

Chapter 3

Environmental Change and Migration in Morocco: What Has Been Done So Far?



Before we delve further into the relationship between migration and environmental change, it is important to gain more insight into the migration history of Moroccans going abroad and the specific environmental changes faced by people in Morocco. Therefore, in the first part of this chapter, we outline the history of Moroccan migration to Europe in general and to Belgium in particular. Morocco provides an interesting case of study with regard to environmental migration, as in the second half of the twentieth century, Morocco evolved into one of the world's leading emigration countries. Moroccan migration is one of the unexpected outcomes in which colonial migration, labour migration, family reunification, and, most recently, undocumented migration combine. Hence, there is a high degree of internal differentiation and dynamics within the migrant population of Morocco (De Haas 2007).

Because Moroccan migration has many consequences for Moroccan society related to development, family, and gender (Schilling et al. 2012), this is also covered in this chapter. In the second part of this chapter, we discuss current and future environmental/climate changes in Morocco that may give rise to migration. Morocco's inhabitants are already experiencing deteriorating environmental conditions and shocks that could endanger their livelihoods, which can create migration movement (Wodon et al. 2014). Finally, in the third part, we discuss the adaptation strategies implemented by the Moroccan government and local or international organizations to better respond to and prepare for (future) environmental changes within Morocco. This chapter as a whole, therefore, seeks to set the contextual background of the different case studies that constitute the empirical material of this book and focus mainly on Morocco but include insights from the Moroccan diaspora in Belgium as well (cf. Chap. 4).

3.1 Morocco's Migration History

3.1.1 *The Start of Migration from Morocco to Europe*

Already in the pre-colonial population history of Morocco, there were centuries-old seasonal and circular migration patterns between certain rural areas – such as between the Rif Mountains and the southern oases – and the relatively humid regions and imperial cities of western and northern Morocco (De Haas 2005). The French colonization of Algeria in 1830 created entirely new migration patterns in the Maghreb region. Thereafter, the increasing demand for wage labour on farms and in northern cities, such as Algiers and Oran, attracted an increasing number of seasonal and circular Moroccan migrants in the second half of the nineteenth century (De Haas 2007; Fadloulah et al. 2000). The French-Spanish protectorate over Morocco was formally established in 1912. While the Spanish protectorate was mainly limited to the ‘Western Sahara’ and the northern Rif mountain zone, the French protectorate took control of the centre of Morocco. Hereby, the integration of autonomous tribes into the economy took place and growing cities along the Atlantic coast became a destination for countryside-to-city migration. This French-Spanish partition fundamentally influenced migration patterns (Bilgili and Weyel 2009) and its importance was clearly reflected in them during both world wars. Starting from World War I, Moroccan migration to Europe began mainly under the lead of France. Particularly, a crucial lack of manpower in France during the first world war led to the active recruitment of Moroccan men, primarily from the southwestern region of Sous (Agadir and Tiznit), for the French army, industry, and mines (Bonnet and Bossard 1973). Labour shortages during the second world war also led to the recruitment of Moroccan men in the French-occupied zone (Bidwell 2012). As France stopped recruiting Algerian workers during the Algerian war of independence (1954–1962), the migration of factory and mining workers from Morocco increased (De Haas 2005, 2007).

The late 1950s and 1960s were characterized by a great demand for Moroccan workers, not only in France but throughout Western Europe. Particularly, rapid economic growth in Western Europe led to the expansion of unskilled labour shortages in sectors such as industry, mining, construction, and agriculture. The migration of thousands of Moroccans was initiated by France, Belgium, Germany, and the Netherlands through bilateral agreements signed after Morocco gained independence (Ennaji 2014). This organised migration towards Western Europe boomed, especially from 1967 to 1972 (Reniers 1999). Thus, Moroccan immigration to Europe began here as labour migration to meet the labour shortages in the coal mines, but in the end, Moroccan migrants wound up in more regions and sectors (Timmerman et al. 2017).

In 1973, Europe decided to limit migration because of economic recession brought on by the oil crisis that caused rising unemployment. As a result, Western European countries closed their borders to new labour migrants and introduced a migration freeze. However, this does not mean that the migrant inflow from

Morocco stopped. Family reunification procedures became for most Moroccans the only – albeit successful – way to migrate. Furthermore, these new restrictions on migration in Europe led to more irregular migration, temporary migration, and migration toward North American and Gulf Countries. In other words, migration within the framework of family reunification supplanted individual migration in Western Europe. This was authorized because family was supposed to facilitate the integration of the migrant in the socioeconomic environment of the host country (Ennaji 2014). What is remarkable during these first migration waves towards Western Europe is that most host societies expected that labour migration would only be temporary and that people would return to their countries of origin when no more labour shortages were noted. Similarly, most of the migrants themselves planned to return after saving enough money, in accordance with an old tradition of circular migration. But since Morocco suffered even more from the high oil prices and the global economic recession than the European countries, many Moroccan migrants did not return and remained permanently in Europe (De Haas 2005, 2007). In addition to the deteriorating economic situation in Morocco, the country also entered a period of increasing political instability and repression, with two failed coups against King Hassan II in 1971 and 1972 (Braun 1978). This led many migrants to decide that it was safer to stay in Europe and bring their families too.

Thus, paradoxically, after the migration halt of 1972–1973, a large wave of migration to Europe was initiated through family reunification procedures. It was at this moment that people (both migrants and policymakers) increasingly realized that these migrants' stay would no longer be temporary in these Western European countries but for a longer period of time. Return migration among Moroccans was low compared to other immigrant groups in Europe. Furthermore, the high degree of naturalization of nationality in the host countries, especially among second-generation Moroccans, shows the permanent nature of Moroccan migration in Europe (Reniers 1999). Family reunification still plays a major role in the migration patterns of Moroccans to Europe. Gender parity in the Moroccan migration populations has therefore been achieved through family reunification in the traditional recipient countries. More recent research by Timmerman et al. (2017) shows that although new forms of migration (e.g., students, undocumented migrants) are emerging, Moroccan migrants are still mainly migrating to Europe based on family reunification procedures and especially through marriage migration.

When looking at the migration from Morocco to Western Europe, we should note that this affected Moroccan life significantly, and its impact varied across regions in Morocco. For example, in 2007, the number of Moroccans living abroad had more than doubled (3.3 million) compared to 1993 (1.5 million); 86.2% of Moroccans abroad lived in Europe. However, we should note that not all regions in Morocco are equally affected by the Moroccan diaspora (De Haas 2005, 2007). According to De Haas (2007), three areas of departure can be distinguished for migrants going to Europe: the eastern part of the Rif Mountains, the south-western Sous region, and Atlantic Morocco (mostly river oases to the southeast of the High Atlas).

The Rif area – Nador and Al Hoceima provinces – became one of the most important emigration areas in Morocco (Bossard 1979; Reniers 1999): in 1971,

nearly 19% of the active male population of Nador lived abroad. The Rif region also has a distinctive pattern in terms of destination countries. For example, France received only one-third of Berber emigrants from the north, while it received three-quarters of emigrants from other Moroccan regions. This was strongly determined by the colonial history of the north. Most of the northern provinces were never part of the French protectorate, and as a result migration to France was not an option. Spain, the occupying power until 1956, was at that time a country of emigration and therefore was not a valid alternative as region of destination. As a result, most emigrants from the northern Rif regions live in Germany, the Netherlands, Belgium, and France (Reniers 1999). A second region of departure that needs to be distinguished is Atlantic Morocco – Casablanca, Marrakech, Rabat, Agadir – which became heavily involved in international migration to Europe from the 1960s onwards. This migration was primarily oriented towards France, although there have also been various groups who migrated to the Netherlands and Belgium. Thirdly, a last important emigration area of Morocco is the Souss Valley between the High and Anti-Atlas – the provinces of Agadir, Taroudannt and Tiznit, Ouarzazate, and the northern provinces of Al Hoceima, Nador and Oujda. Soussi also migrated to Algeria from the nineteenth century and as labour migrants and soldiers to France since early colonial times (De Haas 2005, 2007). This was also the first area involved in the international recruitment of guest workers in the 1960s. Apart from these three regions of departure, we should note that the rest of the country is only marginally involved in migration to Europe (Reniers 1999). This also affects their migration aspirations and trajectories as well as the established cultures of migration.

To summarize the migration history of Morocco, there was little migration from Morocco abroad, and in particular to Europe, before the beginning of the twentieth century. Moroccan immigration to Europe began as a labour-related migration for the coal mines. After the migration stop in 1973, immigration from Morocco, which was just a young migration movement, continued in the form of family-reuniting and family-forming. Furthermore, it is important to note is that there is a spatial distribution of Moroccan migrants, both in the country of origin and the countries of immigration.

3.1.2 The Vision and Strategic Use of Migration by the Moroccan Government

During the post-independence period that started in 1956, the Moroccan government encouraged migration for both political and economic reasons. International migration was seen as a way to reduce poverty and thereby prevent political tensions. Since Moroccans from the Berber regions had the reputation of being rebellious to central government, the Moroccan state primarily encouraged migration from such regions (De Haas and Plug 2006). Migrants, whose stay abroad was considered to be temporary, were seen as innovative development agents who would help Morocco with economic recovery. Additionally, the Moroccan government saw migration as

an instrument for national economic development (Mahieu et al. 2017). For example, migration abroad would have relieved pressure on the domestic labour market, causing a backflow of foreign currency.

During this period, the Moroccan state explicitly addressed all people of Moroccan descent as 'nationals' and discouraged their integration in recipient countries until the early 1990s. With such a policy, the government wanted to prevent Moroccan migrants from organizing themselves politically, and the integration of migrants in immigrant countries was seen as jeopardising vital money transfers (De Haas 2009; De Haas and Plug 2006). The Moroccan government acknowledged in the early 1990s that such a policy increased the sense of mistrust among migrants towards the Moroccan state. Fearing a future decline in remittances that are vital to the Moroccan economy, the Moroccan government adopted a more positive attitude towards the integration of Moroccans abroad (Kapur 2005; Mahieu et al. 2017). Furthermore, a new monetary policy has been pursued in Morocco since the late 1980s, with no restrictions on foreign currency exchange and the repatriation of money. Morocco has opened many banks in European countries with strong Moroccan communities (Refass 1999).

In contrast to the overall increasing contribution of migration to the Moroccan development, the remittances have differential impacts on the resources of the families left behind. Remittances are in general sent within family networks, and therefore, reinforce (existing) inequalities between families. Family members who receive remittances and have extensive migrant networks became increasingly prosperous, compared to those without access to migrant networks or who do not receive remittances or both. Consequently, these families influence other people (usually family members, friends and neighbours) to follow the migrant's footsteps, prompting new migrants to aspire to leave the country for Europe. Interestingly, this effect of migration does not automatically increase migration aspirations. Due to the presence of these remittances, being part of migration networks and receiving remittances can reduce the need to migrate and hence, limit the exodus from the countryside and international migration (De Haas and Plug 2006; Refass 1999).

To conclude, the Moroccan government has made it easier to send money to people living in Morocco, rendering migration very important for the country's economic growth. Without Moroccan remittances, poverty would have been much higher. Therefore, a new monetary policy has been pursued in Morocco since the late 1980s, with no restrictions on exchange and the repatriation of money. This has not only affected the development of the Moroccan state, but also the (re) distribution or widening of wealth and inequalities across the Moroccan population, impacting their migration aspirations in various ways.

3.1.3 Specific Migration History from Morocco to Belgium

Although this migration history to Europe also applies to Belgium, some local specificities should be noted. The first phase of Moroccan migration to Belgium was primarily a matter of individuals who dared to take risks. As a result, there were

only 461 Moroccan nationals registered in Belgium in 1960 (Timmerman et al. 2017). This first phase of ‘pioneer migration’ in Belgium ended in the early 1960s with the signing of bilateral agreements covering Morocco and Turkey, like in the rest of Western Europe. After that, migration was effectively started between 1964 and 1974 (Ennaji 2014), a period described as the second phase that of the ‘novice chain migration’. By the mid-1970s, when the migration stop was introduced, 40,000 people with Moroccan nationality already lived in Belgium. However, only a minority of immigrants used official immigration procedures. The third phase (1974–1989) is seen as the ‘flourishing chain migration’ since the number of Moroccan immigrants risen to 140,000 by 1989 (Timmerman et al. 2017). While labour migration had indeed stopped due to the oil crisis, immigration continued in Belgium largely on the basis of family reunification, as in the rest of Europe (Bilgili and Weyel 2009). This also resulted in intense transnational networks, in particular between regions of origin in Morocco and destination in Belgium. Such networks include a substantial exchange of information that can facilitate the migration process of potential migrants. Subsequently, there was a fourth phase, namely that of ‘late chain migration’. In Belgium, the so-called Fast Belgian Law entered in 1989, allowing foreigners to acquire Belgian nationality in a very short time, which was also the case for Moroccan migrants (Timmerman et al. 2017). While in 1992 more than 80% of the new Belgians with Moroccan nationality in Belgium was born, more than half of those nationality changes since 2000 refers to persons born abroad (Schoonvaere 2014). In the Belgian context today, the profile of Moroccan immigrants is becoming increasingly diverse. The majority of Moroccan immigrants in Belgium today still enter on the basis of family reunification, mainly by marriage migration, however the proportion of students, migrant workers, and so-called irregular migrants is increasing. In addition, in the last years more highly skilled individuals and more women belong to this group of newcomers (Timmerman et al. 2017).

Like more general migration patterns from Morocco to Europe, there seemed to be a very specific spatial distribution of Moroccan migrants, coming from specific regions of origin in Morocco and settling in specific regions of destination in Belgium. More than 40% of Moroccans living in Belgium reported having spent their youth in one of the two provinces of the Rif – Nador or Al Hoceima – and more than two-thirds of them grew up in the countryside or in a small town. In 1970, the proportion of the active male population abroad reached almost 50%, of which 13% lived in Belgium. Emigration from Arabic northern provinces – Tangier, Tetouan, and Oujda – has been important because these Moroccan provinces, along with the Rif, are responsible for 80% of Moroccan migration to Belgium. These migrants have largely an urban origin – which in Tangier’s case was genuine since it has long been a province with a free trade zone with an important international port. As mentioned above, the Souss-valley between the High and Anti Atlas (provinces of Agadir, Taroudant, and Tiznit) are also a prominent emigration area of Morocco, but Belgium was less important as a destination region for this group of migrants (Reniers 1999).

The settlement of Moroccans in Belgium is also geographically dispersed. Moroccan migrants who arrived in the 1960s have settled mainly in one of the 19 municipalities of the Brussels Region; in 1971, 54.7% of the population with Moroccan nationality lived in the Brussels Region. In many Brussels municipalities there is still a strong concentration of the population of Moroccan origin. For example, the number of people of Moroccan origin in Molenbeek in 2009 was 11 times higher than percentage of people of Moroccan origin in the Belgian population. In Sint-Joost, Koekelberg, and Anderlecht, the number of people born with the Moroccan nationality is seven times higher than the concentration of the same population on Belgian territory. In other Brussels municipalities, such as the City of Brussels, Schaerbeek, Saint-Gilles or Vorst, the concentration of people born with the Moroccan nationality is five times higher than the concentration of the same population on Belgian territory. Subsequently, 15% of the first Moroccan migrants settled in the province of Antwerp – three-quarters of this group in the administrative district of the city of Antwerp. Hence, there is also a striking presence in certain Flemish regions, such as Vilvoorde and Mechelen, where the number of people born with the Moroccan nationality is three times higher than the concentration of the same population on Belgian territory (Schoonvaere 2014). In addition to this settlement in Brussels and Antwerp, this first wave of migrants also went to Belgian industrial and mining basins. In particular, in 1971, 8.1%, 7.6%, and 6.3% of the population with Moroccan nationality settled in the provinces of Limburg, Hainaut and Liège, respectively (Schoonvaere 2014). Kesteloot (2006) suggests that this geographical spread of Moroccan migrants is linked to the structure of the housing market and the socio-economic dynamics. However, the geographic distribution of the Moroccan migrant population and the consecutive wave that arrived in Belgium due to family reunification has evolved over the years. Specifically, this population has shrunk proportionally in Brussels, Limburg, and in Hainaut, while it has grown in Flemish and Walloon Brabant and in the province of Antwerp. In Limburg and Hainaut, this decrease in the 1970s and 1980s is due to the crisis in the mining and industrial sector (Schoonvaere 2014).

It is important to note here is that since Moroccans already have a long history of migration to Belgium, it is not always possible to make a clear distinction between persons of Belgian origin and (children of) the naturalized population on the basis of existing statistics in Belgium. This also results in an underestimation of the migrant population of people coming from these regions living in Belgium (Djait et al. 2011). Given that family reunification among Moroccan newcomers is still the main reason for migration in Belgium (Timmerman et al. 2017), we can assume that the new wave of migrants will largely go to the same locations as their predecessors. Second-generation Moroccans continue to settle in Antwerp, Vilvoorde, and Mechelen as well as in Brussels. Interestingly, while many Brussels municipalities continue to attract a strong concentration of the population of Moroccan origin, the second-generation Moroccan migrants seems to move to different municipalities in Brussels. Instead of Schaerbeek, Molenbeek, and Brussels, second-generation Moroccans tend to settle in the municipalities of Sint-Aghata Berchem, Jette and Ganshoren. This spatial relocation stem from the fact that the descendants of Moroccan migrants have

a better socio-economic situation than their parents and therefore want to leave certain disadvantaged neighbourhoods (Schoonvaere 2014).

To conclude, in contrast to the more organized migration of Moroccans at the European level, migration from Morocco to Belgium was initially a pioneering and individual project. However, these migrants did come from similar regions in Morocco as those going to other European regions (especially the Rif region and the Arabic northern provinces). Later, the Moroccan immigrant population increasingly spread to other regions in Belgium as well and continued to grow through family reunification and natural population growth.

3.2 Environmental Changes in Morocco

In the following sections, we look in greater depth at current climate or environmental changes and future climate change projections in Morocco. In addition, the consequences of these environmental changes in Morocco – which mainly affect agricultural activities – will be discussed. The focus on the actual consequences of such environmental changes on everyday life in Morocco is necessary to gain a better understanding of the problems that people face as a result of environmental changes and how this may impact their potential migration aspirations. Despite the fact that the environment/climate is constantly changing, in recent decades climate has changed faster and is expected to do so at an accelerating speed (IPCC 2014). As a result, not everyone is able to adapt to these new conditions from these changes. We also discuss here the adaptation strategies that Morocco as a state is already applying to deal with these climate and environmental changes and the future outlook, and reflect upon individual and household adaptation strategies that are used or will be needed to deal with detrimental effects of climate change.

3.2.1 *Current and Future Climate and Environmental Changes*

Before we specifically focus on climate changes in Morocco, it is important to discuss the general trends in North Africa, which is part of the Mediterranean climate. The Intergovernmental Panel on Climate Change report (IPCC 2014) estimates that 22% of water shortages in the North Africa region in 2050 will be the result of climate change and 78% of water scarcity will be attributed to socio-economic issues. Furthermore, Bazza et al. (2018) observe that given 83% of agricultural land (7.2 million hectares) is not irrigated, yields of major crops suffer very significant variations due to the high variability of rainfall and a high frequency of droughts. As shown in Fig. 3.1 (IPCC 2014: 1265), there are negative precipitation changes at the beginning of the rainy season in October/November. In the period

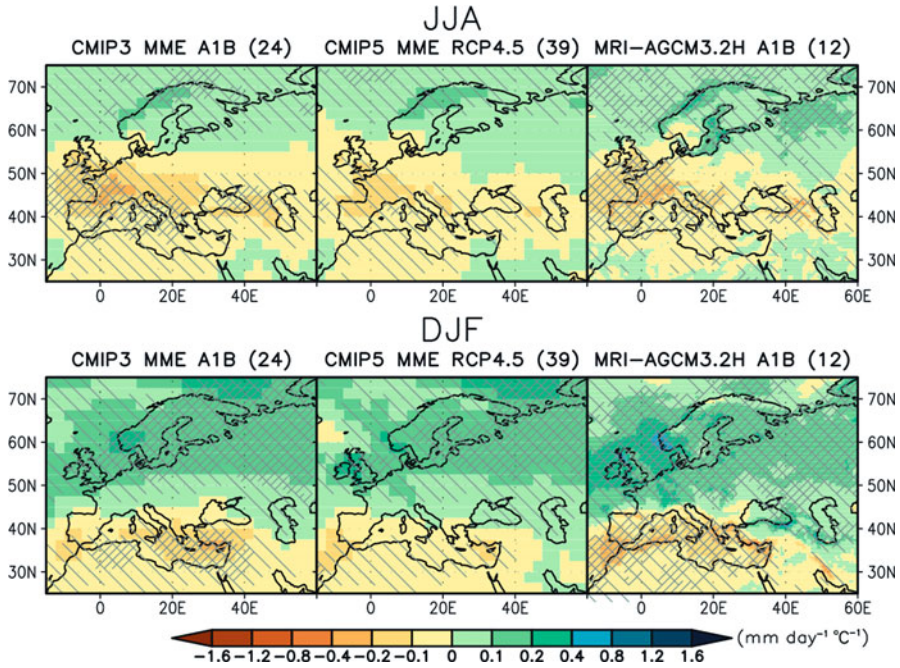


Fig. 3.1 Maps of precipitation changes for Europe and Mediterranean. (Source: *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, Intergovernmental Panel on Climate Change, p. 1265. Legend as formulated in the report: ‘Maps of precipitation changes for Europe and Mediterranean in 2080–2099 with respect to 1986–2005 in June to August (above) and December to February (below) in the SRES A1B scenario with 24 CMIP3 models (left), and in the RCP4.5 scenario with 39 CMIP5 models (middle). Right figures are the precipitation changes in 2075–2099 with respect to 1979–2003 in the SRES A1B scenario with the 12 member 60 km mesh Meteorological Research Institute (MRI)-Atmospheric General Circulation Model 3.2 (AGCM3.2) multi-physics, multi-sea surface temperature (SST) ensembles (Endo et al. 2012). Precipitation changes are normalized by the global annual mean surface air temperature changes in each scenario. Light hatching denotes where more than 66% of models (or members) have the same sign with the ensemble mean changes, while dense hatching denotes where more than 90% of models (or members) have the same sign with the ensemble mean changes’)

of December/January, however, there are substantial increases estimated. Subsequently, weak increases continue in some regions in February/March and the whole region is affected by drier conditions in spring (April/May). Throughout the year, the temperature assessment indicates a rise in the average temperature, with the largest warming rates in summer (June/July) and autumn (October/November) of partly more than 4 °C until the end of the twenty-first century. During the winter months of December and January, the lowest rate of warming is assessed with values up to around 1 °C. In addition, the study shows that the spatial warming pattern is mainly seen in the mountainous areas of the Atlas Mountains and is weakening towards the coastal areas of the Atlantic Ocean and the Mediterranean Sea (Schilling et al. 2012).

These scenarios developed by the IPCC are important for general forecasts and to assess climate changes in North Africa. However, for inhabitants of these regions, these climate change impacts can be very regional, depending on the geographic setting.

When discussing the observed and expected environmental changes in Morocco, we should note that Morocco is geographically located in a region at risk of global change (IPCC 2014; Nouaceur and Mursrescu 2016; Knippertz et al. 2003; Khattabi et al. 2014). It is situated between the dry regions of the western Sahara and the moderate Atlantic and Mediterranean regions (Born et al. 2008). Morocco's topography is highly accentuated and consists of two large mountain ranges, Rif and Atlas, that reach an altitude of 4165 m. The ongoing environmental changes in Morocco vary across regions, each with their different topography. The north consists mainly of coastal plains and lowland plateaus and is influenced by the Mediterranean and Atlantic climates. Generally, the climate of Morocco is characterised by hot and dry summers, with hardly any precipitation and strong evaporation, and by mild winters along the coastal strip, cold on the Atlas chains, Rif and Oriental highlands (Khattabi et al. 2014). This region deals with considerable climate variability between the Atlas Mountains and the coast. The south consists mainly of semi-arid grasslands and dry areas that merge with the Sahara (Khattabi et al. 2014; Climate Expert 2019). Over the past 30 years, Morocco has undergone various changes in the annual climate cycle that are particularly visible in the precipitation rates, average temperature levels, drought periods, and occurrence of extreme events in Morocco. These changes affect desertification and the growing of arid sand, groundwater flows, and salinization across Morocco (Schilling et al. 2012).

We will start with the *changing precipitation rates* to describe the ongoing climatic cycle in Morocco. Rainfall has high inter-annual variability (Driouech 2010). The average annual precipitation rates vary from less than 100 mm in the south and southeast to 1000 mm in the Middle Atlas and considerably more than 1700 mm on the Rif mountains. At the national level, the average annual amount of precipitation reached a decrease of around 15% in the period 1971–2000 compared to the national precipitation levels of 1961–1990. Subsequently, the years 1982–1983, 1994–1995, and 1983–1984 marked the worst droughts that Morocco experienced between 1971 and 2000. In fact, the existence of drought has been shown since the beginning of the last century and the presence of a cycle of drought in Morocco with an average periodicity of 11 years. Additionally, the frequency of drought periods as well as their intensity and duration have increased over the past three decades, leading to an increase in their temporal persistence, especially in spring. Hence, a slight increase in precipitation at the start of the rainy season and a decrease in the rest of the season (especially in the spring) was observed. This decrease represents approximately 25% of total rainfall in the rainy season in the northwest of the country (Benassi 2008).

Morocco has also been very vulnerable for extreme precipitation events (Tramblay et al. 2012). For about three decades, changing climate conditions, together with extreme events including recurring drought and heavy rainfall, have had a negative impact on the water flow (Benassi 2008). Precipitation levels and the frequency of wet days are projected to decrease throughout the country in the period

2021–2015 (Driouech et al. 2010). This decrease could be explained by a reduction of winter rainfall across the entire country. In the Atlas mountains, this decrease in rainfall could be applied to the wettest part of the year, ranging from October until March. At the same time, these changes in rainfall could also be due to the reduction in the number of wet days, combined with a falling number of heavy precipitation events and more persistent droughts (Driouech 2010). However, these projections could also be very regional given the distinct geographical zones in Morocco (Driouech 2010; Knippertz et al. 2003). For example, in the north-western region surrounding Tangier, Rifai et al. (2014), expect the climate trends to lead to more aridity with warmer and drier conditions. Overall, the changing precipitation patterns are expected to reduce average agricultural productivity in Morocco by around 30% by 2080. According to climate forecasts for 2030–2060, vegetables and grains in particular will be affected by less favourable growing conditions, which will decrease productivity by between 15% and 40% (Schilling et al. 2012).

Apart from these changing precipitation rates, trends show increasingly *higher temperatures in Morocco*. The spatial distribution of the intensity levels of heat wave danger also shows that a large part of Morocco has a relatively high temperature. This is crucial since the average global warming over the entire territory is about to change and estimated around 1 °C (Bouchaou et al. 2011; Born et al. 2008; Driouech 2010). Since the 1980s, there is a visible trend for more frequent droughts in Morocco and a clear shift towards warmer and drier conditions (Driouech 2010; Filahi et al. 2015). Furthermore, around the Sahara Desert, rising heat and drought leads to growing arid sand and ongoing desertification. Consequently, land that could be used for farming is now barren. For example, sand is found in areas that were once covered by date palms. There are also fewer places where nomadic herders can find suitable places for their animals (Freier et al. 2012). Roads are blocked by sand and dust accumulations so that areas that are difficult to access are even more enclosed. The same dunes may also cover arable lands and irrigation canals, which increases food insecurity. Human settlements – including homes, schools, dispensaries – suffer from the weight of the sand, which also disturbs local development (Ozer 2006). Additionally, the rising temperatures could result in a rise in the snowline in the Atlas range. This could impact the amount of water that can be stored in snow, reducing water available for domestic and agricultural use, especially at the start of the dry season thus adding to water scarcity. Finally, there are some links that can be made between drought, food security, and social instability in Morocco as well. This means that environmental changes increasingly interfere with the social and political organization of everyday life in Morocco and are not without impacts. This was for instance the case in Al Hoceima, in the northern part of Morocco, where riots erupted in 2008 after a year of losses in food production. Drought-related production losses were not the only factor spurring social disturbances as high global food prices and national policy also had an essential role in the outbreak of violence. Given the increasing urbanization and strong population growth, it is important to prevent price shocks and food insecurity (Esper et al. 2007; Schilling et al. 2012).

Other climatic changes, such as salinization, also impact agriculture in a profound way. Similar to other Mediterranean areas, groundwater in coastal areas is vulnerable to salinization, due to rising seawater levels related to global change. Events of extreme drought also cause salinization because rivers then carry insufficient freshwater towards the sea. Salinization renders water unsuitable for both drinking and agricultural use (El Yaouti et al. 2009). More specifically, it has been shown for Morocco that, within less than 20 years, irrigated soils can lose more than 50% of their productivity due to salinization. Salinization can therefore aggravate the negative effects of climate change considerably. Hence, soil erosion in general threatens the possibility of Morocco to adapt to climate change; 75% of arable land in Morocco is already affected by erosion (Schilling et al. 2012).

These climatic changes should be examined together with *ongoing developments and demographic changes* in Morocco. Coastal areas in particular are developing at a fast rate due to demographic pressure and tourism which adds to these areas' vulnerability to climate change (Carneiro et al. 2010). Sixty per cent of Morocco's population and 90% of its industrial activities and natural reserves are located along the extensive coastline. For instance, in Tangier, coastal erosion due to sea level rise is a major problem, impacting approximately between two and three meters per year. Furthermore, low-lying land is at risk of flooding due to rising sea levels, including the Nador lagoon, the Moulouya river, and the low-lying coastal plains of Oued Nekor and Oued Laou. Indicatively, for Tangier Bay, a 0.86-meter rise in the sea level by 2100 would mean a loss of 99.9% of its port infrastructure and 63% of the city's industrial zone. These climate risks are worrying because the coast continues to attract people from drier areas, constantly increasing the vulnerabilities towards climate changes of people living in coastal areas as well (USAID 2016).

Summarizing, we can state that Morocco has been affected to a large extent by climatic changes and this is expected to continue in the future as well. Morocco is especially confronted with decreasing precipitation rates and increasing average temperatures with severe impacts on droughts, desertification, and arid sand accumulation. Additionally, more extreme events are occurring, such as floods. Finally, the rise of seawater levels also impacts groundwater and makes people living in coastal areas even more vulnerable to climate change effects. While the impact of these climate changes is hardly felt for agricultural activities in these regions, these changes need to be studied and considered together with changing demographic patterns and migrations, social conflicts, and economic trends. In the next section, we delve deeper into how the Moroccan state deals with such climate changes and tries to anticipate or prevent the detrimental effects for the population and the Moroccan economy.

3.2.2 Moroccan Adaptation Strategies to Deal with Climate Change

Since agriculture constitutes a large percentage of the Moroccan economy, it is important to provide a general overview of the economic situation. In recent years the Moroccan economy has been characterized by macro-economic stability and a

low level of inflation. However, GDP growth has fallen since 2014 to 2.7% in 2019. This slowdown is mainly due to an unstable agricultural sector and slow growth in the tertiary sector. However, the economy was boosted by the good performance of phosphates, chemicals, and textiles. The IMF (2019) expects GDP growth to increase by 3.7% in 2020 and 4.1% in 2021 (NORDEA 2020). According to the IMF (2019), unemployment will also continue to fall, and this trend will continue over the next 2 years. However, unemployment will remain high (9.2%) in 2019. Moreover, it affects mainly young people, aged 15–24 years (26%). In addition, the poverty rate remains one of the highest in the Mediterranean, with 15% of the population living below the poverty line. Due to the richness of Moroccan soil, the economy is dominated by the agricultural sector (NORDEA 2020). In fact, this sector employs roughly 37.9% of the working population and contributes to 12.3% of GDP. The industrial sector contributes 25.9% to GDP and employs 21.6% of the labour force (IMF 2019). The main industrial sectors are textiles, leather goods, food processing, oil refining, and electronic assembly, however, new sectors are emerging such as chemicals, automotive components, computers, electronics, and the aerospace industry. This expansion into new sectors should enable the country to become less dependent on agriculture (NORDEA 2020). Finally, the service sector accounts for just under half of GDP (49.5%) and employs 40.5% of the labour force (IMF 2019). The service sector grew by 2.7% in 2018 and is led by the real estate sector and tourism, which remains very dynamic (NORDEA 2020). Because the GDP growth since 2014 has fallen to 2.7% in 2019, mainly due to unstable agriculture sector that is largely affected by climate change, it is important that Morocco as a state applies adaptation strategies to deal with these climate and environmental changes.

At the federal level, Morocco has several efforts to *mitigate climate change*. In the 2019 Climate Change Performance Index, or CCPI, (Burck et al. 2019), Morocco ranks second, after Sweden, in the fight against climate change. However, the first three rankings are traditionally left open because no country is found to make ‘sufficient’ efforts, suggesting that a lot more still needs to be done. The CCPI, which is published annually, is compiled by 350 experts in energy and environment and compares the environmental performance of 56 countries in terms of climate efforts each year. The index is based on 14 criteria and is grouped into four categories, namely greenhouse gas emissions, use of renewable energy, efficient energy consumption, and climate policy. Morocco ranks especially high on the 2019 list thanks to the development of renewable energies. In the last 5 years, for example, Morocco has considerably increased the share of renewable energy, building one of the largest solar parks in the world (Ouarzazate), with the help of development cooperation, while in 2014 Morocco opened the largest wind farm in Africa (Tarfaya). As a result, Moroccan efforts are often used as an example of how Sub-Saharan Africa can benefit from the highest solar radiation rates in the world (Burck et al. 2019). These examples and Morocco’s rating on the climate change index, however, mainly illustrate the overall climate change mitigation efforts. For example, the Moroccan government has been performing well in terms of climate change mitigation efforts by focusing on large structural projects, such as the building of the largest solar panel parks and wind farms (Climate Expert 2019).

Apart from these mitigation efforts, people are already confronted with the consequences of climate changes, therefore *adaptation strategies* also need to be developed (IPCC 2014). One important element is how the Moroccan state as such already tries to deal with the impact of these environmental changes on people's lives and has developed particular adaptation strategies to do so. Although the concept of 'adaptation' is contextual and changes over time and across disciplines (Abbad and Idrissi 2019), in the context of the human dimensions of global change, 'adaptation' usually refers to a process, action, or outcome in a system – at individual, household, local, regional, and national levels – so that they can deal with, manage, or adapt to some changing condition, stress, danger, risk, or opportunity (Smit and Wandel 2006). To fully understand adaptation processes and the impact on society, it is important to distinguish adaptation by whom adjustments are made and according to the interests of the various stakeholders involved. This can range from individuals, local non-governmental organisations, development workers, or at distinct levels of governance. A distinction is sometimes made between planned adjustment, assumed to be implemented by governments on behalf of society, and autonomous adjustment by individuals (IPCC 2014).

In order to understand the impact of environmental changes on the ways it affects people's lives, we have to consider these environmental changes within the *wider societal context* and consider *the adaptive capacity as well as the developed adaptation strategies*. Hence, we will focus in this section mainly on the adaptation strategies developed by the Moroccan federal state, without ignoring the importance of individual or community-level adaptation strategies. Overall, the federal adaptation strategies pay a lot of attention to the variability of the climate change in Morocco. Since the mid-twentieth century, agricultural innovations related to harvesting, water resource management, crops, agricultural technologies, and so on, have been installed by the federal state. Special crop mixes and harvesting strategies are promoted by the Moroccan government to ensure resilience in rain-fed agriculture. With donor support, the government has undertaken large projects designed to bring safe drinking water to rural communities and informal settlements in urban and peri-urban areas. In addition, barley is used instead of wheat because barley needs less water and matures faster, and this has had a positive effect on the capability of the battle against water deficit. In southern Morocco, the traditional adaptation of agriculture to a semi-arid-to-dry climate is the extensive use of surface irrigation systems. To use the percolating water efficiently, irrigated fields are surrounded by trees such as apple, walnut, almond, olives, and date palms. Agricultural patterns have also changed considerably aimed at increasing grain production. More specifically, the use of nitrogen fertilizer, mechanization, and the intensive use of irrigation (surface water and groundwater) was promoted. Additionally, drought-sensitive wheat, Morocco's most important agricultural product in recent decades, was supported by many government initiatives in the mid-twentieth century (Schilling et al. 2012; Skees 2001); for example, a customs duty on soft wheat imports was reintroduced to bolster sales from the local harvest.

Water played and still plays a crucial role in Morocco's agricultural life (Chbouki et al. 1995). The water law introduced in 1995 decentralized integrated water

management and rationalization of water use came into force, including the principles of ‘the user and the polluter pays’. The national water strategy includes action plans to reduce water demand, increase supply, and conserve and protect water resources to withstand water scarcity and pollution. This water law focuses on improving the efficiency of irrigation and urban supply networks and the pricing of water to rationalize its use. Plans to increase supply include the construction of more dams and a large North-South inter-basin water transfer (Schyns and Hoekstra 2014). Since rainfall is scarce and agriculture constitutes a large percentage of the Moroccan economy, dams clearly have many socio-economic benefits for Morocco. Particularly, dams have led to a sharp decrease in water and sediment fluxes from rivers to the coasts. During the last decade, the recurrence of droughts has exacerbated the reduction of water flows in and below reservoirs. By reducing the supply of rivers, dams can also influence the morphological balance of the coastline. However, a great deal of doubt has been expressed about the long-term durability of these dams due to the high speed of natural and man-made soil erosion as well as their limited design capacity and short life (Snoussi et al. 2002). For the southern regions of Ouarzazate and Tafilalet, the use of groundwater for irrigation is still free of charge. Surface-water management projects in Morocco led to a devaluation of traditional water management by transferring power over water resources from local to national authorities. This encouraged farmers to switch their irrigation systems to groundwater supply. However, this has led to a decline in groundwater tables that has already reduced yields in some areas (Heidecke et al. 2010). In addition, inadequate irrigation techniques have led to increasing salinization in Morocco which, in turn, also impacts environmental changes (Schilling et al. 2012).

Apart from these water laws, attention has also been given to overall agricultural development. Since 2008, the Moroccan government has released a new and promising agricultural strategy called ‘Plan Maroc Vert’ in the country’s 16 regions (El Bilali et al. 2012). This new approach was necessary as the country’s economic development since the early 1990s has reduced the relative contribution of agriculture to GDP by an average of 16% in the period spanning 2000–2010. Partly as a result of this, the Plan Maroc Vert was founded on growth, poverty reduction, the agricultural sector’s long-term sustainability and consolidation of its integration into national and international markets. It also seeks to increase socio-economic benefits in terms of investment, job creation, and improved farmers’ incomes for the Moroccan population (Balaghi 2014). The Plan Maroc Vert’s strategy is based on two pillars. The first aims to promote modern agriculture with high added value, adapted to the markets. The second pillar strives to improve the agricultural income of small-scale farmers in order to combat poverty. Various measures are being taken to increase agricultural productivity by as much as 59% by 2020; these include intensification of production, expansion of arable land, improvement of localized irrigation, institutional innovations, and improved processing of products. As part of this plan, several fruit trees are currently being planted in areas where cereals are unsustainable with a target of around 1 million hectares by 2020. The plantations are designed to improve farmers’ incomes and reduce land degradation, through optimum fertilization, collection of rainwater, additional irrigation and conservation of soils against erosion (Balaghi 2014).

Plan Maroc Vert has supported the development of various agricultural value chains and improved the development prospects of many companies. This agricultural policy tends to deal with regional needs and different agricultural challenges but in general also aims to transform the countryside through better economic performance. In practice, the focus is broadly on improving agricultural production. During implementation of Plan Maroc Vert, farms are primarily seen as a way to develop agricultural value chains and increase agricultural production before 2020. Real farms, together with their farmers and rural areas, faded into the background. However, this could undermine the Plan's ability to achieve widespread improvements at the level of farms, agricultural chains, and territory (Faysse 2015). During the same period of 2010–2012, the Moroccan Meteorological Office also implemented various programs to address concerns about the impact of extreme weather conditions through policies to prevent them. Special importance in these programs is attached to actions to better estimate climate variability and associated water resources (Benassi 2008).

Finally, other adjustments can be made by governments on behalf of society, such as adapting building codes to future climate conditions and extreme weather events, building flood defences and raising the levels of dykes, developing drought-tolerant crops, and choosing tree species and forestry practices less vulnerable to storms and fires (Adger et al. 2003). Given the history of water wars and issues with water management, newly developed adaptation strategies have to deal with both the additional pressure put on existing water management by climate change and existing issues with water management (Chbouki et al. 1995; Mounni et al. 2019). Water management is important to consider in a Moroccan context, given the large investments made in the building of dams. The impacts of global warming will interact with water management and lead to changes in irrigation areas, and consequently, to agricultural production as well (Khattabi et al. 2014; Aoubouazza et al. 2019). Overall, these levels of decision-making are embedded in social processes that reflect the relationship between the state and individuals and their networks, capacities, and social capital (Adger et al. 2003).

When discussing these policies, it is important to note that the development of these plans is not necessarily the same as the actual implementation of the initiatives by local communities. Ensuring environmental protection or promoting sustainable development in different sectors requires an appropriate status, which provides a broader capacity for initiating and facilitating inter-ministerial and inter-sectoral cooperation. However, the status of the current environmental authority appears to be too low and dilutes the enforcement of environmental legislation. As a result, not all regions of Morocco are fully represented, and the presence of environmental authorities is often too weak for the effective implementation of its mandate (United Nations 2014). It is therefore necessary to further strengthen the governance structures, which form the basis for coherent and participatory implementation. Subsequently, it is also necessary to broaden ownership at the provincial and local levels in order to enable effective implementation of the various policies to contrast climate change (NAP-GSP 2017).

To conclude, we can state that Morocco has faced intense climatic and environmental changes over the last decades. The Moroccan government has performed well in terms of the development of climate change mitigation policies. Regarding climate change adaptation strategies, large investments in specific regions have focused on agriculture and water management and control. These efforts have been accelerated by the introduction of the Plan Maroc Vert in 2008 to promote modern agriculture with the aim of reducing poverty by focusing on small-scale farmers. Although the efforts in Morocco to reduce and adapt to climate/environmental changes may be relatively high compared to other countries, the question remains to which extent these efforts are felt by the local population and how these efforts impact the existing local social structures and migration patterns.

3.2.3 Individual and Household Adaptation Strategies to Deal with Climate Change

Rapidly changing natural environments are heavily felt by Moroccan inhabitants of distinct regions. Nevertheless, these changes are especially felt by people working in the agricultural sector who are highly dependent on water availability and rain availability (Born et al. 2008; Khattabi et al. 2014). The agricultural sector is important for the Moroccan economy and contributes 15–20% of the GNP and accounts for one-third of Moroccan exports (De Haas 2006). The importance of water availability has been repeatedly shown in the past, when several regions in Morocco suffered severely from water scarcity, which threatened the livelihoods of people working in agriculture or living from pasturing to a large extent (Born et al. 2008). Since individuals are vulnerable to climate risks and other factors, this vulnerability can act as a driver for adaptive resource management. The impact of climate change on Moroccan life will mainly be felt through economic activities such as agricultural activities and tourism (Khattabi et al. 2014; Ait Houssa et al. 2017; Adger et al. 2003; Aoubouazza et al. 2019). Climate change will impact cropping and livestock systems in various ways. Each type of climate change impact – i.e., temperature rise, changing and more extreme precipitation rates, sea level rise, and so on – will demand or force a restructuring of current agricultural activities. For instance, due to global warming crops like bananas and avocados would be easier to grow in more continental regions compared to olive and citrus trees that are expected to move towards the foot of mountains. Additionally, this could replace the drought boundary in Morocco. Moreover, to adapt to changing precipitation rates, water -intensive crops such as rice and sugarcane could be replaced with highly efficient and more lucrative crops (Ait Houssa et al. 2017). Adaptation strategies of individuals such as the purchase of other cereals or crops, installation of water pumps, the search for other professions or moving, can thus be a response to climate threats (Adger et al. 2003; Ait Houssa et al. 2017). As a final remark – in line with the migration-as-an-adaptation discourse (Gemenne 2010) and following ideas from the new economics of labour migration and migrant systems

theory (cf. Chap. 2) – migration can be seen as a potential adaptation strategy for individuals and households to deal with environmental changes. Since migration is the main focus of this book, we discuss this in more depth in the following section.

3.2.4 Environmental Migration and Displacement in Morocco

As mentioned earlier, migration can be seen as an adaptation strategy to deal with environmental/climate change (Gemenne 2010). There are three main reasons for which migration can be seen as a potential adaptation strategy. First, the population may perceive migration as a possible adaptive response to risks associated with environmental changes. Hence, environmental migration can be seen as one of the strategies by which people who perceive themselves to be at risk or are experiencing the impacts of climate change may seek to adjust and adapt (Black et al. 2011; Gemenne 2010). Second, migration can play an important role in the adaptation towards environmental change as it reduces demographic pressure of people on the natural environment. For instance, at the most basic level, migration can lessen strain on limited resources while alleviating other risks related to overpopulation, thus offering those who stay better chances for survival (Gemenne and Blocher 2017). Third, migration can establish flows of financial and other resources (Gemenne 2010). Remittances directly increase the family income and living standards of the recipient with indirect effects on human capital formation through education as well as on the investment ratio (Rao and Hassan 2011).

When examining the relationship between environmental changes and migration and displacement in Morocco, we must consider both environmental changes and migration dynamics. Among developing countries, African nations are most intensely affected by current climate variability and future climate change. Due to low resilience and limited adaptability to climate-related shocks and stress due to widespread poverty, extensive disease burden, and political instability, Africa is considered particularly vulnerable to the effects of climate change and climate variability. Despite the global recognition that climate change is taking place, there is still no clarity about how this affects people's living conditions. As a result, the consequences of future climate scenarios, such as migration flows and livelihood processes, are highly speculative (Williams and Kniveton 2011). This is no different for Morocco. Previous research has already shown a number of important elements that we must take into account when it comes to environmental migration in Morocco. In the next section, we therefore discuss which factors can contribute to migration patterns in Morocco. Next, we look in more detail to the fact that the inhabitants of the most-affected regions usually have the fewest opportunities to migrate due to climate change. In addition, there appears to be a lot of internal migration in Morocco, which is also typical for climate migration. Finally, we conclude with the consequences of existing migration for environmental migration.

Research from Wodon et al. (2014) shows that although climate change is not the main driver of migration in Morocco, it does seem to contribute to it – and worsened

climatic conditions are likely to aggravate future migration flows. Furthermore, there are three specific related issues: the impact of weather shifts on migration, the impact of perceptions of recent climate change on migration, the impact of climate patterns on migration (Wodon et al. 2014). Environmental factors therefore put all other migration reasons under pressure, yet little empirical research has been done into the ways in which they respond to each other. Ever since the first migrations from Morocco, many regions of origin were already confronted with scarcity and drought. These migration flows affected and reduced economic opportunities within Morocco and could have shaped further migration aspirations and patterns. For instance, through the organization of large-scale labour migration, many Moroccans were able to migrate and support their livelihood and that of their family (De Haan 2000). However, inhabitants of regions affected most by climate change usually have the least opportunities to migrate.

When looking at the areas with the highest numbers of migrants in general, these areas are not among the most marginal and poorest areas (McLeman and Gemenne 2018a). Rather, in Morocco, sedentary farming populations or relatively open areas with better connections to the outside world participated more and more intensively in international migration than sedentary and nomadic or semi-nomadic people who lived in relatively remote areas in the Atlas Mountains, steppes, and deserts. This shows that people from coastal areas in Morocco participated considerably more in international migration than people from inland areas. People from areas in the 'margin of the margin' tend to migrate less or rather internally (De Haas 2005, 2007). Subsequently, people with the lowest socio-economic status in the sending communities migrate the least, because they cannot afford the costs and risks and often lack the aspirations and knowledge to migrate (Zickgraf 2018). Thus, despite the high levels of international migration from Morocco, internal migration remains more important in numerical terms (De Haas 2005). This is important to note as many of the migration trajectories – transnational or not – due to environmental changes are fragmentary in nature (McLeman and Gemenne 2018a, b). Hence, most environmental migration in Morocco will probably also be limited to internal movements; it is very likely that urban areas will be the most important destinations. Previous studies mainly point to the enormous importance of migration from the Moroccan countryside to the city and to the crucial function of internal migration as a precursor to international migration (De Haas 2007; Noin 1970; Reniers 1999). A rising number of internal migrants in Morocco do not settle in large cities but in fast-growing small and medium-sized cities close to or within the rural provinces themselves, such as Nador and Al Hoceima in the north, Agadir and Tiznit in the southwest, and Ouarzazate in the south. Numerous smaller, but fast-growing cities have emerged at the regional level. There are substantial indications that urban-oriented consumption and investment of remittances in homes and private companies – e.g., shops, trade, hotels, coffee houses, crafts, transport – by international migrant households have accelerated the growth of medium-sized and large cities (De Haas 2005). In particular, people with a low socio-economic status are limited to migration leading to an 'immobility paradox' because migration requires a minimum level of resources. As a result, international environmental migration

drops immediately after extreme weather conditions, but internal migration increases because affected households cannot afford long-distance travel (Wodon et al. 2014). But as there are already a lot of migration flows from Morocco to Belgium in different ways (labour migration, family reunification), mostly for better economic opportunities, a whole migration culture already exists in Morocco that can have an impact on environmental migration in Morocco.

Morocco's inhabitants are already experiencing deteriorating environmental conditions and shocks that could endanger their livelihoods. Shifts include a decrease in precipitation, increasing risks of drought, more dry areas towards the north of the country, and less groundwater (Wodon et al. 2014). According to the EACH-FOR study (2008) there will be a sharp fall in agricultural output, particularly in the north and midwest, where rainwater-based agriculture is currently prevalent (Wodon et al. 2014). This can lead to uncertain decreases in irrigation-based agriculture. In a country where 40% of the population is employed in agriculture and where nearly 70% of the poor live in rural areas, such environmental shocks and the resulting decline in agricultural production have a negative impact on the livelihood of many people. This can create migration movements. Moreover, Morocco has 3500 kilometres of coastline, which means that an increasing number of floods and rising sea levels also can cause future migration movements (Wodon et al. 2014). However, information is lacking on how households in vulnerable areas perceive changes in the climate and how they are affected by extreme weather events. Wodon et al. (2014) say there is evidence that households leave these areas affected by drought. For example, after a severe drought, two-thirds of the irregular migrants arrested in Spain in 2007 were from the farming and mining region of Khouribga (EACH-FOR 2008). Another study found that environmental degradation was one of the reasons leading to past or intended migration (Hamza et al. 2009). These findings, however, are difficult to generalize as the studies were localized and based on small samples (Wodon et al. 2014).

To summarize, when it comes to environmental migration and displacement in Morocco due to environmental changes, most environmental migration in Morocco will probably be limited to internal movements. Consequently, international migration from Morocco will largely come from areas that are not among the most marginal and poorest areas. Nevertheless, the empirical evidence from Morocco and more broadly on the impact of climate change and extreme weather events on migration remains limited.

3.3 Conclusions

Until the beginning of the twentieth century, there was hardly any migration from Morocco abroad. Moroccan immigration to Europe began as labour-related migration for the coal mines. After the migration stop in 1973, immigration from Morocco, which was just a young migration movement, continued in the form of family reunification and family formation (De Haas 2005, 2007). The Moroccan state saw

benefits in migration flows to Europe and pursued a policy to make it easy to send money, making migration very important for the country's development (Kapur 2005). Therefore, a new monetary policy has been pursued in Morocco since the late 1980s, with no restrictions on currency exchange and the repatriation of money (Refass 1999).

Over the past decades, many environmental changes are noted in Morocco that are expected to aggravate or continue in the future. Shifting precipitation patterns and drought, salinization, desertification, and extreme events in Morocco have the potential to contribute to instability and social inequality. Such changes have different consequences for the local population and may have an impact on the reasons for migration (Benassi 2008). For example, the changing precipitation patterns are expected to reduce average agricultural productivity in Morocco around 30% by 2080 (Schilling et al. 2012). Due to ongoing desertification, land that could be used for farming is now barren; for instance, sand is found in areas that were once covered by date palms (El Yaouti et al. 2009). Salinization also reduces agricultural productivity and makes groundwater unpotable, while coastal erosion due to sea level rise is a major problem that can cause extreme events (Schilling et al. 2012).

The Moroccan government has been performing (relatively) well in terms of climate change mitigation efforts (Burck et al. 2019). With regard to climate change adaptation strategies, large investments have been made in particular regions with emphasis on agriculture productivity and water management and control. Less attention has been given to adaptation strategies and policies, apart from the water law in 1995 that focused on a decentralized policy on water resource management in which both user and polluter pay (Schyns and Hoekstra 2014) and the introduction in 2008 of the Plan Maroc Vert across all 16 regions to contribute to agricultural development and reduce poverty by utilizing a regional approach (El Bilali et al. 2012).

Despite the large migration flows and visible environmental changes, the lack of reference made to environmental factors influencing migration patterns may be due to the largely organized migration trajectories and active recruitment of many Moroccans to work in Europe. This does not necessarily mean that environmental factors have been largely absent in the decision to migrate to Europe, and specifically Belgium. Although environmental changes in Morocco are not (perceived as) the main driver of migration, these worsened climatic conditions contribute to these flows and are likely to swell future migration flows (Wodon et al. 2014). Environmental factors therefore put all other migration reasons under pressure, but so far there has been relatively little empirical research in Morocco into the ways in which they respond to each other. Information is lacking on how (vulnerable) households in vulnerable areas perceive changes in the climate and how they are affected by extreme weather events. Therefore, in this book we would like to illustrate how environmental changes have already urged people to migrate over the last decades and how these processes continue to play a role in newly-emerging trends of environmental displacement and migration.

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