

**Hydropolitical and Biopolitical Dynamics in Maghrebs Water Governance: *Examining the International Community's Role and Initiatives in Enhancing Water Security in Morocco - A Case study***

Myriem Berrabhia Moumen

Major Research Paper as part of the Master's programme in Political Science

Faculty of Social Sciences

University of Ottawa



uOttawa

Director : Miguel de Larrinaga

Submitted on December 20th 2023

## Table of contents

<b>Introduction.....</b>	<b>1</b>
<b>Literature review.....</b>	<b>3</b>
<b>1. Hydropolitics.....</b>	<b>3</b>
1.1 Hydropolitics, general concept.....	3
1.2 Hydropolitics' conundrum: governance.....	5
<b>2. International bodies' role and involvement in Maghreb.....</b>	<b>9</b>
2.1 Water in Maghreb: regional dynamics.....	9
2.2 International presence and hydropolitics in Maghreb.....	11
<b>3. The case of Morocco.....</b>	<b>13</b>
3.1 Water in Morocco: regional dynamics.....	13
3.2 International presence and hydropolitics in Morocco.....	17
<b>Theoretical frame.....</b>	<b>20</b>
<b>Key concepts.....</b>	<b>21</b>
I. Hydropolitics.....	21
II. Biopolitics.....	23
III. Governmentality.....	25
IV. Water security.....	27
<b>Methodology.....</b>	<b>28</b>
<b>Chapter 1: Comparative Analysis and Challenges in Maghreb: Transition, Governance, and International Involvement in Morocco.....</b>	<b>31</b>

A. General conclusion from literature review.....	31
B. Difference between the 3 maghreb countries.....	32
C. Problems faced by Morocco:.....	34
1. The rural exodus under pressure from the labour market.....	34
2. Agricultural sector: Economic dependence on climatic conditions .....	35
3. Need for good governmentality.....	36
<b>Chapter 2 : Analyzing World Bank Support in Morocco: From Hydropolicies to</b>	
<b>Climate Resilience and Sustainable Water Management.....</b>	<b>38</b>
A. Return and in-depth study of Morocco.....	39
1. The policy of dams and its inflexions 1966 to 1985.....	40
1.1 Strategic adjustment policy 1985 to 1993.....	44
1.2 Strategic adjustment 1993 to 2004.....	47
1.3 Criticism of dam policy.....	49
B. Current programmes and effectiveness.....	50
1. Water Security and Resilience Programme.....	53
1.2 Water management and resilient and sustainable agriculture.....	55
2. Rural Drinking Water Supply Project.....	56
<b>Conclusion.....</b>	<b>59</b>
<b>Bibliography.....</b>	<b>61</b>

## **Abstract**

**Title:** Hydropolitical and Biopolitical Dynamics in Maghrebs Water Governance: *Examining the International Community's Role and Initiatives in Enhancing Water Security in Morocco - A Case study*

**Author :** Myriem BERRABHIA MOUMEN

**Supervisor :** Professeur Miguel De Larrinaga

The purpose of this thesis is to contribute to the existing knowledge on the Maghrebs Water Governance including hydropolitical and biopolitical dynamics. Given that it is a very controversial and sensitive subject that envelops more stakes and balance of power whether on the regional or international scene. It delves into the intricate hydropolitical and biopolitical dynamics of water governance in the Maghreb region, with a particular emphasis on Morocco. The study aims to dissect the role and influence of international bodies in shaping water governance and security in the Maghreb, highlighting the complexities and challenges inherent in regional water politics.

The research begins with a comprehensive literature review, then shifts focus to the role of international entities in the Maghreb, dissecting their involvement and impact on regional water dynamics and politics. The core of the study is a detailed case analysis of Morocco. This involves an exploration of Morocco's water management strategies, regional dynamics, and the influence of international bodies in shaping its hydropolitical landscape. Central to this thesis is a comparative analysis of agricultural challenges in the Maghreb, with a focus on transition, governance, and international involvement in Morocco. It also

scrutinizes the World Bank's support in the country, assessing its effectiveness in transitioning towards climate resilience and sustainable water management.

In conclusion, the thesis attempts to contribute to the literature on hydropolitics in the Maghreb. It offers insights into the challenges and opportunities facing Morocco in its quest for sustainable water governance. Moreover, it outlines lessons noted and provides a comprehensive bibliography, still, further comprehensive research is required in this field.

## **Acknowledgements**

This master thesis has been conducted during the fall 2023 and concludes my master degree in political science at the University of Ottawa, Ontario, Canada.

I would like to direct my sincere gratitude towards all the individuals who have supported me during this research journey. First of all, I am thankful for the academic guidance and support from my supervisor, Professor Miguel De Larrinaga. His knowledge, experience and work ethic help me to navigate throughout this process. Last but not least, I am incredibly grateful to my family members and friends who accompanied me throughout this journey. All your feedback and encouragement have been fueling me during these years.

Myriem Berrabhia Moumen, December 2023

## **Introduction**

Water scarcity is one of the main challenges facing the world today. Water stress affects the lives of millions of people, and 2 billion (26% of the world's population) do not have access to safe drinking water (UN World Water Development Report 2023). The MENA (Middle East and North Africa) and Maghreb region are particularly affected by this problem due to the lack of renewable water and population growth. Although the region has nearly 6% of the world's population (World Bank, 2022 data), the average annual availability of water per person is six times lower than the global average, with access to it only access to 2% of the world's renewable freshwater resources, making it in the most water-scarce region of the world (UNICEF, 2017).

According to the studies, by 2030, the amount of water available per capita annually in the MENA region will fall below the absolute water scarcity threshold of 500 cubic meters and by 2050, an extra 25 billion cubic meters of water per year will be needed to meet the region's needs, highlighting the severe water scarcity challenges the region is facing (World Bank report 2023). Morocco is facing an increasingly severe water crisis due to rapid population growth, prolonged drought, the impact of environmental changes and poor water resource management. According to a World Bank report (2021), "Ebb and Flow," the annual water availability per person in Morocco is less than 1,300 cubic meters, far below the global average of 7,000 cubic meters, and the country could face an "absolute water shortage" by 2030. This situation is worrying for the future of the country as well as for the socio-economic stability of the MENA region and the whole world. *Hydrological stress* is a global problem that requires immediate collaboration to find practical solutions and management measures.

However, the last few decades have brought little good news regarding the water crisis, which has been exacerbated by climate change, drought, melting of the phreatic ice and overexploitation of water resources. In many cases, this has had disastrous consequences, including economic losses and social hardship, not to mention water-related health problems that have resulted in nearly one million deaths each year (ibid.).

The effects of the water crisis are already visible in Morocco, where villages like Ouled Essi Messaoud suffer from drought and poor water management in the agricultural sector. The government has taken steps to increase desalination and improve water management to avoid a potential crisis, but more radical measures will be needed to address the situation. In particular, approaches to promote sound water resource management, sustainable agricultural practices, Modernizing water systems and raising awareness among communities about the efficient use of water are necessary to address this. Using empirical data and concrete examples, we will examine the causes of the water crisis in Morocco, the potential solutions and the complex challenges facing dam policy. Hydrological stress has disastrous consequences, including economic and social difficulties, and has also led to numerous regional and international conflicts.

The following literature review will be divided into three main strands, each of which helps and provides essential elements for understanding the contributions of previous researchers on the governance structures and frameworks that shape hydropolitics; the latter will be explored in the first part. The next part will then focus on understanding what characterizes hydropolitics in the Maghreb and the role and impact of the international community in the region. The third and final part looks at the specific features of Morocco's players and policy on blue gold. All of this leads to the following question: how can the role and impact of international hydropolicies be thoroughly assessed ? To answer this question,

this literature review will first examine the concept of hydropolitics and its practical aspect: governance. This will lead to rethinking what characterizes hydropolitics in Maghreb and the international community's role and impacts in the region. Finally, a study case will be needed to highlight this interplay: the specific features of Morocco's actors and political interactions regarding water are a prime example and will be therefore studied hereby.

## **Literature review**

### **1. Hydropolitics**

#### *1.1 Hydropolitics, general concept*

In scientific literature, hydropolitics are defined as various aspects of managing as a resource, within a governance system (Rogers, 2017 ; Sarmiento, et al., 2019). Scholars also emphasize the importance of the interdisciplinary nature of hydropolitics, drawing knowledge and methods from the fields of law, economics, topography, political science, environmental science and so forth (Gibbs, 2009 ; Gandy, 2016 ; Bréthaut, 2022).

Older academic literature often views the politics of water as intimately interconnected with the infamous 18th-century Malthusian concept of natural resources. In fact, this theory strongly shaped public opinion and intensified the fear of a dilemma: upcoming overpopulation faced by primary resources' limited availability, thus influencing the framing of environmental crises, water scarcity and its supposed governance (Loftus, 2015 ; Hellberg, 2018). This paradigm even extended by some means to the recent era where the 1990s water crisis was analyzed within the paradigm of 'modern water'. In this paradigm,

water problems were seen as scientific and technical issues, with the crisis constructed as a static relationship between water availability and population (Hellberg, 2018 ; Aimar, 2019).

Nowadays, however, hydropolitics issues are more viewed as socially and politically constructed rather than purely natural or objective (Hellberg, 2018). The socially constructed nature of water is therefore increasingly highlighted, with its context-specific meaning, emphasizing the importance of considering water's dimensions and its co-evolving relationship with socio-natural practices (Loftus, 2015).

Conventional approaches, as highlighted by Gibbs (2009), tend to neglect the social and cultural dimensions of water places, hindering good governance. This oversight highlights the need to reassess our understanding of and interaction with water, especially as discussions of environmental issues intensify due to factors such as population growth, urbanization and climate change, and water scarcity becomes a central concern in water policy (ibid.). Unfortunately, this heightened concern has, in some cases, resulted in policies that favor the privatization of water rather than recognizing water as a public resource (Bakker, 2013).

IWRM (Integrated Water Resource Management) is the most common approach when addressing hydropolitics management (Hellberg, 2018). The latter is a holistic framework that binds together modern approaches to sustainable development and management of water resources by ensuring their equitable distribution and conservation while considering every stakeholder attached to them (ibid.). Besides, IWRM raises essential questions about the balance between privatization, governance, and sustainability of water resources, challenging organizations' social equity, economic efficiency, and ecological sustainability (Hellberg,

2018). Although this approach has been criticized for being imprecise, lacking specific governance recommendations or not aligned with local realities, it incorporates the most recent trends in hydroponics with its public consultation approach, gender-sensitive participation, openness to data and other 'modern' perspectives. (Hellberg, 2018).

In this regard, it is essential to understand the literature's contributions to governance structures and frameworks shaping hydro politics, which will be explored in the following part.

### *1.2 Hydro politics' conundrum: governance*

As mentioned earlier, hydro politics cannot be separated from its governance system. A conundrum hereby revolves around governance due to the complexity of issues around water resources and their management. There are two main governance styles distinguished in hydro politics: centralized and decentralized governance models (Rogers, 2017; Hellberg, 2018). A centralized model relies on condensed control and management of water resources, often involving large-scale infrastructure projects and advanced technologies to address water challenges (Hellberg, 2018). The focus is on technical solutions, such as dams, reservoirs and centralized water treatment facilities, to meet the growing market demand for water (ibid.).

Most authors argue that this capital-intensive approach can lead to environmental degradation, community displacement and despotic water management, such as Hellberg's 'hydraulic mission' paradigm and Witffogel's hydraulic societies (Rogers, 2017; Hellberg, 2018). The first version, Hellberg's hydraulic mission, perceives water as a resource crucial for nation-building, agriculture, industry, and citizenship. This approach is characterized by

centralized governance, top-down decision-making, and establishing societal roles based on gender, class, and race distinctions (Hellberg, 2018). Dams and private bathrooms are central to this paradigm, reflecting historical water governance approaches.

Besides, Wittfogel's version of the hydraulic mission, also associating water resource management with centralized state power, adds the idea of 'oriental despotism,' suggesting a state control over water and labor, particularly in semi-arid regions, resulting in despotic rule. However, this approach has been criticized for overlooking the diversity of local water management institutions and their complex relationship with state power (Rogers, 2017). Additionally, more research underlined the diversity in the organization of societies concerning water control, emphasizing the varying power dynamics inherent in this relationship (Linton, 2014).

On the other hand, perspectives highlight the efforts of some centralized systems to include diverse actors, as in the centralized cathedral models in Latin America in the 20th century (Boelens, 2015). In this case, although the aim was to maintain control by avoiding unrest, Latin governments included a controlled bazaar (or market) in their centralized cathedral of powerful government institutions in order to involve minorities, as Rafael Correa's government in Ecuador did two decades ago (ibid.). To be more precise, Correa's government, in power between 2007 and 2017, attempted to implement a '21st socialism century' plan, increasing state involvement in most, if not all, of Ecuador's development. That includes a re-nationalization of all water resources, considerable investment in irrigation systems (mostly in marginalized areas) and the creation of the SENAGUA (National Water Secretariat) (Linton, 2014). Still, while criticizing neo-liberal policies, this socialist government still kept various market settings and authoritative practices against non-state

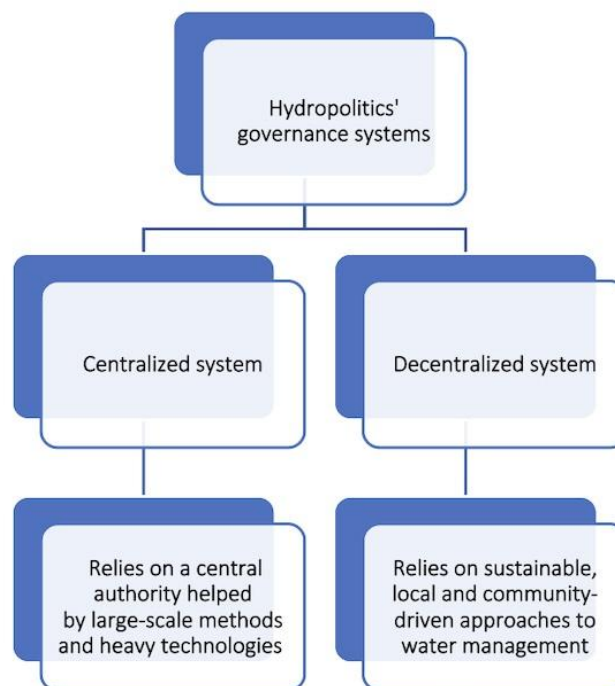
actors and the civil organization society, not to mention the dissolving of organizations critical of the government (via interpreting it as non-compliance with state regulations in the constitution) or the encouragement individualistic 'state-adherent' behaviors (ibid.).

Shifting away from centralization, decentralization models, on the other hand, promote localized, community-driven approaches to water management and other liberal principles that have been driven by two events: The first attempt was the 1992 Dublin conference on water and the environment, which introduced four principles that guided water governance since then: “holistic approach to water, participatory decision-making, the central role of women in water management, and the recognition of water's economic value” (Hellberg, 2018).

Secondly, neoliberal privatization policies and market-based decisions were increasingly criticized by non-profit organizations, minorities and civil society groups in the mid-2000s (Boelens, 2015). The latter, therefore, called for less government and more local communities in decision-making, a trend illustrated by the concept of “active citizenship” in Kerala, India, for example (Babu, 2009). Active citizenship, hereby viewed as a tool of governance and governmentality, can be considered as a “remote government” exemplified by the Jalanidhi program in Kerala, where the locals successfully worked with the help of the World Bank. The method is not, however, flawless as it may provoke conflicts of values and ideas (ibid.).

Decentralized systems recognize the importance of taking into account the social, cultural and ecological aspects of water use. The first concept arises when government promotion of active citizenship and localism can inadvertently marginalize individuals or

groups who resist or negotiate with these approaches. In fact, it is in this context that governmentality plays a significant entry point in examining this. Furthermore, it is important to note that the level of centralization is not solely linked to the state *versus* market or public *versus* private policy or water management debate: this simplification leads to governance failure, according to Bakker (Bakker, 2010). Other factors, such as the regional context and the nature and involvement of stakeholders, need to be taken into account. As it will be developed in the next part, regional circumstances and stakeholders' role play such a crucial role that some theoretical frameworks and practical methods can have constructive effects in one part of the world and be uninteresting in another, such as the variable of the legitimacy of an authoritarian state useful in the Chinese case (Rogers, 2017) but not in Maghreb (Bouchaar, 2006).



*Figure 1: Simplified bipartite typology of hydropolitics' governance systems*

The next part of this literature review will focus on understanding the following question: What characterizes hydropolitics in Maghreb, and what are the international community's role and impacts in the region?

## **2. International bodies' role and involvement in Maghreb**

### *2.1 Water in Maghreb: regional dynamics*

The Maghreb region is a perfect example of the interaction between hydropolitics and water management: the five Maghreb countries - Morocco, Algeria, Tunisia, Libya and Mauritania - heavily depend on their agricultural sector. Indeed, agriculture occupies a considerable economic position there, constituting a significant share of their GDP and serving as the primary source of employment, particularly in rural areas (Houdret et al., 2017). These countries, composed of 70% arid or semi-arid lands (Aimar, 2018), are living through an unprecedented convergence of both human and nature-induced causes, from socio-economic changes to cataclysms (wildfires, droughts) and severe water scarcity, without mentioning geopolitical tensions (Djellouli-Tabet, 2010; Aimar, 2018; Al-Ghwell, 2023). While the WHO considers that regions with an annual availability of less than 1,700 cubic meters of renewable freshwater per person are facing a water shortage, the Maghreb countries have an average of less than 1,000 cubic meters of freshwater per person per year (Al-Ghwell, 2023). Given that by 2025, the population of the Maghreb is expected to be ten times greater than in 1920, the demand for drinking water will increase sevenfold, and the demand for irrigated agriculture will increase sixfold, water in the Maghreb is a crucial issue (Djellouli-Tabet, 2010).

Although it uses a smaller share of water than agriculture, the industrial sector significantly affects the environment. It contaminates water sources, degrades soil and air quality, and hurts biodiversity and human health. Therefore, industrial companies must adopt practices that harmonize development with water protection and risk reduction. (Aimar, 2018). Addressing the high water agricultural consumption, which accounts for over 80% of total water abstraction in the region (Aimar, 2018), and managing industrial risks, a sustainable solution must be found. Corporate Social Responsibility (CSR) is emerging as a solution, encouraging a business organization's commitment to sustainable economic development, recycling, reuse and resource reduction. Governments can encourage CSR through rewards, collaborations and economic incentives while implementing disincentives such as strict regulations and efficient water pricing (Aimar, 2018).

Implementing CSR can address important issues, including inefficient water pricing and insufficient public awareness, contributing to water overuse, waste and inefficiency. Obsolete irrigation systems waste more than 50% (Aimar, 2018) of the water used in agriculture. Consequently, efficient water management practices are essential to achieve substantial savings and reallocate water to other socio-economic activities.

In this critical mission, institutional coordination and efforts from government institutions, business organizations, and civil society emerge as imperative. While national water strategies and plans are deemed crucial, their effectiveness hinges on governance overhauls, financial frameworks, and ongoing adaptations to regional and local climatic conditions (Oualkacha, 2017). The necessity of international governance is also crucial as it allows governments to obtain better techniques, formations and standards, such as the international ISO 26000 for CSR engagement (Aimar, 2018); certifications are very much

needed as complex regulatory requirements from international financial institutions can make great financing opportunities hard to obtain (Bakker, 2013). For instance, the successful involvement of the World Bank, DANIDA (Denmark's development cooperation) and the Netherlands in expanding piped water systems in the rural Indian region of Kerala 40 years ago demonstrates the essentiality of global collaboration, besides mere global assistance (Babu, 2009). Moreover, mapping national, regional, and international stakeholders would be substantial to understanding one region's challenges.

## 2.2 International presence and hydropolitics in Maghreb

While the leading players in water management in the Maghreb are the individual states (Morocco, Algeria, Tunisia, Libya and Mauritania), it is essential to mention the international, regional and local contributors who influence decisions on water policy. Intra-regional organizations such as NEPAD and UMA focus on environmental protection and sustainable development, with NEPAD being particularly active in addressing water issues. The European Union (EU) plays a vital role at the Community and Member State level, with the European Commission implementing agreements under the Euro-Mediterranean Partnership. As a multilateral institution, the European Investment Bank (EIB) supports water projects in the Maghreb. In addition, various multilateral financial institutions such as the African Development Bank, the World Bank, the Islamic Development Bank, the Japan Bank for International Cooperation, the Arab Fund for Economic and Social Development, the Japanese Cooperation, USAID and the Canadian Cooperation contribute funding, expertise and support to water projects in the region (Bouchaar, 2006).



*Figure 2: Overview of the main actors involved in hydropolitics in the Maghreb region*

To deal with water shortages, the Maghreb countries are using a combination of traditional and contemporary strategies. These include modern initiatives such as the construction of dams, exemplified by the Agence Nationale des Barrages (ANBT) in Algeria, and the innovative creation of hill lakes in Tunisia to improve agricultural productivity. In addition, traditional methods such as *"foggara"* and *"khattara"* are recognized for their effectiveness in conserving groundwater, underlining the importance of their maintenance and rehabilitation (Djellouli-Tabet, 2010).

The region also uses non-conventional techniques such as seawater desalination to combat water shortages in coastal areas or long-distance water transfers from water-abundant regions to those facing shortages, with notable examples such as the transfer of water from the Sebou basin to Casablanca or from the Isser basin to Algiers (Ait Kadi, 2003; Djellouli-Tabet, 2010).

An example of international contribution in Maghreb is the US development agency USAID's response to Morocco's water challenges through the H2O Maghreb initiative, recognizing water as a national security concern. Key initiatives include skills assessment, establishment of a training hub with virtual reality tools, development of a six-month training course for Moroccan water professionals, creation of digital training content, and empowerment of women in the water sector. The project has trained young Moroccans, developed a two-year degree in water management accredited by the Government of Morocco, and showcased its achievements at various international conferences. The initiative not only addresses immediate water issues but also invests in the future by developing skilled professionals and exploring replication possibilities in other regions (H2O Maghreb Partnership, n.a.).

Finally, this last section of this literature review will dive deep into the specific features of Morocco's actors and politics regarding the blue gold.

### **3. The case of Morocco**

#### *3.1 Water in Morocco: regional dynamics*

Morocco holds one of the most strategic positions in northwest Africa, close to the Strait of Gibraltar. It also has a diversity of landforms and ecosystems, including mountains, plateaux, plains and deserts, all considered significant assets for the country's development. There are three main types of ecosystems: marine and coastal ecosystems, whose physico-chemical and biogeographical characteristics make Morocco "*one of the richest countries with marine areas in the world*" (Akesbi, N. et al. 2008). Its Atlantic and Mediterranean coasts attract seaside tourism and fishing. At the same time, the Atlas

Mountains encourage mountain tourism with their enormous biodiversity, not forgetting the Sahara desert, which attracts tourists seeking adventure and unique landscapes. (ibid.).

However, the kingdom is suffering and will continue to suffer significant impacts from climate change (more than the global average), deteriorating critical sectors of its economy and society, namely agriculture (Woillez, 2019). While the average temperature (1901-2012) rose by one °C to 2°C, rainfall (1951-2010) fell in the northern regions of the country (-10 to -25 mm/year). Falling precipitation and rising water scarcity are only reducing the flow of rivers and runoff, multiplying the water stress of the population, especially in rural areas. (ibid.)

Nevertheless, the country also has a large agricultural area, which has been the object of much dispute and external colonial envy, favourable to cultivating cereals, legumes, vegetables and fruit. For example, the regions of Marrakech and Souss-Massa have vast olive and citrus plantations, while Khénifra has apple plantations. Unfortunately, the country's land is constrained by drought and the need for more sustainable, modernized agriculture that can adapt to global warming (Akesbi, N. et al. 2008). As for demography, despite the fall in birth rates from 7 to 2.5, life expectancy rose from 47 to 71 between 1960 and 2004 (ibid.).

Urbanization and rural exodus are due in part to the lack of work opportunities on the land due to climate change and drought and to changing habits among young people attracted by the lure of big cities such as Casablanca. All these factors are driving urbanization and unemployment, which rose by 19% between 2001 and 2005 (MEP 2005 *in ibid.*), including among young graduates. With economic growth of 2.3% during the 90s and 4.1% (1960-2005), the Moroccan economy was characterized by weakness and instability.

According to experts in the field, this was due to the poor state of agriculture, the mainstay of the Cherifian kingdom's economy until then, "*Over 45 years (1960-2005), the average growth rate has barely exceeded 4.1% (HCP, 2005; MFP, 2005, MADRPM, 2004)*" (Akesbi, N. et al. 2008). Therefore, public spending in Morocco is high, mainly due to the wage bill and debt servicing. Domestic debt rose from 27% to 56% of GDP between 1990 and 2005, while external debt fell, demonstrating the increase in domestic debt and the pressure it exerts on public finances.

Nevertheless, the country faces natural resource limitations even though it has bio-ecological diversity, such as arable land and water resources. The multiplication of problems such as desertification, erosion, and the salinization of soils and groundwater only worsens this resource limitation. As a result, Morocco loses 22,000 hectares of arable land every year due to urbanization and overexploitation of the soil. This situation illustrates the challenges posed by limiting and degrading natural resources. (Lhafi et al., 2005, *in ibid.* ). However, the agricultural sector accounts for around 15% of Morocco's GDP and 20% of its exports and employs almost 80% of the rural population. This underlines the crucial importance of agriculture in the Moroccan economy and rural communities' lives (*ibid.*).

Rain-fed crops are the most vulnerable to the effects of climate change, and the results will only worsen (Woillez, 2019). Given the lack of water and good governmentality, the country's agricultural production remains mediocre, where global warming and drought only worsen the quote, giving rise to a dependence on imports of agri-food products given the inadequacy of national production, one of the significant imports is soft wheat and corn (*ibid.*) which was primarily damaged during the war in Ukraine, when prices rose. The kingdom's poor governance until 2008 was also clearly reflected in the allocation of financial

resources. According to government publications, irrigation equipment received over 55% of the Department of Agriculture's investment budget, leaving few resources for other essential aspects of agriculture, such as support for professional organizations or rural development projects (ibid.).

Several policies were introduced in the decades following independence in response to this drought. Many of these were liberal in orientation but with few tangible reforms. In fact, after independence (1956), Morocco adopted a liberal strategy, avoiding radical reforms in favor of technical modernization and profitability. Agricultural taxes were reduced, favoring high agricultural incomes and preserving existing land structures, hence the abolition of the unpopular *"tertib"* tax and its replacement in 1961 by *"an agricultural tax which will amount to a very large-scale de-taxation of agricultural incomes"* (ibid.).

The era of the late Hassan II is best known for its policy of building dams in the quest to develop modern agriculture and massive investment in irrigation and mechanization, supported by the World Bank (Akesbi, Guerraoui, 1991 *in ibid.* ), where *"the State's policy in agriculture is identified with the "dam policy,"* which set itself the symbolic objective of irrigating one million hectares by the year 2000". Fifteen dams were thus built, giving rise to an irrigated area of 300 million hectares between 1967 and 1980 (ibid.). Unfortunately, despite the success of the dam policy at the beginning of the 1970s, there were several criticisms of the agricultural policy or its ability to achieve food self-sufficiency (Anechoum, 1987 *in ibid.*). However, by the 1970s, this policy was beginning to change. Concerns about the growing disparities between irrigated and non-irrigated areas and about the cost and effectiveness of this approach began to emerge. This period was marked by the introduction of sectoral plans (sugar, milk, early fruit and vegetables, etc.) and integrated agricultural

development projects for non-irrigated areas. The economic crisis of the 1980s gave rise to the PAMTSA, the agricultural structural adjustment policy (1985-1993), supported by loans from the World Bank, intending to reduce state financial intervention in order to free up production structures and the policy of fair prices in line with the world market (*ibid.*).

In addition to agricultural yields, water stress and reduced river flows are also potentially affecting health, tourism, the production of hydroelectric power, and the cooling systems of the kingdom's thermal power stations (Woillez, 2019). According to projections, by 2050, there will be a 15% reduction in usable hydroelectric capacity in the north of the country (Van Vliet et al. 2016, *in ibid.*). Exposure to heat waves affects human health (Kjellstrom et al., 2016, *in ibid.*), and research predicts that the risk of death for older people (+65 years) in 2050 will reach a factor of 2 to 5 (Ahmadalipour et al., 2018, *in ibid.*). Thirdly, rising sea levels and increased heat also affect coastal tourism. This is due, among other things, to the risk of submergence of beaches and tourist infrastructures, for example, in the 50% of beaches between Saidia and Ras el Ma where the risk is due to the rise in sea level of +0.39m, or in the Tangier region where the disappearance of almost all the beaches is due to the rise in sea level of +0.89 m (World Bank, 2014, *in ibid.*).

### *3.2 International presence and hydropolitics in Morocco*

Following the economic crisis of the 80s, a long period of reflection and strategic hydropolicy development (1993-2004) was launched within the kingdom in the 90s, for example, the rural development strategy in 1993. However, only some were implemented (Akesbi et al., 2008). It is important to stress here that in the old decades, any policy

encompassing hydropolitics was strongly linked to agricultural policies due to the use of the term agriculture rather than hydropolitics.

In 1985, with the same aim of improving hydropolitical governance, the government opted for a structural adjustment policy. The Programme d'Ajustement à Moyen Terme du Secteur Agricole (PAMTSA) was financed by loans and credits from the World Bank, accompanied by technical assistance agreements. This programme was subsequently implemented through several loans and specific programmes: the Agricultural Sector Adjustment Programmes (PASA1 and PASA2), the Large-Scale Irrigation Improvement Programmes (PAGI1 and PAGI2), and the Agricultural Sector Investment Programmes (PISA1 and PISA2). These initiatives aimed to support and reform the Moroccan agricultural sector, focusing on structural adjustment, irrigation improvement, and investment in agricultural infrastructure and technology, i.e. more direct support for investment in the agricultural sector (ibid.). The World Bank has also acted as an advisor and revealer to overcome the obstacles to reform for Morocco.

In addition to the World Bank, other international players have had an indirect or direct influence on the country's hydro-policy. Among the players is the IMF, which is involved in steering agriculture towards a global market in order to overcome its climatic difficulties which indirectly influenced Morocco's hydro-political policy through its participation in the structural adjustment plan. Following the Marrakesh Agreement (April 1994) of the World Trade Organisation (WTO), the conversion of non-tariff protection into tariff protection in 1996 had an impact on national trade policy, influencing Morocco's trade and agricultural policy, including aspects relating to agriculture and dams.

Morocco has signed agreements with the European Union that have influenced its agricultural and trade policy, particularly market access for Moroccan agricultural products. These include the 1996 association agreement, which introduced the principle of reciprocity in trade, affecting Morocco's agricultural and water policy, and the 2003 agricultural agreement, which, despite its time limit, allowed improvements in access to European markets for certain Moroccan agricultural products (ibid.). A year later, the United States of America signed a free trade agreement, which impacted Morocco's agricultural and trade policy. Following its entry into force in 2006, *"the Moroccan authorities have broken the taboo of the "agricultural exception"* (ibid.) by opening up access for Moroccan agricultural products to the US market and imposing liberalization commitments on Morocco for US agricultural and agri-food products.

These years also saw several actions aimed at regional cooperation, which were initiated and signed, such as the Kingdom's participation in the Arab League Agreement (1981), aimed at creating an Arab free trade area in 2008 (Jalal et al., 2002 *in ibid.*). Signed in 2004, the Agadir Agreement between Morocco, Tunisia, Egypt and Jordan aims to establish a free trade area and improve regional economic integration (Jalal et al., 2002 *in ibid.*), as does the Free Trade Agreement between Morocco and Turkey, which includes concessions on certain agricultural products (Jalal 2004, *in ibid.*).

However, what could be the direct possible solution to Morocco's issues? Apart from increasing supply, reducing demand and reallocating water resources (Bouchaar, 2006)? However, how can this be achieved in the face of drought? Is water desalination a viable solution? According to a press release from Nizar Baraka, Minister of Public Works and Water, the Kingdom currently has 12 seawater desalination plants with a capacity of 179

million m<sup>3</sup> per year, plus some 37 million m<sup>3</sup> from the desalination of brackish water (Le360, 2023). In order to increase the supply of water to Morocco and its neighbouring countries, despite the lack of rainfall, which is the primary source for filling dams, it is essential to exploit conventional sources, such as aquifers and surface water, requiring regional cooperation, the collection and efficient use of rainwater in regions where it is abundant, as well as the construction of more dams, the use of non-conventional resources (e.g. wastewater and reuse for agriculture) and desalination (Bouchaar, 2006). Several examples of 5 viable methods are proposed in the region, such as in Morocco and Tunisia. The wastewater treatment for reuse and irrigation is already well established today (ibid.).

In order to reduce demand, five methods can be envisaged: water rationing, because water cuts often occur in Morocco and Algeria, to raise the population's awareness of the need to use this blue gold efficiently; raising awareness through education; improving the efficiency of agriculture through efficient irrigation techniques and the cultivation of drought-resistant plants, such as olive trees and cacti in Morocco; population control and support for rural livelihoods to reduce the exodus and urban water consumption (ibid.). The reallocation of water resources proposes prioritizing drinking and domestic water by devoting water from agriculture to these uses and national or regional food security by importing "virtual water" through food products, reducing dependence on local irrigation (ibid.).

### **Theoretical frame**

Using a constructivist method, this thesis will investigate the international dynamics of hydropolitics in the Maghreb area; using this method enables researchers to investigate how different actors, such as nations, international organizations, and local people, shape and influence the reality of water management. The fundamental aim of the thesis is to assess the

effectiveness of certain water governance programmes, such as the H2O Maghreb plan, a partnership effort between US aid and UNIDO in Morocco. It's not just a question of examining the results of these projects but also the activity associated with them. In other words, how the various players in these programmes exercise their power and manage the internal dynamics and obstacles to effective water governmentality.

Furthermore, to contextualize the biopolitical aspects of development and water supply within the broader framework of international cooperation and governmentality, the research will draw on existing literature, such as Bakker's (2013) article that examines the World Bank's involvement in the creation of the urban water infrastructure paradigm and its consequences for the idea of the “public” sphere. Bakker analyzes how biopolitical and disciplinary power dynamics affected the World Bank's efforts to modernize urban water systems in the twentieth century, leading to multiple problems and failures. She shows just how complex the management of urban water supply is and how important a role the World Bank played in shaping its governance. This explains her criticism of the banking failure due to the challenges of developing hydroelectricity by pointing out that elites are frequently favored in the area of access to water and by examining how biopower and disciplinary power coexist in the management of public services (ibid.).

Key concepts

### *I. Hydropolitics*

The concept of hydropolitics is a recent interdisciplinary approach (Bréthaut et al., 2022) developed in the social science fields, which studies the connection between power

structures and water management (Rogers et al., 2017). Contrary to the first explanations given at the beginning (pages 3 to 8), which dwell on the evolution of the concept of hydropolitics as well as its complex link with governance, the evolution of the approach used to deal with the problem and the new ways of dealing with this concept. This second section looks more closely at the concept behind the multitude of aspects that hydropolitics encompasses, in terms of water management and society, how the state deals with water-related crisis management on both a national and international scale, and the different mechanisms used to achieve good management.

Thus, many other approaches have merged from it, such as the hydrosocial concept, which highlights the study of hydropolitics by linking them to water, society, electricity and infrastructure, giving a wider view of power stakes (Rogers et al., 2017); on the other side the political economy of water (ibid.), which highlights the importance of socio-environmental processes in empowering or disempowering different groups. Emphasizing the essential role of infrastructure in molding these interactions.

However, state discourses call for the attention of scholars, especially the means used to communicate controversies, limits, problems, and actions taken, thus having to study the policies implemented by the government. It was also cited that there needs to be more focus on the use of discourse in cross-border water interactions (Bréthaut et al., 2022). Thus, hydropolitics open the door to the study of transboundary waters, which consist of one of the major axes of the international water law leading to a better understanding of conflicts and cooperation stakes going from the potential for conflict over water resources, especially in transboundary basins, due to the strategic nature of water and the increasing pressure on these resources; to the complex dynamics of conflict and cooperation interactions in transboundary

waters, with tensions at multiple political levels, associated with political, legal, economic and social systems. Passing the potentiality for cooperation, scholars highlight that water cooperation is more sensible and cost-effective, providing long-term access to water supplies and resilience to unrest, even between hostile nations (ibid.).

According to Worster (Rogers et al., 2017), there are different water control models going from local subsistence methods to agrarian and capitalist state systems, signifying a distinct degree of public and private sector involvement in the management of water resources. An old literature review of hydropolitics offered a vision of societal typologies in hydropolitics (ibid.) through water management and its influence on the development of societies, especially in semi-arid and arid regions, often monopolized and centralized by the government. This centrality can be destabilized by more sophisticated mechanisms, including privatization. Recently, a new interest in waterscapes and hydrosocial territories has broadened the scope of hydropolitics to include natural, social and technological factors that shape policy initiatives and water-centered territories (ibid.).

Contrary to popular belief that water management in China is archaic and unsustainable, Wittfogel's "Hydraulic State" concept highlights the fact that the Chinese central government has focused on developing a form of management that includes conventional centrality and contemporary methods of controlling nature (ibid.). The "Powershed" idea which is a juxtaposition of biophysical and political aspects to understand the geographical dimensions of water policy in China. Nevertheless, water is rather analyzed in its virtue of energy production rather than being a subject of primary concern (ibid.). Truthfully, this example remains a little far from our focus but serves as an example that hydropolitics remains contextual, and any good management and governance cannot be done

without an exact study of the local and biological factors specific to each region, hence the inexistence of a prototype capable of being justified to any problem related to hydropolitics.

## *II. Biopolitics*

From the thought of Michel Foucault, biopolitics is a concept that seeks to define a form of power developed in seventeenth- and eighteenth-century Europe in parallel with liberal political philosophy. Developments in politico-economic thought and the life sciences were the main influences, far from the traditional conception of power (jurisdiction, etc). This new conception includes not only the control of living beings, "life itself," for example, targeting by means of biopolitics, but also the consideration of territory as shaped by laws, trends and biophysical processes. (Hellberg, 2019).

In addition, biopolitics does not focus on the individual but rather considers populations as a whole actuated by discernible patterns and behaviors (Sarmiento et al., 2019). This shift in the spectrum links it strongly to biopower, which is the techniques and strategies used by governments to regulate these populations (practices, behavior, etc.). So biopolitics encompasses all aspects of life and is also linked to green governance, as example, the mechanisms of environmental regulation according to which subjectivity is at the heart of power relations (Hellberg, 2019), including the administration of environmental conditions affecting life according to Foucault (ibid.).

Karen Bakker, in turn, takes Foucault's thinking further and analyses, in a modern context, the governmental mechanisms used to optimize water-use practices. Water is a biopolitical entity fundamentally linked to the health and productivity of the population. Thus creating a link between politics and the individual (ibid.). Drawing on the latter 2, Hellberg is

interested in the manifest biopolitical nature of water governance in global and local contexts, where public policies create distinctions between different forms of life, human and non-human, thus contributing to the shaping of socio-political dynamics of inclusion and exclusion. In other words, how existing social orders are challenged, highlighting the links between water governance and issues of gender, class and race.

Nevertheless, biopolitics provides an analysis of water governance, linked to the weight of fundamental needs in this governance and leads to division within populations, resulting in a reinforcement of social disparities in terms of economic capacities and rights. (Hellberg, 2018). Management of drought in England is an example that demonstrates the application of biopolitics, showing the expertise and knowledge production in various forms (such as data visualization and analysis) that underpin a biopolitical approach to governance (Sarmiento et al., 2019).

Explaining this concept is a fundamental part of understanding the impact of politics, or rather of political action or inaction in resource management, on people. The concept of governmentality will be explained in the next section.

### *III. Governmentality*

Biopolitics has been extended to include water governance, based on Michel Foucault's concept of how power is exercised over populations by managing water resources. Thus, governmentality is not a synonym for governance. While the latter refers to state mechanisms and policies for dealing with problems, the former focuses on how governance

shapes and responds to “reality” and the constitution of identities, interests and subjectivities (Hellberg, 2019).

In more detail, governmentality is another way of understanding power struggles within hydropolitics and sees power in a decentralized axis where different actors participate in decision-making. Hence, there is a need to consider rationality, practice and space in order to create or control different types of subjectivity (Rogers et al., 2017) and focus on the mechanisms and strategies deployed by the government to manage and regulate populations and spaces (Hellberg, 2019). Governmentality in our spectrum focuses on distributed forms of governance, the role of discourse and technology in water management, and the biopolitical aspects of the control and practice of water resources. Thus, it is used to analyze how the state seeks efficiency in the exploitation of water resources for health and societal productivity (Rogers et al., 2017). A neoliberal approach is concerned with controlling mass activities by the market economy (Hellberg, 2019).

Remembering that it guarantees a more in-depth examination of policies of access and exclusion. Due to the impact of the Foucauldian list, governmentality studies in depth how the construction of actors, their interests and identities are mobilized to create reality through the bias of interconnections between the technologies of government, politics and the legitimacy of particular forms of governance (ibid.). Examples include Gandy's analysis of water metering technology as a form of control over everyday life, Alatout's study of the discourse of water scarcity in Israel and its role in justifying centralized water management systems; Boelens' discovery of how water literacy shapes water user behavior in the Andean region and Hellberg's study of regulation technologies in South Africa and their impact on the subjectivity of water access. (Rogers et al., 2017).

Focusing on this concept thereby, is not pointless. Unlike governance, governmentality offers a broader vision of the spectrum of actors who can be impacted by hydropolicies. Consequently, governmentality can be seen as an approach to understand governance in terms of forms of power that produce subjectivities, not a policy orientation. This can be noticed in the case of Morocco, whereby overly centralized politics can backfire and lead to harmful effects.

#### *IV. Water security*

When thinking of water security, many ideas come to mind, such as water stress, drought, water scarcity, unequal water distribution and so on. According to Hellberg's (2019) research, water security is an interdisciplinary notion, ranging from water availability to human needs and sustainability. Over the years, the concept has evolved, or rather, its conception has shifted among scholars. At the same time, they used to focus on the need for individuals to have access to water in order to understand their daily lives, as the right to water encourages.

Today, water security is seen as a much broader issue, requiring sustainable solutions to ensure that people have access to the water they need; this cannot be guaranteed without taking into account external factors such as maintaining livelihoods, human well-being and socio-economic development, protecting against water pollution and water-related disasters, and preserving ecosystems, which aligns with the Integrated Water Resources Management (IWRM) bases, water quality and quantity issues etc (ibid.).

Water security can also be linked to water management, including not only state actions but also awareness-raising and influencing individual and societal actions, which after domestic use consists of the greatest expenditure of water; this dual micro and macro spectrum is essential when studying drought issues in order to achieve more effective drought water management (Sarmiento et al., 2019). Awareness-raising to reduce consumption is generally achieved through campaigns, media communication and legal measures (biopolitics). To the point of including the participation of users, planners and decision-makers at all levels, with an emphasis on gender-sensitive commitment (Hellberg, 2019). However, the vision of water security includes several strategies and actors, such as local environmental NGOs, which are seen as the crossroads between the integrated objectives of biopolitical approaches and individual water users. The formation of a self-policing society through educational awareness of water conservation and security (Sarmiento et al., 2019) as knowledge and data sharing between experts and stakeholders is in order to make more effective decisions (Hellberg, 2019). Unfortunately, Malthusian logic has influenced discourse on the environment and resources, viewing "underdeveloped" populations as problematic in the way they use resources; in these discourses, scarcity is presented not only as water security but also as a condition of limited resources, as well as a regulatory tool or governance technique in the context of the global economy (ibid.).

In short, this thesis attempts to present a nuanced understanding of the complexities and problems of water governance and the importance of international collaboration in addressing these problems through this ontological lens (Bakker, 2013). At the same time, it remains within a framework based on the four key concepts of hydropolitics, biopolitics, governmentality and water security.

## **Methodology**

The methodology used is based first and foremost on a multi-disciplinary, hybrid approach involving research and analysis of sources available on the internet, such as scholarly writings by independent authors, articles published in scientific journals, in terms of social science related to hydrology, as well as articles and government and non-government articles, documents and reports published by the World Bank above all, intergovernmental organizations and governmental bodies, such as universities in Morocco.

The aim is to gather as much data and information as possible to provide the best understanding of hydropolitics and water management. This junction between different schools of thought is essential due to the very nature of the critical concepts, hydropolitics, an interdisciplinary approach (Bréthaut et al., 2022) developed in the fields of social sciences, which studies the link between power structures and water management (Rogers et al., 2017) and biopolitics. Hence, it is essential to tackle all the disciplines impacted by water or its management: social, economic, political, and environmental.

Therefore, it is essential to examine the nature of water governance, both centralized and decentralized, to assess their impact on resource management and the involvement of local and international communities. Focusing the study on the Maghreb region and the role of international organizations in water management helps to provide an in-depth analysis of regional dynamics and specific challenges. Nevertheless, using Morocco as a case study aims to illustrate and deepen the analysis of water management in an even more specific context, with a sharper focus on national policies in water management, the actors involved and the

unique challenges facing the country, offering a detailed perspective on hydropolitical issues in a national context.

From another prism, the role of constructivist analysis is to illuminate the understanding of the mechanisms and actors that shape and interpret the reality of water management, particularly suited to examining power dynamics and decision-making processes in Morocco. The aim is to objectively assess the effectiveness of water governance and governmental programs through the Moroccan case study, hence the need for regional-international cooperation through programs financed, supported or initiated by the World Bank, such as the Morocco Water Security and Resilience Program (P179192), aimed at strengthening water institutions and improving and increasing the availability of water, i.e. strengthening governance of the water sector, improving the financial sustainability and efficiency of water use, and integrating non-conventional water resources. The project is still active and led by Carolina Dominguez Torres, Marcus J. Wishart, and Safaa Bahije, with a total cost of 350 million US dollars, implemented by the Moroccan Ministry of the Interior and Ministry of Equipment and Water.

The Rural Drinking Water Supply Project aims to interconnect remote villages to a reliable and safe drinking water supply. According to the results published by the World Bank, more than 1.1 million people are now connected to a safe water source, benefiting from an improved quality of life, a reduction in water-related diseases, and job creation. This is achieved through a combination of the installation of centralized standpipes to ensure sustainable management with a local custodian and the provision of individual connections in densely populated areas (World Bank, 2014). . Since 2014, USD 160 million has been invested in setting up these logistics. Nevertheless, it is important to mention other aids, such

as Support for Morocco's climate policies, with a loan of \$350 million to support Rabat's measures to combat climate change and improve its resilience to climate impacts. Financing for Morocco's climate transition, with an additional loan of \$350 million to help finance a strategic programme to support Morocco's nationally determined contribution (NDC) as part of its climate transition. Water management and resilient and sustainable agriculture, with a loan of \$180 million to support resilient and sustainable agriculture in Morocco, as part of the country's water management program (World Bank, June 2023).

In short, this analysis also aims to understand the impacts and results of international interventions in the region, using Morocco as a case study and benchmark.

Development

## ***Chapter 1: Comparative Analysis and Challenges in Maghreb: Transition, Governance, and International Involvement in Morocco***

### *A. General conclusion from literature review*

Building an integrated Maghreb remains a strategic priority, as indicated by Morocco (IRES, 2019). However, the Arab Maghreb Union, created in 1989, has not achieved its objectives. Despite the obvious economic complementarities between the member countries, progress towards deeper integration remains limited, and despite the continuing pledges towards regional unity, the current assessment highlights the persistent challenges in achieving this ambition (IRES, 2019). Broadly speaking, there are five main points to bear in

mind with regard to hydropolitical issues and the challenges of governance in the Maghreb, particularly in Morocco.

Firstly, hydropolitics is the set of governance mechanisms used to manage water. Modern perspectives consider hydropolitics as socially and politically constructed, underlining the importance of considering the socio-natural relations of water, unlike traditional approaches, which often neglect the social and cultural dimensions of water, essential for effective governance. This has given rise to IWRM, which advocates the holistic and equitable distribution and conservation of water. Secondly, governance in hydropolitics is a complex issue with centralized and decentralized models. While the former focuses on large-scale infrastructure and technical solutions that can lead to environmental and social problems, the latter emphasizes community-based approaches and considers the social, cultural and ecological aspects of water use. Thirdly, agriculture is a major economic sector in the Maghreb countries, heavily dependent on water. As a result, industrial activities have negative environmental impacts, requiring responsible practices. Hence, CSR is emerging as a solution for sustainable water use. Nevertheless, coordination between government, business and civil society is imperative for effective management. Meanwhile, despite Morocco's diverse ecosystems contributing to its development, it continues to face challenges related to climate change. The agricultural sector is vital but limited by water scarcity and requires sustainable practices. Fourth and final, Morocco's hydropolitics has been influenced by various international bodies, including the World Bank, the IMF, the EU, and the US. This cooperation has resulted in policy efforts focused on liberalization, modernization and market integration, impacting Morocco's agricultural and trade policies.

### *B. Difference between the three Maghreb countries*

The Maghreb region comprises roughly three countries (plus Libya and Mauritania), which share similarities in cultural and historical richness, arid to semi-arid climate, but also divergence, which explains the complexity of finding solutions for the region. Geographically, Morocco has a coastline of 1,835 kilometers (Marine Corps, 2015), several mountain ranges and a portion of the Sahara desert. Conversely, Algeria is mainly covered by the Sahara Desert, with mountains and a Mediterranean coastline, resulting in a predominantly demographic settlement in the north. Tunisia is known for its flat Mediterranean coastline, mountains, and the Sahara Desert to the south. Economically, Morocco is known for agriculture, mining, phosphate and tourism, as well as a vast service sector. Tunisia depends on agriculture, mining, manufacturing and tourism. The Algerian economy is less diversified than its neighbors and relies on hydrocarbons (oil and natural gas).

In Morocco, rainfall is irregular, hence the need for intensive irrigation in the southeast (Akesbi, 2006; Bouchaar, 2006). Renewable water resources are estimated at 29 km<sup>3</sup> per year, with the north and north-west possessing most of these resources (Bouchaar, 2006). Out of an average annual availability of 29 km<sup>3</sup>, only 20.7 km<sup>3</sup> of water can be mobilized, and around 12.6 km<sup>3</sup> is abstracted each year, most of which is used for irrigation, i.e. 87% is used for agricultural irrigation, despite an average contribution of 18% to GDP (ibid.). The legal basis for managing and protecting water resources is provided by law no. 10-95. Several ministries and state institutions are involved in water management, with the Office National de l'Eau Potable (ONEP) and the Ministry of the Interior playing a central role.

As for the largest country of the 3, only 3.5% of the Algerian territory is arable, as 84% is desert. Surface water availability is 9.8 km<sup>3</sup>/year, 1.5 km<sup>3</sup>/year underground, and the average rainfall is 89 mm/year (ibid.). Of the total water abstracted, 65% is used for agricultural irrigation (only 7% of cultivated land receives it), 22% for domestic use and 13% for industry (ibid.). The objectives of the 2005 Water Code are to satisfy the population's and agriculture's needs and protect water resources from pollution (ibid.).

The availability of renewable water in the smallest country is uneven. The wetter north of Tunisia accounts for 82% or an average of 594 mm of annual precipitation. In contrast, the south receives less than 100 mm, especially the islands of Kerkennah and Djerba, where the freshwater deficit is already a significant problem (Benjemaa et al. 1988 *in ibid.*). Of the 2,640 km<sup>3</sup> (57.5%) of water abstracted, 82% is used for agriculture, while domestic and industrial uses share the rest, 13.8% and 4.2% consecutively. This gives rise to the highest mobilization rate in the Maghreb region, compared with Algeria (52%) and Morocco (43.5%) (ibid.). The 1975 Water Code and subsequent amendments emphasize sectoral water management and economic development to promote the use of non-conventional resources such as wastewater treatment and desalination. Projects such as PISEAU were set up to improve access to drinking water, extend irrigated areas, and develop non-conventional resources (ibid.).

Applying a biopolitical analysis, it is found that water scarcity and management practices influence public health in different Maghreb countries, especially in rural areas where health is at risk and the life expectancy of the population, thus exacerbating health inequalities within the same people. On the one hand, the consequences of water scarcity on

public health in rural areas of Morocco, resulting in an increase in water-related diseases and a deterioration in general hygiene, are leading to an increase in gastrointestinal disorders, malnutrition, and a reduction in life expectancy, particularly among children and the elderly. On the other hand, centralized policies increase disparities by favoring urban areas (infrastructure, access to water) at the expense of rural areas. This is the case in the Rif region, where the lack of health services, their remoteness and lack of equipment are forcing a rural exodus towards urban centers (Carrera, 2023). Nonetheless, coordination between government, business and civil society is essential, given their impact on the daily habits and lifestyle choices of rural populations, such as fetching water from distant sources, leading directly to less time devoted to education or work, perpetuating cycles of poverty and inequality. And emancipation, particularly for women and young girls. Nevertheless, even water management directly influences farming methods, as in the case of farmers in Morocco, who are forced by water scarcity to consider more water-efficient practices or opt for crops that require less water, impacting not only their food security but also their income.

From a governmentality point of view, it is observable that policy approaches to water management in Maghreb countries shape community behavior. In Morocco, in particular, the centrality of decision-making and the implementation of large-scale irrigation projects have influenced the practices of local farmers and their relationship with the state (power and responsibilities). In more detail, innovative conservation farming practices can be either encouraged or discouraged by more traditional farming practices, depending on the degree of coordination between the different actors, i.e. the degree of their involvement in water conservation depends on whether or not they are included in the decision-making process. Added to this is the impact of international bodies, notably the World Bank and the EU, which influence policies at the national level and their perception at the rural level. One of

the key examples is the Al Massira dam (one of the largest) (Secrétariat d'État chargé de l'eau et de l'environnement, 2011), which is having an impact not only on farming practices in the region, with a shift from rain-fed crops to high-value irrigated crops (citrus fruits and vegetables) but also on their relationship with water and politics, through the embrace of these innovative irrigation methods and dependence on government intervention in water allocation.

### *C. Problems faced by Morocco:*

Water stress has contributed to enormous problems for Morocco, despite the diversification of its activities, agriculture remains at the center of its resources, which has led to a massive rural exodus and an increase in the urban population, putting pressure on the labor market.

#### 1. The rural exodus under pressure from the labor market.

The fact that the rural population is decreasing has an impact not only on the urban labor force but also on the rural labor force, the decrease in this labor, which is mainly used for agricultural activities, has a significant impact on the production (Akesbi, N. et al. 2008).

From a biopolitical point of view, rural demographic decline is leading to an aging population in rural areas, with a decrease in the active youth population (Akesbi, N. et al. 2008).

This tendency could be linked to Boelens' framework previously used to analyze the Andean people and water (Boelens, 2015). Andean people, like the rural population in Morocco, have strong ties to their local communities and traditional practices. Therefore, as Boelens observed, water is also viewed as a strong socio-cultural entity by rural Moroccans, not a mere natural resource (ibid.). This exodus thus affects the ability of rural communities to maintain traditional agricultural activities and their social structures. In addition, the influx of young rural migrants into urban areas, often without adequate access to health services, creates additional pressure on already strained urban health infrastructures and may lead to increased public health problems.

While technological development and mechanization have minimized the need for labor, it is essential to explain that in Morocco, at the level of development, many areas of land where the owners of these types of agriculture do not have the budget or the colossal amount of land to call on this mechanization and new machinery, or many types of agriculture require human capital due to the sensitivity of some products. Such is the case of the highly delicate pruning of saffron, which requires meticulous handling—Olive harvesting. Although partly mechanizable, many producers prefer to harvest by hand to preserve the quality of the olives, especially for high-quality extra virgin olive oils. Grapes for quality wines are often harvested by hand to avoid damaging the grapes and to control the selection of bunches. Adding to it, the harvesting of fragile fruits, such as strawberries, raspberries and other berries, citrus fruits, oranges and mandarins, and vegetables such as asparagus.

The net migration from the countryside to the cities averaged to 106,000 people annually between 1994 and 2004, according to estimates by the *Centre des études et des recherches démographiques* (Akesbi, N. et al. 2008). In several rural regions of Morocco,

migration to large cities such as Casablanca, Rabat-Salé or Marrakech has contributed to a significant decline in the young population, leaving behind less cultivated fields and an aging population (HCP, 2005b *in ibid.*). In order to minimize this mass exodus, Morocco needs to move from extensive, low-productivity and protected agriculture to intensive, competitive agriculture that is open to the world market so that young people can take advantage of the opportunities offered by the global market. In this respect, poor governance is the main obstacle to development.

## 2. Agricultural sector: Economic dependence on climatic conditions

According to researchers, since independence, agricultural policies have often avoided the necessary structural reforms, such as land reform or farmer organization, thereby reinforcing inequalities and failing to achieve modernization and profitability objectives (Akesbi, N. et al. 2008). The reasons for this are often costly state interventionism, the persistence of rent systems, and the failure to genuinely involve the private sector and local communities in development processes (*ibid.*). Due to their agricultural expenditure, they are giving rise to vulnerable economic growth at the macro level. A year of severe drought in Morocco leads to a significant drop in agricultural production, which directly affects the country's GDP; this situation reveals the vulnerability of the Moroccan economy to climatic conditions and the need to diversify its economy (*ibid.*). While the various governments in Morocco since the 90s have promoted economic liberalization, the vast bureaucratic machinery accompanied by conservative political practices continued to block this change until the 2010 decade. This was the case, with credit or loan applications, among others, which despite the state's encouragement of private initiative since the 80s, rigid

administrative and political practices hamper innovation and competitiveness in the private sector (Akesbi, N. et al. 2008).

### 3. Need for good governmentality

The inadequacy of public policy in relation to the agricultural sector appears to be a problem or an obstacle to the achievement of efficient governance, hence the call to avoid path dependency or simply government inaction, such as avoiding fundamental structural reforms, where public policies have failed to address the fundamental problems of the agricultural sector, such as land reform and the organization of farmers, thus limiting the potential for growth and employment in this sector (Akesbi, N. et al. 2008).

Poor governance is identified as the main obstacle to this development, and its consequences include costly state interventionism, the persistence of rent-seeking systems, and the failure to engage the private sector and local communities genuinely in development processes (ibid.). According to the studies, for economic liberalization to succeed, it must be accompanied by political liberalization and good governance, where strategic decisions must involve all stakeholders: elected representatives, social partners, civil society and public opinion (ibid.).

The election of a liberal government in Morocco in 2021 was marked by a commitment to modernization and a particular emphasis on supporting rural communities. The government's programme focused on lifting 400,000 rural households into the middle class. Among the measures was the mobilization of one million hectares of collective land to support investment projects by farmers, particularly young farmers, and to stimulate agro-industry. The mobilization of this collective land is helping to set up 200,000 farmers,

including 45,000 young people, intending to guarantee access to social protection and agricultural insurance for these new farmers. In addition, it advocated the transfer of farms to reduce land fragmentation, enabling 180,000 young people to become farmers and ensuring a pension for older farmers. The programme also envisaged renewing initiatives to combat social and territorial disparities. The aim was to fill the gaps in social services in rural areas, ensuring governmentality and more balanced development between urban and rural areas (RNI, 2021).

Not to mention that without adequate infrastructure, no water management would be efficient, hence the policy of dams and irrigation networks that are essential for agriculture. Modernizing water supply infrastructure is necessary to reduce losses and improve efficiency. The PAGER programme in Morocco, which aims to connect the entire population to the water network, highlights the importance of developing adequate infrastructure for efficient water management (Bouchaar, 2006). Given the compelling link between water, agriculture and food security, the adoption of good agricultural decisions and efficient practices is at the very heart of food security.

From a biopolitical point of view, interdependence is exacerbated by government policy and its impact on society. This is the case with desertification, water pollution and major dam projects, which can have severe social and environmental consequences. The example of desertification problems in the Souss Massa Drâa valley in Morocco, aggravated by extensive irrigation, shows water management's environmental and social impact (Ait Tirri, 1995 *in ibid.*). Climate change is another problem. Although it is not under human control, good governance must consider climate change. Not forgetting Doukkala, a region known for its agricultural potential, is constrained by an unequal distribution of water

resources due to inadequate agricultural policies, multiplying social disparities in food and health.

The importance of adapting water management to the economy explains why it is described as blue gold. In the most arid regions, this resource is, therefore, extremely limited, which explains its price (ibid.). This is an example of the difference between the price of water in Morocco and in Canada. Thus, it is important to remember that pricing influences water management and its use among citizens and that it is fundamental in the field of industry, particularly for the production of hydroelectricity (ibid.).

From the governmentality analysis, an insightful perspective is Alatout's study on water scarcity, which can be applied to Morocco. Indeed, Alatout highlighted that discourse around water scarcity can justify centralized water management systems, impacting local communities and their access to water resources (Rogers, 2017). The intensification of actors' involvement and debates around water in Morocco led to agricultural intensification policies which in turn led to the adoption of more modern and intensive techniques, resulting in specialization in certain high-income crops that require a lot of water, such as avocados. This has drastically impacted the relationship between farmers and traditional agricultural practices (knowledge of the natural cycles of the land), who have been obliged to invest in expensive machinery, incurring debts and becoming dependent on the world market and government subsidies (Bouchaar, 2006).

## ***Chapter 2 : Analyzing World Bank Support in Morocco: From HydroPolicies to Climate Resilience and Sustainable Water Management.***

In order to understand the impact of international bodies in the region, the case of the World Bank and its contributions to Morocco is relevant and continuous over time, far from analyzing the effectiveness or otherwise, in the long or short term of the projects issued, it is clear that aid was and still is a key and promising issue. First of all, Morocco's strategic and dynamic approach to foreign policy is based on its rich historical and cultural heritage while adapting to contemporary challenges.

Morocco's foreign policy, as analyzed by the Royal Institute for Strategic Studies (IRES, 2019), explains the Kingdom's emphasis on a global vision and on the way in which global changes affect the country, identifying the risks, opportunities and ruptures to be anticipated. The vision of His Majesty King Mohammed VI places particular emphasis on the country's relations with its neighbors and various regions of the world, notably America and Asia, with a special focus on the African continent, reflecting Morocco's strategic priority to develop relations and cooperation with African nations, underlining the importance of capitalizing on the image of a democratic and modern Morocco.

Diplomacy must be mobilized to develop economic partnerships, strengthen Morocco's position as a regional pole of stability, integrate into the global economy and promote dynamic foreign relations. Due to its sensitivity to global issues such as human development, global security and climate change, the country is seeking to use soft power, particularly through culture, as a key element of its international strategy. It is actively involved in multilateralism, notably within the United Nations, the World Bank, the IMF, the

WTO, and NATO, in matters relating to peace operations and humanitarian action, and makes an active contribution to the management of global issues, notably by hosting international climate conferences, dealing with the issue of migration, and advocating fair multilateralism.

Multilateral cooperation goes back a long way, and the strengthening of relations with the World Bank helps to create jobs, improve human capital and promote resilient regional planning. Relations with the IMF go back a long way, and Morocco is an active member of the institution's Development Committee. By hosting COP22 in 2016, Morocco advanced the terms of the Paris Climate Agreement, reinforcing its role as a leader in climate diplomacy, working to adapt to climate change and create regional agreements.

#### *A. Return and in-depth study of Morocco*

Hydropolitics in Morocco is a subject that dates back to the first state forms in Morocco. However, international impact and cooperation began in the post-independence years (1956). One of the first water management policies, known as the dam policy, was officially launched on March 3, 1967, by King Hassan II. This policy and its inflexions (1966-1985) are analyzed in two stages: firstly, the development of adjustment strategies and policies from 1985 to 1993, and secondly, the readjustment of these strategies between 1993 and 2004 (Akesbi, 2006).

##### 1. The policy of dams and its inflexions 1966 to 1985

Morocco's dam policy between 1966 and 1985 was part of the Hassanian vision of Morocco as an African California, where the absence of technological assets would be

compensated for by Californian-style agricultural exports (Ihazrir, 2023). To this end, the policy is characterized by a massive but selective commitment on the part of the State, mainly focused on irrigation (Akesbi, 2006). The study of the latter is in turn divided into two periods, the first with a huge implementation, and the second marking the problems and complexities found.

The first years of the project were characterized by major public and government investment, focused on setting up infrastructural mechanisms such as dams and water drainage systems throughout the Kingdom, with the aim of increasing water storage capacity in order to extend the area under irrigation. According to data, in 1956, Morocco had only a dozen "large hydraulic" dams on a surface area of 229,000 ha, of which only 72,600 ha were developed and 40,800 ha were irrigated, representing a storage capacity of 2 billion m<sup>3</sup> (Ministry of Public Works, *in ibid.*). It was with this aim in mind that the project was launched with equipment and development initiatives in 9 large-scale irrigation areas (*ibid.*). Between 1968 and 1972, annual stocking was high and fortuitous at 25,000 ha. This was followed by a census between the 80's and 90's and a further increase between 1996 and 2000, with an average of 16,500 ha per year between (*ibid.*).

In the same vein, the government encouraged the modernisation of farms by offering subsidies, advantageous loans and technical support (*ibid.*). As with any massive policy, the budget was heavy for a country that was just emerging from a period of colonization, hence the difficulty of finding political funding (*ibid.*). However, the mechanical workings of this new hydropolitics led to tensions between the government and the rural world over the relationship between land and water, due to poor governance (Ihazrir, 2023). In this sense, public resources earmarked for this project, among others linked to the agricultural sector,

were estimated at 27.4% between 1965 and 1967, 42.9% between 1968 and 1972 and 21.7% between 1981 and 1985 (Akesbi, 2006). Among other mechanisms, tax exemption for the agricultural sector was the first, with the creation of the “agricultural tax” in the 1960s, exempting 9 out of 10 farmers, but which declined due to a failure to update the tax base and to keep rates low, resulting in only a few tens of millions of dirhams for the state budget in the 1970s (ibid.). Hence the exceptional financial effort devoted to this hydropolitical project, which also included a huge amount of human and educational capital, highlighting the role of engineers in the implementation of this project. (Ihazrir, 2023).

The policy of prices and subsidies was a privileged instrument of intervention for economic and social regulation, but competitiveness was achieved through pressure on wages, dictated by the need to keep food costs down. As a result, producer prices were raised from the 1970s onwards to ensure remunerative incomes for farmers, and to avoid repercussions on consumer prices, the state introduced subsidies to keep public prices below cost (Akesbi, 2006). Until the end of the 1970s, the cost of subsidies was bearable for public finances (around 6% of government expenditure between 1974 and 1979). But in the early 1980s, consumer price rises were used to reduce the relative weight of subsidies and stabilize public finances, giving rise to a comprehensive reform of pricing systems undertaken as part of structural adjustment.

To the same end, the government created the Office de Commercialisation et d'Exportation in 1965, with a monopoly on the export of various agricultural products, and association agreements with the European Economic Community were signed in 1969, renewed in 1976, and adapted in 1988 with the accession of Spain and Portugal. Similarly, imports of agricultural products were subject to strict licenses and quotas, and high customs

duties - in excess of 300% - also protected local production, while a policy of overvalued exchange rates reinforced protection by making imports more expensive. In 1984, a royal decision exempted agricultural income from all taxes until the end of 2000, with an extension until 2010, concerning income from livestock farming and granting a 50% allowance on profits from cereal, oilseed, sugar, fodder and cotton crops. In terms of infrastructure, it is clear that the objective of the project has been achieved, hence the existence of hundreds of dams with a total storage capacity of 15 billion m<sup>3</sup> (over 70% of the mobilisable potential) with a surface area of 771,640 ha, of which 682,600 ha were equipped and 89,040 ha undeveloped, in 2004 (ibid.).

However, the 1970s marked a new phase in policy, with a re-evaluation of policies in the light of the shifts that had taken place, at the center of government interest. Nevertheless, the establishment of the dams and their infrastructure contributed to the strengthening of royal power in the country, accompanied by the establishment of the 1969 code, giving force of law to all royal instructions (strongly recommended by the World Bank) as well as the assignment of the names of former sultans or historical events to several dams, seen as a quest for rural roots in modern development (Ihazrir, 2023).

The first half of the decade was obviously very successful, but the quest to integrate more sectoral plans and structural adjustment was not really positive. In spite of increased investment in agriculture and the supervision of farming practices, the significant increase in the storage and regulation capacity of water resources, the threefold increase in the volume of water stored in dams, reaching 5.9 billion m<sup>3</sup>, an increase of more than 130% in the surface area of large-scale irrigation schemes (180 000 ha), significant growth in agricultural production, notably for sugar beet, sunflower, fruit and vegetable crops, as well as dairy

production, and a contribution to a sugar self-sufficiency rate of almost 50% (Akesbi, 2006). A number of questions have arisen, notably due to the spatial and social disparities created by this policy, hence the creation of sector plans with more integrated planning (sugar plan, dairy plan, early fruit and vegetable action plan, oilseed plan) and integrated development projects, to ensure a more balanced and global approach with a multidisciplinary approach, i.e. economic, social and ecological (ibid.).

This phase was also characterized by the rationalization of agricultural production in line with national needs, the quest for a better balance between different crops, and increased interest in developing the “*bour*” zone (non-irrigated areas) in order to correct the imbalance between the latter and rain-fed areas (Akesbi, 2006). To put it simply, these inflections are the result of irregularity in terms of resource distribution and its impact on food dependency and ecological sustainability, plus a period of enormous social and political instability that gave rise to 2 consecutive *coups d'état* (ibid.) .

All this questioning gave rise to a number of actions in hydraulic policy in the 80s, among them the advent of structural adjustment policies calling into question active state intervention in the agricultural sector, the abandonment of integrated development projects without thorough evaluation, the transition to more liberal, market-oriented approaches and the major shift in Morocco's agricultural policy. In other words, Moroccan dam policy during this period was characterized by heavy government investment in large-scale hydraulic infrastructure, coupled with increasing attention to inequalities and the needs of disadvantaged regions in the 1970s (Akesbi, 2006). This era was characterized by a mix of modernizing ambitions and challenges related to justice and sustainability.

## 1.1 Strategic adjustment policy 1985 to 1993

The structural adjustment policies implemented in Morocco's agricultural sector between 1985 and 1993 took place against a backdrop of crisis, over-indebtedness and budget and trade deficits. But they also represented a period of great upheaval, characterized by a reorientation of agricultural policy and the need for structural reforms under the pressure of the economic crisis in order to reschedule foreign debt and in collaboration with the International Monetary Fund and the World Bank. These reforms were aimed at rationalizing the agricultural sector to achieve efficiency and competitiveness, but their implementation was uneven and partially successful, with varying degrees of success.

In this area, new reforms were put in place, characterized by strong support from international players such as the World Bank and the IMF, in order to address the negative results of the water policy, particularly in the social sphere, with increasing social disparities, the reunification of small-scale farmers and the concentration of land ownership (Ihazrir, 2023). The aim of the PAMTSA (Programme d'Ajustement à Moyen Terme du Secteur Agricole), PASA (Prêts/Programmes à l'Ajustement du Secteur Agricole), PAGI (Amélioration de la Grande Irrigation) and PISA (Investissement dans le Secteur Agricole) programs is to reduce the State's financial commitment, liberalize production and trade structures, and adapt to globalization, and adaptation to the global economy (Akesbi, 2006). More recently, the World Bank's hydropolicy reorientation has focused on large-scale irrigation (PAGI) and support for the rural world, demonstrating the limitations of the previous dam policy and the need for more holistic approaches (Ihazrir, 2023).

To this end, three mechanisms were put in place: a progressive withdrawal of the State from agricultural activities, the abolition of monopolies, quotas and other restrictions on trade in agricultural products, and the elimination of subsidies for factors of production, a policy of "true prices" for production and consumption. And let's not forget that the tax reform carried out between 1986 and 1990 maintained tax benefits for agricultural incomes and provided for tax privileges for the post-2000 and even post-2010 period (Akesbi, 2006). Price liberalization led to an increase in basic food prices, resulting in popular unrest and repressed demonstrations (hunger riots). Between 1980 and 1990, the prices of wheat flour, sugar, seed oil and milk rose by 100%, 71%, 112% and 141% respectively. With the exception of milk (liberalized in 1993), the prices of these products were virtually frozen from 1989-90 (*ibid.*).

Between 1985 and 1987, a \$100 million loan from the World Bank (World Bank, juin 1988, *in ibid.*) enabled the implementation of PASA 1, or the first Agricultural Structural Adjustment Program, with three major focal points: the transfer of animals health services to the private sector, the authorization to transfer to the private sector most of the commercial services of the Regional Offices for Agricultural Development (ORMVA), and the creation of the Agricultural Development Fund (FDA) in 1986, entrusted to the Caisse National de Credit Agricole in order to modernize the State's incentive policy.

The royal objective was, therefore, clear: to build a dam every year until the year 2000, accompanied by a vision of poverty reduction and the promotion of Offices by the World Bank (Ihazrir, 2023). In fact, the implementation of PASA1 had more of an objective of studying and identifying pilot zones and reinforcing support services in order to put in place real structural reforms (World Bank Report, June 1988, *in ibid.*). The "verities des prix"

action on fertilizers, bran and sugar beet pulp, as well as other actions such as the rationalization of state intervention, including the improvement of the collection rate for irrigation water charges, the closure of INRA research stations, and the closure of public fertilizer sales outlets, were examples of the policies implemented (*ibid.*).

Sometime later, PASA2 was implemented, with the aim of eliminating trade restrictions, removing consumer subsidies on staple foods, and liberalizing the key sectors of wheat flour, sugar and edible oils (World Bank Report, 1995 *in ibid.*). However, these objectives were only partially achieved due to delays in implementation, difficulties in reaching objectives, and resistance from interest groups. Thus, all of his ambitious goals to tackle the underlying problems, despite the various adjustments, came to nothing. As shown by the 1994 implementation report (World Bank Report, 1995 *in ibid.*), the significant reforms that were supposed to be undertaken, hence their "sensitive" and decisive nature, were not fully implemented. Similarly, a reform aimed directly at hydropolitics and water governance was developed to improve water management (*ibid.*). In this line, several efforts were made to improve irrigation water management conditions, resulting in positive returns, with the collection rate for water charges reaching 73% in 1992 (*ibid.*). In addition, a new water law was passed in 1995 to establish the rational use of water resources, a Higher Council for Water and Climate, and River Basin Agencies. Nevertheless, despite the promising aspect of PASA2, the complete liberalization of imports of 5 groups of strategic commodities, the reform of the agricultural investment code, and the control of public resources allocated to agriculture could not be implemented, giving rise to a huge "adjustment fatigue" (World Bank Report, September 1994 *in ibid.*) around 1990.

However, the overall 1994 evaluation by the World Bank and the Ministry of Agriculture showed that most of the loan's requirements had been met despite the failure to achieve certain objectives, such as market liberalization, due to power struggles between segments of the government and resistance from Moroccan interest groups. So another effort was launched, known as the Investment Programs, with the PISA 1 (1991-1993) and PISA 2 (1994-1997) loans (World Bank Report, May 1994, *in ibid.*), characterized by an adjustment strategy less focused on one-off measures and more on development.

## 1.2 Strategic adjustment 1993 to 2004

Between 1993 and 2004, still in collaboration with the World Bank, a series of plans were drawn up but not really implemented. Motivated above all by water stress and drought, but when conditions changed, with the arrival of rain or a change of government, the result was a lack of continuity and application of the agricultural policies drawn up, despite recognition of the structural and cyclical problems.

This period also coincided with the end of the IMF-led adjustment programs (1993) and the publication of a report on Morocco's lack of social and economic stability in a state of "heart attack" (World Bank Report, 1995 *in ibid.*). In addition to this report, there were a number of internal criticisms of the ineffectiveness of internal strategies and the formation of think tanks to commission studies to draw up strategies and action plans allied to successive droughts. Added to this anguish is Morocco's ranking as 108 out of 160 countries on the human development scale (UNDP Report, 1991, *in ibid.*). In 1993, an Interministerial Commission was set up to develop a multi-dimensional approach to rural development, and a study including a rural development strategy was published. In the following year, another

commission was set up to develop a "Strategy for Agriculture to 2020", focusing on food security, market integration, increasing farmers' incomes, and preserving natural resources (Ministry of Agriculture and Agricultural Development, August 1994 *in ibid.*). A few months later, several water governance programs were launched, including the Programme National d'Irrigation (1993-2000), whose "National Programs" include the Programme d'Approvisionnement Groupé en Eau Potable des Populations Rurales (PAGER), which aims to establish and improve drinking water supply systems in 31,000 localities in Morocco, benefiting 11 million inhabitants by the year 2000 (*ibid.*).

In international terms, a number of World Bank strategies encompassing hydropower within an agricultural axis were published in the form of reports. The first aimed at adjusting agriculture while reconsidering the priorities and pace of change with a focus on food security through financial and ecological sustainability (World Bank Report, May 1995 *in ibid.*). In other words, there is a need to continue adjusting agriculture by integrating it into the global economy and promoting efficient, sustainable use of natural resources, especially water. Among the criticisms in this report are the government's lack of commitment to the overall macroeconomic and institutional framework and the mismanagement of rural development finances. The second program, called Stratégie de Développement Rural (Rural Development Strategy) by the World Bank (World Bank Report, March 1997 *in ibid.*), highlighted the disparities between urban and rural areas and proposed a transformation towards competitive agriculture. Linked to water management and an equitable interest in the "two Moroccos" (urban and rural).

### 1.3 Criticism of dam policy

The dam policy initiated by King Hassan II and financed by the World Bank remains a polemical subject to this day, between defenders and critics, its impacts and benefits making the balance even more complicated. At the same time, several reports and research studies (quoted above) demonstrate its positive and negative aspects. One thing, however, cannot be denied: without all this infrastructure, which has been in place for decades, today's country could be in even more challenging conditions in terms of water management, or it would be forced to implement this infrastructure rather than just focusing on the area, developing it according to new technologies and international partnerships.

Like all national policies, the barriers, or rather their policy of focusing on irrigated agriculture to achieve agrarian stability and prosperity (Ihazrir, 2023), have been subject to multifaceted criticism, ranging from the socio-economic to the environmental. However, the Direction des aménagements hydrauliques, in line with our vision, have explained that these dams remain essential in climate change due to their water retention capacity, especially during flood periods (Chaabi, 2023). In addition to these assertions, there are arguments such as how dams and equipment are raised to evacuate solid inputs, which serves to counter siltation and evaporation, and the mechanism used to preserve aquatic fauna through fish ladders. As far as the social aspect is concerned, communities near dams benefit from socio-economic development (Chaabi, 2023).

Even today, the complexities of budget allocation and drought dominate the headlines. While the water deficit continues to grow, the disparities between the "two Moroccans" in terms of water allocation and distribution, as well as the agro-export model, strongly encouraged by the World Bank (Ihazrir, 2023), constitute a crisis that seems timeless. The impact of the rural exodus linked to economic problems, around 394,000 people between

1987 and 1991 (ibid.), continues to be felt in the big cities, where we find a large female and male workforce unemployed or earning minimal wages. Faced with this situation, the INDH was launched by royal decree, focusing on the rural world.

In short, the hydraulic policy implemented during the reign of Hassan II has led to both positive and negative results despite the unequal balance of its impact on the rural world. This has led to poor water resource management, a specific modernization of agriculture and an increase in poverty, all of which have contributed to the failure of the agro-export model to solve the deep-seated problems of rural Morocco.

From a biopolitical and governmental point of view, the dam policy can be examined in terms of its impact on hydropolitics and rural populations.

The impact of state policies to turn Morocco into an "African California" has had a substantial biopolitical impact on rural and urban populations, especially regarding access to agricultural water. Given the remarkable results of large-scale irrigation due to Hassanian policy, this has constrained farming practices and land use. In fact, Gandy's analysis of water metering technology as a form of control over everyday life predicted Morocco's fate post-Hassan II's policies as it resulted in an imbalance that is palpable at many levels, particularly in rural livelihoods and migration (Rogers, 2017). Nevertheless, this policy remains a double-edged sword that has demonstrated the enormous state and international interest in providing water infrastructure and agricultural modernization to improve rural communities' physical and social environment. Agricultural incomes are expected to rise by improving access to water, resulting in better nutrition and, consequently, better health. For example, the transition to intensive agriculture may have affected food security and nutrition,

altering the health profiles of communities. Hence, the policy of subsidies and support to facilitate access to these new technologies. (World Bank, October 2019).

Nevertheless, the perspective of governmentality here demonstrates how the state has shaped the decisions made by the rural community by implementing the policy of dams and adjustments in water management and allocation, giving rise to economic incentives. In more detail, creating agricultural plans and objectives shapes the farmer's relationship with his land, which he no longer sees as dependent on his own decisions but rather on the central vision. Far from a negative or positive analysis of this centrality, the very fact of regulating water resources, which shapes the way it is used and consequently the adoption of more intensive or more profitable farming practices, the introduction of subsidies and tax exemptions to meet economic challenges, and modernization initiatives are in themselves clear examples of this approach. Remembering that governmentality also includes the impact of international players in implementing internal strategies.

### ***B. Current programmes and effectiveness***

The start of the second millennium came with a new vision of hydropolitics with good government and commitment under the tutelage of the new king, Mohammed VI. As well as supporting international factors, the World Bank reiterates its commitment to hydropolitics and biopolitics. Not to mention a change of focus: Unlike in the past, when water and agriculture were seen as self-evident issues, the new vision places extreme importance on water as an essential factor in all other activities, hence the establishment of a series of reforms targeting water and its link to sustainable development, thus encompassing all other activities, notably agriculture.

The adoption of Water Law 36 can exemplify this-15 (2016), with a focus on decentralized, integrated and participatory management of water resources, the establishment of river basin councils and the adoption of the National Water Plan (PNE) by the Higher Council for Water and Climate, to achieve water use efficiency, with universal access and the reduction of disparities between rural and urban areas, as well as the establishment of regional multi-service companies (Sociétés Régionales Multiservices, SRM) for the distribution of energy and drinking water, to replace autonomous municipal utilities (World Bank, 2023).

In 2005, the Rural Water Supply and Sanitation Project (RWSSP) was implemented, followed by the loan for the Regional Drinking Water Supply Adductions Project in 2010 and one of the other pilot projects in collaboration with GPOBA for delegated management contracts (World Bank, 2014).

In 2010, a new Strategic Partnership with the World Bank was designed to affirm the latter's commitment to the reforms and development initiated by the government, with the bank providing its expertise and international experience. This new agreement replaced the Assistante agreement (CAS 2005-2009) (ibid.) with a much more flexible commitment, free of rigid collaboration scenarios and based on shared objectives aligned with Morocco's development vision and the creation and development of new sectors and areas.

All this is framed in a plan with three axes: strengthening economic competitiveness and job creation, improving access to services for vulnerable populations and sustainable development in the context of climate change (ibid.). The first axis comprised four action plans: improving the macroeconomic and business environment, a trade policy that supports

competitiveness, targeting small businesses through the targeted financial sector, workforce training and the effectiveness of social protection institutions. The second aims to reduce social disparities, improve administrative efficiency and enhance public service delivery. The third aimed to mitigate vulnerabilities linked to energy, water and natural resources and adapt them to the impacts of climate change (ibid.). This involved an average commitment of US\$600 million annually, with additional technical assistance and knowledge transfer funding. The aim was to move from governance to governmentality, with broad consultation with civil society, the private sector and other stakeholders, and open and constructive dialogue in the elaboration of the strategy (World Bank, 2010).

This partnership was strengthened by the 2014-2017 partnership strategy, establishing a new partnership framework based on three main axes: fostering job creation in the private sector by promoting a more favorable environment for business and competitiveness, supporting private sector growth and facilitating access to financing. It also enhances human capital by improving the quality of education and healthcare systems, reinforcing social protection for vulnerable populations and promoting resilient, win-win spatial planning by improving the performance of critical infrastructure services in cities and towns and developing the capacity to adapt to climate change and resilience in the face of disasters (IRES, 2019).

One of the significant results of all this work was the substantial improvement in access to water in 2013, when 94% of the rural population had access to drinking water, including 35% through individual connections (World Bank, 2014). In 2020, the first phase of the National Water Plan (PNE) was implemented under the name of the National Program for Drinking Water Supply and Irrigation (PNAEPI) to increase water resource mobilization by

around 3 billion m<sup>3</sup> per year by 2027, with a particular focus on desalination and wastewater reuse, considered to be crucial non-conventional water resources for coping with climate change. However, the rise in the latter has impacted the water balance and rising cost structure, failing to cover production, distribution, and maintenance costs, among others (World Bank, June 2023).

#### 1. Water Security and Resilience Programme

In a post-COVID context, the Moroccan economy faced a 6.3% fall in real GDP in 2020 (the biggest on record), jeopardizing all the solid economic growth achieved thanks to structural reforms up to 2019 (World Bank, June 2023). In 2021, GDP growth resumed, supported by various measures and a good agricultural season, but the following year saw negative growth of 1.2% due to economic shocks and severe drought. In response, the government invested \$1 billion in support for farmers, hoping for a positive growth of 3.1% in the current year (World Bank, 2022 *in ibid.*).

Royal speeches emphasized the need for good water governance to achieve development objectives, hence the importance of maintaining the construction of dams and reservoirs, developing water transfers between basins to strengthen solidarity, and building seawater desalination plants; all this to rationally exploit and preserve groundwater resources, as well as improving inter-sectoral coordination and sectoral strategies, and taking actual water costs into account at every stage of water mobilization (Speech by HM King Mohammed VI, October 2022, *in ibid.*).

The "Morocco Water Security and Resilience Program" in 2023, financed by the World Bank 2023, aims to strengthen Morocco's water sector institutions and increase water availability in specific areas. The project cost was \$573 million, with a World Bank loan of \$350 million (ibid.). Unlike the previous project, this one was implemented by the Ministries of Economy and Finance, the Interior, and Equipment and Water to improve water security and resilience in the face of current challenges. Against massive water shortages, with an annual availability of 620 m<sup>3</sup>, reduced rainfall and rising temperatures (ibid.). By 2020, the water deficit has been estimated at 1.8 billion m<sup>3</sup> per year. This situation is aggravated by excessive exploitation of groundwater resources, loss of storage capacity in dams, water pollution and saline intrusion in coastal regions, and demand is likely to increase by 15% over the next three decades (ibid.).

A possible study of the consequences and results of this new project is complex at the moment. However, it is clear that the objectives developed are in constant progress, i.e. increasing water storage capacity, the contribution of non-conventional sources (wastewater reuse and desalination) and the protection of underground water resources. The quest to reduce water losses in distribution networks and improve water productivity in irrigated agriculture are also addressed, as is the quest for universal water supply in these areas and raising awareness of the importance of water (World Bank, June 2023). According to the same report, the success of this project hinges on coordination between the various sectors, an adaptation of the sector's financial framework to the rising costs of water mobilization, and the adoption of critical regulations relating to unconventional water resources and water management.

Structurally, the project is based on, firstly, strengthening the governance of the water sector through the integration of the National Water Plan, the development of participatory aquifer management contracts, and the installation of smart meters to measure groundwater withdrawals. Secondly, financial sustainability and water use efficiency will be improved by developing a financial sustainability framework for the sector, including financial strategies for sub-sectors and water loss reduction plans. Thirdly, integrating non-conventional water resources improves the environment and increases the reuse of treated wastewater (ibid.).

## 1.2 Water management and resilient and sustainable agriculture

The RESWAG project (Resilient and Sustainable Water in Agriculture ), aligned with the "Génération Green" strategy, the National Water Plan and Morocco's New Development Model (La Vie éco, 2022), is the result of this project. Financed by a World Bank loan and linked into this vision of good governance of water resources in Morocco's agricultural sector, improving the quality of irrigation services and widening farmers' access to specialized technical advice. Combining structural investments (modernizing irrigation and drainage services) and intangible investments (strengthening water resource governance and agricultural consultancy) (ibid.).

In more detail, water management is being improved by making the allocation of water resources more flexible, optimizing aquifer management, and refining policies to take climate change into account (La Vie éco, 2022). In order to benefit 16,000 farmers on more than 50,000 hectares, notably in the Souss-Massa and Tadla regions, water conservation techniques, modernized hydraulic equipment and optimized irrigation services were

deployed, followed by improved access to advice adapted to climatic challenges, where 23,500 farmers benefited by training public advisors and hiring consultants (ibid.).

## 2. Rural Drinking Water Supply Project

The Rural Drinking Water Supply Project is part of a long-term project financed and supported by the National Bank, with a total budget of 162.1 million euros (World Bank, 2014). Despite its launch in 1995, its true fruits are visible today more than ever. Unlike the days when only 14% of people had access to drinking water, the March 2023 assessment showed that more than 1.1 million people in rural areas now have access to a reliable supply of safe water, making a major impact in reducing water-borne diseases and creating new jobs, thus improving the quality of life of the inhabitants (World Bank, June 2023). This figure exceeds the 2014 estimate of 390,000 inhabitants in 1,400 rural villages, who will benefit from improved access to drinking water in rural communities in unserved areas (World Bank, 2014).

The project is therefore divided into three major axes and components, as follows: extending access to drinking water via standpipes in certain provinces, supporting the transition to drinking water supply via individual connections, and supporting implementation and capacity-building. Well as the following components: the extension of access to drinking water via standpipes, aimed at improving water supply in selected provinces; support for the transition to individual connections, including a pre-financing mechanism to help households finance their connection; and technical assistance and capacity building, including studies and consultancy to improve the management of the water supply program (ibid.). The inclusion of governmental involvement is reflected, among other things,

in the participatory approach to service delivery, hygiene and wastewater management awareness, and the development of appropriate sanitation solutions, where rural communities, under the supervision of the Ministry of the Interior, are responsible for drinking water supply and sanitation in their territories.

The project also includes the construction of new water infrastructure, the modernization of existing equipment, the installation of standpipes managed locally by a "janitor manager" (World Bank, June 2023) and capacity-building for the Office National de l'Électricité et de l'Eau Potable and local communities, targeting mainly rural areas where access to drinking water is limited, in particular in the provinces of Nador, Driouch, Safi, Sidi Bennour, El-Jadida, Rehamna, Tiznit, and Chtouka Ait Baha (World Bank, 2014). As well as the addition of sanitary facilities for wastewater management in high-demographic areas (World Bank, June 2023).

Finally, this project has had a significant social impact, with the creation of 2,000 caretakers responsible for maintaining and managing the standpipes and the encouragement of community involvement through information and consultation meetings (ibid.). In addition, a major aspect of the impact of the availability of drinking water is that it leads to better school attendance by children and frees up time for productive activities (ibid.). Such is the case of the village of Laaouissate, where before, the inhabitants were forced to travel long distances to collect water, often untreated, and now, thanks to the installation of a pipeline from a treatment plant, drinking water is easily accessible, without health risks linked to the consumption of unhealthy water (World Bank, June 2023).

Biopolitics continues to demonstrate the impact of water security and resilience programmes on public health and well-being. The biopolitical results are positive, although the degree differs from region to region. However, the drive to reduce social disparities between urban and rural areas through projects such as Rural Drinking Water Supply has had a direct impact on access to drinking water, reducing disease rates, contributing to better general health, especially among children, reducing mortality and increasing life expectancy, particularly in rural areas. This is the case in the villages of Laaouissate (Le Matin, 2023), where the installation of pipes and water treatment have helped to reduce illnesses linked to the consumption of untreated water, while at the same time incorporating hygiene education and awareness-raising. Not to mention the fact that raising awareness has helped to change behaviour in terms of hygiene and the use and management of waste water. They are being put in place to meet the challenges of climate change, in the same way as desalination.

From a governmentality perspective, it is clear how the behavior of locals is changing about water management due to these new programmes. In more detail, the promotion of water conservation and irrigation modernization, RESWAG (La Vie éco, 2022), for example, is making farmers aware of the impact of climate change on water scarcity, as well as the need to address this situation through more sustainable practices that encourage inter-community collaboration, which requires knowledge and a collective effort for efficient management. As for the Rural Drinking Water Supply project, it is changing the vision of the rural world, which now sees itself capable of undertaking other activities, such as the participation of the town council, calling for a level of individual responsibility that is growing day by day and allied by awareness-raising towards integrated resource management, and the decentralized governmental approach to water management.

## **Conclusion**

Hydropolitics and biopolitics in water governance in the Maghreb region are closely linked to the region's aridity and scarcity of water resources. Hydropolitics is a multidisciplinary construct shaped by social and political dynamics, evolving from historical perspectives. However, the governance dilemma presents a dichotomy between centralized technical solutions that, while effective, often entail environmental and societal consequences and decentralized community-based management that considers social, environmental, cultural and ecological factors.

Consecutively, the role of international organizations is crucial in the region, especially in the context of the region's agricultural dependence, especially in Morocco and Tunisia, in the face of the drastic effects of climate change and drought. Among the key international players are the EU and the World Bank, which see the modernization of water storage mechanisms and responsible water use as significant ways of tackling this crisis. The complexity of these challenges is illustrated by the Kingdom of Morocco's extensive international cooperation in water management, particularly with the World Bank. Although the country has made significant investments in dams and irrigation, the limits of historical policies are becoming apparent under the impact of climate change. Given these effects, current strategies now focus on sustainable water practices and a reiteration of international collaborations.

However, the way forward for the Maghreb is to balance the diverse economic, cultural and environmental contexts of its regions, addressing the unique challenges each

faces and adopting good governance to develop policies that ensure robust, resilient development in the face of water scarcity and climate vulnerabilities.

All the programmes put in place by the Moroccan government and supported and encouraged by international players such as the World Bank demonstrate this vision of green governance to modernize Moroccan agriculture and increase its productivity while implementing sustainable and responsible water management policies to tackle climate change. However, like all other projects, this has repercussions for biopolitics and governmentality, not only by encouraging the rural world to move from traditional to innovative agriculture, requiring modern irrigation technologies but also due to the cost of this modernization, many have found themselves dependent on government subsidies and indebted, thus constraining their sense of autonomy and resilience in rural communities.

Nevertheless, this new approach highlights the effort of the state and international actors to regulate population and resources through specific policies and incentives, impacting the way rural communities organize themselves, perceive their environment and interact with state structures.

Pursuing green, effective and fair governance in the face of water scarcity requires a delicate balance between modernization efforts and the preservation of rural autonomy. The evolving dynamics of water management highlight the need for policies that acknowledge the complexities of Maghreb's diverse contexts and build resilience in communities facing climate vulnerabilities and economic transformations.

Additionally, exploring the role of collective participation, citizen action, emerging technologies and innovative eco-friendly solutions in shaping sustainable water practices could pave the way for more effective policies and interventions in Maghreb and Morocco's ongoing struggle against water scarcity and its consequences.

\*\*\*

---

## Bibliography

### Articles and scientific articles

- Aimar, A. (2019). *The Contribution of C.S.R. to Water Protection in the Maghreb Region: Engineering a New Approach to Assure Water Security*. In: Behnassi, M., Pollmann, O., & Gupta, H. (eds) *Climate Change, Food Security and Natural Resource Management*. Springer, Cham.  
[https://link.springer.com/chapter/10.1007/978-3-319-97091-2\\_10#copyright-informati](https://link.springer.com/chapter/10.1007/978-3-319-97091-2_10#copyright-informati)  
[on](#)
- Akesbi, N. , Driss Benatya, Noureddine El Aoufi (2008). *L'agriculture marocaine à l'épreuve de la libéralisation*. Économie Critique Éditions.  
<https://www.amse.ma/doc/Agriculture-Economie%20Critique%20ok.pdf>.
- Akesbi, N. (2006). *Évolution et perspectives de l'agriculture marocaine*.  
<https://maktabate.com/wp-content/uploads/2022/07/AKESBI-Evolution-et-perspectives-de-lagriculture-marocaine.pdf>.
- Al-Ghwell, Hafez (2023). *Water Security and the Maghreb*, the SAIS Review of International Affairs.  
<https://saisreview.sais.jhu.edu/water-security-the-maghreb/>.
- Annabelle Houdret, Zakaria Kadiri, Lisa Bossenbroek (2017). *A New Rural Social Contract for the Maghreb? The Political Economy of Access to Water, Land and Rural Development*, in *Middle East Law and Governance*  
[https://brill.com/view/journals/melg/9/1/article-p20\\_20.xml?ebody=pdf-89805](https://brill.com/view/journals/melg/9/1/article-p20_20.xml?ebody=pdf-89805)

- Babu, A. (2009). *Governmentality, Active Citizenship and Marginalisation: The Case of Rural Drinking Water Supply in Kerala, India*, *Asian Social Science*, 5(11), 89–98.  
<https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=aade19c39b8ab41a12b9b5997852f99d9da8aec4>
- Bakker, K. (2013). *Constructing "Public" Water: The World Bank, Urban Water Supply, and the Biopolitics of Development*. *Environment and Planning D: Society and Space*. 31(2), 280–300.  
<https://journals-sagepub-com.proxy.bib.uottawa.ca/doi/epdf/10.1068/d5111>
- Boelens, R., Hoogesteger, J. and Baud, M. (2015). *Water reform governmentality in Ecuador: Neoliberalism, centralization, and the restraining of polycentric authority and community rule-making*, *Geoforum*, 64, 281–291.  
[https://www-sciencedirect-com.proxy.bib.uottawa.ca/science/article/pii/S0016718513001607?casa\\_token=wFnk7jb07P0AAAAA:7TXMvfd96r0zU7R0ykekewsGEgN\\_oy\\_nqd\\_LOwLqp2uT85yhquIML6IPBF5nOrRm6YLVBDg-PWg](https://www-sciencedirect-com.proxy.bib.uottawa.ca/science/article/pii/S0016718513001607?casa_token=wFnk7jb07P0AAAAA:7TXMvfd96r0zU7R0ykekewsGEgN_oy_nqd_LOwLqp2uT85yhquIML6IPBF5nOrRm6YLVBDg-PWg)
- Bouchaar, K. (2006). *The Hydropolitics of the Maghreb and the role of the E.U. within the framework of the Barcelona Process*.  
[https://www.researchgate.net/profile/Katharina-Bouchaar/publication/312498088\\_The\\_Hydropolitics\\_of\\_the\\_Maghreb\\_and\\_the\\_Role\\_of\\_the\\_EU\\_within\\_the\\_Framework\\_of\\_the\\_Barcelona\\_Process\\_2006/links/58bec720a6fdcc7bd45e84fc/The-Hydropolitics-of-the-Maghreb-and-the-Role-of-the-EU-within-the-Framework-of-the-Barcelona-Process-2006.pdf](https://www.researchgate.net/profile/Katharina-Bouchaar/publication/312498088_The_Hydropolitics_of_the_Maghreb_and_the_Role_of_the_EU_within_the_Framework_of_the_Barcelona_Process_2006/links/58bec720a6fdcc7bd45e84fc/The-Hydropolitics-of-the-Maghreb-and-the-Role-of-the-EU-within-the-Framework-of-the-Barcelona-Process-2006.pdf).
- Carrera Bianca (2023, septembre 2019). *From Rif to Atlas: Youth-led NGO crosses Morocco to support rural tribes*, *Al Jazeera*  
<https://www.aljazeera.com/news/2023/9/19/from-rif-to-atlas-youth-led-ngo-crosses-morocco-to-support-rural-tribes>

- Chaabi, C. (Mai 2023). *La politique des barrages n'atteindra jamais ses limites*. Medias 24, modifié en octobre 2023  
<https://medias24.com/2023/10/05/nezha-sadiqi-la-politique-des-barrages-natteindra-ja-mais-ses-limites/>
- Christian Bréthaut, Fatine Ezbakhe, Melissa McCracken, Aaron Wolf & James Dalton (2022). *Exploring discursive hydropolitics: a conceptual framework and research agenda*, International Journal of Water Resources Development. 38:3, 464-479  
<https://www-tandfonline-com.proxy.bib.uottawa.ca/doi/full/10.1080/07900627.2021.1944845>
- Djellouli-Tabet, Y. (2010). *Common Scarcity, Diverse Responses in the Maghreb Region*. n: Schneier-Madanes, G., Courel, MF. (eds) *Water and Sustainability in Arid Regions*. Springer, Dordrecht. [https://doi.org/10.1007/978-90-481-2776-4\\_6](https://doi.org/10.1007/978-90-481-2776-4_6).
- Eric Sarmiento, Catharina Landström, Sarah Whatmore (2019). *Biopolitics, discipline, and hydro-citizenship: Drought management and water governance in England*. p. 361-375  
[https://rgs-ibg.onlinelibrary.wiley.com/doi/full/10.1111/tran.12288?casa\\_token=Oi9e4IAaXssAAAAA%3ApXr84Dxn\\_OoHZU3rebGFgBpSQmnU12mmz5jCFiZnBuK6jfE6gPEYBK96iqIKgvxCQP853kX\\_GAo33Qc](https://rgs-ibg.onlinelibrary.wiley.com/doi/full/10.1111/tran.12288?casa_token=Oi9e4IAaXssAAAAA%3ApXr84Dxn_OoHZU3rebGFgBpSQmnU12mmz5jCFiZnBuK6jfE6gPEYBK96iqIKgvxCQP853kX_GAo33Qc).
- Gandy, M. (2016). *The fabric of space: water, modernity, and the urban imagination*. Cambridge. MA: The M.I.T. Press.  
<https://www-tandfonline-com.proxy.bib.uottawa.ca/doi/pdf/10.1080/2325548X.2016.1187511>
- Gibbs, L. M. (2009). *Water places: cultural, social and more-than-human geographies of nature*, Scottish Geographical Journal. 125(3–4). 361–369

<https://www-tandfonline-com.proxy.bib.uottawa.ca/doi/pdf/10.1080/14702540903364393?needAccess=true>

- Hellberg, S. (2018). *The Biopolitics of Water: Governance, Scarcity and Populations*.

Routledge

[https://ocul-uo.primo.exlibrisgroup.com/discovery/fulldisplay?docid=alma991004547769705161&context=L&vid=01OCUL\\_UO:UO\\_DEFAULT&lang=en&search\\_scope=OCULDiscoveryNetworkNew&adaptor=Local%20Search%20Engine&tab=OCULDiscoveryNetwork&query=any,contains,Biopolitics%20of%20Water%20:%20Governance%20%20Scarcity%20and%20Populations&sortby=rank&mode=basichttps://www.tandfonline.com/doi/pdf/10.1080/07900627.2021.1944845?needAccess=true](https://ocul-uo.primo.exlibrisgroup.com/discovery/fulldisplay?docid=alma991004547769705161&context=L&vid=01OCUL_UO:UO_DEFAULT&lang=en&search_scope=OCULDiscoveryNetworkNew&adaptor=Local%20Search%20Engine&tab=OCULDiscoveryNetwork&query=any,contains,Biopolitics%20of%20Water%20:%20Governance%20%20Scarcity%20and%20Populations&sortby=rank&mode=basichttps://www.tandfonline.com/doi/pdf/10.1080/07900627.2021.1944845?needAccess=true) &

Available on cairn:

<https://www.cairn.info/papiers-de-recherche--1000000148945-page-1.htm>.

- Ihazrir Abdelmalek (2023). *La politique hydraulique marocaine à l'épreuve : Sécheresse et crise des identités rurales* In : Eaux, pauvreté et crises sociales [en ligne]. Marseille : IRD Éditions, 2009 (generated December 12, 2023).

<https://doi.org/10.4000/books.irdeditions.4889>.

- Loftus, A. (2015). *Water (in)security: securing the right to water*. *The Geographical Journal*. 181(4), 350–356

<https://rgs-ibg-onlinelibrary-wiley-com.proxy.bib.uottawa.ca/doi/pdfdirect/10.1111/geoj.12079>

- M.B.H. (2023, May 9). *World Bank: A \$350 million climate finance for Morocco*. *Le Matin*

<https://lematin.ma/express/2023/banque-mondiale-financement-climatique-350-m-maroc/389684.html>

- Marie-Noëlle Woillez (2019). *Revue de littérature sur le changement climatique au Maroc : observations, projections et impacts*.  
<https://www.cairn.info/papiers-de-recherche--1000000148945-page-1.htm>.
- (n/a) La Vie éco ( 2022) *Water management: Morocco obtains a \$180 million loan from the World Bank*.  
<https://www.lavieeco.com/au-royaume/gestion-hydrique-le-maroc-obtient-un-pret-de-180-millions-de-dollars-de-la-banque-mondiale>
- Linton, J., & Budds, J. (2014). *The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water*. *Geoforum*, 57, 170-180.  
[https://www.researchgate.net/publication/259089822\\_The\\_Hydrosocial\\_Cycle\\_Defining\\_and\\_Mobilizing\\_a\\_Relational-Dialectical\\_Approach\\_to\\_Water](https://www.researchgate.net/publication/259089822_The_Hydrosocial_Cycle_Defining_and_Mobilizing_a_Relational-Dialectical_Approach_to_Water)
- (n/a) Le360 avec MAP. (2023, juillet 11). *Dessalement de l'eau de mer au Maroc: 12 stations installées pour une capacité de 179 millions de mètres cubes par an*. Le360.  
<https://fr.le360.ma/economie/dessalement-de-leau-de-mer-au-maroc-12-stations-installees-pour-une-capacite-de-179-millions-de-WKKL3I3N3RDLFF3AQVXZ65PK2U>
- Oualkacha, L., Stour, L., Agoumi, A., Kettab, A. (2017). *Climate Change Impacts in the Maghreb Region: Status and Prospects of the Water Resources*. In: Ouessar, M., Gabriels, D., Tsunekawa, A., Evett, S. (eds) *Water and Land Security in Drylands*. Springer, Cham.  
[https://link.springer.com/chapter/10.1007/978-3-319-54021-4\\_2](https://link.springer.com/chapter/10.1007/978-3-319-54021-4_2)
- Panagiota Kotsila & V. Subramanian Saravanan (2017). *Biopolitics Gone to Shit? State Narratives versus Everyday Realities of Water and Sanitation in the Mekong Delta*. *World Development*. Volume 93. Pages 374-388.  
[https://www-sciencedirect-com.proxy.bib.uottawa.ca/science/article/pii/S0305750X17300104?ref=pdf\\_download&fr=RR-2&rr=825c92964cae33f7](https://www-sciencedirect-com.proxy.bib.uottawa.ca/science/article/pii/S0305750X17300104?ref=pdf_download&fr=RR-2&rr=825c92964cae33f7)

- Rogers, S. & Crow-Miller, B. (2017). *The politics of water: a review of hydropolitical frameworks and their application in China*.  
<https://translateyar.ir/wp-content/uploads/2021/09/The-politics-of-water-a-review.pdf>
- Le Matin. , juin 2023. *Un projet de la Banque mondiale permet à plus d'un million de Marocains d'avoir accès à l'eau potable*.  
<https://lematin.ma/express/2023/banque-mondiale-plus-d-million-marocain-auront-acces-leau/390839.html>

Official documents and reports:

- Morocco [U.S. Marine Corps S](#) , (2015), *Marine Corps Intelligence Activity Morocco Cultural Field Guide*  
<https://publicintelligence.net/mcia-morocco-culture-guide/#>
- IRES (2019). *Panorama du Maroc dans le monde*, Les relations internationales du Royaume (Updated version of July 2019)  
<https://www.ires.ma/iip/wp-content/uploads/2023/05/RS-RI-Vers.-2019.pdf>
- RNI (2021) *Le programme des Indépendants 2021-2026 : 5 engagements, 25 mesures*  
<https://rni.ma/fr/> &  
[https://programme.rni.ma/wp-content/uploads/2021/06/Programme-RNI-21-Book\\_Ma\\_nifesteVF.pdf](https://programme.rni.ma/wp-content/uploads/2021/06/Programme-RNI-21-Book_Ma_nifesteVF.pdf)
- H2O (n/a) Maghreb Partnership *Providing state-of-the-art solutions to address Morocco's urgent water needs*.  
<https://www.usaid.gov/morocco/fact-sheets/h2o-maghreb>
- Anmar (2017), WASH: Water, Sanitation and Hygiene, *Providing safe water to children around the region*, UNICEF, Iraq.

<https://www.unicef.org/mena/wash>

- D. Bonazzi (2023), *Imminent risk of a global water crisis, warns the UN World Water Development Report 2023*, UNESCO

<https://www.unesco.org/en/articles/imminent-risk-global-water-crisis-warns-un-world-water-development-report-2023>

- Dominick de Waal, Stuti Khemani, Andrea Barone, Edoardo Borgomeo (2023). *The Economics of Water Scarcity in the Middle East and North Africa: Institutional Solutions*, World Bank.

<https://openknowledge.worldbank.org/server/api/core/bitstreams/d11bb0c0-8084-4590-ac1d-18d9ed7c364d/content>

- World Bank Data (2022), *Population, total - Middle East & North Africa, World*,

<https://data.worldbank.org/indicator/SP.POP.TOTL?locations=ZQ-1W>

- World Bank (n/a) (2023, June 12). *World Bank project connects more than a million Moroccans to clean water*. The World Bank.

<https://www.banquemoniale.org/fr/news/feature/2023/06/12/world-bank-project-connects-more-than-a-million-moroccans-to-clean-water>

- World Bank (n/a) (2023, June 13). *The World Bank reinforces its support to Morocco's climate policies*. The World Bank.

<https://www.banquemoniale.org/fr/news/press-release/2023/06/13/the-world-bank-reinforces-its-support-to-morocco-s-climate-policies>

- World Bank (2023). *Water Security and Resilience Program for Morocco*. The World Bank. <https://documents1.worldbank.org/curated/en/099060723024517055/pdf/P179192045ef5f070b83c069916d70dcd3.pdf>

- World Bank (2019, October 16). *Moroccan farmers improve water productivity through irrigation and increase agricultural production*. The World Bank.

<https://www.worldbank.org/en/results/2019/10/16/moroccan-farmers-save-water-on-irrigation-and-increase-agricultural-production>

- World Bank (9 January 2010). *Une nouvelle stratégie pour renforcer le partenariat de la Banque mondiale avec le Royaume du Maroc*. The World Bank.

<https://www.banquemonde.org/fr/news/feature/2010/01/09/a-new-strategy-to-strengthen-the-world-bank-partnership-with-the-kingdom-of-morocco>

- World Bank (2014). *Morocco - Rural Water Supply Project : Maroc - Projet d'approvisionnement en eau potable en milieu rural (French)*. Washington, D.C

<https://documents.worldbank.org/en/publication/documents-reports/documentdetail/140911468279860298/morocco-rural-water-supply-project>

- Secrétariat d'État chargé de l'eau et de l'environnement (2011). (n/a).

[https://web.archive.org/web/20111009183249/http://www.water.gov.ma/index.cfm?gen=true&ID=80&ID\\_PAGE=227](https://web.archive.org/web/20111009183249/http://www.water.gov.ma/index.cfm?gen=true&ID=80&ID_PAGE=227)