



Gender Equality, Climate Change and Agriculture in the MENA region: Priorities and Possibilities

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Introduction

The MENA region is highly vulnerable to the effects of climate change. The region is also undergoing rapid social and political transformation (Haddad and Shideed 2013; Sowers et al. 2011; Waha et al. 2017; Waterbury 2013). Temperatures in the region are projected to rise by 2 to 3 degrees Celsius and precipitation is projected to decline by 10 to 30 percent by the year 2050 (IPCC 2014). Agriculture (including cropping and livestock farming) is extremely sensitive to climate-induced changes such as increases in temperature, variation in precipitation patterns and weather anomalies, and the increased frequency of extreme weather events. Such changes may trigger crop failure, pest and disease outbreak, and degradation of land, water, and soil conditions. According to the World Bank report, *Turn Down the Heat*, crop yields could decrease by up to 30 percent at 1.5 to 2°C and by almost 60 percent at 3 to 4°C (Sieghart and Betre 2018).

The MENA region is projected to experience a 10 to 30 percent decrease in precipitation in the coming years, leading to a subsequent decline in groundwater replenishment and severely overexploited aquifers (Haddad and Shideed 2013; Schilling et al. 2012; Sowers et al. 2011). The combined effects of reduced precipitation and higher temperatures are expected to affect agricultural production negatively (Haddad and Shideed 2013; Sowers et al. 2011). Since agriculture as an industry is a major consumer of water, water scarcity will have dire effects upon the region's agricultural productivity (Haddad et al. 2011; Schilling et al. 2012; Waterbury 2013). The MENA region is already the most water-stressed region in the world. In more than half the countries in the MENA region, average per capita water availability is lower than the water scarcity threshold (Sowers et al. 2011).

Water scarcity in the MENA region is already among the highest in the world with average annual available water in the region being less than 1,000 cubic meters (m³) per capita per year, which lies on the water poverty line (UNESCWA 2019). Demand is increasing because of population growth, urbanization, and the expansion of irrigation, with agriculture accounting for 80 to 85 percent of total water consumed. Agricultural land is equally scarce and fragile with only one-third considered as agricultural land (cropland and pastures), while only five percent is arable (FAO 2018). Furthermore, available arable land is highly degraded due to extensive usage and its productivity is estimated to have already been reduced by up to 35 percent of its potential (ibid.). Approximately 60 percent of the population in MENA is already exposed to high or very high-water stress. Although there is some

intra-regional variability, the MENA region as a whole faces declining per capita water availability and is expected to become more arid. Most areas receive less than 300 mm of annual rainfall. Rainfed agriculture is productive only in the semi-arid belts along the coast and mountains (Immerzeel et al. 2011) but rainfall is becoming less reliable, threatening agricultural productivity even further.

It is well-established that poverty, along with socioeconomic, cultural, and political marginalization, cumulatively put women in a disadvantaged position in coping with the adverse impacts of a changing climate (Chanana-Nag and Aggarwal 2018; Huyer 2016; IPCC 2019). The effects and impact of climate change are also locally specific and are experienced differently by different groups of people based on gender, age, race, disability, sexual orientation, class, and other social identities (Nelson et al. 2002; Najjar 2015; Najjar et al. 2017; Vincent and Cull 2014).

Differences in gendered roles and responsibilities; lower access to productive resources, technology, markets, finance, and information; and restrictive sociocultural norms are factors that can make women more vulnerable to climate-change adversities. Although these facts are well-established in the existing research on gender and climate change, it is also known that empowering women through positive actions and interventions can improve their ability to adapt and respond to climate effects (IPCC 2019; Najjar 2015).

A methodology was recently developed by CGIAR to map climate–agriculture–gender inequality hotspots to target climate investments more effectively (CGIAR Gender Impact Platform 2022). The methodology was applied to 87 low- and middle-income countries (LMICs) in Latin America, Asia, and Africa to reveal geographical areas where extreme climate hazards intersect with large concentrations of women participating in food systems and in the agricultural labour force, and with high levels of gender inequalities. Climate–agriculture–gender inequality hotspots, therefore, are areas marked by food systems which are transforming under climate stress, where gender inequalities are persistent, and vulnerabilities are likely to be exacerbated under a changing climate.

The global climate–agriculture–gender inequality hotspot map of LMICs clearly shows that climate hazards, women's significant exposure to climate hazards affecting food systems, and women's increased vulnerability due to gender inequalities occur particularly in West, Central and East Africa; in West and South Asia; and in a few countries in Southeast Asia. The “hottest” countries (global rank 1 to 15) are all situated in Africa. Countries in the MENA region also rank high on the climate–agriculture–gender inequality hotspot

list: Egypt (global rank 14), Syria (45), Morocco (50), Iraq (56), Tunisia (58), Lebanon (59) and Jordan (71) all appear among the top 75 hotspots. Findings from this analysis corroborate what was already quite well known: that MENA countries endure high climate risk and exposure, low adaptive capacities, and higher vulnerability of women to adverse effects of climate change.

Agricultural production is globally already experiencing declines in yield and reduced crop suitability under high temperatures, with greater declines projected for the future. Agriculture in tropical, subtropical, desert, and dry climates including in South Asia, sub-Saharan Africa and the MENA region is particularly vulnerable to the effects of climate change.

Gender and Climate Change Research in MENA

The challenges for strengthening climate security and resilience in the MENA region have already been documented in detail (Läderach et al 2022). These include relatively high levels of conflict within and between countries, growing poverty, unemployment, loss of agricultural livelihoods, high levels of inequality leading to rising dissatisfaction with the status quo, and severe water scarcity and high temperatures that are being exacerbated by climate change (ibid). Many countries across the region have insufficient financial resources and political and institutional capacity to adapt to these changes (Sieghart and Betre 2018; Waha et al. 2017).

Agriculture in the MENA region is becoming increasingly feminized, with women representing more than 50 percent of agricultural workers in some countries (Abdelali-Martini and de Pryck 2015; Najjar et al 2018). Reducing gender inequality and disempowerment has been identified as an important response area that needs to be strengthened to enable the MENA region to adapt and build resilience toward climate change. Since women are participating out of choice and necessity in such large numbers in the agricultural workforce of the MENA region, they must be enabled and empowered to serve as active agents in climate change mitigation, adaptation, and resilience.

The MENA region is both disproportionately vulnerable to compound climate fragility risks and among the most gender unequal regions in the world. Although we must be wary of over-generalizing about women's needs and experiences across such a diverse set of geographic, ecological, cultural, socio-economic, political, and institutional contexts, the existing body of research on gender and climate change in MENA does enable us to comment reasonably certainly on what we know and what we do not know about the opportunities and challenges women experience in

agriculture, the gendered effects and outcomes of climate change upon agriculture, and the roles women have played and could play in the future in adapting and building resilience to climate effects. Based on this existing scientific literature, we can also identify gaps in evidence and knowledge, and make practical recommendations for future research and public policy.

What We Know

The MENA region is both extremely vulnerable to climate change and among the most gender unequal regions in the world. According to the Global Gender Gap report, the gender gap is highest in the MENA region (60.9 percent progress toward parity), and “at the current relative pace, it would take an estimated 142.4 years to close” (World Economic Forum, 2021: 26). The region performs well on health and education, with women and girls outperforming men and boys at all levels of education in some countries, but counterintuitively performs very poorly on economic and political participation: a phenomenon referred to as the “MENA paradox” (Kabeer, Deshpande and Assad, 2019). Only 18.5 percent of women participate in the labour force in the MENA region. This is the lowest level of female workforce participation in the world (ILO, 2014; 2017). The low reported levels of women's labour participation have at least partially been attributed to an overwhelming focus (going back decades) in official labour statistics to formal sector work, which often marginalizes women's informal labour contributions (Hoodfar, 1997; Jensen, 1994; Larson, 1991). Women tend to be employed in large numbers in MENA in the informal sector and in home-based work.

These inequalities put women in a vulnerable position vis-à-vis climate variability and climate change, which is further exacerbated by patriarchal governments and political and social instability. Gender inequality persists in the MENA region because of an entrenched patriarchy from within the private domain of households, to communities, to a more systemic patriarchy sustained by the state and other key political and economic institutions (Geha and Karam 2021; Kandiyoti 1988; Moghadam 2020; Ragetlie et al. 2021). Geha and Karam (2021) and Ragetlie et al. (2021) emphasize that MENA governments focus almost exclusively on skills development as means to strengthening women's economic participation, but they rarely implement policies that address the root causes of gender inequality, such as patriarchal inheritance laws, male-biased land rights, and structural gender inequality in democratic and inclusive governance.

Women's "invisibility" in agriculture despite their active participation

Women's participation in agricultural labour has grown dramatically in the MENA region often in response to men and youth leaving the sector to pursue other livelihoods (Baada and Najjar 2020). For example, Morocco witnessed a sharp increase in female employment in agriculture from 38.9 percent in 1995 to 47.7 percent in 2010, while contribution to agriculture from men and youth decreased considerably from 66 percent to 55 percent during the same period due to their increased participation in non-agricultural livelihoods as well as domestic, regional, and international migration (Abdelali-Martini 2011; FAO 2011). Similar trends in the "feminisation of agriculture" have also been reported in Algeria, Jordan, Syria, Libya, Palestine, and Egypt (Abdelali-Martini 2011). Meanwhile, land privatization, combined with the loss of common pastureland and drought in neighbouring areas, has fuelled landlessness and migration from some regions and created a surge in agricultural labour in more productive areas. Women are increasingly pushed into agriculture, partially due to a lack of other opportunities, or in situations of compulsion or necessity (Kabeer, Deshpande, and Assaad 2019).

Although agriculture is the largest employer of women in the MENA region, women's contribution to the sector remains largely undervalued, if not invisible. Some estimates suggest that about 50 percent of women engaged in agrarian labour are either not counted at all in national surveys or classified as economically inactive (Kabeer, Deshpande and Assaad 2019). This is especially true for women who provide unpaid labour on family farms and are assumed to be (and may even see themselves as) economically inactive or, at most, as helpers to male farmers instead of farmers. In some settings (see, for example, Najjar et al 2017 for findings from rural Egypt) even female wage workers in the agricultural sector are listed as "housewives" on their national IDs while their male counterparts are listed as agricultural workers. This prevents women from being recognized, and often even from recognizing themselves, as workers who make significant contributions to their households, communities, and to the national economy.

Established patriarchal gender hierarchies play a powerful role in how women see themselves and are seen by others. There is an extensive literature on gender and agriculture in the MENA region that emphasizes the tendency for women to be classified as "helpers" rather than as farmers regardless of their contributions, and this is identified as a major barrier for women's optimal participation in agriculture (Barnes, 2013; Galie et al. 2013; Gouda, 2013; Najjar et al. 2017). There is both legal and social failure to recognize women as workers. Being categorized as "helpers" to male workers instead

of as workers has negative implications for women's rights, entitlements, wellbeing and agency.

Migration as a livelihood strategy and women as de facto farmers

One of the reasons women's contributions to agriculture in the MENA region have grown dramatically in recent decades is that migration - as a coping strategy in response to climate change, globalization, political instability, and other influences upon agriculture - is much more widely available to men than to women. Entrenched familial and societal gender norms ensure that women remain almost solely responsible for homemaking and caregiving even as they are increasingly participating out of choice and necessity in the paid economy. These multifaceted economic and domestic responsibilities render women less mobile than the men in their families and communities.

In dry areas, a combination of climatic change and population growth have led to increased male and youth outmigration to cities and towns among rural populations who depend on rainfed agriculture (Abdelali-Martini & Hamza 2014; Afifi et al. 2016; Kristensen & Birch-Thomsen 2013). A report published by the International Centre for Agricultural Research in Dry Areas (ICARDA) of the proceedings from the International Conference on Food Security in Dry Lands held in Qatar in 2012 emphasized that populations that inhabit deserts and dry rural areas of the world are most likely to experience male outmigration to urban areas and to subsequently witness the "feminization of agriculture," a rise in the participation of women in agriculture, often borne of necessity (ICARDA, 2012). Other recent research affirms these trends (Abdelali-Martini and Hamza 2014; Gaurtala et al. 2010; Pattnaik et al. 2018). Male outmigration strongly influences women's roles in agriculture, with associated implications for agricultural productivity and gender equity.

In a study about women's participation in farming in rural China, de Brauw et al. (2008) identify two types of feminization of agriculture: *labour feminization* and *managerial feminization*. Labour feminization refers to women taking on an increased amount of farm work, often to compensate for the outmigration of men in the household or men's increased participation in non-farming economic activities. Managerial feminization refers to women playing a more prominent and visible role in agricultural decision-making alongside gaining greater access to financial and social resources to optimize agricultural productivity. Based on the findings from their study, de Brauw et al. (2008) arrive at the conclusion that rural China was experiencing more labour feminization than managerial feminization. In other words, women were contributing increasing amounts of labour to agriculture

without experiencing a commensurate increase in access to resources or authority to make decisions about farming. Researchers working in the MENA context arrive at similar conclusions about women's participation in farming in the region (see, for example, Abdelali-Martini and de Pryck 2015; Ragetlie et al. 2021; Najjar et al. 2020; Najjar et al. 2018). Women's growing participation in agriculture in the MENA region has not translated into commensurate gains in access to capital, agricultural inputs, or to decision-making power. Women remain largely *de facto* as opposed to *de jure* farmers in the MENA context with associated implications for their ability to adapt and build resilience to the effects upon agriculture of climate change. Public policies designed to enable women to play more agentic roles in agricultural decision-making and to gain greater access to financial resources, agricultural inputs and markets are urgently required to optimize agricultural productivity and food security, particularly in the context of worsening climate effects in the MENA region.

Marginalization and exclusion from land ownership

The gap between women's and men's education and income levels is narrowing gradually all over the world, but the disparity in land and property ownership is stark and seemingly intransigent. Even in countries where women consistently outperform men in educational attainment, they remain extremely marginalized in land and property ownership (Baruah, 2010). Consequently, there is growing acknowledgment that women are particularly discriminated against in their right to land and property (UNDP 1995; UNIFEM 2000; World Bank 2001). Women are disadvantaged in land ownership almost everywhere in the world. At 5 percent, the MENA region has one of the lowest documented rates of women's land ownership in the world (FAO 1999). In 2007, the United Nations Economic Commission for Africa (UNECA) described women's access to land in Egypt as "alarmingly low" and "lagging behind." More recent surveys conducted in Egypt in 2014 reveal an even lower rate of 2 percent (Ministry of Health and Population [Egypt], El-Zanaty and Associates [Egypt], and ICF International 2015). As in several other MENA countries, by law, women in Egypt are entitled to inherit only half of the natal property as their brothers, but ultimately most women do not receive even this limited share. Deep-seated cultural norms ensure that brothers control the shares of their sisters; thus, in practice, women's ownership is just notional. Inability to access land rights at par with men renders unmarried, divorced, and widowed women particularly vulnerable to poverty and climate insecurity. If threats to a family's well-being and security are external to the household, it may be less important whether a woman has independent ownership of and control over an asset – be it land, houses, livestock, or jewellery. The entire household may be

protected if someone within it owns and controls the asset. However, a very different scenario may present itself upon internal threats to family security such as death, divorce, separation, or abandonment. In the latter scenario, a woman's well-being is likely to depend much more significantly on whether she can exercise ownership and control over assets. Thus, inability to access land and other asset rights at par with men renders widowed and divorced women particularly vulnerable.

The extreme marginalization women in the MENA region face in landownership is well documented but its implications for women's ability to adapt and build resilience toward worsening climate effects are not always evident. Without equitable access to land rights and ownership, women are often unable to make decisions about agriculture that would optimally enable them to adapt and thrive despite climate change. This can include everything from which food or cash crops to grow, which trees to plant for shade and to prevent soil erosion, how often to leave farms fallow to enable the soil to recover, and how best to use and invest income from agriculture. Women's marginalization in land and property regimes in the MENA region also translates directly into weaker access to credit and capital, training, technology, and other inputs that influence agricultural productivity.

Weaker access to credit and capital, training, technology, and other inputs into agriculture

Because of their weaker access to land ownership and lower wages and incomes (discussed next), women in the MENA region also have weaker access to credit and capital, training, technology and other inputs into agriculture. Much of the existing research on gender and agriculture in the MENA region arrives at the conclusion that women do not have adequate access to credit services, banking institutions, agricultural extension services, and training to support income generation and livelihood diversification via agriculture. Although all farmers had been negatively affected by the effects of climate change, women often experienced additional challenges due to gender norms and cultural practices. For example, since women rarely own land, they face more challenges than men do in accessing loans and credit due to their inability to offer individual land titles as collateral. Women also had weaker access than men to extension services and training in skills deemed masculine, such as irrigation and other drought-mitigation strategies (Najjar et al 2019; Najjar and Baruah forthcoming). Women also have weaker access than men to markets for the goods they produce because of their lack of income and collateral and the higher burden of domestic responsibilities and higher time poverty.

Wage inequity in agricultural labour

Although women increasingly perform most of the agricultural work in the Global South, including in the MENA region, they are almost always paid less than men, experience more precarious working conditions, and have limited bargaining power (Abdelali-Martini 2011; Abdelali-Martini and de Pryck 2015; de Pryck and Termine 2014; Mills 2003; Razavi 2009). Alongside women's growing participation in agriculture in MENA countries, there is widespread evidence of gender-based wage inequity in agricultural labour. The literature reveals that women systematically perform lower paid and manual tasks that are precarious and seasonal, while men perform more permanent, technologically sophisticated, and higher paying jobs although these stereotypes tend to break in conditions when the supply of male work, for example due to migration, is limited (Deere 2005; de Pryck and Termine 2014; Najjar et al. 2018).

Wages and working conditions are also reported to vary depending on migration dynamics, type of crops, farm, and market (traditional versus more cash-generating crops). For example, export-oriented crops such as fruits and vegetables and large farms tend to have lower gender wage gaps and less precarious working conditions than smaller family-owned farms (Barrientos et al 2003; de Pryck and Termine 2014; Maertens and Swinnen 2012). Although commercial farms tend to pay women better wages than family farms, the expansion of agricultural commercialization in many contexts in the Global South, including MENA countries, has simultaneously been found to be very dependent on the availability of cheap and easily replaceable female labour (Razavi 2009). Very little is known about longer-term economic and social effects and outcomes upon women's lives from their growing participation in commercial farming in MENA. For example, there is virtually no research available to help us understand how women in MENA countries who participate actively in commercial agriculture in their youth fare as they get older and become less productive as agricultural workers. There is no existing research on their needs, priorities, or on their ability to transition into less physically demanding sectors of employment or into retirement.

Almost all countries in the MENA region have framed national legislation against wage discrimination based on gender. Most countries in the region are also signatories to international treaties and guidelines (such as the ILO's decent work agenda) that stipulate equal pay for equal work, but major gaps remain in the implementation, enforcement and monitoring of such laws and policies, explaining the persistent gender wage gaps in many sectors of employment. Enforcing existing legislation to ensure equal pay for women is an essential first step towards enabling women to benefit equitably with men from their agricultural labour contributions.

Most female agricultural wage workers in MENA countries come from families that are landless or from families that own plots of land that are too small to sustain their needs (Najjar et al. 2017; Najjar et al. 2018). Thus, while land ownership and inheritance practices remain extremely male-biased in this region, large numbers of men from poor families are also landless or otherwise disadvantaged in land ownership. Since their labour is the most important asset the landless poor in general, and women in particular, have to offer, it is critical that due emphasis is given to improving wages and working conditions (Razavi 2007; de Pryck and Termine 2014).

The concept of decent work, which stipulates fair pay, equal opportunities and treatment, security, social protection, social dialogue, as well as rights at work, offers a valuable opportunity to improve the working conditions of wage workers (ILO 2014) even as decent work principles remain largely unenforced, especially for informal workers in the rural agricultural sector in the MENA context. The enforcement of existing gender equity wage legislation is crucial as is raising awareness among employers to ensure equal pay and better working conditions for women.

There have been significant advancements in strengthening social protection floors in many countries in Asia and Latin America recently, including both conditional and unconditional cash transfer programs that enable poor women to make priority decisions for themselves and their dependents (for example, Bolsa Familia in Brazil and Oportunidades/ Prospera in Mexico). Structural inequality constrains individual ability to exercise rights and demand entitlements. The benefits women derive from wage employment in agriculture can only find optimal traction within the context of a wider and more comprehensive social security infrastructure. Countries in the MENA region are well-advised to try to introduce and expand the types of social protection programs (pensions, maternity, basic income) that are already in place in other countries. It is difficult to improve wages and working conditions in agriculture when labour supply is abundant and when social security is weak. These considerations are particularly important in the context of land fragmentation and climate change rendering rainfed agriculture less reliable, and paid wage work in irrigated agriculture on larger commercial farms becoming a more important source of income, especially for women. In rural Morocco, male and female workers in rural areas which are drought-prone but rainfed migrate for agricultural wage work opportunities on irrigated commercial farms in large numbers (Najjar et al. 2017).

Widespread evidence of sexual harassment in paid agricultural work

Sexual harassment was systematically reported as a problem faced by women in the agricultural wage sector in MENA countries, often made worse by the seasonal and informal nature of much agricultural labour in the region and the lack of unionization (Maertens and Swinnen 2012; de Pryck and Termine 2014). Women were overwhelmingly the victims of sexual harassment in the agricultural sector (Najjar et al. 2017; Najjar et al. 2018). Young unmarried women were particularly vulnerable to sexual harassment from labour supervisors or fellow male labourers. Because women's access to work often depended on their tolerance of sexual harassment, they were rarely able to resist unwanted advances or to demand respect at work (Najjar et al. 2017; Najjar et al. 2018). Sexual harassment diminishes women's ability to participate optimally in the agricultural sector, which has implications for women's ability to build resilience to climate change via agricultural productivity and food and income security.

Women have fewer opportunities to organize, mobilize and form collectives

Many of the challenges and inequities women face in working in agriculture in MENA countries may have been addressed if women had opportunities to organize and mobilize for fairer wages and better working conditions. Farmers unions are rare in the MENA context, and where they exist, their primary focus appears to be on improving access to subsidized fertilizer and water rights, not on workers' rights, fair wages or decent working conditions (Najjar et al. 2017). Male agricultural workers in MENA also fare quite poorly at bargaining collectively to improve their working conditions, but women were mostly unable to access any opportunities to bargain formally for better wages and working conditions.

Women in agricultural labour in MENA countries contend with erratic incomes, insecure work, lean seasons, work-related injuries, lack of health insurance and unaffordable or unavailable childcare. Increased mechanization of harvesting in both areas is leading to job losses for women (Najjar et al. 2017; Abdelali-Martini and de Pryck 2015). "Many women asked the interviewer to discourage efforts to mechanize their work, particularly the well-paid lentil harvesting" (Abdelali-Martini and de Pryck 2015, p.13). In the absence of adequate social security nets, in most MENA settings women must work well into old age to support themselves and their families.

Although there is some evidence of women organizing and mobilizing informally for better wages and working conditions in agriculture (Najjar et al. 2017; Najjar et al. 2018), there are presently very few opportunities for women to organize formally as workers via collectives such as unions, producer groups, or cooperatives.

Women have weaker access to policy and decision-making structures

The lack of opportunities for women in the MENA region to organize and mobilize as workers also translates into women having much weaker access than men to governance, policy, and decision-making spaces. It is important to create more visibility and social acceptance for women in these spaces. The limited existing research on the topic points to some of what might be needed to enable women to participate effectively in decision-making spaces (for example, institutional support from NGOs and international or intergovernmental agricultural organizations, gender-based quotas or targets, and closer attention and responsiveness to women's domestic responsibilities). More research aimed at understanding how to enable women to participate optimally in public institutions in agriculture in the context of specific countries in the MENA region should be a priority.

What We Don't Know

How best to enable women to gain legal and social recognition as farmers

Despite women's growing contribution to agriculture, sex-disaggregated data on wages and working conditions is extremely scarce in MENA countries. The lack of empirical evidence about the opportunities and constraints faced by women in agricultural labour make it difficult to design policy responses to improve their situation, including enabling them to be legally recognized as workers. The fact that women's contributions to agriculture in the MENA region are undervalued or invisibilized due to patriarchal laws and regressive social norms is well-established (Galie et al. 2013; Geha and Karam 2021; Najjar 2015; Najjar et al., 2017; Najjar et al. 2018; Ragetlie et al. 2021), as are the negative implications women's marginalization in agriculture have for their ability to adapt and build resilience towards worsening climate effects in the region (Najjar 2015; Najjar and Baruah *forthcoming*). What is less well known is how best to go about enabling women to gain both legal and social recognition as farmers. In addition to advancing legal recognition via gender-disaggregated data collection and inclusion and analysis of formal and informal work, governments and donors may be able to play an important role in enabling women to gain social recognition as workers by supporting efforts to raise public awareness about the contribution female agricultural workers make to national economies, food security, the fight against climate change, and to society at large.

How to advocate for reform of male-biased inheritance practices and for gender equality in land ownership

The MENA region has the lowest level of women's land ownership in the world, yet very little research has explored the specific barriers women face in land ownership in different countries in the region and how to go about addressing them in each specific context. Doss et al. (2015) found that gender land statistics were available in only 9 of 53 African countries; and they emphasize that there is virtually no data on gender and land ownership available for North African countries such as Morocco, Algeria, and Tunisia.

The question of how best to advocate for gender equality in land ownership in MENA is complicated by findings from other regions, notably from South Asia and Sub-Saharan Africa and emerging research in Egypt (see, Najjar et al 2020) which suggest that policy interventions such as advocating for titling land in women's names can only play a limited role in altering gender norms and social hierarchies in the absence of wider political consciousness and awareness about gender equality (Baruah 2010; Gammage et al 2016). Even when women are potentially able to acquire land and property through either inheritance, purchase in the market, or distribution by the state, they are unwilling or hesitant to assert the equal inheritance rights of sons and daughters. The simple targeting of resources to women does not always ensure equitable outcomes, since resources may then be allocated in biased ways to children under conditions of strong son preference. Therefore, legal literacy and initiatives that raise awareness among women as well as men about the benefits of greater equity and that address fears about undoing customary male privileges may be as crucial as policy reforms and state actions that protect women's interests and facilitate their agency. Gender equity goals can only be partially accomplished through legal measures and economic interventions, regardless of how well-intentioned and progressive they may be. Since inheritance practices remain so male-biased (and since women are themselves often complicit in making them so) it is also important to ask from a more practical perspective if assets other than land (houses, livestock, jewellery, savings and investments, for example) can also enable women in agriculture to build economic security and resilience to the effects of climate change.

Research on women's ownership of non-land assets

Though there have been a few studies addressing women's ownership of land assets, there has been very little research on non-land assets owned by women in the MENA region, including assets such as livestock, jewellery, private enterprises, cellphones, computers, guaranteed investment certificates, agricultural and irrigation equipment.

The existing research on gender and asset ownership point to land and homes as the most economically and socially valuable assets for women. Livestock and gold are also certainly useful assets for women, especially because they can be sold easily for cash (Moors 2013; Najjar et al. 2020). Because these latter assets are highly liquefiable, it is important for women to have control over their sale and use. Therefore, the existing research highlights the importance of implementing specific policies to enable and optimize land and property ownership by women even if they own other non-land assets such as gold, poultry, and livestock.

Future research on gender and asset ownership should also consider various forms of sole and joint ownership (with, for example, spouses, family members, and friends) through which women and men may own and control assets. However, researchers should be cognizant that joint ownership does not necessarily imply equal ownership (Doss et al 2014; Jacobs and Kes 2015). In addition to enabling women to access and own land and non-land assets, it is important to visibilize, strengthen, and validate women's roles in agriculture. This is critical since women often saw themselves and were seen by others in the community as "helpers" rather than farmers.

How to enable women to access training in irrigation and other skills deemed "masculine"

Parts of the MENA region that are dependent on rainfed agriculture are more vulnerable to climate effects of reduced precipitation (Schilling et al. 2012). Water scarcity has motivated various irrigation initiatives in this region, ranging from drawing water from aquifers, lakes and rivers to desalination of seawater. In irrigated areas, the expansion of commercial labour has led to a growing demand for hired agricultural labour. Women find themselves employed in such contexts in growing numbers, often because they are cheaper to hire than male labourers and because they are more willing than men to accept temporary, seasonal, or otherwise precarious work. Large numbers of women migrate out of necessity from rural areas with rainfed family farms to other areas in the country with irrigated commercial farming due to the prospect of paid wage work (see Najjar et al. 2021 for findings from Morocco). The existing scholarly and practitioner literature on women's participation in irrigation in MENA countries suggest that although women participate quite actively in irrigation and water management, their contributions are poorly understood and undervalued by landowners (typically men in their own families and communities) as well as by irrigation engineers and extension agents (Barnes 2014; Ibrahim 2006; Najjar et al. 2019). Research aimed at identifying and describing women's contributions to the irrigation sector and making recommendations for improving women's access

to irrigation technologies and participation in water governance is critical. Detailed and comparative research in specific countries and local contexts in MENA is important for ensuring equitable participation of women in irrigation especially since control of water resources is increasingly being transferred from centralized entities such as water boards and utilities to community institutions such as local Water Users Associations.

Gender norms also play an important role in determining adoption of irrigation technologies. For example, while pedal pumps were deemed beneficial for men in sub-Saharan Africa, they were deemed inappropriate or even shameful for women to use in the same contexts (Theis et al. 2018). The literature on this topic suggests that the role played by gender norms in enabling or disabling women's ability to adopt irrigation technologies is under-researched and so are the benefits and constraints following the adoption of specific irrigation technologies.

Very few studies explore gendered patterns of irrigation technology adoption and women's ability to benefit from them. The existing research on gender and technology adoption is based in South Asia and sub-Saharan Africa (see, for example, Njuki et al., 2014; Theis et al., 2018). There is very little published research on this topic in the context of the MENA region.

Although gender norms play an important role in technology adoption, it is important to simultaneously emphasize that gender norms are never static. They are constantly being reproduced, adapted, contested and negotiated as part of everyday social interactions (Jackson, 1998). Migration and resettlement, for example, may play an important role in changing gender norms. These are also important considerations for future research on gender and irrigation.

The existing evidence suggests that women are far more actively engaged in irrigation roles in the MENA region than is generally assumed and documented in the literature on the topic. Although women's invisibility in irrigation may be a consequence of their lower levels of land ownership and social status and stronger association with the domestic sphere, it may also be a consequence of the continuing association of irrigation with masculinity (Bossenbroek & Zwarteveen 2014; Carreta 2015; Cole et al. 2015). The limited existing research on gender and irrigation in MENA identify land ownership; educational attainment; institutional support from government, donors and NGOs; and access to training in irrigational technologies as factors that enable women to optimally undertake irrigation.

Identifying opportunities for climate resistant “green” agriculture and rangeland cultivation

In addition to improving women's access to irrigation and other skills and training in agriculture that are still largely only offered to male farmers, it is important to explore and identify opportunities for climate-responsive or “green” agriculture via drought-resistant crops such as barley and cactus and livestock such as hardier breeds of poultry, goats, sheep, camels, and cattle (Najjar 2015; Najjar and Baruah *forthcoming*). Most of the existing training in MENA about drought management focuses on supplementary and alternative irrigation techniques and practices. Other complementary drought mitigation and management strategies such as the introduction of cacti, including as livestock feed, and other drought tolerant crops and animal breeds were not presently being explored by the agricultural extension and training programs in MENA countries. These are worth exploring in the future.

Because women are known to be more vulnerable to the effects of climate change, they also benefit more from access to risk mitigation strategies and tools (Bageant and Barrett 2017; Chanamoto and Hall 2015). Findings from rural Tunisia suggest that women are often unable to access innovations which may mitigate the effects of climate change at par with men (Najjar and Baruah 2021). Skills and training related to drought and irrigation, for example, were targeted almost exclusively to men. It is crucial that women gain access to drought management and adaptation training at par with men. Alongside increasing women's access to such training, it is important to create more visibility and social acceptance for women in roles such as irrigation, grazing and marketing that are deemed masculine. This will enable more women to participate in agriculture (including rangeland cultivation) and livestock rearing on a more equal footing with men and to voice their concerns and priorities in policy dialogues.

How to mechanize the agricultural sector responsibly

Broadly speaking, agriculture in MENA countries is still heavily reliant on human labour because the cost of large-scale mechanization presently far exceeds the cost of human labour, especially given the high levels of rural unemployment and the high availability of cheap migrant labour in the region. The existing research on the mechanization of agriculture in other regional contexts in the Global South suggest that the introduction of mechanization in agriculture will be gradual and incremental rather than sudden and absolute (Lewis et al. 2022). Mechanization will be heavily influenced by economic and social realities of the local context and will initially affect medium- and low-skilled workers, among whom women are the majority, the most (Kawarazuka et al. 2018). In some contexts, mechanization may also be driven by

environmental, health and safety concerns. The limited existing evidence on mechanization of agriculture from MENA countries confirm these broader trends. The mechanization of commercial agricultural enterprises in Egypt and Morocco have raised concerns because women typically have much weaker access to training and machinery and are more likely than men to lose work because of mechanization (Najjar et al 2018; Najjar et al 2020). Research and public policy should anticipate mechanisation displacing wage work and train those affected in other skills.

Mechanization of commercial fruit, vegetable and flower farming in the MENA has also enabled more widespread use of chemical fertilizers and pesticides in agriculture. Research is needed to explore the health implications for workers of heavy chemical use in the agri-export industry (Bain 2010). The fact that agricultural labourers in many MENA contexts do not have health insurance makes this an especially urgent issue.

How to empower renter farmers

Due to land fragmentation in all MENA countries, growing numbers of people must rent land in order to be able to farm. Renter farmers are a disadvantaged group regardless of gender, but women were more vulnerable because of the lower social status attributed to them because of their gender. Landowners, who are almost always men, prefer to rent their lands to men: “Even if the woman [the wife] will be the one farming, I prefer to rent the land to a man,” explained a landowner in Kafr Sheikh, Egypt (Najjar et al. 2020). Women had very weak bargaining positions with farm owners and often faced conflicting priorities between growing food crops (which renters preferred) and cash crops (which farm owners preferred) with very important implications for the ability to optimize returns from agriculture while preventing further soil erosion and degradation, and water overuse, thereby building resilience toward climate effects. Reframing and regulating renter-owner relationships to ensure more equity for renters should be a priority (see for example Bush 2019 for Egypt). Because female renters have even lower bargaining power than male renters, they will benefit tremendously from the reframing of renter-owner relations in MENA countries.

How to create and optimize livelihoods complementary with agriculture

It is increasingly rare for smallholder farming families in the MENA region to sustain themselves solely through agriculture. Members of farming families are compelled to diversify their livelihoods to respond not just to climate-induced stresses but also to other influences such as political conflict, globalization, urbanization, migration and return migration. It is not uncommon for different members of the same family, or even the same individual, to carry

out a range of farming and non-farm related economic activities. Since men are more mobile than women in the MENA region, they typically have more opportunities to participate in off-farm activities. More research is needed to understand how women might optimize incomes from agriculture (via activities such as agro-processing, meat, milk, manure, livestock sales) as well as non-agricultural economic activities such as producing handicrafts and other marketable goods and services such as carpets, leather goods, essential oils, and soaps. NGOs and other civil society organizations may be well placed to assist women in business training and marketing their goods physically and virtually.

How best to organize and mobilize for rights, resources, entitlements (cooperatives, membership-based organizations, unions, etc)

Members of cooperatives hold jobs in a co-operative producing goods and services. They participate in making major decisions concerning the cooperative. Cooperatives are not common in the MENA context, and the ones that exist are almost entirely staffed by men. The existing cooperatives are often not well-organized or well-run. Members had limited access to training, social protection and benefits via cooperatives, but they were able to access markets and export licenses through their participation in cooperatives. Barring a few examples such as argan cooperatives in Morocco, women’s access to cooperatives and producer organizations was minimal in MENA (Perry et al. 2019; Biermayr-Jenzano et al. 2014). Significant research has demonstrated that women are able to increase their social and economic power through membership in co-ops and producer groups, and that such organizations can help women mobilize resources and networks effectively (de Pryck & Termine 2014). However, women were rarely able to join cooperatives in MENA countries. Women’s only cooperatives in other settings have been known to empower women on social, economic and political fronts (the Self-Employed Women’s Association in India is a good example, see Baruah, 2004, 2010) but they are rare in MENA. Research aimed at understanding the experiences of existing co-ops and producer groups in the MENA region as well as in culturally comparable regions such as South Asia and of replicating or adapting them for the MENA is much needed. Increased engagement of unions as organizations that lobby for improved wages and working conditions for workers rather than just on increasing subsidized access to water and fertilizer, which is presently the focus of most existing farmers unions in MENA, is also important.

Women and rangeland cultivation, livestock farming

Pastoralism, which is practiced by close to 200 to 500 million people and in more than 75 percent of countries, is projected to become more vulnerable to climate change (McGahey et al. 2014). Coupled with non-climate-related stressors, climate change is projected to affect pastoralism by lowering pasture and animal productivity, damaging reproductive function, reducing litter size and survival rates, and leading to biodiversity loss (IPCC 2019).

Livestock rearing is an important livelihood strategy for rural communities all over the world. Particularly in developing countries, livestock often serve as assets, capital, and “insurance policies” of rural people with poor access to formal financial institutions and high vulnerability to crop failures (Njuki and Sanginga 2013). Livestock rearing can be an important component of building household and community resilience (Dumas et al. 2018). Livestock rearing tends to be a significant (if not the primary) livelihood activity for rural households and communities located in areas of the MENA region that are dry, or that have more extreme climates where crop cultivation is not as reliable (Archambault, 2016; Turner and Williams, 2002). Livestock may also be integral to crop production in some contexts and therefore to livelihood security (Debela 2016; Fisher et al. 2000).

Existing ecological issues such as overgrazing and desertification that are associated with livestock production have been exacerbated by climate change. An increasing number of dryland areas will be subjected to drought conditions in the future (Fraser et al. 2011). Dryland areas are particularly vulnerable to the effects of climate change because of their low adaptive capacity and higher sensitivity to changes in temperature and precipitation (ibid.). By rendering grasslands and rangelands less productive, climate change will adversely affect dairy, meat and wool production. Thus, the livelihoods of the 2.5 billion people who inhabit dryland areas are particularly vulnerable to climate change (ibid.). Since the effects and outcomes of climate change have been demonstrated to be borne more heavily by women, often as a result of the household and societal division of labour, improving their ability to adapt to changing environmental conditions is critical (Alexander et al. 2011; Carr and Thompson 2014). Climate change also interacts with structural barriers such as tenure insecurity, credit inaccessibility, limited access to agricultural inputs and improved technologies to the disadvantage of women (Carr and Thompson 2014).

Women’s roles in and contributions to rangeland cultivation and the effects of climate change upon their livelihoods are both under-researched topics. There is very little research on gender and pastoral livelihoods in the MENA. Almost all the existing research on the topic was conducted in sub-Saharan Africa. In order to enable women in pastoral communities and rangeland cultivation in MENA

countries to adapt and build resilience toward climate change, we need more empirical research aimed at understanding the roles they play in their communities, and the challenges and opportunities they face.

How to deliver extension services and information in-person and digitally

It is well-established that agricultural extension services do not serve farmers well in the MENA and that women are often completely overlooked by extension agents. Some researchers have recommended training more women as extension agents as a means of reaching more female farmers. Other researchers have noted that the gender of the extension agent is not as important as it is for them to think of women as farmers rather than as “helpers” to male farmers, and for extension agents to reach out to women more proactively with agricultural extension support. Progress has been made on both these fronts (training more women as extension agents and encouraging extension agents of all genders to reach out to female farmers) in some contexts in MENA countries, but one of the biggest limitations remains that some governments in the region do not have the financial resources to offer extension support, especially in remote rural areas, with meaningful levels of training frequency and outreach. In Egypt, for example, since 2015, the annual budget for extension services has been slashed to 230,000 EGP, which as one official from the Ministry of Agriculture and Land Reclamation informed “is not even enough to run 10 motorcycles, let alone 350 extension centres around the country.” (Najjar et al 2017a). If governments are unable to provide adequate funding and support for agricultural extension services, it may be worthwhile to explore the possibilities, which are already available in countries in other regions, of domestic and international civil society organizations, aid agencies and private companies offering such services.

With the expansion of access to the internet and to mobile technologies even in remote rural areas in MENA countries, the idea of providing extension services digitally is being explored both by governments and by intergovernmental agricultural organizations. Of course, the fact that women in MENA typically have much weaker access to ICTs and digital resources than men remains a serious challenge (Najjar et al 2021; Ragetlie et al 2022) but research aimed at finding solutions to address this digital gap is important and must be pursued in the future as a means to improve equity in the provision of agricultural extension services. The limited research that is emerging on the topic has suggested that gender-responsive digital extension, accomplished via means such as phone distribution, radio and SMS messages, and sharing of information prompts can be useful for enabling women to learn about and adopt

new agricultural inputs, techniques, and technologies (see Ragetlie et al 2022 for findings from northern Tunisia). Much more empirical evidence needs to be generated in specific countries and contexts in the MENA region to understand how best to deploy and maintain such services.

How to reduce risk for farmers

As the effects upon agriculture of climate change worsen, the conversation about how to reduce the risks and losses associated with farming via instruments such as crop, livestock and asset insurance and green bonds for agriculture is gaining more traction in research and policy circles. Other tools like payment for environmental or ecosystem services are also being proposed as payments to farmers or landowners who have agreed to take certain actions to manage their land or watersheds to provide an ecological service. However, systematic research on the feasibility and outcomes of such initiatives is lacking almost everywhere, including the MENA region. While such tools may be able to protect farmers from the vagaries of climate effects and may also enhance the adoption of improved agricultural and rangeland management practices (Louhaichi et al. 2016) other related thorny issues such as the rights of landowners, land users and renters have neither been researched nor received any policy attention. The gender implications, effects, and outcomes (especially vis-à-vis community and private property rights regimes, and women's weak access to both) are potentially profound and powerful but remain mostly unknown. Addressing them proactively via focused research and responsive public policy is critical to ensuring gender equity in climate mitigation, adaptation, and resilience.

Research on refugees in agriculture in MENA

Four of the top ten refugee host countries in the world are in the MENA region: Lebanon, Jordan, Turkey and Iran (Al-Dajani and Marlow 2019). It is well known that large numbers of refugees living in rural areas in MENA are working in agriculture, both as formal and informal wage labour, but there is virtually no research on their experiences in farming, what challenges and opportunities they face, and how they might be supported to stabilize their livelihoods and build resilience toward climate effects. Given the continued political strife and turmoil in the region and the scale of migration within and between MENA countries, research on this topic should be considered an urgent priority (see Al Zoubi 2022 on Syrian women migrants' agricultural coping strategies in rural Lebanon). Women and girls represent almost half of the world's migrants and refugees. While refugees of all genders are likely to face challenges working in agriculture in MENA countries, women and girls may face additional problems given entrenched gender hierarchies and

inequities. Specific attention must be paid to understanding and responding to them.

Better understanding of youth perceptions and interests in agriculture

There is strong evidence to suggest that youth in the MENA region are increasingly disinterested in agriculture as a livelihood strategy. The reasons for youth disengagement and disenchantment with agriculture are complex and may be attributable to the influences of globalization, wider exposure to urban lifestyles and professions, generational differences in material and ideological aspirations, and the diminishing prospects of building economic security via sole reliance on agriculture (Bossenbroek et al. 2015; Najjar et al. 2018). As discussed previously, growing female participation in agriculture is often a direct outcome of male and youth migration out of, or diminishing contribution to, agriculture. Youth face significantly higher levels of unemployment in MENA and migrate from rural to urban areas more frequently than other age groups (Bossenbroek et al. 2015). The existing research on agricultural labour in MENA confirms that most of those between the ages of 15 and 24 only participate in agriculture when they have no other viable livelihood options. Among young women, the existing research confirms that agricultural wage labour is most often carried out by women from the poorest landless families as an option of last resort (Najjar et al 2018). Diminishing returns from farming due to climate change may exacerbate these trends of youth departure from agriculture. More research is required in different contexts to better understand youth perceptions of agriculture. Research and responsive policies aimed at revalorizing agricultural labour to render it more compatible with contemporary aspirations of youth are urgently needed. A deeper structural revalorisation of the importance and necessity of the agricultural sector within MENA is also required so that agricultural labour does not continue to be perceived as an occupation of last resort. Agriculture remains the backbone of many national economies in the MENA region. Given the added stress that climate change places upon agricultural systems and productivity, the sector can ill afford to lose out on the labour, energy, enthusiasm, and creativity that youth can bring to it. Governments, donors, intergovernmental organizations and NGOs can also play a role in revalorizing agricultural livelihoods by supporting efforts to raise public awareness about the contribution agricultural workers make to national economies and to society at large.

Policy lessons from the global COVID experience

COVID 19 led to an unprecedented global reckoning of what constitutes essential work and essential services in all countries around the world, leading to calls for comprehensive reforms of

sectors such as basic income, pensions, paid sick leave, childcare, eldercare, and other stronger social protections for those who work in such sectors (Doss et al. 2020; Najjar and Baruah 2020; Baruah 2021; Bossenbroek and Ftouhi 2021). Agriculture, food security, food accessibility and availability (grocery stores, vegetable stands, for example) were recognized worldwide as sectors and services that no country could do without. COVID 19 has also led to a broader conversation about the possibilities and benefits of providing social protection within a human-rights framework and delinking social security from employment status. In recent years, there have been significant advancements globally in expanding and strengthening social protection policies as more countries transition toward developing welfare systems. Some strategies that are being tried in European, African, Asian, and Latin American countries include basic income schemes as well as conditional and unconditional cash transfer programs designed specifically to enable poor women to make priority decisions for themselves and their dependents. Programs like Brazil's Bolsa Familia, Mexico's Prospera, Mali's Social Cash Transfer initiative, Togo's Novissi scheme (a fully digital cash transfer scheme designed and deployed during COVID for workers in the informal sector) and India's basic income pilot are important developments given that structural inequality constrains individual ability to exercise rights and demand entitlements. Since so many countries around the world rolled out new social protection schemes (basic income and paid sick leave, for example) or strengthened and expanded existing schemes during the COVID 19 pandemic, there is now a clear opportunity to design research to understand how such schemes might be introduced or adapted to benefit the agricultural labour force in MENA and other contexts in the Global South.

Recommendations for Future Research

In this section, we present summary actionable recommendations based on the preceding discussion aimed specifically at advancing gender equity in climate adaptation and resilience for agriculture in the MENA region:

- To enable legal recognition of women's contribution to the agricultural sector, we recommend collection and analysis in different MENA countries and contexts of gender-disaggregated data on women's formal and informal participation (including home-based work) in agriculture.
- To enable social recognition of women's contribution to agriculture, we recommend public awareness campaigns

aimed at visibilizing and validating women's contributions to agriculture and food security in MENA countries.

- To promote gender equity in landownership, we encourage reform of male-biased inheritance, land titling and distribution practices. As an example, joint titling of land in the names of male and female household heads would give large numbers of women in MENA countries a legal claim to land and a source of collateral for credit, other banking and financial services, and inputs into agriculture.
- To design public policy to enhance women's ability to acquire non-land assets as complementary sources of income and livelihood security.
- To enforce equal pay legislation for women and men in agriculture along with zero-tolerance for sexual harassment.
- To introduce and expand social protection programs (pensions, maternity, basic income, childcare) to enable women to benefit optimally from their work in agriculture.
- To enable women to participate in cooperatives, unions and collective organizations aimed at improving wages and working conditions in the agricultural sector.
- To conduct more research aimed at understanding the experiences of existing co-operatives and producer groups in the MENA region as well as in culturally comparable regions such as South Asia and of replicating or adapting them in MENA.
- To carry out more research in different MENA countries and contexts to understand how to enable women to participate optimally in public institutions and decision-making in agriculture.
- To conduct more research in different MENA contexts (rangelands, for example) to understand how best to enable women to participate in irrigation. The limited existing research in Egypt on gender and irrigation in MENA identify land ownership, educational attainment, training and other institutional support from government, donors and NGOs, and access to training in irrigational technologies as factors that enable women to optimally undertake irrigation.
- In addition to enabling women to participate optimally in irrigation, more research is needed to identify opportunities for climate resistant "green" agriculture and rangeland cultivation.
- To enable women in pastoral communities and rangeland cultivation in MENA countries to adapt and build resilience toward climate change, we need more empirical research aimed at understanding the roles they play in their

communities, and the challenges and opportunities they face.

- To conduct more research and to identify public policy intervention in anticipation of mechanisation displacing agricultural wage work and training those affected in other skills, with particular attention to training women.
- To conduct more research in specific countries and contexts in the MENA region to understand how best to deploy and maintain in-person and digital extension services.
- To conduct research aimed at understanding how to reduce risks for farmers of reduced agricultural productivity and crop failure via instruments such as crop, livestock and asset insurance, green bonds for agriculture, and payment of ecosystem services. Focused attention must be paid within such research projects to ensure equity between landowners (predominantly men) and land users and renters (among whom women are likely to be overrepresented).
- The MENA region is home to some of the largest refugee populations in the world. Research aimed at understanding the challenges faced by refugee farmers in the MENA region is presently very limited but critically urgent. Specific attention must be paid to the needs of refugee women in such research projects.
- To better understand youth perceptions of agriculture, more research is required in different MENA contexts. Research and responsive policies aimed at revalorizing agricultural labour to make it more compatible with contemporary aspirations of youth are urgently needed.
- A deeper structural revalorisation of the importance and necessity of the agricultural sector within MENA is also required so that agricultural labour does not continue to be perceived as an occupation of last resort.
- To design research to understand how social protection schemes (basic income and paid sick leave, for example)

introduced in different countries around the world during the COVID 19 pandemic might be introduced or adapted to benefit the agricultural labour force in MENA countries.

- To build the capacity of local research institutions to create evidence-based solutions for gender equality in agriculture and climate resilience, in partnership with NGOs and intergovernmental organizations including CGIAR.

Conclusion

Both men and women are negatively affected by rising temperatures, reduced precipitation, soil erosion and other manifestations of climate change upon agriculture, but they bear the costs and effects of climate change in different ways, often based on socially ascribed gender roles and responsibilities. Men appeared to bear more of the financial stress of new costs incurred by responding to the effects of climate change, such as hiring labour to plant trees and purchasing feed from the market for livestock. Women, on the other hand, undertook more of the manual labour and drudgery associated with responding to climate change via activities such as walking longer distances to collect forage and fuelwood, feeding, bathing, and cleaning up after livestock.

Recognizing women as workers, framing and enforcing equal pay legislation for women and men in agriculture, strengthening social protection for all workers, increasing funding and support for agricultural extension services (including hiring more female extension agents) and providing gender-inclusive digital extension services are essential first steps that will enable women in MENA countries to benefit more optimally from working in agriculture and building resilience towards climate change. Investing in more public awareness raising about women as agricultural workers rather than helpers may also eventually shift more deeply entrenched social norms.

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