

ERF Policy Brief

Gender and Climate Change in the MENA Region: Would Women's Participation in MSMEs Accelerate the Transition to Clean Energy?

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In a nutshell

- *The process of combatting climate change and transitioning to clean energy affects women and men in distinct ways in the Middle East and North Africa (MENA), a region where there is abundant renewable energy (RE).*
- *There is heightened awareness about the environment and climate change in the region, especially among youth, women, and high-income groups.*
- *Although women and women's organizations in the MENA region are advocating for climate justice, including in global forums, they are underrepresented in the science, technology, engineering, and mathematics (STEM) fields and in the energy sector.*
- *Structural inequality, discrimination against women and girls, and the traditional division of gender roles within the household, including the responsibility to often find fuel for cooking, compound the impact of climate change on women. Women spend long hours fetching wood for cooking, during which they face gender-based violence—including sexual gender-based violence (SGBV)—in certain areas such as Darfur in Sudan. The transition to clean and RE would help girls and women save time, enable them to access educational and economic opportunities where available, and aid in protecting them from SGBV.*
- *Achieving gender equality and recognizing the roles that women play in halting climate change and in the transition to clean energy are important in their own right. A just transition entails women's participation and a commitment to social justice and gender equality.*
- *Quantitative research in Egypt, Jordan, and Morocco has shown that the age and education of top managers are key factors in explaining the transition to clean energy. Additionally, the economic and institutional context of the country might play a significant role in the transition to clean energy.*
- *Women's organizations and movements play an important role in addressing climate change. There is a need for future research that documents their roles, struggles, good practices, and lessons learned as a result of their mobilization and organization.*

Gender equality and climate change in the MENA region

There is heightened awareness within the Middle East and North Africa (MENA) region—which contributes less than four percent of global emissions—about the need for global, regional, and regional action to halt climate change, including through the transition to clean and renewable energy (RE). RE includes solar energy, wind energy, geothermal energy, hydropower, ocean energy, and bioenergy. Research in five MENA countries (Algeria, Egypt, Lebanon, Morocco, and Tunisia) revealed a positive correlation between gender (being a woman), age (being young), and income levels (having high income) on the one hand and seeking a better environment on the other hand (Dibeh et al., 2021). This suggests that involving more women and youth, in addition to integrating a gender perspective, facilitates the transition to clean energy.

We examine the intersection between gender equality (or the lack thereof) on the one hand, and RE and clean energy on the other. Our findings show that the MENA region has abundant RE, and that many MENA countries have made significant achievements in terms of improved access to education and health for women and communities. Women in the region have a long history of mobilization and leadership; yet, both climate change and gender inequality continue to pose challenges in the region.

Structural inequality, discrimination against women and girls, and the traditional division of gender roles within the household compound the impact of climate change on women and limit their ability to address the consequences of climate change. The transition to clean and RE would afford girls and women time for and better access to educational and economic opportunities.

Conflict, displacement, and natural disasters often exacerbate the impact of climate change on women and communities. For example, women are not always able to evacuate during disasters. Additionally, they are often excluded or are less prepared to engage meaningfully in recovery efforts. Reasons include (but are not limited to) women's limited access to economic resources compared to men in their social groups, and women's unequal decision-making power at the family, community, and governance levels (cf. Sepúlveda, 2024).

Other distinct effects of climate change on women and girls emerge in the areas of agriculture, food security, water resources, biodiversity, and health. Women are often involved in subsistence agriculture because of limited access to land, credit, and other resources. The decline in agricultural production due to environmental degradation arising from the extraction of resources such as mining, for example, impacts women's access to food and their ability to produce and make food for their families and communities, which are important and often undervalued care responsibilities that women perform.

Studies have also documented the negative impact of environmental degradation on women's health, especially women's reproductive health. Most of the 3.2 million individuals who die prematurely from household air pollution are women and children (UNDP, 2023). Using wood, charcoal, and other unprocessed biofuels for cooking increases the likelihood of respiratory health diseases by 80 percent compared to the use of clean energy. Processed biofuels (such as liquid biofuels and biogas) are cleaner energy sources.

Addressing these barriers entails working at different levels to transform power relations and ensure gender equality while also addressing the challenges arising from climate change. The clean energy sector is one arena that helps us better understand the intersection between gender and climate change.

The transition to clean and RE should and could be an opportunity to contribute to efforts to achieve gender equality. The clean energy sector offers a range of employment opportunities for women, particularly in technologies such as solar, wind, and hydropower. Micro, small, and medium enterprises (MSMEs), including those led by women and youth, often contribute to the creation of jobs in low- and middle-income countries (Belghiti-Mahut et al., 2016; Shanon et al., 2019; World Bank, 2022). These jobs can provide women with access to decent work, higher incomes, and professional development opportunities. Moreover, clean energy projects can ensure better access for women to energy services, such as electricity and clean cooking fuels. This, in turn, can improve women's livelihoods and reduce their time poverty.



Despite the opportunities discussed above, there are hurdles to women's access and participation in the clean and RE sector in MENA countries. The MENA region has the lowest female labor force participation rate, at 19.9 percent in 2023 (World Bank Indicators, 2024). Women in the labor force are overrepresented in informal jobs with poor conditions, and they are underrepresented in managerial and leadership positions.

Girls and women are underrepresented in the energy sector and in science, technology, engineering, and mathematics (STEM), fields that are required to get a job in the energy sector. Women's limited access to information, technology skills, assets, and credit hinders their roles as professionals and entrepreneurs in all sectors, including in the energy sector. While there are jobs within the energy sector (such as public relations and administrative roles) that do not require STEM training, higher-level and better-paid positions tend to require STEM training. Women with lower access to STEM training are also less likely to be promoted on par with men to senior positions.

Negative stereotypes and dominant gender norms also contribute to women's limited opportunities. Women are often discouraged from pursuing careers in STEM fields, including in clean energy. An engineer from Jordan, for example, stated in an online forum recorded on YouTube that being a woman limited her ability to find employment in her field. Another engineer from Sudan told the researchers that most women who were in her class as an undergraduate have had to abandon the field due to a lack of access to opportunities, and because of household and other social responsibilities. Discriminatory workplace practices also affect women in STEM fields, including in the area of clean energy, where women often face discrimination in hiring, promotion, and pay. There is a need to document such experiences in a systematic manner. There is also a need to enact policies that contribute to closing gender gaps, especially since numerous studies show that women's ownership and management of firms in all sectors, including the clean energy sector, enhances innovation and improves performance in those firms (Koning et al., 2019; Xie et al., 2020; Biscione et al., 2021; Dibeh et al., 2021; Baseline Survey on Gender, 2024; Kubrusi et al., 2024).¹

¹For further details about the survey and the methodology used, see Ali and Ramadan (2024). Gender and Climate Change in the MENA Region. ERF Policy Paper.

Gender and the transition to clean energy: a quantitative analysis

In this section, we draw on the Economic Research Forum's (ERF) Renewable Energy Firm Surveys for three countries (Egypt, Jordan, and Morocco) to examine the relationship between gender diversification in the ownership and management of MSMEs and the transition to clean energy.

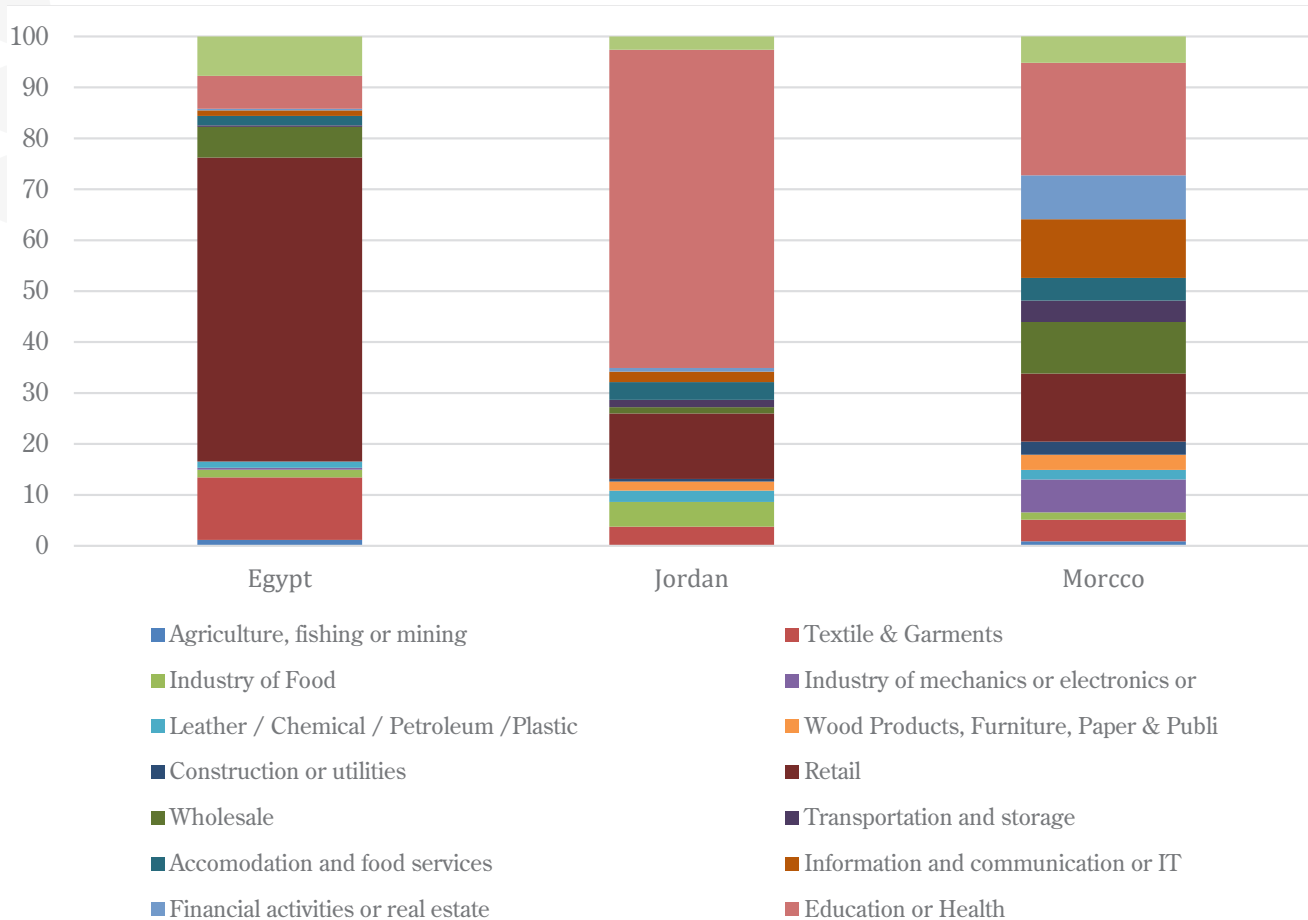
The surveys show that the use of clean energy and the presence of women in top levels of decision-making varies between the three countries. In Egypt, 21 percent of firms are considering shifting to clean energy, but none of the firms have used clean energy. Meanwhile, five percent and four percent of firms in Jordan and Morocco are using clean energy, respectively. In each of the two countries, 37 percent of the firms are considering a shift to clean energy.

Understanding the profiles of firms using clean energy and those considering using RE and clean energy can inform policy for the energy transition in the region. In Egypt, 32 percent of the firms have female top managers, mainly concentrated in the retail sector, followed by the garment and textile sectors. It is worth noting that firms in sectors such as construction, wood products, and furniture only have male top managers and are known to be male-dominated. In Jordan, only 11 percent of the firms are managed by women. Among these firms, 62 percent are concentrated in the health and education sectors. In Morocco, 17 percent of the firms have a female top manager. More than 10 percent of these firms are in the retail, wholesale, information and communication, education, or health sectors (Figure 1). For female ownership, the survey shows that in Egypt, Jordan, and Morocco, 61 percent, 83 percent, and 60 percent of the firms have no female ownership at all, respectively. These findings show that more work is required to increase female participation in management and ownership in the three countries of interest to achieve gender parity.

The decision to consider using clean energy might be associated with the familiarity with the term "clean energy." In Egypt, 93 percent of the firms considering the use of clean energy are familiar with the term. This share is 67 percent in Jordan and 74 percent in Morocco. Only 15 percent of firms managed by women in Egypt, 33 percent in Jordan, and 35 percent in Morocco are considering using clean energy. This low involvement of female management in considering clean energy



Figure 1. Distribution of women-managed firms by sector



Source: ERF Renewable Energy Firm Surveys for Egypt, Jordan, and Morocco.

requires further investigation to identify whether it is a lack of awareness or because of the structural inequalities and barriers faced by female managers.

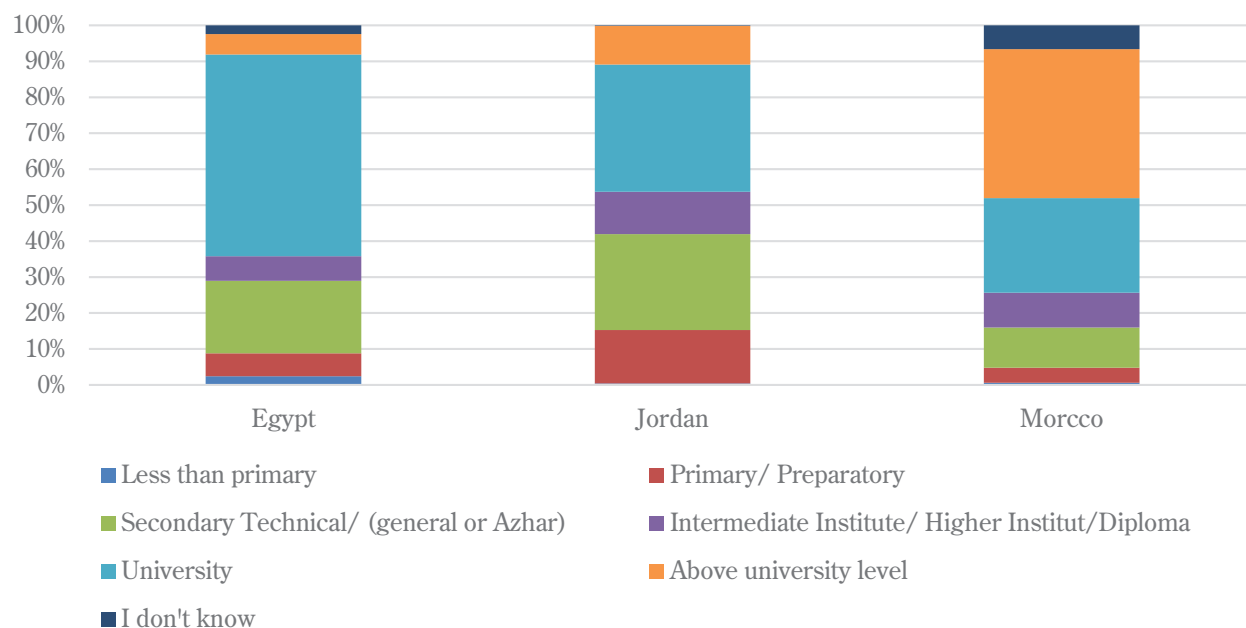
In Egypt, 45 percent of firms managed by women agree or strongly agree to invest in clean energy. This percentage is higher among firms managed by men (53 percent). Meanwhile, 60 percent and 63 percent of Jordanian firms managed by women and men, respectively, agree or strongly agree to invest in clean energy. In both countries, firms agreeing to invest in clean energy are concentrated in the retail sector. In Morocco, 68 percent of the firms managed by women agree and strongly agree to invest in RE, compared to 65 percent for male-managed firms. These firms are concentrated in the industry of mechanics, retail and wholesale, financial activities, education, and health sectors.

The education level of the top manager is a key characteristic in the commitment to the energy transition. Survey findings for the three countries indicate that firms considering transitioning to clean energy have managers with a technical education, a university degree, or higher education (Figure 2).

The quantitative analysis² shows that gender diversification in MSMEs—measured by the sex of the top manager, female ownership, and share of female full-time employment—has no significant effect on the decision to use clean energy in all three countries. However, the interaction between the sex of the top manager and other characteristics, such as age and education, has a significant effect on the clean energy decision. In Morocco, as found in the literature (Dibeh et al., 2021), young women aged 18-59 have higher environmental awareness and are more likely to consider using clean energy compared to the elderly. In Egypt, on the other hand, female top managers with a diploma or university degree are less likely to consider using clean energy. This might be explained by the

² A logit model is estimated where the dependent variable answers the following question: “Have you personally considered using clean energies?” The variable takes the value of one if the answer is yes and zero otherwise. Several versions of the model were estimated with different explanatory variables. Gender diversification is measured by the sex of the top manager, having female ownership, and the share of female full-time employment, in addition to other control variables. For further details about the survey and the methodology used, see Ali and Ramadan (2024). Gender and Climate Change in the MENA Region. ERF Policy Paper.



Figure 2. Education of top managers considering using clean energy

Source: ERF Renewable Energy Firm Surveys for Egypt, Jordan, and Morocco.

field of study; having a university degree in non-STEM fields might hinder the decision to use clean energy. For the education level in general, only top managers with a diploma in Morocco are significantly more likely to consider the transition to clean energy, compared to managers with primary education or lower levels.

The findings reveal that in addition to the characteristics of the top managers, the characteristics of the firms and the countries in which they operate also affect the decision to consider clean energy. In Egypt, small firms have a higher probability of considering the use of clean energy, compared to micro firms. In Morocco, medium firms with more than 20 workers are more likely to consider using clean energy, compared to micro firms. Both small and medium firms have a higher likelihood of using clean energy in Jordan. This might be expected as bigger firms can invest in the technology required for the clean energy transition.

An interesting finding is that the share of electricity bills in the total operational costs has no significant effect on the decision to consider using clean energy. This means that the decision might not be driven by the operational costs but by other factors such as policies and incentives regarding the energy transition in the different countries. Considering the country effect, the global model with the three countries shows that firms in Jordan and Morocco are more likely to consider using clean energy. This explains why only 51 percent of firms in Egypt plan to invest in RE, compared to 63 percent and 65 percent in Jordan and Morocco, respectively. The reasons why firms will consider using clean and

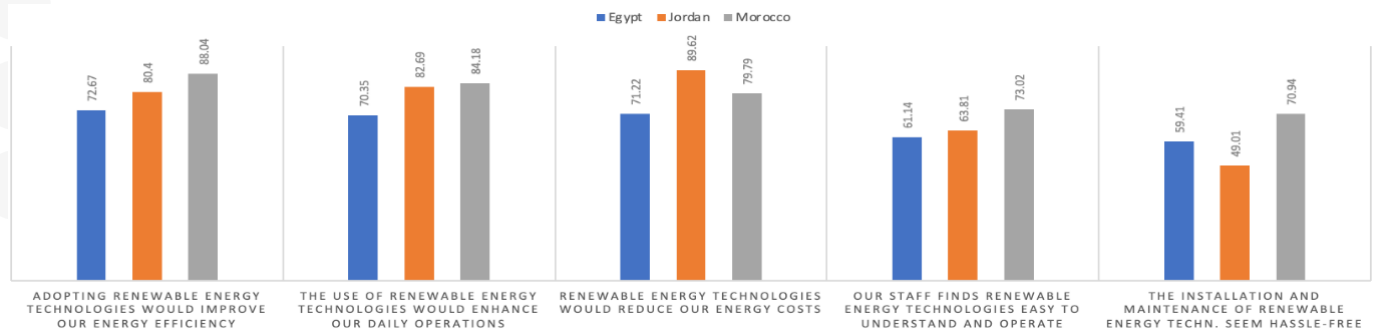
RE vary among the countries (Figure 3). The first reason for considering investing in RE in Egypt and Morocco is the improvement of the firms' energy efficiency. In Egypt and Morocco, 73 percent and 88 percent of the firms considering using clean energy (strongly) agree that adopting RE technologies would improve their energy efficiency, respectively. In Jordan, the first reason is that the use of RE technologies would reduce energy costs, with 90 percent of the firms (strongly) agreeing with this statement.

Policy recommendations

Addressing the barriers discussed in this policy brief entails working at different levels to transform power relations and ensure gender equality while also addressing the challenges arising from climate change. The clean energy sector is one of many arenas that enable us to better understand the intersection between gender and climate change. It also helps explain the ways in which gender inequality—which manifests as a lack of access to education, employment, and managerial positions in certain sectors, and in the prevalence of certain stereotypes that restrict women's choice of employment—hinders a just and inclusive transition to clean energy. In addition, the policy recommendations proposed in this section will only be optimally effective if there are other supportive gender-sensitive and intersectional social and economic policies that contribute to transforming gender relations, and that center the voices of historically marginalized women and communities.



Figure 3. Reasons for investing in RE (prevalence of firms that (strongly) agree - %)



Source: ERF Renewable Energy Firm Surveys for Egypt, Jordan, and Morocco.

Steps to remove barriers to women's involvement in the transition to clean energy should involve the following:

- Committing and taking action to ensure gender equality and women's human rights at de facto and de jure levels.
- Supporting women's entrepreneurship by providing women with access to finance, training, and networks to support their clean energy businesses. Women should have access to finance without the standard requirements of collateral (land, houses, or capital), which women have less access to.
- Creating gender-responsive policies that frame the transition to clean energy in the MENA region. Women's needs and priorities should be part of the planning, implementation, monitoring, and evaluation of all energy planning processes and infrastructures in MENA countries. This includes ensuring that clean energy policies and programs are inclusive and that workplaces are free from all forms of discrimination.
- Promoting gender equality in education and employment is essential. This can be done by ensuring that women and girls continue to pursue STEM education, providing equal access to STEM training and mentorship programs, challenging negative and restrictive sex-role stereotypes in school curricula and beyond, and supporting women's employment in STEM sectors across gender, race, ethnicity, socioeconomic background, and other differences.
- Ensuring that STEM sectors are more sensitive to women's care responsibilities.
- Raising awareness about gender equality by educating the public and decision-makers about the importance and merits of gender equality in the clean energy sector.
- Monitoring systemic biases in technology and artificial intelligence (AI), and working to ensure "media and information literacy, to enable users of AI tools to think critically and deconstruct stereotypes" (UNESCO, 2024: viii).
- Supporting women entrepreneurs by facilitating access to finance, training, and networks to support firms transitioning to clean energy.
- Using an intersectional approach, and looking at the intersection of war, climate change, and displacement. This is important as famine, droughts, floods, and other disasters connected to climate change often exacerbate the challenges faced by communities affected by marginalization, war, and displacement, as evidenced by how the recent floods in Eastern Sudan have affected populations displaced by war, for example.
- Ensuring that local voices, especially the voices of women's organizations and movements working to address climate change in the MENA region, continue to inform global, regional, and local policies focused on climate change and the transition to clean energy.
- Promoting evidence-based intersectional and gender-aware research using up-to-date sex-disaggregated data regarding the different fields of education (STEM and non-STEM), MSMEs, and the energy sector is required to further investigate the characteristics of MSMEs owned by women and the barriers they face in all sectors, including the energy sector.



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ERF at a Glance: *The Economic Research Forum (ERF) is a regional network dedicated to promoting high-quality economic research for sustainable development in the Arab countries, Iran and Turkey. Established in 1993, ERF's core objectives are to build a strong research capacity in the region; to encourage the production of independent, high-quality research; and to disseminate research output to a wide and diverse audience. To achieve these objectives, ERF's portfolio of activities includes managing carefully selected regional research initiatives; providing training and mentoring to junior researchers; and disseminating the research findings through seminars, conferences and a variety of publications. The network is headquartered in Egypt but its affiliates come primarily from different countries in the region.*

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