

Note

CLIMATE CHANGE AND HOTSPOTS OF CONFLICT AROUND THE WORLD

May 2023





The Defence and Climate Observatory, launched in December 2016, is tasked with studying climate-related security and defence issue.

The Observatory coordinated by IRIS under the contract carried out on behalf of Ministry for the Armed Forces' Directorate General for International Relations and Strategy (DGRIS). The Observatory gathers a multidisciplinary and cross-disciplinary team of research fellows specialised in international relations, security, defence, migrations, energy, economics, climatology and health. It is led by two scientific coordinators: Julia Tasse and François Gemenne.

The Observatory is strong of multiple partnerships with European partners (Netherlands, Luxembourg) and international partners (Australia, United States, India), international NGOs and national and international public bodies. Such initiatives enabled strengthening cooperation on climate issues and their security implications.

The Defence and Climate Observatory produces reports and notes, organises restricted seminars and conferences open to the public, and hosts the podcast « Sur le front climatique ».

www.defenseclimat.fr/en

The French Ministry for the Armed Forces regularly calls upon outsourced studies from private research institutes, according to a geographical or sectoral approach that complements its expertise. These contracts are part of the development of a defence foresighting approach, which, as the last White Paper on Defence and National Security underlines, enable armed forces to rely on independent, multidisciplinary and original strategic thinking, integrating university research as well as specialised institutes.

Most of these studies are made public and available on the website of the Ministry for Armed Forces and the Observatory's website.

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TABLE DES MATIÈRES

BIBLIOGRAPHY	6
METHODOLOGY.....	7
Map: the world's hotspots of conflict in the face of climate change.....	8
CLIMATE CHANGE AND CONFLICT IN AFRICA	10
1. West, Central and East Africa: regional analysis	11
2. Focus : Senegal.....	15
3. Foresight scenario: conflict over the waters of the Nile	16
Bibliography	18
CLIMATE CHANGE AND CONFLICT IN MIDDLE EAST AND NORTH AFRICA	22
1. Middle East and North Africa: regional analysis.....	23
2. Focus : Morocco	27
3. Foresight scenario: Forced departure of France from Lebanon.....	28
Bibliography	30
CLIMATE CHANGE IN SOUTH-EAST ASIA AND IN THE PACIFIC.....	32
1. South-East Asia and the Western Pacific: regional analysis	33
2. Focus : Philippines.....	38
3. Foresight scenario: France loses influence because of Chinese aid in French Polynesia	39
Bibliography	41
CLIMATE CHANGE AND CONFLICT IN LATIN AMERICA.....	45
1. Latin America: regional analysis.....	46
2. Focus: French Guiana	51
3. Foresight scenario: The Amazon and the race for green gold	52
Bibliography	54
CONCLUSION AND LESSONS.....	58
GLOSSARY.....	60
APPENDICES.....	62
Appendix 1. Ranking of countries according to the climate-conflict indicator.....	63
Appendix 2. Map of countries' resilience to climate change	64
Appendix 3. Levels of peacefulness in countries around the world	65
Appendix 4. Map of countries most exposed to extreme weather events between 2000 and 2019.....	66
Appendix 5. Projected impact of a rise in temperature	67
Appendix 6. Table of maps, indexes and tools to explore the effects of climate change in greater depth	68

Climate change¹ was particularly destructive in 2022. Rising temperatures in particular have led to an increasing number of extreme weather events and environmental disasters, among which storms and hurricanes (in the Americas, South Africa, South and South-East Asia), floods (in West and South Africa, Asia, Australia and Europe), mega-fires (South America, United States, Europe), droughts (Europe, Brazil, China, Horn of Africa) and heatwaves (India, Pakistan, Australia). Although the intensity of these phenomena is subject to considerable geographical variability, **every state experienced the risks that climate change poses to its economic stability, political sovereignty, and the safety of its population.** By deteriorating the living environment of human societies, **climate change exacerbates existing fragilities², particularly political and socio-economic tensions³.** As a result, people's vulnerability⁴ to climate change contributes, more or less directly, to the **displacement of populations, the threat to people's livelihoods⁵, states' destabilisation and violent conflicts outbreak** (IMCCS, 2021). These security impacts in turn make populations more vulnerable to climate change, creating a vicious circle (United Nations University, 2020).

In this paper, we will examine **the links between climate change and conflict⁶**, i.e., armed confrontation between states or between factions within a state, resulting from disagreement between actors who consider their objectives to be incompatible (Conflict Sensitivity Consortium, 2012). We will take **the security approach to climate change as a factor that multiplies existing threats⁷.** Its security impact is all the greater in regions marked by factors such as **competition for local resources; livelihood insecurity and population displacement; extreme weather events and environmental disasters; food price volatility; transboundary water⁸ management; sea-level rise and coastal degradation; and the undesirable effects of climate policies** (Rüttinger et al., 2015; World Bank, 2018; 2021). In this sense, **security impacts of climate change are considered to be sharper in countries that are already unstable, with a recent history of conflict** (WMO, 2023) - although stable states can also be made more fragile by climate change (Sida, 2018).

The aim of this note is to provide **a global and prioritised view of regions and countries most likely to experience an exacerbation of conflict as a result of climate change.** To this end, the analysis will be divided into four parts devoted to the regions under study - **West, Central and Southern Africa; the Middle East and North Africa, South-East Asia and the Western Pacific as well as Latin America.** Each of these regions will be given a global analysis, a sub-regional focus, and a foresight scenario.

¹ See glossary.

² See glossary.

³ See glossary.

⁴ See glossary.

⁵ See glossary.

⁶ See glossary.

⁷ This approach has been criticised in the literature, which is more focused on the concept of 'resilience', because it tends to ignore the socio-economic diversity of security factors and the dynamics of local governance (Corry, 2014). However, it is still the most appropriate approach for meeting the operational requirements of defence players.

⁸ See glossary.

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METHODOLOGY

This analysis of the potential sources of conflict linked to climate change was based on the cross-referencing of two indicators: the **Notre Dame Global Adaptation Index (ND-GAIN index)**, produced by the University of Notre Dame, and the **Global Peace Index** produced by the Institute for Economics & Peace (think tank).

The Notre Dame Global Adaptation Index ranks countries according to their resilience to climate change, which corresponds to their vulnerability and preparedness to these changes, based on data from the year 2020. Vulnerability indicates **exposure⁹ to climate change** for six major factors (food, water, health, infrastructure, human habitat, and ecosystems), **the vulnerability of the population, the dependence of the state on the sector concerned and the capacity to adapt.** The preparedness indicator assesses **the economic, institutional, and social situation.** Despite the lack of data for certain territories¹⁰ and the great variability in the time series of the data, this indicator provides **a solid basis for an overall analysis of climate risks in the world and the identification of the most affected states.** It also allows vulnerability and preparedness to be considered separately or together, paving the way for more detailed analysis. **On this indicator, the higher the score, the greater the resilience.**

The Global Peace Index, updated in 2022, ranks countries worldwide according to their level of peace. The indicator is based on **current internal and inter-state conflicts, security and safety in society, and militarisation.** It gives **greater weight to internal security than to external security, based on the assumption that greater peace and stability at home have a positive externality on relations with other states.** This index is based on **23 indicators** combining qualitative data such as the perception of crime by residents or the level of control over the circulation of light weapons by countries, and quantitative data such as the impact of terrorism or the number of police officers per 100,000 inhabitants. It is 70% robust, which means that a change in the weightings of the indicators only marginally affects the ranking. In addition, where data was missing, it was supplemented by estimates from the Economist Intelligence Unit. Finally, as with the ND-Gain Index, this indicator did not take into account a number of territories¹¹. **On this indicator, the higher the score, the lower the level of peace.**

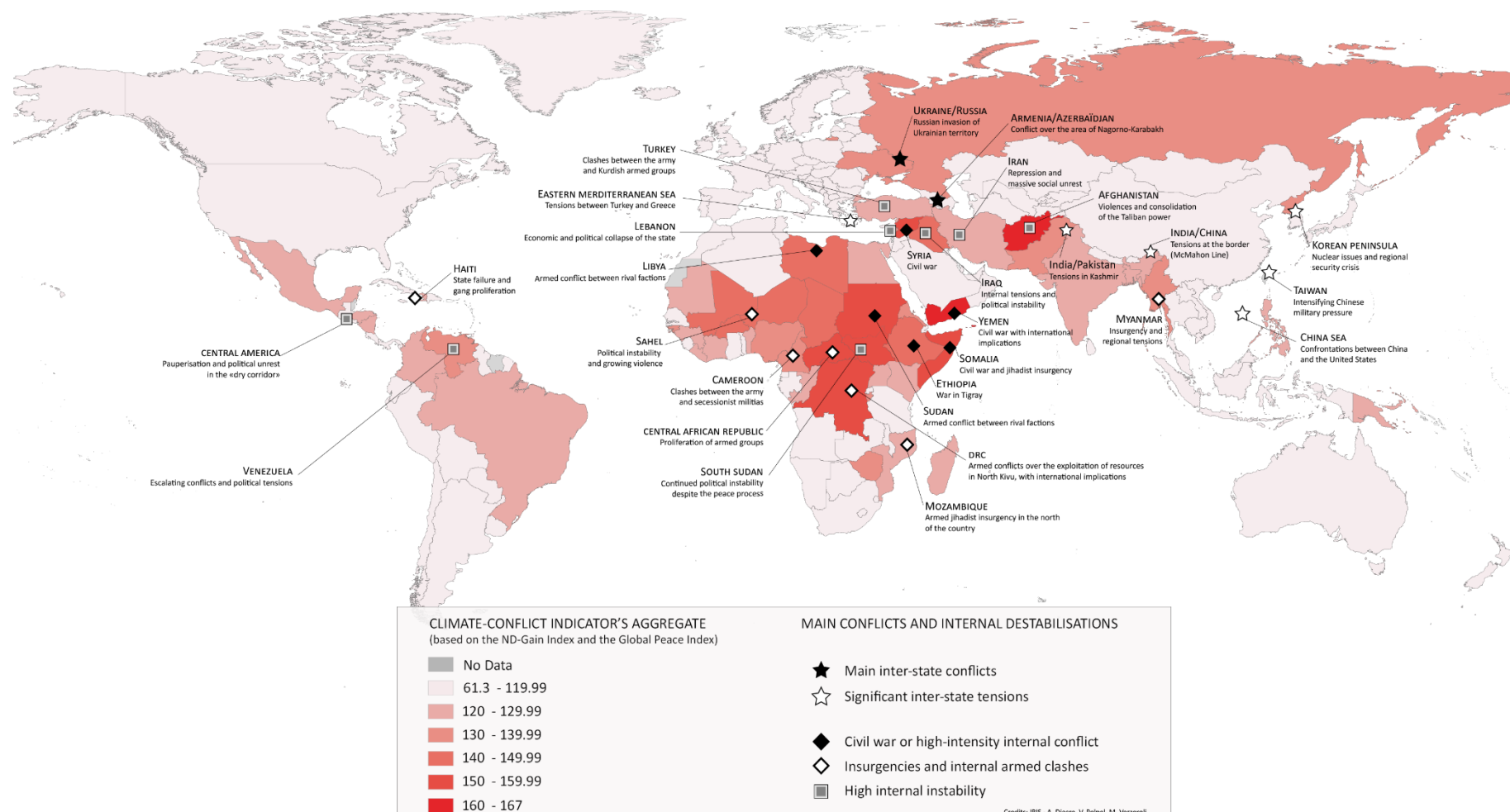
⁹ See glossary.

¹⁰ Taiwan and Palestine are not included in the rankings. The scores of several states have not been calculated: Tuvalu, South Sudan, Saint Vincent and the Grenadines, Nauru, the Palau Islands, the Marshall Islands and the Kiribati Islands. Furthermore, as scores are attributed by State, sub-national entities, such as the French Antilles, are attributed a score representative of the metropolitan situation and not of their local situation.

¹¹ Antigua and Barbuda, Bahamas, Barbados, Belize, Brunei, Cape Verde, Comoros, Djibouti, Fiji, Grenada, Kiribati, Maldives, Marshall Islands, Nauru, Palau, St. Vincent and the Grenadines, St. Lucia, St. Kitts and Nevis, Samoa, Seychelles, Sao Tome and Principe, Suriname, Tonga, Tuvalu, Vanuatu.

Map: the world's hotspots of conflict in the face of climate change

To develop the climate-conflict indicator, we combined the ND-Gain index, chosen for its completeness, and the Global Peace Index, chosen for its comprehensiveness regarding contemporary conflicts, which are at the basis of the security approach of climate change as a threat multiplier. In order to maintain the relevance of these indicators, we first decided to work on a /100 scale. For the ND-Gain index, which is already based on a /100 scale, we took the inverse indicator, so that the highest score corresponded to the highest level of climate vulnerability and unpreparedness. As for the Global Peace Index, we have prorated it on a /100 scale. For each country, the two /100 scores were added together to arrive at a /200 score. This method has enabled us to highlight the major areas of the world where climate vulnerability and conflict intersect, in order to anticipate a possible exacerbation of this conflict under the impact of climate change: West, Central and East Africa, the Middle East and North Africa, South-East Asia and the Pacific, and finally Latin America. The disadvantage of this addition method, which does not include a weighting on the climate indicator (ND-Gain), is that it highlights areas of conflict whose climate vulnerability is not significant, such as Russia and Ukraine.



Other climate indicators that could form the basis of a global map:

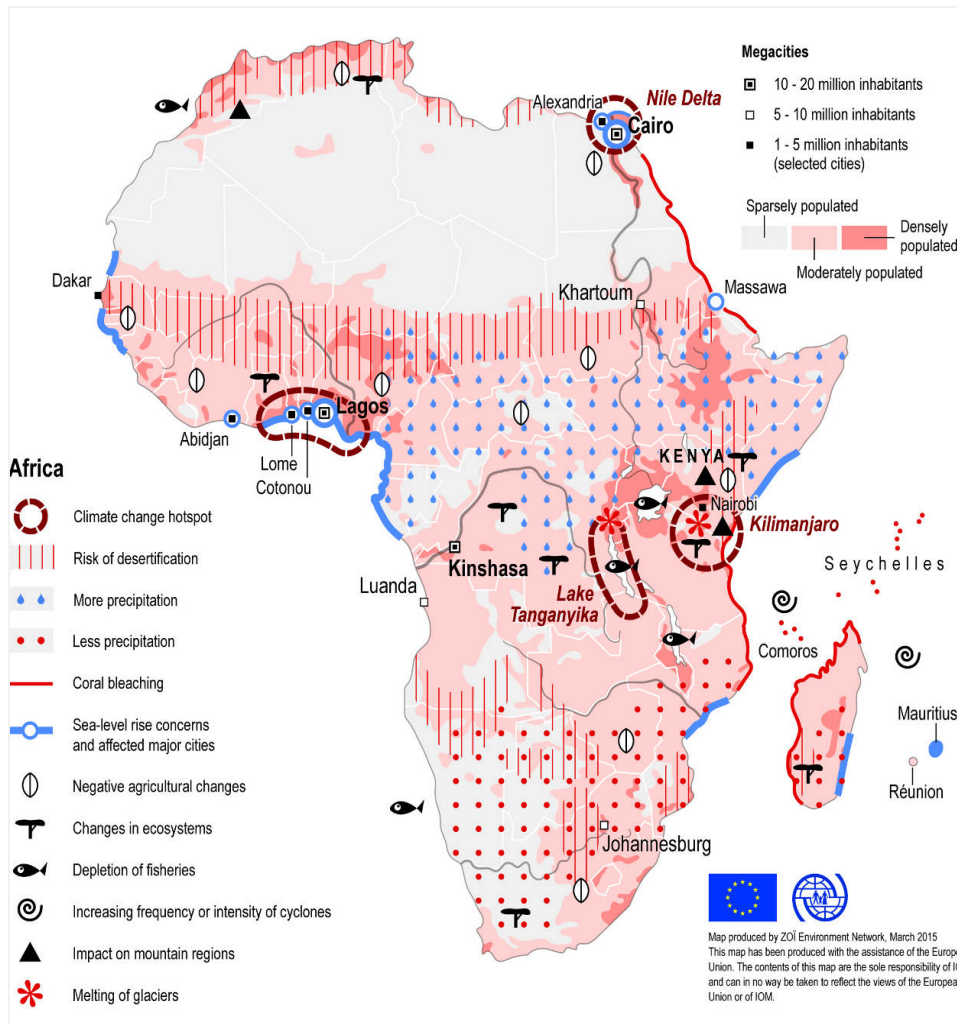
Indicator name	Institution(s)	Date (most recent edition)	Object
Global Climate Risk Index	German Watch	2021	Ranking of states according to losses linked to meteorological hazards (storms, floods, heat waves, etc.)
INFORM Risk Index	Joint Research Centre ; Disaster Risk Management Knowledge Centre	2023	Ranking of countries by level of exposure and preparedness to climate change
Physical Vulnerability to Climate Change Index	Foundation for studies and Research on International Development (FERDI)	2016	Ranking of states on the following factors: sea level rise, temperature rise, rainfall, aridity and storms
Climate Change Performance Index	New Climate Institute	2022	Ranking of countries according to their emissions, energy use, renewable energies and climate policies.
Environmental Performance Index	Yale Center for Environmental Law & Policy; Center for International Earth Science Information Network (CIESIN)	2022	Ranking of countries according to changes in the health of their ecosystems and environment, and according to the environmental action taken.
Green Future Index	Massachusetts Institute of Technology	2022	Ranking of 76 countries according to their level of preparedness for climate change

Other conflict indicators that could form the basis of a global map:

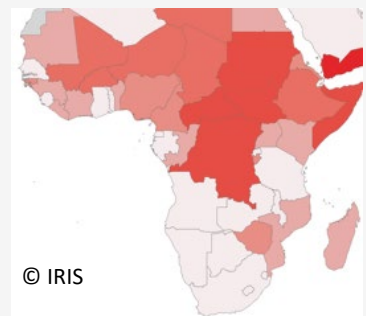
Indicator name	Institution(s)/Project	Date	Object
Global Security Defense Index on Climate Change	The American Security Project (ASP)	2013	Analysis of how governments and armies are anticipating strategic threats posed by climate change
Global Protest Tracker	Carnegie – Endowment for International Peace	2023	List of protest movements and classification
PRIO Conflict Recurrence Database	Unppsala Conflict Data Program (UCDP)	2018	Ranking of states according to the level of organised violence
Global Conflict Risk Index	Joint Research Centre; European Commission's science and knowledge service	2020	Statistical risk of violent conflict in the next four years by country.
ACLED Conflict Severity Index	Armed Conflict Location & Event Data Project (ACLED)	2022	Ranking of countries according to the seriousness of conflicts, based on four factors: loss of life, dangerousness, spread and fragmentation of the conflict. According to this indicator, 46 countries and territories have serious conflicts.
Internal Violence Index	Foundation for studies and Research on International Development (FERDI)	2016	Violence indicator based on crime, political violence, internal armed conflict, and terrorism.
Fragile States Index	Fund for Peace	2021	Ranking of countries according to their internal cohesion and their economic, political, and social situation.
Crisis Watch	International Crisis Group	2023	Interactive map showing the evolution of conflicts

CLIMATE CHANGE AND CONFLICT IN AFRICA

1. West, Central and East Africa: regional analysis



West, Central and East Africa is the region where climate change is most likely to exacerbate conflict. In fact, 10 of the 33 countries in the African region score above 140 on the climate-conflict indicator, with the most critical situations being in the Central African Republic, Sudan and South Sudan, Ethiopia and the Democratic Republic of Congo. In addition, 13 countries have a score between 120 and 140, the highest being Nigeria (139.2).



The African continent is the most exposed and vulnerable to climate change. Between 1970 and 2020, temperatures in Africa rose by 0.5°C overall (GIGA, 2020), and the continent experiences increasingly long and intense periods of drought (UNCCD, 2022) as well as the melting of its glaciers (Mount Kenya, Mount Rwenzori in Uganda and Kilimanjaro in Tanzania). The resulting water stress (See glossary) has a direct impact on agricultural production and on the availability of water and food resources for the population. In 2021, 278 million people were suffering from hunger in Africa (FAO, 2022), African populations being largely dependent on subsistence farming for their own income and food. Furthermore, sea level rise is increasing along Africa's coasts at a higher rate than the global average, particularly along the Red Sea and the south-western Indian Ocean, where the rate is close to 4 mm/year (WMO, 2022). By 2030, 108 to 116 million people in Africa are expected to be exposed to the consequences of rising sea levels (flooding, soil salinisation) on both the east and west coasts, which also include many low-lying coastal towns. West, Central and East Africa are particularly vulnerable to these climatic hazards because of the political instability and economic fragility that characterise their governments, the dilapidated and precarious nature of their infrastructures, the poverty and high demographic growth of their populations, and the armed conflicts that punctuate their territories. In this context, climate change is exacerbating conflicts (Owain & al., 2018).

The African continent is marked by a critical humanitarian situation, high levels of socio-economic and political instability¹², and a security context worsened by multifaceted conflicts. These conflicts include clashes between states and non-state armed groups, whether national movements - in Darfur, the Democratic Republic of Congo or Ethiopia - or transnational terrorist groups such as Boko Haram, AQIM, ISCAP and Al-Shabaab (SSOAR, 2022). In addition, **political tensions often take the form of violent demonstrations**, expressing popular discontent over internal political issues or against heads of state (Sudan, Central African Republic, Chad, Gabon, Guinea, Niger, Nigeria, Eritrea). **As for inter-state relations, these seem to be mainly oriented towards conflict rather than cooperation**, making negotiations and collaboration around cross-border resources particularly difficult (Peña-Ramos et al., 2022).

The region is also marked by **inter-community conflicts with a strong ethnic dimension**, particularly between herders, farmers, and fishermen (Somalia, Lake Chad Basin, Rwanda, Burkina Faso, Mali, South Sudan, Uganda, Kenya). These conflicts take place **against a backdrop of general insecurity linked to cross-border crime and trafficking** (UNODC, ENACT 2022), including trafficking in human beings (Ethiopia-Sudan, Congo-RD of Congo, Mali-Mauritania, or Senegal-Gambia-Guinea-Bissau). As a result, many armed gangs, in addition to national or terrorist organisations, criss-cross these territories (Bamber-Zryd, 2023, 12 January).

Food insecurity and inter-state tensions

Agriculture is the mainstay of the economy in many of the region's states and provides a livelihood for a large proportion of the population¹³. Yet climate change poses **considerable risks to African agro-ecosystems, particularly the most fragile, such as the savannahs of the Sahel and coastal regions** (NEPAD, 2014). **Droughts, mentioned earlier, are the most devastating hazards for food security.** In 2021, they hit Ethiopia, Somalia, and Kenya in particular - **leaving more than 58 million people in East Africa acutely food insecure¹⁴** (WMO, 2022). The erratic and reduced rainfall has also affected cereal production in the west of the continent, leading to a sharp increase in food prices, resulting in **a food crisis affecting 23.7 million people in West Africa between October and December 2021** (WMO, 2021). As a result of these droughts, but also of rising temperatures, the cultivation of cereals that are essential for the continent - wheat, maize, sorghum, millet - has been seriously compromised. **Agricultural yields in sub-Saharan Africa could fall by 10-20% if the threshold of a 2°C rise in global temperature is reached or exceeded.** If the 3°C threshold were to be crossed, all the current maize, millet and sorghum growing areas in Africa would become unusable (ILRI, 2022, 28 February).

Such climate pressure on water resources, which are essential for agricultural production, tends to encourage inter-state competition to secure them. A case in point is **the tension between Egypt and Sudan on the one hand, and Ethiopia on the other, who are struggling to reach agreement on sharing the Nile.** Its waters, historically controlled by Egypt and Sudan, have been the subject of growing claims and ambitions on the part of Ethiopia, manifested by the signing of the Entebbe Agreement in 2010¹⁵, and by the construction of the Grand Renaissance Dam, completed last year. Both initiatives have met with strong opposition from Egypt and Sudan, which are worried the flow of water through their

¹² See glossary.

¹³ In Ethiopia, almost 70% of the population was employed in the sector in 2019. Nearly 40% in Sudan, 54% in Kenya and 80% in Somalia. In West Africa, the figures are also very high: 61% in Guinea, 62% in Mali, 73% in Niger, 35% in Nigeria, and 30% in Senegal (World Bank, 2023).

¹⁴ See glossary.

¹⁵ Agreement signed by Ethiopia, Uganda, Rwanda and Tanzania, providing for a more equitable sharing of the waters of the Nile between the countries of the river basin. Egypt and Sudan, which had an advantage under the old 1959 water-sharing treaty, did not sign the agreement.

territory would be reduced. In this respect, **a secret agreement has reportedly been signed between Egypt and Sudan for the construction of an Egyptian air base on Sudanese territory, the purpose of which would be to attack the dam** (Pena-Ramos, 2022). Similar tensions can be observed between the countries bordering the Lake Chad basin, Cameroon, Niger, Nigeria, and Chad.

Food insecurity, displacements and inter-community conflict

In this context, **many inter-community conflicts are also linked to the worsening of food insecurity due to climate change**. These conflicts are often rooted in tensions between communities fighting for access to food resources and agricultural land. **In the Gulf of Guinea, illegal fishing and piracy are interconnected with legal activities. These pressures add up to rising sea temperatures, water pollution and the destruction of marine environments, resulting in a reduction of available fish stocks, turning into conflicts between fishermen** (Akame Winslow, 2020). **These conflicts are likely to increase in the future because of growing food insecurity and population migration, leading to a rise in the number of people fishing** (Mendenhall et al, 2020). Similar tensions can be observed around agrarian land. In 2003, the **conflict outbreak in Darfur was caused by tensions between farmers and herders, in a dynamic of competition for water and agricultural land**, greatly exacerbated by the prolonged drought that affected the region (Mazo, 2010). As a result, the conflict was described as an "ecological crisis, stemming at least in part from climate change" by the former Secretary-General of the United Nations, Ban Ki-Moon (Carrington, 2019, 19 December). Similarly, around Lake Chad, the increase in rainfall in September is delaying crops and harvests, while dry seasons start earlier. This is pushing herders to migrate towards coasts at the start of the dry season, even though harvests have not yet taken place, thereby increasing crop damage by herds. Food insecurity is worsened and triggers agro-pastoral conflicts (Brettem, 2016). Many other examples of such conflicts can be found, such as the conflict that broke out between the Dogon and Fulani nomads on the border between Mali and Burkina Faso in 2012, the conflict between herders and farmers near the border between Kenya and Ethiopia in 2019, or the violence between these same two social groups in the Sahel, which has intensified since 2018 (Pacific Institute Chronology, 2021). As a result of the scarcity of water resources, **armed conflicts between farmers and herders have become commonplace in the Sahel and East Africa**.

More generally, these agro-pastoral conflicts highlight the potential for conflict arising from population movements in the area. Under the impact of climate change and in a context of strong pressure on natural resources, armed clashes between displaced populations and host populations are likely to increase. **By 2050, the number of climate-displaced people in sub-Saharan Africa could reach 85.7 million** (World Bank, 2021). In addition to armed conflict or terrorism (Heslin & al, 2019), **soil and crop degradation and food insecurity are incentives for people to leave** (Borderon, 2019). However, they can also accentuate local competition for land, water, and food resources in destination areas. In Niger, for example, major migratory flows from Mali, Burkina Faso and Nigeria are exacerbating the country's food crisis, providing fertile ground for the emergence of civil conflicts (AFD, 2022, 2 September).

Climate policies and elite corruption

The way in which political elites as well as administrative and judicial authorities in Africa act in response to climate change tends to accentuate local conflictuality. Indeed, **the authorities' mitigation policies can have negative externalities on the environment and lead to inequalities and conflicts**, as is the case with carbon policies (Leach & Scoones, 2015). Several communities are being dispossessed of their land as a result of policies to convert agricultural land into agrofuel plantations, leading to land and social conflicts. One example is the growing number of land conflicts in Senegal surrounding

agrofuel development projects (Foncier & Développement, 2018). The negative effects of climate policies can also be seen at a regional scale. For example, the growing demand for batteries and solar panels is intensifying competition for critical metals such as cobalt and lithium. Yet these are concentrated in countries with weak governance, such as the Democratic Republic of Congo for cobalt. This competition could exacerbate conflicts (Buhaug & al., 2022). In addition, **certain elites sometimes choose to exacerbate inter-community tensions over natural resources** (SIPRI, 2022a). In Darfur, during the conflict that broke out in 2003, Sudanese authorities supported and armed Arab militias, thereby exacerbating tensions and fuelling the conflict (Leach & Scoones, 2015). Conflicts can also be exacerbated by elites through the political marginalisation of people who are particularly vulnerable to food insecurity (SIPRI, 2022b).

In addition to climate policies, it is also common for local conflict to be fuelled by the misappropriation of funding or resources allocated to climate change projects by corrupt elites. In the Democratic Republic of Congo, there have been reports of corruption in the management of logging permits attributed to climate change mitigation projects, leading to illegal deforestation and the deprivation of local communities' rights to their land and forest resources, generating social and environmental conflict (De Merode et al., 2019). Also in Zimbabwe, cases of corruption have been reported in adaptation fund allocation, generating tensions and conflicts between communities and the authorities (Mawere, 2017).

The use of climate change by terrorist groups in West, Central and East Africa

All the aforementioned climate changes affect people's livelihoods and exacerbate human insecurity, which is also fuelled by inter-community, agro-pastoral and inter-state conflicts. **Such a context encourages recruitment by terrorist organisations, which base their appeal on the physical and financial security they offer to their recruits**, particularly young people with no income (Climate Diplomacy, 2016). Non state armed organisations use the poverty of their populations to **promote an anti-elite discourse, while promising financial opportunities and social benefits**, as Boko Haram does around Lake Chad. Such rhetoric enables them to significantly increase their numbers and expand across the territory (Baillat, 2018).

In addition, **the sense of injustice felt by certain populations, wronged by repeated conflicts, leads them to form self-defence militias and ally themselves with groups of traffickers or jihadist organisations to subsist, following the example of the Fulani** (Carayol, 2017). The Fulani, who are present in several West African countries, have been involved in violent conflicts, and have sometimes formed alliances with terrorist groups such as Boko Haram, in order to obtain protection or resources they need to survive in areas where the state is often perceived as biased or ineffective.

These terrorist groups also use control of natural resources as a weapon of war by putting pressure on needy communities, for example by poisoning water (Anadolu Agency, 2015). They also take advantage of the lack of basic services provided by state institutions to gain legitimacy among the population. One strategy of influence that is extremely widespread on the African continent is precisely to offer health, education, or humanitarian aid services to local communities in controlled areas. One example is the terrorist group al-Shabaab, which has taken advantage of the lack of state infrastructure to strengthen its influence in Somalia by offering

2. Focus : Senegal

Senegal, located in West Africa, is bordered to the north by Mauritania, to the east by Mali, to the south by Guinea-Bissau and Guinea, and to the west by the Atlantic Ocean. It shares the Senegal River with Mali and Mauritania and the Kayanga/Geba River with Guinea and Guinea-Bissau.

Senegal is a key strategic partner for France in West Africa. The two countries have close historical, cultural, linguistic, and economic ties, and Senegal is a major player in the fight against terrorism in the Sahel and in the fight against cross-border crime. **With a climate-conflict score of 113, it is clearly vulnerable to the exacerbation of conflict by climate change.**



Climatic exposure factors	Socio-economic vulnerability factors
• Temperature rise (+0.25°C per decade between 1980 and 2015 (IPCC, 2022)) • Rainfall down 6% between 1981 and 2010 • Reduced flow in rivers. Senegal could experience an 8 to 16% drop • Sea level rise estimated at 2.4 mm per year between 1984 and 2014, threatening all coasts • Risks to coastal infrastructure (north coast) • Soil salinisation: 50,000 hectares of cultivated land lost in the Casamance basin • Reduction of mangrove estuaries (Sine Saloum, Casamance)	• 50% of GDP production and almost a third of the population concentrated in the Dakar region • Overexploitation of renewable groundwater: it accounts for 85% of drinking water and industrial and tourism needs • In 2011, 46.7% of the population below the national poverty line • The primary sector will account for 15.3% of GDP in 2021 • Ongoing internal conflict in Casamance since 1982, which could increase vulnerability to climate change in the region, leading to armed confrontations and inter-community tensions

In Senegal, climate change undermines people's livelihoods, particularly agriculture and fishing. This leads to conflicts, such as those between companies and farmers or herders around the Kayanga/Geba river basin. The combined effects of climate change and national water use policies in the same basin are having a detrimental effect on farmers in Guinea-Bissau, leading to tensions between authorities in these countries. In the north, the lack of fish near the Senegalese coast encourages illegal fishing in Mauritanian waters, which are abundant in fish, leading to clashes between Senegalese fishermen and the Mauritanian coastguard. The weakening of the primary sector and tensions over resources can lead to a feeling of abandonment among the population, which is conducive to the recruitment of non-state armed groups, particularly in remote regions such as Matam and Tambacounda.

Sources : Basel et al. 2021 ; Bodian & al., 2018 ; CGIAR, 2021 ; GIEC, 2022 ; Niang et al., 2014 ; Madura Lopez et al, 2021 ; Statista, 2023 ; USAID, 2023 ; World Bank, 2022.

3. Foresight scenario: conflict over the waters of the Nile

Territories through which the Nile flows are a potential source of conflict because of the growing tensions between the riparian countries over the sharing of cross-border water resources. In particular, the Nile is a vital source of water and food for Egypt, Sudan, and Ethiopia, which depend on its flow for their drinking water and hydroelectric power needs.

*In the region, two factors could in fact lead to inter-state conflict: on the one hand, the **significant reduction in the flow of the Nile as a result of** climate change and repeated and prolonged droughts; on the other, the **revival of Ethiopian claims to the waters of the Nile**, which until very recently were the subject of an Egyptian and Sudanese monopoly.*

© Bobarino, Eric Gaba, 2010



In 2050, East Africa is facing a critical climatic situation, characterised by extreme temperatures, prolonged droughts, irregular rainfall, violent storms, and devastating floods. Food insecurity affects almost 85% of the population heavily depending on agriculture and livestock farming, and further weakened by extremely strong demographic growth. Food insecurity, falling farm incomes and the displacement of people from areas that have become uninhabitable regularly give rise to riots in the region's major towns, reflecting strong popular resentment towards political leaders and their powerlessness. Against this difficult climatic backdrop, Ethiopia has managed to position itself as a major regional power by tightening its control over the waters of the Nile. The Great Renaissance Dam, commissioned thirty years earlier on the Blue Nile in the regional state of Benishangul-Gumuz, developed the country's hydroelectric potential and irrigated agriculture. This initiative was part of a wider drive to expand agriculture, which continued over the following decades, and was intended both to address food insecurity in the country and to pave the way for wider economic development. However, the construction of this dam against a backdrop of repeated droughts greatly reduced the flow of the Nile for the countries located downstream, Sudan and Egypt, which suffered a reduction of almost 80% in their agricultural land.

Relations between these two countries and Ethiopia, which were already extremely tense, came to a head in February 2050 when the latter announced a new construction project: the building of two canals from Lake Tana in the town of Bahir Dar to supply water to dried-up crops in the north of the Amhara region. This announcement provoked an immediate reaction from Sudan, closely followed by Egypt, both countries denouncing a policy of monopolising cross-border water resources at a time when climate change requires close cooperation on adaptation. Ethiopia, however, maintains its position and refuses to cancel its construction project, despite the insistence of neighbouring countries. After consultation, Egyptian and Sudanese leaders request Ethiopia to give them at least one of the two canals to divert towards their land and ensure their access to water. They are supported by Saudi Arabia and the United Arab Emirates, which are heavily dependent on Sudan's

declining agriculture. Ethiopia once again refuses to comply with their demands, arguing that its own territory suffers from the decline in the river's flow, the drying up of the water table and the salinisation of the soil. In an official statement, the Ethiopian leader further fans the flames of resentment in neighbouring countries by claiming that this is "fair compensation" for the decades of monopolisation of the Nile's waters by Egypt and Sudan.

At the end of March, **Egypt and Sudan decide to take military action to destroy the Great Renaissance Dam in Ethiopia.** They carry out a joint operation in two stages, **first carrying out air strikes on the dam, then deploying occupying ground forces in the area.** Armed clashes take place for several weeks, causing considerable human and material losses for Ethiopia, which appeals for international aid. Despite the unanimous condemnation of the conflict by the international community, the United Nations doesn't launch a pacification operation in the area. **Faced with the inaction of the United Nations and the defeat of the Ethiopian troops, Sudan decides to continue its deployment and succeeded in occupying the town of Bahir Dar and the area around Lake Tana in May.** Three French journalists who had gone there to cover the conflict are kidnapped by Sudanese forces on the orders of the government, which denounces a disinformation strategy carried out by Ethiopia with the connivance of Western countries. **Sudan rejects the negotiating route favoured by the French government and cut off all diplomatic relations with France.** In the summer, France launches an intervention to evacuate French journalists, which involves the French armed forces in direct confrontations with Sudanese forces. The fighting is extremely fierce and take place in a degraded environment, with extreme temperatures (over 50°C during the day), which leads to a dozen cases of dehydration among soldiers in the first week. **Food and water supplies are also compromised by electronic malfunctions in the aircraft systems, making it difficult for them to take off or land from the Djibouti base.** After three weeks of fighting, the French forces manage to evacuate the three journalists. However, nine soldiers died and 21 were seriously injured.

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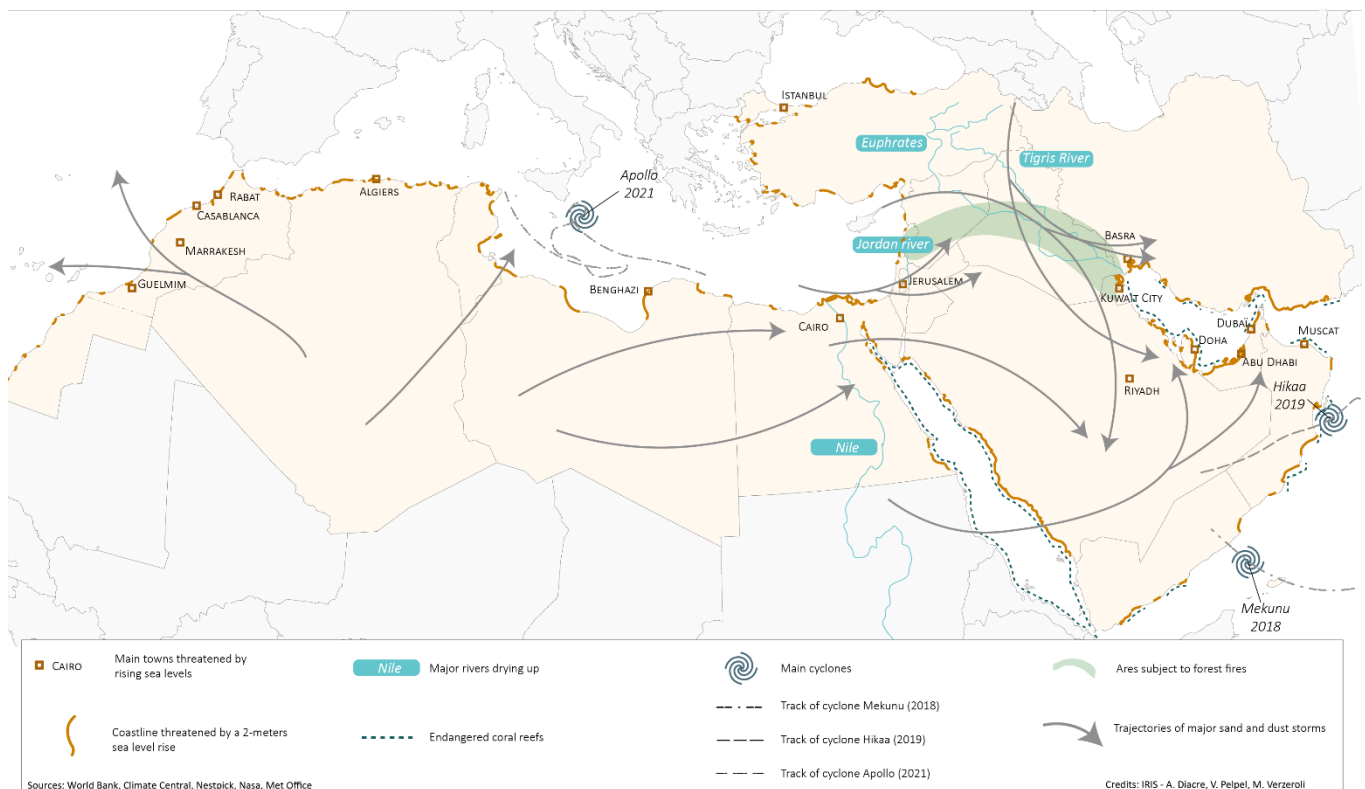
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CLIMATE CHANGE AND CONFLICT IN MIDDLE EAST AND NORTH AFRICA

1. Middle East and North Africa: regional analysis

The MENA region is at **high risk of exacerbated conflicts linked to climate change**, making it the second most critical region after Africa. 4 of the 19 countries in the zone score above 140 on the climate-conflict indicator (in descending order: **Yemen, Syria, Iraq, and Libya**). 4 countries score between 120.8 and 130.1 (in descending order: **Lebanon, Iran, Turkey, and Egypt**).



The area studied includes **the Middle East, North Africa, and the Sahel**. Already subject to harsh geographical and meteorological conditions, **this area is warming almost twice as fast as the global average as a result of climate change** (Zittis et al., 2022). On average, the maximum temperature in the area on the hottest days is around 43°C. **This could rise to around 46°C by the middle of the century and reach almost 50°C by the end of the century**, according to the IPCC's business-as-usual scenario RCP8.5 (Lelieveld et al. 2016). **This warming could permanently alter living conditions, to the point of making certain areas uninhabitable before the end of the century, particularly in the Mediterranean region.** The reduction in annual rainfall is also likely to contribute to a drying out of the area and a reduction in groundwater recharge (Schilling et al., 2020). The reduction in water resources is also a major threat to the region, as is the rise in sea levels in coastal areas. In this context, **Algeria, Morocco, Tunisia, and the Nile Delta could see some of their cities become uninhabitable**, amplifying the economic and migratory pressures on already fragile governments (Scheffran, 2020). **The cities of Algiers, Benghazi, and Alexandria, for example, are concerned** (World Bank, 2014).

Often described as a "powder keg", **the MENA region presents a critical security context, marked by destabilising factors that are rooted in the long term.** These include the Israeli-Arab-Palestinian conflict, tensions between Turkey and Greece, the Arab Spring of 2011, armed conflicts in Iraq, Libya, Syria and Yemen, and terrorist acts perpetrated by non-state actors such as al-Qaeda and the Islamic State. Against this backdrop, several states are struggling to establish their political and economic stability, such as Lebanon, Iraq and, even more so, Libya. Moreover, states such as Yemen and Syria are bogged down in deadly conflicts, fuelled by two phenomena: firstly, **the emergence of non-state armed actors**; secondly, **the involvement of regional powers such as Israel, Turkey, Iran and Saudi Arabia, but also external powers** such as the United States, NATO, the European Union, China or Russia, imposing their own agenda and their own management of conflicts¹⁶ (Ehteshami et al., 2017). This multitude of players has created two camps, which clash throughout the Middle East and part of North Africa: on the one hand, Iran and its allies, notably Iraq and Hezbollah, and on the other, the United States and its allies, notably Israel and Saudi Arabia. As a result of this rivalry, conflicts are rarely confined to a single state, and local players have difficulty in resolving them internally. On the contrary, the multiplication of players at different levels is an aggravating factor in conflicts and prevents their lasting resolution.

Competition for water

The MENA region is the most water-stressed region in the world (Overseas Development Institute, 2021), **with 60% of its population living in areas of high water stress** (World Bank 2017a), due to water and rainfall scarcity, demographic pressures and population concentration. This lack of water is a source of internal unrest, as well as regional tensions, as it encourages **competition for water resources**, which are exploited beyond their natural renewal rate¹⁷ (Borgomeo et al. 2020). In southern Iraq, for example, water shortages have led to armed clashes between tribes (Sumeri 2018). In Iraq, as in Morocco and Yemen, **internal unrest over water is fuelled by major disparities in the distribution of resources**, particularly between urban areas, which are better served, and more rural areas (World Bank, 2021).

Water stress destabilises states, but also leads to the emergence of **tensions and conflicts at the regional scale, over cross-border water resources**. In fact, all MENA countries share water resources with at least one neighbouring country but have very few resources of their own. This is illustrated by the strong tensions that have emerged between Israel and the Arab countries around the Jordan basin, between Ethiopia and Egypt around the Nile basin, and between Syria and the Kurds on the one hand, and Turkey on the other, around the Euphrates.

Competition for water resources, and their weaponisation in the context of intra- or inter-state confrontations, are likely to grow as they become increasingly scarce. The disruption of hydrological cycles is a particular threat to the Tigris and Euphrates basins, the two main snow-covered rivers in the Middle East. Their water resources, which play a fundamental role in the production of hydroelectric power, irrigation and domestic use in Turkey, Syria, Iraq, and Iran, could be reduced by up to 60% by the end of the century, leading to serious disputes between countries in the basin (Özdoğan, 2011). The availability of surface water in the region is also under threat in Iraq, Jordan, and Lebanon (World

¹⁶ The impact of climate change in the region has also led to reflections on NATO's role (Khorrami, 2023, 1^{er} February).

¹⁷ Wells and rivers are already drying up, particularly in fragile and conflict-ridden countries such as Iraq, Libya, Syria and Yemen. In these countries in particular, the distribution of water resources and access to sanitation services have declined (World Bank, 2021).

Bank, 2021). In addition to surface water, conflicts may also arise over water technologies such as seawater desalination or cloud seeding.

Food insecurity

In the MENA region, reduced rainfall, rising temperatures, and the rising level of the Mediterranean Sea are all threats to agricultural production (Verner, 2012). Fishing and tourism are also affected, which is likely to result in a loss of livelihoods and development opportunities (Cramer et al., 2018). These phenomena contribute to the **rise of food insecurity, which will reach 54.3 million people in 2021, i.e., 12.2% of the population (FAO, 2023). This is likely to exacerbate socio-political divisions and frustrations, and in so doing to politically destabilise states.** This is why food insecurity, driven by rising food prices, was identified as **a key causal factor in the outbreak of the Arab Spring in 2011** (Lagi et al., 2011). In fact, in the MENA region, which is one of the driest, governments are heavily dependent on food imports, making them vulnerable to external shocks (Lampietti et al., 2011), such as the extreme weather events that hit the main cereal exporters hard between 2010 and 2011¹⁸. **The resulting food inflation, which highlighted the inability of governments to guarantee food security, was a trigger for social unrest (Soffiantini, 2020),** including in Syria (De Chatel, 2014).

A state's inability to guarantee food security can also allow non-state armed groups to gain influence and legitimacy among local populations. The Islamic State, for example, took advantage of the drought that affected Iraq in 2007-2010 to establish itself as a ruling authority and service provider (Lystad, 2020). In this context, climate change has played a multiplier role in installing a political economy based on violence and illegal economic activities (Ülker, Ergüven and Gazioglu 2018). Today, **food shortages are still one of the main drivers of political instability in the region** (Diawol-Sitko, 2020), and are expected to worsen under climate change, while exacerbating tensions and conflicts in the region.

Population movements

The MENA region is marked by **high levels of intra-regional and international human mobility**. Over the past decade, millions of people have migrated from Syria, Yemen, Afghanistan and Iraq to the Sahel, forced by violent conflict, population growth, economic problems, resource depletion and climate change (Scheffran, 2020). In 2020, there will be an estimated 7.6 million refugees and asylum seekers and 12.4 million internally displaced people fleeing the region's protracted armed conflicts (UNHCR 2020; IDMC 2020; IDMC and NRC 2020).

These upward trends are likely to increase as a result of climate change, and in particular meteorological hazards which increase migratory flows (Wodon et al, 2014). In 2021, 233,000 displaced persons due to environmental disasters were recorded, including 178,000 people migrating due to flooding (IOM, 2022). The region is also hit by recurrent droughts, which encourage population displacement. For example, between 2002 and 2010, drought and water shortages pushed rural Syrian farmers towards urban centres such as Damascus and Aleppo, increasing the country's total urban population by 50%. Against this backdrop, environmental hazards provided fertile ground for political

¹⁸ Droughts have seriously disrupted grain harvests in Russia, Ukraine, Kazakhstan, the United States and China (Stenberg, 2012). Floods destroyed one million tons of grain reserves in Pakistan between August and October 2010. Unusual torrential rains reduced wheat yields by almost a quarter in Canada and reduced the quality of much of the forage crop in Australia and North-West Europe (Holland, 2012). Mexican corn crops were devastated by a frost in early February 2011 (USDA, 2011).

unrest, and largely fuelled the Syrian civil war. In 2015, an estimated 6 million people were displaced as a result of this war, the majority of whom had left the country to flee the conflict (Yazgan et al., 2015).

In a context marked by the scarcity of essential resources, **migratory flows are also likely to amplify the phenomena of competition for resources, particularly in transit regions or in the regions targeted by the flows** (Scheffran/Brauch, 2014), following the example of northern Jordan where violence has increased following the arrival of Syrian refugees (Lazard, 2022). This problem is all the more acute given that areas that have historically been areas of refuge in the MENA region are increasingly exposed to climate hazards threatening their habitability. This is the case of **North Africa, which, as a destination or preferred transit area for migratory movements, is likely to experience increasingly large migratory flows as the effects of climate change are felt in the Sahel and sub-Saharan Africa** (Carnegie, 2022, 24 February). As a result, this region suffers not only from the effects of climate change, primarily increasing competition for resources and falling living standards, but also from the growing demographic pressure exerted by the Sahel.

In this sense, the loss of habitability of migratory destination and transit zones could be a factor in the intensification of migratory flows from the MENA region to Europe, encouraged by the differences in income, development and climatic vulnerability between southern Europe and the MENA region (Schilling et al., 2020). This intensification is a source of potential conflict, as the arrival of migratory flows *via* the Mediterranean and the Balkan route led to a "refugee crisis" in the European Union in 2015. This was characterised by the emergence of tensions around anti-migration movements, particularly between nationalist governments and NGOs (Scheffran, 2020).

Climate change as an opportunity for non-state armed groups in the Middle East and Northern Africa

Climate change exacerbates the economic and political conditions conducive to the development of terrorist networks. This is all the more true in regions such as the Middle East and North Africa, where these networks already have a significant foothold (Doherty 2017). In this region, **these organisations are able to supplant government authorities by targeting the populations most affected by climatic and environmental hazards** (Schwartzstein, 2017). These organisations are also taking advantage of the weakening of the region's governments, accentuated by the increase in climate hazards, the intensification of foreign aid for local governance, and the energy transition, which is expected to reduce the revenues of oil producers. Unstable producers such as Iraq and Libya, which finance their budgets from oil, are particularly vulnerable (Saha, 2019, 14 May). In particular, non-state armed organisations feed on the poverty of populations and their distrust of state authority, which is also challenged by widespread corruption, by presenting themselves as providers of income and services. **As essential resources become increasingly scarce, non-state armed organisations develop growing authority and power, which could lead them to replace local governments in the long term** (Lystad, 2020). Furthermore, by contributing to the impoverishment of local populations and global inequalities, climate change fuels resentment towards the West, which is notably an ideological basis for the recruitment of Islamist terrorists (Martin 2007; Matusitz 2013; Toth 2003; Dobratz et al. 2019)¹. It is therefore extremely likely that non-state armed organisations in the Middle East will exploit the deteriorating climatic conditions in the MENA to become dominant players in the region.

2. Focus : Morocco

Morocco is bordered by the Atlantic Ocean to the west, the Mediterranean Sea to the north, and Algeria and Mauritania to the west. The country is located in an arid/semi-arid zone, which already makes it a target for droughts and heat waves. The population is concentrated in the least arid areas, namely the north-west, and particularly along the coast.

France and Morocco cooperate and conduct bilateral exercises in response to security challenges, particularly those linked to the presence of non-state armed groups in the Sahel region. France provides training for Moroccan forces under an agreement on technical military cooperation, and through a security and defence cooperation support detachment (DACSD).



Climatic exposure factors	Socio-economic vulnerability factors
• Temperature rise (+0.25°C per decade between 1980 and 2015) • Average rainfall fell by around 25% between 1951 and 2010 in the north of the country • Droughts: almost 72% of Morocco affected between 1990 and 2015. • Aridification: South-east Morocco, in particular the provinces of Ouarzazate, Zagora and Errachidia, the Atlas Mountains and coastal areas (Agadir, Essaouira). • Intensifying heat waves and dwindling water resources	• Importance of the primary sector in the economy (12.65% of GDP in 2021) • Dependence on imports (trade deficit of 18.3% of GDP in 2019), sensitivity to external price shocks • Importance of cereals in the diet: average per capita consumption of wheat per year is 3 times the world average, while local production covered only 54% of wheat requirements between 2014 and 2019 • Production of mainly rain-fed cereals (wheat, maize, barley). Depending on rainfall, cereals account for 10-20% of agricultural GDP. • Poverty and precariousness: poverty rate of 4.9% in 2021

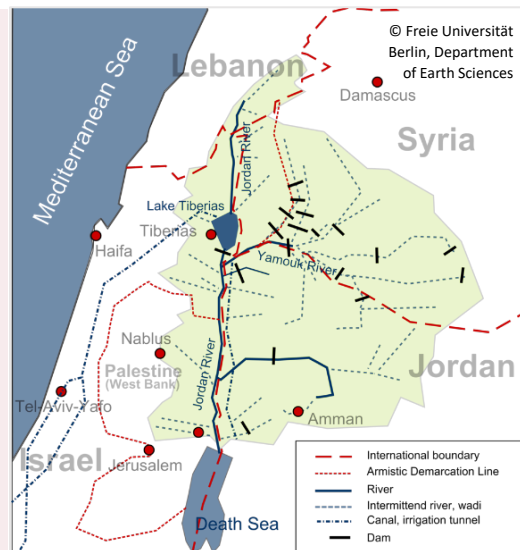
In Morocco, climatic factors and socio-economic weaknesses create a context conducive to tension. **Focused on water and land resources, tensions oppose the state and local populations** over the management of dams (for example at Dayt Sriej and Merzouga) or laws affecting agriculture and livestock farming (law on transhumance, 2016). **Populations are also in conflict with each other** over the distribution of land and access to water. In some regions, armed confrontations increased between nomadic herders and sedentary farmers (region of Souss-Massa), leading some farmers to poison their water and set fire to their crops to repel the herders (Berchid). These confrontations could be exacerbated by aridification, which pushes breeders towards farming communities. Lastly, **these conflicts are exploited by political parties** on the basis of racial and ethnic considerations, which are echoed on social networks. Herders are portrayed by their detractors as the "pastoral mafia", complicit in the state's efforts to displace the population (Souss-Massa). **This political game based on tensions linked to climate risks encourages instability, protests, and potentially inter-ethnic confrontations.**

Sources : Banque Mondiale, 2022 ; Barkouk et al, 2016 ; Gao et al, 2017 ; GIEC, 2021, 2022 ; El-Maayr et al., 2018 ; Fellahtade, 2021 ; FAO, 2017 ; Hassani et al, 2016 ; Haut-Commissariat au Plan, 2022 ; Statista, 2023 ; USAID, 2016.

3. Foresight scenario: Forced departure of France from Lebanon

The Jordan Valley is a region in the Middle East to the east of the Mediterranean Sea. It borders Israel and Jordan. Its main tributaries are the Hasbani River (Lebanon), the Dan River (Israel) and the Baniyas River (Golan Heights) upstream, and the Yarmouk and Nahr ez-Zarqa rivers (Jordan) after Lake Tiberias. The Jordan Valley refers in particular to the area between Lake Tiberias and the Dead Sea. The river then flows into the Red Sea.

The region is characterised by a complex and extremely tense security and geopolitical context. Tensions over water management increase the risk of conflict at both state and local level. Climate change could lead to an increase in violence, growing insecurity, and more complex relations between players in the area.



By 2050, rainfall in the Jordan Valley has decreased significantly in frequency and intensity. In this context, and due to the increased evaporation of the Jordan River, **the projects to fill the Lake Tiberias, carried by Israel, have failed.** The flow of the Jordan has fallen by 40% compared with 2030, and the water tables have dried up in both Israel and Jordan. The depletion of water resources affects not only farmers and fishermen, who struggle to make a living from their activity just as they struggle to retrain, but also the entire population: **50% of the Israeli population and 75% of the Jordanian population are food insecure.** Yet population growth drives up water consumption. On an inter-state scale, Israeli production is no longer sufficient to maintain supplies to Jordan, the West Bank and Gaza, in addition to feeding its own population. **Syria and Lebanon request their share, as they consider Israel to be responsible for the drying up of the Jordan,** and also believe they have rights over the basin. Diplomatic tensions rise, and Syria threatens to let the massive refugees' flood in. Lebanon, for its part, suggests that without water, the armed groups attacking Israel will increase in number and it will not be able to hold them back. **Israel agrees to supply some water in exchange for a guarantee that its partners will maintain border security.**

While the situation has stabilised for the time being at inter-state level, local conflicts over access to water increase, particularly in Israel, where Israeli and Palestinian communities are at loggerheads. The division of the West Bank into areas under Israeli and Palestinian control is still in force, as is the ban on Palestinians building wells. The maintenance of these arrangements fosters **strong resentment among the Palestinian population towards the Israeli population, which is accused of being complicit in the government's water grabbing.** The various Israeli and Palestinian villages form local defence and attack units. These organised operations, such as the unsuccessful attempt by the Palestinian militia of Hebron to steal water from the Israeli settlement of Arba on 2 June 2050, result in the destruction of water storage infrastructures. This context of instability also encourages the development of new non-state armed groups, fuelled by young people seeking physical and financial security. These groups act against the state, which they consider to be responsible for the lack of water,

and undertake **operations to hijack water supply networks, as well as attacks on healthcare infrastructures**. In this way, the canals of the Ashkelon and Ashdod desalination plants in the north of the Gaza Strip are hijacked, and the hospitals south of Ashdod fall under the control of Palestinian militias. In addition to the development of militias in Israel and the Palestinian uprisings, **Hamas, Hezbollah and groups operating from the Gaza Strip resume to their activities against Israel at an unprecedented level.**

The French forces, the only forces still present in Lebanon as part of the United Nations Interim Force in Lebanon (UNIFIL), have renewed their commitment in the area where they operate in support of the Israeli-Lebanese border. Against this backdrop of escalating armed violence, **they become the target of various groups, mainly Lebanese and Israeli, who see them as a threat to their own activities**, from hijacking infrastructures to attacks on their governments. **The French forces are also the target of several attempts to steal water and food supplies**, which are coveted by needy local populations on both sides of the Israeli-Lebanese border. **Although the French forces had no trouble defending their infrastructure and food supplies, the Israeli, Syrian, Jordanian and Lebanese authorities declare in the autumn that they require France to withdraw from Lebanon.** In their view, the French military presence exacerbates the situation and fuel resentment among armed groups and local populations. While this presence is not the root cause of the deteriorating security situation in the area, France's exclusion is driven by the desire of countries in the area to build an exclusively regional entente, the only way to overcome Israeli-Arab tensions. This exclusion is supported above all by Israel, which is criticised for its proximity to Western countries, considered to be historically responsible for the climate change affecting the region.

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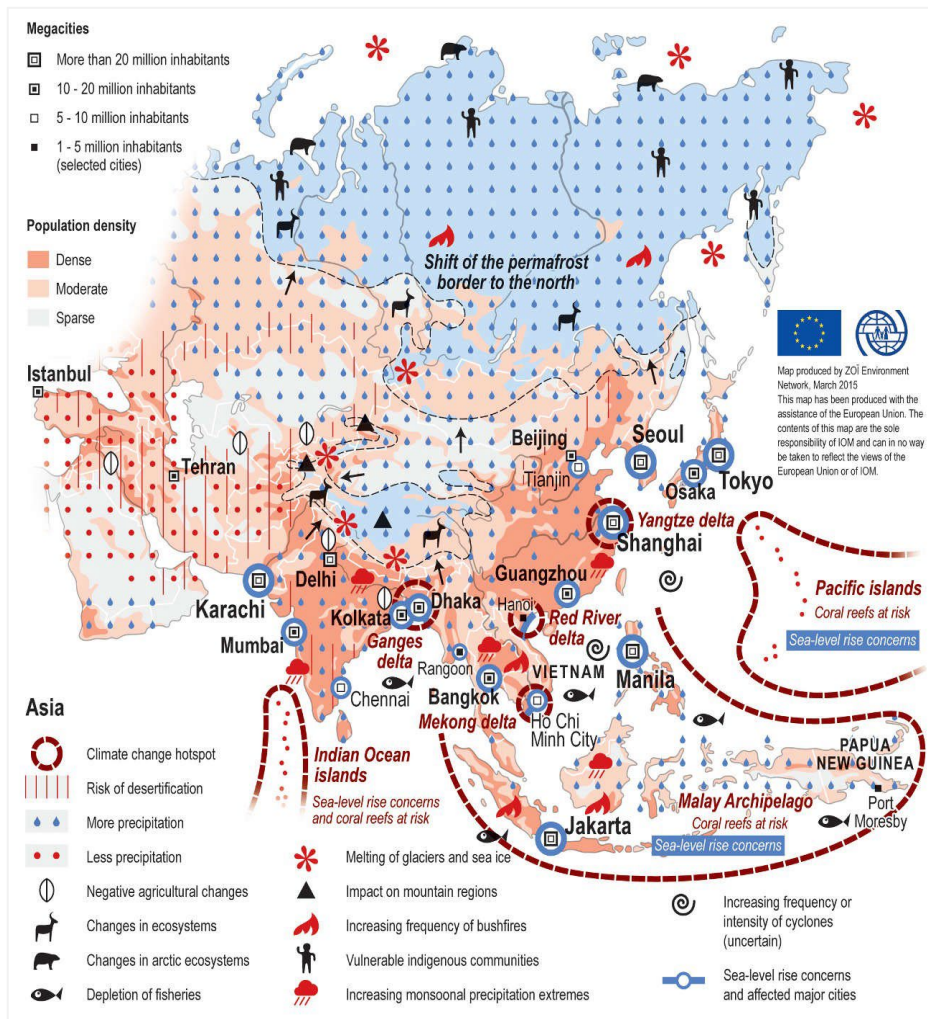
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CLIMATE CHANGE IN SOUTH-EAST ASIA AND IN THE PACIFIC

1. South-East Asia and the Western Pacific: regional analysis



The South-East Asia and Pacific zones present a significant risk of conflicts exacerbated by climate change, making them the third most critical zone after Africa and the MENA zone. Afghanistan is the country with the highest score in this zone (167), reflecting its high climate vulnerability and current tensions. 6 countries also have a score between 120 and 140 (descending order: Pakistan, Myanmar, India, Philippines, Bangladesh, Papua New Guinea).



Due to the geographical diversity of the region, the effects of climate change vary greatly. These include **heat waves** (with an increasing number of days of extreme heat), which represent a major risk for Central and South Asia. The latter are also exposed to **changes in rainfall patterns and in the flow of major rivers rising in the Himalayas**. As a result, the land is less able to absorb more intense rainfall, exposing the region to a combination of **drought, heatwaves, landslides, and flooding**. The rise in air temperature on the continent has already been observed (in 2020 it was **1.4°C higher than the 1981-2010 average**), while the Indian and Pacific Oceans are also warming, particularly the Arabian Sea (at a rate three times faster than the rest of the globe) (WMO, 2020). This warming of the waters is one of the factors behind the increasing intensity and frequency of tropical storms, cyclones and typhoons, as well as the **rise in sea level**, which is proving to be more rapid in the northern Indian Ocean (WMO, 2020). Asia and the Western Pacific are home to **low-lying, densely populated marine coastlines, agricultural deltas and coral islands, making them particularly vulnerable to rising sea levels**. In addition, all Asian countries will face **drought conditions** by 2100. Melting glaciers will result in uneven and irregular river flows. While more than half of the world's undernourished live in Asia, **a large majority of the region's agricultural production relies on irrigation** (ASPI, 2022a). Changes in the intensity and frequency of rainfall will not only alter the **water supply for crops but could also expose agricultural areas to floods and fires**.

Asia is home to major economic and political powers with vast territories, most of which are highly exposed to multiple impacts of climate change: China, India, Japan, South Korea, Singapore, and Indonesia. These countries also have dense industrialised areas that are vulnerable to climate change. Urban centres are densely populated, and some unplanned and informal urbanisation¹⁹ can be explained by rural exodus movements and strong demographic renewal (SIPRI, 2018). Most urban centres in the region are located on the coast, exposing almost 742 million city dwellers to climate events (FAO, 2023).

These urban centres are home to **populations from a variety of ethnic and linguistic groups** - often present in several neighbouring states - **in which the major religions (Hinduism, Islam, Christianity, Buddhism) coexist** (Courmont, 2023). **This cultural diversity can lead to instability and tension, between majority ethnic groups and minorities, between political parties, and even between non-state armed groups and state forces.** Examples include antagonisms in Indonesia and the Philippines (Courmont, 2023), inter-religious tensions in India and the situation of certain ethnic minorities in China (Uighurs, Tibetans, Mongols). There are also inter-community and intra-state armed conflicts, notably between certain Arakanese armed groups and the Burmese army (the *Tatmadaw*) (Observatoire Défense et Climat, 2020a).

These intra-state conflicts are compounded by strong inter-state territorial tensions. The diversity of intergovernmental and security organisations (SAARC, ASEAN, BIMSEC, SCO, RCEP, etc.) highlights the **desire of certain powers to initiate regionalism and alliances, while at the same time illustrating the persistence of tensions that seem unbridgeable - between India and Pakistan, between the two Koreas, between China and Taiwan.** In the continuity of these historical dissensions, certain territories, both continental and maritime, are the subject of disputes. **The South China Sea, Kashmir, Arunachal Pradesh, and certain islands in the western Pacific Ocean (such as Daecheong and the Kuriles) make Asia an area where challenges to borders and international law have a strong potential to create crises.**

Weakening livelihoods, a challenge for the political stability of certain countries

Agriculture will have to cope with the salinisation of soil and groundwater, particularly in deltas such as the Mekong (Vietnam) or the Pearl River (China), due to rising sea levels. Agriculture will also face floods, droughts, fires, tropical storms, and cyclones. It is estimated that a 1°C rise in average temperature in South Asia will lead to the loss of 4 to 5 million tonnes of wheat per year (ASPI, 2022a). These factors pose a particular **threat to food security in South and South-East Asia, a rice-growing region that will account for 55.4% of global rice production in 2019**²⁰. These factors pose a

¹⁹ See glossary.

²⁰ Thailand and Vietnam, two countries with large deltas, accounted for 22% and 12% respectively of rice exports between 2017 and 2019 (Lin et al., 2022).

particular **threat to food security in South and South-East Asia, a rice-growing region that accounted for 55.4% of global rice production in 2019²¹.**

One of the first repercussions of the destruction and reduction of agricultural land is the **growing insecurity of populations relying on agriculture for their food and household income.** Regions populated by ethnic minorities are often agricultural regions, as is the case in Myanmar, where 61% of the population of Rakhine (the Rohingya region) is linked to the primary sector (Nitta, 2018; Day & Caus, 2020). Climate change may also increase the vulnerability of minority populations in a context of social discrimination in Myanmar, but also in Afghanistan and Bangladesh (Vigil & al., 2022). **This additional pressure on these minorities' livelihoods could fuel mistrust of local and national governments.**

In addition, **the fall in agricultural yields can indirectly fuel the financial flows of non-state armed groups.** Some farmers in Asia's mountainous regions are turning to more resistant crops, including illegal opium cultivation, particularly in Afghanistan (Danish Refugee Council, 2022) and Myanmar (Observatoire Défense et Climat, 2020a). In addition, in some regions, **a temporal link has been observed between the scarcity of rainfall needed for agriculture and conflicts with government forces initiated by non-state armed groups:** for example, in the Philippines, additional rainfall during the wet season or droughts during the dry season, both affecting agricultural yields, are followed by **more civil conflicts** (Crost et al, 2018).

Inhabitability of territories and population displacements, factors worsening the security situation

Climate change and its consequences could render certain regions uninhabitable. Habitability is understood here **as the capacity of a place to protect its inhabitants from extreme climatic events, to provide space, food and drinking water, but also the means to develop economic activities and contribute to good health and well-being** (inspired by Duvat et al., 2021).

By 2050, according to climate models, certain territories in Central and South Asia will be subject to such high levels of heat, humidity and solar radiation that they could regularly experience conditions adverse to human life²². In addition, submergence and salinisation of the water tables could reduce the habitability of the atolls in the Western Pacific, leaving the local populations with no other option than to move permanently. **Such a reduction in habitability presents real security issues, as it makes local populations more vulnerable and impoverished. An increase in cases of slavery and human trafficking,** for example, has been noted following natural disasters in Bangladesh (Climate Diplomacy, 2016). As disaster victims see their means of subsistence eroded or even disappear, they rely on networks to get around, exposing themselves to deprivation of freedom (IMCCS, 2020). In addition,

²¹ Thailand and Vietnam, two countries with large deltas, accounted for 22% and 12% respectively of rice exports between 2017 and 2019 (Lin et al., 2022).

²² The combination of high levels of humidity and high temperatures will make certain regions uninhabitable, as the human body will no longer be able to lower its body temperature. The wet-bulb globe temperature (WBGT) index can be used to illustrate these conjunctions. (Xu et al., 2020 and Hansen and Sato, 2016)

the **lack of capacity of certain towns and regions to absorb new arrivals** (lack of infrastructure and social services) **can be a breeding ground for tension** (Sekiyama, 2022), not to mention the high climatic vulnerability of the precarious habitats of refugees such as the Rohingyas on the outskirts of towns (Vigil & al., 2022). Finally, **the inability of certain authorities to prepare for extreme weather events, reduce the risks and then intervene after the event (fragility, lack of resources, desire to weaken certain populations or regions) is a catalyst for public discontent** (Hendrix, 2013). While few social movements have materialised in the wake of natural disasters, **the increasing risks of occurrence and the increasingly common use of disinformation mechanisms tailored to aggravate discontent could lead to the emergence of violent reactions** (Climate Diplomacy, 2016; World Economic Forum, 2023).

This decline in habitability is all the more structuring as it affects a region with a high population density, which exacerbates vulnerability to extreme climatic events around cities, particularly heat waves and tropical storms. The Bay of Bengal is home to nearly a quarter of the world's population (Xavier, 2018), and its many megacities are exposed to rising sea levels (marine submersion), flooding and landslides that can follow the monsoon, or submersion due to cyclones. Bangladesh, for example, could see 60% of its territory flooded as a result of a combination of these factors (Rahman & Salehin, 2013). However, climatic hazards could also eventually prevent people from moving, and the most vulnerable populations would then be those forced to remain immobile (Vigil & al., 2022).

Exacerbation of inter-state competition for resources and territories

Climate change will also underline the strategic stakes that territories represent for regional powers, by reducing the availability or accessibility of certain resources, or by changing the landscape.

One of the special features of South and South-East Asia is that water is abundant but poorly distributed²³. Some countries have to contend with their neighbours, who have leverage through their control of major rivers upstream: Bangladesh and Cambodia, for example, are highly dependent in terms of water supply (with 91.4% and 74.7% respectively of their water supply coming from outside their territory) (ASPI, 2022a). **Climate change, by making water resources scarcer, is likely to exacerbate the inequalities and dependencies that structure their distribution, fostering conflicts around transboundary basins in particular.** In this context, **the dams on Asia's major rivers are key infrastructures, both the object of inter- and intra-state tensions over access to and control of water** and exposed to the threat of sabotage or takeover by non-state armed groups. The capture of the Afghan-India Friendship Dam (AIFD) by the Taliban on 12 August 2021, three days before the takeover of Kabul, is a case in point (Vigil et al, 2022). This dam had also been the target of numerous attacks and attempts to control it (ten Taliban attacks recorded in the week before it was taken, ten rockets launched at a time when the 600 soldiers protecting it were gradually being mobilised elsewhere) (Javaid, 2021).

²³ We can compare countries with scarce internal water resources, such as the Philippines, with countries with large rivers, such as Bhutan or Laos (ASPI, 2022).

Disruption of the flow of major rivers has three main repercussions: it affects irrigation (see section on agriculture), it can also represent a security risk (risk of altering the operation of nuclear power station cooling systems) and it has economic repercussions (Observatoire Défense et Climat, 2020a). In the region, **water from major rivers is coveted for its importance in power generation and industrial production systems**. Of the 13 developing countries in Asia, 11 are classified by the IPCC (IPCC, 2022) as being exposed to high levels of energy insecurity and risks to industrial systems as a result of climate change. In an **area of high economic growth (which is often based on ever-increasing exploitation of resources and high energy and electricity consumption)**, any alteration to the industrial system, either directly or as a result of reduced energy availability, is of national importance. In addition, China and Russia have nuclear development agreements with several countries in the region. The development of such energy infrastructures in a context of rising sea levels and cyclones increases the risk of disasters (IMCCS, 2021b).

At the same time, the above-mentioned disputes over water resources and the use of dams are taking place in a **context where three major powers in the area rely on civil nuclear power and possess nuclear weapons**: China, India, and Pakistan (Baillat & Tasse, 2022; IMCCS, 2021a). **These three states also have incompatible territorial claims, which in recent years have led to tense situations that could quickly have fuelled an escalation of tensions**. Disrupting the flow of these rivers could be the spark for diplomatic or military intimidation or social unrest, as economies of these countries and the survival of their populations depend on it.

Increased competition for territories, both maritime and continental, could also crystallise existing antagonisms. **In the South China Sea, the use of fishing fleets as actors in China's territorial claim is making access to certain fishing zones more difficult for fishermen from neighbouring countries, contributing to tension overfishing resources** (Baillat & Tasse, 2022), **which are also threatened by overfishing and climate change. This could lead to an exacerbation of tensions at sea, accompanying a regional naval rearmament**.

Finally, as mentioned earlier, **Asia is an area where challenges to borders or international law have a strong potential to cause conflict**. It is interesting to note that part of this law is based on natural elements (rocks, tides, coastline, etc.) that can be modified by climate change. For example, rising sea levels could cause certain islands, such as the Japanese island of Okinotorishima, to submerge at high tide, affecting the legal basis for exploiting its exclusive economic zone (400,000 km²), rich in fishery and associated mineral resources (Sekiyama, 2022). In this sense, **the gradual submergence of low-lying territories in the zone could lead to an exacerbation of territorial claims against a backdrop of contestation of international law**. The weakening of the legal basis of certain maritime areas as a consequence of climate change and the exacerbation of competition over resources between states already involved in territorial disputes are the two pillars of the implications of climate change for security in the region.

2. Focus : Philippines

The Philippines is an archipelago of more than 7.000 islands located in south-east Asia, between the South China Sea to the west and the Pacific Ocean to the east. The climate is tropical, with high temperatures and a rainy season from May to October.

Terrorist groups, organised crime and political violence have a strong foothold in the Philippines. Groups such as Abu Sayyaf, the New People's Party and the Moro National Liberation Front have carried out recurrent attacks in recent years. Inequalities and social tensions have also been exacerbated by the Covid-19 pandemic, as well as the "War on Drugs" launched by the Philippine government in 2016, the violence of which has sparked strong protests within the country.



Climatic exposure factors	Socio-economic vulnerability factors
- Sea level rise: risk of coastal erosion²⁴ and marine submersion, including North Manila, South Roxas City, North East Davao City, Cotabato City, Naga, Dagupan and Aparri - Heavy rainfall in the wet season, with the risk of flooding, destruction of crops and landslides - Vulnerable to typhoons: 5 category 5 typhoons on the Saffir-Simpson scale (>252 km/h) between 2021 and 2022	- Importance of the primary sector in the economy (24.2% of workers, 9.5% of GDP) - Criticality of rice production, sensitive to rainfall: 8th largest rice producer in the world by volume in 2022-2023, 81% of the Philippines' rice supply was produced locally in 2021 - Poverty and precariousness: 16.7% of the population below the national poverty line in 2018 - Presence of non-state armed groups (notably New People's Army, Moro Islamic Liberation Front, Abu Sayyaf terrorist group)

In the Philippines, precipitation extreme variations, whether in the form of an overabundance of rain in the wet season, which severely affects rice crops, or a lack of rain in the dry season, conduct to conflict. Extreme weather events, which have been particularly violent in recent years, contribute to a serious humanitarian crisis, characterised by high levels of food insecurity. This food insecurity facilitates the recruitment and activities of non-state armed groups, prompting the government to step up its counter-insurgency operations. Armed groups are all the more welcome when the state is perceived as unfair in its response to climatic events. In addition, pre-existing tensions over control of the land could be encouraged by problems of erosion and landslides, as well as by internal migration: in 2021, there were 140,000 internally displaced people as a result of conflict or violence, and 5,681,000 internally displaced people as a result of climatic disasters. The relocation of populations can lead to territorial conflicts, such as the conflict on Sicoon island after the typhoon in 2013.

Sources: Alejo & al., 2021; Asian Development Bank, 2022; World Bank, 2022; Climate Central: Coastal Risk Screening Tool, n.d.; Corbera & al., 2017; Crost & al., 2018; Eastin, 2018; Gordon, 2022; IDMC, 2023; Philippine Rice Research Institute, n.d.; Philippine Statistics Authority, 2022; Statista, n.d.; Tolentino & al., 2016; Uson, 2017.

²⁴ See glossary.

3. Foresight scenario: France loses influence because of Chinese aid in French Polynesia

French Polynesia is a group of five French archipelagos in the South Pacific, forming an overseas authority: the Society Islands comprising the Windward Islands and the Leeward Islands, the Tuamotu archipelago, the Gambier Islands, the Marquesas Islands in the north and the Austral Islands in the south. The French forces are mainly based on the island of Tahiti and are also responsible for monitoring the Moruroa and Fangataufa atolls.

In the South Pacific, France is confronted to the presence of China, which seeks to increase its influence. To this end, it is using humanitarian assistance in particular to win over the Polynesian islands. The Polynesian islands are at risk of landslides, flooding, cyclones, and tsunamis, and could become the scene of unprecedented environmental disasters and humanitarian crises in the future.



On the 31st of December 2049, a **tropical depression off the coast of Australia caused heavy rainfall in the area, flooding French air base 186 in Nouméa, New Caledonia**. The depression became a tropical storm on 1st of January when it hit the Fiji Islands. **Reaching a speed of 250 km/h as it moved eastwards, the storm became a cyclone and hit Tonga the following morning, before passing off the Cook Islands and 1,000 km from the Austral Islands in French Polynesia in the evening**. The cyclone caused a cyclonic swell in the Austral Islands on the night of the 2nd of January, flooding the coastline and in particular the capital Papeete in Tahiti and the town of Faa'a, leaving its airport inaccessible. The Austral Islands reported 350 deaths. The cyclone also caused particularly heavy rainfall in the Society Islands and the Tuamotu archipelago, while the rain had already been falling since the beginning of December as part of a very wet season. **On the 3rd of January, several landslides occurred in various parts of the Society Islands** as a result of the heavy rainfall which, accentuated by the cyclone, had soaked the land with water. Because the landslides occurred so suddenly, the authorities were unable to evacuate the towns, and almost 890 inhabitants died or went missing. These multiple landslides also caused waves to flood the coasts of the Gambier and Tuamotu islands. **Agricultural crops, aquaculture facilities and coastal hotels were destroyed, wiping out any prospect of tourism, Polynesia's main source of income.**

For the time being, the Polynesian authorities are calling for help from the neighbouring islands in the Western Pacific, but these islands, which had also been affected by the cyclone, were unable to send help to Polynesia. The Polynesian authorities and the French forces stationed there were devastated and asked France for additional resources, insisting that reinforcements be sent under article 14 (paragraph 6) of the 2004 law stipulating that the State is responsible for security in crisis and emergency situations (organic law no. 2004-192 of 27 February 2004 on the autonomy of Polynesia). Military forces present were essentially patrol forces and were not suited to intervention. The French government released emergency funds to provide financial support to Polynesian

authorities and promised to send intervention forces, equipment, and supplies within 48 hours. Polynesian authorities criticised the inadequacy of these funds, as well as France's response times, which were deemed too long. **On the French side, the impossibility to intervene within 24 hours was justified by the overstretch of the armed forces and aircraft, which also had to provide assistance to New Caledonia.**

Faced with France's paralysis, China took direct action on the afternoon of the 3rd of January, thanks to its projection capabilities in the region. Chinese units, made up of military personnel and medical staff, were deployed to all the archipelagos of French Polynesia except the Marquesas Islands, which were spared these extreme climatic events. In the first two days following the destructive floods, Chinese hydration and first aid kits were able to treat 50% of the population, and Polynesians' perception of the Chinese forces turned very positive. China's proximity to the region explained its ability to provide regular and continuous supplies of food and water via air bridges. **The French forces arrived on the morning of 6th January, when the situation had already been stabilised by China.** They struggled to be included in the decision-making process and were given secondary missions, such as providing security for Chinese convoys. A few weeks later, political parties such as Tāvini huirā'atira, which were in favour of Polynesian independence, highlighted the limited usefulness of the French forces and relaunched their campaign for France to leave. **According to communications from these political parties, relayed by the media and encouraged by anti-Western Chinese forces, dependence on France for security has prevented Polynesia from being adequately prepared for climatic risks and is the cause of the extent of the humanitarian damage.** The French forces have thus become the symbol of a hindrance to the well-being of the Polynesian people, and targets of popular aggression, particularly in the metropolises. **The desire for independence from France grew with each passing day, and civil unrest, which had already erupted around 2035 around the issue of independence, resumed in earnest with slogans such as "For independence, get out France!"**

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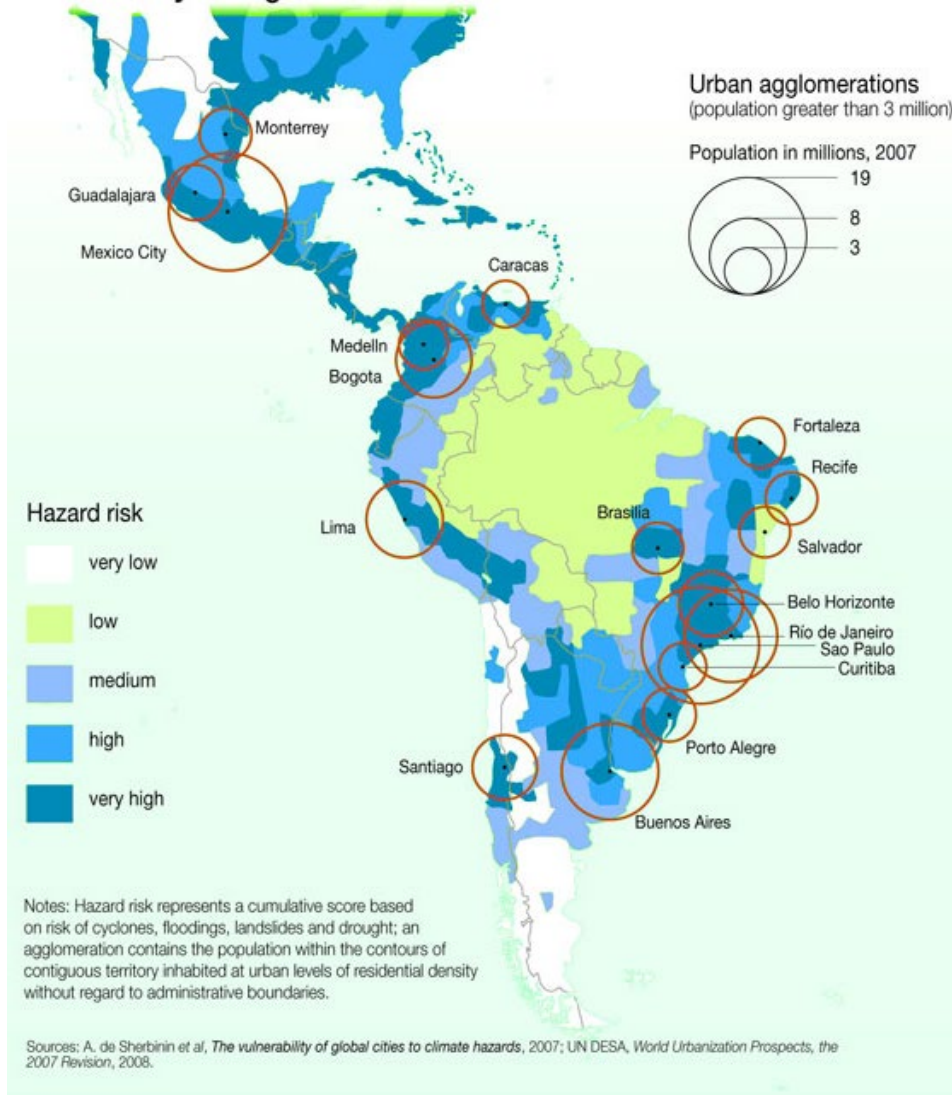
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CLIMATE CHANGE AND CONFLICT IN LATIN AMERICA

1. Latin America: regional analysis

Vulnerability of large cities to climate hazards



L'Amérique latine est, parmi les quatre zones étudiées, la zone qui présente le risque le plus faible d'exacerbation des conflits par les changements climatiques. En effet, l'ensemble des pays de cette zone ont des scores inférieurs à 150 sur l'indicateur climat-conflit. Un certain nombre de pays se démarquent cependant, notamment le Venezuela (138,7). Les six autres pays les plus à risque présentent un score entre 120 et 128,4 (par ordre décroissant : Colombie, Haïti, Mexique, Nicaragua, Honduras, Brésil).



The geographical area studied includes South America, Central America, and the insular Caribbean - which is however dealt with more briefly, having been the subject of a previous Observatory report (Observatoire Défense & Climat, 2022). The region is subject to an **increasing number of extreme weather events**, which pose a threat to coastal populations and infrastructures, particularly in the Caribbean, as well as **intermittent droughts** (ECLAC, 2014). These droughts are particularly severe in Central America, where food insecurity is on the rise and the rural population is extremely vulnerable (Hannah et al., 2017). The melting of the glaciers in the tropical Andes, which have lost at least 30% of their surface area since the 1980s, is leading to both **floodings and a growing scarcity of available water resources**. In addition, **the Amazon rainforest, a major carbon sink, is disappearing** as a result of “savannization” (See glossary) **because of drought and deforestation** (WMO, 2021), which is likely to exacerbate local and global climate change. Finally, the rise in sea level, which is faster in the area than on a global scale, is progressively leading to loss of territory, particularly along the Atlantic coast of South America and in the subtropical area of the North Atlantic and the Gulf of Mexico (WMO, 2021). In an already fragile political and economic context, these phenomena may contribute to a deterioration in the security situation (IMCCS, 2020).

Latin America is marked by considerable political, economic, and social instability, fuelled by the presence of non-state armed groups. In the first few months of 2023, this instability, which is primarily intra-state, was reflected in a series of events such as political clashes in Peru, gang attacks in Haiti, clashes between drug cartels in Mexico and between armed groups in Colombia, and violent attacks against environmental activists in Honduras (ACLED, 2023). **Organised and common crime are thus the main security threat in the region.** In 2015, the regional homicide rate was four times higher than the global average²⁵ (Franchini, Viola, 2019).

In this region of domestic insecurity, inter-state military confrontations are few and sparse. Nevertheless, there is a latent conflict, reflected in long-lasting tensions and recurring disputes (Colombia/Venezuela, Bolivia/Chile, Ecuador/Colombia, etc.), and defence budgets that are sometimes substantial. **Some states whose policies include strong territorial ambitions or border activity, such as Venezuela, Chile, Brazil, and Colombia, tend to invest more in armaments** (Franchi et al., 2017). Thus, **while climate change is likely to lead to an increase in intra-state conflicts in the region, this tacit militarisation of disputes does not allow us to rule out the possibility of inter-state conflict.**

Precarious livelihoods and population displacements

In Latin America, food insecurity has risen sharply in recent years, affecting 40% of the local population in 2021, compared with 29% of the world population (FAO, 2022). At the root of this crisis are socio-political and geopolitical factors such as major disparities within the population, the Covid-19 epidemic, the war in Ukraine, and climatic hazards, in particular **recurrent droughts which have caused considerable agricultural losses**²⁶. **In addition to food insecurity, the vulnerability of the agricultural sector to climatic hazards compromises the income of a large proportion of the population.** In 2021, on average, 19% of the region's total population depended on this sector, which employed over 60% of the population in Saint Lucia, Antigua and Barbuda and Barbados, over 40% in Jamaica, Haiti, Honduras and Nicaragua, and over 30% in Paraguay, Ecuador, Suriname and Panama (World Bank, 2023). Rising food insecurity and insecure farm incomes are contributing to political instability by exacerbating **popular discontent and mistrust of public services.** It is highlighted by the hunger riots that have been recurrent in Argentina, which broke out again in April 2022 to protest against food inflation reaching 60% (Rojas-Sasse, 2022, 14 May).

²⁵ They are particularly prevalent in Central America, Jamaica, Trinidad and Tobago, Venezuela, Brazil and Colombia.

²⁶ In South America as a whole, droughts have led to a 2.6% drop in the 2020-2021 cereal harvest compared with the previous season (WMO, 2021).

The precariousness of people's livelihoods can also worsen the security situation in border areas. The socio-economic disparities between Venezuela and Colombia, for example, encourage the proliferation of criminal groups, smuggling activities and illegal migrant crossings at the border, which led to its closure by Colombia in 2014 (BBC, 2014, August 14), before its reopening in 2023. Crime also thrives when natural disasters, like Irma's storm, oblige law enforcement forces to prioritise supporting the population over pursuing criminals (Albaladejo & al., 2017, September 3). In addition, **the mass exodus of millions of impoverished Venezuelans to Colombia provides cheap recruits for the country's armed and criminal networks**, which, given the government's extreme economic fragility, are major providers of employment. The exploitation of displaced Venezuelans by these armed networks has largely contributed to the **spread of xenophobia among the Colombian population**, which considers them responsible for political violence and criminal activities (International Crisis Group, 2022, 9 August). In the long term, and with the population increasingly exposed to climate change, **this xenophobia could intensify internal violence, as well as fuel new tensions between Venezuela and Colombia.** Similar risks of conflict based on **xenophobia is observed in the US, where some populations and authorities nurture resentment towards people displaced from Central America**²⁷ (ARGOS, 2021, 9 April; United Nations, 2018, 28 November).

Competition for land

The climate vulnerability of the agricultural sector and the parallel growth of agro- and mining industry exacerbate competition for agricultural land and minerals, generating tensions between socio-economic groups, particularly farmers and industries (Brent, 2013). The vulnerability of agricultural populations also contributes to the **proliferation of non-state armed groups, which are involved in land grabbing and the illegal production and transport of foodstuffs.** Tensions in the region have crystallised around the issue of land tenure, and more specifically **unequal access to and control over land, which continues to fuel political crises.** The link between agricultural land and armed conflict is particularly striking in the context of the FARC guerrilla war in Colombia. **Inequalities in land distribution are considered to be at the root of the conflict**, in that they have encouraged land grabbing and accumulation by criminal groups, and triggered armed clashes motivated by the fight against the extreme concentration of land (Duque et al., 2022; Igarapé Institute & ICS, 2019). This same

²⁷ These migratory movements, the vast majority of which are illegal, have intensified sharply in recent years as a result of tougher weather conditions, particularly the water stress affecting the "dry corridor" (See glossary) (FAO, 2020). US Customs and Border Protection encountered nationals from the four main Central American countries of origin (El Salvador, Guatemala, Honduras and Nicaragua) at the US-Mexico border 109,100 times in fiscal year 2020, and 705,500 times in fiscal year 2022 (Ward & Batalova, 2023, May 10).

concentration of land was one of the structural causes of the Guatemalan civil war, which culminated in the 1996 peace agreement (Ofxam, 2016).

Agrarian conflicts, and territorial conflicts in general, also have an extremely strong socio-environmental dimension (FBSP, 2022). While Latin America is home to natural ecosystems that are essential for the subsistence of local populations, biodiversity and the global climate - the Amazon rainforest, the Andes Mountain range and the Patagonian forest - **these ecosystems are also the target of economic development projects, particularly those linked to extractive industries** (McNeish, 2018). **The clash of conflicting interests surrounding these ecosystems gives rise to socio-environmental conflicts, closely linked to the struggle for access to and control of natural resources such as water, land, forests and minerals.** For example, the Conga mining project in Peru, deployed on land considered sacred by the local indigenous peoples, led to violent clashes with the police in 2011, resulting in several deaths and hundreds of injuries (Grieco & Salazar-Soler, 2013).

Socio-environmental conflicts can also arise around the agro-industrial sector (Azuela & al, 2008) - in Brazil, the Belo Monte hydroelectric dam construction project in 2013 provoked resistance from indigenous communities (Reuters, 2013, 4 May) - **oil and gas** - in Ecuador, in 2022, several weeks of popular demonstrations led to the signing of a one-year moratorium on new mining and oil projects (Palma, 2022, October 12) - **or tourism** - in the Caribbean, similar socio-environmental conflicts are emerging around the tourism industry, which is damaging local ecosystems while exacerbating disparities in resources (Atsé, 2023, February 13). **The dynamics of these environmental struggles are set to intensify under the impact of climate change, which makes natural resources increasingly scarce and exacerbates the degradation of ecosystems.** In this context, **the Amazon, which is at the centre of all deforestation-related concerns, has already become a central focus of tensions surrounding climate inaction** (IMCCS, 2021), as well as **being at the crossroads of local competition for natural resources** (*L'Express*, 2019, 23 August; *France info*, 2022, 9 March).

Competition for access to water and conflicts around transboundary basins

The region is home to some of the world's largest freshwater reserves, such as the Amazon, Paraná, Orinoco and Magdalena rivers, as well as strategic underground aquifers. However, **although the countries of the region have a water supply per capita four times greater than the world average, its reserves and flows are unevenly distributed and water stress is increasing, particularly in the most populated areas** (ECLAC, 2023). Climate change is exacerbating this water stress by contributing to the scarcity of water resources, particularly through the intensification and multiplication of periods of drought - such as the 'mega-drought' that has affected central Chile since 2010 - and the melting of the region's glaciers,

several of which have disappeared altogether. Water insecurity is also exacerbated by local social factors, such as rapid population growth and accelerated urbanisation leading to growing demand for water resources, as well as pollution of water bodies and the dilapidated and/or faulty nature of distribution networks (Observatoire Défense & Climat, 2019).

Against a backdrop of growing water insecurity and disparities in its distribution, competition for the use of water is increasing. Water-related conflicts over quadrupled over the period 2000-2019, compared with the period 1980-1999²⁸ (ICTA, 2023), reflecting the **exacerbation of violence and civil unrest resulting from a water crisis. This competition over access to water is likely, in time, to spill over into inter-state conflict, as these conflicts are a major destabilising factor in the region.** Today, of the 22 Latin American countries, only four (Argentina, Brazil, Ecuador, and Paraguay) have signed agreements covering at least 90% of the surface area of their transboundary basins (UNESCO, 2023). In particular, the Amazon rainforest is a hotbed of tension and conflict over transboundary water resources, as it is a prime target for hydroelectric projects (Calhman et al., 2017). For example, tensions have arisen between Brazil and Argentina over the construction of the Itaipu hydroelectric project on the Paraná river, which is also shared with Paraguay²⁹.

²⁸ One example is the struggle waged in 2017 by the people of Correntina, Brazil. Aggrieved by the privatisation of the water in their rivers, the population destroyed agro-industrial farms, followed by demonstrations to express their dissatisfaction with the local shortage (Peixoto et al., 2022). Similarly, in Mexico, during the drought of 2020, farmers in Chihuahua occupied a dam to protest against the diversion of water to the United States, leading to clashes with the national guard.

²⁹ The Argentinians were concerned about the construction of a dam on the river, which would make Argentina's use of its waters totally dependent on the flow supplied by the Brazilian and Paraguayan hydroelectric companies.

2. Focus: French Guiana

French Guiana is a **single French collectivity** in South America. It is bordered to the south by **Suriname and Brazil**, and to the north by the Atlantic Ocean. The climate is equatorial. Except for the coastline, **most of the territory is covered by tropical rainforest**.

The French military is present in **French Guiana through the Armed Forces in French Guiana (FAG)**. They carry out **missions to protect the national territory**, such as the **TITAN mission (securing the space centre)**, **HARPIE (combating illegal gold mining)** and **POLPECHE (combating illegal fishing)**. They are also responsible for maintaining security in the **Antilles-Guyane permanent area of responsibility (ZRP)**.

© On the World Map



Climatic exposure factors	Socio-economic vulnerability factors
• Increase in average temperature (+1°C over the period 1991-2020 compared with 1951-1980) • Decrease in average rainfall and increase in weather variability • Floods and landslides • Prolonged drought, forest fires • Loss of biodiversity (disappearance of mangrove swamps, essential for the supply of drinking water)	• 50% of the population below the poverty line • Economic dependence on natural resources (gold, timber, fishing) and activities in the Kourou spaceport (15% of GDP) • Strong demographic growth (+2.1% between 2014 and 2020) • Demographic concentration on coastal areas (more than half of Guyana's population) • Lack of infrastructure and informal urbanisation - limited projection and rescue capacities, need for air bridges • Highest homicide rate in France • Recurrent social conflicts

The tensions in French Guiana are linked to a difficult socio-economic context, which could be exacerbated by an increase in climate hazards. Flooding of the Maroni, marine submersions at Kourou and Cayenne and fires in forested areas could increase the number of displaced persons, damage to property and mobilisation of the armed forces, as in Apatou and Mana during the floods in 2022. Internal displacements, which are already significant, densify the central coastal area around Cayenne and the border with Suriname. **The high concentration of a poor and growing population contributes to the deteriorating security situation.** In addition, **Guyana's transport network is unsuitable for emergency inland operations, increasing the potential impact of flooding.** This difficulty compromises the fight against illegal gold panning, which is rife in both French Guiana and Suriname. The fight is made **all the more difficult by the porous nature of the Suriname-Guiana border**. In addition, flooding could alter the current distribution of gold panners and increase the number of areas of confrontation among gold panners, between gold panners and local authorities, or even areas of civil and environmental mobilisation against gold panners.

Sources: ADEME, 2019; Boukan, n.d.; Topographic map of French Guiana, 2023; DTM, 2019; Faatau, J.H., 2023; Guyacimat, 2022; IEDOM, 2019; INSEE, 2018, 2019, 2020; Le Progrès, 2022, 22 June; MeteoFrance, n.d.; Ministry of the Armed Forces, 2023; Observatoire de la dynamique côtière de Guyane, 2018.

3. Foresight scenario: The Amazon and the race for green gold

The Amazon rainforest covers some 5.5 million square kilometres, includes the world's largest watershed, and extends over the territory of nine countries: Brazil (60% of the forest), Colombia, Venezuela, Guyana, Suriname, French Guiana, Ecuador, Peru and Bolivia. The forest and the indigenous peoples who live there are threatened by deforestation and mining.

*The Amazon rainforest is a **potential hotspot for conflict this century**. Reasons for potential conflict include the defence of biodiversity, competition for arable land, habitable areas, mineral and water resources, and the impact of deforestation on climate change (Shanker, 2012).*



In August 2050, an extreme drought hits Latin America, causing a drastic reduction in the flow of rivers through the Amazon Forest, as well as devastating forest fires. Reduced rainfalls and the accelerated melting of the Andean glaciers have led to a **water crisis** in the region, where **almost 80% of the population no longer has access to a safe and healthy source of water**. This crisis is exacerbated by antiquated and inefficient distribution networks. In addition to the water shortage affecting the population, agricultural and industrial water needs struggle to be met, exacerbating food insecurity in the region (70% of the population in Latin America). Against **this backdrop, the Union of South American Nations (UNASUR) convened an emergency summit on the sharing and preservation of water resources**, less than six months after the previous summit. The countries through which the Amazon river flows encounter difficulties reaching an agreement, as they find themselves **competing for control over water resources, which are at the heart of security and strategic issues**. Brazil and Bolivia, upstream of the river, are fiercely criticised by Colombia and Peru for building new hydroelectric dams that will reduce the flow of water to downstream countries. Negotiations at the summit are difficult and make little headway, but they result in the adoption of a **one-year moratorium on the construction of hydroelectric dams**, and the **creation of a working group to implement a hydrodiplomacy plan**.

One month later, **following the publication of a United Nations report showing that almost 40% of the Amazon rainforest had disappeared, COP55 put the protection of this ecosystem, as the world's leading source of water and the planet's green lung, on the agenda**. This issue had already been at the centre of discussions at COP41 on the fight against deforestation, but without any major commitments. As a matter of fact, international discussions remain fruitless, with countries in the region, notably Brazil, Peru and Colombia, opposing any international agreement that could affect their economic development - particularly agriculture and forestry - as well as their territorial sovereignty. **The blocking of negotiations is supported by China, the leading financier of industrial construction projects in the Amazon Forest**, which is also seeking to strengthen its influence in the region. The United States, concerned about the expansion of Chinese influence in the area and seeking to protect

its own strategic interests, ask the United Nations to **send an international armed force to preserve the Amazon ecosystem**. No action is taken on this request.

The inadequacy of measures taken by UNASUR and the deadlock in the COP negotiations lead to a **series of demonstrations in the major cities, accompanied by civil actions to destroy oil infrastructures and logging concessions**. Galvanised by the United States' stance on the urgency of the climate cause and the common good of humanity that is the Amazon Forest, **the people, first of Brazil and then of Colombia, call for the overthrow of their government**. These protest movements do not spare French Guiana, where for several years the population has been deploring the lack of **commitment to climate change on the part of the French government, and its inability to put a stop to mining and oil drilling projects**. Popular discontent grows and is amplified by the occurrence of repeated and destructive climatic hazards, such as severe flooding in coastal towns and devastating forest fires. **The demonstrators take over the construction site of the hard dyke intended to slow the erosion of the coastline at Kourou**, denouncing the absurdity of this construction and arguing the need to dismantle the site. A more aggressive group of demonstrators also attempt to enter the space centre but are **intercepted by the French Armed Forces in French Guiana (FAG), in coordination with the gendarmerie**. The gendarmerie, which had been reduced in numbers due to the dispatch of troops on the HADR (*Humanitarian Assistance and Disaster Relief*) mission following a cyclone in Martinique, recalls some of its personnel taking part in the HARPIE mission. As they seek to secure the space centre, the FAG are attacked by demonstrators who denounce the French government's inaction in the face of the degradation of the Amazon rainforest by Guyana's neighbours. Not only are the forces faced with the need to arbitrate between their various missions in the area, but they also suffer from the **loss of influence of the French mainland in French Guiana**, which remains a key location for French strategic interests, particularly in the space sector. More generally, these events contribute to a deterioration in relations between mainland France and French Guiana and are rekindling local demands for independence.

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CONCLUSION AND LESSONS

By cross-referencing the ND-Gain and the Global Peace Index, our analysis led to the **development of a climate-conflict risk indicator**. This indicator has served as the basis for a **global map of the possible exacerbation of conflict under the impact of climate change** and has enabled us to highlight four major concerned areas: **West, Central and East Africa, the Middle East and North Africa, South Asia and the Western Pacific, and finally Latin America**. These are **areas where the level of conflict is already relatively high**, whether the conflict is mainly intra- or trans-national (in Latin America or Africa), or whether it is on a regional scale, causing lasting divisions between states (in MENA or Asia).

Within each of these zones, **a sharp increase in conflict is foreseeable as livelihoods become more precarious**. Populations living in these areas rely heavily on sectors of activity that depend on natural resources, such as agriculture. **By making these resources scarcer, climate change is amplifying the dynamics of local competition between different socio-cultural groups, and also between states when territorial tensions or tensions linked to cross-border resources are already present in the area**. The **Ministry for Armed Forces must keep a close watch on such developments, especially in regions where French strategic interests are at stake**.

Region	Lessons for the French armed forces
West Africa	The impoverishment of the population and the multiplication of inter-community conflicts in the Sahel encourage criminal and terrorist networks. The same phenomenon is threatening the security of French-speaking countries along the Atlantic coast, such as Senegal, Guinea, and Côte d'Ivoire, which are exposed to desertification and rising sea levels. Climatic hazards can affect the operational capabilities of French forces prepositioned in Senegal, Côte d'Ivoire and Gabon, as well as partnership elements in Niger and Chad. Rising insecurity in the Gulf of Guinea could affect the missions of French vessels deployed there as part of Operation CORYMBE.
East Africa	The potential exacerbation of water-related conflicts between Ethiopia, Sudan and Egypt must be monitored. The risks of a deterioration in the security environment as a result of climate change must be analysed, taking into account the reduction in France's operational capabilities, particularly as a result of rising temperatures. The vulnerability of the Djibouti base needs to be monitored.
MENA	Climate vulnerability of partner countries such as Morocco, Tunisia, Algeria and Lebanon is an issue for France. The exacerbation of conflict over water resources in the Jordan basin could affect the French armed forces deployed in Lebanon as part of Operation Daman. Developments in climatic and maritime security in the Persian Gulf could, in the same way as in the Gulf of Guinea, affect maritime surveillance in the area, with the French Forces stationed in the United Arab Emirates (FFEAU) piloting the EMASOH mission in the Strait of Hormuz.
South Asia and Western Pacific	Climate change is likely to exacerbate territorial conflicts and amplify clashes over resources, particularly in cross-border watersheds. In addition, the climate vulnerability of the area's territories, which are all the more densely populated, creates a favourable context for China's strategy of influence through HADR. This strategy could result in a loss of influence for France in New Caledonia and French Polynesia, where French forces are stationed.
Latin America	The Armed Forces in French Guiana (FAG) are concerned by the development of tensions and conflicts around Amazonia, the social unrest that could emerge in French Guiana as a result of the population's growing climate vulnerability, and the climate vulnerability of the French overseas territories in the insular Caribbean, where they could be called upon to reinforce the Armed Forces in the West Indies (FAA).

GLOSSARY

Climate change: variations in the state of the climate observed since the end of the 20th century, attributed directly or indirectly to human activity, modifying the composition of the atmosphere. These variations result in the occurrence of specific, slow-onset hazards that can have environmental implications, as well as safety implications.

Conflict: armed confrontation between states, between factions within a state or between a state and an internal faction. It results from disagreement between actors who consider their objectives incompatible.

Dry corridor: also known as the "drought corridor", an arid zone covering a large part of Guatemala, Honduras, El Salvador, and Nicaragua, prone to droughts and floods.

Exposure: possibility of occurrence of a climatic-environmental hazard in a specific geographical area and for a specific period.

Food insecurity: a situation in which, according to the FAO, "regular access to sufficient, safe and nutritious food for normal growth and development and an active and healthy life" is not guaranteed (FAO, 2022).

Fragility (social system): the degree to which a social system can be altered directly or indirectly, positively or negatively, by variations induced by climate change. This fragility is social, political, and economic, and depends on many factors: adaptation strategies, levels of development, poverty rates, social cohesion, and degrees of economic dependence on an activity, resources, institutions, and states.

Livelihood or Means of subsistence: All the resources needed to meet the basic needs of a population.

Political instability: a situation of high tension or internal conflict which compromises the legitimacy and/or the ability of the government in power to maintain itself.

"Savannisation": process by which the ecosystem and geographical characteristics of a region are structurally transformed and become those of a savannah. The Académie française describes savannah as a plant formation in tropical regions with a long dry season, characterised by the presence of tall grasses and scattered trees.

Soil erosion: the gradual, long-term alteration of the earth's surface by the action of water or wind.

Tension: situation of disagreement between groups, states, or between a state and a group that does not give rise to violence, or gives rise to low-intensity violence, such that it cannot be referred to as an armed conflict.

Transboundary waters: surface water or groundwater spread over territories related to separate states

Urbanisation: the process of urban population growth, increasing demographic concentration in cities, and the extension of urban areas into rural and natural areas.

Vulnerability (climate): propensity or predisposition to be adversely affected by climate change (slow variability and rapid extreme events). It depends on the sensitivity of the natural environment, the fragility of the human environment and adaptation policies.

Water stress: phenomenon of strong tension on the water resources of an area, occurring when the demand for water exceeds the quantity of water available, or when its poor quality limits its use. This expression is also used to describe the biological phenomenon whereby the quantity of water transpired by a plant is greater than the quantity of water absorbed.

APPENDICES

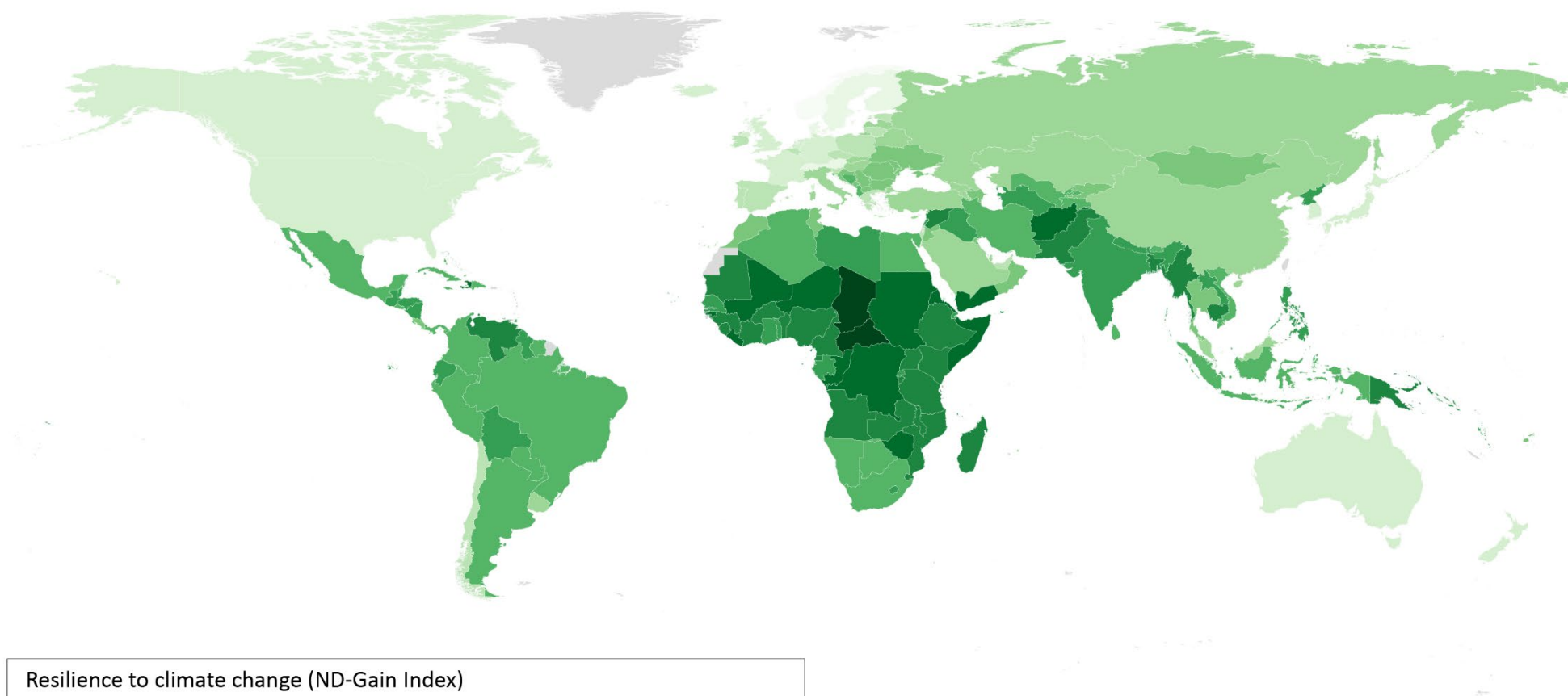
Appendix 1. Ranking of countries according to the climate-conflict indicator

To develop the climate-conflict indicator, we combined the ND-Gain index and the Global Peace Index. In order to maintain the relevance of these indicators, we first decided to work on a /100 scale. For the ND-Gain index, which is already based on a /100 scale, we took the reverse indicator, so that the highest score corresponds to the highest level of climate vulnerability. As for the Global Peace Index, we have prorated it on a /100 scale. For each country, the two /100 scores were added together to arrive at a /200 score.

*Scores developed in 2023 based on figures for 2022 (GPI) and 2020 (ND-Gain)

Country	Climate-Conflict aggregate	Country	Climate-Conflict aggregate	Country	Climate-Conflict aggregate
Afghanistan	167	Angola	117,9	Armenia	100,4
Yemen	161	El Salvador	117,7	Kazakhstan	100,4
Democratic Republic of Congo	158	Guyana	117,6	Georgia	100,3
Central African Republic	157,9	Eswatini	117,6	Albania	99,7
Syria	156,3	Togo	117,5	China	98,7
Somalia	153,7	Lesotho	117,4	Oman	98,6
Sudan	152,3	Tanzania	117,2	Mongolia	96,4
Mali	147,2	South Africa	116,8	Montenegro	96,1
Chad	146,2	Guatemala	116,8	Cyprus	95,9
Iraq	145,9	Malawi	116,3	Romania	95
Niger	141,8	Bolivia	114,6	Costa Rica	94,9
Ethiopia	141,8	Cambodia	114,3	Uruguay	94,8
Burkina Faso	141,2	Algeria	113,4	Kuwait	94,7
Libya	140,6	Nepal	113,1	Bhutan	93,9
Pakistan	139,5	Sierra Leone	113	Northern Macedonia	93,1
North Korea	139,2	Senegal	113	United Arab Emirates	91,8
Nigeria	139,2	Cuba	112,9	Greece	91,5
Eritrea	139,1	Rwanda	112,7	Chile	90,9
Venezuela	138,7	Equatorial Guinea	112,7	Bulgaria	88,5
Cameroon	137,2	Gabon	111,8	Latvia	87,7
Burma	136,4	Zambia	111,8	Lithuania	87,5
Burundi	134	Ecuador	111,5	Mauritius	87,2
Zimbabwe	133	Gambia	111,2	France	86,4
Russia	132,1	Israel	111,2	Italy	86,2
Ukraine	131,4	Tajikistan	111	Croatia	85,7
Lebanon	130,1	Sri Lanka	110,8	Qatar	85,1
Guinea-Bissau	130,1	Laos	110,8	Slovakia	84,9
Uganda	129,6	Peru	110,2	Malaysia	84,8
Colombia	128,7	Dominican Republic	109,5	Estonia	84
India	128,5	Namibia	108,6	Spain	83,3
Haiti	128,4	East Timor	108,2	Hungary	83,3
Mozambique	127,6	Trinidad and Tobago	108,2	South Korea	82,9
Republic of Congo	126,7	Paraguay	107,6	Poland	82,7
Guinea	126,6	Saudi Arabia	107,6	Belgium	80,2
Kenya	126,1	Jamaica	107,1	United Kingdom	77,5
Mexico	126	Uzbekistan	106,9	Netherlands	76,2
Iran	125,6	Thailand	106,6	Australia	75,5
Nicaragua	124,4	Bahrain	106	Czech Republic	74,5
Honduras	123,5	Belarus	105,7	Portugal	74,4
Mauritania	122,4	Ghana	105,5	Slovenia	72,9
Philippines	121,9	Argentina	105	Sweden	72,7
Liberia	121,7	Kyrgyzstan	104,9	Ireland	72,2
Turkey	121,7	Indonesia	103,8	Japan	72,1
Benin	121,6	Tunisia	103,7	Canada	71,6
Bangladesh	121,3	Panama	103,3	Germany	71,3
Brazil	121,3	Vietnam	103,2	Finland	68,5
Madagascar	120,8	Morocco	102,8	Singapore	66,7
Egypt	120,8	Moldova	102,8	Austria	66,5
Ivory Coast	120,7	United States	102,5	Switzerland	66,3
Papua New Guinea	120,2	Botswana	102,4	New Zealand	66
Djibouti	119,9	Bosnia and Herzegovina	102,4	Norway	65,8
Azerbaijan	118,5	Serbia	100,9	Denmark	65,4
Turkmenistan	118,2	Jordan	100,6	Iceland	61,3

Appendix 2. Map of countries' resilience to climate change



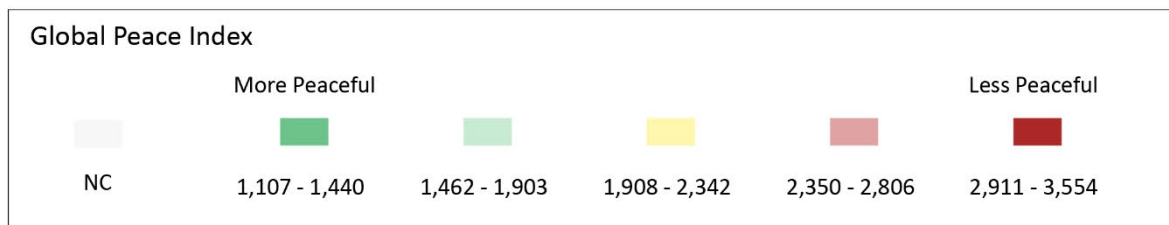
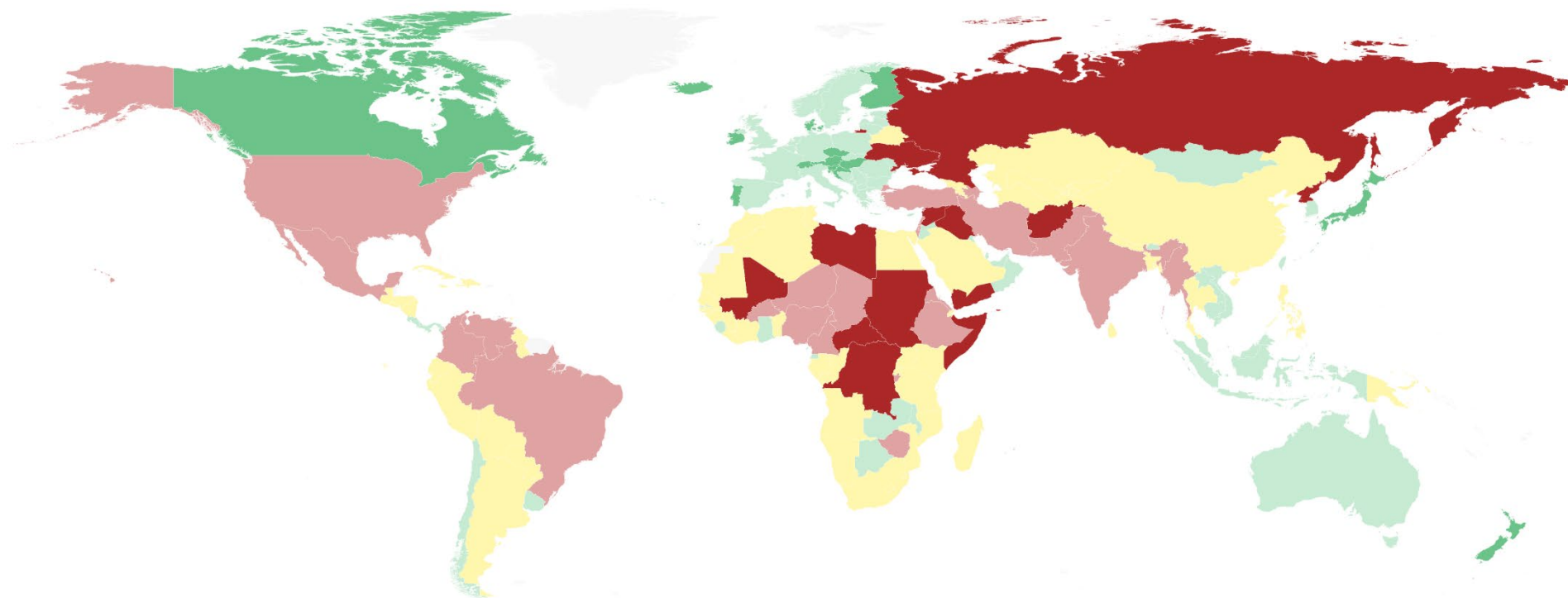
Resilience to climate change (ND-Gain Index)
(Readiness & vulnerability)

26.7 - 29.9	40 - 44.9	55 - 59.9	70 - 74.9
30 - 34.9	45 - 49.9	60 - 64.9	75 - 75.4
35 - 39.9	50 - 54.9	65 - 69.9	

Authors: Antoine Diacre, Victor Pelpel, Marc Verzeroli
Source: Notre Dame Global Adaptation Initiative (ND-Gain), University of Notre Dame

*Figures for 2020

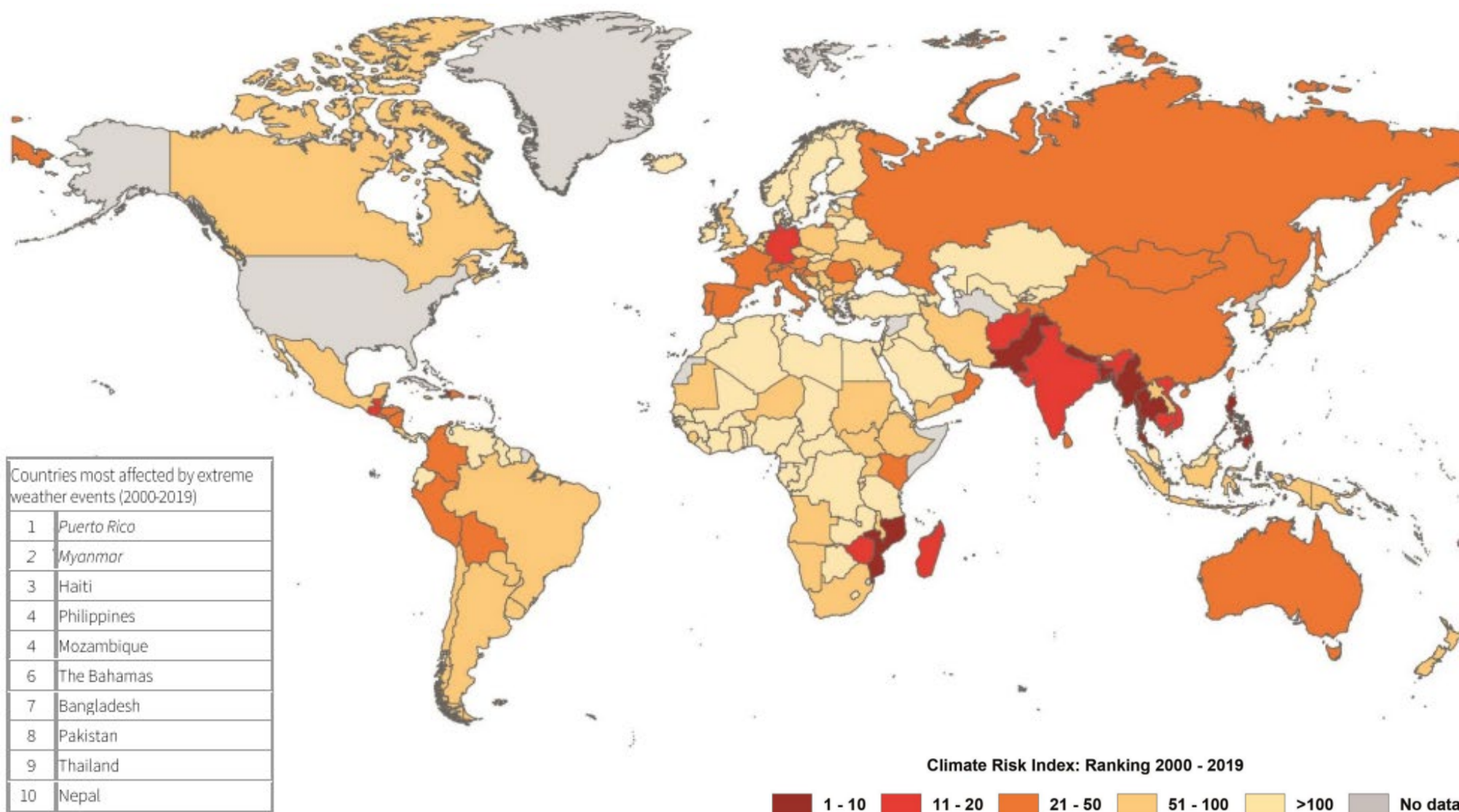
Appendix 3. Levels of peacefulness in countries around the world



Authors: Antoine Diacre, Victor Pelpel, Marc Verzeroli
 Source: Global Peace Index 2022, Institute for Economics and Peace

*Figures for 2022

Appendix 4. Map of countries most exposed to extreme weather events between 2000 and 2019

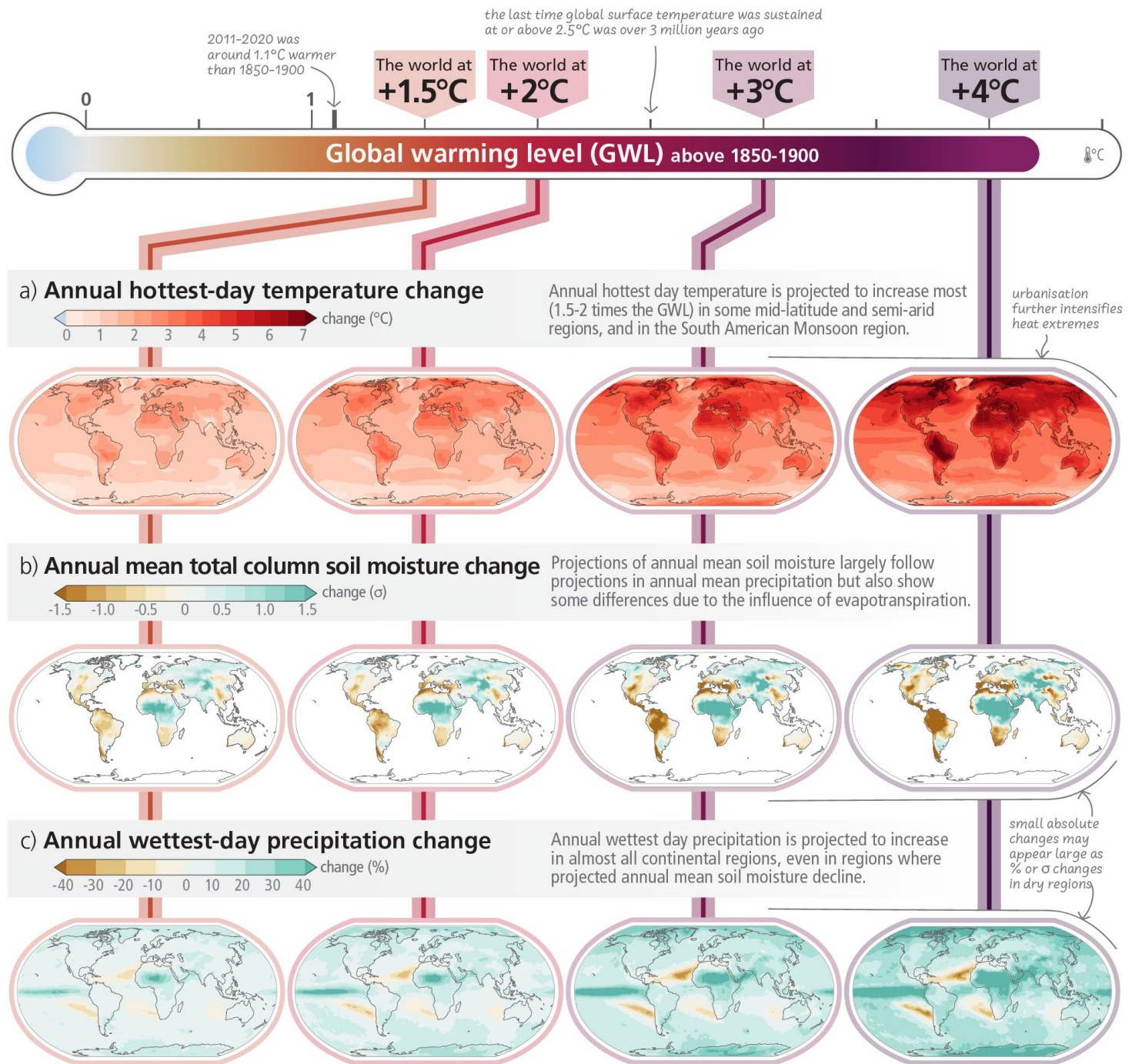


Italics: Countries where more than 90% of the losses or deaths occurred in one year or event

Appendix 5. Projected impact of a rise in temperature

Description: Projected changes in the number of days with maximum temperature per year, total annual mean soil moisture, and maximum precipitation per day per year in the case of global warming of 1.5°C, 2°C, 3°C and 4°C compared with temperatures in 1850-1900.

With every increment of global warming, regional changes in mean climate and extremes become more widespread and pronounced



Source : GIEC. (2023). AR6.

Appendix 6. Table of maps, indexes and tools to explore the effects of climate change in greater depth

Name	Institution	Product indicators
Air Quality	UNEP	Interactive map of air quality and forest fires in real time
AQUASTAT	FAO	FAO Global Information System on Water and Agriculture . Databases by country and sub-region. World dams' database
Climate Security Risk Monitor	Hague Center for Strategic Studies	Interactive maps for the risks of heat waves, coastal flooding, floods, droughts, landslides, tropical storms, forest fires, etc.
Climate Tipping Points	Climate Tipping Points News	Articles on climate and environmental tipping points , often accompanied by infographics
Coastal Risk Screening Tool	Coastal Climate Central	User-configurable interactive map projecting sea level rise to 2050
Global Climate Change : Vital signs of the planet	NASA	Animated maps and graphs showing changes in global and sea temperatures, Arctic ice, CO₂ concentration in the air and methane, ice caps and rising sea levels .
Global Environment Monitoring	UNEP	Resources and data relating to the environment: air, water, pollution, mountains, oceans, biodiversity, ozone layer, etc.
Global Forest Watch	World Resources Institute	Forest monitoring: deforestation, fires
Global Groundwater Information System	International Groundwater Resources Assessment Center	Databases on aquifers, extraction points and boreholes
IEA Data and Statistics	IEA	Infographics and interactive maps on various energy-related indicators
Indicateurs pour le suivi national des objectifs de développement durable	INSEE	Indicators for France to assess progress towards sustainable development objectives
Little green databook	World Bank	Environmental indicators by region of the world
National Hurricane Center and Central Pacific Hurricane Center	National Oceanic and Atmospheric Administration	Map following the areas of disturbance at sea Archiving of cyclones and their data sheets by year
Our World in Data	Our World in Data	Figures and infographics on air and climate, water, energy, pollution, and waste , among others.
Rapport spécial du GIEC sur la désertification et la dégradation des terres (2019)	IPCC	Infographics and maps on desertification, land degradation and terrestrial ecosystems
SDG 6 Data Portal	UN Water - UNESCO World Water Assessment Programme (WWAP)	Interactive, animated map of water, the economy, society, and the environment
SDG Indicators Database	United Nations	Global statistics to assess progress towards sustainable development goals
Water Risk Atlas	Aqueduct	Customisable interactive map showing water-related risks (water stress, risk of flooding, water quality, etc.)
WGI Interactive Atlas: Regional synthesis	IPCC	Interactive map covering 5 main themes: temperature, humidity, wind, snow and ice, coastline
World development indicators	World Bank	Statistics for development indicators
World Food and Agriculture Statistical Yearbook 2022	FAO	Statistics for 2021

*This table is not exhaustive.

Source: Defence & Climate Observatory, 2023

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