Climate change, vulnerability and security in the Sahel

Three scenarios for Burkina Faso, Mali and Niger in 2050.

Pia Van Ackern and Adrien Detges, adelphi

November 2022

Acknowledgements

Special thanks go to our colleagues and teammates in the CASCADES project, Oriol Puig Cepero, Sophie Desmidt and Fabien Tondel, whose research and comments on earlier drafts of this document have contributed significantly to the development of the scenarios presented here. [1]

Furthermore, we warmly thank our interlocutors and regional experts for the time they gave us and the experiences they shared with us: Ramata Abba Kiari, Amadou Attikou, Boubacar Ba, Malick Ba, Dougoukolo Alpha Oumar Ba Konaré, Bruno Barbier, Balkisou Buba, Norbert Dembele, Mamadou Diarrah, Brema Ely Dicko, Lara Gruber, Abdoulaye Kandé, Nènè Konaté, Ali Mahamane, Ornella Moderan, Saadatou Oumarou, Issaka Ouedraogo, Sayouba Ouedraogo, Safiétou Sanfo, Anca-Elena Ursu, Philippe Zoungrana and all other participants in our scenario workshops.

We would also like to thank Chloé Baumes, Oli Brown, Arthur Boutellis, Josie Lianna Kaye and Michelle Helene Reuter for their invaluable support in organising the workshops that formed the basis of this work, as well as for their constructive comments on earlier drafts of this document.

[1] This work is partly based on a report written by our team in the framework of the CASCADES project: Puig Cepero, O., Desmidt, S., Detges, A., Tondel, F., Van Ackern, P., Foong, A. and Volkholz, J. (2021): Climate Change, Development and Security in the Central Sahel. CASCADES Report.

Background

Climate change plays an important role in the future of the Sahel. Temperatures, particularly in the northern-central Sahel, could rise 1.5 times faster than the global average. Climate shocks and extreme events such as droughts and heavy rains are projected to become more frequent and severe. These changes are accompanied by other challenges: accelerated population growth, low economic productivity and production diversity, political conflicts and crises, inter-communal violence and violent extremism.

However, the severity of climate impacts on livelihoods, food security, mobility and conflict in the Sahel will depend largely on the future evolution of socio-economic and political conditions in the region. These will ultimately determine the vulnerability and resilience of Sahelian communities to climate impacts.

The evolution of these conditions is uncertain, but we can consider different scenarios to help Sahelian communities and decision-makers prepare for the possible challenges (and opportunities) ahead. Looking ahead to 2050, this paper presents three scenarios for the part of the Sahel comprising Burkina Faso, Mali and Niger. Each scenario is characterised by a different level of vulnerability and resilience to the future effects of climate change, depending on the social, political and economic parameters that characterise it. Thus, each scenario presents different challenges and opportunities for the security and development of the region. The main purpose of the scenarios is to describe and assess these challenges in order to facilitate anticipatory action.

This work is part of the EU-funded CASCADES project[2], which studies the impacts of climate change on trade, investment, sustainable development and security in the EU's neighbouring regions, in order to provide useful information for EU policy-making and improve interregional cooperation. The scenarios presented in this document were developed jointly with 19 experts from the region, working in the fields of climate change adaptation, natural resource management, conflict prevention and other relevant sectors, in order to obtain a multidisciplinary perspective on the main challenges and solutions. The methodological approach is described in the annex.

The scenarios presented here are not exhaustive. Rather, they are intended to provide an overview of different possible futures, to provide a basis for adaptation strategies, and to raise awareness among decision-makers and stakeholders in the EU and the Sahel more generally. In particular, the scenarios can be used as tools to identify relevant policy options in the face of uncertain climatic, social, political and economic conditions in the Sahel.

[2] www.cascades.eu

Climate vulnerability and resilience scenarios

Three scenarios have been developed to project the future effects of climate change on development and security in the Sahel. They represent possible future situations based on different developments, actions and constraints faced by governments and civil society. Each scenario describes challenges and opportunities for climate adaptation along several dimensions. Indeed, agricultural productivity, infrastructure, trade, social security systems, institutions, and resource and conflict management systems are key factors to be considered in this regard, as are economic opportunities and social and intercommunity relations more generally:

- Scenario 1: "Success of the classic model" represents the possible result of a development trajectory that is consistent with currently dominant development paradigms (i.e. with a strong emphasis on economic growth).
- Scenario 2: 'Everyone for themselves' describes the result of stagnating development marked by insecurity and increased vulnerability to the effects of climate change.
- Scenario 3: "A new direction" presents the result of an alternative development trajectory focusing on social inclusion and environmental sustainability.

The possible effects of climate change on human security and development in the region are identified for each scenario.

Vulnerability

"The propensity or predisposition to suffer harm. Vulnerability encompasses a variety of concepts or elements, including susceptibility or fragility and the inability to cope and adapt."

Resilience

"The capacity of social, economic or environmental systems to cope with a disturbance, trend or hazardous event, enabling them to respond or reorganise in such a way as to retain their essential function, identity and structure, while retaining their capacity to adapt, learn and transform.

Adaptability

"The ability of systems, institutions, people and other organisms to adjust to protect themselves against potential harm, to take advantage of opportunities or to respond to consequences.

These definitions are taken from: IPCC, 2014: Annex II: Glossary [Mach, K. J., S. Planton and C. von Stechow (eds.)], Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Lead Writing Team, R. K. Pachauri and L. A. Meyer (eds)]. IPCC, Geneva, Switzerland, pp. 131-145.

Scenario 1: "Success of the classic model"

Summary

- This scenario represents a 'classical' development trajectory in line with currently dominant development paradigms.
- Agricultural productivity has increased significantly by 2050. The resilience of agricultural and livestock activities is supported by the promotion of large-scale irrigation systems, new production technologies and improved infrastructure. These allow better access to markets. However, intensive agricultural practices put pressure on ecosystems and lead to degradation of the environment and ecosystem resilience.
- The high demand for food, especially in the rapidly growing cities, can only be met by imports, which increases dependence on international markets and vulnerability to food price fluctuations, especially for the poorest households.
- Although social inequalities persist, living conditions have improved for much of the region's population. People enjoy better public services. Economic opportunities and political institutions encourage non-violence, leaving little room for armed groups to proliferate.

Agricultural productivity

In the region, agricultural productivity has increased significantly by 2050. After years of investment in agricultural development, promotion of large-scale irrigation systems, crop adaptation, technological innovations and scientific research, agriculture is healthy and considerably industrialised. Burkina Faso, southern Mali and the Tillabéri region of Niger have strengthened the cultivation of rice as a food crop. In addition, Burkina Faso and Mali have increased cotton production. Burkina Faso and Niger have, for their part, increased millet, sorghum and black-eyed pea production. Millet and sorghum have been shown to tolerate slightly higher temperatures, while rice and black-eyed peas can even benefit from climate change.

Infrastructure and market access

Access to markets in the region, as well as to international markets, has also become easier over the years thanks to targeted policy reforms both domestically and internationally. The strengthening of infrastructure, including roads and railways, and the guarantee of cross-border trade in the region have contributed significantly. Linked to the development of the cotton market, the textile and fashion sector has also developed and the region has made a name for itself for the quality of its fabrics and fashion designs. In particular, Dalifini and Bogolan fabrics in Mali, as well as Faso Dan Fani fabrics from Burkina Faso have gained international recognition. The increase in domestic production capacity has ensured basic food security and created many jobs. However, the strong growth in demand (especially in the rapidly expanding cities) can only be met by additional imports, especially of foodstuffs.

Large-scale photovoltaic installations recently built in the region have increased solar energy production capacity and connected several million people to electricity in the Sahel region. They have also increased cross-border trade in electricity. This development has improved the resilience and reliability of electricity supply, reduced electricity costs for individuals, improved services in hospitals, and facilitated business start-ups in cities.

Public institutions and services

In addition, public institutions have become more efficient and focused on economic growth. The economic boom due to the strength of the agricultural sector has had a positive impact on the governance structure of the region. Access to public services (water, health, education) is relatively good and social safety nets exist. This means that not only large agricultural enterprises, but also small-scale producers, have some protection in case of crop failure.

Although access to services and credit has improved, it remains difficult for historically disadvantaged groups, such as women, youth, and nomadic people. There is still a long way to go before de facto equality is achieved, even though special support programmes have been launched to speed up the process. Power and wealth are still concentrated in the hands of the elites and the older generation of the country.

However, after years of fighting corruption and introducing new accounting systems, corruption has decreased significantly. The legal system has been reformed and standardised in the region. Current surveys show that the population as a whole has confidence in public institutions.

Resource and conflict management

This has led to easier management of resources and conflicts. Although much land has been privatised and is owned by large agricultural companies, use rights are more clearly defined. This benefits everyone, even if the conditions are not necessarily favourable for land redistribution or the expansion of small-scale farming and pastoral activities. Local conflict management structures throughout the region facilitate the resolution of disputes between farmers, fishers and herders. Although setbacks occur from time to time and pastoralist communities must continue to fight for their rights, the management of agricultural land, grazing land and transhumance corridors is generally effective.

Nevertheless, there is still some discontent among the population because, despite the existence of better economic opportunities than in the past, the possibilities to improve or significantly change their living conditions remain limited. The scope of armed groups is more limited, but they are still powerful in some parts of the region and continue to challenge governments.

Urbanisation, environment and social relations

Cities and the manufacturing and service sectors have grown significantly. A young and well-educated elite is coming up with many ideas and is innovative and research-oriented. Although some social inequalities remain, this evolution has contributed to the development and improvement of living conditions for a large part of the region's population.

Urbanisation has acted as a catalyst and allowed better access to basic infrastructure, health services and education. There has been some improvement in the equality between generations, genders and community groups, although the different social groups live more side by side than together. There is little contact and exchange among them.

Migrants are accepted as far as they contribute to the economic development; however, some communities remain on the sidelines.

The downside is that despite efforts to manage natural resources, the region's ecosystems have reached their limits. The introduction of new crops resistant to climate change has led to a decline in agro-biodiversity and the loss of some local crops, especially food crops. Production gains and continued economic growth put a strain on ecosystems. Most people are proud of the economic success of the region, but some of the youth point out that overexploitation of resources may jeopardise their future and that of the planet. This group is well connected and is part of a global movement calling for respect for the planet's limits.

Table 1: Possible effects of climate change on development and security in the "Success of the classic model" scenario

Possible effects of climate change	Scenario-specific vulnerability and resilience factors
Climatic conditions increase rice crop yields	• Better land management • Better management of infrastructure
Production shocks in major cereal producing countries and variability in import prices put pressure on the economy (especially on low-income households)	• Increased dependence on international markets for food, despite improved domestic production capacity
Vulnerability to agricultural production shocks and pressures on rural livelihoods (associated with droughts and floods or reduced rainfall in some areas)	• Much of the agricultural sector is well adapted to climate change, but the economic dependence on this sector is very high (meaning that, in the event of a shock, the economic and social effects are significant) • In some regions the population remains highly dependent on rain-fed agriculture • Vulnerability of women and marginalised groups (e.g., more difficult access to credit and land)

Scenario 2: "Everyone for themselves"

Summary

- This scenario describes a future of economic stagnation, insecurity and increased vulnerability to the effects of climate change.
- The benefits of agricultural reforms and investments in irrigation and other infrastructure are accruing to a few large-scale producers, leaving small-scale farmers, especially minority groups, out in the cold. The latter have become even more vulnerable to climate-induced production shocks, loss of livelihoods and food insecurity. Continued degradation of land and ecosystems increases the vulnerability of the region.
- Ineffective institutions make it difficult to manage resources and resolve conflicts. The role of traditional and local authorities has been devalued, and there are conflicts between customary and formal norms. Competition for resources fuels conflicts, which are exacerbated by climatic pressures and shocks.
- Corruption, ineffective resource management and conflict resolution, and growing social inequalities lead to a social divide. This scenario sees the influence of armed groups and illicit activities increase, also due to the climatic impacts on rural livelihoods.

Agricultural productivity

In 2050, the region is characterised by increased agricultural productivity. Large investments in irrigation systems and the rapid introduction of climate-resilient crop varieties have paid off. Road, transport and storage infrastructure have been improved and open borders facilitate trade. Access to fertiliser and other inputs has improved. The sector is highly mechanised.

In contrast, traditional agricultural knowledge is largely neglected in agricultural policies and, as a result, is only used by a small number of people. The high-tech sector is mainly focused on agri-tech, fintech and communication services. Governments favour large-scale commercial agriculture and the main players in agri-food growth, to the detriment of small producers and small and medium-sized agri-food enterprises. This not only has an economic impact, but also an environmental one: biodiversity is severely depleted and land is overexploited, leading to progressive soil degradation.

Public institutions and services

Apart from promoting agricultural productivity or supporting large enterprises, public authorities do little to promote the public interest and social institutions remain weak. The judicial system is still weak. Corruption is rampant. This makes it difficult for a large part of the population to access public services (water, health, education, etc.) and social safety nets are weak. Only elites close to political power can afford good education and better health services. Social and economic disparities have increased.

Energy infrastructure

The region faces an energy deficit. Although energy is available (and mainly based on biomass and oil), electricity costs are high. Electrification is centralised and only large companies and cities can afford access to the energy grid, while others are dependent on expensive electricity, often produced by diesel generators.

Resource and conflict management

Governments in the region have focused on security issues, which has led to increased military spending. On the other hand, ineffective institutions make resource management and conflict resolution difficult. The role of traditional and local authorities has been devalued. The increase in agricultural productivity and the priority given to large-scale producers have been accompanied by a large wave of land privatisation and the development of public-private partnerships. This privatisation marginalises customary users and has increased agricultural encroachment on pastoral land. Access to land is difficult for certain groups (especially women, small-scale pastoralists and migrants). These developments have repeatedly led to uprisings by the rural population and social unrest in the cities, but without bringing about change.

Urbanisation and social relations

Although many people live on little money, individualism reigns. People are convinced that hard work is enough to get by. They try their luck on large farms in the countryside or move to the cities, which are better served by services and food markets. Many try their luck in the informal urban economy. In and around the cities, industrial production and the service sector have also grown. Manufacturing and technological services related to the agricultural sector are the most successful branches of the economy. Cities in the region have grown rapidly and relatively unplanned, and there is a great deal of informal housing on the outskirts of the cities.

Corruption, inefficient resource management, lack of participatory and conflict resolution mechanisms, generally weak public institutions, social inequalities and the deteriorated image of political elites have led to a divided society. In this system, losers are likely to become radicalised and recruited by armed groups, who promise them economic and political alternatives, especially when their livelihoods are undermined by climate change. In addition, competition and xenophobia persist between some communities. Migrants are often stigmatised.

Table 2: Possible effects of climate change on development and security in the "Everyone for themselves" scenario

Possible effects of climate change	Scenario-specific vulnerability and resilience factors
Impacts on pastoralists and other vulnerable groups: food insecurity, poverty and loss of livelihoods	• Weaknesses in social safety nets • Difficult access to credit, especially for women • Difficult access to public services (water, health, education, etc.)
Migration: trend towards rural exodus, but migrants do not always find favourable conditions in the cities Accelerated urban growth	• Ineffective urban planning (housing in hazardous locations) • Resentment towards some migrants when they are seen to reduce opportunities for host populations • Uncertain legal status of migrants (especially with regard to land ownership) makes them vulnerable to exploitation and expropriation
Intra- and inter-community conflicts: risk of escalating disputes between farmers and herders	• No clear demarcation of grazing areas • Marginalisation of livestock farmers and anti-livestock farmer bias in land policies • Failure of the authorities to resolve disputes and other problems • Legal pluralism, dissonance between customary and formal norms, corruption and "forum shopping"
Increased influence of armed groups and increased illicit activities when livelihoods are undermined by climate change	• Lack of access to essential services • Lack of trust in justice and arbitration mechanisms that struggle to prevent inter-community violence • Lack of security and deterioration of relations between citizens and the military • Crisis of legitimacy and loss of confidence in public authorities • Polarisation of society and ideological radicalisation

Scenario 3: "A new direction"

Summary

- This scenario presents an alternative development path that focuses on social inclusion and environmental sustainability.
- Production is organised in a decentralised manner, with an emphasis on sustainable and inclusive practices. Improved resource governance reduces conflict and allows for more effective coordination of agricultural, pastoral and fishing activities. The levelling of social inequalities and the emphasis on inclusive governance and services reduce the vulnerability of a large part of the population to climate change.
- There are good urban planning systems, although drainage systems and water infrastructure in urban areas are of an average standard due to the lack of financial resources to maintain them. Migrants are generally well accepted and integrated into the host communities. These factors facilitate human mobility and make it a viable strategy for dealing with climate change.
- Corruption levels have decreased considerably. The legal pluralism of the region is appreciated and well regulated. Legal structures are decentralised and responsive to local needs. Public grievances are low and armed groups have lost influence in the region. In some cases, the loss of livelihoods due to climatic effects is pushing communities into illicit activities.

Agricultural productivity

As a result of critical reflection on the past, accompanied by a desire to overcome historical dependencies and linkages, both within the region and internationally, the region is following a different trajectory and has moved away from the predominant development models. The agricultural sector has not been heavily industrialised. There has been a deliberate focus on agricultural diversification and the many small and medium-sized producers. By diversifying and modernising family farming, improving irrigation techniques and building on local knowledge, small-scale agriculture has been strengthened.

The various types of micro-basins for harvesting rainwater—earthen pits, half-moons and benches—are widely used in the region and help to reduce soil degradation and increase soil nutrient content. Weirs and micro-dams have been installed to store rainwater and reduce runoff. New innovative technologies have also been developed and introduced, which can be managed without extensive technical knowledge and mainly through new communication technologies. Nevertheless, rain-fed irrigation still plays an important role in many areas. Livelihoods, basic income and food security are broadly guaranteed for most people, but wealth is not very high in monetary terms.

Public institutions and services

Producers have few means to accumulate savings and prepare for more difficult times. Fortunately, this is compensated for by very good public institutions, including social

safety nets, organised largely at the community level. Previously marginalised groups have better access to credit. However, the banking system is only moderately developed. Thanks to foresighted and prudent management and the support of diaspora, inclusive and effective institutions have been established. Diaspora support has been strengthened by the reduction of remittance fees from very high levels in the region to 3%, following the achievement of the Sustainable Development Goal on remittances (SDG 10.c) in 2030. The state has a strong role, but is controlled by several participatory mechanisms and democratic structures, as well as a strong civil society. Corruption has reached a low level. Legal pluralism in the region is appreciated and well regulated. The legal system is organised at a decentralised and local level. It is highly functional.

Infrastructure and energy

Off-grid Photovoltaic systems and mini-grids have rapidly brought electricity to many households as well as hospitals and other public buildings in the region. The health and education sectors in particular are operating efficiently. There is an extensive network of rural schools and a system of distance learning through the internet, radio and mobile phones.

Resource and conflict management

Resource and conflict management also works well. Access to land and use rights are clearly defined. There are local conflict prevention and resolution committees, which deal mainly with conflicts between farmers, fishers and herders. Communities have worked hard to reconcile and victims of past conflicts have been compensated.

Women and youth have played an important role in peacebuilding. Another key element is the effective implementation of cross-border regional peace programmes. Cross-border cooperation has also contributed to the development of regional trade networks and proximity exchanges.

As a result, there are few public grievances and few armed opposition groups in the region. In some cases, the loss of livelihoods due to climatic impacts is leading community members to turn to illicit activities to cope, such as theft and trafficking of livestock. The lack of strict controls and police repression may encourage such activity, even though social conditions are generally unfavourable.

Urbanisation, environment and social relations

Cities have grown less than in the other scenarios. Biodiversity in the region has returned to balance and ecosystems are recovering. People like to live in the countryside and organise themselves into independent units. The social fabric is very strong. New communication technologies and the widespread development of the internet allow for good communication throughout the region, as well as between communities.

Some of the young people, mostly graduates, are not satisfied with this way of life and want less social control. They therefore seek their fortune outside the region. Another part of the young people neither want to work in agriculture nor leave the region and have started small businesses in the manufacturing and service sectors. The region is making a name for itself internationally with its creative and sustainable business ideas.

Table 3: Possible effects of climate change on development and security in the "New direction" scenario

Possible effects of climate change	Scenario-specific vulnerability and resilience factors
Loss of agricultural productivity due to droughts, floods etc., but effects on food security and livelihoods are mitigated.	• Economic dependence on agriculture, fishing and livestock; dependence on local production • Moderately developed road and transport infrastructure • Medium level irrigation and flood management capacities • Medium access to agricultural inputs and services (seeds, fertilisers) • Few currency reserves in case of crisis • Mixed production technologies using traditional knowledge • Access to credit is generally equal, but the banking system is only moderately developed • Good access to public services for all
Rural-urban migration as a result of climatic shocks and pressures is mitigated and living conditions for rural migrants are generally acceptable	• Vulnerability to droughts, floods and other climate change impacts • Ease of migration to cities (acceptance of migrants, women's mobility) • Good urban planning but average state of drainage systems and water infrastructure in cities
In some cases, the loss of livelihoods due to climate impacts leads to an increase in illicit activities (cattle theft, trafficking, etc.)	• Weak police and military presence • Existence of criminal networks (trafficking, livestock theft, etc.) • Little corruption and social marginalisation; good understanding between generations and communities and overall few grievances • The presence of legal economic opportunities reduces the incentives to resort to illicit activities

Conclusion

The three scenarios presented here outline three different trajectories for the future. They show that the impacts of climate change can have different effects depending on various social, political and economic factors. The scenarios invite reflection on the importance of these factors and how they may evolve in the coming years—sometimes more certain, sometimes less certain. From this exercise, we can draw three lessons:

- The effects of climate change on livelihoods and food security in the Sahel will depend on **the ability to maintain local agricultural and pastoral productivity** in the face of harsh environmental conditions. The agricultural sector may evolve in different ways under different scenarios, implying different levels of vulnerability and capacity to adapt to climate change impacts.
- Similarly, **social safety nets and access to services** (such as health and education) are essential to cope with climate change and develop more resilient societies. This is particularly important for women and disadvantaged groups, who are not only more vulnerable to climate shocks, but often less likely to benefit from these services. Access to services and means of political participation will also influence the relationship between the state and citizens more generally, trust in public authorities and ultimately the ability of armed groups to extend their influence.
- Furthermore, the risk of climate change-related inter-communal violence is correlated with **changes in institutions, conflict and resource management practices, and social relations** more generally. Legal pluralism and its difficulties, in particular the coexistence of sometimes inconsistent rules, or the existence of inconsistencies between levels of governance, will be a major challenge to prevent further conflict.

The scenarios presented here show that the future of the region is not set in stone and that different trajectories are possible. However, they also show that it is important to act to improve the social, political and economic conditions that determine the level of climate vulnerability and resilience of Sahelian populations. The scenarios aim to open a dialogue on the future, on the challenges that it could entail, but also on the trajectories to follow and the strategic choices to be made today.

Annex: Methodology

The scenarios presented here describe possible future situations. They do not predict the future, but rather explore different trajectories and delimit the scope of what could plausibly happen. In doing so, they offer the possibility of looking to the horizon and searching for future challenges in order to better prepare for them. They also allow one to consider future opportunities and how best to seize them. In short, the exercise helps to prepare for the uncertain climatic and political conditions of the future. In addition, scenarios can stimulate creativity and help overcome prejudices and preconceptions about the future that stand in the way of innovative policy-making.

The scenarios were co-developed with 19 experts, mostly from the region, working in the fields of climate change adaptation, natural resource management, conflict prevention and other relevant areas to allow for a multi-disciplinary perspective on possible challenges and solutions. The process followed four stages.

Step 1: Prior research by the project's research team and preparatory interviews with experts identified key parameters of vulnerability and resilience to the effects of climate change, as well as their potential implications for livelihoods, food security, conflict and other issues relevant to this exercise.

Step 2: In a virtual workshop, researchers and regional experts identified the most important and uncertain vulnerability and resilience parameters and outlined three scenarios, including the changes in these parameters and thus the different vulnerability and resilience conditions. The term 'important' here refers to the influence of the parameter on the vulnerability and resilience of the region to climate-related risks. This criterion ensures that the scenarios developed reflect the political, economic, social etc. conditions most relevant to this exercise. "Uncertain" refers to the unpredictability of the evolution of vulnerability parameters in the future. This criterion ensures that the scenarios developed are based on different but plausible future situations.

Stage 3: Three additional workshops with smaller working groups allowed each scenario to be fleshed out and a coherent “picture of the future” to be created for each of them.

Step 4: The research team analysed the scenarios for aspects of vulnerability and resilience, in order to derive potential impacts of climate change on livelihoods, food security and conflict. These impacts were then added to the scenarios in the form of text and summary tables.