

## The Constitutionality of Water Irrigation Policy in Morocco: Sustaining Agricultural Security Amid Climate Change

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### ABSTRACT

This study aims to evaluate the effectiveness of current irrigation water policies in Morocco, examine the alignment of institutional governance with constitutional and environmental principles, and propose alternatives that promote sustainable and equitable water use. This study contributes to the government's efforts to manage and prevent irrigation water crises, ensuring that agricultural water needs are adequately met, particularly in light of the increasingly severe impacts of climate change. This study employs a qualitative analytical methodology, drawing on a governance and constitutional rights-based framework, and reviews legal texts, public policy documents, parliamentary debates, and relevant national and international reports. The findings reveal gaps between legislative commitments and implementation practices, particularly in terms of coordination among institutions, prioritisation of agricultural uses, and responsiveness to climate stress. The study concludes with several recommendations, most notably: reinforcing integrated water governance frameworks, strengthening the monitoring and evaluation of irrigation programs, and enhancing the legal enforcement of the constitutional right to water in policy execution. This research contributes to the field by linking constitutional governance with climate-resilient water policy for agriculture.

## Introduction

Water policy in Morocco has been a matter of concern for many years, which is why most Moroccan governments have given water policy a special priority in their government programs,<sup>1</sup> announcing the continuation of major plans and

<sup>1</sup> Machrafi Othman et al., "Water in Morocco, Retrospective at the Political, Regulatory and Institutional Levels," *Open Journal of Modern Hydrology* 12, no. 02 (2022): 11–31, <https://doi.org/10.4236/ojmh.2022.122002>.

strategies related to water governance or activating new schemes to improve water productivity.<sup>2</sup>

Irrigation water is among the most pressing concerns of Moroccan governments, given its fundamental importance for food security, its critical role in developing the national and rural economy, and its crucial role in adapting to climate change.<sup>3</sup> This has prompted the sector in charge of agriculture to work on rationalising water consumption in the agricultural industry. This has enabled the industry to manage irrigation water by equipping approximately one million hectares with irrigation systems, including 653,000 hectares with drip irrigation for 271,000 beneficiaries, and saving and valorising more than 2 billion cubic meters of irrigation water.<sup>4</sup>

In this regard, Morocco has made significant strides in establishing a water policy since 1960, starting with a strategy of building dams and major facilities to control water resources. This approach primarily focused on strengthening its infrastructure for storing precipitation and surface water, to irrigate one million hectares by 2000.<sup>5</sup> This strategy reached its peak in the 1980s and 1990s with the construction of several hydropower installations, which enabled the expansion of irrigated land.<sup>6</sup> This strategy culminated in the 1980s and 1990s of the same century with the construction of several hydropower facilities, which allowed the expansion of the area of irrigated lands; this phase witnessed a drought that is considered one of the most serious natural disasters that the planet was exposed to during the twentieth century, due to its consequences, which were represented in economic, social and environmental crises, as evidenced by the decrease in agricultural production and the volume of water resources, and the spread of famine.<sup>7</sup> It also contributed to the disruption of ecological balances due to the intensification of aridity and desertification in semi-arid regions.<sup>8</sup>

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<sup>2</sup> Riyad Fakhri and Youness Lazrak Hassouni, “Protecting Water Resources in North African Countries as an Entry Point to Achieve the Sixth Sustainable Development Goal,” *Journal of Sustainable Development Law and Policy (The)* 15, no. 2 (October 25, 2024): 24–54, <https://doi.org/10.4314/jsdlp.v15i2.2>.

<sup>3</sup> Jaime Martínez-Valderrama et al., “Complex Policy Mixes Are Needed to Cope with Agricultural Water Demands Under Climate Change,” *Water Resources Management* 37, no. 6–7 (May 4, 2023): 2805–34, <https://doi.org/10.1007/s11269-023-03481-5>.

<sup>4</sup> Hanane Azemzi, “Governance and Policy Approaches for Addressing Water Scarcity: Insights from Morocco,” *Euro-Mediterranean Journal for Environmental Integration*, March 24, 2025, <https://doi.org/10.1007/s41207-025-00768-4>.

<sup>5</sup> Luis Miguel Silva-Novoa Sánchez et al., “Governance and Sustainability Challenges in the Water Policy of Morocco 1995–2020: Insights from the Middle Draa Valley,” *Water* 14, no. 18 (September 19, 2022): 2932, <https://doi.org/10.3390/w14182932>.

<sup>6</sup> Mohammed Doukkali, “Water Institutional Reforms in Morocco,” *Water Policy* 7, no. 1 (February 1, 2005): 71–88, <https://doi.org/10.2166/wp.2005.0005>.

<sup>7</sup> Mohamed Alaoui, “Water Sector in Morocco: Situation and Perspectives,” *Journal of Water Resources and Ocean Science* 2, no. 5 (2013): 108, <https://doi.org/10.11648/j.wros.20130205.18>.

<sup>8</sup> Imane Mahjoubi et al., “Analyzing Stakeholder Perceptions of Water Ecosystem Services to Enhance Resilience in the Middle Drâa Valley, Southern Morocco,” *Sustainability* 14, no. 8 (April 15, 2022): 4765, <https://doi.org/10.3390/su14084765>.

It should be noted that Morocco's water policy has made it well equipped with 149 large dams with a total capacity of more than 19 billion cubic meters, 137 small dams to support local development, 88 drinking water treatment plants, including nine seawater desalination plants (which provide 147 million cubic meters per year), 158 wastewater treatment plants, 16 water transfer facilities, and thousands of wells and boreholes to extract groundwater.<sup>9</sup>

Despite the gains achieved by the water policy in terms of irrigation water, the latter remains vulnerable to several constraints and challenges, mainly related to the increasing scarcity of water resources due to the double impact of successive and prolonged droughts associated with climate change, the rising demand for irrigation, the poor rationalization of irrigation water use in agriculture, and the overexploitation of groundwater reserves, all these factors have contributed to the irrigation water crisis.<sup>10</sup>

The significance of this study lies in its focus on a topic that intersects constitutional, developmental, and environmental challenges—foremost among them is the right to water, which is enshrined in Article 31 of the 2011 Moroccan Constitution, as well as Morocco's international commitments to the Sustainable Development Goals (specifically Goal 6). The water crisis is no longer purely technical but has become closely tied to governance, accountability, and institutional dynamics.<sup>11</sup>

This research aims to assess the effectiveness of public policy in managing irrigation water in Morocco, under the pressure of climate change, and to examine institutional and legislative responses to this challenge. It also seeks to analyse the role of the right to water in parliamentary debates and agricultural policy planning, while offering strategic proposals to achieve water justice in rural areas.

From the above, it is clear that Morocco is working diligently to develop a comprehensive water policy that encompasses various measures, actions, and achievements undertaken by the government and its institutions to ensure the sustainability and continuity of water, particularly in terms of water security for irrigation.<sup>12</sup> The main issue arises, particularly in light of the negative repercussions associated with natural climatic factors.

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<sup>9</sup> Pierre-Louis Mayaux and Sara Fernandez, "Blinded like a State: Water Scarcity and the Quantification Dilemma in Morocco," *Geoforum* 155 (October 2024): 104093, <https://doi.org/10.1016/j.geoforum.2024.104093>.

<sup>10</sup> Terry Roe et al., "Feedback Links between Economy-Wide and Farm-Level Policies: With Application to Irrigation Water Management in Morocco," *Journal of Policy Modeling* 27, no. 8 (November 2005): 905–28, <https://doi.org/10.1016/j.jpolmod.2005.05.007>.

<sup>11</sup> Francesco Tamburini, "The State of Emergency and Exception in Algeria, Morocco and Tunisia: The 'License to Kill' the Rule of Law?," *Journal of Asian and African Studies* 56, no. 6 (September 28, 2021): 1286–1303, <https://doi.org/10.1177/0021909620962530>.

<sup>12</sup> Ayoub Guemouria et al., "Opportunities and Challenges of Irrigation in Morocco, Spain, and India: A Critical Analysis," *World Water Policy* 9, no. 4 (November 24, 2023): 682–701, <https://doi.org/10.1002/wwp2.12148>.

In contrast to the study by Ait Kadi and Ziyad,<sup>13</sup> which provides a macro-level analysis of national water policy with an emphasis on economic planning and strategic infrastructure. While the study by Silva-Novoa Sánchez et al. (2022) focused on the local challenges of implementing water policy in the Middle Draa Valley and emphasized the limitations of the Integrated Water Resources Management (IWRM) approach in achieving sustainability and social justice, this research examines irrigation water policy in Morocco through a national and rights-based lens.<sup>14</sup> Its originality lies in adopting an analytical approach that integrates the review of legal frameworks, public policies, and political discourse to assess the effectiveness of agricultural water policy in ensuring water and food security. The study also proposes alternatives to strengthen institutional coherence, promote climate justice, and uphold the constitutional right to water.

It also differs from the study by Abdelmajid Saidi et al.<sup>15</sup> Linking the legal and constitutional dimensions of the right to water with an analysis of irrigation policy from a governance perspective. Unlike most existing studies, which focus on technical aspects, such as Hanane Azemzi's work.<sup>16</sup> The issue was treated as a general environmental concern without a specific focus on agricultural policy.

Thus, the novelty of this study lies in presenting a multidimensional framework for evaluating and enhancing irrigation governance by integrating legal, political, and institutional analyses. It thus contributes to academic debates and policy reform efforts aimed at achieving water justice and agricultural resilience in Morocco and similar contexts

## Methods

This study adopts a descriptive, analytical, and comparative approach grounded in a governance and constitutional rights-based framework.<sup>17</sup> The research draws on various primary legal and policy sources, including the Moroccan Constitution (2011), Law 36.15 on Water, and national development strategies such as the Green Morocco Plan and the Green Generation Strategy. It also incorporates parliamentary debates and political discourse to assess the institutional and political engagement with irrigation water governance. Data are analysed through qualitative content analysis of legal texts and public policy documents to evaluate the coherence,

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<sup>13</sup> Mohamed Ait Kadi and Abdeslam Ziyad, "Integrated Water Resources Management in Morocco," in *Global Water Security. Water Resources Development and Management* (Singapore: Springer, 2018), 143–63, [https://doi.org/10.1007/978-981-10-7913-9\\_6](https://doi.org/10.1007/978-981-10-7913-9_6).

<sup>14</sup> Silva-Novoa Sánchez et al., "Governance and Sustainability Challenges in the Water Policy of Morocco 1995–2020: Insights from the Middle Draa Valley."

<sup>15</sup> Saidi Abdelmajid et al., "Climate Change, Agricultural Policy and Food Security in Morocco," in *Emerging Challenges to Food Production and Security in Asia, Middle East, and Africa* (Cham: Springer International Publishing, 2021), 171–96, [https://doi.org/10.1007/978-3-030-72987-5\\_7](https://doi.org/10.1007/978-3-030-72987-5_7).

<sup>16</sup> Azemzi, "Governance and Policy Approaches for Addressing Water Scarcity: Insights from Morocco."

<sup>17</sup> Vincent Kazmierski, "How Much 'Law' in Legal Studies? Approaches to Teaching Legal Research and Doctrinal Analysis in a Legal Studies Program," *Canadian Journal of Law and Society / Revue Canadienne Droit et Société* 29, no. 03 (December 20, 2014): 297–310, <https://doi.org/10.1017/cls.2013.61>.

consistency, and enforceability of existing frameworks. Additionally, discourse analysis is employed to examine how irrigation-related issues are addressed in legislative debates and policy narratives. The study also conducts a comparative analysis with international case studies, particularly Jordan and Spain, to contextualise Morocco's approach within broader efforts to manage irrigation water under climate stress. This mixed-methods strategy enables a multidimensional understanding of how legal, institutional, and political factors shape irrigation water governance in Morocco.

## Discussion

### The Legal and Policy Framework Governing Irrigation Water in Morocco

The references to water policy in Morocco can only be comprehensively understood by examining its contents and the principles on which it is based, given the nature of the Moroccan political and constitutional system.<sup>18</sup> Which makes the process of preparing these policies mainly based on fixed and stable references, namely the requirements of the constitutional document and royal directives (first), as well as other variables and unstable references (second).

#### 1) *Stable References in Guiding Water Policy Related to Irrigation Water*

The standard references in the water policy prepared by most Moroccan governments are inspired by the constitutional provisions stipulated in the 2011 Constitution and royal directives.

##### a) The 2011 Constitutional Document: The Obligation of The State and its Institutions to Guarantee Citizens' Right to Water

The 2011 Constitution firmly stipulates that the state, public institutions and territorial communities shall mobilise all available means to facilitate the equal access of citizens to the right to water and sustainable development.<sup>19</sup> As expressed in the ninth and tenth paragraphs of Article 31 of the Constitution, which shows that water has been given a prominent place in the 2011 Constitution in addition to Article 31 of the latter, several principles and provisions are stipulated in the preamble to the Constitution, which are closely related to the right to water, such as the establishment of a solidarity society in which everyone enjoys security in all its fields, including water security because of its importance in the social and economic life of citizens and the ecological balance of Morocco.<sup>20</sup>

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<sup>18</sup> Mohamed Cheikh Banane, Souad Ezzerouali, and Ahmed Mohamed Elzein, "The Struggle for Land in Morocco: A Case Study of Amazigh," *Mazabib* 23, no. 2 (December 9, 2024): 391–430, <https://doi.org/10.21093/mj.v23i2.8627>.

<sup>19</sup> Nicolas Faysse et al., "Formulation and Implementation of Policies to Deal with Groundwater Overuse in Morocco: Which Supporting Coalitions?," *Irrigation and Drainage* 61, no. S1 (April 6, 2012): 126–34, <https://doi.org/10.1002/ird.1652>.

<sup>20</sup> Ahmed Legrouri, Khalid Sendide, and Jack Kalpakian, "Enhancing Integrity in Water Governance in Morocco: Opportunities and Challenges," *Journal of Governance and Integrity* 3, no. 1 (November 18, 2019): 1–9, <https://doi.org/10.15282/jgi.3.1.2019.5417>.

Article 20 of the Constitution stipulates the right to life,<sup>21</sup> and this right is intertwined with the right to access water for irrigation, a vital material for life, existence, and agricultural production. In addition, Article 35 of the Constitution stipulates that the state is committed to achieving sustainable development and preserving the environment, as it states: "The State guarantees (...) and endeavours to achieve human development that promotes social justice, the preservation of national natural resources, and the rights of future generations." All these constitutional provisions intersect with the water rights, making the promotion of water policy related to irrigation an issue that will always remain a special concern for Moroccan governments.<sup>22</sup>

## b) Royal Directives: A Constant Reference in Guiding Morocco's Water Policy

In the Moroccan constitution, the King is considered the head of state and chairs the Council of Ministers, which deliberates on the strategic directions of state policy. The King also exercises the power to direct state policy by addressing the nation and parliament,<sup>23</sup> or by convening royal working sessions.

### 1. Royal Speeches

Royal speeches are considered a mechanism that serves as a guide and program of state policy.<sup>24</sup> As royal speeches on national occasions are a carrier of directives, instructions and orders to the executive and legislative authorities,<sup>25</sup> and among the most prominent royal speeches that serve as a basic reference that directly affected the water crisis in Morocco recently, both the royal speech addressed to Parliament on the occasion of the opening of the first session of the second legislative year of the 11th legislative term on 14 October 2022, and the recent royal speech on the occasion of Throne Day (29 August 2024), which formed a new road map aimed to overcome significant challenges identified by the King.

The most important instructions and directives addressed by the King to the government can be highlighted in the following table:

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<sup>21</sup> Souad Ezzerouali, "Expanding the Authority of Muhtasib to Protect Consumers: A Comparison between Moroccan Law and Islamic Qanun of Aceh," *Trunojoyo Law Review* 7, no. 2 (2025): 161–91, <https://doi.org/10.21107/tlr.v7i2.29151>.

<sup>22</sup> Manal Ammari et al., "Assessing National Progress in Achieving the Sustainable Development Goals: A Case Study of Morocco," *Sustainability* 14, no. 23 (November 23, 2022): 15582, <https://doi.org/10.3390/su142315582>.

<sup>23</sup> Alison D. Elder, "The Green Morocco Plan in Boudnib: Examining Effects on Rural Livelihoods," *The Journal of Environment & Development* 31, no. 3 (September 11, 2022): 275–99, <https://doi.org/10.1177/10704965221098149>.

<sup>24</sup> Souad Ezzerouali, Mohamed Cheikh Banane, and Brahim Hamdaoui, "Sharia in Moroccan Law: A Perpetual Source and Guiding Reference," *Legality: Jurnal Ilmiah Hukum* 33, no. 1 (December 2, 2024): 44–68, <https://doi.org/10.22219/ljih.v33i1.36744>.

<sup>25</sup> Rabia Naguib, "Legitimacy and 'Transitional Continuity' in a Monarchical Regime: Case of Morocco," *International Journal of Public Administration* 43, no. 5 (April 3, 2020): 404–24, <https://doi.org/10.1080/01900692.2019.1672733>.

**Table 1.** The Most Essential Royal Speeches on Water Policy

<b>The Royal Speech</b>	<b>The Guiding Lines of the Royal Speech</b>	<b>The Government is Involved in the Speech</b>
Royal Speech on the occasion of the opening of the first session of the second legislative year of the eleventh legislative term on 14 October 2022	<ul style="list-style-type: none"> <li>a. Accelerate the completion of projects in all regions of the Kingdom.</li> <li>b. Completing the construction of programmed dams, water interconnection networks and seawater desalination plants.</li> <li>c. Strengthening the trend to economise on the use of water, especially in the field of irrigation.</li> <li>d. Taking the water issue, in all its dimensions, with the necessary seriousness.</li> <li>e. The water issue should not be the subject of political bidding or a means of fueling social tensions.</li> <li>f. Responsible and rational use of water.</li> <li>g. The need to launch more ambitious programs and initiatives, and invest in innovations and modern technologies in the field of water saving and wastewater reuse.</li> <li>h. Giving special attention to rationalising the exploitation of groundwater and preserving water springs by addressing the phenomenon of illegal pumping and illegal wells.</li> <li>i. Emphasise that water policy is not just a sectoral policy, but a cross-sectoral concern. This requires the continuous updating of sectoral strategies in light of the pressure on water resources and their future development.</li> <li>j. The need to take into account the real cost of water resources at every stage of their mobilisation, which requires transparency and awareness of all aspects of this cost.</li> </ul>	Aziz Akhannouch's government
Royal Address to the Nation on the occasion of Throne Day on 29 July 2024	<ul style="list-style-type: none"> <li>a) The need to optimise the implementation of all components of the National Drinking and Irrigation Water Supply Program 2020-2027.</li> <li>b) The need to continuously update the mechanisms of the national water policy, and to set a strategic objective, in all circumstances and conditions, which is: Ensuring drinking water for all citizens and providing at least 80 per cent of irrigation needs on the national territory.</li> <li>c) Accelerate the completion of seawater desalination plants according to the set program, which aims to mobilize more than 1.7 billion cubic meters per year, which will enable Morocco, by 2030, to cover more than half of its drinking water needs from these plants, in addition to irrigating large agricultural areas, thus</li> </ul>	Aziz Akhannouch's government

The Royal Speech	The Guiding Lines of the Royal Speech	The Government is Involved in the Speech
	<p>contributing to enhancing the country's food security.</p> <p>d) Here, we reaffirm that there is no room for any complacency, delay or mismanagement in a crucial issue such as water.</p> <p>e) We call on the competent authorities to be more resolute in protecting the public domain, activating the water police, and curbing the phenomenon of overexploitation and indiscriminate pumping of water. We also strongly call for more coordination and harmonisation between water policy and agricultural policy, especially in periods of shortage, while working to popularise drip irrigation.</p> <p>f) We call for the adoption of a more ambitious program in the field of water treatment and reuse as an important source to cover the needs of irrigation, industry and others.</p> <p>g) The need to encourage innovation and exploit the potential of new technologies in the field of water management. To meet the needs of the population and the requirements of the productive sectors, such as agriculture, tourism, industry and others."</p>	

**Source:** *Compiled by the author based on several references*

The royal speeches show the central role of the King in directing the water policy in general, which makes the government adopt the philosophy of the royal speech in implementing its directives and instructions, and this was embodied in the royal speech on 29 August 2024, where the Prime Minister held a meeting the next day - Tuesday 30 August 2024 - of the steering committee of the National Drinking and Irrigation Water Supply Program 2020-2027,<sup>26</sup> which "focused on ways to enhance the dynamism of the implementation of this **program** and update its various components in a way that takes into account the acceleration of various urgent investments to be made in the water sector, in addition to studying the various priorities contained in the royal speech."<sup>27</sup>

<sup>26</sup> Hanae Hamidi and Houda El Haddad, "Water Circular Economy Strategic Approaches," in *Artificial Intelligence and Modeling for Water Sustainability* (Boca Raton: CRC Press, 2023), 273–83, <https://doi.org/10.1201/9781003260455-12>.

<sup>27</sup> Rania Soula et al., "Water Scarcity in the Mahdia Region of Tunisia: Are Improved Water Policies Needed?," *Groundwater for Sustainable Development* 12 (February 2021): 100510, <https://doi.org/10.1016/j.gsd.2020.100510>.

## 2. Royal Working Sessions: A Guiding Mechanism for Major Strategic Programs Related to Water Policy

The royal working sessions are of a traditional nature, chaired by the King from time to time, and are considered a form of communication between the King and other constitutional authorities and institutions. They involve policy-making, alerting and questioning officials, and making binding decisions for public authorities.<sup>28</sup>

Among the most prominent royal working sessions was the one held on 07 January 2020, which was dedicated to the National Priority Program for Drinking and Irrigation Water Supply 2020-2027:<sup>29</sup>

- a) Developing the water supply, particularly through the construction of dams.
- b) Managing demand and valorising water, especially in the agricultural sector;
- c) Strengthening the supply of potable water in rural areas;
- d) Reusing treated wastewater to irrigate green spaces.
- e) Communication and sensitisation to raise awareness of the importance of conserving water resources and rationalising their use.

The royal working session on the National Priority **Program** for Drinking and Irrigation Water Supply 2020-2027 shows the King's role as head of state in tracking the most important objectives of this strategic program, which brings together many sectors concerned with water policy, and through which he gives his most important instructions for its implementation.

### 2) *Changing References in Guiding the Water Policy Related to Irrigation Water*

References that change in response to the state's shifting political and economic conditions, given that there are numerous changing references.<sup>30</sup> The study is limited to the most prominent of them.

#### a) The New Development Model Report

The general report of the new development model has included one of the most important strategic choices to shape a new development model, namely "preserving natural resources and strengthening the committee called for "preserving water resources by valorising them and managing their scarcity." It is recommended, in the case of irrigation water, to raise the price of irrigation water gradually and to manage its scarcity. In the case of irrigation water, the committee recommended the gradual increase of water tariffs for farmers, in addition to

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<sup>28</sup> Abdelrahman Allal, "Working Sessions: The King's Executive Presence," The King's Executive Presence (Rabat, 2020), <https://mipa.institute/?p=7996&lang=en>.

<sup>29</sup> Abdelkarim Guaadaoui et al., "Preserving the Environment and Establishing Sustainable Development: An Overview on the Moroccan Model," ed. S. Bourekadi et al., *E3S Web of Conferences* 234 (February 2, 2021): 00065, <https://doi.org/10.1051/e3sconf/202123400065>.

<sup>30</sup> Mohamed Aboubakr Abdelmaqsoud Abdelhadi, "Responsible Investment Within the Framework of Sustainable Development: A Comparative Constitutional Law Perspective," *Constitutional Review* 11, no. 1 (May 31, 2025): 197–232, <https://doi.org/10.31078/consrev1117>.

"developing mechanisms to encourage water saving based on irrigation quotas commensurate with the areas of agricultural exploitation, and resorting to seawater desalination to provide a complementary and guaranteed source of water supply, provide additional water resources for irrigated areas and significantly reduce water wastage. The report also recommended that wastewater and rainwater be treated and reused regularly to meet the needs of irrigated areas and reduce pressure on dams.<sup>31</sup>

b) National Water Plan 2020-2050

It is a roadmap to face future challenges in the field of water over the next 30 years,<sup>32</sup> by the requirements of Law No. 36.15 on water, which obliges the government and its institutions to adopt a national water plan spanning 30 years, and is an extension of the National Priority Program for Drinking and Irrigation Water Supply 2020-2027.<sup>33</sup>

This plan outlines measures and procedures related to water policy for irrigation, offering a proactive perspective on this policy over the next 30 years. It also aims to keep pace with economic and social development, as well as the corresponding increase in demand for water, to meet long-term water needs in the agricultural sector.<sup>34</sup> To manage the demand for water for irrigation by continuing the irrigation water saving program by converting irrigation systems from gravitational to localised irrigation to reach 2050 70% of the irrigated area with water-saving irrigation systems, and to expand the irrigation orbits through the hydropower treatment of 160,000 ha associated with dams.<sup>35</sup>

c) The National Priority Program for Drinking Water Supply and Irrigation 2020-2027:

This program presents several measures related to the water policy related to irrigation water, by strengthening the water supply and diversifying the sources of supply, through the construction of seawater desalination plants - one of the most prominent of these plants targeting irrigation programs was the seawater desalination project to supply the city of Agadir with drinking water and promote irrigation in the Ashtouka region - the most prominent of these plants targeting

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<sup>31</sup> François Molle and Oumaima Tanouti, "Squaring the Circle: Agricultural Intensification vs. Water Conservation in Morocco," *Agricultural Water Management* 192 (October 2017): 170–79, <https://doi.org/10.1016/j.agwat.2017.07.009>.

<sup>32</sup> Zouhair Samir, "Socio-Economic Impacts of Sustainable Development on Agriculture in Morocco," in *Szemelvények a BGE Kutatásából (II. Kötet)* (Budapest: Budapesti Gazdasági Egyetem, 2023), 232–42, [https://doi.org/10.29180/978-615-6342-76-8\\_30](https://doi.org/10.29180/978-615-6342-76-8_30).

<sup>33</sup> Imad Zaryouh and Youssef Fahmi, "Smart Water Management: What Implications for Morocco?," in *Digital Technologies and Applications* (Cham: Springer, 2024), 226–36, [https://doi.org/10.1007/978-3-031-68660-3\\_22](https://doi.org/10.1007/978-3-031-68660-3_22).

<sup>34</sup> Molle and Tanouti, "Squaring the Circle: Agricultural Intensification vs. Water Conservation in Morocco."

<sup>35</sup> I. Haddiya et al., "Hemodialysis and Water Management in a Dialysis Unit in Morocco, an Approach to Dealing With Water Scarcity," *Hemodialysis International*, April 2025, 1–8, <https://doi.org/10.1111/hdi.13241>.

irrigation programs. This program will cover a total area of 510,000 hectares, benefiting 160,000 farmers. It aims, in particular, to follow up on the implementation of the national program to save irrigation water by converting and replacing traditional irrigation systems with local irrigation, saving irrigated lands in the Saïss plain, following up on the development and modernization of small and medium irrigation circuits, and launching the hydro-agricultural equipment project for the south-eastern region of the West Plain.<sup>36</sup>

d) Reports of Good Governance and Human Rights Bodies

The constitutionally mandated good governance and human rights bodies contribute to expressing their opinions and engaging in consultations to make recommendations to the government. Perhaps one of the most prominent bodies that monitored the "water scarcity" situation in Morocco is the National Council for Human Rights,<sup>37</sup> which issued a memorandum entitled "The Right to Water: Approaches to Confronting Water Stress in Morocco": Approaches to Confronting Water Stress in Morocco", which contained several recommendations related to irrigation water, the most important of which are:<sup>38</sup> 1) adopting sustainable water policies based on the priority of ensuring the right to water for all Moroccans for future generations; 2) Develop distribution models for groundwater resources to ensure the right to food for decades to come, allowing for a gradual reduction of the margin of vulnerability to fluctuations in the global environment and fluctuations in the prices of agricultural products on international markets; 3) Diversifying economic activity by supporting sectors that are less consumptive of the country's water resources; 4) Gradually adapting the quality of export-oriented crops to the country's climatic changes and water capacities; 5) Treating scientific research as a strategic option that Morocco should invest in to develop its capabilities in vital areas, such as seawater desalination, wastewater treatment, and the development of water-saving irrigation techniques.

In addition to developing governance in the water sector, protecting the water environment, promoting the sustainable development of water resources and improving the conditions of protection to face the extreme phenomena associated with climate change.

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<sup>36</sup> Oumaima Attar et al., "A Critical Review of Studies on Water Resources in the Souss-Massa Basin, Morocco: Envisioning a Water Research Agenda for Local Sustainable Development," *Water* 14, no. 9 (April 21, 2022): 1355, <https://doi.org/10.3390/w14091355>.

<sup>37</sup> Johanna Hohenthal and Paola Minoia, "Social Aspects of Water Scarcity and Drought," in *Handbook of Drought and Water Scarcity* (CRC Press, 2017), 607–25, <https://doi.org/10.1201/9781315404219-32>.

<sup>38</sup> Abdellatif Rafik et al., "Soil Salinity Detection and Mapping in an Environment under Water Stress between 1984 and 2018 (Case of the Largest Oasis in Africa-Morocco)," *Remote Sensing* 14, no. 7 (March 27, 2022): 1606, <https://doi.org/10.3390/rs14071606>.

e) The Government Program of the Governments After the 2011 Constitution: Continued Presence of Water Policy

The government program is a tool to simplify the strategies through which each government seeks to crystallise its policy, and a document that the government undertakes to prepare, develop, and continue implementing public policies in the social, economic, cultural, environmental, and external dimensions during its constitutional mandate. It is also a set of precise and concrete measures adopted by the government to address issues or face challenges; the government program defines the objectives of public policies and translates the state policy into strategic terms.<sup>39</sup>

Therefore, since the beginning of their mandates, governments seek to put many projects and public policies in the content of the government program document, and this is what is observed during the inclusion of water policy in the contents of the government program for governments after the 2011 Constitution.<sup>40</sup> The following table shows us the number of water policy categories, including irrigation water:

**Table 2.** Water Policy Commitments in the Three Government Programmes (2011-2016/2016-2021/2021-2026)

Government Period	Government Program	Outline of the Government's Pledges on Water Policy
2011–2016	Abdelilah Benkirane's government program	23
2016–2021	Saadeddine Othmani's government program	11
2021–2026	Aziz Akhannouch's government program	13

*Source:* Machrafi Othman et al, *Water in Morocco, Retrospective at the Political, Regulatory and Institutional Levels, Open Journal of Modern Hydrology.*

What is noticeable from the table above, which relates to the commitments of the government programs of the governments of the 2011 Constitution, is that they included water policy in the body of the government program on an ongoing basis and continuity in activating the projects and projects that were planned from one government program to another, which shows that these government programs (2011-2026) are continuity programs in terms of the commitment to activate measures and procedures related to water policy, including irrigation water.<sup>41</sup>

<sup>39</sup> Mohammed Hssaisoune et al., “Moroccan Groundwater Resources and Evolution with Global Climate Changes,” *Geosciences* 10, no. 2 (February 22, 2020): 81, <https://doi.org/10.3390/geosciences10020081>.

<sup>40</sup> Sylvia I. Bergh, “Public Sector Governance Reforms and Advanced Regionalization in Morocco: What Role for the European Union?,” *RSCAS 2016/56 Robert Schuman Centre for Advanced Studies BORDERLANDS Project* (Florence, 2016), <https://doi.org/10.2139/ssrn.2869851>.

<sup>41</sup> Silva-Novoa Sánchez et al., “Governance and Sustainability Challenges in the Water Policy of Morocco 1995–2020: Insights from the Middle Draa Valley.”

## Institutional Mechanisms in Charge of Implementing Water Policy in Irrigation

An examination of references to water policy in Morocco reveals that public water policy has successfully established a significant model in water management, primarily based on long-term planning spanning 20 to 50 years. This provides official actors with a long-term perspective and vision, making Morocco one of the leading countries in developing technical competencies contributing to the control and mobilisation of water resources.<sup>42</sup>

The study of the institutional mechanisms responsible for preparing and implementing programs and projects related to water policy reveals that numerous institutions are involved in implementing Morocco's national water policy.<sup>43</sup> Two central bodies manage water resources for irrigation: the Directorate of Irrigation and Preparation of the Agricultural Field, under the Ministry of Agriculture, and the Regional Offices for Agricultural Investment, also under the Ministry of Agriculture.

### 1) *Directorate of Irrigation and Preparation of the Agricultural Field: A Pivotal Role in Rationalising Irrigation Water in Light of Climate Change*

The Directorate of Irrigation and Agricultural Field Preparation is a key central directorate within the Ministry of Agriculture, Fisheries, Rural Development, Water and Forestry, established under Decree No. 2.09.168, which defines the terms of reference and organisation of the Ministry's central directorates in the agriculture sector. This Directorate is responsible for developing general policies for the irrigation sector, enhancing agricultural infrastructure, and improving non-irrigated agrarian land. It plans and monitors the use of water resources in irrigation, conducts both public and private studies in this field, and promotes the rational use of water resources in agriculture. Additionally, it coordinates and monitors the implementation of programs to save and valorise irrigation water. The Directorate also oversees national and regional programs related to hydropolitical and land preparation, preservation of agricultural land, and pasture preparation. It provides technical support to the Ministry's territorial departments for implementing related projects and defines the criteria for intervention. Furthermore, it encourages and monitors public-private partnerships in irrigation and regulates relationships with private actors under agreements for the delegated management of hydraulic resources. The tasks assigned to the Directorate of Irrigation and Preparation of the Agricultural Field are mainly aimed at achieving water security at the level of irrigation water and winning the bet of improving and valorising irrigation water, which is one of Morocco's top priorities, given the importance of this vital substance

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<sup>42</sup> Joep F. Schyns and Arjen Y. Hoekstra, "The Added Value of Water Footprint Assessment for National Water Policy: A Case Study for Morocco," ed. Vanesa Magar, *PLoS ONE* 9, no. 6 (June 11, 2014): e99705, <https://doi.org/10.1371/journal.pone.0099705>.

<sup>43</sup> Hanae Lrhoul, Naïma El Assaoui, and Houcemeddine Turki, "Mapping of Water Research in Morocco: A Scientometric Analysis," *Materials Today: Proceedings* 45 (2021): 7321–28, <https://doi.org/10.1016/j.matpr.2020.12.1222>.

in achieving social peace, in addition to its key role in achieving economic and social development in light of climate change and the scarcity of rainfall.<sup>44</sup>

In this context, under the new agricultural strategy "Green Generation 2020-2030" and the "National Drinking Water Supply and Irrigation Program 2020-2027", the Directorate of Irrigation and Agricultural Area Preparation plays leading roles to rationalize the use and valorisation of water resources, improve water service, ensure the sustainability of irrigation infrastructure and hydraulic equipment by modernizing and rehabilitating irrigation networks and supporting public-private partnerships.<sup>45</sup>

Accordingly, the interventions of the Irrigation and Agricultural Field Preparation Directorate cover all agricultural areas, which are divided into irrigated and non-irrigated agricultural lands, as shown in the following table:

**Table 3.** Area of Farmland and Pastures in Morocco

Farm land and pastures (outside the forest area)	Space	
	8.7million hectares (12 per cent of the total area)	
Arable Land	Irrigated land	Arable fallow land
	1 million hectares (17 per cent of arable land)	7.2 million hectares
Pastoral lands	53 million hectares (74 per cent of the total area)	
	Total	
	Approximately 62 million hectares (more than 86 per cent of the national total area)	

**Source:** Joep F. Schyns and Arjen Y. Hoekstra, "The Added Value of Water Footprint Assessment for National Water Policy: A Case Study for Morocco"

The management of these vast areas of arable land and pastures in the context of climatic changes and their repercussions on the agricultural sector in general and irrigation water in particular, made the Directorate of Irrigation and Preparation of the Agricultural Field develop a program aimed mainly at rationalising irrigation water.<sup>46</sup>

<sup>44</sup> Mohamed Ben-Daoud et al., "Stakeholders' Interaction in Water Management System: Insights from a MACTOR Analysis in the R'Dom Sub-Basin, Morocco," *Environmental Management* 71, no. 6 (June 26, 2023): 1129–44, <https://doi.org/10.1007/s00267-022-01773-x>.

<sup>45</sup> Victor Ongoma et al., "Morocco's Climate Change Impacts, Adaptation and Mitigation—a Stocktake," *Regional Environmental Change* 24, no. 1 (March 17, 2024): 14, <https://doi.org/10.1007/s10113-023-02176-2>.

<sup>46</sup> Hasnae Benjaafar et al., "Green Morocco Plan and Moroccan Legislation for the Socioeconomic and Sustainable Development of Agricultural Cooperatives: Challenges and Prospects," ed. M. Arabi et al., *E3S Web of Conferences* 527 (May 24, 2024): 03003, <https://doi.org/10.1051/e3sconf/202452703003>.

- a) National Irrigation Water Saving Program  
 This program aims to encourage farmers to adopt water-saving irrigation techniques by assisting the State's Agricultural Development Fund. This program has contributed to increasing the areas equipped with localised irrigation at the national level to about 802,000 hectares by the end of 2023.
- b) Modernisation of Irrigation Networks for Better Water Conservation  
 This program aims to encourage farmers to adopt water-saving irrigation techniques by assisting the State's Agricultural Development Fund. This program has contributed to increasing the areas equipped with localised irrigation at the national level to about 802,000 hectares by the end of 2023.
- c) Program for the Valorisation of Water Resources Mobilised by Dams  
 This program aims to establish new irrigation districts and support irrigation in the downstream areas of completed or under-construction dams. This program will enable the valorisation of dam water resources for irrigation, improve the distribution of irrigation water, strengthen and enhance agricultural production, and increase farmers' incomes.
- d) Public-Private Partnership Program (PPP) in Irrigation  
 This program contributed to the revival of public-private partnership in the field of irrigation water, and the most critical PPP projects can be summarised as follows:<sup>47</sup>

**Table 4.** Project of Irrigation Water

Project Location	Description	Irrigated Area (hectares)
El Kerdane, Souss Massa	PPP project for irrigation	10,000
Coastal area of Azemmour	PPP project with a new well for irrigation (third year)	3,200
Ashtouka Plain, Ashtouka Ait Baha, Souss Massa	PPP project exploiting seawater desalination plant and irrigation facilities	15,000
Dakhla region	PPP project exploiting desalination plant, wind power plant, and irrigation facilities	5,000
South-eastern Gharb Plain	PPP project for the construction and management of an irrigation network	30,000
Sidi Rahal region	PPP project for the construction and management of an irrigation	8,000

<sup>47</sup> Rqia Bourziza et al., "Desalination of Seawater in Morocco: Case Study of Chtouka and Dakhla Public-private Partnership Projects," *World Water Policy* 9, no. 4 (November 25, 2023): 767–86, <https://doi.org/10.1002/wwp2.12143>.

Project Location	Description	Irrigated Area (hectares)
	network, desalination of seawater in Casablanca	
Guelmim Oued Adnoun	PPP project for the construction and management of a seawater desalination plant	5,000
Saïs Plain	Ongoing study for the delegated management of irrigation facilities	30,000
Kadoussa dam	Ongoing study for the delegated management of the irrigation network	5,000

*Source: Compiled by the author based on several references*

#### e) Small-Scale Irrigated Agriculture Development Program

This program aims to rehabilitate and modernise traditional irrigation infrastructure in small and medium irrigation districts. Small and medium irrigation plays a crucial social and economic role at the local level by reviving subsistence farming in fragile areas far from significant water sources, at a total cost of approximately 2.9 billion dirhams, through several annual interventions covering all regions of Morocco, tiny and medium irrigation districts in mountainous and oasis areas. The program undertakes: a) the rehabilitation and reclamation of 200,000 hectares of small and medium irrigation circuits during 2020-2030; b) the construction of thresholds to recharge groundwater and enhance surface water mobilisation; c) the rehabilitation of pipelines aimed at irrigating subsistence crops.

The programs mentioned above planned by the Directorate of Irrigation and Agricultural Field Preparation are part of the new agricultural strategy 'Green Generation 2020-2030', specifically about efficiency, water conservation and renewable energy, which mainly aims at modernizing irrigation systems, valorising irrigation water, valorising water resources allocated by dams, developing irrigated family farming, and developing solar pumping in irrigation.<sup>48</sup>

#### 2) *Regional Agricultural Investment Offices: A Key Player in the Implementation of Irrigation Programs*

Articles 4 and 5 of Decree No. 2.65.190 of 6 Muharram 1385 (7 May 1965) establishing the Office of Agricultural Investment (OAI), which is one of the most critical public institutions under the administrative jurisdiction of the government

<sup>48</sup> Amgad Elmahdi, "Addressing Water Scarcity in Agricultural Irrigation: By Exploring Alternative Water Resources for Sustainable Irrigated Agriculture," *Irrigation and Drainage* 73, no. 5 (November 27, 2024): 1675–83, <https://doi.org/10.1002/ird.2973>.

sector in charge of agriculture, defines some of its tasks that fall within the scope of its management of irrigation water:<sup>49</sup>

- a. To take all measures aimed at utilising water resources, adapting natural areas, improving production conditions in the exploitation establishments, contributing to the vocational training of farmers, and carrying out installations that will help the development of life in the villages;
- b. Carrying out works related to the storage, collection, drainage and transport of water from or to agricultural exploitation establishments. Water resources intended for agricultural use are allocated in total and by region to the office based on decrees issued on the joint proposal of the Minister of Public Works and Communications and the Minister of Agriculture;
- c. Utilize public facilities for irrigation and rehabilitation;
- d. Exercise water police functions within their areas of influence regarding the use of irrigation water.

It should be noted that Article 19 of Decree No. 2.65.190, referred to above, granted the possibility of creating regional offices for agricultural investment to which the competencies of the Office are transferred. This resulted in the establishment of nine regional offices for agricultural investment, which are involved in implementing major irrigation programs and projects.

In this context, the State aims, through the tasks assigned to the Directorate of Irrigation, the preparation of the agricultural field and the regional offices for agricultural investment<sup>50</sup> by its policies in the management of water resources and the implementation of the axes and objectives of the "National Drinking and Irrigation Water Supply Program 2020-2027" and the "Green Generation Strategy 2020-2030", to ensure water security for irrigation and through it achieve food security for the State, by focusing on the importance of activating **programs** and projects specifically for irrigation within the framework of convergence, partnership and integration between different stakeholders to ensure efficiency and sustainability in the use of irrigation water.<sup>51</sup>

### **The Presence of Water Policy Related to Irrigation Water in The Political Debate in Parliament: Marginal or Essential**

The presence of water policy related to irrigation water in the parliamentary debate is an indication of the establishment of one of the most essential principles

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<sup>49</sup> Guemouria et al., "Opportunities and Challenges of Irrigation in Morocco, Spain, and India: A Critical Analysis."

<sup>50</sup> Loukous Regional Office for Agricultural Investment; West Regional Office for Agricultural Investment; Souss Regional Office for Agricultural Investment; Hawz Regional Office for Agricultural Investment; Dokala Regional Office for Agricultural Investment; Tadla Regional Office for Agricultural Investment; Tafilalet Regional Office for Agricultural Investment; and Ouarzazate Regional Office for Agricultural Investment.

<sup>51</sup> Ayoub Guemouria et al., "System Dynamics Approach for Water Resources Management: A Case Study from the Souss-Massa Basin," *Water* 15, no. 8 (April 12, 2023): 1506, <https://doi.org/10.3390/w15081506>.

of water security governance in Morocco<sup>52</sup>: the principle of accountability, through which parliament monitors the government's management of water and irrigation policy.<sup>53</sup>

**Table 5.** Distribution of Oral and Written Questions on the Subject of Irrigation Policy in the House of Representatives (2021-2024)

Teams and Parliamentary Groups		Number of Questions	Answered	Unanswered	Answer Percentage
Pro-Government Parliamentary Teams	National Rally of Independents Team	25	21	4	84%
	Authenticity and Modernity Team	16	5	11	31%
	Independence Team for Unity and Equilibrium	12	5	7	42%
	Social Democratic Constitutional Team	2	2	0	100%
Teams and Groups	Socialist Team	15	9	6	60%
	Actionist Team	11	7	4	64%
	Progress and Socialism Team	5	4	1	80%
	Justice and Development Parliamentary Group	10	8	2	80%
Women MPs and unaffiliated MPs		3	1	2	33%
Total		99	62	37	63%

**Source:** Based on data from the official portal of the House of Representatives.

By analysing the data in the table above, it is clear that parliamentary teams and groups raised 99 written and oral questions directly related to irrigation policy. At the same time, the government responded to the questions by 63%. This highlights the importance of water management in the agricultural sector for the political and oversight debate between the House of Representatives and the government.<sup>54</sup>

<sup>52</sup> Mohamed Almoden, "Ensuring Water Security in Morocco," Moroccan Journal of Local Administration and Development, no. 158 (May–June 2021): 139.

<sup>53</sup> Othman et al., "Water in Morocco, Retrospective at the Political, Regulatory and Institutional Levels."

<sup>54</sup> Silva-Novoa Sánchez et al., "Governance and Sustainability Challenges in the Water Policy of Morocco 1995–2020: Insights from the Middle Draa Valley."

The House of Representatives held a session on 12 December 2022, where the Prime Minister was present to answer the pivotal public policy question posed by the MPs on "Morocco's water policy". The following table shows the proceedings of the monthly question session addressed to the Prime Minister on water policy:<sup>55</sup>

**Table 5.** Oral Question Session for the Prime Minister Under the Eleventh Legislative Term (2021-2026)

Legislative Year	Legislative Session	Session Date	The Pivotal Question	Time for Presentation and Discussion	Participants in Posing and Discussing the Central Question
2023-2022	October session 2022	Monday 12 December 2022	Water Policy in Morocco	Two hours and fifty-seven minutes 2 H:57 min	19 Deputy

*Source:* Based on the Minutes No. 79 of the Proceedings of the House of Representatives - October 2022 Session.

The prominence of water policy, particularly irrigation policy, within parliamentary debates underscores its critical role in Morocco's strategic public policies. This is evidenced by numerous oral and written questions directed at government sectors responsible for water and agriculture, including direct inquiries addressed to the Prime Minister. Such parliamentary engagement reflects a high level of governmental and political attention to water management, emphasising its importance amid challenges posed by climate variability.<sup>56</sup>

To support water security in Morocco, it is essential to understand that water policy serves as a framework for managing limited water resources efficiently, especially in the agricultural sector, which is the largest consumer of water. The active parliamentary oversight ensures that policies are responsive to emerging issues such as droughts, population growth, and changing climate patterns. Moreover, the interaction between parliament and the executive highlights the government's commitment to adapting irrigation practices, promoting sustainable water use, and investing in infrastructure that enhances water availability.

In scientific terms, water security in Morocco involves integrated resource management strategies that combine policy, technological innovation (e.g., irrigation modernisation, desalination), and institutional collaboration to reduce vulnerability and ensure sustainable agricultural productivity. Clear communication and political

<sup>55</sup> Yossef Ben Meir, Kerstin Opfer, and Ellen Hernandez, "Decentralized Renewable Energies and the Water-Energy-Food Nexus in Rural Morocco," *Environmental Challenges* 6 (January 2022): 100432, <https://doi.org/10.1016/j.envc.2021.100432>.

<sup>56</sup> Othman Machrafi et al., "Analysis of the Water Management System in a Mountain Territory, the Case of the Nekor Watershed, Rif, Morocco," *Open Journal of Modern Hydrology* 12, no. 04 (2022): 125–54, <https://doi.org/10.4236/ojmh.2022.124008>.

commitment are fundamental to translating these concepts into practical actions that address water scarcity, safeguard food security, and mitigate climate risks.

## Conclusion

Water policy management in Morocco is based on established references that guide the formulation of directives and the implementation of programs and projects. The Directorate of Irrigation and Preparation of the Agricultural Field plays a crucial role in developing policies to conserve agricultural water and reduce deficits in irrigated areas, supported by regional offices for agricultural investment that help execute these policies on the ground. The prominence of irrigation water policy in parliamentary debates highlights the significant political attention to water issues, especially in light of Morocco's climate variability. Despite notable progress in rationalising irrigation water use, challenges remain due to natural constraints, rising water demand, and low dam reservoir levels. To address these imbalances threatening water security for irrigation, several measures are proposed: raising public awareness through media, social platforms, and religious sermons to emphasize the vital role of irrigation water in food security; expanding the construction of large desalination plants and canal infrastructure to supply inland agricultural zones; supporting scientific research to develop innovative, sustainable solutions tailored to farmers' needs while conserving water resources; fostering strong political commitment, societal collaboration, and strategic investments in infrastructure and technology focused on enhancing irrigation water value; and ensuring effective coordination among all stakeholders involved in irrigation policy to promote efficiency and synergy. Together, these efforts aim to secure water availability for agriculture, which is essential for Morocco's food security and resilience in the face of climate change.

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