

Jordan's environmental policies and engagement on climate change

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Question

Please provide an overview of Jordan's environmental policies and engagement on climate change, especially on water and energy. Discuss Jordanian domestic policies, regional engagement, and global engagement, as they relate to adaptation and resource management for human security or stability. Describe Jordan's plans and, where possible, brief assessments of their gaps and implementation, and the political economy underlying them. There is no need to cover Jordan's involvement in major international climate instruments and institutions, such as those at the UN.

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1. Overview

As climate change is set to worsen an already difficult environmental, political, economic, and social situation in Jordan, the State has adopted a large number of general and sector-specific climate policies, and actively engaged diverse actors on these issues at domestic, regional, and international levels. It has implemented many significant measures to adapt to climate change, especially regarding water and energy. However, while it has achieved some successes, important gaps and shortcomings in policy and action remain, due to a mix of legislative, regulatory, institutional, political, and economic factors.

Beside Jordan's overarching 2025 **National Vision and Strategy** and **National Green Growth Plan**, the country's major policy on climate change is the **National Climate Change Policy and Sector Strategic Guidance Framework**, which has now been extended to 2030. In it, Jordan has put the emphasis on adaptation rather than mitigation, with the aim of achieving both socio-economic development and environmental resilience. The priority sectors it identifies include water, agriculture, energy, land use, and desertification. On water, the key policies are '**Water for Life: Jordan's Water Strategy (2008-2022)**', the **National Water Strategy for 2016-2025**, and the **Climate Change Policy for a Resilient Water Sector**. On energy, the key policies are the **Master Strategy in the Energy Sector (2015-2025)**, and the policies based on the 2012 **Renewable Energy and Energy Efficiency Law (REEEL)**.

The leading governmental body on climate change is the **Ministry of Environment (MoE)**. At the National Climate Committee on Climate Change (NCCC), the MoE brings together other major ministries, including the Ministry of Agriculture, the Ministry of Health, the Ministry of Water and Irrigation (MWI), and the Ministry of Energy and Mineral Resources (MEMR), alongside participants from civil society, the private sector, and academia.

So far, Jordan's **efforts on climate change, including on water and energy, have remained limited in ambition and action**. One reason for this is that most policy-makers do not see the issue as a priority (compared to e.g. employment), in part due to a lack of understanding of its implications and costs and of the benefits of action. Another reason is that policy-making on the issue is not unified, with fragmented plans and institutions that lack consistency, comprehensiveness, links, and common purpose. Climate action at scale is also severely under-funded, and adaptation would require large investments, for example in more efficient infrastructure for water and energy. In addition, implementing adopted policies in specific sectors would push for major changes in people's practices, but this could affect the interests or livelihoods of significant parts of the population (e.g. with higher prices on water and electricity). Similarly, population growth, combined with internal migration to cities and the large presence of refugees, has all led to competition for land use and essential goods and services, with difficult policy choices remaining. All this has led government to favour policies and actions that increase supply of scarce resources over ones that decrease demand for them.

Internationally, Jordan remains **highly dependent on regional and global exchanges, especially for water, food, and energy**. There has been little regional policy-making and cooperation on climate change with neighbouring States. Regionally, it has sought to cooperate with Israel and Syria on water, but both countries have violated agreements and overused water to the detriment of Jordan. With energy, Jordan is attempting to diversify its providers of fossil fuels while increasing its domestic production of renewable energies (particularly wind and solar). It has had some success in this thanks to effective policies, but is still far from significant autonomy, and uncertainties remain about the pace of change its policies would enable.

2. State of knowledge and gaps

Based on a rapid review, there is a **medium-sized body of literature in English** about the report topics. While there is a larger body of literature on climate change and its current and projected effects in Jordan, there is more limited yet sufficient information to specifically examine Jordanian policies and engagement. The type of information found reflects the two dimensions that DFID requested. One set of references is descriptive, laying out the formal laws, policies, commitments, and official action of Jordan. The other set of references is analytical, critically discussing whether and how Jordan implements its formal texts and engagements, and what the political economy behind this is.

Taken as a whole, the knowledge base has **a number of strengths**. First, most of the references found are based on **rigorous** methodology, sourcing, and citation. The more recent publications typically draw on up-to-date information too, thus ensuring that publications from 2018-2019 reflect current affairs. The approaches used are often akin to meta-reviews or syntheses (which reflects the query), though a number of case studies on specific locations or policies are available as well.

Second, the knowledge base is **diverse and well-balanced** in several valuable ways. To begin, it is based on a balanced mix of quantitative, qualitative, and mixed-method methods. Within each of these approaches, the specific methods used are fairly diversified too, though some methods predominate. For example, qualitative methods range from literature reviews to semi-structured interviews, group discussions, and ethnography (this last one being rare, however). In addition, the types of sources are diverse. They come from a balanced mix of academic, practitioner, and policy literature. Within each of these, there are fairly diverse sources, with a mix of Jordanian and other sources and authors, although non-Jordanian ones predominate.

Further, there is good coverage of the report topics in several regards. There is a good balance between the literature on formal or technical aspects and that on political economy, mentioned above. There is also a good balance between general coverage of climate change, coverage of the water sector, and coverage of the energy sector. Regarding time frames, information is usually about Jordanian action over time, not just about one-off data points. Likewise, most authors pay attention to short-, medium-, and long-term time frames.

Geographically, the knowledge base also provides good coverage of all governorates and of both urban and rural areas through country-level analyses, though studies on subnational cases only cover a handful of provinces. The most frequent level of analysis found is at the country level, followed by the regional level, then by the subnational level, and lastly by the global level. Much of the literature discusses macro- and meso-level variables, but there is also some attention to micro-level ones.

Third, **most findings are conclusive**, not just indicative, **and are largely consistent** throughout the literature. They are also typically able to identify causalities, not just correlations.

However, the English-language knowledge base also has **some limitations**. First, **practitioner and policy publications typically adopt more descriptive and less analytical lenses**, and the resulting political economy analyses coming out of them are usually less critical and wide-ranging than those in academic literature. Moreover, practitioner and policy literature seems largely funded by various Western or multilateral aid donors, raising the risk that some issues or areas might potentially be over- or under-covered, or influenced by donors' perspectives.

Second, **only a very small number of authors and sources have written on specific sub-aspects of the report topics**, reducing the diversity of perspectives. For example, only a few academic researchers have worked over sustained periods of time on the political economy of the water sector.

Third, the literature presents **significant sociological gaps in mainstreaming attention to structures of inequalities**. It does frequently address socio-economic class, and nationality and ethnicity in relation to refugees, though it does not do so systematically. By contrast, it only marginally addresses gender. Where it does, it often reduces gender to ‘women and girls’, and even then, it is patchy in the policies and aspects of political economy it considers (e.g. there is little on unpaid care work and participation in the paid workforce). Further, it largely fails to address age (especially childhood and older age), disability, and migration that is unrelated to refugees, such as labour migration. It also fails to systematically consider how the various structures of inequalities interplay with one another.

3. General Jordanian policies and engagement on climate change

Domestic laws and policies

Formal provisions

Laws and policies

In 2015, the government launched **Jordan’s 2025 National Vision and Strategy (NVS)**. This is the reference for all development pathways in the country, “and sets a holistic economic and social framework based on equal opportunities for all”. It contains over 400 policies, including ones on environment and climate (Bany Yasin, 2018, p. 54; EcoPeace, 2019, p. 20), alongside socio-economic policies, such as the 2013 Jordan Poverty Reduction Strategy (USAID, 2017, p. 4). The NVS included a list of measures for adaptation regarding environment, food, agriculture, water, and energy. It also identified as a priority the development of a legislative framework on climate change to maximise any benefits, minimise the negative impacts, and build up national capacity. Among others, its scenarios for the security and management of resource (water, energy, food, and agriculture) called for strengthening line ministries’ engagement with the risks and opportunities related to climate change. The NVS has been implemented through a three-year Executive Development Program (EcoPeace, 2019, pp. 20–21).

In addition to its Nationally Determined Contributions (NDC) submitted to the United Nations Framework Convention on Climate Change (UNFCCC), Jordan has **adopted and updated a set of relevant environmental policies over the past 15 years**, including¹:

- On the **environment** overall: A National Green Growth Plan for Jordan (2017), a reference guide for green policies and for green growth projects, with a cost-benefit analysis for 24 projects (EcoPeace, 2019, pp. 20–21; MoE, 2017);
- On **climate change** overall:
 - National Climate Change Policy and Sector Strategic Guidance Framework, 2013-2020, extended to 2030 and to be revised accordingly, as reported in Jordan’s 2016 NDC (see MoE, 2013; MFA NL, 2018, pp. 8–9);
 - Climate Change Adaptation and Low Emission Development Strategy (2013);
- On **desertification**:
 - National Strategy and Action Plan to Combat Desertification, 2015-2020 (2006);
 - National Action Program to Combat Desertification;
- On **water**:
 - Water for Life: Jordan’s Water Strategy, 2008-2022;
 - Climate Change Policy for a Resilient Water Sector (2016).

The **National Climate Change Policy (2013-2020)**, which Jordan has extended to 2030, is a key document. It provides a comprehensive overview of Jordan’s vulnerable sectors, and of proposed measures for mitigation and adaptation. Its purpose is to provide overarching guidance for the government in implementing national priorities on climate change to adapt to and mitigate GHG emissions. Subsequent strategies and plans have aligned and been consistent with its goals and proposed actions (EcoPeace, 2019, p. 20; MFA NL, 2018, p. 8). The long-term goal of the policy is for Jordan to actively become resilient to climate risk, to have a low-carbon but growing economy that moves towards sustainable development, “with healthy, sustainable, and resilient communities, sustainable water and agricultural resources, and thriving and productive ecosystems” (MoE, 2013, p. 8).

The national priorities and pillars of the policy **emphasise adaptation to climate change** as the imperative track for action, with mitigation of GHG secondary to this though it is present. The specific objectives of the policy are to: build up the adaptive capacity of communities and institutions, taking into account gender and addressing the needs of vulnerable groups; increase the resilience to climate change of natural ecosystems, water, and agricultural resources; and to optimise opportunities for mitigation (MoE, 2013, p. 8). It identifies priority sectors as those which have direct links to Jordan’s main developmental challenges and the highest risks of Jordan being exposed to the effects of climate change, such as water, agriculture, energy, land use, and desertification².

¹ (EcoPeace, 2019, pp. 20–22; MFA NL, 2018, p. 7; USAID, 2017, p. 4).

This list highlights key policies, to provide a general overview of the topics covered. Further information on the policies about water and energy are provided in the corresponding sections of this report.

² (EcoPeace, 2019, p. 20; MoE, 2013, p. 8; MFA NL, 2018, p. 8)

The policy pays special attention “vulnerable groups”, i.e. those who stand to disproportionately suffer from the harms of climate change. It also lays out strategies to address gender imbalances – Jordan was the first Arab country to include gender in its national policies on climate change (MoE, 2013, p. 8; MFA NL, 2018, p. 8).

The policy also provides institutional details. It sets forth how its implementation will be monitored. It also notes what institutional arrangements will encourage ministries other than those directly involved with environmental management to adopt the perspective of climate change (MoE, 2013, p. 8; MFA NL, 2018, p. 8).

Jordan has also adopted some **revenue-generating policies to fund its climate action**. For example, under its transport law, the Passenger Support Fund is funded by a small surcharge on the gasoline price, i.e. this environmental taxation is linked to environmental impacts and economic revenue (Bany Yasin, 2018, p. 61).

Lastly, **Jordan’s policies on refugees, including the Jordan Response Plan (JRP) and the 2016 Jordan Compact**, also have positive links to climate adaptation and environment. The JRP identifies infrastructure projects and strategic sectors for funding, among them water, energy efficiency, renewable energy, and green construction. For example, its 2016–18 objectives on energy were: offsetting incremental energy demand; promoting energy efficiency and renewable energy technologies; and providing safe sustainable energy for refugees and Jordanians. The Platform, chaired by the Minister of Planning and International Cooperation (MOPIC), is the strategic partnership mechanism between the government of Jordan, donors, UN agencies and NGOs for the development of an integrated response (Lahn, Grafham, & Elsayed Sparr, 2016, pp. 3–5, 12–13)³.

Similarly, measures in the Jordan Compact could lead to 200,000 jobs for Syrians in the coming years. Improved and more affordable delivery of energy could increase productivity and private opportunities, while some projects on energy resilience could offer Jordanians and Syrians training and job opportunities. Jordan is exceptional in having national plans for response and resilience to channel aid and funding towards managing the socio-economic and environmental pressures associated with the presence of large numbers of refugees, and improving the lives of both refugees and Jordanians (Lahn et al., 2016, pp. 3–5).

Institutions

The **Ministry of Environment (MoE)**, established in 2003, is the main ministry responsible for climate change policies⁴. Within it, the Climate Change Directorate (CCD), established in 2014, is the institutional hub for co-ordinating and developing all activities related to UNFCCC⁵. The MoE oversees the policy and legal frameworks that guide climate change mitigation and adaptation efforts” (USAID, 2017, p. 4). The core responsibility of the MoE, especially for the CCD, is to reach out to stakeholders to develop actions for climate response, and to incorporate the resulting policies into executive decision-making (EcoPeace, 2019, p. 20; Rizzo, 2016, pp. 36–39). It has become the focal point for international climate treaties, including the UNFCCC, and the development of the National Communication and the NDC to it⁶. The MoE also acts as

³ See: Jordanian government – Ministry of Planning and International Cooperation: <http://www.mop.gov.jo/>

⁴ See: Jordanian government – Ministry of Environment: <http://www.moenv.gov.jo/>

⁵ (Bany Yasin, 2018, p. 60; EcoPeace, 2019, p. 20; Rizzo, 2016, p. 36)

⁶ (Bany Yasin, 2018, p. 60; MFA NL, 2018, p. 7; USAID, 2017, p. 4)

Jordan's National Designated Authority (NDA) for the Adaptation Fund and the Green Climate Fund (GCF) (MFA NL, 2018, p. 10).

Other key ministries on issues related to climate and environment are the **Ministry of Water and Irrigation** (MoWI), and the **Ministry of Energy and Mineral Resources** (MEMR). The **Ministry of Agriculture** (MoA), and the **Ministry of Health** (MoH) also play significant roles, as do other ministries (Rizzo, 2016, p. 36; USAID, 2017, p. 4)⁷. The MoWI “is responsible for managing water resources by implementing irrigation policy, determining water allocation, constructing water infrastructure and establishing water conservation programs” (USAID, 2017, p. 4).

The **National Climate Change Committee (NCCC)**, established in 2001, is the highest coordination body for climate policy. It brings together stakeholders from different sectors, including representative of several Ministries, and partners from civil society, the private sector, and academia. The MoE has special responsibility as the chair and secretariat for the NCCC. The NCCC is meant to play the main role in supervising the implementation of the climate policy⁸. It is also tasked with overseeing the Partnership for Market Readiness⁹, funding agencies, NGOs, and private industries (EcoPeace, 2019, p. 20; Rizzo, 2016, pp. 36–39).

By late 2018, the Ministry of Environment was finalizing its bylaw on climate change. This will mandate that bodies participating in the NCCC be represented at a higher level (i.e. general secretaries) than previously. It will also open up participation in the NCCC to non-state actors such as academia and the private sector (Bany Yasin, 2018, p. 61).

A number of **other entities** also work on environment and climate change, “such as the Meteorology Department, the Royal Scientific Society, the Royal Department for Environment Protection, the Greater Amman Municipality, the Aqaba Special Economic Zone, the Jordan Environment Society, the National Center for Agricultural Research and Extension, the Department of Vehicle Licensing and the Jordan Women National Council” (ClimaSouth, n.d.).

⁷ See respectively:

- Jordanian government – Ministry of Water and Irrigation: <http://mwi.gov.jo/>
- Jordanian government - Ministry of Energy and Mineral Resources: <https://www.memr.gov.jo/>
- Jordanian government – Ministry of Agriculture: www.moa.gov.jo/
- Jordanian government – Ministry of Health: <http://www.moh.gov.jo/>

⁸ (Bany Yasin, 2018, pp. 60, 63; EcoPeace, 2019, p. 20; MoE, 2013, cited in MFA NL, 2018, p. 8; Rizzo, 2016, p. 36)

⁹ This instrument of the World Bank is an international platform that supports developing countries in preparing and implementing policies for climate change mitigation, including carbon pricing, to scale up GHG mitigation (Rizzo, 2016, p. 38).

Figure 1 : See summarises the **key institutions for policy on climate change in Jordan**.

Figure 1. Key institutions for climate policy in Jordan (GIZ, 2015, cited in Bany Yasin, 2018, p. 60)

https://www.preventionweb.net/files/62199_actalliancereport1.5c.pdf

Assessment and implementation of formal provisions

Globally, Jordan is ranked as **the 84th least ready country worldwide** (ranking 1 being the least ready), where readiness “measures a country’s ability to leverage investments and convert them to adaptation actions by looking at the country’s economic, governance and social readiness” (MFA NL, 2018, p. 3). Jordan is ranked 81st out of 181 countries in the ND-GAIN index for climate vulnerability (ranking 1 being the least vulnerable) – where the index summarises “a country’s vulnerability to climate change and other global challenges in combination with readiness to improve resilience” (MFA NL, 2018, p. 3).

The status of progress on climate-related objectives in the **JRP** remains unclear, but there is clearly an array of ongoing initiatives in energy and water resilience. However, current efforts remain very small compared to actual needs (Lahn et al., 2016, p. 4).

Political economy at domestic level

Climate change will aggravate pre-existing problems, i.e. it will act as a multiplier of threats or risks which are fundamentally caused by the State’s already weak capacity to support adaptation (EcoPeace, 2019, p. 5; MFA NL, 2018, p. 3)¹⁰.

Leaders’ and population’s low prioritisation of climate action

The climate change agenda is not yet a priority in Jordan. The majority of Jordanian policy-makers “still don’t see climate change as a threat” (Bany Yasin, 2018, pp. 62–63). Most of them are not well aware of its consequences and humanitarian, economic and social costs, nor are they well aware of the benefits of formulating and implementing more ambitious climate action (Bany Yasin, 2018, pp. 62–63; UN Women, 2018, p. 1). According to the Jordanian government, poverty and unemployment are its major challenges in meeting its sustainable development goals (SDGs). Yet, climate change would seriously hinder achieving the SDGs, including in rural areas, and undermine the progress that has already been made in reducing poverty¹¹. Similarly, a study of rural women found that their “theoretical knowledge and understanding of climate change and adaptation remain limited, impeding their ability and willingness to act and find long term adaptive solutions” (UN Women, 2018, p. 4).

Legal and institutional limitations

At the NCCC, the Ministry of Environment does not have a veto right for all policies under discussion. This leaves the **NCCC institutionally weaker than it could be**, and shows the limits

¹⁰ Conversely, climate change has the potential to be a multiplier of opportunities, as Sherri Goodman, Senior Advisor for International Security at the Center for Climate and Security and Senior Fellow at the Woodrow Wilson International Center, notes (EcoPeace, 2019, p. 28).

¹¹ (Bany Yasin, 2018, pp. 54–57; EcoPeace, 2019, p. 6; TNC, 2014, & NDC, 2016, cited in MFA NL, 2018, p. 7)

to the policy commitment toward ambitious implementation of climate policies. In addition, attention to sectoral interdependence is not mainstreamed at the NCCC, for example when designing policies for sectors such as water, energy, and food (Bany Yasin, 2018, p. 63).

The MoE operates under the mandate of the Environment Protection Law passed in 2006 which **does not specifically refer to climate change** (EcoPeace, 2019, p. 20). Similarly, the NVS does not explicitly make a connection between climate change and the initiatives it lays out to strengthen line ministries' engagement with resource security and management in water, energy, food and agriculture. Nevertheless, this constitutes significant entry points for mitigation and adaptation (EcoPeace, 2019, p. 21).

Budget and financing

Climate adaptation and mitigation for green growth have proven challenging, and remain **highly conditional on the availability of financing** (Bany Yasin, 2018, p. 60). While Jordan has committed funds for adaptation and mitigation, the current lack of finance is likely to impede implementation (Bany Yasin, 2018, p. 61; MFA NL, 2018, p. 10). Jordan's general budget has chronically been in deficit (Bany Yasin, 2018, p. 61). For now, the Jordanian economy remains highly vulnerable to external shocks (Bany Yasin, 2018, p. 54). The service sector contributes over 70% of the Gross Domestic Product (GDP) and 75% of jobs, but creates little activity of added value, while the country's industrial base remains narrow. Essentially, Jordan relies on rents, remittances, and foreign aid (Bany Yasin, 2018, p. 54; Lahn et al., 2016, p. 25).

Given the **funding gap between Jordan's climate goals and its public finances**, climate action will require a shift in national planning and budgeting (alongside international funding). Jordan needs to become able to allocate domestic resources to mitigation and adaptation (MFA NL, 2018, p. 10). Investors in climate adaptation need planning security and guarantees for their investments, including loan guarantees (Bany Yasin, 2018, p. 61).

Food, agriculture, and biodiversity

Factors hampering effective adaptation towards climate-responsive food security include the lack of a comprehensive drought monitoring or early warning system, and the scarcity of research on agricultural adaptation (Bany Yasin, 2018, p. 57). For now, Jordan imports 80% of its **food**, leaving it highly sensitive to international price fluctuations and endangering its food security¹².

The majority of the rural population remain dependent, directly or indirectly, on **agriculture** for their livelihoods (MFA NL, 2018, pp. 6–7). Agriculture consumes 65% of Jordan's freshwater resources, even as it only provides 19% of Jordan's food, and employs only 1.8% of Jordan's workforce (TNC, 2014, cited in MFA NL, 2018, p. 6). Factors hampering effective adaptation against **biodiversity** loss include changes in land use, and violations in protected areas (Bany Yasin, 2018, p. 57).

Population growth, and internal and external movements of populations

The "**combined effects of climate change and population growth**" are anticipated to increase pressure on limited land and water, and to make sustainable development more challenging (MFA NL, 2018, p. 3).

¹² (Government of Jordan, 2014, cited in Bany Yasin, 2018, pp. 54, 56; USAID, 2017, p. 1)

High population growth, combined with domestic migration from rural to urban areas and the arrival of large numbers of refugees, has led to rapid urbanisation. In turn, this has forced urban development in areas needed for agriculture. Only 10% of Jordan's land is suitable for agricultural production, and most of it lies in the areas where population is already concentrated at high density¹³. This competition over land use has pushed agriculture to marginal areas in the Badia. But this region suffers "from drought and soil degradation and will be under further stress from climate change" (MFA NL, 2018, p. 6).

The high numbers of refugees in the country has brought up demand for energy, water, food, infrastructure, and public services, which has further strained Jordan's finances, natural resources, and community relations. Demand for water and energy are acute concerns for current and future water and energy resources¹⁴. Forced migrations to Jordan increased the country's population almost tenfold over the past 55 years, where Syrians make up the largest non-Jordanian group by far¹⁵. Most refugees registered with UNHCR live in urban areas with the most intense competition for resources and services, especially raising concerns among low- to middle-income Jordanian (Lahn et al., 2016, p. 3; UNHCR, 2017, cited in MFA NL, 2018, p. 7).

Women in political economy: example of women in rural areas¹⁶

Rural women consulted in a UN Women study identified "the **lack of awareness raising, networking opportunities and leadership capacities** as the main obstacle to their participation in addressing climate change in their communities" (UN Women, 2018, p. 4). Women's role in the rural economy, both within households and in agriculture, is substantial. However, while they legally have the right to own land, social norms diminish their access to it by favouring male inheritance and giving disincentives for women to purchase land (Sweiden, 2016, cited in MFA NL, 2018, p. 7).

Regional engagement

Assessment and implementation of formal engagement

The bilateral agreements between Israel and Jordan, including the peace treaty, "were never designed to accommodate climate-change related events" such as extreme weather events, a steadily declining availability of water, and prolonged droughts (EcoPeace, 2019, p. 6).

So far, **Jordan, Palestine, and Israel have paid little attention to what climate-related change implies for security and stability at national and regional levels.** In particular, they are yet to fully recognise the connection between how its negative effects affect their neighbours' national security, and the implications of this for their own national security. Due to this lack of understanding, the three countries have done little to develop a regional roadmap for national

¹³ (among others MWI, 2016, cited in MFA NL, 2018, p. 6; USAID, 2017, pp. 1, 3)

¹⁴ (Bany Yasin, 2018, p. 54; EcoPeace, 2019, p. 6; Lahn, Grafham, & Elsayed Sparr, 2016, p. 3; MFA NL, 2018, p. 3; USAID, 2017, p. 1)

¹⁵ (Government of Jordan Department of Statistics, 2015, cited in Bany Yasin, 2018, p. 53; Lahn et al., 2016, p. 3)

¹⁶ For further studies on women or gender in climate policies and action, see for example: (Carmi, Alsayegh, & Zoubi, 2019) on women in water diplomacy; (USAID, n.d.) on women in the energy sector.

security related to climate. In fact, they have made no significant change in policy, and have no greater willingness to cooperate across borders (EcoPeace, 2019, pp. 5–6).

Yet, according to authors for EcoPeace Middle East, regional cooperation is needed to combat the effects of climate change, which in turn would be a step in a cycle of positive interactions that build trust. The authors name the case of the Water Energy Nexus project, which EcoPeace Middle East and the Konrad Adenauer Foundation have developed, as one opportunity to counter the effects of climate change and the insecurity it may generate while advancing regional security in water and energy (EcoPeace, 2019, p. 6).

Political economy at regional level

In Jordan, Palestine, and Israel, climate-related changes are forecast to impact a variety of sectors where the adaptive capacity of these States is already weak, particularly in Jordan and Palestine (EcoPeace, 2019, p. 5). The combination of climate change and a weakness in States' adaptive capacities will therefore “have serious implications for the social and political stability of the region” (EcoPeace, 2019, p. 6). “Systemic failure to respond to humanitarian and environmental crises creates dissatisfaction with the governing authorities” (EcoPeace, 2019, p. 6).

However, ‘securitising’ climate or water issues “would narrow the range of negotiations and valuable opportunities for action”, whereas viewing those issues as a fundamental part of national security “from a regional human security perspective” would be more beneficial, according to EcoPeace (EcoPeace, 2019, p. 32). For now, Jordan, Palestine, and Israel view “climate change, water, and energy security as a zero-sum game” (EcoPeace, 2019, p. 27).

4. Water

Domestic laws and policies

Formal provisions

Jordan’s main policy in the water sector is the comprehensive ‘**Water for Life: Jordan’s Water Strategy (2008-2022)**’ (EcoPeace, 2019, p. 20; USAID, 2017, p. 4). Among many other points, the Jordanian government “proposes to increase the use of treated wastewater to supplement irrigation rather than rely on potable water” (USAID, 2017, p. 3).

Jordan has also adopted a **National Water Strategy for 2016-2025** (MWI, 2016b). As evidenced in this document, much of Jordan’s climate change response is dedicated to large-scale desalination. Proposals include the desalination of brackish water in the Jordan Rift Valley and the Badia, and a regional conveyance project between the Red Sea and Dead Sea¹⁷ (Bany Yasin, 2018, pp. 54–55; EcoPeace, 2019, p. 22).

The above policies are complemented by the **Climate Change Policy for a Resilient Water Sector**, adopted in 2016 (MWI, 2016a). This framework has two purposes: strengthening the resilience of the water sector, based on existing approaches to Integrated Water Resource

¹⁷ See the sub-section on regional engagement for more information on this specific project.

Management (IWRM); and better mainstreaming climate adaptation and mitigation into existing institutions. The policy does not develop new activities, but rather complements other core documents on the water sector (MFA NL, 2018, p. 9).

Given the decrease in water availability that climate change is anticipated to bring, the policy **emphasises the need to focus on reducing demand**. It mentions a number of solutions to that end, including managing demand for water and energy, and providing economic incentives to reduce the use of water and energy. It also lists a number of solutions to increase available water, such as: using water harvesting, water transfers, and water from wastewater collection and treatment; turning to desalination (based on RE); and importing water-intensive products (MFA NL, 2018, p. 9).

In addition, it identifies actions to better conserve and manage water resources, such as: using all available options for water storage; integrating planning, management, and zoning on both water and land; ensuring that land use is water-smart; and improving water use efficiency. It details actions to protect and improve water quality. It also calls for providing incentives to use more RE in the water sector (MFA NL, 2018, p. 9).

Lastly, it addresses public policy on water. It calls to improve collection, monitoring, and early warning on climate data, and to increase trainings and capacity development on water issues. It also notes that coordination and policy coherence across institutions and levels (including the global one) are important to achieving solutions and resilience for sustainable development (MFA NL, 2018, p. 9).

Assessment and implementation of formal provisions

There are several **major inconsistencies between Jordan's National Water Strategy for 2016-2025 and the climate change projections** it has mentioned in its National Communications to the UNFCCC and its NVS. The National Water Strategy fails to reflect the expected steady decline of available freshwater. Instead, it refers to a constant level of safe yield in groundwater up to 2025, and to an increase in the total amount of water supplied "through the use of alternative sources, such as non-renewable groundwater, increased surface water, more supply from treated wastewater, and [...] large-scale desalination" (EcoPeace, 2019, p. 21).

Jordanian governmental experts on water **tend to focus on how to increase water supply**, mainly through regional solutions and transboundary agreements, whereas donors and international organisations focus on demand restraint and a cross-sectoral prioritisation of water issues (Hussein, 2018, p. 176). For example, greater investment is urgently needed in rainwater collection, rehabilitation of river ecosystems, and wastewater treatment. For now, local actors are experimenting with rainwater collection, with international organisations and NGOs giving grants for these (Lahn et al., 2016, p. 9).

Jordan has **started to make fundamental revisions to its tariffs on water and wastewater**, in order to promote smart use of water, incentivise the treatment of wastewater, and narrow the gap between expenditures and revenues on water and wastewater. However, the implementation of these reforms has been slow (EcoPeace, 2019, p. 34). In particular, Jordan has maintained low tariffs for natural freshwater, which have obstructed a shift towards better water management because they disincentivise greater use of treated wastewater. Yet, treating wastewater could best increase Jordan's water supply in the near future, and could supply its industry and agriculture with a large share of the water they use (EcoPeace, 2019, pp. 21–22).

Jordan's **water treatment system** functions well. Despite this, physical and administrative factors leading to water losses are estimated to account for as much as 50% of water supply (Lahn et al., 2016, p. 9). Besides, increasing the use of treated wastewater to supplement irrigation, as policies often recommend, is risky, because poorly treated water can increase the risk of transmitting pathogens, "such as those carrying diarrheal disease and cholera" (USAID, 2017, p. 3).

Political economy at domestic level

The reduced availability of natural water is forecast to make it more difficult to meet domestic needs, resulting in water rationing. Intermittent water supply is expected to fuel "public animosity that is already present" on issues unrelated to water (EcoPeace, 2019, p. 5). However, water is already effectively rationed for many, and households are usually "aware of water efficiency and use water conservatively" (Lahn et al., 2016, p. 9).

Factors hampering effective adaptation to water scarcity and drought include:

- rapid growth of the population (Bany Yasin, 2018, p. 56).
- high losses in the water network, and inefficient technologies for harvesting and storing water (Bany Yasin, 2018, p. 56). Jordan's estimated losses amount to more than half of the water supplied per person each day (MWI, 2016b, p. 15). This results not only in "an immense loss of revenue needed to improve and expand services, but also a decline in available water" (EcoPeace, 2019, p. 33).
- the lack of desalination of seawater (Bany Yasin, 2018, p. 56).
- inefficient irrigation technologies (Bany Yasin, 2018, p. 56).
- moderate public awareness water scarcity, drought, and adaptation (Bany Yasin, 2018, p. 56).
- the pricing structure for water and wastewater, as currently implemented. Water subsidies have been problematic. The MWI's debt exceeded USD 1.3 billion as of 2016, and servicing debt was the largest item on its budget. This has restricted MWI's ability to undertake essential repairs and construct new infrastructure (Lahn et al., 2016, p. 22). Similarly, poor cost recovery has contributed to held back Jordan on its plans for desalination and water treatment. Jordan needs these funds "to cover future operation costs, making the sectors financially sustainable, and [to] lessen dependence on international donor support" (EcoPeace, 2019, p. 35);
- interests vested in the *status quo* by individuals who act informally in what Hussein calls the "shadow state", for example in support of illegal wells and uses, or the unsustainable use of water in agriculture. Jordan's evolving political settlement, "based on a system of economic benefits, rewards and privileges, permitted powerful individuals, sometime working in groups, to influence policy choices, control the economy and allocation of resources, and resist reforms in the national interest" (Hussein, 2018, p. 175). Informal actors do not necessarily seek advantageous solutions, but rather want to use their water without interference, and maintain their privileges and benefits. This is why improved management and technical solutions alone cannot solve Jordan's water problems – political reforms are required to move towards an inclusive political system (Hussein, 2018, p. 175).

One positive factor is that the MWI leadership is “technically experienced, well informed, and politically savvy and aware – they have a short, medium, and long-term views” (Hussein, 2018, p. 175).

Regional engagement

Formal commitments and engagement

The current **bilateral water agreement between Jordan and Israel** was formalised and institutionalized by the 1994 ‘Treaty of Peace between the State of Israel and the Hashemite Kingdom of Jordan’. Its provision on sharing water rest on a mutual recognition of both States’ “rightful allocations” of water from the Jordan River, the Yarmouk River, and the Arava groundwater (EcoPeace, 2019, p. 26). It also establishes a coordination body, the Joint Water Committee, to implement the water provision and resolve matters that may arise. Under the agreement, both countries would use the Sea of Galilee / Lake Tiberias as a shared water reservoir. Israel would pump winter water from the Yarmouk River into the Sea / Lake, and store it for transfer to Jordan in the summer, with losses to evaporation incurred by Israel (EcoPeace, 2019, p. 26).

Moreover, in 2001, Jordan and Israel agreed to conduct joint studies on the **Red Sea-Dead Sea Project** (RSDS). This was followed by years of delays. In 2013, Israel, Jordan, and the Palestinian Authority formalised plans and agreed on a pilot RSDS for water exchange. A desalination facility would be built in Aqaba, and produce up to 80 million cubic metres per year (mcm/y) of desalinated Red Sea water. 30 mcm/y of these would be supplied to Aqaba, and 50 mcm/y sold to Israel for use in the Eilat and Arava areas. In exchange, Israel would sell 50 mcm/y of water from the Sea of Galilee to Jordan, in addition to the 55 mcm it is meant to supply as part of its Peace Treaty with Jordan (EcoPeace, 2019, p. 22). According to the National Water Strategy for 2016-2025, demand for freshwater is projected to overshoot available resources by over 26% by 2025, and the Red Sea-Dead Sea project is expected to narrow this gap to 6% (MWI, 2016b, p. 10).

The price of the water Jordan would sell to Israel would be “equivalent to the cost of desalination at the Red Sea together with brine disposal at the Dead Sea” (EcoPeace, 2019, p. 22). The price of the water Israel would sell to Jordan would be lower than the marginal cost of desalinated water in Israel, i.e. reportedly around US\$0.40 per cubic meter (EcoPeace, 2019, p. 22).

In 2013, Jordan “began conveying water from the **Disi Aquifer (shared with Saudi Arabia)** in the south, 325km to Amman and then to other urban areas” (Lahn et al., 2016, p. 9).

Assessment and implementation of formal engagement

Environmental and political factors have put **strains on the bilateral water agreement** between Jordan and Israel. As climate change dramatically reduces the availability of water in the upper Jordan Basin catchment area and the Sea of Galilee / Lake Tiberias, there is increasing risk over the viability of the Sea / Lake as a freshwater body. Further, although water has “historically been a source of robust cooperation”, considerable political tension has arisen. First, the two countries have had growing political differences over water. Second, the failure to advance agreed water projects such as the RSDS has led to tensions (EcoPeace, 2019, p. 26).

Indeed, political issues at regional level have led to the **Red Sea-Dead Sea project being delayed**. Jordan's National Water Strategy envisioned that the first phase of the project would be implemented between 2017 and 2021, and its second phase between 2020 and 2025. However, completion by 2025 is unlikely. This delay further worsens Jordan's increasing water scarcity, with implications for national and regional security (EcoPeace, 2019, p. 22).

More broadly, plans centred on a desalination plant at Aqaba and increased purchases from Israel require energy, for desalination and pumping over long distances, and entail **substantial environmental risks** (Lahn et al., 2016, p. 9).

Political economy at regional level

For most of its surface waters, Jordan is **dependent on the transboundary Yarmouk and Jordan Rivers, whose waters both Syria and Israel have overused to the detriment of Jordan**. Indeed, both Syria and Israel have retained significant control over the respective headwaters (Rajsekhar & Gorelick, 2017, cited in MFA NL, 2018, p. 6). Syria has carried out unilateral water projects in the Upper Yarmouk basin, and Israel has carried out projects in the Upper Jordan River and the Golan. Their actions have violated long-standing agreements, and left Jordan with under 10% of the total flow of the freshwater resources of the Upper Yarmouk and Jordan Rivers. This could cause further destabilisation and conflict in the region¹⁸. Additionally, the effects of climate change and climate vulnerability will complicate the management of shared resources of water (EcoPeace, 2019, p. 27; RICCAR, 2017, cited in MFA NL, 2018, p. 6).

Jordan, Palestine, and Israel have paid little attention to the connection between climate change, regional water insecurity, and national security, even though control over water resources has long been a subject of national security in all three countries (EcoPeace, 2019, p. 30).

5. Energy

Domestic laws and policies

Formal provisions

Laws and policies

The government's **Master Strategy in the Energy Sector for the period 2015-2025** plans for 1,350 MW of RE, covering 20% of generated electricity, by 2025 (Abu Hamed & Bressler, 2019, p. 385; Bany Yasin, 2018, p. 59). Figure 2 shows the planned energy mix for 2020 and 2040 under this strategy. Jordan also launched a nuclear strategy, aiming at producing 30% of its energy, i.e. 2,000 MW, from nuclear power plants by 2030 (Bany Yasin, 2018, p. 59).

Figure 2. See Jordan's primary energy mix in 2020 (left), and 2040 (right), under FBUR (Bany Yasin, 2018, p. 59)

https://www.preventionweb.net/files/62199_actalliancereport1.5c.pdf

¹⁸ (Bany Yasin, 2018, p. 55; EcoPeace, 2019, p. 27; Rajsekhar & Gorelick, 2017, cited in MFA NL, 2018, p. 6; USAID, 2017, p. 2)

Jordan thus **aims to have its electricity system transition**, by diversifying its mix for power generation, reducing its dependency on imported fossil fuels, improving its energy security, and developing domestic renewable resources (RES4Med, 2019, p. 6). Its projects have focused on solar and wind energy, although it has also developed projects from other RE sources on a smaller scale, such as biogas and hydropower (RES4Med, 2019, p. 8).

The **2012 Renewable Energy and Energy Efficiency Law (REEEL)** provides the legal framework for governmental action, and a regulatory framework for developing RE and energy efficiency. It focuses on diversifying the country's energy mix and promoting technologies for RE. It makes the Ministry of Energy and Mineral Resources (MEMR) responsible for identifying sites and allocating these for projects of RE. It also tasks the MEMR with issuing and managing public tenders for clean electricity on a competitive and transparent basis (Lahn et al., 2016, p. 9; RES4Med, 2019, p. 6).

In addition, the REEEL includes plans for private investments in RE projects (Abu Hamed & Bressler, 2019, p. 384; EcoPeace, 2019, p. 20). It makes it compulsory to purchase RE through standardised Power Purchase Agreements (PPAs). It sets up a priority corridor for private companies in RE to negotiate directly with MEMR for new projects without going through tendering. Moreover, it offers further incentives for private companies in RE, such as an exemption from the fee for grid connection, and a policy of tax exemptions and incentives on equipment (Abu Hamed & Bressler, 2019, p. 384; RES4Med, 2019, p. 6).

The REEEL also supports distributed electricity generated through net metering and wheeling. These mechanisms allow small RE installations for residential, commercial, or industrial use to sell their excess electricity to the grid, at a set purchasing price established by the regulator (Abu Hamed & Bressler, 2019, p. 384; RES4Med, 2019, p. 7).

A **2013 National Energy Efficiency Action Plan (NEEAP)** identifies the interventions needed to increase national energy efficiency by 10-20% by 2020 (Lahn et al., 2016, p. 9), following a 2005 National Energy Efficiency Strategy by the MEMR (Abu Hamed & Bressler, 2019, p. 384). Jordan has adopted building regulations to make buildings more energy-efficient (Lahn et al., 2016, p. 19). The MWI also adopted a policy in 2016 to improve the energy efficiency of water pumping, boosting, treatment, and distribution, and to increase the share of RE in the consumption of power of billed water (Abu Hamed & Bressler, 2019, p. 384).

Institutions

The **Ministry of Energy and Mineral Resources** (MEMR) is the leading institution on energy policy. It is responsible for the country's strategy, policies, and targets on energy and the development of the national energy system (RES4Med, 2019, p. 5). The REEEL also established the **Jordan Renewable Energy and Energy Efficiency Fund**, to support the realisation of objectives in this sector as laid out in Jordan's National Strategy (EcoPeace, 2019, p. 20; RES4Med, 2019, p. 7).

The regulator of the electricity market is the **Energy and Minerals Regulatory Commission** (EMRC), which was established in 2014. By law, it has financial and administrative independence. It is tasked with setting electricity tariffs and awarding licenses to the providers and distributors of power (RES4Med, 2019, p. 5).

As Jordan has a single-buyer model for its electricity market, the **National Electric Power Company** (NEPCO) is a State-owned operator and the only authorised actor for wholesale energy. Private actors act as independent power producers (IPPs) by generating and distributing power, while NEPCO builds, operates and maintains the whole transmission system for power (RES4Med, 2019, p. 5).

Figure 3: See summarises the institutional set-up in the energy sector.

Figure 3. Institutional set-up in the energy sector (RES4Med, 2019, p. 6)

<https://www.res4med.org/wp-content/uploads/2019/03/Scaling-Up-Renewable-Energy-Development-in-Jordan.pdf>

Assessment and implementation of formal provisions

The **State's actions on energy have been mixed**. The government enacted major reforms on energy subsidies, raising the prices of transport fuel and electricity (Lahn et al., 2016, p. 9). In contrast, the government has failed to provide incentives for compliance with legislation on energy efficiency in new buildings, and has failed to enforce it. Municipalities lack the capacity to do on-site checks (Lahn et al., 2016, p. 18). Moreover, to meet growing demand for energy, Jordan established two new tri-fuel power plants, which use diesel oil, heavy fuel oil, and natural gas (Abu Hamed & Bressler, 2019, p. 380).

The share of RE in the total domestic capacity for power generation has remained modest, at 14%, representing only 600 MW, in 2017. In comparison, that same year, it was an energy mix largely based on fossil fuels that met almost all of the 17.5 TWh of electricity demand in the country, as Figure 4 shows. 93% of electricity production came from traditional power plants. In these, 76% of production was generated through combined cycles (involving fossil fuels), and only 7% through RE (RES4Med, 2019, p. 4).

Figure 4. See Energy mix for installed power capacity and power generation (RES4Med, 2019, p. 4)

<https://www.res4med.org/wp-content/uploads/2019/03/Scaling-Up-Renewable-Energy-Development-in-Jordan.pdf>

However, **technological development and project implementation in RE has started to pick up** (Bany Yasin, 2018, p. 62; RES4Med, 2019). For example, in 2018, the share of RE in the total domestic capacity for power generation rose to over 21%, reaching 1,150 MW, a noticeable increase in just a year. Almost all Jordan's domestic sources for primary energy come from renewables (RES4Med, 2019, pp. 4–7). Following the REEEL, there have been three rounds of tenders, in 2012, 2013, and 2016, which have met with success. Total installed power capacity in RE is expected to reach 2,726 MW by the end of 2021. Should this be effective, Jordan would exceed its 2020 targets (RES4Med, 2019, pp. 4–7). This being said, there may be a recent slowdown in growth (RES4Med, 2019, p. 9).

Political economy at domestic level

Energy supply remains a challenge for Jordan, as it currently lacks primary energy reserves. Jordan currently imports 97% of its energy supply. This makes the energy mix a key issue, as Jordan's current dependence leaves its energy system acutely insecure¹⁹. Yet, upgrading the national grid so it can integrate more power, especially from RE, requires large financing (Lahn et al., 2016, pp. 15–16).

¹⁹ (Abu Hamed & Bressler, 2019, p. 379; Bany Yasin, 2018, pp. 54, 59; RES4Med, 2019, pp. 4, 6)

Energy demand has also been a challenge. Total demand for primary energy has more than doubled in the last two decades (Lahn et al., 2016, p. 8). Syrian refugees' needs have also increased demand for energy and electricity, and total consumption of residential energy has risen significantly (NDC, 2016, cited in MFA NL, 2018, p. 7). Further, services for water (pumping, treating, trucking, and wastewater collection) are interlinked with energy demand. Meeting increased demand while holding prices low has brought up costs for the government. Curtailed gas supplies and higher oil prices "led to a rise in fuel subsidy bills for government and billions of dollars of debt for state utilities, which had to pay independent power producers for diesel and heavy fuel oil generation" (Lahn et al., 2016, p. 8). In fact, it was concerns about energy and the country's unsustainable subsidy bill which led Jordan to adopt the REEEL (Lahn et al., 2016, p. 9).

A major problem has been “financing the necessary maintenance and upgrading for utilities in severe deficit” (Lahn et al., 2016, p. 16). Power in Jordan is expensive for larger commercial consumers. Simultaneously, the government supports the lower consumption blocks with a very high electricity subsidy, but richer households pay “the lower rate for their first blocks of consumption” (Lahn et al., 2016, p. 16). The subsidies have thus led to some misuse and exploitation, to the unsustainable debt of the national electricity company, and to incentives for inefficient use. The subsidy regime is a burden to government, business, and taxpayers (Lahn et al., 2016, p. 16).

However, there is a consensus in the literature that Jordan has **excellent natural conditions for a rapid expansion of RE**, which could enhance its energy security, increase access to affordable energy, create jobs, and mitigate its emissions of greenhouse gases²⁰. It has further major assets in having an active national private sector, and expertise in solar photovoltaic power (Lahn et al., 2016, p. 4).

The REEEL has **succeeded at creating an attractive market for local and international investors in RE**. Key strengths of the RE market are thus: the stability and clarity of its policies and regulations; the attractiveness of its incentives, mainly on taxes and on costs for grid connection; and competitive financing available from international and local actors (RES4Med, 2019, pp. 8–9). More broadly, a 2017 RES4Med Survey on investments in RE found that Jordan was perceived as having a stable economy and posing limited risks in its local market for energy (RES4Med, 2019, p. 4).

Nonetheless, several factors pose **challenges to the continued growth of the RE sector**. One is the lack of comprehensive and timely strategies on energy that go beyond 2025 targets to 2030 or 2050, and that embrace the wider decarbonisation of the energy sector. The MEMR is working on a new strategy for 2030 to 2050, however (RES4Med, 2019, pp. 9–12).

Another factor is the rising concerns about the stability of the grid and its flexibility in efficiently integrating higher capacity in RE, especially with variable sources of energy. Jordan seems to lack coordinated planning to make the power system evolve through developments in infrastructure, which could eventually reduce cost effectiveness and make electricity bills unaffordable (Lahn et al., 2016, pp. 15–16; RES4Med, 2019, pp. 9–12).

A final factor is the lack of clarity in the permissions and classifications about tariff and metering, amongst the different utilities and distribution companies (Lahn et al., 2016, p. 22). Further, there have been unexpected proposals to significantly change the regulatory framework, on issues such as new obligations to use a set share of locally produced solar panels, procedures for grid connection, and costs. One example of enacted discontinuity in policies that has led to a stop-and-go effect pertains to the tax exemption on hybrid cars, whose stop in February 2018 has led to a stark fall in the sale of such cars (RES4Med, 2019, pp. 9–12).

With policies related to resilience and refugees, challenges include “enhancing clarity and avoiding delays when approving projects, integrating renewables into the national grid, finding practical models of enabling energy investments for low-income households given the subsidy system, and finding ways to enable payment in the camps where refugees lack legal status and populations may be transient” (Lahn et al., 2016, p. 4).

²⁰ (Bany Yasin, 2018, p. 54; Lahn et al., 2016, p. 23; RES4Med, 2019, p. 6)

Regional engagement

Formal commitments and engagement

NEPCO manages the interconnections of the transmission system with neighbouring countries (RES4Med, 2019, p. 5).

Assessment and implementation of formal engagement

Jordan's reliance on **fuel imports** has worsened ever since the loss of cheap Iraqi oil in 2003 (Lahn et al., 2016, p. 8). Crude oil is currently delivered at the port of Aqaba (Abu Hamed & Bressler, 2019, p. 380).

Once the Arab Gas Pipeline was completed in 2003, natural gas started being the supply to Jordan's power generation instead of heavy fuel oil (Abu Hamed & Bressler, 2019, p. 380). However, there have been disruptions and reductions in the gas supply from **Egypt** from 2012, due to attacks on the Arab Gas Pipeline and to shortages (Lahn et al., 2016, p. 8). The "dearth of supplies from the Sinai pipeline prompted the government to switch to expensive diesel fuel" (Abu Hamed & Bressler, 2019, p. 380).

In 2015, the Jordanian government and NEPCO signed a purchase agreement with the **Israeli** owners of the Leviathan field of natural gas for the provision of 15 billion cubic meters of natural gas per year, despite "some public pushback against negotiating with Israelis". This "represented the largest economic cooperation between Israel and Jordan to date" (Abu Hamed & Bressler, 2019, p. 380).

On its electricity grid, Jordan is already connected to **Egypt** through the Gulf of Aqaba, and with Syria (RES4Med, 2019, p. 13). In January 2019, the Director General of NEPCO has expressed interest in further extending the national electricity grid across borders and connecting it to **Saudi Arabia**, in order to increase power exchanges and to draw benefits in prices, supply, and trade from the countries' complementarities (RES4Med, 2019, pp. 13–14).

Political economy at regional level

Jordan's energy landscape has **historically been impacted by the relations between and among States in its region**. For instance, the instability of the natural gas pipeline from Egypt prompted Jordan to seek a more secure energy supply within Jordan (Abu Hamed & Bressler, 2019, pp. 379–380).

6. Appendix: Jordan's domestic and regional policies and engagement with links to its involvement at the UN

Global engagement on global warming and climate change²¹

Formal commitments and engagement

Under the **United Nations Framework Convention on Climate Change** (UNFCCC), Jordan submitted its Third National Communication (TNC) in 2014, its Nationally Determined Contributions (NDC) in September 2015, and its First Biennial Update Report (FBUR) in November 2017. Jordan's overall scenarios for baseline and mitigation submitted to the UNFCCC cover the period 2015-2040 (Bany Yasin, 2018, pp. 54, 58)²².

Its submissions to the UNFCCC have **links to its domestic policies, strategies and trends**. For instance, its 2014 TNC builds on the objectives and actions of the Climate Policy (MFA NL, 2018, p. 8). Under the 2016 NDC, Jordan identifies national-level actions for climate mitigation and adaptation, as well as "sectoral actions for energy, transports, waste management, industries, water and agriculture" (MFA NL, 2018, p. 9). In particular, its actions for adaptation in the NDC are primarily actions proposed in the National Climate Change Policy (MFA NL, 2018, p. 9). More recently, its updated baseline scenarios for NDC in the 2017 FBUR have links to its Climate Change Policy 2013-2020 and its sectoral endeavours such as its Energy Strategy 2015-2025 (Bany Yasin, 2018, pp. 54, 58).

By 2017, Jordan had the following **domestic targets as priorities** under the NDC (Bany Yasin, 2018, p. 59; MFA NL, 2018, p. 9):

- In the water sector: adapt irrigation; improve water quality and saving, and adapt water pricing; adopt desalination.
- In the energy sector: reach a 10% share of renewable energy (RE) in 2020; improve energy efficiency by 20% by 2020.
- In transports: improve public transport, and deploy infrastructure to support a zero-emissions fleet powered by RE²³.
- In land use: improve the contribution of agriculture to adaptation, by addressing production losses, water scarcity, and the vulnerability of crops to climate; afforest 25% of barren forest areas in the rain-belt areas.
- In waste management: reduce the share of solid waste that is deposited in landfills, from 80% to 60% in 2025; increase the rate of solid waste that treated and re-used, from 20% to 40% in 2025.

²¹ In line with DFID's instructions, this report does not cover Jordan's involvement in major UN processes on climate as such. However, it highlights a few key points here, because these provide context and an important framework for Jordan's domestic climate policies, and have links to domestic policies and budgets.

²² To read the original documents Jordan submitted, see: (UNFCCC, n.d.).

²³ For a detailed discussion of Jordanian global and domestic policies in the transport sector, particularly in relation to the energy sector, see: (RES4Med, 2019, pp. 16–18).

Throughout, Jordan's **priority in climate action is adaptation rather than mitigation**. This is because Jordan is a small emitter of greenhouse gases while facing high climate risks (Bany Yasin, 2018, p. 58).

Its **priority strategies for adaptation** are twofold. One is to secure access to improved water supply sources, by protecting groundwater, developing surface water, managing demand, and using systems to monitor water resources. The other is to set up and implement a policy for sustainable agriculture. To keep adapting, Jordan has also committed to regularly updating its climate vulnerability assessments and its adaptation plans. Indeed, in late 2018, the Ministry of Environment was developing its National Adaptation Plan (NAP) through a national consultation (Bany Yasin, 2018, pp. 59–60). The NAP was expected to be finalised in January 2019 (EcoPeace, 2019, p. 21), but did not appear to have been adopted as of the writing of this report.

Jordan's **priority strategies for mitigation** are to: rationalise energy consumption in all sectors; improve energy efficiency; encourage the development of RE; increase the use of zero-emission public transport; and reduce the disposal of solid waste (Bany Yasin, 2018, p. 59).

Assessment and implementation of formal engagement

Jordan has long shown a strong "**commitment to international climate diplomacy** and is considered very progressive in the region" (Bany Yasin, 2018, p. 62). Jordan was the first Non-Annex I country to produce an Initial National Communication, in 1997, and "has been an active member in almost all Climate Change and other UN Conventions' global treaties, partnerships and programmes" (MFA NL, 2018, p. 7). In fact, the NDC has led the government to start to realising the socio-economic benefits of climate action (Bany Yasin, 2018, p. 60).

Jordan's climate action **lacks unified guiding principles**, leading to piecemeal action both domestically and internationally. For example, the overarching policies that governmental departments develop domestically do not necessarily align with the NDC. Similarly, some of the projects in the NDC come from Jordan's TNC to the UNFCCC, and others from sectoral strategies. This lack of guiding principles prevents Jordan from setting priorities strategically, and from mobilising the shared benefits between adaptation, mitigation, and sustainable development in a targeted fashion (Bany Yasin, 2018, pp. 61–62).

To implement its NDC, Jordan has set **a planning process, and a strategy to track progress**, but these have had some limitations (Bany Yasin, 2018, p. 60). Jordan used a mechanism to assess climate risks in order to identify priorities in its TNC and translate these into the NDC. However, this mechanism had shortcomings which hampered the quality, scale, and scope of risk assessments. As a result, it fell short in properly identifying all relevant risks, e.g. in agriculture, water, and health (Bany Yasin, 2018, p. 62).

The Ministry of Environment has been implementing a tool for Monitoring, Reporting and Verification (MRV) at sectoral and activity levels, as required under the UNFCCC (Rizzo, 2016). However, it needs "increased institutional capacity to extract, collect and manage data" (Bany Yasin, 2018, p. 61). In addition, it has not granted public access to this tool, so there is no open-source portal where stakeholders including experts, academics, and NGOs could access data and track implementation (Bany Yasin, 2018, p. 63).

Several legal and procedural problems are likely to impede NDC implementation (Bany Yasin, 2018, p. 62). For example, in **public transport**, laws and policies are not comprehensive, and are “fragmented between different ministries and units” (Bany Yasin, 2018, p. 62). Further, there are no regulations and no tax incentives to establish zero-emission public transport (Bany Yasin, 2018, p. 62). In **agriculture**, there is much “overlap and inconsistency between the Agriculture Law and the Environmental Protection Law regarding land degradation” (Bany Yasin, 2018, p. 62).

Political economy in relation to global engagement

Jordan’s economy is **heavily dependent on external finances**²⁴. The country especially depends on “donor assistance, international loans, foreign remittances and trade as a result of its limited water and other natural resources” (USAID, 2017, p. 1; also see Bany Yasin, 2018, p. 61). For now, most initiatives and projects on climate remain driven by donors. Financing climate action will require substantial financial support from international sources. Jordan has already been seeking and getting funding, both from international climate funds and from bilateral and multilateral aid sources (MFA NL, 2018, p. 10)²⁵.

Global engagement on water

Formal commitments and engagement

Under the 2016 NDC, Jordan grouped its **national-level actions for adaptation** into four categories (MFA NL, 2018, p. 9):

- “groundwater protection (e.g. sustainable extraction rates);
- surface water development (e.g. surface and sub-surface storage; modernizing and upgrading systems and dams);
- demand management (e.g. mobilization of additional water resources and reduce water consumption);
- water resources monitoring (quantity and quality)”.

Its mitigation actions focus on energy efficiency and RE (MFA NL, 2018, p. 9).

Assessment and implementation of formal engagement

Several legal and procedural problems are likely to impede NDC implementation (Bany Yasin, 2018, p. 62). In the water sector, the water management law and associated regulations have been weak, including on greywater hazards, unsafe groundwater and aquifers usage (Bany Yasin, 2018, p. 62).

²⁴ (Bany Yasin, 2018, p. 61; MFA NL, 2018, p. 10; USAID, 2017, p. 1)

²⁵ On international aid and donor engagement on climate, including water and energy, in Jordan, please refer to the other Helpdesk report commissioned in parallel to the present one.

Political economy in relation to global engagement

Public budgets have been insufficient to implement proper systems for wastewater and irrigation (Bany Yasin, 2018, p. 62).

Global engagement on energy

Formal commitments and engagement

Under the 2016 NDC, Jordan identified national-level actions for mitigation on energy, including (MFA NL, 2018, p. 9):

- On RE: encouraging investment in RE, among others by attracting investments from the private sector; expanding the development of projects in RE;
- On solar energy: encouraging the use of solar energy for water heating; expanding the use of solar cooling in commercial and industrial facilities;
- On the reduction of demand: implementing green building codes; improving energy efficiency;
- On diversification of the energy mix: diversifying the sources and kinds of energy, which includes diversifying the sources of imports in natural gas.

Assessment and implementation of formal engagement

Several legal and procedural problems are likely to impede NDC implementation. With **investments in RE**, the technical and administrative process to get a license for RE projects is lengthy, and transmission among private actors (domestic or international energy trade) is forbidden. There also lacks a public awareness about available incentives, due to inadequate communication in spaces such as regional gatherings and media (Bany Yasin, 2018, p. 62).

With **energy efficiency**, the mechanism to monitor energy efficiency regulations is weak, among others in its links to local regulators. Due to poor communication, people in Jordan generally do not know about the economic benefits of energy efficiency regulations (Bany Yasin, 2018, p. 62).

7. English-language references cited in the report

- Abu Hamed, T., & Bressler, L. (2019). Energy security in Israel and Jordan: The role of renewable energy sources. *Renewable Energy*, 135, 378–389. <https://doi.org/10.1016/j.renene.2018.12.036>
- Bany Yasin, H. (2018). The Case of The Hashemite Kingdom of Jordan. In ACT Alliance (Ed.), *Enhanced Climate Action in Response to 1.5°C of Global Warming. Scaling Up Nationally Determined Contributions* (pp. 53–63). Retrieved from https://www.preventionweb.net/files/62199_actalliancereport1.5c.pdf
- Carmi, N., Alsayegh, M., & Zoubi, M. (2019). Empowering women in water diplomacy: A basic mapping of the challenges in Palestine, Lebanon and Jordan. *Journal of Hydrology*, 569, 330–346. <https://doi.org/10.1016/j.jhydrol.2018.12.011>
- ClimaSouth. (n.d.). Institutional framework. Retrieved from ClimaSouth website: <http://www.climasouth.eu/en/node/61>
- EcoPeace Middle East [EcoPeace]. (2019). *Climate Change, Water Security, and National Security for Jordan, Palestine, and Israel*. Retrieved from EcoPeace Middle East; & Konrad Adenauer Stiftung website: <http://ecopeace.org/wp-content/uploads/2019/01/climate-change-web.pdf>
- Hussein, H. (2018). Tomatoes, tribes, bananas, and businessmen: An analysis of the shadow state and of the politics of water in Jordan. *Environmental Science & Policy*, 84, 170–176. <https://doi.org/10.1016/j.envsci.2018.03.018>
- Lahn, G., Grafham, O., & Elsayed Sparr, A. (2016). *Refugees and Energy Resilience in Jordan* [Research Paper]. Retrieved from Chatham House, Royal Institute of International Affairs website: <https://www.chathamhouse.org/sites/default/files/publications/research/2016-08-03-refugees-energy-jordan-lahn-grafham-sparr.pdf>
- Ministry of Environment [MoE]. (2013). *The National Climate Change Policy of the Hashemite Kingdom of Jordan 2013-2020. Sector Strategic Guidance Framework*. Retrieved from Ministry of Environment, Hashemite Kingdom of Jordan website: http://www.moenv.gov.jo/AR/PDFs/Climate%20change%20policy_PDF.pdf
- Ministry of Environment [MoE]. (2017). *A National Green Growth Plan for Jordan*. Retrieved from Ministry of Environment, Hashemite Kingdom of Jordan website: <http://www.moenv.gov.jo/AR/Documents/report2017/%D8%A7%D9%84%D8%AE%D8%B7%D8%A9%20%D8%A7%D9%84%D9%88%D8%B7%D9%86%D9%8A%D8%A9%20%D9%84%D9%84%D9%86%D9%85%D9%88%20%D8%A7%D9%84%D8%A3%D8%AE%D8%B6%D8%B1.pdf>
- Ministry of Foreign Affairs of the Netherlands [MFA NL]. (2018). *Climate Change Profile. Jordan* [Climate Change Profile]. Retrieved from Ministry of Foreign Affairs of the Netherlands website: <https://www.government.nl/binaries/government/documents/publications/2019/02/05/climate-change-profiles/Jordan.pdf>
- Ministry of Water and Irrigation [MWI]. (2016a). *Climate Change Policy for a Resilient Water Sector*. Retrieved from Ministry of Water and Irrigation, Hashemite Kingdom of Jordan website: <http://www.mwi.gov.jo/sites/en-us/Hot%20Issues/Strategic%20Documents%20of%20The%20Water%20Sector/Climate%20Change%20Policy%20for%20a%20Resilient%20Water%20Sector%2025.2.016.pdf>

- Ministry of Water and Irrigation [MWI]. (2016b). *National Water Strategy 2016-2025*. Retrieved from Ministry of Water and Irrigation, Hashemite Kingdom of Jordan website: [http://www.mwi.gov.jo/sites/en-us/Hot%20Issues/Strategic%20Documents%20of%20%20The%20Water%20Sector/National%20Water%20Strategy\(%202016-2025\)-25.2.2016.pdf](http://www.mwi.gov.jo/sites/en-us/Hot%20Issues/Strategic%20Documents%20of%20%20The%20Water%20Sector/National%20Water%20Strategy(%202016-2025)-25.2.2016.pdf)
- RES4Med. (2019). *Scaling-Up Renewable Energy Development in Jordan* [Position Paper]. Retrieved from RES4Med website: <https://www.res4med.org/wp-content/uploads/2019/03/Scaling-Up-Renewable-Energy-Development-in-Jordan.pdf>
- Rizzo, A. (2016). *Transparency of climate action in the ENPI South region. An assessment of the capacity of South Mediterranean countries to undertake Measurement, Reporting and Verification (MRV) and related challenges* (ClimaSouth Policy Series No. 1). Retrieved from ClimaSouth, for European Commission website: http://www.climasouth.eu/sites/default/files/policy_paper/CS_policy_paper_N1_pagsing.pdf
- UN Women. (2018). *Rural Women and Climate Change in Jordan* [In Brief]. Retrieved from UN Women website: <http://www2.unwomen.org/-/media/field%20office%20jordan/attachments/publications/2018/un%20women-ruralwomenjordan-brief-web%20en.pdf?la=en&vs=2839>
- UNFCCC. (n.d.). Documents. Jordan. Retrieved from UNFCCC website: <https://unfccc.int/documents%3Ff%5B0%5D%3Dtopic%3A4047?f%5B0%5D=country%3A1306>
- USAID. (2017). *Climate Change Risk Profile. Jordan* [Fact Sheet]. Retrieved from USAID website: https://www.climatelinks.org/sites/default/files/asset/document/2017_USAID_Climate%20Change%20Risk%20Profile_Jordan.pdf
- USAID. (n.d.). *Women in Energy in Jordan. Challenges, Opportunities and the Way Forward. The Energy Sector Women's Leadership Forum and Networking Event, May 19-20, 2015* [Energy Sector Capacity Building Activity]. Retrieved from USAID website: <https://escb-jordan.org/wp-content/uploads/2016/01/Forum-report-English.pdf>

8. Further references

The following references were not used in this report, but are relevant to the issues addressed. They were not used for different reasons. These are, among others: helpdesk time constraints; the reference being inaccessible within the turnaround time of this report; less direct connections to the core report topics. Nonetheless, all these references discuss issues relevant to the present report, and their authors may be interesting to contact. Such references are thus listed below.

Where a reference was available in more than one language, English was prioritised, followed by French, with the Arabic version coming last, as agreed with DFID.

References in English

- Ababsa, M. (Ed.). (2014). *Atlas of Jordan : History, Territories and Society*. Retrieved from <http://books.openedition.org/ifpo/4560>
- Abdeljabbar, A., Cherkaoui, A., Cordonier Segger, M.-C., Gehring, M., Hammami-Marrakchi, A., Haralampieva, V., ... Moussa, F. (2017). *Assessment of Key Policy, Legal and Institutional Mechanisms Required for the Development and Implementation of the Nationally Determined Contributions (NDCs). Selected SEMED Countries*. Retrieved from European Bank for Reconstruction and Development (EBRD); Centre for International Sustainable Development Law (CISDL) website: http://www.cisdsl.org/wp-content/uploads/2018/05/EBRD_Report_-_07.12..2017_-_FINAL.pdf
- Abdul Rahim, N., & Eid, N. (2017). *Energy Projects in Jordan*. Retrieved from Flanders Investment & Trade, invest-export.brussels, & Wallonia.be website: https://www.flandersinvestmentandtrade.com/export/sites/trade/files/market_studies/Energy%20projects%20in%20Jordan.pdf
- Abu Dayyeh, A. (2015a). *Empowering NGO's on nuclear power socioeconomic and environmental hazards versus renewables as energies of peace*. Retrieved from Friedrich-Ebert-Stiftung website: <http://library.fes.de/pdf-files/bueros/amman/12162-20160314.pdf>
- Abu Dayyeh, A. (2015b). *From Energy Mess to Energy Management: Jordan as a Case Study (2007-2020)* [Policy Paper]. Retrieved from Friedrich-Ebert-Stiftung website: <http://library.fes.de/pdf-files/bueros/amman/11188.pdf>
- Abu Dyak, A. T., Abu-Lehyeh, E. O., & Kiwan, S. (2017). Assessment of Implementing Jordan's Renewable Energy Plan on the Electricity Grid. *Jordan Journal of Mechanical and Industrial Engineering*, 11(2), 113–119.
- ACT Alliance. (2018). *Enhanced Climate Action in Response to 1.5°C of Global Warming. Scaling Up Nationally Determined Contributions*. Retrieved from ACT Alliance Secretariat website: https://www.preventionweb.net/files/62199_actalliancereport1.5c.pdf
- Ali, D. (2018, November 12). Jordan, its Debt and the Mirages of the IMF. Retrieved 10 June 2019, from Orient XXI website: <https://orientxxi.info/magazine/jordan-its-debt-and-the-mirages-of-the-imf,2745>
- Al-Kofahi, S. D., Jamhawi, M. M., & Hajahjah, Z. A. (2018). Investigating the current status of geospatial data and urban growth indicators in Jordan and Irbid municipality: implications for urban and environmental planning. *Environment, Development and Sustainability*, 20(3), 1067–1083. <https://doi.org/10.1007/s10668-017-9923-y>
- Alqadi, K. A., & Kumar, L. (2014). Water policy in Jordan. *International Journal of Water Resources Development*, 30(2), 322–334. <https://doi.org/10.1080/07900627.2013.876234>

- Al-Saidi, M., & Dehnavi, S. (2019). Comparative Scorecard Assessment of Urban Water Pricing Policies—The Case of Jordan and Iran. *Water*, 11(4), 704. <https://doi.org/10.3390/w11040704>
- Al-Zu'bi, M. (2016). Jordan's climate change governance framework: from silos to an intersectoral approach. *Environment Systems and Decisions*, 36(3), 277–301. <https://doi.org/10.1007/s10669-016-9602-9>
- Atamanov, A., Jellema, J., & Serajuddin, U. (2015). *Energy subsidies reform in Jordan. Welfare implications of different scenarios* (Poverty & Equity Global Practice Working Paper No. 035). Retrieved from World Bank website: <https://openknowledge.worldbank.org/bitstream/handle/10986/22051/Energy0subsi00different0scenarios.pdf?sequence=5>
- Baylouny, A. M., & Klingseis, S. J. (2018). Water Thieves or Political Catalysts? Syrian Refugees in Jordan and Lebanon. *Middle East Policy*, 25(1), 104–123. <https://doi.org/10.1111/mepo.12328>
- Bazza, M., Kay, M., & Knutson, C. (2018). *Drought characteristics and management in North Africa and the Near East* (FAO Water Reports No. 45). Retrieved from Food and Agriculture Organization of the United Nations website: <http://www.fao.org/3/CA0034EN/ca0034en.pdf>
- Cockburn, J., Robichaud, V., & Tiberti, L. (2018). Energy Subsidy Reform and Poverty in Arab Countries: A Comparative CGE-Microsimulation Analysis of Egypt and Jordan. *Review of Income and Wealth*, 64(s1), S249–S273. <https://doi.org/10.1111/roiw.12309>
- EcoPeace, & Konrad Adenauer Stiftung [KAS]. (2017). *Water Energy Nexus. A Pre-Feasibility Study for Mid-East Water-Renewable Energy Exchanges*. Retrieved from EcoPeace Middle East; & Konrad Adenauer Stiftung website: http://ecopeaceme.org/wp-content/uploads/2018/03/WEN_Full_Study_Final_Web.pdf
- El-Anis, I. (2016). Explaining the behaviour of small states: an analysis of Jordan's nuclear energy policy. *Cambridge Review of International Affairs*, 29(2), 528–547. <https://doi.org/10.1080/09557571.2015.1018136>
- Farhan, Y., & Al-Shawamreh, S. (2019). Impact of Rapid Urbanization and Changing Housing Patterns on Urban Open Public Spaces of Amman, Jordan: A GIS and RS Perspective. *Journal of Environmental Protection*, 10, 57–79. <https://doi.org/10.4236/jep.2019.101005>
- Fichter, T., Trieb, F., & Moser, M. (2014). Optimized Integration of Renewable Energy Technologies Into Jordan's Power Plant Portfolio. *Heat Transfer Engineering*, 35(3), 281–301. <https://doi.org/10.1080/01457632.2013.825183>
- Gamba, A. (2015). *New Energy Sources for Jordan: Macroeconomic Impact and Policy Considerations* (IMF Working Paper No. 15/115). Retrieved from International Monetary Fund website: <https://www.imf.org/external/pubs/ft/wp/2015/wp15115.pdf>
- Gilmont, M., Nassar, L., Rayner, S., Tal, N., Harper, E., & Salem, H. S. (2018). The Potential for Enhanced Water Decoupling in the Jordan Basin through Regional Agricultural Best Practice. *Land*, 7(2), 63. <https://doi.org/10.3390/land7020063>
- Gilmont, M., Rayner, S., Harper, E., Nassar, L., Tal, N., Simpson, M., & Salem, H. (2017). *Decoupling National Water Needs for National Water Supplies: Insights and Potential for Countries in the Jordan Basin*. Retrieved from West Asia-North Africa Institute website: http://wanainstitute.org/sites/default/files/publications/Publication_DeliveringFoodAndWaterSecurity_0.pdf

- GIZ. (2015). *Climate Change Governance in Jordan: Towards Policy and Institutional Coordination* [Intersectoral Coordination for the Implementation of the Climate Change Policy of the Jordanian Environment Ministry (GF – ICE)]. Retrieved from GIZ website: <http://www.greengrowthknowledge.org/sites/default/files/downloads/policy-database/JORDAN%29%20Climate%20Change%20Governance%20in%20Jordan%20-%20Towards%20Policy%20and%20Institutional%20Coordination.pdf>
- Hammouri, N., Adamowski, J., Freiwan, M., & Prasher, S. (2017). Climate change impacts on surface water resources in arid and semi-arid regions: a case study in northern Jordan. *Acta Geodaetica Et Geophysica*, 52(1), 141–156. <https://doi.org/10.1007/s40328-016-0163-7>
- Hashemite Kingdom of Jordan (The). (2017). *Jordan's Way to Sustainable Development. First National Voluntary Review on the Implementation of the 2030 Agenda* (No. Full report). Retrieved from United Nations, High-Level Political Forum on Sustainable Development website: https://www.unescwa.org/sites/www.unescwa.org/files/events/files/jordan_vnr_2017_en.pdf
- Henderson, S. (2015). *Jordan's Energy Supply Options. The Prospect of Gas Imports from Israel* (Foreign and Security Policy Paper Series No. 2015). Retrieved from The German Marshall Fund of the United States website: <http://www.gmfus.org/file/6752/download>
- Hürçan, Y., Rame, X., Rial, I., & Pamuksuz, S. (2017). *Jordan. Public Investment Management Assessment (PIMA)* (IMF Country Report No. 17/366). Retrieved from International Monetary Fund website: <https://www.imf.org/~media/Files/Publications/CR/2017/cr17366.ashx>
- Hussein, H. (2018a). A critique of water scarcity discourses in educational policy and textbooks in Jordan. *Journal of Environmental Education*, 49(3), 260–271. <https://doi.org/10.1080/00958964.2017.1373620>
- Hussein, H. (2018b). *Jordan-Israel Tensions Threaten to Derail Water-Sharing Project* (IAI Commentaries No. 18 | 01). Retrieved from Istituto Affari Internazionali website: <http://www.iai.it/sites/default/files/iaicom1801.pdf>
- Hussein, H. (2019a). An analysis of the framings of water scarcity in the Jordanian national water strategy. *Water International*, 44(1), 6–13. <https://doi.org/10.1080/02508060.2019.1565436>
- Hussein, H. (2019b). Yarmouk, Jordan, and Disi basins: Examining the impact of the discourse of water scarcity in Jordan on transboundary water governance. *Mediterranean Politics*, 24(3), 269–289. <https://doi.org/10.1080/13629395.2017.1418941>
- International Monetary Fund [IMF]. (2017a). *If Not Now, When? Energy Price Reform in Arab Countries; April 2017 Rabat, Morocco*. Retrieved from International Monetary Fund website: <https://www.imf.org/~media/Files/Publications/DP/2017/GCC-Energy-Pricing-Reforms.ashx>
- International Monetary Fund [IMF]. (2017b). *Jordan : 2017 Article IV Consultation-Press Release; Staff Report; and Statement by the Executive Director for Jordan* (IMF Country Report No. 17/231). Retrieved from International Monetary Fund website: <https://www.imf.org/~media/Files/Publications/CR/2017/cr17231.ashx>
- International Monetary Fund [IMF]. (2017c). *Jordan. Selected Issues* (IMF Country Report No. 17/232). Retrieved from International Monetary Fund website: <https://www.imf.org/~media/Files/Publications/CR/2017/cr17232.ashx>

- International Monetary Fund [IMF]. (2019). *Jordan : Second Review Under the Extended Arrangement Under the Extended Fund Facility, Requests for a Waiver of Nonobservance of Performance Criterion, an Extension of the Arrangement, and Rephasing of Access-Press Release; Staff Report; and Statement by the Executive Director for Jordan* (IMF Country Report No. 19/127). Retrieved from International Monetary Fund website: <https://www.imf.org/~media/Files/Publications/CR/2019/1JOREA2019001.ashx>
- International Renewable Energy Agency [IRENA], & UN Economic and Social Commission for Western Asia [UN ESCWA]. (2018). *Evaluating Renewable Manufacturing Potential in the Arab Region: Jordan, Lebanon, United Arab Emirates*. Retrieved from International Renewable Energy Agency website: <https://www.unescwa.org/sites/www.unescwa.org/files/publications/files/evaluating-renewable-manufacturing-potential-arab-region-english.pdf>
- Khashman, A., Shukri, K., Al-Abbassi, Q., Aliwat, M., Al-Amleh, E., Taweel, S., ... Awawdeh, Y. (2018). *Energy in Jordan. A Youth Perspective Position Paper*. Retrieved from Friedrich-Ebert-Stiftung Jordan & Iraq website: <https://germanwatch.org/sites/germanwatch.org/files/Energy%20in%20Jordan%20-%20A%20Youth%20Perspective%20Position%20Paper.pdf>
- Klassert, C., Gawel, E., Sigel, K., & Klauer, B. (2018). Sustainable Transformation of Urban Water Infrastructure in Amman, Jordan – Meeting Residential Water Demand in the Face of Deficient Public Supply and Alternative Private Water Markets. In S. Kabisch, F. Koch, E. Gawel, A. Haase, S. Knapp, K. Krellenberg, ... A. Zehnsdorf (Eds.), *Urban Transformations: Sustainable Urban Development Through Resource Efficiency, Quality of Life and Resilience* (pp. 93–115). https://doi.org/10.1007/978-3-319-59324-1_6
- Komendantova, N., Ekenberg, L., Marashdeh, L., Al Salaymeh, A., Danielson, M., & Linnerooth-Bayer, J. (2018). Are Energy Security Concerns Dominating Environmental Concerns? Evidence from Stakeholder Participation Processes on Energy Transition in Jordan. *Climate*, 6(4), 88. <https://doi.org/10.3390/cli6040088>
- Mercy Corps. (2014). *Tapped Out: Water scarcity and refugee pressures in Jordan*. Retrieved from Mercy Corps website: https://reliefweb.int/sites/reliefweb.int/files/resources/MercyCorps_TappedOut_JordanWaterReport_March2014.pdf
- Ministry of Energy and Mineral Resources. (n.d.). *Jordanian Oil Shale 2019*. Retrieved from The Hashemite Kingdom of Jordan, Ministry of Energy and Mineral Resources, Petroleum and Oil Shale Directorate website: <https://www.memr.gov.jo/EchoBusV3.0/SystemAssets/PDFs/AR/General/Oil%20Shale.pdf>
- Molle, F., Al Karablieh, E., Al Naber, M., Closas, A., & Salman, A. (2017). *Groundwater governance in Jordan. The case of Azraq Basin* [Policy White Paper]. Retrieved from International Water Management Institute website: <http://publications.iwmi.org/pdf/H048395.pdf>
- Musa, M. (2017). *Amman: Gulf Capital, Identity, and Contemporary Megaprojects*. <https://doi.org/10.4324/9781315558585>
- Mustafa, D., Altz-Stamm, A., & Scott, L. M. (2016). Water User Associations and the Politics of Water in Jordan. *World Development*, 79, 164–176. <https://doi.org/10.1016/j.worlddev.2015.11.008>
- Mustafa, D., & Talozzi, S. (2018). Tankers, Wells, Pipes and Pumps: Agents and Mediators of Water Geographies in Amman, Jordan. *Water Alternatives*, 11, 916.

- Nakayama, M., Fujibayashi, H., & Sasaki, D. (2017). Connecting Jordan to GCC Power Grid: Creation of Geopolitical 'Power' Grid. *Journal of Asian Development*, 3(2), 10–22.
- Nassar, L. (2017). *A Guidance Note for SDG Implementation in Jordan: Water, Energy, and Climate Change*. Retrieved from West Asia-North Africa Institute website: http://wanainstitute.org/sites/default/files/publications/Publication_SDGGuidingNote_English_0.pdf
- OCDE. (2014). *Water Governance in Jordan*. Retrieved from <https://www.oecd-ilibrary.org/content/publication/9789264213753-en>
- Office of the High Commissioner for Human Rights [OHCHR]. (n.d.). UN Treaty Body Database. Ratification Status for Jordan. Retrieved from Office of the High Commissioner for Human Rights website: https://tbinternet.ohchr.org/_layouts/15/TreatyBodyExternal/Treaty.aspx?CountryID=88&Lang=EN
- Quba'a, R., El-Fadel, M., Abou Najm, M., & Alameddine, I. (2017). Comparative assessment of joint water development initiatives in the Jordan River Basin. *International Journal of River Basin Management*, 15(1), 115–131. <https://doi.org/10.1080/15715124.2016.1213272>
- Quba'a, R., El-Fadel, M., Alameddine, I., & Abou Najm, M. (2017). A Positive Apportionment Framework towards Enhancing Cooperation in the Jordan River Basin. *WIT Transactions on Ecology and the Environment*, 220, 3–13.
- Ramana, M. V., & Ahmad, A. (2016). Wishful thinking and real problems: Small modular reactors, planning constraints, and nuclear power in Jordan. *Energy Policy*, 93, 236–245. <https://doi.org/10.1016/j.enpol.2016.03.012>
- REACH. (2015a). *Jordan Emergency Services and Social Resilience Project (JESSRP) Monitoring and Evaluation Framework [Baseline Study - Jordan]*. Retrieved from REACH, & DFID, World Bank, British Embassy in Amman website: https://reliefweb.int/sites/reliefweb.int/files/resources/reach_jor_report_jordan_emergency_services_and_social_resilience_project_baseline_study_may_2015.pdf
- REACH. (2015b). *Social Cohesion in Host Communities in Northern Jordan [Assessment Report - Jordan]*. Retrieved from REACH, & British Embassy in Amman website: https://reliefweb.int/sites/reliefweb.int/files/resources/reach_jor_report_social_cohesion_in_host_communities_in_northern_jordan_may_2015%20%281%29%20%281%29.pdf
- REACH. (2016). *Jordan Emergency Services and Social Resilience Project (JESSRP) Monitoring Study 1 [Monitoring Report - Jordan]*. Retrieved from REACH, & DFID, World Bank, British Embassy in Amman website: https://reliefweb.int/sites/reliefweb.int/files/resources/reach_jor_jessrp_1st_monitoring_round_report_final.pdf
- Regional Centre for Energy Policy Research [REKK]. (2016). *Water demand management in the context of water services. Jordan*. Retrieved from Regional Environmental Centre, Sweden website: http://documents.rec.org/publications/WaterDemandManagement_Jordan_May2017.pdf
- Regional Food Security Analysis Network [RFSAN], & REACH Initiative [REACH]. (2016). *Jordan. Disaster Risk Reduction Assessment. Understanding Livelihood Resilience in Jordan*. [Assessment Report]. Retrieved from https://reliefweb.int/sites/reliefweb.int/files/resources/12122016%20DISASTER%20RISK%20REDUCTION%20ASSESSMENT_V4%20FINAL.pdf

- Rodriguez Lopez, J. M., Tielbörger, K., Claus, C., Fröhlich, C., Gramberger, M., & Scheffran, J. (2019). A Transdisciplinary Approach to Identifying Transboundary Tipping Points in a Contentious Area: Experiences from across the Jordan River Region. *Sustainability*, 11(4), 1184. <https://doi.org/10.3390/su11041184>
- Sixt, G. N., Klerkx, L., & Griffin, T. S. (2018). Transitions in water harvesting practices in Jordan's rainfed agricultural systems: Systemic problems and blocking mechanisms in an emerging technological innovation system. *Environmental Science & Policy*, 84, 235–249. <https://doi.org/10.1016/j.envsci.2017.08.010>
- Skøien, J., Salamon, P., Alagic, E., Alobeiaat, A., Andreenko, A., Bari, D., ... Givati, A. (2018). *Assessment of the capacity for flood monitoring and early warning in enlargement and Eastern/Southern Neighbourhood countries of the European Union* (Science for Policy Report No. EUR 29073EN). Retrieved from Joint Research Centre (JRC), European Commission, European Union website: <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC108843/kjna29073enn.pdf>
- Special Rapporteur on the human right to safe, & Special Rapporteur on the human right to safe drinking water and sanitation [Special Rapporteur]. (2014). *Report of the Special Rapporteur on the human right to safe drinking water and sanitation, Catarina de Albuquerque. Addendum. Mission to Jordan (11 – 16 March 2014)* (Human Rights Council, Twenty-Seventh Session No. A/HRC/27/55/Add.2). Retrieved from UN General Assembly, Human Rights Council website: https://spinternet.ohchr.org/_Layouts/15/SpecialProceduresInternet/Download.aspx?SymbolNo=A%2fHRC%2f27%2f55%2fAdd.2&Lang=en
- UN Economic and Social Commission for Western Asia [UN ESCWA]. (2017). *ESCWA Water Development Report 7. Climate Change and Disaster Risk Reduction in the Arab Region* (No. E/ESCWA/SDPD/20). Retrieved from UN Economic and Social Commission for Western Asia website: <https://www.unescwa.org/sites/www.unescwa.org/files/publications/files/escwa-water-development-report-7-english.pdf>
- UN Economic and Social Commission for Western Asia [UN ESCWA]. (2018a). *Case Study on Policy Reforms to Promote Renewable Energy in Jordan*. Retrieved from UN Economic and Social Commission for Western Asia website: <https://www.unescwa.org/sites/www.unescwa.org/files/publications/files/policy-reforms-promote-renewable-energy-jordan-english.pdf>
- UN Economic and Social Commission for Western Asia [UN ESCWA]. (2018b). *Progress on Shared Water Resources Management in the Arab Region: Regional baseline for SDG Indicator 6.5.2* (Working Paper No. E/ESCWA/SDPD/2018/WP.1). Retrieved from UN Economic and Social Commission for Western Asia website: https://www.unescwa.org/sites/www.unescwa.org/files/publications/files/progress_on_shared_water_resources_management_in_the_arab_region.pdf
- UN Economic and Social Commission for Western Asia [UN ESCWA], & UN Environment Programme [UNEP]. (2015). *Arab Sustainable Development Report* (No. E/ESCWA/SDPD/2015/3). Retrieved from UN Economic and Social Commission for Western Asia website: <https://www.unescwa.org/sites/www.unescwa.org/files/publications/files/arab-sustainable-development-report-1st.pdf>

- United Nations Development Programme [UNDP]. (2014). *Municipal Needs Assessment Report. Mitigating the Impact of the Syrian Refugee Crisis on Jordanian Vulnerable Host Communities - Jordan*. Retrieved from United Nations Development Programme (UNDP), & Host Communities website: <https://reliefweb.int/sites/reliefweb.int/files/resources/118-undpreportmunicipality.pdf>
- Verdeil, É. (2014). The Contested Energy Future of Amman, Jordan: Between Promises of Alternative Energies and a Nuclear Venture. *Urban Studies*, 51(7), 1520–1536. <https://doi.org/10.1177/0042098013500085>
- Verdeil, E. (2014). The Energy of Revolts in Arab Cities: The Case of Jordan and Tunisia. *Built Environment*, 40, 128–139. <https://doi.org/10.2148/benv.40.1.128>
- Weinthal, E., Zawahri, N., & Sowers, J. (2015). Securitizing Water, Climate, and Migration in Israel, Jordan, and Syria. *International Environmental Agreements: Politics, Law and Economics*, 15(3), 293–307. <https://doi.org/10.1007/s10784-015-9279-4>
- Yasuda, Y., Schillinger, J., Huntjens, P., Alofs, C., & de Man, R. (2017). *Transboundary Water Cooperation over the lower part of the Jordan River Basin. Legal Political Economy Analysis of Current and Future Potential Cooperation* [Project Report]. Retrieved from The Hague Institute for Global Justice website: https://www.siwi.org/wp-content/uploads/2018/01/Jordan-Basin-Report_design.pdf
- Zozmann, H., Klassert, C., Sigel, K., Gawel, E., & Klauer, B. (2019). Commercial Tanker Water Demand in Amman, Jordan—A Spatial Simulation Model of Water Consumption Decisions under Intermittent Network Supply. *Water*, 11(2), 254. <https://doi.org/10.3390/w11020254>

References in French

Rapid searches in academic, practitioner, and policy literature in French show that there is a small but meaningful body of information in this language about Jordan's policies and engagement. Several highly relevant search results also turned out to be available in English, and are therefore listed in the subsection on English-language references. The following are additional relevant references in French that remained after this filtering.

- Alaïme, M. (2015). Le paradoxe extraterritorial au cœur des territoires mondialisés. Le cas de la zone économique spéciale d'Aqaba, Jordanie. *Annales de géographie*, N° 705(5), 498–522. <https://doi.org/10.3917/ag.705.0498>
- Ducharme, E. (2015, June 24). La gestion de l'eau en Jordanie face à la « crise syrienne » : entre transition néolibérale et tensions sociales - Métropolitiques. Retrieved 10 June 2019, from métropolitiques.eu website: <https://www.metropolitiques.eu/La-gestion-de-l-eau-en-Jordanie.html>
- Ducharme, E. (2016). Les politiques de mobilité durable à Amman : vecteurs de promotion urbaine et outils de gouvernement contestés. *EchoGéo*, (36). <https://doi.org/10.4000/echogeo.14558>
- Gascone, L., & Feingold, E. (2017). La situation critique des réfugiés syriens en Jordanie entre manque de ressources, hostilité de la population et rapatriements forcés. *Outre-Terre*, N° 52(3), 185–191. <https://doi.org/doi:10.3917/oute1.052.0185>
- Larzillière, P. (2014). Gestion de crise en Jordanie: contestation limitée, réformes bloquées, société divisée. In F. Charillon & A. Dieckhoff (Eds.), *Afrique du Nord Moyen- Orient : l'échec du rêve démocratique* (p. 107-121). Retrieved from <http://hal.ird.fr/ird-01144572/document>
- Legrand, V. (2015). La situation en Jordanie: un aperçu général. In *Annuaire IEMed de la Méditerranée 2014* (pp. 226–229). Retrieved from https://dial.uclouvain.be/downloader/downloader.php?pid=boreal:166366&datastream=PDF_01

Verdeil, É. (n.d.). Jordanie. Retrieved 10 June 2019, from Rumor. Recherches urbaines au Moyen-Orient... et ailleurs website: <https://rumor.hypotheses.org/tag/jordanie>

References in Arabic

Rapid searches in academic, practitioner, and policy literature in Arabic show that there is limited information in this language about Jordan's policies and engagement, beyond official government websites (whose key information is already available in English). Most search results were media reports, which were outside the scope of this report. Several highly relevant search results also turned out to be available in English or French, and are therefore listed in the subsection on English-language references. The following are additional relevant references in Arabic that remained after this filtering.

(No. E/ESCWA/SDPD/2019/INF.1). Retrieved from website: https://www.unescwa.org/sites/www.unescwa.org/files/publications/files/renewable-energy-legislations-policies-arab-region-arabic_1.pdf

(No. E/ESCWA/SDPD/2019/INF.3). Retrieved from website: https://www.unescwa.org/sites/www.unescwa.org/files/publications/files/energy-efficiency-legislations-policies-arab-region-arabic_1.pdf

ندر لأ في تعبيطلا تايمحما في ISO 14000 تولودلا تيسايقا تلسلسا قبيطت. (2018). ز. ن. د. تدمارحلا & .خ. إ. د. وظاظب (قلا د تسارد) تنييلا رطاخما ليلقت في اهرثاؤ. Retrieved from <https://dspace.qou.edu/handle/194/2057>

Key websites

- ClimaSouth – Jordanie: <http://www.climasouth.eu/en/node/26>
- EcoPeace – Publications: <http://ecopeaceme.org/publications/publications/>
- Jordan Response Platform for the Syria Crisis (JRPSC): <http://www.jrpsec.org/>
- Jordanian government – Ministry of Agriculture: www.moa.gov.jo/
- Jordanian government - Ministry of Energy and Mineral Resources: <https://www.memr.gov.jo/>
- Jordanian government – Ministry of Environment: <http://www.moenv.gov.jo/>
- Jordanian government – Ministry of Planning and International Cooperation: <http://www.mop.gov.jo/>
- Jordanian government – Ministry of Water and Irrigation: <http://mwi.gov.jo/>
- PreventionWeb – Jordan: <https://www.preventionweb.net/english/countries/asia/jor/>
- Reliefweb – Updates – Jordan: https://reliefweb.int/updates?primary_country=129#content
- UN ESCWA – Publications – Jordan: https://www.unescwa.org/publications/publications-list?field_publication_type_tid=All&shs_term_node_tid_depth=All&field_sdgs_tid=All&field_publication_year_value%5Bvalue%5D%5Byear%5D=&combine=Jordan
- UNFCCC – Documents – Jordan: <https://unfccc.int/documents%3Ff%5B0%5D%3Dtopic%3A4047?f%5B0%5D=country%3A1306>

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About this report

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