

# The unequal vulnerability of Kurdish and Azeri minorities in the case of the degradation of Lake Urmia, Iran

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## Abstract

This article explores the differences between the vulnerability of two ethnic minorities faced with the same environmental disaster, along with the causes of those disparities. Set in the context of the degradation of Lake Urmia in north-western Iran, the study problematizes the unequal access to political power of the Kurdish and Azeri minorities and the historical dynamics of marginalization and empowerment. It links those dynamics with the current differential vulnerability of the members of the two minorities living in proximity of the lake, who have traditionally been dependent on agriculture as a means of subsistence. The degradation of the lake has severely affected the agricultural production in the region through the salinization of irrigation water and the degradation of arable land. The study focuses on households in the proximity of the lake with the goal of exploring to what extent their ethnicity determines their vulnerability and adaptive capacity in the face of the disaster. We find that ethnic politics plays a role in the access to irrigation water and the potential for income diversification, as well as being a component of the coping capacity embedded in social networks. Additionally, we find that ethnicity is a determinant of the availability of economic resources, and strongly influences the knowledge of – and willingness to participate in – governmental and non-governmental projects to mitigate the effects of the environmental disaster.

**Key words:** vulnerability, ethnicity, Iran, political power, minorities, environmental degradation, Lake Urmia

## Résumé

Cet article explore les différences entre la vulnérabilité de deux minorités ethniques confrontées au même désastre environnemental et les causes de ces disparités. Placée dans le contexte de la dégradation du lac Urmia dans le nord-ouest de l'Iran, cette étude remet en question l'inégalité d'accès au pouvoir politique des minorités kurde et azérie et la dynamique historique de la marginalisation et de l'autonomisation. Il relie cette dynamique à la vulnérabilité différentielle actuelle des membres des deux minorités vivant à proximité du lac, qui dépendent traditionnellement de l'agriculture pour leur subsistance. La dégradation du lac a gravement compromis la production agricole de la région par la salinisation de l'eau d'irrigation et la dégradation des terres arables. L'étude se concentre sur les ménages à proximité du lac dans le but d'explorer dans quelle mesure leur appartenance ethnique détermine leur vulnérabilité et leur capacité d'adaptation face à la catastrophe. Nous constatons que la politique ethnique joue un rôle dans l'accès à l'eau d'irrigation et le potentiel de diversification des revenus, tout en étant un élément de la capacité de gestion intégrée dans les réseaux sociaux. De plus, nous constatons que l'appartenance ethnique est un facteur déterminant de la disponibilité des ressources

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économiques et influence fortement la connaissance et la volonté de participer à des projets gouvernementaux et non gouvernementaux visant à atténuer les effets de la catastrophe environnementale.

**Mots clés:** vulnérabilité, appartenance ethnique, Iran, pouvoir politique, minorités, dégradation de l'environnement, Lac d'Urmia

## Resumen

El presente artículo explora las diferencias en cuanto la vulnerabilidad -y las causas de estas- de dos minorías étnicas que enfrentan el mismo desastre natural. Ubicado en el contexto de la degradación del lago Urmia, en el noroeste de Irán, este estudio problematiza el acceso desigual al poder político que tienen la minorías Kurdas y Azeri, así como las dinámicas históricas de marginalización y empoderamiento. Se hace un vínculo entre estas dinámicas y las actuales diferencias en la vulnerabilidad de los miembros de las dos minorías que viven en las proximidades del lago, y que tradicionalmente han dependido de la agricultura como modo de subsistencia. La degradación del lago ha afectado gravemente la producción agrícola en la región a causa de la salinización del agua para riego y la degradación de la tierra cultivable. El estudio se enfoca en los hogares próximos al lago, con la finalidad de explorar hasta qué punto la etnicidad determina su vulnerabilidad y capacidad de adaptación para enfrentar el desastre. Encontramos que las políticas étnicas juegan un rol en el acceso al agua para riego y en el potencial para la diversificación de ingresos, además de ser un componente para la capacidad de respuesta incorporada en las redes sociales. Además encontramos que la etnicidad es un determinante para la disponibilidad de recursos económicos, y afecta considerablemente el conocimiento de -y disposición para participar en- proyectos gubernamentales y no gubernamentales para mitigar los efectos del desastre natural.

**Palabras clave:** vulnerabilidad, etnicidad, Irán, poder político, minorías, degradación ambiental, Lago Urmia

## 1. Introduction

With environmental disasters becoming more frequent at a global scale, understanding people's vulnerability to them is becoming critical for their mitigation (IPCC 2012). In hazards and disaster literature, vulnerability is used to explain the susceptibility of a person or a group affected by a hazard. However, not all individuals and groups are equally affected by the same hazard, as people's vulnerability is greatly determined by social relations, discrimination, inequality and their access to resources (Birkmann and Wisner 2006). In turn, the vulnerability of people in the face of a hazard reflects their spatial, social, economic and political marginalization within society (Gaillard 2010; Lewis 1999; Wisner *et al.* 2004). Ethnic minorities are frequently among the most vulnerable groups (Clark *et al.* 2005; Cutter *et al.* 2009; Elliott and Pais 2006; Peacock *et al.* 1997) due to structural discrimination, which leads to their economic and geographical marginalization (Bolin and Kurtz 2018; Cutter *et al.* 2009; Fothergill *et al.* 1999). Cultural barriers (Cutter *et al.* 2003), as well as inadequate representation of their interests in environmental decision-making also increase their vulnerability (Dash 2013).

The dynamics of selective marginalization or empowerment of certain groups within a society over time, along with the reflection of these changes to the vulnerability of those groups to environmental hazards, are relatively underexplored topics in political ecology. Adopting analytical frameworks with a sufficient temporal scope enables the exploration of variations of political power in periods of significant political transitions, such as those following 'regime change.' This article does so by arguing that the nature of the marginalization of entities can vary over time, and in periods of significant political change a certain empowerment may be achieved. To justify this, we explore national-level political change and link the selective empowerment of one minority versus others to variance in their disaster exposure and coping. A case in Iran involves one ethnic minority, the Azeri, transitioning from a state of marginalization to a high level of representation in the political and economic elite, with this empowerment driven by alliance-building during the Islamic revolution of 1979 (Alamdari 2005). The large-scale change driving this empowerment was centered on the rapid modernization and urbanization of Iranian society, and this simultaneously structured the further marginalization of other ethnic minorities, including the Kurds. The diverging trajectories of the two ethnic minorities under consideration are most evident in those geographic areas where the two minorities cohabit. Here, the continuously marginalized ethnic minority gains a new actor with which its members compete or are in conflict. This cleavage between ethnic minorities, with one emerging as part of the Iranian political and social elite,

becomes latent in the post-revolutionary period and is central in influencing the characteristics and effectiveness of coping strategies and the degree of vulnerability when these two ethnic communities face a large-scale environmental disaster. This disaster is the degradation of Lake Urmia in north-western Iran, exacerbated by economic and social changes in the post-revolutionary period.

The article explores the effects of the degradation of the lake on communities living in its proximity. Over the course of several decades the rapid desiccation of the lake, caused by environmental and human factors, created one of the largest environmental disasters in Iran, producing threatening consequences for the population in the lake basin. This population is predominantly ethnic Azeri, who regard Lake Urmia as a symbol of their identity (Mirchi *et al.* 2015), with the Kurds populating the area around the lake in smaller numbers.

Our primary objective is to contribute to the political ecology of vulnerability. This is done by examining the dynamics and consequences of selective empowerment of a given minority over time and by linking these changes to the varying vulnerability to environmental disasters of this minority on a household level, and to one that remained marginalized. Tracing the historical development and dynamics of marginalization and empowerment of certain groups, and recognizing the root causes of their enhanced vulnerability, can provide a more detailed understanding of marginalization and illuminate the possible political and structural interventions needed to decrease the levels of their inequality. As this study shows, significant power disparities can be observed between different minority groups, and the empowerment of one at a given time can enhance the vulnerability and diminish the adaptive capacity of the other. This article also contributes to the literature on the status of ethnic minorities in contemporary Iran, which is dominated by national-level studies (Koochi-Kamali 2003; Romano 2006: 222-247; Yildiz and Taysi 2007). The example of the manifestation of the political and social exclusion of the Kurdish minority on an individual or household level is a significant contribution to this field of research.

The second section presents the theoretical framework that informs the study. Specific developments within ethnic politics and political power in Iran are discussed in the third section, which outlines the diverging development of political power attainment between the Kurdish and Azeri ethnic minorities. The region is then contextualized, outlining the degradation of Lake Urmia and its effects. The penultimate section presents the results of the study, differentiated by observed sensitivity and adaptive elements, before concluding.

## 2. Vulnerability, marginalization and empowerment

In the hazards and disaster literature, studies of vulnerability investigate environmental hazards connected to social, political, and economic inequalities (Bolin and Kurtz 2018). Though there is no one definition, since it varies with topic and approach (Birkmann 2006; Cutter *et al.* 2008; Fuchs *et al.* 2011) a widely accepted one is that by Wisner *et al.* (2004: 11) who define vulnerability as "...the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard." Political, demographic, and economic processes may create power asymmetries among different groups within a society, impacting their vulnerability (Wisner *et al.* 2004).

Vulnerability is therefore a predisposition of a subject or a system affected by a hazard (Cardona 2003). Political ecology offers opportunities to critically examine the differences in vulnerability of certain groups within society. Vulnerability is linked to the economic and political marginalization of particular groups, and the causes and sources of their marginalization are investigated (Kasperson and Kasperson 2005; Oliver-Smith and Hoffman 1999). It is generated by processes and social conditions that change over time.

The social vulnerability paradigm focuses on socioeconomic and demographic attributes that make some people more vulnerable to natural hazards (Cutter *et al.* 2009). Social vulnerability to natural events is driven by social inequality (Phillips and Fordham 2010) and exists separately from a natural hazard (Cutter *et al.* 2003). Cutter *et al.* (2009: 20) define it as "...those characteristics of the population that influence the capacity of the community to prepare for, respond to, and recover from hazards and disasters." It is often described using personal characteristics such as age, gender, health, income, ethnicity, employment and race. According to Fordham *et al.* (2013: 17) "...social vulnerability reflects the stratified conditions in which people compete for scarce, limited resources to mitigate against, respond to, and recover from disasters." Some of the factors affecting social vulnerability are a lack of access to resources, reduced political power and lower political

representation, limited social capital, and an underdeveloped infrastructure (Adger 2006; Cutter *et al.* 2003). Such characteristics have been observed among ethnic minorities, as have a reduced access to social services, higher unemployment rates, and lower social and financial capital to cope with disasters, all of which make them more vulnerable to hazard events (Bolin and Kurtz 2018). Indeed, ethnicity is a commonly noted factor that influences vulnerability (Cutter *et al.* 2003; Wisner *et al.* 2004), as has been observed in many studies of disasters (eg. Clark *et al.* 2005; Elliott and Pais 2006; Masozera *et al.* 2007; Peacock *et al.* 1997). According to Dash (2013) "...ethnicity is based on a shared culture such as language, religion, or common norms and practices."

The interests of ethnic minorities are often poorly considered in environmental decision-making and policies, with environmental racism manifesting as unequal exposures to environmental hazards, health hazards, and access to health care. When analyzing ethnicity within African states, Raleigh (2010: 69) notes that groups can be characterized by their 'relevance' for national-level politics or their exclusion from that level, with consequent impacts on economic marginalization or inclusion. Sowers (2007: 37) explores the Egyptian government's curtailment of minority conservation efforts, noting that marginalized communities were even compelled to defend their own efforts against the state, regardless of any benefits for the community. Increased social vulnerability of minority groups to environmental hazards is therefore not a result of being a minority, but results from unequal social conditions created by discriminatory structures that politically and socially marginalize them (Dash 2013).

Widely contested as a concept, political power stands at the center of discussions on minority marginalization. We consider power as "...based on privileged access to valued social resources" (Van Dijk 1996: 85). Following this, a nuanced examination of the underlying mechanisms of power politics is proposed, which sees the issue of access to political power as being at the center of minority political endeavors. Indeed, access is defined by exclusionary mechanisms, intimately tied to resources based among others on relations of "...production, gender, ethnicity, status and age" (Blaikie *et al.* 1994: 48). With systemic exclusion defining structured ethnic inequality, *access* becomes the key factor in determining power, with two processes to be addressed: first, the way that this access was achieved or constructed, and second, the way that power is maintained or reproduced, primarily through organized and institutionalized means (Van Dijk 1996: 85). Decentralized and smaller-scale contestations of power inequalities leave the 'weaker' of the minorities still prone to vulnerability, and require greater coordination (O'Riordan and Timmerman 2001). Additionally, in contexts of centralized power where resource management policies are distant from those affected by them, an 'environmental alienation' can emerge, leading to conflict and crisis (Johnson 2003: 82).

The marginalization of a given group may be altered. 'Empowerment' is the process of an individual or group gaining or developing the capacity to alter their surroundings or the broader society in which they are embedded (Beteille 1999; Cooke 2002). Crucially, empowerment can occur where change is large-scale, when newfound political regimes develop altered alliances and new institutional arrangements emerge that affect the balance of power. Decolonization, state fragmentation, and revolutions are contexts where such change can occur (Cavanagh 2018). But new power dynamics can subsequently be wielded by newfound elites to produce novel marginalizations. In their study of water reforms in Zimbabwe, Derman and Ferguson identify the social consequences of political elites claiming to reinforce empowerment. While their reforms were intended to "...increase racial equity by providing black communal area farmers with greater access to water resources", the outcome was the exclusion of the 'white population', political opponents, and "...almost anyone who disagreed with the [ruling party's] program for reelection" (Derman and Ferguson 2003: 285). This shows how political processes can be empowering for one section of society, disempowering for another, and *maintaining* the marginalization of a third. Such processes represent trajectories of 'selective empowerment.' We present the Iranian experience with selective empowerment in the following section.

### 3. Iranian ethnic politics in transition

As the focus of this article is on the changing nature of marginalization that brought about the current state of affairs in the country, we need to examine the transition that occurred from the political era that preceded it. The pre-revolutionary period in Iran was characterized by the dominance of the Pahlavi dynasty in two

continuous periods, between 1925 and 1941, and between 1941 and the 1979 revolution. Characterized by absolute monarchism, the Pahlavi era produced significant marginalization of ethnic groups that were not seen as representing the political base of the monarch. Persian-centrism became the dominant ideological footing for the new regime, with ethnocentric policies informing the expansion of bureaucratic rule as part of modernization drives instituted by the Shah (Grebenikov 2013). While at least one of the minorities, the Azeri, managed to achieve some level of elite integration driven primarily by their commercial endeavors (Atabaki 2005), Persian-centric policies meant that cultural freedoms such as linguistic rights marginalized all ethnic minorities. This would become an important mobilizing element in the period leading up to the 1979 revolution (Kurzman 1996).

Iranian ethnic minorities inhabit areas destined for peripheral status because of their geographic characteristics and remoteness from historically established political and economic centers (Malm and Esmailian 2007). This trajectory of isolation is characterized by an indiscriminate form of marginalization, most evident in the economic modernization that took hold in Iran in the 20<sup>th</sup> century. Two stages can be identified, with one taking place before the Islamic revolution and the other following it (Adhajianian 1983; Madani 2014). While they occur under two different regimes, and within largely different contexts for the international placement of the Iranian economy, their common trait is political centralization in the provinces populated mostly by ethnic Persians (Elling 2013: 54). For example, large-scale industry was almost completely absent from areas populated predominantly by ethnic minorities, including those in this article. Agricultural industrialization followed the same centralized logic. Contemporary investment has continued in relatively developed regions, seen to have a higher potential for profit because of prior investment in infrastructure and the 'modernization' linked to it (Malm and Esmailian 2007). Difference has been maintained between the geographic, political, and economic center, and peripheries dominated by ethnic minorities.

The 1979 Islamic revolution brought about diverging trajectories of inclusion into the Iranian political elite for the marginalized groups discussed above. The revolution granted opportunities for different interest groups, thus motivating their support. The Kurdish and Azeri minorities both attempted to institutionalize their stated national programs (Bill 1982; Shaffer 2000). Separate from the combined effort of the revolutionary elites, the Kurds achieved autonomous territorial control of the north-western part of the country (Yildiz and Taysi 2007). A subsequent negotiation between the Kurdish Democratic Party of Iran and the new government failed to address the particular demands of the Kurds, since their desires for more autonomy were deemed incompatible with Islamic jurisprudence (*ibid.*). An open and violent conflict followed, further deteriorating relations between Kurds and the new Islamic political elites. The Iran-Iraq war was highly destructive to Kurdish areas (Saleh 2013: 69). After the conclusion of the conflict and the death of Imam Khomeini in 1989, the militarized Kurdish areas slowly became normalized with inclusive governmental control returning, albeit largely following the same developmental exclusionism that had existed throughout the pre-revolutionary period.

A decidedly different relationship developed between the Azeri population and the regime. The Azeri are often considered as being politically the most powerful ethnic minority in Iran. This is in part due to a markedly different allegiance to the Islamic revolutionary regime, in particular, their lack of dissent during the Iran-Iraq war (Saleh 2013). Other factors include: a shared religion with the state's Persian majority, namely Shi'i Islam; a larger population compared to the other minorities, thus representing a significant political bloc of up to 30% of the Iranian population (Elling 2013); and being the ethnic ingroup for large segments of the Islamic clerical and economic elites, including the current Supreme leader Khamenei. With Iranian society traditionally characterized by informal politics (Bill 1973; Samii 2006), such relations develop easily, and feature highly resilient informal networks of influence (Shaffer 2000). Furthermore, with the Azeri achieving significant positions in Iranian society, again driven by their favorable relationship with the regime and the Persian majority, the desire emerged to "address past injustices and gaps and to raise the issue of Iran's treatment of sub-state groups" (*ibid.*). When linked to power struggles between the minorities at the regional and local level, ingroup favoritism is an important predictive factor for determining political power. There has been growing regionalism in Iran since the enactment of local self-governance reforms in the late 1990s and early 2000s, resulting in attempts to gain resources for underdeveloped provinces populated in large part by ethnic minorities. But only a sub-section of the population is favored.



The meso- and micro-level manifestation of ethnic politics is a severely under-developed area of research in Iran, especially among Kurdish groups inside the country. We turn to the micro-dynamics of political power at the individual or household level, and the enactment of what Rosino (2016: 942) understands as 'boundaries', which "restrict groups from benefiting from the state via the construction of categories and the distribution of resources and penalties according to those categories." These boundaries are frequently reproduced at the micro and meso levels, with divided communities frequently the sites of 'localized social practices' (*ibid.*), which reproduce boundaries as extensions of political power.

Writing on Iran, Wellman (2017: 513) problematizes kinship, religion, and nation-making in the reproduction of political structures and allegiances. Intermediaries in networks of power, such as village officials, maintain relations with the community and local political elites (Wellman 2017: 506). These meso-level power players develop and nurture ties with provincial-level governmental offices, with those ties facilitating the acquisition of "government funds and other assistance for village projects" (Hoogland 2009: 39). In turn, ingroup favoritism or informal politics determine not only the success of the resource-gathering campaigns but also the subsequent meso-level distribution of resources. With the Kurdish population economically more deprived in most contexts in Iran (Saleh 2013; Yildiz and Taysi 2007), we feel that Hoogland's finding (2009) that the socio-economic status of households correlates with their success in taking advantage of developmental programs instituted after the 1979 revolution should be read for its ethno-political implications. Furthermore, the Kurdish position in the labor market and their access to economic opportunities needs to be considered, also for its influence on household-level adaptive strategies (Cutter *et al.* 2009; Fothergill and Peek 2004). Ethnic discrimination in labor markets and other areas are extensions of the structural determinants of political power or the broader exclusion of non-Shi'i Iranians (Saleh 2013; Tohidi 2009: 302).

#### 4. Methods

In this study a qualitative approach was used to explore experiences and coping with a slow-onset disaster. The goal of measuring and defining vulnerability is to reduce it (Green 2004) and qualitative methods are valuable in local and community scale vulnerability assessments (Birkmann 2006). They can provide additional and deepened information about peoples' perceptions (Fuchs *et al.* 2011; Massmann and Wehrhahn 2014) of their geographical and social environment as well as vulnerability to hazards, and their coping strategies (Wisner 2006). Local knowledge can help understand local risk. Participatory vulnerability assessments give voice to people directly affected by hazards as well as the power to address risk (IFRC 2006; Thomas *et al.* 2013).

In-depth semi-structured open-ended interviews were conducted with the help of an interpreter during ethnographic field work in villages and settlements around Lake Urmia between June 2016 and August 2017. Some 63 farmers were interviewed, of which 26 were Kurdish and 37 Azeri, living in areas with a mixed Azeri and Kurdish population. The main objectives were to explore the livelihood strategies of farmers affected by the degradation of Lake Urmia, the underlying factors that impacted their vulnerability to the degradation of the lake, and any coping mechanisms that farm families employed. Only villages and settlements around the lake with a mixed population were selected, so that the physical conditions were the same for both ethnicities. Farmers were approached and the study was explained, with all agreeing to be interviewed. Additional interviews were conducted with officials from governmental and non-governmental institutions connected with the conservation of Lake Urmia. All interviews were analyzed using ATLAS.TI software. While the interviews are not generalizable to a broader population, they provide detail and insight into issues and themes for further vulnerability assessment (Thomas *et al.* 2013).

#### 5. The context: Lake Urmia

Lake Urmia is located in north-western Iran (Figure 1) and is one of the largest hypersaline endorheic lakes in the world (Ghaheri *et al.* 1999), and the largest lake in the Middle East (Abbaspour and Nazariouost 2007). The Lake Urmia basin is divided between the provinces of West Azerbaijan, East Azerbaijan and

Kurdistan. It comprises 3% of Iran's surface area and holds 7% of the total available freshwater resources (Hashemi 2012).

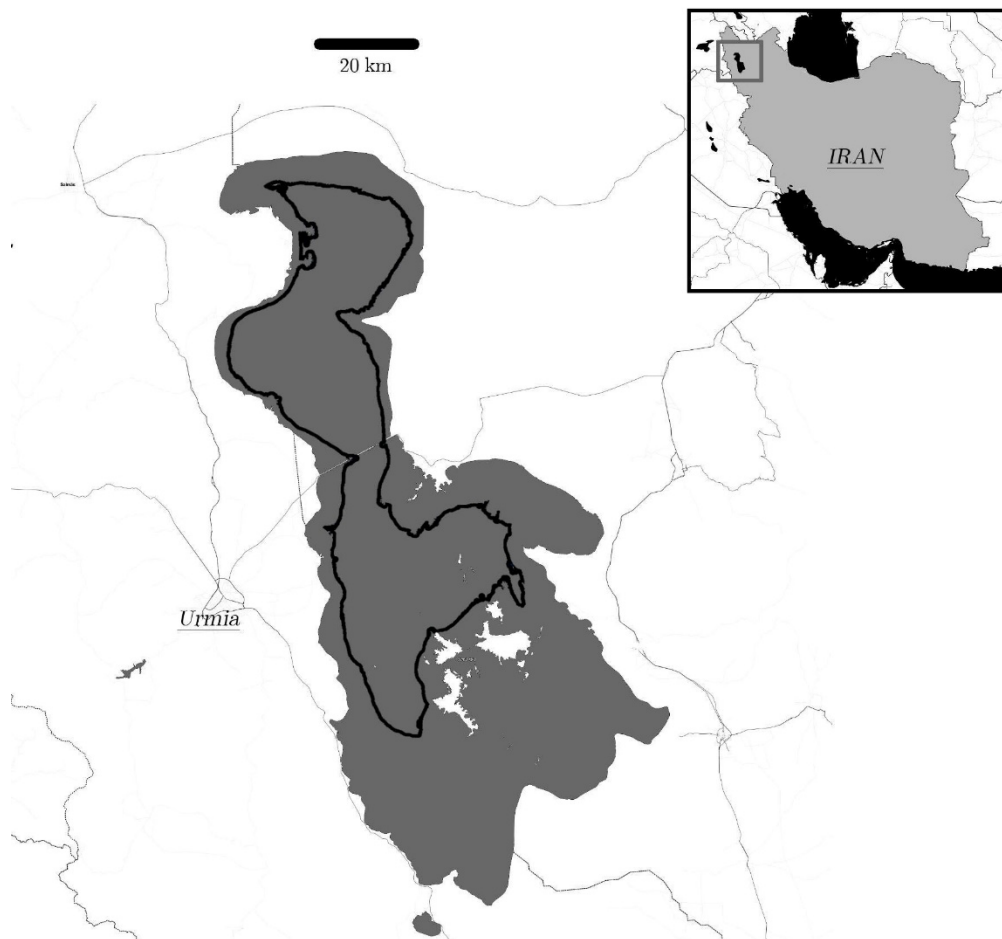


Figure 1: Location of Lake Urmia and its receding shoreline. The dark grey area shows the extent of the lake in 2000 and the black line is the boundary in 2018.

Over the last two decades the lake's surface began to decrease significantly (AghaKouchak *et al.* 2015; Eimanifar and Mohebbi 2007; Jalili *et al.* 2016; Shadkam *et al.* 2016; Shokoohi and Morovati 2015; Tisseuil *et al.* 2013). AghaKouchak *et al.* (2015) reported an 88% reduction of the area of the lake since 1972. There are several reasons for this drastic reduction, the most important of which are the upstream overuse of water mainly for irrigation purposes (AghaKouchak *et al.* 2015; Hassanzadeh *et al.* 2012; Tisseuli *et al.* 2013); the construction of dams on the tributaries and other hydro-economic developments in the upstream regions (Abbaspour and Nazarioust 2007; AghaKouchak *et al.* 2015; Hassanzadeh *et al.* 2012; Hoseinpour *et al.* 2010); and the construction of a causeway that parts the lake into two arms (Eimanifar and Mohebbi 2007; Zarghami 2011; Zarrineh and Azari 2014). The demand for water has increased due to population growth (Madani 2014) and unsustainable agricultural development (AghaKouchak *et al.* 2015; Madani 2014; Zarghami 2011). Many researchers blame the degradation of the lake on poor water management (AghaKouchak *et al.* 2015; Hesami and Amini 2016; Madani 2014; Zarghami 2011).

Water extracted in upstream rivers is mostly used for the irrigation of agricultural land (Eamen and Dariane 2013; Hashemi 2012; Yazdandoost and Moradian 2016), the area of which has been sharply increasing in the Lake Urmia basin (Hassanzadeh *et al.* 2012; Hesami and Amini 2016; Shadkam *et al.* 2016; Shokoohi and Morovati 2015). Due to low irrigation efficiency (Hashemi 2012; Hassanzadeh *et al.* 2012), cultivation of water intensive crops and an extensive agricultural drive, there is a high upstream demand for agricultural water (AghaKouchak *et al.* 2015). Despite the efforts and implementation of more than 88 projects aimed at saving Lake Urmia (ULRP 2015), the water volume in Lake Urmia is still decreasing, according to 2017 measurements (IEWW 2017).

As a result of the retreat of the lake, vast areas of salt flats have been exposed to wind erosion. The wind carries salt particles which are mixed with chemicals, pesticides, and herbicides deposited on the lakebed (Hassanzadeh *et al.* 2012; Hoseinpour *et al.* 2010). The resulting salt storms lower soil fertility, posing a risk to agriculture and driving regional economic problems (Madani 2014; Tisseuil *et al.* 2013). Many authors have mentioned potential health impacts of the salt storms, including respiratory and eye diseases and increased cancer risks (Ghalibaf and Moussavi 2014; Hesami and Amini 2016; Hoseinpour *et al.* 2010).

## 6. Results

The characteristics of individuals and communities that contribute to social sensitivity also influence their adaptive capacity (Marshall *et al.* 2010). Key sensitivity and adaptive capacity elements were identified based on their prevalence in the responses obtained. The key variables identified were access to irrigation water, income diversification, presence of social networks, and economic resources. Knowledge of and participation in governmental and non-governmental projects was identified as an important adaptive capacity element.

### *Access to irrigation water*

Lack of irrigation water presented the main stressor for all of the respondents. The degradation of Lake Urmia severely impacted water resources in the surrounding areas. In most of the sites studied, farmers relied on water from wells for domestic and irrigative use, however the quantity and quality of water in the wells decreased significantly. Salinization of wells occurred in many areas and rendered wells useless for the farmers. Due to largely unregulated extractions of underground water, Iranian legislation restricts the use of wells, and even prescribes the payment of fees for their use. In order to control the use of underground water resources, legislation was adopted by an Act in 1984 that required the registration of private wells and the acquisition of permits for their use. An over-subscription of permits followed, and there are nowadays still a considerable number of unauthorized wells operating in the Lake Urmia basin (Hashemi 2012). According to the respondents, this problem is being addressed by officials by closing the unauthorized wells, and limiting the number of wells to one per farm, which is causing significant problems for these farmers.

Only some of the respondents used water from the rivers for irrigation, with most of this being unauthorized with farmers risking financial penalties. Relying on illegal water infrastructure was for many farmers the only coping mechanism they were able to adopt, however with water resources diminishing this is a short term individualistic coping solution. It additionally prevents them from obtaining help from institutional frameworks which could offer more long term solutions and enhance the adaptive capacity. According to Hashemi (2012) 27% of all water extractions from the rivers in Lake Urmia basin are informal. There is also no formal water allocation for dams in the Lake Urmia basin. A similar situation is visible at the local level, where the distribution of water from irrigation networks provided by the government is largely informal with different rules for water allocation in use in each of the studied villages. Without formal rules for water extraction, informal politics influenced the development of exclusionary practices which favored those with a particular local political influence.

As part of cooperative measures to reduce water scarcity, some of the villages had government-built irrigation networks. However, the respondents reported that the irrigation canals are mostly dry and irrigation was only possible between one and three times per month, and there was not enough water for all the farms. The mechanisms for the distribution of water from the irrigation canals differed between the case study villages. The distribution of water from the irrigation canal was officially regulated in only one of them, with farmers



paying governmental organizations for the use of canal water with fees proportional to the size of their land and type of crops grown. In others the water distribution was managed on a village level by informally selected representatives, which often caused conflicts and competition for water among farmers. In all of the studied villages these representatives were Azeri farmers with good social connections. Distance of the farm from the irrigation canal played an important role in their access to water. The construction of the canals in the villages had in the past been undertaken in such a way as to benefit those involved in their planning, thus echoing the political inequality within the communities and their governance structures. In all of the studied villages, the Kurdish population had less access to water from the canals and none of the Kurdish respondents were included in the management and distribution of water on a village level. Many did not have knowledge of how the distribution of water is managed. According to Kurdish respondents in the village that had officially managed irrigation canals, their limited use of water was the result of their inability to pay for the water or equipment (such as pumps). In the villages with informal management of irrigation water, the Kurds most often reported that they did not use the water from the canal due to the fear of being reported to the authorities for having wells without water allocation permits. The differential experience of access to water resources between an Azeri and a Kurdish farmer in the same village is illustrated in the following quotes:

Our village has a canal that provides half of the irrigation water for our fields. We can irrigate from it about once per month, and for the rest we can irrigate from the well, so we can still survive with farming, although the income from it is now lower. One farmer in the village is responsible for the distribution of water from the canal among the farms and we have different "watering times" so everyone gets their share of water. There is good cooperation between the farmers, especially since we started sharing the water sources. (Female, Azeri, village 1)

There is a canal for irrigation in the village, but the water never reaches our farm. I don't know who manages the water from the canal, but the farms closer to the source use all the water so there is none left for us. We used to irrigate from the wells, but the other farmers reported on us, so the authorities closed two of our three wells, and now we cannot irrigate anymore. We get much less produce than before, and the quality of it is worse, so we can no longer export it. (Male, Kurdish, village 1)

Access to resources is an important factor influencing vulnerability. According to Blaikie *et al.* (1994: 94) "[a]ccess involves the ability of an individual, family, group, class or community to use resources which are directly required to secure a livelihood in normal, pre-disaster times, and their ability to adapt to new and threatening situation." As Bolin and Kurtz (2018) noted, marginalized groups can have diminished access to resources in the face of disasters. Adequate access to water is determined by social factors such as ethnicity (Wisner *et al.* 2004). The results demonstrate that irrigation water is a critical resource that impacts vulnerability of individuals in the case study. The Kurdish ethnic group suffers from a lack of access to water both as a result of discriminatory informal policies as well as an unfavorable political environment, as shown with the allocation of water permits. Their coping with a disaster is limited to reliance on informal and often illegal coping strategies, while the Azeri were more likely to be included in cooperative adaptation measures. Ability to mobilize resources is essential for adaptation to environmental hazards (Adger 2006).

#### *Income diversification*

Agriculture used to be the primary source of income for all of the respondents before the decline in water resources, but some farmers also had livestock, most often cattle and sheep. Often those became the main sources of income after the failure of agriculture. They do not provide much profit however, as farmers are no longer able to provide feed for the animals by themselves, but have to buy it instead. Other sources of income before the degradation of the lake included fisheries and tourism. Lake Urmia used to be a popular destination for health tourism (Zarrineh and Azari 2014), but after the retreat of the shoreline, tourist facilities closed, and

fisheries were left without water, which caused significant losses of income. Diversification in terms of crop types somewhat reduced vulnerability. Farmers with several different crop types usually experienced a lower loss of income than those relying on one crop type, which was usually a water intensive one, as those reached higher market values.

As after the degradation of the lake farming did not provide sufficient income for many of the respondents, some had to find additional income sources. Kurdish respondents reported working as day laborers in construction or on other farms. Azeri respondents on the other hand most often mentioned working in the service industry (such as in retail or as taxi drivers) or as low-ranking public sector employees. A significant disparity of employment options and income provided by those jobs amongst members of the two ethnicities was observed (Table 1). The structural discrimination faced by the Kurdish population, which is in part identified by the lower representation in public sector employment, provides an explanation for the disparities observed. Such restrictions do not simply limit the capacity to respond to a crisis in a particular moment but are in fact prolonged, preventing the formation of broader individual- or household-level economic prosperity.

Diversification is considered an important vulnerability reducing measure (Agrawal 2008; Birkmann 2006; Yeh *et al.* 2014). However, before the degradation of the lake even those respondents who had diversified sources of income mostly relied on economic activities related to the lake, such as farming, tourism, and fisheries. As these were all affected, diversification helped reduce vulnerability only in those cases where the sources of income were not connected to the lake.

	Day labor	Public sector	Service sector	No additional employment
Azeri	1 (3%)	4 (11%)	7 (19%)	25 (67%)
Kurdish	8 (31%)	0	0	18 (69%)

Table 1: Distribution of employment among the Kurdish and the Azeri (percentages of the total sample size of the respective ethnic minority).

*Social networks*

Social support networks "include a wide variety of rights and obligations between members of the same household [...], with the extended family and with other wider groups with a shared identity" (Wisner *et al.* 2004: 104) which can help individuals claim access to resources in challenging times. Social networks and connections reduce vulnerability (Braun and Aßheuer 2011; Collins 2008; Cutter *et al.* 2003; Margles Weis *et al.* 2016). They proved to be an important sensitivity factor and increased the adaptive capacity of households. They provided monetary support, help in finding new jobs, housing for people who had to abandon their farms, and provided mental support to cope with stress, anxiety and depression which many respondents reported as a result of disaster-induced economic insecurity.

Significant differences in the use of social networks were observed between Azeri and Kurdish respondents. More Azeri reported cooperation with other villagers, especially in regards to village-level irrigation water management. Additionally, they used social networks in towns to accommodate family members who left farming to search for other income opportunities, and for help in finding work opportunities. Networks provide monetary support too, and some were receiving remittances from urban family members. In order to obtain a loan a guarantor with a steady income is required, which was more of a problem for Kurdish respondents, in turn making investments in infrastructure like water-saving irrigation systems difficult. The Kurdish farmers often used social networks for mental support, socialization and for farm labor. Some reported, however, that Azeri families found out-migration easier as their social networks were better developed:

The Azeri families were able to move away as soon as the lack of water started. They sold the land and moved to the relatives in the city. They live good lives now. We didn't have anywhere to go, and now it is too late to sell the land as it is not worth anything. (Male, Kurdish, village 4)

The use of urban social networks was identified as an important factor for vulnerability reduction. Azeris commonly migrate to urban areas like Tabriz and Urmia and they form a significant part of Teheran's upper middle class. The Kurds on the other hand were historically rural, with those living in urban centers resigned to low income employment (Elling 2013). According to some respondents, social networks also impacted access to institutional help:

It is much easier for the Azeri people to obtain governmental help. They know the right people and the connections are all that matters here. They also have better access to the [institutions] such as different organizations that can provide some help. (Male, Kurdish, village 2)

#### *Economic resources*

We evaluated the economic status of households based on non-monetary poverty indicators. Relative wealth affected sensitivity and adaptive capacity, as those farm families with greater economic assets were able to invest in drought management activities such as drip irrigation systems and the cultivation of salt tolerant crops like pistachio trees (*Pistacia vera*), thus securing their income. Economic status also directly determined farmer access to irrigation, where they pay for the use of irrigation water. Low income households were unable to pay for irrigation water from the canal, nor to purchase pumps and water-effective irrigation systems. Some respondents reported they did not have the money to obtain permits for their wells, which further affected their ability to obtain governmental and non-governmental aid. Many farmers did not address health problems due to a lack of financial means. While the degradation of Lake Urmia severely influenced the income from farming for both Azeri and Kurdish communities, Kurdish families were often in worse economic conditions. They were less likely to obtain financial loans, receive remittances from other family members, or to receive help from governmental and non-governmental organizations.

In general, poorer households are more vulnerable to disasters. While their economic and material losses might be smaller in monetary terms, they are greater in relative terms (Cutter *et al.* 2009; Fothergill and Peek 2004). Lack of economic assets limits their ability to respond adequately to a disaster. Ethnic minorities typically experience lower socio-economic status (Masozera *et al.* 2007), characterized by unequal rights and obligations as determined by complex social and economic relations (Wisner *et al.* 2004).

#### *Knowledge and participation in governmental and non-governmental projects*

In 2013 the National Committee for Saving Lake Urmia and the Regional Management Council for management of Lake Urmia were founded (ITRTDW 2014) and a "Urmia Lake Restoration Program" established. The Ministry of Energy coordinated the execution of the program and several projects were launched aimed at securing the water requirements for Lake Urmia, raising public awareness and participation in the conservation of the lake, and promoting sustainable agriculture practices and water use (ULRP 2015). Since 2014 the Japanese government has been funding a project through the United Nations Development Programme Iran, focused on engaging local communities and introducing sustainable agriculture practices and reducing water consumption in the Lake Urmia basin (UNDP 2017). At the time of the fieldwork for this study, more than 88 projects aimed at saving Lake Urmia were implemented, many of them targeting local farmers (ULRP 2015). Many governmental and non-governmental projects are aimed at mitigating the impacts of the degradation of Lake Urmia on farmers, ranging from improving infrastructure, providing loans for the installation of water-saving irrigation systems, providing subsidies for planting certain crops and buying those crops from farmers, and providing free advice for farmers. While this shows that there has been considerable effort from governmental and non-governmental institutions to save Lake Urmia and to help the affected

population, our findings indicate that alongside mechanisms of support for farmers, there are also mechanisms excluding farmers from being able to obtain that support. It has been noted in other case studies that governance institutions often help reduce vulnerability of those best placed to take advantage of them and not those who need it most (Adger *et al.* 2005), and this is visible around Lake Urmia as well. The marginalization of groups, manifesting in the exclusion from obtaining help, exists formally and informally. An example of the latter is the informal water distribution among farmers described in the first subsection of the results, while an example of the former is the requirement of possessing a well permit for farmers wanting to obtain help from institutional projects and participation in them. As discussed previously, social connections and financial capital play a role in obtaining such well permits, framing the vulnerability of the marginalized groups.

Among the respondents, few farmers had any knowledge of these projects and their benefits, and only three Azeri farmers benefited from such projects. A negative attitude towards governmental organizations and their actions was frequently observed among respondents. Kurdish farmers had significantly less knowledge of governmental projects and none of the interviewed Kurdish respondents were included in them. Higher levels of mistrust towards governmental and non-governmental institutions was observed among Kurdish farmers. Those who had some knowledge of the projects were reluctant to participate in them due to this mistrust, and due to a lack of necessary certificates, as was demonstrated by the following respondent:

I have heard about such projects, but it is very risky to participate in them. If they [officials at the Agricultural organization] find out I have an illegal well, they would close it, and it is my only source of water. I would have to get the permit for the well and land ownership certificate, but I do not have the money to pay for it. (Male, Kurdish, village 6)

Access to information and knowledge is a commonly mentioned factor affecting adaptive capacity (Cutter *et al.* 2003; Schneiderbauer and Ehrlich 2006). Those with better access to information have better knowledge of relief actions, which can impact their recovery quite considerably. Ethnicity frequently influences the access to information, as well as sources of information (Bolin and Bolton 1986). Minorities more often receive information from family and social networks, rather than official sources, which limits their access to accurate information. They might also not recognize official sources as trustworthy, which is often based on their previous experiences (Dash 2013). Restricted access to information can be a product of language barriers (Masozera *et al.* 2007), however in the cases studied this was not considered to be an important factor in reducing access to information, since the great majority of Kurds speak Persian.

## 7. Conclusions

Having traced the development of unequal political power between the Kurdish and Azeri minority in Iran, we argue that the increased vulnerability of the former to environmental disaster is produced by an absence of significant political power. This leads not only to unfavorable treatment in terms of any national policy of resource distribution or development, but also manifests itself in discriminatory micro- and meso-level practices. Together, these contribute to a structurally embedded reproduction of the power disadvantage of the Kurdish minority. This corresponds to a main thesis of the political ecology approach, that the function of social conditions and historical circumstances determine vulnerability.

Our findings show that ethnicity and its socio-economic and political implications affect the sensitivity and adaptive capacity of the members of the two minorities. The main sensitivity and adaptive capacity elements were identified, with these being access to irrigation water, social networks, income diversification, and economic resources. Adaptive capacity also depended on knowledge and participation in governmental and non-governmental projects aimed at mitigating the impacts of the degradation of the lake for local farmers. One of the central differences can be found in the differential access to resources between members of the two ethnic minorities, which is determined by structural inequalities. With wells representing an elusive water source, a widespread example of the disparity are farmers without water allocation permits for their wells who then cannot take part in governmental aid programs. As we have shown, a reason that Kurdish farmers are less likely to have a permit for their wells is that economic inequalities prevent financial expenditure, with their

unfavorable position partly the result of discriminatory practices in employment opportunities. Another reason is a resilient mistrust of governmental institutions, arguably determined by past political and cultural oppression of the Kurdish minority in their striving for greater autonomy. Trust and reciprocity in society, participation in community-based organizations and social networks have been shown to be important factors influencing coping capacity in other case studies (eg. Birkmann and Wisner 2006; Willroth *et al.* 2012).

Having found that disparities in political power influence the way the two minorities are affected and are able to cope with disaster, we further propose that in the continuation of that disaster, and due to the initial inequalities, the gap between their respective adaptive capacities further increases. This is largely driven by lesser sensitivity and more resilient adaptive practices which develop within a better-placed social group as a result of better access to resources, economic conditions, social networks, and knowledge and information exchange. This gap is further influenced by a deepening conflict between members of the ethnic minorities now vying for more limited or extraction-costly resources.

This social division influences whether coping strategies will take a cooperative or individualized form, with congregating entities developing the former, and isolated entities forced to adopt the latter. Cooperative measures develop largely on the basis of informal social connections which are determined by a shared ethnicity or political allegiance with (more) powerful actors. As such, cooperative measures may transcend the boundary between the national and the local, with these being funded, led, or at least sanctioned by the state or nationally-dominant political actors. Contrary to this, individual coping by members of the marginalized ethnic community is secluded from any favorable interaction with the state. In fact, individualized coping is frequently scrutinized or targeted by the state, as those affected first adopt measures based on the capacities immediately available to them, which can include illicit water extraction.

However, it must be stated that the situation described in this article does not lead us to conclude that social and political action is futile. One of the central obstacles to an increased equality of coping mechanisms to environmental disasters is the limited access to knowledge of inclusive public institutions among the Kurdish population. Mitigating this can be as easy as following Schneiderbauer and Ehrlich's thought that "...having access to information can be one way of decreasing vulnerability" (2006). A future increase in political participation of the Kurds in decision-making bodies would contribute to their participation in existing and future targeted programs, taking into account the cultural and developmental specificities of the social problem we have presented. This would heed Hewitt's appeal for a "protection from the social forces that create inequitable exposure to risk" (1983).

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