



# Niger

The following climate factsheet summarizes available information on the climate of Niger, climate change and impacts of these changes on humanitarian activities in country. Each of the factsheets were written as a compilation of information from peer-reviewed academic papers, government publications, and INGO documentation.

## 1. Climate overview

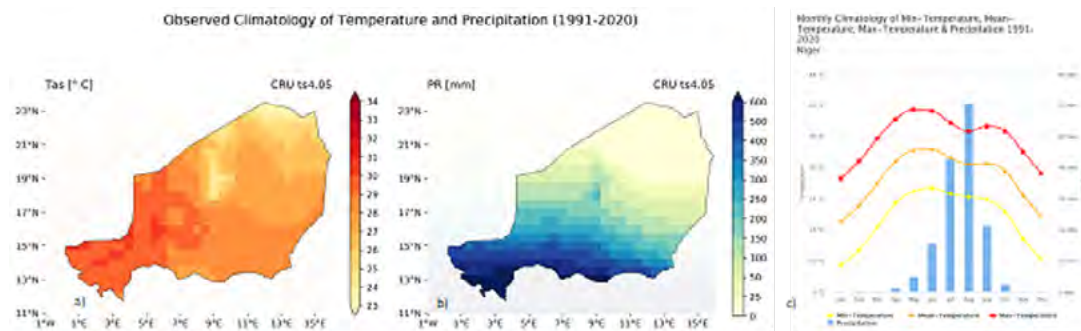
Average annual temperature: Temperature range 21°–36°C with a decreasing gradient from South-West to North-East. Substantially cooler temperatures are found in mountainous regions (figure 1a).

Average annual rainfall: Lower rainfall are found in the North with less than 100mm, while higher amounts are found in the South (400–600 mm) (Figure 1b).

### Short overview

Niger's climate is largely hot and dry with the northern half being classified as a desert and most of the southern parts having a semi-arid climate. The country climate alternates between two seasons, a long dry season from October to May and a short rainy season from May to September. The highest average temperatures are recorded between March and April, when they exceed 40°C. The lowest average temperatures are recorded from December to February when they can be around 10°C (figure 1c).

Figure 1: Observed Climatology of mean Temperature (a), annual mean total precipitation (b) and monthly climatology (c) over 1991-2020. (Adapted from World Bank, 2022)



The El Niño Southern Oscillation (ENSO) creates irregular periodic variation in the temperature as well as sea surface temperature, thus influencing year-to-year variability and extreme weather events such as heatwaves, droughts, and floods. During El Niño periods, parts of Niger typically experience drier than normal conditions and during La Niña periods, wetter than usual conditions typically occur.

The diverse and varied geography of Niger means that it is exposed to a broad array of environmental hazards (hydrometeorological as well as geophysical) which are directly impacted and exacerbated by the impacts of climate change across the country. Ranked 8 out of 191 countries by the 2022 Inform Risk Index (DRMKC, 2022), Niger is one of the higher hazard risk countries in the world.

## 1.1 Climate change in Niger

### Historical Climate change

### Projected climate change

#### Temperature

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| <ul style="list-style-type: none"> <li>▪ The mean annual temperature over Niger have increased at a rate of approximately 0.2°-0.3°C/decade since 1961 to 2015 (Gutiérrez <i>et al.</i>, 2021)</li> <li>▪ The frequency and intensity of hot extremes have increased and cold extremes have decreased (Seneviratne <i>et al.</i>, 2021)</li> </ul> | <ul style="list-style-type: none"> <li>▪ Mean temperature over the region are projected to rise until 2050 by at least 3°-4°C for a high greenhouse gas concentration scenario (SSP5-85) and 2°-3°C for low greenhouse gas concentration scenario (SSP2-4.5) (Gutiérrez <i>et al.</i>, 2021).</li> <li>▪ Maximum and minimum temperature will increase, and heat waves will intensify in duration and peak temperatures for every increase in global warming levels above the pre-industrial values. In line with rising mean annual temperatures, the annual number of very hot days (days with daily maximum temperature above 35 °C is projected to rise and with high certainty (Gutiérrez <i>et al.</i>, 2021; Ranasinghe <i>et al.</i>, 2021; Seneviratne <i>et al.</i>, 2021).</li> </ul> |
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#### Precipitation

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| <p>Overall, long term trends (1979-2015) in annual total rainfall show an increase (AfDB 2018)</p> | <ul style="list-style-type: none"> <li>▪ Mid-century estimates (2040-2060) of annual precipitation changes over Somalia under a low emission scenario (SSP2-4.5) and high emissions scenario (SSP5-8.5) is projected to increase more than 50%, with enhanced interannual variability (Gutiérrez <i>et al.</i>, 2021).</li> <li>▪ The frequency and intensity of heavy precipitation events are projected to increase with potential effects in flooding and soil erosion (Seneviratne <i>et al.</i>, 2021).</li> </ul> |
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## 2. Priorities of the Movement and climate change

### 2.1 Scale up climate-smart DRR, early action and preparedness: DRR portrait

Existing Hydrometeorological Hazard	Projected risks
<b>Floods</b>	
<p>Flood hazard risk is affecting the entire country. In addition, riverine flooding poses a threat mostly in the river Niger basin and floods impacts approximately 100,000 people each year (GFDRR, 2019). About 40% of the country’s population is estimated to live within the River Niger basin, meaning a significant number of people are exposed to the impacts of flooding on the region.</p> <p>2012 saw the worst flooding reported in 80 years, resulting in over 300 deaths, 6000 people injured and 4 million people impacted by the ensuing impacts of the floods (GFDRR, 2019).</p>	<p>GFDRR (2019) projects that increasing population combined with the impacts of climate change could result in increases of droughts and floods across Niger.</p> <p>In the coming years, it is projected that 90,000 people will be impacted on average by flooding across the country. This will be coupled with more than \$500 million in economic damages (GFDRR, 2019).</p>
<b>Droughts</b>	
<p>Since 2011, Niger has faced recurrent droughts leading to millions of people requiring food assistance. The drought in 2011 led to food challenges as well as having impacts on the livelihoods of thousands of people; livestock in particular were particularly affected.</p>	<p>Water scarcity is projected to become an increasing issue for the health of communities across Niger. GFDRR (2019). It is estimated that in Maradi, 3 million people live in areas expected to suffer water scarcity each year. This is expected to cause at least \$60 million in agricultural livestock and crop losses.</p>
<p>It is essential to note that many of these hazards are interrelated and produced compound risks to the same areas and communities. In addition, risk must be understood as the interplay between hazard risk, exposure, and vulnerability which make certain communities, individuals, and sectors more impacted by the hazards. All project design should consider the risk mentioned above and the compounding risks they represent.</p>	

## Disaster Risk Management Strategies

Between 1973 and 2013, Niger reported over 3700 disasters which led to significant economic damage as well as the loss of over 10500 lives (GFDRR, 2022). In 2012, the National Platform for DRR (NP-DRR) was established as a mechanism to coordinate, analyse and provide advice in regard to DRR activities across the country. The NP-DRR is responsible for also coordinating risk prevention and designing integrated information and communication systems for DRR.

### Disaster Risk Management Law and Policies

- The Ministry of Humanitarian Action and Disaster Management oversee the National Food Crisis Prevention and Management Mechanism which consists of three units and contributes to DRR in Niger; Early Warning System Coordination, Food Crisis Unit and Social Safety Net Unit.
- The **National Strategy on Disaster Risk Reduction 2019-2030**. This is the overarching framework for the implementation of DRR activities in the country. The strategy involves four strategic goals, which are aligned to the four priorities of the Sendai Framework.
- La Loi N°2017-06 du 31 mars 2017 ; déterminant les principes fondamentaux de l'organisation de la protection civile. Elle stipule que l'organisation des secours dans chaque région et dans chaque département se fait à travers un plan d'Organisation des Secours (plan ORSEC).
- La Loi N°2007-28 du 3 décembre 2007 créant le Centre National de Lutte Antiacridienne (CNLA) avec pour missions de prévenir tout départ d'invasion du Criquet pèlerin à partir du Niger, de donner l'alerte et de coordonner la lutte en cas de forte recrudescence ou d'invasion.
- Le Décret n° 2018-538 en date du 27 Juillet 2018, définissant le code d'alerte au Niger.
- Le décret n°2016-344/PRN du 8 juillet 2016, pris en application de la loi 2017-06 du 31 mars 2017, déterminant les principes fondamentaux de l'organisation de la protection civile

## 2.2 Reduce health impacts of climate change

Temperature rises, increased variability in rainfall patterns, and more intense and frequent droughts and floods threaten human health in Niger. The most significant health risks are related to increased food insecurity and malnutrition, a surge in the spread of diseases (vector-borne, waterborne and respiratory diseases), increased death and injuries and more cases of heat stress (USAID, 2017; World Bank, 2021).

Food insecurity and malnutrition are the most pressing health challenges in Niger, especially among children and mothers (USAID, 2021). Food insecurity is caused by a disruption in agricultural production due to frequent droughts and floods that are expected to increase with climate change (Egbuonye *et al.*, 2021). In 2022 alone, over 4.4 million people needed humanitarian assistance as crops had failed due to droughts (IFRC, 2022). Notably, as many as 50% of children in the country are stunted (Egbuonye *et al.*, 2021).

An increase in temperatures and rainfall variability (with the associated floods and droughts) threaten human health and sanitation by increasing cases of infectious diseases such as malaria, meningitis and measles (MSF, 2021; World Bank, 2021). The geographic range and activeness of disease vectors, such as mosquitoes, will likely increase due to the rising temperature and floods (Potsdam Institute, 2021).

Higher temperatures will also increase the **risk of heat waves**. The population impacted by heatwaves are expected to rise from 1.7 percent in 2000 to about 12% in 2080 (Potsdam Institute, 2021). Furthermore, **frequent floods will increasingly injury and mortality**. For example, the 2021 Niger floods killed 77 people (OCHA, 2021). Another climatic risk to human health is the increase in the frequency of sandstorms that **affect both health and wellbeing** (World Bank, 2021).

## 2.3 Sustainable water: resources management, infrastructure and access

### Water, Sanitation and Hygiene

**Recurrent droughts are by far the greatest climatic threat to water, hygiene and sanitation in Niger. Droughts are reducing the availability and quality of surface and groundwater resources** (Boko *et al.*, 2020). In Niger, 4.4% and 27.03% of the population use surface water and unimproved sources for drinking water respectively (JMP, 2021). Droughts impact water resources and slow down the country's progress in achieving universal water and sanitation services. Droughts are also increasing stress on surface and groundwater resources by reducing their quantity and availability. Surface water in rivers and other water bodies such as River Niger will likely be reduced following from long periods of drought (Water Aid, 2021). People who rely on surface water will have to shift to groundwater, a significant amount of which is low quality and insufficient for consumption (Salhou Djari *et al.*, 2018). Increased evaporation rates during higher temperatures will also reduce and mineralise limited groundwater resources (Water Aid, 2021). Furthermore, the projected increase in sandstorms due to temperature rises will significantly deteriorate water quality across the country (World Bank, 2021).

### Infrastructure, Power and Electricity

Hydropower efforts are another victim of a changing climate. Though Niger is investing heavily in building capacity—currently constructing the Kandadji Dam—projected variability in rainfall and climate conditions could render this a very unpredictable and unreliable investment (Potsdam Institute and GIZ 2021).

## 2.4 Enable climate resilient livelihoods and economic security

Niger has experienced an average of one flood per year and one drought every three years over the past two decades (Gao & Mills, 2021). **Droughts and floods pose the most significant threat to agriculture in the country.** In 2022, Floods and droughts disrupted agricultural production and resulted in the highest number of food-insecure people in the last eight years (FAO, 2022). Agriculture, primarily rainfed, is the most significant livelihood sector in Niger. The sector (including livestock and crop farming) employs about 80% of the population and contributes over 43% to the country's GDP (Ado *et al.*, 2019, 2020). Agriculture is primarily rainfed and subsistence, with less than one per cent of arable land irrigated (Potsdam Institute and GIZ 2021).

On one hand, **increasing flooding due to climate change destroys and inundates crops and kills livestock.** In 2020, Niger faced one of the largest floods in its history which submerged over 3,082 hectares of irrigated land (World Bank, 2022). Again in 2021, similar flooding following torrential rains submerged as much as 6000 hectares of cultivated land and killed over 10,000 livestock (OCHA, 2021). Flooding is mainly a challenge in the southern part of the country (World Bank, 2021).

On the other hand, **droughts reduce water availability for crop farming, pasture growth and watering animals.** With the changing climate, the crop area exposed to drought will significantly increase (Potsdam Institute, 2021). Droughts will also increase damages to crops and higher rates of livestock mortality (Issaharou-Matchi *et al.*, 2019). In addition, droughts pose a threat to the county's fish production through declining water levels and reductions in water quality (*ibid.*, 2019). Food insecurity is already an acute issue in Niger, which ranks second last out of 189 countries when it comes to vulnerability to climate change in terms of food production and access (ND-GAIN 2021).

## 2.5 Address climate displacement and protection

**According to UNHCR, as of August 2022, Niger had more than 347 648 IDPs caused by conflict, with government relocation having helped reduce the higher number of displaced people in 2020** (UNHCR 2022a) . Disasters, mainly flooding, triggered 118,000 displacements in 2021, which was also lower than 2020 displacements (*ibid.*). The country is also a main refugee-hosting country, with almost 600,000 refugees and asylum seekers in 2022 (UNHCR 2022a).

**By 2050 Niger is projected to be the country with the highest numbers of internal climate migrants in West Africa, if not action is taken – up to 19.1 million** (IOM 2021, Rigaud *et al.* 2021). One study found that more than half of respondents had a family member who had been forced to migrate for work because droughts, floods, wildfires, changing rainfall patterns, and/or desertification had impacted their livelihoods (*ibid.*).

**Both rural and urban migration is predicted to rise as rainfall fluctuations and rising temperatures continue** (Hassan and Tularam 2018). Modelling finds that a strong correlation between amounts of rainfall and higher temperatures and both rural and urban migration in Niger (*ibid.*). Drought is already and will remain a significant driver of migration and displacement (IOM 2021).

Displacement in Niger is both caused by conflict and a cause of conflict, as scarce resources lead to competition when displaced people move to other areas (IDMC 2022). Significant climate out-migration hotspots are predicted in southern Niger (Rigaud *et al.* 2021).

Climate-induced IDPs have not always been perceived as IDPs in Niger unless they were also displaced by conflict (d'Orsi and Naldi 2022).

## Potential needs for migrants and displaced people

Agricultural adaptation strategies to help people avoid migration in the first place as well as support those already displaced can help generate livelihoods and food security in Niger (UNHCR 2022). Research on climate change adaptation strategies and its impact on household income in southern Niger found significant increased household income when appropriate strategies were used (Zakari *et al.*, 2022).

## Protection

The impact of climate change on the security situation in the Sahel is a widely recognized and documented issue (OECD 2010). The confluence of climate and non-climate stressors is producing a volatile and deteriorating security situation in Niger. Stressors such as increased temperatures, increased hazard risk of drought and floods, increased desertification and evapotranspiration, decreased access to water and pastoral lands, population growth, historic tensions between tribal and state government, historical grievances between tribal groups, increased and a weak social protection system have been contributing to 'persistent, though localized, conflict' in Niger (USAID 2012) - though arguably, the recent insurgency spillover from Boko Haram, conflict in the Lake Chad area, influx of refugees, and challenge to the first peaceful transition of power since the 1960s constitutes an escalation and broadening of conflict beyond the local.

Protection crises are also emerging through the impacts that climate change is having on the livelihoods and lifestyles of livestock herders in Niger. These pastoralists must grapple with competing and compounding threats: shrinking pasture as desertification increases, decreased access to water as sources dry up, insufficient fodder or crops to sustain their livestock or themselves as agricultural yields plummet, and increased disease prevalence as these stressors erode the health of their livestock (ICRC 2020). These climate-related developments in turn impact the socio-economic fabric of society, in which tensions soar as herders compete for scarce resources and access, armed groups line traditional transhumance routes, and population growth exerts additional pressure on resources (ICRC 2020). Historical and cultural considerations must also be factored in; the Tuareg people feel these impacts especially acutely, as they have a long history of marginalization that interacts with their livelihood dependence on pastoralism (USAID 2012). When left unaddressed, and combined with threats to their lives and livelihoods, this creates a context for recruitment by extremist groups (Wesch and Rheinbay 2021).

It is important to note that escalating conflict in the area is further affecting people through constraining their access to humanitarian support, as more and more organizations are unable to access the area due to the rising violence (ICRC 2020).



People in detention frequently have heightened vulnerability to natural disasters due to: spatial marginalization resulting from prison locations on hazard-prone land and/or isolation from emergency evacuation services; limited to no connections to social networks, which are crucial aspects to hazard resilience; and political marginalization, including lack of policies and services to prevent disaster impacts on imprisoned populations (Gaillard and Navizet 2012). These vulnerabilities, coupled with more frequent and intense disasters due to climate change, may leave prison populations in especially precarious positions to hazards such as extreme heat and flooding.

## 2.6 Policy

### Relevant information from the [Nationally Determined Contribution \(NDC\) \(2021\)](#)

**Emission target:** Niger has targeted emissions reduction in the energy sector and land management sector. A 6,7 billion USD budget is expected for adaptation – over the double of the mitigation budget – for the 2021-2030 period. This budget is largely expected to be funded by international support.

**Area of focus on Adaptation:** Agriculture, forest, livestock, water and resources management, health.

**Inclusion of DRR:** Yes, it is part of the priority adaptation measures. It includes climatic data, early warning system, DRR, insurance, gender and social inclusion.

**National Designated Entity:** Prime Minister Office / Cabinet du Premier Ministre

**Key stakeholders:** Le Conseil National pour l'Environnement et le Développement durable (CNEDD), Centre Africain pour les Applications de la Météorologie au Développement (ACMAD), l'Institut de Recherche pour le Développement (IRD), ECOWAS, UNDP, Japan, European Union, World Bank.

### Additional Climate Policies

- [National Policy on Climate Change \(PNCC\) \(2012\)](#). This document aims to coordinate the national approach on climate change. DRR is mentioned in relation with food security, but does not occupy a central place. The document presents the legal environmental framework in the country, specifying that the right to a healthy environment is part of the Constitution (article 35).
- Niger has not submitted a National Adaptation Plan, its [National Adaptation Programme of Action \(NAPA\)](#) was submitted in 2006 and reflect similar priorities than the NDC.

### Climate finance

National societies cannot directly apply for climate finance from the [Green Climate Fund \(GCF\)](#), but they can be an implementing partner for an accredited entity (Climate centre, 2022a).

In addition to regional projects, Niger has two Green Climate Fund national projects combining mitigation and adaptation: 'Inclusive Green Financing for Climate Resilient and Low Emission Smallholder Agriculture' and 'Hydro-agricultural development with smart agriculture practices resilient to climate change in Niger' (GCF, 2022).



National Societies can explore options for accessing climate funds through smaller funds, such as the [GEF's Small Grants Programme](#) or the [FFEM's Small Scale Initiatives Program](#). These grants range from about \$20,000 to \$50,000 USD and are intended to support community-level initiatives. The GEF Small Grants Programme sits under UNDP and has a [National Coordinator in each country](#). Some countries have National Climate Funds, which may be accessible to the National Society. Other funding from bilateral donors, national climate funds, or multilateral climate funds like Adaptation Fund, CREWS, or GCCA+ could be explored (Climate centre, 2022a).

Engaging in national climate adaptation planning is vital for accessing climate finance.

## Additional Resources

Climate Centre. (2022a). Factsheet on Climate Finance. <https://www.climatecentre.org/wp-content/uploads/Fact-Sheet-on-Climate-Finance.pdf>

Climate Centre. (2022b). Entry points for National Societies on Climate Finance partnerships. <https://www.climatecentre.org/wp-content/uploads/Entry-Points-for-Climate-Finance-Partnerships.pdf>

# References

- Ado, A. M., Leshan, J., Savadogo, P., Bo, L., & Shah, A. A. (2019). Farmers' awareness and perception of climate change impacts: case study of Aguié district in Niger. *Environment, Development and Sustainability*, 21(6), 2963–2977. <https://doi.org/10.1007/s10668-018-0173-4>
- Ado, A. M., Savadogo, P., Pervez, A. K. M. K., & Mudimu, G. T. (2020). Farmers' perceptions and adaptation strategies to climate risks and their determinants: insights from a farming community of Aguié district in Niger. *GeoJournal*, 85(4), 1075–1095. <https://doi.org/10.1007/s10708-019-10011-7>
- Boko, B. A., Konaté, M., Yalo, N., Berg, S. J., Erler, A. R., Bazié, P., Hwang, H.-T., Seidou, O., Niandou, A. S., Schimmel, K., & Sudicky, E. A. (2020). High-Resolution, Integrated Hydrological Modeling of Climate Change Impacts on a Semi-Arid Urban Watershed in Niamey, Niger. *Water*, 12(2), 364. <https://doi.org/10.3390/w12020364>
- D'Orsi, C. and Naldi, G. (2022) Climate-induced displacement in the Sahel: A question of classification. *International Review of the Red Cross*, no. 918. Available at: [https://international-review.icrc.org/articles/climate-induced-displacement-in-the-sahel-classification-918#footnote149\\_getst2g](https://international-review.icrc.org/articles/climate-induced-displacement-in-the-sahel-classification-918#footnote149_getst2g)
- Egbuonye, N. C., Ishdorj, A., McKyer, E. L. J., & Mkuu, R. (2021). Examining the Dietary Diversity of Children in Niger. *Nutrients*, 13(9), 2961. <https://doi.org/10.3390/nu13092961>
- FAO. (2022). *The Niger: Humanitarian Response Plan 2022*. <https://doi.org/10.4060/cb9428en>
- Gaillard, J.C and Navizet, F. (2012). 'Prisons, prisoners and disaster' in *International Journal of Disaster Risk Reduction*, 1(1), 33–43. <https://www.sciencedirect.com/science/article/pii/S2212420912000039?via%3Dihub>
- Gao, J., & Mills, B. (2021). Influence of weather shocks and coping strategies on food consumption: Evidence from rural Niger. *African Journal of Agricultural and Resource Economics*, 16(3), 193–215. [https://doi.org/10.53936/afjare.2021.16\(3\).13](https://doi.org/10.53936/afjare.2021.16(3).13)
- GCF. (2022). *Niger*. <https://www.greenclimate.fund/countries/niger>
- Global Facility for Disaster Risk Reduction (GFDRR) (2019). *Disaster Risk Profile: Niger 2019*. <https://www.gfdr.org/en/publication/disaster-risk-profile-niger-2019>
- Global Facility for Disaster Risk Reduction (GFDRR). (2022). *Policy coherence between disaster risk reduction and climate change adaptation – case study Niger*. <https://reliefweb.int/report/niger/policy-coherence-between-disaster-risk-reduction-and-climate-change-adaptation-case>
- IDMC (2022) Country Profile: Niger. Webpage, available at: <https://www.internal-displacement.org/countries/niger>
- IFRC. (2022). *Niger: Food Insecurity Crisis - Emergency Appeal n° MDRNE026*. <https://reliefweb.int/report/niger/niger-food-insecurity-crisis-emergency-appeal-n-mdrne026>
- International Committee of the Red Cross (ICRC). (19 March 2020). *Niger: Climate change and armed conflict threaten the livelihoods of nomadic herders*. <https://reliefweb.int/report/niger/niger-climate-change-and-armed-conflict-threaten-livelihoods-nomadic-herders>
- IOM (2020) *National Study on the Nexus Between Migration, Environment and Climate Change in Niger*. International Organization for Migration. Available at: <https://rodakar.iom.int/sites/g/files/tmzbd1696/files/documents/study-iom-migration-environment-and-climate-change-niger.pdf>
- Issaharou-Matchi, I., Rabiou, H., Mahamane, M., Idrissa, B., Mahamane, A., & Saadou, M. (2019). Rural Communities' Perceptions of Climate Change and Its Impacts on Their Livelihood in Southeastern Niger. *International Journal of Environment and Climate Change*, 789–800. <https://doi.org/10.9734/ijecc/2019/v9i1230157>
- JMP. (2021). Niger WASH data. *WASH Data*. <https://washdata.org/data/household#!/ner>
- MSF. (2021). In Niger, climate change impacts food production and malaria rates. <https://reliefweb.int/report/niger/niger-climate-change-impacts-food-production-and-malaria-rates>
- OCHA. (2021). *West and Central Africa: Weekly Regional Humanitarian Snapshot (21-27 September 2021)*. <https://reliefweb.int/report/cameroon/west-and-central-africa-weekly-regional-humanitarian-snapshot-21-27-september-2021>

- OECD (Organization for Economic Cooperation and Development) (2010). *Security Implications of Climate Change in the Sahel Region: Policy considerations*. <https://www.oecd.org/swac/publications/47234320.pdf>
- Potsdam Institute for Climate. (2021). *Climate Risk Profile: Niger*. [https://www.adaptationcommunity.net/wp-content/uploads/2021/02/GIZ\\_Climate-risk-profile-Niger\\_EN\\_final.pdf](https://www.adaptationcommunity.net/wp-content/uploads/2021/02/GIZ_Climate-risk-profile-Niger_EN_final.pdf)
- République du Niger. (2012). *Avant-projet de document de Politique nationale en matière de changements climatiques (PNLCC)*. <https://www.climate-laws.org/geographies/niger/policies/national-policy-on-climate-change-pncc> (French)
- République du Niger. (2021). *Contribution déterminée au niveau national* (French). [https://unfccc.int/sites/default/files/NDC/2022-06/CDN\\_Niger\\_R%C3%A9vis%C3%A9e\\_2021.pdf](https://unfccc.int/sites/default/files/NDC/2022-06/CDN_Niger_R%C3%A9vis%C3%A9e_2021.pdf)
- République du Niger. (2006). *National Adaptation Programme Of Action*. <https://unfccc.int/resource/docs/napa/ner01e.pdf>
- Rigaud, Kanta Kumari; de Sherbinin, Alex; Jones, Bryan; Adamo, Susana; Maleki, David; Abu-Ata, Nathalie E.; Casals Fernandez, Anna Taeko; Arora, Anmol; Chai-Onn, Tricia, and Mills, Briar. 2021. *Groundswell Africa: Internal Climate Migration in West African Countries*. Washington, DC: The World Bank.
- Salhou Djari, M. M., STOLERIU, C. C., SALEY, M. B., MIHU-PINTILIE, A., & ROMANESCU, G. (2018). GROUNDWATER QUALITY ANALYSIS IN WARM SEMI-ARID CLIMATE OF SAHEL COUNTRIES: TILLABÉRI REGION, NIGER. *Carpathian Journal of Earth and Environmental Sciences*, 13(1), 275–288. <https://doi.org/10.26471/cjees/2018/013/024>
- UNHCR (2022a) Operational Data Portal: Niger. Webpage, available at: <https://data.unhcr.org/en/country/ner>
- UNHCR (2022b) Communities in Niger adapt to displacement and a changing climate. 11 February. Webpage, available at: <https://www.unhcr.org/uk/news/stories/2022/2/6206891a4/communities-niger-adapt-displacement-changing-climate.html>
- USAID. (2017). *Climate Change Risk Profile: West Africa Sahel*. [https://www.climatelinks.org/sites/default/files/asset/document/2017%20April\\_USAID%20ATLAS\\_Climate%20Change%20Risk%20Profile%20-%20Sahel.pdf](https://www.climatelinks.org/sites/default/files/asset/document/2017%20April_USAID%20ATLAS_Climate%20Change%20Risk%20Profile%20-%20Sahel.pdf)
- USAID. (2021). *Niger: Nutrition Profile*. [https://www.usaid.gov/sites/default/files/documents/Copy\\_of\\_tagged\\_Niger-Nutrition-Profile.pdf](https://www.usaid.gov/sites/default/files/documents/Copy_of_tagged_Niger-Nutrition-Profile.pdf)
- USAID. (2012). *Climate Vulnerabilities and development in Burkina Faso and Niger*. <https://www.climatelinks.org/sites/default/files/asset/document/Climate%20Vulnerabilities%20and%20Development%20in%20Burkina%20Faso%20and%20Niger.pdf>
- Water Aid. (2021). *Climate Change and Water Security: Case of Burkina Faso and Niger* (Advocacy Brief). <https://washmatters.wateraid.org/sites/g/files/jkxoof256/files/climate-change-and-water-security-in-burkina-faso-and-niger---advocacy-brief.pdf>
- Wesch, S. and Rheinbay, J. (17 March 2021). *Climate Insecurity: Undermining Rural Livelihoods in Niger*. <https://peacelab.blog/2021/03/climate-insecurity-undermining-rural-livelihoods-in-niger>
- World Bank. (2021). *Niger. Climate Change Knowledge Portal*. <https://climateknowledgeportal.worldbank.org/country/niger/vulnerability>
- World Bank. (2022, April 15). *Niger: Improving Municipal Resilience to Flooding and Access to Basic Services*. Press Release. <https://www.worldbank.org/en/news/press-release/2022/04/15/afw-niger-improving-municipal-resilience-to-flooding-and-access-to-basic-services>
- Zakari, S.; Ibro, G.; Moussa, B.; Abdoulaye, T. (2022). Adaptation Strategies to Climate Change and Impacts on Household Income and Food Security: Evidence from Sahelian Region of Niger. *Sustainability* 14 (2847). Available at: <https://doi.org/10.3390/su14052847>