Sida's Helpdesk for Environment and Climate Change

SWEDISH UNIVERSITY OF AGRICULTURAL SCIENCES
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Environment and Climate Change Policy Brief for Yemen

Picture 1: Irrigated terrace cultivation in Yemen.

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Sida's Helpdesk for Environment and Climate Change is a government agency collaboration between the Swedish University of Agricultural Sciences (SLU), University of Gothenburg (GU) and Sida to promote enhanced integration of environmental issues and perspectives in Swedish development cooperation.

Executive summary

Sida's Helpdesk for Environment and Climate Change developed this Environment and Climate Change policy brief after a request from Sida and the Embassy of Sweden in Amman. The policy brief aims to inform the Embassy and Sida in their process of operationalising the regional strategy for the Middle East and North Africa region. The purpose of the report is to summarise the environment and climate change impacts on the poverty situation in Yemen.

The policy brief attempts to respond to the following questions: from an environmental perspective who is poor and why, what are the main risks and stress factors for vulnerable people, and what are their opportunities to escape poverty?

Yemen is an arid country and water scarcity is one of the most critical environmental problems facing the country. In many areas, water tables are falling at an alarming rate, especially in densely populated areas, such as the Sana'a basin. The severity of stress increases significantly at the western and southern highlands. In addition to water scarcity, other key environmental challenges include land degradation, pollution, loss of biodiversity and climate change induced impacts, such as high temperatures, rising sea levels, and floods and droughts. The environment is under significant pressure, for instance from overutilization of water and unsustainable agricultural practices. The problems are compounded by weak state institutions and failed government policies, population growth, a lack of awareness and capacity, and a full scale internationalized civil war.

Even prior to the conflict the country was considered one of the poorest in the Middle East. An estimated 70 percent of the population has minimum access to public electricity, piped water networks, adequate health facilities, schools, and paved roads. Stark inequalities have always existed across governorates and between urban and rural areas, in terms of service provision, food insecurity and access to quality healthcare and electricity. The groups that are most vulnerable and subject to discrimination and exclusion include women, migrants, refugees and IDPs, and other marginalized groups. Two communities in particular stand out in this regard: the Muhamasheen (Akhdam), and Mazayina (artisans). These groups are also the most vulnerable to environmental degradation and poverty.

Resource poverty is severe and widespread and closely linked to access to and control over natural resources. For instance, Yemen faces acute energy poverty. Estimates show that almost 90% of the population is now living without access to public electricity, the majority living in northwestern areas of the county. The lack of electricity not only impacts people's livelihoods, but also hampers the delivery of essential services, such as health and education.

Agriculture supports the livelihoods of about two thirds of the population, however, land ownership (and hence access to water resources) is highly unequal, which severely limits the ability of smallholder farmers to increase their production and earnings. Women are particularly disadvantaged when it comes to land ownership and access to water resources.

As water becomes scarcer, it also becomes more costly, thereby increasingly difficult to access for people living in poverty, particularly for the landless rural population. Today, more than 16 million

people are in urgent need of water, sanitation and hygiene (WASH) assistance, with women, children, and the IDPs being the most vulnerable.

The resource poverty is aggravated by limited power and voice, particularly for the vulnerable groups, and has negative implications on human security and opportunities and choice, which could help people escape poverty.

Natural resources have historically constituted a major source of income for Yemen, particularly fossil resources (oil and natural gas) and agricultural and fish resources. Agriculture and fishery also provide job opportunities, food and household incomes, although this is changing. The water scarcity situation has severely reduced agricultural productivity, and the fishery sector has been hit hard during the course of the conflict, with estimates of over 2 billion USD in financial losses and around 50% of fishermen becoming unemployed. Control over high value natural resources, especially the gas and oil fields, has become a key driver of a war economy.

Recently, the environment in Yemen has come under immense pressure as a result of the internationalised civil war. Control over high value natural resources, especially the gas and oil fields, has become a key driver of the war economy. The conflict has destroyed critical civilian infrastructure, including water and sanitation systems, and disrupted agricultural production, contributing to food insecurity and malnutrition, and led to a perfect storm of both environmental degradation and humanitarian crisis, with more than 80 percent of the population in need of assistance.

The main opportunity for people to move out of acute poverty and reliance on humanitarian aid is to have increased access to and control over resources and services, including water, food, electricity, sanitation and hygiene. For instance, in non-conflict areas where there is access to water resources there is an opportunity to improve food security through rehabilitation of the agricultural infrastructure. At the same time, it will be absolutely necessary to start managing the scarce water resources in a more efficient and equal manner. For instance, reduce the production of qat and other crops using much water, to more water efficient crops. The farmers would likely also benefit from training, sustainable and climate resilient agricultural inputs (drought resistant seeds, etc.) and be able to access support (e.g. extension services) at a regular basis.

Increased and more equitable access to cheap and clean electricity may be another opportunity for poor women and men, boys and girls to access more opportunities through education and health care facilities.

One key aspect, considering the low level of power and voice, is to make sure that all stakeholders are able to participate in a meaningful way in development activities, to promote climate resilient and sustainable development and avoid maladaptation.

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Definitions: Environment and Climate Change

- **Environment**: The concept has a wide coverage including natural resources, land use, biodiversity and ecosystem functions and services, and encompasses aspects related to climate change, resource depletion, environmental degradation and pollution. Climate change is included when environment is mentioned, even if it is not always explicitly expressed.
- **Climate change** is a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (UNFCCC, Article 1)
- **Environmental integration** (or environmental mainstreaming) refers to the systematic integration of environment into all domains. It is understood as a "strategy to make environment an integral dimension of the organisation's design, implementation, monitoring and evaluation of development policies and programmes"[1]. Sida's view on environmental integration includes measures to identify and i) reduce negative impacts, ii) enhance opportunities and iii) reduce/manage environmental impacts on the sustainability of the contribution. Sida's requirements on environmental integration is further detailed in Sida's Green Toolbox.
- **A crosscutting issue** is an issue that is linked with, or related to, other concerns. Although sometimes seemingly unrelated, the crosscutting issue can be affected by, or influence the outcomes of, interventions in a different area or sector. The underlying perspective is that different parts of a system are interconnected. Environment is treated as a crosscutting issue that permeates sectors, projects, and activities, rather than being the main focus of the activities.
- **Direct environmental impacts**: impacts that derive directly from the organisation and its staff, and direct activities, e.g. travels, electricity consumption, procurement (e.g. office supplies, catering, cleaning supplies, etc.), waste, etc.
- **Indirect environmental impacts**: refer to impacts associated with the programs/projects, for instance support to capacity development, infrastructure development, natural resource management, advocacy, or other types of development cooperation.

[1] OECD DAC (2014)

1. Background and approach

This Environment and Climate Change policy brief has been developed after a request of the Embassy of Sweden in Amman and the Unit for Middle East and North Africa at Sida.[2] The policy brief aims to inform the Embassy and Sida in their process of developing a Multidimensional Poverty Analysis (MDPA), to better understand the dynamics, dimensions and drivers of poverty in Yemen. The MDPA will, in turn, inform the operationalisation of the Regional MENA Strategy 2021-2025.

The **purpose** of this policy brief is to identify key environmental and climate change challenges and opportunities and describe how they link to **multi-dimensional poverty** aspects in Yemen.

The assignment was conducted as a desk-study during three weeks in March-April 2022. It is based on publicly available reports, research papers and statistics.

It should be noted that reliable information and statistics on environment and climate change issues pertaining to Yemen has to some extent been a challenge to obtain. Much information is from secondary sources, e.g. World Bank, UN or NGOs. This should be considered when reading this policy brief.

2. Key environment and climate change issues

The purpose of this chapter is to provide a summary of key environmental information, problems/ challenges, causes and key drivers in the Republic of Yemen. Here, environment is defined broadly and includes natural resources, land use, biodiversity, ecosystem functions and services, and encompasses aspects related to climate change, resource depletion, environmental degradation and pollution. An additional purpose of the chapter is to present relevant environmental indicators and, wherever possible, trends.

2.1. Environmental context

Situated in the southern tip of the Arabian Peninsula, Yemen is an arid Middle Eastern country with a total land area of just over half a million square kilometers, about the size of Sweden. Despite its small size, Yemen is one of the most diverse countries in the region in terms of its topography. The country can be divided into five major natural regions: (1) the hot and humid coastal plain, (2) the temperate Yemen highlands, (3) the Yemen High Plateaus and Hadramawt-Mahra Uplands, (4) the desert interior, and (5) the islands. In addition, the country has a long coastline of over 2000 kilometers along the Gulf of Aden, Arabian Sea and the Red Sea.[3] The country's diverse topography results in a similarly diverse climate, with an average annual temperature range of 20-30°C and an

[2] The views expressed in this Environmental Policy Brief are those of the authors and do not necessarily represent the views of Sida or the Embassy of Sweden in Amman.
[3] World Bank et al., 2011

average annual rainfall that varies from 50mm in coastal and desert areas to about 600mm in Western mountainous highlands.[4]

2.2. Key environmental and climate change issues

Yemen's environment is under pressure from a range of challenges, including water scarcity, land degradation, pollution, loss of biodiversity, along with climate change induced impacts, such as rising sea levels, floods and droughts. These problems are compounded by weak state institutions, a lack of awareness and capacity, and a full scale internationalized civil war now in its seventh year.

Water scarcity: Water scarcity is one of the most critical environmental problems facing Yemen today. With no permanent surface water bodies such as rivers, the country relies heavily on sparse rain and underground aquifers for its water needs. However, the latter too is under stress due to over-extraction, particularly in the agricultural sector that accounts for around 90% of water usage. In many areas, water tables are falling at an alarming rate, especially in densely populated areas. For instance, in the Sana'a basin the extraction rate is estimated at five times recharge, with water stress levels ranging from 23% to 26%. The severity of stress increases significantly at the western and southern highlands, with levels ranging between 67% and 89% (see Figure 5, Annex 4).[5] At the current rates of extraction, it is likely that a number of aquifers will be depleted by 2025[6].

What has largely contributed to this problem is a weak water governance at both the national and local levels, as well as a series of failed government policies that have encouraged the overextraction of groundwater. The latter includes fuel subsidies that have made it cheaper to pump water for irrigation, as well as trade policies that have incentivized the exports of water-intensive crops. A 2002 water law that was supposed to regulate water usage through the prohibition of arbitrary drilling of wells has largely failed due to a lack of enforcement. It was further made toothless by a government decision to transfer the responsibility for the irrigation sector to the Ministry of Agriculture and Irrigation, the institutional home of large landowners.[7]

In addition to the over extraction of ground water, water scarcity is also exacerbated *by population growth (averaging 3 % per annum), increasing urbanization, conflict and climate change*. The result is that Yemen now has one of the lowest per capita water availability levels in the world, at just 85 cubic meters per person per year, compared to an average of 550 cubic meters in other Middle Eastern and North African countries.[8]

Land degradation: Although the agricultural sector supports the livelihoods of two thirds of Yemenis, only around 2-3% of the country's land is suitable for farming.[9] According to the Anti-Desertification Unit at the Forests and Desertification Control (FDCD), 95% of Yemen's agricultural land is at risk of

[4] ICRC, 2021.
[5] Ministry of Planning and International Cooperation, 2021.
[6] Lackner, 2020
[7] Lackner, 2020
[8] World Bank, Renewable internal freshwater resources per capita (cubic meters).
[9] World Bank, Arable land (% of land area) - Yemen, Rep.

deterioration and desertification[10], which is happening at a rate of about 3-5% per annum[11]. This alarming statistic is attributed to a range of natural and man-made factors. On the natural side, these include *topography and slope, geology and soils susceptibility to erosion, along with other natural calamities, such as droughts, floods, and dust storms* that are further compounded by *climate change*.[12]

Man-made causes of land degradation include *unsustainable agricultural practices,* such as the overuse of pesticides and fertilizers, *the overgrazing by domestic animals, the cutting down of trees for fuel wood and charcoal, and the overexploitation of water resources*. In addition, there is also the problem of *uncontrolled urbanization and construction*, which lead to the abandonment of agricultural land.[13] All of these have contributed to land degradation, particularly in the form of soil erosion that has left large parts of the country barren and unproductive. These problems are also being e*xacerbated by the conflict, especially by the widescale use of* unexploded weapons, which are preventing farmers from returning to their farmlands.[14] *Ineffective government regulation and weak law enforcement are also key obstacles preventing adequate response to these problems.* For instance, there has been a rise in the use of illegal fertilizers and pest control products after the outbreak of the conflict, encouraged by the flourishing of smuggling networks and loss of sanitary controls at ports.[15]

Pollution: Prior to the conflict, the main sources of pollution in Yemen were from *vehicular emissions[16], sewage treatment plants, along with agricultural and industrial activities*. Water basins are vulnerable to pollution from agricultural run-off, particularly in the case of pesticides and fertilizers, as well as untreated sewage and industrial effluents. The desert locusts, and the chemicals used to combat them, constitute significant risks of toxic pesticide pollution if not manged properly. The dilapidated and old piped water network also means that a lot of sewage is discharged directly into water bodies, resulting in waterborne diseases.[17] The *oil industry* has also been a major source of air and water pollution, particularly in Hadhramaut, Shabwah, and Marib, which are the main oil-producing governorates. In fact, a recent study has confirmed the link between human and livestock diseases, including cancer, and hydrocarbon exploitation at least in Hadhramaut.[18]

The *conflict* has also led to a significant increase in pollution. This is largely due to the use of weapons containing toxic materials in highly populated areas and the use of unexploded weapons, such as landmines, cluster munitions, and improvised explosive devices. These weapons have largely limited access to agricultural land even when the descalation of fighting permitted people to return to their areas, rendered large swaths of agricultural land unusable and further exacerbating the food security crisis.[19] Attacks on farmlands and agricultural infrastructure were most prevalent in the central

[10] The New Humanitarian, 2007.
[11] Lackner, 2020.
[12] Ministry of Agriculture and Irrigation, 2000.
[13] Darbyshire, 2020.
[14] Al-Mowafak, 2021.
[15] Darbyshire, 2020.
[16] The New Humanitarian, 2008.
[17] The New Humanitarian, 2009.
[18] Altamimi et al., 2019.
[19] Al-Mowafak, 2021.

upland areas along with Tihamah and the north western uplands (see Annex 7). Some of the weapons release thick clouds of smoke containing hazardous toxins, such as PAHs, dioxins and furans, which have long-term impacts on human health.[20] Critical infrastructure such as wastewater treatment plants have also been damaged or destroyed in the conflict (see Annex 5),[21] contributing to the outbreak of cholera, with over 2.5 million suspected cases already documented (see Annex 4).[22] This situation was further exacerbated by the destabilization of waste governance structures, leading to piles of uncollected garbage in the streets, which sometimes would wash into water supply (see Annex 4).[23] Estimates show that only 40% of waste is collected, with a poor waste disposal that uses open dumping or burning that exacerbates air pollution, or even burying, which can lead to soil and water contamination.[24]

Loss of biodiversity: Yemen is home to a wide variety of plant and animal species, many of which are exclusive to the country (see Annex 1). For example, it is estimated that over 25% of plants in Yemen are endemic. The Island of Socotra (included in UNESCO's Word Natural Heritage list for harboring globally important biodiversity and a high proportion of endemics) alone hosts over 825 plant species, of which 37% are endemic. However, this biodiversity is under threat from a number of factors, *including habitat loss and fragmentation, over-exploitation, pollution, weak environmental governance, lack of awareness, and climate change*.[25]

Compounding the pressure on biodiversity is *the destabilization of environmental monitoring and governance systems due to the conflict*, with reports of unchecked illegal hunting of endangered wildlife, such as the Arabian leopard, the cheetah, and the Arab mountain gazelle[26], along with logging in protected areas, including in Jabel Bura'a National Park, which was designated as a biosphere reserve by UNESCO in 2011.[27] Additionally, UAE's occupation of the Island of Socotra is also having a negative impact on the island's unique ecosystem. This is manifested in the form of UAE's *military bases and major infrastructure projects* that are being carried out without any regards to environmental impact assessment[28], as well as other environmental transgressions, including overfishing, illegal trade in endemic species, increased waste, and infringing on the island's cultural fabric (see Annex 7).[29]

Climate change: Although Yemen is one of the least contributors to global greenhouse gas emissions, the country is among the most vulnerable to the impacts of climate change. This is due in large part to its location, as it is situated within what is known as the "climate change hotspot" in the Arabian Peninsula. For the past few years, Yemen has experienced a range of climate-induced shocks, including flash floods, droughts, and unprecedented cyclones (see Annex 3). These extreme weather events have an adverse impact on agriculture, hence food security, with agriculture activities in the

[20] AbdulKareem, 2020.
[21] Reuters, 2016.
[22] WHO, 2021.
[23] Fenton, 2021.
[24] Ministry of Planning and International Cooperation, 2021.
[25] Ministry of Water and Environment, Environmental Protection Authority (EPA), 2017.
[26] Holm Akhdar, 2020.
[27] Weir, 2021.
[28] Dunais, 2019.
[29] Holm Akhdar, 2021 (AR).

coastal plains and deserts being the most vulnerable.[30] The 2020 torrential rains and the resultant flooding alone impacted nearly half a million people and led to the collapse of many houses along with inflicting damages to basic infrastructure.[31] Some of the most affected areas are in Hajjah, Hudaydah, Marib, Sana'a city, Sana'a governorate, Aden, Lahj, and Hadramout, with displacement sites, such as in Marib, being particularly hardly hit. The floods damaged for instance the agricultural terraces, obstructing food production, and led to displacement of around 90,000 people[32]. Historical World Heritage sites, such as the Old City of Sana'a and Shibam, were also affected by the floods, along with thousands of unique endemic species in the UNESCO-listed Socotra archipelago.[33]

In addition to the immediate impacts of climate shocks, Yemen is also experiencing the effects of short – and long-term climate change, such as rising temperatures and changes in rainfall patterns. Over the past few decades, there has been a steady increase in temperature at a rate of approximately 0.39°C per decade, along with a decrease in average rainfall at a rate of 1.2mm per month (-9%) per decade. These changes are projected to continue, with temperatures expected to increase by 1.2°C to 3.3°C by 2060, and rainfall patterns becoming more erratic and unpredictable. The increase in temperature and rainfall in coastal areas, specifically the western Tihama region (Hudaydah/Hajjah) and the southern city of Aden, are largely contributing to the outbreak of vector borne diseases such as malaria, dengue fever, and chikungunya, with tens of thousands of recorded cases.[34]

The rising sea levels are also a cause for concern, as they are projected to increase by up to 0.54m by the end of the century.[35] Three of the country's major cities - Aden, Al Hudaydah, and Mukalla - are already suffering from increased salinity of aquifers as a result of sea level rise, which have caused the deterioration of the water supply, as well as agricultural production on the coastal plains.[36] In some areas, like the Tihamah region, aquifers' salinity is further driven by over extraction of groundwater.[37] Such changes will have a profound impact on the country, particularly in relation to water availability, agriculture, and the economy.

3. Who is poor and in what way?

Poverty is a multidimensional phenomenon that cannot be adequately captured by income-based measures alone. This chapter uses the Sida model for multidimensional poverty analysis (MDPA) to identify who is poor and in what way, based on four dimensions of poverty: (i) Resources, (ii) Opportunities and choice, (iii) Power and voice, and (iv) Human security.

When we look at poverty from a multidimensional perspective, it is clear that Yemen is a country in which poverty is widespread and deep. According to the Human Development Index (HDI) for the

[30] USAID, 2016.
[31] Al-Akwa et al., 2021.
[32] Personal contact with Walid Saleh, FAO.
[33] Lackner et al., 2020.
[34] Holm Akhdar, 2020.
[35] ICRC, 2021.
[36] Lackner et al., 2020.
[37] CEOBS, 2021.

year 2022, Yemen ranks 174 out of 186 countries, with a HDI value of 0.463 - which is classified as one of the world's least developed countries (LDCs). [38] This is indicative of the country's poor performance in a number of key areas, including health, education, standard of living, along with government stability. Even prior to the conflict, the country was considered one of the poorest in the Middle East, with 40% of the population living on less than 2 USD per day. Stark inequalities have always existed across governorates and between urban and rural areas, in terms of service provision, food insecurity and access to quality healthcare and electricity. The country's Gini Index[39] for income inequality was reported at 36.7 in 2014, slightly lower than the world's average of 38.8, but it's likely to be higher after the conflict.[40]

According to the UNDP, poverty in Yemen skyrocketed from a national rate of 47% in 2014 to a staggering 75% in 2019, with projections suggesting that it could reach as high as 79% by 2022.[41] This increase is largely due to the conflict, which has led to a deterioration in living conditions and a decline in economic activity. The conflict has also exacerbated existing inequalities, with the poorest and most vulnerable people bearing the brunt of the humanitarian crisis. Women and ethnic minority groups, such as the Muhamasheen, are particularly vulnerable, as they are often excluded from decision-making processes (section 3.3) and lack access to resources (section 3.1) and opportunities (section 3.2) which could help them to escape poverty.

The population in Yemen is estimated to be 31 million, the majority of which (around 70%) live in rural areas. The country's high population growth rate, currently at 2.18%, along with increasing urbanization and conflict- and climate-related displacement are putting immense pressure on already stretched services, resources, and employment opportunities. This is particularly evident in the case of water, where the per capita availability of water is declining to as little as 55 cubic meters by 2031, well below the 500 cubic meters threshold for "absolute water scarcity," according to the Falkenmark Indicator, a common measure of water stress.[42] The conflict also significantly reduced economic growth, with ever-rising unemployment, the collapse of salary payments to public servants, the devaluation of Yemen's currency, and the blockade on fuel, food, and aid imports, which further pushed the population into abject poverty.

3.1. Environment and the *Resource* dimension of poverty

Resources are a key feature of environmental linkages to multidimensional poverty. Being poor in terms of resources means not having access to, or power over, good quality environmental resources needed to sustain a decent living standard. Environmental resources necessary for human wellbeing include: water and sanitation, energy, forests, biodiversity and ecosystems, land and fertile soil, and clean air. In order for people to make use of the resources they need to be available, accessible, affordable, appropriate and of good quality.

[38] World Population Review, 2022.
[39] The Gini Index is a summary measure of income inequality. A Gini index of zero represents perfect equality and 100, perfect inequality.
[40] Moyer et al., 2019.
[41] UNDP, 2019.
[42] White, 2012.

Access to energy: Despite being a net energy exporter, Yemen faces acute energy poverty. This means that a large segment of the population still relies on fuelwood and other biomass for cooking and heating, as they do not have access to modern energy services. Although the residential sector accounts for most of the energy consumption in Yemen, at 65%, only 40% of the population had access to electricity in 2014. The disparity is even more stark when looking at rural-urban differences, where only 23% of the rural population had access to electricity compared to 85% in urban centers.[43] In addition, communities living in slums, such as Muhamasheen and IDPs, are generally deprived from access to electricity, whether before or after the conflict.

Today, public electricity is almost non-existent, largely due to the physical and non-physical damage to the country's energy infrastructure caused by the war. Estimates show that almost 90% of the population is now living without access to public electricity, the majority living in northwestern areas that are under the control of the Houthis. The lack of electricity not only impacts people's livelihoods, but also hampers the delivery of essential services, such as health and education. In 2020, only 50% of health facilities were operational, with the majority of those struggling to operate without a reliable source of energy.

Surprisingly, Yemenis were quickly able to adapt to the new reality and started using solar panels and other means to produce their own electricity. By 2016, around 75% of the urban population, and 50% of rural households were already using small solar systems as their main source of energy. The remainder relied on self-generated power, such as diesel generators, or had no access to electricity (see Figure 9, Annex 4). Wealth disparities, however, have limited access to good quality solar technologies to those who can afford it. Indeed, a 2017 World Bank Group phone survey found that only 10% of households using solar panels stated that the energy provided by the solar system is sufficient for their needs. Wealthier households also continue to rely on diesel generators for heavier energy needs such as water pumps and refrigeration, despite fuel crisis.[44] The geographical distribution of solar systems, mostly found in the county's northwest, also shows that the solar revolution was born out of necessity since these areas were the ones most impacted by the electricity crisis, as opposed to southern and eastern regions who had better access to public supply and fuel (see Figure 8, Annex 4).[45]

Access to land: Agriculture is another key sector of the Yemeni people and economy. Despite the limited cultivable land, agriculture supports the livelihoods of about two thirds of the population and accounts for about 16% of GDP, and 14% of exports. [46] This sector is a key economic development driver in rural areas and is an important source of food security. However, agriculture is highly water intensive, and with water availability rapidly declining, it is becoming increasingly difficult for farmers to secure the water they need for irrigation. In addition, agricultural production, and access to water, are both dependent on land access and ownership.

In Yemen, land ownership is highly unequal, with large tracts of land owned by a small number of elites. Ambiguities in the legal system surrounding land ownership, as well as a lack of an effective

[43] Almohamadi, 2021.
[44] Badiei, 2018.
[45] Ansari et al., 2019.
[46] Ministry of Planning and International Cooperation, 2021, Agriculture in Yemen.

registration and titling system, have contributed to this inequality. The country's military, and members of the former Saleh regime patronage networks, have used their power to appropriate large tracts of land, often from the old South Yemen.[47] Following Yemen's National Dialogue Conference recommendations in 2013-2014, President Hadi established two committees to look into the issue of land reform and dispute resolution. By 2014, the Committees had received 100,000 cases in the south, mainly in Aden and Abyan, and 2,025 grievances from Hudaydah, all of which represent less than 4% of the total number of cases related to land grievances.[48]

When it comes to agriculture, the cultivated area is distributed very unevenly, as small farms (less than 2 hectares) make up 62% of farmlands, whereas large farms (more than 10 hectares) account for only 4%.[49] The large farms are generally owned by a small number of elites, often members affiliated with the former ruling regime or other politically connected individuals, while the small farms are generally owned by poor smallholder farmers. This unequal distribution of land severely limits the ability of smallholder farmers to increase their production and earnings, as they lack the resources to invest in irrigation and other inputs, forcing many to sell their lands and move to urban areas in search of work.

Women are particularly disadvantaged when it comes to land ownership. According to data from the Ministry of Planning and International Cooperation, women make up more than 50% of agricultural work force, more than 90% of livestock grazers, and perform 75% of cultivation activities in Yemen. Despite this significant role, women, especially rural women, have very limited access to land and water resources.[50] It is generally difficult to find data on women's land ownership specifically in Yemen, but according to one study by the World Bank, women are estimated to own only around 3% of all land titles in the country, the majority of which is believed to be purchased by wealthy women rather than inherited.[51]

One of the main reasons for this disparity is Yemen's patriarchal customs rather than Sharia Law or Yemeni Laws. In some areas, such as Shabwah, Yaffie, and several villages in Taiz, women are not allowed to inherit or even own land, regardless of their social or economic status. Generally, women relinquish their inherited land to their male relatives in exchange for a small gift, such as a sheep, which often leaves them landless and economically dependent, further entrenching them in poverty.[52]

Of course, women are not the only ones facing discrimination when it comes to land ownership in Yemen. Caste and ethnic minorities, as well as other marginalized groups, such as migrants, refugees, and IDPs, also suffer from discrimination and exclusion. Two communities in particular stand out in this regard: the Muhamasheen (Akhdam), and Mazayina (artisans).

The first are a marginalized, impoverished community with unclear origins, although some describe them to be of East African descent. Discrimination against Muhamasheen manifest in various ways,

[47] Hill et al., 2013.
[48] Housing and Land Rights Network.
[49] USAID, Property Rights and Resource Governance.
[50] Ministry of Planning and International Cooperation, 2021, Agriculture in Yemen.
[51] World Bank, 2009.
[52] World Bank, 2009.

blending elements of racism, due to their darker skin color, and a caste system, due to their unclear descent. By custom, Muhamasheen do not own land, and often establish illegal slums on public land in the outskirts of cities. In rural areas, they are even prohibited from buying land, and instead are forced to work for wealthier landowners or tribal leaders.[53]

The Mazayina, on the other hand, are a group with low social status, relative to those of tribal or Hashemite descent, mainly due to their occupations (butchers, barbers, singers, shoemakers, etc.) Members of this caste do not have land of their own, and often do not intermarry with landowning families due to the stigma, further depriving them from land inheritance.[54]

The country's large population of IDPs are also facing precarious land tenure situations. According to UNHCR, as of March 2022, there are around 4.3 million IDPs in Yemen, most of whom have fled their homes due to the conflict. While some IDPs have been able to find shelter with host families or in rented accommodation, around 1.6 million are living in camps or makeshift settlements, with much uncertainty about their ability to return to their homes. Many displaced people are under the threat of undergoing a second displacement wave, mostly due to flooding or conflict escalation, such as the case in Marib which hosts around 1 million of Yemen's IDPs population. Within this population, women and children, who make up around 79% of IDPs, are the most vulnerable to exploitation and abuse as well as limited access to WASH services.[55]

Access to water: Given the interdependence between land ownership and access to water, landless groups are also at a disadvantage when it comes to access to water resources. Since Yemen lacks permanent surface water sources, such as rivers and lakes, communities rely on temporary surface water flows, such as wadis, and groundwater aquifers, which accounts for about 70% of water supply in the country.[56] It is estimated that between 45,000 and 70,000 wells exist in Yemen, the majority of which are under private control. Although the government issued a law prohibiting the drilling of new wells without a permit in 2002, the law was rarely enforced. [57]

In the absence of effective government regulation, this setting produced multiple types of inequalities in water access. The first is between upstream and downstream communities, as the former often has priority over the latter in terms of utilizing surface water flows. The second is between wealthy landowners who have the financial means to drill more, and deeper, wells in their lands, and poor smallholders. The third is between farmers and community members, with the former consuming huge portions of water for irrigation (90 % of water resources), leaving the latter with little or no water for drinking or domestic use. Finally, there is an urban-rural inequality, as rural communities often lack the infrastructure and financial means to access water resources, compared to their urban counterparts,[58] and have significantly less access to all WASH services (see Figures 2-4

[53] Al-Warraq, 2019.
[54] World Bank, 2009.
[55] UNHCR, 2022.
[56] Herzberg, 2018.
[57] Lichtenthaeler, 2010.
[58] Jagannathan et al., 2009.

in Annex 4). These inequalities, in turn, often lead to conflicts over water resources, with thousands of reported casualties each year (see chapter 3.4).[59]

Access to water is also assessed based on affordability and quality. According to the UNDP, only 22% of rural and 46% of urban populations are connected to the municipal piped water network (see Annex 4).[60] These networks, however, are often unreliable, and long waiting times are common. Prior to the conflict, connected households in Sana'a received water twice per week, whereas in Taiz they received it once every 40 days.[61]

The conflict exacerbated this already dire water situation by destabilizing water and sanitation services and damaging or destroying water networks and storage facilities (see Annex 5). Now more people rely on private water tanker trucks to supplement their water needs, which comes at an increasingly high price. According to a 2018 report by the World Bank, the cost of water supplied by tankers cost seven times the price of municipally supplied water in Sana'a, whereas it costs 25 times as much in Aden.[62] These prices are also impacted by the recurring fuel crisis, since fuel is needed to operate the pumps extracting water from the ground and to transport it to people's homes. Those who cannot afford these prices get free water from standpipes, mosques and charity organizations. TToday, more than 16 million people are in urgent need of water, sanitation and hygiene (WASH) assistance, with women, children, and the IDPs being the most vulnerable.[63]

Also **access to sanitation** is unequal, with around 80% of urban and 40% of the rural population having access to improved or basic sanitation, and as much as 15% of the rural population practising open defecation. The inequality remains also for access to **hygiene**, with 70% of urban and 36% of rural population having access to basic hygiene services (see Annex 4).[64]

Access to marine resources. Fish is an important source of livelihoods and protein for the population living close to the coast. During the past two decades, trawlers have destroyed much of the marine environment around Socotra, even fairly close to the land, thus dramatically reducing fisheries catches and the ability of the population to live from local resources and therefore worsening poverty locally. Most of these are foreign fishing vessels, particularly from Iran and South Korea, operating in the vicinity of the Socotra archipelago and threatning its diverse marine life and the local livelihoods it supports (see Annex 7).

3.2. Environment and the *Opportunities and Choice* dimension of poverty

All the deprivations described in the previous chapters, and the challenges of Yemen to attain the SDGs (see Annex 2), are strongly linked with lack of opportunities and choice. Being poor in terms of opportunities and choice means that people lack the possibility to use available environmental

[59] Small Arms Survey, 2010.
[60] UNDP.
[61] Whitehead, 2015.
[62] Abu-Lohom et al., 2018.
[63] UNICEF, WASH.
[64] WHO & UNICEF JMP, 2021.

resources and ecosystem services for their own benefit, to lift themselves out of poverty. This is often the case in rural areas of Yemen, where people rely on natural resources for their livelihoods but do not have the rights or access to use them. This is particularly true for women, who often face more barriers than men when it comes to accessing and using natural resources.

The **water crisis** affects people's opportunities and choice. For instance, villages in different parts of the country have already been evacuated due to the exhaustion of local aquifers. The qat production poses a particular problem as it consumes much water, leading to low water availability for smallholders' shallow aquifers, thereby preventing them from cultivating their land and thus earn an income, eventually forcing them to sell their land and become landless laborers in agriculture or in the cities. Many rural people suffer from water scarcity, and the situation is deteriorating rapidly due to population growth, the increased use of diesel-operated pumps and deep drilling technology for water for irrigation, and destruction of agricultural terracing due to heavy rains.[65]

Gender roles often leave women and children with the task of collecting water, which can take several hours a day and limit their ability to participate in other activities, such as income-generating work or school. As the war continues, families are forced to choose between sending their children to school or making them work to support the family, with girls often being pulled out of school first. Indeed, out-of-school rates are higher for girls, as they represent 63% of the total dropout children in Yemen.[66] It is often the families concern for the safety of their daughters that leads to this decision, especially given the lack gender-sensitive WASH facilities and long distance to schools. Other times, early marriage pulls girls out of school.

Yemen's rigid gender roles have eased somewhat since the start of the conflict, as women have had to take on additional responsibilities traditionally reserved for men.[67] Yet, the economic inequality between men and women remains a big challenge, as women perform unpaid work in the household and are paid less than men for their work in the labour market. This is especially true in rural areas, where women make the majority of agricultural labour, but own less than 1% of agricultural land and earn 30% less than men on average.[68] In fact, a 2018 UNFPA report found that poverty rates are highest among female-headed households in rural areas of Yemen, at 72%. A number of factors contribute to this, including women's lack of access to agricultural inputs, equipment, and agro financing, along with a high rate of illiteracy.[69]

In 2020, Yemen ranked the last out of 155 countries on the World Economic Forum's Global Gender Gap Index, which measures gender equality in four main areas: economic participation and opportunity, political empowerment, educational attainment and health and survival. The data show a very low labour force participation rate, 6% for women compared to 72% for men, and a large gender gap in professional and technical work, as well as in senior roles. In addition, women's literacy rates are much lower than men's, at just 35% compared to 73% respectively.[70] Other factors limiting

[65] Lackner, 2020
[66] Care International, 2016.
[67] Abdullah, 2022.
[68] Care International, 2016.
[69] Ministry of Planning and International Cooperation, 2021, Agriculture in Yemen.
[70] World Economic Forum, 2020.

women's economic opportunities and choices include early marriage, as well as social and cultural norms that restrict women's mobility.

Tenure insecurity is affecting opportunity and choice. It promotes short-term exploitation instead of long-term sustainable management of the resources, which can have long-term negative impacts on the quantity and quality of the natural resources and ecosystems.

Agriculture has traditionally provided the key livelihood opportunity, as well as the most important non-oil sector of the economy. However, agricultural productivity remains low, and the conflict has severely disrupted access to markets, transportation, and distribution (see Annex 5). The conflict has impaired production conditions, for instance resulting in a shortage of inputs (e.g. seeds, fertilizer and fuel), damage to agricultural machinery, irrigation systems and storage facilities along with a deterioration of water, sanitation and electricity services, and a breakdown of logistical chains. Farmers have shifted from irrigated to rain fed crops, reducing yields, and is increasingly relying on family labour instead of on hired workers.[71]

Bad health also affects people's opportunities and choice, for instance through low school attendance and reduced productivity. The most significant health risk factor in Yemen is malnutrition. In addition, the low access to improved WASH and inadequately managed water resources cause health problems (see Annex 4). CIA estimates that there is a high degree of risk for food or waterborne diseases (e.g. bacterial diarrhoea, hepatitis A, and typhoid fever) and vector borne diseases (dengue fever and malaria). The latter have been exacerbated by the impacts of climate change, such as increasing temperatures and rainfall especially in coastal areas (see chapter 2.2). As mentioned before, Yemen has also been facing serious cholera outbreaks at nearly 2.5 million cases (see Annex 4). Furthermore, the conflict has created a severe humanitarian crisis, with more than 7 million people at risk of famine, and more than 80% of the population in need of humanitarian assistance.[72]

Yemen's large population of **internally displaced persons** (IDPs) is also among the most vulnerable to poverty in terms of opportunities and choices. Displacement is not new to Yemen, yet the conflict has exacerbated the problem, with an estimated four million people displaced since 2014, of which the overwhelming majority (76%) are women and children.[73] **Natural disasters**, mainly floods, triggered additional 335,172 displacements between January and September of 2021 (see Annex 3).[74] Today, around 1 million IDPs live in makeshift settlements, which puts them at increased risk of secondary displacement when floods or other disasters hit. [75]

It is important to understand that displacement is not only a physical process but also social and economic one, which often leads to the loss of livelihoods, housing, and social networks. Many of the IDPs were forced towards unsustainable coping mechanisms, such as the over reliance on aid. For instance, the International Organization for Migration reports that around 73% of the displaced

[71] UN, 2021
[72] CIA World Factbook, Yemen.
[73] Beuze, 2021.
[74] Shelter Cluster Yemen, 2021.
[75] Ministry of Planning and International Cooperation, 2021, Environmental Situation.

population in Al Dhale'e governorate are farmers who were driven from their lands and unable to find work.[76] In addition, IDPs often have difficulty accessing essential services, such as healthcare, education, and water and sanitation, with women and children facing additional risks of violence, exploitation, and sexual abuse. In fact, IDPs are more likely to face inadequate food consumption, as 43% of them are unable to meet minimum food needs.[77]

One of the most vulnerable and overlooked population are migrants and refugees. It is estimated that around 283,000 migrants and refugees are living in Yemen, mainly from Ethiopia and Somalia. Most of them live in urban areas in Aden and Sana'a, and to a lesser extent in Mukalla and Lahj. Migrants and refugees face numerous challenges in Yemen, such as a high rate of unemployment, especially given the collapse of Yemen's economy due to the conflict. In addition, they are often confined to informal settlements with inadequate access to water, sanitation and healthcare. They also have limited access to education and are at increased risk of exploitation, violence, and abuse.[78] For instance, some migrants are forced to work on farms to pay off their debts, while others, in particular women and children, are at an increased risk of being trafficked. Yemen is a transit stop for many of those migrants who are trying to make their way into Gulf Countries. However, due to strict Saudi border controls, many of them, around 32,000, are stranded in Yemen in dire conditions due to movement restrictions preventing them from returning home. [79]

3.3. Environment and the *Power and Voice* dimension of poverty

Being poor in terms of power and voice means that people lack the ability to articulate their concerns, needs and rights in an informed and meaningful way, and to take part in decision-making affecting these concerns. Human rights principles and governance – how decisions are made and power exercised – have a strong effect on environmental actions and outcomes. Achieving sustainable management of the environment is a complex task and many perspectives need to be taken into consideration. All people should have the possibility to participate meaningfully in public consultations, planning and political processes that affect their environment and livelihood opportunities without being discriminated[80]. Power and voice are often related to access to information, and the ability to participate and hold duty bearers accountable.

In Yemen, power is highly centralized in the hands of few political, military, and tribal elites. Although the conflict has enabled new groups to access political and economic power structures, the country's power and wealth dynamics remain highly exclusive. In this political context, the poorest and most vulnerable people are further marginalized, as they lack the power and voice to shape policies and decisions that affect their lives, including decisions relating to allocation of and access to resources such as aquifers.

[76] IOM, 2020.
[77] Ministry of Planning and International Cooperation, 2021, Environmental Situation.
[78] UNHCR, 2020.
[79] UN News, 2021.
[80] UN Special Rapporteur on human rights and the environment, *Good practices*, https://www.ohchr.org/EN/Issues/Environment/SREnvironment/Pages/GoodPractices.aspx

Yemen is a tribal and patriarchal society and that has reflected itself in women's significant underrepresentation in formal and informal power structures. Although Yemeni women made some progress in ensuring their political participation in the aftermath of the 2011 uprising, these advances were short-lived, as women were left with nearly no political power since the outbreak of the conflict. In 2020, women were completely absent from the government for the first time in 20 years.[81] These patriarchal cultural and social norms largely limit women's ability to participate in decision-making processes about how natural resources are used. Women, for example, are generally prohibited from talking with men outside their immediate family, which limits their opportunities to gather information and join gatherings where decisions about natural resource management are made. This has been particularly the case with public and private water management projects, where women are reportedly often missing from project focus groups, consultations and roundtable discussions, which often fail to take women's needs into consideration in project design. Women are also largely missing from the public water sector, with only 22 out of 130 employees in the Ministry of Water and Environment are women. And while there is an effort to include more women within local water structures, such as Water User Associations, they remain excluded from holding higher ranking positions.[82] It is worth noting that women in the South are perceived to face less socio-cultural pressure (i.e., freedom of movement) given that women's rights used to be more progressive under the Socialist Party rule in the south (1970-1990), as opposed to the long history of theocratic imamate rule in the North.[83]

Other poor and marginalized groups, such as IDPs, migrants, refugees, and ethnic minorities, also lack the power and voice to shape decisions affecting their ability to access natural resources and basic services. This is compounded by their lack of awareness of their rights and the lack of avenues to access such information. Generally, all segments of the population lack access to information around natural resource management and environmental decision-making. This is mostly due to high levels of illiteracy among the populations, along with the state institutions' weak capacity in the collection, storage, and dissemination of environmental information.[84]

3.4. Environment and the *Human Security* dimension of poverty

In Yemen, insecurity and violence are widespread even before the outbreak of conflict. With about 53 firearms for every 100 residents, Yemen comes second to the United States in civilian gun ownership.[85] The availability of firearms, as well as the lack of rule of law and effective state regulatory institutions, has contributed to a high incidence of local conflicts, often believed to be linked to environmental concerns such as water scarcity and land disputes. For example, Yemen's former minister of water and environment has long linked disputes over lands and competition for water resources in the northern Sa'dah governorate to the outbreak of the first Sa'dah war in 2004.[86]

[81] Bin Othman, 2021.
[82] Zabara, 2018.
[83] Nasser, 2019.
[84] Ministry of Water and Environment Environment Protection Authority (EPA), 2017.
[85] Small Arms Survey, Global Firearms Holdings.
[86] Small Arms Survey, 2010.

The depletion of Sa'dah aquifers turned one of Yemen's richest areas for growing grapes, pomegranates, and oranges into barren land, which largely enabled the Houthis to recruit young unemployed farmers into their movement.[87] On the same vein, grievances over the confiscation of Southern lands by Northern elites after the war of 1994 have long animated riots and subsequently calls for secession in the South.[88] To illustrate the gravity of these communal conflicts, in one case in Taiz, which faces the most acute water crisis in the country, two villages fought for 13 years over perceived unfairness in the distribution of water from a shared water tank. The Hadi government had to deploy around 60 military vehicles in 2013 to quell the fuse of war.[89]

The impacts of climate change have also had a drastic negative impact on human security in Yemen. This is especially the case with natural disasters, such as floods and cyclones. For example, the death toll from the 2020 floods reached 174, mostly in Sana'a and Marib governorates.[90] Thousands more were displaced, many of which were already living in shelters for displaced people due to the conflict. In a country with largely damaged health facilities due to the fighting, fears of spread of diseases such as Cholera and dengue fever were high in areas affected by the floods, especially given the damage to water and sanitation infrastructure. And indeed, the number of dengue fever cases increased from 16,645 in 2019, to 50,747 cases by the end of August 2020, with Tihama region (Hudyadah/Hajjah) being the most affected (see Annex 4).[91] The lack of effective drainage also adds to the severity of the situation by turning paddles into mosquito swamps who then infect people.

Generally, the conflict has produced high levels of insecurity that have constrained people's ability to move out of poverty. For example, the restrictions on movements between the different governorates have limited people's ability to pursue livelihood opportunities and access essential services, including health facilities and education. This is particularly the case for women, who face numerous social and cultural barriers that restrict their mobility without male family members around, with some regional differences between south and north as mentioned above (see chapter 3.3). But even young men have found it increasingly difficult to travel alone without their families for fear of being detained, or even killed, on the road.[92]

There are intricate linkages between food security and conflict, with research suggestion that in addition to conflict causing food insecurity, food insecurity can also be a driver of conflict. Yemen is highly vulnerable to global food price shocks and can be severely affected by the war in Ukraine.[93]

The conflict also led to a progressive deterioration of fishermen's livelihoods as they were prevented from accessing fishing grounds due to restrictions issued by the Saudi-UAE led coalition.[94] According to Human Rights Watch, the Coalition's airstrikes also targeted fishermen in the Red Sea, and detained (and even tortured) them in Saudi prisons.[95] This has not only deprived people of their

[87] Herald-Tribune, 2013.
[88] Small Arms Survey, 2010.
[89] Al-Kamali, 2014.
[90] Baser, 2020.
[91] IFRC, 2020.
[92] Al-Jeddawy, 2022.
[93] Breisinger et al., 2019
[94] DW, 2021 (AR).
[95] HRW, 2019.

livelihoods along the coastal areas, but also threatened food security in the country. The situation is further compounded by the absence of accountability structures and other formal and non-formal avenues to seek redress for human rights violations.

4. The development context

The multidimensional poverty framework is based on the understanding that poverty is dynamic and not a static condition. People who live in poverty are not inherently destined to stay in poverty, and people who are higher up on the socio-economic ladder today can – depending on changing circumstances – fall into poverty in the future.

This chapter presents a wider perspective, providing information of poverty at a structural level and a description of the development context including information on the linkages between environmental aspects and the other three development context areas: i) economic and social context, ii) political and institutional context, and iii) peace and conflict.

4.1. Environment and the *Economic and Social* context

Yemen is endowed with significant **oil and natural gas** reserves, mainly found in Yemen's eastern and southern provinces of Marib, Hadramout, and Shabwah. According to the U.S. Energy Information Administration (EIA), Yemen has an estimated crude oil reserve of about 3 billion barrels and 71 trillion cubic feet (Tcf) of natural gas, ranking it 29th in the world for crude oil reserves and 32nd for natural gas reserves.[96] Yemen's economy is highly dependent on oil production, which contributed to about 24% of GDP, 45% of government revenues and 83% of exports by 2014 estimates.[97]

Although oil dependence enabled Yemen to achieve high economic growth rates in the 2000s, it did so on the expense of diversifying sources of government revenue. For example, it hampered the stimulation of labor productivity and weakened the state's ability to collect taxes as a source of domestic revenues. Even foreign investment in the past has been limited to oil, gas, and mining operations.[98]

Declining oil and gas reserves have long exacerbated Yemen's economic woes, and the significant drop in oil production after the outbreak of conflict has inflicted an even heavier economic toll (see Annex 6). Oil production came to a virtual halt in 2015, and slowly picked up to about 50% of pre-conflict levels by 2018.[99] With recurring fuel blockades, people were forced to turn to the black markets where prices are 180% higher.[100]

Yemen's oil and gas resources have also been at the heart of power struggle among the country's conflict actors and their regional backers. The control of these resources has been animating Houthis'

[96] Binwaber, 2019.
[97] Ministry of Planning and International Cooperation, 2016, Oil Sector.
[98] Schmitz, 2012.
[99] EIA, 2020.
[100] WFP, 2021.

offensives in the southern province of Shabwah and Marib in the east since 2020. Currently, Marib is under the control of the Internationally recognized government (IRG), while Shabwah has recently been recaptured by the UAE-backed Giants Brigade in January 2022. Other resource-generating institutions, including ports, have also been at the heart of the war economy, with armed groups competing for control to finance their war efforts. The 2018 escalation between the Houthis and the UAE-backed Tareq forces were mainly over control of the Red Sea port city of Hudaydah. Furthermore, Yemen's natural resources have been a key driver for UAE's deployment of its UAE-backed militias in strategic areas, ensuring control over the "port cities of Aden, Mukalla, Mokha, and Bi'r Ali, as well as the gas hub of Balhaf, the oil fields of Masila, and the export terminal at Shihr".[101]

The country has also relied heavily on its **agricultural and fishing sectors**, which were the largest sectors in terms of GDP shares between 2005-2010 (over 20% of GDP).[102] However, due to years of ineffective state management, environmental degradation, over-exploitation, climate change impacts, and recently the conflict, these sectors are now in decline. The country's severe water crisis is a primary driver of decreased agricultural productivity and will continue to do so in the absence of effective state management and strategic investment, such as in rainfed agriculture. The fishing sector is an essential source of employment, income, and food security along the coastal zone. Approximately 83,400 small-scale enterprises, sustaining around 667,000 people, dominate the industry. In total, nearly a million people are engaged in capturing, processing, and selling fish and shellfish.[103] The sector has also been hit hard during the course of the conflict, with estimates of over 2 billion USD in financial losses and around 50% of fishermen becoming unemployed.[104]

In addition, Yemen's rich and diverse **ecosystem** has a significant economic value, estimated at approximately 287 Billion USD (See Annex 1). This is ten times the value of Yemen's current GDP. The country has some of the world's most biodiverse coral reefs, mangroves, and forests, which support a significant number of fish, bird, and mammal species. However, the country's natural resources are under immense pressure from unsustainable exploitation, weak state management, along with significant adverse impacts from both the conflict and climate change. For example, the 2008 floods alone were estimated to have caused nearly 1.6 billion USD in damages and losses - the equivalent of 6% of the country's Gross Domestic Product by 2014 estimates.[105]

4.2. Environment and the *Political and Institutional* context

Perhaps one of the most key drivers of environmental degradation and natural resource depletion in Yemen is the country's **weak institutions and governance structures**. To enhance institutional frameworks for resource management, the government established a number of environmental institutions and regulatory bodies over the years. These include the Ministry of Water and Environment (MoWE), the Ministry of Agriculture and Irrigation (MAI), the Ministry of Fish Wealth, the Environment Protection Authority (EPA), the General Department of Forestry and Combating

[101] Al-Mowafak, 2021.
[102] World Bank, 2015.
[103] UN, 2021
[104] Al-Fareh, 2018.
[105] Al Harazi, 2014.

Desertification (GDFCD), and the National Water Resources Authority (NWRA) among others. However, these institutions have been significantly weakened by corruption, a lack of capacity and resources, and overlapping responsibilities. This is not to mention the government's lack of preparedness and capacity to deal with the climate crisis and its impacts.[106]

Several laws and policies were also enacted to address environmental concerns and promote sustainable resource management. Yemen also signed a number of international agreements, including the Climate Change-Kyoto Protocol in 2008, and has been party to the UN Framework Convention on Climate Change (UNFCCC) since 1996.[107] Despite these efforts, environmental regulations are often **not enforced** due to a lack of capacity and resources, weak rule of law, and lack priority attention. For example, the Water Law of 2002 was largely unable to enforce water rights or stop the illegal drilling of private wells, especially when influential individuals were involved.[108] The country's rule of law institutions were also struggling to process cases and hold violators accountable even before the outbreak of conflict. This is not to mention that **rule of law** infrastructure, such as police departments and courts, is largely absent in rural areas where the majority of the population live.

In the absence of state regulation, or presence in the case of rural areas, most Yemenis turned to **tribal customary law** to resolve disputes and protect their rights. Although historically this has been the case, customary law is in many ways limited in its ability to effectively address environmental concerns, especially when they conflict with the economic interests of tribal sheikhs.[109] In addition, customary law is not always accessible to women and other marginalized groups, who often face strong patriarchal norms or lack the social capital necessary to navigate these systems.

With the **fragmentation of state institutions** due to conflict, environmental governance in Yemen has significantly collapsed. Currently, the state's environmental institutions are divided between the government-controlled areas in the south and the Houthi-controlled areas in the north. This division has resulted in weak or absence of coordination and cooperation between the different branches of government on environmental issues. In addition, the collapse of Yemen's economy and the shift in international funding towards humanitarian aid as opposed to development aid has largely impacted the government's ability to finance and implement environmental initiatives and projects, while civil society organizations are in no position to fill this gap. In fact, the Joint Arab Report for 2020 shows that Yemen received one of the lowest shares of funding among Arab countries under what is called “climate finance”, a UN Climate Change Agreement pledged to provide financial support to the development countries.[110]

In this context, local authorities, severely underfunded and without salaries for years, have turned towards commercializing environmental services to generate revenue, such as the corporatization of water and electrical utilities as well as waste management services. The corporatization and privatization of these public services is a trend observed mostly in northern and western areas under

[106] Ministry of Water and Environment, the Environment Protection Authority (EPA), 2017.
[107] Environmental Protection Authority, 2013.
[108] Al-Mowafak, 2020.
[109] Ibid.
[110] Ministry of Planning and International Cooperation, 2021.

the control of the Houthis, whereas public supply remained relatively stable in areas under the nominal control of the IRG. At least in the case of electricity supply, this regional variation could be explained in part due to the poor payment scheme of public servants' salaries in Houthi-controlled areas, where they receive around a half salary every two months or so, as opposed to the regular payments made to electricity sector staff in IRG-controlled areas. Also, as opposed to the limited capacity of power plants in Sana'a and Hudaydah, which are under Houthi control, power plants in IRG-controlled areas have largely resumed their generation capacities, but limit supply to local consumption.[111] Although the privatization of these public sectors in Houthi-controlled areas can be seen as a resilience strategy to circumvent the severe lack of funding and disruptions to salaries, it also has a significant impact on deepening existing inequalities between urban and rural areas and between rich and poor.[112]

4.3. Environment and the *Peace and Conflict* context

Yemen is currently in its 7 years of war, with no foreseeable end in sight. The conflict started in 2014, after the Houthi rebels ousted Hadi's interim government from power. Since then, the conflict has escalated into an internationalized civil war, with Saudi Arabia and the United Arab Emirates leading a coalition of countries in support of Hadi's government, while Iran is supporting the Houthis. According to OCHA, the conflict has resulted in over 230,000 casualties, including 131,000 from indirect causes such **as lack of food, health services and infrastructure**.[113] It has also displaced over four million people. In addition, the country is currently facing the world's worst humanitarian crisis, with over 24 million people in need of assistance.[114]

As shown above, the conflict has also had a significant impact on the environment and natural resources in Yemen. For example, the war has resulted in the destruction of critical infrastructure, such as water and sanitation systems, power plants, and roads (see annex 5). This has not only **disrupted the delivery of essential services** but has also led to **environmental contamination and pollution**, with water borne diseases such as cholera and dengue fever becoming a major concern.

The conflict has further limited people's ability to access natural resources and essential commodities. With the increasing proliferation of armed groups, especially given the generous support of regional powers, limited natural resources have been monopolized and sometimes used as a weapon of war to punish communities. Reports of **land seizures** and the **extraction and appropriation of groundwater** by state and non-state armed groups have become all too common in areas such as Taiz, Sana'a, and Aden. The Saudi-UAE-led Coalition blockade, along with the Houthis' siege around the city of Taiz, have further deprived people from accessing urgently needed humanitarian assistance, including food, water, and medicine.[115] In addition, the conflict has allowed new armed actors, including the Houthis and the UAE-backed southern separatists, to gain control over oil, gas resources, and ports, after they were monopolized by a small group of political, military

[111] Almohamadi, 2021.
[112] Al-Mowafak, 2021.
[113] UN News, 2020.
[114] UNICEF, Yemen Crisis.
[115] Al-Mowafak, 2021.

and tribal elites affiliated with the former Saleh regime (see Annex 7). [116] In fact, much of the fighting revolves around capturing important natural resource centres, including the oil rich Marib (see setion 4.1).

5. Conclusions

As shown in the sections above, poverty and environmental degradation are deeply intertwined in Yemen. Defining who is poor is thus contingent not only on economic indicators, such as income levels, but also on one's access to essential services, natural resources, and healthy living conditions. Based on these criteria, it becomes clear that the majority of Yemenis are living in poverty. This is especially the case in rural areas, where the government was largely unable to establish a presence, leaving 70 percent of the population with minimum access to public electricity grid, piped water networks, adequate health facilities, schools, and paved roads. Even rule of law institutions, including police stations and courts, were largely missing in rural areas, which forced rural population to turn to traditional conflict resolution mechanisms to solve their disputes, often related to access to land and water. This situation left rural areas largely underdeveloped and ignored, which contributed to trends of mass urbanization, exerting more pressure on already scarce resources and services in urban areas.

Pockets of vulnerability often cut across urban-rural divides, with marginalized groups, such as women, IDPS, and refugees, along with ethnic minorities, such as Muhamasheen, being disproportionately affected by poverty and environmental degradation. Although the reasons underpinning their vulnerability are often different, these groups share one common trait: their exclusion from the formal economy and political process. This has not only left them without a voice to demand their rights but has also made them more susceptible to exploitation and abuse, both by state and non-state actors, including tribal Sheikhs and other armed groups. Regional inequalities have also been a major source of grievances, with northern elites historically exploiting southern resources, while largely depriving southern population of their fair share and marginalizing them politically.

In a country where power and wealth are highly centralized, the majority of Yemenis, and especially vulnerable groups, have little to no say in how natural resources are managed and allocated. This has not only led to the mismanagement and over-exploitation of these resources, such as water, but has also allowed a small group of elites to benefit disproportionately from them, often at the expense of the majority. The conflict has exacerbated these trends, as control over natural resources, especially the gas and oil fields, has become a key driver of the war economy, with various actors using them to finance their war efforts and consolidate their power. Communal conflict over limited resources, such as water and land, has also been commonplace, as the state proved unable to effectively manage and fairly distribute these resources or provide legal avenues for dispute resolution. These conflicts are only likely to increase in the future, as climate change, population growth, and increasing urbanization put additional strain on already scarce resources.

[116] Al Aulaqi, 2020.

Recently, the environment in Yemen have come under immense pressure as a result of the 7 years internationalized civil war. The conflict has destroyed critical civilian infrastructure, including water and sanitation systems, and disrupted agricultural production, contributing to food insecurity and malnutrition. In fact, it is believed that both the Saudi- and UAE-led Coalition and Houthis have used starvation as a weapon of war, with both sides blocking food and water supplies, destroying water, and agricultural infrastructure as well as preventing aid from reaching those in need. This has created a perfect storm of both environmental degradation and humanitarian crisis, with more than 80 percent of the population in need of assistance.

With the impacts of climate change becoming more pronounced and costly, it is more urgent than ever to find long-term solutions to these environmental problems. This will require concerted efforts from all stakeholders, including the government, civil society, and the international community. In its efforts to integrate environmental concerns into the Swedish development cooperation, the Embassy of Sweden in Amman can play a critical role in catalysing such an effort.

Issues for Sida to consider

Issue 1. Support initiatives that promote sustainable development and address environmental degradation.
On the technical side, this could include supporting initiatives that promote rainfed agriculture, water conservation, and renewable energy.

On the political side, it could include supporting initiatives that promote improved environmental governance, for example by providing technical assistance and training to strengthen local government institutions' ability to manage natural resources in a sustainable manner. Projects that promote dialogue between different stakeholders are also useful to strengthen trust and accountability. This could involve convening forums and dialogues to bring together different stakeholders, including government officials, civil society representatives, and experts, to discuss ways to address environmental problems. It is important to ensure gender equality and the participation of marginalized groups in such dialogues, as they are often the most affected by environmental problems.

Issue 2. Promote the exchange of knowledge and best practices on environmental management between Yemeni and Swedish stakeholders
This could involve organizing workshops and training sessions on topics such as climate change adaptation, water resources management, and renewable energy. It could also involve sharing knowledge on how to strengthen environmental governance and promote sustainable development.

Issue 3. Advocate for increased funding for environmental rehabilitation and reconstruction in Yemen as well as for the inclusion of environmental concerns in the humanitarian response.
The international community must recognize the important role that environmental rehabilitation and reconstruction can play in alleviating the humanitarian crisis in Yemen. Funding for such initiatives has been sorely lacking in recent years. For instance, in non-conflict areas where there is access to water resources there is an opportunity to improve food security through supporting rehabilitation of the agricultural infrastructure. In addition, environmental concerns must be

included as a key component of the humanitarian response in Yemen. This would involve ensuring that humanitarian actors are aware of the environmental impacts of their interventions and taking steps to mitigate these impacts.

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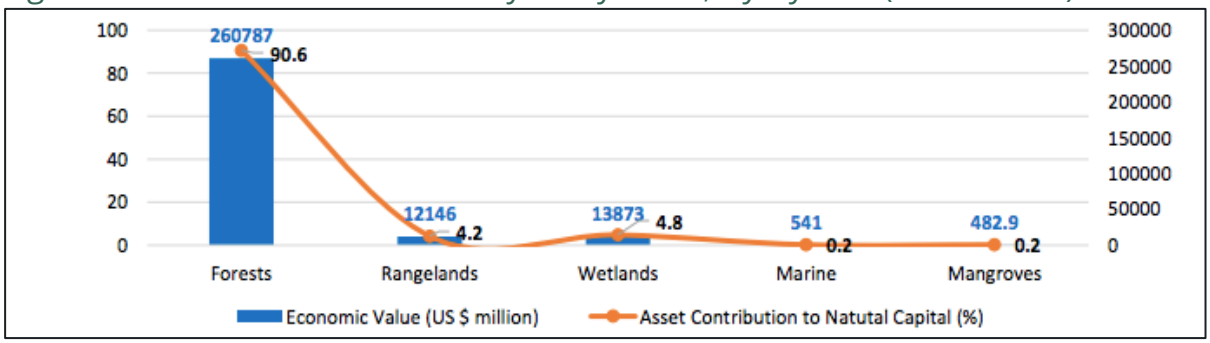
https://worldpopulationreview.com/country-rankings/hdi-by-country

World Population Review, Yemen Population 2022 (Live)
https://worldpopulationreview.com/countries/yemen-population

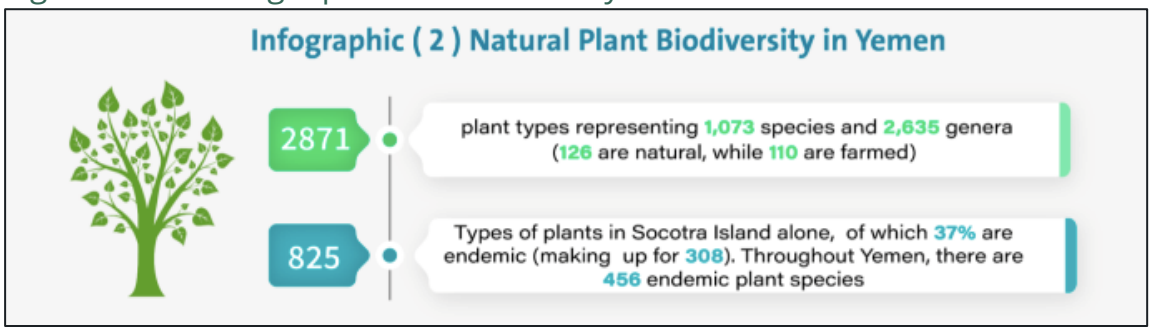
Annex 1. Yemen's Rich Ecosystem and Biodiversity

Figure A1.1. Economic Value of Key Ecosystems, by System (USD million)



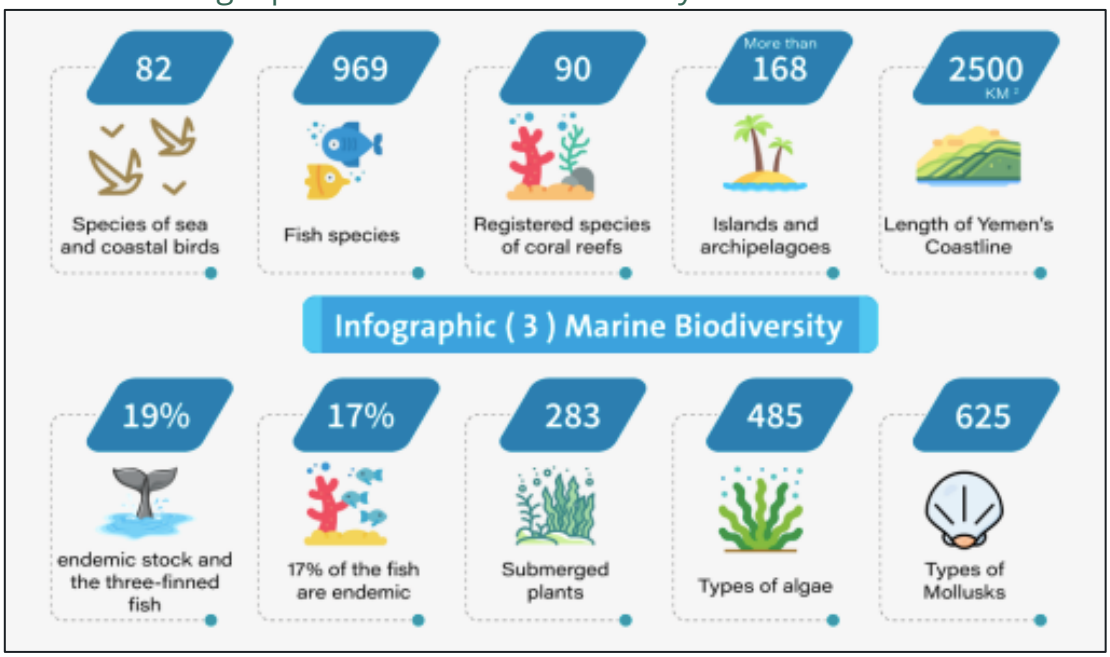
Source: Yemen's Sixth National Report to Convention on Biological Diversity, March 2019, Ministry of Water & Environment, Environment Protection Authority.

Figure A1.2. Infographic – Biodiversity in Yemen



Source: Ministry of Planning and International Cooperation, Sector for Economic Studies and Forecasts

Figure A1.3. Infographic – Marine biodiversity in Yemen



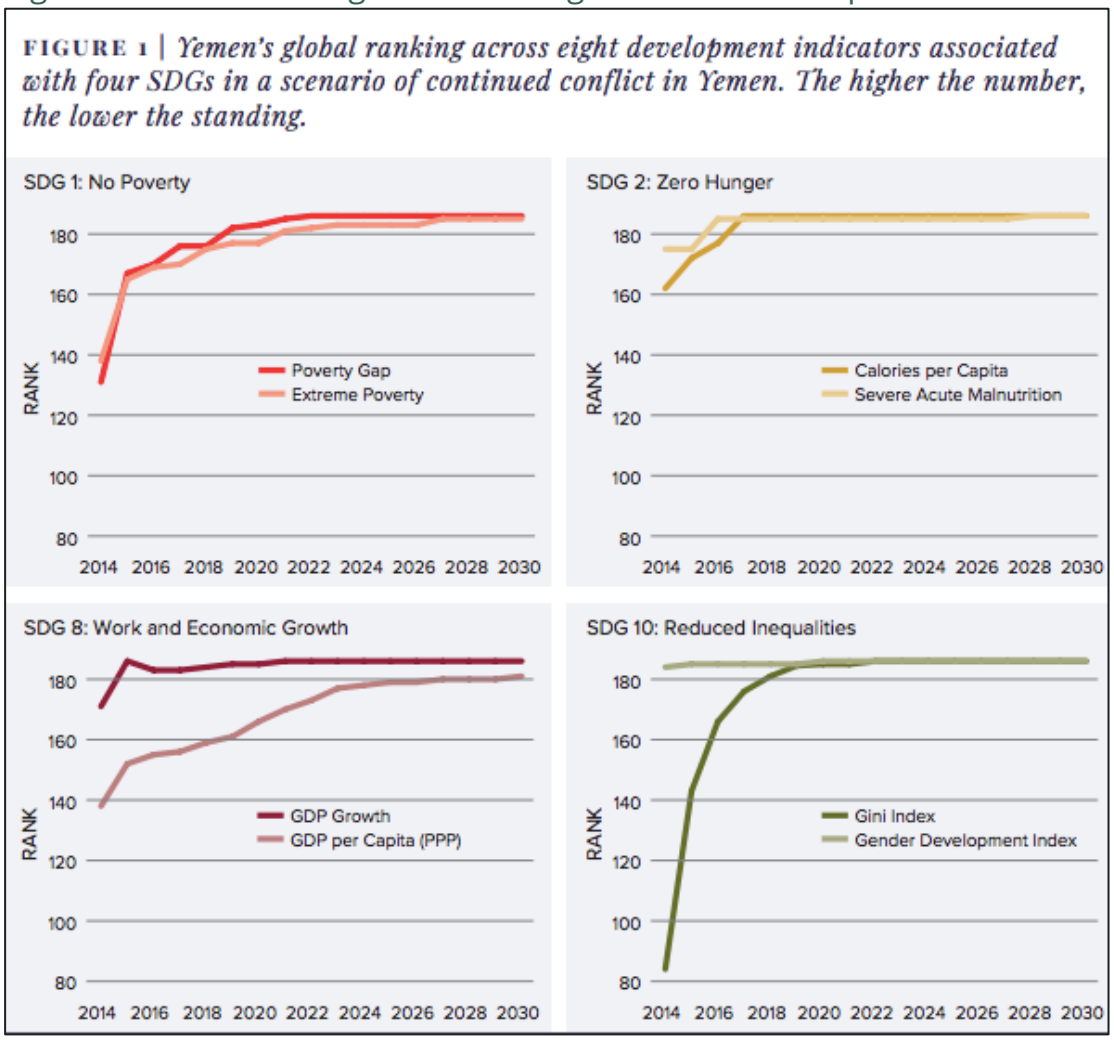
Source: Ministry of Planning and International Cooperation, Sector for Economic Studies and Forecasts

Annex 2. Yemen's SDG goal fulfilment

Figure A2.1. Assessment of the SDG goal fulfilment for Yemen.

Source: 2021 Sustainable Development Report

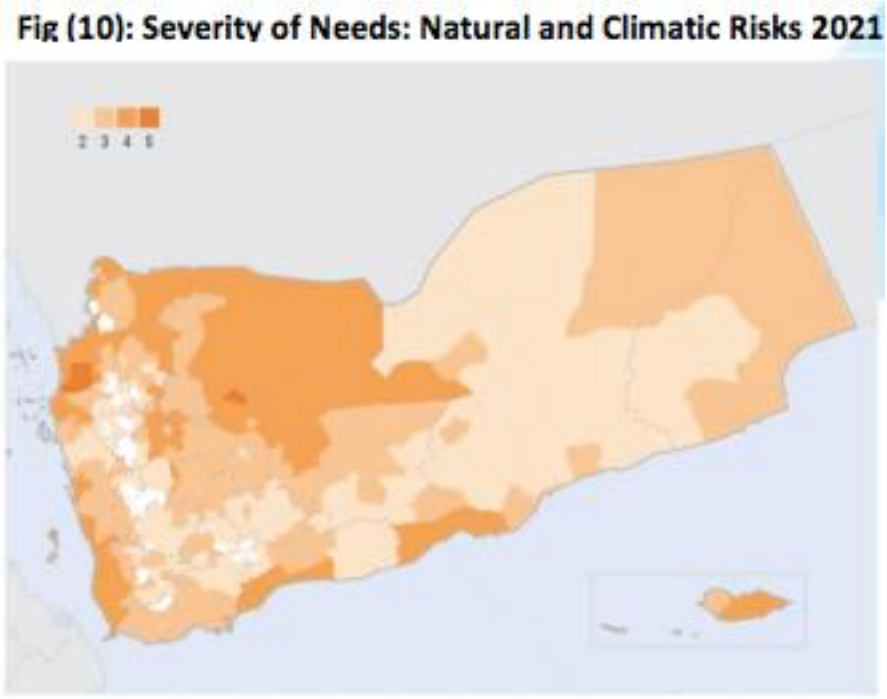
Figure A2.2. Yemen's global ranking across 8 development indicators



Source: UNDP, Assessing the Impact of War in Yemen on Achieving the Sustainable Development Goals, 2019.

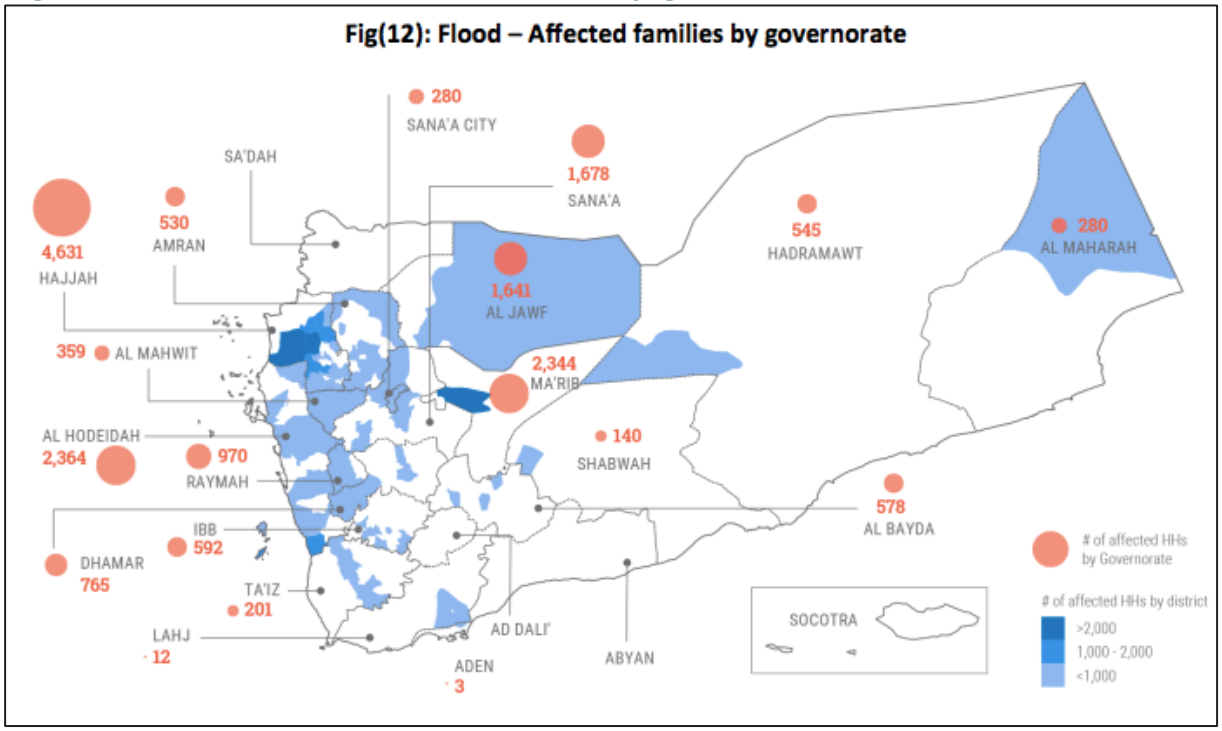
Annex 3. The Impacts of Climate Change

FigureA3.1.Severity ofneeds



Source: OCHA, Yemen, Humanitarian Needs Overview, February 2021.

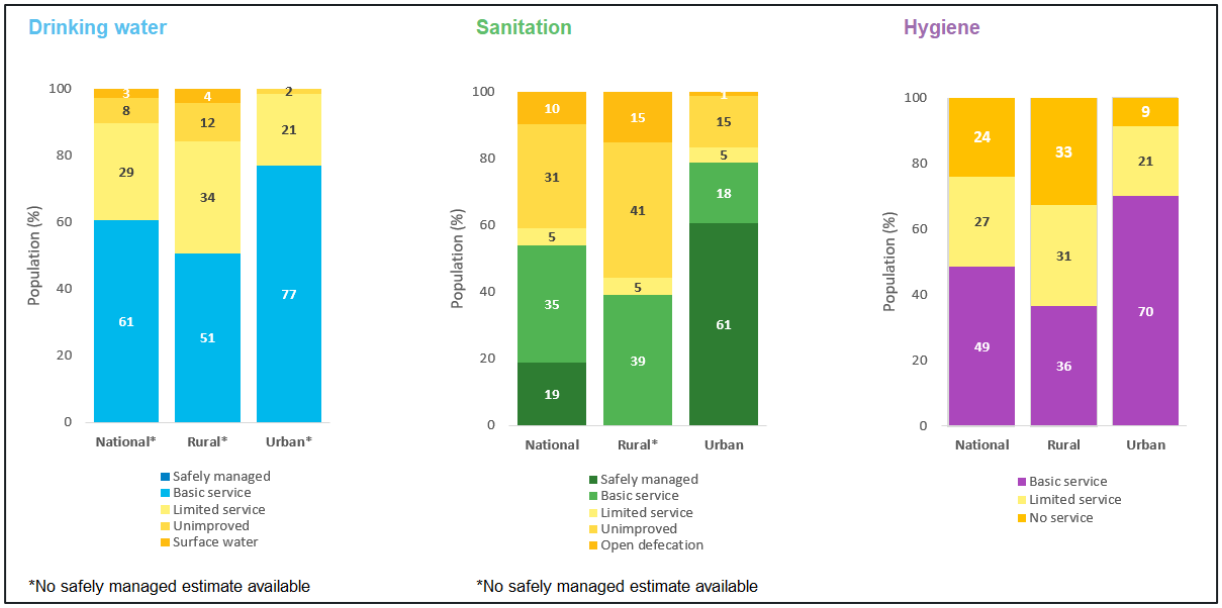
Figure A3.2. Floods: affected families by governorate



Source: OCHA, Clusters.

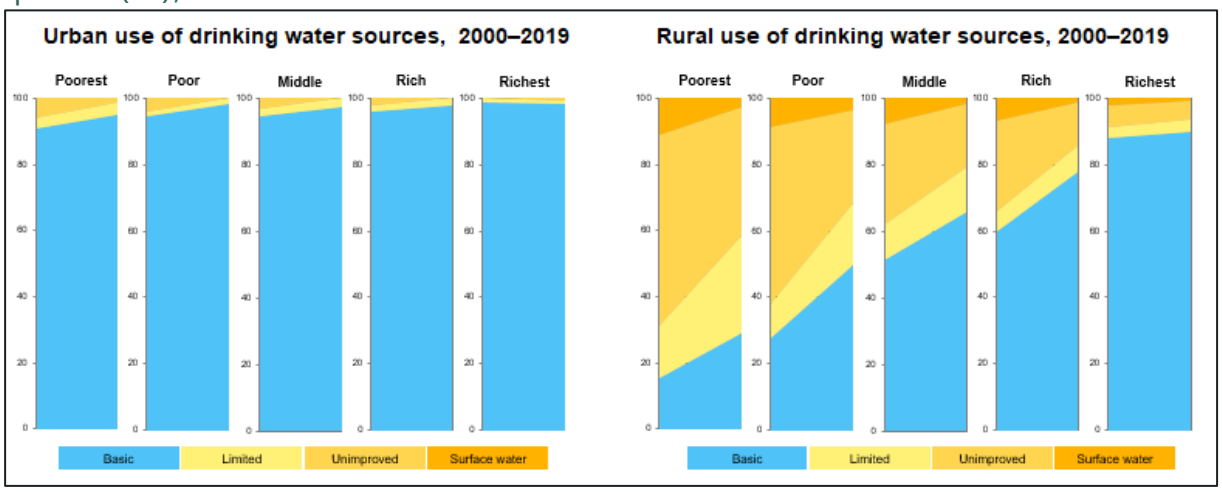
Annex 4. Access to WASH and electricity in Yemen and implications of low access

Figure A4.1. Access to drinking water, sanitation and hygiene, in Yemen.



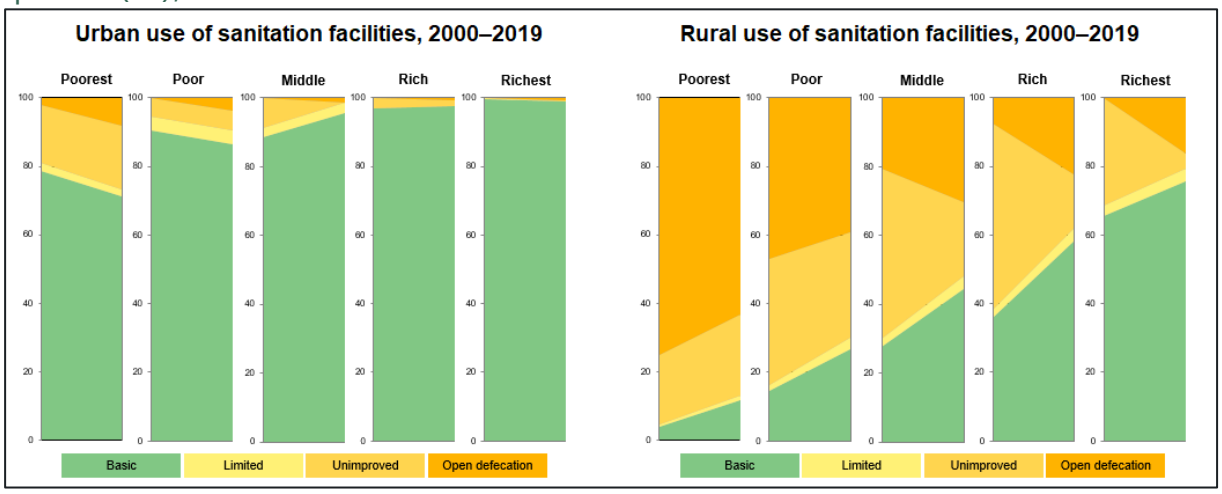
Source: WHO and UNICEF, 2021. Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, Yemen.

Figure A4.2. Summary of trends in use of drinking water by wealth quintil (%), in Yemen.



Source: WHO and UNICEF, 2021. Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, Yemen.

Figure A4.3. Summary of trends in use of sanitation facilities by wealth quintil (%), in Yemen.



Source: WHO and UNICEF, 2021. Joint Monitoring Programme for Water Supply, Sanitation and Hygiene, Yemen.

Figure A4.4. Access to hygiene facilities by wealth quintil (%), in Yemen.

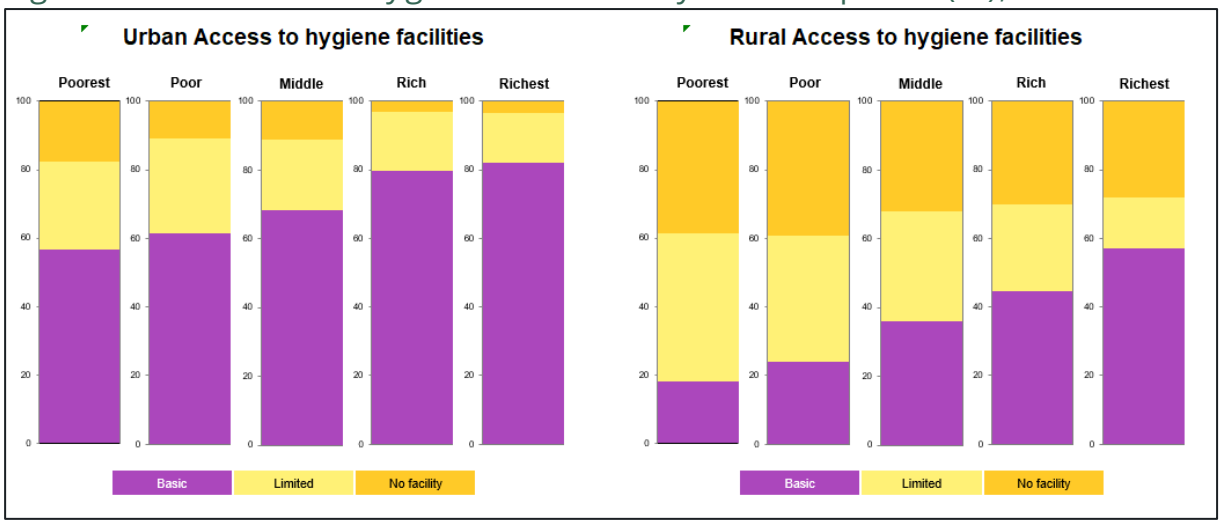
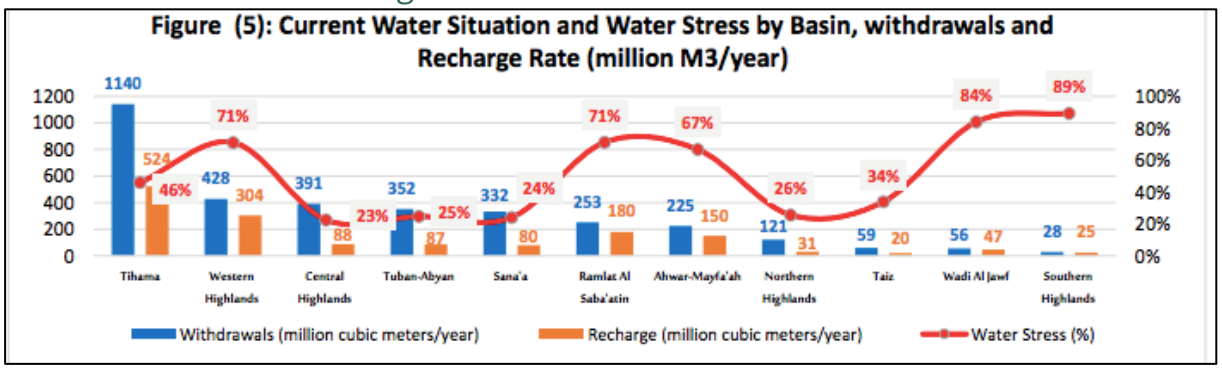


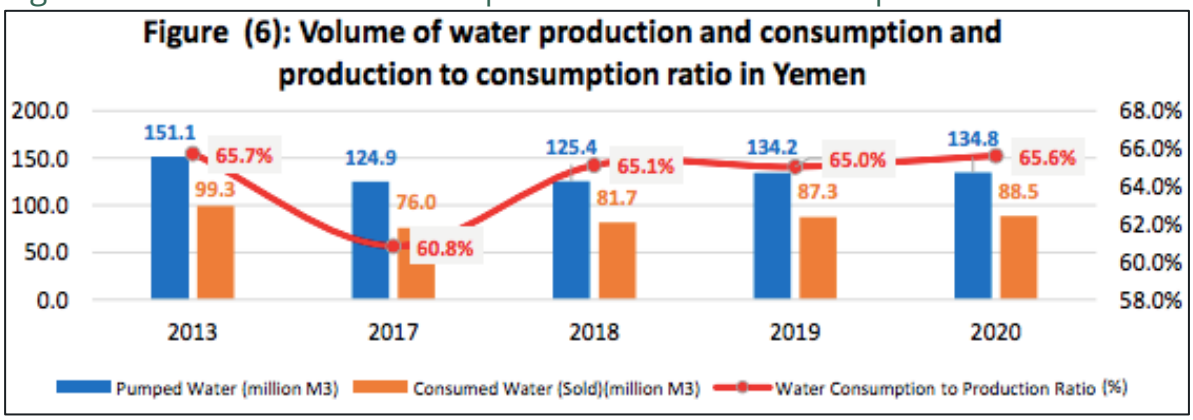
Figure A4.5. Current water situation and water stress by basin, withdrawals and recharge rate



Source Ministry of Water and Environment, Water Sector in Yemen, Resources and Services 2019.

https://www.unescwa.org/sites/default/files/event/materials/2._lnob_view_form_yemen-al-sharjabi-mowe_0.pdf

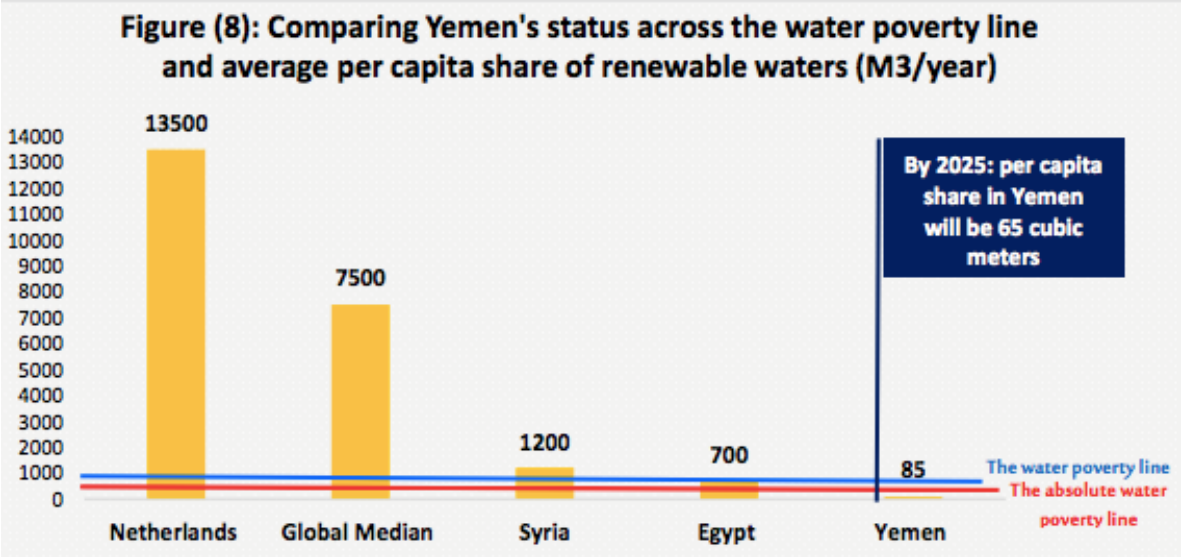
Figure A4.6. Volume of water production and consumption in Yemen



Source: Statistical Yearbook 2013 and 2019.

Ministry of Water and Environment,National Water and Sanitation Authority 2020 Unpublished data.

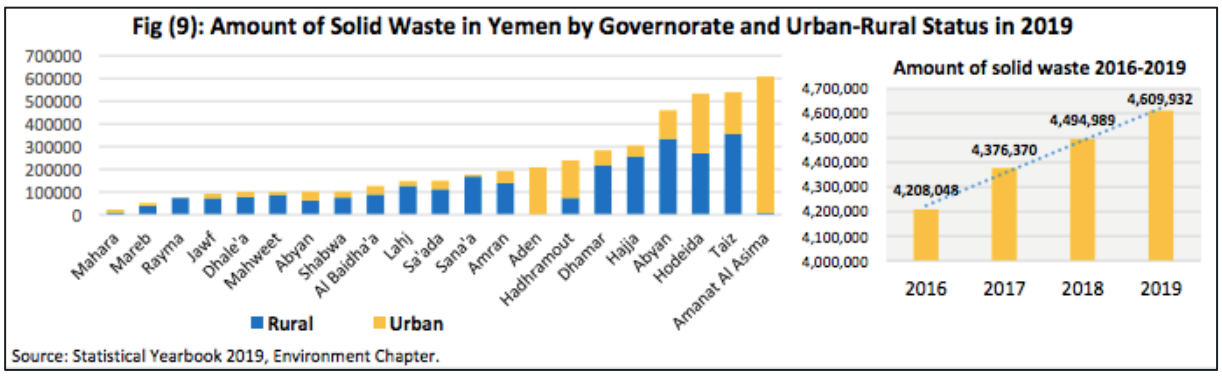
Figure A4.7. Yemen's per capita water poverty, compared to other countries.



Source Ministry of Water and Environment, Water Sector in Yemen, Resources and Services 2019.

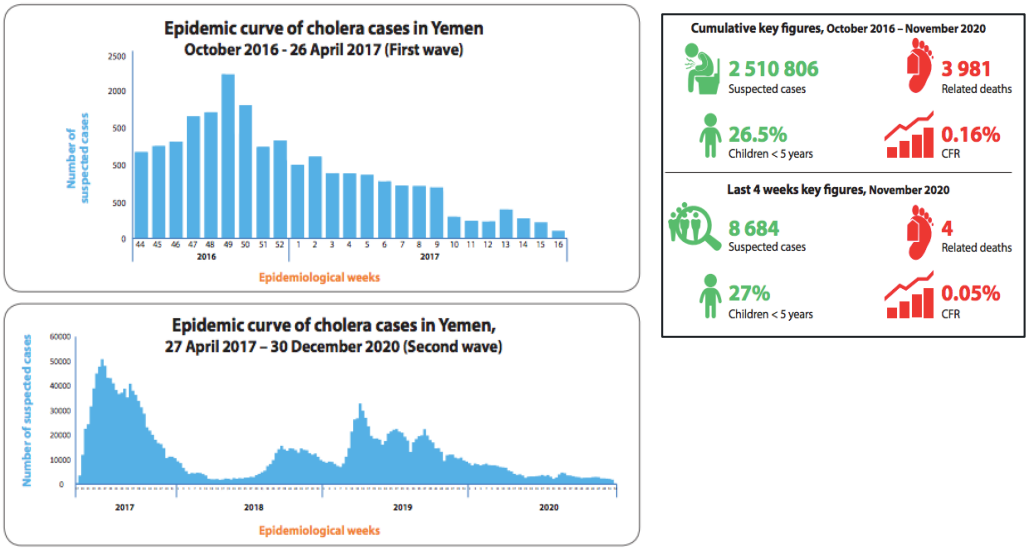
https://www.unescwa.org/sites/default/files/event/materials/2._lnob_view_form_yemen-al-sharjabi-mowe_0.pdf

Figure A4.8. Amount of solid waste in Yemen by governorate and urban-rural status in 2019



Source: Statistical Yearbook 2019, Environment Chapter.

Figura A4.9.Cholera outbreak, first wave (2016-2017) and second wave (2017-2020)



Source: World Health Organization, 2020.

Figure A4.10. Dengue Fever cases in Yemen

Overview of Dengue Fever From Wk1-WK35,2018,2019 and 2020

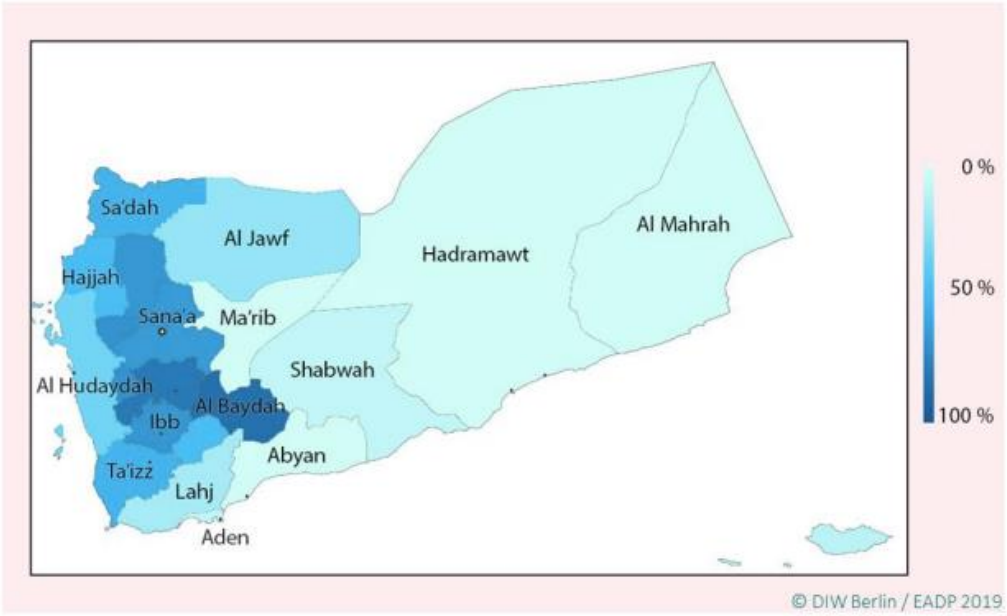
Indicators (From Week 1 to Week 35)

Indicators	Year 2018	Year 2019	Year 2020
Suspected Cases	16,554	16,645	50,747
Death Cases	21	96	162
CFR %	0.1%	0.6%	0.3%
AR/10,000	5.5	5.5	16.9
Positive RDT (IgM)	594	654	1,525
% from total tested	68% from total tested (875)	57% from total tested (1,147)	42% from total tested (3,594)
Affected Governorates	22 Governorates (96%)	22 Governorates (96%)	22 Governorates (96%)
Affected Districts	159 Districts (48%)	152 Districts (46%)	205 Districts (62%)

Source: IFRC, 2020.

Figure A4.11. Share of households with solar energy supply by governorate

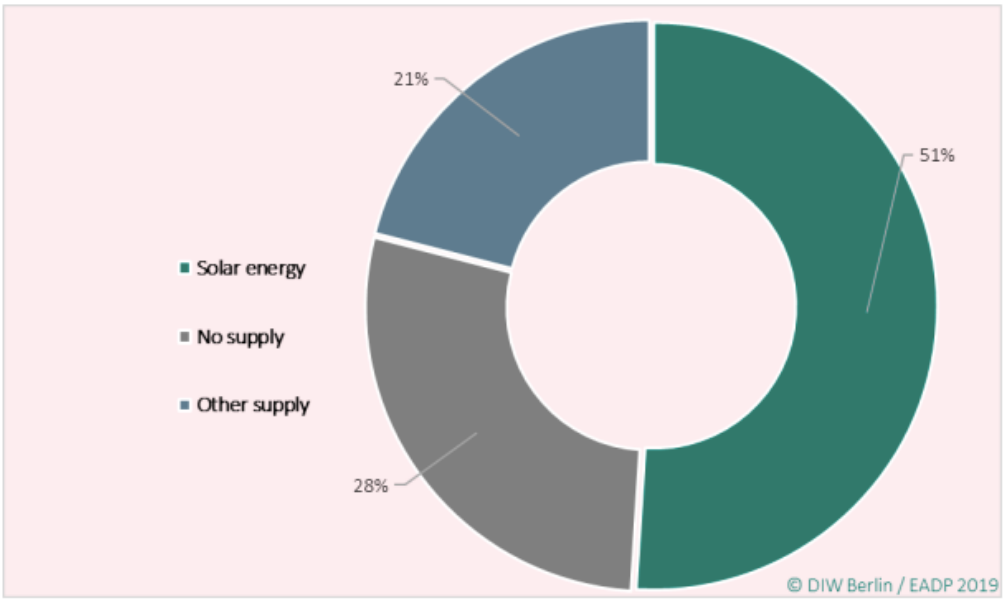
Figure 8: Share of households with solar energy supply by governorate
Own illustration with map from d-maps.com, Data: Percent for Polling Research (2019)



Solar energy is less concentrated in the governorates with remaining access to public supply.

Figure A4.12. Electrification in Yemen by type of dominant electricity source

Figure 9: Electrification in Yemen by type of dominant electricity source
Data: Percent for Polling Research (2019)

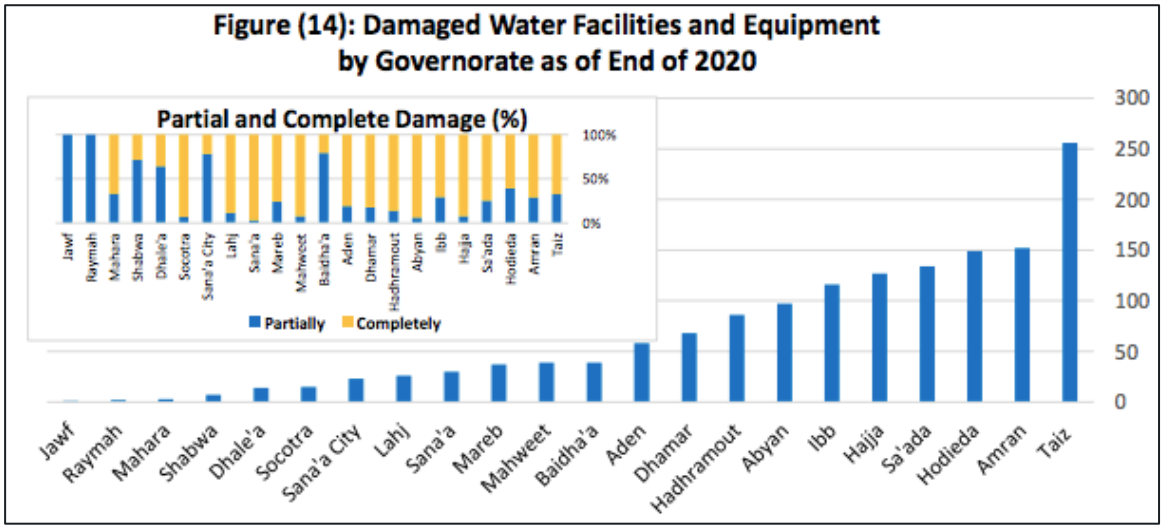


Solar energy is the primary source of electricity for the majority of Yemeni households.

Source: Energy Access & Development Program (EADP), 2019

Annex 5. The Conflict's Impact on Water & Agriculture Sectors

Figure A5. 1. Damaged water facilities and equipment by governorate

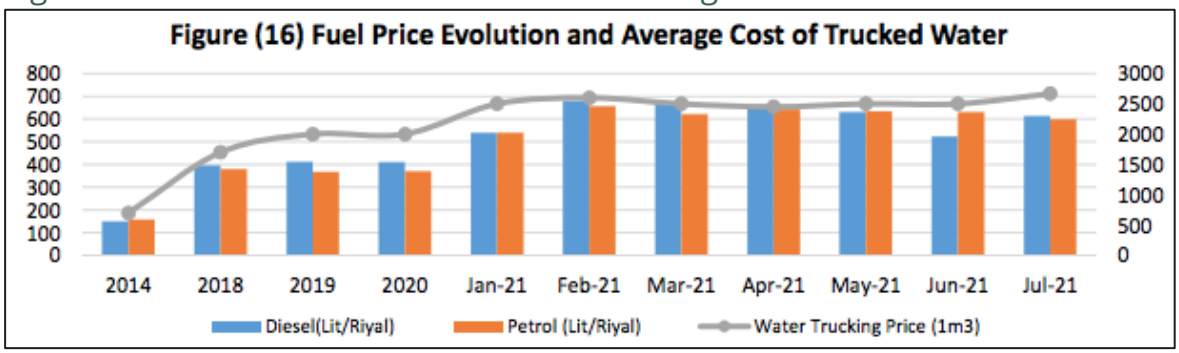


Source: - World Bank, Yemen Continuous Needs Assessment, Phase III, 2020.

- Ministry of Water and Environment, Aug 2021.

https://app.powerbi.com/view?r=eyJrIjoiYmNhMDYwODItYTkzZC00ODI5LTkyYzYtNmZiNjNkZDBmZTdmIiwidCI6IjMwMmFkZTNhLTU3M2UtNDQ4NipageZi1hODcRcwEZmZDbmZTdmIiwidCI6IjMwMmFkZTNhLTU3M2UtNDQ4NipageZi1hODcRecwEZmV239OVMi4Name

Figure A5.2. Fuel Price evolution and average cost of trucked water



Source: Yemen Joint Market Monitoring Initiative: July 2021 Situation Overview-2018.

https://reliefweb.int/updates?search=Yemen%20Joint%20Market%20Monitoring%20Initiative FOOD SECURITY AND NUTRITION INFORMATION AND EARLY WARNING SYSTEM – YEMEN.MARKET INFORMATION SYSTEM, July 2021.

https://app.powerbi.com/view?r=eyJrIjoiMmMwYzE0OWEtMDFkYS00ZGM4LTgwYmItMjBjN2M5OWM5ZDAzIiwidCI6IjE2M2FjNDY4LWFiYjgtNDRkMCpage04MWZkLYWmNeWQ5Z5ZGYxIxIiwidCI6IjE2M2FjNDY4LWFiYjgtNDRkMCpage04MWZkLYWmWQi75ZGiction3

Figure A5.3. Agricultural crops production in Yemen, 2013- 2019

Table (3) Amount of agricultural crops production in Yemen for the years 2013 and 2019 (tons)			
Crop	2013	2019	2013Change since
Wheat	232,790	100,332	-56.9
Other grains (Maize - Millet - Barley - Corn)	631,144	356,382	-43.5
Legumes	96,765	93,139	-3.7
Vegetables	1,032,414	888,610	-13.9
Fodder	1,933,474	1,715,991	-11.2
Cash crops	87,960	88,992	1.2
Fruits	999,256	953,674	-4.6

Source: Central Statistical Organization, Statistical Yearbook 2013 and 2019.

Figure A5.4. Acute Food Insecurity in Yemen

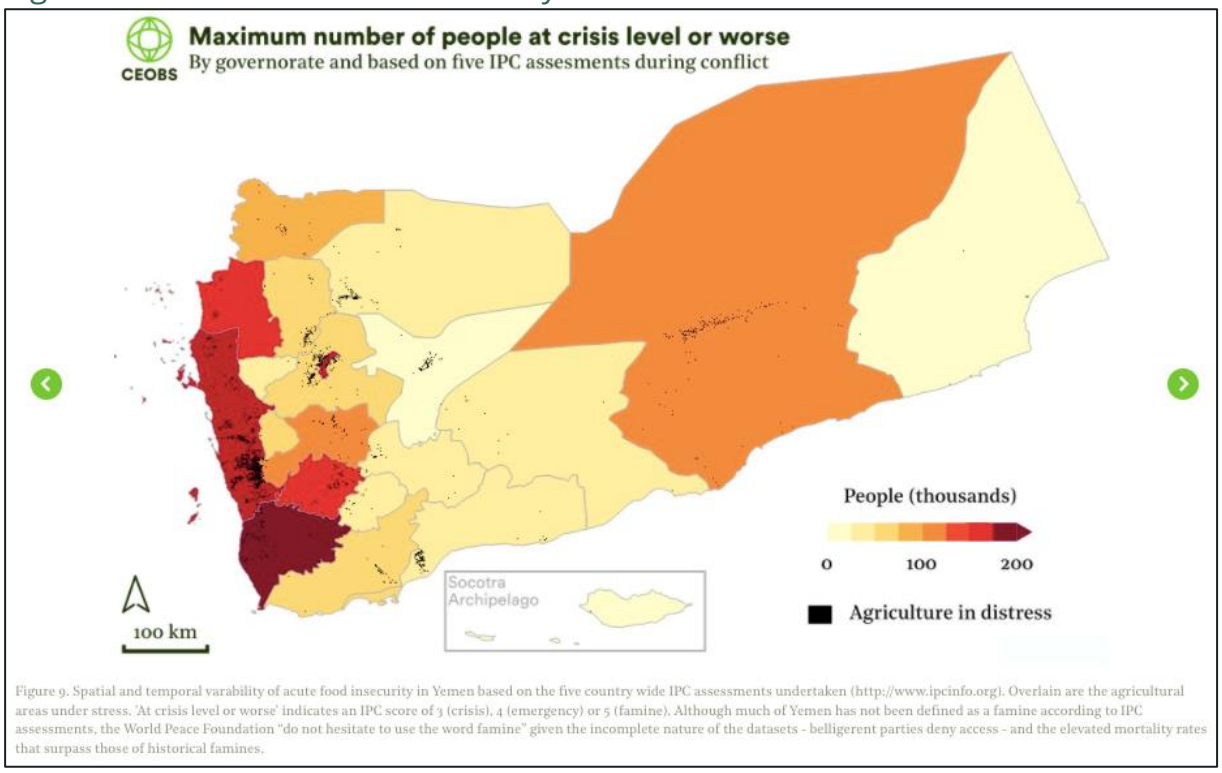
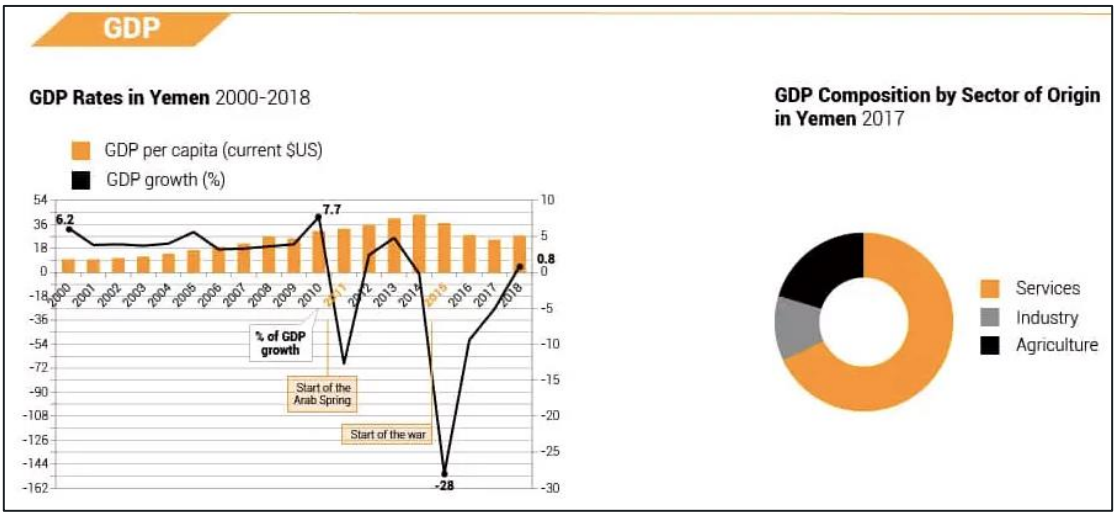


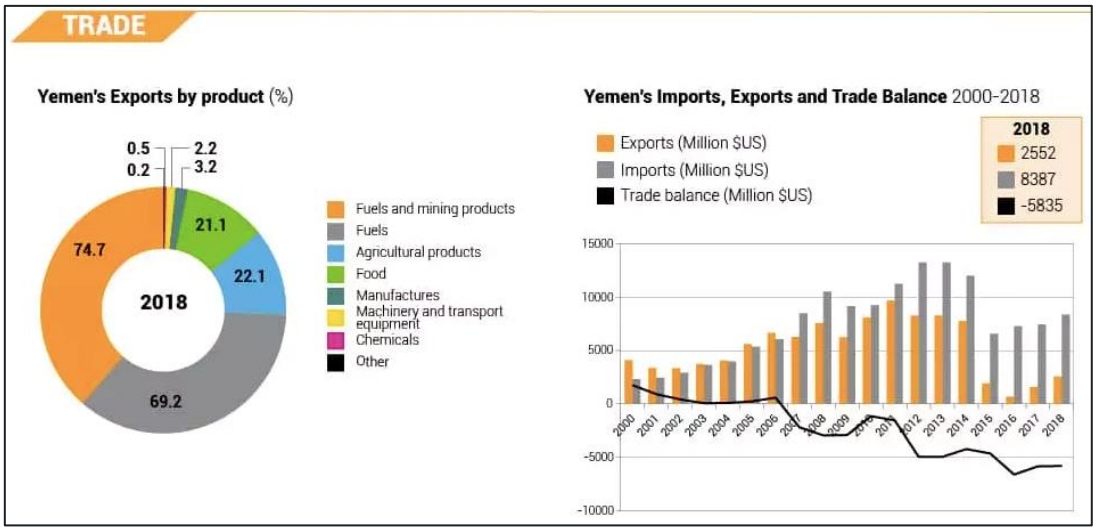
Figure 9. Spatial and temporal varability of acute food insecurity in Yemen based on the five country wide IPC assessments undertaken (http://www.ipcinfo.org). Overlain are the agricultural areas under stress. 'At crisis level or worse' indicates an IPC score of 3 (crisis), 4 (emergency) or 5 (famine). Although much of Yemen has not been defined as a famine according to IPC assessments, the World Peace Foundation "do not hesitate to use the word famine" given the incomplete nature of the datasets - belligerent parties deny access - and the elevated mortality rates that surpass those of historical famines.

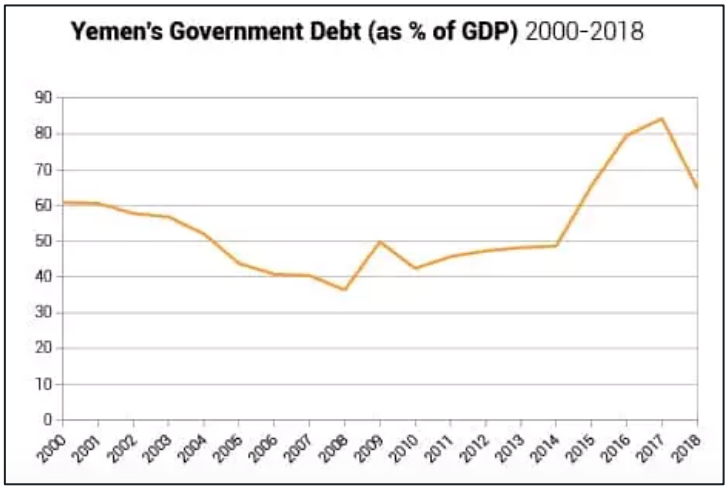
Source: CEOBS, Yemen's Agriculture in Distress, 2020.

https://ceobs.org/yemens-agriculture-in-distress/#11

Annex 6. The Economic Impact of the Conflict







Sources: International Monetary Fund (IMF), World CIA Factbook, World Bank Data, and World Trade Organization (WTO). @Fanack

Annex 7. Armed Conflict Associated with Natural resources

Figure A7.1. Water sector

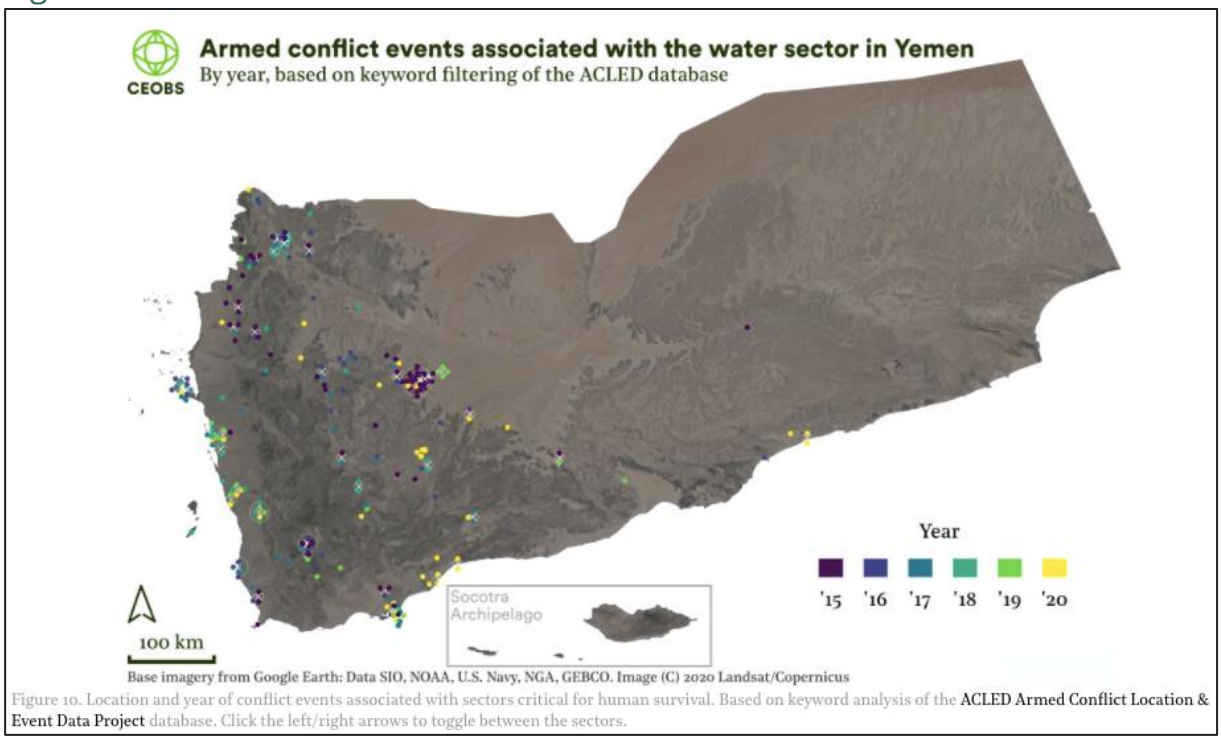


Figure 10. Location and year of conflict events associated with sectors critical for human survival. Based on keyword analysis of the **ACLED Armed Conflict Location & Event Data Project** database. Click the left/right arrows to toggle between the sectors.

Figure A7.2. Energy sector

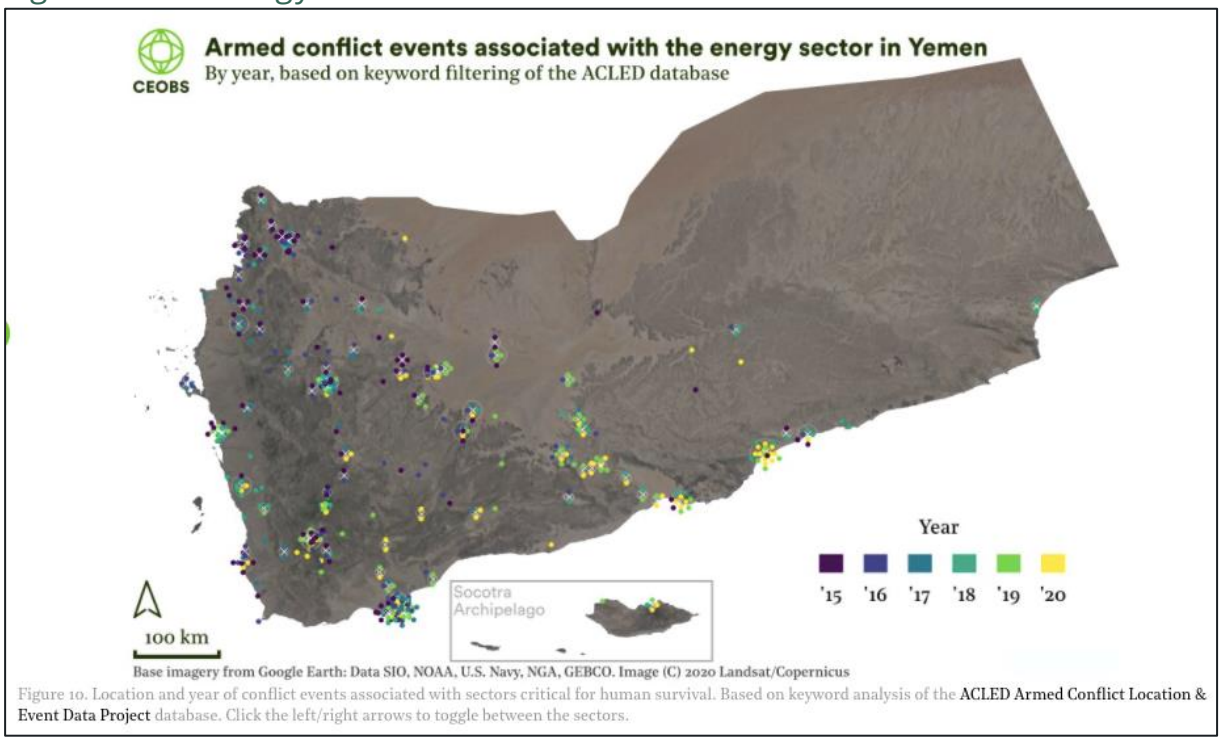
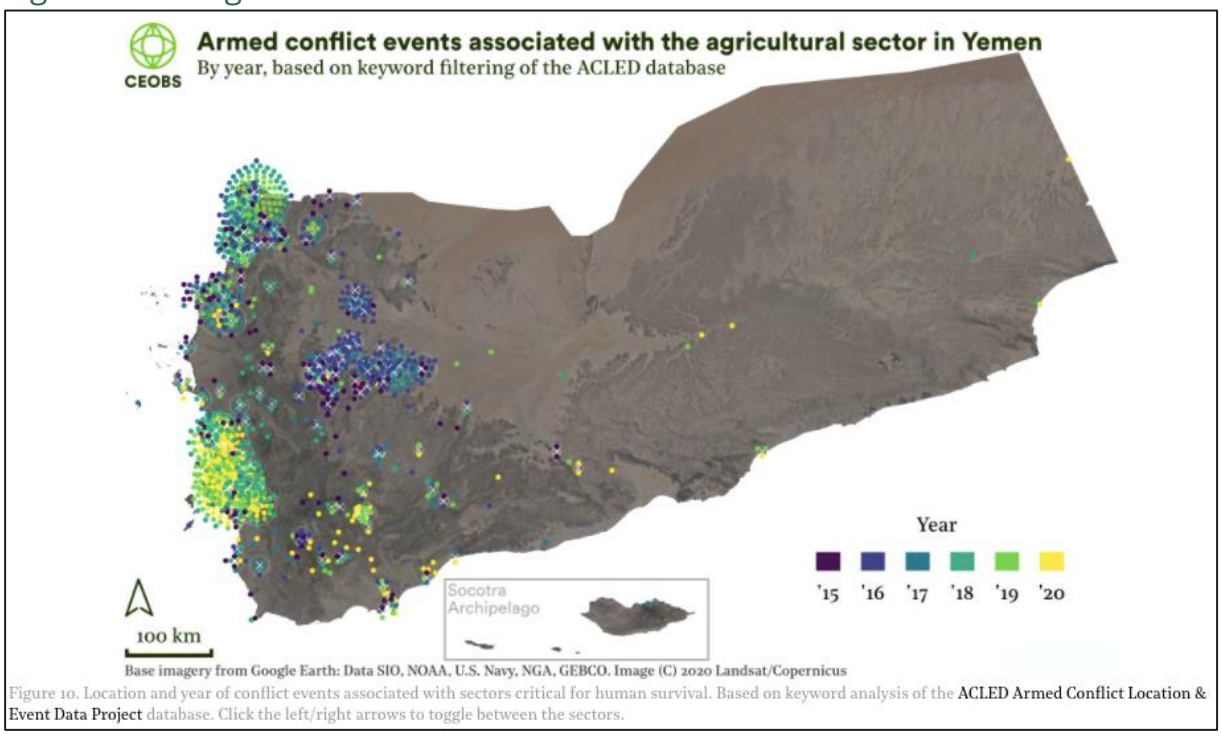
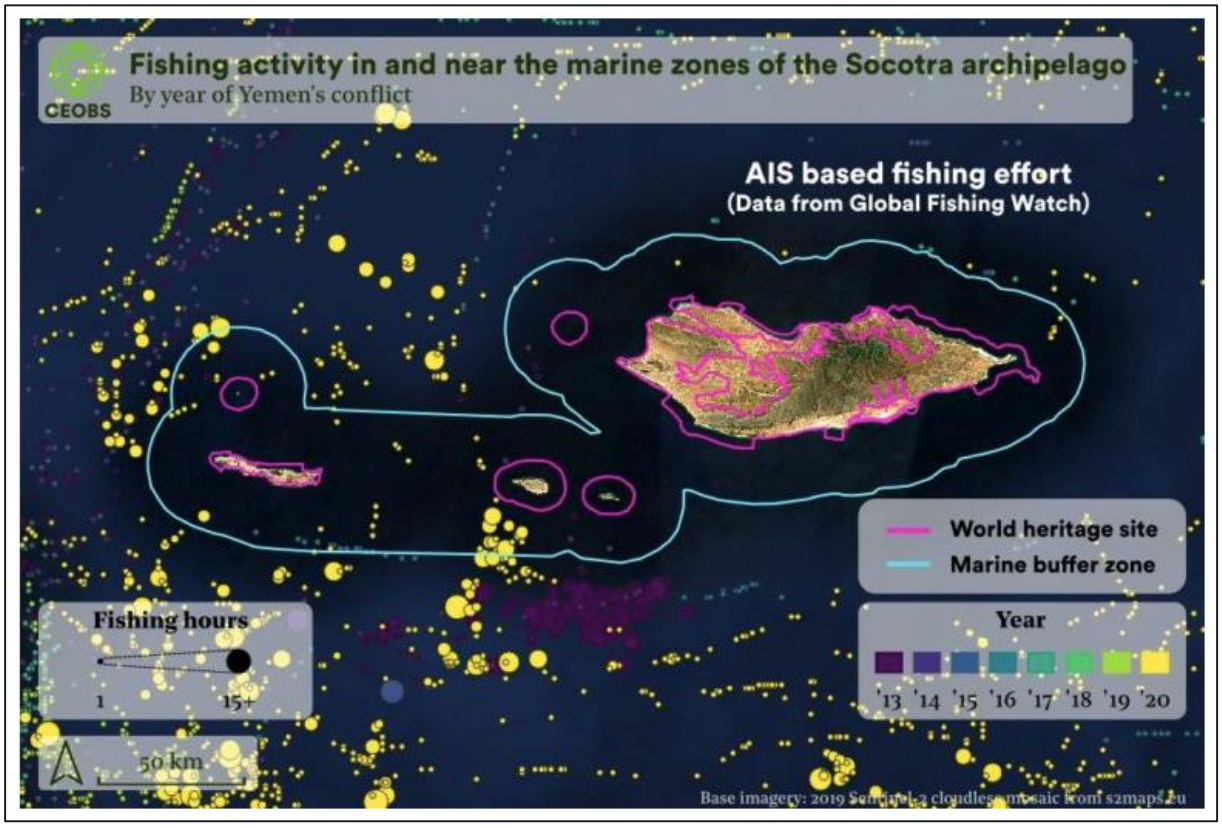


Figure A7.3. Agricultural sector



Source: CEOBS, Groundwater depletion clouds Yemen's solar energy revolution, 2021.
https://ceobs.org/groundwater-depletion-clouds-yemens-solar-energy-revolution/

Figure A7.4. Fishing activity in or near the marine zones of the Socotra archipelago

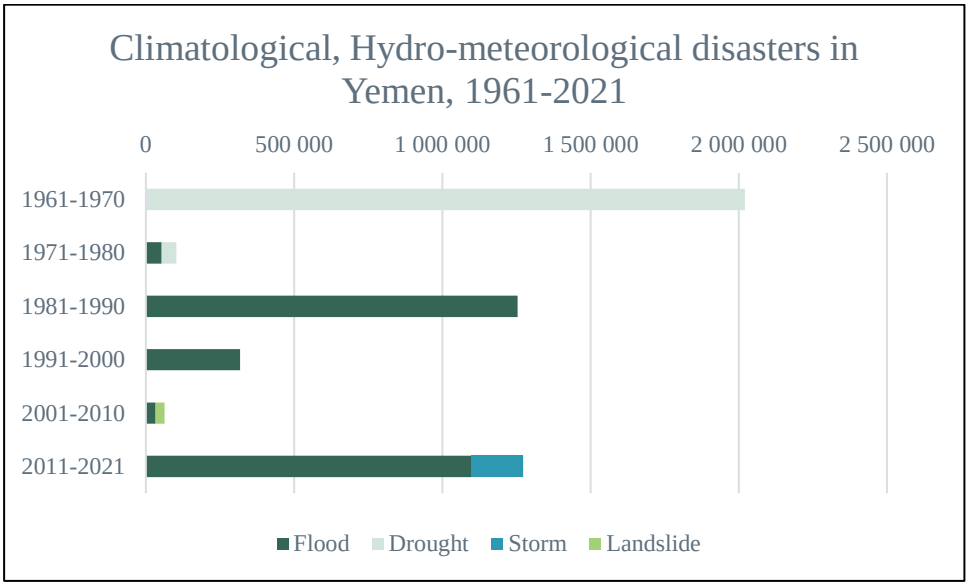


Source: CEOBS, Protected area conservation in Yemen's conflict, 2021. https://ceobs.org/protected-area-conservation-in-yemens-conflict/

Annex 8. Climatological, hydrological and meteorological disasters in Yemen, 1961-2021

The drought in 1969-1971 was severe and affected over 2 million people in Yemen. After that, floods constitute the most frequent natural disasters in Yemen, and the most costly. See figures below.

Figure A8.1. People affected by climatological, Hydro-meteorological disasters in Yemen, 1961-2021



Soure: EMDAT publication 2022 Data Yemen, https://public.emdat.be/data

Figure A8.2. Total damages (adjusted,'000 USD) from floods and storms in Yemen, 1961-2021

	Total Damages, Adjusted ('000 US$)	
	Flood	Storm
1961-1970	73,867	0
1971-1980	63,945	0
1981-1990	8,474,139	0
1991-2000	2,093,176	0
2001-2010	503,421	0
2011-2021	249,590	228,650

Soure: EMDAT publication 2022 Data Yemen, https://public.emdat.be/data

Annex 9. Terms of reference

The Embassy of Sweden in Amman, with support from the Sida MENA Unit is commissioning a study focusing on the environmental and climate related challenges in Yemen to be used in a Multidimensional Poverty Analysis (MDPA) to better understand the dynamics, dimensions and drivers of poverty in Yemen. The MDPA is expected to help inform operationalization of development cooperation under the Regional MENA Strategy 2021-2025. An important aspect of this MDPA is an analysis of the environmental challenges, trends and opportunities facing Yemen and, most importantly, how they impact and govern the lives of people living in poverty.

1. Background

In December 2020, the Government of Sweden decided on a new regional strategy for development cooperation in the Middle East and North Africa region for the period 2021 – 2025. As part of the new regional strategy, a particular bilateral focus on Yemen is included with three separate sub-objectives: (1) Improved conditions for peaceful development with inclusive dialogues at different levels; (2) Strengthened respect for Human Rights; and (3) Increased capacity to provide basic public services and promote sustainable development. The bilateral assistance to Yemen is expected to average 80 MSEK/year over the duration of the strategy period.

While Sida has for years had significant humanitarian funding in Yemen, there has been no strategy mandate to support the country through development cooperation. The new strategy therefore entails an operationalization process that involves building up a portfolio of contributions that can help deliver on the overall objective of promoting peaceful development in Yemen. Sida conducted an MDPA for the MENA region in 2019 to inform its strategy reporting process, in which Yemen was included. However, no country-specific MDPA has been undertaken, so the current exercise will serve an important role in guiding the operationalization process and ensuring that the resultant portfolio is well aligned to and to the best extent possible responds to the multidimensional poverty situation in the country. In this effort, quality information and analysis on the impact that climate change and environmental challenges have on the lives of people living in poverty is deemed important.

2. Purpose

The purpose of this assignment is to inform the operationalisation process of identifying key environment, climate change, and biodiversity challenges and opportunities and describe how they link to multi-dimensional poverty aspects in Yemen. This to ensure that Sida's portfolio design adequately responds to the needs in the context and constitutes the best approach to delivering on the objectives in the regional MENA strategy.

This analysis shall assist Sida Headquarters in developing an MDPA, in line with Sida's conceptual thinking on poverty and guidelines provided for under the Poverty Toolbox (Thematic method support - Poverty Toolbox (sida.se)), including "Guiding questions" and "Menu of indicators".

3. Description of the Assignment

The analysis shall be based on a desk-review of reports, statistics and other secondary sources of information and analysis on how the environment and climate is impacting the poverty situation in Yemen and shall summarize existing findings. The report shall be analytical and assess how environmental factors impact *who is poor, in what way they are poor and why (underlying causes)* in line with Sida's above-mentioned methodology on Multi-Dimensional Poverty Analysis. Main risks and stress factors for vulnerable people shall be examined as well as linkages between these. Lastly, the report shall look at what possibilities or opportunities, given the environmental context, people living in poverty have in order to escape poverty and what prerequisites are needed for this to be achieved. Gender equality and an intersectional analysis shall be applied that takes into account the situation faced by different social groups dependent on their gender, sexuality, age, ethnicity or class. A brief description of how the Covid-19 pandemic has affected the context and dimensions of people living in poverty shall also be included. The final report shall be detailed, while still managing to stay within the bounds of the page limit is requested.

More specifically, the analysis must include the following:

1. The key environmental (incl. climate change, biodiversity and natural resource) issues and describe their links to multi-dimensional poverty in Yemen. A foresight approach on climate and natural resource trends and how these trends are expected to impact poverty in Yemen. And, if possible, a brief discussion on trade-offs between long term climate adaptation vs short mitigation and recommendations for Sida in this area.

2. An analysis of how the environmental factors impact the other three contexts (economic & social, political & institutional and conflict/peace) as well as the four dimensions of poverty (resources, opportunities & choice, power & voice, and human security).

3. Evidence and references to reliable, relevant and *varied* sources that underpin conclusions. As well as a careful effort to include a large variety of sources with as recent available data as possible.

While there is a plethora of reports and analysis, data and statistics are oftentimes scarce or unreliable in the Yemeni context. It is therefore essential that the authors behind this report have access to quality information beyond sources what can easily be accessed by non-professionals. This may also include data from various humanitarian actors operating in Yemen. The analysis must also be conflict sensitive and adhere to a neutral stance towards all warring parties in the conflict. A regular dialogue with focal points (contact: Sofia.Dohmen@sida.se) is expected to be helpful in ascertaining the validity and reliability of various sources identified by the Consultants.

4. Expected Outputs

The help desk assignment shall produce a final report of between 15 and 20 pages that is analytical in nature. A final presentation of the report is also expected.

5. Proposed Timeline

A start-up meeting shall take place before February 15, in which the help desk team can exchange with the Sida reference group on the assignment.

A draft report is to be shared with Sida by April 1, 2022 at the latest. Sida will then be given an opportunity to provide input/feedback/questions to the draft, which will be addressed ahead of a final version and presentation to be completed before April 30, 2022[117].

6. Expert Requirements

The Expert shall meet the following qualifications:

- Long term documented professional experience working with international development and poverty reduction.
- Demonstrated experience in leading environmental analyses, multidimensional poverty analyses, conflict analyses, gender analyses to inform development partners
- Demonstrated experience in leading data collection and analysis through structured and transparent methods
- Demonstrated experience in working with Yemen, the wider MENA region, or other countries in a conflict setting.
- Advanced university degree (minimum of Masters') in International Development, Economics or other related field
- Demonstrated ability to deliver quality results within deadlines
- Excellent written and spoken English

[117] The deadline has been changed in agreement with Sida: a draft version for 30th of March 2022, feedback from Sida by 5th of April 2022, and a final workshop on 20th of April, 2022