Hespéris-Tamuda LXI (1) (2026): 295-320

Climate-Induced Sedentarization Impacts on the Intangible Cultural Heritage of Nomadic Communities in Southeastern Morocco

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Abstract: Climate change is one of the major challenges of our time, having significant impacts on the economy, society, people and their cultural heritage. In this paper, I explore the impacts of climate-induced sedentarization, particularly driven by severe droughts, on the cultural heritage of nomadic communities in southeastern Morocco. I focus on intangible cultural heritage, which is deeply impacted by climate change, due to its dependence on the environment where people live. Using a qualitative approach with in-depth interviews with both sedentary and practicing nomads, the research reveals how the scarcity of natural resources has forced these communities toward sedentarization, leading to cultural losses. Traditional practices, such as multi-day wedding celebrations and the use of Tamazight as their mother tongue, are eroding as families shift to urban centers. The findings highlight how these changes threaten the transmission of elements of the intangible cultural heritage of nomads to the future generations.

Keywords: Climate Change, Nomadic Communities, Sedentarization, Intangible Cultural Heritage, Amazighs.

Introduction

Climate change is among the most critical challenges confronting humanity and the sustainability of the global environment. Although uncertainties persist regarding specific scenarios and models, it is unequivocal that climate change presents a range of significant threats. These include rising temperatures and changes in the frequency, intensity, and distribution of extreme weather events such as droughts, heavy precipitation, floods, and tropical cyclones.[1] Additionally, climate change contributes to rising sea levels and increased ocean acidification resulting from elevated atmospheric carbon dioxide levels.[2]

According to the Climate Change and Heritage Working Group of ICOMOS (2019), climate change has become one the most significant and fastest growing threats to people and their cultural heritage. Indeed, historic buildings, archaeological sites, monuments, their meanings and intangible aspects, is a legacy of the past that gives meaning to our land, our identity and the well-being of local communities.[3] Cultural heritage is connected to its environment, and therefore liable to change if the environment undergoes

[1] Yong-Ki Kim, "Climate Change: Causes, Consequences, and Policy Responses," *Journal of Environmental Policy* 12, 2 (2011): 45-62.
[2] International Council on Monuments and Sites, *The Future of Our Pasts: Engaging Cultural Heritage in Climate Action. Outline of Climate Change and Cultural Heritage* (Paris: ICOMOS, 2019).
[3] May Cassar, "Sustainable Heritage: Challenges and Strategies for the Twenty-First Century," *APT Bulletin: The Journal of Preservation Technology* 40 (2009): 3-11.

changes.[4] The potential impacts of climate change range from (i) physical effects (tangible heritage) and (ii) effects on social and cultural structures and habitats (intangible heritage).[5]

There is a growing body of literature on the impacts of climate change on cultural heritage. The rich literature on this matter underlines the profound impacts on both tangible and intangible cultural heritage. Studies on the impacts on tangible heritage, such as the destruction of historical sites and monuments, have been well-documented.[6] However, the available literature disproportionately focuses on physical tangible heritage, with less attention given to intangible cultural heritage, such as practices, rituals, traditions, indigenous local knowledge.[7] With this paper, I aim to contribute to filling this gap in the literature focusing on the intangible cultural heritage of nomadic communities in Morocco.

In Morocco, the impacts of climate change are particularly acute. The country has experienced a fivefold increase in the frequency of droughts over the past two decades, escalating from one dry year in 15 between 1930 and 1990 to one dry year in three in the last two decades.[8] Current projections by the IPCC suggest that this trend will only intensify, with a predicted doubling of drought frequency across North Africa.[9] Climate change, manifested in consecutive and severe years of drought, has led to chronic water shortages in southern Morocco. Water-related protests have broken out in the region, notably in the provinces of Figuig and Zagora.[10]

These climate change trends impact the most vulnerable groups within the country, such as the nomadic communities. Their way of life is essentially based on livestock breeding, mainly sheep and goats, and they engage in

[4] Elena Sesana, Aimée S. Gagnon, Chiara Ciantelli, Jean Cassar and Julie J. Hughes, "Climate Change Impacts on Cultural Heritage: A Literature Review," *Wiley Interdisciplinary Reviews: Climate Change* 12 (2021): e710.
[5] UNESCO World Heritage Centre, *Climate Change and World Heritage*. World Heritage Reports, no. 22 (Paris: UNESCO, 2007).
[6] Aktürk, Gökçe, and Marek Lerski. "Intangible Cultural Heritage: A Benefit to Climate-Displaced and Host Communities," *Journal of Environmental Studies and Sciences* 11 (2021): 305-15; Sarah A. Orr, Jennifer Richards and Suzana Fatorić, "Climate Change and Cultural Heritage: A Systematic Literature Review (2016–2020)," *History and Environment: Policy and Practice* 12 (2021): 434-77; Jennifer Pearson, Grant Jackson and Katherine E. McNamara, "Climate-Driven Losses to Indigenous and Local Knowledge and Cultural Heritage," *Anthropocene Review* 1 (2021): 1-24; Sesana et al., "Climate Change," e712; Nicole Higgins, "Changing Climate; Changing Life-Climate Change and Indigenous Intangible Cultural Heritage," *Laws* 11 (2022): 47.
[7] Pearson, Jackson and McNamara, "Climate-Driven Losses."
[8] R. Balaghi, M. Jlibene, B. Tychon, and H. Eerens, *Agrometeorological cereal yield forecasting in Morocco* (Rabat: 2013).
[9] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2023: Synthesis Report*. (Geneva: IPCC, 2023).
[10] K. Tachfine, "Mass Resignations in Figuig Council as Water Protests Enter 7th Month," Hespress (2024).

migratory patterns in search of suitable pastures as the seasons change. However, suitable routes for their migratory patterns are dying out due to widespread desiccation and increasingly severe droughts leaving natural resources (pastures and water) desperately lacking.[11] Under such circumstances, many nomadic families find themselves forced to give up their livestock and settle in nearby villages or towns. The decision to adopt sedentarization disrupts their way of life and undermines the foundations of their culture and identity.[12]

Extant literature has not examined the link between climate change and intangible cultural heritage in the context of Morocco. This paper aims to contribute to filling this gap, offering a deeper understanding of climate change issues through the lens of intangible cultural heritage. I focus on the case of Moroccan nomads, and how the transition from nomadic lifestyle to sedentarism causes cultural losses. Employing a qualitative methodology based on in-depth interviews with nomads, this research aims to capture firsthand accounts of the challenges posed by persistent droughts. Its significance lies in the fact that it reveals another angle of climate change's impact. The main conclusion drawn from this research is that the scarcity of natural resources is forcing these communities to sedentarization. This shift leads to a significant loss of cultural heritage, particularly in terms of intangible cultural heritage, including language, traditions, celebrations and social practices. Ceremonial occasions, such as weddings, are no longer celebrated the same way as in the past according to nomads. In addition, a growing number of the youth generation are adopting a different language from their parents.

This study will proceed as follows: the literature review will explore key concepts such as sedentarization, climate change, and intangible cultural heritage, while examining their interlinkages and the empirical work conducted on the subject. The methodology section will outline the research design, participant selection and the study area, data collection and analysis. The results and discussion section will present the findings, offering insights into the experiences of nomadic communities in the face of climate-induced sedentarization. Finally, the conclusion will summarize the key outcomes.

Literature review

Sedentarization, as a complex and multi-dimensional process, represents a profound transformation of nomadic societies that extends far beyond the simple geographical settlement of populations. This phenomenon is explained by three main dynamics: (i) ecological changes such as drought,

[11] The IMAL Initiative for Climate and Development, *Loss and Damage from Climate Change: Impacts on the Human Rights of Moroccan Nomads*. Submission to OHCHR, 2024.
[12] The IMAL Initiative for Climate and Development, *Loss and Damage*.

which disrupt the balance between the animal population and pastoral resources; (ii) external political pressures, often imposed by states or foreign actors; (iii) and individual failures in pastoral management.[13] Salzman[14] enriches this analysis by conceptualizing sedentarization as a process of adaptation in which nomads respond in an institutionalized way to environmental and socio-political constraints. This perspective underscores the non-linear and reversible nature of the transition from mobility to settlement. In contrast, Bocco[15] highlights that sedentarization often entails a redirection of economic activities toward agriculture, sedentary livestock rearing, or artisanal and commercial ventures. Importantly, sedentarization can result from voluntary decisions or be driven by public policies. This indicates that sedentarization can be driven by different factors.

In the context of arid lands, such as those studied in this research, mobile pastoralism has historically been the most suitable livelihood strategy, adapted to environments marked by low and irregular rainfall. Seasonal mobility has enabled nomadic communities to optimize limited water and grazing resources, ensuring the subsistence of their herds. However, the intensification of climate change, particularly through prolonged and severe droughts, has exacerbated pressures on these resources, forcing pastoralists to reevaluate their mobility strategies or, in many instances, adopt a sedentary lifestyle. As Agade[16] illustrates, forced sedentarization leads to profound economic and social changes, particularly in pastoral practices. While this shift sometimes provides alternative economic opportunities, it also generates significant challenges.[17]

The process of sedentarization, while often associated with economic adaptation, also carries significant cultural consequences, particularly with regard to intangible heritage. As nomadic communities move towards more settled lifestyles in response to climate change, their cultural practices and social structures – previously tied to their mobile way of life – begin to shift. This shift impacts intangible heritage elements such as oral traditions, rituals, and social practices, which have been passed down through generations as part of a collective memory and identity. The Convention of the Safeguarding of the Intangible Cultural Heritage (CSICH) of UNESCO, adopted in 2003,

[13] Fred Barth, *Nomads of South Persia: The Basseri Tribe of the Khamseh Confederacy* (Boston: Brown & Company, 1961).
[14] Peter C. Salzman (ed.), *When Nomads Settle: Processes of Sedentarization as Adaptation and Response* (New York: Praeger Publishers, 1980).
[15] Riccardo Bocco, *La Sédentarisation des Pasteurs Nomades: Les Experts Internationaux Face à la Question Bédouine dans le Moyen-Orient Arabe (1950-1970)* (Paris: Éditions de l'ORSTOM, 1990).
[16] Kennedy Mwangi Agade, "Changements et défis de la réserve de police du Kenya: Le cas du comté de Turkana," *Revue des Études Africaines* 58 (2015): 199-222.
[17] Xue Wang, Chenxi Liao, Sarah M. Brandhorst and Peter E. Clark, "Sedentarization as an Adaptation to Socio-Environmental Changes? Everyday Herding Practices in Pastoralist Communities in Southern Ethiopia," *Ecology and Society* 27, 3 (2022).

plays a crucial role in recognizing the value of these living traditions in preserving the cultural heritage and identity in transition.

Since its adoption, there has been a growing legal recognition of the social role of heritage as a living tradition.[18] This framework expanded the concept of heritage beyond tangible elements such as buildings, monuments, and landscapes, to include intangible aspects such as customs, habits and songs which, although intangible, inform who we are as collectives and help create our collective social memory.

Cultural heritage encompasses both tangible and intangible elements, integrating natural and cultural aspects.[19] These two dimensions are not entirely distinct; rather, they intersect and complement each other in meaningful ways. Tangible heritage refers to material artifacts, including components of the built environment and the natural landscape.[20] Meanwhile, the convention states that intangible cultural heritage is manifested through various ways, i.e., oral traditions and expressions, including language as a vehicle of the intangible cultural heritage; performing arts; social practices, rituals, and festive events; knowledge and practices concerning nature and the universe; traditional craftsmanship.[21] The article 2 of the CSICH defines the intangible cultural heritage as:

> "the practices, representations, expressions, knowledge, skills – as well as the instruments, objects, artifacts and cultural spaces associated therewith – that communities, groups and, in some cases, individuals recognize as part of their cultural heritage. This intangible cultural heritage, transmitted from generation to generation, is constantly recreated by communities and groups in response to their environment, their interaction with nature and their history, and provides them with a sense of identity and continuity, thus promoting respect for cultural diversity and human creativity."

Establishing a clear causal link between climate change and cultural heritage is a complex challenge. Nevertheless, scientific evidence suggests that climate-induced displacement provides a critical basis for connecting climate change with cultural heritage impacts.[22]

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[18] Paul McDermott and Máiréad Nic Craith, "Intangible Cultural Heritage and Climate Change: Sustainability and Adaptability in a Time of Crisis?" *Anthropological Journal of European Cultures* 33 (2024): 1-10.
[19] Saskia Maus, "Hand in Hand against Climate Change: Cultural Human Rights and the Protection of Cultural Heritage," *Cambridge Review of International Affairs* 27 (2014): 699-716.
[20] UNESCO, *Convention for the Safeguarding of the Intangible Cultural Heritage* (Paris: UNESCO, 2003).
[21] Higgins, "Changing Climate."
[22] Kim, "Climate Change."

As mentioned before in the introduction, most of the research examining the link between climate change and cultural heritage focuses on the damage inflicted on historical buildings and monuments, i.e., tangible cultural heritage[23] Tangible heritage has been severely impacted by climate change, with extreme weather events causing the destruction of monuments, and the melting of glaciers leading to flooding of natural heritage sites.[24] The preamble of the ICH convention recognises the deep-seated interdependence between intangible and tangible cultural heritage, which is important in the context of the current discussion as climate change impacts on both types of heritage. However, it is important to mention that the impacts extend far beyond physical/tangible structures.

The link between climate change and intangible cultural heritage is not always clear and obvious. However, a definite link can be identified between the destruction of intangible cultural heritage and climate migration. When climate change negatively impacts a place, e.g., erosion of land, destruction of knowledge linked to the destroyed or forsaken former home is no longer passed down through generations.[25] Kim comments that "[r]ecent observations that climate change increasingly makes people move appear to provide an existential foundation for linking climate causes and cultural heritage effects."

Pearson and others conducted a comprehensive review of 100 studies to assess the existing knowledge on climate-induced losses to indigenous local knowledge and cultural heritage.[26] Their findings reveal that climate change is having profound negative effects on indigenous socio-ecological systems, encompassing both tangible and intangible cultural heritage. The review of the literature reveals that traditional knowledge systems and cultural heritage are deeply intertwined with the livelihoods and lives of many indigenous communities worldwide. Anthropogenic climate change poses both immediate and long-term threats to indigenous local knowledge and cultural heritage, undermining the inherent resilience these provide for adapting to changing conditions. The results reveal that non-climatic factors, including population growth, deforestation, and shifts in lifestyle, play a significant role in accelerating these losses. Cultural loss is not exclusively attributable to climate change.[27]

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[23] Aktürk and Lerski, "Intangible Cultural Heritage"; Pearson, Jackson, and McNamara, "Climate-Driven Losses" ; Orr, Richards and Fatorić, "Climate Change."
[24] Higgins, "Changing Climate; Changing Life."
[25] Higgins, "Changing Climate; Changing Life."
[26] Pearson, Jackson and McNamara, "Climate-Driven Losses."
[27] Petra Tschakert, Nicole R. Ellis, Clare Anderson, Andrew Kelly and Joseph Obeng, "One Thousand Ways to Experience Loss: A Systematic Analysis of Climate-Related Intangible Harm from Around the World," *Global Environmental Change* 55 (2019): 58-72.

Post[28] explores how climate change affects cultural practices among Kazakh mobile pastoral herders in Mongolia's Altai Mountains. The study underscores the extensive ecological knowledge passed down through generations, which is expressed in various cultural forms such as music, instruments, textiles, and heritage-related activities like work patterns and social gatherings. It shows that extreme weather events, loss of water sources, and desertification have significantly disrupted these cultural practices. Music plays a central role in how Kazakh herders in western Mongolia articulate their concerns about environmental changes. Through vocal forms, instrumental pieces, and songs, herders express ecological knowledge and the deep connection between their lives and the natural world. Instruments like the *dombyra* and *sybyzghy* convey themes of nature, with some songs explicitly addressing issues like declining water sources.[29] These musical expressions, along with other cultural practices like needlework, felt production, and ceremonial gatherings, embody the herders' adaptive responses to climate change.

As climate change undermines the contexts in which these skills and traditions are practiced, the transmission of these know-how and tools to future generations becomes increasingly fragile. Post argues that without the intergenerational transmission, a cornerstone of the definition in Article 2 of the CSICH, a significant portion of the herders' intangible cultural heritage faces the risk of extinction.

Traore and Owiyo's[30] study of the Sahel region provides critical insights into how climate change disrupts pastoral systems and cultural heritage. Their research, focused on the severe droughts of 2004 and 2010, revealed how climate change impacts cascade through pastoral communities. The authors documented how reduced seedling growth and crop yields diminished the effectiveness of transhumance – traditionally a key adaptation strategy where pastoralists would move their cattle across long distances to find pasture and water during droughts. Pastoralists reported extreme droughts as the primary factor in dismantling their pasture resources, leading to increased community conflicts and pressure on the remaining resources.

This environmental stress triggered a significant shift in livelihood strategies, with many pastoralists transitioning from purely livestock-based practices to a mixed system of agriculture and animal husbandry. Significantly, these changes extended beyond economic impacts to affect

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[28] Jason C. Post, "Climate Change and Cultural Heritage in Western Mongolia," *Leonardo* 51 (2018): 285-86.
[29] Post, "Climate Change," 285-86.
[30] Salif Traore and T. Owiyo, "Dirty Droughts Causing Loss and Damage in Northern Burkina Faso," *International Journal of Global Warming* 5 (2013): 498-513.

cultural identity.[31] Their interviews revealed a profound sense of cultural dislocation among pastoralists who were forced to abandon their traditional practices. The study suggests that climate change threatens not only the material basis of pastoral livelihoods but also risks the loss of traditional knowledge, practices, and social structures associated with transhumance, potentially preventing their transmission to future generations.

Similarly, Adger and others point out that droughts threaten pastoral societies not only economically, but also as a cultural phenomenon.[32] Pastoralism, a practice intrinsically linked to traditional social structures, is threatened by the erosion of these structures as populations gradually abandon animal herding. Lavrillier[33] has studied the impact of climate change among nomadic and sedentary Tungus populations in Siberia. A Tungus nomad, interviewed in Lavrillier's study, shares a poignant statement: "We are the people of the Taiga/Tundra, the Taiga/Tundra is our home. If the Taiga/Tundra no longer exists, the Tungus will no longer exist. When I'm in the Taiga/Tundra, I feel strong, my soul sings, I'm happy. This is my homeland."[34]

These words reflect the reality of nomads whose livelihood depends on the environment. For these populations, climate change is creating a major ecosystem dysfunction, threatening their way of life based on a traditional economy of exploiting nature.

The displacement of people from places they deeply value often leads to a weakening, or even a jeopardizing, of their culture.[35] The significance of these impacts is closely linked to the degree of attachment individuals feel towards their place of habitation. This attachment is defined as the bond that individuals maintain with the people and environment in which they live. Adger and others point out that attachment plays a key role in the decision to migrate or stay. Individuals with strong attachments to their communities are often reluctant to migrate, illustrating the importance of cultural and identity ties in life choices.

This sense of cultural dislocation is not unique to pastoral communities. In their study of a Fijian village, Charan and others[36] illustrate the emotional

[31] Traore and Owiyo, "Dirty Droughts," 498-513.
[32] W. Neil Adger, Jon Barnett, Katrina Brown, Natalie Marshall and Karen O'Brien, "Cultural Dimensions of Climate Change Impacts and Adaptation," *Nature Climate Change* 3 (2013): 112-17.
[33] Anne Lavrillier, "Climate Change among Nomadic and Settled Tungus of Siberia: Continuity and Changes in Economic and Ritual Relationships with the Natural Environment," *Polar Record* 49 (2013): 260-71.
[34] Lavrillier, "Climate Change."
[35] Adger et al., "Cultural Dimensions."
[36] Deepika Charan, Manpreet Kaur and Prashant Singh, "Customary Land and Climate Change-Induced Relocation: A Case Study of Vunidogoloa Village, Vanua Levu, Fiji," *Climate Change Adaptation in Pacific Countries* (2017): 19-33.

and cultural implications of forced mobility. In particular, they describe the pain felt by residents at having to leave their ancestral land, where they have lived all their lives. The study highlights as well the heartbreaking nature of the decision to move the remains of their ancestors to a new burial site.

Gharbaoui and Blocher[37] emphasize that the loss of cultural heritage and identity are significant challenges when communities are displaced or relocated due to climate change. The impacts of climate change pose significant threats to cultural heritage and identity, as seen in communities in Papua New Guinea and Fiji. Displacement disrupts social cohesion and leads to the loss of traditional practices, rituals, and place-based identities, resulting in altered or hybrid cultural forms.[38] Customary land tenure, which underpins cultural cohesion and sustainable resource management, is often neglected in relocation processes, risking the erosion of vital cultural practices, such as burial ceremonies on ancestral lands. The authors demonstrate that climate-induced relocation exacerbates the loss of intangible cultural heritage and weakens community identity.

In an interesting study, Tschakert and others[39] draw on Edward Relph's concept of *existential outsideness*,[40] Casey's (2001) notion of *the desiccation of both self and place*,[41] and Glenn Albrecht's idea of *solastalgia*[42] to describe the growing estrangement felt in environmentally and socially transformed homes in northern Ghana. Existential outsideness refers to the sense of alienation or disconnection from a place, often experienced when individuals move to a new location or return to a former home after a prolonged absence.[43] Solastalgia, a term coined by environmental philosopher Glenn Albrecht, captures the emotional distress, including sadness, depression, and despair, caused by witnessing significant environmental changes in one's home.[44] Tschakert and others[45] argue that emigration to urban areas not only disrupts the connection to the natural environment but also induces a symbolic desiccation, eroding both the sense of self and ties to one's place of

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[37] Dounia Gharbaoui and Johannes Blocher, "Limits to Adapting to Climate Change through Relocations in Papua-New Guinea and Fiji," *Limits to Climate Change Adaptation* (2018): 359-79.
[38] Gharbaoui and Blocher, "Limits," 359-79.
[39] Petra Tschakert, Raymond Tutu and Anna Alcaro, "Embodied experiences of environmental and climatic changes in landscapes of everyday life in Ghana," *Emotion, Space and Society* 7 (2013): 13-25.
[40] Edward Relph, *Place and placelessness*, vol. 67 (London: Pion, 1976).
[41] Edward S. Casey, "Between geography and philosophy: what does it mean to be in the place-world?," *Annals of the Association of American Geographers* 91 (2001): 683-93.
(2001): 683-693.
[42] Glenn Albrecht, Gina-Maree Sartore, Linda Connor, Nick Higginbotham, Sonia Freeman, Brian Kelly, Helen Stain, Anne Tonna and Georgia Pollard, "Solastalgia: the distress caused by environmental change," *Australasian psychiatry* 15, no. sup1 (2007): S95-S98.
[43] Relph, *Place and Placelessness*, 67.
[44] Albrecht et al., "Solastalgia," S95.
[45] Tutu Tschakert and Alcaro, "Embodied Experiences," 13.

origin, similar to what Charan and others[46] observed among Fijians. This process contributes to a broader erosion of cultural heritage and a sense of belonging.

In regions such as West Africa, Abubakari[47] has documented how sedentarization is becoming an increasingly significant trend among the Fulani of Ghana. The combined effects of climate change and urbanization have led to prolonged dry seasons and unpredictable rainfall patterns, which in turn create shortages of pasture and water, making traditional pastoralism increasingly difficult. As a result, many Fulani have been forced to adopt sedentary lifestyles, moving to urban areas, diversifying their income sources, or combining farming with livestock rearing. However, this shift has not come without consequences for their cultural identity. Abubakari notes the erosion of the *Pulaaku* moral code, cultural isolation, intermarriage with other groups, and changes in language and dress codes. While sedentarization can offer certain economic opportunities, the Fulani also face considerable challenges, such as a lack of professional skills in urban settings, stigmatization, and social isolation.

The process of sedentarization, while multifaceted and varying across different contexts, reflects broader patterns of adaptation in response to environmental and socio-political changes. For communities such as the Fulani and other nomadic groups in arid regions, the consequences of sedentarization go beyond the loss of a traditional lifestyle; they extend to a deeper cultural and social transformation that affects their sense of identity and community cohesion. Similarly, Oppong[48] provides an ethnographic exploration of Fulani identity and mobility in the Greater Accra region. Her work emphasizes the complexities of mobility, survival, and identity among this transnational community, highlighting how cultural and social markers allow the Fulani to maintain their distinct identity despite being spatially dispersed and often marginalized. This dynamic is not unique to West Africa but is also increasingly evident in North Africa, particularly in Morocco, where nomadic communities face similar challenges due to climate change, particularly severe droughts that threaten traditional pastoral practices.

Research exploring the relationship between climate change and cultural heritage has primarily focused on tangible cultural heritage, while

[46] Dhrishna Charan, Manpreet Kaur and Priyatma Singh, "Customary land and climate change induced relocation - A case study of Vunidogoloa Village, Vanua Levu, Fiji," *In Climate change adaptation in Pacific Countries: Fostering resilience and improving the quality of life* (Cham: Springer International Publishing, 2017), 19-33.

[47] Abdulai Abubakari, "Climate change, urbanization, sedentarization, and dissipation of pastoral Fulani culture in Ghana," *Frontiers in Research* 1, 1 (2025): 1-19.

[48] Yaa PA. Oppong, *Moving through and passing on: Fulani mobility, survival and identity in Ghana* (New York: Routledge, 2017).

research into intangible cultural heritage remains limited. This gap is particularly pronounced in Morocco, where no comprehensive studies have examined how climate change affects nomadic communities and their cultural traditions and practices. Our research addresses this critical gap by investigating Moroccan nomadic communities, specifically examining how climate-induced sedentarization leads to the erosion of traditional cultural practices. The following sections detail our methodology and present findings from extensive fieldwork conducted among these nomadic communities.

Methods

Research design

A growing trend of sedentarization is observed among nomadic communities, as their traditional lifestyle no longer provides the means to meet their basic needs. This phenomenon has been documented within the nomadic tribe of Ait Aissa Izm examined in this study since the twentieth century.[49] Skounti's thesis provides a detailed account of the processes and implications of this transformation among nomads.[50]

In this research, through a qualitative study involving semi-structured interviews, I aim to explore the impacts of climate-induced sedentarization on the nomads of the Ait Aissa Izm tribe. More specifically, I discuss aspects of cultural and heritage transformations within this community, with a particular focus on the intangible cultural heritage such as language, clothing and celebrations. Details on the participants, data collection, analysis, and ethical considerations are outlined below.

Participants

This study included interviews with 15 participants divided into two primary categories based on their current lifestyle. The first group comprised individuals who formerly were nomads but have transitioned to a sedentary lifestyle. These participants were located in the small town of Er-Rich, situated in southeast Morocco. Their transition was primarily driven by environmental pressures, particularly severe droughts, and the diminishing viability of a nomadic way of life. The second group consisted of active nomads residing in the High Atlas Mountains, primarily in the village of Assoul in Tinghir Province. These individuals continue to maintain a nomadic lifestyle despite the significant challenges posed by consecutive years of drought.

[49] Ahmed Skounti, *Le sang et le sol. Nomadisme et sédentarisation au Maroc* (Rabat: Institut Royal de la Culture Amazighe; 2012).
[50] Skounti, *Le sang et le sol.*

Moreover, 5 women were interviewed. The inclusion of nomadic women in the sample is crucial given their central role in sustaining nomadic life. Women are disproportionately impacted by drought, as they bear primary responsibility for fetching water and domestic tasks. As water sources become increasingly scarce, these women are often forced to undertake long journeys to secure this essential resource.

Additionally, one expert in intangible cultural heritage was interviewed to provide external validation of the findings and to contextualize the relationship between climate change and nomad's intangible cultural heritage. This expert's contributions were instrumental in corroborating the participants' testimonies and enhancing the study's analytical depth by connecting the observed impacts of climate change to broader cultural and historical contexts.

Data collection

Data were collected over two periods: one week in January 2024 and one week in October 2024. 15 interviews were conducted with members of the nomadic community in Er-rich in Midelt province and the village of Assoul, 90 kilometers from the province of Tinghir. Er-rich is a significant gathering point for former nomads who have opted for sedentarization, while Assoul represents a key stage in the annual transhumance cycle.

My belonging to this community facilitated access to participants and enabled in-depth interviews, although this proximity may introduce a risk of familiarity and objectivity bias. I tried to diversify the participants, including both sedentary nomads and individuals still practicing nomadism, to enable comparisons on linguistic, clothing and ceremonial celebration aspects, which are the dependent variables in this study.

Sampling was also conducted opportunistically in the field, by approaching nomads encountered at random during their pastoral activities in the mountains. This approach aims to increase representativeness by giving every member of the nomadic population an equal chance to participate. Sampling errors were reduced by increasing the sample size, although some individuals occasionally declined to be interviewed.

During the field work, interviewing nomadic women was challenging. Unlike male nomads who were more visible and approachable while herding cattle in the mountains, women primarily remained in their tents performing domestic tasks or going fetch water. Additionally, their hesitation to interact with unfamiliar faces, particularly given their role as guardians of the domestic sphere, created barriers to establishing trust and conducting the interviews. Regardless of these challenges, I managed to interview 5 women out of the 15 participants.

Interviews lasted on average between 30 and 60 minutes, with the exception of one discussion lasting one hour and 21 minutes. The questionnaire was created using Sphinx software and printed out for the face-to-face interviews. The audio recordings were made via cell phone. The recorded data were then transcribed and coded manually to identify recurring themes and facilitate in-depth analysis.

It is important to note that such interviews can lead to a social desirability bias, as respondents, aware of my tribal origins, may provide answers they perceive as favourable to the interviewer. All interviews were conducted in Tamazight, the language spoken by the nomads and the ancestral language widely spoken in North Africa, to ensure that the respondents fully understood the questions. My fluency in Tamazight facilitated the conduct of the interviews.

One expert interview was conducted with an expert in intangible cultural heritage. This interview took place remotely, via an online written exchange. His answers were analyzed thematically, and some particularly significant quotes were selected to support our argument. The interview guide was specifically adapted to make the most of his expertise in the field, thus distinguishing it from the questionnaire used with nomads.

Data analysis

The data analysis process commenced with the critical phase of manual transcription. While transcription can be executed by multiple individuals or external personnel,[51] scholars posit that the researcher who collected the data should ideally conduct the transcription to ensure comprehensive understanding of the material.[52] In this study, I personally transcribed each interview into digital format (Microsoft word). Subsequently, the transcripts underwent translation into English to facilitate their integration and exploitation into this article.

The subsequent analytical phase involved data coding, a fundamental component of qualitative research methodology. Coding entails the systematic categorization and labelling of data segments to simultaneously summarize and account for their content.[53] This process necessitates rigorous analytical interrogation of the data rather than mere textual segmentation, requiring sophisticated interpretative skills to transform raw data into

[51] Sabine Kowal and Daniel C. O'Connell, "Transcription as a crucial step of data analysis," *The SAGE handbook of qualitative data analysis* 7, 5 (2014): 64-79.
[52] Uwe Flick, *The SAGE handbook of qualitative data collection* (London: Sage; 2018), 1-736.
[53] Kathy Charmaz, *Constructing grounded theory: A practical guide through qualitative analysis* (London: Sage, 2006).

coherent analytical units.[54] Employing a thematic analytical approach, the coding process identified recurring patterns pertaining to climate change impacts on nomadic intangible cultural heritage. The analysis particularly emphasized nomadic communities' perspectives on post-sedentarization transformations, specifically examining changes in linguistic practices, traditional attire, and wedding ceremonies, while considering the broader implications of climate change on sedentarization decisions.

Ethical considerations

The participants were verbally informed that the interviews were part of a research project. To comply with ethical considerations, it was imperative to secure their informed consent by clearly explaining the purpose of the study, the data collection process, and the intended use of the data.[55] The method employed involved recording the interviews using a smartphone, after each participant had given me their informed consent.[56] Participants also agreed to the use of the data collected. Censent was specifically obtained through verbal agreement at the start of each interview, when I directly asked participants for their permission to use their responses in my research.

Results and Discussion

For various actors, drought is the major problem in southern Morocco.[57] It is noteworthy to observe that, at the time of this study in 2024, almost no water sources remaining in the study areas, as only one water point remains, which is the result of an initiative financed by the Office Régional de Mise en Valeur Agricole de Ouarzazate (ORMVAO), aimed at facilitating nomads' access to water.[58] According to the national census by the High Commission for Planning (Haut Commissariat au Plan - HCP), Morocco's total nomadic population in 2014 stood at 25,274, down 63% from 2004.[59] An ex-nomad, who left nomadism to sedentarize in Assoul, indicates: "*Among our tribe, we've gone from nearly 600 tents in 1961 to just a few dozen today*."

This reduction in tents is not just a change in housing patterns, it signifies the gradual erosion of an entire cultural ecosystem. Due to the recent and severe droughts, nomads are forced to sedentarization. Such a decision poses a serious threat to the transmission of the traditions, language and culture to the next generations. Consequently, they may no longer be passed

[54] Robert Thornberg and Kathy Charmaz, "Grounded theory and theoretical coding," *The SAGE handbook of qualitative data analysis* 5, (2014): 153-69.
[55] Flick, *SAGE Handbook*.
[56] Louise Corti, "Data collection in secondary analysis," *The SAGE handbook of qualitative data collection* 1 (2018): 164-81.
[57] Barbara Casciarri and Francesco Staro, "Water and pastoralists: an introduction," *Nomadic Peoples* 23, 2 (2019): 159-76.
[58] IMAL Initiative for Climate and Development, *Loss and Damage*, 2024.
[59] Haut-Commissariat au Plan (HCP), *General census of population and housing (RGPH)*, 2014.

down to future generations, increasing the risk of their abandonment. Our analysis confirms this concern, aligning with findings from previous research on the impact of climate migration on cultural heritage.[60]

Their cultural heritage is changing as they adapt to sedentarization. For these nomadic communities, the separation from their traditional pastoral migrations and mountain ranges represents more than just a change in living patterns. It fundamentally alters their identity and worldview. As one nomad starkly observes: "Everything has changed for us."

As Kim argues, this forced displacement disrupts not only their traditional practices but also their deeper understanding of themselves and their relationship with the environment.[61] One of the most significant cultural losses highlighted in our findings relates to the disappearance of a language, traditional celebrations, and attire.

Climate mobility: A driver of Amazigh language loss

The nomadic population of the study area speaks Tamazight as their mother tongue language. In Morocco, there are two official languages: Tamazight and Arabic. Tamazight is the language of the Indigenous people of North Africa and Arabic gradually introduced from the time of the Muslim conquest of North Africa. After the independence of the country in 1956, Arabization was institutionalized by public policies often to the detriment of Tamazight.[62] These policies were passed to force Arabisation upon local populations and to break their resistance.[63] This state orientation led to a linguistic marginalization that persists in many areas, notably in administration, education and health services and the public sphere. During my journey, I met an aphasic nomadic woman who shared the challenges faced by nomads when trying to access healthcare services. She recounted an experience where she had visited a hospital, but the nurse did not speak Tamazight, which led to a complete breakdown in communication. As she put it: "I went to consult, but the nurse didn't speak Tamazight, so we couldn't understand each other at all."

Arabization has perpetuated a perception of inferiority for Tamazight speakers. The inferiority feeling is analyzed in the works of Frantz Fanon (1925-1961) even though the context is not similar as Fanon developed this concept in the context of colonization. In his renowned book '*Black Skin,*

[60] Jacqueline P. Hand, "Global climate change: a serious threat to native American lands and culture," *Envtl. L. Rep. News & Analysis* 38 (2008): 10329; Post, "Climate Change," 285-86; Aktürk and Lerski, "Intangible Cultural Heritage."
[61] Kim, "Climate Change."
[62] Blanca Madani, "Arabization of the Amazigh lands," *International journal of francophone studies* 6, 3 (2003): 211-13.
[63] Mohand Tilmatine, "Arabization and linguistic domination: Berber and Arabic in the North of Africa," *Language empires in comparative perspective* (2015): 1-16.

White Masks', Fanon argues that when two languages coexist in a territory, one as the dominant language and the other belonging to the indigenous people, a hierarchy is formed in which the dominant language imposes an inferiority complex on speakers of the indigenous language – in this case Tamazight, contributing to their cultural alienation.[64] This inferiority complex pushes many Tamazight speakers to adopt Darija or French (in a few big cities), perceived as necessary for better social and economic integration and access to public services.

For nomads forced to sedentarize in Er-rich, while Tamazight remains the family language, children increasingly favour Darija in their daily lives. Beyond school instruction in Arabic, they predominantly use Darija in their interactions with peers and the wider community. This shifting language dynamic threatens the intergenerational transmission of Tamazight, as many children develop only a limited command of their ancestral language. The gradual erosion of Tamazight proficiency represents not just a linguistic change, but a profound loss of cultural identity and heritage.

During the field work, the younger generation rarely express themselves in Tamazight, preferring Darija. Tamazight, a pillar of nomadic cultural identity, faces an existential threat. Sedentarization exacerbates this. A language is not simply a matter of forgotten words or turns of phrase, it embodies the disappearance of a unique know-how, traditions and practices shaped by centuries of nomadic life in harmony with the desert and mountains. It is also a loss of knowledge on how to better adapt to extreme environmental events and droughts. Indeed, it is a loss of a collective identity and cultural memory that, once lost, are impossible to replace. This analysis demonstrates that sedentarization threatens all elements stated under Article 2 of the CSICH. Tamazight acts as a crucial thread weaving through multiple dimensions of cultural expression: oral traditions and storytelling, songs and performance arts, social rituals and celebrations, traditional ecological knowledge, and artisanal craftsmanship. These elements are not isolated but form an interconnected cultural fabric, where the weakening of language proficiency undermines the entire system of cultural transmission.

The process of sedentarization, coupled with the results of Arabization, is altering the linguistic landscape of these formerly nomadic communities. As an intangible heritage expert confirms: "Like Moroccan society as a whole, nomads have undergone transformation under the influence of sedentarization. By settling down, especially in areas undergoing Arabization like Rich or Midelt, they have started to adopt Arabized ways."

[64] Frantz Fanon, *Black skin, white masks* (London: Paladin, 1970).

He adds: “Not only do the newly settled adopt the Amazigh language of the sedentary population, but they are now beginning to follow them by adopting Darija, especially in public spaces and on social media.”

The preservation of Tamazight has become a pressing concern as the language faces the threat of erosion due to sociocultural and environmental changes, particularly in sedentarized communities. As traditional nomadic lifestyles fade, so too does the everyday use of Tamazight, especially among younger generations. The expert emphasized the critical role of education in ensuring the survival of the language, stating: “The only way today to preserve Tamazight for future generations is through education and school. Without education, there will be no more Tamazight, unfortunately.”

Climate change undermines traditions

Forced sedentarization due to climate change has triggered a profound transformation of the traditions in these communities. Once defined by mobility and adaptability, their traditions are now increasingly at odds with the realities of sedentary life as I will explain in this section. The shift from living in tents and moving through campsites to residing in permanent houses within villages or cities has altered not only their physical environment but also their cultural practices. As the expert observed: “The shift in lifestyle, from tents to houses and from campsites to villages or cities, is expected to gradually lead to the abandonment of traditions tied to the old way of life and the adoption of new ones.”

Here, I start with the loss of how people used to celebrate weddings. The change in wedding celebrations, once characterized by the vibrant Ahidous dance that celebrated several days, underscores a broader trend of sedentarization-induced cultural erosion. Our results indicate that the new life has forced many nomads to reduce these celebrations to one day or, at most, two days. This change not only alters the length of the celebration but deeply affects the way nomads honor their unions. The prevalence of new songs and instruments, which often lack the authenticity of traditional forms, further illustrates the challenges faced in preserving cultural heritage. One nomad, forced to abandon his nomadic lifestyle due to drought and settle in Er-rich, points out that everything about weddings has changed from a cultural point of view. He explains: “In the past, we used to celebrate weddings for four days with Ahidous every day. Today, musical instruments and materials have taken over, creating music that no longer sounds like us.”

Asking a nomad on how have your wedding celebrations and other events evolved, he replies: “Ahidous is practiced on a variety of occasions, not just weddings. For example, to celebrate the birth of a child, parents may organize an evening where Ahidous is accompanied by traditional Amazigh

chants. Similarly, before the wedding, the evening when the nomad asks for the young woman's hand in marriage is also celebrated with Ahidous dance and Amazigh song. The wedding itself lasts four days and Ahidous is practiced everyday."

When asked about the current practices, particularly since settling in Er-rich, he replies: "Pfft, instruments… we don't listen to that. It's today's generation's music. Today, musical instruments and materials have taken over, creating music that no longer sounds like us."

Indeed, this shift risks hindering the transmission of Ahidous art and dance to future generations. A nomad notes that young generations today are adopting new traditions, new ways of celebrating weddings that aren't inherently theirs but are shaped by their new environment of living. Even the language of certain wedding songs has begun to change, there are more songs in Arabic than in Tamazight.

Another poignant illustration of cultural erosion within nomadic communities is the transformation of traditional clothings. In the past, women wove their own garments from wool, a skill that has nearly vanished in the context of sedentarization. These once-vibrant garments, which served as symbols of nomadic identity, have become associated with outdated notions and are often met with ridicule. It was a garment made from wool, prepared by women themselves. According to an interviewee, the perception that wearing traditional clothing invites mockery, where a woman not donning the traditional jellaba would face derision. This highlights the profound shift in cultural traditions and practices. A 91 years old nomad who has lived through both experiences of being nomad and sedentarization explains: "In the past, women wearing a jellaba would have been the target of mockery; it was unimaginable. Today, all women wear the jellaba, and those who don't dare to wear it seem to be missing out on something or are seen as eccentric."

Also, severe droughts have had an impact on their transhumance routes, which are no longer the same. In the past, the year would be structured around a clear, well-defined travel schedule: usually the summer months would be spent in Imilchil in the Midelt province, the winter months would be spent in Errachidia province, with a return to Assoul and surrounding villages in the Tinghir province when the cold set in. The traditional routes are disrupted by drought and the scarcity of natural resources, which no longer allows the nomads to preserve their lives and their livestock, diminishing reliance on transhumance to sustain themselves and their livestock. This observation is in

line with Næss findings[65] and forces the nomads to sedentarize, also in line with Kim.[66]

Urban centers may not be recognized as heritage repositories in the conventional sense, but they are home to a silent and profound loss of heritage.[67] After sedentarization, old traditions and practices often lose their usefulness and relevance, as they are interconnected with the environment, eroding their intergenerational transmission. As a result, these traditions and practices are threatened with extinction. This invisible factor of cultural loss has profound implications, not only for the nomadic communities themselves, but also for the Moroccan heritage as a whole. It highlights the urgent need for policies that safeguard and adapt these traditions and practices, ensuring that they are valued and preserved even as populations migrate. Without such efforts, the rich cultural heritage of nomadic communities in Morocco risks becoming a memory, rather than a living and evolving heritage.

Our study also demonstrates that nomadic communities make concerted efforts to adapt and preserve their traditional way of life. One adaptation strategy involves semi-sedentarization, settling in nearby villages or small towns, allowing children to be in school and live with their mothers, while the fathers maintain their nomadic lifestyle by continuing to live in tents with the livestock. Another strategy involves selling part of their livestock to sustain the remaining herd and support their families, while hoping for the return of favorable conditions. This is consistent with findings by Bechchari and others,[68] who report that, as a result of climate change, nomads are often compelled to sell portions of their herds to provide for their families and engage in temporary wage labor.

Conclusion

This study set out to examine how climate-induced sedentarization affects the intangible cultural heritage of nomadic communities in southeastern Morocco, with a particular focus on the Ait Aissa Izem tribe in the village of Assoul and the small town of Er-rich. The study aimed to fill a critical gap in the literature, as previous research has predominantly focused on tangible cultural heritage impacts of climate change, while the effects on intangible cultural heritage, such as language, clothes, traditions like how they celebrate their weddings etc, remain understudied. Morocco is very

[65] Marius Warg Næss, "Climate change, risk management and the end of nomadic pastoralism," *International Journal of Sustainable Development & World Ecology* 20, 2 (2013): 123-33.
[66] Kim, "Climate Change."
[67] Nick Brooks, Joanne Clarke, Grace Wambui Ngaruiya and Elizabeth Edna Wangui, "African heritage in a changing climate," *Azania: Archaeological Research in Africa* 55, no. 3 (2020): 297-328.
[68] A. Bechchari, A. El-Aich, H. Mahyou, M. Baghdad and M. Bendaou, "Analysis of the evolution of the pastoral system of Eastern Morocco," (2014): 151-62.

vulnerable to climate change effects but these questions are yet explored by Moroccan scholars.

Through a qualitative methodology employing semi-structured interviews with 15 participants, including both sedentarized and currently nomadic individuals, this research captured firsthand accounts of cultural transformation. The inclusion of five women participants and an expert in intangible cultural heritage provided crucial perspectives on gender-specific impacts and broader cultural implications. The study area's selection was particularly relevant given the increasing frequency of droughts in Morocco, which has risen from one dry year in 15 between 1930 and 1990 to one in three in recent years.

The findings reveal profound impacts of climate-induced sedentarization on three key aspects of intangible cultural heritage. First, the research documents a significant erosion of the Tamazight language, particularly among younger generations who increasingly favor Darija in urban settings, threatening the intergenerational transmission of linguistic heritage. Second, traditional celebrations, particularly wedding ceremonies, have undergone substantial transformation, with the multi-day Ahidous celebrations being reduced and traditional music being replaced by modern alternatives, songs and instruments. Third, traditional clothing practices have shifted dramatically, with traditional wool garments giving way to modern dress, reflecting broader cultural adaptation to urban life.

This study's significance lies in its documentation of how climate change acts as a catalyst for cultural transformation through forced sedentarization. The findings demonstrate that climate change threatens not only the physical existence of nomadic communities but also their cultural continuity and identity. These results contribute to our understanding of climate change's broader sociocultural impacts and highlight the urgent need for policies that address both environmental and cultural preservation concerns. Future research could explore potential strategies for preserving nomadic cultural heritage within the context of inevitable climate-induced transitions, ensuring that these valuable cultural traditions are not lost to future generations.

However, this study has several limitations that should be acknowledged. The relatively small sample size of 15 participants, while providing rich qualitative insights, limits the generalizability of the findings. A larger sample would likely reveal additional perspectives and nuances in how climate-induced sedentarization affects cultural heritage. Additionally, while the inclusion of five women participants provided valuable gender-specific insights, a greater representation of nomadic women would have strengthened the study's gender perspective, particularly given women's

crucial role in preserving and transmitting cultural practices and their heightened vulnerability to climate change impacts.

Despite these limitations, this research serves as an important foundation for future studies examining the intersection of climate change, forced sedentarization, and cultural heritage. It opens new avenues for research that could explore these dynamics across different nomadic communities in Morocco and beyond, potentially employing different types of approaches and methods to capture the evolving nature of these cultural transformations. Future research could also explore potential strategies for preserving nomadic cultural heritage within the context of inevitable climate-induced sedentarisation, ensuring that these valuable cultural traditions are not lost to future generations.

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العنوان: تأثيرات الاستقرار الناجم عن تغير المناخ على التراث الثقافي غير المادي للمجتمعات القروية في جنوب شرق المغرب

ملخص: يعد تغير المناخ أحد التحديات الرئيسية في عصرنا الحالي، حيث له آثار كبيرة على الاقتصاد والمجتمع والناس وتراثهم الثقافي. في هذه الورقة، أستكشف أثر الاستقرار القسري الناجم عن تغير المناخ، ولا سيما بسبب الجفاف الشديد، على التراث الثقافي للرحّل في جنوب شرق المغرب. أركز على التراث الثقافي غير المادي، الذي يتأثر بشدة بتغير المناخ، بسبب اعتماده على البيئة التي يعيش فيها الناس. باستخدام نهج نوعي مع مقابلات متعمقة مع كل من الرحل المستقرين والممارسين، تكشف الدراسة كيف أن ندرة الموارد الطبيعية قد أجبرت هذه المجتمعات على الاستقرار، مما أدى إلى خسائر ثقافية. تندثر الممارسات التقليدية، مثل احتفالات الزفاف التي تستمر لعدة أيام واستخدام اللغة الأمازيغية كلغة أم، مع انتقال العائلات إلى المراكز الحضرية. تسلط النتائج الضوء على كيفية تهديد هذه التغييرات لنقل عناصر التراث الثقافي غير المادي للرحل إلى الأجيال القادمة.

الكلمات المفتاحية :تغير المناخ، المجتمعات القروية، الاستقرار، التراث الثقافي غير المادي، الأمازيغ.

Titre: Impacts de la sédentarisation induite par le climat sur le patrimoine culturel immatériel des communautés nomades du sud-est du Maroc

Résumé: Le changement climatique est l'un des défis majeurs de notre époque, ayant des répercussions importantes sur l'économie, la société, les populations et leur patrimoine culturel. Dans cet article, j'étudie les effets de la sédentarisation induite par le climat, notamment par les sécheresses sévères, sur le patrimoine culturel des communautés nomades du sud-est du Maroc. Je m'intéresse particulièrement au patrimoine culturel immatériel, qui est profondément affecté par le changement climatique en raison de sa dépendance à l'environnement dans lequel vivent les populations. À l'aide d'une approche qualitative et d'entretiens approfondis avec des nomades sédentaires et pratiquants, la recherche révèle comment la rareté des ressources naturelles a contraint ces communautés à la sédentarisation, entraînant des pertes culturelles. Les pratiques traditionnelles, telles que les célébrations de mariage de plusieurs jours et l'utilisation du tamazight comme langue maternelle, s'érodent à mesure que les familles s'installent dans les centres urbains. Les résultats soulignent comment ces changements menacent la transmission des éléments du patrimoine culturel immatériel des nomades aux générations futures.

Mots-clés: changement climatique, communautés nomades, sédentarisation, patrimoine culturel immatériel, Amazighs.