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**Hydro-hegemony, ecocide and
climate change – local responses to
multi-layered crises in North East Syria**



EU-Turkey Civic Commission

In cooperation with Kurd-Akad – Network of Kurdish Academics

CONTENTS

Introduction	1
Impact of climate and environmental change on NES	3
History of Hydro-Hegemony - monopolization of water resources	6
Escalating risks from water scarcity	7
Environmental destruction and ecocide	8
Reconstruction in the shadow of marginalization	11
Solar power solutions and future perspectives of ecological resilience	12
Future local perspectives and urgent solution recommendations	14
Appendix	
Images	
Bibliography	
Author	

Hydro-Hegemony, Ecocide and Climate Change – local responses to multi-layered crises in North East Syria

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Introduction

The Middle East region is among the most threatened by political and ecological crises. Arbitrarily drawn nation-state borders, political deals excluding local groups, and, above all, the exclusion of women in politics inhibit the region's dignity and resilience. Furthermore, decades of civil wars and supply crises due to unequal resource distribution aggravate increasingly devastating consequences of environmental change.

This report focuses on North-Eastern Syria (NES), also called Rojava - a particularly neglected region both in science and politics regarding humanitarian aid and preventing ecological destruction in conflict settings. NES is heavily affected by climate change, water scarcity, drought, and ecological destruction on the one hand and by political scarcity, sanctions, and war on the other hand. This part of the contribution will discuss the escalating risks of climate change and ecocide, including their unequal distribution across the region. By the time this submission is being made to the EUTCC, winter has set in the NES region, critical infrastructure has been targeted repeatedly, essential services such as clean water access cannot be guaranteed for the civilian population, and access to electricity has been interrupted in large parts of the region (Staepa Dêrik 2023b). While the dry months this year have had a strong effect on food security, large parts of the NES are still affected by the 2023 earthquake in February in central Kurdistan (Staepa Dêrik 2023a).

Democratic initiatives in the region initiate sustainable change in local structures. Self-governance through pilot projects aims to combat the destruction of the environment, for women's self-determination, and the active political organization of women and a democratic multi-ethnic society. Due to the still unresolved political status of the NES, the region constantly faces new political challenges, for example, recent military attacks that occur arbitrarily.

This report ends with an insight into local structures in NES, self-administration, municipalities, and international corporations and opens a call to action for international initiatives. In a transitional period in which humans have become one of the most critical factors influencing Earth's biological, geological, and atmospheric processes, it is essential to note that an important fact is being neglected in addition to war crimes. At the international level, the legal understanding of environmental protection has not evolved. Environmental disruptions continue to occur, for example, due to wars - accompanied by a lack of transparency and scarcity of data. In recent years, human-induced climate change has revealed many risk scenarios scientists outlined in the 1980s. The perceived escalation of risks such as water scarcity, drying up of earth's surfaces, rivers and lakes, devastation, and extinction of flora and fauna are some of the facts that are now part of the reality of the civilian population, especially in NES.

The changes and shifts in climate zones are currently making themselves felt by the inhabitants of this region. Accordingly, NES as an emergency region needs more attention, especially in climate policy debates in politics and scientific studies, as well as in possible cooperation work in the context of the SDGs and other goals. The crisis complex outlined here is intended to provide an introduction to the status quo of the ecological crisis in NES as well as examples of initiatives and collaborations actively addressing the ongoing impacts of climate change such as water scarcity, drought, and deforestation.

Inequality and ecological risks are manifested in particular in the example of freshwater: While natural freshwater reserves are becoming increasingly scarce (W. L. Steffen et al. 2018; W. L. Steffen et al. 2004; Rockström et al. 2009), the common good of water is turned into a tool of power and a means of prestige for people and nation-states like Turkey. Natural water resources are monopolized by dams and infrastructures in the particularly crisis-prone regions of NES, which became targets during civil war and military invasions.

Impact of climate and environmental change on NES

North East Syria is massively affected by climate and environmental change. Increasing temperatures lead to a shift in fertile and habitable zones.

The climate of Syria and NES is mostly semi-arid. The region's water supply comes from two primary streams, the Euphrates and Tigris (Lossow 2021), and smaller rivers that collect water from the Taurus Mountains. The region generally depends on three water sources: rainfall, groundwater, and rivers.

Rainfall across NES has been below average for three years. Particularly the east of Al-Hasakeh governorate has seen up to 60% less rainfall on average per month. The lack of rainfall in NES and regionally has severely impacted water resources. In 2022, groundwater reached its lowest level within the 20-year period data was available.

Obtaining clean water in rural regions and cities is currently very challenging due to increasingly prolonged drought periods caused by climate change (WBGU 1997; IMMAP 2021). Outdated water pipes in the cities, built by the Assad regime in the 1980s, and the drying up of smaller rivers like Jarjab, Jaghjagh, Zarkan, and Khabur in rural areas exacerbate the water stress in NES to various degrees.

In 2021, the region experienced a severe drought when the winter season received much lower-than-usual rainfall and above-average temperatures.

This dry phase continues: the region has been plagued by an intense, prolonged drought for the last three years. Consequently, groundwater levels and the amount of water collected in the wadis were also massively affected.

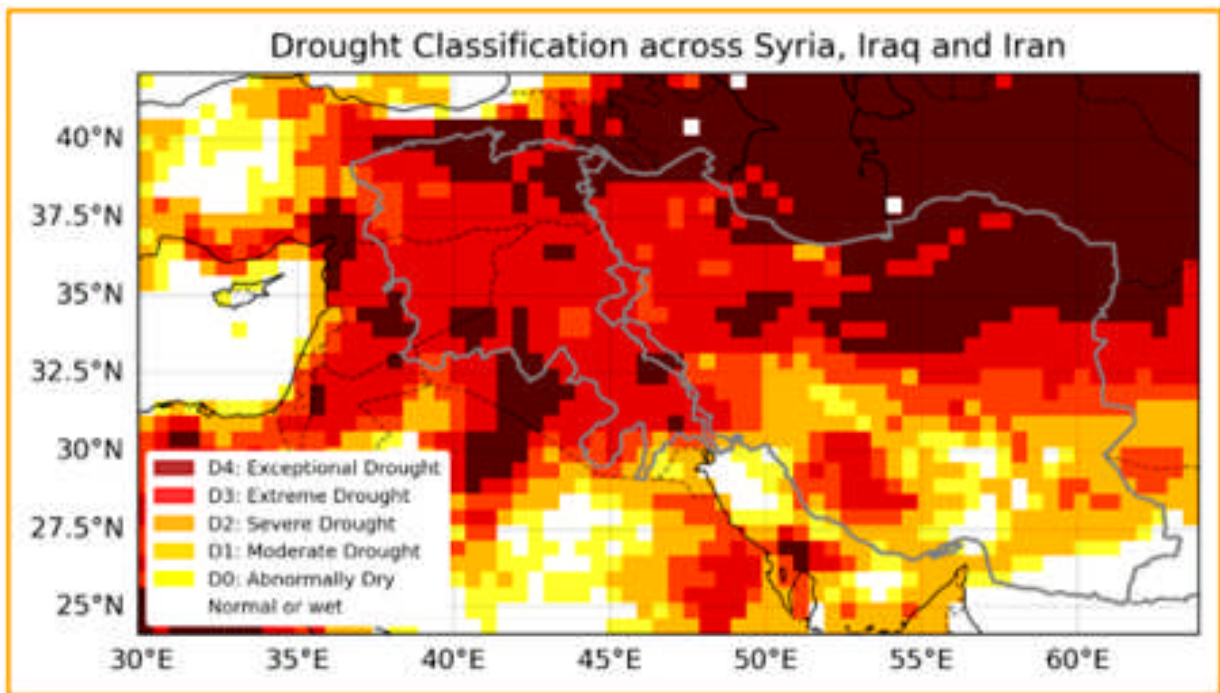


Fig. 1: "Drought classification for the wider West Asia region, categorized according to the US Global Drought Monitor system. The categories are based on the 36-month SPEI values in June 2023, calculated from ERA5" (F. Otto et al. 2023), CC BY-NC-ND 4.0

The summer of 2021 presented unprecedented challenges for rural communities in NES as severe drought and escalating conflict compounded, pushing them further into poverty; farmers observed staggering declines in crop yields and, in some cases, complete failure (PAX for Peace 2022).

Poorer small-scale farmers without extensive equipment are particularly affected by the drought. They draw water from the smaller rivers to irrigate their approximately 10 hectares of land, most of which they use for subsistence. According to farmers living along the Jaghjagh River/rural area, their yields have decreased by 90 percent (Field research, November 2022). Furthermore, numerous livestock herds experienced significant reductions, with some halving in size or more.

Against a backdrop of soaring food prices, virtually no one in the northeast, be it rural or urban Syrians, has been exempt from the repercussions of these hardships (PAX for Peace 2022).

Satellite images from the beginning of the current drought period show a significant impact on vegetation, as there has been a decline in green chlorophyll leaf pigment. The brown colour shows the dried vegetation and soil on the Syrian/NES side.

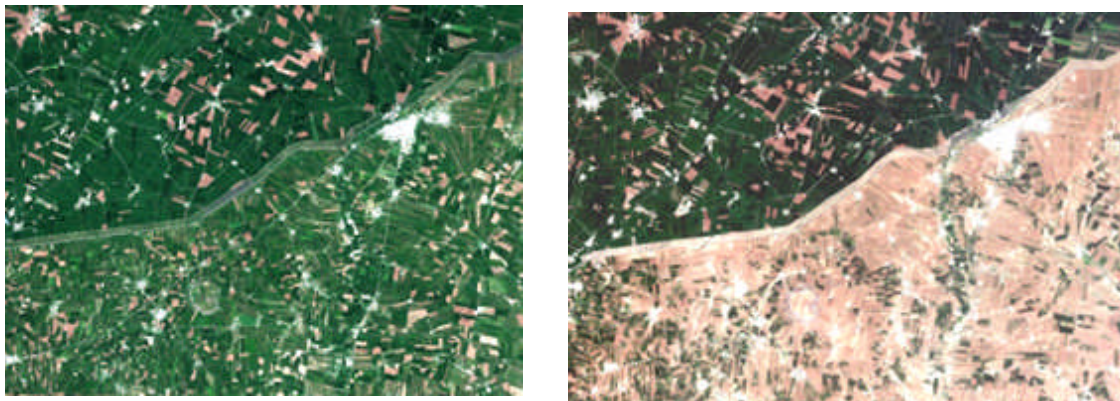


Fig. 2: Qamişlo region near JINWAR/ April 2020 and April 2021
(Source: Copernicus Sentinel data, processed by ESA; Şermin Güven - Disaster Research Unit/ FU-Berlin)

Another fact illustrated by the satellite images is that the areas to the north on the Turkish side of the border (upper-left half of the image) are significantly more resilient to drought. This is because Turkey has far greater water resources and irrigation infrastructure. In contrast to early climate change scholars, e.g. Beck (1986), climate change does not affect all populations to the same extent.

Access to water is unequally distributed in this region, and the unilateral control over rivers and streams further exacerbates this.

Seasonal drying of rivers is prolonged, which damages river ecology in the long term and opens up new opportunities for preventable diseases such as cholera and malaria. Khabur is the longest tributary of the Euphrates - crossing the border between Turkey and Northeastern Syria it flows into the Euphrates after about 400 kilometres. The scarcity of precipitation in NES has severely affected water resources. The groundwater level reached its lowest level in the 20-year period in 2022. This is also reflected in the drying up of the rivers. In several places, the farmers also report that the dried-up riverbed can be observed along the tributary rivers.

This satellite images shows an example of the dried Khabur river bed:



Fig. 3: Dried up river bed of Khabur near Tel Halaf (Maxar 2023)

History of Hydro-Hegemony - monopolization of water resources

The quality and quantity of water from streams in North Eastern Syria have become increasingly unpredictable during the past decades. The largest river in Syria is the Euphrates, a key source of water and electricity (Tishrin Dam, Euphrates/al-Tabqa Dam and Baath Dam) in NES. Flow rates have even decreased by more than half in some instances (OCHA 2021a; Xewla Isa Al-Ali - Interview: Nov. 2023). This is primarily due to the upstream reservoir systems in Turkey, which play a crucial role in determining the water flow rates.

During the last three years of prevailing drought, the flow rates and water levels in the larger rivers of NES have been reduced even further. The current conflicts are reinforcing climate change and acting like a catalyzer.

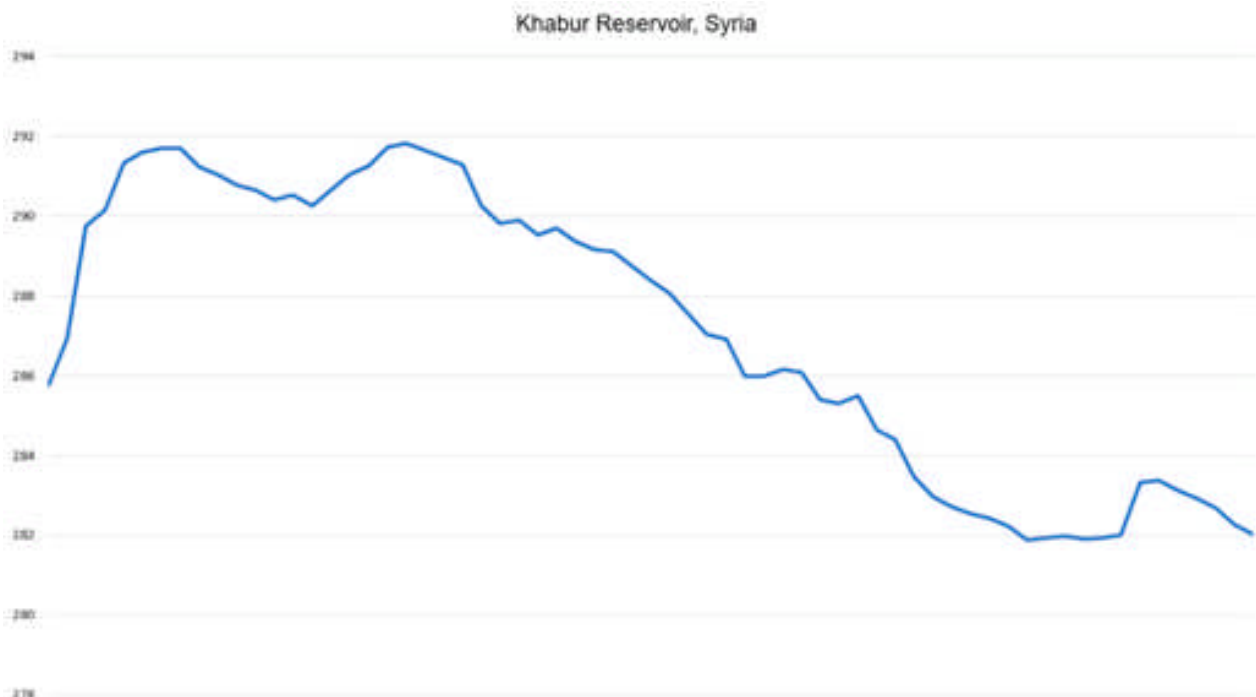


Fig. 4: Water Level Time Series (Altimetry) Khabur reservoir, Syria (Data: Schwatke et al. 2023/ Şermin Güven - Disaster Research Unit/ FU-Berlin)

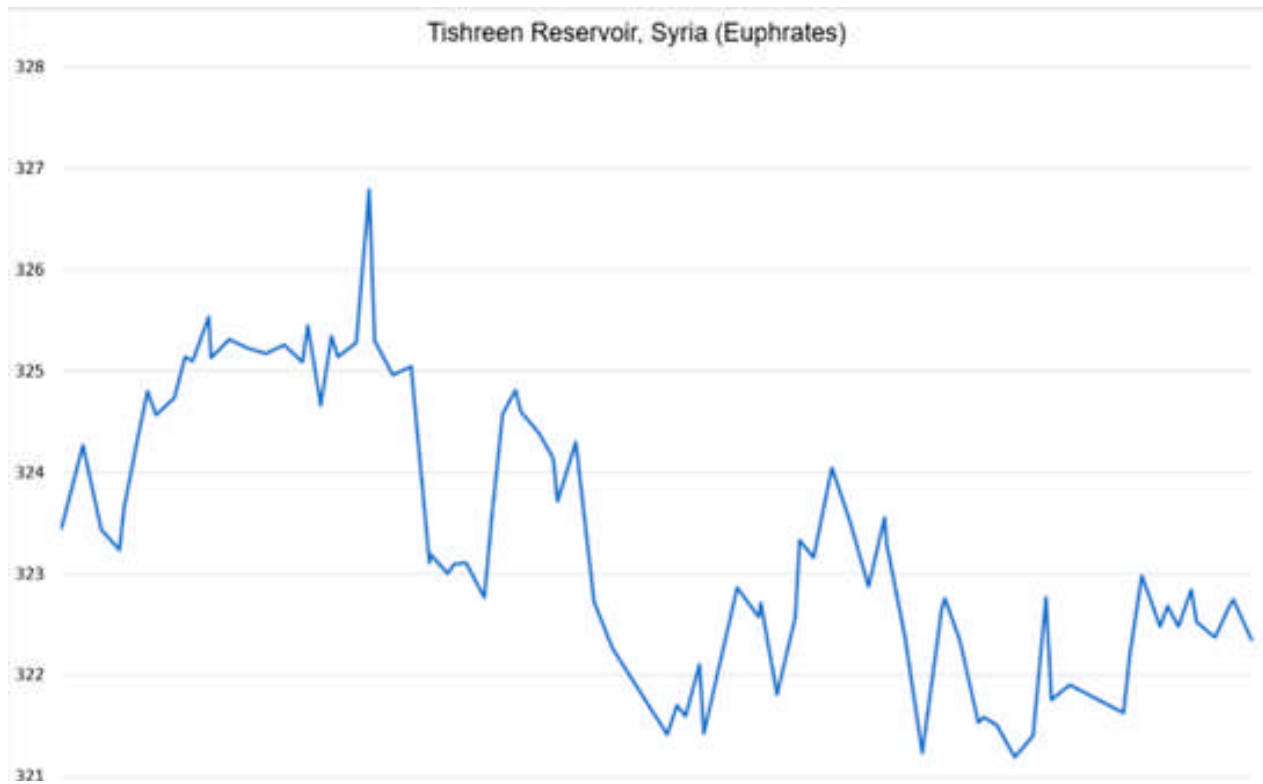


Fig. 5: Water Level Time Series (Altimetry) Tishreen reservoir Euphrates, Syria (Data: Schwatke et al. 2023/ Şermin Güven - Disaster Research Unit/ FU-Berlin)

Historically, the arbitrary borders drawn after the disintegration of the Ottoman Empire and the uneven distribution of river sources in the Turkish region have led to the Turkish state's water hegemony (Zeitoun & Warner 2006; Daoudy 2009; Zeitoun et al. 2013).

In the 1980s, extensive dam infrastructure was constructed on the region's river systems, known as the "South Anatolia Project" (GAP). This conflict is now intensifying in the NES region in particular. With decreasing rainfall, the dependence on the supply from the Euphrates and Tigris rivers is increasing.

Escalating risks from water scarcity

Related to water scarcity, North Eastern Syria faces particular challenges that worsen the situation in contrast to Turkey and Kurdistan Region Iraq (KRI).

One significant factor that has a major impact is the long-term consequences of the internal Syrian civil war. During military attacks, critical infrastructure in NES has been targeted repeatedly (OCHA 2021b). Following the Turkish army operation "Peace Spring" in the fall of 2019, the pumping station "Alouk" has been in the hands of Turkish-controlled militias. Half a million people, primarily in the Hassakeh district, are supplied with water by the Alouk Station. These Turkish-backed militias have blocked the water supply repeatedly. The war also affects the leakage and spread of toxic substances in soils and groundwater reserves - whether through ammunition remnants or destroyed infrastructure.

Also, the damage caused by years of sanctions imposed against the Syrian state (including NES) has prevented the local population from taking timely action on the challenges of climate change.

The lack of water affects other domains and escalates risks on multiple levels:

Due to the decreased flow rates, the water levels of Syria's vital Tishreen and Tabqa dams have experienced a substantial drop, resulting in reduced electricity generation capacity. This, along with fuel scarcity, led to power outages throughout northeastern Syria (IMAPP 2021; OCHA 2021b), which also limited the operations of critical water pumping stations (OCHA 2021a).

As a result of scarcity, local communities and cities in the region often have no choice but to purchase water delivered to households in water trucks. However, these water transporters are often contaminated, leading to a 133% increase in acute diarrheal disease cases (EWARS 2021). Although international humanitarian aid provides water tanks, there is no investment in building pipes, which would be a more cost-effective solution.

The unregulated private water transport business further exacerbates the vulnerability of economically disadvantaged groups. With high demand, water transport prices have increased by 36% between January and June 2021, leaving less household income available for other essential expenses (IMAPP 2021).

Water for the internally displaced persons (IDP) camps in the region is also delivered by trucks. If more water trucks are needed in other parts of the region due to interrupted pipelines, they are unavailable to supply these camps. This means the amount of water available per person in the camps is rationed. In the summer of 2021, the water supply in the Al Hol camp, for example, had to be reduced from an average of 40 liters per day to just 15 liters per person (Saad 2020). Al Hol camp is currently controlled by the SDF.

Environmental destruction and Ecocide

There are also severe challenges for the region's ecosystems. Historically, NES has always been a fertile place for vegetation - even for plantations requiring a lot of water, like vineyards.

But for decades, the Syrian regime has practiced monoculture, relied mainly on the cultivation of wheat, and eliminated agricultural diversity in NES. In 2000, for example, village residents cut down trees near Dêrik because of severe droughts. According to the villagers - deforestation seemed to be a solution against drought, so no irrigation would be used for trees anymore.

In many places where Kurds and other minorities live, the state often did not allow the planting of fruit and olive trees. There were strict regulations for the planting of trees. Large parts of the soil in NES have now become very dry, and it has to rain a lot before the soil can absorb any water. Usually, the roots of the trees function as water reservoirs and keep the soil moist.

The ongoing drought in NES and Mesopotamia is one of the most severe in decades. It is having far-reaching ecological consequences, particularly in the context of habitat destruction. The region has a rich history of supporting diverse ecosystems, but drought severely threatens these natural habitats.

One of the critical impacts of the drought is the desiccation of minor watercourses, which serve as vital biotopes for various life forms. These watercourses, such as streams, creeks, and small rivers, are essential ecosystems that support a wide range of flora and fauna. However, as the water levels decrease due to the drought, these habitats are being disrupted, damaging the region's biodiversity.

Insects, for example, play a crucial role in these watercourses, forming the basis of aquatic food chains. The decline in water levels can result in the loss of breeding grounds for aquatic insects, disrupting the entire ecosystem. Additionally, aquatic animals that rely on these watercourses for survival, such as fish and amphibians, face challenges in finding suitable habitats and adequate food sources. The diminishing water availability directly affects these species and has cascading effects on predators and other organisms within the food web. Some animal species, fish and birds, are disappearing permanently—new insect species, which also transmit diseases, multiply in parallel with the heat waves.

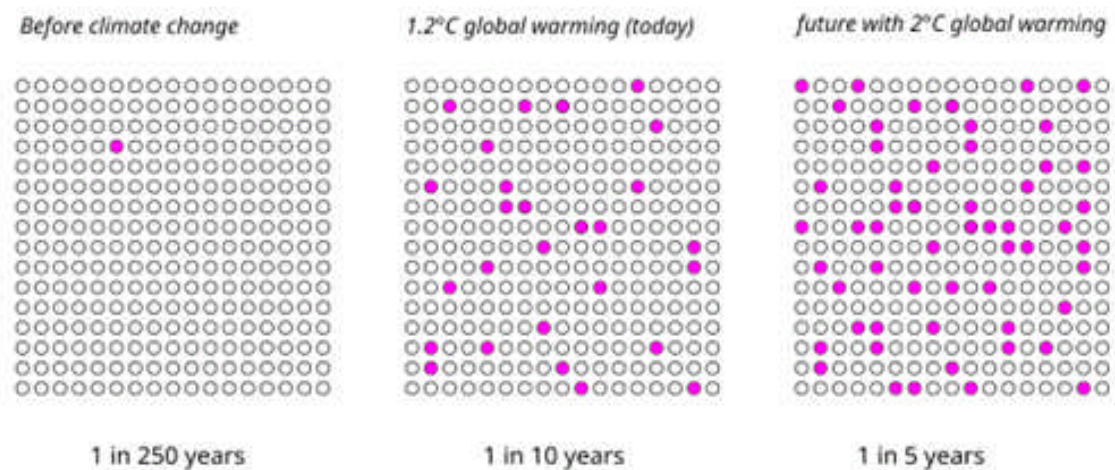
Moreover, the drought is impacting endangered flora in Mesopotamia. Many plant species in the region are adapted to specific moisture levels, and the prolonged water scarcity threatens their existence. Endangered plants dependent on small watercourses for irrigation and sustenance face the risk of extinction as their habitats dry up.

The destruction of these habitats has broader implications for the overall health and resilience of the ecosystems in Mesopotamia. Loss of biodiversity, disruption of ecological processes, and the potential collapse of food webs are all plausible outcomes if the drought persists. Additionally, the impact on ecosystems can have repercussions for human communities that rely on these natural resources for their livelihoods, such as fishing and agriculture.

Due to the ongoing drought, the drying vegetation in NES contributes to a significant increase in soil erosion and devastation. Vegetation plays a crucial role in stabilizing soil and preventing erosion through its roots, which bind the soil together, and its above-ground biomass, which provides a physical barrier against the forces of wind and water. As drought diminishes water availability, vegetation cover declines, making soil more vulnerable to erosion and degradation. This was the case in areas around the ecological women's village of Jinwar and the area surrounding the city of Dêrik.

The frequency and severity of droughts are increasing globally, and this trend is closely linked to the impacts of climate change. Drought, once considered a rare or once-in-a-century event, is now becoming a more common and recurrent phenomenon. This shift has profound implications for ecosystems, agriculture, water resources, and human communi-

Probability of extreme drought events in Syria and Iraq



ties as the threat of drought becomes more acute.

Fig. 6: Probability of extreme drought events in Syria and Iraq (Data: F. Otto et al. 2023)

All this makes it necessary to take measures now to counteract the degradation of nature and create resilience to increasingly frequent disasters.

Reconstruction in the shadow of marginalization

The role of international cooperation in times of crisis is of immense importance. However, in the past, international efforts in crisis prevention (COVID-19 pandemic, cholera epidemic) did not reach NES in time. A particularly negative example is the restrictions on disaster relief and project funding for organizations such as Heyva Sora Kurd, Cadus e.V., Medico International, and Städtepartnerschaft Friedrichshain-Kreuzberg - Dêrik e.V. (examples from Germany), which also support ecological projects intended for the autonomous regions in NES.

Ensuring equal access to clean water is a fundamental human right that should not be limited by geographical or political boundaries. As such, it is crucial to consider this responsibility not only at the local level but also internationally. Equitable distribution of water should be a key aspect of any political peace negotiations. It is also essential to take into account the increasing risks associated with health, environment, agriculture, economy, and disaster management in NES when developing crisis prevention strategies.

The primary context for water scarcity, drought, and overall environmental insecurity and injustice is created by social and political factors, as demonstrated by multiple studies (Donahue and Johnston 1998; Wuttich and Brewis 2014). Additionally, while hazards like droughts can affect large regions equally, disasters often arise from social, political, and economic marginalization that forces individuals to live in vulnerable conditions (Cannon in 1994; Voss in 2008).

“It is time to overcome the marginalization of the NES, to advocate for the development of the region at an international level, and to create sustainable resilience and strengthen local resilience.” (Ruken Ahmed - Interview: Nov. 2023) The international climate agreements also apply to NES, and the actors must be involved. “To this end, further opportunities must be created at the international level for stateless administrations to strengthen the civilian population in climate adaptation.” (Delsha Osman - Interview: Nov. 2023)

To address both the environmental and the underlying socio-political issues amplified by disasters like droughts, it is vital that the people affected lead the policymaking process (Voss 2008). In doing so, we can adequately and justly respond to the myriad of local and regional crises. This requires empowering and including marginalized communities.

Local democratic committees in NES are heavily concerned with sustainability and environmental protection issues. In a recent interview, the local ecology representative Berivan Omar (Interview: Oct./Nov. 2023) says the basic concepts on which the self-government in NES is based are the concepts of the democratic nation, whose main principles are democracy, ecology, and women's freedom. “It is a matter of a practical application of social ecology, as the form of organization of society would play the primary role in solving social problems, especially environmental problems.” (Berivan Omar Nov. 2023)

Communal efforts to preserve ecosystems, restore them, and provide broad-based ecological education deserve more attention and greater international support. Ecological awareness in NES had to be raised anew, which the self-administration in NES has achieved

in large parts of the region during the last five years and introduced in the municipalities. Against years of monopolization, war, and drought, reforestation is seen as a sustainable strategy, and trees are planted in the municipalities of Dêrik and Qamişlo. In Dêrik, for example, 6000 trees were planted in 2022, riverbeds were revived with vegetation (also in 2019), and tree nurseries were started. Exchange with the inhabitants of rural areas on climate adaptation strategies and sustainability is regularly supported by joint workshops organized by NES (Interview: Delsha Osman Nov 2023).

Local actors in NES support and further develop global discourses on drought, water scarcity, environmental justice, and disaster while raising ecological awareness. They exchange existing local knowledge with other international environmental and humanitarian aid initiatives such as Make Rojava Green Again and Rojava University. They are actively pursuing similar goals to those of the SDGs. Initiatives include a reforestation project in Hayaka, projects for reusing water, an internationalist commune tree nursery, a community garden, and planting projects in the city and schools.

Establishing city partnerships is essential for tackling global ecological challenges through cooperation - for example, between cities in Europe and NES, such as in Dêrik (official partnership with the municipality in Berlin Friedrichshain since 2019), Qamişlo (partnership with Cologne will begin officially in 2024), and Kobane began a sister city friendship with Frankfurt.

Solar power solutions and future perspectives of ecological resilience

The City partnership between the municipalities of Friedrichshain-Kreuzberg/Berlin (Germany) and Dêrik (NES) can be seen as a lighthouse project for further possible international cooperation and strengthening of ecological resilience in the region. In addition to the greening of riverbeds and the strengthening of the role of women in politics and ecology, the possibilities for solar-powered water pumps are also being jointly developed.

Case example: Solar power solutions and planting of river bed greening in Dêrik

Twenty-six freshwater wells are located in Dêrik, which are between 200 and 300 meters deep. In these wells, the level between the bottom of the well and the water table is between 85 and 200 meters.

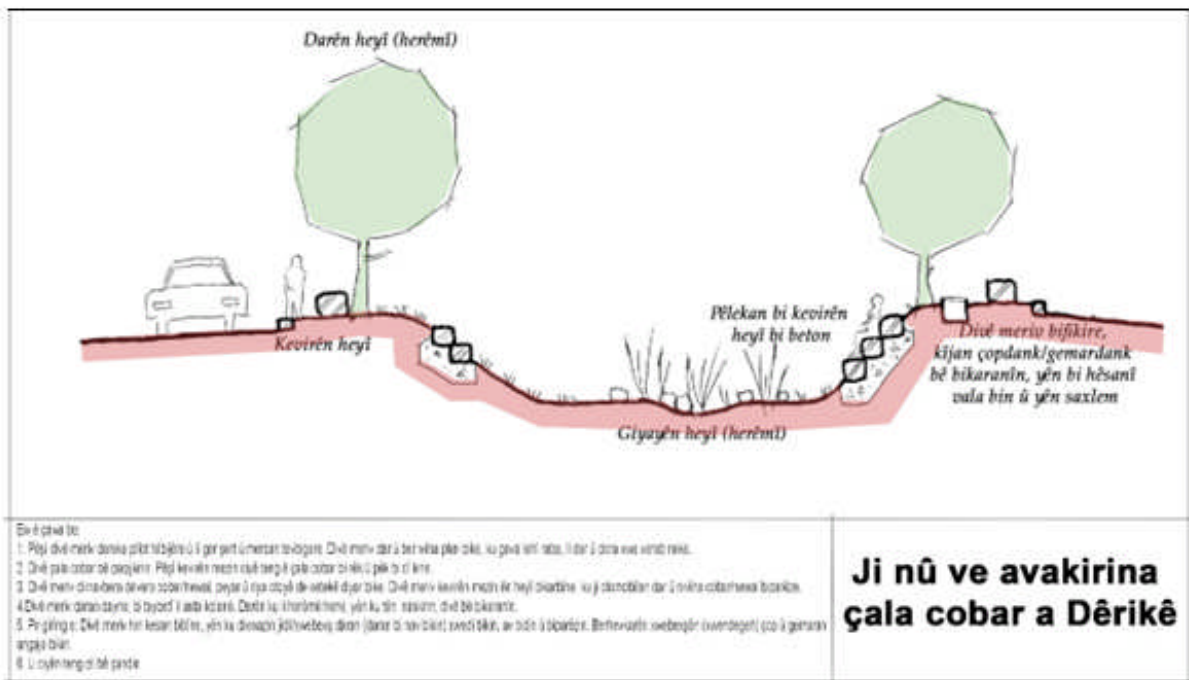
Until now, the pumps have been operated with electricity that is brought in from afar and used to be mainly generated in gas-fired power plants within the canton of Cezire. Turkish airstrikes in November 2022 (like in October 2023) largely destroyed these gas-fired power plants - as well as a substation near Dêrik. The electricity for Dêrik's drinking water pumps is currently mainly generated by outdated diesel generators, which are not environmentally friendly, in the town itself, which are prone to repairs. The diesel generators used to start up automatically when the power failed. However, there are always interruptions to the electricity and water supply when switching over. Even before the gas-fired power stations were destroyed, the pumps could only be operated for 10-12 hours daily.

The construction of a solar well in the Sîlemaniye/City district to Dêrik, for example, is intended to supply around 5,000 people who need 125-130 m³/h of water.

This solar-powered pumping project is an example of how in small steps solutions can be created from the local level as part of the upcoming ecological strengthening of a municipality. Like the City of Dêrik, Jinwar, Qamislo, and some other villages and municipalities

are already planning solar-powered pumping station. The awareness that groundwater can be conveyed very sensitively by pumping wells is also discussed with the residents. Other projects such as tree nurseries and tree and riverbed planting campaigns in parks and schools are intensifying and other municipalities are joining the projects. (Berivan Omar Nov. 2023)

These projects are translated into local languages such as Kurdish and Arabic for a better exchange of content and promotion of environmental awareness of the communities in their own language.



See an example flyer of the riverbed greening project:

Fig. 7: More green for Dêrik: community gardens and redesign of the riverbed at Kornîş (Staepa Dêrik 2019)

The city administration and MRGA report that the greening project has been well received by the population. The public meetings were a key factor in this. As a result, community was involved in the realisation of the project on the riverbed and in the gardens. The creation of shade by the street trees along the riverbed and in the gardens improved air quality in the city thanks to the greenery and greater personal responsibility for the maintenance and cleanliness of the riverbed and gardens (Staepa Dêrik 2020).

Unlike in other development policy contexts, there is no lack of knowledge or innovative ideas and international cooperation for generating more environmentally friendly solutions for global drought, water and energy crisis. The pros and cons of these projects are also discussed with residents as part of ecological awareness-raising and training programmes. (Ruken Ahmed - Interview: Nov. 2023)

Future local perspectives and urgent solution recommendation

“Currently, the environmental authority in NES is preparing to establish an Environmental Council composed of all relevant bodies and institutions to discuss decision-making mechanisms that align with our principles of environmental preservation in all our endeavours. Additionally, the organisation of women has formed a platform for the ecological needs in NES”

(Berivan Omar Nov.2023)

The current water crisis is part of a long-term ecological crisis in Syria and the NES. This ongoing crisis involves an escalating frequency and increasing droughts and sinking water levels in the Euphrates and the groundwater in NES.

Action is needed to minimise the humanitarian impact of the current and future water and ecological crises. Political insecurity is one of the causes, which prevents the solutions to ecological crises at the local level in NES.

A more feasible and beneficial solution for NES could be an agreement on sharing the water resources of the Euphrates River.

Based on UN and EU rules in alignment with climate agreements such as the SDGs, the resourcing of financial support programs for environmentally sustainable projects need to be developed in NES.

To conclude: Climate change is happening in real time, and one of the main reasons for this is the ecological imbalance caused by humans and states which is shown and faced as the incessant environmental destruction. It is a necessity, not a formality to recognise controlled water sources and ecocide as a crime in a stateless region such as in NES, which is handled in a setting of conflict.

In order to calm the current crisis, the following steps must be urgently implemented. Regarding low-level Euphrates and other rivers, to strengthen the protection of the civilian population during the ecological and especially water crisis we should consider the protocol of the AANES:

“Drinking water in Northeast Syria” (Autonomous Administration North East Syria 2023):

Excerpt:

- Existing laboratory for water quality control analysis should be supported in their development.
- Systems of trucking water toward areas suffering from lack of water access, especially Hasake, should be improved in efficiency and quantity.
- Supports for water trucking filling stations with the chlorination Systems of pre-distribution, as flocculation, settling and reverse osmosis processes should be pursued and implemented. This will imply additional purchase of chlorine and aluminum sulfate by the various Water Departments for the water stations.

To minimise the drought conditions:

- Further hydro-geological studies are needed in order to allow a better understanding, planning and decision making regarding future projects. Research and pilot plant of water treatments as anaerobic biodigester.

Urgent steps for the future of Alouk water station:

- Intervene to re-allow access to the station by qualified and well-trained staff, in order to carry on the maintenance/rehabilitation required, and work to assess this access as constant, not sporadic.
- This requires the establishment of a safe, unhindered humanitarian corridor to the water station, covering both drinking water supply and electricity infrastructure, should be supported. In this way, there is hope that a more constant access and control will also discourage/prevent the voluntary manipulation or blockade of the station.

Perspective toward electricity situation:

- Intervention in order to increase the efficiency in generation, distribution and use of electricity, research for develop in the fields of renewable energy, how to overcome the obstacle represented by the embargo in this field.
- Research and material support for photovoltaic batteries production.
- Research and implementation of biogas plants from organic wastes and wastewaters.

These are some of the points that the Autonomous Administration North East Syria have set as goals to overcome the local crisis for civilian population in NES. Further analyses of these multi-layered crises are needed at both scientific and political level. Global cooperation and political will is needed to develop a recognition of ecocide, water crisis and preserve the future of civilians in North East Syria.

Appendix

Interview:

Berivan Omar - Agriculture Engineer and Faculty Member of Jineoloji at the University of Rojava. She works with the local municipality/ the Department of Women and Environment in NES.

Delsha Osman - Diplomatic Relationship Centre of Kongra Star/ Representative in Europe (Nov.2023)

Ruken Ahmed - Member of the women's movement Kongra Star/ Qamishlo - NES (Nov.2023)

Xewla Isa Al-Ali - Member of the Arab women's organization Zenobiya (Women's Gathering Zenobiya)/ Raqqa - NES (Nov.2023)

Images

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Fig. 3: Dried up river bed of Khabur near Tel Halaf (Maxar 2023)

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Fig. 5: Water Level Time Series (Altimetry) Tishreen reservoir Euphrates, Syria (Data: Schwatke et al. 2023/ Şermin Güven - Disaster Research Unit/ FU-Berlin)

Fig. 6: Probability of extreme drought events in Syria and Iraq (Data: F. Otto et al. 2023)

Fig. 7: More green for Dêrik: community gardens and redesign of the riverbed at Korniş (Staepa Dêrik 2019)

Bibliography

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