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Integrating Climate Policy, Social inclusion, and Indigenous Knowledge: Toward a Holistic Approach for Morocco's Sustainable Future

Intégrer la politique climatique, l'inclusion sociale et les Connaissances Indigènes : Vers une Approche Holistique pour un Avenir Durable au Maroc

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Abstract :

This study explores the intrinsic integration of climate policy, social inclusion, and indigenous knowledge in the context of Morocco's unique socio-cultural context. Despite their recognized individual importance, the literature lacks comprehensive insights into the transformative potential of this triangular approach. Based on existing research and theoretical frameworks, this study highlights the lack of exploration into how the interaction of these elements can foster effective climate policies and promote social cohesion. The detailed analysis highlights the need for empirical investigation to fill this gap and shed light on the complex dynamics between climate policy, social inclusion, and indigenous knowledge. This study aims to unveil unexploited potential for sustainable development by proposing a comprehensive framework that recognizes the interdependencies and potential benefits of integrating these dimensions. By filling this gap, this research contributes to academic discourse and policy formulation by offering insight into developing climate policies that embrace social inclusion and leverage indigenous knowledge for climate resilience in the Moroccan context. This study provides a roadmap for future studies to explore the complexities, nuances, and tangible impacts of this integrated approach in the Moroccan context and beyond, ultimately contributing to creating more informed and equitable climate policies in other countries.

Keywords: Climate Policy, Indigenous knowledge, social cohesion, Morocco.
Classification JEL : E61, F68, J15, Q01
Paper type: Theoretical Research

Résumé :

Cet article explore l'intégration de la politique climatique, de l'inclusion sociale et des connaissances indigènes dans le contexte socioculturel marocain. Malgré leur importance respective, la littérature manque de perspectives globales sur le potentiel de cette approche transversale. Sur la base des études et des cadres théoriques existants, cet article met en évidence le manque d'exploration de la manière dont l'interaction de ces aspects peut favoriser la mise en place de politiques climatiques efficaces et promouvoir la cohésion sociale. Notre analyse met en évidence la nécessité d'une enquête empirique pour combler cette lacune et mettre en lumière sur la dynamique complexe entre la politique climatique, l'inclusion sociale et les connaissances indigènes. Cette étude vise à dévoiler un potentiel inexploité pour le développement durable en proposant un cadre global qui reconnaît les interdépendances et les avantages potentiels de l'intégration de ces trois dimensions. En comblant cette lacune, cette recherche contribue au développement du champ académique en offrant un aperçu de l'élaboration de politiques climatiques qui intègrent l'inclusion sociale et tirent parti des savoirs ancestraux pour la résilience climatique dans le contexte marocain. Cette étude fournit une feuille de route pour de futures études visant à explorer les complexités, les nuances et les impacts tangibles de cette approche intégrée dans le contexte marocain, contribuant finalement à créer des politiques climatiques plus éclairées et plus équitables dans d'autres pays.

Mots clés : Politique climatique, Connaissances indigènes, Inclusion sociale, Maroc.
JEL Classification : E61, F68, J15, Q01
Type du papier : Recherche Théorique

1. Introduction

Climate change extensively threatens natural ecosystems and human societies, impacting economic and social progress, particularly in developing countries. Despite being a low emitter of greenhouse gases, Morocco is susceptible to the consequences of climate change, which could be felt in the near future. The country's climate exhibits variations, leading to noticeable fluctuations in rainfall and irregular weather patterns. Morocco has taken measures to address climate change in response to these challenges and actively participates in implementing the Paris Agreement. Notably, the country has advanced in combating climate change by integrating climate considerations into key sectors of its national economy.

Morocco has made significant progress regarding its climate policy in recent years, positioning itself at the forefront of global efforts to combat climate change. Thanks to its proactive policies and commitment to renewable energy, Morocco has become a leading African country in transitioning to clean and sustainable energy sources (Chaibi et al., 2021). The Moroccan government has implemented various policies to encourage investments in renewable energies, which are expected to generate 52% of the country's electricity by 2030 (Boulakhbar et al., 2020).

One of the key milestones in Morocco's climate policy is the ratification of the Paris Agreement. By ratifying the Paris Agreement, Morocco has solidified its commitment to reducing greenhouse gas emissions and limiting the global temperature rise to below 2°C. Furthermore, Morocco showcased its commitment to climate action by hosting the United Nations Conference of Parties COP7 in Marrakesh in 2001 and COP22 in 2016. The latter marked a significant step forward for African countries, notably through the Summit of African Heads of State, which launched three African climate commissions to support climate action in Africa through regional funds dedicated exclusively to climate change mitigation and adaptation projects.

In order to support its climate goals, Morocco has implemented a series of actions and measures. These include establishing renewable energy and energy efficiency agencies, engaging domestic and international stakeholders, and enacting legislation that promotes and incentivizes adaptation and mitigation strategies (Papapostolou et al., 2020). These actions have helped create an ambitious national climate policy that attracted significant domestic and international investments in Morocco. Accordingly, Morocco has gained recognition for its commendable efforts in addressing climate change through progressive policies and strategic initiatives.

In addition to the pressing need to transition to clean energies, the importance of combating climate change and adapting to its effects has also highlighted the need to ensure that climate action efforts are inclusive for all. Social inclusion, in the context of climate change, means ensuring that individuals and communities, regardless of status, race, gender or other identity factors, have equal and fair opportunities to participate in the planning, execution and benefits of climate policies and projects (Atmadja et al., 2020). In fact, the issue of inclusion has gained more attention when it comes to climate matters especially in developing nations. In these countries certain groups such as workers, women and children face challenges regarding their rights and well-being. Indeed, climate change worsens the vulnerabilities faced by these groups emphasizing the need to urgently focus on inclusion, within the framework of climate action.

Social inclusion issues are particularly felt among Moroccan rural communities, where the effects of climate change are disproportionately severe. These communities, whose way of life relies heavily on agriculture and natural resources, face increasing challenges such as droughts, unpredictable rainfall and soil degradation. Despite these challenges, it is important to highlight the wealth of local knowledge that is deeply embedded within these communities. This rich source of wisdom, passed down from generation to generation, equips them with practices, adaptable techniques and a deep understanding of their local ecosystems. From water

conservation methods to crop varieties capable of thriving in changing climatic conditions, these rural communities draw on a treasure trove of traditional wisdom (Jacques, 2023). For instance, the Amazigh people have an enduring history in Morocco that spans countless centuries. Their presence in the region reflects their strength and deep connection to the land. Throughout time the Amazigh individuals have shown resilience and adaptability in the face of different empires, environmental changes and challenges.

An intriguing aspect of the Amazigh history in Morocco is their ability to navigate desertification during the Holocene era, which took place approximately 6,000 to 4,000 years ago. Desertification refers to when fertile land transforms into desert due to factors like climate change and human activities (Liu et al., 2006). However, it's important to recognize that the significance of local communities' knowledge in Morocco is often overlooked (Gagliardi, 2019).

While Morocco's climate policy and environmental strategies have received deserved praise (World Bank, 2016), examining the gaps that need thorough evaluation is essential. If left unattended, these gaps could hinder achieving an inclusive approach toward Morocco's climate goals and ambitions.

This paper delves into the relationship between Morocco's climate policy, socioeconomic fairness, and cultural wisdom. It critically evaluates the concept of just transition, which has gained significant global attention, to determine its relevance and potential within Morocco's unique context. By integrating the principles of just transition into Morocco's climate policy framework, an equitable and inclusive shift towards green practices can be ensured while safeguarding against exacerbating social inequalities.

The importance of addressing disparities within the realm of climate policy becomes evident when considering Morocco's societal framework. This paper explores how adopting a just transition approach can act as a protective mechanism for vulnerable segments of society during a rapid green transformation. By placing these concerns within Morocco's social fabric, the paper emphasizes the importance of aligning climate policy with principles of social justice.

One other crucial aspect is the relationship between indigenous knowledge and climate adaptation. Morocco's rich cultural heritage is deeply rooted in wisdom passed down through generations intimately connected to the land's ecosystems and communities (Crate et al., 2017). This paper explores how traditional insights, deeply ingrained in culture, can serve as a valuable tool for climate adaptation, enhancing the nation's resilience against challenges posed by climate change.

Furthermore, this exploration extends to finding synergies between the concepts of a just transition and indigenous knowledge. By blending these distinct ideas, a holistic and multifaceted approach to climate policy is envisioned—one that promotes fair transformation and recognizes and values Morocco's cultural heritage. This collaboration can lead to strategies that leverage the benefits of indigenous knowledge while supporting principles of a just transition, fostering long-term sustainability.

This paper explores the complexities of these aspects, bringing together a narrative that supports a fair and culturally aware climate policy in Morocco. Through this examination, we aim to contribute to the discussion on aligning environmental and societal welfare in an ever-evolving global landscape.

2. Literature review

2.1 Climate Policy Landscape in Morocco

Against the backdrop of being one of the least responsible countries for climate change and one of the most susceptible to its impacts, Morocco has taken significant steps towards transitioning to a low-carbon economy and reducing its reliance on fossil fuels. Since the Rio Summit in

1992, Morocco has actively engaged in efforts to tackle climate change. The country's commitment is evident through its endorsement of international agreements such as the UNFCCC in 1995, the Kyoto Protocol in 2002, and the Paris Agreement in 2016. Morocco has taken steps to uphold these commitments by setting its NDC (Nationally Determined Contributions) in 2016 and updating it in 2021. These efforts span sectors, including agriculture, housing, waste management, solar pumping, photovoltaic roofs, tourism, and transportation. Additionally, Morocco demonstrates its approach through regular reporting. The country has diligently produced two updated reports known as BUR1 and BUR2 to outline progress toward carbon mitigation. Furthermore, Morocco has meticulously developed its National Communications (NC) following the United Nations Framework Convention on Climate Change guidelines. Morocco emphasizes its role as a dedicated global participant in addressing climate change and forging a sustainable path forward through these initiatives.

Morocco has shown its dedication to tackling climate change by implementing various policies and strategies to reduce greenhouse gas emissions and foster sustainable development. A key document guiding climate initiatives in Morocco is the National Charter for Environment and Sustainable Development, adopted in 2009. This charter serves as a foundation for protecting the environment and promoting sustainable growth, specifically focusing on addressing the urgent issue of climate change.

In 2015, Morocco implemented the National Strategy for Sustainable Development (NSSD). This strategy aims to integrate social and environmental objectives within a comprehensive framework. The NSSD establishes objectives and action plans to support renewable energy adoption, enhance energy efficiency, measures to promote sustainable agricultural practices, and improve waste management systems. It also highlights the importance of involving stakeholders and engaging the public, private sector, and civil society in decision-making processes related to these issues. The Moroccan government has established organizations and regulatory bodies to oversee the implementation of climate policies. The Ministry of Energy Transition and Sustainable Development creates and implements policies, including climate change initiatives. In 2020 the National Climate Change and Biodiversity Commission (NCCBC) was established to ensure coordination and collaboration among government entities. The NCCBC acts as a coordinating body ensuring the monitoring of commitments made in international agreements concerning climate change and biodiversity (Climate Laws, 2020). Morocco's commitment to tackling climate change is evident through its regulatory framework, which encompasses a wide range of laws, decrees, plans, and strategies as shown in Table 1.

Table 1 Legal framework, Strategies and Plans for Sustainable Development and Climate Action in Morocco

Legal and regulatory frameworks	National policies and strategies
▪ Law 11-03 on the protection and enhancement of the environment (2003); ▪ Decree 2-18-74 concerning the creation of the National Greenhouse Gas Emissions Inventory System (SNI-GES) (2009); ▪ Law No. 57-09 on the creation of the Moroccan Agency for Solar Energy (MASEN) (2010); ▪ Law 13/09 on renewable energies (2010); ▪ Law 47/09 on energy efficiency (2011);	▪ National Sustainable Development Strategy ▪ Climate Change Policy in Morocco ▪ National Adaptation Plan ▪ National Strategic Adaptation Plan ▪ National Climate Plan by 2030 ▪ National Strategy for Environmental Protection ▪ Green Investment Plan ▪ National Water Plan ▪ Meteorological Services Adaptation Strategy ▪ Integrated Coastal Zone Management Action Plans

▪ Framework Law No. 99-12 on the Charter of the Environment and Sustainable Development (2014); ▪ Law 58/15 amending and supplementing Law 13-09 on renewable energies (2015); ▪ Law 36-15 on water (2016); ▪ Law 81-12 related to the coastline (2015) ▪ Decree 2-19-721 concerning the establishment of the National Commission on Climate Change and Biodiversity (2020)	▪ Green Generation Strategy (2020-2030) ▪ Forests of Morocco 2020-2030 Strategy ▪ Blue Belt Initiative (2016-2030) ▪ Oasis and Argan Tree Development Strategy ▪ Sustainable Oasis Initiative ▪ LT-LEDS 2050 – Long-term Low Emission Development Strategy 2050 ▪ Morocco's National Communications to the United Nations Framework Convention on Climate Change ▪ Nationally Determined Contribution

Source: Authors

Alongside these efforts, climate finance has emerged as a significant catalyst in supporting Morocco's climate projects, policies, and reforms. In fact, climate finance plays a crucial role in assisting climate related projects and initiatives that aim to mitigate and adapt to the effects of climate change in Morocco. The country's vulnerability to climate change and commitment to reducing greenhouse gas emissions have led to a significant need for financial support in implementing climate strategies and projects. According to the Second performance review of the Green Climate Fund, climate finance investment is estimated to be around USD 4.34 billion from 2016 to 2019 in Morocco (GCF, 2023). This demonstrates the recognition and importance placed on addressing climate change in the country. The country has actively sought support from different international funding mechanisms, such as the Green Climate Fund (GCF) and the Climate Investment Funds (CIF). These funds aim to provide resources to developing nations for activities related to adapting to and mitigating climate change. In this respect, the country has received support for agriculture initiatives and climate-resilient infrastructure. For instance, it has successfully obtained funding from the GCF for projects like the Noor Solar Power Plant, the world's largest concentrated solar power plant.

In this way, Morocco has responded to the current urgency for climate adaptation and mitigation by taking significant steps to promote renewable energy sources. The country's dedication to renewable energy is demonstrated by its target of achieving 52% of installed electricity capacity from renewable sources by 2030 (Boulakhbar et al., 2020). Notable projects, like the Noor Ouarzazate Solar Complex and wind farms along its coastline, showcase Morocco's commitment to reducing greenhouse gas emissions. Furthermore, Morocco has implemented a set of plans and strategies, mentioned in Table 1, to adapt to climate change, acknowledging its vulnerability to issues such as water scarcity, rising sea levels, and extreme weather events.

While Morocco has undeniably made significant progress in the fight against climate change thanks to the implementation of sound climate policies, preserving the environment and adopting a holistic approach that integrates social considerations into its national strategy remains imperative. Despite commendable progress, there is an urgent need to engage with the complex tapestry of societal dimensions and ensure the inclusion of marginalized groups and minorities in the nation's sustainable development trajectory. Social inclusion is at the heart of this mission, which encapsulates the imperative of equal and equitable participation by all segments of society in the processes and benefits of development. At the same time, the principles of climate justice are put forward, demanding the recognition and rectification of historical inequalities in the burden of climate change. By integrating social inclusion and climate justice into the fabric of the national strategy, Morocco reinforces its commitment to sustainable development and sets a precedent that aligns with international standards of equity

and justice. This harmonious interplay between climate policies, social inclusion, and climate justice creates a more holistic, inclusive, and resilient approach to tackling climate change.

2.2 Social Inclusion and Climate Change

Climate change presents a challenge that risks both human societies and natural ecosystems. Ensuring our response to climate change encompasses inclusivity and leaves no one is crucial. Pham & Saner, (2021) conducted a review, emphasizing the importance of social inclusion in tackling climate change. This means recognizing the needs and concerns of vulnerable populations. The study also highlights the implications for national climate change adaptation policies, stressing the significance of adaptation that takes into account the social, economic, and political aspects of climate change. It underscores the necessity for participation and meaningful engagement from various stakeholders in adapting to climate change, particularly those who may be marginalized. The insights mentioned in this study by Arthurson & Baum, (2015) align with the idea that certain groups, such as low-income communities, indigenous peoples, women, and individuals with disabilities, are disproportionately affected by the impacts of climate change. These marginalized communities often struggle to access resources and are more vulnerable to extreme weather events, rising sea levels, and food insecurity caused by changes in the climate. To address climate issues inclusively, it is crucial to consider environmental factors and their social, economic, and political dimensions (Pham & Saner, 2021). It is essential to ensure that these marginalized communities have a say in decision-making processes related to climate change. Equally important is providing them with access to resources, knowledge, and technologies that can assist them in adapting to and mitigating the effects of climate change.

Furthermore, an inclusive approach towards addressing climate issues acknowledges the significance of a transition. As societies move towards a low-carbon economy, it is essential to consider the needs and rights of workers and communities affected by the shift away from fuels. By promoting inclusion and implementing a just transition, we can effectively respond to climate change while building more equitable and resilient societies (Rigolini, 2021). Addressing the root causes of social exclusion and inequality is necessary to achieve this climate approach and just transition.

Furthermore, investing in education and capacity-building programs empowers marginalized communities to understand and respond effectively to the impacts of climate change. One reason for the response to climate policies may be attributed to inadequate methods for addressing social inclusion within the context of climate change.

Addressing exclusion and inequality in the context of climate change necessitates adopting a comprehensive strategy that encompasses empowering marginalized communities, guaranteeing their involvement in decision-making processes, and furnishing them with the requisite resources and assistance to cope with and alleviate the consequences of climate change (Pearson et al., 2023). This multifaceted approach should also consider the intersectionality of identities and how different forms of oppression and discrimination can compound the effects of climate change on marginalized communities.

The National Strategy for Sustainable Development is a crucial document demonstrating the nation's commitment to sustainable development and acknowledging the interconnectedness between social inclusion, climate change, and economic prosperity. Within the framework of the NSSD there is an understanding of how crucial social inclusion is in achieving sustainable development goals. This understanding emphasizes the connection between socioeconomic factors and environmental well-being, highlighting that a prosperous society is built on principles of inclusivity and fairness. In a study on the challenges and impacts of climate change on rural and cultural tourism activities in semi-arid areas of Morocco conducted by Berred & Berred, (2021) it was stressed how vital it is to comprehend how climate change affects natural

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and cultural heritage sites, as well as local communities in semi-arid regions who rely on natural ecosystems for their livelihoods. These communities are disproportionately affected by climate change, with issues like water scarcity, soil erosion, and desertification posing challenges. Another report published by Social Watch sheds light on Morocco's struggles in implementing the 2030 Agenda for Sustainable Development, particularly regarding inequality, governance issues, and corruption (Saadi, 2016). In this regard, Morocco's new development model emphasizes the importance of social inclusion and empowerment of marginalized groups. The model aims to promote an inclusive and united social model, emphasizing empowering women, promoting the inclusion of young people, and guaranteeing essential social protection. In the context of Morocco's new development model (NDM) unveiled in 2021, the focus is on the complex interplay between sustainable development and the multifaceted challenges posed by climate dynamics. The model underlines the imperative not only to tackle existing socioeconomic disparities but also to navigate the complexity of the climatic challenges that confront the nation. Recognition of the intrinsic importance of social inclusion and empowerment of marginalized groups is at the core of this paradigm. This forward-looking model meticulously orchestrates a trajectory to foster an inclusive and harmoniously united Moroccan society. It moves forward with resolute determination by empowering women, promoting the active and meaningful inclusion of young people, and adopting measures that guarantee the foundation of essential social protection. Collectively, these principles constitute a holistic approach, recognizing that sustainable development is intimately linked to the imperative of addressing the complex and evolving climate challenges facing the nation (CSMD, 2021). By interweaving these facets into the tapestry of the new development model, Morocco is taking steps forward to shape a more equitable and inclusive societal landscape and strengthen its resilience in the face of the climatic complexities of the contemporary world.

However, it is imperative to stress that while the NSSD and NDM emphasize social inclusion, climate change, and sustainable economic growth, translating these ideals into tangible action remains complex. In other policy documents, the depth of this integration may not be as elaborate, revealing potential gaps in the overall consideration of these aspects. Thus, while the NSSD serves as a laudable vanguard in encapsulating these principles, a need remains to ensure coherent and consistent integration.

2.3 Local knowledge and climate resilience

Indigenous communities deeply understand their local ecosystems and have developed sustainable practices over generations that enable them to adapt to climatic changes. These practices help indigenous communities preserve their cultural heritage and traditional ways of life and offer valuable insights and strategies for broader climate change adaptation efforts in the face of increasing uncertainties and challenges (IPCC, 2023). Indigenous communities possess a perspective on climate change and its effects since they have resided on their ancestral lands for generations, closely interacting with nature. According to Nursey-Bray et al., (2022) indigenous knowledge encompasses an understanding of the environment encompassing weather patterns, seasonal fluctuations, and the behavior of plants and animals. Based on this knowledge, indigenous communities have developed strategies like crop diversification, water management techniques, and methods to prevent forest fires. Moreover, indigenous knowledge emphasizes the significance of maintaining harmony and equilibrium with the world.

This viewpoint promotes practices and underscores the interconnectedness of all living beings—a fundamental aspect in effectively adapting to climate change. Indigenous knowledge makes contributions to climate change adaptation. Firstly, it offers insights into local climate patterns and changes. Often rooted in long-term observations, this knowledge can supplement data by enhancing our comprehension of climate change impacts and enabling more precise localized predictions (Chanza & Musakwa, 2022). In a study conducted by (Ankrah et al., 2022)

among smallholder farmers, both indigenous predictors (reliability index of 0.72) and scientific predictors (reliability index of 0.88) were found to be reliable for weather forecasting.

These predictors have an impact on the development of adaptation strategies, making it essential to incorporate them into weather forecasts to address climate change in sub–Saharan Africa. Additionally, indigenous knowledge provides tailored adaptation strategies that are deeply rooted in traditional practices. These strategies are often cost-effective, environmentally friendly, and culturally suitable. For example, indigenous communities have conventional water harvesting and management practices, such as constructing terraces and irrigation systems, which can help mitigate the negative impacts of droughts and water scarcity caused by climate change (Zvobgo et al., 2022). Thirdly, indigenous knowledge promotes community-based approaches to climate change resilience. Indigenous communities have strong social networks and collective decision-making processes that have proven effective in times of uncertainty and change. These communities deeply understand the interconnectedness between humans, nature, and the climate and prioritize the well-being of the community and the environment over individual interests. Therefore, they are more likely to collaborate and cooperate in implementing adaptation measures that benefit all community members. Indigenous knowledge can also play a role in adapting to climate change by safeguarding traditional ecological knowledge and practices that have supported communities for generations (Filho et al., 2023). Indigenous communities have established agricultural methods that are resilient to climate variations and shifts. For instance, implementing agroforestry systems promoting crop diversity and practicing seed preservation techniques can boost soil fertility, conserve water, and enhance crop resilience. This ensures food security in the face of changing climates.

Over the years, indigenous and local knowledge has been crucial for developing and ensuring Morocco's food security. Indigenous communities and local farmers have accumulated insights into effective agricultural practices, managing natural resources, and adapting to climate change (Kmoch et al., 2018). In fact, indigenous and local knowledge in Morocco is deeply intertwined with the country's cultural and ecological context. It encompasses an array of practices, techniques, and strategies that have been developed over time to ensure successful crop cultivation, regeneration of natural resources, as well as biodiversity preservation.

The knowledge that has originated from the local communities has played a crucial role in helping rural areas in Morocco adapt to their unique agricultural needs. For instance, traditional irrigation and terraced farming methods have effectively managed water resources and addressed water scarcity issues in regions of the country. Moreover, indigenous and local knowledge encompasses practices like preserving seeds ensuring plant varieties' survival well suited to Morocco's diverse climates and soil types (Mathez & Loftus, 2023).

Apart from their applications, these knowledge systems hold great cultural significance in Morocco. They are deeply ingrained within beliefs, customs, and spiritual practices, reflecting a strong bond between people and nature. This connection fosters a responsibility toward sustainable use of natural resources and encourages behaviors that promote environmental balance (Plieninger et al., 2023). These knowledge systems also have implications as they contribute to social cohesion and identity within indigenous communities by instilling a sense of pride and belonging based on their rich cultural heritage.

It is worth noting that there is existing literature on the importance of local and indigenous knowledge in Morocco, specifically regarding climate change challenges.

The global recognition of the importance of knowledge in addressing climate change through adaptation and mitigation is increasing. However, there is a lack of academic discussion regarding its specific implementation in Morocco.

3   Theoretical framework

This study's primary goal is to connect climate policy, social inclusion, and indigenous knowledge within the context of sustainability. The focus is on establishing a theoretical foundation that explains the complex relationships between these aspects and emphasizes their combined potential in a comprehensive approach.

According to the framework, climate policy plays a crucial role in addressing environmental challenges and mitigating the impact of climate change. At the time, it recognized that social factors are integral to sustainability discussions, emphasizing the importance of inclusive development that benefits all groups involved. Indigenous knowledge, rooted in generations of lived experience and observation, is recognized as a reservoir of wisdom that harmoniously blends ecological knowledge and cultural practices. Integrating these three dimensions forms a complex nexus where climate policies intersect with societal dynamics and indigenous knowledge, creating a foundation for sustainable progress.

The complex interplay of these dimensions is brought to reality through the insightful lens of analysis, revealing the intricate interactions and symbiotic relationships within. The discourse reflects how climate policies, when conceived with an inherent commitment to social inclusion, can herald a paradigm shift, catalyzing the redistribution of resources, empowering marginalized communities, and promoting social robustness to navigate the turbulent currents of climate change. Simultaneously, assimilating indigenous knowledge into the policy-making process enriches strategies with local knowledge, amplifying the adaptability and effectiveness of climate initiatives.

However, the essence of this conceptual integration transcends conventional technical advances. It rests on the fundamental notion that a comprehensive approach to climate action is intrinsically linked to social dynamics and cultural identities. It embraces the deep-rooted relationship between man and environment that indigenous knowledge embodies, guaranteeing the preservation of heritage and the continuity of diverse ways of life.

The proposed theoretical model aims to provide a broad understanding of the interconnection between climate policy, social inclusion, indigenous knowledge, and their collective impact on sustainable development. The model includes several key variables highlighting these dimensions' complex relationships and synergies.

1. Climate policy (CP): This variable represents formulating and implementing policies, regulations, and initiatives to combat climate change and its effects. Climate policies are fundamental to sustainability efforts, guiding mitigation, adaptation, and resilience-building strategies.

2. Social Inclusion (SI): Social inclusion refers to the extent to which marginalized groups, women, and youth are integrated into development processes and benefits. This variable encompasses measures to ensure equitable access to resources, opportunities, and social protections, thereby promoting a fair and cohesive society.

3. Indigenous knowledge (IK): Indigenous knowledge encompasses the wisdom, practices, and cultural knowledge accumulated by indigenous communities over generations. This variable indicates the vital role of traditional ecological knowledge in understanding ecosystems, climate patterns, and sustainable management of resources.

4. Holistic sustainability (HS); Holistic sustainability is the goal of the model. It involves an integrated approach to development that focuses on preserving the environment, ensuring social fairness, and maintaining cultural continuity.

We propose these hypotheses as an avenue for future research presenting a comprehensive framework for empirically investigating the complex connections between climate policy (CP), social inclusion (SI) and indigenous knowledge (IK) within the context of sustainable development in Morocco. These hypotheses offer propositions that can be systematically tested to reveal detailed insights and measurable relationships. By exploring the relationship between

climate policies and social inclusion (CP → SI) researchers can shed light on how policies promoting fairness benefit marginalized communities in tangible ways. Similarly, examining the interaction (SI → CP) allows us to understand how social inclusion policies influence marginalized groups to shape climate strategies.

Moreover, incorporating knowledge into climate policies (IK → CP) provides an opportunity for research to evaluate how traditional wisdom enhances the effectiveness and sustainability of climate policies. The proposed triadic relationship (CP ↔ SI ↔ IK) offers a pathway to explore the cumulative impact of synergies among climate policy, social inclusion, and indigenous knowledge. This global approach aligns with the overarching development objective, allowing us to comprehend the various impacts of integrating policies.

Examining the connection between inclusion and holistic sustainability (SI ↔ HS) presents an intriguing perspective on how incorporating marginalized groups into climate policies can strengthen sustainability on multiple levels. Investigating the relationship between knowledge and holistic sustainability (IK ↔ HS) provides valuable insights into how preserving cultural heritage aligns with principles of sustainable development. Lastly, understanding the link between climate policies and holistic sustainability (CP ↔ HS) helps determine how integrated climate strategies contribute to environmental and social well-being.

4 Discussion and Analysis

The review of literature and synthesis of frameworks help us grasp the intricate connection between climate policy, social inclusion, indigenous knowledge, and sustainable development in Morocco. This discussion focuses on emerging assumptions, examines how integrating social inclusion and indigenous knowledge can potentially impact the situation, and explores policy formulation, implementation, and evaluation implications.

The literature review pointed out the lack of exploration into the role of local and indigenous knowledge in addressing climate change concerns in Morocco. This gap underscores the urgency of comprehensive research investigating the practical integration of indigenous know-how into climate policies. The theoretical framework has established a solid structure for examining how climate policies, social inclusion, and indigenous knowledge jointly contribute to holistic sustainability. The framework hypothesizes that by aligning these dimensions, Morocco can foster community empowerment, amplify resilience, and mitigate disparities, driving the nation towards a more equitable and resilient future.

Integrating social inclusion and indigenous knowledge offers a transformative opportunity to improve the sustainability of climate policies in Morocco. Morocco's socio-cultural complexities and rich indigenous heritage provide fertile ground for the practical integration of local wisdom (Filho et al., 2023). By prioritizing social inclusion, climate policies become more responsive and inclusive, addressing the needs of marginalized groups and fostering collective ownership. Integrating indigenous knowledge enriches the scientific basis of policies and ensures context-specific strategies that resonate with communities' cultural values and practices. This integration strengthens policy effectiveness and aligns with Morocco's commitment to sustainable development (Brown, 2022).

Integrating social inclusion and indigenous knowledge has important implications for policy processes. At the formulation stage, policymakers must engage with marginalized communities and indigenous representatives to co-create policies corresponding to their needs and ideas (Donkor & Mearns, 2022). This participatory approach ensures policy relevance and strengthens community ownership, enabling effective implementation. In addition, mainstreaming requires innovative monitoring and evaluation mechanisms considering the socio-cultural dimensions of policy impact. Traditional indicators of success need to be

complemented by measures that reflect improvements in social equity, community resilience, and preservation of cultural heritage.

Morocco's rich cultural heritage and ecological diversity make it uniquely able to reap the benefits of social integration and indigenous knowledge. The framework outlined in the discussion aligns perfectly with Morocco's commitment to sustainable development. Climate policies can transcend environmental concerns to address societal disparities by capitalizing on indigenous wisdom and ensuring social inclusion. This holistic approach aligns with Morocco's aspiration to create an inclusive, resilient, and culturally dynamic society, as stated by the NDM (CSMD, 2021).

Ultimately, integrating social inclusion and indigenous knowledge into climate policies in Morocco appears to be a critical imperative for sustainable development (David-Chavez & Gavin, 2018). As the nation strives to secure a sustainable future, integrating these dimensions could foster community cohesion, amplify resilience, and bridge disparities. The applicability of integration in the Moroccan context is profound, paving the way for policies that align with cultural values and ecological knowledge. Ultimately, this discussion envisions a Morocco where climate policies mitigate environmental risks and nurture a society that thrives in harmony with its heritage and environment.

5   Conclusion and future research

Based on existing literature and theoretical exploration, it becomes clear that there is a shortage of global insights into the critical importance of adopting a triangular approach encompassing climate policy, social inclusion, and indigenous knowledge for sustainable development. While the literature recognizes the importance of these factors individually, their integrated dynamics remain underexplored. This gap highlights the need for further research to release the transformative potential of this integrated approach.

In Morocco, various challenges, including socio-barriers and political factors, can hinder the effective implementation of climate policies. While it is vital to prioritize climate action for long-term sustainable development, short-term economic interests and political considerations may complicate the process. For instance, transitioning from fuels to renewable energy sources might face resistance from vested interests within the energy sector. Moreover, climate policies that could potentially have socio-impacts, such as job losses in specific industries, may encounter opposition from affected communities or industries. It is essential to take into account the consequences when designing climate policies. This way, we can ensure that these measures do not unfairly burden communities.

This theoretical study focuses on the case of Morocco, a country rich in cultural heritage and environmental diversity. In this context, there is potential for future research in exploring the complex relationship between climate policy, social inclusion, and indigenous knowledge. Morocco's unique socio-cultural and ecological challenges provide a backdrop for examining how a triangular approach to climate resilience can be practically applied and its impact assessed.

This study offers valuable insights into their interconnectedness and the potential for mutually beneficial relationships by adopting a framework that connects climate policy, social inclusion, and indigenous knowledge. The aim is to shed light on how these elements work within a holistic approach, strengthening the argument for integrating social inclusion and indigenous knowledge into climate policy, specifically within the Moroccan context. Such an approach enhances the effectiveness of climate initiatives while fostering an equitable and resilient society in line with sustainable principles.

Climate policy plays a role within this framework as it guides societies toward sustainable development by creating positive change. Climate policies encompass strategies, regulations,

and initiatives aimed at mitigating environmental degradation and adapting to the effects of climate change. The framework recognizes that climate policy is a pillar that defines a nation's environmental resilience, energy transition, and societal well-being trajectory.

Meanwhile, the framework underlines the profound significance of social inclusion in sustainable development. The concept postulates that the benefits of climate policies must go beyond environmental protection to encompass social equity. Social inclusion means fostering an environment where marginalized groups, women, and young people are empowered and where basic social protections are assured. The framework recognizes that unless societal inequalities are addressed, the full potential of climate policies cannot be realized.

Fundamental to this framework is the central role played by indigenous knowledge, which encompasses the traditional wisdom and practices that indigenous communities have accumulated over generations. This knowledge represents a comprehensive understanding of ecosystems, climate patterns, and sustainable resource management. The framework emphasizes that indigenous knowledge is a treasure trove for harmonizing cultural inheritance and environmental sustainability.

In Morocco's unique socio-environmental landscape, integrating climate policies, social inclusion, and indigenous knowledge becomes essential. The country's commitment to sustainable development, as reflected in its new development model, finds a powerful ally in the integral approach advocated by the proposed theoretical framework. The framework's principles resonate with Morocco's recognition of the central role played by social inclusion in fostering unity and empowerment, particularly among marginalized groups, women, and young people. The indigenous knowledge intrinsic to Morocco's heritage presents a wealth of ideas deeply rooted in harmonious coexistence with the environment, offering a perspective that aligns perfectly with sustainable living ethics.

Future research efforts can explore uncharted territory by investigating the effectiveness of integrating social inclusion and indigenous knowledge within Morocco's climate policy framework. By examining the interconnectedness of these dimensions and their collective impact on sustainability, researchers can uncover nuanced insights that guide policy formulation and resonate with cultural values and ecological realities. Furthermore, research examining Morocco's broad spectrum of indigenous knowledge, encompassing its diverse communities, practices, and traditions, could highlight new approaches to climate adaptation and mitigation.

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