



## **Climate Change and Water Security in Morocco: Challenges and Responses**

In its latest report, World Resources Institute asserted that “the Middle East and North Africa (MENA) is the most water-stressed region on earth”.<sup>1</sup> It identified two categories of the most vulnerable countries to water security: that of the extremely high baseline water stress category (including mostly Middle Eastern and North African countries such as Iran, Lebanon, Qatar, Saudi Arabia and Libya) and that of the high baseline water stress (comprising also many Middle Eastern and North African countries such as Morocco, Algeria, Tunisia, Turkey, Egypt and Iraq).<sup>2</sup>

Water security affects a whole range of issues, from drinking water to agriculture. In the MENA region, North African countries are particularly vulnerable in this regard, and Morocco is among the most vulnerable North African countries. Morocco lacks oil and gas resources. Libya and Algeria dispose of to compensate for water security, and its economic and social consequences. Additionally, the size of Morocco’s population (over 35 million people) is more than that of Tunisia (11 million people). Morocco also relies on agriculture as a major source of GDP and employing sector.

In this paper, I will focus on the challenges climate change and water security present for Morocco. The latter is traditionally an exporting country of migration to Europe. The specific objective of this study is to investigate whether climate change, water security, and drought *cause or correlate with migration*. The current narrative displayed on climate change, by many international actors, promote the idea that climate change is a cause of migration. I argue that a close analysis of data in Morocco does not support climate change, water security and drought as direct causes, and therefore inevitable, of immigration. It is maintained here that fragile semi-urban and urban structures, unable to offer prospects for young people in the cities, are the major push factors of Moroccan immigration. In spite of the challenges at stake, the

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<sup>1</sup> 17 Countries, Home to One-Quarter of the World's Population, Face Extremely High Water Stress <https://www.wri.org/blog/2019/08/17-countries-home-one-quarter-world-population-face-extremely-high-water-stress> (last accessed on 30 September 2019)

<sup>2</sup> *Idem*.

consequences of climate change, water security and drought for rural economy are balanced by a successful governmental policy in this regard. This is a participant observation study conducted in Tangiers in August 2019<sup>3</sup>, and its purpose was to gain insights through interviews and field notes on the links between climate change and migration in Morocco.

## **1. Climate change and drought in Morocco**

Morocco endured recurring droughts over the previous decades, but water stress is yet to dramatically increase. To take a case, the area of the second largest reservoir in Morocco, Al Massira, has been reduced by 60% in the last three years. This will affect particularly agriculture, the source of living of hundreds of thousands of people in the region of Doukkala and Casablanca, the economic centre of the country.<sup>4</sup> Knowing that the percentage of the population employed in agriculture is about 33% of the Moroccan workforce, agriculture remains one of the largest contributors to Gross Domestic Product (14%), ahead of tourism and industry, and as a result, official projections have already anticipated a slowdown in growth which would fall to 2.7% in 2019 - compared to 3% in 2018 and 4% in 2017.<sup>5</sup> Moreover, Morocco's urban water demand is expected to increase by 60 to 100 percent in most major cities by 2050, and the consequences could be disastrous.<sup>6</sup>

During the summer of 2019, the Moroccan Ministry of Agriculture announced that because of drought “the final production of cereals is estimated at 52 million quintals, a decrease of 30% compared to an average year (75 million quintals) and that in May, the rainfall, of 290.5 mm, was 11% lower than the average for 30 years (326.3 mm)”.<sup>7</sup>

According to a 2017 report of the Economic, Social and Environmental Council (ESEC), “Morocco's water potential is estimated in the average year to be around 22 billion cubic meters per year, or the equivalent of nearly 700 cubic meters per inhabitant per year, less than the threshold of 1,000 m<sup>3</sup> / inhabitant / year, commonly accepted as the threshold below

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<sup>3</sup> Conducted between 19 and 25 August 2019, in the neighbourhood of al-'Irfan II ( inhabited by both Moroccans and Sub-Saharan Africans) although violent clashes between the two groups, including murder, led to security forces to intervene and drive many Sub-Saharan Africans to southern regions in Morocco.

<sup>4</sup> Le stress hydrique s'apprête à augmenter au Maroc

<https://www.agrimaroc.ma/stress-hydrique-augmente-maroc/> (last accessed on 30 September 2019)

<sup>5</sup> Maroc : la sécheresse fait craindre une production céréalière en baisse de 30 %

<https://www.jeuneafrique.com/813457/economie/maroc-la-secheresse-fait-craindre-une-production-cerealiere-en-baisse-de-30/> (last accessed on 30 September 2019)

<sup>6</sup> Le stress hydrique s'apprête à augmenter au Maroc

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which water shortages and latent crises occur”.<sup>8</sup> Concurrent reports expect that “water scarcity will reduce GDP in Morocco by 14 percent by 2050 and the annual share of water for the Moroccan citizens threatened to decline to 500 cubic meters in two years, compared to 750 cubic meters minimum acceptable”.<sup>9</sup>

Drought and water stress impact all regions of the country including the north and north-east of Morocco, two gates of illegal migration to Europe and historically providing millions of immigrants, in addition of having significant needs as tourist and new industrial areas.<sup>10</sup>

While the situation is quite critical in the north, however it receives in average 800 mm of rain annually, the south-east of the Kingdom of Morocco lives in agony: “a severe shortage of potable water for long years because of the quasi absence of rain, as there are some wells as deep as 400 and 500 meters without a drop of water, makes it difficult to live in these areas known for their high temperature due to their semi-desert geographical location”.<sup>11</sup> The human factor plays a role in the depletion of underground water, for example by active melon farming which needs irrigation and lack of governmental action in the area. Moroccan researchers and engineers agree that “drought and the human factors threaten these areas with lean years, thus affecting the ecological balance and threatening the future of the inhabitants in this region, expecting movements of mass migrations towards the interior areas”.<sup>12</sup>

## **2. Are Climate change and drought push factors of International migration?**

A good answer to this question was provided by the FAO in 2018 in the previously mentioned report on *Water Stress and Human Migration*. People who rely on agriculture, and we have seen how a third of Moroccans do so, are impacted directly by water stress, and migrate primarily to cities. As put by FAO Director-General José Graziano da Silva “some people may see no alternative to migrate and in search of better livelihoods. But migration should be a choice and not the only remaining option”.<sup>13</sup> The FAO does not see a causal interaction between

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<sup>8</sup> Le Maroc à la frontière du stress hydrique

<https://www.leconomiste.com/article/1044829-le-maroc-la-frontiere-du-stress-hydrique> (last accessed on 30 September 2019)

<sup>9</sup> al-Jafaf yuhaddid iqtisad al-Maghrib

<https://www.alhurra.com/a/499180/المغرب-الجفاف-يلاحق-القطاع-الزراعي.html> (last accessed on 30 September 2019)

<sup>10</sup> *Idem*.

<sup>11</sup> Tahdid al-jafaf lil-janub al-sharqi bi-l-mamlaka yujaddid matlab bina' al-sudud

<https://www.hespress.com/regions/441069.html> (last accessed on 30 September 2019)

<sup>12</sup> *Idem*.

<sup>13</sup> Anticipating Water Woes Can Ease Migration Burden

<http://www.fao.org/news/story/en/item/1107387/icode/> (last accessed on 30 September 2019)

the two, and rather highlights as a missing link in connecting water stress to migration, that of the human factor, namely the absence of structures of transition in the urban centres. <sup>14</sup>

Unequal social policies and ineffective strategies pile up young and unqualified males of rural origin in semi-urban areas. These internal migrants create belts of poverty and become “social refugees”, working as car guards, street vendors, cleaners, etc. Unable to adapt to the market because of lack of training, and unwilling to endure a life of hard labour and fragile professions, some of them envision migration to Europe as the solution, but as I will show next, this is far from being the dominant group.

Currently, there are two groups of candidates to migration from Morocco to Europe. On the one hand, some 40,000 Sub-Saharan Africans who obtained residency in Morocco (and others who live illegally in Morocco) and postpone their journey to Europe until better conditions are available. Socio-economic data reveals that only 4.07 % of the Sub-Saharan Africans in Morocco are of rural origin while 91.42% are of urban origin and 4.51 % are of semi-urban origin. Another important finding was that more than 87% have finished secondary or university studies.<sup>15</sup> This is a clear indicator that climate change and drought are not push factors of international migration, but rather the incapacity of urban economy to meet the expectations of young people.

Milieu de résidence dans le pays d'origine	Pourcentage
Rural	4,07
Urbain	91,42
Péri-urbain	4,51
Total	100,00

Niveau d'éducation	Pourcentage
Néant	9,06
Niveau primaire	4,24
Niveau secondaire	37,43
Niveau supérieur	49,27
Total	100,00

Source: Mourji *et al.*<sup>16</sup>

Fouzi Mourji *et al.* demonstrated that the Sub-Saharan Africans in Morocco are “relatively of affluent backgrounds and possess a certain level of education. They are living in urban areas that have the necessary means to finance their migration. . . . migrants are more likely

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<sup>14</sup> *Idem.*

<sup>15</sup> Fouzi Mourji, Jean-Noël Ferrié, Saadia Radi, Mehdi Alioua, “Les migrants subsahariens au Maroc”, Rabat, Konrad-Adenauer-Stiftung, 2016. p. 26.

<sup>16</sup> *Idem.*

to be urban with secondary education”.<sup>17</sup> This finding shows the correlation between urban, education and the migratory project established by other studies on Sub-Saharan African migration in Morocco and discards the link established between climate change and droughts, which affect rural areas, and migration.

As for Moroccans, a study conducted in Spain on the socio-demographic profiles of Moroccan migrants in Andalusia, shows that one-third has completed high school, and another 10% have a university education, (29%) obtained elementary education. 26.7% were unemployed prior to departure and 45.6% were employed, while 18.6% were students, the majority are coming from the cities of the North and the Atlantic Ocean.<sup>18</sup> This result joins other studies, which proved that the motivations for immigration are not a quest for material subsistence. The Moroccan immigrant typically lives in a city, has a job and is relatively educated, but low-paid and “the immigrant justifies migration by the will to free himself from the straitjacket of poverty in which he is maintained despite his active status”.<sup>19</sup>

### **3. Morocco and the strategies of adaptation to climate change**

So far this paper has focused on the problems of climate change, drought and their effects on migration. The following section will discuss how Morocco attempts to solve these problems and which kind of adaptation strategies it endorses in this concern.

It would be fair to state that the Moroccan government has options to reduce or even absorb the impact of water stress. Actually, it makes plans and takes action in this regard. A National Water Plan for 2050 was enacted to ensure the water security of Morocco, through a dam construction policy, the desalination of seawater, the capture of rainwater, the demineralization of brackish water and the reuse of treated wastewater. However, the progress in these actions is slow, especially in the south-east, the east and the north regions of Morocco.<sup>20</sup>

Let us start with the problems of water security, for which several solutions have been developed: creation of new hydraulic dams for surface waters, digging new boreholes for the mobilization of deep aquifers, desalination of seawater for freshwater supply to cities, recovery and reprocessing of wastewater for irrigation and industry, use of brackish water for industry,

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<sup>17</sup> Fouzi Mourji *et al.*, “Les migrants subsahariens au Maroc”, 2016. p. 26.

<sup>18</sup> Mohamed Berriane and Aron Cohen, “Regards croisés sur la migration marocaine en Andalousie à travers ses origines géographiques, ses profils socio-démographiques et ses expériences migratoires” *Méditerranée: Revue géographique des pays méditerranéens*, N° 113, 2009, p. 64.

<sup>19</sup> *Ibid.*, p. 65.

<sup>20</sup> Stress hydrique: le danger guette le Maroc <https://www.bladi.net/stress-hydrique-maroc.58175.html> (last accessed on 30 September 2019)

injection of surface water into groundwater, wastewater treatment and protection of resources against pollution, water savings in large areas consumer sectors, water savings in agriculture and the industrial sector, savings in drinking water consumption,<sup>21</sup> replacement of groundwater extraction for overexploited layers (85 million m<sup>3</sup> / year) with surface water extraction, artificial recharging of aquifers with a capacity of 180 million cubic meters/year, urban sewerage connections by 75% in 2016 and wastewater treatment by 50% in 2016.<sup>22</sup>

Other adaptation strategies are endorsed in the agriculture and include recasting of the traditional agricultural calendar, the use of selected seeds and choice of varieties adapted to the climate, the reconversion and repositioning of crops, widening of irrigation (application of complementary irrigation), or intensification of irrigation (application of total irrigation), generalization of optimal irrigation techniques, soil protection against erosion, pollution and desertification,<sup>23</sup> localization of irrigation techniques in site-specific irrigation on 550,000 ha, delegation of the public service of irrigation water to a public/private sector partnership, development of hydroponics for dam-related areas with an area of approximately 160,000 ha, at a total cost of US \$ 2.1 billion.<sup>24</sup>

These strategies are complemented with other ones in the sectors of forest and fishing. Thus, forests were reshaped over an area of 20,000 hectares, and the fishing sector reached 95% of sustainable managed marketed species, which reduced rejections by 90% from the current level.<sup>25</sup>

In addition to these strategies, Morocco built “one of the largest solar farms in the world near Ouarzazate, a city known as the gateway to the Sahara Desert, which has been providing electricity to approximately 650,000 people since its launch in 2016”.<sup>26</sup> Thanks to these efforts, Morocco ranked second, and first in Africa, in Climate Change Performance Index 2018 and 2019, following Sweden. The Climate Change Performance Index is published annually by Germanwatch, the New Climate Institute and the Climate Action Network.<sup>27</sup>

The Climate Change Performance Index describes Morocco’s achievements as follows:

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<sup>21</sup> René Arrus, Nathalie Rousset, “L’agriculture du Maghreb au défi du changement climatique: Quelles stratégies d’adaptation face à la raréfaction des ressources hydriques?”, *RePEc*, 2007, p. 7.

<sup>22</sup> Isham al-mamlaka al-maghribiyya fi mukafahat al-taghayyur al-munakhi  
<https://www.4c.ma/ar/ltgyr-lmnkhy-blmgrb> (last accessed on 30 September 2019)

<sup>23</sup> René Arrus, Nathalie Rousset, “L’agriculture du Maghreb au défi du changement climatique”, p. 7.

<sup>24</sup> Isham al-mamlaka al-maghribiyya fi mukafahat al-taghayyur al-munakhi  
<https://www.4c.ma/ar/ltgyr-lmnkhy-blmgrb> (last accessed on 30 September 2019)

<sup>25</sup> *Idem*.

<sup>26</sup> Morocco ranked second in Climate Change Performance Index 2018  
<https://www.unenvironment.org/news-and-stories/blogpost/morocco-ranked-second-climate-change-performance-index-2018> (last accessed on 30 September 2019)

<sup>27</sup> *Idem*.

Morocco moves up one place to become the second best-performing country in this year's CCPI, ranking fifth<sup>28</sup>. The country has significantly increased the share of renewables over the past five years and has increased new renewable energy capacity. With the connection of the world's largest solar plant and multiple new wind farms to the grid, the country is well on track for achieving its target of 42% installed renewable energy capacities by 2020 and 52% by 2030. In addition, its low GHG emission level and ambitious NDC cumulate to a high rating in the GHG emissions category. Morocco has also maintained its high ranking in the Climate Policy category. While national experts observe some delay in the implementation of national policies, they acknowledge the consultative process of developing a long-term strategy for 2050, which among other initiatives could make the country a policy frontrunner on the international level. <sup>29</sup>

#### **4. Morocco and the strategies of fighting illegal migration**

Morocco has been a major source of legal and illegal migration to Europe for more than 50 years. In the course of 2018, it became the main gate of illegal immigration from Africa to Europe after Italy tightened its policy towards attempts from Libya and Tunisia. To assure no waves of illegal migration submerge Spain, the EU and Spain funded and cooperated with the Moroccan government to fight illegal migration from its coasts. Morocco's efforts in this regard are regularly praised by the EU and the Spanish government.

Official data of 2018 is available now about these efforts. The Moroccan government said it "prevented 89,000 illegal immigration attempts in 2018, up 37% from a year earlier and dismantled more than 229 migrant smuggling networks. 80% of those intercepted illegal immigrants last year were of foreign nationality, 29,715 were rescued at sea, while 5,608 were returned to their countries of origin."<sup>30</sup> Official data from the Moroccan government about the period between January and August 2018 provides more details:

At the end of August 2018, 54,000 attempts of emigration were aborted in Morocco against 39,000 during the same period of 2017. Moroccans account for 13% of migrants in

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<sup>28</sup> The three first places are not awarded.

<sup>29</sup> Jan Burck et al., *Climate Change Performance Index: Results 2019*, Berlin, Germanwatch, 2019, p. 16.

<sup>30</sup> al-Maghrib bawwabat al-tasallul ila Urubba

<https://arabic.euronews.com/2019/01/18/morocco-foils-89-000-illegal-migration-attempts-in-2018> (last accessed on 30 September 2019)

2018, or 7,100 people. They were 8,200 in 2017, or 20% of all migrants arrested. The number of Moroccans who attempted or succeeded in illegal emigration was 13,100 (of which 7,100 have been stopped by the authorities). In 2017, the number of Moroccans who attempted or succeeded in illegal emigration amounted to 10,883 (of which 8,200 had their attempts halted by the authorities). Thus, the number of illegal Moroccan migrants who succeeded more than doubled (123% increase). The number of Moroccans who made attempts (successful or not) increased by 20.3%<sup>31</sup>

In spite of the measures taken to fight illegal migration and to reduce migration in general, thousands of Moroccans illegally migrate to Europe yearly and dozens of thousands migrate as students, workers or via family reunification, mostly from urban areas.

## **Conclusion**

This study has shown that water stress and drought do not explain the decision to migrate. An analysis of the case of Morocco reveals that there are other variables (ineffective social policies and internal migration) which correlate to push some youths to consider migration to Europe. In sum, it is the lack of effective development and not climate change, which should be considered as push factors to international migration.

Morocco faces two challenges, that of water shortage and social inequality. The problem of water stress is the result of climate change and drought, and in this concern, the National Water Plan for 2050 bears many hopes, and several effective strategies are adopted. The EU and Hungary should consider technical and practical ways to help develop further water sources and reduce water stress in Morocco. Sustained water security is a concrete issue, which affects important segments of population and the rural economy. The second challenge lies in social inequality (and not of poverty) between classes and regions, and is the consequence of ineffective social policies of development in the urban areas, since the independence. This is bigger a fish to fry.

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<sup>31</sup> Emigration clandestine du Maroc: enfin des chiffres officiels  
<https://www.medias24.com/MAROC/SOCIETE/185962-Emigration-clandestine-au-Maroc-enfin-des-chiffres-officiels.html> (last accessed on 30 September 2019)