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# Watering the Desert, Draining the Oasis: Navigating Drought, Development, and Irrigation Politics in the Draa Valley, Morocco

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## **Abstract**

Today, calls are growing for policymakers to address Morocco's dwindling water resources and better support the country's many small-scale farmers as the nation faces increasing drought. The government continues to employ the same toolbox of solutions – building more dams, expanding the use of water saving technologies, forming farmers into water user associations, and designing aquifer contracts – which are influenced by its recent history of economic modernization as well as by development donors. At the same time, the Moroccan government continues to promote a production-oriented agriculture development strategy that encourages the overconsumption of water in arid regions through the Green Morocco Plan (2008-2020) and the Generation Green Plan (2020-2030). These national level plans fail to map onto how water is produced on the local level through the everyday practices of water users. This disconnect creates a local geography of uneven development; small-scale farmers are largely dispossessed of water resources while larger landowners, some farming water intensive commodities, accumulate this resource. Moroccan water management, I argue, must begin from below and engage with the ways that water is produced locally – a process embedded in post-colonial development of the country as well as embodied in and shaped by the everyday actions of local water users. For the case presented in this thesis, this means centering the narratives and experiences of water users in the Draa Valley in southeast Morocco.

Watering the Desert, Draining the Oasis: Navigating Drought, Development, and Irrigation  
Politics in the Draa Valley, Morocco

by

Jamie Fico

B.A., University of Virginia, 2017

Thesis

Submitted in partial fulfillment of the requirements for the degree of  
Master of Arts in Geography.

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Conducting this research in Tamazight and Moroccan Arabic would not have been possible without the support of several tutors, translators, and friends. Thank you first to Bilal Kasaoui whose weekly Tamazight sessions gave me the foundation to carry out this work, as well as countless laughs and conversations that kept me going during a remote first year at Syracuse University in the middle of COVID-19. Thank you to Bilal, Abdelsamad Ikinou, and Soufiane Amzile for your work translating interviews and checking my own translations. Thank you to my fellow graduate students at Syracuse University, Ismail IIsouk and Mustapha Outbakat, for your impromptu Tamazight and Darija lessons, insight into culture and language in the region, Moroccan music recommendations, and always making the time to share tea and reflect on life in the *tamazirt*.

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### **A Note on Transliteration**

I use the Qalam transliteration for Arabic and Tamazight words throughout this thesis. Most letters are transliterated phonetically. For the ح I use a H, for the ع I use ‘, and for the ق I use q.

### **Confidentiality Statement**

All names are pseudonyms to protect the confidentiality of participants unless given permission by the participant to use their real name. All photos of participants included in this thesis are used with their permission.

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# Chapter 1

## Water, Scarcity and Agency

### Introduction

Moroccans are praying for water. In February 2022, farmers across the country face parched earth and dry wells as they prepare their fields for the spring. Press headlines read “Morocco is experiencing its worst drought in 30 years” (Haskouri, 2022a) and fill national television screens with images of dusty wheat fields and dejected farmers. The country’s new parliament led by Prime Minister Aziz Akhannouch faces mounting pressure to address the country’s water crisis as King Mohamed VI leads rain prayers in mosques across the nation.

Farming is critical to the national economy—almost 15 percent of Morocco’s GDP is based on agriculture and the sector employs about 45 percent of the population (*Morocco - Agricultural Sector*, 2020). Since 2015-2016, average annual rainfall has not exceeded 200 mm with just 140 mm reported for 2021-2022 (*Water Scarcity*, 2022). Water storage in the nation’s dams is only 12.7 percent their capacity as of March 2022 (Haskouri, 2022b). In response to these issues, the Moroccan government has launched the Hassan II relief fund to deliver animal feed, wheat, financial loans and insurance to farmers. The government is also proposing the building of additional dams, desalination and wastewater treatment plants across the country (Haskouri, 2022b).

Based on this conversation, the nation appears to be solely focused on the country’s dwindling water reserves as opposed to the drivers of its consumption. This approach reduces the question of water in Morocco to one of supply; a challenge that may be addressed by increasing the amount of dams and investing in alternative technologies and sources of water. Hardly any decision-makers are asking where Morocco’s water is going.

While Morocco's press and policy community are particularly concerned about drought this year, the country's challenges with water are not new for residents in the Draa Valley, a date palm oasis region in the southeast of the country. In June 2021, nine months before the Moroccan government announced their drought plan, I was traveling from the city of Marrakesh to Tamezmoute, a community of 21 Amazigh villages in the Middle Draa Valley. The other passengers and I gripped sweating water bottles, preparing for the winding 6-hour taxi drive through the Atlas Mountains towards the pre-Sahara, beads of moisture collecting under the face masks mandated by Covid-19 regulations. A quick shower of rain pelted the side of the cab as we climbed in elevation, leaving the dusty fields of olive trees surrounding Marrakesh behind us. The temperature began to climb again as we descended along the Tizi n'Tichka pass, and a familiar hot wind hit my face as I cracked open the window.

The road leveled as we reached Agdz, a market town at the beginning of the valley's oases. The taxi slowed to avoid passersby headed to school, cafes, or local administrative buildings. Our driver raised his arm greeting familiar individuals and peppered his horn as we zig-zagged between the usual flurry of mopeds, taxis, and supply trucks unloading vegetables from the region's local farms. My mouth watered as I took in vegetable stands filled with fuzzy peaches, slick melons and round grapes along the road. As we left the town towards Tamezmoute, trucks hauling watermelons passed us in the opposite direction, carrying their produce to Agdz from farms scattered throughout the valley. Entering the date palm valley, I noticed a snaky line of cement tubes strewn along the side of the road to our right with "Superlit" stamped on their side, waiting to be pieced together. I later discovered that these tubes were intended to carry water to Zagora from a new dam under construction in Agdz and was part of the local government's plan to address water scarcity in the region under the National Water

Strategy. On our left, browning date palms flashed by the window next to a dry riverbed, demonstrating the urgency of the region's water scarcity.

Periods of drought are common in the Draa Valley. However, this year was more difficult than most. According to data from the local weather station, there had been no significant rainfall in the region since 14.5 mm of rain in January 2021. Annual rainfall in this upper region of the valley has not exceeded 74 mm over the last six years.<sup>1</sup> Still, the contrast between the browning date palms in the oasis and the steady export of water-intensive crops like watermelons hinted at a more complex and uneven reality of water distribution where some residents had ample access and others did not. This simple observation helped me to see that the region's water challenges are not just an abstract issue of scarcity, but relate to more specific questions *where* exactly the region's water was going, *who* was managing it and *how*? These questions are entangled in the agrarian development of the region and the systems and policies of Morocco's water management, which is the focus of this thesis.

My research is guided by three questions: *(1) how has Morocco's water management changed over time and how does this impact water users in the Draa Valley today?*; *(2) what is the impact of irrigation assistance from Morocco's agrarian strategy, the Green Morocco Plan, on local farmers in the Draa Valley?* and, *(3) how is water produced in the Draa Valley today and how has this changed within peoples' lifetimes?*

To answer these questions, I focus on the narratives and daily lives of residents of Tamezmoute, an agrarian community where labor is diversifying from oasis farming and is developing as a small commercial center within the valley. The oasis originally rooted the tribes of residents to this space, and oasis farmers built the elaborate system of irrigation canals and

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<sup>1</sup> Data from the Agriculture Development Center (ORMVA) extension office in Agdz. Acquired 6/2022.

dams to cultivate a diverse mix of household vegetables, cereals and alfalfa under the region's date palms. Oasis farming and animal raising were the predominant livelihood activities for people in the region until the 1970-1980s when drought and urban development sparked a trend of male wage labor migration to the cities. Today, most household incomes are based on remittances from this continuous cycle of seasonal wage labor.

At the same time, commercial farming activities are increasing on extended irrigated areas outside the oasis space and local businesses proliferate around the center of town. Water flows at times through the cemented irrigation canals, plastic drip irrigation lines, and pipes to home faucets—carrying salts and pollutants from fertilizers and industry with it. Other times it does not flow—the riverbed runs dry, wells are empty, and faucets cut off in the middle of the hot summer day. This movement of water—influenced by its physical properties, human technologies, and social organization—shapes the lives and natural space of the *tamazirt*.<sup>2</sup> The oasis communities living in the valley build this space through the elaborate series of irrigation canals running through the oasis (Hammoudi, 1985; Ouhajou 1996). Today this hydrosocial system is impacted by the *makhazen*'s (central government) water management policies and irrigation development in the region as well as decreasing precipitation and rising temperatures due to climate change. The variability of water and shifting hydrogeology in the valley impacts the social processes and development of the region today. Lamenting this, one elderly female resident told me, “If there was enough water for the *tamazirt*, that would be a blessing.”

In what follows, I first present the theory that frames my analysis of water scarcity and access in the Draa Valley. I then present the research context, my methods and approach, and a

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<sup>2</sup> Indicates the ancestral homeland or countryside of an Amazigh community.

general description of my participants whose knowledge and insight provide the backbone for this work.

### **Theoretical Framework: The Hydrosocial and Everyday Water Politics**

Moroccan policy solutions present water as neutral and fail to address the uneven impacts of drought on different water users across the country. They simplify Morocco's water challenges to one of supply that can be solved through technical solutions that create additional sources of water rather than addressing the drivers of water overconsumption. These policies, which can be traced back to the influence of the French and the country's post-independence modernization, fail to acknowledge the multiple ways that water is made locally. As scholars have pointed out, however, water is not merely a natural resource: it is embedded in the human technologies, systems and daily actions that manipulate its flow. Water is produced.

This production occurs in the political manipulations of water through irrigation networks, social arrangements, technology and policies by numerous institutions and actors. In her analysis of the everyday politics of water management in Egypt, Jessica Barnes (2014) writes:

The supply side of a national water budget cannot be captured in a simple summation of rainfall, groundwater, and surface water inflow. Instead, what water comes to be is the outcome of social, biophysical, technical, and political processes that produce particular quantity and quality characteristics in any given time and place...the politics of water lies in these quotidian practices of making water as a resource available for use (p. 3).

For Barnes, water is made and remade through the actions and interactions between farmers, state engineers and gatekeepers who open weirs, block bypasses, and channel it through the canals system to flood the fields of the Fayoum irrigation scheme in Egypt. It is a multi-scalar process that is influenced by the decisions of water ministers who determine the releases of the Aswan High Dam on the Nile as well as by customary watering turns established in the

community. Despite the formation of water user associations by the government since the 1990s, Barnes demonstrates how local irrigators are rarely included in government water management decisions. They are, however, actively manipulating water to reshape the space of the fields. By focusing her analysis on the movement of water in the fields, and the cross-scalar systems and actors that produce it, Barnes reveals not only the ways in which water is managed, but also how it is constantly in production.

In the Draa Valley, Moroccan scholars have traced a similar movement of water through the social and physical network of dams and canals that structure the oases (Hammoudi, 1985; Ouhajou, 1996). It is not the substance of water that irrigators' hold, Abdellah Hammoudi claims, but instead a politically negotiated relationship within an interconnected system of hydro-social networks. He writes:

If by substance it is meant any quantity delimited in terms of known area or volume, such as a defined or measured plot of land, it should be clear that what an individual owns is not a substance. All he has in his hands — as distinct from a substance — is a relationship that is evaluated in relation to other users over time. By means of an irrigation network, itself the product of joint labor, this relationship permits him to obtain water to irrigate his lands (Hammoudi, 1985, p. 52).

In describing how water is made in the valley, Hammoudi articulates the dual nature of irrigation water as both an individual right and a communal resource negotiated through deeply relational practices. It is a political process created through the collective labor that maintains the irrigation network which is organized by the village decision-making council, *jma'a*, who allocates watering turns to different users. Hammoudi offers numerous examples of various irrigation schedules and systems employed by *qsor* communities in the Draa, demonstrating how watering turns differ based on social status and land ownership which can be traced back to pacts made between sedentary oasis dwellers and nomadic Amazigh tribes who protected these groups from outside invaders. Historically, the *makhazen* largely left water management to its traditional

mechanisms except during periods of drought when governors would break dams in the upper oases to allow water to reach the downstream oases. Even with the construction of the Mansour Eddahbi dam at the beginning of the river in 1972, Hammoudi writing in 1985, sees little evidence of these traditional systems based on valley and village-level micropolitics disappearing.

Barnes and Hammoudi's analyses of oasis irrigation systems in opposite ends of North Africa align with water scholars' calls to examine water as not merely a resource but as a hydro-social nature where water is simultaneously biophysical and social (Bakker, 2002, 2012; Budds et al., 2014; Perreault, 2014; Swyngedouw, 1999). Building from the hydrological cycle, scholars developed the concept of the hydrosocial cycle to demonstrate water's circulation through human infrastructure, the atmosphere, lithosphere and hydrosphere. Water's materiality – its “biophysical and ecological characteristics” – and the discourses and social systems that produce it are mediated by technology such as pumps, dams and canals (Bakker, 2012, p. 617). Scholars argue that water cannot be reduced to merely technical terms such as supply, water budgets, and precipitation levels. The social processes and human technology of irrigation networks, hydro-infrastructure, and governance systems must also be considered to understand how water scarcity is produced, rather than naturally occurring. Budds et al. (2014) write that the strengths of the hydrosocial cycle lie in its “attention to the complex and context-specific social production, discursive construction and political mobilisation of ‘water’, and the dialectic process through which such (produced, constructed and mobilised) ‘water’ in turn configures society” (p. 2). The hydrosocial cycle offers a roadmap to follow the circulation of water through the social and natural world. It helps us understand how human technologies such as dams and water pumps –

as well as policies and social arrangements – influence the flow of water in order to challenge apolitical discourses of water scarcity.

Scholars such as Jessica Budds (2008) have applied the hydrosocial cycle to demonstrate the insufficiency of technical state solutions to water scarcity in the La Ligua river basin in Chile. She notes how farmers diverting water to irrigated slopes employ a narrative of abundance to justify their actions while farmers in the valley face dwindling water resources. The state's hydraulic assessment failed to engage with this social production of water which depoliticized farmers' struggles. Instead, the government assessment focused merely on the hydrologic cycle in the valley and presented a planned reservoir as a development solution intended to benefit all farmers equally. Budds concludes that the technical solution offered by the state does not address the valley's water issues. It obscures the "underlying socio-political processes" that led to groundwater overdraft related to the country's water law and export oriented agrarian development (p.73). Budds argues that the issue of water scarcity in the valley is socially constructed in the discourses and competing motivations of farmers in the valley. Her analysis demonstrates how an attention to the hydrosocial – the human manipulations and discourses embedded in the circulation of water in the valley – is necessary to truly address these issues.

As Budds and others indicate, water is not a neutral resource. Since "water circulation...is dependent upon institutions and practices as much as on the hydrological cycle" (Bakker, 2002, p. 774). Water "both reflects and reproduces relations of social power" (Perreault, 2014, p. 235) and is mobilized by states to transform their society and geography (Swyngedouw, 1999). Understanding water as political helps identify the actors and institutions who shape its production in particular ways and opens a space to reexamine these processes. One way scholars have discussed the reproduction of social power through water is by drawing on David Harvey's



(2003) concept of accumulation by dispossession to demonstrate how water has been commodified and directed away from rural irrigators (Barnes, 2014; Birkenholtz, 2016; Joy et al., 2014; Mustafa & Tillotson, 2019; Swyngedouw, 1999). Harvey (2003) argues that neoliberal capitalist production is a constant process tending towards overaccumulation, building on Marx's understanding of primitive accumulation where the producer is removed from the means of production as a precondition for capitalism. Under neoliberalism, new sites of production or demand are constantly being drawn into this system at the expense of dispossessing others of land or resources. Common resources such as water are privatized and marketized which dispossesses some of this resource. Scholars have applied Harvey's accumulation by dispossession framework in a variety of contexts to explain the transformation of state power through irrigation modernization (Swyngedouw, 1999), the dispossession of water from rural peasant farmers to urban centers of capital (Birkenholtz, 2016; Joy et al., 2014; Mustafa & Tillotson, 2019), as well as in reclaimed rural agricultural spaces (Barnes, 2014; Budds, 2008). Perreault (2012) draws attention to the need to examine the role of water's materiality in influencing the process of accumulation by dispossession by demonstrating how campesino communities in Bolivia are dispossessed of water in part through the accumulation of toxic sediments in floodplains and farmland.

Harvey's accumulation by dispossession is useful for understanding larger forces underlying modern irrigation projects across a variety of contexts and spatial scales. However, it is less useful for providing a nuanced understanding of the agency and influence of local actors involved in this process. Jessica Barnes (2014) writes that Harvey's concept overlooks the motivations of peasant farmers who accumulate water from the Nile on reclaimed desert land to provide for their households and children's future (pp. 112-113). Chris Sneddon (2007) also

points out that Harvey's concept fails to engage with the materiality of water, which influences how it is appropriated for subsistence or commercial activities, and may help resist its complete capitalization. Scholars have also provided numerous examples as to how this process is challenged by farmers and local water users on the ground. Birkenholtz (2016), for example, demonstrates how rural farmers in India have contested state reallocation of canal water away from their farms to urban capital centers by "capitalizing on gaps in state surveillance of irrigation and diversion infrastructure" (p.95) to divert water from the canals to their fields. The unsanctioned actions of these farmers actively resist the process of state accumulation by dispossession and reconfiguring the irrigation network.

As these local analyses indicate, the politics of water cannot be reduced to the economic logic of capitalism. Karen Bakker (2003) discusses how the biophysical properties of water resists its complete commodification as it is privatized. Attempts to buy and sell on the market are fraught with difficulty as water "deviates from the standard behavior of commodities" which challenges the assumption that this nature can be regulated (p.22). Bakker argues that water's biophysical properties as a "flow resource" and its density make it difficult to bound, establish exclusive property rights for, and require expensive infrastructure investments to transport it (pp.32-33). By demonstrating the ways in which water acts as an "uncooperative commodity," Bakker's work opens a space to consider the different ways that water interacts with nature, society, technology, and culture.

Accessing water, then, becomes a process that is constantly negotiated, impacted by the materiality of water, and mediated by social power relations. Through her work on uneven arsenic water contamination in Bangladesh, Farhana Sultana (2011) demonstrates how the micro-level politics of water collection are ongoing and constantly changing. Arsenic-contaminated

wells add another layer to an already messy political process of household water collection mediated by female water providers. Sultana notes how “access is never fully secure, and has to be re-ensured and re-articulated over time and space” (Sultana, 2011, p. 166) as the changing nature of well contamination, breakage, and decisions by well owners present developing challenges to women’s ability to provide safe water for their families. Sultana’s attention to the political nature of these negotiations, fluid nature of this resource, as well as emotional geographies of suffering offers new value to studies of water management. Her analysis reveals how female water providers can employ their suffering over water to invoke sympathy from those with access to clean water in order to gain access and rights from new sources (Sultana, 2011, p. 168). Thus, the social power relations of water are mediated by the actions and emotion of water collectors.

Understanding water as hydrosocial, emotional, and uncooperative to attempts of commodification illuminate how water scarcity is a political process produced through societal manipulation of water. Scholars who ground their analyses in the local realities of water production offer valuable insight as to how these forces come to manifest in unexpected and multiple ways on the ground, at times defying the easy development logic of water policymakers. Tracing the political processes of water production through its hydrosocial cycling and “multiple acts of the everyday,” Barnes (2014) illuminates overlooked spaces and connections between policymakers, development donors and local irrigators. This is, as Barnes puts it, “a politics that revolves around a central question of agency – who is able to shape the nature of Egypt’s water?” (2014, pp. 172-173). Answering this question, “demands attention to the processes that produce a resource and govern its movement through space and time—an amalgam of things beyond any one person’s direct control,” (p.70).

This thesis examines the processes of how water is held, released, diverted and pumped by different actors in the Draa Valley. This analysis reveals the power disparities between small-scale oasis irrigators and *malin lfwarem* (farm owners), the weaknesses to participatory water resources management models, and underlying drivers of water scarcity in the country. The everyday acts of producing water also reveal the local meanings of water and how these are embedded in the social processes that build the community in the *tamazirt*. Water scarcity, then, is not so much a result of Morocco's lack of rainfall, nor is it necessarily a given. It is produced through state structures, agrarian policy, and the daily negotiations occurring on the ground, impacting the lives of community members unevenly and reshaping the local community. Morocco's water "crisis" can only be addressed by attending to these multi-scalar processes that build the irrigation network, and to the ways that water flows through daily lives in the *tamazirt*.

Building from this critical research on the hydrosocial and everyday water politics, I argue that the production of water must also be understood temporally. In the Draa Valley, Morocco, water is a key feature in residents' discussions of how the *tamazirt* has developed from the past, some recalling a more bountiful waterscape in their youth. Perreault (2018) argues that memory, particularly of water abundant pasts, "tell us as much about contemporary lived experience of environmental suffering as about past realities" (p. 240). These memories express not only emotions produced by the change in the water landscape, but also alternative visions to how water might be reconstructed to shape particular places of value. In this way, alternative visions in the memories and everyday practices of those who touch the Draa Valley's water daily, offer insight to typical development policy solutions that are largely failing their stated goals of facilitating local water access and participatory management.

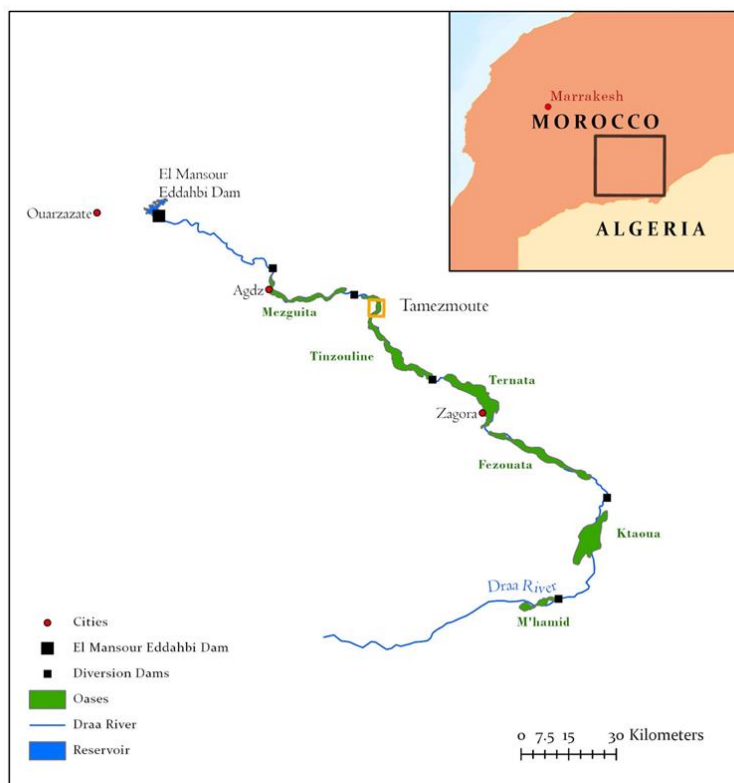
Today, calls are growing for policymakers to address Morocco's dwindling water resources and better support the country's many small-scale farmers. The government continues to employ the same toolbox of solutions – building more dams, expanding the use of water-saving technologies, forming farmers into water user associations, and designing aquifer contracts – which are influenced by its recent history of economic modernization as well as by development donors. At the same time, the Moroccan government continues to promote a production-oriented agriculture development strategy that encourages the over-consumption of water in arid regions through the Green Morocco Plan (2008-2020) and the Generation Green Plan (2020-2030). These national level policies fail to map onto how water is produced on the local level through the everyday practices of local water users and agriculture officials. This disconnect creates a local geography of uneven development; oasis farmers are largely dispossessed of dwindling water resources while larger landowners, some farming water-intensive commodities, accumulate this resource. This process is also actively reshaping the agrarian space in the region by drawing groundwater away from the oasis to farm extensions located outside the oasis cover. Consequently, the Draa Valley oases, called “un couloir de vie en avant du desert” by Ouhajou (1996, p. 17), are drying as the surrounding sands and rangelands blossom with new watermelon farms and date palm plantations.

Moroccan water management, I argue, must begin from below with local irrigators. It must engage with the ways that water is produced locally – a process embedded in post-colonial development of the country as well as embodied in and shaped by the everyday actions of local water users. For the case presented in this thesis, this means centering the narratives and experiences of water users in the Draa Valley.

## Empirical Context

The Middle Draa Valley is a collection of six date palm oases that run for 200 kilometers (about 124 miles) in the southeast of Morocco (Karmaoui et al., 2014) (Figure 1). The climate in the region is arid with temperatures that exceed 48 degrees Celsius in July to August and reach lows of 0 degrees Celsius in the winter (*Province de Zagora*, n.d.). Average annual precipitation varies from 108 mm in the north of the valley to 54 mm in the south (ibid). Tamezmoute, the main study site, sits in the second of the six oases, Tinzouline. It is a group of 21 Amazigh villages overseen by the local *jma'a* or Commune of Tamezmoute.

**Figure 1**



The Middle Draa Valley. Map by Jamie Fico.

Water for the Draa River originates in the High Atlas Mountains and is stored in the Mansour Eddahbi dam located near the city of Ouarzazate. The reservoir of the dam collects

snowmelt and rainwater from these mountains, providing drinking water for the city of Ouarzazate and irrigation water for the valley (Berger et al., 2021; Moumane et al., 2021). The dam was originally built in 1972 to store and conserve water for agriculture throughout the year. As rainfall has declined and siltation builds behind the dam, the number of releases have been reduced. Ouhajou recorded eight releases for the 1978-79 season. These releases were highly irregular, with 58.8 percent of the annual water released in the months of January, February and March and only 10 percent released during the summer months of June-August. (Ouhajou, 1996, p. 156) Today, according to the regional agriculture ministry (ORMVA), the dam releases on average four times a year of 120,000,000 cubic meters total (Berger et al., 2021; field notes). In reality, these releases are dependent on the storage availability in the reservoir for a given year and may fluctuate over or below 120,000,000 cubic meters annually based on data provided by the ORMVA office in Ouarzazate (Chapter 2).

The Draa Valley is made up of an alluvial aquifer system that depends on regular floods from the river to recharge the groundwater (Hssaisoune et al., 2020, p. 21). According to the agriculture office's water management system, the water from the dam releases may not be diverted from the river for surface irrigation until the water reaches M'hamid, the last oasis in the valley. This policy is meant to allow time for the water to percolate through the riverbed and recharge the water table, causing the water in farmers' wells to rise. Once the water has reached M'hamid for three days, a series of five diversion dams are opened at the top of each oasis which channel the water to the main irrigation canals (*targwa*- Tamazight, *segia*- Arabic) on either side of the oasis. Farmers then use this water for flood irrigation of their individual plots in the oasis following local watering turns established in each *timizar* (village) by the local governing council (*jma'a*).

Due to the intermittent availability of surface water, farmers rely on groundwater irrigation through private wells that many built themselves or through support from the local agriculture ministry as part of the Green Morocco Plan (Chapter 3). While the dam helps control the amount of water reaching the oasis villages below to prevent flooding, there has been significant desertification at the lower end of the valley in M'hamid, which led to the drying of Lake Iriki following its construction (Karmaoui et al., 2014).

Communities living in the Draa Valley are not homogenous and historically were stratified by ethnicity (Arab, Amazigh, Haratin), race (white, black), and social status (*shorfa*, *shlu*, *akhamas*, *abid*<sup>3</sup>), as well as tribal affiliation (Ait Atta, Ait Sederate). Social stratification reflects waves of settlement and alliances in the southeastern oases, where, as Paul Silverstein (2015) has noted, Amazigh nomadic tribes became local landowners that protected the black Haratin and their date harvests from outside invaders. The Haratin in turn became sharecroppers in exchange for this protection and livelihood security. *Shorfa* possess large landholdings and *baraka*, or blessings, due to their lineage from the prophet and connection to the ruling 'Alawi dynasty of Morocco (Silverstein, 2015). Tribal affiliation, origin, and status continue to play a role in social differentiation in places of the Draa Valley such as Tamezmoute, the community's *shorfa*, sharecropper descendants, and *shlu* (mountain-originating Imazighen), but today all groups identify as Amazigh. They speak different dialects of Tamazight and own land side-by-side in the Tinzouline oasis. Some landholdings remain held by the local *zowya* in Temsla, and

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<sup>3</sup> *Shorfa* are those belonging to landholding, Sufi establishments known as *zawaya* and possess *baraka*, blessings, by tracing their lineage to the prophet Mohamed. *Imaghizen* or *Shlu* are mountain-originating Amazigh tribes who settled in the area to protect date growers from caravan and nomadic invaders. *Akhamas* are sharecroppers who worked the land in exchange for a portion of the harvest. *Abid* were enslaved sub-Saharan who were forcibly brought to the region by the trans-Saharan trade through the oases.



community members living in these villages still pay the institution a portion of their harvest every year (more on this in Chapter 4).

## **Methods and Approach**

My methods were primarily ethnographic and supplemented by quantitative data acquired from the local agriculture ministries in Ouarzazate, Agdz and Zagora as well as through an analysis of documents from USAID, the Moroccan government, and well permits and land titles from farmers. Forty-one semi-structured and unstructured interviews were conducted with farmers, government officials and community members from June-August 2021. I additionally performed participant observation of commercial farming activities in the districts of Tamezmoute, Tangafa, Agdz, Feija and Tilogui outside Zagora. Handwritten notes were taken during each interview and after each participant observation. This data collection was supplemented by informal conversations with people on daily issues – water, work, COVID-19, debt, health difficulties, educational opportunities – that added to my knowledge of local living in Tamezmoute. A follow-up survey and interviews with farmers and local officials was conducted summer 2022 to verify and provide more contextual information to responses shared in 2021. All research activities were conducted under IRB Protocol number 21-055.

My approach was consistent with what Natalie Koch (2020) describes as deep listening. Deep listening emphasizes empathy and respect towards participants to move researchers away from a tendency to consider themselves the expert, leaving room for those with lived experiences on research issues to challenge and expand our own understandings (Koch, 2020). This approach is informed by feminist reflexivity and the understanding that all knowledges are situated, and thus valuable in their own right. My own approach to these methodologies started from a place of care and respect for my participants. I entered with a prepared set of questions, yet I let

participants lead the conversation which usually began with a discussion of water changes but devolved into conversations on family, personal ethics, injustice, gender roles, colonialism, and politics. Through these winding conversations, I began to piece together how women and men in Tamezmoute understood and made sense of the water and life challenges they face on a daily basis, and how they lived within this context.

My focus was on Tamezmoute, the community where I lived and worked as a Peace Corps Volunteer from December 2018-March 2020. My previous relationships here greatly impacted the nature of this research, making it more personal and my approach empathetic. At the same time, my presence as a white, female American was unavoidable, and respondents frequently reminded me of my privilege — especially my easy ability to move between southeast Morocco and the United States. Participants’ jokes about me taking them back to the United States or finding them an American spouse was evidence of frustrations of a lack of mobility living in Morocco’s southeast; a commentary on the visible wealth of America on a global level; and a pointed critique at my own ability to move so easily back and forth between these contexts. Still, I strove to not just extract research data from people, but to use the time that I had to truly *be* with folks in Tamezmoute by sharing in meals and household chores, attending community events, “stoeping” outside homes with families in the evenings, celebrating when students passed their national exams, and tutoring youth in English. These efforts were appreciated by community members and resulted in deeper conversations with people as we continued our relationships.

This type of embedded research has important emotional dimensions. I began delving into what Farhana Sultana (2015) describes as “emotional political ecology” by bearing witness to the affective and embodied toll that water and livelihood challenges have on individuals I

know well and care for, which only scratched the surface of these daily burdens. Research that is integrated within personal relationships can thus be a challenge. Many times, I felt as if I wasn't doing real research, that the "hanging out" portion of my work was overpowering my ability to ask pointed questions of local residents and observe their farms, especially as I became anxious that people would grow tired or ask me to accompany them to visit neighbors. Nevertheless, emotional embeddedness fundamentally shifted my understanding of water and development issues in the region, allowing me to see community members as fully human actors within contexts of change, hardship, and community life, rather than merely impacted by drought and uneven development.

Ultimately, this approach built on care and listening, as well as my personal history with community members in Tamezmoute, transformed this research into more than just a commentary on access to irrigation assistance or how people are responding to the "shocks and stressors" of drought, common in development discourse. It became a larger story of how those that tend to be left out of and overlooked in water governance are experiencing and shaping the production of water in the valley. The political decisions and policies implemented in the region have *real* consequences for their lives and families.

My approach draws on the work of anthropologist and critical food scholar, Ashante Reese (2019), who allows black storytelling to lead her through her research on food inequality and black food geographies in Deanwood, Washington DC. For Reese, her participant is "an expert in his own lived experience and what that meant in the context of food," (2019, p.2). I likewise had guiding questions, but I allowed residents in Tamezmoute to take over the conversation, if they so chose, and to tell their story of the change around them. The

conversations allowed me to piece together a story of the production of water and its uneven geographies in the Draa Valley, Morocco.

### **Interviewee Participants:**

32 out of 41 of my interviews (78 percent) were conducted with individuals living in the Commune of Tamezmoute. These respondents reflected a mix of villages, tribal lineages, races, genders, and ages. I conducted my interviews in Moroccan Arabic and Tamazight, sometimes individually and other times with the assistance of a local research assistant who helped rephrase my questions to participants and translate their responses from Tamazight to Moroccan Arabic. Interviews ranged in time from 5 minutes to 75 minutes. Most of the interviewees were recorded, but only if the participant gave their consent. I took shorthand notes during each interview, which I later transcribed and elaborated on at the end of every interviewee in a separate notebook. Data were later translated, coded and analyzed.

If interviews were with individuals I did not know personally, I was always accompanied by a local research assistant to facilitate introductions and communication. These research assistants were three previous students of mine who lived in different villages in Tamezmoute (two female, one male). Two were current university students who returned in late July for break, and one had just completed her final year of high school. When interviewing government agriculture directors and representatives, I was accompanied by local teachers I used to work with in the region, and we communicated in a mix of Moroccan Arabic and English.

The primary occupation of most respondents was oasis farming, although some were primarily wage laborers or caretakers who also engaged in oasis farming periodically. To add context to the larger valley, I included four interviews with farmers located in Agdz and Zagora,

upper and mid-lower ends of the valley, who were primarily engaging in commercial farming (watermelons, date palm plantations, henna, and wheat). I also conducted five interviews with regional and local representatives from the agriculture development offices in Ouarzazate and Zagora to understand how government irrigation assistance was dispersed and these ministries' efforts to reach farmers in the region. To protect the confidentiality of participants, all names used here are replaced with pseudonyms.

Women made up 27 percent of total interviewees, and 45 percent of oasis farmers (based on my classification of their livelihood activities). It should be noted that there is typically a gendered division of labor with oasis farming. Women tend to perform much of the harvesting by hand of alfalfa, vegetables, and henna. Men, on the other hand, water the fields, operate the motorized groundwater pumps, plant seeds, apply organic and chemical fertilizer, and harvest dates and cereals. This was not always the case, however. Some women oasis farmers I spoke with would water fields themselves, either because they were the sole owner or because they were tending the land for the owner and receiving a share of the harvest in return. Oasis farming, then, reflects a wide range of subsistence activities mixed with limited market integration predominantly of dates.

A summary of the participants' backgrounds can be found in Appendix 1, but interviewees fell into four broad categories: oasis farmers (*ifilaHen*),<sup>4</sup> commercial farmers (*malin lfwarem*), wage laborers (*ikhaddamen*), and government officials (*makhazen*). It is important to note that these categories were not always self-identified, but I chose these labels after listening to the participants' description of their daily activities and work. These categories were at times overlapping and by no means the sole descriptor of participants' occupations in the past or at this

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<sup>4</sup> Oasis farmers can also be understood as peasant or household farmers who cultivate the area underneath the date palm valley.

point in time. The majority of respondents in Tamezmoute in fact play many roles at the same time. They are oasis farmers—maintaining family landholdings even as these fields produced minimal income for their families—as well as seasonal wage laborers, mothers and caretakers, date cutters, farm workers, association leaders, and retired construction workers. A description of the broad categories is included below:

Oasis Farmer ( <i>AflaH</i> )- 23	Farming plots ranging from less than a hectare to 4 hectares under the oasis cover. Either own the land themselves or are renting. Products include a variety of vegetables, alfalfa, and cereals predominantly for household consumption. Dates or small amounts of fig and pomegranates may also be harvested and sold on local markets or exchanged among neighbors. Tend to also be retired or seasonal wage laborers and caretakers.
Commercial Farmer ( <i>Mul Firma</i> )- 7	Predominantly farming crops for the market such as melons, henna, and date palms outside of the oasis cover. Farms range from 4 hectares to 40. Connected in varying degrees to value chains.
Wage Laborer ( <i>Khadam</i> )- 5	Majority of time is spent traveling for wage work either locally in the region or to other cities in Morocco. Typical jobs include construction, trucking, and farm laboring. May have limited involvement in family farms in the oasis or elsewhere.
Government Official ( <i>Makhazen</i> )- 5	Directors and employees of the regional agricultural development office in Ouarzazate, Adgz (ORMVA) and the Commune of Tamezmoute.

In reality, these general categories were overlapping and much more fluid than appear on paper (with the exception of government officials). Residents’ engagement with wage economies and relationship with subsistence farming activities in Tamezmoute is insecure and constantly in flux. Men may work for various construction companies over the course of their life, while spending periods of “unemployment” in the region maintaining farms or working as a farm

laborer on larger agriculture production in Zagora or Ouarzazate. Many women maintain homes and oasis farms while also working as cleaners in local town buildings, selling dresses and other products from their living rooms, performing traditional medicine for jammed fingers and strained muscles, as well as maintaining household sheep/chickens, and harvesting farm vegetables (not to include the amount of unpaid care work). Their activities can be framed in the way livelihoods scholar Simon Batterbury (2001) describes as diversifying, or piecing together a living. This diverse landscape of individuals' livelihood activities provide more than an economic income – it also gives meaning to peoples' lives. With this in mind, it is important to consider the ways that oasis farming remains meaningful to community members even as it provides little economic security.

### **Chapter Outline**

The focus of this research centers on how Draa Valley residents navigate urgent challenges of water within a context of drought and how they make good water available on a day-to-day basis. Chapter 2 traces the development of Moroccan water management, shifting between the local scale of the Draa Valley and the national, from the country's post-independence dam building period to the contemporary context of integrated water resources management. I argue that this current model is not fully in place and works to depoliticize water while in fact deepening disparities between rural water users. Chapter 3 examines the implementation of irrigation assistance from Morocco's primary agriculture strategy, the Green Morocco Plan, at the local level; it demonstrates how this top-down, production-oriented policy has uneven impacts locally and contributes to water insecurity in the region. Finally, Chapter 4 presents how residents use and evoke water to make the *tamazirt* in the Draa Valley through the everyday actions, memories, and storytelling of residents. It moves between residents' memories

of the valley's historic waterscape and current examples of how it is labored over, spoken about, and managed in the *tamazirt* today.

Together, these chapters critically examine how water is produced in Morocco across scales through the discourses, policies, structures and everyday actions of local water users, development donors, and government policymakers. It builds upon research about the hydrosocial production of water to critically examine the water-saving models of the development community and Moroccan policymakers and presents an alternative basis – one that attends to the experiences and insight of local water users – to build this policy. In doing so, it opens a space for designing more equitable, inclusive, and effective irrigation strategies that serve the needs of local water users to sustain Morocco's oasis waterscapes and farmers.



## Chapter 2

### Damming the Draa: The Impact of Morocco's Hydro-Agrarian Policy on Local Livelihoods

The sun was just emerging as I rose early one morning in June 2021. It cast a deep orange glow against the shadowed mountain that formed the backdrop to Tamezmoute. I leaned over the wall of the roof where I slept that summer, taking a minute to gaze at the hazy palms in the oasis below, the town quiet behind me. This sliver of time just before dawn was a relief from the day's impending peak of 110-degree Fahrenheit that would set in by the afternoon, a typical temperature for the pre-Saharan region during the summer months. Like the three years before, this year had no rain, and the oasis was thirsty. Noting the time, I quickly rolled up my *ponj* and hurried downstairs to dress. As I was considering grabbing a quick glass of tea, my phone rang. It was Tuda.

"Jamie," she said in her cheery voice, "*Knsana 'layk. Finik?* I'm waiting, where are you?"

"*Ana jaya.* I'm coming." I replied as I stepped into my shoes and slipped out the door.

Tuda was waiting for me outside her home and gave me a smile as she pulled together her tools, standing straight. She carried a plastic sack tied with a rope, an empty water bottle, and an *inger*<sup>5</sup> in her left hand. This simple combination of traditional and re-purposed materials was all we needed this morning to collect grass and leftover barley in the oasis to feed to Tuda's household sheep.

We made our way down the narrow dirt switchbacks from the still-sleeping town to the oasis farms while chatting pleasantly about the morning air's coolness. The water tasted better in the wells in the oasis, Tuda informed me, and so she was planning to fill her bottle once we happened upon someone running their motorized groundwater well. While residents all have access to potable water since 1978, the water flowing through residents taps in Tamezmoute was described by many as salty and *Hmad* (sulfury/sour). It caused our stomachs to bloat and occasional illnesses.

As we descended, I noticed the tiny figures of other women heading into the palms, black *taHarut* wrapped around their shoulders and some leading donkeys charged with carrying loads of hand-cut alfalfa back to their homes from the farms.

Tuda was my guide this morning. She gestured to the *kasbah* of *Asheshihin* next to us as we crossed over the *targwa* (irrigation canal). Her family used to live there, she told me. There was no running water or electricity in the earthen fortress's crumbling walls, and a lone hand-draw well sat idle in the middle. In contrast, today's homes in Tamezmoute sat along the main road connected to potable water, electricity, and satellite dishes. Yet women continue to make the daily trek to the oasis to cut alfalfa or harvest corn and household vegetables grown beneath the palms' protective shade. Men too would join them to start the groundwater pumps that

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<sup>5</sup> A traditional hand-cutting tool. L'menjel in Arabic.

watered the fields. Throughout the agricultural season, they also arrive to plow the earth, plant seeds, harvest cereals, and eventually climb the oasis palms to cut ripe dates at the end of the summer.

The oasis is divided into small plots owned by different families in the community. These *igran* have become fragmented over time as parents pass away and the land is divided amongst children or sold to neighbors. Tuda's own father sold their landholdings in the oasis years ago, having gone blind after fighting in the Western Saharan war with Polisario. For most residents, oasis farming is no longer a viable way to make a living following drought in the 1980s, and many instead engage in sporadic and seasonal wage labor jobs outside of the community. Even so, oasis farming continues to play an important role in peoples' daily lives in the Draa Valley. Yet as water becomes scarcer, this practice has become less secure.

For Tuda, gathering grass and walking the oasis' winding paths every couple of mornings is a simple, yet meaningful, routine that taps into the communal history of the space. She tends her eight sheep by foraging for feed in the spaces between now privatized landholdings; she can sell these animals to local butchers for a small profit when her family is low on cash. Although Tuda's household now primarily relies on the seasonal wage earnings of her son who travels for construction jobs, many women in Tamezmoute continue to raise and sell household sheep or goats to supplement their income and remain connected to farming and shepherding histories.

Tuda was well-versed in the various oasis crops and plants that provide the best nourishment for her sheep. She explained to me the difference between wheat and barley and named the local plants we passed as she sought out an assortment of grasses and herbs she would later add to scraps of bread and dried dates for these animals.



*Left: Tuda tying her assorted sack of dried grass, herbs, and leftover cereals cuttings as we neared the Draa River. Right: Tuda's demonstration of the difference of barley (tumzin) on the left versus wheat (irdin) on the right.*

As Tuda and I filled her sack, moving deeper and deeper into the oasis, we heard the gentle lull of the Draa River in the distance. It was three days past the long-awaited dam release that controls the river running through the middle of the *igran*, and its absence was sorely missed.

“Ah, do you hear it? The river.” Tuda explained as we followed the sound, anticipation building as we neared the river’s bank.<sup>6</sup>

The river ran brown, lapping at the muddy shores just meters from households’ corn crops. Its arrival was a blessing; it filled the dry, cracked riverbed and infiltrated the valley’s alluvial surface to recharge farmers’ groundwater wells. This cycling allows farmers to grow barley, vegetables, alfalfa, and dates. However, the longer the river was absent, such as this summer, these crops begin to wither and die due to lack of well water.

We stood still for a couple minutes gazing at its choppy movement, feeling the coolness from rising from its surface. The Draa River was a rare sight these days in Tamezmoute. It would remain flowing for only 15 more days, making its course to the end of the valley at M’hamid before being diverted through a series of five diversion dams into the irrigation canals of the

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<sup>6</sup> Like the majority of residents in Tamezmoute, Tuda is an Amazigh (Berber) woman and speaks Tamazight. However, knowing my Tamazight is limited, she spoke to me predominantly in Moroccan Arabic, with bits of Tamazight mixed in to expand my knowledge of her language.

Draa Valley farming communities. Knowing this, Tuda waved to a passing branch that sailed by us carried by the water, saying,

“*Slm ‘la M’hamid*. Send our regards to M’hamid.”



*Gazing at the Draa River three days following the dam release with Tuda in Tamezmoute.*

Throughout the morning, Tuda had taken me on a journey not just of the oasis space, but through time. The stories she shared as we moved deeper into the oasis reflected decades of change that had drastically altered her community’s relationship with the space. There was the shift from communal *kasbah* living to individual homes with modern amenities in the 1970s and the resulting fragmentation and privatization of oasis landholdings. Sheep and goats were no longer grazed around the oasis. Instead, women such as Tuda keep them near their homes and collect their feed themselves from the fields. The oasis’ waterscape has likewise changed over time and the constant chugging of groundwater wells is now the norm over the intermittent Draa River. Water, or *aman*, was on everyone’s minds this summer as the valley experienced a particularly difficult drought.

This excursion through the oasis with Tuda illustrates how water underpins the massive changes experienced by her community in the Draa Valley. The increasing intermittency of the river and expansion of private groundwater wells have altered the oasis space and local livelihoods. As a result, water in the community is no longer good. It carries pollutants from industry and agriculture through the *igran* as it makes its way to the end of the valley. While it

now flows through homes, it frequently causes discomfort and illnesses. These changes in water are not merely a result of a decline in rainfall in the region.

Starting in the mid-1960s, the government began incorporating the Draa Valley into the national economy through the construction of the basin's modern irrigation scheme. Since the 1990s, the valley has also been a site of "participatory development" as the government works towards a new water management framework, Integrated Water Resources Management (IWRM). These processes have had major implications for groundwater exploitation and governance in the region today. This section traces the historical development of Morocco's hydro-agrarian policy leading to the current structure of water management in the Draa Valley.

I argue that key components of Morocco's IWRM strategy are not fully in place and there remains a disconnect between participatory water management discourse in policy spaces and the reality on the ground for local water users. The model is largely produced in international development offices and treats water as an apolitical resource which overlooks the hydrosocial cycling of water through irrigation networks and the power disparities between water users. These national water management policies largely do not address water's social properties — how it is manipulated through irrigation networks and negotiated on a local level. Tom Perreault (2014) argues that the "institutional arrangements" for managing water must fully consider equity, representation, and the welfare of communities (p.233). By treating water predominantly as a natural resource, little attention is given to how these management practices influence the social arrangements and organization around water in places such as the Draa Valley which allow some having greater access to this resource than others. The country's efforts to manage water equitably and sustainably must involve a critical examination of the hydrosocial impact of these policies on the local level over time.

Addressing this, this chapter is divided into three sections that reflect major developments in the country's water management. First, I outline the dam development period under French and the post-independent country's *politiques de barrages*. Second, I lay out the economic context and development influences that led to the country's current decentralized model of IWRM. Finally, I examine the repercussions of these policies for participatory groundwater governance — the primary issue currently facing farmers and policymakers in the Draa Valley. These developments, reaching across national and local scales from the 1930s to today, continue to influence the space of water in the Draa Valley with major implications for local livelihoods.

### **Morocco's *Politiques de Barrages***

*“That is all I have, daughter. That is all I have. The past was beautiful and water was available...water is the only problem [now], the river is not full. When there was no dam, life was good.”*

-Female community member from Tighomar

The government's construction of the Mansour Eddahbi dam in 1972 to control the Draa River marked a major shift in the valley by consolidating the region's water resources under the *makhazen* and beginning the process of integrating the region into the national economy (Ouhajou, 1996, p. 143). While the French established control over Morocco in 1912, the Draa Valley resisted incorporation until 1930. The French Protectorate in Morocco lasted from 1912 to 1956 where the French administered the country through the Moroccan Alawi dynasty. Even after the region was incorporated to the *makhazen*, the Draa Valley was not a key focus of French development due to its low potential for agricultural productivity, resting within the region the French considered Morocco *intuile*, or useless Morocco. Instead, the region's water management was largely left to its traditional governance; a system that reflected layered social arrangements between nomadic and settled oasis communities (Hammoudi, 1985).

This changed after Morocco gained independence in 1956, following King Hassan II's *politiques de barrages*, a policy seeking to harness the country's water for its agricultural development. Within this framework, the Draa Valley's decentralized irrigation system was considered inefficient, wasteful, and a driver of conflict as the upper oases had priority over the downstream (Ouhajou, 1996). Thus, the goal of the dam was to store water and maximize production in the oases through controlled releases, as well as to conserve water during drought and protect against floods. However, from the perspective of many small-scale irrigators in the Draa Valley today, the dam did little to increase water supply for the oases and is largely considered a driver of drought.

The French were the first to erect the country's large-scale irrigation schemes. After consolidating the country's water resources under state control through the 1914 and 1919 laws,<sup>7</sup> French landowners began buying land from Moroccans in the 1930s to cultivate wheat in the northwest Gharb plains. Yet the failure of this rain-based industry led the colonial administration to look towards water development models in California to expand the Protectorate's irrigated agriculture and diversify its production (Molle et al., 2019, p. 53). Following this move, the French embarked on an extensive dam building mission in the 1930s-40s to expand the Protectorate's irrigated agriculture and promote the cultivation of water-intensive commodities (ibid).

Swearingen (1987) discusses how the French's construction of large-scale irrigation systems consolidated land from local populations, established a colonial landowning elite, and sparked ambitious wheat and citrus production across the fertile Gharb plains. Pascon (1977) writes that the colonial administration's monopolization of the most fertile areas in the Haouz

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<sup>7</sup> At the same time, water rights acquired before the law were allowed to remain in place (Abdellaoui, 1989, p.166).

Plain surrounding Marrakesh led to a loss in the autonomy of local water management systems. French agrarian development also initiated a process of uneven development that persists to this day between the productive northwestern portions of the country, so called *Morocco utile* by the colonizers, and the arid and mountainous regions in the Atlas, northern rif, and pre-Saharan south, labeled *Morocco inutile*. Today, the majority of Morocco's large-scale farms and production is located in the Gharb. While the development of dams and large-scale irrigation schemes boosted the Protectorate's production, it resulted in a loss of local autonomy over water and land and initiated development disparities in the country that continue to this day.

As the Protectorate's preoccupation with the "California model" indicates, these policies of economic modernization through agrarian development were not unique to the French during this time. Beginning in the twentieth century, a global hydraulic mission where "not a single drop of water should reach the sea without being put to work for the benefit of man" inspired state development of river basins and the establishment of national bureaucracies to manage public hydro-infrastructure for irrigation, hydropower, and flood protection (Molle et al., 2009, p. 332). Swyngedouw (1999) discusses this production of nature as a way for states to transform waterscapes into sources of capital for national economic modernization.

It was not until after Morocco's independence in 1956 that the state expanded large-scale irrigation development throughout the country, a trend found across postcolonial contexts to channel water resources towards national economic development. Worldwide, states poured resources into its hydro infrastructure and water development as a way to strengthen their legitimacy (Molle et al., 2009; Shokr, 2009). Describing the logic of this development discourse, Shokr (2009) writes "that newly independent societies were composed of populations whose overall levels of productivity and well-being could be improved by state intervention, and that



the post-colonial state was the best deliverer of development” (p.13). This positioned the independent state discursively against the oppressive colonial regime as a bearer of “development” and prosperity for its citizens, when in fact, the state increased its control over water resources using tactics first introduced by the colonial administrations.

Embracing this development model, King Hassan II launched the ambitious *politique de barrages* in 1967 that sought to irrigate one million hectares of the country by the year 2000 through large-scale irrigation development across the nation (Mayaux, 2021). Harnessing the country’s water resources allowed the new monarch to consolidate power and expand the reach of the *makhazen* while increasing national agricultural production to boost the economy. In contrast, small scale irrigation systems led by farmers predominantly for subsistence production and vegetable marketing (Doukkali, 2005) were haphazardly invested in (Abdellaoui, 1989, p. 167). Morocco’s large-scale irrigation schemes constructed on its main rivers were placed under the management of nine regional agricultural offices (ORMVAs) (Abdellaoui, 1989).

The regional agriculture office for Ouarzazate (ORMVA-O) was established in 1966 and tasked with managing water in the Draa Valley (Ouhajou, 1996). As mentioned above, a key challenge to water management in the region was ensuring the availability of this resource for agriculture during periods of drought, particularly for the downstream oases. Prior to the dam, the flow of water in the valley was highly irregular with periods of drought and other years of heavy flooding (Ouhajou, 1996). In the past, drought periods were the only time central authorities intervened in the valley’s irrigation management by breaking dams on the river or closing the upper oases’ canals to cause artificial floods to reach the downstream oases. This was a technique predating the French Moroccan Protectorate’s presence in the region. In the 1920s the Glaoua governors, who controlled much of the land in the southeast region during the

Protectorate period, had been known to break the dams that feed into the Draa, Ouarzazate and Dades Rivers to allow water to reach the populations downstream during drought. The Protectorate, for their part, increased the number of artificial floods in the valley, doing this six times between 1934 and 1935. Latching onto this precedent in the 1960s, the independent Moroccan government constructed the Draa Valley's modern irrigation system which established a permanent system of artificial floods in the valley based on the Mansour Eddahbi dam at the head of the Draa River and a series of five diversion dams at the beginning of each oasis. This system established *makhazen*'s control over the region's water management under the auspices of promoting peace and stability in the region by regulating this resource for the oases. Thus, the goal of the dam was to regulate the valley's water to "reduce water losses and contribute at the same time to meet the needs of irrigation" (Ouhajou, 1996, p.153).

The dam was built at Zaouit n'Ourbaz, the confluence of the two rivers that feed into the Draa (p.154). The total capacity of the dam is 560 cubic meters, "which makes it possible to regularize an average annual volume of 250 cubic meters" (Ouhajou, 1996, p.154). Initially, it appeared that the dam was successful in regulating the water in the valley. Ouhajou (1996) records eight to fifteen releases a year between 1978-1982 with an average released volume of 241 million cubic meters (Table 1). However, following a drought in the 1980s, this dropped drastically to only four releases for the 1982-1983 season of 101 million cubic meters along with a decrease in the dam's storage retention.

**Table 1**

<b>The Regularization of Water from the Dam (1978-1983)</b>						
<b>Year</b>		<b>1978-79</b>	<b>1979-80</b>	<b>1980-81</b>	<b>1981-82</b>	<b>1982-83</b>
Returned Volume	Number of Releases	8	15	15	9	4
	Cubic meters	221	291	270	182	101
	percent of guaranteed volume	88.5	118	108	73	40
Annual Contributions	Cubic meters	458	436	232	132	52
	percent of average intake	111	103	55	31	12
Reservoir Volume	beginning of the season			436	200	90
	end of the season		436	200	90	50

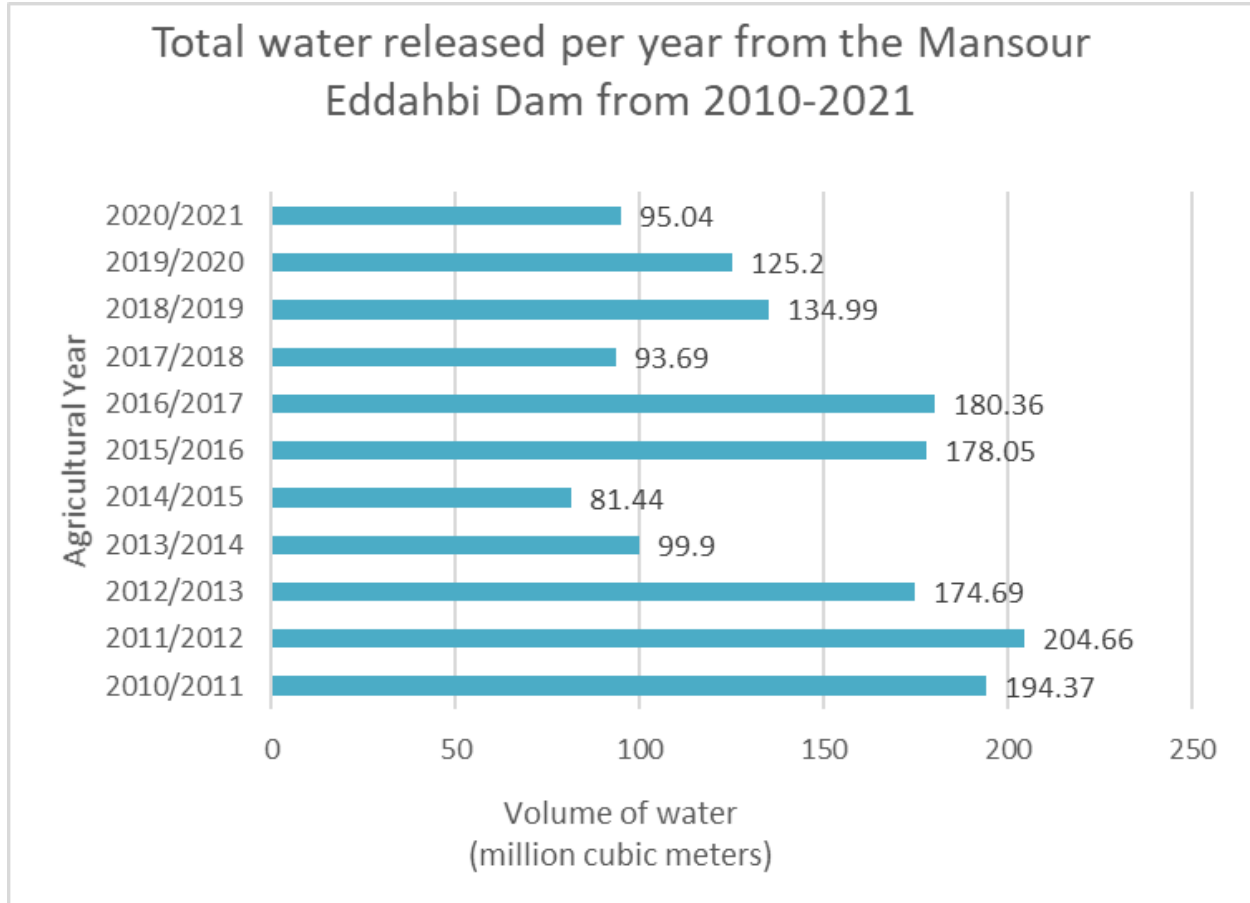
*Adapted from Ouhajou, 1996, p.155. Data from ORMVA Ouarzazate.*

Today, the dam is released on average four times a year of a total of 120 million cubic meters.<sup>8</sup> However, depending on the intake of the dam during a given year, this amount can fluctuate above or below this number. Over the last 10 years (2010-2021), the total annual volume released was between 81 million and 204 million per year (Figure 2). Most recently, this amount has been under 120 million cubic meters with only 95 million cubic meters released for the 2020-2021 agriculture season.<sup>9</sup>

<sup>8</sup> According to ORMVA Ouarzazate, interview on 7/5/2021

<sup>9</sup> Data from ORMVA Ouarzazate.

**Figure 2**



Data shared with author from ORMVA Ouarzazate.

This amount is not sufficient to meet irrigation needs in Tamezmoute (see Chapter 4). In addition, the amount of siltation has reduced the dam’s annual storage capacity over time to 420,000,000 cubic meters of water.<sup>10</sup> Considered in this light, the dam, rather than maximizing water, is impacted by its cycling through the watershed and contributes to the water scarcity in the valley.

Currently, the government continues to expand the number of dams across the country as part of its National Water Strategy to mitigate drought and climate change. Today, more than 50 years after the initiation of Hassan II’s *politiques de barrages*, Morocco has 145 dams with a

<sup>10</sup> According to ORMVA Ouarzazate.

total capacity of 19.3 billion cubic meters and 45 small and large dams under construction across the country (Kasraoui, 2021). The 2020-2027 National Program for Drinking and Irrigation Water Supply allocates 61 billion Moroccan dirhams for dam building to improve water supply (Naji, 2020). However, this policy needs to be reexamined to ensure the long-term supply of irrigation water for the country's countless small-scale farmers as the capacity of dams decline across the country due to siltation and lack of rainfall.

Part of the solution lies in the country's management of its water resources. Morocco's current water management system is largely a result of its economic policies and development since the 1970s. To understand this relationship, I move next to the time period following the dam's construction which marked a major turn in local livelihoods in the Draa Valley.

### **Urbanization, Austerity, and Morocco's Turn Towards Participatory Development**

*"In the past there was no 'azaghar,'<sup>11</sup> in the past people stayed just in the tamazirt."<sup>12</sup>*

-Elderly female community member from Tagersift.

The 1980s marked a significant turning point for the Draa Valley's *timizar*<sup>13</sup> and their relationship with urban centers of the country. During this time, many men began leaving the *tamazirt* for seasonal labor jobs in urban areas of the country. The woman referenced above comments on this recent development by marking the *azaghar*, a place where jobs and capital are consolidated, in contrast to the *tamazirt*. The reasons for this shift partly have to do with water: the dam changed the natural flow of the river, causing it to become intermittent and limited communities' access to this resource; a multiyear drought struck the country from 1981 to 1984 (Molle et al., 2019, p.56) which also restricted agriculture and increased the reliance on

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<sup>11</sup> *Azaghar* is an Amazigh term that means valley. However, the term has also come to mean an urban center that draws those from the surrounding regions for wage work.

<sup>12</sup> Village or homeland.

<sup>13</sup> Plural of *tamazirt*. Villages or homelands.

groundwater irrigation. These two intersecting factors produced a context of water scarcity and forced communities to diversify from a singular reliance on agriculture or pastoralism. During this time as well, Morocco shifted from a development state towards implementing neoliberal economic reform that opened up its urban areas to foreign investment and business (Zemni & Bogaert, 2011).

Seasonal migration has had positive implications for local livelihoods by providing additional income for rural households. De Haas (1998) discusses that while this drove the population away from collective oasis agriculture in Agadir-Tissint, it also improved the welfare of households, equalized previous sharecropper arrangements, and reduced poverty (p. 17). Along these lines, many community members in Tamezmoute discussed the necessity of engaging in migration and wage work in order to meet increased costs of living. As life expenses increase and landholdings shrink, farming alone is not sufficient to meet household needs. Yet this has not sparked the abandonment of oasis farming or outmigration from the region as some might expect. Farms are maintained by family members in the *tamazirt* and wage labor earnings are used to invest in rising farm inputs.

The 1970s and 80s proved a challenging time for the country as increasing debt coupled with drought led to hunger riots in the north from 1983-84 (Mayaux, 2021, p. 6). Morocco's continuous investments in increasing the amount of irrigated area and production resulted in budget deficits. To address its economic crisis, the country began fiscal austerity measures in 1978 (Molle et al., 2019, p.56). It later entered a series of World Bank structural adjustment programs from 1983 to 1992 which resulted in reduced state subsidies for flour and oil, flooding the country with cheap imports, and encouraging privatization and deregulation, all hitting poor populations particularly hard (Davis, 2006, p. 89). Structural adjustment contributed to lowering

of domestic protections and increased integration with global commodity chains in order for Morocco to decrease its debt by opening up their agriculture sector to foreign investment. This has encouraged large-scale farming ventures for products such as tomatoes and green beans in the Souss region (Sippel, 2015), as well as fruit shipped to Europe across the country. In the Draa Valley, watermelons intended for the global market were introduced in the early 2000s, adding additional strain to groundwater resources. After the end of structural adjustment in 1992, privatization and loans from the World Bank and other international donors continued with no benefits trickling down to the rural poor (Davis, 2006, pp. 90–91). Even today, Morocco continues to liberalize the economy by promoting private-public partnerships in the water and agriculture sectors and removing state regulations.

King Mohamed VI assumed the throne in 1999 under a context of financial precarity and deepening rural poverty, leading him to embark on a policy trajectory seeking to increase the economic prosperity of the country by integrating the rural periphery into its development model. Mohamed VI's efforts to develop these so labeled "fragile" areas of the country through modern agriculture initiatives such as the Green Morocco Plan (2008-2020), Generation Green Plan (2020-2030) and New Development Model (April 2021) have appeared alongside policies focusing on opening Morocco's urban centers for foreign investment and privatization which have further consolidated capital and growth in Morocco's cities (Zemni & Bogaert, 2011) and contributed to labor migration from rural regions.

The economic transition and water challenges in the 1980s led to a second major shift in water management in Morocco. During the 1990s, the international development community began calling for a more equitable and integrated management of water resources, an approach known as Integrated Water Resources Management (IWRM) which was popularized during the

1992 Dublin Protocols. Rather than planning water allocations from the national level, IWRM promotes a decentralized and integrated approach at the level of the watershed amongst various stakeholders and water users. In theory, this decentralized approach promotes basin-level water sharing by drawing together different actors to discuss their objectives across the water sector to coordinate management. It also attempts to address the lack of communication between different ministries governing water, such as the separate management of surface water and groundwater, as well as the division between agriculture, drinking water, and municipal ministries.

In practice, the effort to bring multiple water actors together with differing priorities has proved challenging and some have argued it depoliticizes water allocation under an egalitarian and participatory label. Molle (2008) describes IWRM as a nirvana concept where the equitable allocation of water is perpetually just beyond reach. Within the auspicious egalitarian model of IWRM, Molle et al. (2009) argues that “water bureaucrats, state-level and local politicians, water business companies, and development banks are often tightly associated in ‘synergetic relationships’ whereby the ways the flows of water are created or modified by water infrastructure are intertwined with flows of power and influence, often manifested in the form of political or financial benefits, whether private or collective,” (p.336). That is, IWRM systems are not politically neutral and even offer space for some actors to extend their influence over others.

Latching onto the IWRM trend, Morocco’s water governance shifted in the 1990s. The 1995 Water Law decentralized water management through the creation of nine regional water basin agencies (*Agencies du Bassin Hydraulique*, or ABHs). These agencies are tasked with allocating water resources at the watershed level (Ait Kadi & Ziyad, 2018, p. 159). To do so, they design a 20-year water management plan in coordination with other water users in the basin to allocate water to the municipal, industry, and agriculture sectors (Doukkali, 2005, p. 83).



International development models put Morocco on the path to IWRM, but it was the United States Agency for International Development (USAID) that developed the first ABH in the Souss Massa. USAID credits itself, writing, “in the late 1990s, USAID improved water resources management in the Souss-Massa River Basin, establishing a model of integrated water management that is still in use today” (U.S. Agency for International Development, 2020). The Souss Massa Integrated Water Management Project was implemented in 2000 managed by Development Alternatives Incorporated (MD) to evaluate the ABH model in Souss Massa and improve planning and coordination at the regional level for local water policy (Keith & Ouattar, 2003, p. 6). The program provided training in GIS tools to manage and monitor groundwater, and established task forces and study tours to the US to promote “strategic planning and management processes as practiced in the U.S” and to encourage “inter-agency dialogue regarding water issues and management” (Keith & Ouattar, 2003, p. 9). Seen in this light, the formation of Morocco’s regional water basin agencies is not only a national initiative, but also an American development project. US water governance models and practices are imported to the country with little examination of how these tools operate within the country’s layered water governance structure involving local customs, Islamic law and modern water law.<sup>14</sup> This has created challenges when attempting to integrate this largely outside model into local forms of water governance.

ABHs coordinate water management in the basin, but irrigation systems are still managed by ORMVA, regional agriculture offices. Farmers in most large-scale irrigation systems are charged a rate for their water usage (Molle et al. 2019, p.59). The Draa Valley is an exception, however. ORMVA maintains the irrigation canals and infrastructure with funding from the

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<sup>14</sup> See Abdellaoui (1989) for an in depth analysis of how these three systems are layered within existing Moroccan water law and governance.

government and World Bank. The high cost of this work is the main motivator for promoting private sector involvement in these activities and establishing water user associations in the irrigation schemes to pass on some of these costs to users (Molle et al., 2019, p.60).

Water user associations (WUAs) are promoted by the IWRM model as a mechanism for local irrigators to participate in water governance, as well as to contribute to the maintenance of the irrigation system. In Morocco, WUAs are state-sanctioned groups of local irrigators who are responsible for establishing rules over water access in their irrigation scheme amongst farmers. They may be set up either by the agricultural administration or by the request of two thirds of farmers in irrigation areas. They sign an agreement with the agricultural administration outlining their cost-sharing to receive financial support. They are led by a president and board with seven members and cover their expenses through annual membership fees or water rates (Mayaux, 2021, p.8). Hursh (2015) suggests that water user associations that have adjusted fixed payment schedules and activities to better fit local needs have been successful in managing resources in Morocco and is a valuable tool in helping communities “reclaim voice” (pp. 281–282).

Yet water user associations have also allowed the government to devolve financial responsibilities over local irrigation schemes while at the same time enforcing a state model to local water management with a participatory label. Their model is based on the concept of participatory irrigation management which Mayaux (2021) summarizes as:

a blending of two quite different streams of normative ideas: on the one hand, ideas of community empowerment and ‘ownership’, whereby irrigation reforms were supposed to cause a clean break with top-down, authoritarian State management. On the other hand, were ideas of cost cutting and cost effectiveness. In a highly ambiguous *mélange*, this form of ‘participatory neoliberalism’ (Yashar 2005) valued both the irrigator’s self-management as a political ideal in itself, and as a vehicle for State retrenchment and austerity (p.9).

Water user associations thus serve two goals: to support community ownership over irrigation systems and to lessen the financial burden on the central administration for their maintenance. Under Morocco's IWRM model, these associations in theory work with the river basin authorities to develop regional plans for water management. Yet in practice, they have little authority over the control of water resources in large-scale irrigation parameters (Doukkali, 2005). While WUAs in small scale systems were further strengthened by the new legislation in 1990 by benefiting from increased subsidies and training contracts, WUAs in large-scale irrigation systems "despite being represented in the boards of ORMVAs and often consulted on aspects such as annual water allocation and rehabilitation programs, remain less active than was expected in terms of maintenance works and collection of charges" and are dependent on the state for funding (Doukkali, 2005, p. 82). Locally, WUAs have much political power within community water management. However, within the scene of large-scale irrigation systems, their participation remains mere tokenism for inclusion.

In practice, local officials in Morocco have not given WUAs proper control over irrigation resources. Rather, they are often designed without taking community resource management into consideration, and may reinforce uneven power structures in local communities between elites and farmers or along gender lines. This has led to lack of local buy-in by community members and lack of action by the water user associations (Faysse et al., 2010). Yet WUAs remain the primary mechanism utilized by the regional agricultural offices for farmer inclusion in water management decision making or to disperse funds intended for rural farmers, emphasizing the power of these organizations in local micropolitics.

As of December 2021, there are 45 registered water user associations in the Agdz subdivision of the Draa Valley.<sup>15</sup> I spoke with some members of several of these associations during the summer who told me they had successfully received support from the local ministry in order to maintain irrigation canals and other communal projects such as building a road so that melons and other produce from the oasis farms can be transported by trucks. However, it is less clear what role these water user associations play in larger management decisions such as the allocation of water from the Mansour Eddahbi. According to representatives from ORMVA Ouarzazate and Agdz whom I spoke with in June and July 2021, these decisions are made each November through a coalition consisting of the water user associations, ABH, ORMVA, ONEE (Office for Electricity and Drinking Water), and MASEN (Moroccan Agency for Sustainable Energy)- the parastatal company that manages the 600 megawatt solar energy complex outside Ouarzazate.

Morocco's championing of the IWRM model has strengthened its relationship to powerful aid donors such as USAID, while also developing a reputation within the international development community as a champion of participatory development and climate change mitigation. Support continues to pour into Moroccan water projects from major development donors including the World Bank, the United Nations, and USAID. These donors continue to stress the need for Morocco to adopt IWRM principles in order for the country to effectively manage its water resources under an impending context of scarcity. Warnings of potential conflict and erosion of the national economy underpin USAID reports on the need for sustainable management of water resources in Morocco (*USAID Water Team, n.d.*).

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<sup>15</sup> Administrative region that includes Tamezoute. Data from the ORMVA extension office in Agdz.

Yet currently in regions such as the Draa Valley, IWRM principles are only partially in place and layered on top of existing procedures through ORMVA, contributing to a highly uneven distribution of water resources and bureaucratic headache for local farmers. Private groundwater exploitation has expanded with little coordinated management on the local or regional level. Instead, extra bureaucratic processes are placed on farmers who seek authorization to build a well. When examining a farmer's well-driving permit in summer 2021, I noted this double authorization process between ORMVA and the ABH. The permit from the ABH gave permission to drill the well, but it included the caveat that read "this permission is not considered a license to fetch water, and you cannot exploit the facility without a prior authorization for that from the regional office for agriculture investment of Ouarzazate (ORMVA)." Even though the 1995 Water Law shifted licensing for water drilling under the purview of the ABH, ORMVA negotiated a dual process where they continue to license drilling in areas under their purview (large irrigation schemes) and ABH issues "water use permits," thereby creating a double permit process for farmers (Molle et al., 2019, p.64). In addition, the Green Morocco Plan, ORMVA's champion agriculture strategy, encourages well drilling as it seeks to expand production and irrigated agriculture in the region (ibid). This strategy promoting the increase in irrigated agriculture clashes with the ABH's mission of conserving water and limiting well drilling in the region.

Far from providing better integration, the overlapping responsibilities of the ABH and ORMVA in the Draa Valley creates an extended bureaucratic process for farmers seeking to drill a well. They must seek permission from multiple agencies in order to access groundwater, which can be a burdensome and time-consuming process. Since 2017, the Draa Valley rests within the Water Basin Agency for Draa Oued Noun which is centered in Guelmim. In order to request a

permit to dig a well, farmers first send their request to the local extension office in Ouarzazate. A representative of the Agency then comes to their land to verify the information, and then the request is sent over 1,000 kilometers to Guelmim for approval. One farmer from Zagora informed me that in order to circumvent this process, many farmers will instead pay a bribe to the local authorities in order to dig a well without a permit. Environmental groups argue that this institutional vacuum drives the unauthorized drilling of wells due to lack of oversight and farmer frustration with the lengthy, burdensome process (Sakri, 2022).

This model has particular consequences for the management of groundwater; a resource that is quickly being depleted in arid regions around the world as basin development and agriculture modernization accelerate.

### **Groundwater Overexploitation**

*“In the past there was enough water, now there is little because simply speaking, what’s the reason? There are too many wells. One well here, another one over there and so on, just from here to the other side from where you passed when you were coming there are 75 groundwater pumps, and from here to the other side area, 160.”*

-Oasis Farmer from Ait Hamou

**Jamie:** *Do you use the water from the river to water your fields?*

**Hamou:** *There is water in the segia.<sup>16</sup> If there is water in the river, the segia comes.*

**Jamie:** *But only like two days right, not a lot of time?*

**Hamou:** *Not a lot. If there is rain, it stays for a month. Now, the segia of the dam, just two or three days, that’s it.*

**Jamie:** *So, you use the groundwater pump most of the time to water the field?*

**Hamou:** *Always, always, always.*

-Interview between researcher and a 63-year-old oasis farmer from Ouzagor

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<sup>16</sup> Irrigation canal

Groundwater exploitation spread around the world at the end of the 20th century led by development actors' promotion of deep tube well extraction technology to increase the supply of drinking and irrigation water for rural populations (Birkenholtz, 2015). This has led to a management crisis particularly within arid contexts around the world as private landowners withdraw as much water as they desire (ibid). Likewise, in Morocco, groundwater is positioned as a "strategic reserve" within climate change adaptation strategies, "providing security in the face of diminishing availability of surface water" (Kuper et al., 2017, p. 735).

Currently, Morocco is overdrawing 862 million cubic meters of groundwater than is being recharged (Hssaisoune et al., 2020, p. 4). In the last 30 years, the country has seen groundwater levels decline between 20 to 65 meters, a trend predominantly driven by agriculture (Hssaisoune et al., 2020). Efforts by the government to control well digging and the amount of water farmers draw prove difficult to enforce. Barnes (2014) comes to a similar conclusion based on her observations of these systems implemented in Egypt, commenting that these integrated resource management systems implemented by policymakers to manage groundwater "do not match the reality on the ground" (p. 120).

Groundwater governance is a key task of the ABHs, but one that they have been slow to implement. The focus of groundwater governance in Morocco has rather been on "maintaining fragile socio-political compromises than on ensuring environmental sustainability" (Kuper et al., 2017, p. 725). Since the 1980s, groundwater exploitation became a key tool in rural development strategies seeking to transform rural livelihoods from subsistence agriculture to small farm enterprises contributing towards national production. Kuper et al. (2017) write, "the availability of pumped groundwater 24 hours per day, 7 days a week provided a sense of abundance, at least in the short term. Encouraged by ambitious agricultural policies, farmers increasingly sought to

extend the irrigated area and intensify their farming systems, often leading to greater water use at the plot, farm and regional levels and declining groundwater resources” (p. 726). Thus, the ABHs are many times working against other agricultural initiatives that encourage groundwater exploitation through the expansion of irrigated farmland in arid, rural regions.

The ABHs struggle to manage the drilling of wells, having little authority to police this. Wells drilled before the 1995 law are required to be reported to the ABH. Farmers were given until 2015 to register their wells or face up to a 2000-dirham penalty. However, due to the bureaucratic burden and the additional requirement to add a water meter paid for out of pocket, farmers have little motivation to register their wells. Many only began doing so after the country’s agrarian strategy, the Green Morocco Plan, due to its incentives for receiving 80-100 percent subsidies for irrigation equipment (Molle et al., 2019, p.64). Government subsidies for drip irrigation dispersed through the Agriculture Development Fund (established in 1986) have increased over time from 12 percent in the 1990s to 80-100 percent in 2008 (depending on farm size) with the Green Morocco Plan (ibid., p.62). In the Draa Valley, farmers have taken advantage of these subsidies to farm on reclaimed land outside the oasis through state-approved private companies who drill the well, storage basin and equip them with the motor pump and drip irrigation set-up. Ironically, these subsidies, which are meant to promote “water-saving” through expanding drip irrigation usage, have encouraged the expansion of groundwater exploitation through drilling wells on reclaimed land outside the oases.

To address Morocco’s growing groundwater deficits, the ABHs are tasked with drawing water ministries and users together to design basin-level aquifer contracts “committing groundwater users to specific targets for water withdrawals and, planning the necessary actions to meet these targets” (Mayeux, 2021 p.10). These contracts are an important component of



fulfilling the country's 2015 National Water Plan and 2014 National Water Strategy that seek to provide sufficient water resources for economic and social development by 2030 (Ait Kadi & Ziyad, 2018, pp. 159-160). In 2014 the government, prompted by a conditionality on a World Bank loan, enforced the design of contracts for all the country's major aquifers by 2016, although this was later reduced to just three aquifers (Molle et al., 2019, p.67). Aquifer contracts were further emphasized in the updated 2016 Water Law (36-15) under article 115-116, which articulated their joint agreement with basin water users and shared participation in their control and management.

The development of aquifer contracts for basin sub regions has proven a slow and difficult task for the ABHs. As Faysse et al. (2012) point out, the officials of these agencies are not trained in multi-stakeholder coalition building or engaging with rural farmers, instead coming from engineering backgrounds (p. 132), making it challenging for them to include the voices and needs of small-scale farmers. As of 2019, two out of 36 aquifer contracts have been signed in Morocco in Sebou and Souss Massa and 14 are either awaiting signature or are in development (Table 2). These initial aquifer contracts emerging from the basins have been critiqued for focusing on increasing the supply of surface water through infrastructure projects and done little to control the actual consumption of groundwater led by agriculture (Vecchio, 2018).

**Table 2**

Progress of Morocco's Aquifer Contracts (2019)						
ABH	N	Aquifer	Signe d	Ready to be Signed	In Development	Pendin g
Bouregreg- Chaouia	1	Berrechid			x	
	2	Chaouia Coastal				x
Draa/Oued Noun	3	Low Draa				x
	4	Feija (High Draa)				x
	5	Guelmim				x
	6	Taassalt Tan Tan				x
Guir-Ziz-Rheris	7	Boudenib			x	
	8	Errachidia				x
	9	Goulmima				x
	10	Jorf				x
	11	Tafilalet				x
	12	Tinjdad				x
Loukkous	13	Charf El Akab			x	
	14	Rhiss-Neckor			x	
	15	Rmel			x	
	16	Ain Bni Mathar				x
	17	Figuig				x
	18	Triffa			x	
Oum Er Rbia	19	Bahira				x
	20	Complex Aquifer of Tadla		x		
	21	Sahel Doukkala				x
Sakia Lhamra Oued Eddahab	22	Bir Guendouz				x
	23	Dakhla		x		

	2					
	4	Foum El Oued				x
Sebou	2					
	5	Bou Agba				x
	2					
	6	Dradere-Souiere			x	
	2					
	7	Fes-Meknes		x		
	2					
	8	Maamoura				x
2						
9	Mnasra (1)	x				
3						
0	Mnasra (2)				x	
3						
1	Middle Tabular Atlas					x
Sousss Massa	3					
	2	Chtouka				x
	3					
3	Sousss (1)	x				
3						
4	Sousss (2)				x	
Tensift	3					
	5	Bousbaa				x
3						
6	Haouz-Mejjate		x			
<b>Total</b>			<b>2</b>	<b>4</b>	<b>10</b>	<b>20</b>

Adapted from (Royaume du Maroc, Agence du Bassin Hydraulique de Draa-Oued Noun, 2019, p. 19)

The first of the aquifer contracts in Sousss Massa, signed in 2007, is not considered a success. The local government's initial policing and filling in of illegal dams in the community sparked protests by farmers. To resolve this, the authorities negotiated a contract agreeing to build additional dams in the region, legalize the unpermitted wells, increase groundwater user fees, and stop the expansion of irrigated areas for citrus and vegetables (Faysee, 2012; Molle et al., 2019, p.66). Molle et al. (2019) report that this aquifer contract has not been enforced or followed by water users, nor has the government completed the construction of the additional dams that were agreed to. They conclude that the contract has done little to control the exploitation of the region's aquifer (p.66). The poor results following the signing of the Souss

Massa contract indicate the immense challenges of these negotiations and ineffectiveness of this tool as a regulator for groundwater exploitation across Morocco. Regardless of this early precedent, aquifer contracts continue to be offered as a solution to its exploitation under the logic of IWRM.

As of June 2022, an aquifer contract for Feija in the Draa Valley is under review by the different partners of the project (which include 12 different regional agencies, stakeholders, and water user associations). Employees at the Water Basin Agency for Draa Oued Noun in Ouarzazate informed me that one of the key obligations for farmers under the contract is that they install water meters in their wells and pay for their water withdrawals. The Agency, for their part, will work on providing more local water resources. It is unclear if the Agency will be able to motivate farmers to agree to this contract. Discussions with farmers in Feija in June 2022 reveal that many are frustrated by the lack of movement on a dam for the Bou Tious ephemeral river in the basin, first discussed in 2012, which would provide an additional 8.6 million cubic meters of irrigation water and help recharge the groundwater (Moumane et al., 2021).

Government policy has emphasized participatory and decentralized water management, but the ABH continues to resort to supply-based solutions in these negotiations. Rather than addressing the drivers of groundwater overexploitation, they have instead worked to build more dams, wastewater treatment facilities, and desalination plants to create more surface water resources for users. Water conservation measures are undermined by Morocco's agrarian strategy which promotes value-added products and continued expansion of irrigated areas through "many generous subsidies for established farmers related to the planting of orchards, irrigation equipment, the clearing of new agricultural land, etc., encouraging farmers to intensify agricultural production, often based on intensive groundwater use" (Kuper et al., 2017, p. 730).

Thus, aquifer contracts and the work of the ABHs across Morocco appear unable to win out over the interests of agriculture in the country.

## **Conclusion**

Morocco's water management is embedded within the country's hydro-agrarian development and is influenced by the IWRM models designed by development donors. This system intended to promote integrated and inclusive water resource management is haphazardly in place across the country. Scholars studying the politics of this model offer examples of how these policies have altered local water governance, accumulated access to powerful agriculture forces, and driven the exploitation of water resources. Water, then, is critically shaped by this historical and social process of the country's hydro-agrarian development. Over time, Morocco has attempted to harness its water as a means of increasing agricultural production to boost the national economy. This strategy impacts the amount of water available for oasis farming in the Draa Valley today. Water scarcity is not merely a result of the amount of rainfall in a given year, but produced by the hydrosocial cycling of water through the country's dams, water management models, and groundwater governance structures.

Morocco's current water crisis emphasizes the need to critically examine the impact of these water management models on local farmers. Doing so provides insight as to how they might be molded into more effective and inclusive systems that incorporate local water users and conserve water. The Draa Valley, as a water-scarce region experiencing the uneven implementation of the country's agrarian development and current IWRM models, presents an exceptional and timely case study to examine these questions. Today, this policy of harnessing water for agriculture productivity and rural development is perpetuated through the country's premier agriculture assistance program, the Green Morocco Plan (GMP), which seeks to connect

small-scale farmers to global value chains as a way of alleviating rural poverty (Chapter 3).

Water is a critical component of this plan.

### Chapter 3

#### **Draining the Oasis: The Implementation of the Green Morocco Plan in the Draa Valley.**

*“The Green Morocco Plan, you need water. We need water. We need wells. People are poor. They need wells. They need help so they can work on their fields.”*

-Oasis Farmer from Tamezmoute

**Jamie:** *How many farms are here in the region?*

**Omar:** *I don't know exactly. Mostly, people have fields. But some people from outside the village rent the land from the villagers to make watermelon or henna farms. I know of four people that do that. So we have four farms.*

**Jamie:** *Do they get funding from the agricultural office?*

**Omar:** *Yes, they do. The office equips their farms with everything they need like irrigation systems. It even gave them the diesel pumps. It's the office that's in Ouarzazate.*

**Jamie:** *Is it included within the Green Morocco Plan?*

**Omar:** *Yes, it is part of it. It's the program through which farmers get funded and equipped.*

-Conversation between researcher and community member from the village of El Mouda', Tamezmoute.

## Introduction

In Tamezmoute, there are two distinct forms of agriculture: farms and fields. The majority of community members cultivate vegetables, cereals, alfalfa and dates on fields, or *igran*, which are located inside the oasis. Farms, on the other hand, are newer ventures on land outside the oasis producing commodities — mainly watermelons, henna, and dates — to sell to packaging companies and buyers from outside the community. Oasis farmers tending their fields largely lacked water in their wells during the drought of 2021 while farms pumped tons of groundwater using solar powered motors into storage basins the size of swimming pools. From here, water was pushed through meters of drip irrigation tubing and slowly released through even rows of melons and henna. While there is government funding dedicated to assist farmers in the region with “water-saving” irrigation equipment under the Green Morocco Plan, this has largely gone to those with larger landholdings and market-oriented farms. Tamezmoute oasis farmers, on the other hand, have never received assistance from the agriculture delegation for building or maintaining their wells in the *igran*.

The Green Morocco Plan (GMP) is intended to support small-scale farmers in regions such as the Draa Valley. However, conversations with farmers throughout the valley during the summer of 2021 reveal that the relationship between Morocco’s premier agriculture strategy and local access to water was much more complex and uneven than touted by the plan’s advocates in the local ministries and development community.

This chapter studies the local impact of the GMP by examining which farmers are able to access this assistance and how the plan is impacting water availability in the region. I begin with an overview of the plan based on reports from the World Bank and Moroccan Government and its critiques in the scholarly literature. I then delve into the application process and



implementation of GMP irrigation assistance in the Draa Valley based on information from the local agriculture ministries and my research participants. Finally, I end with a comparative analysis of the GMP's impact on different farmers in the Draa Valley based on three case studies from my research. Drawing on David Harvey's (2003) concept of accumulation by dispossession, I demonstrate how the plan allows recipients to pump greater amounts of groundwater located in dry land outside the oasis boundaries, thereby greening the desert, which in turn pulls this resource from oasis farmers with shallow wells. This case study reveals the social and political impacts of the government's irrigation assistance program on local farmers and water, further emphasizing the need to examine water as both a physical and social resource. Overall, the chapter adds to the conversation on the local impacts of the GMP in Morocco as well as literature on the promotion of drip irrigation, arguing that the model exacerbates water scarcity in the region, particularly for oasis farmers who do not match the modernization vision of the plan.

### **Productivizing Agriculture: A Critical Analysis of the Green Morocco Plan**

The Green Morocco Plan (GMP), Morocco's 2008-2020 agriculture strategy, seeks to power the national economy through a revitalized agriculture sector. At the same time, the strategy attempts to address Morocco's uneven development by focusing certain interventions in "fragile" zones with low agricultural production but large numbers of rural farmers. The GMP specifically mentions small-scale farmers in oases as target beneficiaries as part of its second pillar. Yet, in practice, the overarching productivist goal of the plan has driven policies and programs that threaten the viability of family farming and over-exhaust natural resources in rural regions of the country. In fact, the GMP's free trade model has been critiqued for putting subsistence farming in competition with the high-producing north of the country, risking the ruin

of many family farms that make up the majority of livelihoods in Morocco's rural regions (Akesbi, 2011, p.98).

Historically, the GMP is a continuation of the country's agricultural liberalization since the 1980s. These policies are marked by the retreat of the state from farm management to create a space for private sector influence and integration with global markets (Faysse, 2015). Akesbi (2011) argues that Morocco's free trade agreements with the EU, Arab countries, and United States since the 2000s drive this agriculture policy, leading to a singular focus on producing for export rather than meeting the country's own food needs. On a macro-scale, Morocco's exports of fresh and agri-food products increased during the GMP's time period by 9.5 and 8.2 percent, respectively, contributing to an increase in Morocco's GDP from US\$1,727 to US\$2,948 from 2000-2019 (The World Bank, 2020, p.6) The Moroccan government has attributed this to the GMP's promotion of "value-added" products such as olives, citrus, dates, vegetables, and red meat" (ibid, p.8). 71 percent of the country's exports were to the EU in 2018, predominantly France and Spain (ibid, p.9). Yet as Akesbi points out, this "liberalization without upgrades" continues to ignore structural issues in the country's agriculture sector that drive Moroccan reliance on imports for basic foodstuffs such as sugar, cereals, oil, and dairy (Askebi, 2011, pp. 96-97). Under this model, small farms face increasing pressure to produce for the global market rather than meet their own local food needs. This has led critics to point out that the underlying goal of the GMP is not to support the Moroccan small farmer, but to increase the country's agri-exports and presence within the global economy.

The GMP has two pillars; the first focuses on intensively developing agriculture that is productive and high value-added (Ministère de l'Agriculture, 2008); while the second focuses on supporting small-scale farmers in rural regions, or "fragile zones," by increasing their production

of products with high market value. The GMP distinguishes between the two pillars based on location (productive regions vs. fragile zones), farm characteristics (large farms vs. small), and source of funding (private sector vs. state subsidies). Pillar II programs range from planting orchards, building farming cooperatives and economic interest groups to providing subsidized irrigation equipment for farmers (Faysse, 2015, p.628). Equipping farmers with subsidized drip irrigation is part of Morocco's National Irrigation Water Saving Program which seeks to "convert 550,000 hectares to drip irrigation in the period from 2007 to 2022" (van der Kooij et al., 2017). However, in reality, distinctions between the intended beneficiaries of the two pillars are less clear cut, leading to the wide application of programs that are not tailored to the diverse needs of different farmers. This leads to the failure of provincial ministries to reach the most marginalized farmers within their territory (Faysse, 2015).

While the GMP claims a dual approach based on the distinctive needs of large vs small farms, in essence, it moves the country towards a single farming model that emphasizes production for global markets (Faysse, 2015, p.628). This model was molded by the entrepreneurs, consultants, and global development institutions who designed and funded the plan. The GMP was introduced by Aziz Akhannouch, a wealthy entrepreneur who served as the country's Minister of Agriculture from 2007 to 2021. He is credited with increasing the Department of Agriculture's budget during this time period which made up 5.7 percent of the national budget in 2018 (a 20 percent increase from 2017) (Vecchio, 2018, p.651). The GMP was co-financed by the World Bank through two loans: \$203 million in 2003 and \$205 million in 2011 (*World Bank Involvement in the Agricultural Sector in Morocco*, n.d.). The World Bank is critiqued for exacerbating rural poverty since the 1980s through its own development strategy emphasizing economic growth (Vetterlein, 2012, p.41) The plan was designed by McKinsey, a

US consulting firm, who recommended that Morocco “develop export agriculture by extracting groundwater and using drip irrigation (Vos & Boelens, 2018, p. 291). Due to the influence of these powerful politicians, consultants, and donors, the GMP’s development strategy emphasizes economic progress that prioritizes farming efficiency and production over farmers themselves.

Translated locally, this policy overwhelmingly has led to concentrating land to elites while failing to sustain local livelihoods and environments (Bossenbroek, 2016.; Elder, n.d.; Faysse, 2015; Vos & Boelens, 2018). Nicholas Fayssee (2015) discusses how GMP implementation has failed to reach most marginal farmers largely due to its lack of prioritization for local, case specific strategies. He discusses how in rural territories “approaches that focus on a single agricultural value chain cannot generate significant income and are consequently unable to produce a wide range of changes” due to farmers’ reliance on diversified, small-scale production (p.630). Farmers are not encouraged or empowered to submit their own project plans and these program decisions instead are largely made without the inclusion of farmers’ organizations (ibid). Other scholars have shown how a macro-scale focus on increasing agriculture production in southeastern regions of the country has privileged external land speculators over local farmers and women (Elder, 2019).

In terms of water management, the plan has encouraged drilling deeper to access declining groundwater tables with alarming environmental and social consequences in water-stressed regions of the country. Lisa Bossenbroek (2016) writes that the program’s subsidization of deep-tube wells for private farmers “has led to over extraction from the aquifer, concentrating land in the hands of the (urban) elite, destroying communal irrigation traditions, and empowering young men to the disadvantage of women, who were not associated with ‘modern’ agriculture” (cited in Vos & Boelens, 2018). Her critique ties the plan to a process of agricultural

modernization where local water management is disrupted, groundwater is stressed and power imbalances are further entrenched. Women in particular are not easily included in the model as many provide manual farm labor that is undervalued and are left out of land titling and farm decision-making.

The World Bank acknowledges that the plan “has not benefited enough small-scale producers and other vulnerable groups, particularly women and youth” in the Moroccan Ministry of Agriculture’s 2018 evaluation of the plan (The World Bank, 2020, p.10). The successor to the GMP, the Generation Green Plan (GG) (2020-2030), attempts to engage in these areas while continuing to emphasize improving production and marketing of agriculture. The new GG plan focuses on youth entrepreneurship in the agriculture sector, creating a middle class in rural regions, and “building human capital and skills to facilitate higher productivity, employment, and labor mobility” (The World Bank, 2020, p.6). It is supported by the French Development Agency (AFD) and \$250 million from the World Bank. The World Bank presents the new plan as a recovery strategy for Morocco’s disadvantaged rural regions impacted by job losses from the COVID-19 pandemic and increasing drought, describing the project as shifting from “a production centered strategy to a people-centered strategy” (ibid). While youth entrepreneurial and green tech programs are just beginning to emerge under the GG model, irrigation subsidization programs under the GMP continue. It remains unclear if these strategies centered on technical solutions and innovation will translate to better supporting rural farmers.

This chapter adds to critiques of the GMP based on a local analysis of the plan’s impacts on a diverse range of farmers. It focuses on the ways that the plan’s irrigation assistance is dispersed at the regional level and the impact this has on everyday geographies of water access for farmers in the Draa Valley, Morocco. This analysis reveals the plan’s modality does little to

aid the most disadvantaged oasis farmers and its productivist focus exacerbates water scarcity in the region.

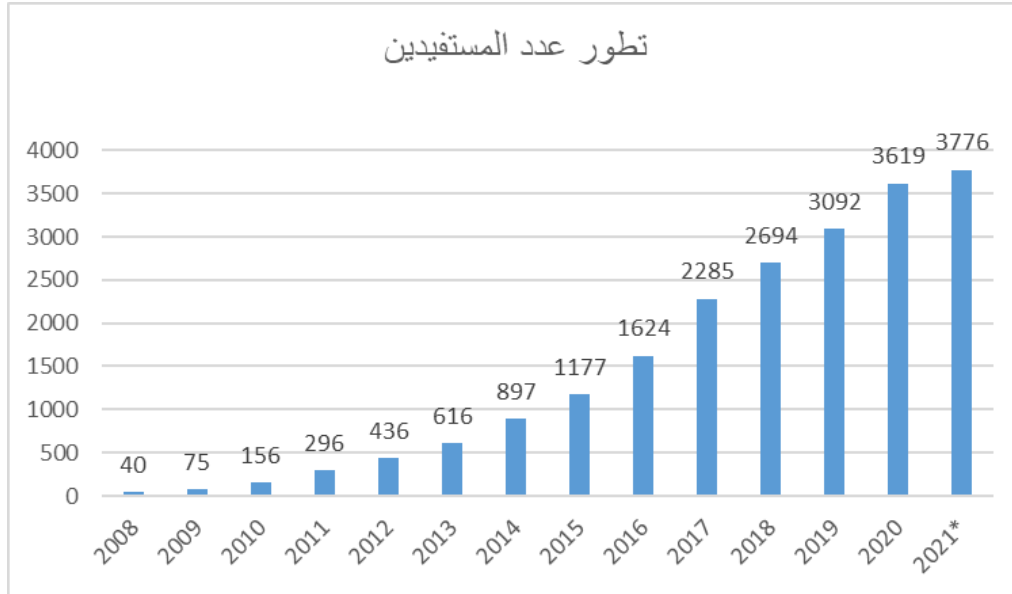
### **The Implementation of the GMP in the Draa Valley**

Irrigation assistance from the GMP in the Draa Valley is dispersed by the Regional Office for Agriculture Development (ORMVA) in Ouarzazate. There are four local extensions of ORMVA Ouarzazate that act as interlocutors between farmers and this entity within the Middle Draa Valley: Agdz, Tinzouline, Zagora, and Tagounite<sup>17</sup> (*Province de Zagora*, n.d.). These offices manage requests for assistance, visit farms to confirm application information, and disperse date palms and other agriculture assistance to farmers within their district. The plan provides 100 percent subsidies for irrigation materials and well construction for qualifying farmers with less than five hectares and 80 percent subsidized for those with over five hectares in the region. Data from ORMVA Ouarzazate shows that the GMP has supported increasing numbers of farmers in the Province of Zagora (which incorporates the Middle Draa Valley), with the number of beneficiaries increasing from 40 in 2008 to 3,619 in 2020 (Figure 3). While these data show continual growth, the number of farmers reached in 2020 represents only 16 percent of the Province's farmers (*Province de Zagora*, n.d.). Although the plan officially ended in 2020, it was extended for another year in the region due to the influx of applications in the final year, according to the director of the ORMVA Ouarzazate extension in Agdz.

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<sup>17</sup> The Province also includes a fifth local agriculture extension located in Tazarine, north of the Middle Draa Valley.

**Figure 3**



Source: ORMVA Ouarzazate (July 2021). Title translation: “Development of the number of beneficiaries”

One explanation for the low percentage of farmers reached is that the process to request assistance and modality of dispersal does not match the needs of the majority of the Province’s farmers. Irrigation assistance from the GMP includes a well (if approved by the ABH), storage basin, and drip irrigation tubing (Figure 4). This equipment is designed for farmers with combined landholdings who plant in separate rows rather than the layered polyculture system typical to oasis farming. The average farm size in the Province of Zagora is 1.65 hectares (*Province de Zagora*, n.d.) and consists of mixed household production and limited market integration. On top of this, many landholdings in the oasis are fragmented — it is common for oasis farmers to own multiple *igran*<sup>18</sup> at different locations spread throughout the oasis. Scholars studying this system have discussed how it is a strategy for equitable distribution of productive land amongst oasis farmers and allows the cultivation of different crops based on different land/water characteristics throughout the oasis (Rignall, 2015). However, land fragmentation

<sup>18</sup> Igran are field plots. A single plot, or *iger*, is typically 30x10 meters.

works as a barrier for the productivist goals of the GMP as it proves a barrier to farm growth and efficiency in irrigating, planting and harvesting.

**Figure 4**



*Irrigation assistance from the GMP in the Province provides reimbursement to private companies for the construction of wells, storage basins, and drip irrigation to pull groundwater from aquifers to reach farmers' crops.*

In addition, bureaucratic regulations emphasizing private ownership do not match the collective farming model used by some oasis farmers. In order to receive GMP assistance, water rights must be proven through a well-drilling permit from the Regional Water Basin Agency (Agence Bassin Hydraulique- ABH) or through membership in a water user association (ibid) and land titles must be in the applicants' name. This emphasis on individual ownership creates difficulties for farming families who are faced with dividing their land upon the death of a family member. While land is inherited by descendants of landowners (both female and male), many farming tasks continue to be shared amongst the household and extended family. Some oasis farmers have used this as a strategy to pool their land in order to engage in balanced market and household production. It is also not uncommon for several farmers to share a well in the oasis (with each family allotted one day of the week to water). Particularly during drought, some farmers will pool their water with their neighbor's well to irrigate their fields (conversations with farmers in June 2022).



I spoke to a man from a family who collectively owns about 1,600 date palms in the oasis, under which they grow barley, corn, alfalfa, and vegetables. They own additional land outside the oasis cover, where they plan to extend their collective farm operation. Noting that their farm is an ideal size for GMP assistance, I asked Brahim if he had submitted a request for GMP assistance to the agriculture delegation. He responded, “I prepared my papers and submitted my documents. [However,] my father died so we need to re-submit the papers. We have to prepare the paper under one name because we are five siblings.” In a similar vein, another farmer later in the summer provided a similar response when asked if they would apply for GMP assistance for their 3-hectare oasis farm. The farmer, Bilal, informed me that they were not applying for assistance because they had not yet decided whose name to put on their land title after their father recently passed away. They appeared to be doing well collectively managing their farm among the seven brothers, allowing them to cultivate a balanced mix of dates, henna, corn, cereals and vegetables to both sell and use for the household. Dividing the land amongst the children would create parcels too small to be worth applying for assistance and disrupt the shared family operation. At the same time, redrawing the land title under one sibling’s name disrupts power dynamics within the household, giving one complete ownership over the land. Many families prefer to continue their collective farm operations upon the death of the land title owner as they work through the micropolitics of land inheritance and fragmentation. However, they are unable to apply for GMP assistance until a new land title has been drawn. This creates a barrier for accessing GMP assistance for a number of small-scale farmers in the oases who combine their family farming operations with wage labor migration.

In addition, scholars have pointed out that the eligibility process for the GMP is overly bureaucratic, creating barriers for small-scale farmers (Venot et al., 2014). The process for

gathering paperwork and submitting a request for assistance is time consuming for farmers, some of whom cannot afford to pay the irrigation engineers before being reimbursed by the GMP.

According to the regional agriculture development office in Agdz, farmers must submit:

- Le carte nationale (National Identification Card)
- Certificate of Land Ownership stamped by the local Qaid (governor)
- Demande d'Approbation Prealable (request for support to begin work)
- A well-drilling authorization from the ABH
- Paperwork from the irrigation company completing the project:
  - work plan with GPS coordinates of the property and
  - the company's work certificate

After a farmer prepares these papers, they submit them to the nearest extension of the agriculture delegation as a request for assistance. An excerpt from my field notes during an interview with the director of the agriculture delegation in Agdz on 29 June, 2021 explains the assistance process:

The director informed me that paperwork is submitted to the agriculture delegation, after which an engineer inspects the plan in Ouarzazate. If it is approved, it is then sent to the regional director in Agdz who then goes to check the land himself and confirm if the information is accurate. If there are any issues he notes them and gives the farmer a week to fix them. The entire process usually takes 4-6 months. We looked at one file that was submitted on 30 December 2020 and was just approved in June 2021. (p.45).

This timeline, however, does not take into account the additional time that it may take for farmers to gather their paperwork, have their land measured and land titles stamped, as well as the time it takes for the irrigation company to begin equipping their farm after the request is approved. Thus, the entire timeline from gathering the paperwork to the installation of the equipment may take up to a year or longer, according to farmers whom I spoke in 2021 and 2022 in Zagora. Farmers surveyed in the summer of 2022 reported different lengths of time ranging between 6 months to four years between submitting their request to receiving assistance. Seven of these farmers in Feija, a watermelon producing region outside of Zagora, informed me that they submitted their request for assistance between 2018-2020 but were either still waiting or had

not received assistance. The experience of one date palm farmer who successfully received GMP assistance is presented as one of three cases demonstrating the impacts of irrigation assistance on different types of farmers in the Draa Valley.

### **Case One: Watering the Valley's Extensions**

Abdelkarim, a small-scale date plantation farmer, spoke highly of the GMP. He owns a 3-hectare farm on an extension outside of Zagora growing dates, wheat, alfalfa and household vegetables to sell to packaging companies that travel to the region. When asked if the process to receive assistance was challenging, Abdelkarim responded:

It was easy. The engineer was in charge of bringing all the needed materials and equipment for the project. All I did was get the *waqeel al aradi*<sup>19</sup> and the engineer to measure the land. Then we went to the *skeikh*<sup>20</sup>, he stamped the papers, the *muqadim*<sup>21</sup> also stamped the papers. Then we took them to the *qiyada*<sup>22</sup> in Tamgroute and he also stamped them. Then to Ouarzazate from there. [The papers] stayed in Ouarzazate for a bit, then the agriculture administration in Ouarzazate called the administration of Green Morocco Plan in Zagora who came again here to verify the measurements I declared in my application. 'Does he have 3 hectares or is he playing?' They also verified the depth of the well, if I did the exact measurement that I submitted. After everything was good, the administration in Ouarzazate approved it and called us to come get the paperwork, which my son did. Then, my son gave the paperwork to the technician that's in charge of the project. Once the technician receives the paper in his hand, the Green Morocco Plan will automatically send him the money. He left and brought the support.

I asked Abdelkarim who brought him the support. He responded:

It's from the state. This is the Green Morocco Plan. When we created the request, they accepted it, then they calculated how much we would need. They calculated the payment for everything- the payment for the man who will work. It was about 19,000,000 cintiem (\$20,148). They called us to Ouarzazate. We brought the check. We gave that check to the engineer who is going to work. Then he took it and bought the materials- he brought the engines, the irrigation tubes [and other materials]. The *makhazen*<sup>23</sup> provided the money. The only thing we did was get the paperwork and application stamped.

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<sup>19</sup> Leader of the tribal representatives for collective land

<sup>20</sup> Local representative of the Ministry of the Interior

<sup>21</sup> Local representative of the Ministry of the Interior

<sup>22</sup> Governor

<sup>23</sup> Central government

Abdelkarim describes how they were able to move their request through all the local authorities (tribal representatives, local representatives of the states, and the governor), without experiencing any difficulty. Abdelkarim's detailed description of this process outlines just how many steps one must take to gather their paperwork, navigating the complex hierarchy of local figures who manage the region's land and water as well as the private sector technocrats endowed with state contracts. To prepare their request for assistance, a farmer must be able to approach tribal and local state officials for confirmation of ownership rights, engineers and private irrigation companies for assistance with the design, as well as the agriculture delegation for final approval.

Abdelkarim then proceeded to tell me his opinion of those who have not received support from the GMP. He explained:

People just need to move a bit, and the state will be here for them. But lazy [people] will not get anything. Some people don't want to work, so they did and got nothing. People need to move and act. You lose a little bit at the beginning but then you gain a lot at the end. The *makhazen* will refund you [more than what you spent]. We invested 500 dirham (\$53) at the beginning and the government gave us 19,000,000 cintiem (\$20,148). The government encourages people to apply, and you just need to move. You need to look for these opportunities. The *makhazen* said, '*if you want support, you need to do your request, and all the required paperwork,*' Then you get the support. If one works, he will get the money; if you don't, you will not. Why? Because [these individuals] don't want to move. The government doesn't turn a blind eye on you if you do the work. If you move, they will give you the support. The government in our country, if you work for it, they support you. If you have the right to get the support. Because some people are poor, they have the fields but they don't have anything [materials/money/equipment] to work with. Instead of flood irrigating, it's better to economize the water with this kind of project. This [support] economizes the water. We don't lose water with this. Then the crops are good. They grow well. In the past, we didn't have this [irrigation system]. We didn't grow grapes. But now with the drip irrigation, grapes as well as other fruit are growing [here on our farm].

The assistance from the GMP has allowed Abdelkarim to "economize" his water usage in order to create an oasis in the desert; an extension of the Fezouata oasis located in the Commune of Tamegroute. Drip irrigation allows Abdelkarim to grow crops that are more water-intensive

crops such as grapes which complicates the water saving logic of drip irrigation promoted by the GMP. It is unclear if overall water consumption is being reduced or directed instead towards increased production.

Abdelkarim firmly believes that anyone who “moves,” puts in the effort, to request assistance will be supported by the state by the GMP. He believes that those who have fields, referring mainly to oasis farmers, but lack resources need to make more of an effort to receive assistance. In Abdelkarim’s opinion, the government rewards those who work hard, and everyone must “move a little” in order to take advantage of the program.

Yet, Abdelkarim’s ability to move along in the application process has more to do with his political connections, relative wealth, and time he is able to invest in farming. Abdelkarim is someone who, as those in Tamezmoute would say, “has land.” He bought the farm in 1999 and expanded the plantation by planting additional date palms—many of which he received from the state. He was able to invest 500 dirham initially into the project before being reimbursed by the GMP. He is also a respected community member as the *faqi* of the local mosque, a relationship closely associated with the state. Abdelkarim is an example of a GMP beneficiary who is a small-scale farmer with strong political connections both locally and to the *makhazen*, as opposed to small-scale farmers in the oasis who have a more subjugated and contested relationship to the state. While Abdelkarim is adamant that the state supports those who work hard and initiate the process, his access to these resources and political connections allow him to easily navigate the GMP process.

The process proves more burdensome, challenging and confusing for oasis farmers who lack large landholdings, time (as they typically combine farm work with wage labor migration), savings to invest in start-up costs, and are not strongly integrated into markets. Some of these

farmers are not even aware of how to begin the process to receive assistance, while others are pessimistic about even attempting the request as they know their small, largely subsistence activities are not the intended target of the plan.

In reality, successful applicants were those with combined land, access to water, better politically connected and economically endowed, even though government representatives assured me that all farmers are eligible regardless of land size. Referring to a single farmer's landholdings that are side-by-side or "combined lands" (*majmua*'), as opposed to fragmented (*mufarqeen*) at different locations across the space, one oasis farmer/wage laborer explained "the agriculture delegation equips the land for those with combined lands. The farmers who want to equip their land, he submits his request, when it is approved, the support comes from the government. They equip [the land] with the well basin, and the irrigation tubes, the motor, everything." Curious about his opinion on this, I asked him, "It's difficult, right, if you don't have enough land?" He responded, "Yes, it's difficult. [It's] only [possible] if you have four or five hectares or more [of land]."

This sentiment that assistance is only given to those with large or non-fragmented landholdings was reflected by many interviewees throughout the summer. Abdelfatah, one of the larger oasis landholders in Tamezmoute, commented that he had equipped his fields with sprinkler and drip irrigation himself. When asked why he did not apply for GMP assistance, he responded that he only has 0.8 hectares of land and one needed to have at least two hectares to receive support (field notes, p.10). Other oasis farmers responded that they did not have the funds necessary to pay irrigation companies for the plan, lacked water (it's a requirement that farmers have ready access to water), or simply did not know about the plan.

Contrary to Abdelkarim's comments, oasis farmers are "moving." They are simply not moving in ways that bring them within reach of GMP assistance. They do physically grueling work plowing fields, harvesting cereals/alfalfa or cutting dates on bigger farms such as Abdelkarim's for little pay. Many men travel from the region to work with construction companies in Rabat, Casablanca or Marrakesh, who require the workers to spend long lengths of time away from their homes and farms, but provide little pay, benefits, or consistent work. Women regularly labor in the oasis or on farms cutting henna and alfalfa by hand and carrying these bundles on their backs to homes. They are paid on average 20-40dh per day less than men for this work, and sometimes not all — instead taking a portion of the cut in lieu of payment. Overall, these movements, laboring for others both within the valley and outside the region, pull oasis farmers from their own land cultivation. Their agriculture activities are largely oriented for the household as opposed to markets, and therefore are not considered "farming" to delegates of the GMP; just as women routinely labor on farms but are largely not considered "farmers." This offers further support to Faysse's critique that the GMP operates under a single farming model; one that prioritizes productivist agriculture over household activities, further devaluing the agricultural activities of oasis farmers with small plots of land.

State and development institutions continue to view GMP's impact quantitatively in terms of increased production, growing exports, or numbers of farmers reached. Yet these discourses and metrics fail to explain why so many farmers continue to struggle to access the plan and ignore the realities of farmers in regions such as the Draa Valley. The GMP contributes to the increase in groundwater irrigated farms in the region by significantly subsidizing the costs of well-drilling and storage basins (which hold over 100 tons of water), allowing some farmers to expand their operations or grow water-intensive commodities. It allows farming to be more

accessible and cost-effective for many families yet does not address the environmental constraints of implementing this model in the water-scarce region. In order to better explain how this program is impacting small-scale farmers in the oases, I turn to a second case that highlights the water access challenges of several oasis farmers which is not addressed by GMP irrigation assistance.

### **Case Two: Dry wells in Tamezmoute's Oasis Fields.**

I sat down with Aziz, Mohamed and Lahcen to chat under the shrinking shade offered by a nearby home. The three men in their early 60s are oasis farmers — they maintain small plots of land consisting of a couple hectares in the oasis after having retired from seasonal wage labor jobs in construction and truck driving. Aziz mentioned he had been forced to stop working due to an injury. The men told me that none of them had any work for the last two years due in part to the travel restrictions from COVID-19. These restrictions had also shut down local markets, making it difficult to sell their date harvests. Even so, they continued to farm intermittently over the years throughout their wage labor movements in and out of the *tamazirt*. While income was meager or nonexistent from oasis farming, it remained a meaningful activity for them which they associated with the sustainability of the local environment. Their type of farming and solidarity draws on traditions and agriculture knowledges passed down from earlier generations. Currently, the tight-knit group was helping Aziz rebuild his groundwater well which was dry and in danger of collapsing. I asked Aziz, “What’s the water level in your well now?” Shaking his head, he responded:

The water level is decreasing fast. I dug the well in 1982. Back then, the water was eight meters deep. Now the water is 16-18 meters deep, or even deeper. It decreased double what it was...The well eroded and is worn out. It's 41 years old.

Unsure of how to respond, I asked Aziz if he used the irrigation canal which recently had irrigation water available from the river following the dam release on June 15, 2021. He replied:



Yes, for two days. Now, it's dry. Once the river is dry, the canal dries out. We used it to water the palm trees, but it wasn't enough for all the trees.

The three of us—Mohamed, Lahcen and I—expressed our sympathy for Aziz's predicament, shaking our heads. I then proceeded to ask Aziz if he dug his well himself, or if he had received support from the agriculture delegation. He told me:

I dug and built it myself. [The agriculture delegation] did not give us any support or funding. No one helped us. I want to rebuild it but no one will help me. The commune or the agricultural delegation won't help us. We only have Allah. I want to fix the well by supporting its walls, but I'm afraid because it's risky. To dig a new one, it will cost around 2 million cintiem (US \$2,000). When I dug my well, I didn't support its walls with cement and metal bars to prevent it from falling apart. I didn't know then. Now people build the well walls with lots of cement and metal bars which makes it easy to go down the well. I'm blocked! I can't fix the old one and I can't build a new one.

Aziz's predicament demonstrates the difficulty many small-scale oasis farmers face as water becomes more and more scarce in the region. They rely more heavily now on groundwater irrigation as surface water has declined, digging wells deeper to reach the declining water table. Today, as Aziz mentioned, these wells are eroding and in danger of breaking. Earlier in the summer, I met a farmer whose son had been killed while deepening their well when the earth collapsed and buried him. It costs 200dh per meter to rent the machine, known as *sondar*, to safely dig a well. Many oasis farmers cannot afford this and resort to deepening their wells with their own bodies, a risk that can prove fatal. According to the 1995 Moroccan Water Law, farmers must have a permit to dig a well that outlines its allowable depth and irrigation perimeters. However, many small-scale farmers in the oasis originally dug their wells before this law came into effect. Aziz, Mohamed and Lahcen discuss how the state did not assist them with proper well installation, they relied on their own labor and resources to build these. Now facing challenges maintaining these weakening structures, these farmers fall through the cracks in

government irrigation assistance. Today, they continue to rely on their own labor, knowledge and communal aid to access water.

Continuing the interview, I asked the men if they had contacted the local agriculture delegation for support. Aziz responded, “They don’t provide us with any funding or trainings. We don’t even know how to ask for that.” I followed up by saying, “There’s a program by the government called ‘The Green Morocco Plan,’ have you heard about it?” Aziz responded that he had not. I elaborated, “It’s a program that gives support to farmers with the agriculture delegation in Agdz. Things like drip irrigation.” His voice rising with emotion, Aziz cut in:

Here, if one has a hectare, or even if that land is not his, he goes to the governor, they fill out the ‘right to use the land.’ They give them the assistance. They get a part of the land. Here, there’s nothing [for] the poor, like here, and here” gesturing to his friends, “I’m telling you the truth... There is nothing. Seriously!... If you don’t have a hectare, you have nothing. Here, we are *msakeen*.

The word Aziz used, *msakeen*, literally translates to poor, but has a broader connotation to someone who is just surviving or in a difficult (personal, financial, emotional) situation. It was used by many during the summer to refer to farmers who had not received support and whose crops were dying due to lack of water. Farmers such as Aziz are frustrated by their inability to access support from government ministries. They witness examples of favoritism and clientelism by these offices and consider assistance from these ministries inaccessible. Faysee (2015) writes that in practice, local officials face pressure to design pillar two projects which leads them to work with farmers they already know or within already existing cooperatives, staying clear of the most challenging and unintegrated areas within their district. This leads them to, “work with farmers with whom they already have a close relationship. Their limited time and means, and often a lack of motivation, prevent them from becoming involved in marginalised areas where – in addition – farmers lack the ability to interact with the Department of Agriculture

administration. As a result, some farmers involved in Pillar II projects are relatively well off compared with poorer farmers in the zones in which the projects are being implemented” (p.629). The conversation with Aziz and other oasis farmers summer 2021 indicate that this is also likely the case in the province, as many oasis farmers with small amounts of *igran* did not have strong relationships with the local agriculture delegation and had not received support.

While the agriculture delegation had assured me that there are no land restrictions for receiving irrigation subsidies from the GMP, most small-scale farmers in the oasis I spoke with this summer were in disagreement. Many believed that you had to have at least two hectares of land in order to receive assistance from the GMP, although Aziz believed even one would be enough. In addition, as this conversation with Aziz indicates, there is a general perception amongst farmers that one must be well connected with the agriculture delegation in order to receive assistance. On a day-to-day level, this becomes translated in not supporting farmers whose activities are too minimal to be considered contributing to the value chain.

Many oasis farmers in Tamezmoute are also skeptical of government programs due to the region’s history of conflict and exploitation by the *makhazen*, dating back to before French colonization of the region. They observe the accumulating investment of resources, education, and skills training in urban centers such as Marrakesh, Rabat and Tangier while their region continues to experience a lack of jobs and educational support. This history of continuous neglect contributes to oasis farmers’ pessimistic and frustrated attitudes regarding the GMP. Put in this context, the reactions by these farmers indicates that these women and men quite deftly understand that their small-scale activities and household production do not match the GMP’s vision for Morocco’s agricultural growth; and they recognize that they are continuously left out of Morocco’s development despite claims otherwise by the *makhazen*.

While the agriculture delegation sends engineers and irrigation companies to install the irrigation equipment for beneficiaries of the GMP, oasis farmers such as Aziz, Mohamed and Lahcen rely on themselves to maintain and fix their wells. Yet their current dependency on groundwater is also a result of state policies impacting the natural flow of surface water in the valley. Farmers in the oasis became reliant on groundwater in the 1980s following the construction of the dam upstream and increasing drought. Before this, the men reported that they relied on surface water irrigation for their farms. The purpose of the dam is to regulate water throughout the year to prevent drought and increase irrigated agriculture production. However, many oasis farmers perceived the dam instead as a driver of drought in the region. Aziz articulated this point of view when asked about the time when water availability was good in the region. He told me:

Actually, [the drought] started in 1975. Since then, we have been going through rough years. We're short of water, especially after they closed the dam in Ouarzazate. We use the well [now] for irrigation... Before the construction of the dam, [water availability] was good. When the river flooded, the groundwater refreshed and increased (this includes the wells and the springs). But now the groundwater is very low and is drying out.

River basin development in the Draa Valley disrupted the hydro-social cycle of springs, wells, and the surface water management system farmers used prior to their reliance on groundwater. For farmers such as Aziz, Mohamed and Lahcen, Moroccan water development has largely worked to restrict their access to water over time, rather than improve it. Their experience navigating these changes and discussion of the shortcomings of GMP assistance demonstrate the consequences of river basin development implemented by the Moroccan government and the weakness of agriculture strategies such as the GMP in reaching under-resourced farmers.

The conversation with Aziz, Lahcen and Mohamed then began to veer into how water access geographies in the oasis were changing as groundwater was drawn away from them to

larger landowners with deeper wells and better irrigation equipment, some of which was funded by the GMP. Farmers were using this “water-saving” technology to grow water-intensive crops.

Aziz elaborated on this trend:

The planting of the watermelons has been killing us. The watermelon farms consume so much water. They water them day and night. The owners of the watermelon farms gain a lot of money and profit from selling the watermelons, but they leave the other regular farmers suffering. They consume all the underground water and leave us with no irrigation water for our plants and crops. The palm trees are the ones that need water, not the watermelon farms. Those melon farm owners are supported and funded by the government. The authorities don't even supervise or inspect them after funding them. Our plants, crops, and palm trees are dying because those watermelon farms consume all the underground water using modern pumps.

Aziz was frustrated by the fact that government assistance was supporting farming that harmed the region and generational farming traditions in the oasis. Not enough was being done to ensure that recipients of the GMP assistance were properly using the equipment and not overdrawing water. It is unclear if safeguards on water withdrawals are even implemented within assistance provisions, and if so, how government ministries would police this. At the same time, these water assistance programs have a deeper impact on oasis farmers whose families have lived in the region for generations. They watch as the expanding number of watermelon farms draw water away from the palms that they have tended in the oasis for generations. The irrigation subsidies offered by the GMP plays a major role in driving this process.

On top of a lack of water, farming costs have continued to climb for small-scale farmers who must now invest in fuel for their motorized wells and chemical fertilizer necessary to allow the soil to keep giving. Aziz told me, “we have to pay for the fuel for the well pump, the worker who does the irrigation and fertilizers. It's just expensive, out of reach.” The increased costs of fertilizer and fuel for groundwater pumps was articulated by multiple residents over the course of my interviews. Chemical fertilizer is necessary to grow even small amounts of vegetables, alfalfa and cereals in the oasis today, even while it is mixed with the organic fertilizer which people

only used in the past. Several residents commented on the fact that while production improved through the use of these aides today, the quality of food was poor and people were consequently “not as strong.” Increasing water scarcity coupled with climbing cost of farming inputs is making oasis farming more challenging, even as it remains an important component of local livelihoods in the region.

As we were wrapping up the interview, I asked the men, “Do you have anything else to say or any questions for me?” Aziz responded, “Well, you see our situation. We need help. So, if you know any association or organization that could help us, that will be good.” I responded that I had visited the local agriculture delegations and noted that it seemed as if they funded farmers who had at least several hectares. Aziz confirmed this, saying, pointedly:

Yes, they only fund people with large lands, but no one cares for us. I want to fix my well but I can't find any help. We need help to fix the old wells so we can water the trees that are dying...I have broken bones three times. Now, I can't work and no one is helping. The poor people are suffering here. The government should help the traditional farmers. Their irrigation wells need to be rebuilt. They just fund farmers that are willing to farm very remote and dry areas.

Aziz's experience is indicative of many small-scale oasis farmers who combine farming activities with other forms of off-farm wage labor. Many do not earn enough income to invest in upgrading their farms and groundwater wells. These “poor people” are running out of options as drought continues in the valley and water levels in their wells continue to decline. Ironically, the government's strategy for aiding small-scale farmers in regions such as the Draa Valley is exacerbating this situation by diverting water from smaller landholders to larger farms. Aziz, Mohamed and Lahcen provide specific areas where government assistance may be better directed to meet their needs—by providing assistance to fix groundwater wells and support date growing. Under the GMP, Faysse (2015) explains how the Agricultural Development Agency (ADA), which disperses funding to the provincial offices, tends to reject projects that reach less

than 100 farmers. This creates a situation where provincial offices are little empowered to design projects that are locally specific, pushed instead to reach as many farmers as possible under a single model (p.630). In marginal areas such as the Draa Valley, projects continue to operate under the wide-scale application of drip irrigation promotion with well construction contracted through private irrigation companies. This program does little to assist small-scale oasis farmers meet their basic irrigation needs.

As Aziz pointed out, Moroccan scholars have discussed how GMP irrigation subsidies in the Draa Valley have translated into expanding watermelon farms on pastoral land and overdrawing groundwater (Ait Lamqadem et al. 2019; Mansouri & Baouzil n.d.). Officially on paper, ORMVA and the GMP do not support melon growing. However, in practice, their policy is more lenient, doing little to disincentivize melon growing in the valley. While oasis farmers and advocacy associations were adamant that melon farming has reduced date farmers' water access, ministry officials continued to assure me that melon growing does not actually consume that much water compared to date palms if planted on just a hectare. Melons only consume water for three months of the year, as one official from Ouarzazate informed me, while date palms consume water throughout the entire year (interview on 5 July, 2021).<sup>24</sup> Expanded irrigation outside of Zagora in Feija for watermelon growing has faced criticism by local advocacy organizations for contributing to the community's drinking water crisis and declining water table (Sakri, 2022). Yet there is little discussion of who exactly these farmers are and why they are growing watermelons in the desert within this advocacy discourse.

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<sup>24</sup> In a follow-up interview in June 2022, a ministry representative informed me that they encourage date palm growing through annual date palm distributions, date farming trainings with farmers, and the development of date cooperatives centers which package and market farmers' produce to local supermarkets in Morocco. However, the date palms distributed by the ministry are small and it takes about five years (according to ministry representatives) and as long as 10 years (according to some farmers), for these palms to start producing dates. Many farmers will continue to grow melons, which are planted and grown in four months, as they wait for their date palms to mature.

To answer this, I turn to a third case from the summer that describes the situation of a family farming watermelons in one of these “remote and dry areas” that Aziz refers to. A deeper look at their experience navigating drought in Feija, outside of the Zagora, reveals cracks in the GMP promises of increased water-saving by expanding irrigated areas using drip irrigation. It also suggests that benefits from GMP assistance are short-lived for farmers as the continuous growth promoted by the model is unsustainable for the region in the long term as it continues facing increased water scarcity. At the same time, it contextualizes the family’s production of melons within a history of government policies that have encouraged farming in traditionally nomadic, dryland spaces.

### **Case Three: Nomads to Watermelon Farmers in Feija, Zagora.**

While farmers throughout the Draa Valley are growing melons,<sup>25</sup> large-scale production is particularly condensed in recently converted groundwater-irrigated spaces such as the Feija Plain outside of the city of Zagora. *Feijas* are intramontane basins, meaning that they are situated between mountain formations (Klose, 2009). Feija, outside of Zagora, is a sub watershed of the Draa Valley composed of an alluvial fan of fertile sediments deposited by the Draa River. Surface and groundwater in Feija flows to the Draa River and oases. It was previously used as nomadic rangeland and is collectively held by the Messoufa de Amzrou tribe (Moumane et al, 2021). As pastoralism has declined, parcels of land have been allocated to individual families of the tribe and irrigated farming has expanded since the mid-1990s and early 2000s through the drilling of private groundwater wells predominantly to grow watermelons. Today, watermelon cultivation covers about 85 percent of cultivated area in Feija (Moumane et al., 2021).

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<sup>25</sup> Farmers tend to plant three types of melons: red watermelon (*dulaH*), cantaloupe (*ananas*), and canary melons (*lamhaya*).



I visited one of these farming families in Feija to better understand the relationship between GMP assistance, watermelon growing and water access for local farmers. The family had received assistance from the GMP in 2011 yet had largely abandoned this well and equipment due to lack of water access this year. I was curious how farming had changed for them over time and how they were impacted by the region's current drought.

The family belonged to the Ait Atta, a nomadic Amazigh tribe in southeast Morocco. The patriarch of the family, 76-year-old Khaled, practiced nomadism in the region until the early 1990s, traveling as far as Marrakesh with their herds. Khaled told me that there were no farms in Feija before 1970 and that people only herded. The first farms in the region in the early 1970s predominantly grew wheat and alfalfa. It was only in the 2000s that the first farms began growing watermelons, which is now the dominant crop in the region.

Khaled and his family settled in Feija in 1994 on a five-hectare plot of land given to them by the tribe and began farming. Scholars have shown how the Moroccan government has encouraged the privatization of nomadic rangelands, blaming nomads for land degradation due to overgrazing. This declensionist narrative has long been a trope of French colonization to territorialize the periphery of the country and has also been used by donors such as USAID since the 1960s to encourage post-independence Morocco to privatize rangelands (Davis, 2006; 2007). Yet scholars have commented on how nomadic movements and collective well usage is in fact a more adaptive lifestyle for pre-Saharan and Saharan environments (Casciarri, 2006).

Khaled explained how farming had become increasingly difficult in Feija as the region experienced a progressive decline in rainfall and water. The family was severely impacted by the drought this year as Khaled told us, "everything decreased." The proof of this statement was evident in our surroundings—their farm was bare of vegetation and dying date palms stood over

abandoned piles of drip irrigation. The family had to prioritize which crops to irrigate this year due to the lack of well water, choosing to cultivate a small plot of henna located next to their well and abandoning the date palms and they were unable to grow wheat this year, one of their sources of income from the farm. Their fruit trees had died well before this and the farm had progressively declined over time as groundwater became more challenging to access. Instead, the family predominantly relied on a new farm they acquired several kilometers away in Feija with ample access to groundwater. Here, they grew alfalfa, henna, melons as well as date palm offshoots harvested from older palms that they were waiting to mature.

I sat down with Khaled and his family on a rug in their home as wind shook open the window, dusting sand over our bodies. “How has farming changed in your lifetime?” I asked, beginning the interview. He responded, “At that time there wasn’t any *langrey* (chemical fertilizer), just *loghbar* (organic fertilizer/manure). Farming now requires fertilizer and insecticides...farming now is hard. When there is no water, it is hard.” Khaled went on to describe how farming was easier in the past because they did not need to irrigate, they just relied on rain, also known as *bor* farming. Now they are not able to do *bor* because there is no rain. I pushed, “When did this change?” He responded:

It changed a little by little by little. Every year [it changed] a little. Every year the water decreased, the land decreased, the rain decreased, and time passed like this.

Khaled describes a progressive change in rainfall in Feija which corresponds to a decline in the amount of land they could cultivate. I continued the interview, asking, “When did you start using a groundwater pump?” He responded, “In 1994, but only [us] here. There were people who had the pump before that [in Feija].” Khaled also affirmed that they deepen their well every year, telling me “the well is 50 meters [now], and there is no water in it.”

Khaled's observations indicate that farming has become increasingly difficult in Feija as water has decreased. He alludes to a major transformation of land and livelihoods in the region as he discusses how they became more reliant over time on groundwater for farming over herding and rainfed agriculture. Since 1989, annual rainfall has fluctuated in the Zagora region with some years receiving up to 120mm of rainfall and some years dipping below 40mm. The average rainfall for the region is 67.4mm according to local weather station data (Asrir, Zagora). We had visited their well on the farm earlier that day. It was surrounded by withering date palms and blocked off by a few trunks placed over the opening. The family had another well a half mile away that was about 30 meters deep. Wells in Feija, which were located far from the Draa River and supporting larger, commercial farms, were on average deeper than wells in Tamezmoute.

I asked Khaled if the family had ever received assistance from the agriculture delegation for their farm. He responded, "We received 120,000 riyal (\$638) for the drip irrigation and to dig the well. We had to make the storage basin and well structure ourselves." Khaled showed me a copy of the well permit from the ABH that they submitted as part of their GMP application for assistance. It stated the permitted depth of the well (10 meters) and the irrigation limit (6 hectares). Today, irrigation companies are paid by the agriculture office to plan and construct the wells and setups for the farmers. However, around 2011 when Khaled's family received assistance, this system was not in place and the family was given the money to build the irrigation system themselves. Ten years later, they are unable to take advantage of this irrigation technology as the water table has dropped below where they may be able to access groundwater.

The GMP functions under the logic that water-saving irrigation equipment will allow farmers to better direct groundwater to plants' roots, decreasing evaporation and thereby saving more drop by drop (Venot et al., 2014). This technique appears to make water-use more efficient

and farms more productive. However, Khaled's family experienced a decline of water over time, continuously deepening their well year after year. Water saving assumptions of drip irrigation are complicated by many scholars studying their implementation (Benouniche et al., 2014; van der Kooij et al., 2013, 2017; Venot et al., 2014). Studies that report high water saving from drip irrigation technology are typically based on controlled experiments when lower efficiencies are reported as farmers adapt these systems to fit their own needs (van der Kooij et al., 2017). Additionally, the promotion of groundwater exploitation for agriculture as a buffer against climate variability in North Africa has led to the region facing the highest vulnerability of decreased groundwater resources as water is withdrawn faster than it can be replenished (Kuper et al., 2017). The GMP's promotion of irrigating through deep tube well promotion, particularly in dryland extension areas far from surface water sources, is problematic for local livelihoods and long-term environmental sustainability. Rather than assisting farmers to adapt to changing weather, the GMP's focus on farm growth over sustainability is exacerbating groundwater depletion and threatening the viability of livelihoods in the region.

After our interview, we accompanied Khaled's son, Merwan, as he watered the family's new five-hectare farm that evening. The farm was equipped with a solar powered groundwater well and large storage basin that fed drip irrigation lines of alfalfa and henna. Several young date palms were dispersed throughout the fields, still too young to produce dates. Torn plastic soil protectors and snaking drip irrigation lines, the remnants of melon harvests, extended for several kilometers around the henna and alfalfa. One could envision the wide expanse of the farm during the watermelon season which shrinks to just a fraction of this size following the harvest.

Watermelon cultivation land is typically left bare for the majority of the year unlike date palms,

alfalfa or henna crops which are grown all year long, except for a period of habitation during the winter.

Merwan was of the opinion that melon growing did not consume as much water as people thought. Pointing out the condensed rows of drip irrigation lines running through the henna, he commented that these crops consume more water than the melons, whose lines run at wider intervals. Merwan is correct that henna and alfalfa are also high water-consuming crops. However, the amount of waste of these crops is low in comparison to melons which have been grown in larger proportions due to their lucrative market.

While this farm had adequate access to groundwater, Merwan commented on the difficulty their neighbors faced obtaining a permit for a well. He told me:

There is another issue here. I don't want to talk about politics. However, the authorities stop farmers from working. For example, [the neighbors] didn't dig a well. The authorities require that you have a permit, but they don't give the permits easily.

Merwan discussed how they allowed their neighbor to use their well to irrigate their farm since they had been unable to receive a permit to dig their own well. The Water Basin Agency for Draa Oued Noun recently stopped approving well permits in Feija due to the drastic decline in groundwater resources in the plain (conversation with ABH Draa Oued Noun- Ouarzazate on 6/29/2022). While this is a rational water conservation response, farmers in Feija are left with no options if they run out of water in their well. Many resort to illegally drilling wells and paying the local authorities in order to continue farming (conversations with farmers in June 2022). Like Aziz, Merwan was not a fan of government ministries and considered them doing more to restrict and police farmers in the region rather than help them. He perceives the current official processes to regulate well digging by the ABH and ministry officials as a concentrated effort to impede farmers in the region. Even though water management appears participatory on paper, typical

family farmers such as Khaled's family are policed for water usage on their tribal land (i.e. not able to drill a well without a permit), without having equal voice in the management process. This causes frustration and at times attempts to access water outside of sanctioned means amongst farmers in the region. As Merwan's statement demonstrates, water in region is always political, with farmers navigating and circumventing this shifting landscape of water policies and hydro resources.

Reflecting on the future of farming in Feija, Khaled had told us, "the land [here] is good, but it needs water." Deserts occupy popular imagination and state discourse as wastelands, uncondusive to life. Through technology, state actors and institutions are able to green these spaces, turning them into oases dependent on groundwater irrigation. The hydrogeology of the basin, however, is not built to sustain this practice as water is being withdraw faster than it can be recharged. Khaled, whose family practiced rainfed agriculture and nomadism in the region for generations, knows that the land is able to support limited amounts of agriculture when there is rain. As precipitation in the region continues to decline, water-intensive farming in places such as Feija will need to be checked and groundwater withdrawals carefully monitored.

Similar to oasis farmers in Tamezmoute, Khaled's family was struggling to access water for their farming activities. Yet unlike Aziz, Mohamed, and Lahcen, Khaled's family were complicit to some extent in the overexploitation of the region's groundwater by engaging in watermelon growing. Still, their predicament shares key similarities to Aziz, Mohamed and Lahcen: the intensive exploitation of groundwater occurred through government modernization policies that privatized land and promoted export-oriented farming in desert spaces with little concern for their impacts on local environments and livelihoods. Like oasis farmers in Tamezmoute, this policy has drawn water resources away from their farm over time.

Overall, the GMP does not address the central issue facing farmers in the Draa Valley — access to water — through its current program of subsidized irrigation assistance. Rather, it makes it worse, as it encourages over-extraction of groundwater for expanded, water-intensive new farming activities outside of the oases even during periods of drought.

## **Conclusion**

While development advocates applaud Morocco's efforts to reach rural farmers through the GMP, reactions from everyday farmers in the Draa Valley complicate this picture of development success. Household farmers and families managing small-scale operations in the oasis overwhelmingly considered the plan inaccessible. In contrast, small-scale commercial farms located in the valley's growing extensions, particularly those with strong political connections and capital, applauded the government's efforts through the GMP. Farming in the Draa Valley takes many forms other than is defined by the GMP. Farmers own land of different sizes, farm for different purposes, and organize their labor in unique ways — meaning that their irrigation needs are not identical. Faysse (2015) argues that due to the GMP's focus on production and value chains, "real farms, along with their farmers and with rural territories, faded into the background" during the plan's early implementation (p.632). Likewise, my conversations with a diverse array of "real" farmers in the Draa Valley, those who have been farming for generations for both their households and markets, are falling through the cracks of GMP assistance. The work reveals that these farming activities making up oasis (and non-oasis) agriculture in the Draa Valley hold additional meanings than mere market production for these farmers: they are shared family and household routines; they provide fodder for household sheep and supplement local diets; and they sustain the valley's local date palm environment.

Morocco has long struggled with integrating farmers and traditional water rights in its development of small-scale irrigation systems. In this respect, the GMP is not a radical departure from this history: it continues to disadvantage farmers who work on oasis plots of less than two hectares, especially those with fragmented land which presents a challenge to drip irrigation and well design. The GMP's promotion of subsidized irrigation assistance has changed local geographies of water access: larger landholders are able to withdraw water during drought, accumulating water away from oasis farmers and their palms. Water overdrawn encouraged by these operations has also forced families into unsustainable coping strategies. Approaches grounded in the local experiences of programs such as the GMP demonstrate the uneven impacts of these programs on local land, water, and farmers. They reveal the most pressing issue for farmers in the region is not just access to water, but the overexploitation of this resource. In its focus on improving the productivity of agriculture, the GMP largely overlooks its impact on water scarcity in regions such as the Draa Valley and how its program is allowing some to accumulate this resource while dispossessing smaller-scale and undervalued farmers. A grounded approach in everyday hydrosocial impacts of irrigation assistance shed light on the local nuances of productivist development strategies which higher level analyses of water management miss.

Through the GMP, water is largely treated as a resource to be exploited. However, water holds much deeper meaning in oasis communities such as Tamezmoute. Farmers and community members in the oasis *timizar* continue to make a living off the land and water while navigating drought, increasing cost of farm inputs, and declining soil productivity through their own labor, family networks, and persisting communal forms of aid. These everyday actions, social



processes, and values of water offer insight to water management planning and reveal the integrated nature between water, the land, and community in the Draa Valley.

## Chapter 4

### Water in the Fields, Water in Hearts: How Water Makes the *Tamazirt*

*“When I was small, there was water in the mountain. And the people, all of them, herded their goats. They had cows and camels. The water in the swagi (irrigation canals) was available. Always available. There wasn’t the motor at that time at all.”*

40-year-old farmer from the village of Abernous, Tamezmoute

#### Introduction

Good water (*ma’ halu*) is not a given in Tamezmoute. It may not rain this season or the water of the Atlas Mountains that is stored and released from the dam becomes mixed with municipal and agricultural pollutants. Wells that are dug deeper and deeper each year pull salts from declining water tables to frost the topsoil of household farms and brine the local drinking water. The water policies, plans and assistance of the regional state authorities fail to provide an adequate supply of water for farms and homes. And so, local residents in the Draa Valley are the ones who make water available in homes and in the fields on a day-to-day basis.

Water has multiple impacts on everyday life in Tamezmoute. It allows farmers to cultivate household cereals, alfalfa and vegetables and ensures a good quality date harvest. Irrigation assistance is a key focus of the national agriculture program (the Green Morocco Plan—see Chapter 3). It is also an important resource for a new income-generating practice in the valley, watermelon production. Water’s variability disrupts daily household routines, cutting off in the middle of washing the dishes, or as I was about to pour a bucket of water on my head to wash. It was pooled and drained throughout the community of Tamezmoute—by the local tourist hotel filling their new pool and charging the local children five dirham a day to swim, or by women watering household gardens, attempting to keep wilting tomatoes and peppers alive. Its arrival was ceremoniously announced with the familiar beep of the water truck’s horn carrying

*halu* water from another *tamazirt*. Water is deeply embedded in the social life of the Draa Valley through its production in farms, homes, discourses and memories.

This chapter examines the production of water in Tamezmoute and the daily encounters that shape these interactions. I use the local concept of the *tamazirt* to refer to both a natural oasis space as well as the community. *Tamazirt* is an Amazigh word meaning homeland. It evokes a connection to the place where one was raised and is rooted in connections to land, lineage, and communal identity. Katherine Hoffman (2008) writes that the *tamazirt* is where Ashelhi<sup>26</sup> identity is produced through the gendered actions of men's moving and women's dwelling which constantly re-make and rejuvenate the *tamazirt* and Ashelhi culture (p.5). Water holds significant meaning in the *tamazirt* as it both produces its physical landscape and is embedded in everyday agrarian and household routines. Stories and daily actions involving water in the *tamazirt* reassert the importance of the place and its practices through values such as hard work and generosity. In contrast to earlier chapters that focused on national conversations of water and their local impacts, I start with the production of water in the *tamazirt* and extend this gaze outward. My goal is to tell a different story of water in Morocco and thus provide a frame of analysis that *starts* with the everyday experiences of water users.

This chapter is not an evaluation of water management policies and practices, but a narrative about how it comes *to be* in fields, homes, and daily lives. It tells a story pieced together from memories, discourses, and daily actions of local residents that stretch across time and space in both the fields and homes. Ultimately, I demonstrate that water is not just an inert resource that can be managed through systems and policies from above, but is produced through the actions and evocations of local users. It is only through this lens that water becomes

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<sup>26</sup> Ethno-linguistic Amazigh group in the Souss Massa region of Morocco.

meaningful, allowing us to see how water builds the community and reproduces the *tamazirt*. In the *tamazirt*, water connects people, places, and histories.

### **Conceptual Framework**

Earlier chapters drew upon concepts of accumulation by dispossession and the hydrosocial cycling of water to describe processes producing uneven geographies of water in the Draa Valley. David Harvey's (2003) theory of accumulation by dispossession is helpful in revealing larger economic processes that drive the draining of irrigation water from the oasis to water-intensive and commercial farming in the surrounding extensions (Chapter 3), but misses local nuances and other motivations behind this practice in the region. Similarly, while the hydrosocial cycle is helpful in thinking through the ways that water moves through the infrastructure and policies of the country (Chapter 1), this framework overlooks how water is discussed and valued on a day-to-day basis. It does not allow us to see how water bleeds through memories and merges with values of collective care and generosity in the *tamazirt*.

Jessica Barnes' (2014) focus on the production of water in the fields is useful in turning the gaze towards the ways that water is channeled, accessed and diverted within an agrarian community. However, my work departs from Barnes in a few ways. First, I look at how water is made not only in the fields, but also in homes, and how it gets there. Community members truck and carry water from cleaner sources (wells, springs, other *timizar*). This labor is gendered, as it is women who fill and carry plastic jugs from communal wells to homes, circumventing the poor quality of water running through household pipes to provide good drinking water for their families. Through these actions, water becomes embedded in the social and cultural life of the *tamazirt*, mediating between the individual and community.

Second, I look at how water has changed over time in the memories and stories people share about water. As Tom Perreault (2018) argues, memories of water-abundant pasts are fruitful building blocks for imagining an alternative present. Perreault articulates memory as a powerful political tool where these visions can be mobilized by communities to enact change. Thus, memories and stories play a critical role in countering environmental inequalities and confronting water governance systems. Scholars have made a similar argument for the hydrosocial cycle as a tool to contest apolitical renderings of water by demonstrating its embeddedness in systems of power (Bakker, 2012; Budds, 2008; Budds et al., 2014). These political framings offer useful insights into the systems and policies that shape water scarcity in the Draa Valley from the national to international development models (Chapter 2). However, more intimate ethnographic perspectives are needed to understand the meaning of water for local residents and the community.

In Tamezmoute, particularly among the older generation, water is closely tied to social relations of mutual aid and values of generosity which act to counter the selfishness and disparate economies of the *azaghar* (city) and an emerging desire for affluence at the expense of caring for family and neighbors in the *tamazirt*. And yet, the community in the *tamazirt* is neither homogenous nor egalitarian. Power disparities based on wealth, political connections, gender, tribe, race, and lineage underlie daily social interactions. Land holdings are not equal and farm labor is exchanged for wages or shares of the harvest. But because water flows between different individuals and villages, it prompts interactions and relationships among different people to manage, collect, and allocate it. It takes on significant meaning in these processes, shaping the physical space and social relations that flow through the *tamazirt*.

These meanings are revealed through the storytelling of residents. Geographers have used storytelling to elevate non-represented voices in political spaces (Cameron, 2012), as well as examine how it builds an attachment to place (Hammond, 2021). I find the approach by critical food scholar, Ashante Reese, particularly useful in the context of my own work. Reese focuses on the process of knowledge transmission from the storyteller to the researcher where storytelling “laid bare practices of everyday life that were neither loud nor attention seeking” (2019, p.2). Her approach to storytelling allows the researcher to examine food security from not just the systems that produce it but also how it is addressed in the everyday ways that residents live their lives — work that often is unacknowledged and overlooked by decision-makers and outside organizations working on food access in Black communities. Food access is not just a political issue for residents but encountered and addressed daily through their own work that draws upon generational food knowledge and self-reliance.

Building from Reese’s approach, this chapter’s story emerges from the conversations held in my participants’ homes—on rugs laid on the floor, over a cup of tea, or on the dusty *akal* (earth) of the *igran* (oasis fields). It involved perspiring as we discussed water, or tasting the salt mixed in the tap water as we refilled cups in between questions. Like Reese’s interlocutors, many women and men in Tamezmoute imparted lessons and wisdom through their stories involving water. This act, as well as daily discourses and actions, revealed the often-overlooked work that people in Tamezmoute do to produce good water for their households, fields, and community, navigating drought and piecemeal policies. This work is not outwardly political, but instead is a daily part of life in Tamezmoute and making the *tamazirt*.

For example, while many participants told me that the dam reduced the amount of water available for farming, they did not express a desire to contest the dam or the authorities who

managed it. Instead, participants would elaborate on their farming techniques to teach me how this was done in the *tamazirt* and discuss how life was much harder in the past, even as there was more water in the irrigation canals then. Thus, my participants overall were not commenting on waterscapes of the past as a way to mobilize and confront the systems around them. In fact, many viewed these uneven geographies of water scarcity and quality as unavoidable. In contrast to some of the political work of other water scholars, I found that memory and stories about water in Tamezmoute serve a purpose other than political mobilization. Through storytelling, water narratives offer an important tool to reinforce the social processes that build the community and life in the *tamazirt*. They offer examples of making a living in relation to others that prioritizes caring for neighbors and the community as whole as opposed to singularly looking out for one's own gain and private accumulation of capital and resources. The *tamazirt*, as central to *Imazighen* identity and language, is built, maintained, and remade through practices of water. These stories and daily actions reinforce the importance of the *tamazirt* in a context where many young people today are abandoning oasis farming and migrating away from the region.

Take my university research assistants, for example. Roquiya, Aziza, and Abdelaaziz – previous students of mine – all grew up in Tamezmoute and worked the oasis fields with their families, but do not wish to stay and take on the family farms. The fields are associated with hard labor and the town with *tabergik* (gossip), family obligations, and boredom. Agadir, the coastal city where they study, offers a chance to become a professional and no longer be bound by the immobility of rural life. But as we sat with people listening to their stories about water, change, and the *tamazirt*, we learned how the community developed over time in intimate and meaningful ways. We learned of hard lives made easier over time and injustices counterposed

with generosity. We heard stories of seasonal migrations and return, of water's presence and its absence. We were struck by these stories and would talk about them for hours on our walks home. These stories and my constant questions prompted them to think more deeply on the meaning behind particular farming practices that knowledges in the *tamazirt* that they took for granted. Other times they expressed surprise at hearing about famine, conflict, and hard, grueling labor in the past, and were appreciative that life had changed for the better in the community. Hearing about the *tamazirt* in the past only made us more concerned about water insecurity in the present.

Roquiya, Aziza, and Abdelaaziz will likely not stay in the *tamazirt* their entire lives as they finish university and pursue outside opportunities. Storytelling is not necessarily a tool that roots people physically to space, but it does reinforce their attachment to the place. Hoffman (2008) writes how Tachelhit's<sup>27</sup> song and performance continue to root Ashelhi to the *tamazirt* in the Souss. Likewise, storytelling about water reinforces the *tamazirt* as a center of cultural and material production for oasis *Imaghizen*. In this way, stories build an understanding and attachment to place. They allow us to see ordinary places differently, filling them with meaning. This work cements a sense of belonging to a particular place, to a community, to the *tamazirt*.

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<sup>27</sup> Amazigh language spoken in the Souss Massa region of Morocco.



**Figure 5**



*The oasis fields are associated with work for my university research assistants from the community. But on these research walks, we would discuss the significance of the place- the names and reasons for the different areas of the fields, what was planted where, the problem of land fragmentation, and the stories our participants shared.*

Residents' storytelling and daily actions collectively reflect the fact that local understandings of water are embedded in values of generosity in the *tamazirt*. This was made especially clear to me one afternoon after *l'sr* prayer as I was sitting with Brahim, a retired wage laborer and oasis farmer, who spoke about the differences between life in the *tamazirt* and the city. Responding to a question regarding the change in water in the *tamazirt*, he told me, "now, we are very short of water. We need water for our fields and *our hearts* too" [emphasis added]. It was an off-hand comment, not further explained while the others in the room nodded in

agreement. But to me, it was a striking articulation of an emotional and spiritual void in the community.

This sentiment was similarly expressed by Lala Ittou, a 52-year-old oasis farmer. She told me, “in the past, people had enough water. There was enough rain and there was enough water. Now, may god protect us, now people don’t have enough water in their hearts.” Both Brahim and Lala Ittou express the deep connection between a change in water in the *tamazirt* and the change in the values and actions of the community. Water is associated with purification in Islam. It is used by Muslims to perform ablutions, cleanse their bodies, before praying. In doing so, water takes on deeper meaning, as Schimmel (1994) puts it, as “a fitting symbol for the purification of hearts” (p.6). It cleanses a person both internally and externally. To fully understand what Brahim and Lala Ittou mean, we must understand how water is embedded in the social processes of the *tamazirt* and how this has changed over time.

### **Stories of Change**

It is late July 2021. The temperature throughout the day creeps into the mid-100s, making it unbearable to be outside past 11 in the morning. However, today, Roquiya, Aziza and I face the heavy rays as we trek through the river valley to El Mouda’, a village located two kilometers from the center of Tamezmoute. While Tamezmoute is a peripheral region to Morocco, El Mouda’ is peripheral to Tamezmoute. The village is located across the river and several kilometers from the nearest bridge. Tamezmoute’s lines of homes, corner stores, cafes, and mechanic shops beckoned, visible across the valley’s expanse from El Mouda’, yet seemed just out of reach.

Recent developments in the village have had major impacts for youth growing up today, according to Omar, a resident in his 30s. In the past, Omar and his friends were unable to go to

school if the river was full, as it would wash out the dirt bridges they built to cross. It was also impossible to carry back produce from the weekly souk located in Tighomar during these times. The mobility of community members changes with the presence or absence of the river. Today, however, the local government constructed a cement footbridge over the river and provides a transportation van for school-age youth whose families can afford the monthly fee, demonstrating how local development can have a major impact on the quality of life for residents.

While water divided this region from the local schools, stores, souk, and other services, it also connected them through irrigation networks and the cultivation of barley, vegetables and dates for household food and income, as I learned from Omar's grandfather, Walid.

**Figure 6**



*El Mouda', situated between the riverbed and the mountain. July 26, 2021.*

**Figure 7**



*Looking from El Mouda' across the river to the center of Tamezmoute where the school, the souk, shops, and main road are located.*

Walid self-identifies as *sharif*, connected to the prophet Mohamed. I asked Walid about his family's origins, and he clarified, "As far as I know, we are from Zaouia n'Igramen. I am Sharif of Ait Qasem. I have been here since birth. I don't know where my parents came from [originally]. My memory sometimes fools me. Things have changed. People don't talk and share stories and myths as before." The land of El Mouda' is owned by the local *zowiya* in Temsla and the villagers continue to pay the institution a share of their harvest every year. Many residents identify as *shorfa*, tracing their lineage to the prophet Mohamed, and consider themselves part of the *zowiya*. *Zawaya* (pl) are complicated institutions in Morocco enmeshed in the politics and land rights of the region. Many leaders of the *zawaya* are related to the royal family and continue to own vast amounts of land throughout the southeast region of Morocco. The area surrounding Tamezmoute used to have two prominent *zawaya*: Bennaser and Belqasim. According to Walid, when the *makhazen* (central government) came to Tamezmoute, they dissolved the Bennaser *zowiya* and began renting this land. The Belqasim *zowiya*, having papers proving the land was theirs, were allowed to keep their 99 lands, which they still own to this day.

According to Walid, the *zowiya* played a major role in mediating disputes in the region and sheltering people who were hungry and needed a safe place to stay. The institution protected them during colonization and Walid remembers a year when the *qaid*, local governor, even defeated the French. Land in Tamezmoute that includes the villages of El Mouda' and Ikhfranazrou is still owned by the *zowiya* and these villagers continue to give a portion of their harvest to the institution as taxation. Some individuals from these villages contest this relationship, arguing that they are part of the *zowiya*'s family, *shorfa*, and own the land in the villages, rather than *akhamas*, sharecroppers. Others refuse to continue farming the land altogether for the *zowiya* and instead travel for wage work. Yet for Walid, the *zowiya* and El

Mouda' were codependent and their arrangement involving payment for protection had been passed down for generations. He considered himself part of the institution.

Walid, Aziza, and I spoke about changes in the community related to water and livelihoods, with Aziza translating between Moroccan Arabic and Tamazight. As we spoke, community members flowed in and out of the room paying their respects and sharing a glass of tea with him and his family. Walid spoke about the changes in water in the community today:

**Walid:** Today the river is under the management of the *makhazen*. Before when the river flooded and the canal was running, there was lots of water. Now both the river and the canal are dry. If you don't have a well and a diesel pump, you can't get water.

**Aziza:** When did the river and canal start to dry out?

**Walid:** In the '90s.' Every village had its own canal and was responsible for it. Now, all the villages share one canal that comes from the dam in Ouarzazate. The *makhazen* is responsible for it.

**Jamie:** Is there any difference between planting now and before?

**Walid:** God knows! Now, if you don't have a diesel pump, you can't plant. The river is dry. If you have money for diesel, you can plant all you want. The market is full of food, you can buy all you can afford. When we had canal water running, we planted everything we wanted and we made some money out of it.

Walid distinctly remembers the presence of water in the irrigation canal in the past which allowed for the cultivation of household crops, some of which they would sell. Today, cultivation is dependent on having the money available to buy diesel for motorized groundwater wells due to reduction of water in the irrigation canals. Walid, like many residents, associates this change with the central government's management of the river through controlled dam releases. This change in irrigation from surface water to groundwater introduces a financial barrier to household oasis farming and transforms the way that it is practiced in the *tamazirt* today. Today, people are mostly dependent on the local market for food, rather than producing for themselves and making a living off this practice. We continued:

**Jamie:** Did it rain more in the past?

**Walid:** It depends. Some years we had lots of rain. Other years were dry. I remember one year, we didn't harvest. There was no rain for an entire year.

**Jamie:** When was that?

**Walid:** Before I got married. We went through years of drought and years of huge flooding. People didn't have food. They migrated to the west of Morocco for work. After it rained again, the *makhazen* sent them back to their villages. There's a lot to say, but my memory fools me.

**Jamie:** Did the government then give you any support during the drought?

**Walid:** Yes, they gave us rice. That year is called the Year of the Rice. Sometimes, the leaders of the villages go to Ikhfranouzrou to get it from the *makhazen* and bring it back to the village. Other times the *makhazen* would bring it to the villages and spread it out. This happened during the drought.

The politics of land and water are important for the development of the El Mouda' and its place within the region, but Walid's storytelling was not a political endeavor. He was merely telling me about life and how it has changed for him over time in the community. Walid's words run through memories of the past—of lives, work, famine, migration, government intervention, and farming. Water is present throughout his entire discussion. For Walid, fluctuations of water over time and living within this context of scarcity and variability are part of the identity of the Draa Valley *timizar*, one that is negotiated through social institutions such as the *zowiya* and the *makhazen*.

Walid's memory of the Year of the Rice is an important touchstone for many elder community members in the *tamazirt*. This was a major drought that led to widespread famine in the region. According Hafsa, an elderly community member who I spoke with several weeks earlier, the Year of the Rice was a time when "people were living on nothing, no water, and the river was dry, people did not gather the harvest...the government used to give people rice...you take a mug and you go and they give you rice." She details how the community's reliance on the Draa River for food production made them vulnerable to drought during the Year of the Rice and were dependent on government rice distributions to feed themselves and their families during this time. This event is ingrained in older community members' memories as a reminder of

devastating impacts water scarcity can have in the region. It emphasizes the *tamazirt*'s dependency on water in the Draa River and rain for local production. Yet the community's collective act of remembering this event also reinforces a sense of belonging to one another and the land. The shared experience of surviving hardship binds them. Living with the variability of water has long been a defining characteristic of the *tamazirt*, but one that is changing today with mobility and work outside the region.

Today, the *tamazirt* is less impacted by periods of drought due to diversified income from wage labor activities. This pattern of wage labor migration is largely attributed to drought in the 1980s, as Walid mentions. Another participant, Brahim, likewise emphasized the necessity of wage labor migration today. He told me, "there is no work here and the population is increasing. Therefore, the fields alone are not sufficient to cover living expenses. What would a family of 10 or 20 members live off if they do not travel for work?... It is mandatory that they leave for work to cope with life expenses. After the 1982 drought, men started to travel to cities for work." Brahim and Walid describe wage labor migration as necessary for growing families in the Draa Valley to overcome reduced production in the region due to drought. Wage labor migration is both a response to water insecurity in the region as well as a strategy for continuing to farm traditional oasis landholdings in the *tamazirt*, reproducing this practice for future generations.

Some families combine wage work migration with oasis farming by not dividing their landholdings among siblings and pooling their earnings to support the farm, such as Bilal's family. He told me, "I work in construction (*bini*)...Not everyone [in our house] works in farming. Now there is my brother [running the farm]. Once he gets tired, I replace him. But everyone knows farming." Responsibility for managing the farm rotates between Bilal's brothers who cycle in and out of the *tamazirt* in between periods of wage work outside of the region. This



diversification of labor and pooling of resources allows them to invest in the necessary inputs for their three-hectare farm (the motorized groundwater well and diesel fuel, fertilizers/pesticides) and to pay workers to harvest. For most families, making water available for oasis farming in the *tamazirt* today involves engaging in a larger political economy with urban centers of the country.

However, wage labor migration is far from a secure form of work. Workers are typically hired for short-term, unpredictable gigs and find their wages cut unexpectedly or they may be suddenly fired. Many are not registered with the social security administration (CNSS) and do not receive state benefits. Explaining this process, Brahim told me:

We would walk into construction sites, then ask the site supervisor if he needs workers. If he does, the accountant registers us and we start work. If the new worker is already registered in the social security office, he gives them his card. If not, he gives them a photograph and his information so they can register him. Workers accept any wage the company gives, because they have family to feed. The law is written but it is not respected. Some worker supervisors take away 100 or 200 dirham from workers' paycheck every 15 days. Workers sign the work contracts but the companies do not respect it. They fire employees for no reason and they get away with it. You might be sick and they ask for the paper from the doctor. Where is your paper? I don't have it. Allah guarantees the poor rights. Take Draa Valley as an example, people have no steady income or agriculture. However, every house door you knock for help or food, you would not be turned down. They would give you food or anything you need. If you do this in Casablanca or Rabat, you will be turned down and be called a thief.

While wage labor migration can be an effective strategy for oasis farming today in the *tamazirt*, it can be a gamble based on the whims of the company one works for. Many community members' understandings of the *tamazirt* were shaped by their time working for companies outside of the region where they experienced exploitation, corruption, and closed doors. The *tamazirt* is a place of welcome and security where neighbors look out for one another even though they may not have much themselves. These values of selflessness and solidarity are also extended to ways that community members manage and share water.

While Walid presents a past of water variability—years of drought and other years of plenty—while other community members reflected on previous water abundance and sweetness in the region when they were young. For example, Meryem, an elder community member, and her son, Said, told me about how the water had changed in the community over time:

**Meryem:** There is a difference nowadays when people dig [wells], they say the water tastes weird. At least in the past they used to say my well is good....[water] was good (*halu*), people used to come from far away to get water.

**Said:** Do you know about the springs? In the past people from Ait Ouzagor, Ait Hmou, and Ait Iken used to get water from there. And one spring is still there.

**Jamie:** Back then there were springs?

**Abdelaaziz:** Yes, when I was young I witnessed them.

**Said:** People took turns. You respect the order even if I am coming with him, if he is the first one, then he is to get water first. You follow the order without disorder.

**Meryem:** You follow the turn, order without any issues or disruptive behavior

**Said:** And without the *makhazen* or anything.

Meryem remembers a past where water quality was good and community members collected water from natural springs. Everyone respected the order of this local system without requiring the interference of the *makhazen*, central government, to manage this process.

Meryem and Said's collective memory illustrate how social processes organizing the allocation of water have shifted in the community as water has declined. As the water table lowers, natural discharge sites such as springs dry up. Meryem and Said discussed how the village continues to use traditional governance systems for managing surface water. This system is overseen by the *amghar*, who would stand at the head of the *targwa* (irrigation canal) and track water turns using a traditional system called the *tanast*. According to Hammoudi (1985), the *tanast* system is frequently used in communities in the Draa Valley who access springs beneath the riverbed. It refers to the amount of time it takes for a cone-shaped instrument to sink to the bottom of a pail of water (Hammoudi, 1985, p.41). Today, the *tanast* system in Ait Hamou has been replaced by *tiram*, or watering turns based on hours, which is only used when there is

surface water available after a dam release. These social processes governing water management have weakened with the decline of surface water and resulting reliance on private groundwater exploitation. Today, there is no central mechanism for controlling the amount of water drawn from private groundwater wells, and consequently, farmers pump as much water as they have in their well rather than treating water as a collective resource for the community that must be allocated and conserved.

Figure 8



Changes in water today in the tamazirt include soil salinization (top left), reliance on fertilizer/pesticides (top right), dry irrigation canals in between dam releases (bottom left) and a reliance on motorized groundwater wells (bottom right).

Excessive groundwater pumping has created uneven geographies of water in Tamezmoute. There are some places with good water (*Halu*) and many more places with bad water—salty (*malH*), sour (*asamum*), bitter (*murr*) as groundwater resources continue to be exploited in the absence of surface water.

For many people, life in the *tamazirt* involves searching for and collecting good water even with the extension of potable water in homes. Khadija (38 years old) and Fatima (60 years old) are two women who regularly collect good water for their homes due to the poor quality of the tap water, a situation that they tell me has gone on for far too long. I met the two women with my research assistant, Roquiya, settling in for a rowdy conversation in the middle of tea with the children. The women had a lot to tell me about water in the village of Tagersift:

**Khadija:** We can't afford to pipe the good water from the mountain to the home. It stays in the mountain. We don't have good water [in our taps]. We have sour water, but not good water in the house.

**Fatima:** We take the donkey and bring back the good water. Past the souk.

**Jamie:** Does the commune help you?

**Khadija:** No, no one helps us.

**Jamie:** Now you don't have good water?

**Fatima:** Not good water. Sour. And it cuts off. [the water] stops and comes back. This year, tap water...[turning to Roquiya] You know when Fadma and her husband went to the *azaghar*. The water did not come then.

**Roquiya:** Ah, about three months ago. [translates to Arabic for me] Three months ago they didn't have any water at all. [turning back to Fatima/Khadija] Did you dig the well at that time?

**Fatima:** You do know the well for drinking water next to the road? We went there but it collapsed. We called everyone and cleared it. Then we dug another well near the souk and found good water. We can't afford [to pipe] the good water to our homes. So we use the donkeys to carry it [from the well by souk].

**Jamie:** Do you still have to carry the good water here by donkey?

**Khadija:** Yes, we fill the *triwoyat* (plastic jugs) and put them on the donkey and bring them back home. And we drink it.

**Jamie:** You don't have tap water?

**Khadija and Fatima:** There *is* tap water. But it's sour, salty. Not good.

**Fatima:** God forgive us, we use it even to pray.<sup>28</sup> When we put the water in our mouths, it's *isamum* (bitter, bad).

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<sup>28</sup> Before praying Muslims perform ablutions which involves washing your mouth. In Islam, if your water is of bad quality good then your ablutions are not considered acceptable.

**Jamie:** Did the tap water change from the past?

**Khadija:** It was good in the past and now it is sour. When we were bringing the water from the well it was good. But now, it's not good.

**Fatima:** *Ohoo* (no). The water of the well has been good, but the tap water was never good. We used to draw the well water by hand [ourselves] and fill the containers.

**Jamie:** There's *always* been a problem with the [tap] water. The water has never been good?

**Fatima:** We don't drink the tap water. We go to Ircheg, l'hed<sup>29</sup>, and bring back the good water [to drink].

Fatima and Khadija make a distinction between well water which is good and tap water which is sour and undrinkable. They have never had good water in their homes. Sour water differentiates them from other villages that have good water available directly in their homes. Ironically, the local government's extension of potable water to homes as part of its development mandate does little to help women and men in Tagersift who are unable to drink it. Good water instead arrives through the collective work of community members to fix their well and find an appropriate source of water—and particularly through the gendered labor of women such as Khadija and Fatima who carry this water to homes. Finding and making good water available becomes a part of daily life in the *tamazirt*.

The stories and memories of Walid, Omar, Brahim, Hafsa, Fatima, and Khadija illustrate that water in Tamezmoute is constantly changing, impacting the social processes of the community, and is associated with a set of values that both shape the oasis fields as well as the identity of the *tamazirt*. They provide us with examples of development improving local quality of life as well as other times where these initiatives fall short. They demonstrate how life is impacted by the variability of water in the region and how this has prompted significant livelihood changes. If the river is full, you may not be able to go to school. If there is no water in your well, you cannot grow alfalfa and barley for your sheep. Bad water impacts your prayers,

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<sup>29</sup> Other villages located nearby with good water.

your mediation with God. Without water, you search for work in other places, you go to the *azaghar* working for companies, unsure where your next paycheck will come from. These are the ways that water impacts daily life in the *tamazirt*.

At the same time laboring for water involves community mobilization. Khadija and Fatima discuss how the community collectively identified a new source of water after their drinking water well was discovered collapsed. Surface water management still involves the employment of traditional village governance systems, such as the *tanast* and *tiram*, which rely on collective agreement to these systems. In the *tamazirt* it is community members who are ensuring that the fields—and thus the oases—are watered, and that families have good water to drink. This physical production of water is embedded in labor arrangements between community members, the social organization of irrigation in the community, as well as values of hard work and generosity. I turn now to further elaborate on the values embedded in producing water in the *tamazirt*.

### **Watering the Fields**

Hafida's morning routine involves waking early and going to the fields to cut or water the alfalfa for neighbors (taking a portion for her own sheep) then returning home to make breakfast for the children. During our interview, Hafida shared her personal story involving water. She began by describing a decrease in rain and water over time in the region, which had deeply altered the life of her family.

Hafida's family was not from Tamezmoute. Before 2009, the family lived in Feija outside of Zagora and, like many other families in the region, began growing watermelons. The resulting overdraw of groundwater forced the family to migrate to Tamezmoute. Hafida explained, "The wells [in Feija] were empty. Totally dry. So the farm dried. So we came to

Tamezmoute and bought the house.” When the family first arrived in Tamezmoute, they lived for the first six months in a tent until neighbors offered them a home which they were eventually able to buy in 2019. I asked Hafida about the changes to water over her life. She responded:

The water changed a lot. There is no water [now]. It decreased a lot. With lots of watermelons, they consume a lot of water. When there were no melons [there was water]... Then 14 years ago when watermelons started, the level of water decreased. Before that, there was just barely, wheat, corn, alfalfa, henna. In 2006 the melons started. Right now, there is not a lot of henna, just a small amount. Now, it's only melons. When there was no watermelon the level of water [in the wells] was high. But, with the watermelons, they consume most of the water. The water level lowered in a bad way.

Hafida discusses how the region's water declined following a transition from more diverse production of cereals, alfalfa and henna to melon production. She, like many other residents, note a direct correlation between the production of watermelons in the region and the lowering of the water table.

Other farmers such as Lahcen considered watermelon growing a major threat to the *tamazirt*, telling me, “The watermelons should not be planted here. It is not the appropriate area for it. The water here should be used for the palm trees so we can preserve green areas. We shouldn't give up something our ancestors did [date farming] for something new [watermelon farming]. Lahcen, like many residents, consider this practice not only draining the oasis fields of the *tamazirt*, but also threatening the generational practice of oasis farming that originally centered communities to the region. By stating that the region is not appropriate for watermelon growing, Lahcen is commenting not just on the appropriateness of the physical environment for this practice, but also highlighting how communities in the region have collectively managed water and adjusted to periods of scarcity through oasis farming. His invocation serves as a reminder to the community that these are practices and knowledges that should be continued in the *tamazirt*, rather than abandoned for the quick payout of melon farming. Through Lahcen's



lens, it is not just the fields and water resources that are threatened by watermelon growing, but the community itself which is bound to the land and oasis farming practices. In doing so, he constructs the *tamazirt* as a place of nourishment of land and the community in contrast to the water-extractive practices of melon growing.

Hafida herself was not responsible for watermelon cultivation, instead laboring and caring for the household and their animals. These obligations transformed as her family moved to Tamezmoute and the children grew older. She told me:

When we came to this house, the girls were grown so they were able to help with the housework and with cooking, but when they were small, I was by myself. I watched over the *bahym* (household sheep/goats) and brought up the children with difficulty<sup>30</sup> [long pause]. It's no longer like that time. When they grew up, the work lessened.

Life in the *tamazirt* is dependent on the physical labor of women who run homes, bring up children, work farms, and rear household animals as men cycle in and out during wage labor migrations. Hafida emphasizes the difficulty of this work when her children were small. Today, however, Hafida is able to work in the fields while her daughters take care of the home. Due to this support, Hafida has the time to rent a plot of alfalfa from neighbors in the oasis allowing her to raise more goats to sell, increasing the household's income. Hafida was responsible for watering, cutting, and caring for the alfalfa as part of her rental agreement.

As we were wrapping up the interview, Hafida's daughter, Fatima Zahra, approached her and told her that the alfalfa owner wanted them to go water the field. "*Daghi?* Now?" Hafida asked. Fatima Zahra affirmed, so we gathered our things to head to the oasis fields. Hafida carried a *l'talt* (hoe) to manipulate the dirt irrigation canals.

In the oasis fields, Hafida waited her turn as another irrigator finished watering his own alfalfa crops. Once done, the two of them used the *l'talt* to manually remove the dirt barrier

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<sup>30</sup> Hafida uses the phrase "tarbit atadout" which literally means raising [children] with the labor of your back.

between their plots, allowing water to flow through the *aghalal* to water Hafida's alfalfa. It was a laborious task demonstrating the manual work that goes into oasis farming, but also demonstrated the social arrangements that organize the community's irrigation schedules—Hafida and the neighbor irrigator channeled water to her plot only after he had finished his allotted turn. Hafida does not just speak about water but works it. Water flows through changes in her life, pushing the family from their *tamazirt* to Tamezmoute where she labors over it to make a living for her family.

Oasis farming involves physically working walls (*tigit*) and dividing pieces (*tirgt*) of the tertiary irrigation canals (*aghalal*), in order to channel water from its source at either the main irrigation canal or a private well to farmers' fields. Illustrating this point, one farmer told me, "if there is no water and no one to work it, there is dirt. It gives you nothing." This sentiment was also articulated by Said from Ait Hamou. I asked Said if there was a difference in the soil in the oasis from the past. He told me, "the difference is in the work. If you work it, it appears well (*tabaynin lkhair*). If you don't work, nothing appears (*tabaynin walu*)." Farming in the *tamazirt* is dependent not just on water, but on the physical investment of labor to working the soil.

**Figure 9**



*Going to the igran to water the alfalfa with Hafida. l'talt used to move the mud canals to channel water to different plots.*

This labor is both an individual and a collective task. Many participants discuss local iterations of *twizi*, a form of collective work organized by the village governing council (*jma'a*). *Twizi* is used both for community tasks such as clearing the irrigation canals of debris prior to a dam release as well as a form of reciprocal labor used by farmers to help with harvesting or other forms of farm work. In the case of irrigation canal clearing, the call for *twizi* comes from the *'amil*, the locally elected village representative who oversees water allocation, or the *faqi* of the mosque. Farmers may also individually lead a call for *twizi* for help with farm labor. Food is exchanged instead of monetary payment, as Khadija told me, “If you help me plow, I will help you plow tomorrow...cook you lunch.”

Today, farming frequently involves individual monetary or reciprocal exchanges. Some plot owners pay workers in the community to maintain plots for them with cash or sometimes

with a portion of the harvest. Collective farm labor such as *twizi* has begun to decline and some community members have sold their landholdings which have fragmented to smaller parcels as land is divided among children. Some scholars such as de Haas (1998) write that oases in Morocco have become significantly degraded as collective maintenance systems erode due to individualization of farming (p.4). However, I found that community members continue to draw upon these traditional forms of reciprocal aid in contexts that include privatization and wage labor in the fields. Many community members continue to help other families with farm labor without exchanging wages. These forms of collective work and reciprocity are essential to making the *tamazirt* meaningful today. Khadija and Fatima told me that they prefer reciprocal labor exchanges in the fields as paying workers for these tasks is too expensive. Taking this a step further, Brahim described to me how solidarity was a defining characteristic of the community and not dependent on the enforcement of communal labor such as *twizi* through traditional governing systems. Responding to my question about whether they received support to build their wells, he explained:

**Brahim:** Back then, there were no associations or cooperatives. We dug the wells ourselves. We helped each other. We helped each other free.

**Jamie:** Is this *twizi*?

**Brahim:** No. If someone came across someone else digging the well, they just take off their clothes and help them dig. Now people don't do that.

**Jamie:** Why?

**Brahim:** Now, people want money. It is all about money. People are excused because money is everything now unlike the past. But there are still people who help each other without expecting anything in return...I once worked in Harhoura<sup>31</sup> installing streetlights. I was working as an electrician with one company. It was a huge area with only one mosque. I was thirsty because it was summertime. So, I knocked on a door and a 70-year-old man opened the door. I asked him for a cup of water and he said, 'go away, the water bill is expensive.' Homdallah, people here [in the Draa Valley] are so generous. Knock on any door and you won't be turned away.

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<sup>31</sup> A suburb of the city of Rabat.

On the surface, Brahim's response does not appear to be as much about water as it is about the differences between people in the city versus the *tamazirt*. However, his story would not be the same if water was removed. In the memory, water is asked for. It is refused. It serves as a medium through which the lack of generosity of those in the north is enacted on day laborers from the south. The act of sharing water or of hoarding it is a practice that reflects the social practices of making a community. Brahim starts off his story describing how farmers in the valley make water available for the fields through collective labor. Brahim is adamant that the people in the Draa Valley *timizar* are generous, it is a defining characteristic of the place and community. It is this generosity shared through acts of making water (building wells, giving a cup to a thirsty neighbor) that make the *tamazirt* meaningful for residents in a context of water scarcity and rural-urban migration.

These stories and daily actions in the community demonstrate that water is embedded in the social processes and the moral geography of the *tamazirt*. Good labor produces good soil, supporting one another through this labor produces both good soil and good people, and a good community brings rain. Water underlies the social arrangements involving labor and payment that community members exchange in order to make a living. Even though water flows to individual homes and is pulled by private pumps to fields, it is never a fully private resource. Water remains central to practices that facilitate labor through social networks in the community. The physical labor involved in making good water available—digging wells, carrying it to homes, working the fields—cannot be accomplished individually. The production of the *tamazirt* is a collective process that relies on the physical work and values of solidarity of the community particularly involving water. The storytelling and daily actions of community members in

Tamezmoute reveal how reciprocal exchanges continue to be employed to make good water available for the community, reinforcing values of generosity and support.

The labor of community members to make good water available in the Draa Valley also reveals the failure of local officials and water policymakers to meet residents' basic needs. The piped water flowing to homes should be drinkable and community members should not have to buy it from private providers or carry it from other sources. Irrigation assistance should be dispersed to small-scale oasis farmers whose wells are dry as well as *firma* owners (commercial farmers). Dam releases should be better allocated in order to provide enough water to recharge farmers' wells. At the same time, these daily examples of communal aid and support demonstrate that making good water available takes many different actions. Valuing the *tamazirt* means valuing its water and the processes that produce it.

**Figure 10**



*Tasting the good water in the fields (irrigated with groundwater) while going to check out the Draa River shortly after the dam release one evening.*

## **Conclusion**

I always carried my water bottle with me during the summer. I filled it with cool water from the fridge each morning and turned its lid tight to seal in the precious drops. I encouraged Roquiya, Aziza and Abdelaaziz to do the same as we made our way under the baking sun to research sites. But water is embedded in different social practices in the Draa Valley. Water, like meals, is given to those who labor for others. If you are thirsty and walking by someone's home, you can stop in and fill the *aghorrof* (mug) with water, or grab a quick drink from a farmer's well in the fields. Water involves exchanging a conversation with your neighbor as you pause for

a sip, or sharing in irrigation labor in the fields so that your neighbor may also water their fields. In this way, water fosters daily exchanges in the *tamazirt* and builds the set of social processes that allows it to function. Thus, water is never fully a private resource and is never fully communal, but moves between these spaces. It flows between space of privately owned land (that is communally worked) and public irrigation canals.

Access to good water varies in the Draa Valley. While most villages have access to tap water today, it is not always of good quality and cuts in and out at unpredictable times during the summer. While many farmers have a groundwater well, they do not always have the money to pay for diesel or ability to deepen wells when they run dry. Development initiatives encourage farmers to save water through equipping their land with drip irrigation and employing water-saving techniques, painting farmers as both drivers and victims of water scarcity. These solutions only address part of the problem and do not acknowledge underlying drivers of water consumption in Morocco. Little attention in the country's policy spaces is given to the work that residents do themselves to make good water available on a day-to-day basis and the meanings water holds for the community. Water is embedded in social processes in the *tamazirt* that mediate between individually cultivated plots and collectively organized irrigation systems, and between wage exchanges and communal aid. Just as water builds the physical structure of the oasis, it builds social relations within the community. Water is many things—sweet, late, sour, salty, available, unavailable—but it is never static. It is constantly manipulated by residents, shaping the geography of the oasis fields and daily pathways of water collection.

Traditional governing systems continue to play an important role in allocating water between farmers in the Draa Valley – representing a social system from which water planners and policymakers could learn a great deal. This system has been adjusted to the changing



quantity of surface water and the schedule of dam releases. Reciprocal exchanges and local arrangements involving water are also necessary tools to make water available for residents and shape social relations in the community. Community members know the locations where good water has changed in recent times and are actively working to produce new sources. While they cannot control the amount of rainfall a given year or the overall water budget of the nation, water scarcity in the region will not be solved without their labor, knowledge, and insight.

Technological solutions and the promotion of water user associations are only one part of the process of addressing Morocco's water crisis. Valuing water also means valuing the community and engaging in practices of solidarity, care, and collective management to make the *tamazirt*.

## Chapter 5

### Water, Land, and Identity

وجعلنا من الماء كل شيء حي.

And we made from the water every living thing.

-The Quran, surah XXI, verse 30

Morocco is facing increasing water scarcity. Rainfall is predicted to decrease by 10-20 percent across North Africa by 2050 with the western-most country especially vulnerable due to its reliance on agriculture (Schilling et al., 2012). However, painting the entire country as water-scarce ignores the nuances of water accumulation, dispossession, and the everyday negotiations and navigation of local irrigators in places such as the Draa Valley. It ignores the role of the country's hydro-agrarian development and current implementation of irrigation assistance through the Green Morocco Plan (GMP) in driving water scarcity in the Draa Valley oases. It also overlooks the agency of everyday farmers and residents as they channel, store, and work it on a day-to-day basis within this context. Oasis farmers tending small and fragmented fields have less access to water than those with combined landholdings and commercial farms in the Draa Valley. However, residents make good water available daily, building both place and community in this process.

Water and scarcity in Morocco are typically discussed in terms of numbers. Policymakers and experts debate the annual amount of precipitation, the storage capacity of the country's dams, groundwater deficits, or the amount of drip irrigated land promoted through government subsidies. Water management is made equitable through efforts towards Integrated Water Resources Management and participatory development which include the formation of regional

water basin agencies, water user associations, and aquifer contracts. Yet this is not necessarily the case as these systems are haphazardly in place locally and at odds with the overarching logic of the GMP, the country's premier agriculture strategy; a strategy whose goal centers on increasing agricultural production across Morocco. In the Draa Valley, this translates to equipping farmers with technology that withdraws groundwater faster than it can be recharged and promoting the expansion of groundwater-irrigated farms on dry land. Water scarcity in Morocco is not just a result of a lack of rainfall, but also socially produced.

I began this research with three questions: *(1) how has Morocco's water management changed over time and how does this impact water users in the Draa Valley today?; (2) what is the impact of irrigation assistance from Morocco's agrarian strategy, the Green Morocco Plan, on local farmers in the Draa Valley? and, (3) how is water produced in the Draa Valley today and how has this changed within peoples' lifetimes?*

I answer the first question in Chapter 2 by examining Morocco's hydro-agrarian development over time and how this has impacted water in the Draa Valley today. The construction of the Mansour Eddahbi dam in 1972 as part of Morocco's economic modernization under Hassan II's *politiques de barrages*, was intended to regularize water in the watershed. However, the dam and its irrigation system also centralized water management under the *makhazen*, which, as Tamezmoute farmers express, diminished the flow of irrigation water in village canals. The dam's reduced releases from nine to four a year during the drought of the 1980s led to a reliance on groundwater irrigation. Households responded by diversifying income through wage labor migration to meet rising living expenses and reduced household production. Today, farming in the region is impossible without access to groundwater. Consequently,

groundwater governance is a major challenge for the country, one in which regional water resource planning and aquifer contracts appear unable to resolve on their own.

Groundwater exploitation is encouraged by subsidized irrigation assistance through Morocco's agriculture strategy. This strategy, the GMP, is explored in Chapter 3 and addresses my second research question. My evidence based on participant observation and interviews reveal that most farmers receiving GMP irrigation assistance in the Draa Valley are not the oasis farmer with fragmented land of less than two hectares struggling to get dates to market. Instead, assistance is largely dispersed to newer farms on reclaimed dry land. This disparity is partly due to the plan's singular vision of farming in the country which prioritizes market production over more localized and household practices. The GMP does not easily incorporate the date palm cutter with fragmented land, the female alfalfa irrigator raising household sheep, or the diversified wage laborer/farmer whose well is dry. These farmers' irrigation needs differ, and water is intimately connected to their production of land and community identity.

It is these farmers and residents I turn to in Chapter 4 to understand how water is produced in the Draa Valley, addressing my third research question. Water cannot be separated from the practices in which it is locally embedded. While water is managed in the offices of policymakers, it is made through the daily work of farmers in the fields (Barnes, 2014) and women providing clean drinking water for homes in the *tamazirt*. It is thus embodied in the lives of people and places. I focus on the production of water in the *tamazirt* because this frame offers a perspective little explored by water scholars and policymakers alike. While Moroccan scholars have extensively studied the social and physical production of water in the Draa Valley by examining the valley's irrigation networks (Hammoudi, 1985; Ouhajou, 1996), the meaning of water for residents who build these systems is largely absent. Work on water and memory in

hydrosocial scholarship likewise focuses on the political possibilities of these alternative visions; possibilities, perhaps, that scholar advocates hope communities may mobilize around in the future to contest the governance structures that produce scarcity and injustice. This is a useful and important tool for building environmental justice movements centered on local agency. But political mobilization is largely not the reason why residents evoke water and change in Tamezmoute. Here, residents employ stories and memories of water to build place and community identity in a context of social and environmental change.

Everyday social processes involving water are integral to the Draa Valley *timizar* by creating a bond through shared labor, hardship, problem-solving. Just as Hoffman (2008) demonstrates how local usage and negotiation of Tachelhit language build the Asheli *tamazirt* in the southwest of Morocco, so do practices with water in the Draa Valley. Water in the Draa Valley is produced through everyday actions that mediate between the individual and the community. Water is not just a resource but embedded in values of care, hard work, and solidarity that build both the physical, communal and moral space of the *tamazirt* which continue to be employed in a context of decreasing water availability.

In the Draa Valley *timizar*, water is more intimate and consequential. It is faith and life (*aman iman*). The river is late (*L'oued ta'tl*), unavailable (*walu/urlan*), salty (*malH*), dirty (*musakh*), or good (*Halu*). It is located in hearts as well as in homes and fields. On the surface, it may seem as though people I spoke with in Tamezmoute were merely describing the changes they saw around them – declining rainfall, salty or bitter tap water, empty wells, growing watermelon and date palm plantations in surrounding areas while oasis palms wither and wilt. But many evoked water to note deeper changes in the community and ways that individuals interact with one another. Water shapes lives and is at the same time shaped by the people who

channel it through the fields or carry it to the home. It is these practices saturated in meaning that distinguish the *tamazirt* from other, more urban, areas of the country and continue to make this place central to oasis residents' identity and life today. Water connects people and land in a way that capital does not — through generosity and care. In this way, community members' discourses and actions with water provide insight to more effective water management planning in the country. Water coming from a place of care for both people and land teaches us how to build equitable water management systems around the work that residents are already doing in order to make good water available in places such as the Draa Valley.

Turning our gaze to how water is made in the *tamazirt* prompts many larger questions about water: What does it mean to think of water as a blessing? What does it mean to think of water as partly uncontrollable, partly produced through daily social relations? What insight do the everyday, easy-to-overlook actions with water – laboring in the fields, providing good drinking water, sharing a cup with your thirsty neighbor – offer us? How can water be negotiated between the individual and the collective? The daily actions and memories of water in Tamezmoute address the practicalities of living in a variable, water-scarce area. These are the essential questions that residents consider as they work with water. The Draa Valley is a place where everyday people have as little say in the country's management decisions as in God's decision to bring rain. Yet they touch and make water available daily, building community and place through these processes.

My own approach in conducting this research centered on deep listening (Koch, 2020) as a critical starting point in building relationships and understanding of water issues in Morocco. Speak to anyone in the Draa Valley and they will tell you about their problems with water: “There is no water at all (*urlan waman ga*);” “The river is late, empty (*ta'til le oued, khawi*);”

“People are digging/deepening their wells (*le nas kayHafru le beer*).” However, it is only after sitting down and exchanging words with people that water takes on deeper meaning. It is only when asking residents about their lives and water in the past, and how these experiences translate to today, that we start to see water differently: we understand water as work; water as unpredictable; water as embedded in social practices; water as generosity; and water as intimately connected to shared land, labor, and community.

Today, an aquifer contract in Feija is under review by the Water Basin Agency for Draa Oued Noun and local partners. Tubes connecting a yet-to-be finished dam in Agdz are being pieced together to carry water from the upper end of the valley to the lower. The Green Morocco Plan has come to a close and is being replaced by the Generation Green Plan which emphasizes youth entrepreneurship and human capital in “nurturing sustainable and climate-smart rural value chains” according to the World Bank (*World Bank Supports Morocco’s Green Generation Strategy*, n.d.). Yet there remains a disconnect between these participatory development and integrated management approaches and the reality of local irrigators in the fields. Many residents in Tamezmoute, as well as family farmers in Feija producing watermelons, still feel excluded from integrated water management decisions led by government ministers and participatory development assistance while they face the worst impacts of water scarcity in the region. Irrigation assistance and water planning are only as flexible as the effort their interlocutors exert to reach farmers. It is only in the *tamazirt* –particularly in the version that community members envision through their memories and storytelling – that water builds community and sustains place. That is why it is crucial that policymakers and water scholars take seriously the production of water in the *tamazirt*.

Here is where I draw our gaze as researchers and water policymakers. Tamezmoute is one of the Draa Valley's many *timizar* where water is made through physical labor, flexible governing systems, and collective problem-solving. It is not always a perfect process. It is not removed from village micropolitics or fully successful in producing adequate water for the fields all the time. Yet it is one that stretches back in time to the formation of the valley's oases and has been adapted to the reduced flow of water in the canals and reliance on private groundwater wells, mediating between the individual and the community. Today, the *tamazirt* is increasingly threatened by water-intensive farming and groundwater overdraft. Yet if we pay careful attention to these processes of making water in the community, if we listen, and build policies around them, the Draa Valley is a place where sufficient water will continue to be made for the *tamazirt* in the future.



## Appendix 1: Interview Participants

#	Location	Date	Gender	Age	Occupation	Tribe/Social Group
1	Tamezmoute	6/13/2021	male	52	oasis farmer (association president)	Ait Sederat
2	Tamezmoute	6/15/2021	male		date cooperative employee	
3	Tamezmoute	6/18/2021	male	85	oasis farmer	Sherfa/Ait Sidi Aissa
4	Tamezmoute	6/18/2021	female		oasis farmer (home/care work)	Sherfa/Ait Sidi Aissa
5	Tamezmoute	6/20/2021	male	58	oasis farmer	Sherfa/Ait Sidi Aissa
6	Tamezmoute	6/21/2021	female	52	oasis farmer (home/care work)	Ait Ouzagor
7	Tamezmoute	6/24/2021	female	73	oasis farmer (home/care work)	Sherfa/Ait Sidi Aissa
8	Tamezmoute	6/26/2021	female	46	oasis farmer (home/care work)	Ait Atta
9	Tamezmoute	6/27/2021	male		commercial farmer (melon/henna)	Ait Sederat
10	Tamezmoute	6/27/2021	male	73	oasis farmer	Sherfa/Moulay Driss
11	Agdz	6/29/2021	male		Director, Agdz Agriculture Office	
12	Agdz	6/29/2021	male		Assistant Director, Agdz Agriculture Office	
16	Tamezmoute	6/29/2021	female		oasis farmer (home/care work)	Ait Sederat
13	Tamezmoute	6/30/2021	male	41	Commercial farmers (melon/henna)	Ouzagor
14	Tamezmoute	6/30/2021	male	45	oasis farmer, date cutter	Ouzagor
15	Tamezmoute	6/30/2021	male		Wage laborer (farm worker)	Ait Atta
17	Tamezmoute	7/3/2021	female		Oasis farmer	Zowya Tamezmoute

18	Tamezmoute	7/3/2021	female (widow)	52	oasis farmer (home/care work)	Zowya Tamezmoute
19	Ouarzazate	7/5/2021	female		Ouarzazate Agriculture Office	
20	Ouarzazate	7/5/2021	male		Ouarzazate Agriculture Office	
21	Tamezmoute	7/7/2021	male		oasis farmer	Ait Ouzagor
22	Tamezmoute	7/7/2021	males (3)	61 and 62	oasis farmers (retired wage laborers)	Ait Ouzagor
23	Tamezmoute	7/9/2021	male		Tighomar Commune	
24	Tamezmoute	7/10/2021	female(s) 2	60 and 38	oasis farmers (care/home work)	Ait Tagersift
25	Agdz	7/12/2021	male	39	commercial farmer (melon/henna/dates)	Ait Atta
26	Tamezmoute	7/13/2021	male		oasis farmer (retired wage laborer)	Ait Ouzagor
27	Tamezmoute	7/13/2021	male	63	oasis farmer/farm worker (retired wage laborer)	Ait Ouzagor
28	Tamezmoute	7/15/2021	male	55	oasis farmer (retired wage laborer)	Ait Sederat
29	Tamezmoute	7/17/2021	female		oasis farmer (home/care work)	Ait Sederat
30	Tamezmoute	7/17/2021	male		wage laborer	Ifkhfernazrou
31	Tamezmoute	7/20/2021	male(s)	72	oasis farmers (retired wage laborers)	Ait Ouzagor
32	Tamezmoute	7/24/2021	female (2)	63 and 59	oasis farmers (home/care work)	Ait Tagersift
33	Tamezmoute	7/25/2021	male		wage laborer	Ouzagor
34	Tamezmoute	7/26/2021	male		wage laborer	Oulid Silman (Arab)
35	Tamezmoute	7/26/2021	male		oasis farmer	Zawya Ait Kasem (Sharif)
36	Tamezmoute	7/27/2021	male	40	wage laborer (oasis farmer)	Ait Abernous
37	Zagora	7/29/2021	male	26	commercial farmer (melons, wheat, henna, dates)	Ait Atta

38	Zagora	7/29/2021	male	77	commercial farmer (melons, wheat, henna, dates)	Ait Atta
39	Zagora	7/30/2021	male	40	commercial farmer (dates)	Ait Unzar
40	Zagora	7/30/2021	male		commercial farmer (dates)	
41	Tamezmoute	8/2/2021	male	57	oasis farmer	Ait Ouzagor

## References

- Abdellaoui, R. M. (1989). *Small scale irrigation systems in Morocco: Present status and some research issues*.
- Ait Kadi, M., & Ziyad, A. (2018). Integrated Water Resources Management in Morocco. In *Global Water Security: Lessons Learnt and Long-Term Implications* (pp. 143–163). Springer. [https://doi.org/10.1007/978-981-10-7913-9\\_6](https://doi.org/10.1007/978-981-10-7913-9_6)
- Akesbi, N. (2011). La nouvelle stratégie agricole du Maroc annonce-t-elle l'insécurité alimentaire du pays? *Confluences Mediterranee*, 78(3), 93–105.
- Bakker, K. J. (2003). *An uncooperative commodity: Privatizing water in England and Wales*. Oxford Geographical and Enviro.
- Bakker, K. (2002). From State to Market?: Water Mercantilization in Spain. *Environment and Planning A: Economy and Space*, 34(5), 767–790. <https://doi.org/10.1068/a3425>
- Bakker, K. (2012). Water: Political, biopolitical, material. *Social Studies of Science*, 42(4), 616–623.
- Barnes, J. (2014). Cultivating the Nile: The Everyday Politics of Water in Egypt. In *Cultivating the Nile*. Duke University Press. <https://doi.org/10.1515/9780822376217>
- Batterbury, S. (2001). Landscapes of Diversity: A Local Political Ecology of Livelihood Diversification in South-Western Niger. *Ecumene*, 8(4), 437–464. <https://doi.org/10.1177/096746080100800404>
- Benouniche, M., Zwarteveen, M., & Kuper, M. (2014). Bricolage as Innovation: Opening the Black Box of Drip Irrigation Systems. *Irrigation and Drainage*, 63(5), 651–658. <https://doi.org/10.1002/ird.1854>
- Berger, E., Bossenbroek, L., Beermann, A. J., Schäfer, R. B., Znari, M., Riethmüller, S., Sidhu, N., Kaczmarek, N., Benaissa, H., Ghamizi, M., Plicht, S., Ben Salem, S., El Qorchi, F., Naimi, M., Leese, F., & Frör, O. (2021). Social-ecological interactions in the Draa River Basin, southern Morocco: Towards nature conservation and human well-being using the IPBES framework. *Science of The Total Environment*, 769, 144492. <https://doi.org/10.1016/j.scitotenv.2020.144492>
- Birkenholtz, T. L. (2015). Recentralizing groundwater governmentality: Rendering groundwater and its users visible and governable. *WIREs Water*, 2(1), 21–30. <https://doi.org/10.1002/wat2.1058>
- Birkenholtz, T. (2016). Dispossessing irrigators: Water grabbing, supply-side growth and farmer resistance in India. *Geoforum*, 69, 94–105. <https://doi.org/10.1016/j.geoforum.2015.12.014>
- Bossenbroek, L. (2016). *Behind the Veil of Agricultural Modernization: Gendered Dynamics of Rural Change in the Saïss, Morocco* [Ph.D., Wageningen University and Research]. <https://www.proquest.com/docview/2522077450/abstract/160E7EFD1596450BPQ/1>
- Budds, J. (2008). Whose Scarcity? The Hydrosocial Cycle and the Changing Waterscape of La Ligua River Basin, Chile. In M. K. Goodman, M. Boykoff, & K. Evered, *Contentious Geographies: Environmental Knowledge, Meaning, Scale*. Ashgate Publishing, Ltd.
- Budds, J., Linton, J., & McDonnell, R. (2014). The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water. *Geoforum*, 57, 170–180. <https://doi.org/10.1016/j.geoforum.2013.10.008>
- Cameron, E. (2012). New geographies of story and storytelling. *Progress in Human Geography*, 36(5), 573–592.

- Davis, D. K. (2006). Neoliberalism, Environmentalism, and Agricultural Restructuring in Morocco. *The Geographical Journal*, 172(2), 88–105.
- Davis, D. K. (2007). *Resurrecting the granary of Rome: Environmental history and French colonial expansion in North Africa*. Ohio University Press.
- Direction Générale de l'Eau. (n.d.). Retrieved February 15, 2022, from <http://81.192.10.228/>
- Doukkali, M. (2005). *Water institutional reforms in Morocco | Water Policy | IWA Publishing*. <https://iwaponline.com/wp/article-abstract/7/1/71/20253/Water-institutional-reforms-in-Morocco>
- Elder, A. D. (2019). *Irrigation in Southeast Morocco: Effects on Rural Livelihoods* [M.A., The University of Arizona]. <https://www.proquest.com/docview/2248639694/abstract/DD28A1E79B184400PQ/1>
- Ennabih, A. (2020, September 16). *Running out of water* -. <https://mipa.institute/8137>
- Faysse, N., EL Amrani, M., EL Aydi, S., & Lahlou, A. (2012). Formulation and Implementation of Policies to Deal with Groundwater Overuse in Morocco: Which Supporting Coalitions? *Irrigation and Drainage*, 61(S1), 126–134. <https://doi.org/10.1002/ird.1652>
- Faysse, N., Errahj, M., Kuper, M., & Mahdi, M. (2010). *Learning to Voice? The Evolving Roles of Family Farmers in the Coordination of Large-Scale Irrigation Schemes in Morocco*. 3(1), 20.
- Faysse, N. (2015). The rationale of the Green Morocco Plan: Missing links between goals and implementation. *The Journal of North African Studies*, 20(4), 622–634. <https://doi.org/10.1080/13629387.2015.1053112>
- Haas, H. D. (1998). Socio-Economic Transformations and Oasis Agriculture in Southern Morocco. Pp. 65-78 in *Looking at Maps in the Dark*, Edited by Leo de Haan and Piers Blaikie.
- Hammond, T. (2021). *Building Islam: Stories and Monuments in a Changing Istanbul*. unpublished manuscript.
- Hammoudi, A. (1985). Substance and relation: Water rights and water distribution in the Dra valley. In *Property, social structure, and law in the modern Middle East* (pp. 27–57).
- Harvey, D. (2003). Accumulation by dispossession. In *The new imperialism*. Oxford University Press.
- Haskouri, K. (2022a, February 12). *Morocco is experiencing its worst drought in 30 years*. <https://en.hespress.com/36155-morocco-is-experiencing-its-worst-drought-in-30-years.html>
- Haskouri, K. (2022b, March 4). *Moroccan Minister of Water warns of dwindling hydraulic resources water*. HESPRESS English - Morocco's Leading Digital Media. bak
- Hoffman, K. E. (2008). *We share walls: Language, land, and gender in Berber Morocco*. John Wiley & Sons.
- Hssaisoune, M., Bouchaou, L., Sifeddine, A., Bouimetarhan, I., & Chehbouni, A. (2020). Moroccan Groundwater Resources and Evolution with Global Climate Changes. *Geosciences*, 10(2), 81. <https://doi.org/10.3390/geosciences10020081>
- Hursh, J. (2015). 13. Water Scarcity in Morocco: Voice, Narrative, and Essential Resource Governance. In *13. Water Scarcity in Morocco: Voice, Narrative, and Essential Resource Governance* (pp. 270–287). Columbia University Press. <https://doi.org/10.7312/pist17278-013>
- Joy, K. J., Kulkarni, S., Roth, D., & Zwarteveen, M. (2014). Re-politicising water governance:

- Exploring water re-allocations in terms of justice. *Local Environment*, 19(9), 954–973.  
<https://doi.org/10.1080/13549839.2013.870542>
- Karmaoui, A., Messouli, M., Yacoubi Khebiza, M., & Ifaadassan, I. (2014). Environmental Vulnerability to Climate Change and Anthropogenic Impacts in Dryland, (Pilot Study: Middle Draa Valley, South Morocco). *Journal of Earth Science & Climatic Change*, 05.  
<https://doi.org/10.4172/2157-7617.1000193>
- Kasraoui, S. (2021, December 28). *Minister: 45 New Small, Large Dams Under Construction in Morocco*. <https://www.moroccoworldnews.com/>.  
<https://www.moroccoworldnews.com/2021/12/346235/minister-45-new-small-large-dams-under-construction-in-morocco>
- Keith, J., & Ouattar, S. (2003). Strategic Planning, Impact Assessment, and Technical Aid: The Souss-Massa Integrated Water Management Project. *Economics Research Institute Study Paper*, 10, 1–20.
- Klose, A. (2009). Soil characteristics and soil erosion by water in a semi-arid catchment (Wadi Drâa, South Morocco) under the pressure of global change.
- Koch, N. (2020). Deep Listening: Practicing Intellectual Humility in Geographic Fieldwork. *Geographical Review*, 110(1–2), 52–64. <https://doi.org/10.1111/gere.12334>
- Kuper, M., Amichi, H., & Mayaux, P.-L. (2017). Groundwater use in North Africa as a cautionary tale for climate change adaptation. *Water International*, 42(6), 725–740.  
<https://doi.org/10.1080/02508060.2017.1351058>
- Li, T. M. (2007). The Will to Improve: Governmentality, Development, and the Practice of Politics. In *The Will to Improve*. Duke University Press.  
<https://doi.org/10.1515/9780822389781>
- Mayaux, P.-L. (2021). Layering and perpetuating: The logics of conservative reforms in Morocco's irrigation policies. *The Journal of North African Studies*, 0(0), 1–24.  
<https://doi.org/10.1080/13629387.2021.1950348>
- Ministère de l'Agriculture. (2008). *Plan Maroc Vert: Premières perspectives sur la stratégie agricole*.
- Molle, F. (2008). *Nirvana Concepts, Narratives and Policy Models: Insights from the Water Sector*. 1(1), 26.
- Molle, F., Mollinga, P. P., & Wester, P. (2009). *Hydraulic Bureaucracies and the Hydraulic Mission: Flows of Water, Flows of Power*. 2(3), 22.
- Molle, F., Tanouti, O., & Faysse, N. (2019). Morocco. In F. Molle, C. Sanchis-Ibor, & L. Avellà-Reus (Eds.), *Irrigation in the Mediterranean* (Vol. 22, pp. 51–88). Springer International Publishing. [https://doi.org/10.1007/978-3-030-03698-0\\_3](https://doi.org/10.1007/978-3-030-03698-0_3)
- Morocco—Agricultural Sector*. (2020, December 10). <https://www.trade.gov/country-commercial-guides/morocco-agricultural-sector>
- Moumane, A., El Ghazali, F. E., Al Karkouri, J., Delorme, J., Batchi, M., Chafiki, D., & Karmaoui, A. (2021). Monitoring spatiotemporal variation of groundwater level and salinity under land use change using integrated field measurements, GIS, geostatistical, and remote-sensing approach: Case study of the Feija aquifer, Middle Draa watershed, Moroccan Sahara. *Environmental Monitoring and Assessment*, 193(12), 769.  
<https://doi.org/10.1007/s10661-021-09581-2>
- Mustafa, D., & Tillotson, M. (2019). The topologies and topographies of hydro-social territorialisation in Jordan. *Political Geography*, 70, 74–82.  
<https://doi.org/10.1016/j.polgeo.2019.01.011>

- Naji, A. (2020, July 17). *The Morocco water saving program*. Wall Street International.  
<https://wsimag.com/economy-and-politics/62805-the-morocco-water-saving-program>
- Ouhajou, L. (1996). *Espace Hydraulique et Societe Au Maroc cas des systemes d'irrigation dans la vallee du dra*. Universite Ibn Zohr Publications de la Faculte des Lettres et des Sciences Humaines-Agadir, Maroc.
- Pascon, P. (1977). *Le Haouz de Marrakech: Vol. 2 tomes* (Editions marocaines et internationales.).
- Perreault, T. (2013). Dispossession by accumulation? Mining, water and the nature of enclosure on the Bolivian Altiplano. *Antipode*, 45(5), 1050-1069.
- Perreault, T. (2014). What kind of governance for what kind of equity? Towards a theorization of justice in water governance. *Water International*, 39(2), 233–245.  
<https://doi.org/10.1080/02508060.2014.886843>
- Perreault, T. (2018). Mining, meaning and memory in the Andes. *The Geographical Journal*, 184(3), 229–241. <https://doi.org/10.1111/geoj.12239>
- Province de Zagora*. (n.d.). [Agriculture monographie]. ROYAUME DU MAROC MINISTERE DE L'AGRICULTURE ET DE LA PECHE MARITIME.
- Reese, A. M. (2019). *Black Food Geographies: Race, Self-Reliance, and Food Access in Washington, D.C.* UNC Press Books.
- Royaume du Maroc, Agence du Bassin Hydraulique de Draa-Oued Noun. (2019). *Etude d'Elaboration du Contrat de Nappe de Feija*.
- Sakri, M. (2022, January 2). جمعيات تنبه الحكومة إلى انتشار واحات جهة درعة من مخاطر بيئية [News]. Hesperess. <https://www.hesperess.com/percent d8percent acpercent d9percent 85percent d8percent b9percent d9percent 8apercent d8percent a7percent d8percent aa-percent d8percent aapercent d9percent 86percent d8percent a8percent d9percent 87-percent d8percent a7percent d9percent 84percent d8percent adpercent d9percent 83percent d9percent 88percent d9percent 85percent d8percent a9-percent d8percent a5percent d9percent 84percent d9percent 89-percent d8percent a7percent d9percent 86percent d8percent aapercent d8percent b4percent d8percent a7percent d9percent 84-percent d9percent 88percent d8percent a7percent d8percent adpercent d8percent a7percent d8percent aa-percent d8percent ac-924501.html>
- Schilling, J., Freier, K. P., Hertig, E., & Scheffran, J. (2012). Climate change, vulnerability and adaptation in North Africa with focus on Morocco. *Agriculture, Ecosystems & Environment*, 156, 12-26.
- Schimmel, A. (1994). *Deciphering the signs of God: A phenomenological approach to Islam*. State University of New York Press.
- Shokr, A. (2009). Hydropolitics, Economy, and the Aswan High Dam in Mid-Century Egypt. *The Arab Studies Journal*, 17(1), 9–31.
- Silverstein, P. A. (2015). The diaspora and the cemetery: Emigration and social transformation in a Moroccan oasis community. *The Journal of North African Studies*, 20(1), 92–108.  
<https://doi.org/10.1080/13629387.2014.981998>
- Sippel, S. R. (2015). All you need is export? Moroccan farmers juggling global and local markets. *Handbook on the Globalisation of Agriculture*.  
<https://www.elgaronline.com/view/edcoll/9780857939821/9780857939821.00024.xml>
- Sneddon, C. (2007). Nature's Materiality and the Circuitous Paths of Accumulation: Dispossession of Freshwater Fisheries in Cambodia. *Antipode*, 39(1), 167–193.  
<https://doi.org/10.1111/j.1467-8330.2007.00511.x>

- Sultana, F. (2011). Suffering for water, suffering from water: Emotional geographies of resource access, control and conflict. *Geoforum*, 42(2), 163–172.  
<https://doi.org/10.1016/j.geoforum.2010.12.002>
- Sultana, F. (2015). Emotional political ecology. *The International Handbook of Political Ecology*.  
<https://www.elgaronline.com/view/edcoll/9780857936165/9780857936165.00056.xml>
- Swearingen, W. D. (1987). *Moroccan Mirages*. Princeton University Press; JSTOR.  
<http://www.jstor.org/stable/j.ctt7zvrrs>
- Swyngedouw, E. (1999). Modernity and Hybridity: Nature, Regeneracionismo, and the Production of the Spanish Waterscape, 1890–1930. *Annals of the Association of American Geographers*, 89(3), 443–465. <https://doi.org/10.1111/0004-5608.00157>
- The World Bank. (2020). *International Bank for Reconstruction Program Appraisal Document on a Proposed Loan in the Amount of EUR214.2 Million (US\$250 Million Equivalent) to the Kingdom of Morocco for a Morocco Green Generation Program-For-Results (Program Appraisal PAD 3800)*.
- U.S. Agency for International Development. (2020, December 22). *Improving Water Security and Climate Resilience in Morocco | Fact Sheet | Morocco |*.  
<https://www.usaid.gov/morocco/fact-sheets/improving-water-security-and-climate-resilience-morocco>
- USAID Water Team Case Study in Integrated Water Resources Management. (n.d.).  
[https://rmportal.net/library/content/nric/124.pdf/at\\_download/file](https://rmportal.net/library/content/nric/124.pdf/at_download/file)
- van der Kooij, S., Kuper, M., Zwarteveen, M. Z., & de Fraiture, C. M. S. (2017). A user-centred approach to irrigation performance: Drip irrigation in the Khrichfa area, Morocco. *Water International*, 42(7), 794–809. <https://doi.org/10.1080/02508060.2017.1373319>
- van der Kooij, S., Zwarteveen, M., Boesveld, H., & Kuper, M. (2013). The efficiency of drip irrigation unpacked. *Agricultural Water Management*, 123, 103–110.  
<https://doi.org/10.1016/j.agwat.2013.03.014>
- Vecchio, K. D. (2018). *Has Morocco's Groundwater Policy Changed? Lessons from the Institutional Approach*. 11(3), 25.
- Venot, J.-P., Zwarteveen, M., Kuper, M., Boesveld, H., Bossenbroek, L., Kooij, S. V. D., Wanvoeke, J., Benouniche, M., Errahj, M., Fraiture, C. D., & Verma, S. (2014). Beyond the Promises of Technology: A Review of the Discourses and Actors Who Make Drip Irrigation. *Irrigation and Drainage*, 63(2), 186–194. <https://doi.org/10.1002/ird.1839>
- Vos, J., & Boelens, R. (2018). Neoliberal water governmentalities, virtual water trade, and contestations. In *Water Justice* (pp. 283–301).  
<https://doi.org/10.1017/9781316831847.019>
- Water Scarcity and Emergency Measures to Ensure Supply*. (2022). [Presentation to Parliament]. Kingdom of Morocco, Ministry of Trade and Water.
- World Bank Involvement in the Agricultural Sector in Morocco*. (n.d.). [Text/HTML]. World Bank. Retrieved January 30, 2022, from <https://www.worldbank.org/en/country/morocco/brief/world-bank-involvement-in-the-agricultural-sector-in-morocco>
- World Bank supports Morocco's Green Generation Strategy*. (n.d.). World Bank. Retrieved May 1, 2022, from <https://www.worldbank.org/en/news/press-release/2020/12/15/world-bank-supports-moroccos-green-generation-strategy>



Zemni, S., & Bogaert, K. (2011). Urban renewal and social development in Morocco in an age of neoliberal government. *Review of African Political Economy*, 38(129), 403–417.  
<https://doi.org/10.1080/03056244.2011.603180>

## **Jamie Fico**

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Syracuse University Maxwell School of Citizenship and Public Affairs  
144 Eggers Hall, Syracuse, NY 13244

### **EDUCATION**

- 2022 M.A. Geography, Syracuse University
- 2017 B.A. Middle Eastern Studies and Global Studies, University of Virginia  
Thesis: *The Changing Players of Humanitarian Aid Operations in Yemen*
- 2016 Study abroad: Intensive Arabic and North African Studies Program  
(ARANAS), Ifrane, Morocco

### **GRADUATE ASSISTANTSHIPS**

- 08/21 – 05/22 **Global Environmental Change (GEO 215)**  
Syracuse University, Department of Geography & the Environment– Syracuse, NY  
*Teaching Assistant*
- 09/20 – 05/21 **Syracuse Community Geography Program**  
Syracuse University, Department of Geography & the Environment– Syracuse, NY  
*Research Assistant*

### **PUBLICATIONS**

- 2021 Fico, J. (2021, December 15). *What Happens to Oasis Farming When the Water Runs Out?* Jadaliyya - جدلية. <https://www.jadaliyya.com/Details/43606/What-Happens-to-Oasis-Farming-When-the-Water-Runs-Out>

### **CO-AUTHORED PUBLICATIONS**

- 2022 Monitoring long-term land use, land cover change, and desertification in the Ternata oasis, Middle Draa Valley, Morocco. *Remote Sensing Applications: Society and Environment*. Elsevier. (co-authored with A. Moumane et al.)
- 2020 Ecological Sanitation (ECOSAN) in Oasis Communities: Lessons From a Pilot Project in Five Villages of Draa Tafilalet, Morocco. *The Handbook of Research on Environmental Education Strategies for Addressing Climate Change and Sustainability*. IGI Global. (co-authored with A. Karmaoui et al.)

### **GRANTS & AWARDS**

- 2022-2023 Fulbright U.S. Student Research Award- Morocco
- 2021-2022 The American Institute for Maghrib Studies (AIMS) short-term research grant (\$3,000)
- 2020-2021 Roscoe-Martin Fund for Graduate Research from the Maxwell School of Citizenship and Public Affairs at Syracuse University (\$1,200)
- 2019-2020 USAID/Peace Corps Small Project Assistance (SPA) Grant (\$1,500)
- 2012 STARTALK Arabic Language Program

### **CONFERENCE PRESENTATIONS**

- 05/21 Presented a paper on the desert blues movement in southeast Morocco for the Comparative Desert Imaginations Symposium, Williams College (via Zoom).

## SERVICE POSITIONS AND INTERNSHIPS

01/21-12/21 **Intern, Near East Foundation**, Syracuse NY

01/21-12/21 **Graduate Student Representative**

Syracuse University, Syracuse NY

## PREVIOUS EMPLOYMENT

09/18-03/20 **Peace Corps Morocco**, Tamezmoute, Morocco

*Youth Development Volunteer:*

- Led English classes for participants ages 7-40 of varying literacy levels.
- Designed and led cross-cultural clubs and participatory environment workshops with high school youth.
- Designed a youth center library with Moroccan counterparts funded by USAID.
- Organized series of climate change workshops and tree plantings with the High Atlas Foundation for 3 farming associations and 1 women's group.

10/17-08/18 **Catholic Relief Services**, Baltimore, MD

*Project Associate*, Institutional Donor Engagement:

- Provided grant management support by reviewing and submitting reports, liaising with country programs and donors, and advising on compliance for a \$2 billion portfolio of U.S government grants across Europe, the Middle East, Latin America, Africa, and Asia. Provided business development support by writing and reviewing proposals for compliance, designing Agency templates for proposal annexes, and writing a donor capacity statement for new business opportunities.

06/17-10/17 **Catholic Relief Services**, Baltimore, MD

*Intern*, Food Security Donor Engagement:

- Prepared and presented webinars outlining key donor guidance on annual reporting for multiple country programs. Wrote and edited key documents for the agency including a "Food Security Donor Capacity Statement" to be used in new business opportunities for the Agency. Designed a standardized grant tracking system in Excel to display the history and value of USAID awards for the Food Security Donor Engagement Unit. Participated in high-level department meetings and workshops on food security policy, proposal development, and donor engagement.

## VOLUNTEER ACTIVITIES

04/20-07/20 **Corps Africa Morocco**

*Proposal Evaluator*- supported proposal development for 3 African volunteers' community development projects in Morocco.

## CERTIFICATIONS

2019 Peace Corps Project Design and Monitoring

2019 Peace Corps Library Design

2018 USAID Rules and Regulations: Grants and Cooperative Agreements

## LANGUAGES

Moroccan Arabic- Advanced

Modern Standard Arabic- Advanced

Tamazight (Berber dialect)- Intermediate low