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Migration and its interdependencies with water scarcity, gender and youth employment

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FOREWORD

by **Stefan Uhlenbrook**

Coordinator, United Nations World Water Assessment Programme (WWAP), UNESCO

The World Water Development Report 2016 on Water and Jobs (a UN-Water report, coordinated by WWAP) highlights that climate change, water stress and environmental degradation are affecting large parts of the population around the world, causing major threats to international peace, human security and wellbeing. Water is not only critical for the environment, but also essential for economic and social development. Employment and decent jobs are also heavily dependent on water. The WWDR 2016 further underlines the clear connection between water scarcity, food insecurity, social instability and social unrest, which in turn can trigger and intensify migration throughout the world. It has been estimated that by 2050 between 150 and 200 million people could be displaced as a consequence of phenomena, such as desertification, sea level rise and increased extreme weather events.

William L. Swing, Director General of the International Organization for Migration (IOM), stated in 2017 that 'Climate change and migration are among the most pressing policy issues of our time. The international community has been slow, however, to recognize the many ways in which the two phenomena are interrelated.' One aspect is the direct impact of increased climatic variability on water resources, their quantity, quality and distribution in time and space, and how it impacts on the livelihood of people.

Half a billion people already live under conditions of severe water scarcity, exacerbated by increasing water demand and increasing climate variability, causing at many places unprecedented droughts, like in arid and semi-arid regions of Africa and the Middle East. Increasing water scarcity translates into poorer livelihoods, food insecurity and loss of employment opportunities, in particular for the young and for women. Migration is often the response of the vulnerable members of society as a way to adapt to the risks and uncertainties of a changing climate and its impact on water.

This WWAP publication presents a review of the climate, water and migration nexus, with a specific focus on those who are often more vulnerable, particularly women and youth. It highlights the fundamental role played by water in securing social stability and resilience to environmental stresses, and calls for a major effort to improve water security and governance. It is my hope that this publication will help put this nexus higher on the political agenda and lead to follow-up actions. Ignoring the problem or postponing responses are not viable options.

Stefan Uhlenbrook





ABSTRACT

This paper seeks to assess the interdependencies among water scarcity, youth unemployment and migration. It also attempts to unravel the different roles of women and men in the gendered migration process.

Evidence shows that growing climatic variability has impacts on water availability and quality, which in turn jeopardizes social stability and jobs for the younger generations. This is particularly true in arid and semi-arid regions, where often migration is both the result of and a way to adapt to climate-induced environmental stresses. This paper makes the case that medium- to long-term strategies to mitigate social unrest, improve livelihoods of communities and individuals, and reinforce resilience to environmental stresses should include a special focus on improving water supply, access and governance.

According to a recent study (Mekonnen and Hoekstra, 2016), two-thirds of the global population (or 4 billion people) live under conditions of severe water scarcity at least one month per year, while another half a billion people face severe water scarcity year-round. The impacts of climate change, including water scarcity, are expected to lead to substantial employment cuts across the global economy, impacting in particular heavily water-dependent jobs – 95% of which are estimated to be agricultural jobs (WWAP, 2016) – in arid and semi-arid areas highly affected by climate change, where populations with low adaptive capacity may be led to migrate. Migration can hence represent a response to the consequence of failed adaptation to environmental stress.

As the World Water Development Report 2016 (WWDR 2016) points out, 'There is a clear connection between water scarcity, food insecurity, social instability [...] which in turn can trigger and intensify migration patterns throughout the world' (WWAP, 2016, p. 29). Already, a considerable number of people had to move across international borders due to food scarcity (Jägerskog and Swain, 2016) and in search of job opportunities. Agriculture, the main water user, accounts for 60% of all jobs in Sub-Saharan Africa. Trends of increasing water scarcity show that this will impact heavily-dependent water jobs, threatening its sustainability. The increase of 'water-scarce' countries will affect income-generating opportunities, in particular for the youth (WWAP, 2016).

Finally, the paper provides an overview of migration hotspots, in particular on the originating and transit countries in Africa, the Mediterranean, the Middle East and South and East Asia.

1.

CLIMATE VARIABILITY, ENVIRONMENTAL CHANGES AND HUMAN MOBILITY: AN OVERVIEW

There are many reasons why people move, and there are many classifications of human mobility. Although lacking an agreed definition, 'climate-induced human mobility (Warner, 2010) [broadly refers] to movement of people driven by sudden or progressive changes in the weather or climate' (Wilkinson et al., 2016, p. 2). However, people move differently depending on different types of climate risks they face: 'intensive climate risks' that include highly-severe events (e.g. hurricanes, cyclones, tornadoes, severe flooding), or 'extensive climate risks' representing low-severity, high frequency or persistent weather and climatic events (e.g. persistent drought and recurrent local flooding) (Warner et al., 2013; Wilkinson et al., 2016). The same authors categorize the different types of climate-induced human mobility as 'migration, displacement and planned relocation'.

Climate-induced *migrations*, either permanent, long term or seasonal, are responses to 'extensive climate risks', as reported in many studies on individuals and households that migrated due to risks related to rainfall variability and livelihood insecurity (Warner and Afifi, 2014, cited in Wilkinson et al., 2016). Instead, climate-induced *displacements* happen when people move suddenly and temporarily in the face of hydrological natural disasters (intensive climate risks) which make up for 90% of all natural disasters (WWAP, 2012). It is often, however, the case that due to the perception of likely future risks, people's displacements become permanent (Warner, 2010). The International Displacement Monitoring Centre reports that 'There were 27.8 million new displacements in 127 countries during 2015... Of the total, 8.6 million were associated with conflict and violence in 28 countries, and 19.2 million with disasters in 113 countries' (IDMC, 2016, p. 7). Global estimates report that by 2050, around 150-200 million people will be permanently displaced due to droughts, floods and hurricanes (Stern, 2007, cited in Sugden et al., 2014; Scheffran et al., 2012; UNCCD, 2012).

While the sudden onset of climate-/environment-induced mobility is generally due to a major disaster, the mobility triggered by slow onset environmental change is due to a complex set of push and pull socio-economic factors, e.g. financial resources, family, social capital (Brown, 2008, cited in Chindarkar, 2012; Warner and Laczko, 2008, cited in Laczko and Aghazarm, 2009). A slow-onset environmental change progressively increasing livelihood insecurity and vulnerability might trigger seasonal and circular migration – as is the case in East Africa and in the Sahel region, where rural populations migrate during the dry season when agriculture is not viable and food starts to be scarce. It is noteworthy that these climate-induced migratory fluxes are, against common beliefs, taking place more within countries than across borders (Boano et al., 2008; Kevane and Gray, 2008; Laczko and Aghazarm, 2009).

Contrary to armed conflicts, natural disasters do not have the same impact in pushing people to flee internationally (Ferris, 2008, cited in Laczko and Aghazarm, 2009). This type of migration is instead a response to a progressive reduction of rainfall and tends to be male dominated (Afifi, 2011). Such is the case when households are dependent on rain-fed agriculture with a single harvest per year, a condition that makes livelihood diversification unfeasible. Rainfall variability, expressed in repeated droughts, has been singled out as a clear factor in migration attempts (Warner and Afifi, 2014).

Depending on household profiles (Warner et al., 2012, cited in Warner and Afifi, 2014), migration can be seen as an adaptive measure (resilience to climatic stressors such as rainfall frequency and intensity changes) or as the consequence of failed environmental stress adaptation (high vulnerability) (Table 1).

Table 1. Household (HH) profiles illustrating whether migration is adaptive or erosive vis-à-vis rainfall, food and livelihood insecurity

Migration improves HH resilience	Migration used to survive, but not flourish	Migration erosive-coping strategy	Migration not an option: trapped populations
<ul style="list-style-type: none"> • Economy: poor • Adaptation options: access to livelihood options and assets (social, economic, political) • Education: children have 3-5 years more education than parents • Migrant: early 20s, single; temporal migration • Remittances: education, livelihood diversification, health 	<ul style="list-style-type: none"> • Economy: land scarce • Adaptation options: less access to assets and institutions for support • Education: children have same education level as parents • Migrant: HH head, mid 40s; migration in hunger season • Remittance: success in obtaining food or money to buy food 	<ul style="list-style-type: none"> • Economy: landless • Adaptation options: few adaptation options in situ, inability to diversify • Education: all HH members have low or no education/skill levels • Migrant: HH head, mid 40s; migration in hunger season • Remittances: partial success in obtaining food or money to buy food 	<ul style="list-style-type: none"> • Economy: chronically food insecure, landless, female-headed HH • Adaptation options: insufficient assets to adapt locally or through migration • Education: more HHs have low or no education/skill levels • Migrant: no applicable • Remittances: none abandoned/trapped populations



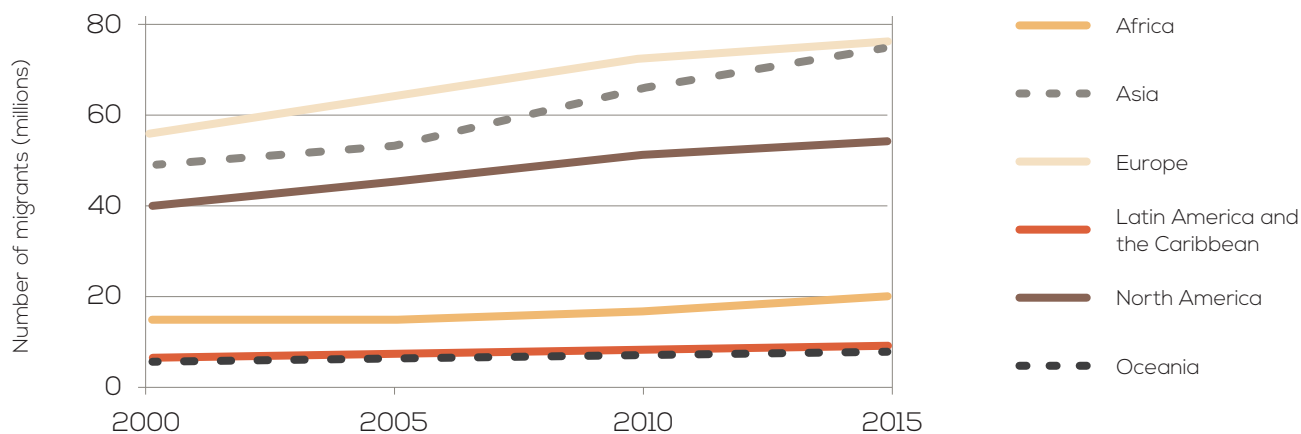
Resilience to climate stressors

Vulnerability to climate stressors

Source: Warner and Afifi (2014, Fig. 2, p. 11).

Numbers regarding environmental migrants¹ are across the board. It is estimated that 25 million people per year are forced from their homes nationally and internationally due to anthropogenic natural disasters. By 2050, studies indicate that global environmental changes could push anywhere from 50 to almost 700 million people to migrate (UNCCD, 2012). Other estimates regarding desertification point to a possible 1.8 billion living in water scarcity and 5.3 billion living under water-stress conditions by 2025, and 135 million being displaced by 2050 (Bonilla et al., 2015).

Figure 1. Number of international migrants by major area of destination, 2000-2015



Source: UNDESA (2015, Fig. 1, p. 1).

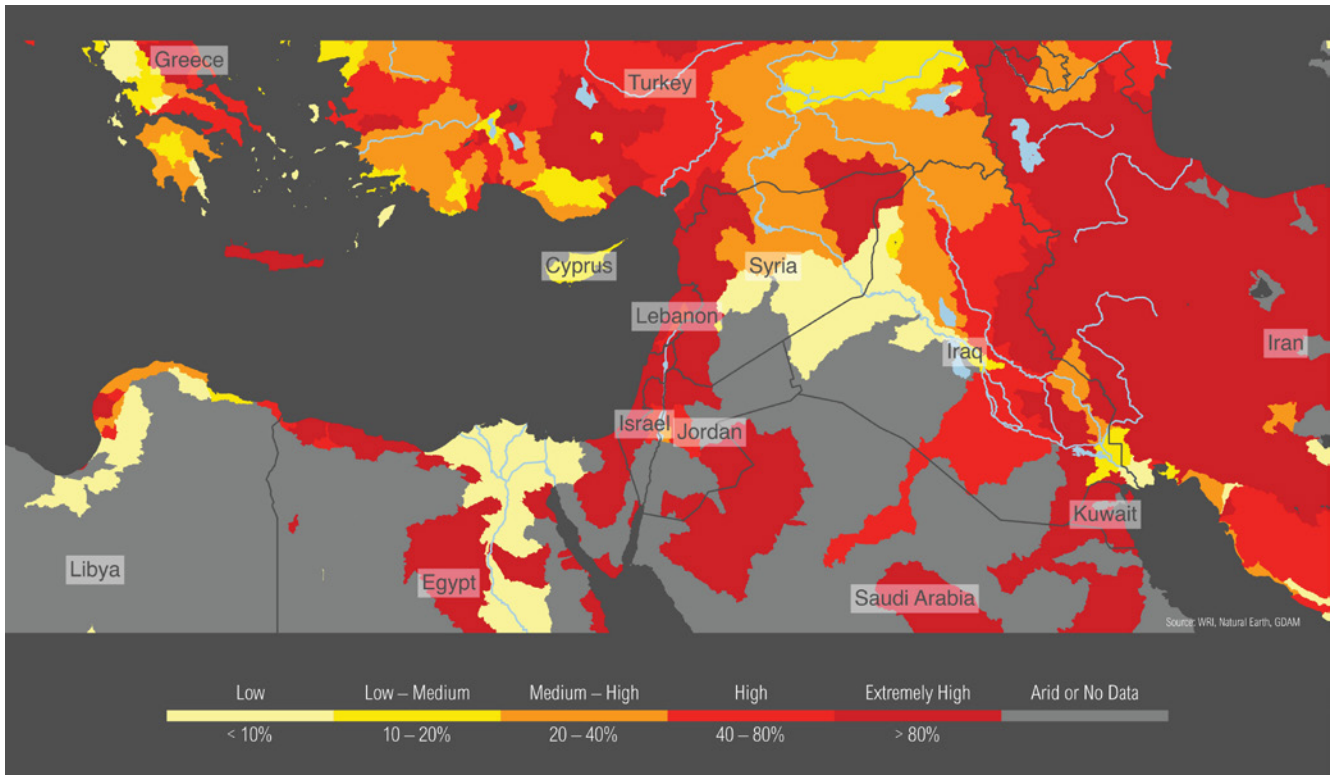
As Figure 1 shows, in 2015, international migrants² (including those displaced due to severe environmental changes) reached 244 million – an increase of 71 million, or 41%, compared to 2000 (UNDESA, 2015). Nearly two thirds of all international migrants live in Europe (76 million) or Asia (75 million). North America hosts the third largest number of international migrants (54 million), followed by Africa (21 million), Latin America and the Caribbean (9 million), and Oceania (8 million). In terms of gender, the female share of migrants globally was estimated at 48.2%, with 52% of international migrants in Europe being women (UNDESA, 2015). Of all migrants, 30% are under the age of 29, with 35 million of international migrants under the age of 20, up from 31 million in 2000, and another 40 million between the ages of 20 and 29 (UNDESA, 2013).

Figure 2 shows that water stress influences the migrants' choice to leave their homeland, as well as their choice of where to settle. Migrants move from dry to wet countries to find better economic opportunities and a better quality of life, and in the assumption that water-rich countries are more willing to accept them.

¹ The International Organization for Migration (IOM) defines environmental migrants as 'persons or groups of persons who, for compelling reasons of sudden or progressive change in the environment that adversely affects their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad' (IOM, 2007, pp. 1-2).

² 'Water stress' is generally described as the ratio of water used over the total amount of renewable water available. Water scarcity is also a function of access...maybe a social construct, product of affluence, expectations and customary behavior, or the consequence of altered supply patterns (WWAP, 2012). For example, climate change is the result of multiple causes, where three dimensions of water scarcity can be considered: (1) physical water scarcity; (2) economic water scarcity, due to a lack of infrastructure because of financial or technical constraints, irrespective of the state of water resources; (3) institutional water scarcity, due to the failure of institutions in place to ensure reliable, secure and equitable supply of water to users (FAO, 2012).

Figure 2. Water stress – an underlying conflict and migration multiplier



Source: WRI Aqueduct Water Risk Atlas, aqueduct.wri.org.

The figure also shows the hotspots of water-related disputes in the Mediterranean and North Africa (MENA) region, e.g. Jordan River, the control of the water resources of the Golan Heights or of the Litany River (Chazournes et al., 2013). Other conflicts among riparian countries are related to the allocation of the water from the Nile (Veilleux, 2015) and the downstream impacts of the Turkish Southeastern Anatolia Project (GAP) (Hommes et al., 2016). Often, these conflicts are caused by the high and intensive use of water in agriculture (in 2000, amounting to 63-79% of total water usage in North Africa) in a context of endemic water scarcity, which leaves other sectors and household water scarce. Notwithstanding, food security is in peril as population growth – coupled with constantly decreasing water flows since the 1960s – has in fact required an ever growing water usage in agriculture. The current situation is symptomatic of a low-adaptive capacity to climate change (Brauch, 2011).

Typically, room for manoeuvre becomes limited when water resources are already stretched to capacity, which is the situation in the Mediterranean region, where additionally a heightened inter-annual and seasonal precipitation variability, coupled with an increase in temperature and in extreme rainfall events, is expected (Liuzzo et al., 2015). Climate change will have multifaceted yet generally extreme manifestations in MENA and Europe in the coming decades, which will inevitably reduce the reliability of public water supply, power generation and irrigation (Brauch, 2011).

South and East Asia show high human vulnerability due to climate change and drought-risk hotspots (Thow and de Blois, 2008). Agricultural production has already declined due to water stress, increasing temperature and destructive incidence of typhoons. Some of the highest malnutrition rates worldwide are found in China, India and Pakistan, where more than 40% of the world's youth resides (UNDESA, 2010). South and East Asian societies have long been challenged by water hazards and they have adapted progressively. However, as

climate change is expected to hit them more consistently, their capacity to adapt is seen as limited (Nuorteva et al., 2010). Climate change will impact worst those that are least able to cope. This is often the case for young people who are less resilient as they might not have a sufficiently high level of education or they might be dependent on a single livelihood. Young people in the Global South are going to be worst affected by ongoing climate change, while on the contrary young people in the Global North are the least concerned by environmental issues (White, 2011; UNDESA, 2010).

In the context of water scarcity, vulnerability will depend on the incidence of climatic variability as well as on a person's or community's resilience and adaptive capacity to this stressor. Adaptive capacity is intricately and intrinsically linked to social structures, such as gender, class, caste and ethnicity (Sugden et al., 2014). This perspective is relevant as the process of migration is gendered from its inception – for instance, in relation to resources needed to migrate and customary norms around migration – and its consequences – whether migration leads to integration or segregation (Boyd and Grieco, 2003). While the gendered nature of migration has been widely discussed (i.e. Parreñas, 2001; Pessar, 2003; Donato et al., 2006) along with water in the context of climate-induced migration it is seen as a primary concern (e.g. Laczko and Aghazarm, 2009; Jägerskog and Swain, 2016), the relation between migration and youth has been marginally, if at all, analytically explored.

2.

WATER AND ENVIRONMENTAL MIGRATION DYNAMICS

The impacts of water scarcity on food security can force people to migrate in search of countries with more water. This factor is often associated with other aspects, such as political stability, governance, economic strength and job opportunities. Hence, water is both a push and a pull factor for migration, while migration can be seen as an adaptation strategy to preserve a household's security (Black et al., 2011), which, if denied or prevented, heightens environmental vulnerability and human insecurity (Selby and Hoffmann, 2012).

Black et al. (2011) developed a conceptual framework according to three levels – macro, meso and micro – which analyzes drivers and factors affecting the decision to migrate. At the macro level, the framework identifies five drivers of migration – social, demographic, economic, political and environmental – that seldom act in an isolated manner; at the meso level, it considers the intervening obstacles and facilitators; and at the micro level, the personal and/or household characteristics.

According to the authors of the framework, the environmental characteristics of a specific place 'affect both a population's exposure to hazard and the availability of ecosystem services' (Black et al., 2011). In specific localities, and particularly those economic systems in which agriculture and fisheries are the main production, a change in availability and access to water and related ecosystem services directly affects wellbeing and the demand for migration. The supplying system of water-dependent ecosystems is particularly affected by slow onset hazards, particularly drought. When drought affects yields, this may trigger 'progressive, large-scale migration (as the case in July 2011 in the Horn of Africa)' (Black et al., 2011).

The actual migration depends, however, on whether for instance at the meso level, there are local arrangements in place for the management of water and other natural resources, which are indications of social capital, or whether local communities can negotiate new environmental conditions with neighbouring communities (Black et al., 2011). If these two conditions are met, then migration is not an inevitable destiny.

On the other hand, at the macro level, much depends on national governments policies, for instance, whether there are provisions and capacity to provide relief to humanitarian crisis or whether economic policies are



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supportive of the agricultural sector under strain due to water scarcity. Historically, environmental and governmental policies are indirectly to blame in triggering migration patterns. For example, in Niger, colonial rule shaped an exclusionary and unequal land tenure system and imposed cash cropping which led in the early 1990s to soil degradation and food shortages that created a pattern of circular migration (Laczko and Aghazarm, 2009; Afifi, 2011; Hunter et al., 2015). Additionally, if national water governance and management policies and practices are deficient, this will fuel conflict and ultimately migration (Foresight, 2011). In this regard, numerous authors (de Châtel, 2014; Kelley et al., 2015; Van der Heijden et al., 2015; Wendle, 2016) argue that the deregulation in Syria through the removal of subsidies from agricultural sector in the late 1990s followed by the 2006-2010 droughts might have fuelled the Arab Spring uprising.

The social sphere, however, appears unlikely to trigger environmental-induced migration, with the possible exception of the spread of diseases. In fact, the actual final decision on whether to migrate or not is taken at micro level, i.e. the household (Black et al., 2011). Its economic status is crucial: poverty constrains migration, as those dependent on a single livelihood will be more affected by environmental change and will not have the resources to flee (Foresight, 2011). The decision of who migrates within a household changes depending on the context. In the Philippines, the women usually migrate, while in Sub-Saharan Africa it is mainly a male out-migration (Wilkinson et al. 2016). The next two sections will further explore how intra-household gender division of labour and age control the order of migration (Sellers, 2016).

3.

GENDER IN THE MIGRATION PROCESS

Climatic threats to water availability and access have different impacts on women and men. Gender is a fundamental variable in the decision-making process of migration (Pessar, 2003; Donato et al., 2006; Sellers, 2016). Although, between 1960 and 2015, the number of female migrants doubled (Gabaccia, 2016), it is fundamental to recognize how both women and men facilitate or hinder migration and how they are differently affected by the overall process of migration from its inception to integration in the hosting society. Migration is hence a gendered process which plays out differently in diverse societies depending on local cultural norms that do not only affect and are affected by gender roles, but also by age, class and ethnicity (Piper, 2008; Laczko and Aghazarm, 2009). The link between gender and climate-induced migration is still under investigation and few studies provide concrete country-specific examples of this phenomenon.

Looking at the overall migratory process, we shall attempt to show its different phases and how they are gendered.

3.1 Pre-migration stage

Loss of livelihood is the triggering event that sets migratory plans into motion. In addition, during this phase, food starts and continues to lack when women feed their children and husband first. They then remain with an empty stomach (Arku and Arku, 2010; Afifi, 2011; Djoudi and Brockhaus, 2011), which leads to dire consequences on their health. Moreover, the migratory process creates unique challenges for women and girls in regards to their reproductive roles as mothers and has adverse impacts on pregnancy and maternal health outcomes (Sellers, 2016). Additionally, male unemployment and poverty have been singled out as prompts for gender-based violence (Demetriades and Espen, 2008).

Other factors. Generally, it can be said that men and women adapt in different ways to climate variability. Regardless of who makes the actual decision or consideration to migrate, women and men are placed differently in this process (Piper, 2008). In Bangladesh, a study of women showed that due to insecurity in land tenure they are more likely than men to migrate due to crop failure and flooding (Gray and Mueller, 2012a, cited in Hunter et al., 2015). In Ethiopia, droughts reduce women's mobility for marriage-related migration (Gray and Mueller, 2012b), while

in Mali and in Nigeria, the opposite happens (Findley, 1994). Such different reactions to climate variability might also be due to a calculation on the bride's family side whether it is more expensive to marry off the daughter than having to keep on feeding her while she works on the family farm. Also in Ethiopia, during droughts, girls are prevented from going to school to help collect water (Sellers, 2016). In Burkina Faso, as well as in all Sahel countries, droughts and rainfall variability spark men's migration. At the same time, it should not be taken for granted that women are worse affected by climate change than men are.

Men tend to migrate. A typical example of this dynamic is seasonal migration, which tends to be dominated by men (Warner and Afifi, 2014). Although there is no conclusive evidence on how temperature and precipitations affect men's migration, it is apparent that they diversify their household income by migrating when farming becomes uncertain (Sellers, 2016). Women, on the other hand, resort to using gardens/small-scale agriculture with different seed varieties and collecting forest products (Djoudi and Brockhaus, 2011; Caretta and Börjeson, 2015; Sellers, 2016) to counterbalance the impact of climate variability.

3.2 Migration stage

Male out-migration. For the majority of affected people, out-migration is just one among many livelihood strategies essential to meet subsistence needs. To those who possess land, remittances are crucial in this process as they are diverted into hiring labour to maintain the productivity of the land while the male head is absent (Sugden et al., 2016).

In the case of women, their workload increases due to climate variability or due to absence of the male head, by having to walk further to collect water and fuelwood (Hunter and David, 2009; Djoudi and Brockhaus, 2011; Chindarkar, 2012). While men are away, women do take up traditional male roles, but without getting the same rights, i.e. participation in natural resource management (Djoudi and Brockhaus, 2011). By the same token, as their partners migrate, women are forced to make trade-offs, foregoing clean water to keep children safe and completing other chores or foregoing family care due to longer distances to cover to collect water (Crow and Sultana, 2002). All these competing tasks reduce women's access to get paid work or to attend school (Sugden et al., 2014).



Given women's limited or absent participation in water management, male out-migration jeopardizes the sustainability and functionality of local water management institutions. Women are excluded from these settings because they do not own land. Such exclusion coupled with male out-migration escalates the risk of losing the household's only livelihood: agriculture (Djoudi and Brockhaus, 2011; Caretta and Börjeson, 2015; Sellers, 2016).

Cultural and legal barriers to land ownership restrict women's access to agricultural services and force them into common property resource-dependent activities, which are more vulnerable to climate variability. Consequently, women-headed households are more frequently prone to loss of homesteads and housing for an extended period of time, as well as loss of self- and family-esteem, and lack of production opportunities and food security (Hunter and David, 2009; Sugden et al., 2014). On the bright side, women's control over the household income inevitably increases as men migrate. This makes female-headed households an important component of the rural economy (World Bank, 2011; Sugden et al., 2014).

Feminization of migration. Women's mobility in the Global South is restricted. This condition makes them less likely to evacuate or to migrate in the aftermath of natural disasters (Hunter and David, 2009; Chindarkar, 2012). Accordingly, women tend to follow later in the migratory process and, when they do, they often leave behind children with other family members (Parreñas, 2001; Hunter and David, 2009). This is an indication of the so-called phenomenon of the feminization of migration: women's migration is the manifestation of families disintegrating, as women are the ones caring for the home, children and the overall wellbeing of the family (Parreñas, 2001; Hunter and David, 2009).

It has also been shown that women tend to suffer more than men do from the psychosocial impacts of migration, as they are tasked with taking care of family members while disregarding their own distress. This condition often leads to women suffer from anxiety and post-traumatic stress (Sugden et al., 2014), which are some of the consequences of sexual violence on women in camps of internally or internationally displaced people (Brown, 2008, cited in Chindarkar, 2012). Additionally, women and children are more vulnerable to attacks and abuse, particularly after dark when they need to use the latrine in communal facilities in camps (Jägerskog and Swain, 2016).

3.3 Post-migration stage

Once in the host country, integration is experienced differently by women and men depending on various factors, amongst which their inclusion in the job market, and the impact of migration on their status (Piper, 2008). Different immigration rules might be in place when it comes to work eligibility or refugee status eligibility depending on one's gender. It has emerged, for instance, that women are more often than men denied full citizenship (Boyd and Grieco, 2003).

Migration can make women more dependent on their husbands on one hand, if they try to uphold conservative gender roles in the host country or, on the other hand, women's social mobility, economic independence and autonomy can increase (Boyd and Grieco, 2003; World Bank, 2011). The latter situation is facilitated in a receiving labour market that is open to women, and that is particularly in need of employees in the service sector where women tend to be more commonly occupied.

Women's increased occupation can trigger a change of gendered roles within the household (Pessar, 2003; Piper, 2008; Hunter and David, 2009). This new set-up, however, does not result in more equality within the household as women can easily find themselves carrying out a second shift when they get home from their full-time work. Finally, migration certainly challenges gender roles, but the outcomes might not be always positive for either women or men.

4.

WATER SCARCITY AND YOUTH UNEMPLOYMENT AMONG THE ROOT CAUSES OF MIGRATION

High unemployment rate is one of the reasons that trigger young people's decision to migrate abroad permanently (ILO, 2016). The WWDR 2016 highlighted the strong nexus between water and jobs. When discussing jobs and how they relate to water, the report categorizes as 'water jobs' those direct jobs in the water sector (water resources management, infrastructure, water supply and sewerage), and as 'water-dependent jobs' those comprised in economic sectors that are heavily or moderately water-dependent. The WWDR 2016 estimates that 95% of jobs in the agriculture sector, 30% of jobs in the industry sector and 10% of jobs in the services sector are heavily dependent on water. These job sectors include agriculture, forestry, inland fisheries and aquaculture, mining and resource extraction, water supply and sanitation, and most types of power generation, as well as a number of jobs in manufacturing and transformation industries such as food, pharmaceuticals and textiles (WWAP, 2016).

Since agriculture is the primary employment sector in most developing countries (WWAP, 2016), inadequate and unreliable water supply in heavily dependent water jobs results in the loss or disappearance of those jobs. Consequently, income stability is compromised which then has dramatic effects especially on the poorest households that have 'limited assets and safety nets to cope with risk' (FAO/WWC, 2015, cited in WWAP, 2016).

'Although no legal definition of "youth" has been established, the United Nations defines persons aged 15 to 24 as youth' (GMG, 2014, p. 2). In 2015, international youth migrants reached almost 28 million, 60% of whom come from the Global South (ILO, 2016). Many internally displaced people in the world are under the age of 18, some move with their families, others, mostly in South Asia and West Africa, migrate alone (UNDESA, 2013). Globally, 46.5% of youth migrants are young women or girls; almost similar to the percentage of females in the total migrant population (48%) (GMG, 2014). In the Middle East, North Africa, West Africa and Sub-Saharan Africa, migrant youth see migration as a way out of poverty to seek a better future (GMG, 2014; ILO, 2016; Toli, 2017). Although Sub-Saharan Africa is already subject to 'widespread poverty and a high yield gap' (WWAP, 2016), it is estimated that '195 million new entrants are expected to enter the labour market by 2025' (World Bank, 2011, cited in WWAP, 2016).

In West Africa and the Middle East and North Africa region, youth usually migrate inter-regionally and particularly from rural to urban settings (GMG, 2014; Toli, 2017), adding stress on urban areas that offer



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inadequate infrastructure (Toli, 2017) and on saturated labour markets (GMG, 2014). Therefore, the most skilled youth decide to leave the country and migrate to Europe (Toli, 2017). This negative impact is especially true for adolescents and young women who 'are more likely to be underemployed, and more likely to be out of the labor force...[and] work more hours than males and are more likely to engage in non-market activities... [young women] are more likely to be stuck in low productivity jobs.' (World Bank, 2008, p. 7).

Generally speaking, young people aged 15-24 are forced to face discouraging socioeconomic perspectives because of the combined effect of increased water-related risks due to climate change and variability, rapid population growth and increased unemployment (Toli, 2017). Moreover, their educational aspirations are often curbed due to the need to generate an income (UNICEF, 2014). Yet, migration is often described by youth as a life-changing and enriching experience, which has improved their capacity as agents of social change and development. Staying connected with their peers, community and family is considered critical in making the most out of the migration process for themselves, their families and their communities. Diasporas are in fact often a great source of technology transfer and creativity that, upon their return, is introduced in their originating country. Similarly, migration puts into motion a process of brain drain which deprives the country migrants leave behind of mostly educated and highly skilled human resources (UNDESA, 2013).

5.

SNAPSHOT OF MIGRATORY FLOWS IN COUNTRIES OF THE AFRICAN, THE MEDITERRANEAN, MIDDLE EASTERN, AND SOUTH AND EAST ASIAN REGIONS

The intensity, incidence and severity of drought, desertification and floods are soaring particularly in the drylands of Africa where 70% of the populations are mostly young and dependent on a single agricultural livelihood (Laczko and Aghazarm, 2009). Sub-Saharan Africa is where most of the refugees that have been reaching the coasts of the Mediterranean in the last year come from, most of them youth. The countries around the Mediterranean reached by these migrants are considered to be the faultline of political, economic, societal and environmental insecurities.

The Sahel region, where seasonal and circular migration is fairly common, is representative of a common pattern of climate-induced migration: seasonal internal migration due to drought (Laczko and Aghazarm, 2009; Afifi, 2011; Djoudi and Brockhaus, 2011; Black et al., 2013; Morrissey, 2013; Warner and Afifi, 2014; Dillon et al., 2011, cited in Hunter et al., 2015). Migration, in this case, is an adaptation strategy to the increasing environmental degradation and enables remittances to ensure the survival of families left behind.

Although a slow-onset disaster is commonplace in the Sahel, it has not been studied from a youth and gender point of view. Likewise, a study has yet to be carried out using gender-disaggregated data gathering techniques specifically looking at how the condition of women is affected by water stress in the three migration stages. Additionally, it is urgent to bring attention to this area of the world as it attracts only 5% of climate-related funding, but has 65% of its population exposed to climate change (Bird, 2016). A study showed that the populations of these areas seek advice from international organizations and non-governmental organizations (NGOs) to sustain their harvest in the context of changing climatic conditions. Locals value positively this educational opportunity, which they believe will be beneficial for the employability of their children in the future (Okunola and Ikuomola, 2011).



In the Middle East, countries have been hosting 4.8 million Syrian refugees since 2011 (UNHCR, n.d.). Lebanon and Jordan are high-water-stress countries (see Figure 2 in Van der Heijden et al., 2015); Lebanon has seen an increase of its population by 25% between 1992 and 2012 (Jägerskog and Swain, 2016) due to the inflow of Syrian and Palestinian refugees, currently amounting to one and two million respectively (UNHCR, n.d.; Selby and Hoffmann, 2012).

Jordan is the third country in the world for highest water insecurity, after Saudi Arabia and the United Arab Emirates. However, Saudi Arabia and the United Arab Emirates have the resources to desalinate water massively. Between 1990 and 2008, Jordan's population grew by 86% (Mercy Corps, 2014). In the recent years, the influx of more than 655,000 refugees (UNHCR, n.d.) has contributed to putting pressure on the water resources that are already exploited or not efficiently managed. The Disi Aquifer was supposed to cover Jordan water needs until 2022. However, massive losses of water, estimated at 76 billion litres per year, are lost in leakages – an amount that is enough to satisfy needs of 2.6 million people (Mercy Corps, 2014).

Initially, Jordanians and Lebanese poured resources into hosting the swelling Syrian population, but like all countries faced with long-term displaced people, tensions and competition have started to rise over the sharing of resources, such as education, health services and jobs (Phillips, 2012; Jägerskog and Swain, 2016). Unemployment has in fact been on the rise in the Middle East due to decreasing agricultural productivity and depletion of groundwater resources, which has caused rural to urban migration, and brought about social unrest (WWAP, 2016). In turn, to respond to the crisis, these countries resorted to unsustainable water and land use practices, i.e. increase in groundwater mining and in untreated sewage discharge (Jägerskog and Swain, 2016). As its use accelerates, 40% of all groundwater is expected to be depleted by 2030. At the same time, while the strain on resources is understandable in the short-term emergency phase, it should not be forgotten that most refugees have been in a condition of displacement for more than five years (World Bank, 2011).



South and East Asia have been identified as areas prone to high human vulnerability due to climate change and as a drought risk hotspot (Thow and de Blois, 2008). For instance, the Ganges River basin shared by Bangladesh, China, India and Nepal and home to 655 million people gets much of its water from monsoon rains. The monsoon pattern and intensity will be affected by climate change through changes in the precipitation patterns throughout the basins. Likewise, snow melting in the Himalayas will be increasing during the dry season, which will impact runoff. All these countries are heavily dependent on agriculture and will be negatively affected in their productive capacity by increased flood and drought events (Sugden et al., 2014).

Most of the research on climate change in the South and East Asia region has been carried out in Bangladesh, which is a low-lying country whose population is in peril due to two effects of climate change: sea level water rise and change in the monsoon pattern. These two effects bring about more intense flooding and salinity intrusion, which are responsible for a reduction in rice yields (Sugden et al., 2014; Warner and Afifi, 2014).

There are indications in two countries that migration has been long engendered (Piper, 2008) and is now being induced by climate change (Hunter and David, 2009). The first one is the Philippines, whose migration trend has been dominated by women's circular migration from the outer islands to urban areas (Hunter and David, 2009), but is now being characterized by younger educated males migrating transnationally. This latest trend is linked to a rise in temperature and an increase in the incidence of typhoons, which was already the highest in the world and has resulted in the loss of livelihoods, human life and property damage due to landslides and flooding (Bohra-Mishra et al., 2016).

Water-sensitive jobs are at stake generally in South and East Asia (WWAP, 2016), but particularly in the Philippines where 33% of the employment depends directly from the agricultural sector, which has seen a decrease in rice yields due to higher temperatures in the growing season and 60% leave along

the coastline (Bohra-Mishra et al., 2016). The second one is Cambodia, where it has been estimated that 680,000 people have migrated to Thailand as a response to the 2008 flood. Environmental stress, however, is not a new factor in the lives of Cambodians who have been experiencing increasing levels of poverty and economic pressure due to loss of agricultural livelihood (Bylander, 2016).

Because of temperature rise and increased but shorter rainfalls, some cultivations, i.e. rubber, cassava, rice and coffee, are less productive and will be even less suited in the future. These extreme water conditions occur in particular in the poorest regions of Cambodia, fuelling youth migration into Thailand due to joblessness, landlessness and environmental insecurity (Bylander, 2016). In Cambodia, a clear connection between environmental changes and out-migration has been identified, where people's longstanding adaptation capacity has become limited over time and where migration is seen as a feasible option (Nuorteva et al., 2010).

6.

CONCLUSIONS: IMPROVING WATER SUPPLY AND GOVERNANCE

'... In Niger, seasonal migration – cattle herding – has become permanent and migration is now crossing the national borders. Drought led to deforestation and to overgrazing the land, which led to land degradation. Due to land degradation, the sand siltation also increased, thus negatively impacting lakes and fishes, so [fishers] also had to migrate. [Now women and children dug canals.] The Government is trying to increase water levels to promote fisheries and to attract men to the region again.'

(Thomas et al., 2011, p. 3).

The life story illustrated above contains all the interlinked factors – climate variability and change, increasing lack of sufficient water resources, ecosystem degradation, loss of jobs, gender and age inequalities – that play a role in triggering 'environmental migrations' from arid and semi-arid regions, as shown by the literature cited in this paper. The Niger story also indicates that medium- to long-term strategies to improve livelihoods of communities and individuals should include the reinforcement of their ability to adapt to environmental stresses through improved water supply and governance.

With a changing climate leading to increased droughts and floods, and water pollution, there will also be a rise in risk of conflicts among water uses and users, poverty, economic losses, social disruption and migrations. Countries that face increased water insecurity – threatening food, energy, and water supplies, economic development and internal stability – can no longer make sound decisions on water development in one sector versus another one without creating conflict in other water-user sectors. A true transformation in approaches based on valid water resource data and modern analyses, informed decisions and targeted investments need to be undertaken by countries and their development partners.

The new approaches for addressing the drivers for migrations and conflicts by balancing the nexus of water, food, and energy supplies, and by improving governance of surface-and groundwater together, are impossible to implement without more comprehensive and integrated water information (WWAP, 2012). Water-use systems are inextricably linked and therefore must be managed together in an integrated fashion, if poverty and migration is to be reduced and social stability achieved. The drivers of migration and water conflict linked to climate change and variability could be better addressed through adaptive water solutions aiming at moving away from a 'predict-and-control' paradigm, but rather towards an approach based upon flexibility, resilience, and continuous learning through assessments.

Progress in terms of water-related governance is hence required. This calls for engaging a broad range of actors through inclusive governance structures that recognize the dispersion of decision-making across various levels and entities, the role of women in water management and land tenure, and strengthen social, administrative and political accountability.

According to the the World Water Development Report 2015 (WWAP, 2015), sustainable development and human rights perspectives both call for reductions in inequities and tackling disparities in access to water-related services. Therefore, investing in all aspects of water resources management, services provision and infrastructure is beneficial to social and economic development. For example, prioritizing investments in the provision of basic services unlocks the potential of economic growth and breaks the vicious cycle of low productivity linked to poor health and lack of education opportunities. Such conditions maintain poverty, thus blending structural and non-structural approaches (including 'natural infrastructure') could be particularly cost-effective and has a multiplier effect in job creation.

All these actions, together with the strengthening of knowledge and capacity, will foster the development of resilient strategies and reduce communities' vulnerability, and contribute to achieving the goals of the 2030 Agenda for Sustainable Development.

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Arid and harsh environment outside Koulomboutej village (Niger)

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Areas of water scarcity

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Aid distribution to Syrian refugees (Turkey)

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Red Cross reception centre is temporary hub for refugees arriving in Italy

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Syrian children playing at the Zaatari refugee camp in Mafraq (Jordan)

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Bangladeshi people crossing a flooded street at Dhaka-Narayanganj-Demra Dam in Dhaka

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Evidence shows that growing climatic variability has severe impacts on water availability and quality, which in turn jeopardizes social stability and jobs for the younger generations. This is particularly true in arid and semi-arid regions, where often migration is both the result of and a way to adapt to climate-induced environmental stresses and its social and economic impacts.

This paper explores the interdependencies between water scarcity induced by climate change, youth unemployment and migration, and provides an overview of migration hotspots, in particular in originating and transit countries in the African, Mediterranean, Middle Eastern, and South and East Asian regions.

This publication is addressed to governments, Official Development Assistance (ODA) partners, private business and finance sectors, academia, civil society and all other stakeholders. It makes the case that medium- to long-term strategies to mitigate social unrest, improve livelihoods of communities and individuals, and reinforce resilience to environmental stresses has to include a special focus on improving water supply, access and governance.



Regione Umbria