Acosta & Carvajal Martínez, 2019; Espinoza Hernández, 2019).

Framed within ongoing debates in extractivism and environmental justice literatures, this article contributes to understanding to which degree the environmental justice struggles are pursuable within existing legal and policy frameworks and instruments, and furthermore how the latter succeed or fail to undermine unsustainable speculation of the land by the companies dedicated to industrial development. Specific questions we aim to address are: (i) Do environmental authorities apply the law in favor of environmental justice? and (ii) To what extent do legal and policy frameworks support the protests of environmental defenders,[1] as well as local and Indigenous communities in their struggles against industrial-scale development projects?

As a result of fieldwork, interviews with local key stakeholders, literature review and collaboration with local grassroot organizations and activists, this article takes the case of renewable energy (RE) conflicts within the Mexican State of Yucatan as study ground. Yucatan is a suitable geography to understand the complexities of the nexus between the rule of law, environmental justice and sustainability. Here, the use of the territory is regulated at different levels by a wide range of environmental laws and policies. At the same time, RE schemes are vastly and conflictingly consuming and privatizing land to the benefit of private firms and at the expense of local and Indigenous communities (Avila et al., 2022; Barragán-Contreras, 2022; Flores and Deniau, 2019; Sánchez et al., 2019; Torres-Mazuera et al., 2021). As global RE deployment is on the rise (IEA, 2024), such developments are not exempt from conflict, controversy and injustices (Levenda et al., 2021; Scheidel and Sorman, 2012; Sovacool et al., 2021; Temper et al., 2020; Zografos and Robbins, 2020). Our case contributes to deepening the understanding of the drivers of such problematic trends.

Our findings suggest that an uneven access to the legal and policy spheres leaves much of the power in the hands of public administrations and corporate powers, who often engage in more 'formal' business partnerships, therefore marginalizing less 'formal' critical voices that oppose projects implemented in their territories. Notwithstanding related challenges, we discuss the limits and possibilities of pursuing those required institutional reforms for Yucatan's rule of law to become a better-suited foundation from where environmental justice can be built.

2. Theoretical background

2.1. Renewable energy development, extractivism, environmental justice and conflict

The present work is grounded on the overlapping critical literature on extractivism, environmental justice and conflict. The discussion on extractivism started consolidating as a debate within Latin American academic and political contexts from the early twenty-first century ('extractivismo'), to point at the drivers and negative cumulative consequences of a fast commodification of (often, Indigenous) territories in an ever-expanding capitalist global economy (Chagnon et al., 2022; Grosfoguel, 2016; Post, 2023). Even if early works on extractivism mainly referred to processes of extraction of natural resources in the region (Acosta, 2013; Gudynas, 2015, 2013; Svampa, 2012), during the last decade various authors expanded the understanding of extractivism to discuss, for example, the epistemic and ontological aspects of it (Grosfoguel, 2016), or to apply the framework to other realms, such as the urban (Vásquez Duplat, 2017) or the financial (Gago and Mezzadra, 2017). Others expanded the understanding of extractivism as a techno-economic system that aims for total consumption of life (Dunlap and Jakobsen, 2020) and as a 'global' phenomenon (Chagnon et al., 2022). Across different perspectives, there is a common understanding of extractivism. Paraphrasing Chagnon et al. (2022: 767-768), extractivism involves (i) the appropriation of ecosystems and societies that implies their damage or depletion in a potentially irreversible way; (ii) it is founded on the centralization of power in the hands of capitalist elites that strive for the accumulation of their wealth; (iii) such an appropriation relies on power disparities and alienation of subjugated actors. Understood as such, the notion of extractivism underscores the power disparities and socio-environmental implications caused by initiatives otherwise promoted as 'sustainable.' Such is often the case of industrial scale RE development, which has also been conceptualized as forms of 'eco-' (Núñez et al., 2022), 'green' (Post, 2022) or 'renewable' (Del Bene et al., 2018) extractivism.

Environmental justice (EJ) is a relevant basis from which to analyze extractivism premises, *modus operandi* and implications (Dunlap, 2023). While the concept of EJ is rooted in civil rights movements in the United States in the 1980s that denounced the poor environmental conditions of racialized communities (Bullard, 1994; Cole and Foster, 2001), the term has been later adopted by a wider spectrum of users within civil society organizations, academia and public administrations. Currently, EJ scholarship also represents a broad body of works that study how and why injustices in the environmental realm are reproduced within and between different sectors of society or regions. During the last three decades, the scholarship has grown in different directions. Therefore, different understandings of EJ have been formulated. Among others, the work of Schlosberg (2007) has been referenced when framing EJ in terms of unequal distribution of environmental benefits and burdens (distributional justice), fair and transparent participation in decision making (procedural justice), and recognition of subjugated actors' existence, claims, wills or worldviews (recognition justice). Later, Schlosberg & Carruthers (2010) introduced the idea that EJ should be assessed by also looking at what it is that hinders "the ability of individuals and their communities to function fully" (*ibid.*:18; capabilities approach to EJ). Drawing on these dimensions, several works have expanded conceptually, which were complemented and adapted within specific contexts and case studies, resulting in the expansion of EJ framings. We can find literature about intergenerational, epistemic, restorative or cosmopolitan dimensions of EJ, among others (Enrique Villasana et al., 2021; Maltais, 2008; Motupalli, 2018). Examples of issue-/context-specific EJ framings include climate justice (Sultana, 2022) or urban environmental justice (Anguelovski, 2013). Social justice implications of RE deployment are especially considered within energy justice literature (Avila Calero, 2021; Jenkins et al., 2016; Jenkins et al., 2021; Levenda et al., 2021).

While the aforementioned body of literature on EJ advances possible understandings of how environmental injustices are reproduced, it has not been without critique. In recent years, critical, de-/anti-colonial and Indigenous EJ thinkers have argued that much of this work are problematically rooted in hegemonic, Western notions of 'environment' and 'justice'. These frameworks often conceptualize nature as a distributable object, with solutions to injustices overly bound to the realm of the State (Álvarez and Coolsaet, 2020). Inspired by Indigenous people's struggles, proponents of decolonial EJ theories suggest that the historical–geographical legacy of colonialism is (still) a major driver of injustices, especially under the form of a 'coloniality' of dominant values and worldviews (Rodríguez and Inturias, 2018). From this standpoint, distributive equity of environmental goods and bads, together with calls for more recognition and participation mechanisms in environmental decision-making are questioned as desirable solutions to address injustices. The main critique consists in that these proposals risk reinforcing and legitimizing the very roots of injustice (i.e. colonialism, extractivism, capitalism) rather than addressing them. Radically, some decolonial EJ thinkers embrace calls for (i) a disruption of the human-nature dichotomy that underpins the possibility to objectify the environment; (ii) embracing self-government, self-determination and the

[1] We rely on Scheidel et al.'s (2020) definition of environmental defenders as "individuals and collectives who protect the environment and protest unjust and unsustainable resource uses because of social and environmental reasons".

idea of a radical redistribution of power; (iii) thinking in epistemic justice and self-affirmation terms; and (iv) the construction of interculturality (Álvarez and Coolsaet, 2020; Barragán-Contreras, 2022; Barragán-Contreras, 2023; Rodríguez and Inturias, 2018; Temper, 2019). Decolonial theory has also been applied to energy justice (Dunlap and Tornel, 2024; Tornel, 2023a).

While theoretical debates develop within EJ literature, the individuals and communities that are impacted by undesired controversial development projects often oppose them on the ground. Environmental conflict emerges when threats of potential or actual environmental degradation raise serious concerns, and individuals or social groups mobilize against related injustices (Scheidel et al., 2020). EJ movements have therefore informed a conceptual framework that helps us understand how injustices have historically and globally been perpetuated towards and resisted by subjugated actors, including local peoples and Indigenous communities, women, and environmental defenders (Martinez-Alier et al., 2016; Scheidel et al., 2023, 2020; Tran and Hanaček, 2023). That of environmental conflicts is a growing field of study (Lee, 2019). For instance, as of February 2025, the Global Atlas of Environmental Justice documents more than 4200 social conflicts that have occurred or are currently taking place because of environmental reasons (Temper et al., 2015). The action against conflictive projects or economic activities may include a diverse range of mobilization strategies, from civil disobedience to the engagement with existing institutions.

Despite diverging arguments on what EJ should entail and whether it can be built within existing institutions, there is a shared recognition that legal and policy realms are crucial battlegrounds for EJ movements and environmental defenders (Rodríguez and Inturias, 2018; Temper et al., 2018). In fact, not only are environmental justice struggles argued to have a potentially positive influence on shaping environmental policy and law (Pellow et al., 2001; Scheidel et al., 2018), but also the institutional sphere serves as a measure of the practical limits of making environmental justice (Álvarez and Coolsaet, 2020; Temper et al., 2018).

2.2. Environmental rule of law versus environmental justice

Concepts such as 'environmental rule of law' may elicit the idea that more institutions, laws, regulations, policies and juridic instruments are needed to guarantee healthy ecosystems and communities (McManus, 2020; UNEP, 2024). However, environmental rule of law is not necessarily the same as environmental justice. Whereas environmental justice refers to historical and current social movements, as well as the conceptual frameworks and policies they have informed, environmental legal frames and institutions are a component of procedural issues within the scope of environmental justice (Kuehn, 2000; Schlosberg, 2007). Yet again, the question of who can access and benefit from environmental institutions remains open.

Academic work at the nexus between jurisprudence and environmental conflicts studies suggests that environmental laws and policies can be "double-edged swords" (Chiaramonte, 2020: 948) for environmental defenders: i.e. they can end up working in their favor or curtailing their efforts. On one hand, scholars discuss the potential of legal frameworks and instruments to advance environmental stewardship that is also socially just. For instance, after studying the role of popular consultations established by Colombian Constitutional law in mining conflicts, Bocanegra Acosta and Carvajal Martínez (2019) conclude that these legal frameworks and instruments may be effective means to question the extractive model. Similarly, Richardson and Mcneish (2021) put forward how activism against extractivism may be facilitated by nature's rights court rulings. Litigation is also argued to be a positive strategy for environmental movements, regardless of the (un)success rate of the legal action (Aquino-Centeno, 2021; Skjævestad, 2010; Vanhala, 2012).

On the other hand, other authors point out how environmental laws and policies do not necessarily work in favor of vulnerable or marginalized actors and may even help legitimize or facilitate speculation by industries of various natures. In this context, some argue about how national and international legal architectures promote extractivism, fuel conflict or perpetuate environmental injustices (Galligan, 2021; González-Serrano et al., 2021; Guzmán Solano, 2016; Vélez-Torres, 2014). The literature that analyses the judicialization of struggles against extractivism and controversial development projects has also shown the uncertain outcomes of such a strategy. Various authors have discussed the limits of litigation for environmental defenders, in terms of social and environmental gains and losses along the judicial course, both theoretically and empirically (Albiston, 2011; Conde et al., 2023; Medici-Colombo and Ricarte, 2024; Pigrau, 2014). The role of the judiciary power (courts and judges) in favoring or hindering impacted communities and environmental defenders' struggles has been an object of problematization too. For instance, Bertenthal (2018) explores the limits in making sense of EJ in court opinions in the US. Braconnier de León (2021) investigates how progressive courts suffered backlash from extractivist elites when mobilizing law in favor of Indigenous communities in Guatemala, or yet another example where Rao et al. (2023) discuss the potential and limits of India's National Green Tribunal.

Other authors problematize how legal and policy-making processes may take ground to political ones (Dressel, 2010; Hirschl, 2009; Kramarz et al., 2017; Vallinder, 1994). These studies point to a need for building more mechanisms for a re-politicization in law and policymaking.

With a few exceptions (Chiaramonte, 2020; Conde et al., 2023; Guzmán Solano, 2016; Montoya et al., 2021), the above-mentioned body of works does not frame the analysis specifically within critical theoretical debates over extractivism or EJ. Most of these authors do speak about 'extractivism' or 'justice', but while the former is often referring to the practice of industrial extraction of raw materials from the ground, the latter is commonly understood as the one achievable in the institutional-judiciary realms.

2.3. The role of laws and policies in energy justice struggles in Mexico

Several scholars that work on matters of RE extractivism addressing the question of how energy systems disproportionally affect most vulnerable populations have based their research in Mexico (see e.g. Avila et al., 2022; Baker, 2016; Boyer, 2019; Post, 2022, 2023; Silber Coats, 2017; Tornel, 2023b). Among such a rich academic production, the role of existing laws and policies in tackling environmental injustice has also been studied. For instance, Dunlap (2018, 2020) elaborates a critique of Free and Prior Informed Consent mechanisms and includes them in a list of 'soft mechanisms' for a 'social engineering of extraction' in the context of wind energy development. Or again, the critical jurist and activist-lawyer Espinoza Hernández (2019) explains how recent institutional and juridical reforms in the environmental realm in Mexico have favored the commodification of its territories.

Among the authors focusing on Yucatan, both Escalante Kantún (2021) and Barragán-Contreras (2022, 2023) take large-scale RE developments in Yucatan as case studies to discuss EJ in the region. The former frames EJ in procedural, distribution and recognition terms, the latter employs a decolonial EJ framework. They both touch upon policy and legislation regulating the construction of conflictive solar and wind parks. Both propose a series of recommendations to policymakers and park developers. Similarly, other authors who study legal and policy instruments regulating Yucatan's renewable energy developments without framing their analysis on EJ or extractivism (see e.g. Encalada Gómez, 2019; Kim, 2018; Rousseau, 2020; Zárate-Toledo et al., 2021; Zárate-Toledo & Fraga, 2016) conclude that much work is needed to improve such mechanisms, warranting the need to inquire further on the limitations of legal and policy instruments in EJ terms.

3. Context background

3.1. Yucatan's renewable energy conflicts

The region of analysis is in Southeast Mexico, on the tip of the Yucatan peninsula (Fig. 1).

The state of Yucatan is characterized by a predominantly karstic, flat land of 39′524 square kilometers (INEGI, 2017), mostly under social land-tenure (known as ejidos: see section 3.2), with a 73 % of forest cover as of 2020 (Global Forest Watch, 2024), 245 km of coast facing the Gulf of Mexico (Pech Pool et al., 2010), and a system of underground caves filled with freshwater and beautiful exposed sinkholes known as 'cenotes' (Schmitter-Soto et al., 2002). Approximately 42 % of its 2,3 million people are concentrated in the municipal district of Mérida, where the capital city is settled, while the rest of the settlements are scattered across 105 other municipalities (INEGI, 2021). More than 65 % of the total population self-identifies as indigenous and 23,7% speaks the Maya language (INEGI, 2015, 2020).

This region of the Yucatan peninsula also has a high potential for RE production (Sánchez et al., 2019). The Federal Government of Mexico crystallized the plan to rapidly take advantage of such potential through an energy reform which was decreed in 2013 and culminated with the Energy Transition Law of 2015 along with a related series of laws, policies and land use planning instruments (*ibid.*; Articulación Yucatán, n.d.1). While the reform was carried out without involving social actors from the territory, the RE development model promoted in this context is characterized by the concentration of the property and management rights of large-scale wind and solar parks in the hands of private capitals under a competitive regime, also through long-term auctions (CENACE, 2015). As a result, we have estimated that 29 large-scale RE developments of private (and mostly foreign) investors have been planned in the State of Yucatan in less than a decade for a total installed capacity of approximately 1′835 MW for wind projects and 671 MW for photovoltaic projects, although only five parks have begun operations (Zárate-Toledo et al., 2021).

In such panorama, civil society organizations, local and Indigenous community members, activists, and academics, among others, have publicly contested the energy reform and single projects as problematic both in terms of social and environmental implications or as undesired development models. The protests consider potential major environmental impacts such as deforestation, damages to the karstic geology and aquifers, or the disruption of birds' migratory routes; but also how the installation of windmills and solar panels negatively impact the biocultural practices, social fabric, traditional ways of life and subsistence economy of local Mayan communities (Sánchez et al., 2019). From a broader perspective, critics argue that such social and environmental burdens are born by local inhabitants which benefit the multinational corporations and produce electricity that is largely used to source the big cities and industries of the region (including Cancun) but not directly to satisfy the needs of the local population (*ibid.*). In such an understanding, RE parks relate to larger-scale profit-driven development plans for the region, including the expansion of mass tourism and agro-industries, as well as the Tren Maya developmental project (Espadas Manrique et al., 2020; Flores and Deniau, 2019; García de Fuentes, 2019; Greenpeace, 2020; Martínez Romero et al., 2023; Polanco Rodríguez and Beilin, 2019).

3.2. Laws and policies for renewable energy development in Yucatan

The law requires RE projects to be approved by environmental authority. Promoting companies need to produce paperwork and follow specific procedures to obtain permits to construct on, or to use a specific piece of land. Meanwhile, authorities must grant that a development project is socio-environmentally viable and in agreement with actors from civil society and impacted communities.

Fig. 2 provides a simplified overview of the relations between major actors, laws and regulations, compulsory bureaucratic procedures and territorial planning instruments at stake in Yucatan's industrial scale RE development.

The Mexican Constitution attributes authority at three governmental levels: national (the federal government), regional (Yucatan State), and local (municipality). Each level is attributed to certain powers over the territory of Yucatan, which are unevenly allocated across levels.

The federal government maintains a privileged position, holding legislative powers and, at the same time, preserving the right (and responsibility) to control key procedures that RE developers should follow to build and operate a plant. First, developers attain a permission to produce energy by the Federal Energy Regulatory Commission (CRE).

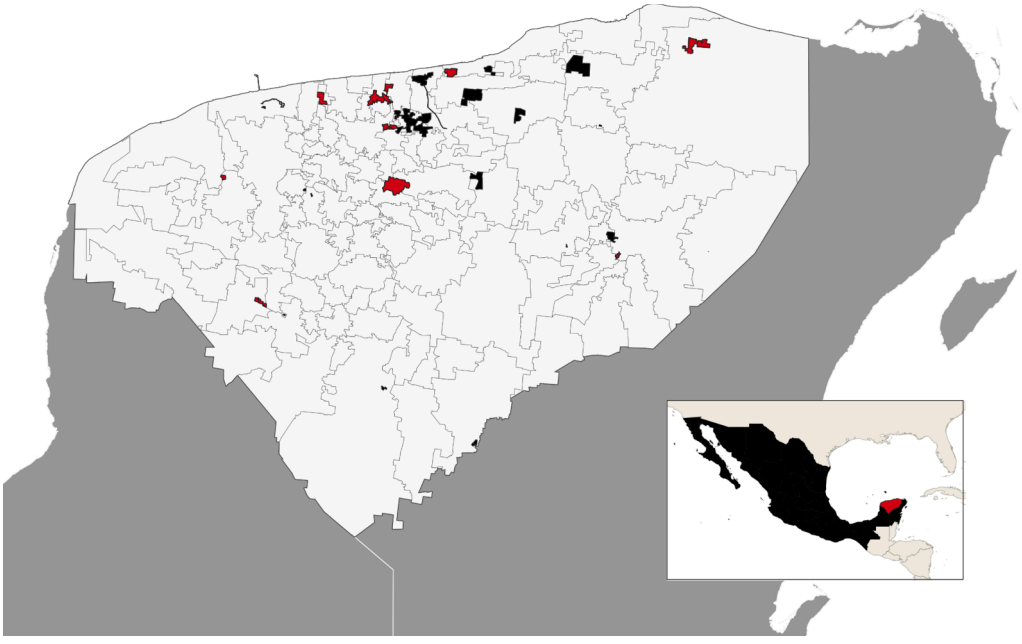

Fig. 1. Administrative map of the state of Yucatan and its 106 municipal districts. The RE projects either operating or planned are identified as colored areas. Among these, those included in our analysis are identified in red color (own elaboration from GeoComunes' (2023) and INEGI's (2016) data).

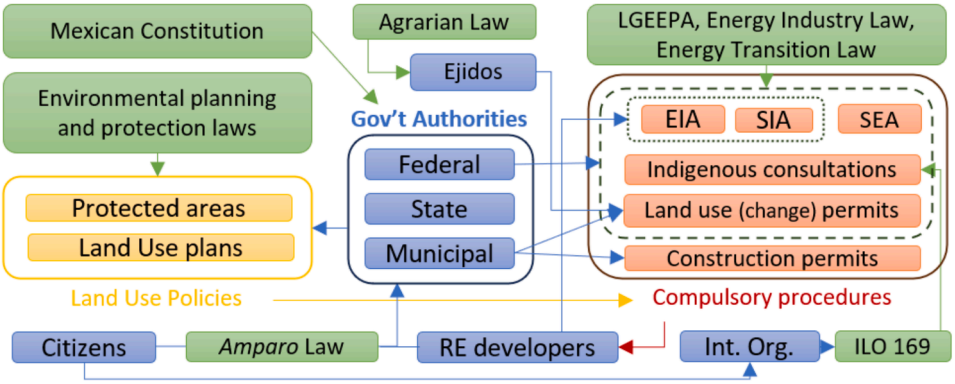

Fig. 2. Mind map of the relations between laws (green), actors (blue), policies (yellow) and the bureaucratic procedures (red) that are governing industrial scale RE development in Yucatan. Arrows indicate a certain degree of influence of one element over another.

Then, through its Environment and Natural Resource Ministry (SEMARNAT: 'Secretaría de Ambiente y Recursos Naturales'), the federal government receives and evaluates paperwork that is part of the Environmental Impact Assessment (EIA), regulated by the General Law of Ecological Balance and Environmental Protection of 1988 (LGEEPA: 'Ley General del Equilibrio Ecológico y la Protección al Medio Ambiente). Second, this latter law and related regulations also establish that the SEMARNAT has jurisdiction over the land use change of forests and coastal areas (up to 100 km inland). Third, as ruled by the Energy Industry Law of 2014 ('Ley de la Industria Eléctrica'), the Ministry of Energy (SENER: 'Secretaría de Energía') should emit a revision over a Social Impact Assessment (SIA), to be produced by the developer. Through this revision, it is possible to identify if Indigenous communities are potentially affected, and SENER oversees conducting an Indigenous consultation. The latter is a measure introduced to comply with the International Labour Organization (ILO) Convention 169 of 1989 and, more broadly, to respond to international pressure over the recognition of Indigenous rights (Rousseau, 2020). Fourth, Article 19-VIII/a of the Energy Transition Law establishes that SEMARNAT should perform a Strategic Environmental Assessment (SEA) for regions with a large potential for RE developments. A SEA is defined as a "regional-scale assessment to determine the relevant characteristics of the ecosystems potentially affected by the projects, the related potential environmental impacts, aimed at dictating the prevention and control measures to which project developers must adhere" (Energy Transition Law, 2015).

Other Federal environmental authorities that branch off SEMARNAT are constituted and given a budget to address environmental issues. For instance, the Federal Attorney General's Office for Environmental Protection (PROFEPA) holds the role of surveilling the implementation of and compliance with Federal environmental legislation, including a mechanism to address public environmental denunciations. Also, some national commissions are formed to promote good management of specific environmental assets, such as: the ones for the Knowledge and Use of Biodiversity (CONABIO), for Natural Protected Areas (CONANP), for Forestry (CONAFOR) and for Water (CONAGUA).

On another environmental governance level, the Yucatan State does not always have direct jurisdiction over the region's land and its resources, unless the federal government convenes to cede their faculties for coordination purposes. Nevertheless, the government of Yucatan also articulates into environmental authorities and regulations. Municipalities have a certain power over their territory: Article 115 of the Mexican Constitution confers to the municipalities the power to regulate land planning and grant land use, as well as the construction permits within their jurisdiction. During this process, RE developers must hire and pay consultants to develop social and environmental assessments, as well as for all licenses and permits, and ultimately for the land occupation of a given project.

Likewise, a series of other land use and planning policies based on environmental laws are in place to provide guidance and directives about the development of the territory. Particularly, the so-called Ecological Land Use Plans ('Ordenamientos Ecológicos del Territorio'; Gobierno de México, 2021), Protected Areas and Urban Land Use Plans are notorious in these terms. The former are introduced in LGEEPA as an "instrument whose purpose is to regulate or induce land use and productive activities, to achieve environmental protection and the preservation and sustainable use of natural resources […]" (art. 3o-XXIV, 1988). They are conceived to be either national, marine, regional, or local. National and marine plans are designed by SEMARNAT. The others are at state and municipal levels, respectively. In Yucatan, there are two regional *ordenamientos*: one concerning the entirety of the state, the POETY ('Programa de Ordenamiento Ecológico Territorial del Estado de Yucatán'); plus, another targeting the coast only, the POETCY ('Programa de Ordenamiento Ecológico del Territorio Costero del Estado de Yucatán'). Concerning the protected areas, in Yucatan, there are some managed by the federal government and others by the Yucatan state; municipalities are also legally able to designate their own. Finally, Urban Land Use Plans establish zoning and land use planning for the territory of a given municipality.

While administrations create laws and policies with which RE developers are expected to comply, citizens and Indigenous communities in Yucatan have only two avenues to influence the decision-making process outside of electing political representatives. The first is through public consultations, which may occur as part of the EIA: the local population can request SEMARNAT to hold public information or consultation meetings before a project is authorized. The second avenue, as previously mentioned, involves Indigenous consultations mandated by SENER to "to take into account the interests and rights of communities" (Art. 119 of Energy Industry Law). Additionally, authorities are expected to engage interested non-governmental actors (from the private sector, civil society, and local communities) during the design of Ecological Land Use Plans. In theory, also the SEA should consider public participation during its process.

Other instruments are provided to non-governmental actors to litigate authorities' rulings, including public denunciations, complaints, and civil and collective actions. Among legal mechanisms, the Protection Law of 2013 ('Ley de Amparo') has gained relevance. As a regulation of Articles 103 and 107 of the Mexican Constitution, this law guarantees the right to pursue a lawsuit against any authority or individual when their acts or omissions violate the human rights recognized as the protections granted by the Mexican Constitution, as well as by the international treaties to which the Mexican State is a party (Article 1).

Finally, another influential entity in determining territorial use in Mexico are the so-called *ejidos*. Established as a result of the Mexican Revolution, the Agrarian Law of 1915, recognizes and regulates ejidos as a form of social land tenure. This framework also outlines the authority

of landholders and establishes Agrarian Tribunals to resolve legal disputes concerning ejidal territories (Ortiz Yam, 2014; Torres-Mazuera and Appendini, 2020; Tribunales Agrarios, 2021). Unlike private property regimes, decisions regarding ejido land are, at least theoretically, made collectively by a community of landholders through assemblies. When RE developers seek to build on ejido land, a land use change must first be approved by the ejido assembly, after which the decision is reviewed and finalized by the federal government.

4. Methods

We base our discussion on the analysis of environmental conflicts related to the nine industrial-scale solar and wind parks detailed in Table 1, selected among the complete list of 29 large-scale RE developments that the federal government of Mexico planned since 2014 within the State of Yucatan (Zárate-Toledo et al., 2021). The selection was based on two main criteria: (i) the project led to a certain degree of conflict (i.e. when explicit claims were made against a development by specific actors because of social or environmental concerns); (ii) sufficient information was available for the case.

The foundation of this study stems from the experiences gained by some of the authors in the addressing of RE conflicts in Yucatan. These authors are part of *Articulación Yucatán* (https://articulacionyucatan.wordpress.com/), a collective of local activist scholars formed in 2016 as a critical think tank in response to the rapidly evolving large-scale RE development plans in the region. Since its inception, the group has collaborated with local environmental defenders, Indigenous communities, academies, non-scholar experts, and civil society organizations to gather and analyze public information regarding various kinds of infrastructural projects. Their objectives include understanding the social and environmental implications of these projects, disseminating the findings to local populations, and promote collective analyses with pertinent regional and local actors including government authorities and actors from the private sector.

Our research questions guided a more targeted collection of data on the panorama of Yucatan's environmental legislative and policy frameworks and instruments, and related implications for environmental justice struggles. Between September 2022 and March 2024, in collaboration with the corresponding author, we conducted both fieldwork in Yucatan, visiting specific sites and communities affected by conflicting RE projects. Additionally, we carried out 29 semi-structured interviews with a diverse range of social actors involved in environmental governance and conflicts within the Yucatan State. Interviewees were selected based on the authors' expertise and network, ensuring representation of diverse sociopolitical perspectives. To shed light on the complexities of the issues, we interviewed representatives of federal, state, and municipal governments, affected communities, grassroots organizations, and international intergovernmental organizations. Given the sensitive social context of environmental conflicts that often lead to additional vulnerability to local defenders, we have decided to anonymize the various testimonies. Finally, where applicable, secondary data review (relevant grey and peer-reviewed literature, and official paperwork) complements fieldwork and the dedicated interviews.

The diversity in terms of nature of data was then treated through triangulation of both sources and authors' perspectives, as explained in Carter et al. (2014). Through discussions we systematically organized the interpreted information into the matrix included here as an Appendix.

Concerning our positionality: we stand with those communities and activists who are on the frontline contesting the construction of top-down planned RE parks, and who too often see their livelihoods, traditional ways of life and social fabric disrupted because of foreign private interests. We are aware that our privileged position being scholars who get merit for knowledge from frontline communities is at risk of epistemic extractivism (Grosfoguel, 2016). To address concerns of epistemological injustice in academia, during the review processes, drafts of this article have been shared with those environmental defenders whose knowledge was of key importance in building our understanding, to keep their concerns at the front and gather their feedback. In this sense, our research aim and process refer to the theory and strives to respond to the principles of scholar-activism in co-producing knowledge for environmental justice in alliance with activists and impacted communities (Conde and Walter, 2022; Weber et al., 2024).

Table 1
List of cases of environmental conflicts included in the analysis.

	Conflict Case	MW	Ha	Municipalities
1	**Cansahcab wind parks**	250	7′541	Cansahcab
2	**Chicxulub wind park**	71	1′157	Motul, Ixil
3	**Dzilam Bravo wind park**	70	1′300	Dzilam de Bravo
4	**Kimbilá wind park**	159	4′940	Hoctún
5	**Oxcum-Umán solar park**	155	300	Umán
6	**Sinanché I & II wind parks**	151	3′222	Sinanché, Telchac Pueblo
7	**Ticul A/B solar parks**	310	738	Muna
8	**Tizimín wind parks**	162*	4′075*	Tizimín
9	**Yucatán Solar park**	70	255	Valladolid

* Of which 76 MW, 2247 Ha for the ampliation of the park in a second stage.

5. Findings

5.1. Bound environmental authorities, flawed bureaucratic procedures and barriers to participation

"Look", says a responsible from SEMARNAT in Merida while indicating a shelf full of ring binders stuffed with papers. "These are all EIAs to evaluate. Just mine. This is what is killing me these days". They were lamenting the lack of human resources to handle a growing flow of paperwork. However, these EIAs were related to other development projects rather than the solar and wind parks considered in our analysis. "Most of those, with the exception of the wind park in Dzilam, were evaluated in Mexico City's offices". When speaking about large scale renewables, this fact is corroborated in another interview with a responsible from PROFEPA: "they [the central offices in Mexico City] won't even let you look at the file".

The fact that the Merida-based offices of Federal environmental authorities cannot have a say to large-scale projects in Yucatan is significant, as this implies that those governmental actors who hold better knowledge of the problems of the territory and are in closer contact with its actors are excluded from decision-making. But this is not the only concern that raises questions about the impact assessment procedures. On the top of this, permits for the construction and operation of controversial wind and solar parks are issued despite serious legal shortcomings. Flaws in the issued paperwork and due procedures suggest that authorities do not necessarily comply with their own rules. Fig. 3 reports a selection of recurrent major problems that relate to the approved impact assessments and the consultation processes, where applicable.

First, no SEA was performed by SEMARNAT for the Yucatan region, despite the obligation set by Article 19-VIII/a of the Energy Transition Law (Articulación Yucatán, n.d.2).

Second, EIAs are approved despite several shortcomings. Zárate-Toledo et al. (2021) previously studied the deficiencies of approved EIAs related to four wind projects on our list: Tizimín, Dzilam de Bravo, Chicxulub, and Sinanché. Similar shortcomings are denounced in the EIAs connected with other three solar parks: Ticul A/B (EJAtlas, 2022a; interview with activist-lawyer), Yucatán Solar (EJAtlas, 2022a; interview with local activists) and Oxcum-Umán (Oliver Quintal, 2020; interview with responsible of Umán's municipal administration). Particularly, major deficiencies relate to the fragmented definition of the area of influence of the projects; the absence of an evaluation of cumulative, residual, or synergistic impacts; poor impact evaluation

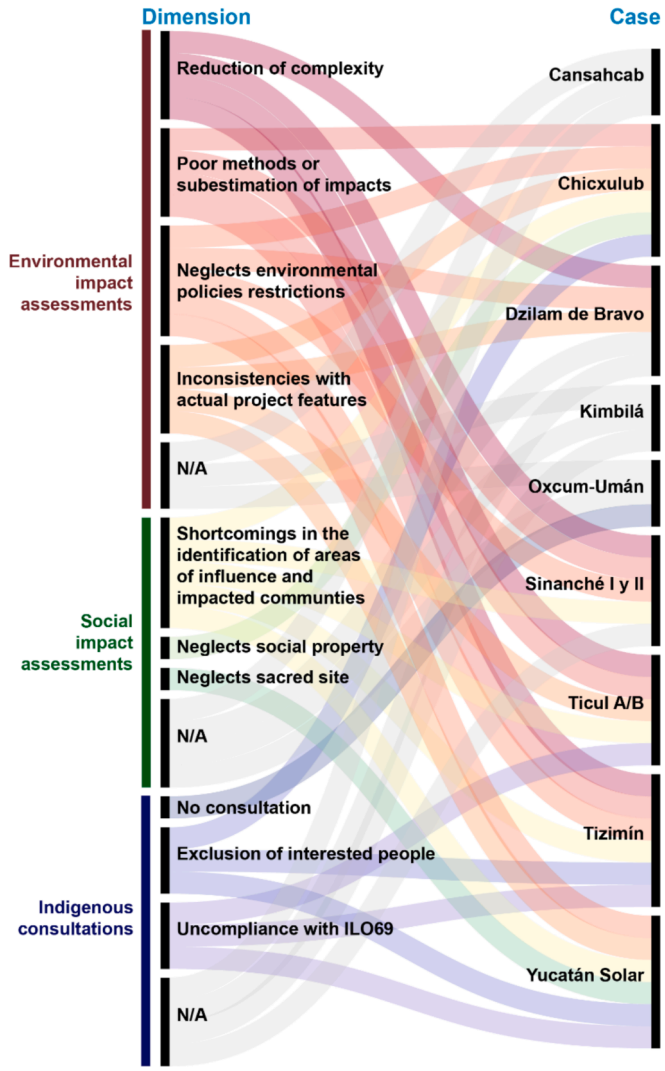

Fig. 3. Recurrent shortcomings of impact assessments and consultation processes for the analyzed RE parks (see Appendix for more detailed information and sources).

methodologies; problems with long-term monitoring of impacts; and conflicts with existing environmental regulations and policies. For instance, policy restrictions that are not accounted for in the EIAs often include the ones imposed by ecological land use plans of the Yucatan State (the POETY and the POETCY) and by the presence of protected areas, as in the cases of the wind parks near the coast where conservation activities are mainly indicated (Dzilam Bravo, Tizimín, Chicxulub and Sinanché I/II). Generally, evaluations are characterized by simplification of the complexity and lack of critical considerations. In this regard, the case of Ticul A/B solar and Tizimin wind parks are each indicative of fragmentation of one single project into two projects that are intended to be analyzed individually, to avoid cumulative and synergistic impacts. It is most common for environmental defenders, activist scholars or grassroots organizations to formally submit critical observations to SEMARNAT denouncing social and environmental risks (Articulación Yucatán, 2019, 2020). However, in no case were these claims taken into consideration.

SIAs are not exempt from problems, either. For six conflict cases for which SIAs could be retrieved, severe shortcomings emerge. A common major problem is that SENER uses arbitrary criteria for the identification of areas of influence and related impacted communities (Barragán-Contreras, 2022; EJAtlas, 2021, 2022a, 2022b; interview with activist-lawyer). As a result, significant portions of the local population are excluded from both the impact evaluation and subsequent consultation processes. Another problem identified in the cases of Ticul A/B and Sinanché I/II is the poor design of preventive and compensatory measures, which contrast serious socio-ecological impacts with inadequate monetary compensations or minor interventions in the impacted settlements (Barragán-Contreras, 2023; Fuentes López, 2020; Múuch' Xíinbal, n.d.; interview with activist-lawyer).

Nevertheless, in three cases within our sample, the impact assessments were withheld or not produced. We find that this may also be a result of strong opposition to the project. In the case of Oxcum-Umán, SEMARNAT also withheld permission for the solar park after press conferences and a denouncing letter was signed by indigenous, citizen, academic and social organizations (De los Ríos Ibarra, 2020; La Jornada Maya, 2019). In the cases of Kimbilá and Cansahcab, the impact assessments are not available also because the developers did not find consensus within local communities from the beginning (interviews with local activists; Yucatán Ahora, 2020). However, the exclusion of major parts of impacted communities from Indigenous consultation processes is reported in the four projects where the process was implemented by SENER: Chicxulub (interview with local community leader), Tizimín (EJAtlas, 2021a), Ticul A/B (EJAtlas, 2022c, interview with activist-lawyer) and Yucatán Solar (EJAtlas, 2022b; interview with local activists). Generally, when Indigenous and public consultations are organized, they are found to violate ILO 169 Convention standards, are hastily handled, or roughly managed (EJAtlas, 2022a, 2022b, 2021a; interviews with activist-lawyers). Extended bribery for gaining consent within local communities in the consultation is reported in the case of Ticul A/B project (interview with an activist-lawyer).

Land use plans are not exempt from controversies either. The case of the reform to the POETCY is infamously emblematic. The instrument had originally been designed through participatory processes, including eleven on-site public workshops amongst local academics, authorities, and citizens that led to its enactment in 2007. The enforcement of specific restrictions on environmental and land use conflicted with the interests of developers of large-scale projects, including RE, who started to put pressure on the State government to reform the zoning instruments. As a result, the interests of the private sector are largely reflected in a first reform of the instrument (EJAtlas, 2021a; Encalada Gómez, 2019; López Fernández et al., 2016; Zárate-Toledo & Fraga, 2016; interview with a representative of Valladolid's municipal administration). More recently, a group of academics from a well-known national university was appointed as coordinator of a second reform process, despite being new to the region. The so-called periods of public consultation excluded many interested parties and local actors, including scholars who had helped design the original land plan, a good part of the rural population, and grassroots movements (interview with an activist scholar who participated in the process).

Several problems are also recurrent in the management of RE parks from the Municipal administrations. First, bureaucratic transparency is lacking, as land use and construction permits are not published anywhere once issued, nor are there institutional mechanisms in place for anyone to retrieve such important documents a posteriori. Second, a multifaceted lack of capacity of the Municipality to face administrative, technical, and juridical challenges is recurrent in our interviews with different kinds of actors, including local activists, representatives from Municipal governments, from the Yucatan State and Federal environmental authorities. An inadequately allocated budget, the administrative personnel's lack of expertise in environmental and jurisprudence domains, and the administrative discontinuity caused by short 3-year political mandates are identified as major shortcomings that disempower the capacity of municipal governments. Disheartened, an interviewee from Valladolid's municipal government shares:

> "[An *ordenamiento*] costs us a million pesos, or more. For the work it requires: documentation, research, surveys, socialization, dissemination, public consultations […] And then, well, there is a lack of a

water pump there, for a community that does not have the human right to sanitation and water. But it also has the right to a healthy environment. Which one do I prioritize? There may be a will, but there are also priorities…"

Third, corruption and bribery are recognized by most of our interviewees as a major issue at the municipal level. For instance, a former representative from the Dzilam de Bravo's municipal administration reports the falsification of the balance sheets to the benefit of the Mayor at the time of the approval of the homonymous wind park:

"As they were 15 private plots of land… It was about 40'000 pesos, as they pay for land use. The Mayor kept it all […] that was not reported in accounting"

5.2. Litigation: reacting on legal grounds comes with high costs

If impacted communities have no or limited space in the design of policy and legislation or the decision-making process, they have a chance to resist undesired RE projects by reactively appealing to the judicial power. The cases we highlight indicate that litigation can, in certain instances, work in their favor; however, these outcomes often come with relatively high costs.

In some of the analyzed cases, impacted communities followed legal procedures to contest the RE parks and reclaim their rights. Ixil's community members appealed to the Agrarian Tribunal to invalidate forged assembly minutes that were recorded in the National Agrarian Register by an individual in the attempt to falsely certify that there was consensus to sell communal land to Chicxulub wind park developers (EJAtlas, 2022a). Meanwhile, the Yucatan's Chartered Tribunal recently suspended the permits for the Ticul A/B project, ruling in favor of members of the Mayan communities of San José Tipceh and Plan Chac, who appealed to the Protection Law against the potentially irreparable environmental, cultural and health impacts coming from the removal of more than 600 ha of forest to make space for the solar park (CEMDA, 2022; interview with activist-lawyer). Also, in the case of the Yucatán Solar park, a lawsuit appealing to the Protection Law led to the suspension of the project permits and works (EJAtlas, 2022b). In Kimbilá, ejido members filed a complaint with the Agrarian Attorney's Office and the State Delegation of the institution cancelled a call for public consultation wanted by the construction company, which would have invalidated a unanimous vote against the park in a previous assembly (EJAtlas, 2022d; interview with an environmental defender). Similarly, local Mayan communities successfully appealed to the Mexican Supreme Court of Justice to block Sinanché Wind Park (Fierro, 2020). Finally, the same Supreme Court cancelled the permit to develop the Cansahcab project after the litigation by Sinanché's ejido members (Yucatán Ahora, 2020). As evidenced here, the rate of success of litigation in our sample is relatively considerable.

However, while entering litigation may end up benefiting communities' struggles in opposing controversial RE projects that would speculate on their territories, these processes are expensive: litigation entails high costs in three aspects. First, litigation consumes significant time. In the above-mentioned cases, the time between the initial awareness of plans to construct a RE park and a court ruling spans several years – ranging from a minimum of three years, as observed in the cases of Yucatán Solar and Sinanché, to more than six years in the case of Ticul A/B projects. These estimates are conservative, given the challenges in defining the exact start or the end of a litigation process. Nevertheless, they provide a sense of how prolonged the journey to bring RE parks to justice can be, as well as the sustained tension this imposes on those involved. Meanwhile, as formal claims proceed in the courts, developers may avail themselves of the permits they possess to advance with the works.

Second, litigation requires alliances. Impacted communities face several challenges: (i) building a critical understanding of the cumulative social and ecological implications of an industrial-scale development project; (ii) navigating the technical complexities of law and policy frameworks and instruments; and (iii) overcoming the language barriers of the Mayan population, which can restrict access to the judiciary ground to those who hold the required knowledge. Consequently, it is common praxis that impacted individuals and communities establish alliances with environmentalists, activist scholars and lawyers who are equipped with the required expertise to support the struggle. However, this dynamic may be problematic, due to the significant power that 'expert' knowledge often holds. As an activist-lawyer informant explains:

"We must change the concept of litigation. Because […] for a long time […] the lawyer arrived, and they said what had to be done […] This continues to be a certain type of colonialism […] The lawyer cannot be the only one who knows, who says what has to be done […] A lot of work has been done by anthropologists, who often help to translate the language, interpreters, scholars of multiculturalism, interdisciplinary teams, as well as people from the community who have gone abroad and studied in the city"

Trustworthy alliances are crucial not only with external actors but also from within the community. Testimonies of conflicts between project opposers and promoters within the same community often emerge from our interviews, often driven by the significant pressure to sell land. As a result, in the above-mentioned litigation cases, lawsuits are tendentially initiated by a small group of community members. These lawsuits are often led by local environmental defenders, grassroots organizations, or individuals who possess the capacity to critically understand the implications of the RE development at stake.

Third, the highest price for formalizing a complaint in the form of a lawsuit is paid by its signatories. We collected testimonies of personal threats, harassment, and intimidation against those who publicly critique RE parks. For instance, a local activist from Valladolid explains:

"After I signed the amparo lawsuit, I started to receive acts of digital violence, and also pressures to leave my job."

Public denunciation in Yucatan can be not only challenging, but also rather dangerous.

6. Discussion

As we outlined in the theoretical section, literature at the nexus between legal and environmental conflict study points to describe environmental legislation and policy as 'double-edged swords' for environmental defenders and EJ movements. We question what side of the sword weighs more in Yucatan.

If we think in terms of distribution of environmental goods and bads, we see how controversial and conflictive projects are legitimized also through environmental authorities, legislation, land-use policies, and bureaucratic paperwork, at the expense of those who inhabit the territory in which solar and wind parks are developed. We have reported that participation mechanisms are limited, with few institutional spaces for impacted communities or environmental defenders to mobilize in decision-making processes. As a result, their involvement tends to be reactive, often focusing on litigation. In turn, litigation encompasses high costs, in terms of time, technical knowledge outsourcing, and exposure to individual threats. With regards to recognitional injustices, both the laws and the paperwork surrounding the projects are complex, specialized, written solely in Spanish, failing to acknowledge the existence of different epistemologies. Additionally, the very existence of Indigenous communities is often disregarded in official documents, such as certain Social Impact Assessments.

We consider that the situation outlined above may be a symptom of another level of injustice: an uneven distribution of institutional power. On one side, the law grants institutional authority to a handful of federal public administrators and judges, whose offices and homes are far from

where the projects are to be built. These individuals hold the power to write laws, design policies, enforce them, monitor their implementation, decide who to include in decision making and determine what is 'just'. On the other side, those most affected by decisions regarding the construction of controversial RE parks have limited power to make their voices heard within the institutional realm. As a result, much of the development reflects the interests of the economic agenda of the federal government in Mexico City, who confers legal legitimacy to the RE parks at the expense of local peoples and Indigenous communities, and instead benefitting private developers. In line with the thinking of critical and decolonial EJ scholars (Álvarez and Coolsaet, 2020; Barragán-Contreras, 2023, 2022; Temper, 2019) and with those authors advocating for a re-politicization in law and policy making (Hirschl, 2009; Kramarz et al., 2017; Vallinder, 1994), we support the idea that a fairer distribution of decision making power is key in achieving EJ. Shifting powers over law and policy making, and its application to the community level could lead to more equitable EJ outcomes. However, the dilemma of whether and how such a redistribution of institutional power could be achieved remains unresolved.

Rodríguez & Inturias (2018) maintain that there are two major dialectical ways to impact institutions: outright confrontation (e.g. political mobilization) and ensuring greater representation in public policy making. This could involve using existing institutional spaces, or "by creating new institutional arrangements where none exist, such as decision-making councils, co-management committees, roundtables or processes of consultation" (*ibid.*:99). Related to this latter idea, we consider relevant the valorization of Indigenous institutional systems such as the Mayan Law (Hessbruegge, 2014; Schwank Durán, 2005) or initiatives like The Rights of Nature Tribunal (https://www.rightsofnaturetribunal.org), which was recently organized to sentence about the pass of a new infrastructure project in Yucatan: the Mayan Train (Múuch' Xíinbal, 2023).

In terms of influencing existing institutional spaces, we see a window of opportunity for Yucatan's environmental justice struggles in those institutions that are closer to the 'epicenter' of the conflict, i.e. municipalities. From one side, we recognize the importance of political control over the municipality (e.g. through elections of the mayor). As we have seen, the Mexican Constitution grants municipalities the authority to issue land use and construction permits, essential documents for advancing industrial-scale development. A municipal administration committed to pursuing progressive social and ecological agendas could help institutionalize mechanisms for tackling major shortcomings, such as the lack of municipal land use plans or corruption. However, this is contingent on (i) the willingness of federal and state governments to empower the municipalities and provide them with the financial, technical, and juridical resources needed; and (ii) a municipal administration equipped with a certain degree of 'ethical morality' that would confer power to local communities.

Agrarian institutions could also serve as a space for democratically building Yucatan's legal struggles from the ground up. However, currently, related challenges are many. The aging of landholders, and lack of access to social land holding for young generations and women often contribute to ignite conflicts within the communities (Torres-Mazuera et al., 2021). Furthermore, the Agrarian Law has undergone significant reforms in the last three decades – including the one in 1992 that opened the possibility of its privatization – which has accelerated land grabbing to the benefit of development industries (GeoComunes et al., 2020). Thus, ejidos are becoming the place where agreements for the development of RE parks are forged, often a decision-making process made by only part of the population. Nonetheless, in several of the analyzed conflict cases, lawsuits to oppose RE parks were issued by ejido members and members of local communities. We consider these alliances as an indicator of a potential counterbalance to the power of governmental authorities.

However, it is crucial to recognize that the effectiveness of the struggle at the institutional level for EJ movements is highly context dependent. It is not something that can be generalized; rather, one must consider the ethics and motives of the actors involved, the capacity of the movements, as well as power unbalances at play in each situation. The words of a Mayan community leader and environmental defender help us to express this idea:

> "The legal [ground] is a very relative thing. Whether it works or not depends very much on the political line of whoever is in power at that time. […] The struggle for the defense of the territory cannot be carried out from a single strategy. It must be integral. We cannot only bet on the legal – nor can we only bet on the organizational or media struggle. I believe that they all have a strength, and our ability to read the situation is important to know when it can generate good results, and when it cannot."

We conclude by acknowledging that the nature and quality of the collected information relies on our lack of expertise in jurisprudence and a limited networking capacity, which may lead to gaps in understanding. Furthermore, the attempt to render a holistic picture of a complex reality inevitably leads to a loss in detail. Future analyses could focus more closely on specific levels of environmental authority, legal instruments, lawsuit filings or court decisions. For example, what role do the rights to people's self-determination play in the context of extractivism? To what extent related legal frameworks empower local and Indigenous communities to establish their own development models?

7. Conclusions

The case of RE conflicts in the state of Yucatan helps us to advance the understanding of the extent to which environmental conflicts over extractivism are also played on the grounds of jurisprudence and policymaking. These factors play a significant role in advancing or blocking controversial development projects.

Environmental laws, policies and paperwork are part of a wide spectrum of instruments that are mobilized in territorial development disputes to pursue certain interests within the boundaries of the rule of law. Governments legislate over 'the rules of the game', RE parks developers produce documentation, authorities issue permits, and impacted citizens and communities may file lawsuits to contest undesired projects. However, the power to leverage environmental policy instruments is unevenly distributed across the spectrum of actors. Particularly, critics of the RE parks are given limited opportunities to make their voices heard through the legal sphere. While litigation has the potential to formalize struggles for environmental justice through existing institutions to suspend projects over the long term, it remains a reactive strategy requiring time, technical expertise, and lobbying capacity to be outsourced outside impacted communities. Meanwhile, development projects continue to move forward, often with flawed paperwork and hasty consultations.

Our analysis aims to contribute to ongoing discussions in literature at the nexus between (green) extractivism, environmental justice and law and policy studies. We corroborate the idea that existing legislative and policy frameworks and instruments can be conceived as a crucial ground on which to understand the drivers of extractivism, and 'double-edged swords' for environmental justice struggles. However, we advance such a hypothesis by recognizing how a side of the sword weighs unevenly more against impacted communities and environmental defenders, who are given limited spaces to oppose undesired projects within the boundaries of the rule of law.

CRediT authorship contribution statement

Antonio Bontempi: Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Ivet Reyes Maturano:** Writing – review & editing, Validation, Methodology, Investigation, Formal analysis, Conceptualization. **Jazmín Sanchéz Arceo:** Writing – review & editing,

Validation, Methodology, Investigation, Conceptualization. **Rodrigo Tarkus Patiño Díaz:** Writing – review & editing, Validation, Supervision, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We are grateful to all interviewees who shared sensitive information and their personal stories with us. Special thanks go to those environmental defenders who agreed to review the manuscript before submission. This work would not have been possible without the tremendous commitment of Drs. Alfonso Munguía Gil (RIP) and Ariana Escalante Kantún, who actively engaged as activist scholars for several years in the collective Articulación Yucatán. Thanks also to Drs. Roser Maneja Zaragoza, Daniela Del Bene and Arnim Scheidel, who supervised the corresponding author during his research stay in Mexico. Thanks also to Drs. Clara Esteve Jordá, Yannick Deniau, Cristina Espinosa Mora-Bowen, Jevgeniy Bluwstein and all the participants of the author's workshop 'Politics Legal Processes to Redress Environmental Injustices from Contested Natural Resource Governance' held 15-17 November 2023 at the Freiburg Institute for Advanced Studies (Freiburg, Germany), who provided useful comments on earlier versions of the manuscript. Finally, thanks to the Miranda Vallart family for borrowing their car for fieldwork purposes. A.B. acknowledges funding from the FI-SDUR 2020 464 scholarship awarded by the Catalan AGAUR Agency.

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.geoforum.2025.104243.

Data availability

The data that has been used is confidential.

References

Acosta, A., 2013. Extractivism and neoextractivism: two sides of the same curse. In: Lang, M., Fernando, L., Buxton, N. (Eds.), Beyond Development: Alternative Visions from Latin America. Transnational Institute / Rosa Luxemburg Foundation, pp. 61–86.
Albiston, C., 2011. The dark side of litigation as a social movement strategy. Iowa Law Rev. Bullet. 96, 61.
Álvarez, L., Coolsaet, B., 2020. Decolonizing environmental justice studies: a Latin American perspective. Capital. Nat. Social. 31, 50–69. https://doi.org/10.1080/10455752.2018.1558272.
Anguelovski, I., 2013. New directions in urban environmental justice. J. Plan. Educ. Res. 33, 160–175. https://doi.org/10.1177/0739456X13478019.
Aquino-Centeno, S., 2021. Experticias y juridificación comunitaria: defensa del subsuelo y tierras comunales en Oaxaca, México. Íconos - Revista de Ciencias Sociales 13–32. https://doi.org/10.17141/iconos.72.2022.5022.
Articulación Yucatán, 2020. MIAs Parques Eólicos. Available at: https://articulacionyucatan.wordpress.com/manifestacion-de-impacto-ambiental-mia/mias-parques-eolicos/ (accessed 9.2.25).
Articulación Yucatán, 2019. MIAs Parques Fotovoltaicos. Available at: https://articulacionyucatan.wordpress.com/manifestacion-de-impacto-ambiental-mia/mias-parques-fotovoltaicos/ (accessed 9.2.25).
Articulación Yucatán, n.d.1. Reforma Energética en México. Available at: https://articulacionyucatan.wordpress.com/acerca-de/ (accessed 9.2.25).
Articulación Yucatán, n.d.2. Evaluación Ambiental Estratégica. Available at: https://articulacionyucatan.wordpress.com/evaluacion-ambiental-estrategica/ (accessed 9.2.25).
Avila Calero, S., 2021. Decarbonizing the South. Space, justice and politics at the renewable energy frontiers (PhD). Universitat Autònoma de Barcelona. http://hdl.handle.net/10803/671659.
Avila, S., Deniau, Y., Sorman, A.H., McCarthy, J., 2022. (Counter)mapping renewables: Space, justice, and politics of wind and solar power in Mexico. Environ Plan E Nat Space 5, 1056–1085. https://doi.org/10.1177/25148486211060657.
Baker, S.H., 2016. Mexican energy reform, climate change, and energy justice in indigenous communities. Nat. Resour. J. 56, 369.
Barragán-Contreras, S.J., 2022. Towards a people-centred sustainable energy transition: Exploring energy justice in Yucatan, Mexico (PhD). University of Sheffield.
Barragán-Contreras, S.J., 2023. Towards more pluralistic energy justice frameworks, in: Handbook on Energy Justice. Edward Elgar Publishing, pp. 240–252. https://doi.org/10.4337/9781839102967.00024.
Bertenthal, A., 2018. Environmental justice in context: assumptions, meanings, and practices of environmental justice in U.S Courts. Environmental Justice 11, 203–207. https://doi.org/10.1089/env.2018.0014.
Bocanegra Acosta, H., Carvajal Martínez, J.E., 2019. Extractivismo, derecho y conflicto social en colombia. Revista Republicana 26, 143–169. https://doi.org/10.21017/Rev.Repub.2019.v26.a63.
Boyer, D., 2019. Energopolitics. Wind and Power in the Anthropocene. Duke University Press. https://doi.org/10.1215/9781478004394.
Braconnier de León, A.-I., 2021. Disputing extractivism at the court: elite countermobilization and backlash in a (still) colonial Guatemala. University of Texas at Austin. https://doi.org/10.26153/tsw/14689.
Bullard, R.D., 1994. Unequal Environmental Protection: Incorporating Environmental Justice in Decision Making. In: Finkel, A.M., Golding, D. (Eds.), Worst Things First? The Debate over Risk-Based National Environmental Priorities. Washington DC, pp. 237–266.
Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., Neville, A.J., 2014. The use of triangulation in qualitative research. Oncol. Nurs. Forum 41, 545–547. https://doi.org/10.1188/14.ONF.545-547.
CEMDA, 2022. Otorgan suspensión definitiva contra megaproyecto solar Ticul A y B en Yucatán. Available at: https://www.cemda.org.mx/otorgan-suspension-definitiva-contra-megaproyecto-solar-ticul-a-y-b-en-yucatan/ (accessed 9.2.25).
Centro Nacional de Control de Energía (CENACE), 2015. ACUERDO por el que se emite el Manual de Subastas de Largo Plazo. Available at: http://www.diputados.gob.mx/LeyesBiblio/regla/n439.pdf (accessed 9.2.25).
Chagnon, C.W., Durante, F., Gills, B., Hagolani-Albov, S., Hokkanen, S., Kangasluoma, S., Konttinen, H., Kröger, M., LaFleur, W., Ollinaho, O., Vuola, M., 2022. From extractivism to global extractivism: the evolution of an organizing concept. J. Peasant Stud. https://doi.org/10.1080/03066150.2022.2069015.
Chiaramonte, X., 2020. The Struggle for Law: Legal strategies, environmental struggles and climate actions in Italy. Oñati Socio-Legal Series 10, 932–954. https://doi.org/10.35295/osls.iisl/0000-0000-0000-1153.
Cole, L.W., Foster, S.R., 2001. From the ground up: Environmental racism and the rise of the environmental justice movement. NYU Press.
Conde, M., Walter, M., 2022. Knowledge co-production in scientific and activist alliances: unsettling coloniality. Engag. Sci. Technol. Soc. 8, 150–170. https://doi.org/10.17351/ests2022.479.
Conde, M., Walter, M., Wagner, L., Navas, G., 2023. Slow justice and other unexpected consequences of litigation in environmental conflicts. Glob. Environ. Chang. 83, 102762. https://doi.org/10.1016/j.gloenvcha.2023.102762.
De los Ríos Ibarra, E., 2020. Proyecto solar Parque Fotovoltaico Oxcum–Umán: Comentarios acerca de su Manifestación de Impacto Ambiental. En el Volcán Insurgente. Available at: https://www.enelvolcan.com/ediciones/2020/61-abriljunio-2020/87-ediciones/061-abril-junio-2020/650-proyecto-solar-parque-fotovoltaico-oxcum-uman-comentarios-acerca-de-su-manifestacion-de-impacto-ambiental (accessed 9.2.25).
Del Bene, D., Scheidel, A., Temper, L., 2018. More dams, more violence? A global analysis on resistances and repression around conflictive dams through co-produced knowledge. Sustain. Sci. 13, 617–633. https://doi.org/10.1007/s11625-018-0558-1.
Dressel, B., 2010. Judicialization of politics or politicization of the judiciary? Considerations from recent events in Thailand. Pac. Rev. 23, 671–691. https://doi.org/10.1080/09512748.2010.521253.
Dunlap, A., 2023. The Structures of Conquest: Debating Extractivism(s), Infrastructures and Environmental Justice for Advancing Post-Development Pathways. Revue internationale de politique de développement. https://doi.org/10.4000/poldev.5355.
Dunlap, A., 2020. Wind, coal, and copper: the politics of land grabbing, counterinsurgency, and the social engineering of extraction. Globalizations 17, 661–682. https://doi.org/10.1080/14747731.2019.1682789.
Dunlap, A., 2018. "A Bureaucratic Trap:" Free, Prior and Informed Consent (FPIC) and Wind Energy Development in Juchitán, Mexico. Capitalism Nature Socialism 29, 88–108. https://doi.org/10.1080/10455752.2017.1334219.
Dunlap, A., Jakobsen, J., 2020. The violent technologies of extraction. Springer International Publishing, Cham. https://doi.org/10.1007/978-3-030-26852-7.
Dunlap, A., Tornel, C., 2024. An insurrection in energy research: a dialogue between Carlos Tornel and Alexander Dunlap on energy justice, capitalist warfare & decolonization. Globalizations 21, 162–182. https://doi.org/10.1080/14747731.2023.2204543.
EJAtlas, 2022a. Proyecto Fotovoltaico Ticul A y B Yucatán, México. Available at: https://ejatlas.org/conflict/proyecto-fotovoltaico-ticul-a-y-b-yucatan-mexico (accessed 9.2.25).
EJAtlas, 2022b. Parque Fotovoltaico Yucatán Solar, Valladolid, México. Available at: https://ejatlas.org/conflict/parque-fotovoltaico-yucatan-solar-valladolid-mexico (accessed 9.2.25).
EJAtlas, 2022c. Parque Eólico Chicxulub en ejido de Ixil, Yucatan, Mexico. Available at: https://ejatlas.org/conflict/parque-eolico-chicxulub-incluye-linea-de-transmision-e-intento-de-privatizacion-de-tierras-del-ejido-de-ixil (accessed 9.2.25).
EJAtlas, 2022d. Parque eólico en Kimbilá, Yucatán, Mexico. Available at: https://ejatlas.org/conflict/parque-eolico-en-kimbila-yucatan (accessed 9.2.25).

EJAtlas, 2021a. Parque Eólico Tizimín, Yucatán, México. Available at: https://ejatlas.org/conflict/parque-eolico-tizimin-yucatan-mexico (accessed 9.2.25).
EJAtlas, 2021b. Parque Eólico Dzilam Bravo, Yucatán, México. Available at: https://ejatlas.org/conflict/el-largo-comienzo-de-la-energia-eolica-en-yucatan-el-parque-eolico-dzilam-bravo-el-primero-entre-la-incertidumbre-y-la-injusticia (accessed 9.2.25).
Encalada Gómez, J.C., 2019. Producción del "Parque Eólico Dzilam Bravo". Estrategias para lograr el control y explotación de un espacio. Colegio de Michoacán, A.C. Available at: https://colmich.repositorioinstitucional.mx/jspui/handle/1016/664 (accessed 9.2.25).
Enrique Villasana, P., Ibáñez, R., Estay-Sepúlveda, J.G., Monteverde Sánchez, A., 2021. Justicia Ambiental, Justicia Territorial y Justicia Epistémica. Chile, Zona de Sacrificio. Historia Ambiental Latinoamericana y Caribeña (HALAC) revista de la Solcha 11, 39–61. https://doi.org/10.32991/2237-2717.2021v11i3.p39-61.
Escalante Kantún, N.A., 2021. Energy [in]Justice in México: An analysis of wind and solar energy projects in Yucatán. University of York. https://etheses.whiterose.ac.uk/29838/.
Escobar, A., 1995. Encountering development: the making and unmaking of the Third World. Choice Reviews Online. https://doi.org/10.5860/CHOICE.32-5764.
Espadas Manrique, C., García Quintanilla, A., Munguía Gil, A., López Santillán, Á., Patiño Díaz, R., Reyes García, C., Reyes Maturano, I., Sánchez Arceo, J., 2020. Perspectiva de los territorios del norte de la Península de Yucatán de cara al Tren Maya: una visión integral de sus condiciones socioeconómicas, socioambientales y socioculturales al 2019. Mérida. Available at: https://articulacionyucatan.wordpress.com/wp-content/uploads/2020/04/gc-ttm-2-2019.pdf (accessed 2.9.25).
Espinoza Hernández, R., 2019. Despropósitos normativos y estrategias jurídicas para la reivindicación colectiva de los derechos, in: Barreda Marín, A., Enríquez, L., Espinoza Hernández, R. (Eds.), Economía Política de la devastación ambiental y conflictos socioambientales en México. Editorial Itaca, México: Facultad de Economía-UNAM, pp. 231–319.
Fierro, J.O., 2020. La SCJN concede amparo a comunidad maya para suspender proyecto de energía eólica. Proceso. Available at: https://www.proceso.com.mx/nacional/estados/2020/5/6/la-scjn-concede-amparo-comunidad-maya-para-suspender-proyecto-de-energia-eolica-242506.html (accessed 9.2.25).
Flores, A., Deniau, Y., 2019. El megaproyecto para la península de Yucatán. México. Available at: http://geocomunes.org/Analisis_PDF/AnalisisGeneralYucatan.pdf (accessed 9.2.25).
Fuentes López, G., 2020. Antes que las eólicas, indígenas se quejaron de ser pisoteados. Y ellas, y gobiernos, los ignoraron. SinEmbargo. Available at: https://www.sinembargo.mx/22-05-2020/3789827 (accessed 9.2.25).
Gago, V., Mezzadra, S., 2017. A critique of the extractive operations of capital: toward an expanded concept of extractivism. Rethink. Marx. 29, 574–591. https://doi.org/10.1080/08935696.2017.1417087.
Galligan, B.P., 2021. Fisheries extractivism and the right to subsistence: Conflicting governance models and the legal structures that enact them. Mar. Policy 133, 104729. https://doi.org/10.1016/j.marpol.2021.104729.
García de Fuentes, A., 2019. Representaciones cartográficas de la turistificación de la península de Yucatán a medio siglo de la creación de Cancún. Investigaciones Geográficas. https://doi.org/10.14350/rig.60023.
GeoComunes, 2023. Geovisualizador de la Península de Yucatán - Parques solares y eólicos en la península de Yucatán (polígonos). Available at: https://geocomunes.org/Visualizadores/PeninsulaYucatan/ (accessed 9.2.25).
GeoComunes, C., Torres-Mazuera, G., Gómez Godoy, C., 2020. Expansión capitalista y propiedad social en la Península de Yucatán. Available at: https://geocomunes.org/Analisis_PDF/Expansion_capitalista_propiedad_social_Junio2020.pdf (accessed 9.2.25).
Global Forest Watch, 2024. Forest cover in Yucatán, Mexico. Available at: https://www.globalforestwatch.org/dashboards/country/MEX/31/?category=land-cover&lang=en&map=eyJjYW5Cb3VuZCI6dHJ1ZX0%3D (accessed 9.2.25).
Gobierno de México, 2021. Ordenamiento Ecológico del Territorio. Available at: https://www.gob.mx/semarnat/acciones-y-programas/ordenamiento-ecologico-del-territorio (accessed 9.2.25).
González-Serrano, M.X., Montalván-Zambrano, D.J., Viaene, L., 2021. Hacia la descolonización del régimen extractivo: patrones y límites de la judicialización en conflictos mineros. Íconos - Revista De Ciencias Sociales 97–116. https://doi.org/10.17141/iconos.72.2022.5041.
Greenpeace, 2020. La carne que está consumiendo al Planeta. Available at: https://www.greenpeace.org/static/planet4-mexico-stateless/2020/05/0dad8ed4-resumen_granjas_web.pdf (accessed 9.2.25).
Grosfoguel, R., 2016. Del «extractivismo económico» al «extractivismo epistémico» y al « extractivismo ontológico»: una forma destructiva de conocer, ser y estar en el mundo. Tabula Rasa 24, 123–143.
Gudynas, E., 2015. Extractivismos: ecología, economía y política de un modo de entender el desarrollo y la naturaleza. CEDIB, Centro de Documentación e Información Bolivia.
Gudynas, E., 2013. Extracciones, extractivismos y extrahecciones. Un marco conceptual sobre la apropiación de recursos naturales. El Observatorio del Desarrollo.
Gustafsson, M.-T., Schilling-Vacaflor, A., 2022. Indigenous peoples and multiscalar environmental governance: the opening and closure of participatory spaces. Glob Environ Polit 22, 70–94. https://doi.org/10.1162/glep_a_00642.
Guzmán Solano, N., 2016. Struggle from the margins: Juridical processes and entanglements with the Peruvian state in the era of mega-mining. Extr. Ind. Soc. 3, 416–425. https://doi.org/10.1016/j.exis.2016.02.004.
Hessbruegge, J., 2014. Mayan law in post-conflict Guatemala. Customary law and the rule of law in war torn societies.
Hirschl, R., 2009. The Judicialization of Politics, in: The Oxford Handbook of Law and Politics. Oxford University Press, pp. 119–141. https://doi.org/10.1093/oxfordhb/9780199208425.003.0008.
Instituto Nacional de Estadística y Geografía - INEGI, 2021. Panorama sociodemográfico de Yucatán. Censo de Población y Vivienda 2020.
Instituto Nacional de Estadística y Geografía - INEGI, 2020. Principales resultados del Censo de Población y Vivienda 2020. Yucatán. Available at: https://www.inegi.org.mx/app/biblioteca/ficha.html?upc=702825198374 (Accessed 9.2.25).
Instituto Nacional de Estadística y Geografía - INEGI, 2017. Anuario estadístico y geográfico de Yucatán 2017.
Instituto Nacional de Estadística y Geografía - INEGI, 2016. División política municipal [en México]. Available at: http://geoportal.conabio.gob.mx/metadatos/doc/html/muni_2018gw.html (accessed 9.2.25).
Instituto Nacional de Estadística y Geografía - INEGI, 2015. Principales resultados de la Encuesta Intercensal 2015.
International Energy Agency, 2024. Massive expansion of renewable power opens door to achieving global tripling goal set at COP28. Available at: https://www.iea.org/news/massive-expansion-of-renewable-power-opens-door-to-achieving-global-tripling-goal-set-at-cop28 (accessed 9.2.25).
Jenkins, K., McCauley, D., Heffron, R., Stephan, H., Rehner, R., 2016. Energy justice: a conceptual review. Energy Res. Soc. Sci. 11, 174–182. https://doi.org/10.1016/j.erss.2015.10.004.
Jenkins, K.E.H., Sovacool, B.K., Mouter, N., Hacking, N., Burns, M.-K., McCauley, D., 2021. The methodologies, geographies, and technologies of energy justice: a systematic and comprehensive review. Environ. Res. Lett. 16, 043009. https://doi.org/10.1088/1748-9326/abd78c.
Kim, E., 2018. Wind Energy Development in Mexico: At What Cost? Investigating social acceptance of wind farms in Oaxaca and Yucatán, Mexico. Harvard Kennedy School.
Kramarz, T., Cosolo, D., Rossi, A., 2017. Judicialization of environmental policy and the crisis of democratic accountability. Rev. Policy Res. 34, 31–49. https://doi.org/10.1111/ropr.12218.
Kuehn, R.R., 2000. A Taxonomy of Environmental Justice. Environmental Law Reporter 30.
La Jornada Maya, 2019. Semarnat niega permiso a megaproyecto solar en Yucatán. Available at: https://www.lajornadamaya.mx/yucatan/112325/semarnat-niega-permiso-a-megaproyecto-solar-en-yucatan (accessed 9.2.25).
Lee, J.R., 2019. What is a field and why does it grow? Is there a field of environmental conflict? Environmental Conflict and Cooperation 69–75. https://doi.org/10.4324/9781351139243-9/FIELD-GROW-FIELD-ENVIRONMENTAL-CONFLICT-JAMES-LEE.
Levenda, A.M., Behrsin, I., Disano, F., 2021. Renewable energy for whom? A global systematic review of the environmental justice implications of renewable energy technologies. Energy Res. Soc. Sci. 71, 101837. https://doi.org/10.1016/j.erss.2020.101837.
López Fernández, R.J., Munguía Gil, A., Sarmiento Franco, J.F., 2016. Una nueva reforma del POETCY: el rol del estado en la protección del medio ambiente y la participación ciudadana, in: 21° Encuentro Nacional Sobre Desarrollo Regional En México. AMECIDER – ITM, Mérida.
Maltais, A., 2008. Global warming and the cosmopolitan political conception of justice. Env Polit 17, 592–609. https://doi.org/10.1080/09644010802193476.
Martínez Romero, E., Gasparello, G., Díaz Perera, M.Á., 2023. Territorios mayas en el paso del tren. Riesgos previsibles y posturas independientes sobre el Tren Maya. Bajo Tierra A.C.
Martinez-Alier, J., 2021. Mapping ecological distribution conflicts: The EJAtlas. Extr. Ind. Soc. 8, 100883. https://doi.org/10.1016/J.EXIS.2021.02.003.
Martinez-Alier, J., Temper, L., Del Bene, D., Scheidel, A., 2016. Is there a global environmental justice movement? J. Peasant Stud. 43, 731–755. https://doi.org/10.1080/03066150.2016.1141198.
McManus, P., 2020. Environmental Regulation, in: International Encyclopedia of Human Geography. Elsevier, pp. 241–246. https://doi.org/10.1016/B978-0-08-102295-5.10056-3.
Medici-Colombo, G., Ricarte, T., 2024. The Escazú Agreement contribution to environmental justice in Latin America: An exploratory empirical inquiry through the lens of climate litigation. J Hum Rights Pract 16, 160–181. https://doi.org/10.1093/jhuman/huad029.
Montoya, A., Sieder, R., Bravo-Espinosa, Y., 2021. Juridificación multiescalar frente a la industria minera: experiencias de Centroamérica y México. Íconos - Revista de Ciencias Sociales 57–78. https://doi.org/10.17141/iconos.72.2022.5038.
Moore, J.W., 2000. Sugar and the expansion of the early modern world-economy: commodity frontiers, ecological transformation, and industrialization. Review (Fernand Braudel Center) 23, 409–433.
Motupalli, C., 2018. intergenerational justice, environmental law, and restorative justice. Wash J Environ Law Pol.
Múuch' Xíinbal, 2023. 8vo Tribunal de los Derechos de la Naturaleza. Available at: https://asambleamaya.wixsite.com/muuchxiinbal/tribunalt (accessed 9.2.25).
Múuch' Xíinbal, n.d. Ejidatarios de Sinanché rechazan parque eólico. Available at: https://asambleamaya.wixsite.com/muuchxiinbal/single-post/2019/03/15/ejidatarios-de-sinanch%C3%A9-rechazan-parque-e%C3%B3lico (accessed 9.2.25).
Núñez, A., Benwell, M.C., Aliste, E., 2022. Interrogating green discourses in Patagonia-Aysén (Chile): green grabbing and eco-extractivism as a new strategy of capitalism? Geogr. Rev. 112, 688–706. https://doi.org/10.1080/00167428.2020.1798764.
Oliver Quintal, J., 2020. Piden a la SEMARNAT consulta pública en Oxcum sobre el Parque Fotovoltaico Oxcum-Umán. Available at: https://www.jhonnyoliverquintal.com/2020/10/piden-la-semarnat-consulta-publica-en.html (accessed 9.2.25).
Ortiz Yam, I., 2014. De milperos a henenqueneros en Yucatán 1870-1937. El Colegio de México, México DF, 2013, 266 p. Nuevo Mundo Mundos Nuevos. https://doi.org/10.4000/nuevomundo.67571.

Pech Pool, D., Mascaró Miquelajáuregui, M., Simões, N., Enríquez Ortíz, C., 2010. Ambientes Marinos. In: Durán, R., Méndez, M. (ed.), Biodiversidad y desarrollo humano en Yucatán. CICY, PPD-FMAM, CONABIO, SEDUMA. 496 p. Available at: https://www.cicy.mx/documentos/CICY/sitios/Biodiversidad/pdfs/Cap1/07%20Ambientes%20marinos.pdf (accessed 9.2.25).

Pellow, D.N., Weinberg, A., Schnaiberg, A., 2001. The environmental justice movement: equitable allocation of the costs and benefits of environmental management outcomes. Soc. Justice Res 14, 423–439. https://doi.org/10.1023/A:1014654813111.

Pigrau, A., 2014. The Texaco-Chevron case in Ecuador: Law and justice in the age of globalization. Revista Catalana De Dret Ambiental 5. https://doi.org/10.17345/rcda1437.

Polanco Rodríguez, A.G., Beilin, K., 2019. Toxic bodies: water and women in Yucatan. Hispanic Issues Series 24, 168–193.

Post, E., 2023. Expanding Extractivisms: Extractivisms as Modes of Extraction Sustaining Imperial Modes of Living. Revue Internationale De Politique De Développement. https://doi.org/10.4000/poldev.5376.

Post, E., 2022. Hydroelectric Extractivism: Infrastructural Violence and Coloniality in the Sierra Norte de Puebla, Mexico. J. Lat. Am. Geogr. 21, 49–95. https://doi.org/10.1353/lag.2022.0039.

Rao, N.V., Bhaskaran, V., Nagendra, H., 2023. Can green tribunals help to resist neoliberalism in environmental governance – the case of India. Land Use Policy 131, 106739. https://doi.org/10.1016/j.landusepol.2023.106739.

Richardson, W., Mcneish, J.-A., 2021. Granting Rights to Rivers in Colombia: Significance for ExtrACTIVISM and Governance. In: Shapiro, J., McNeish, J.A. (Eds.), Our Extractive Age. Routledge. https://doi.org/10.4324/9781003127611.

Rodríguez, I., Inturias, M.L., 2018. Conflict transformation in indigenous peoples' territories: doing environmental justice with a 'decolonial turn. Dev. Stud. Res. 5, 90–105. https://doi.org/10.1080/21665095.2018.1486220.

Rousseau, I., 2020. La reforma energética (2013-2014) a la luz de la nueva legislación sobre los impactos sociales de los proyectos. Foro Int 853–887. https://doi.org/10.24201/fi.v60i2.2740.

Sánchez, J., Reyes, I., Patiño, R., Munguía, A., Deniau, Y., 2019. Expansión de proyectos de energía renovable de gran escala en la península de Yucatán. Available at https://geocomunes.org/Analisis_PDF/EnergiaRenovableYucatan.pdf (Accessed 9.2.25).

Scheidel, A., Del Bene, D., Liu, J., Navas, G., Mingorría, S., Demaria, F., Avila, S., Roy, B., Ertör, I., Temper, L., Martínez-Alier, J., 2020. Environmental conflicts and defenders: A global overview. Glob. Environ. Chang. 63, 102104. https://doi.org/10.1016/j.gloenvcha.2020.102104.

Scheidel, A., Fernández-Llamazares, Á., Bara, A.H., Bene, D.D., David-Chavez, D.M., Fanari, E., Garba, I., Hanaček, K., Liu, J., Martínez-Alier, J., Navas, G., Reyes-García, V., Roy, B., Temper, L., Aye Thiri, M., Tran, D., Walter, M., Whyte, K.P., 2023. Global impacts of extractive and industrial development projects on Indigenous Peoples' lifeways, lands, and rights. Sci. Adv. 9. https://doi.org/10.1126/SCIADV.ADE9557/SUPPL_FILE/SCIADV.ADE9557_DATA_S1_TO_S3.ZIP.

Scheidel, A., Sorman, A.H., 2012. Energy transitions and the global land rush: Ultimate drivers and persistent consequences. Glob. Environ. Chang. 22, 588–595. https://doi.org/10.1016/j.gloenvcha.2011.12.005.

Scheidel, A., Temper, L., Demaria, F., Martinez-Alier, J., 2018. Ecological distribution conflicts as forces for sustainability: an overview and conceptual framework. Sustain. Sci. 13, 585–598. https://doi.org/10.1007/S11625-017-0519-0.

Schlosberg, D., 2007. Defining Environmental Justice: Theories, Movements, and Nature. Oxford University Press, Oxford. https://doi.org/10.1093/acprof:oso/9780199286294.001.0001.

Schlosberg, D., Carruthers, D., 2010. Indigenous Struggles, Environmental Justice, and Community Capabilities. Glob Environ Polit 10, 12–35. https://doi.org/10.1162/GLEP_a_00029.

Schmitter-Soto, J.J., Comín, F.A., Escobar-Briones, E., Herrera-Silveira, J., Alcocer, J., Suárez-Morales, E., Elías-Gutiérrez, M., Díaz-Arce, V., Marín, L.E., Steinich, B., 2002. Hydrogeochemical and biological characteristics of cenotes in the Yucatan Peninsula (SE Mexico). Hydrobiologia 467, 215–228. https://doi.org/10.1023/A:1014923217206.

Schwank Durán, J., 2005. La costumbre jurídica en los pueblos mayas. IIDH.

Silber Coats, N., 2017. Clean energy and water conflicts: contested narratives of small hydropower in Mexico's Sierra Madre Oriental. Water Altern. 10 (2), 578–601.

Skjævestad, A., 2010. The Mapuche People's Battle for Indigenous Land: Litigation as a Strategy to Defend Indigenous Land Rights, in: Couso, J., Huneeus, A., Sieder, R. (Eds.), Cultures of Legality: Judicialization and Political Activism in Latin America. Cambridge University Press, pp. 207–233.

Sovacool, B.K., Turnheim, B., Hook, A., Brock, A., Martiskainen, M., 2021. Dispossessed by decarbonisation: reducing vulnerability, injustice, and inequality in the lived experience of low-carbon pathways. World Dev. 137, 105116. https://doi.org/10.1016/j.worlddev.2020.105116.

Sultana, F., 2022. Critical climate justice. Geogr. J. 188, 118–124. https://doi.org/10.1111/geoj.12417.

Svampa, M., 2012. Resource Extractivism and Alternatives: Latin American Perspectives on Development. J. für Entwicklungspolitik XXVIII 43–73.

Temper, L., 2019. Blocking pipelines, unsettling environmental justice: from rights of nature to responsibility to territory. Local Environ. 24, 94–112. https://doi.org/10.1080/13549839.2018.1536698.

Temper, L., Avila, S., Bene, D.D., Gobby, J., Kosoy, N., Billon, P.L., Martinez-Alier, J., Perkins, P., Roy, B., Scheidel, A., Walter, M., 2020. Movements shaping climate futures: a systematic mapping of protests against fossil fuel and low-carbon energy projects. Environ. Res. Lett. 15, 123004. https://doi.org/10.1088/1748-9326/abc197.

Temper, L., Del Bene, D., Martinez-Alier, J., 2015. Mapping the frontiers and front lines of global environmental justice: the EJAtlas. J Polit Ecol 22. https://doi.org/10.2458/v22i1.21108.

Temper, L., Walter, M., Rodriguez, I., Kothari, A., Turhan, E., 2018. A perspective on radical transformations to sustainability: resistances, movements and alternatives. Sustain. Sci. 13, 747–764. https://doi.org/10.1007/s11625-018-0543-8.

Tornel, C., 2023a. Decolonizing energy justice from the ground up: Political ecology, ontology, and energy landscapes. Prog. Hum. Geogr. 47, 43–65. https://doi.org/10.1177/03091325221132561.

Tornel, C., 2023b. Energy justice in the context of green extractivism: Perpetuating ontological and epistemological violence in the Yucatan Peninsula. J Polit Ecol 30. https://doi.org/10.2458/jpe.5485.

Torres-Mazuera, G., Appendini, K., 2020. La regulación imposible: (i)legalidad e (i) legitimidad en los mercados de tierra en México al inicio del siglo XXI. El Colegio de México. https://doi.org/10.2307/j.ctv19rs0f4.

Torres-Mazuera, G., Madrid, S., Benet, R., 2021. Tres décadas de privatización y despojo de la propiedad social en la Península de Yucatán. Available at https://www.ccmss.org.mx/wp-content/uploads/2020_22_TresDecadasPrivatizacion.pdf (Accessed 9.2.25).

Tran, D., Hanaček, K., 2023. A global analysis of violence against women defenders in environmental conflicts. Nat Sustain 6, 1045–1053. https://doi.org/10.1038/s41893-023-01126-4.

Tribunales Agrarios, 2021. Tribunales Agrarios. Naturaleza Jurídica y Atribuciones. Mexico City. https://www.tribunalesagrarios.gob.mx/ta/docs/pdf/cua.pdf.

UNEP, 2024. Environmental Rule of Law. Available at: https://www.unep.org/explore-topics/environmental-rights-and-governance/what-we-do/promoting-environmental-rule-law-0 (accessed 9.2.25).

UNEP, 2019. ENVIRONMENTAL RULE OF LAW First Global Report. Available at https://www.unep.org/resources/assessment/environmental-rule-law-first-global-report (Accessed 9.2.25).

Vallinder, T., 1994. The Judicialization of Politics. A World-Wide Phenomenon: Introduction. International Political Science Review / Revue internationale de science politique 15, 91–99. https://www.jstor.org/stable/1601557.

Vanhala, L., 2012. Legal opportunity structures and the paradox of legal mobilization by the environmental movement in the UK. Law Soc. Rev. 46, 523–556. https://doi.org/10.1111/j.1540-5893.2012.00505.x.

Vásquez Duplat, A.M., 2017. Extractivismo Urbano Debates para una construcción colectiva de las ciudades. Fundación Rosa Luxemburgo., Buenos Aires.

Vélez-Torres, I., 2014. Governmental extractivism in Colombia: Legislation, securitization and the local settings of mining control. Polit. Geogr. 38, 68–78. https://doi.org/10.1016/j.polgeo.2013.11.008.

Weber, L., Walter, M., Temper, L., Rodríguez, I., 2024. Co-production of Knowledge for Environmental Justice: Key Lessons, Challenges and Approaches in the ACKnowl-EJ Project, in: Rodríguez, I., Walter, M., Temper, L. (Eds.), Just Transformations Grassroots Struggles for Alternative Futures. Pluto Press.

Yucatán Ahora, 2020. La Corte anula permiso de parque solar y eólico en el norte de Yucatán. Available at: https://yucatanahora.mx/la-corte-anula-permiso-de-parque-solar-y-eolico-en-el-norte-de-yucatan/ (accessed 9.2.25).

Zárate-Toledo, E., Fraga, J., 2016. La política eólica mexicana: Controversias sociales y ambientales debido a su implantación territorial. Estudios De Caso En Oaxaca y Yucatán 65–95.

Zárate-Toledo, E., Wood, P., Patiño, R., 2021. In search of wind farm sustainability on the Yucatan coast: deficiencies and public perception of Environmental Impact Assessment in Mexico. Energy Policy 158. https://doi.org/10.1016/j.enpol.2021.112525.

Zografos, C., Robbins, P., 2020. Green Sacrifice Zones, or Why a Green New Deal Cannot Ignore the Cost Shifts of Just Transitions. One Earth 3, 543–546. https://doi.org/10.1016/j.oneear.2020.10.012.