



**GENDER AND CLIMATE-RELATED MIGRATION IN JORDAN AND SUDAN:
Building Women's Economic and Social Resilience to Climate Risk and Migration for
Survival within Sustainable Development**

FULL REPORT

GENDER AND CLIMATE-RELATED MIGRATION IN JORDAN AND SUDAN: BUILDING WOMEN'S ECONOMIC AND SOCIAL RESILIENCE TO CLIMATE RISK AND MIGRATION FOR SURVIVAL WITHIN SUSTAINABLE DEVELOPMENT

THE ARAB WATER COUNCIL (AWC) AND THE UNITED NATIONS ENTITY FOR GENDER
EQUALITY AND THE EMPOWERMENT OF WOMEN (UN WOMEN)



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ACRONYMS

ARDD	Arab Renaissance for Democracy and Development
AWC	Arab Water Council
CAQA	Centre of Accreditation and Quality Assurance
CBJ	Central Bank of Jordan
CBO	Community-based Organization
CPP	Cyclone Preparedness Program
CVAW	Combating Violence Against Women Unit, Government of Sudan
DOS	Department of Statistics
DRR	Disaster Risk Reduction
EM-DAT	The Emergency Events Database
ESCWA	United Nations Economic and Social Commission for West Asia
FAO	Food and Agriculture Organization of the United Nations
FGDs	Focus Group Discussions
GCF	Green Climate Fund
GDP	Gross Domestic Product
GER	Gender Enrollment Rate
GGCA	Global Climate Change Alliance
GGGI	Global Gender Gap Index
GIS	Geo-information Science Technologies
GII	Gender Inequality Index
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GOS	Government of Sudan
HCNER	High Council for Environment and Natural Resources, Republic of Sudan
HDI	Human Development Index
HD	Human Development
ICRC	International Committee of the Red Cross
IDMC	The Internal Displacement Monitoring Centre
IDP	Internally Displaced Person
IFAD	International Fund for Agricultural Development
ILO	International Labor Organization
IOM	The International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
IPV	Intimate Partner Violence
IUCN	International Union for Conservation of Nature
JD	Jordanian Dinar
JICA	Japan International Co-operation Agency
JMD	Jordan Meteorological Department
JNCCP	Jordan's National Climate Change Policy

JOHUD	Jordan Hashemite Fund for Human Development
KII	Key Informant Interview
LPG	Liquefied Petroleum Gas
MEMR	Ministry of Energy and Mineral Resources
MMP	Mixed Migration Platform
MENA	Middle East and North Africa
MoEnv, Jordan	Ministry of Environment, Jordan
MWRE	Ministry of Water Resources and Electricity
MWI	Ministry of Water and Irrigation, Jordan
NARC	National Agricultural Research Center
ND-GAIN	Notre Dame Global Adaptation Initiative
NERC	National Energy Research Centre
OECD	Organization for Economic Co-operation and Development
PDNRA	Post Disaster Needs Rapid Assessment
RCCC	Red Cross Red Crescent Climate Centre
RCP	Representative Concentration Pathway
SGBV	Sexual and Gender-based Violence
SNNP	Southern Nations, Nationalities, and Peoples' Region
TNH	The New Humanitarian
UN	United Nations
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNEP	United Nations Environment Programme
UNESCWA	United Nations Economic and Social Commission for West Asia
UNFPA	United Nations Population Fund for Women
UNGA	United Nations General Assembly
UN-Habitat	United Nations Human Settlements Programme
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations International Children's Emergency Fund
UNIDO	United Nations Industrial Development Organization
UNISDR	UN Office for Disaster Risk Reduction (UNISDR)
UN-REDD	United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
UNWRA	The United Nations Relief and Works Agency for Palestine Refugees in the Near East
UN Women	The United Nations Entity for Gender Equality and the Empowerment of Women
USAID	The United States Agency for International Development
WASH	Water and Sanitation
WFP	World Food Programme
WRM	Water Resource Management
WWPC	Wise Women Plumber Co-operative



GLOSSARY

Gender Gap Index: examines the gap between men and women in four fundamental categories (subindexes): economic participation and opportunity, educational attainment, health and survival and political empowerment and 14 different related indicators. The Index considers recent data available for a minimum of 12 indicators out of the 14 that comprise the index.¹

Gini Index: measures the extent to which income or consumption distribution among individuals/households in an economy deviate from a perfectly equal distribution. The coefficient ranges from 0 (0%) to 1 (100%), with 0 and 1 representing perfect equality and inequality, respectively. A higher Gini index shows greater inequality, with high-income individuals receiving much larger percentages of total income of the population.²

Gender Inequality Index: is a composite metric of gender inequality using three dimensions: reproductive health, empowerment and the labor market. A low GII value indicates low inequality between women and men, and vice-versa. A maximum of 1 denotes complete inequality.³

1 World Economic Forum. (2021). *Global gender gap report*. https://www3.weforum.org/docs/WEF_GGGR_2021.pdfhttps://www3.weforum.org/docs/WEF_GGGR_2021.pdf

2 Hayes, A. (2022, August 5). *Gini Index*. The Investopedia Express Podcast. <https://www.investopedia.com/terms/g/gini-index.asp>

3 UNDP. (n.d). *Gender inequality index (GII)*. <https://hdr.undp.org/data-center/thematic-composite-indices/gender-inequality-index#/indicies/GII>

Human Development Index: The HDI value is determined by combining a country's scores in a vast and wide-ranging assortment of indicators including life expectancy, literacy rate, rural populations' access to electricity, GDP per capita, exports and imports, homicide rate, multidimensional poverty index, income inequality, internet availability etc. These indicators are compiled into a single number between 0 and 1.0. 1.0 is the highest possible human development. HDI is divided into four tiers: very high HD (0.8-1.0), high HD (0.7-0.79), medium HD (0.55-.70), and low HD (below 0.55).⁴

Migrant Worker: The International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families, 1990 defines «migrant worker» as a person who is to be engaged, is engaged or has been engaged in a remunerated activity in a State of which he or she is not a national.⁵

Migration: There is no universally accepted definition of migration. This paper defines “migration” as “movement away from one’s place of usual residence, whether within a country or across national borders, temporarily or permanently, and for a variety of reasons. The term includes a number of well-defined legal categories of people, such as migrant workers; persons whose particular types of movements are legally defined, such as smuggled migrants; as well as those whose status or means of movement are not specifically defined under international law, such as international students.”⁶

Multidimensional poverty captures deprivations on multiple aspects - resources, opportunities and choice, power and voice, and human security. It complements monetary measures of poverty based on income and consumption by considering these multiple deprivations and their overlap and provides us with a more comprehensive understanding of poverty.⁷

4 World Population Review. (2022a). *Human development index by country 2022*, <https://worldpopulationreview.com/country-rankings/hdi-by-country>

5 The International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families, 1990. <https://www.ohchr.org/en/instruments-mechanisms/instruments/international-convention-protection-rights-all-migrant-workers>

6 IOM. (2022). *Who is a migrant?* <https://www.iom.int/who-is-a-migrant>.

7 This definition is adapted from and draws on the following sources: OECD. (2021). *Understanding the multidimensional nature of poverty* <https://www.oecd.org/development-cooperation-learning/practices/understanding-the-multidimensional-nature-of-poverty-059d28ba/>; World Bank. (2018c). *Multidimensional Poverty Measure (4th edition, circa 2018)*, World Bank, Washington, DC. 2022. <https://www.worldbank.org/en/topic/poverty/brief/multidimensional-poverty-measure>; Sida. (2017). *Dimensions of Poverty: Sida's Conceptual Framework*, https://publikationer.sida.se/contentassets/f3e30b6727e8450887950edb891c05af/mdp_conceptual_framework.pdf; Development Strategy and Policy Analysis Unit. (2015). *Development Policy and Analysis Division Department of Economic and Social Affairs Multidimensional Poverty Development Issues No. 3*. 21 October 2015. https://www.un.org/en/development/desa/policy/wess/wess_dev_issues/dsp_policy_03.pdf



EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

CONTEXT

Jordan and Sudan are climate hotspots. Climate change and topography combine with socio-economic-political processes to increase vulnerability to droughts and floods in both sites, with increasing frequency, magnitude, severity and adverse societal impacts. Key socio-economic vulnerabilities to climate risks and hazards include multi-dimensional inequality and rural/urban poverty; unsustainable rural development including increasing environmental degradation and reliance on climate sensitive agriculture; unsustainable urban planning and development; high population growth and density; rural-urban migration and the influx of migrants and refugees from neighboring countries. This strains already scarce resources, their distribution and use, and feeds the vicious cycle of vulnerability to climate crisis and its impacts.

Gender considerations: systemic vulnerabilities, impacts and capacities in climate crisis

Women contribute less to GHG emissions than men, in their socially prescribed traditional roles as small-scale subsistence farmers, landless workers, small livestock raisers, natural resource managers, unpaid care givers, and consumers of less emissions-intensive goods and services. But pervasive gender inequalities, location at the lower ends of agricultural and other value chains, and deprivation from material/non-material assets and benefits⁸, wreak disproportionate climate impacts on women relative to men. Gender interacts with other inequalities to differentiate impacts among women as well.

- 1. Data on deaths and casualties was not sex-disaggregated** in Jordan and Sudan, raising the need for it. Data from elsewhere showed worse impacts on women, due also to the nature of hazard and context. Key inhibitors to survival included poor knowledge and access to early warnings to women closeted at home; warning dissemination in formats unsuited to women, especially those with audio/visual disabilities; gendered cultural factors that limit mobility and physical activity that could enhance survival; and that restrict interaction and hence evacuation with non-familial men. The worst impacted were women with young children and dependents, especially female headed households (FHHs), women who were pregnant, older, ill or had disabilities. They lacked evacuation assistance. Shelters did not address their access needs and other priorities.
- 2. The economic impacts were disproportionate on women with the smallest asset bases.** Out of 180,000 badly hit people in Jordan's 1999-2000 drought, the worst impacted were small women farmers in climate-sensitive rainfed farming who lost nutritious cereals and food crops, women landless laborers who lost daily wage jobs and small women herders, highly reliant on drought-affected rangelands who lost animals. They could not afford even state subsidized feed, access water or veterinary services for animals. FHHs especially those with big families and fragile members were worst impacted. Sudan's 2020 floods badly hit more women (51 percent vs 49 percent men) out of about 900,000 people in all 18 states, but mainly the very poor. Per early assessments about 252,000 (42 percent) FH farming/pastoral households were badly hit. Women lost cereal and horticultural crops, livestock, seeds, farm inputs, equipment, water and livestock infrastructure, fishing tools and aquaculture farms. Their small and micro enterprises were badly affected. Poor daily wage earners lost work.
- 3. Women's heavier unpaid care work relative to men increases** in the worsened context of climate crises to cope and recover.

⁸ This includes land, livestock, production technologies, agricultural inputs, infrastructure, finance, markets, training and extension services, time, leadership and representation

- 4. Women's greater water insecurity** in both sites typically manifests in their poorer access than men to irrigated agriculture, or in damage to irrigation systems or other forms of water infrastructure during Sudan's floods reduced yields and incomes. In rural Jordan poor FHHs lack access to water that is provided by tankers once in two weeks and is collected and distributed by men in a context of to sex-segregation. Poor FHHs are often unable to afford water or storage tanks thus diminishing their access to it. Women's responsibility to manage in-house water scarcity increases their stress as they and the household are on high alert, with all plans on hold on water distribution days in Jordan. In both sites, scarcity and unclean water compromised personal hygiene especially for menstruating females. It led girls to drop out of school especially in Jordan, and triggered health and safety concerns that were also female-specific, age or maternity related. Pregnant women risked complications delivering in water-scarce insanitary conditions. Ill-health increased women's unpaid care work as they nursed ailing family members in the context of disrupted and limited medical services.
- 5. Energy insecurity has specific impacts on women especially in crisis.** Although Jordan has near country-wide electrification, energy insecurity affects many households and public infrastructure in remote areas that are unconnected to or under-served by the grid. Rising temperatures and heatwaves, lack of access to water and electricity for cooling and drinking cause women (men), children, the elderly and others heat stress. This increases women's unpaid care work and stress and depletes their health. Sudan's floods destroyed stored fuel and reduced access to it. Foraging for fuel afar compromised women's time, health and security. No power in homes, worksites, and service institutions elevated safety and security concerns, caused women income losses, disrupted schooling, increased health risks especially for pregnant women, infants, children, the ill, and survivors of violence.
- 6. Food insecurity disproportionately affects poor women, poor FHHs and other groups of excluded women.** FHHs are 62 percent more likely to experience **food insecurity** than MHHs in Jordan. In Sudan's floods this was 44 percent for FHHs versus 33 percent for MHHs. Poor women farmers, herders, landless women laborers, pregnant and nursing women whose special nutritional needs were unmet; women from migrant/refugee households, older women, women with disabilities and chronic ailments who often could access food relief were also at risk. Women skipped meals, had lower dietary diversity, poor nutrition and experienced food insecurity in drought and floods more palpably. Anaemia worsens for women during droughts, especially for poor women and FHHs who make financial decisions about food groups, work longer hours and must find alternative food (often not nutritious) or alternative ways to access nutritious food.
- 7. Education levels** in Jordan are high for boys and girls at over 95 percent. Per Sudan's 2016-2017 data, the gross enrollment rate for boys and girls in compulsory basic education was 73 percent (boys 75 percent vs girls 71 percent). 265.1 thousand and 183.9 thousand households with male and female children respectively, dropped out of school due to damage and shutdowns in Sudan's floods, increased debts due to borrowing for fees, loss of children's education equipment, and withdrawal of girls for unpaid care work and boys for paid work.
- 8. Violence against women and girls** increases in climate crises. Jordan's acute water scarcity often increases family tensions and intimate partner violence against women. Over 1 million women risked violence in Sudan's 2020 floods, an increase of over 70 percent from before. About 206,000 women of reproductive age in temporary flood shelters were at increased risk. Women and girls reported rape while collecting fuel, water and food. Child marriage reportedly increased. Despite high protection needs, support services for violence were absent in over 90 per cent of the country.
- 9. Migration** in Jordan and Sudan driven by climate and related development deficits suggest that women's migratory patterns (time frames, geographical boundaries, mode of movement – independent/facilitated, route/transport, accompaniment/single or whether they stayed behind in home sites while males migrate) depend on the nature of hazards, ability to survive and recover;

social and legal restrictions on mobility, concerns in moving with children, risks en route or in host sites; care responsibilities; need to protect surviving assets; cultural ties with kin and village, land and livestock; age, ill-health, and disability, among others. Low-skilled rural-urban, seasonal/permanent migrant women whose migration is planned tend to be informally employed in unprotected as wage work or as self-employed workers in women-specific service, petty trade or manufacturing work. Such migration has contributed to growth of the informal urban economy in Sudan that has large numbers of poor, low-skilled women who work in or run subsistence/unofficial enterprises (food, garments, handicrafts). Sudanese women and girls also migrate to Egypt, other North African countries, or Europe with families or singly. Third parties often facilitate irregular movement that is risky. Women suffer sexual and other abuse enroute and in host sites. Per initial surveys on Sudan's 2020 floods, about 1.1 million households with women members, FHHs, IDPs, refugees and asylum seekers in acute poverty were temporarily relocated, had moved, or were planning to move permanently. FHHs were more likely to move (8 percent) than MHHs (2 percent) for work, although an equal proportion of MHHs and FHHs had already moved. Women had more limited settlement options, more financial concerns due to loss of small asset bases, jobs, and inability to find jobs and sustain families in new sites; low levels of privacy, safety and security due to woman-insensitive infrastructure in relocation sites and poor access to services due to damaged facilities and networks. Stay-behind women from richer Jordanian households with migrant spouses had workload increases, but the socio-economic benefits of steady remittances were clear. In rural Sudan they held up rural/household economies with workload and stress increases and were in precarious situations if remittances were not regular or they were re-hit by climate crises in male absence. Things worsened if male relatives went missing, died in dangerous irregular movement or if ransom money was demanded by traffickers with threats to security.

- 10. Decision-making:** Men hold cabinet portfolios on environment/climate, agriculture and migration in Jordan and Sudan. Women are 12 percent and 30.5 percent of Jordan's and Sudan's national parliaments, respectively. Both have climate policies/strategies that address women's vulnerability/agency via climate action. But this must be integrated into all priority sectors; address priorities of different groups of women via their active representation; and needs better funding. Women are marginal to environmental decision-making in communities. They make routine household decisions, but control over cash, decisions on production, purchase of production inputs, consumer goods or major family needs are with men.
- 11. Women's agency in normal times and crises** is demonstrated as they bring their local knowledge, skills, leadership styles and networks to bear on coping, recovery and development. While immediate coping included positive and negative strategies such as sharing extended family and community resources, using remittances and/or accessing relief, selling assets/personal items, borrowing etc, women's adaptive action included roof planting, prevention of overgrazing, greywater re-use for agriculture, green poultry-rearing.

RECOMMENDATIONS FOR ACTION (See details under this section in the publication)

Climate, migration and development priorities of affected women must be integrated synergistically into policies, strategies and programs on climate mitigation and adaptation, labor migration, development and humanitarian response. This demands a whole of government and society approach that widens the stakeholder base across these thematic fields to ensure coherence and amplified impact. Women from these stakeholder groups and affected groups of women must be effectively represented at all stages of policy, strategy, program design and implementation, so that their practical and strategic climate and migration priorities are well addressed with engendered targets, indicators, budgets, monitoring/evaluation, and accountability mechanisms. It is critical to invest in:

- 1. Gender-responsive impact reviews** of climate crises, post-disaster needs assessments, response and recovery packages, migration and development policies and programs to guide investment priorities at scale for affected women, taking account of their intersecting inequalities.
- 2. Gender-responsive budgeting for target groups of women affected by climate risk**
- 3. Building women's resilience to climate-sensitive agriculture & to migration for survival** by integrating their priorities into NDPs and climate and agricultural policies, strategies and programs. These should ensure research on the drivers and impacts of climate risks and hazards on agriculture, including migration for survival on affected women; enhanced productivity, wages, climate-resilience for women in agriculture via better access to assets, climate-sensitive information, infrastructure, finance, markets; support for green businesses for women and investments of savings and remittances in climate-resilient agriculture/businesses; ensure reduced care work including via renewable energy-driven technologies; undertake inclusive risk assessment, evacuation planning and assistance; ensure that shelters are suited to women's diverse needs; ensure women's participation in decision-making in 'normal' times and climate-crisis response and recovery; better access to holistic services, including SGBV and social norm change.
- 4. Empowering women in planned international migration via migration policies, strategies and programs** that ensure comprehensive labor market data disaggregated by sex and other variables; pre-departure, onsite-return information on protection measures, including on climate crises in host and source sites; decent green jobs with robust enforcement and accountability mechanisms; job skills matching/mobility partnerships for low-skilled migrant women workers; more legal migration channels; social protection for poor migrant and local women in the informal economy or out of the labor market and child-care and other support services for children left behind; anti-violence law coverage/access to services for all migrant women; discriminatory social norm and behavior change; long term alternatives to detention; comprehensive reintegration of returnees in normal times and from climate-affected host countries. There is also need to ensure data generation and dissemination sharing on the impacts of climate crises on migrant women in host sites; inclusion of their priorities in preparedness and response plans in host sites based on non-discriminatory protection and humanitarian assistance.

- 5. Empowering women in planned/unplanned movement to urban sites via urban policies** that ensure consultation with women (and men) who have moved in unplanned/planned ways to urban slums/settlements on urban outskirts; inclusion of women from migrant/host communities in planning and implementing durable solutions; local integration with strong enforcement such as including formal/informal settlements in urban development plans; provision of secure land/housing to women (men) residents in slums, shanties and urban outskirts, aligned with UN Guidelines on Internal Displacement and Forced Evictions; decent work; support to women's businesses; access to education, essential public good/services, care services for low-income groups of women; anti-violence law coverage with strong enforcement and comprehensive services for all women and girls, including access to justice in new sites and in affected home sites.
- 6. Engendering humanitarian response to women's unplanned movement & to 'stayers' in affected home sites** per Sphere and Core Humanitarian Standards. This includes ensuring awareness on rules on spontaneous settlements/camps, aid distribution modalities; help in safe aid access and equitable intra-household resource-sharing; more women in humanitarian decision-making response and more women service providers; appropriate aid items, cash and decent work; better site security and infrastructure; comprehensive services, including for survivors of violence; engagement with men and boys on preventing SGBV, including through informal justice mechanisms; women's representation in management and decision-making in relocation sites and affected homesites; support to women leaders to identify the most vulnerable women's and girls' priorities to link them to relevant services and to catalyze community mitigation measures;

INTRODUCTION

LOCATING CLIMATE RISK-RESILIENCE AND THE RELATIONSHIP WITH MIGRATION WITHIN SUSTAINABLE DEVELOPMENT

INTRODUCTION

LOCATING CLIMATE RISK-RESILIENCE AND THE RELATIONSHIP WITH MIGRATION WITHIN SUSTAINABLE DEVELOPMENT⁹

The Arab and African regions like others are caught in a quagmire of multiple, related crises - eroded ecosystems, climate change and extreme events, non-climate hazards, and conflict. These are huge threat multipliers to development. They destroy physical infrastructure, food, land, water, energy security, livelihoods, human and other life and are among the key drivers of mobility, especially among underserved communities.

The discourses on climate change and disasters originated in the 'scientifically neutral' climatological, meteorological, hydrological and geophysical sciences. Numerical models, geo-information science (GIS) technologies, computer visualizations of climate processes and extreme events dominated climate discussions. Disasters were deemed 'natural hazards.' Both discourses now also recognize the vital link between human action, climate risks and their different impacts on varied segments of communities, they also recognize the role of the social sciences, socio-economic-political processes and human action in reducing exposure, vulnerability and risk to climate hazards, and in augmenting climate resilience (Cohen et al., 1998; Kelman et al., 2016; UNISDR, 2002).

Anthropogenic discourses on climate change and vulnerability-resilience paradigms on disasters assert that planetary crises stem from unsustainable models of development (Commission on Climate Change and Development, 2009), as they prioritize production, consumption and distribution of goods and services for immediate economic gain over equitable distribution of resources, social and environmental sustainability and health and well-being (Adams & Luchsinger, 2009). This causes inequality, multi-dimensional poverty (OECD, 2015) and ecosystem depletion, thus creating the vicious cycle of vulnerability to climate risk and hazards. A key impact of climate risks and skewed development is migration. The Inter-governmental Panel on Climate Change (IPCC, 1990) noted that, 'the gravest effects of climate change may be those on human migration as millions are displaced by shoreline erosion, coastal flooding and severe drought (IOM, 2008). Since 2008, an average of 21.2 million people have been forced to move yearly by extreme weather events, the equivalent of 58,000 people daily, or 41 people per minute. These numbers exclude forced movement by slow on-set threats. (Trent, 2022). According to the World Bank, climate conditions are estimated to account for 10-20 percent of current migration flows in the Arab region, including rural to urban migration, and climate change is expected to further accelerate this (Wodon et al., 2014).

These discourses concur that sustainable development and climate-resilience is best secured through governance and accountability that combines growth with equality, and holistic development that builds socio-economic-environmental system resilience synergistically. This is achievable through action on mitigation and adaptation, sustainable financing, technology transfer, capacity-building, economic diversification, sustainable production, consumption and natural resource management (UNGA, 2015; United Nations, 2015). It is also achieved by centering the specific priorities of vulnerable people; using local resources and practices that preserve ecosystems; and enhancing community engagement and resilience (United Nations, 2015).

⁹ UNDRR. (2021). *Vulnerabilities to and capacities in disaster risk reduction: addressing structural drivers, impacts on and empowerment of affected populations*. In Regional Assessment Report on Disaster Risk Reduction in the Arab Region. <https://www.undrr.org/2021-regional-assessment-report-arab-states>

DIFFERENT AND UNEQUAL VULNERABILITIES OF POPULATIONS TO CLIMATE HAZARDS AND IMPACTS: A CASE FOR GENDER EQUALITY AND WOMEN'S RIGHTS

Different segments of the population are differently and unequally exposed to climate hazards and are likewise differently impacted. The structural drivers of vulnerability to climate risk, hazards, and impacts, including migration are not gender neutral. Unequal gender relations privilege men in most countries, rendering 'the climate risk and migration experience' different for women and men, with disproportionate negative impacts on women. But gender also interacts with women's other intersecting identities and forms of marginalization based on age, economic, ethnic, racial, and migration status, health and well-being and geographical location to create hierarchies not just between men and women, but also among women. These intersecting inequalities must be addressed. Moreover, women constitute about half the human population (United Nations, n.d.) and make a significant contribution to development. Addressing their priorities on climate risk and its impacts, including migration is not only aligned with key international and national human rights frameworks on these issues, but also helps achieve sustainable development.

LITERATURE REVIEW FOR SELECTED SITES

Situated conceptually and ideologically within the fore-going frame of reference, this publication focuses on Jordan, a low middle income country in West Asia, and Sudan a least developed country in Northeast Africa - both highly vulnerable to climate risks and impacts. Jordan is the fifth most water stressed country globally (Whitman, 2019) and Sudan ranks 174 out of 181 countries on the Notre Dame Global Adaptation Initiative (ND-GAIN) Index (RCCC-ICRC, 2021b).

A rapid literature review on climate change in Jordan and Sudan suggests the availability of government data and policies, and information and analysis generated by international organizations, academia, research institutions, think tanks, NGOs and CBOs on the following:

- Profiles, trajectories and broad impacts of climate change and extreme weather events (Government of the Netherlands, 2019; RCCC & ICRC, 2021a; RCCC & ICRC, 2021b; USAID, 2017; USAID, 2016a; World Bank, 2021a; World Bank, 2021b);
- Agricultural trends and policies (Omer, 2011; Soliman & Mashour, 2012; Tarawneh, 2021); the role of women in agriculture (Ahmed et al., 2012; Ibnouf, 2011; REACH & UN Women, 2018; UN Women, 2021, WANA Institute, 2021); impacts of climate variations on the agricultural sector and the agricultural population in general (Mohamed, 2022; Siddig et al., 2020; UN Women, 2018; Verner et al., 2013; World Bank, 2022b);
- Policies on climate change (Combaz, 2019; GIZ, 2015; HCNER, 2021; Ministry of Environment, Natural Resources, and Physical Development of Sudan, 2016; Ministry of Environment of Jordan, 2013, 2021a, 2021b; Ministry of Environment of Jordan and UNDP, 2022).
- Policies on climate change (Arabtech Jardaneh, 2020; Combaz, 2019; GIZ, 2015; HCNER, 2021; IUCN, 2010; Ministry of Environment, Natural Resources, and Physical Development of Sudan, 2016; Ministry of Environment of Jordan, 2013, 2021a, 2021b; Ministry of Environment of Jordan and UNDP, 2022).
- Migration (Babiker, 2010; ILO, 2020; Olwan, 2007; Saeed & Badri, 2010); movements of women and men migrants and refugees within, and into and out of Jordan and Sudan (IOM, 2011; Mixed Migration Platform, 2017; Sweidan, 2018). It is noted that there is much information on Jordan on conditions of entry, residence, work and stay in camps, urban settlements, and farms or in their vicinity especially of Syrian women (ILO, 2017; Tiltnes et al., 2019; UN Habitat, 2022)

However, less obvious are data and analyses in both countries on the gender-based structural drivers of vulnerability (and capacity) to climate risks and impacts including migration on different categories of women, including in the climate-sensitive agricultural sector. Climate policies and programs and related reviews seldom comprehensively address the vulnerabilities, impacts and resilience building of women, and more importantly of different groups of women, including migrant women to climate risks and hazards. Likewise, labor migration policies and programs seldom comprehensively address the migration and climate priorities of migrant women (including stay-behind women from migrant households), especially low wage migrant women workers to climate risks and hazards at different stages of migration. Moreover, these thematic agendas tend to be treated in silos in the first place whether in sectoral/ stakeholder engagement, or research and analysis, or in policy and program design and consequently in implementation – although this is gradually changing.

FOCUS, APPROACH AND SIGNIFICANCE OF THE PUBLICATION

Against this background, this publication entitled, “Gender and Climate-related Migration in Jordan and Sudan: Building Women’s Economic and Social Resilience to Climate Risk and Migration for Survival within Sustainable Development,” is framed within the sustainable development paradigm. It adopts a nexus approach that addresses the connectivity between climate variations and hazards and related population movements, thus also connecting development and humanitarian agendas. Central to the analysis is a transformational gender equality, and women’s rights approach to resilience building that addresses women’s other intersecting identities and forms of marginalization. This collectively constitutes the value-addition of the publication.

To this end, this paper concretely explores the gendered structural drivers of vulnerability to climate risk and its economic and social impacts on women, including migration for survival induced by climate variations and related development deficits. It focuses on underserved migrant women in Jordan and Sudan, and non-migrant Jordanian and Sudanese women nationals, including stay-behind Jordanian and Sudanese women nationals from migrant households in informal, vulnerable employment, taking account of their intersecting vulnerabilities.¹⁰ Drawing on existing good practice and the target groups of women’s priorities in these sites, the publication suggests immediate and long-term structural measures to build their economic and social resilience to climate risks and impacts, including to migration for survival. It thus also argues for robust protections especially for low-income women, (men and children) who migrate due to climate risks and hazards and related development deficits, or may be impacted by climate hazards at other stages of labor migration. The recommendations address the links between these thematic agendas across disciplines and policy fields. They suggest the integration of climate, migration and development priorities of these women synergistically into climate mitigation/adaptation, labor migration, humanitarian and broader development policies and programs. This demands a whole of government and whole of society approach that widens the stakeholder base across these themes to ensure coherence and amplified impact.

¹⁰ Hereafter referred to the target groups of women

CHOICE OF SITES, HAZARD-TYPES AND SECTOR

As noted earlier, Jordan and Sudan are both highly vulnerable to climate risks and impacts. However, both governments are making determined efforts to combat the climate threat. For example, both have National Action Plans to address climate change (ESCWA, 2023), and both have received funding from the Green Climate Fund (GCF) to implement projects on climate resilience including community-based projects on adaptation and mitigation (Al Khayyat, 2021; Yassin, 2022). In its updated submission of its first Nationally Determined Contribution (NDC), Jordan's macroeconomic GHG emission reduction target has been increased from 14 per cent to 31 per cent, based on a \$7.5 billion action cost that includes only mitigation (Dahiyat, 2022). In 2020, the Sudanese government also launched its first-ever State of the Environment and Outlook report (Yassin, 2022). Moreover, there are a network of relatively active civil society and international organizations working on these issues in these countries. It is consequently possible to feature good practices from government, civil society and international organizations that can inform dialogue and action on workable solutions at scale. Further, the Arab Water Council (AWC) has government representation from Jordan and Sudan on its Board of Governors, and UN Women has country presence in both sites. Both organizations have strong engagement in these countries.

Although both sites have multiple hazards, the focus is on gendered vulnerabilities and impacts of water-related hazards in agriculture. This is underlined by the particular significance of agriculture to both Jordan and Sudan in different ways and the significance and impact of water-related hazards on the sector. Agriculture in both sites is highly dependent on natural elements such as precipitation and is hence highly exposed, sensitive and vulnerable to climate variations. While the proportion of Jordanian women engaged in agriculture is small, rural Jordanian women are among the poorest sections of the population and depend on agriculture and natural resources for a livelihood. Sudanese women have a sizeable presence in agriculture. Women in both sites make critical contributions to the agricultural sector, albeit at lower ends of value chains. They are hence more vulnerable than men to climate risks and impacts including related migration, and its impacts. They nevertheless deploy their local knowledge, practices, attributes, networks and leadership effectively to respond to crises, recovery, and longer term development. Addressing their priorities is a moral imperative but also achieves sustainable development.

METHODOLOGY

The paper is qualitative. It seeks to provide insights and highlight gender equality and women's rights considerations on the structural drivers of vulnerability (and capacity) related to climate risks and impacts, including migration for survival from a 'nexus' perspective. It does not seek to measure the scale of this impact on women. It thus draws primarily on secondary data and key informant interviews. This includes data and analysis on Jordan and Sudan from government, academia, research institutions, think tanks, media, national NGOs, CBOs and international organizations. This includes studies, reports, information on policies and programs, articles in journals, media reports, case studies. It is important to note that detailed reviews of climate and migration policies are not the focus of this publication, as the intent is to highlight the climate and related migration and development priorities of different categories of women for consideration in policies and programs, adopting a nexus approach.

This secondary data is backed by 30 key informant interviews with senior government officials across ministries and departments dealing with environment, water resources, agriculture, migration and women's empowerment (7), civil society organizations working on these issues (12), and with women and men farmers and community mobilizers (11). A major challenge to the pursuit of these was COVID-19 and the difficulty in pursuing face to face interviews. Online interviews were sometimes challenged by infrastructural capacities – power outages, and poor connectivity.



SECTION I.

CLIMATE CHANGE AND HAZARD TRENDS IN THE TWO SITES: TOPOGRAPHY AND CLIMATE AS DRIVERS

I. CLIMATE CHANGE AND HAZARD TRENDS IN THE TWO SITES: TOPOGRAPHY AND CLIMATE AS DRIVERS

Jordan and Sudan are vulnerable to climate variations and hazards, especially extreme temperatures, droughts, storms and flash floods. This is especially pronounced in their agricultural sectors that depend hugely on natural elements. Climate variations and topography together with socio-economic-political processes have been augmenting vulnerability to hazards with rising frequency, magnitude, severity and adverse societal impacts.

Jordan (West Asia) which is located 80 kms to the East of the Mediterranean is dominated by arid deserts, the rift valley, highlands and plains. It has the world's lowest valley that lies North-South between two mountain ranges and between 170-400 meters below mean sea level. Its climate ranges from Mediterranean to desert climates (World Bank, 2021a). It is natural-resource scarce, with three quarters of its land covered by deserts (Ramirez et al, 2022). Jordan lies downstream of Israel and Syria who share water resources from the Yarmouk and Jordan Rivers. This complicates its scarce waterscape (Krampe, 2020).

Jordan receives only 50 millimeters of rain each year. Only nine other countries worldwide receive less rainfall than Jordan. Jordan has one of the lowest renewable water resources available per person in the world at less than 100 m³ per year (Ramirez et al, 2022) and ranks fifth among nations facing extreme water stress (Whitman, 2019). It is prone to droughts, heat waves and floods. The Jordan Meteorological Department's (JMD) data (MWI, 2018) shows droughts of record,¹¹ including those that occurred in 1933, 1958-62, 1983-1984, 1998-2000, 2007-2009 and 2013-2014.

Jordan is however not a major emitter of GHGs and ranks 80¹² on the World Population Review's Global Ranking of Green House Gas Emissions for 140 countries for which 2019-2020 data was available (World Population Review, 2023). However, it will likely have a 2°C increase in its average annual temperatures by 2050 and variable rainfall with likely decrease of between 10-37 percent by 2099, although the intensity of rainfall will probably increase (Abdulla, 2020; USAID, 2017). By mid-century, most global climate models project more frequent heatwaves and fewer frost days (Representative Concentration Pathway (RCP) 8.5 ensemble) (RCCC-ICRC, 2021a), more frequent and protracted droughts and intense water scarcity due to climate change (Hoerling et al., 2012).

Sudan (Northeast Africa) has a vast plain, and widely separated mountain chains and desert in the North, with desert to semi-desert climatic zones in the north, arid savannah in the east, west and south, seasonal rains in the center. Sudan too is not a major emitter of GHGs and ranks 87¹³ on the fore-mentioned World Population Review's Global Ranking of Green House Gas Emissions for the same period (World Population Review, 2023). Mean annual temperatures from 26- 32°C country-wide, often exceed 43°C in the north, and are likely to rise by 0.5-3°C by 2050 (USAID, 2016a). Sudan ranks 174 out of 181 countries in the Notre Dame Global Adaptation Initiative (ND-GAIN) Index, showing high vulnerability to climate risks and other concerns, and low readiness to improve resilience. (RCCC-ICRC, 2021b). Between 1990-2014, floods that constituted 73 percent of all disasters, and droughts that ranked second and comprised 15 percent of all disasters in the same period, increased in frequency (World Bank, 2021b), and the frequent occurrence of both continues.

¹¹ This is defined as having annual Standardized Precipitation Index values below (-1)

¹² At rank 80, Jordan emits 22.80 MT of CO₂ (2019) and 2.3 tons of CO₂ per capita (2019)

¹³ At rank 87, Sudan emits 18.50 MT of CO₂ (2019) and 0.4 tons of CO₂ per capita (2019), in comparison to China the highest emitter at 9,876.50 MT and 7.1 tons per capita for the same period



SECTION II.

THE SOCIO-ECONOMIC AND POLITICAL DRIVERS OF CLIMATE HAZARDS IN THE SELECTED SITES

II. THE SOCIO-ECONOMIC AND POLITICAL DRIVERS OF CLIMATE HAZARDS IN THE SELECTED SITES

Development processes in these sites converge with fore-mentioned topographic, and climate profiles, including climate variations to increase vulnerability to climate risks, hazards and impacts. Key socio-economic vulnerabilities include high population growth and density (that strain scarce existing resources), multi-dimensional inequality and poverty, a lack of sustainable rural and urban development, and reliance on climate-sensitive agriculture, especially among the poor.

According to World Bank data in 2021, Jordan had a population of 10,269,022 people (World Bank, 2021e), with an annual population growth rate of 0.6 percent (World Bank, 2021g). Its current population density at 127/km² places it 92nd globally. Jordan's population is expected to peak at 14.15 million people in 2080, after which it will gradually decline (World Population Review, 2022b). Per 2021 World Bank data, Sudan had a population of 44,909,351 in 2021 (World Bank, 2021e), with an annual population growth rate of 2.4% (World Bank, 2021g). At this rate, Sudan's population will likely reach 100 million by 2064, adding over 1 million people to the population annually (World Population Review, 2022c).

Per Table 1, both Jordan and Sudan had low levels of economic inequality with Gini indexes at 33.7 and 34.2 percent respectively per 2010 and 2014 data respectively.

TABLE 1: THE GINI INDEX

Country	Most Recent Year	Most Recent Value
Jordan	2010	33.7
Sudan	2014	34.2

SOURCE: ADAPTED FROM © WORLD BANK, 2022A.

Per Table 2, Jordan ranks high at 102 out of 186 countries rated on the 2021 Human Development Index (HDI). Sudan ranks 171 on the same index, with a low HDI rating (UNDP, 2022). Low HD levels caused by a lack of sustainable development and governance deficits create greater vulnerability to climate risks and impacts which further accentuate vulnerabilities.

TABLE 2: THE HUMAN DEVELOPMENT INDEX (HDI) BY COUNTRY, 2021

Country	HDI 2021	HDI tier
Jordan	0.720	High
Sudan	0.508	Low

SOURCE: ADAPTED FROM © UNDP, 2022.

Jordan is now reclassified as a lower middle-income country (World Bank, 2017a). About 14.4 percent of the population live in poverty, and the bulk of the bottom 40 percent is exposed to the risk of transient and seasonal poverty (World Bank, 2016a). Inequality in multidimensional poverty between the highest and lowest wealth quintiles in Jordan is acute, suggesting a huge gap in access to resources and capabilities between rich and poor households. Households in the bottom quintile are 24 times more likely to be poor than those in the top quintile (ESCWA, 2018).

According to the National Baseline Household Budget Survey 2014-2015 in Sudan,¹⁴ global poverty prevalence in Sudan was 36.1 percent. Further, 25 percent of Sudan's population is below the extreme poverty line. The poorest states are Southern kordofan, Western Darfur and Central Darfur, where two in three people are poor (Letsara & Jmal, 2018).

¹⁴ A sample of 11,953 households was surveyed during the three rounds of data collection across Sudan's 18 states. A household was designated as poor if its consumption fell below the poverty line set at 5,110 Sudanese Pounds (SDG) per capita per year in urban areas, and 4,044 SDG in rural areas.

RURAL POVERTY AND UNSUSTAINABLE RURAL PRODUCTION, CONSUMPTION AND DISTRIBUTION

In both countries, most of the poor live in the climate-sensitive agricultural sector where poverty rates are higher than in urban areas. Primary agriculture contributes about 4 percent to Jordan's GDP, although agricultural contribution rises to 25-30 percent of the GDP when indirect contributions (food sector) are accounted for (World Bank, 2018d). About 20-25 percent of Jordan's active population depend on the agricultural sector, which employs many women and refugees (MoEnv, 2020). There are about 102,000 farming households in Jordan, of which 85 percent have less than 20 dunams (2ha), inhibiting industrialization and integration in the agri-food industry. 25 percent of farmers are herders. Less than 20 percent of farming households are involved in formal financial markets (DOS, 2018). 40 percent of households in Jordan's agriculture sector are considered poor (MoEnv, 2020). 17 percent of rural Jordanians live below the poverty line, compared to a national average of 14.4 percent (World Bank, 2018b). Most of the rural poor live in areas with low investment in industrial and services activities and are reliant on agricultural activities for an income (MoEnv, 2020).

Agriculture is a source of livelihood for about 65 percent of the Sudanese population, but 80 percent of Sudan's poor live in rural areas where poverty is twice more than in urban sites. This is estimated to be 58 percent of households in rural areas compared to 27 percent of households in urban areas. The crop and livestock sector account for approximately 30-35 percent of Sudan's GDP and 80 percent of non-oil exports (World Bank, 2016 b).

Agricultural policy, legal frameworks and strategies, land tenure systems, redistribution of assets/benefits, land use, taxation systems and trade enablers, productivity growth, natural resource management and resilience to climate risk are inadequate in both sites. Investments to improve research, infrastructure, production technologies, inputs, marketing systems, natural resource management, human capacities and access to resources including finance demand greater attention. Poverty, knowledge and governance gaps tend to lead to maladaptive practices that erode ecosystems, natural resource and economic security, thus increasing climate risk and vulnerability (Bataineh & Zecca, 2017; Charles et al., 2019, Maghoub, 2014; MoEnv, 2020; World Bank, 2016a, World Bank, 2018b; Ramirez et al., 2022;).

In Jordan, for instance, unclear land tenure policies and land fragmentation complicate land use governance and agricultural development planning. It restricts economies of scale and profitability, and accentuates environmental degradation and soil erosion, creating a vicious cycle of deprivation, vulnerability to climate risks and impacts, and further deprivation (MoEnv, 2020). Despite its relatively smaller contribution to GDP, agriculture demands the largest share of water (52 percent), mainly over-exploited groundwater, which is contaminated by the overuse of fertilizers and pesticides (MoEnv, 2020). Moreover, extracted groundwater needs huge amounts of energy for pumping because of falling water table levels. Only 30 percent of the agricultural land is irrigated, but represents 90 percent of the agricultural production. (Ramirez et al, 2022). Water-scarcity increases food insecurity and 87 percent of food is imported. Jordan relies on fossil fuel imports (mainly oil and natural gas) that covered about 93 percent of the domestic demand in 2018 (Ramirez et al., 2022), although the country is becoming a leader on renewable energy in the MENA region (Carey, 2019). According to a 2004 World Bank study, the cost of overall environmental degradation was about 3 percent of GDP annually (205 million JD), of which the cost of land degradation and high soil salinity was about 0.6 percent of GDP. The government's National Strategy and Action Plan to Combat Desertification identified 'land mismanagement (human factors) and climate change as the primary drivers of desertification in Jordan.' Decades of prolonged overgrazing have substantially reduced the value of rangelands, as their carrying capacity has decreased by up to

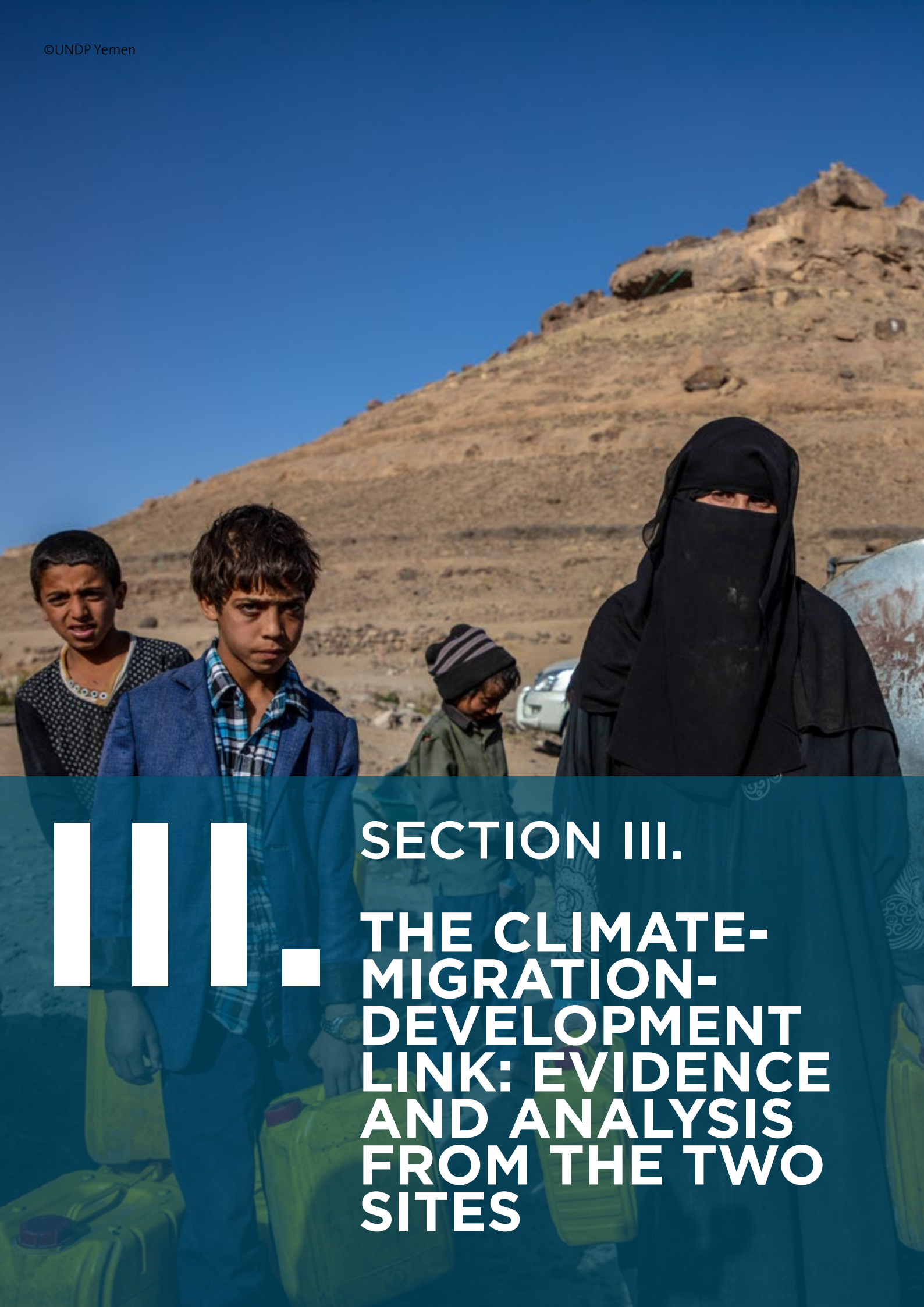
70 percent since the 1970s. Only about 1 percent of Jordan is classified as forested, with natural forest constituting 0.44 percent of the total land area (MoEnv, 2020).

Agriculture which is central to Sudan's economy suffers serious and chronic environmental challenges, including land degradation, riverbank erosion, invasive species, pesticide mismanagement in large irrigation schemes, and water pollution. Inadequately managed mechanized rainfed agriculture, which covers about 6.5 million hectares has led to large-scale forest clearance, loss of wildlife and severe land degradation. A huge growth in livestock numbers – from 28.6 million in 1961 to 134.6 million in 2004 – has caused widespread degradation of the rangelands. Between 1990 and 2005, Sudan lost about 8,835,000 hectares or 11.6 percent of its forest cover – largely because of energy needs and agricultural clearance. Finally, inadequate rural land tenure, is an underlying cause of many environmental problems and a hurdle to sustainable land use, as farmers have little incentive to invest in and protect natural resources (UNEP, 2007). Agricultural output levels of Sudanese farmers and large state-owned schemes are less than optimal due to recurrent drought, land degradation, inadequate irrigation infrastructure, inconsistent agricultural policies and climate fluctuations (Mahgoub, 2014). Agriculture uses about 97 percent of the country's water that is often diverted to mechanized farms and intensive cultivation by rural farmers, contributing to aridity (Barton & Writer, 2012).

Irrigated agriculture is largely concentrated in the centre of the country and there is a disparity in development indicators between the best and worst performing regions. Most Sudanese are food insecure, especially internally displaced persons (IDPs) and those in conflict-affected regions such as Darfur, Kordofan and others (Mahgoub, 2014). In drought-prone, arid/semi-arid parts of Sudan, pastoralists settle near water points because range resources are shrinking. This results in the over-exploitation of water points. It changes nomadic grazing patterns and contributes to conflict between farmers and pastoralists (UNDP, 2018). While environmental factors are intrinsically connected to other socio-economic, political issues, contestations over rangeland and rain-fed agricultural land in more arid parts of Sudan are an example of the link between natural resource scarcity and its contribution to conflict. Likewise, conflict and its impacts, such as population displacement, maladaptive environmental practices to survive, conflict-related resource exploitation, lack of good governance and underinvestment in sustainable development further deplete the environment contributing to climate risk (UNEP, 2007).

70 percent of Sudanese people are considered forest-dependent, although official accounts of the contribution of forestry to Sudan's GDP are underestimated (UN-REDD, 2014). Studies note that despite Sudan's Forest Management Policies of 1986 to develop and conserve forest resources through public participation in afforestation and sustainable forest management, there is continuous deforestation and degradation of forests. Key drivers in the Tozi and Wad Al-Bashir forests, for instance, are livestock grazing and conversion of forestland to farmlands, respectively. This is underlined by poor Implementation of forest policy and poor land tenure systems (Gadallah, 2018).

Quite evidently topography, geopolitical location, climate conditions combine with unsustainable rural production, consumption and distribution to exacerbate environmental degradation, decrease agricultural yields that decrease farmers' incomes and food insecurity. This increases costs of food, basic services and production (Carry, 2019, Maghoub, 2014) and reinforces the vicious cycle of poverty and exacerbates climate risk and vulnerability to climate crises.



SECTION III.

THE CLIMATE- MIGRATION- DEVELOPMENT LINK: EVIDENCE AND ANALYSIS FROM THE TWO SITES

III. THE CLIMATE-MIGRATION-DEVELOPMENT LINK: EVIDENCE AND ANALYSIS FROM THE TWO SITES

URBAN POPULATION GROWTH IN JORDAN AND SUDAN: STRUCTURALLY-INDUCED RURAL-URBAN MIGRATION, AND REFUGEE/MIGRANT INFLUX

The annual average urban population growth rate as a proportion of the total population (2021) in Jordan and Sudan is 0.9 percent and 3.3 percent respectively (World Bank, 2021i). Jordan's cities host 91.6 percent of its overall population (Urbanet, 2021). Jordan's population is highly concentrated in the northern governorates of Amman, Irbid, Zarqa, and Marfaq (UN Habitat, 2022). In 2021, 35.59 percent of Sudan's total population lived in urban areas and cities (Statista, 2022). Metropolitan Khartoum is one of the most populated cities on the African continent reported to host about 19 percent of the total population of Sudan (Ille & Steel, 2021).

Both Jordan and Sudan have natural population growth. But Jordan's urban population growth is largely caused by rural-urban migration, and a steady influx of refugees from conflict affected neighboring countries in the region (David & Nilsson, 2021). As noted earlier, rural planning, development and governance deficits in Jordan create a vicious cycle of deprivation and environmental degradation leading to climate vulnerability and its impacts and further deprivation (MoEnv, 2020). In Jordan, it is projected that "the occurrence of frequent droughts and adverse impacts of climate variations will increase rural-urban migration, with about 15 percent of the country's farmers leaving their lands or shifting their use from agriculture to other uses" (Hagood, 2020). While water is usually available less than once every two weeks in rural areas, with reduced frequency during the summer, it is available once a week in urban areas (UNICEF, n.d.).

Confirming the above, women (and men) farmers note:

"Weather and climate changes are a big reason for migration. My husband and his brother used to plant more than 10 agricultural donum. I now plant 1 donum. We cannot grow some crops anymore because they need more water and clean water. Our crop levels have reduced or we lost them because of less water, frost, salt in water and soil, less minerals in soil, heavy wind which carries insects and they destroy our crops and cultivated land. Also, the prices of products we use on our land is very high. Workers' per day wages have increased to 2 dinars for a man and one and a half or one and a quarter for a woman. So, we have big financial losses"(Interview with Fatima Muhammad Lotfi Al-Hayagna, 2021).

"Agricultural migration started at a small rate, and later it spread. From our farmers' point of view, migration is better than losses and debts that we cannot pay, so they started selling agricultural lands and moved to live in other areas. The agricultural decline is clear from many things like poor seeds or rotten seeds that are not good for cultivation, in addition to the scarcity of water after sending water from the King Abdullah Canal to the King Talal Dam. The water was previously 24 hours, now only 4 hours, and this forced farmers to reduce percentage of cultivated areas. Farmers could cultivate 20 agricultural dunums of zucchini crop, and now because of the winds and frosts, the crop is permanently destroyed" (Interview with Samira Mahmoud Karim Al-Diyat, 2021).

“Many farmers have left the Jordan Valley and migrated to other governorates looking for jobs and a better life for their families. Agriculture is no longer what it used to be. Now we see a lot of weather fluctuations and crop failure. We don’t get the price for our crops and farmers get no compensation. Farm work now exposes farmers now have a lot of legal cases against them because of piling up debts. Many farmers are now wanted by the courts because of checks signed without balance. So, leaving the agricultural profession now is a great blessing for them, to protect the same farmers from new debts, which they will not be able to pay. I have left farming but stay in the valley, but all are looking for employment” (Interview with Ahmed Hussein Al-Gharaghir, 2021).

Between 2004-2015, refugee and migrant influx from neighboring countries into Jordan was responsible for an average rate of population growth of 5.3 percent (Fanack, 2020). About 85 per cent of registered refugees in Jordan live outside camps (Townson, 2016), primarily in urban areas such as Amman, Mafrqa and Irbid (Wilson & Caswell, 2018). UNHCR’s 2017 year-end data estimates that there are about 691,000 Syrians in Jordan. Others place this closer to 1.3 million (International Rescue Committee, 2018). Syria’s protracted drought (2006-2010) also led men to migrate as agricultural and construction workers to Jordan and Lebanon (UN-OCHA, 2009). Jordan also hosts nearly 80,000 refugees from Iraq, Sudan, Somalia, and Yemen, and about 2.2 million Palestinian refugees who are registered with UNRWA (Wilson & Caswell, 2018). While large numbers of Somalis, Sudanese and Yemenis are registered with UNHCR in Jordan, there are many more outside the international protection system. It is pertinent to note mixed migration flows of Somali, Sudanese and Yemeni populations to Jordan, underlined by complex interacting ‘drive and draw’ forces, a mix of motives and multiple migratory routes. Conflict, poverty and/or natural disasters have driven some of these populations from countries of origin, followed by displacement from a third country for the same or similar reasons. Others have migrated for medical reasons, employment or travel and have found themselves displaced, because conflict has cut off routes of return or the viability and safety of heading home (MMP, 2017).

Sudan’s urban population growth has largely been because of rural-urban migration. In Sudan climate events from 2008-2021 drove about 1.9 million people (IDMC, 2021), many to cities like Khartoum and its outskirts. In Darfur and its vicinity, for instance, drought has driven nomadic pastoralists attached to land and livestock to migrate in search of water and fodder or to move finally to cities for jobs (McLeman & Smit, 2006), with aggravated vulnerability if they had inadequate education and skills (Osman-Elasha, 2008). Flooding can and has also driven migration in Sudan, but such movement tends to be temporary, as communities are often willing to rebuild after flooding events (Quinn et al., 2019). But climate is not the sole driver of migration in Sudan. While at certain points it is a palpable driver, it interacts with other related development factors, and conflict to drive Sudanese migration to cities or overseas.

Structural changes in economic sectors such as the growing significance of Jordan’s industrial sector whose indirect contribution to GDP is about 40 percent (Jordan Investment Commission, 2019); centralized urban investments and services; large-scale real estate and development projects along the Nile especially in the case of Khartoum during the oil-boom between 2000-10 (Ille & Steel, 2021) lead to better employment and education opportunities in urban cities in these countries. The search for jobs and better living standards in the Jordanian cities of Amman, Zaqar, Irbid or Khartoum in Sudan, away from degraded rural ecosystems, poor rural development, climate hazards, conflict (in Sudan), and rural poverty have contributed to rural-urban migration, rapid urban population growth and urbanization in these countries (Al-Jedaiah, 2021; IDMC, 2021, Osman-Elasha, 2008; UN Habitat, n.d.a, n.d.b). Many Jordanians and Sudanese also migrate abroad for better work that is locally scarce and further eroded by ecosystem depletion, climate hazards or conflict (Sudan). As noted earlier there have been mixed migration flows of Sudanese and other nationalities into Jordan. Jordan’s relative economic prosperity, political stability and overall receptivity has been a draw factor (MMP, 2017).

SCARCE RESOURCES AND RESULTING IMPACTS IN URBAN HOST-SITES

Rural-urban migration, refugee influx and migration from neighboring countries into Jordan, urban population growth and density and poor urban planning and development in these sites alter lifestyles and resource use. Existing food production-demand-consumption gaps are further widened, as agriculture loses land and people. This situation further stresses existing urban socio-economic infrastructure and services, and is marked by growing urban poverty, poor access to decent work and basic services, land reclamation, encroachment on agricultural land and natural habitats, squatting, evictions and the growth of slums.

Jordan's urban spatial expansion is about 1 percent per year or 15 km² posing a risk to agricultural land and the provision of infrastructure and finance (UN Habitat, n.d.b). 23 percent of its urban poor lived in slums in 2018 (World Bank, 2022g). In Amman where population growth and the influx of refugees has contributed to a 1.7 percent increase in rental costs (UN Habitat, 2022), only 10 percent of households can buy houses above 100 m² without spending more than 30 percent of their monthly income (UN Habitat, 2022). Low-income neighborhoods will be hardest hit by acute water scarcity with 91 percent of the households receiving less than 40 liters daily for eleven consecutive months by 2100 (Garthwaite, 2021). It is important to note though that some of the municipal water loss is also through leakage and water theft. Depending on the region, the network loses between 50 percent of the water supply, largely caused by inadequate administrative procedures, infrastructure, and maintenance (Al-Ansari et al., 2014).

Increasing industrialization, population growth, and a stressed waste management infrastructure generate about 2 million tons of municipal waste in Jordan each year, with most of it diverted to unsanitary landfills and dumpsites. Half of this is in Amman. Improper solid waste disposal is leading to public health risks, adverse environmental impacts and socio-economic problems (Yamin, 2022). Air pollution is acute in Jordan's cities. About 90 per cent is caused by road traffic. Finally, the strain on natural resources and services has generated tension between Jordanians and the refugee and migrant population from neighboring countries. This could grow acute (Carry, 2019). Reportedly refugee inflows increase the probability of Jordanian internal migration. "Residing in governorates with refugee camps increases the probability of Jordanians moving out, while the probability of them moving in decreases. This may be driven by potential negative impacts on the labor market pushing out natives, or an increase in the price of services and housing, or congestion and competition in access to services." (El-Mallakha & Wahba, 2021).

In Sudan internal migrants and others are known to pervasively squat on unplanned land or land owned by public/private entities. Half the urban poor living in planned or unplanned camps have moved or have been forcibly moved at least once post-arrival in Khartoum - some up to thrice (Pantuliano et al., 2011). Many live on riverbanks in flood-prone areas, in informal settlements resulting from subdivision of agricultural lands or illegal occupation of seemingly vacant lands. The lack of inclusive national urban development strategies, coordinated state urban development plans and an overall vision for land and natural resource use underscores this (UN Habitat, n.d.b).

As noted earlier, Sudanese movement into Jordan is marked by mixed flows driven by poverty and/or disasters and conflict (MMP, 2017). While many Sudanese are registered with UNHCR in Jordan, many more have no protection. In the floods of 2015 in Jordan, more than 3000 Sudanese in Jordan suffered from the cold and rain that flooded their tents, and an outbreak of disease, especially among children. They reportedly receive little financial assistance as refugees and have no legal right to work. Nevertheless, they engage in casual day labor such as car washing, cleaning or work in markets to eke out a living - mostly only for a few days a month. They are also targets of racist behavior (Dabanga, 2015).

THE DISCOURSE ON CLIMATE RISK, RELATED HAZARDS AND MIGRATION

The fore-going data returns us to conversations around three key issues on the relationship between climate change, related hazards and migration: (a) whether migration is primarily climate-induced or driven by broader development factors, (b) whether climate-induced migration is an adaptation or a survival strategy, and (c) whether fair, voluntary and safe return to climate-affected sites of origin is a durable solution. These are questions demanding rigorous empirical research in Jordan and Sudan. This is because the nature and type of hazard, the socio-economic and political contexts, the environmental and climate risk profiles of each of these sites determines migration patterns and trajectories, including returns.

THIS PUBLICATION NOTES THAT:

(a) There exists a robust link in Jordan and Sudan between the lack of sustainable rural and urban planning and development and related socio-economic and environmental impacts including climate risks, consequent further deprivation, and often migration. But migration is underscored by a complex web and mix of motives, 'drive and draw' forces and mixed flows. Not all migrants are equally likely to migrate as a result of climate or other related factors. "Usually the poorest, or those dependent on rainfed agriculture are the most vulnerable. They lack safety nets, resources, and lack resilience to climate impacts. Often, they are the first to migrate. However, in some instances, the poorest are unable to migrate and suffer the impact of exposure to extreme climate events" (USAID, 2016b). In Sudan, for instance, engaging in small-scale agriculture where possible, selling some of the herd (Osman-Elasha, 2008), changing migration patterns often with great difficulty in finding grazing land as in the case of pastoralists who migrate seasonally (Quinn et al., 2019), are coping mechanisms for those who stay behind.

The moot point is not whether climate risk is the primary or secondary driver of migration, even if it contributes palpably. Rather, there are a range of long-term inter-related systemic drivers of migration for survival the parenthesis and its impacts underlined by a lack of sustainable development. Climate risks and hazards, are in part, the product of a lack of sustainable development and contribute together with other development deficits to migration for survival. (as detailed in the recommendations).

(b) There are various types of migration, including that which is driven by social, economic, environmental, or political circumstances marked by degrees of force on a continuum, and progressively increasing desperation. This may include efforts to survive multi-dimensional poverty and sudden onset or protracted hazards that aggravate pre-existing impoverishment. In such situations 'migration for survival' is perhaps a more accurate description in these contexts than 'migration as adaptation.' This holds even more weight if life in destination sites (internal or cross-country) is also marked by poverty and insecurity, including vulnerability to water crises, floods and other climate hazards affecting destination sites – as demonstrated by fore-mentioned data for Jordan, but especially for Sudan. This reflects more survival coping, rather than adaptation which is a more positive process, marked by greater agency, ability to recover and greater resilience. However, this adverse situation could improve should timely and robust investments be made in more inclusive sustainable rural and urban development with de facto access of affected groups to the ensuing benefits.

(C) Return to economically and environmentally impoverished, acutely climate-affected homes sites is not always sustainable, even if people wish to return. This demands an assessment on a case-by-case basis – whether in Jordan, Sudan or elsewhere. Often sites of origin are hit by multiple, cascading climate hazards (and most recently, COVID-19 – a biological hazard), with increasing frequency and intensity, and with recurring damage and loss to pastoral and agricultural assets, soil and water quality, household assets and businesses. This coupled with rising prices overall could leave little time for people to adapt or recover, and renders living and working in many sites untenable. Where the level and scale of investment in climate-resilience building and readiness to improve it is low, it would be difficult to see how sustainable people’s return to acutely climate-affected home sites would be as a long-term durable solution unless action to build resilience could be taken with positive results and did happen.



IV

SECTION IV.

GENDERED STRUCTURAL DRIVERS OF VULNERABILITY TO CLIMATE RISKS AND IMPACTS, INCLUDING MIGRATION

IV. GENDERED STRUCTURAL DRIVERS OF VULNERABILITY TO CLIMATE RISKS AND IMPACTS, INCLUDING MIGRATION

Per Table 3, women are almost 50 percent of the population in Jordan and Sudan. Addressing the gendered differences in climate and migration priorities of different groups of women is crucial to achieving inclusive development

TABLE 3: PROPORTION OF FEMALES AND MALES IN TOTAL POPULATION IN 2021

Country	Total Population	Female	Male
Jordan	10,269,022	49.3%	51%
Sudan	44,909,351	50 %	50%

SOURCE: ADAPTED FROM © WORLD BANK 2021E, 2021F, 2021H.

Jordan and Sudan rank poorly on global indexes that measure gender equality. Jordan ranks 122 out of 146 countries in the Global Gender Gap Index 2022 (GGGI) with a score of 0.639. GGGI data on Sudan is unavailable (World Economic Forum, 2021), but the 2021 Gender Inequality Index (GII) ranks both countries. Jordan ranks 102 and Sudan 172 out of 191 countries, with GII values of 0.471 and 0.553 respectively (UNDP, 2022). Gender also interacts with other socio-economic-political inequalities resulting in inequalities not just between men and women, boys and girls, but also among different groups of women and girls and their male counterparts. Poor rural and urban women, especially female-household heads, pregnant and nursing women, older women, women with disabilities, low-skilled migrant women, indigenous women, women in hard-to-reach sites are among the most excluded and worst hit by climate crises, as will be demonstrated subsequently.

GENDERED STRUCTURAL DRIVERS OF MORTALITY AND CASUALTIES FOR WOMEN AND CHILDREN IN DISASTERS

A summarized table of seven types of natural disasters in Jordan from 1990-2009, (EM-DAT, 2014) that included droughts, earthquakes, epidemics, extreme temperatures, floods, insect infections and storms, shows the numbers of casualties and deaths, but the data was not sex disaggregated.¹⁵ Likewise, available data from 1990-2022 in Sudan on mortality and casualties from climate-related hazards is not sex-disaggregated (EM-DAT, 2022). This raises the urgent need for sex-disaggregated data and gender analysis on the issue. However, where such data is available elsewhere, albeit taking account of context-specificity, it shows that more women and children died in major disasters. For example, Bangladesh's cyclone Bhola claimed 300,000 lives with women outnumbering men 14:1 (Bhuiyan, 2013). In the 1991 cyclone in Bangladesh, 90 percent of those who died were women and children. (Ahmad, 2011). In the 2010-2012 famine in Somalia that killed nearly 260,000 people, half were children (UN, 2013).

The factors that inhibited women's and children's survival in the fore-mentioned disasters were context-specific, and Bangladesh's Cyclone Preparedness Programme (CPP) has contributed to a reduction in deaths (Bhuiyan, 2013). The lessons drawn from an analysis of vulnerabilities and the impacts of the CPP hold good for other contexts. Inhibitors include poor knowledge and access to early warning information, women-unfriendly evacuation plans, gendered cultural factors that restrict mobility and interaction with non-familial men. This pre-empted evacuation with the community in the absence of male relatives. Gendered restrictions on certain types of survival-enhancing physical activity, and unsafe housing and

¹⁵ The two drought events during this period (1990-2009) affected 330,000 people totally. There were no deaths. In the same period, there were four flood events that killed 44 and affected 529 people, while 2 flash floods killed 267 and affected 23792 people (EM-DAT, 2014).

living sites were other factors causing deaths. Many women died as they had to fend for their little children, older people and themselves, especially if male relatives were away. Some remained to protect meagre assets, including animals. Women remained indoors because they feared the dark, the turbulent weather, theft, sexual abuse or because shelters were far off, not women-friendly, or non-existent. They consequently drowned with children and others in the 'refuge' of homes. Women's dress code, the sari became a death trap causing entanglement and preventing quick movement. It was hard to swim in the surge, negotiate high wind speed and slush with children (Bhuiyan, 2013; D'Cunha, 1997).

More generally, early warning systems also tend to exclude the needs of older women and men, women and men with chronic ailments and disabilities. This is of relevance and note to countries of the Arab region, as well. Warnings are often relayed as audio-video or televised messages without sign language, or captions or audio descriptions. These warning formats are unsuited for women and men with hearing, visual or other disabilities. Evacuation planning too, rarely identifies these groups. It seldom arranges support to carry their aids, service animals, medicines, or provides suitable transport with assistance. Shelters often lack the infrastructure for older persons and persons with disabilities (Center for Disaster Philanthropy, n.d; Help Age International, 2000, 2019)

GENDERED STRUCTURAL VULNERABILITIES (AND CAPACITIES) RELATED TO CLIMATE RISKS AND IMPACTS IN THE AGRICULTURAL SECTOR: WOMEN'S ROLE AND POSITION IN NORMAL AND CRISIS TIMES

THE BROAD GENDER-BASED DIVISION OF LABOR IN BOTH SITES AND IMPACTS ON WOMEN'S ECONOMIC AND SOCIAL PARTICIPATION

Jordan and Sudan have a gender-based division of labor that varies across both sites but that broadly accords men public sphere roles in the state, market and community and relegates women to the privacy of domesticity (JICA, 2012; Shahzadeh, 2021). A 2018 World Bank survey in the urban areas of Amman, Marfaq and Zarqa in Jordan found that 96 percent of 2000 male and female respondents between 20-55 years found it was acceptable for women to work, subject to certain conditions. These included not leaving the children with relatives, not working alongside men in mixed workspaces and not returning from work after 5.00 pm (World Bank, 2018a) Further, despite the primacy of women's domestic roles, household headship and decision-making tend to rest with men (JICA, 2012).

While not specific to Jordan and Sudan per se, gender roles could be more flexible than they seem, especially in female headed households or when migrant women workers return home more empowered when women exercise more agency in crisis situations. But changing gender roles could also mean increased workloads with adverse implications for women, or the risk of community and domestic violence as men feel threatened. Sustaining transformative changes in gender relations begs sustained social norm and behavior change, a reduction in women's workloads including unpaid care work, and a range of socio-economic support services and infrastructure, among other things, to realize real gender equality (D'Cunha, 2019).

Overall, the traditional gender-based division of labor and related discriminatory social norms and practices largely underscore gender gaps in the totality of women's paid and unpaid work in the state sector, markets, communities and households in Jordan and Sudan. It underpins their labor force participation and unemployment rates, work conditions, access to economic assets, resources and benefits, economic and social decision-making (JICA, 2012), and social behavior and practice.

OVERALL GENDER-BASED LABOR FORCE PARTICIPATION RATES, EMPLOYMENT AND UNEMPLOYMENT RATES

Per Table 4, estimates of labor force participation rates are very low for women in Jordan (13 percent) which is 4.7 times less than men’s at 62 percent. The country is in fact reported to have the lowest rate of women’s economic participation of any country not at war (Robbin, 2022). Sudan’s labor force participation rates for women are just below 30 percent but 2.34 times less than men’s at 68 percent. Employment for women in both countries is very low – about 5.1 times less for women than men in Jordan and 2.9 times less for women than men in Sudan. National unemployment rates for women are also much higher for women than for men, at a little less than double for women in Jordan and over twice higher for women in Sudan

TABLE 4: LABOR FORCE PARTICIPATION, EMPLOYMENT AND UNEMPLOYMENT RATES FOR FEMALES AND MALES IN JORDAN AND SUDAN (% OF FEMALE AND MALE POPULATIONS RESPECTIVELY, AGES 15+, MODELED ILO ESTIMATE, INTERNATIONAL LABOR ORGANIZATION) ILOSTAT DATABASE.

	Labor Force Participation Rate % (Most Recent Year: 2021)		Employment (Most Recent Year: 2021)		Unemployment (Most Recent Year: 2021)	
	F	M	F	M	F	M
Jordan	13%	62%	10%	51%	27%	17.6%
Sudan	29%	68%	20%	58%	31.8%	14.6%

SOURCE: ADAPTED FROM © WORLD BANK 2022C, 2022D, 2022E, 2022F, 2022I, 2022J

WOMEN’S CONTRIBUTION TO AND CONSTRAINTS IN AGRICULTURE: STRUCTURAL DRIVERS OF ECONOMIC VULNERABILITY TO CLIMATE RISKS AND CRISES

The particular manifestations of the gendered division of labor in agriculture in both countries (and within them) are contingent on the particular production systems and the diverse ecology that conditions this, social and cultural norms (partly tribal) that underscore family and kinship systems and internal conflict in the case of Sudan, among other factors. Most rural women in both sites tend to engage in small-scale, subsistence farming rather than cash-crop production that men dominate. While women dominate traditional rather than mechanized agriculture, they are hired as paid agricultural laborers on commercial farms owned by men. Women are small livestock raisers, and small traders of local produce in local markets. Men dominate larger scale marketing of food and agricultural crops in-country and abroad, as they control markets and related processes of storage, transport, grading, pricing and the sale of agricultural products. Women are also managers and sustainers of natural resources and bear the sole responsibility of unpaid care-work. Women thus ensure food, water and health security for families and communities and maintain adequate productivity levels among the rural work force (FAO 2005; FAO et al., 2010; FAO, 2021; Government of Sudan, 2021; IFAD & FAO 2007; UN Women & REACH, 2018).

Consequent to the broader gender-based division of labor in both Jordan and Sudan, women are not considered farmers in the same manner as men. Their agricultural work is deemed an extension of their unpaid care work in homes and both forms of work are invisibilized and unaccounted for in household and national incomes (FAO, 2005; UN Women & REACH, 2018). The consequent gender-based occupational segregation and gender gaps in ownership and access to agricultural assets, resources, services and

benefits that weigh against women disempowers them. It adversely impacts agricultural productivity and their ability to cope and recover in climate crises compared to men.

The proportion of the Jordanian population that is engaged in agriculture has declined over the years. Per table 5, a smaller proportion i.e. 1 percent of Jordan’s total female population is employed in agriculture in comparison to Jordanian men at 3 percent, although this difference is small. However, the labor force participation rates of Sudanese women in agriculture are significantly higher than that of Jordanian women in agriculture, and also much higher than the labor force participation rates of Sudanese men in agriculture - at least 18 percent higher.

However, in Sudan these rates vary noticeably between states. In states such as Darfur, agricultural work is almost entirely performed by women, while women are banned from agricultural work in all its forms in states such as Gedaref, Red Sea and Kassala (Ministry of Human Resources, Development and Labour, 2013).

TABLE 5: EMPLOYMENT IN AGRICULTURE FOR FEMALES (% OF FEMALE EMPLOYMENT) AND MALES (% OF MALE EMPLOYMENT) IN JORDAN AND SUDAN (MODELED ILO ESTIMATE)

Country	Female (Most Recent Year) (2019)	Male (Most Recent Year) (2019)
Jordan	1%	3%
Sudan	52%	34%

SOURCE: ADAPTED FROM © WORLD BANK 2021C, 2021D

Although the proportion of Jordanian women in agriculture is low, nearly half of rural Jordanian women work in the sector, and nearly a quarter of Jordanians below the poverty line, including many women, rely on agriculture (Netherlands Enterprise Agency, 2016; World Bank, 2018d). The significantly low proportion especially of women is perhaps because only formal employment is officially accounted for. The agricultural sector is considered one of the largest in the country for informal employment (WANA, 2021) and women’s informal work in agriculture in Jordan is high at 16 percent, compared to men’s at 5 percent (UNDP, 2013). A majority of rural Jordanian women are unpaid agricultural laborers in small to medium-sized family farms and make up a sizeable section of the female population active in agriculture (Augustin et al., 2012). Women are also actively involved in home-based agricultural activities, often managing small homestead gardens, compatible with their domestic roles and are typically responsible for the family plot (UN Women & REACH, 2018). Poorer women are employed informally as paid agricultural laborers on land owned by others often without contracts. Against this background, women’s accurate numerical strength and work in the sector tends to be invisible.

A 2018 UN Women and REACH study of women in agriculture in four governorates in Jordan ¹⁶ confirms the above. It shows that rural Jordanian women work across different segments of agriculture - in home-based micro-farming, crop and livestock production. 73 percent of women are engaged in home-based agricultural production - cultivating fruits, vegetables and raising livestock - on family-owned or rented land geared to family consumption and trade of surplus in local markets. They are involved at all stages of the production process including land preparation, harvesting, post-harvest processing and generating value added by-products for sale such as olive oil, dairy and other animal products. Men play supportive roles in home-based agriculture and undertake physically heavier labor such as ploughing the land and grazing livestock. Only 5 percent of women respondents owned the land being used. 26 percent of women respondents, especially from poorer economic backgrounds also worked as paid agricultural workers, employed informally and seasonally on land owned by others. These included commercial farms undertaking medium to large scale production of olives, fruit and livestock. Paid agricultural

¹⁶ The four governorates in Jordan are Irbid, Mafraq, Balqa and Karak

women workers on commercial farms engage in most activities at all phases of agricultural production including cultivation, crop maintenance, harvesting, while men engage in physically heavier labor, such as ploughing of land, packaging of produce, carrying and loading crates of produce onto transport (UN Women & REACH, 2018).

Despite their significant contribution to agriculture, and provisions in Jordan's legal framework that guarantee women's rights to land ownership and inheritance (UN Women & REACH, 2018), Jordanian women own 10.3 percent of all land by area (World Bank, 2017b), and significantly less land than men – 17 percent versus men's 48 percent (Ministry of Environment of Jordan & UNDP, 2022). The small proportion of women-owned agricultural land mostly does not exceed two hectares (Institute for Women's Studies in the Middle East, 2022). Female headed households tend to be among the poorest and have fewer economic assets than male headed households (IFAD, 2013). Limited land rights constrain women's scope of production and access to agricultural inputs, resources and services, including microcredit to start agribusinesses as land and other material assets are usually required to collateralise loans. Inadequate land rights also constrain decision-making on production and marketing issues. Rural women's sizeable engagement in home-based agriculture and as unpaid workers on family farms reinforces the perception of this work as an unaccounted extension of unpaid domestic roles.

Despite their significant contribution to livestock production, Jordanian women farmers were found to be under-served by extension services; less than one fifth of women are found to have access to state extension services and 3 percent to private extension (Al-Rimawi, 2002). When they are paid, women's wages are typically only 50 percent that of their male counterparts (around 150 JD/month) for unskilled and manual seasonal tasks - mainly during spring and summer - such as weeding, pruning, harvesting, packaging, and sorting (Fragaszy et al., 2022). According to another study of 83 women in the Jordan Valley, conducted between June to July 2020, women earned about 5-6 JD a day, and spent all their earnings on food, basic needs, and their children's education (Sadaqa, 2020). All respondents reported exclusion from social protection and health insurance, no provision of sick leave or annual leave, and no breaks during the day. Nationally, only 27 percent of women hold an account with a financial institution, and this can be expected to be much lower in rural areas (GIZ & Central Bank of Jordan, 2017). Only 21 percent of women heads of households receive loans for agricultural development and 9 per cent for income-generating activities, compared to 43 percent and 14 percent of male household heads (IFAD, 2013) Despite these challenges, Jordanian women work in the agricultural sector out of dire economic need (Sadaqa, 2020).

The agricultural sector in Jordan also employs a large number of Syrian women refugees and migrants, who rely on agricultural work – home-gardening and landless wage work - as a primary source of income, especially given their limited access to alternative opportunities. They live in high levels of economic, social and legal insecurity and vulnerability. They dominate informal and vulnerable employment with poor wages, long work hours and no social protection. Syrian women see little difference between their agricultural activities and men's, possibly because of the kinds of farms in which Syrians are employed and/or due to specific working conditions for Syrians. Many do not have work permits because of perceptions that women are not eligible, or because they find costs high or because they are reportedly unaware of application procedures. They are more likely than Jordanian women to move around between seasons to engage in paid agricultural work which is a challenge. Large numbers of Syrians live in informal tented settlements in or around large agricultural farms. They depend on private landlords who often compel them to relocate to formal or informal camps, and this may explain their greater tendency movement around for agricultural work (UN Women & REACH, 2018).

In Sudan, women are engaged in varied capacities across all agricultural subsectors – crop farming, livestock raising, fisheries and forestry. At the national level, Sudanese women are about 49 percent of farmers in the irrigated sector and 57 percent in the traditional rainfed sector, but over 85 percent in Darfur and Kordofan (Ministry of Agriculture and Forestry, 2014; World Bank, 2020). While women in the rainfed sector are primarily subsistence farmers, they are also employed as seasonal wage laborers in the rainfed mechanized sector and as hired or unpaid family laborers in the irrigated sector. Women’s engagement in agriculture has been increasing and often depends on them, as men are involved in armed conflict and migrate in search of agricultural or non-agricultural supplementary sources of livelihood (FAO, 2021). In crop farming Sudanese women are engaged with men in land clearance and preparation, harvesting, transporting and marketing crops, but do most of the planting, weeding and food processing (Government of Sudan, 2021). In traditional agro-pastoral farming systems and nomadic and semi/nomadic contexts, men primarily own and raise large livestock, while women raise smaller animals such as goats and poultry, care for sick animals, participate in milking, processing milk products, and selling animal products on a small scale in local markets (FAO, 2021). Women thus contribute substantially to households and agriculture by way of labor and incomes. In North Kordofan, for instance, women contribute 74 percent of the monthly agricultural income, 65 percent of total income, 62 percent of the labor, and 65 percent of unpaid care work, among other things. Moreover, women have successfully and increasingly diversified their livelihoods in rural farm and non-farm work, including through producing and selling handicrafts and establishing and owning micro businesses – mostly in retail trade and in selling tea and prepared food (FAO, 2021).

Fishery-based livelihoods in Sudan are dominated by men who almost exclusively engage in fishing and marketing. Women perform important supportive, but unpaid invisible tasks mostly within the household such as fish cleaning, processing and repairing nets. Their participation in the sector is partly constrained by mobility restrictions (Anton & Curtis, 2017). In some coastal areas, women also produce handicrafts made from marine products.

Sudanese women participate in various aspects of forestry governed by complex and varied forest/tree tenure and management systems. Restricted mobility within village environs largely limits women to wage labor and collecting forest tree and wild food products with their children for personal consumption or sale, timber cutting and charcoal production for personal use and sale, seedling preparation and weeding. As paid workers in gum Arabic production, men almost exclusively engage in tapping, while women do other essential tasks such as collecting, grading, cleaning, packaging and selling gum Arabic. But wages for this type of work are lower. Women are poorly represented in forest-sector decision-making (FAO, 2021).

Despite their substantial contribution to agriculture, Sudanese women have limited land rights, and are more likely to be landless than men, even though Sudan’s national land laws do not discriminate against women (JICA, 2012). While data on land ownership is not available, most agricultural land is communal, and managed by men. Where women have land ownership rights, social norms inhibit their authority, control and management over the land. In the event of divorce or spousal death, it is difficult for women to gain access to family land or maintain their land rights, and they tend to lose their rights to family property, including land. The widow is “inherited” by her husband’s family or clan, who decide whether she will have access to the land. Should she choose to leave the clan, she is denied this access to land. Personal law entitles a woman to inherit half the inheritance of her brothers, but this seldom happens. Women’s high rates of illiteracy and limited participation in decision-making mechanisms further contribute to gender disparities in access to and control over land (Gender Centre for Research & Studies, 2009). Absence of land ownership and land titles in women’s names inhibit women’s access to agricultural loans, agricultural inputs (e.g., improved seeds, fertilizers, pesticides), information, training

and extension services. Women's formal and customary rights to forest land are limited and depend on the discretion of male decision-makers. Further, women are typically unpaid for their work in traditional agriculture. This was borne out by a case study that found that nearly half the Sudanese women had not been paid for work in traditional agriculture outside the home within the previous month (OECD, 2015). About 86 percent of rural female employment and over 75 percent of agricultural employment is considered vulnerable. The agricultural sector also has the highest incidence of unpaid family work, estimated at 26.3 percent in 2011 (ILO, 2014). Finally changes in technologies and land-use patterns towards medium and large-scale modern technology-based production tend to benefit male farmers with greater access to resources and services, thus enhancing their incomes and profits, while further relegating women farmers to weaker and less profitable production systems (FAO, 2021).

Other serious hindrances to Sudanese women's economic participation and benefits in agriculture, underlined by locale-and tribe-based norms include: limiting women's access to certain sources of livelihood by preventing them from growing perennial crops or planting fruit trees; limiting access in pastoral areas to local markets thus preventing women from selling dairy and other products; or not permitting women to work in agriculture or to work at all in parts of Kassala, Red Sea and Gedaref states (FAO, 2021).

GENDERED ECONOMIC IMPACTS OF CLIMATE RISKS/CRISES ON WOMEN IN AGRICULTURE IN JORDAN AND SUDAN

In 2011, the main sources of greenhouse gas emissions in Jordan, for example, were the energy, transportation and construction sectors (73 percent), waste and agriculture (15 percent) and the industrial sector (9 percent) (UN Women, 2018). Most of these are traditionally male-oriented sectors, but despite women's active participation in the agricultural sector in Jordan and Sudan, they likely contribute less to GHG emissions than men given their small scale, subsistence farm and non-farm work, and their consumption of less emissions intensive goods and services compared to men. But their location at the lower ends of agricultural and non-farm value chains in subsistence roles, their lower asset ownership, lower access to and control over material and non-material resources and benefits relative to men, adversely impact their farm investments, productivity, earnings and climate resilience. When climate change and crises deplete women's fewer and smaller-scale assets, their already informal and vulnerable jobs and incomes, then the impacts of multi-dimensional poverty, workload increases, coping and recovery are heavier for women. Moreover, different categories of women (and men) are differently and unequally impacted, given their socio-economic and political location.

In Jordan, the impacts of drought on agriculture are strongest in rainfed systems in which large numbers of Jordanian women work, including cereals-based systems and staple crops for nationwide food security (chickpea, lentils, and olives), crop-livestock integrators, and rangelands pastoralism (Fragaszy et al., 2022). Cereals are also highly exposed to drought risk because they are largely cultivated in areas with high hazard risk (northern highlands bordering the Jordan Valley). Cultivation is on small landholdings with minimal inputs, mechanization, and access to credit, "with major implications for Jordan's overall food importation characteristics" (Fraj, 2018). For example, Jordan's most acute drought of 1999-2000 recorded a rainfall decrease over 75 percent, a fall in reservoirs to their lowest historical levels (Fragaszy et al., 2022), a drop in domestic cereals output from 10 percent of total demand to just 1 percent (FAO, 2004), and the lowest fruit earnings in a decade. 180,000 women and men were badly affected by a loss in assets, livelihoods, incomes, food and indebtedness, particularly women and men small farmers and herders. Women and men pastoralists with small flocks were acutely affected as they are heavily reliant on rangelands whose carrying capacity is badly affected by drought. They were unable even with

government feed subsidies to purchase enough feed for livestock, let alone the highly priced fodder imports to maintain herd sizes, compared to large commercial operators. The purchase of water for livestock too was unaffordable (Fragaszy et al., 2022). The worst impacted among small farmers and herders in terms of a loss of income, food availability and affordability were landless households, especially female headed households, and those with many family members, including ill and elderly members (IFAD, 2013).

A similar situation prevailed in the severe drought of 2007-2008 in Jordan when 85 percent of hay production and between 30-50 percent of irrigated crops were badly affected (DOS, 2018). Small women (and men) herders and small women (and men) farmers were disproportionately impacted by the lack of timely access to veterinary services during the drought but also during dry months when livestock are more likely to fall sick from thirst and hunger, and by crop losses often also caused by a lack of storage and processing facilities. (Fragaszy et al., 2022). This tends to have heavier impacts on small women herders and farmers who have a lower asset base and access to services than males, and potentially more delayed recovery.

Jordanian women and school-going children in transhumant herding households are very vulnerable to drought impacts as they are expected to graze and milk livestock. Grazing is harder when moving long distances, in search of pastures with suitable carrying capacity and clean and adequate water sources. Moving to remote areas reduces children's school attendance (Fragaszy et al., 2022).

Changing patterns in rainfall and changing seasons have caused a drop in the growth and availability of rainfed plants that have altered women's food preservation and production timelines. This has eroded their diversified livelihood systems and additional income earning opportunities. For instance, women gather medical and edible herbs such as thyme, chamomile, sage for household consumption and sale, but indicate, that Persian thyme which is very good for health, is now difficult to find. Further, while these plants can be irrigated, their medical benefit is higher when they are natural and rainfed (Ministry of Environment of Jordan & UNDP, 2022).

Women preserve food such as cheese and dairy products in some seasons to ensure their availability in others. But reduced rainfall and grazing land have reduced the volumes produced and have also delayed the seasons. This has adversely impacted women's livelihoods as many women depended on the sale of these products in local markets as a reliable source of income. In addition, women face competition from big businesses who flood the markets with dairy products (Ministry of Environment of Jordan & UNDP, 2022).

Further, climate variations and changing seasons have resulted in convergence between different types of seasonal work such as olive and vegetable growth, picking and processing – whose income would enable women manage larger expenditures for education and other items. Women indicate that with an overlap between 'the olive and vegetable season' they are now torn between olive picking and food processing and risk losing incomes, unless they can manage their priorities and time better, or draw in other family members, especially girls to assist (Ministry of Environment of Jordan & UNDP, 2022). This places girls' education at risk.

Drought increases pre-existing levels of high casual employment and lowers women's wages further. While men have the option to migrate in search of work, women's access to employment is limited by mobility restrictions governed by social norms, traveling conditions, safety, responsibility for children and other unpaid care work. "Women have low bargaining power and few representative organizations to improve their socio-economic conditions. The availability of cheaper labor from neighboring refugee communities also limits local women's ability to organize, communicate and negotiate around employment issues, including those stemming from drought impacts" (Fragaszy et al., 2022).

Jordanian women's greater vulnerability than men to drought impacts is exacerbated by their lack of access to credit and financial relief, including drought insurance or other products for financial risk management, given their lack of land ownership. Payouts in the 2000 drought in Jordan went to irrigated agriculture and not to the highly drought exposed and sensitive rainfed systems in which large numbers of women worked. This led to inequity in distribution. With lower rates of asset and land ownership (for collateral), lower earnings, and lower rates of account holding, women are less well-positioned to access credit or formal assistance to coping with drought impacts (Fragaszy et al., 2022).

In Sudan's devastating floods of 2020, for example, that badly affected about 900,000 people (October 2020) in all 18 states, women especially those in extreme poverty and those suffering from other forms of exclusion were disproportionately impacted. About 51 percent of women compared to 49 percent of men were acutely affected. Early assessments showed that besides severe infrastructure damage, almost 600,000 farming and pastoral households (2.9 million people) were badly affected, of whom 252,000 (42 percent) were female-headed. Women lost crops and livestock as about 2.2 million hectares of cultivated land in 15 assessed states and 108,000 livestock heads owned by over 20,000 households were lost. They also lost horticultural products, seeds, agricultural inputs, tools, machinery and other equipment, water infrastructure, slaughter slabs, and livestock service facilities. Women lost fishing nets, baskets, and aquaculture farms. Incomes and savings of daily wage earners (607.3 thousand households), a critical income generator for very poor women (and men) were lost as daily wage work declined. Likewise, people earning from micro- small- or medium enterprises (374.6 thousand households), especially light manufacturing, small agri-food processing and trading in which many women are engaged, were badly affected (Government of Sudan, 2021).

Job opportunities such as casual agricultural labor – considered one of the most important income-generating activities for the rural population diminished and were projected to decrease even further during the upcoming harvest season. The lack of job opportunities as farm labor and in agri-food processing and marketing had significant impacts on the livelihoods of many vulnerable women. With high food prices and acute income and food insecurity, women (and men) farmers borrowed and sold productive assets to access food and ensure that they had seeds for the upcoming agricultural seasons (Government of Sudan, 2021).

However, recovery planning and response in general do not always adequately recognize the survival strategies, especially of women in impoverished rural and urban households and the huge role women play in generating household incomes and holding up the household and larger economy. This is particularly true for female-headed households, and is often a missed opportunity for gender inclusive building back better.

THE GENDERED DIMENSIONS OF WOMEN'S UNPAID CARE WORK IN NORMAL TIMES AND CRISIS

In line with the gendered assumption that care work is women's work, women in both sites bear almost the entire responsibility for 'unpaid, unrecognized care work,' that ensures family well-being and labor productivity and serves as a social safety net in the absence of public service provision. This is in addition to their paid and unpaid work in agriculture. Women consequently work longer hours than men, due to their multiple roles within and beyond the household.

In Jordan women spend on average 19 hours on unpaid care work per week, regardless of their employment status, whereas men spend only one hour per week on unpaid care work (ARDD, 2021).

A study of Jordanian women agricultural workers shows that women have long work hours and bear heavy workloads as they combine unpaid care work with agricultural work outside the home, in the absence of child-care facilities provided by the state and landowners/employers. 45 percent of the 83 respondents in the study had children below the age of 5 years. Employers did not provide child care facilities. Bringing children to the worksite was hazardous given the prevalence of ponds and other waterbodies in its vicinity, the distance from home and unsafe transportation. Many women left their children in the care of female relatives till they returned home (Sadaqa, 2020).

In the words of women agricultural workers (Sadaqa, 2020),

“It is our responsibility to take care of our children from early morning - preparing their breakfast, getting them ready for the day, and taking care of them - and the same goes when we get back home, it is our responsibility to prepare the food, do the laundry, and help them with school. We work on the farms, and then come back and work at home - the work at home is a burden for us.”
“If I do not work, they won’t be able to eat.”

There are gaps in availability of time use data for Sudan (UN Women. n.d.). But a study of rural areas in Western Sudan (Ibnouf, 2009) showed that women spend an average of 80 hours per week on unpaid activities, the equivalent of two full-time jobs. This broadly reflects the situation in most rural areas in the Sudan (FAO, 2021). Women’s unpaid household activities typically include family care, food processing and preparation, cleaning, fetching water and collecting wood. A workday of approximately 18 hours that starts around 05.00 hours is not exceptional for rural women (FAO, 2021).

Longer hours of women’s unpaid care work combined with paid/unpaid agricultural work (within or outside the home) increases their workloads, affects their health/well-being, reduces leisure time, adversely impacts women’s labor force participation, wages and job quality.

INTENSIFICATION AND OTHER IMPACTS OF UNPAID CARE WORK FOR WOMEN IN CLIMATE CRISES

Unpaid care workloads combined with paid workloads further increase as a result of climate risks and impacts, as newer forms of work emerge in more difficult circumstances. Also, women’s search for even scarcer new income-generating opportunities intensifies in order to survive and to reconstruct daily life, replace household goods, rebuild businesses, or meet children’s new needs. This often tends compromise a range of development outcomes for women and girls.

In acutely water-scarce Jordan, managing water in households is very stressful especially for women who are responsible for household water management. In rural areas, where water distribution could extend to two-week intervals, women’s unpaid care and lives rotate around the 24- hour water delivery time-frame. Although Jordanian women unlike African women are not responsible for collecting and fetching water as this is done by males or through public distribution systems, women and their families are on high alert and on standby on the anticipated water delivery day. All plans are put on hold. Says a rural woman (Ministry of Environment of Jordan & UNDP, 2022),

“Do not come to visit anyone on the day they supply water. We do not know the exact time of delivery, so we are always on the alert that day. If you have plans – you cancel them.”

Moreover, it's a hard-pressed day for women especially female headed households as water tanks must be cleaned and filled, although all family members are drawn in to assist (Ministry of Environment of Jordan & UNDP, 2022).

Further, women's workloads and stress increase as they have to re-prioritize work, coordinate more family labor and manage time better to avoid losing incomes. This is because climate-induced changes in seasons for different crops have resulted in overlaps, for example between olive and vegetable growth, picking and processing. This also increases workloads for young girls in the family, compromising their education (Ministry of Environment of Jordan & UNDP, 2022).

In Sudan there has been a huge increase in female headed households, with accompanying workload increases for women because droughts and protracted internal conflict have led to mass male migration to urban areas in search of food and off-farm employment, or to join conflicts. (FAO, 2021). Loss of forests, water scarcity, desertification and drought in Sudan has made it more burdensome for women to provide food, water and firewood for families. This compels women and girls to walk longer distances, for example up to 4 kms in West Kordofan State in Sudan risking accidents and sexual violence (UNDP, 2018). Moreover, an Oxfam study in South Sudan, for instance, shows that when women are away or indisposed, girls are automatically expected to assume their unpaid care work - cooking, fetching water and firewood, milking cows and caring for family members, far more than boys. They risk punishment by parents and male relatives for non-compliance. This heavy workload results in poor school attendance and performance and dropouts of girl children (Rutandaro et al., 2022), perpetuating the vicious cycle of multi-dimensional poverty for females.

Women's responsibility to routinely meet the emotional and physical needs of male partners, children, aged relatives, the ill, those with disabilities, and other dependents increases dramatically in the context of increased hardship in climate crises. For example, women construct make-shift shelters to keep family especially children above flood water levels and protect them from drowning accidents, insect and snake bites. Women must nurse family members who have contracted drought and flood related diseases back to health and attend to pregnant women who go into labor. This needs to be done in the face of harsh conditions - inundation, disrupted transport, power supply, communication systems, and medical services, and depleted stores and money. But there are new needs as well, from new housing and clothing, to help in relocating, and perhaps long-term medical or psychological care. Households expand in size, increasing women's daily workload as displaced kin or strangers are accommodated.

THE GENDER-BASED DRIVERS AND IMPACTS OF WATER, ENERGY AND FOOD INSECURITY ON WOMEN AND GIRLS

There is a critical link between food, water and energy security, whose integrated management is central to sustainable growth and development. Population growth, rapid urbanization, changing diets geared towards meat and dairy products and economic growth exert pressure on this link. Food production and energy are currently highly water intensive. Water is used to produce most forms of energy such as its use in coal-fired power plants and in nuclear reactors, and in bio-fuel crop production. Agriculture is the largest consumer of water resources, and water and energy are used in food production and supply (UN-Water, n.d.). Water, energy and food insecurity are major markers of climate crises, especially in rural areas.

WATER INSECURITY AND ITS ECONOMIC AND SOCIAL IMPACTS ON WOMEN, INCLUDING HEALTH

Water governance at different administrative levels in the public sphere in Jordan and Sudan is the responsibility of government, private sector, public-private sector partnerships and communities, and is mediated by economic and political status, gender, race/ethnicity, geographical location and other variables. While the gendered division of labor vests control, use and management of water resources in the public sphere largely with men, its collection, use and management in households primarily rests with women. Women also farm irrigated and rainfed crops. They consequently have considerable knowledge about water resources, including quality and reliability, restrictions and acceptable storage methods. Women are thus critical to the success of developing water resources and related policies and programs. In water-scarce Jordan, where irrigated agriculture covers only 30 percent of agricultural land, but represents 90 percent of the agricultural production, it is primarily male owners of medium and large commercial farms who control and access irrigation, thus enjoying increases in productivity and profits. Women farmers who own means of production (land, livestock, and partial produce transformation) account for only about 30 percent of 102,000 farming households and are mainly smallholders (DOS, 2018). They have limited access to irrigated agriculture, adversely impacting their productivity. Women's dependence on rainfed systems of agriculture that are highly vulnerable to declining precipitation and drought has resulted in their loss of food, economic assets, incomes and livelihoods (Fragaszy et al., 2022).

Rainwater harvesting and wastewater reuse is gaining ground among Jordan's rural communities, including greywater re-use for agriculture and home gardening, especially among women. But women indicate that these new techniques should be carefully implemented 'as greywater reuse could contribute to increased disease among livestock if not properly managed' (UN Women, 2018). However, women farmers in Jordan are still not at the beating heart of wastewater recycling, food import substitution and water efficiency policies, drip irrigation, water efficient crop production techniques such as aquaponics or hydroponics and other soilless agriculture technologies.

In Jordan, where water distribution often by trucks to rural households could extend to two-week intervals and sometimes more, these limited options to access limited water are also mediated by economic status, social influence/networks, a gendered division of labor and cultural norms. While water collection is done by Jordanian men, women are responsible for rationing water, prioritizing domestic work depending on its availability and finding ways to cope in-house with its scarcity. This increases pressure on women as caregivers and augments their stress. As noted earlier, water distribution affects women and the whole household dynamic in ways that place the whole family on extreme alert in anticipation of distribution. All plans and social obligations are put on hold so as not to miss water delivery that day. "For women, this becomes a huge issue because they have a policing role" (UNFPA, 2022).

Female headed households in Jordan tend to be especially vulnerable as they are often likely to be poor with high unemployment rates and are more socially isolated. Purchase of private well water that is distributed by tanker trucks is expensive (Mercy Corps, 2014), and so are storage tanks priced at 50 to 80 JD, if the demand is high (Ministry of Environment of Jordan & UNDP, 2022). According to local rural women, male truck drivers tend to prioritize deliveries to their friends, almost all of whom for cultural reasons tend to be men. Even when a driver agrees to deliver more neutrally, a single woman cannot accept the delivery and a widow may well be excluded. Moreover, women describe pumping water as a tough two-person job. While the driver manages the controls in the cab, someone must operate the hose at the rear of the truck: holding it in the cistern while water is pumped out. High pressure makes the hose snake and jerk and could 'toss' the operator. Many women and certainly children lack the strength for this. But even if a woman can hold down the hose securely, undertaking that kind of labor is socially unacceptable for women (Mercy Corps, 2014).

A particular impact of water scarcity on women is the inability to maintain good personal hygiene, especially menstrual hygiene for women and girls in the reproductive age group. Poor access to water and sanitation combined with inability to afford sanitary products and medication among poorer women increase the existing stigma attached to menstruating women, and their experience of indignity. Some women use newspapers instead of sanitary products during their courses. Less water for hygiene puts women's and girl's sexual and reproductive health and other health at risk. Moreover, a study in Mafrqa found that one third of the respondents had no regular access to water and that the vast majority suffered from sanitation-related psychological stress because of poor water and sanitation infrastructure. The inability to safely manage their menstrual cycle in schools could augment school dropout rates for girls, if water shortages continue to increase.

A baseline study conducted in 2015 showed that out of all surveyed schools, 57 percent reported that available stored and supplied water was insufficient to provide the minimum quantity of water per student. 77 percent received water less than four times per month, 8 percent received water once or twice a month and 3 percent never received water (UNFPA, 2016). The body-water composition for older women and men is naturally much less compared to the young and they need more water intake. Poor water intake in the context of scarcity places them at greater risk of dehydration which leads to number of ailments, including muscle pain, fatigue, and heat exhaustion. Persistent dehydration that causes difficulty in walking, confusion, rapid heart rate or other more severe symptoms could require hospitalization (Cleveland Clinic, 2018). Finally, water that is polluted by fertilizers and pesticides, as is the case in Jordan (Ramirez et al, 2022), is a health risk for women and other family members depleting women's own health and increasing their unpaid care work, as they nurse ill family members back to health.

Sudan's floods in 2020 directly impacted 594,676 people across its 18 states, including large numbers of women and girls, due to damages and losses related to water infrastructure - both WASH and Water Resources Management (WRM). Women who at national level constitute 49 percent and 57 percent of farmers in the irrigated (hired or unpaid family laborers) and traditional rainfed sector, (small farmers, hired laborers) respectively (World Bank Group, 2020; Ministry of Agriculture and Forestry, 2014), lost or suffered damage to agriculture and irrigation-related infrastructure. Damage to irrigation systems, placed women and men farmers at risk of missing the start of the upcoming agriculture seasons and related work/income loss (Government of Sudan, 2021).

Challenges in accessing drinking water was widespread (UN-OCHA, 2020). Immediate or long-term loss of water supply services due to damaged infrastructure placed additional strain and economic burden on households, especially on women and poor women-headed households who had to rely on purchase of water from water trucks or bottled water. Increased salinity in the water made available bore-hole water unpotable, forcing them in some instances to purchase drinking water at 150 SDG a barrel (Norwegian Refugee Council, 2020). Many faced challenges in temporary access to water owing to loss of jerry cans, washing basins, and buckets placing additional economic burdens on them to replace these (Government of Sudan, 2021).

The loss or destruction of sanitation facilities such as septic tanks, latrines, handwashing and ablution facilities disproportionately affected women. It resulted, for instance, shared sanitation facilities, open defecation by about 4.3 million women, or rationing toilet times at either too early in the morning or late at night. This disproportionately affected women in terms of reduced levels of privacy and personal hygiene including managing menstrual hygiene, high levels of sexual assault and gynecological problems. Many women and girls contracted urinary tract infections caused by delayed urination or reduced water intake to cope with a lack of access to sanitation facilities (Government of Sudan, 2021). Further, in having

to guard against snake and scorpion bites – creatures that are inevitably driven out of their holes by flood waters - women were faced with safety concerns for themselves and for family members, especially children, thus increasing their stress levels (Government of Sudan, 2021).

Poor solid waste management, inundation of pit latrines and open defecation resulted in the presence of garbage and sewage in water. Stagnant water, poor vector control, increase in mosquitoes and foul odors, blocked drains, water contamination due to cross contamination and penetration of pollutants into ground water were widespread. This hugely increased vector-borne disease like malaria, and water borne diseases like cholera, digestive ailments, skin eruptions, etc. This not only compromised women's health and that of other family members, but increased women's unpaid care work and stress - given too that blocked and damaged facilities prevented access to health and other services during and after the floods (Government of Sudan, 2021). Preliminary assessments said that this included about 150.3 thousand people with special health conditions such as newborn babies and children between the ages 1-3 years (who also missed out on vaccinations with risk of exposure to otherwise preventable diseases in the long-term), elderly women and men, women and men with disabilities, or HIV and pregnant women who miscarried or delivered babies under unsanitary and unsafe conditions (Government of Sudan, 2021).

Damage and loss of hydrological monitoring stations negatively impacted dissemination of further flood warning that provided updated information on flood impacts and safety measures. Breach of water harvesting and flood management structures such as large and small dams, embankments and dykes destroyed livelihoods, personal assets, agricultural land, livestock, and increased the vulnerability of women and men farmers, pastoralists and others to water scarcity during the upcoming dry months. Damage to the Boot Dam in Blue Nile State with a reservoir capacity of 5 million m³ negatively impacted water provision to its 100,000 recipients, to tens of thousands of heads of livestock and to small-scale irrigation. Its breach killed six people, injured many others, and displaced nearly 80,000 people, causing stress systems and trauma. Stranded and the worst affected populations largely consisted of children, women, elderly women and men, and women and men with disabilities (Government of Sudan, 2021).

WATER WISE WOMEN

The German Agency for International Co-operation (GIZ), the Ministry of Water and Irrigation in Jordan, and the Jordan Hashemite Fund for Human Development (JOHUD) worked in partnership to promote the employability and economic empowerment of women in the water sector (Prieto, 2018). Although girls and boys have equal rights to education in Jordan and women are highly educated, social norms inhibit this from translating into jobs for women, especially in non-traditional sectors of work that restrict women. The Water Wise Women initiative publicly recognized women's key role in household and community water management; trained about 200 women of all ages and backgrounds on efficient water management and water saving techniques, and on health and hygiene. It supported them to spread the same awareness and training in their communities and trained interested women volunteers to take a plumbing course and receive a repair kit with the required tools. The initiative thus empowered women as change agents and contributed to transforming limiting social norms which allowed, for example, only men to be plumbers and rendered invisible the significant role women play in household and community water management (GCF, 2021, Prieto, 2018).

The results are impressive. The initiative reached about 2000 households in seven communities. Women in the target areas have learned and used water saving and management techniques such as grey water re-use for home-gardening and drip irrigation, and basic hygiene, leading also to about 40 percent saving in household consumption of water. Women plumbers were supported

to acquire additional licenses from the Jordanian Centre of Accreditation and Quality Assurance (CAQA) to work as plumbers and have established Wise Women Plumber Cooperatives (WWPC). WWPC has had a transformational impact on women as most of them had never engaged in paid public work before or earned any money. The support generated from government institutions and public NGOs is reflected in the National Women Plumbing Campaign under the umbrella of the Ministry of Water and Irrigation or via various NGOs and local actors willing to adapt the same concept in their communities.

The project generated the following key lessons: (a) behavioral change is a process that requires time, constant reinforcement of the key message, and provision of needed information and tools (b) community change agents must be trusted by the community and “practice what they preach” (c) change agents who themselves are affected are more effective than outsiders (d) interventions for behavior change need to match a person’s willingness to change. (e) the proposed solutions must be affordable, practical and demonstrate visible results over a short time-span.

ENERGY INSECURITY AND ITS ECONOMIC AND SOCIAL IMPACTS ON WOMEN, INCLUDING HEALTH

Jordan has limited domestic resources to meet its rising energy demands. In 2018, it imported 94 percent of its energy needs (10 percent of its GDP), causing vulnerability to fuel price variations. 87 percent of these imports were oil and natural gas. Jordan targets 10 percent of its energy needs to be met from renewable energy resources. It does this mainly by increasing renewable electricity generation (Abu-Rumman, 2002), whose share grew from 0.7 percent in 2014 to over 13 percent in 2019, making Jordan a regional front-runner in renewable energy (IRENA, 2021).

Its national electrification rate is close to 100 percent, but there are inequalities in access. Households (mainly the urban elite) account for 21 percent of total final energy consumption and 46 percent of electricity consumption (MEMR, 2019), largely for lighting and powering high order domestic and entertainment appliances (USAID, 2015). Over 60 percent of household energy consumption is for space heating and cooling. In high-income areas, central heating with diesel oil and air conditioners using electricity are common, while in low income sites, small stoves using kerosene or liquefied petroleum gas (LPG) are used (Al-Sallami & Al-Hinti, 2017). Many households and public infrastructure in remote areas – women and men in rural communities in villages, border points, desert camps, women and men refugees and migrants living in non-permanent settlements, schools, clinics, telecommunications systems – are unconnected to or under-served by the grid. Off grid renewable energy is being deployed to provide electricity to these groups (Irena, 2021).

Prior to its 2020 floods, Sudan had one of the largest power systems in sub-Saharan Africa with 3,500 MW of hydro and thermal based electricity generation capacity. But only about 32 percent of the mainly urban population and certain states have benefitted from Sudan’s grid services. Remote, hard-to-reach sites unconnected to a grid rely on biomass as an energy source and some benefit from scattered small-scale diesel power plants for electricity. Most rural homes have no electricity connection and rely on solid fuels for cooking, impacting women’s health negatively. About 5 percent use decentralized systems (solar, battery etc.). Sudan plans to achieve universal electricity access by 2031, that reaches 75-80 percent and 20- 25 percent of the population by grid and off-grid respectively (Government of Sudan, 2021). There is growing use of renewable energy, e.g., solar energy to augment local development and women’s empowerment, employment and enterprise. But women’s access to consistent financing for relevant energy equipment is poor, given their limited access to assets and participation in household decision-making (Government of Sudan, 2021).

Women and men have different and unequal positions in the energy system in Jordan and Sudan as elsewhere. Energy generation, distribution, consumption and maintenance of energy infrastructure at macro level in the public sphere is a socially-determined, largely male terrain. By contrast, women are responsible for the provision and management of almost all household energy services.

In poor rural areas in Jordan and Sudan, women provide, use, prioritize and ration the use of biomass fuel for cooking, lighting, home-based agricultural processing, home-based production of value-added food and by-products, and/or handicrafts from (cereal and horticultural crops, livestock, poultry and marine products), charcoal production, for self-consumption and sale. They may also use pumped water for household purposes or kitchen gardening. However, women's use of biomass and fossil fuels in Sudan, in parts of the Badia region and in camp settlements in Jordan and their cooking over open stoves adversely impacts their health, including respiratory health. It increases the time spent on unpaid care tasks such as hand-washing clothes, walking distances in search of scarce fuel that increases fatigue, impairs health and often compromises safety and security. It reduces job opportunities, diminishes work efficiency and limits market access that telecommunications and information technology would have enhanced. Finally, the use of these fuels depletes trees for cooking and perpetuates deforestation, which contributes to climate risks (Government of Sudan, 2021; Homebiogas, n.d; UNDP et al., 2016).

With increasing average and peak temperatures, hot air mass and heatwaves in Jordan (Arabiaweather, 2022), lack of access to adequate water and electricity for cooling and drinking can cause women, children, the elderly and other family members to suffer heat stress. This also increases women's unpaid care work, stress and women's health concerns.

The floods in Sudan temporarily affected 436.9 thousand households who lost access to cooking fuels, both in terms of stored fuel and ability to access more, challenging women's ability to provide cooked food for the family. Foraging for scarce fuel post disaster posed further risks to time poverty, health, safety and security. Large numbers of people who had no power from the outset or lost electric power, were exposed to the increased risks of darkness in crisis conditions. This compromised hygiene, safety and security for younger women and girls, pregnant women, elderly women, those who were chronically ill or had disabilities, and children. Loss of power disrupted several small and medium enterprises and women's home-based work resulting in a loss of income. Likewise, its loss in institutions providing basic services such as schools, primary health care centers and clinics, law enforcement agencies and women's centers caused disruptions in schooling for girls and boys, increased health risks for pregnant women, children and others who were ill, and interrupted services for women and girls exposed to sexual and other forms of violence. Delay in re-establishing services, including in hard-to-reach areas meant an increase in the use of fuel wood contributing to further environmental degradation (Government of Sudan, 2021)

INNOVATIVE CLEAN, RENEWABLE, AND SUSTAINABLE ENERGY SOLUTIONS IN SUDAN

The Darfur region in Sudan has suffered protracted conflict, environmental degradation, drought, crop and livestock losses, migration and displacement, causing high levels of poverty, and overall insecurity. Despite the benefits of high levels of solar radiation, like the rest of Sudan wherein only one-third of the national population has regular access to electricity, Darfur too has high levels of energy insecurity.

Here are two good examples of sustainable energy solutions

The Low Smoke Stoves Project by Practical Action and Carbon Clear is delivering health, and economic dividends to women and other household members, and environmental benefits to communities in

North Darfur where climate change, drought, and desertification are pervasive. The project replaces traditional wood and charcoal stoves with energy efficient LPG stoves. It is the first carbon credit program to be registered in Sudan; cuts over 300,000 tons of carbon dioxide emissions over ten years; reduces energy consumption in comparison to dirtier fuels; saves 50 percent of energy costs that are diverted to other expenditures like food and education; reduces the exposure of women and young children to indoor smoke from cooking with solid fuels whose pollution is 100 times higher than acceptable levels, and prevents deaths from smoke inhalation. The project also prevents deforestation. Reportedly popular with low-income households, there are plans to expand the initiative to other parts of Sudan to bring the benefits of clean energy to many more women and families (UNFCCC, n.d.).

Expanding decentralized sustainable solar energy solutions can help overall recovery, resilience-building, including energy security for household requirements and revitalize livelihoods, as people displaced by drought and conflict return. To this end, UNDP with support of Qatar and in partnership with UNIDO, WHO, UN-Habitat and national partners implemented a Darfur Solar Electrification program that has deployed solar solutions across 70 villages in Darfur, enhancing the operations of health clinics including delivery rooms, schools, police stations and women's centers and improving street lighting and water pumping. The initiative directly benefits 7,000 returnee households, with additional dividends for neighboring 35,000 households in target areas. UNDP and the Government of Sudan are working to implement durable sustainable energy solutions in other parts of Sudan as a means of building resilience, increasing access to services and livelihoods for vulnerable communities, including excluded women, thus reducing the energy bills of service institutions, including health facilities. UNDP is also providing advisory support to the Government to scale-up results into broader policy frameworks and partnership platforms to expand the role of sustainable energy in achieving the SDGs (Khoday & Gitonga, 2018).

FOOD INSECURITY AND ITS ECONOMIC AND SOCIAL IMPACTS ON WOMEN, INCLUDING HEALTH

In both sites, climate variations, droughts floods and unsustainable development have caused reductions in or complete loss of food staples, horticultural output, animal feed and livestock and their by-products. The consequent lack of availability causes a rise in food and other prices; lost livelihoods and incomes decrease food affordability; and the loss of nutritious food staples and poor food quality intake result in poorer nutrition. Conflict in-country or in the region exacerbates this.

In Jordan, for example, the primary staple crops wheat and barley are very vulnerable to climate change. In Jordan's most acute drought of 1999-2000 domestic cereals output dropped by 13,000 tons, representing an alarming reduction in production from 10 percent of total demand to just 1 percent (FAO, 2004). Food security for about a quarter of the total population (of ~4.75 million) was threatened, out of which some 180,000 women and men were badly affected, particularly women and men from small farming and herding households. The worst impacted in terms of a loss of income, food availability and affordability were landless households, especially female headed households, and those with many family members, including ill and elderly members (IFAD, 2013). Barley output in the Yarmouk Basin in Jordan is likely to drop 5-50 percent by 2050 due to poor rainfall and higher temperatures (Government of Netherlands, 2019). This is worrisome as Jordan relies on international markets for 80 percent of its food supply which is challenged with the disruption of traditional trade routes due to the conflict in Syria. Reliance on international markets for food exposes the average Jordanian household to huge food price increases, significant increases in food expenditures and greater financial burden. Also, the shift towards higher value crops and reduced cultivation of staples has likely affected food security for farming households in particular. Food insecure households have lower per capita expenditures, more debt, and tend to spend

most on food rather than on medical services or education. Diets are also less varied and less protein-rich, contributing to nutritional deficiency whose population-wide incidence rose to 13.5 percent in 2015-2017 from 6.6 percent in 2004-2006 (Fragaszy et al., 2022).

Although women are producers, providers and managers of food, female-headed households across Jordan are 62 percent more likely to be food insecure or vulnerable to food insecurity, relative to male-headed households. The likelihood of this is higher in particular communities. About 1/3 of Syrian refugee households are female-headed (World Bank, 2018b). Female-headed households are more likely than male-headed households to experience poor food consumption and lower dietary diversity, and thus experience the impacts of drought more palpably (Fragaszy et al., 2022). The consequent health risks are especially evident in certain population segments. Anaemia affects many Jordanian women. About 43 percent of tested women were anaemic. The prevalence of anaemia worsens during droughts where women, especially poor women, women from migrant and refugee households, female headed households across these groups are required to make financial decisions about food groups, work longer hours and find alternatives to or alternative means to access meat, dairy products and legumes (Fragaszy et al., 2022). Pregnant women, older women and those chronically ill are also at risk. Nationally, 32 percent of children in Jordan suffer from anaemia, but the figure is 38 percent in the north of the country. Children of Syrian mothers have slightly higher levels of anaemia relative to those of other nationalities (UNICEF, 2020). 7.7 percent of children below the age of 5 years suffer from malnutrition (FAO et al., 2018). For Syrian children living in camps and in host communities, dietary diversity is badly restricted (Fragaszy et al., 2022).

Sudan's diversified crop portfolio of cereals, oilseeds, industrial crops, fodder crops and horticultural crops suffered badly in its 2020 floods. Estimated losses of its major nutritious staples that women were substantively involved in growing included 330,885 tons of sorghum, 178,893 tons of millet, 102,897 tons of sesame and 432,268 tons of groundnut. Likewise stored crops and food were also damaged or lost. The loss of small livestock largely raised by women included: 264,840,000 goats, and 116,000 poultry kept mainly as a source of animal protein in the form of milk, eggs, and poultry meat, and 1,262,778,000 sheep kept mainly as a source of income. This contributed to a further depletion in food availability. Moreover, 111 tons of different seed varieties many of which women are primarily engaged in collecting, sorting, preserving, storing were washed away. This together with waterlogging caused delays in replanting, thus reducing the future availability of food in some affected areas (FAO & Government of Sudan 2020; Government of Sudan, 2021). This placed those in extreme poverty - women (and men) in small farming, small herder and poor landless labor households at risk of acute food insecurity.

About 2.2 million households were food insecure in the flood affected areas owing to fore-mentioned economic loss and vulnerability, increasing inflation, upcoming lean season and trade restrictions. Nearly 1.5 million of them are estimated to have borrowed money to get food for their families, exacerbating their debt and poverty. Female-headed households showed a much higher prevalence of food insecurity at 44 percent, relative to 33 percent of the male-headed households (WFP, 2020a). Female-headed households in North Darfur had the highest rate of food insecurity at 70 percent, while the male-headed households in White Nile had the lowest rate at 21percent (WFP, 2020b).

Certain food items, and special food and nutritional needs of certain population groups were unavailable. This included milk for children and crucial nutrients and vitamin supplements for pregnant, and use nursing mothers instead of lactating women to ensure adequate milk production. Breastfed children were also affected as the mothers either did not have time, or sufficient food themselves to be able to feed (Government of Sudan, 2021). Elderly women (and men) and women (and men) with disability found it difficult to access markets and food relief.

Many women coped by skipping meals (Interview with Siddig Ahmed, 2022), rationing food portions, or changing their dietary composition by increasing carbohydrates or reducing proteins or vegetables, all of which is likely to affect the mid- to long-term malnutrition outcomes. Women and female-headed households were significantly more likely to skip, reduce, or change their dietary intake (93 percent) compared to male-headed households (59 percent) after the floods (Government of Sudan, 2021). This could have disproportionate long-term implications for female-headed households.

The 2020 floods exacerbated and intensified food insecurity and malnutrition of already vulnerable populations (as highlighted above) and further put them at risk of falling into more severe phases of food insecurity – (FAO & Government of Sudan, 2020).

GENDER-BASED GAPS IN EDUCATION IN NORMAL TIMES AND CLIMATE CRISES

Access to education for both boys and girls in Jordan is estimated at more than 95 percent for both (Ministry of Environment of Jordan & UNDP, 2022), although this does not translate into jobs for women. The dropout for girls and boys between 12-17 years paves the way for child marriage for girls and work for boys (Klein, 2018).

In Sudan, according to 2016-2017 data, the gross enrollment rate (GER) for boys and girls in compulsory basic education was 73 percent (75 percent for boys, and 71 percent for girls). Although there is considerable difference in GER between the states, the gender gap remains small in the majority of states (slightly higher levels of boys than girls). Gender, location, and wealth are key determinants of access to quality education in Sudan. Non-participation of girls is due to negative community cultural attitudes towards girl's education, early marriage, movement in nomadic families, unpaid care work, and distance from home to school, especially in conflict-affected areas.

Poor school facilities and learning environments, and a lack of female teachers also deter girls' participation: 265.1 thousand and 183.9 thousand households with male children and female children respectively dropped out of school in the Sudan floods because of damage to schools and school shutdowns, increased debts due to borrowing for school fees, loss of education assets such as books and equipment (Government of Sudan, 2021).

VIOLENCE AGAINST WOMEN AND GIRLS IN NORMAL TIMES AND CLIMATE CRISES, INCLUDING COMMUNITY CLASHES

Women and girls in Jordan and Sudan, as elsewhere, face various forms of violence. This is an assertion of male power and authority coupled with other interacting forms of socio-economic and political power exercised by males. The cultural manifestations of the forms of violence against women and girls are however context specific.

According to UNFPA, 79 percent of women in Jordan between 18-64 years have experienced domestic violence in their lives, with 14 percent of ever-partnered women aged 15-49 years having experienced sexual violence and/or rape by their partner within the 12 months of the survey, and 24 percent in their lifetime (GCF, 2021). Jordan's Demographic Health Survey data for 2017-2018 shows increases in child marriage for under 15-year-olds and under 18-year-olds (Fry et al., 2019) Crimes of Honor are also prevalent in Jordan (Araji et al., 2001; UNDP, 2018). Sudan does not have national prevalence data on lifetime physical and/or sexual IPV or lifetime non-partner sexual violence (UN Women, 2016). However, these forms of violence against women are widely prevalent (UNFPA & CVAW, 2021). Forced marriage and female genital mutilation (FGM) are also widespread in Sudan. On average 38 percent of Sudanese girls are married

before the age of 18 (Thiam, 2016), and 87 percent typically between 5 years and 14 years have undergone FGM which involves the partial or total removal of the female external genitalia for non-medical reasons (Akinwotu, 2020).

Normal time violence against women and girls increases in climate and other crises, triggered by various factors that include the disintegration of traditional support systems, rule of law and even more pervasive impunity for perpetrators. In addition, women-insensitive infrastructure in IDP camps and settlements, including cramped shelters and living arrangements, and unsecured and distant wash facilities spur violence (UNFPA, 2022). Diminishing basic needs and resources and economic insecurity generate and/or increase family tensions, and often result in violence against women and girls.

In Jordan, water scarcity often sets off increased family tensions and IPV against women. Says Jaleela Smadi, head of a community -based organization (CBO) on women's issues,

“As women are responsible for household water management, if they run out of water, the husband has to buy more, and then he blames his wife” (Mercy Corps, 2014).

Women living in governorates indicated that they are scheduled to receive water every 14 days but that it frequently extends to 17 days or so, and once for 21 days generating major tensions in the community. Only when men raised this with the municipality was the 14 day time frame restored (Ministry of Environment of Jordan & UNDP, 2022).

Violence against women and girls was notable in Sudan's unprecedented rains and flash floods in 2020 across eighteen states, but its exact extent is undetermined given under reporting and difficulties in collecting comprehensive data in crisis conditions. It is expected that over 1 million women were at risk of gender-based violence, an increase of over 70 percent from before. About 206,000 women of reproductive age were living in temporary flood shelters with increased risk of gender-based violence. Women and girls reported rape, especially when they went to collect fuel, water, food. Despite high protection needs, support services to survivors of violence were minimal, and absent in more than 90 per cent of the country (Government of Sudan, 2021). Crises like these see an increase in the incidence of child marriage, especially of girl children, as a means of economic survival and ensuring the safety of girl children (Interview with Siddig Ahmed, 2021). In the 2020-2022 drought – the worst in forty years - in the Horn of Africa, girls were being forced into FGM and child marriage at “alarming rates,” as impoverishment pushed families to the brink. Some girl children as young as twelve are being married to men more than five times their age. Both practices are seen to secure dowries to help support the family, to have one less mouth to feed, to help the bride enter a richer household (UNICEF, 2022), and to provide sexual ‘protection’ and ensure chastity. But this compromises girls' education, increases their vulnerability to domestic violence and enduring poverty (UNICEF, 2022).

GENDERED DRIVERS AND IMPACTS OF WOMEN'S MIGRATION IN 'NORMAL' TIMES AND IN CLIMATE CRISES

Jordanian and Sudanese women nationals migrate within and out of the country. Jordan and Sudan also receive mixed flows of women (and men) of other nationalities into the country. Sex-disaggregated macro data on international migration is available for both countries, although a rigorous disaggregation of profiles of out-migrating Jordanian and Sudanese women is not readily available.

Comprehensive sex-disaggregated macro data on internal migration is not as easily accessible, as that on international migration.

Per Table 6 (adapted from original source), out-migrating Jordanian women constitute 36.6 percent of all out-migrating Jordanian migrants. While out-migrating Sudanese women are 45 percent of all out-migrating Sudanese migrants, the combined proportion of out-migrating Jordanian and Sudanese women is 42 percent in relation to the combined proportion of their out-migrating male counterparts (57.2 percent). The combined proportion of out-migrating Jordanian and Sudanese women is about 14 percent less than the combined proportion of their out-migrating male counterparts.

TABLE 6: NUMBER AND PERCENTAGE OF FEMALE AND MALE EMIGRANTS OUT OF TOTAL EMIGRANTS, MID-YEAR 2020

Country	Total emigrants	No. and % of male emigrants	No. and % of female emigrants
Jordan	814,909	516,954 (63.4%)	297,955 (36.6%)
Sudan	2,104,887	1,155,684 (54.9%)	949,203 (45%)
Total	2,924,796	1,672,638 (57.2%)	1,247,158 (42.8%)

SOURCE: ADAPTED FROM © UNITED NATIONS DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS

Gendered development impoverishes different categories of women differently and drives their migration, which is marked by different degrees of freedom or force on a continuum. High and low skilled Jordanian and Sudanese women nationals migrate internally and overseas mainly for better jobs and incomes (Al-Nawafleh, 2015; Baldwin-Edwards, 2005; Interview with Salma Nims, 2022; Interview with Shaza Ahmed, 2021; Jaspars & Buchanan-Smith, 2018), to survive the impacts of climate crises (Interview with Siddig Ahmed, 2022; Hagood, 2020; Osman, 2020; Jaspars & Buchanan-Smith, 2018), conflict (in Sudan) and violence (Jaspars & Buchanan-Smith, 2018; UNHCR, 2022).

Available data on climate and related development drivers of migration in Jordan and Sudan suggest that women move temporarily/permanently, internally/abroad with family men, the entire family, singly, or as female household heads with children. Many remain behind with children and other family members, while male relatives migrate (Al-Nawafleh, 2015; Jaspars & Buchanan-Smith, 2018; Metz, 1989). Decisions on women’s migration are usually family decisions, except where female household-heads can make them (Interview with Al-Banawah, 2021; Shaza Ahmed, 2022). Migration decisions that are triggered by slow onset hazards that gradually degrade ecosystems, slowly destroy livelihoods and make life untenable, may be made over time (Interview with Siddig Ahmed, 2021). Acute sudden onset hazards drive quick, unplanned movement. Movement may be phased or straight to destination sites (Government of Sudan, 2021). Women’s migration patterns or staying behind in Jordan and Sudan, as occurs in many other locales, depend on a number of factors. Among these are the type of hazard, its magnitude, severity and frequency; levels of damage and loss; economic and social resources ability to survive and recover; (D’Cunha, 2023, Government of Sudan, 2021). Other factors are as follows:

Women often do not have the resources to move or have fewer resources to move than men:

“Sudanese women going out or even Eritrean, Ethiopian women coming to Sudan mostly do not get information or do not know recruiting agencies or have no money to migrate (FGD with women migrants in Sudan, facilitated by NGO NADA Al-Azhar, 2021).”

Concerns in moving with many children, risks en route and in host sites; care responsibilities; the felt need to stay and protect surviving assets; age, ill-health, disability constrain women's migration and prompt them to stay behind (Interview with Shaza Ahmed, 2022; D'Cunha, 2023). Cultural ties with land and livestock, kinship and village bonds are factors that tend to make Sudanese women stay in home sites (Interview with Siddig Ahmed, 2022).

Women's socially prescribed private sphere roles, and restrictions on women's independent mobility and relationships in Jordan and Sudan inhibit women's autonomous migration and cause them to stay behind. While in Jordan it is restrictive social norms, in Sudan both social norms and legal restrictions come into play.

"Local rural communities in Jordan generally perceive that women's migration, whether domestic or otherwise, is temporary. While a woman may, in compliance with local norms migrate for study and education purposes, she may not do so for work purposes. Since women are not traditional breadwinners, they are expected to stay behind and take on family and household responsibilities, or if possible, migrate with the patriarchal figure in their households. Migration in Jordan is often seasonal and undertaken by men with the majority of women and families left behind" (Interview with Mohammad Talafha, 2021).

Further, male internal migration in Jordan allows periodic return to the family back home in the village, which allows women to stay behind without disrupting the whole family. "Since the 1970s, increasing numbers of villagers had migrated to Amman. Rural male migrants, however, maintained close ties with their natal villages. On Fridays (the official day off in Jordan) and during holidays, the villages were witness to family reunions of men who worked in the cities during the week and returned home at the week's end" (Metz, 1989).

"Or in the case of seasonal migration, men migrate for work during the week depending on seasonal demands. During the harvest season, men from the Jordan valley, for instance, may take temporary work in the highlands during weekdays and return home over the weekends" (Interview with Dina Safarini, 2021).

Sudan's Ministry of Interior repealed the 1995 Passport and Immigration Rules and Regulations in 2005. These mandated women to have written permission from husbands or male guardians to travel within or out of Sudan for employment, medical or other purposes. Women are via this reform free to travel, as long as they are able to satisfy the same requirements as men to obtain an exit visa. However the 1991 Muslim Personal Matters Act continues to restrict women's freedom of movement out of Sudan. In addition to the requirement for permission from husbands or male guardians, women are not allowed to travel alone unless it is for medical treatment, academic conferences or business, and they must provide documentation to validate their claims for an exception." Also, Sudanese immigration laws restrict women's long-term emigration. Women cannot leave the country with their children without the permission of their husbands or male guardians as parental responsibility is always with the father unless otherwise determined by a competent court of law (Babikar, 2011).

Whether migration is internal or international, planned or unplanned, its impacts on low-income migrant women and families left behind are contingent on a web of factors: the gender-responsiveness of governance systems, including enforcement of accountability measures across sites of origin, transit and destination; levels of labor-market discrimination in work-sites; gender-based cultural norms in sites of origin and destination; state, NGO, community and family support systems for migrant women and accompanying family and for left-behind family; and the agency of migrant women themselves.

WOMEN'S PLANNED MIGRATION INTERNALLY OR ACROSS NATIONAL BOUNDARIES

Women constitute 4.64 million of Jordan's 9.4 million urban population which is largely composed of original Jordanian inhabitants, Jordanian rural-urban migrants, an influx of refugees (David & Nilsson, 2021) and mixed migration flows from neighboring countries (MMP, 2017).

Climate variations also interact with other factors to influence migration, including that of young Jordanian women

“While Jordanian women rural-urban migrants move to cities with husbands or families, there is a growing trend particularly among younger more educated women to migrate independently to cities. They lack interest in engaging in hard rural labor, especially in the context of climate variations, water shortages, drought and desertification and poor agricultural productivity. They aspire to what they perceive are better paying, prestigious public sector jobs. There are instances of successful candidates who work during the week in urban centers and reunite with families on week-ends or festive and religious occasions. Some of these women may even own small plots of their own land or belong to families owning land in villages” (Interview with Salma Nims, 2022).

“On the other hand, there are economically disadvantaged rural male or women-headed households who have sold or lost their small plots of land, or shifted it to other uses, in the context of climate variations and a lack of agricultural productivity, and moved to cities. Women from these households either move with families or independently with children and work in the unprotected informal sector as domestic workers, small vendors of cooked food, fruits and vegetables, and other products” (Interview with Salma Nims, 2022).

“The third and more dominant scenario is internal (or overseas) male migration, while women remain behind to take care of children and families and existing rural assets. Some of these women are part of agricultural projects, including water management and conservation projects to enhance rural livelihoods” (Interview with Salma Nims, 2022).

Despite restrictive legal and social norms in Sudan, a growing number of Sudanese women are migrating with families and independently to work internally in Sudan and abroad (Jaspars & Buchanan-Smith, 2018). Drought, conflict and acute poverty have pushed nomadic pastoralists to settle and diversify their economic activities to animal husbandry, crop-farming, petty trade and wage labor, with women tending to dominate the latter. For over a decade, women of different ages and marital statuses from nomadic pastoralist tribes e.g., the Woya-Fuleb and Rufa'a al Hoi, who traditionally moved with family and tribe to find new grazing lands for cattle, are increasingly engaging in independent seasonal unprotected informal wage work in urban areas, such as Sinia. Most take wage work on demand with tea and food vendors in the dry season from November-August. They perform tasks such as dish washing, fetching water, arranging chairs and tables, serving clients, grinding spices, dried vegetables and coffee; or work at laundries as clothes washers (Osman, 2020).

Rural to urban migration in Sudan has triggered rapid growth of the informal economy, in cities such as Khartoum, which is attracting greater participation of typically poor, unskilled and uneducated women who work in or run subsistence or unofficial enterprises (ILO, 2014). Subsistence work includes female-dominated sectors such as petty trading, home-based activities and women-specific crafts, and traditional food and beverage making for sale. Although less publicly visible than in other African countries, women tend to occupy designated areas within the open marketplace. Restricted mobility, lack of experience

and access to credit, and networks keeps women's trading ventures and businesses typically micro or small. Unofficial enterprises may be owned by both poor or wealthy entrepreneurs, and include bakeries, garment and pottery-making. Women seldom participate in apprenticeships (Government of Sudan, 2021).

Sudanese women and girls also migrate to Egypt, other North African countries, and/or onward to Europe with families or singly, especially if they are targets in conflict situations, or impacted by drought and floods. Many move irregularly with third-party assistance, travelling by bus or tediously through the desert between Sudan and Egypt avoiding checkpoints, suffering sexual violence enroute and on-site (Interview with Shaimaa Hassanein, 2021; Shaza Ahmed, 2021).

“The bulk of Sudanese women work in irregular situations in the unprotected low-wage informal economy as domestic workers, babysitters, cleaners in Egypt and other North African countries, or as workers in textile/clothing or plastic factories in Egypt or as small home-based own-account micro-entrepreneurs who produce and sell traditional food, tea, alcohol, traditional clothing, henna and handicrafts. They are also small own-account providers of home-based beauty services: haircutting, styling, dyeing and henna and nail art. Sudanese women without jobs are supported by NGOs, religious charities, or they engage in begging or transactional sex (Interview with Shamaa Hassanein, 2021). Most Sudanese women enter Europe legally with children as part of family reunification, when husbands acquire refugee status, but increasing numbers are migrating into the UK singly for work – often irregularly (Jaspars & Buch-Smith, 2018).

WOMEN'S LARGE SCALE UNPLANNED MOVEMENT TO SAFER RURAL SITES, PERI-URBAN AREAS, LARGE CITIES AND THEIR OUTSKIRTS

Preliminary assessments of Sudan's 2020 floods showed that nearly 1.1 million households with women members and female headed households turned homeless or were displaced. The worst affected among these households were IDPs, refugees, asylum seekers, and women and female headed households belonging to these groups, who were also in a state of severe poverty. According to one estimate, 372.9 thousand of these households affected by severe income poverty were female-headed. Of the households who were forced to move, 790 thousand households were temporarily relocated, and over 123.9 thousand had already relocated or were shortly planning to relocate permanently (Government of Sudan, 2021). Women who were forced to move were reported to have more limited settlement options, and financial difficulties due to job loss (UN News, 2020).

Female-headed households were more likely (8 percent) to migrate than male-headed households (2 percent) in search of alternate livelihoods, although of those already forced to move at the time of the survey, both male- and female-headed households constituted similar proportions (Government of Sudan, 2021).

According to UNFPA, homelessness and displacement reduced privacy, safety and security for women and girls, especially those of reproductive age living in temporary shelters (UN News, 2020). This was particularly when they were menstruating and needed privacy for personal hygiene, or to wash and dry their menstrual cloth padding and underwear. Privacy levels also decreased for women who were nursing babies, or when they were giving birth, or when women had to bathe and defecate. Contributing to this lack of privacy, safety and security were the spacing and design of shelters marked by congestion, lack of privacy from outsiders, unsecured doors and inadequate lighting, culturally inappropriate cooking,

washing, bathing, sanitation facilities that were either too distant from the site of residence, or too close to male bathing spaces and toilets, or when these facilities were shared with men (Government of Sudan, 2021; UN, 2020). According to UNFPA, pregnant women giving birth would likely experience birth-related complications and need life-saving sexual and reproductive health services (UN News, 2020). Displaced women and girls faced heightened risks of rape, unwanted and high-risk pregnancies and higher exposure to contagious diseases including HIV/AIDS. They had limited access to services threatened by damaged facilities and networks (Government of Sudan, 2021; UN News, 2020).

Flood assessments note that, “condoms, reproductive health kits and midwifery kits, along with reproductive health information are key post-disaster needs for women. Relief packages need to contain supplies for menstrual blood absorption that are in line with what women would normally use (sanitary pads and clean strips of cloth) and should include underwear for women and girls”. Given existing social norms, it is preferable that women are involved in relief distribution to women (Government of Sudan, 2021).

Available literature, assessments and related action on climate and disaster risk, impact and resilience building in Sudan in particular did to some extent highlight the priorities of vulnerable people such as older women (and men), women (and men), with chronic ailments and disabilities. But information from Somalia’s 2011-2016 drought provides graphic insight - contextual differences notwithstanding.

“Persons with disabilities were often left behind when others fled as they could not move on their own and families often lacked the strength or means to assist them. Even when humanitarian assistance arrived in south central Somalia, surviving persons with disabilities were not reached in time. Local leaders sometimes withheld information about their food allocation entitlements. Where food and humanitarian assistance reached them, as in Beledweyne and Kismayo, they were stolen.” The situation was worse for persons with disabilities in IDP camps or those who belonged to minority groups or were separated from families. Women and widows with physically disabilities were more likely to be excluded from distributions compared to men with disabilities. Women and children with disability were more vulnerable to violence due to reduced ability to defend themselves” (Development Initiatives, 2019).

STAY-BEHIND WOMEN FROM MIGRANT HOUSEHOLDS

The on-site situation of stay-behind wives or female relatives of migrant males is mediated by several factors: socio-economic and political status, geographical location (e.g., rural/urban), social norms on gender equality, steady inflow of adequate remittance systems, paid public work, and other socio-economic and legal services, including targeted support services for women and families left behind.

In Jordan, data on stay-behind women from migrant households is rather scarce, but the few studies that exist provide interesting insights. Some key findings of a study of 518 primarily urban Jordanian households with skilled to high skilled husbands migrating to GCC countries and 532 households with resident husbands – both located in the same area included the following: (a) a larger proportion of wives from migrant households shouldered greater workloads after the husband’s departure, especially when combining the responsibility for unpaid care work with participation in the labor force; (b) about 52 percent of wives from migrant households decreased the number of social visits to family and friends, as a result of increased workloads; (c) 40 percent of wives from migrant households reported improvement

in spousal relations and 41percent reported no change; (d) schooling outcomes for children were better in migrant households and migrant wives found the husband’s migration to be beneficial overall (Khaled, 1995).

Another study of rural households in Jordan with males who migrated to the Gulf States, leaving their wives and families behind, and households with resident males, showed that women’s productivity increased with male migration. “Women with largest families are more productive, particularly when they have increased access to basic resources through the higher income provided by male emigration. In a culture with a strong sex-based division of labor, domestic productivity is less affected by loss of male headship than might otherwise be expected” (Basson, 1982).

The following observations emerge in rural Sudan:

“Poor stay-behind rural Sudanese women whose husbands or other male relatives have migrated, hold up household and rural economies. They engage in long hours of unpaid care work, including care of children, and in farm and non-farm work. Their workloads and hardship rises to new heights as they cope with protracted and quick onset climate crises such as flash floods in the absence of husbands, and other male relatives or at times when remittances from male relatives dwindle or stop” (Interview with Shaza Ahmed, 2023)

Moreover, cross border movements of Sudanese men (and women) occur in much more precarious circumstances with far more tenuous prospects today than in earlier decades. “The criminalization of cross-border migration into Europe has created new regional and trans-regional routes. These link Sudan to neighboring countries and the Middle East, making Sudan a core transit point for transregional clandestine cross-border migration, but also a destination for migrants and refugees from Ethiopia, Eritrea and Central Africa” (Reumert, 2022). Many Sudanese migrants rely on trafficking and smuggling networks and must use hazardous land (desert) and sea routes voyaging in overcrowded, unsafe vessels, without protective gear to reach destination sites.

Problems for stay-behind Sudanese women are compounded when traffickers demand ransoms coupled with threats to the safety and security of families to force payment, or when male (and female relatives) go missing, die en route or are physically and sexually abused. Women are forced to further diversify sources of income, borrow and fall into debt, or succumb to transactional sex to cope. They also deploy other negative coping strategies such as the sale of alcohol or drugs that endanger their and other lives. In some instances, stay-behind Sudanese women are abandoned by the husband’s family and alienated from their rights to family property, including land when their migrant husbands have lost contact with them, divorced them, or have gone missing or died enroute” (Interview with Shaza Ahmed, 2023).

GENDERED DIMENSIONS OF GOVERNANCE AND LEADERSHIP IN NORMAL TIMES AND CLIMATE CRISIS

Discriminatory gender stereotypes and skewed gender relations exclude women from leadership and decision-making to varying degrees, at various administrative levels, and in communities and households in Jordan and Sudan. Women rarely hold formal senior decision-making positions on portfolios related to external relations, the economy, planning and finance, agriculture, environment, and migration as these are typically perceived to be the province of male engagement. They tend to hold administrative portfolios at lower levels in government departments under these ministries. Recent developments in Sudan show changes to this.

WOMEN'S REPRESENTATION AT NATIONAL-LEVEL ON CLIMATE AND RELATED PORTFOLIOS

In Jordan (as of October 2022), only three of the thirty (10 percent) listed ministers (including the prime minister), were women. Two held women-stereotyped portfolios (social development and culture), while one was state minister for legal affairs (Government of Jordan, 2022). In Sudan (as of January 2023), four of the fifteen (26.6 percent) cabinet ministers were women, heading the Ministries of Industry, Trade and Supply, Investment and International Co-operation, Labor and Administrative Reform (Alarabiya, 2022). Men held all Jordan's¹⁷ and Sudan's¹⁸ ministerial portfolios that directly dealt with climate change, agriculture and migration and displacement, and related areas.

Per 2021 data, Jordanian women held 12 percent of the seats in the country's national Parliament (World Bank, 2022 h), while in 2018 Sudanese women held 30.5 percent of seats of the national Parliamentary seats (World Bank, n.d.)

THE GENDER-RESPONSIVENESS OF CLIMATE POLICIES, CRISIS RECOVERY PLANNING AND WOMEN'S REPRESENTATION ON THESE POLICY AND PLANNING MECHANISMS

Jordan has been a fore-runner in the Arab region on combating climate change, including from a gender perspective. The country was a signatory to the UNFCCC since 1992, and subsequently acceded to the Kyoto Protocol, Paris Agreement and adopted general and sector-specific climate change policies and strategies in line with its commitment to address climate change. It submitted a statement of commitment to decision 23 at the 18th UNFCCC Climate Conference in which it highlighted the challenges in achieving gender parity, challenging gender roles, and identifying barriers to women's participation in different sectors and in decision-making. In 2010, the Ministry of Environment (MoEnv) and the Jordanian National Commission on Women (JNCW), the women's national machinery, developed a gender action plan, entitled "Mainstreaming gender in climate change efforts," "that was sidelined before it was referenced in the climate change policy and endorsed by the Government of Jordan" (Ministry of Environment of Jordan & UNDP, 2022). The plan that aimed to "ensure that climate change efforts in Jordan mainstream gender considerations so that women and men can participate in, contribute and hence optimally benefit from climate change initiatives, programs, policies and funds," (IUCN, 2010) was nevertheless presented

17 These include Ministries of Foreign Affairs and Expatriates; Defence, Interior; Planning and International Cooperation; Finance; Investment Commission; Agriculture; Industry and Trade and Supply; Labor; Digital Economy and Entrepreneurship; Economic Affairs and State Minister for Public Sector Modernization, Energy and Mineral Resources; Environment; Transport; Water and Irrigation are all headed by males (Government of Jordan, 2022)

18 These include Ministries of Cabinet Affairs; Foreign Affairs; Urban Development, Roads and Bridges; Agriculture and Forests; Energy and Oil; Irrigation and Water Resources; Communications and Digital Transformation; Health; Religious Affairs and Awqaf; Culture and Information; Youth and Sports (Alarabiya, 2022).

as Jordan's official position on gender and climate change (Ministry of Environment of Jordan & UNDP, 2022). Jordan's Third National Communication in 2014 emphasized that its socio-economic analysis established women's key role in addressing climate change. Investing in and capacitating women to engage in adaptation and mitigation initiatives and strategy development would expedite the realization of results and reduce the inequitable impact on the most vulnerable (Government of Jordan, 2014).

Jordan has also ratified CEDAW, adopted Security Council Resolution 1325 and has endorsed the Beijing Declaration and Platform for Action.

Gender Equality and Women's Empowerment in Jordan's National Climate Change Policy 2013-2020 (JNCCP).

Jordan's National Climate Change Policy 2013-2020 (JNCCP) has been the overarching framework that informs the development of adaptation and mitigation strategies for priority sectors such as water, energy, agriculture, biodiversity, etc. It also voluntarily committed to reducing GHG emission levels to 31 percent by 2030. The policy addresses the disproportionate impact of climate change on vulnerable groups. It also highlights via its objectives the significance of national and sector-based mainstreaming of a gender equality perspective as follows: (a) integrating gender considerations into sectoral and national policies, strategies and action plans; (b) ensuring that financing mechanisms for adaptation and mitigation address the needs of poor women and men equally; (c) enhancing capacity at all levels to ensure effective gender mainstreaming and implementation of gender responsive solutions; (d) information and knowledge sharing to mainstream gender into policies; (e) increasing studies and information to better comprehend gender inequalities and the differential gender impacts, roles and access to resources (f) endorsing sector specific actions to promote gender equality (Ministry of Environment of Jordan & UNDP, 2022).

The Government of Jordan has adopted the National Adaptation Plan (2021); the Green Growth Plan, the National Biodiversity Strategy and Plan, and the Aligned National Action Plan to combat Desertification. These complement the JNCCP and support Jordan implement its commitments to the UNFCCC and Paris Agreement, and achieve the NDCs and SDGs.¹⁹ Moreover, the JNCW launched the Jordanian National Strategy for Women (2021-2025) that focusses on gender equality and women's rights across thematic areas. The strategy makes no explicit reference to climate change, but addresses this through actions related to outcome 2 of the strategy viz women developing their full potential and living a life free of discrimination. The relevant actions listed include increasing women's accessibility to "appropriate infrastructure that meets the needs of women, particularly those in rural areas, to access basic public services: electricity, energy, namely renewable energy – sustainable and clean water, sanitation and other basic services related to information technology." (Ministry of Environment of Jordan & UNDP, 2022).

¹⁹ These include SDGs on Climate Action (G 13), Clean Water and Sanitation (G 16), Life on Land (G 15), Affordable and Clean Energy (G 7), Zero Hunger (G 2), Good Health and Well-being (G 3) and Gender Equality (G 5)

These are huge steps forward. However, a cursory review shows that the next phase provides huge opportunity to ensure (a) that gender equality and women's rights are comprehensively integrated into priority sectors in terms of concrete actions addressing root causes of vulnerability to climate risks, and concrete actions (adaptation and mitigation) to address immediate gender impacts and imbalances, based on an intersectional approach to gender equality and women's rights; (b) that different groups of women working on different sectoral priorities are fully represented and involved in the development and implementation of the policy and related action plans; and (c) that plans have robust targets, indicators, are costed and have strong budget allocations on climate action for women.

A rapid review of Sudan's National Action Plan on Climate Change 2016 shows for this publication, that it refers to women most specifically in relation to certain states (Kordofan and Eastern States). In both states, it constructs women as part of those groups who are vulnerable to climate change, and whose resilience it seeks to build through adaptation measures. Its specific objective in relation to women viz. enhancing the participation of women and youth in development and environmental conservation (Kordofan) constructs women as subjects and contributors to development. The specific adaptation measures, though strategic, are generically framed for all vulnerable groups. The objective in the Eastern States is to reduce maternal and infant mortality, with clearly identified actions on health improvement. These too are generically constructed (e.g., establishing dispensaries and health care centers; provision of water quality testing). The Eastern States have a program on 'capacity building and women's empowerment components,' that include nine actions. All but one of these were generically presented (e.g., 'capacity building for all stakeholders; establishing early warning stations for meteorological action'). The only action that was specifically targeted at women was 'encouraging the establishment of women co-operative societies'.

These generically framed actions are certainly important entry points to address women's priorities in climate action. However, there is need for more solid analysis of the different realities and priorities of women and men within the general realities for more tailored and effective response to women. The plan referred to an inclusive process of development which it might well have been. However, there was no palpable indication of women's participation from the list of technical committees and stakeholder groups presented, and presents opportunity for inclusion in future.

Post disaster recovery planning is informed by Post-Disaster Needs Assessments, which Sudan has laudably undertaken, including from a gender equality perspective.

SUDAN RAPID POST DISASTER NEEDS AND RECOVERY ASSESSMENT, MARCH 2021

The Government of Sudan with the support of international partners undertook a Rapid Post Disaster Needs and Recovery Assessment (PDNRA) of the 2020 floods - the worst that the country had suffered in 30 years – that hit all 18 states. The PDNRA, a good example of mainstreaming gender equality and women's rights, identified the pre-disaster structural vulnerabilities (socio-economic and political) of women to climate risks and the post hazard impacts across a range of sectors – the economy in general, agriculture, industry, food, water and energy, sanitation, transport, education, health and decision-making. Moreover, the PDNRA also highlighted the impacts and recovery needs of different categories of vulnerable women – small farmers, small herders, landless women, female headed households, pregnant women, older women, women with disabilities, girls and young women. These assessments are important tools that inform recovery and reconstruction plans and programs that are costed and are used

to generate international development assistance. Active consultation with different groups of affected women and women's influential representation on recovery/reconstruction planning, programming, finance and budgetary mechanisms at national/local levels, in camps/urban sites to which they have moved, contributes to ensuring that their priorities are addressed. (Government of Sudan, 2021)

WOMEN IN DECISION-MAKING ON ENVIRONMENTAL ISSUES IN LOCAL COMMUNITIES

Although Jordanian and Sudanese women hold local knowledge about the environment, men are the primary makers and takers of decisions in community mechanisms on agriculture, energy, water and waste management. If women are represented in these structures, they are not always heard or considered (Interview with Shaza Ahmed, 2021; Ministry of Environment of Jordan & UNDP, 2022). Women from CBOs in Jordan express that they are brought in for donor and other meetings, but their insights and priorities have no effect bearing on outcomes of these meetings. It requires facilitation from projects that women are part of, women's palpable delivery of project results or a solid network behind them to ensure they get heard (Ministry of Environment of Jordan & UNDP, 2022).

WOMEN AND DECISION-MAKING IN HOUSEHOLDS

National data on household decision-making is difficult to access. Factors mediating such decision-making include family/kinship systems, gender-based headship patterns, economic/education levels, geographical location, cultural norms, the significance of issues on which decisions are made. Per 2018 data, 77.8 percent of Jordanian women (15-49 years) participated in decision-making on three issues: own health, major household purchases and visiting family (World Bank, 2022k). Evidence also suggests that in male-centered sex-segregated contexts with functioning male household heads, men dominate major decision-making in households in Jordan and Sudan, especially in rural areas. In Jordan, decisions about women's paid public work or migration including in climate crises are often made by male family members (Shahzadeh, 2021; JICA, 2012). There are also indications that Jordanian men are still the household decision-makers on actions entailing expenditure. This includes, purchasing water tanks and ensuring water availability – even though women make decisions on household water management (Ministry of Environment of Jordan & UNDP, 2022). Despite the critical roles Sudanese women play in agriculture, the control over cash and purchase decisions, whether for production-related goods, consumer goods or other family requirements, is primarily in the hands of men - even when women and girls earn wages in mechanized or large-scale agriculture. In their primary responsibility for unpaid care work, women do make routine decisions relevant to household management. In some cases, this may extend to important decisions related, for instance to health and education (FAO, 2021).



V.

SECTION V.

STRUCTURALLY- DETERMINED GENDER-BASED CAPACITIES

V. STRUCTURALLY-DETERMINED GENDER-BASED CAPACITIES

WOMEN'S COPING AND LONGER-TERM ADAPTATION STRATEGIES

Women (and men) across both countries adopt a range of positive and negative coping and longer-term adaptation strategies at household and community levels, in response to acute water scarcity and droughts in Jordan, and to the droughts and floods in Sudan.

During the floods in Sudan, households in a family pooled resources to cover expenses or communities shared available food, water, clothing, shelter with others in greater need. In Jordan's droughts and Sudan's floods women (and men) in many cases depended on remittances from relatives living and working overseas (Fragaszy et al., 2022; Government of Sudan, 2021). Others relied on assistance and relief aid from NGOs, charities, religious institutions, government and the UN. In many cases women temporarily or permanently relocated. Those who were displaced from their homes and were staying with relatives, neighbours or at nearby schools were able to access some drinking water during those days. Some fetched water from less affected areas, conserved water, and boiled water before drinking. Others who could afford it bought water bottles or water distributed by tankers. Women and men often rebuilt homes from new or salvaged material (Government of Sudan, 2021).

In Jordan, women describe a variety of longer-term adaptation practices that they engaged in, including roof planting, overgrazing prevention techniques, greywater re-use for agriculture and home gardening, green poultry-rearing techniques and other innovations related to conservation practices and management of natural resources (UN Women, 2018). In Sudan many women and men built stronger houses than before at elevated levels and with new material as a flood protection measure (Government of Sudan, 2021; Interview with Siddig Ahmed, 2021).

However, women (men and families) also adopted more negative coping strategies. In both sites running down savings, borrowing money or taking food on credit and falling into deep debt was widespread (FAO, 2021; Fragaszy et al., 2022; Government of Sudan, 2021). Women sold personal items like jewelry and house effects (Interview with Shaza Ahmed, 2021). Women in particular skipped meals (Interview with Siddig Ahmed, 2022). They changed their dietary composition to increase carbohydrates, and rationed food among household members. Some had no alternative but to drink unsafe water, share neighbors' toilet facilities, use toilets too early or too late at night, or shift to open defecation (Government of Sudan, 2021). Distress sales of productive assets like land and livestock were common. Crises like these tend to cause an increase in the incidence of precarious child labor, and child marriage, especially of girls, as a means of economic survival and of ensuring their 'protection'. Women with no wherewithal are often forced into begging, sale of alcohol and drugs, and transactional sex to earn a living (Interview with Shaza Ahmed, 2021).



VI.

SECTION VI.

RECOMMENDATIONS
FOR ACTION

VI. RECOMMENDATIONS FOR ACTION

Against this background, governments and other relevant stakeholders need to ensure that the climate, migration and development priorities of affected women are integrated synergistically into policies, strategies and programs on climate mitigation and adaptation, labor migration, development and humanitarian response. This demands a whole of government and society approach that widens the stakeholder base across these thematic fields to ensure coherence and amplified impact. This includes practitioners on gender and development, climate adaptation and mitigation, DRR, agricultural and urban development, and humanitarian response. **Women from these stakeholder groups and affected groups of women must be effectively represented at all stages of policy, strategy, program design and implementation, so that their practical and strategic climate and migration priorities are well addressed with engendered targets, indicators, budgets, monitoring/evaluation, and accountability mechanisms.** It is critical to invest in:

- 1. Gender-responsive impact reviews** of climate crises, post-disaster needs assessments, response/recovery packages, plans, programs, and migration and development policies/programs. This helps guide investment priorities of affected women at scale, taking account of their intersecting inequalities.
- 2. Gender-responsive budgeting for women** affected by climate risk, to ensure that fiscal policies advance gender equality in immediate response and long-term recovery via law, fiscal policy design, budgetary and financial management processes. Moreover, all climate financing mechanisms, including private sector mechanisms must have gender benchmarks on climate financing.
- 3. Building women's resilience to climate-sensitive agriculture & to migration for survival via climate and agricultural policies, strategies and programs.** In line with relevant international human rights frameworks (CEDAW, SDGS, UNFCCC, the Paris Agreement, SFDRR and the GCM), and national priorities and initiatives, governments should mainstream the priorities of the target groups of women into National Development Plans, and sectoral frameworks: climate and related agricultural development policies, strategies and programs as follows:
 - Analyze the structural drivers/impacts of climate risks in agriculture including migration for survival on non-migrant women, migrant women including returnees, stay behind women from migrant households, especially the most vulnerable women in these groups;
 - Enhance these women's productivity, wages, climate-resilience in agriculture via improved access to:
 - asset ownership (independent/joint ownership of land/livestock) underpinned by social norm change and good legal and programmatic reform;
 - climate-sensitive information: climate variations, hazard warnings, household/ community preparedness ensuring reach to older women and those with disabilities etc.;
 - climate-resilient infrastructure, production technologies, inputs (drought/flood resistant seeds, changes in crops/cropping patterns/livestock, renewable energy-driven agriculture, robust embankments, stilt-housing, mangrove plantations etc.), sustainable soil, water, energy management practices and extension services;
 - innovative finance for poor women and access to marketing;
 - Enhance these women's businesses in the green economy (e.g., non-traditional water resources and renewal clean energy), based on feasibility studies, and through improved education and business skills tailored to identified sectors, and through access to capital, technology, inputs and laws responsive to women's businesses;

- Support these women to invest savings/remittances in climate-resilient agriculture and green entrepreneurship;
- Reduce these women's care work in normal times and in climate crises via access to time, labor-saving, renewable energy-driven domestic and agricultural technologies and child-care infrastructure;
- Ensure inclusive risk assessment, evacuation planning/assistance, construction of flood/cyclone shelters responsive to these women, children, and particularly pregnant women, older women, women with chronic ailments and disabilities;
- Ensure these women's participation in household, community (water and land committees), local government decision-making in 'normal' times and in climate-crisis response and recovery;
- Enhance these women's and girls' access to education, healthcare, and services to prevent and protect them from violence, including through access to effective formal and informal justice mechanisms;

4. Empowering women in planned international migration via labor migration policies

- Generate labor market data and analysis for national and migrant women (men) by sector, occupation, education, skill and wage level, disaggregated by sex, age, nationality at minimum;
- Provide pre-departure, post-arrival, on-return information to migrant women workers on the following: labor market demand and employability; policies, mechanisms, services on recruitment, entry, work, residence, return and their use on entitlements, protection, available remedies and access to them; and on protection measures in climate crises in host sites, and on return. Tailor content to women's work sectors in migration corridors in accessible communication formats, at suitable sites and times;
- Create decent green jobs governed by labor laws in line with ILO/CEDAW standards, including for domestic workers, with strong wage, social security, enforcement and accountability provisions;
- Ensure job skills matching and mobility via co-ordination between sites of origin and destination, and ethical, accountable recruitment for all, especially low- skilled migrant women workers;
- Promote legal migration for poor migrant women by liberalizing emigration/ immigration policies;
- Enhance social protection (pensions, health insurance etc) for poor migrant/local women in the informal economy and out of the labor market and child-care and other support services to those left behind, including in climate crises;
- Include all migrant women in anti-violence laws, access to services including healthcare and justice;
- Change gendered, racist social norms and behavior and provide long-term alternatives to detention viz. regularization, safe, non-custodial community housing and safe, paid, dignified return in case of deportation;
- Ensure woman-friendly socio-economic, legal, psychological reintegration for returnees in normal times and on return from climate-crisis affected host countries;

PROTECTING MIGRANT WOMEN IN CLIMATE CRISIS IN HOST COUNTRIES VIA MIGRATION POLICIES

- Generate and share data on impacts of climate crises on migrant women in host sites;
- Identify and include them and their priorities in preparedness and response plans, in host sites based on non-discriminatory protection and humanitarian assistance. This should include timely information and warnings on crisis risks, evacuation, entitlement to food, healthcare, shelter, links to consular services, extended time to renew expired documents or apply for duplicates if lost, status regularization and redress mechanisms;
- Facilitate job protection and mobility in host sites; safe, paid voluntary return home; support to claim outstanding wages and assets left in destination sites; re-employment and safe remigration options to destination countries ;

5. Empowering women in planned/unplanned internal movement to urban sites via urban policies

Protracted large unplanned movement to new sites is fraught with risk, as is much planned urban migration where women (men) migrants live in poverty and insecurity in slums. However, many often prefer to remain in these sites. Governments and partners must provide durable solutions:

- Consult with women (and men) who have moved in unplanned/planned ways into urban slums, spontaneous settlements on urban outskirts so as to understand their future plans; and ensure that women in new sites and in host communities participate in planning and implementing durable solutions;
- Support local integration through national/local policies, strategies and laws backed by strong enforcement mechanisms. This must include formal/informal settlements in green urban development plans, and provide security of land and housing to women and men residents in slums, shanties and urban outskirts. This should be aligned with UN Guidelines on Internal Displacement and Forced Evictions, in ways that benefit host and migrant communities;
- Provide decent green jobs and develop women's businesses via public-private partnerships; improve access to education, essential public good/services, care services for women earning low incomes;
- Enact/amend anti-violence as needed laws with strong enforcement and comprehensive services for all women and girls including access to justice in new sites;

6. Engendering humanitarian response to women's large scale unplanned movement & to 'stayers' in affected home sites in line with Sphere and Core Humanitarian Standards on Quality and Accountability.

National, local governments and humanitarian actors must provide safer conditions for aid distribution in the following ways:

- Inform women of rules governing spontaneous settlements/camps, aid distribution modalities, help in safe aid access and facilitate equitable intra-household resource-sharing;
- Increase the numbers of women enumerators, analysts, aid distributors, service providers, decision-makers in government and humanitarian organizations working in partnership with women's organizations;
- Ensure that aid items suit women's and girls' needs, and provide cash and decent work for women;
- Improve site security: proximal, well-lit, secure, sex-segregated toilets/baths, waterpoints, shelter;

- Strengthen services for women/children: general health, sexual/reproductive and maternal health and responses to violence against women/children through service mapping, awareness-raising, safe referrals, better medical services, trauma counselling, and legal services;
- Engage men and boys in community dialogue to respond to their challenges, and engage them in preventing gender-based violence, including through informal justice mechanisms;
- Ensure women's representation in management and decision-making in new settlements and affected homesites. Support women leaders to identify the most vulnerable women's and girls' priorities, to link them to relevant services and to catalyze community mitigation measures.

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ANNEX: LIST OF KEY INFORMANT INTERVIEWS

JORDAN INTERVIEWS

#	Name	Date	Type	Organization	Title
1	Dina Safarini	29 March 2021	Civil society	Tamkeen Legal Aid	Advocacy Manager
2	Mohammad Talafha	17 June 2021	Civil society	BORDA	Water engineer
3	(Anonymous)	26 April 2021	Civil society	Consultant for government projects in ME and Africa	Consultant
4	Lara Nassar	1 June 2021	Civil society	Nuffic Global Development	Project Manager
5	(Anonymous)	28 May 2021	Civil society	Organization based in Jordan	Sustainable Development Researcher
6	Shada ElSharif	13 April 2021	Civil society	SustainMENA	Founder
7	Riyadh Alsawalha	18 April 2021	Farming community member		
8	Mustafa Abdallah	19 April 2021	Farming community member		
9	Ahmad Gharaghir	23 April 2021	Farming community member		
10	Amina Ahmad	26 April 2021	Farming community member		
11	Samira AlDayyat	1 May 2021	Farming community member		
12	Fatima Hayajneh	28 April 2021	Farming community member		
13	Radwan Alshaty	17 April 2021	Farming community member		

14	Dr. Maram Jameel Al-Abbady	26 May, 2021	Government	Department of Environment and Climate Change, National Agricultural Research Center (NARC), Jordan	Head of Drought Unit
15	Dr. Razan Al-Roud	26 May, 2021	Government	Ministry of Water and Irrigation, Jordan	Head of GIS Department
16	Dr. Abeer Al-Banawah	3 June, 2021	Government	National Agricultural Research Center (NARC), Jordan	Expert Researcher, Projects Director & Consultant for the Director General for Environment and Water Issues.
17	Eng. Wafa Shehadeh	10 June, 2021	Government	Ministry of Water and Irrigation, Jordan	Director of Environment and Climate Change
18	Eng. Emad Ali Al-Qudah	10 June, 2021	Government	Land and Irrigation Department, Ministry of Agriculture (Jordan)	Head of Land Use Management Division
19	Dr. Salma Nims	22 June, 2021	Government	Jordanian National Commission for Women (JNCW)	Former Secretary General

SUDAN INTERVIEWS

#	Name	Date	Type	Organization	Title
1	Sawsan Abdallah Ali	27 April 2021	Civil society/ semi gov	National Forestry Commission/ MoA	Officer
2	Fatema Ahmed	22 April 2021	Civil society	Zenab for Women's Development	Director
3	Nisreen Ahmad	28 March 2021	Civil society	Climate negotiation, African Group for Negotiators	Climate Negotiator
4	Mohammad Ibrahim	1 June 2021	Civil society	Sudan Youth Organization for Climate Change	Co-founder

5	Dr. Saddig Ahmed	2 June 2021 12 Dec 2022	Civil Society	UNESCO	Former Director General, Chair for Water Resources
6	Amira Ahmed Musa Ali	9 April 2021	Community Activist		
7	Taher Basheer	11 April 2021	Farming community member		
8	Halima Mohamed Abdelrahman	14 June 2021	Farming community member		
9	Nadia Saeed	12 June 2021	Farming community member		
10	Shaimaa Hassanein	24 August, 2021	Civil Society		Former GBV Case Management Advisor
11	Shaza Ahmed	26 January, 2023	Civil Society	Nada Al-Azhar Organization	Executive Director



Gender and Climate-related Migration in Jordan and Sudan:

Building Women's Economic and Social Resilience to Climate Risk and Migration for Survival within Sustainable Development

The Arab Water Council (AWC) and the United Nations Entity for Gender Equality and the Empowerment of Women (UN Women)