CHAPTER 5

RURAL DEVELOPMENT AND MIGRATION: AN ENVIRONMENTAL DIMENSION

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The studies of the CIHEAM had drawn up a critical assessment of the situations that prevailed in the agricultural and rural world of southern Mediterranean countries at the end of the years 2000: demographic vitality and rural exodus as a consequence of the farming crisis, poverty and precariousness of rural territories, ill-planned urbanisation, serious degradation of natural resources and high inequalities in the distribution of wealth (CIHEAM and Blue Plan, 2009 ; CIHEAM and AFD, 2011; CIHEAM, 2016). This research also focuses on the failures of agricultural and rural public policies that have led to the marginalisation, if not the exclusion, of rural areas from development processes.

Today, it is clear that migratory phenomena are the ultimate consequences of these complex situations of poverty and unequal access to wealth, combined with political conflicts in the Arab countries (Egypt, Sudan, Tunisia, Libya and Syria), that have pushed hundreds of thousands of people – sometimes putting their lives at risk – to leave their villages, countries or region. In recent years, the acceleration of these flows, mainly towards Europe, has imposed migration issues on international political agendas (Schmoll *et al.*, 2015)[1].

The review of an increasingly abundant literature on migration issues enables to establish close links between internal and cross-border migrations affecting southern Mediterranean countries (Thiollet, 2013). These studies show that in the Mediterranean, migrations have experienced a rapid change in (huge influx) flows, forms (undocumented migration), profiles of migrants (men, women, children), destinations and new routes and networks used (South-North, South-South) (*NAQD*, 2009; *Insaniyat*, 2015).

1 - In European Union countries (EU), the "threat" of waves of migrants and refugees fleeing political instability in southern Mediterranean countries has fuelled ongoing debates reported by the media. The fear of massive arrivals has led the EU to lock up its migratory space and to restrict is asylum politics. In some European countries, it has contributed to political changes (Hungary, Poland, Austria, Germany, Italy).

Middle Eastern and North African (MENA) countries that continue to fuel emigration have now also become transit and/or destination countries (Elbassil and Schuettler, 2017) for migrants coming from the region but also others coming from Africa (sub-Sahara, West and East). A number of studies analyse migration legislation and policies and mention the precariousness of the jobs offered to migrants by an informal sector and by relocated companies at low wages and with scarce or no social protection.

Current migrations are no longer exclusively migrations of rural populations and farmers whose relations to rural development are essentially addressed through the issue of migrant remittances to villages or rural communities.

Recent studies suggest links between these migratory processes, climate change and desertification affecting the MENA region (Requier-Desjardins, 2008; Wodon *et al.*, 2014b). These interrelations had already been highlighted by Oli Brown (2008) who noted that "migration is, and has always been, a coping mechanism to deal with climate stress". He also recalled that archaeological evidence around the world has revealed, "that human settlement patterns have responded repeatedly to changes in climate", such as the complex societies of Egypt and Mesopotamia, which "emerged as people who migrated away from desiccating rangelands into riverine areas". Tariq Madani (2009), historian of the Arab-Islamic civilisation, also pointed out that "even though the understanding of exodus processes, the low profitability of rural activities, [...] the adaptation options of rural migrants, and the integration processes undertaken by Maghreb cities in medieval times, [...] are still poorly known" (Madani, 2009), the causes of migration observed in the history of medieval Maghreb including "famine epidemics, overexploitation of farmers, underemployment, insecurity, collapse in prices of agricultural produce, irregular weather conditions and long years of drought" were nearly the same as those that can be observed today.

Although the share of environmental migration is small in the region, it is now an alternative strategy for rural households facing income losses as a result of climatic incidents (droughts in particular) (Wodon *et al.*, 2014b). In highly agricultural-dependent economies, risks and natural hazards related to climate change are associated with other socio-economic factors of migration observed in the MENA region (Brücker *et al.*, 2012; Tangermann and Chazalnoel, 2016). A recent World Bank report (2018a) notes that internal climate migration will intensify by 2050, especially in the sub-Saharan region. Associated with socio-economic factors, climate change can be a catalyst for cross-border and international migration, as the projected flows of internal climate migrants are unlikely to stop at the borders of countries in the MENA region. In this chapter, we will try to better comprehend the complex interactions between natural resource degradation, climate change and migration in the southern and eastern Mediterranean regions. "Forced" migration linked to natural disasters and more specifically, to the process of degradation of natural resources (land, agricultural water) and climate change, has taken on new dimensions that are important to understand and analyse.

We will firstly present the migration patterns that have prevailed so far in the region within and between countries. The demographic transitions initiated in MENA

countries are reflected in mobility and a pattern of international migration flows that vary between regions. Being an emigration region since the colonial period and becoming an immigration one since the years 2000, the Maghreb remains in contact with the European countries of the northern Mediterranean shore (France, Spain and Italy). An area of major conflict, the Middle East mainly receives Palestinian, Iraqi, and currently Syrian refugees. The description of these migration patterns will be followed by an analysis on the drivers of these migration flows. Secondly, we will address the issue of migration in relation to the development trajectories of the MENA region, focusing on the structural transition characterised by an industrial sector that has been lagging behind, including the economic activities relying on the digital revolution or the economy of knowledge. Thirdly, we will tackle the amplification of migration processes as a result of the degradation of natural resources (land and water) and climate change. This form of climate migration will also be analysed in light of political instability as well as civil and armed conflicts with particular reference to the Syrian crisis. The preliminary results of a study by the *Agence française pour le développement*[2] (AFD) and the World Bank, conducted in a number of countries in the MENA region, indicated that climate change could indeed contribute to sometimes violent conflict (Brücker *et al.*, 2012). These three themes are closely related because if migration is in general caused by strong demographic pressures, it is also driven by socio-economic difficulties, increased poverty, conflicts and the continued degradation of natural resources.

In conclusion, in terms of public policy, we will highlight the implications of the relationship between internal climate migration, which feeds international and cross-border migration, and agricultural and rural development policies. Development strategies in countries of the MENA region rarely refer to climate change migration in development planning. Yet, taking it into consideration would allow the preservation of the resilience of moving populations and that of both origin and host communities.

Devoted to environmental dimensions of migration, this chapter is based on a literature review and on national and international statistics (United Nations High Commissioner for Refugees [UNHCR], International Organisation for Migration [IOM], World Bank...) available on countries of the MENA region. Although data and knowledge are often lacking, they do allow a qualitative analysis for a number of countries.

Migration patterns in the MENA region: a historical perspective

Southern Mediterranean countries have a long history of migratory flows dating back to pre-colonial times. Both within and between countries, these flows have fluctuated with significant historical events. Independence, the European and Arab oil producers demand for labour, the Palestinian exodus, conflict in the Near East and, more recently, the Syrian crisis, are all events that have shaped migratory flows in the region. At the same time, demographic pressure, the degradation of scarce

2 - Translator's note: French Development Agency.

resources and climate change bring a veil of uncertainty on the livelihoods of rural people. Consequently, confronted with high unemployment levels, the young workforce of the region considers international migration as the only chance to climb the social ladder.

International migratory flows in the MENA region more directed towards Europe

According to the latest UN data, the current rates of migratory stock in the MENA region range from almost 4% for Egypt to 9% for Jordan. It is interesting to note that while Egypt has the lowest rate, this country has the largest diaspora: being the most populated country in the region, almost 3.3 million Egyptians live abroad. On the other hand, Jordan has a rather small diaspora (almost 700,000 migrants) but the highest emigration rate (Table 1).

Table 1 - General emigration figures from selected MENA countries (in thousands)

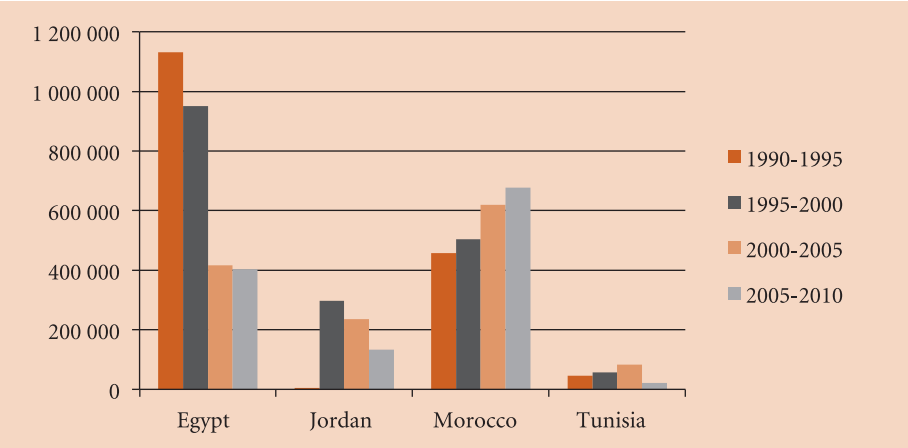
	Egypt	Morocco	Tunisia	Jordan
International migrant stock	3,269	2,835	651	700
Developed regions	547	2,636	608	123
	– 17%	– 93%	– 93%	– 18%
Developing regions	2,722	199	43	577
	– 83%	– 7%	– 7%	– 82%
Emigration rate in total population	3.9%	8.3%	5.8%	9.1%

Source: David and Nilsson (2017) based on UNDESA data for 2015.

These differences provide a first insight into the complex migratory patterns of the MENA countries and the changing dynamics they have witnessed over the last decades. Recent estimated data by Guy J. Abel and Nikola Sander (2014) shows that while migratory outflows from Egypt, Jordan and Tunisia have decreased between 1990 and 2010, migratory outflows from Morocco have increased significantly over the same period (Graph 1).

The OECD data show that inflows from MENA countries to OECD destinations increased between 2000 and 2015, while migration flows within the region (mainly from Tunisia, Egypt and Jordan towards Libya and the Gulf countries) are decreasing. Data from the United Nations Department of Economic and Social Affairs (UNDESA) of 2015 confirm this trend, as the share of intra-regional migrants of the total number of migrants from MENA countries has decreased by 5% over the period 1995-2015. If the MENA region is divided into two sub-regions, the Middle East and North Africa, this trend is more obvious in the Near East where the share of migrants decreased by 7%, but reaches 10% if the particular case of Syria is abstracted.

Graph 1 - Estimated migrant outflows, all destinations



Source: David and Nilsson (2017) based on data from Abel and Sander (2014).

A generally low internal migration

Globally, internal migration outweighs international migration by three to four times (Bell and Charles-Edwards, 2013). Despite its undeniable importance, internal migration is hard to quantify, and the lack of reliable data on this form of mobility makes the monitoring of internal migration more complex. These internal migrations are more circular, with individuals moving between home and host regions according to seasons, life cycles or other external factors. In addition, the internal migration of an individual to a city serves as a step further towards international migration (De Haas, 2005).

Despite theses limits, we will focus on internal migration in the MENA region mainly in countries such as Egypt, Morocco, Jordan, Lebanon and Syria. The comparisons are based on data from Demographic and Health Surveys (DHS) assembled by Alwyn Young (2013). This standardised data covers the poorest countries of the world (mainly sub-Saharan) but also covers some middle-income countries in Africa, Latin America, South and South-East Asia and MENA. The only flaw is that the data on the countries we are interested in (Egypt, Jordan and Morocco) only concern women, and this may therefore not reflect the regional migration patterns where the majority of migrants are male.

Firstly, these data reveal that internal migration in MENA countries is lower than in other regions. The share of migrants in Egypt, Jordan and Morocco is 8% below the global average. Secondly, the net rural-urban migration in MENA countries is close to zero and this differs from other similar regions.

Based on a survey focusing on internal migration in Syria, Marwan Khawaja (2002) finds that pre-war Syria's internal migration is low by international standards, while Santiago Herrera and Karim Badr (2012) note that internal migration in Egypt is

noticeably low by international standards. Still referring to Egypt, Barry McCormick and Jackline Wahba (2004) also find that rural-urban migration decreased by half in the 1990s compared to the rate in the 1980s, while in the 1990s, net rural-urban migration was even negative (Table 2).

Table 2 - Internal migration in Egypt

Census	1996	2006
Moved over the last 5 years	3%	2.4 %
Moved over the last 10 years	5.1 %	3.9 %
Moved more than 10 years ago	7.5 %	4.9 %
Never moved	87.4 %	91.2 %

Source: David and Nilsson (2017); Original source: the 1996 and 2006 Egyptian censuses, available online on the IPUMS project website (population concerned: individuals 15-64 years old).

The proportion of working-age Egyptians born in a different place than their current residence has dropped between 1996 and 2006 thus reflecting a downward trend in departures to cities (David and Nilsson, 2017). Barry McCormick McCormick and Jackline Wahba (2004) provide three explanations for the decline of migration in Egypt in the 1990s. Firstly, the reduction of staff in the public sector, then the inaccessibility of urban housing subject to a speculative market and lastly, the improvement of transport infrastructure that facilitates mobility over longer distances.

Data reveals that internal migration in Morocco is relatively more significant than in other MENA countries. For instance, Morocco's lifetime migration is of about 32% compared to only 10% in Egypt. However, as in Egypt, Morocco's migration is also declining. Between 1982 and 2004, the share of internal migrants has fallen by 2.6% for migration that took place in the last five years but the decrease reached 5.5% in the case of lifetime migration. Over the same period, the share of those who never moved has increased by 10% (Table 3).

In total, and given data limitations on internal migration, the few available sources provide evidence that when compared to international standards, lifetime and short-term mobility appear to be rather low in the region. Morocco is an exception to this as lifetime mobility exceeds 30%. However, throughout the region, including Morocco, internal migration is probably slowing down or at least, not increasing. The causes of migration lie in the rural-urban gaps mainly measured by indicators that relate to poverty rates and access to basic services (Box 1).

Table 3 - Internal migration in Morocco

Census	1982	1994	2004
Moved last 5 years	11.4%	11.6%	8.9%
Moved last-10 years	19.4%	18.2%	15%
Moved more than 10 years ago	22.5%	21.6%	17%
Lifetime migration	41.9%	39.8%	32%
Never moved	58.1%	60.2%	68%

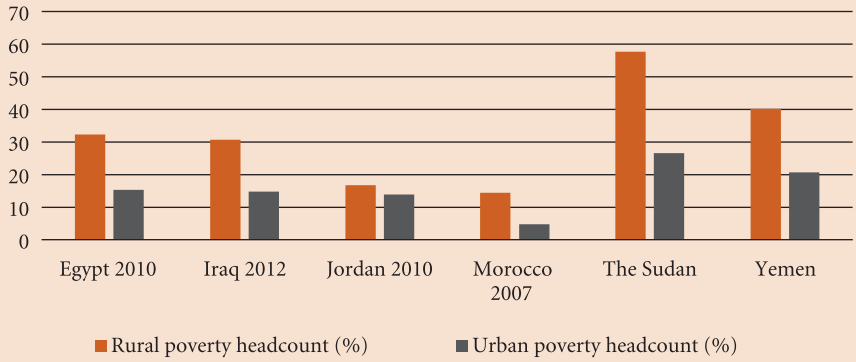
Source: David and Nilsson (2017); Original source is the 1982, 1994 and 2004 Moroccan censuses, available online on the IPUMS project website (population concerned: individuals 15-64 years old).

Box 1: Persisting disparities between the rural and the urban worlds

Given the data available, rural areas in the MENA region generally have higher rates of monetary poverty (Graph 2) than urban areas.

The rural-urban divide is also revealed by the differences in access to education, health, public services and housing. Sabina Alkire and Gisela Robles (2017) find that in most MENA countries, access to these services is far lower in rural areas (from 3 to 20 times). For instance, in Sudan, rural poverty is twice as high as urban poverty while the lack of rural basic services is three times higher than in urban centres. In Morocco, rural income poverty is three times higher than in urban areas but the proportion of the rural population deprived of basic services is up to twenty times higher than in urban areas (Alkire and Robles, 2017). In this country, the per capita household consumption in rural areas is only 54% of that in urban areas and unemployment rates show differences of up to 15% on the basis of indicators for education, health, land tenure and political participation. The MENA region is among the regions with the highest inequalities between women and men in the world (Martín and Bardak, 2013). Similar results confirming the existence of large rural-urban gaps can be found in pre-war Syria (36,9 in 2007), and in Egypt (32.3% in 2010) (Abu-Ismail *et al.*, 2011; World Bank, 2018b).

Graph 2 - Rural and urban income poverty headcount evaluated at national poverty line for selected MENA countries



Source: World Bank (2018b).

Despite these large gaps between rural and urban areas in the region, and the productivity gaps between agriculture and other sectors, migration in general and rural-urban migration in particular, are growing at a slower pace: the lack of resources of agricultural populations combined with the drying up of job opportunities in cities explain this slowdown. If the share of rural people in the total population is progressively declining, the rural population continues to grow in absolute terms under the effect of a positive natural growth rate. For example, the rural population of Egypt increased from 16.7 million in 1960 to 54.3 million in 2016, that of Syria rose from 2.9 million to 9.3 million in 2010. Only Lebanon will have recorded a significant decrease in its rural population (1 million in 1960 against 700,000 in 2016) (World Bank, 2017).

Urbanisation is thus developing mainly due to high natural growth of the urban population and the reclassification of rural areas into urban centres.

What are the economic basis of internal migration, and how have many urban and peri-urban areas of the MENA countries faced the continued influx of internal migrants without being able to provide them with the necessary living conditions and sufficient job offers? What are the reasons behind these discrepancies between population movements and the capacities of national productive systems?

Migrations faced with an incomplete structural economic transition

In developed countries, the modernisation of the agricultural sector was part of the canonical frame of reference for structural transition (in reference to Rostow's stages of economic growth), which considers the decline of the agricultural labour force as inevitable, in favour of the secondary and tertiary sectors. By releasing land and surplus labour, the so-called "progress" agricultural and rural exodus has facilitated the restructuring of farms in the North, improved labour productivity gains in agriculture, and ultimately, ensured parity in the lifestyles of urban and rural people.

However, it must be noted that the conditions for the departure of agricultural workers towards other sectors in the MENA countries are fundamentally different from those of the Western countries, which entered the industrial era as from the end of the 19th century. Combined with the colonisation processes of vast territories around the world, the industrial revolutions have absorbed millions of European migrants[3].

In MENA countries, this structural transition has not occurred, and none of them has succeeded in creating non-agricultural economic activities (either in rural or urban areas), and in increasing the density of an economic fabric capable of absorbing a continuously growing population of agricultural and rural workforce in the countryside and a candidate for rural exodus. Development patterns have been fundamentally characterised by a weak industrial boom or branches of economic activity

3 - European migrations (60 million people) to the New World and colonies, have accompanied the industrialisation process of these developed countries and favoured economic modernisation.

that may provide opportunities for the surplus rural and agricultural workforce in the countryside.

The industrial environment of these countries remains dominated by micro-enterprises and SMEs, and the creation of knowledge-based businesses – expanding rapidly in northern countries – remains marginal. Of the 4.8 million companies officially registered in Algeria, Egypt, Jordan, Lebanon, Morocco, Syria and Tunisia, 98% employ fewer than 50 workers (Martín and Bardak, 2013). In Algeria, the non-hydrocarbon industrial sector represents only 5% of the GDP and barely 6% of employment. In Morocco, "the ambition of economic diversification through industry has not been fully satisfied, integration has made little progress and the control of the internal market remains incomplete and technological dependence accentuated" (Pellissier *et al.*, 2015). In Egypt, one can hardly identify a "national productive system", due to the lack of links between the different production segments (Amin, 2012). In Lebanon, it is the services economy (driven by trade, banking intermediation, real estate or tourism) that provides most of the added value (FAO *et al.*, 2017) and, in Syria the last eight years of war have ruined the manufacturing activity. Non-agricultural sectors provide very few jobs, excluding construction, mining and public services. In fact, the State remains the main employer in some countries: 30 to 40% of employment in Algeria, in Egypt, in Jordan and in Syria and almost 50% in the Occupied Palestinian Territories.

These economic conditions do not allow the agricultural labour force to be absorbed by the industrial sector or by other branches of economic activity. The labour-intensive manufacturing sectors lag behind. For the MENA region, it is estimated that only 20% of agricultural production is processed by the agro-food sector, even if this is one of the priorities of public policy (FAO, 2018).

Even though over the past decades, in almost all the countries in question, there has been a relative decrease in agriculture in the production of national wealth, the sector remains always one of the first sources of employment in the country (except in Lebanon and in Jordan). In 2016, in Morocco the agricultural working population represented 33% of the total working population, 25.6 in Egypt, 18.4% in Syria, almost 12% in Tunisia and in Algeria and more than 30% in Sudan (World Bank, 2017).

Dominated by unpaid female family labour, this low-productivity sector hides underemployment and unemployment. Active overpopulation in cities is concentrated in the sector of little productive informal services in the retail trade as in the case of Morocco and Yemen or in underprivileged public sectors as in Egypt, Jordan, Lebanon and Syria (Benjamin *et al.*, 2014; Angel-Urdinola and Tanabe, 2012; Chen and Harvey, 2017).

At a macroeconomic level, unemployment, especially among young people, is a crucial issue. In most MENA countries, unemployment rates exceed by far those of other regions and data suggests that these rates are deteriorating since the years 2000. In addition, the region has the highest average youth unemployment rate (25% on average). For example, in Tunisia the rate of young unemployed workers is of 42% (Martín and Bardak, 2013).

The problem of youth unemployment seems to be the consequence of two parallel processes. If in northern countries, there is a drastic fall in labour markets in the agricultural sector young employed workers and a reduction of about 2% on average per year in the number of farmers in southern Mediterranean countries, agricultural labour markets are characterised by a massive influx of young workers each year: approximately 40,000 new workers in Algeria, more than 50,000 in Morocco and around 250,000 in Egypt.

All this has been coupled by low productivity in agriculture that is lacking the capacity to generate sufficient employment opportunities (Box 1). In 2015, 20% of the labour force employed in agriculture produced only 5% of the GDP (World Bank, 2017) and an average farm worker in the MENA region produced only one third of the amount produced by an average worker in other sectors (UNCTAD, 2017).

If pluriactivity helps rural households to overcome the seasonal nature of agricultural employment, it does neither lead to a complete transition of agriculture nor to productivity gains. In fact, the improvement in household incomes remains modest and fragile and therefore unsustainable. These households are either condemned to live in poverty, to fuel internal or international distress migration or to adopt survival strategies.

After having examined the socio-economic foundations of the internal and international migration of rural populations, the employment problems and the precariousness of the livelihoods they encounter, it is important to understand, in the case of agriculture that is the basic activity of the rural world, the interactions between climate impacts, changes in fragile ecosystems and mobility.

Climate change, environmental degradation and migration

Little empirical evidence exists on environmental and climate factors and their impact on migratory movements. Understanding the interactions between climate change and human mobility is nevertheless necessary in the formulation of adaptation policies to climate change (Wodon *et al.*, 2014a). Climate-related migration is not new and migration has always been an important adaptation mechanism to climate risks. Physical and climate constraints of many Mediterranean regions partly explain the population maps of Mediterranean regions in the course of history. For instance, Oli Brown (2008) notes that "in the 8th century, Muslim expansion in the Mediterranean and southern Europe was, to some extent, driven by drought in the Middle East". Tariq Madani (2009) points out that at the time "when agriculture in the peripheral regions of the Muslim world or al-Andalus was doing well, the decline had already begun to be felt in the Near East through the abandonment of sites in Transjordan and Hedjaz or the degradation of soils in Iraq". Fernand Braudel (1979) who characterised the Mediterranean as a "space of movement", states that large urban societies have emerged due to the aridification of climate and the changes that have had an impact on the environment of the Mediterranean regions. The climatic accidents underlying food crises (famines or shortages) have often caused

widespread population migrations. The droughts of 1946-1947, that severely affected southern Tunisia led to a migratory movement that depopulated entire villages (Baduel, 1981)[4]. Recent studies on the rural exodus in Morocco suggest a strong link between migration and desertification in some regions (Lahlou and Zouiten, 2001). In order to ensure their livelihoods, rural families have always resorted to mobility as an adaptation strategy during periods of climatic stress. In western Sudan, rural families adapted to drought by sending one of their members to Khartoum to provide support for the family (Brown, 2008).

This section will focus on climate change and degradation of natural resources in the region and their impacts on "forced migration". The adopted approach takes account of the differences between climate change (occurring over the long term) and natural resource degradation processes resulting from agricultural policies and practices. The lack of government anticipation in this field, causing major political conflicts triggered in some countries of the region (Syria and Sudan), will then be highlighted.

A region strongly impacted by climate change and land degradation

Scientific debates and observers of many international organisations note that climate change is one of the main drivers that explain current migration patterns. The Fifth Assessment Report of the International Plant Protection Convention (IPCC) indicates that the MENA region is one of the most prone to climate risk. In 2100, the warming would probably be between 2°C and 4.5°C. It will lead to decreases in the annual average precipitation of between 10% to 20%, a multiplication of climatic accidents (floods, droughts), an increased risk of desertification and soil degradation, changes in species composition, a loss of habitats and agricultural and forestry production (IPCC, 2014). Climate change is expected to translate into greater water scarcity and land loss in the region, thereby ruining the livelihoods of many rural communities, and forcing them to move in situations of distress. No longer having the capacity for adaptation, these rural communities will be forced to emigrate to regions offering better conditions. Based on a survey covering 23 countries, the study of Warner (2010), confirms these strong links between environmental factors and migration.

According to the study conducted by the World Bank and the *Agence Française du Développement* (Brüker *et al.*, 2012) and focusing on Algeria, Egypt, Morocco, Syria, Yemen, a +4°C scenario that is plausible by the end of the century will result in migratory movements of unprecedented extent. Environmental impacts will be acute in the region (cataclysmic floods, repeated droughts or severe sandstorms), or will be more gradual (desertification of fragile ecosystems, deforestation of forest basins, depletion of water resources or soil degradation). In the Maghreb and Middle Eastern countries, the same study indicates that by 2025, 80 to 100 million people could be affected by water stress and that, by 2050, the availability of water could be reduced

4 - Empirical evidence is provided in the book of D. K. Davis, *Les mythes environnementaux de la colonisation française au Maghreb*, Paris, Champ Vallon, 2012.

by 50% if the States do not engage in strong protection actions (Brüker *et al.*, 2012). The largest river in northern Algeria, the Cheliff basin could reduce water flows by 34-40% in 2020 and 60-78% by 2050 due to climate change. Climate change impact seriously affects Moroccan oases where the temperature increased between 1960 and 1990 by 0.4-0.6ºC: it is expected to increase by 1.6ºC by 2050. Precipitation decreased by 3 to 15% between 1960-1990 and 2015. In Tunisia, the temperature is expected to rise by 1.9% by 2030 and 2.7% by 2050, and precipitation is expected to decrease by 9% in 2030 and 17% by 2050 compared to the reference period (1961-1990). In addition to water scarcity, one of the major risks is the deterioration of water quality in the coastal oases of Tunisia (Gabes) following the rise in sea level and the likely penetration of marine saline water in the local groundwater. One of the most densely populated areas of the world, the Nile Delta in Egypt is extremely vulnerable to sea level rise. A rise of just one metre would displace at least 6 million people and flood 4,500 km^2 of farmland (Brown, 2008). Marked in recent years by a series of climatic accidents with successive floods and droughts, Yemen and Sudan are highly vulnerable to climate change.

Combined with climate change effects, the demographic dynamics have disrupted natural ecosystems. The desertification of several million hectares and the loss of cultivable land due to climatic and anthropogenic factors have contributed to migratory processes (Desjardins, 2008). In Morocco, it is estimated that 75% of arable land is already affected by soil erosion. Mountain, oasis and border areas are subject to desertification, rangelands are severely degraded and the forestry sector is shrinking due to clearing and insufficient reforestation (Schilling *et al.*, 2012). In Tunisia, representing 25% of the country's farmlands, the farmlands of the North and Centre are threatened by erosion and the soils irrigated by over-exploited groundwater are affected by salinization. In Algeria, desertification is a threat to the 32 million hectares of rangeland. The forest cover of northern Algeria is permanently exposed to natural risks (fire) and anthropic pressure (deforestation-clearing). The state of the steppes is of concern as the production potential of these areas would be reduced by 75% (CIHEAM and Plan Bleu, 2009). Tamer Afifi (2011) states that environmental problems have been the main cause of migration from rural areas of Egypt; they have been responsible for lower crop yields leading to reduced incomes and unemployment for many landless farmers. Other reports refer to lower yields in Egypt due to climate change and soil erosion (Elbehri and Sadiddin, 2016). In Sudan, the paradox lies in the fact that on the one hand, this country has significant water resources (Nile waters, wadis surface waters and groundwater) that are underutilised and on the other hand, the country suffers from severe drought episodes. The latter have severely affected the southern regions (Darfur) and resulted in famine and large-scale migratory movements. Rising temperatures and decreasing precipitation have accelerated desertification processes and favoured a fall of the bioclimatic level resulting in a southward movement of the border separating the desert from semi-desert areas. These natural phenomena have had a significant impact on the relations between nomads and sedentary communities and are the source of conflicts over the use of resources (water and rangelands).

This degradation of the natural capital has led to situations of poverty and food insecurity for rural households that derive most of their income from the exploitation of natural resources: water, soil and vegetation. The links between human mobility and environmental and climate change are becoming more apparent, urging for immediate public policy action. In all contexts, these policies play a crucial role in shaping people's adaptation strategies.

Climate change or poor governance?

Inspired by his master Ibn Khaldoun (1332-1406), in his famous "*Traité sur les famines*"[5], El Maqrizi (1364-1442) concludes that the episodes of famine in Egypt were more the result of the poor governance of dynastic States than climatic accidents (floods of the Nile). According to him, the tax levies and the numerous situations of exactions exerted by the State or its representatives of the countryside, contributed to weaken the *fellahs*, thus exposing them to famine during climatic crises. He thus raised the legitimate question of the links between natural disorders and the social and economic order, in other words, that of the good governance of political systems.

Historically, it is well established that development projects implemented in some MENA countries in the 1960s (construction of large dams on the Nile and the Euphrates, the "dam revolution" in Morocco) were strategies to struggle against climatic hazards that are faced by the region. Today the emblematic achievements represented by the Aswan Dam in Egypt or the Tabqa Dam in Syria, allow the mobilisation of more than 3.5 million ha of irrigated land in Egypt and more than a million ha in Syria. Over the past three decades, dams in Morocco or new techniques of water mobilisation (drilling) introduced in all the other countries of the region (Algeria, Tunisia, Jordan, Lebanon and Egypt) enable the improvement of land and the extension of cropping.

The models of agricultural growth adopted in the years 1990-2000, or earlier, were based on an increasing mobilisation of agricultural water and enhancement of land with the objective of developing intensive sectors (fruits, vegetables, olive oil, cotton, dates) dedicated to export. The agricultural reforms based on the liberal model adopted by the States of the region have transferred both natural and financial resources to a "capital pole", to the detriment of family farmers who have since then lost most of their support and grants required for them to survive.

In Egypt, public policies have disadvantaged the rural areas of Upper Egypt (80 to 85% of total agricultural area with 90% of the rural population). The current policy benefits the new lands that roughly make up only 15 to 20 % of the agricultural land, inhabited by only 8% of the population and represent only 2% of agricultural holdings. These new lands have faced the emergence of large capitalist farms whose model is very different from family farming that prevails in the "old lands" situated in the Nile Valley. The farming systems of these irrigated and mechanised farms are export-oriented. Social amenities, services and economic activity are concentrated on these new lands, while the majority of the rural population of the Nile Valley,

5 - Translator's note: Treaty on famine.

mostly composed of small farmers, workers, and the landless is poor and dependent on aid from the public authorities.

In Jordan and Syria, public intervention has played an important role in the degradation of natural resources. For instance in Syria, grain farming has expanded to the detriment of better pasture areas, and hydraulic developments (water-well drilling) have enabled pastoralists to exploit steppe areas in the South of the Euphrates that were difficult to use. Crop extension in arid or semi-arid regions, where rainfall is hardly over 200mm, has been followed by continued yield degradation. Observations made on the different sites of ICARDA (International Centre for Agricultural Research in Dry Areas) had identified alternation processes of the soil structure favouring water and wind erosion (Jaubert, 1993).

Myriam Ababsa (2013) highlighted the fact that the crisis that has affected the Syrian rural world has been accelerated by agricultural policy measures promoted by the State. As also highlighted by several reports, the lack of State control in the exploitation of water resources, for example, has resulted in the collapse of the groundwater levels pumped by thousands of illegal wells and the impoverishment of land due to the implementation of a rigid master plan favouring strategic crops (wheat, barley, cotton). In addition, the government had also lifted subsidies on diesel fuel and chemical fertilisers, which consequently increased production costs. Farmers, particularly those in northwestern Syria, who used diesel to pump water from private wells, rivers and public networks, have experienced sharply rising prices and falling incomes with multiplier effects on the employment of landless agricultural or seasonal workers (Sadiddin, 2013). Combined with the 2004 land counter-reform, which strengthened the powers of large landowners, these public actions precipitated Syria into a serious agrarian crisis. The dramatic price increases forced farmers and herders from the Northeast to massively abandon their land and migrate to urban areas and the southern governorates in search of work. The UN agencies estimated that up to 65,000 families or around 300,000 people emigrated from the Northeast and that 60 to 70% of the villages in the governorates of Hassakeh and Deir ez-Zor had been deserted in 2009. The agrarian counter-reform adopted by the Syrian government in 2004 resulted in the arbitrary expulsion of hundreds of sharecroppers and worsened the situation of agricultural workers, especially women (Ababsa, 2013). Between 2004 and 2008, the agrarian crisis resulted in the loss of 40% of the agricultural labour force (1.4 million to 800,000 in this sector) and was further aggravated, as we know, by an unprecedented climate crisis (drought of 2007-2010). In conclusion, all the analyses show that bad governance and inappropriate agricultural policy measures can magnify climate crises.

Climate change adaptation policies

In the Maghreb countries, institutional devices have been implemented with the establishment of climate change agencies, councils or monitoring observatories. These countries have acceded to the United Nations Convention on Climate Change, adopted National Sustainable Development Strategies (NSDS), National Environmental Action Plans (NEAP), National Action Plans to Combat Desertification (PAN/LCD) and benefited from projects funded by the United Nations Development

Programme (UNDP) and the Global Environment Facility (GEF) to carry out their Initial National Communication (INC) or the strategy and action plans to address climate change. All the countries of the region are showing climate change adaptation measures: water saving, construction of dams and reservoirs, adaptation of technical itineraries, introduction of technical practices, conversion of production systems, struggle against erosion and desertification, protection and rehabilitation of steppe lands, watersheds management, diversification of activities, safeguarding and extension of forests, and development of agricultural insurance. With the support of international organisations (FAO, IFAD, World Bank) and a large number of local agricultural associations and organisations, Egypt has been preparing a 2030 sustainable development strategy. Sudan has incorporated the environmental vulnerability to which its agricultural sector is exposed in the definition of its objectives. All these actions implemented by the State (irrigation, pastoral policy, programmes to combat desertification, fight against poverty, etc.) aim to cope with the upheavals caused by the deterioration of the environmental framework.

Nevertheless, all climate change adaptation measures are hampered by the absence of financial instruments and operational plans for their implementation. Most farms do not have the means to adapt to climate change and the current agricultural policy measures exacerbate competition over access to land and water resources. Small-scale agriculture dominates in the three Maghreb countries where two farms out of three have less than 5 ha. In Morocco, 77% of micro/small farms are situated in areas with limited potential (mountain, semi-arid and pre-Saharan areas) and 70% of Moroccan farmers have an area of less than 2.1 ha. In the MENA countries, inclusion (struggle against poverty) and sustainability (made necessary by the severe climatic constraints) remain goals that have not been achieved, and the programmes implemented have not rectified inequalities. This has contributed to the deterioration of the environment.

Intensive agricultural practices, even hyper-intensive ones conducted and encouraged in large farms in Morocco, Egypt, Jordan, or Algeria (mechanisation, chemical intensification, intensive livestock production, irrigation by the multiplication of wells and drilling) accentuate the impact of climate change with effects on water and soil resources, employment, workforce or salaries.

Inequalities of income within countries and the facilitation of circulation granted to private capital reactivate competition between family production structures - with little capital - and national or foreign economic operators that are capable of mobilising significant private or public funding (Purseigle and Hervieu, 2009). The result is a strong labour productivity gap with consequent difficulties in eradicating poverty of the poorest households.

In the end, few countries include concrete measures to address climate migration in their national development plans. In most countries in the region, there are no laws or land-use policies to reduce the displacement of people, leaving areas with high climate risk for areas likely to be already heavily populated. This last remark is important because climate shocks reinforce the role played by socio-economic factors in migration processes. A number of counties have already experienced this type of

situation, where climatic accidents, combined with economic and political shocks may have provoked violent conflicts (Syria and Sudan).

Migration due to conflicts

In March 2008, a report by the High Representative of the European Union for Foreign Affairs and Security Policy stated that "in the future, climate change is likely to have an impact on social and political stability in the Near East and North Africa". The report added that "tensions related to water resources management in the Jordan Valley and the Tigris and Euphrates basin whose waters are becoming scarce" are likely to worsen in the future. The works of Pierre Blanc (2012) on the Near East provide relevant arguments for these statements.

It is important to distinguish between migration in relation to political and community conflicts (the case of Lebanon), and the one that is more specifically related to economic and geopolitical factors (Egypt), and that related to more recent conflicts where climate (combines with politics) played a catalytic role (the case of Sudan and Syria).

The works of Pierre Blanc devoted to Lebanon (2013) point out that we cannot understand and interpret the evolution of agriculture and rural areas in Lebanon without taking account of these local and regional community and geopolitical conflicts: "in the land of the Cedars, the hydraulic policy was not very active, the land policy was absent and the farmers little supported. This state of affairs has contributed to an unbalanced development of the territories. This was one of the seeds of the Lebanese civil war, a real final blow for the agricultural sector".

A source of institutional stability, the conflicts and particularly the 1975-1990 civil war, have affected the economy and the Lebanese territories for long periods. The low interest of the Lebanese government in agriculture, particularly in some parts of the country (Akkar and North Bekaa), has been a risk factor in building national cohesion (Blanc, 2013). Studies on Lebanon also note that, although migration has been a constant in the country's historical development, structural change in the economy, coupled with political and military conflicts, have been crucial in the evolution of the agricultural sector and the development of the rural world. The migratory movements that date back to the nineteenth century have been followed by population movements across the country and the region faced with recent community and political conflict (civil war, Israeli Occupation of southern Lebanon, etc.). The mass exodus of rural populations towards urban agglomerations or abroad, that they have caused, have contributed to territorial reconfigurations resulting in transformations of the rural-urban relationship and a change in the role of agriculture in the national economy. These departures have resulted in depriving the territories of better-educated and skilled young workers. Paradoxically, in some case, they have also played a role in the revitalisation process of certain territories. Emigrant remittances sent to families that remained in the country, representing more than 15% of the GDP in Lebanon in 2016 (World Bank, 2017) have enabled the implementation of projects and works for the benefit of their communities.

After the Lebanese civil war and others events, the recent Syrian conflict has attracted more than 1 million refugees to Lebanon, a country that is largely composed of a rural and agricultural population. The majority of Syrian refugees are settled in the poorest rural areas of Lebanon, particularly in Akkar, Tripoli, Beqaa and southern Lebanon. Nearly half of the Syrian refugees in Lebanon (45%) work as unskilled labourers in the construction and service sectors but also in the agricultural sector (FAO *et al.*, 2017).

Since the outbreak of the war, the massive influx of these Syrian populations (Palestinian and Iraqi in the past) is now having an influence on the rural economy and on Lebanese society. The effects of this immigration are contradictory. If Syrian labour competition in Lebanon is not a new phenomenon, the increase in the labour force of more than 15% over the last eight years has important consequences. According to the data of the World Bank, this has led to a rise in the unemployment rate from 11% to 18%. This had a negative impact on Lebanese unskilled workers whose wages decreased by 30% in Baalbeck and by half in the North (Abi Samra, 2010). Besides, the influx of Syrian refugees also has an impact on agriculture especially in the North of the country. Some of them, including those that have financial means, were therefore able to rent land in Lebanon and farm it. This phenomenon is positive from certain aspects, as it has allowed the recovery of activity on some farms. However, it has also led to an increase in the cost of leasing which was already expensive.

Surrounded by the desert, the present Egyptian agricultural and rural worlds remain structured and organised by the existence of the Nile waters and more recently that of the Aswan Dam. In the past, agriculture was developed through traditional farming in the Nile Valley, the Delta area and today, the land developed in other northeastern or northwestern areas of this Delta. In this context, new lands are farmed by a class of private entrepreneurs. The oil economy of the countries of the region had generated a flow of Egyptian migrants mostly coming from the Egyptian countryside. The regional crisis linked to the political upheavals (Egyptian revolution of 2011, conflicts in Syria, Bahrain etc.) and then, the collapse in oil prices have had effects on regional mobility, which occurred until then during periods of political stability and economic prosperity. As opportunities to leave were halted, the Egyptian countryside was forced to keep its surplus population. Today, national and international seasonal migration only concerns the working population that has access to social networks or to financial means.

In Sudan, repeated droughts have reshaped the map of human settlements and increased conflict between ethnic and religious communities. The ones that affected Darfur in the 1970s, 1980s and 1990s were followed by famine and large-scale migrations (FAO *et al.*, 2017). They have increased pressure on rangelands and cultivated lands in marginal areas and promoted competition on agricultural land between southern herding communities and sedentary farming communities in the North. Poorly governed by the public authorities (that are rather favourable to farmers), this competition led to a political and military conflict that led to the partitioning of the country. Climate shocks served as a catalyst in the outbreak of conflicts.

Regarding the specific case of Syria, and even before the war, a debate arose on whether the drought that hit the country was due to the natural variability or an increasing warming trend. A study published in 2010, mentioned the drought of 2007-2010 as a consequence of global warming (Skar and Mathbout, 2010). In the early stages of the war, the case of drought in Syria was re-analysed by academics and most of the time, used as a relevant example to support the proposition that climate change is likely to induce or exacerbate conflicts. Colin P. Kelley and his colleagues (2015) argue that in Syria, a country characterised by poor governance and unsustainable agricultural and environmental policies, drought has had a catalytic effect, contributing to political instability. Peter H. Gleick (2014) goes further by stating that the drought of 2007-2010 and the resulting economic deterioration caused a very large migration of rural communities to cities, and that these phenomena have accentuated urban and rural unemployment, creating the economic difficulties generating social protest movements. As a result of this drought, around 1.5 million rural people have reportedly migrated to urban areas in search of employment opportunities, especially in the places where the uprisings started (Deraa) in March 2011 (Swain and Jägerskog, 2016).

It thus appears quite clearly that political conflicts and "forced" migrations that accompany them are multiplied when climatic constraints are combined with political, economic and social constraints.

Conclusion: what perspectives for the future?

MENA countries are faced with significant challenges in terms of sustainable agricultural and rural development: diversifying activities in rural areas to reduce unemployment, reducing poverty and maintaining urban/rural balances in a context of high population growth, restoring and managing sustainable natural resources, improving the ability of farmers to adapt to climate change.

In a context of under-industrialisation, weak diversification of the economic fabric, technological backwardness and dysfunctional institutions and market, the continued concentration of farms leads to a reduction in the number of farmers, to an increase in unemployment and rural exodus on the one hand, and presents major political and social risks on the other hand. Little inclusive and insufficient rural policies with regards to the challenges raised by poverty and territorial inequality generate political conflicts. This clearly demonstrates the need to rebalance the relationship between small-scale family farming and large-scale agriculture, between the rural and the urban world.

Already strongly marked by aridity, the development of rural areas in MENA countries is hampered by desertification land degradation processes. Environmental public policies must be more robust especially when climate crises become collectively intolerable and politically dangerous. Disruption of the balance between resources and populations make today's societies more vulnerable to drought and climate hazards. Old forms of natural resources regulation and spontaneous adaptation of rural communities must give way to more vigorous public actions of territorial planning.

As Mélanie Resqueir-Desjardins points out since 2008, preventing "degradation and restoring degraded natural capital should be included as national and international priorities in order to meet the Sustainable Development Goals adopted in 2000". The problem of the struggle against the degradation of resources is addressed, by the reduction of poverty on the one hand and the achievement of sustainable development on the other hand. The crucial issue of economic development in dry rural areas requires the reduction of inequalities between developed regions. Since permanent migration is the ultimate solution to desertification, the living and working conditions of village communities must be improved upstream in order to prevent or regulate migration. Migrants sometimes organise their own integration by entering the job market of host regions or countries. It would be useful to accompany this process with labour and social protection legislation.

Governments need to promote the adoption of new agricultural practices and encourage farmers to gradually abandon yield-based agriculture and opt for sustainable crops and practices that are resilient to climate change. Climate change adaptation measures require enhanced scientific knowledge on their effects on agriculture and rural development and also the promotion of regional cooperation revolving around environmental vulnerability and risks related to climate change.

In a context where agricultural systems are running out of steam, structural reforms are necessary to support family farming, organise the gradual withdrawal of agriculture or of certain crops in vulnerable areas and to organise an "exodus of progress" from these areas that are subject to strong anthropogenic pressure. It is important to invest in human capital and ensure a dignified living environment for rural populations. In other words, it is urgent and necessary to finally put an end to all kinds of "erosions" that threaten the future of the Mediterranean: the erosion of soil and water resources, the erosion of people. It is therefore an issue related to both social cohesion and social justice, and the political stability of States and the preservation of human civilizations.

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