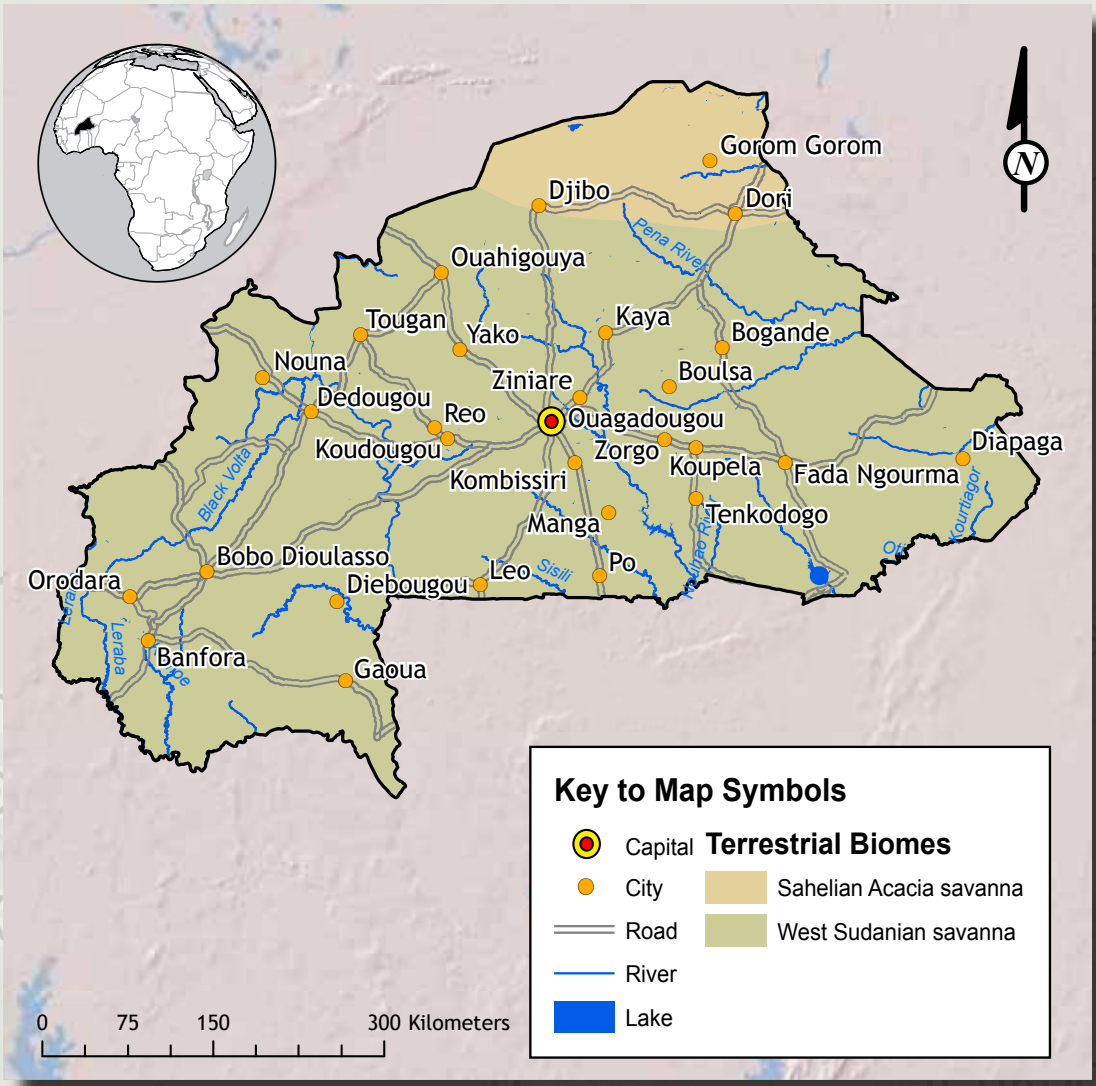
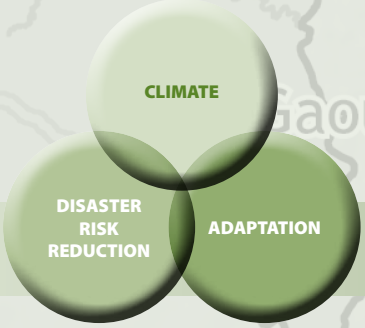


Vulnerability, Risk Reduction, and Adaptation to Climate Change



BURKINA FASO

GFDRR Global Facility for Disaster Reduction and Recovery

Climate Investment Funds

Climate Change Team ENV

COUNTRY OVERVIEW

OVERVIEW

Burkina Faso is a landlocked country located in the middle of the West African Sahel region and occupying over 274,000 square kilometers (sq km). With limited natural resources and a highly variable climate, Burkina Faso struggles to provide its dense population with food security and economic opportunity. One of the smallest economies in the world, Burkina Faso is deeply dependent on agriculture, with roughly 80% of employment linked to subsistence farming. The country's soils tend to be poor in nutrients, have low water-holding capacity, and are largely degraded. When rainfall declines, dust storms occur, or temperature spikes, food supplies/yields are immediately affected. As a result of this fragility, Burkina Faso remains at the bottom of the UN's Human Development Index, ranking 162 out of 169 countries, with 46% of the population below the poverty line[1]. Located between the Sahara Desert to the north and coastal rainforests to the south, Burkina Faso is prone to chronic drought, flash floods, wind storms, and disease outbreaks.

Key Sectors
Agriculture
Water Resources
Animal Resources
Forestry
Biodiversity

SOURCE: BURKINA FASO'S PROGRAMME D'ACTION NATIONAL D'ADAPTATION (PANA), 2007.

Measures to improve water retention and cultivation resilience to climate variation have started, but remain local and small scale. Low agricultural productivity continues to impede the nation's growth; therefore, major efforts to increase technical capacity, financial lending, water storage, crop diversification, and soil restoration are necessary. In addition, national weather early warning systems, environmental monitoring, and research on best practices will be essential to better forecast and combat the impacts of climate change.

PRIORITY ADAPTATION MEASURES

Priority Adaptation Projects
Early warning weather system for food security
Improved grain production through supplementary crop irrigation
Institutional integration and strengthening of weather information and early warning systems
Community-based adaption actions
Development and management of Lake Oursi
Forage production and stockpiling of feed for livestock
Managing natural resources and forests

In 2007, Burkina Faso's National Adaptation Plan of Action identified many of the country's urgent needs for adaptation action; the sectors of agriculture, water resources, livestock, forestry, and biodiversity required further research and immediate action. Institutional integration and strengthening of disaster risk reduction and climate change adaptation functions, functional weather information and early warning systems, and community-based adaptation actions were key cross-cutting priorities identified in the 2010 action plan on Disaster Risk Management and Adaptation to Climate Change.

[1] Burkina Faso's National Adaptation Programme of Action, 2007.

CLIMATE BASELINE AND CLIMATE FUTURE

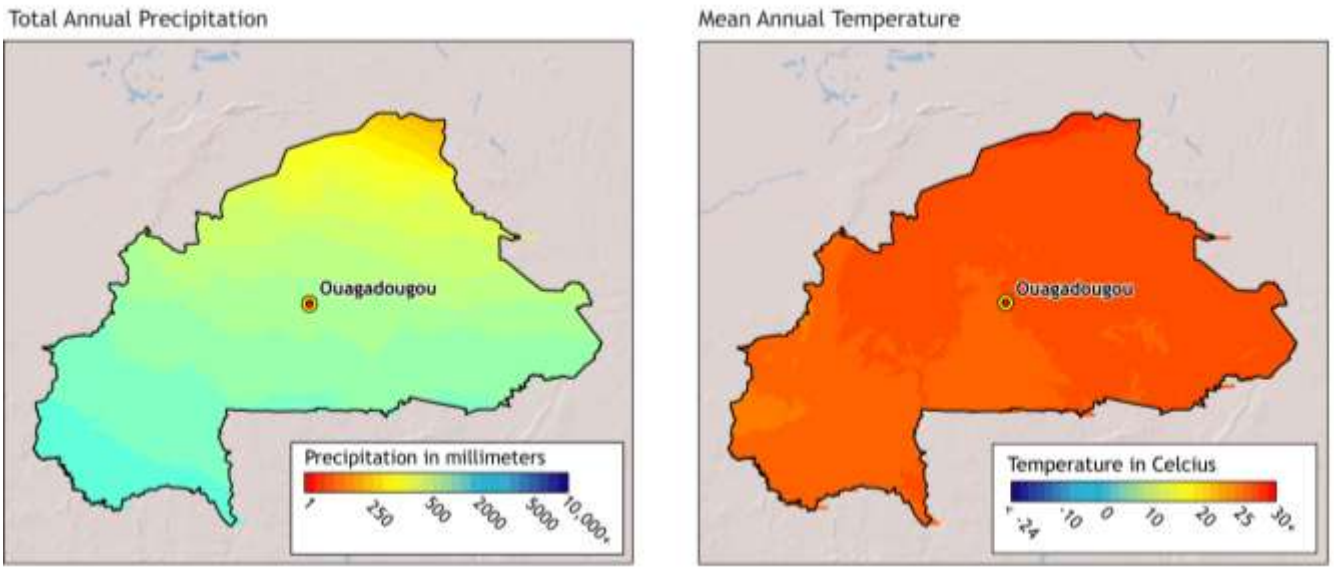


Figure 1: Climate baseline for Burkina Faso[2]

CLIMATE BASELINE

Burkina Faso experiences high temperatures and variable rainfall. Three climate zones split the country from north to south: the Sahelian zone in the north with rainfall less than 600 millimeters per year (mm/year), the Sudano-Sahelian region on a savanna plateau (Mossi Plateau) with rainfall from 600-900 mm/year and slightly cooler temperatures, and the southern more humid Sudanian zone with rainfall averages between 900-1200 mm/year. Each of these zones experiences a pronounced wet and dry season, with the wet season extending over a two-month period in the north and a six-month period in the south. The rainy season starts slowly in late March to early April in the southwest, extending gradually toward the center of the country in May and June, and reaching the northern extents in June or early July. The length of the growing season varies from less than 60 days in the north to 160 days in the south, with large inter-annual variations. The dry season is influenced by the *harmattans*, or dry, easterly winds that bring hot air to Burkina Faso from March to May. Potential evapotranspiration (PET) remains high throughout the year across the country, always above 100 mm per month, and can even reach 200 mm in February and March. Climate variability is already a major constraint on food security, health, environment, and poverty reduction due to the high dependence on the primary agricultural sector, which contributes 86% of the GDP. Droughts, floods, heat waves, locusts, and dust storms are the major climate-related hazards in Burkina Faso, which hamper the country's development and contribute to problems such as desertification, land degradation, epidemics (e.g. meningitis, cholera),

[2] WorldClim 1960-1990 averages. Robert J. Hijmans, Susan Cameron, and Juan Parra, at the Museum of Vertebrate Zoology, University of California, Berkeley, in collaboration with Peter Jones and Andrew Jarvis (CIAT), and with Karen Richardson (Rainforest CRC). www.worldclim.org/current

food insecurity, increased poverty incidents, migration away from the central area of the country[3], and overall development. The government of Burkina Faso has provided support to enhance warning systems concerning outbreaks of meningitis (produced by the national Meteorological Service since 2009) and some short-term climate forecast on a monthly basis on cumulative rainfall and waterflow of major river basins.

Recent Climate Trends

- Weather station observations since 1902 show that the dry zone has been extending southwards over the last century[4].
- Extremes in temperatures are occurring with monthly high temperature averages now regularly exceeding the previous maximums of 35°C, particularly in the north.

Climate Future

Climate change summary for Burkina Faso:

- Temperatures across Burkina Faso are projected to increase 3-4°C by 2080-2099, in comparison to the 1980-1999 time periods. This represents substantially higher temperature increases than the global average. Projected temperatures will increase in the north at a relatively higher rate than in the south and more in the wet season than in the dry season.
- There is a high level of uncertainty associated with climate projections for Burkina Faso and West Africa in general, particularly for changes in precipitation, meaning that projections should be treated with caution.
- According to the Intergovernmental Panel's Fourth Assessment report published in 2007, the number of extremely dry and wet years will increase during the present century, and semi-arid areas will become more arid.
- There are discrepancies between models projecting expansion or contraction of vegetation: some models predict significant drying of land, while others predict a general increase in moisture and expansion of vegetation into the Sahara.

As with the rest of Sub-Saharan Africa, the lack of an efficient meteorological network is one of the main reasons for the high uncertainty of the climate projections in the region. Yet, even with the high uncertainty of long-term precipitation pattern projections, some impacts emerge more clearly. Climate change is expected to increase variability and the incidence of extreme weather events, such as droughts, floods, and intense rainfall events. The variability can be expected to negatively impact crop production, particularly because agriculture is already vulnerable to current fluctuations in climate. Increasing temperatures will cause greater evapotranspiration, which will lead to drier soil conditions in many areas. The increasing demand for water will likely decrease water availability even with an

[3] Gouvernent de Burkina Faso (2001) Communication National de Burkina Faso (2002).
[4] Ministere de l'Environnement et du Cadre de Vie (2007).

increase in precipitation[5]. An increase in maximum temperatures, and probable increase in drought conditions, will affect pastoralist activities by contributing to land degradation and by directly impacting herd mortality rates[6]. Similarly, climate change decreases the ability for nomadic or semi-nomadic groups to use traditional indicators to plan their movements. The costs of climate change have not been calculated for Burkina Faso, and it would be difficult to do so given the uncertainties in climate change projections.

The most vulnerable sectors to climate change in Burkina Faso are water, health, agriculture, pastoralism, and forestry. Expected increases in extreme temperatures will increase heat-related mortality, and extreme events such as heavy rainfall and floods will increase the incidence of diarrheal diseases. Indirectly, if subsistence activities such as agriculture and livestock production are negatively affected by changes in climate, then the overall health of the population will be affected due to decreased food security and ability to gain enough nutrients.

CLIMATE CHANGE IMPACTS ON NATURAL HAZARD VULNERABILITY

Burkina Faso's vulnerability to droughts and floods is projected to increase as the frequency and intensity of extreme weather events increases. Since the 1970s, Burkina Faso has been gripped by frequent drought. Given the country's fragile high reliance on agriculture, droughts and floods can quickly create an emergency situation, and even with continuous foreign aid, food security continues to be an issue. In particular, rain deficiencies in the north have grown dire. Droughts deplete water reserves, reduce or eliminate crop yields, increase food prices, exacerbate poverty, and decimate livestock. When the wet season finally does come, the torrential rain storms often cause flash flooding and damage to infrastructure. With Burkina Faso's population doubling over the past 25 years and as population continues to increase, additional demand for water resources and added deforestation pressure are expected to be compounded by the increasing climate variability and change.

Burkina Faso is at risk from the threat of several natural hazards:[7]

- ***Droughts***—With sporadic rains and poor water retention in soils, Burkina Faso has experienced 'quasi-drought' conditions since the early 1970s[8]. These conditions are most pronounced between November and December when humidity averages 10%, and in the north where rain only comes during two months out of the year. Many of the country's rivers are intermittent. The country relies on rainfall for almost all of its water needs, including for agriculture; when water supplies dry, populations, especially in the Central Plateau, migrate to the east and west in search of better living conditions. This migration leads to overcrowding and environmental

[5] Danida (2008). Appréciation des impacts des changements climatiques sur les programmes de développement de la cooperation Danoise au Burkina Faso.
[6] Ministère de l'Environnement et du Cadre de Vie 2007. Programme d'Action National d'adaptation à la variabilité et aux Changements Climatiques (PANA).
[7] Country Note on Disaster Risk Management and Adaptation to Climate Change in Burkina Faso. http://www.gfdrr.org/gfdrr/sites/gfdrr.org/files/documents/Country_Program_Burkina_Faso.pdf
[8] Adaptation Learning Mechanism, ALM.net.

degradation of the receiving areas. Continuous water deficits cause acute water shortages, low yields, famine, desertification, and the decimation of both livestock and wildlife.

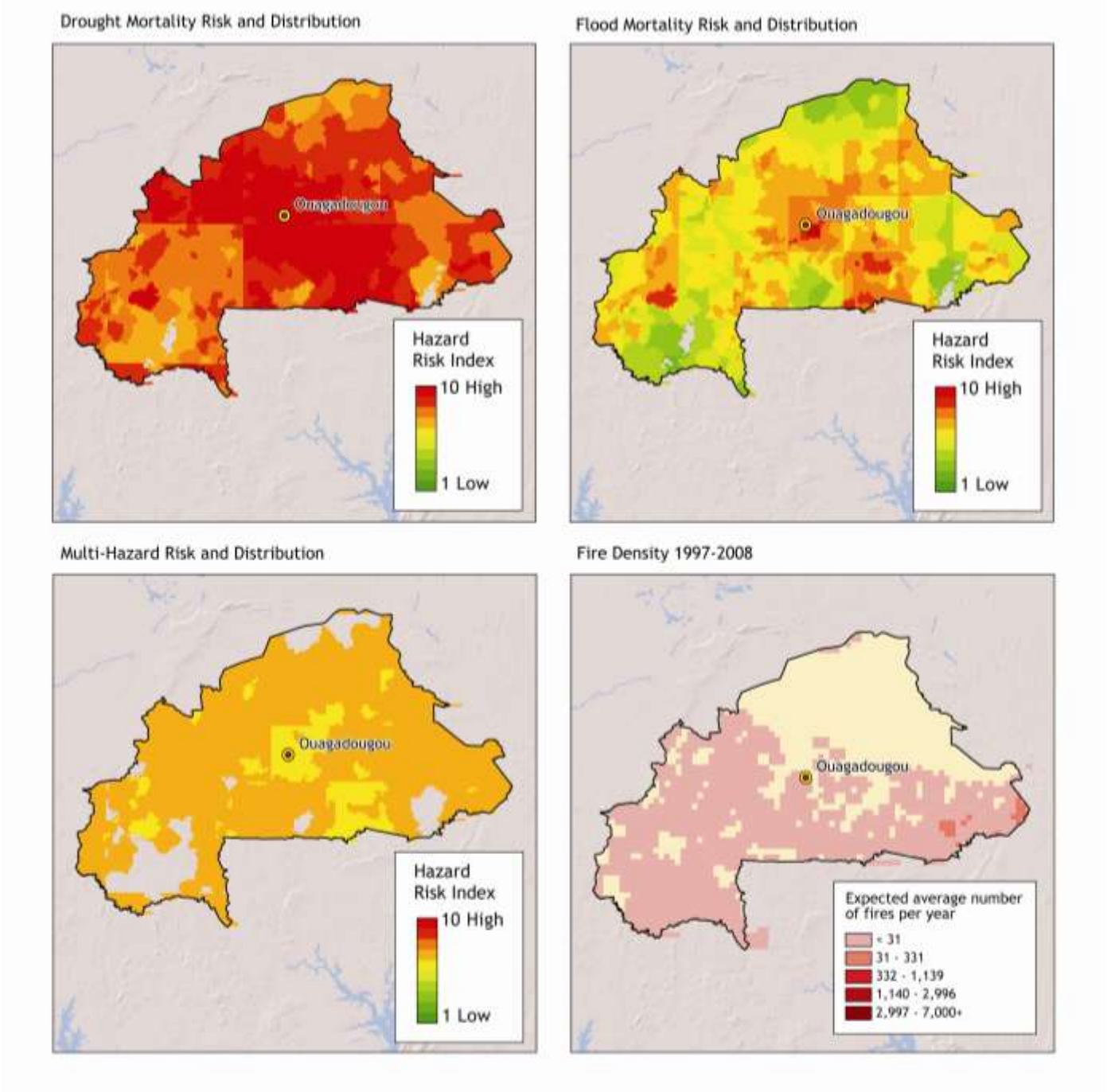


Figure 2: Exposure to climate-related hazards across Burkina Faso[9]

[9] UNEP's Global Risk Data Platform, Columbia University Center for Hazards and Risk Research (CHRR), and Columbia University Center for International Earth Science Information Network (CIESIN).

- ***Flooding***—Burkina Faso's wet season is characterized by heavy and often relentless rain that can wreck havoc on the country's poorly constructed informal settlements and degraded landscape, disturb the entire water sector, and destroy or reduce infrastructure services. Over the past 30 years, severe flooding has occurred repeatedly [10] especially in the north and center of the country, resulting from successive drought periods. Major crises were recorded in 1972/73 and 1983/84, and minor crises in 1990/91, 1995/96, and 1997/98[11]. In 2007, the National Agricultural Statistics and Forecasting Services reported at least 33,000 hectares of farmland completely inundated by floods between August and September. Two years later in 2009, heavy rainfall once again flooded crops and washed away 22,220 hectares of farmland, breaking 15 dams, and destroying 42,000 homes[12].

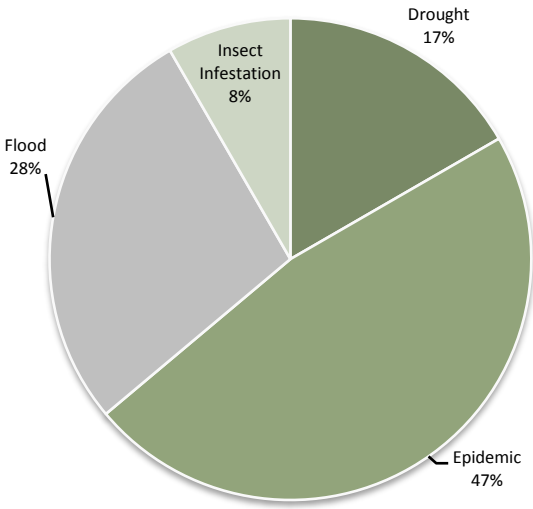


Figure 3: Reported natural disaster distribution in Burkina Faso: 1980-2008

SOURCE OF DATA: "EM-DAT: THE OFDA/CRED INTERNATIONAL DISASTER DATABASE, UNIVERSITÉ CATHOLIQUE DE LOUVAIN, BRUSSELS, BEL." DATA.

- ***Epidemics***—Burkina Faso's hot and dry climate is favorable to meningitis outbreaks from October to May and to cholera epidemics. Deadly meningitis outbreaks occurred in 1996 (killing 4,000), 2001 (killing over 1,500), 2006 (killing 600), 2007 (killing 1,330)[13], and most recently in March 2010 with 193 fatalities[14]. Measles epidemics also led to health emergencies, with the most recent outbreak taking 250 lives and affecting more than 35,000 people[15].

- ***Wind Storms*** **and** ***Insect Infestations***—During the dry season, the harmattan winds spread across Burkina Faso, bringing hot, dry air and sand storms across the central Mossi Plateau. When coinciding with locust outbreaks, the harmattan winds can accelerate their spread to communities at a rate up to 200 km per day[16].

[10] In 1988, 1992, 1994, 1999, 2007, 2009.
[11] GFDRR Burnika Faso Country Note 2010 and PNOCSUR 1999.
[12] Post-Disaster Needs Assessment (2010). Inondations du 1erSeptembre 2009 au Burkina Faso, Evaluation des dommages, pertes et besoins de construction, de reconstruction et de relèvement.
[13] BBC Timeline: Burkina Faso http://news.bbc.co.uk/2/hi/africa/1032662.stm.
[14] Burkina Faso: Meningitis International Federation's Disaster Relief Emergency Fund (DREF).
[15] Disaster Assistance at a Glance: Burkina Faso, OFDA/USAID 2010.
[16] Locust Crisis deteriorates (http://www.afrol.com/articles/14090).

SECTORAL CLIMATE RISK IMPACTS AND REDUCTION RECOMMENDATIONS

AGRICULTURE AND FOOD SECURITY

Burkina Faso's economy is deeply rooted in the agriculture sector, with farming and forestry employing over 80% of the work force and contributing to 40% of the GDP. The principle cash crop is cotton, although millet, sorghum, maize, groundnuts, rice, cowpea, bambara groundnut, and yam are widely cultivated. Average farmland holdings are extremely small and advanced technology is limited. Only 15,000 hectares of the country's 3.27 million hectares of farm land are irrigated, making the entire sector extremely vulnerable to rainfall variations. Soil is generally nutrient poor and of limited water retention capacity, especially in the northern Sahel region. Inputs such as fertilizers are used in limited scope and exclusively on cash crops.

The majority of farmers rely on groundwater and rain. With future climate scenarios predicting an increase in temperatures, decrease in rainfall, and, most importantly, increased year-to-year variability, the climatic conditions for agricultural production become less favorable, such as the possibility for a more pervasive grain deficit. Millet yields in the north, for example, are projected to decrease as are maize yields in the south due to water deficits in July-September[17]. Burkina Faso is the largest producer of cotton in Sub-Saharan Africa; the industry contributes 8% of the country's GDP and employs approximately 17% of the population[18]. Despite a general decline expected in the yield of most of the country's cereal crops, cotton yields have the potential to increase due to rising temperatures[19]. Nevertheless, if rainfall grows increasingly erratic, Burkina Faso's largest and most economically important cotton cash crop will continue to be vulnerable. Attempts to boost rice production in 2000 through an irrigation scheme successfully doubled the country's output and could be further improved, along with other crops, to increase its resilience to climate risks in the future.

Burkina Faso's agriculture sector is one the least productive amongst African countries. In order to reverse this trend and attain food security, Burkina Faso needs to implement the following additional measures:

- Decentralizing food stocks (cereal banks) and securing grain production through the promotion of supplementary irrigation in the provinces of Oudalan and Nammemtenga.
- Improving communication and management of food stock distribution during a crisis.
- Strengthening drought preparedness and crisis food management in Oursi and Boulsa.
- Strengthening early warning systems for weather-, water-, and climate-related hazards, improving communications and notifications to farmers regarding climate (seasonal) and hydrological forecasts (pockets of drought, floods, and pests), and harmonizing information databases and methodologies.
- Educating and training people on how to deal with the risk of food insecurity.

[17] Burkina Faso's National Adaptation Programme of Action, 2007.
[18] IMF: Tackling Burkina Faso's Cotton Crisis. 2008 http://www.imf.org/external/pubs/ft/survey/so/2008/CAR022508B.htm
[19] Burkina Faso's Initial National Communication.

- Promoting the use of more resilient crop seeds and techniques that are "anti-aleatoire" (multiple varieties, planting date, tillage, and CES/DRS techniques)[20].
- Improving soil fertility through the correct use of organic manure (compost pits and mineral rich fertilizers).
- Expanding irrigated agriculture and supplementary irrigation.
- Establishing strategic land grazing policies that secure access to water points.
- Improving the management of transhumance.

URBAN AREAS

While the vast majority of Burkina Faso's population remains rural, urbanization rates rise as people migrate from drought-plagued regions in search of job opportunities and food security in cities. Thus, the droughts affecting the country since the 1970s and 1980s have led the poor fringe of the population to move into the valleys and the small basins of the rivers, which in turn aggravates the aftermaths of flooding, particularly in the outskirts of cities. Currently, 20% of Burkinabes are urban dwellers, a percentage that is steadily rising at an average of 5% annually since 2005[21]. Most of the urban population lives on the central Mossi Plateau, the location of the sprawling capital city Ouagadougou (population 1.5 million). This densely populated plateau receives minimal rain (600-800 mm/year), and a majority of inhabitants rely on rainfed urban and peri-urban farming. Poor sanitation and shallow water supplies aggravate the health conditions of the urban population; an estimated 70% of Ouagadougou residents use pit latrines, and only 5% of the population has access to septic tanks[22]. The combination of standing water and poor sanitation leads to disease outbreaks, especially high rates of malaria outbreaks. From 2001-2008, the World Health Organization reported 28 communicable disease outbreaks in Burkina Faso, including meningitis, yellow fever, measles, and cholera.

While basic urban services/utilities such as waste disposal and water supplies are overburdened, increases in rainfall variation are expected to exacerbate the situation. Burkina Faso's Initial National Communication predicts that by 2025, the drinking water supply in Ouagadougou could require government rationing to meet the demands of a growing industrial sector. The Nakambé reservoir's water volume, which supplies Ouagadougou with the majority of its water, is expected to decrease by 29.9% and have a 35.7% increase in runoff due to advanced soil degradation[23]. In rural areas, an increase in droughts not only depletes the urban water supply, but also leads to urban population growth—when fields dry up, farmers migrate to cities, increasing urban water demands. Adaptation options in the urban sector include:

- Improved land-use planning and zoning
- Improving the formulation and providing for regular provision of climate risk information

[20] Conservation des Eaux et des Sols/Défense et Restauration des Sols.
[21] CIA Factbook.
[22] AFD [Agence Francaise de Développment] (2008) Evaluation ex-post du projet d'assainissement collectif de la ville de Ouagadougou. Série Évaluation et capitalisation, No. 16. http://www.pseau.org/outils/biblio/resume.php?docu_document_id=1492
[23] First National Communication, 2003.

- Combating water pollution in overburdened and inefficient water systems
- Improving waste management and urban sanitation
- Strengthening awareness about long-term reduction of flood risk

ENERGY

The government of Burkina Faso is attempting to strengthen and diversify its economy through the development of its mineral resources and industrial processing sectors. The push triggered an expansion in the consumption of fossil fuels and hydroelectric power. Several new thermal power generations were recently constructed, but costs remain high, and demand is rising. With limited fossil fuel energy sources, the country is focused on the production of biomass, hydroelectric, and solar energy. While all petroleum products are currently imported, and water supplies are becoming increasingly unpredictable, solar energy is the nation's most abundant and reliable source of energy accounting for roughly two-thirds of the country's electricity.

Despite the country's progress in implementing economic structural reforms, lowering costs and improving efficiency in the energy arena gained limited success. According to the African Development Bank, the average production cost per kilowatt hour (kWh) for 2008 was about US$0.32 per kWh. Because only 17% of all Burkinabes—including 4% of rural households—have access to electricity, wood fuel provides over 90% of domestic energy. The Government's *Ministère de l'Environnement et du Cadre de Vie* is trying to promote energy-efficient butane stoves to slow deforestation and reduce pollution from wood fuel, but progress is difficult. In order to meet the future demand for energy, the government launched some actions, including:

- An *Electricity and Infrastructure Strengthening and Rural Electrification Project* to rehabilitate and extend the national energy generation and energy grid. While this project will increase accessibility, measures to improve the efficiency of the system need to be implemented in order to decrease dependency on neighboring countries' power sources.
- Additional adaptation options for the energy sector include 'green' stoves and other alternative energy equipment, such as water heaters and solar dryers.

INFRASTRUCTURE

In spite of numerous projects funded by the World Bank, UNDP, and UN Habitat over the past three decades, Burkina Faso's infrastructure remains inadequate and outdated[24]. Burkina Faso's Poverty Reduction Strategy Paper highlights the need for stronger transportation and communication networks that could stimulate economic growth. Improved infrastructure helps to increase market accessibility and improve the standard of living through accessibility to schools, health clinics, and jobs. Stronger infrastructure could substantially decrease the population's vulnerability to weather shocks, by increasing the range of income-generating activities to minimize the effects of failed crops and by allowing aid to reach remote villages.

[24] The World Bank (2002) Burkina Faso: Country assessment report upgrading of low-income settlements. <http://web.mit.edu/urbanupgrading/upgrading/case-examples/overview-africa/country-assessments/burkina-faso.html>

Implications for Disaster Risk Management

- Increases in climate variability, reduction in the length of the rainy season, and uncertain projections of increasing extreme rainfall events can lead to insufficient crop yields. In order to prevent detrimental effects on the economy, support needs to be extended for the implementation of cost-effective risk transfer and risk reduction measures such as the provision of "safety nets" and the development of early warning systems[25].
- To reduce the loss of lives and destruction of infrastructure during the wet season, spatial management of rural and urban areas as well as housing construction materials, design, and locations need to be improved. Almost half of the homes in Ouagadougou are constructed with mud brick; the majority of the houses are built without adhering to any type of risk regulations. Enhanced urban and rural land-use planning remain critical in the long term. Dams and drainage systems should also be strengthened so that intense rainfall does not easily overwhelm and break the system.
- Government sector ministries need to include risk reduction of hazards and vulnerabilities into future planning and concrete actions, including establishing "better multi-sector coordination within the ministries and key-stake-holders in order to assure a common approach in disaster prevention management."[26] The role of the DGPC (La Direction Générale de la Protection Civile) and CONASUR[27] need to be clearly defined and promoted to rely less on external disaster management[28]. The role and operations of CONASUR and the National Council on Environment and Sustainable Development (SP/CONEDD), which is the national focal point for climate change, should be harmonized to address climate change adaptation and mitigation and disaster risk reduction and management in an integrated manner.

ADAPTATION

Climate change adaptation measures have yet to be fully integrated into the government's institutional framework. Harmonizing and/or integrating the functions of CONASUR and CONEDD will provide a useful starting point in this respect. Clear mandates to address future climate change risks are needed and must be weighed against tight budgets to allocate substantial resources toward long-term adaptation strategies. Poor rural communities that depend directly on subsistence farming or cattle raising are likely to be disproportionately affected because of low access to information, capital, and decision-making structures that allow for successful adaptation. Lowering Burkina Faso's vulnerability to climate change requires the implementation of a number of integrated measures aimed at strengthening agricultural production and water resource management, including the systematic

[25] Post-Disaster Needs Assessment (2010). Inondations du 1er Septembre 2009 au Burkina Faso, Evaluation des dommages, pertes et besoins de construction, de reconstruction et de relèvement.
[26] See priority action list outlined in the GFDRR COUNTRY NOTE ON DISASTER RISK MANAGEMENT AND ADAPTATION TO CLIMATE CHANGE IN BURKINA FASO, P.13. <http://www.gfdrr.org/gfdrr/CountryPrograms >
[27] Conseil National de Secours d'Urgence et de Réhabilitation.
[28] Post-Disaster Needs Assessment (2010). Inondations du 1er Septembre 2009 au Burkina Faso, Evaluation des dommages, pertes et besoins de construction, de reconstruction et de relèvement.

assessment of hydro-meteorological risks and provision of early warning. Other efforts include the restoration of degraded areas, improvement of sanitation services, protection of wildlife and forests, and promotion of alternative energy sources. Community-level adaptation action is needed to translate the objectives of the numerous sectoral policies and plans already adopted in the country into specific on-the-ground outcomes.

Ongoing Efforts and Strategies at a Glance (some examples)

Cross-Cutting

- National Emergency Aid Organization and Coordination Plan (PNOCSUR)
- The West African Seasonal Forecast (PRESAO)
- Adaptation capacity-building programs focusing on civil society and on improved food security supported by bilateral donors, NGOs, and the UN Development Programme (UNDP)

Agriculture

- Agricultural Development Support Program of Burkina Faso (PADAB II)
- National Food Security Program (2006-2015), supported by bilateral donors and the Food and Agriculture Organization (FAO)
- The Sustainable Rural Development Program (PDRD, 2005-2014)
- Support Program to the Agro-Sylvo-Pastoral Sectors (PAFASP,2006-2012), supported by the World Bank
- The *West African Inland Valley Information System* (WAIVIS) provides information on future agriculture conditions in the lowlands of West Africa.
- "Support to Adaptive Capacities to Climate Change in the Sahel" program of the AGRHYMET Regional Center
- *Institut de l'Environnement et de Recherches Agricoles* (INERA) is a research institute focused on sustainable agriculture and environmental management in Burkina Faso. http://www.inera.bf/

Rural Development/Food Security

- The *Rural Urban Cooperation on Water Management in the Context of Climate Change in Burkina Faso* is a project funded by DFID and IDRC to facilitate a dialogue between rural and urban stakeholders to reduce vulnerability to water supply.
- The *Forum for Agricultural Research in Africa* (FARA) manages the production of cheap rural energy to support post-harvest technologies. Funded by the World Bank, this program supports the development of solar energy and energy produced from agricultural waste.
- The *Africa Emergency Locust Project* (AELP), funded by the World Bank, aims to prevent locust infections and enhance early warning systems. Millions of farmers have already received assistance through the AELP program.

- *Le Programme National de Gestion de l'information du milieu* (PNGIM) is a government program that manages environmental data collection.
- *African Adaptation Program* (AAP) supports integrated and comprehensive approaches to climate change adaptation in Africa.
- *FAO* has several programs that support sustainable rural livelihoods and strengthen the foundations for food security. Programs target communities vulnerable to soaring food prices, disease outbreaks, and climate shocks.

Water Management

- Because drought and water scarcity is a recurring problem, strategies to mitigate the impact of sporadic rainfall on the cotton industry are underway. In December 2009, GFDRR held a workshop on weather risk management in Burkina Faso's cotton sector.
- After the flooding in 2009, GFDRR's Post-Disaster Needs Assessment called for the support of improved construction of houses through the use of better flood resistant materials and design to reduce damage from flash floods.
- Small-Scale Irrigation and Water Management Project (PIGEPE, 2004-2014)
- Action Plan for Integrated Water Resources Management (PAGIRE, 2004-2015), supported by a number of bilateral donors, the EU, GEF, and Africa Development Bank

The Global Facility for Disaster Reduction and Recovery (GFDRR)

An in-depth analysis of the disaster risk management and climate change adaptation in Burkina Faso distinguished four priority areas of intervention that could be supported[29]:

- Strengthening CONASUR, improving its relations with other institutions;
- Establishing a functional early warning system;
- Strengthening the response capacity of CONASUR institutions;
- Implementing climate change adaptation actions at the village level.

EXISTING ADAPTATION FRAMEWORK/STRATEGY/POLICY AND INSTITUTIONAL SETUP

Burkina Faso's First National Communication to the Framework Convention on Climate Change outlined the following weaknesses in available policies, programs, and strategies to address climate change risks in the country:

- The ignorance of the phenomenon of climate change;
- The inadequacy of public health policies;
- The lack of a coherent energy policy;

[29] Burkina Faso GFDRR country profile.
https://www.gfdrr.org/gfdrr/sites/gfdrr.org/files/documents/Country_Program_Burkina_Faso.pdf

- The absence of pollution standards.

GAPS[30]

- There are no programs devoted to capacity building in the area of disaster risk reduction and climate change; training is not systematically carried out but is done using projects, although without any coordination.
- Mechanisms for rapid assistance to those affected by natural disasters, including floods and droughts, such as monitoring capabilities and institutions responsible for addressing natural disaster risk.
- Financial and operational support for the National Programme for Land Management and Administration (PNGT), which is proposed as the main government program tasked with incorporating climate change adaptation into local and community-level planning.
- Financial and operational; support for ongoing efforts to expand irrigation in key cereal production areas, particularly in the northern provinces of l'Oudalan and Namentenga.
- Trained technical experts in climate change for coordination among institutions with clear mandates.
- Seed varieties that require less water, particularly for farmers who are expected to continually face water shortages.
- While knowledge about the risks associated with drought (food insecurity and malnutrition) are relatively well understood, awareness about long-term reduction of flood risk is only partially addressed.

RESEARCH, DATA, AND INFORMATION GAPS

A large percentage of Burkina Faso's population is dependent on the sectors most vulnerable to climate change. Additionally, Burkina Faso does not have adequate monitoring systems to predict extreme events or assess possible changes in weather patterns, thus making the task of developing short-term responses or disaster mitigation strategies extremely difficult. Adaptation strategies are therefore difficult to formulate without detailed vulnerability and impact assessment studies. These challenges necessitate addressing the following research, data, and information gaps.

DATA AND INFORMATION GAPS

- Although regional meteorological and agricultural institutes, such as WAIVIS (The West Africa Inland Valley Information System) and FEWS Net (Famine Early Warning Network), work to predict seasonal crop conditions, the dissemination and accuracy of knowledge need improvement and expansion to support appropriate response measures.

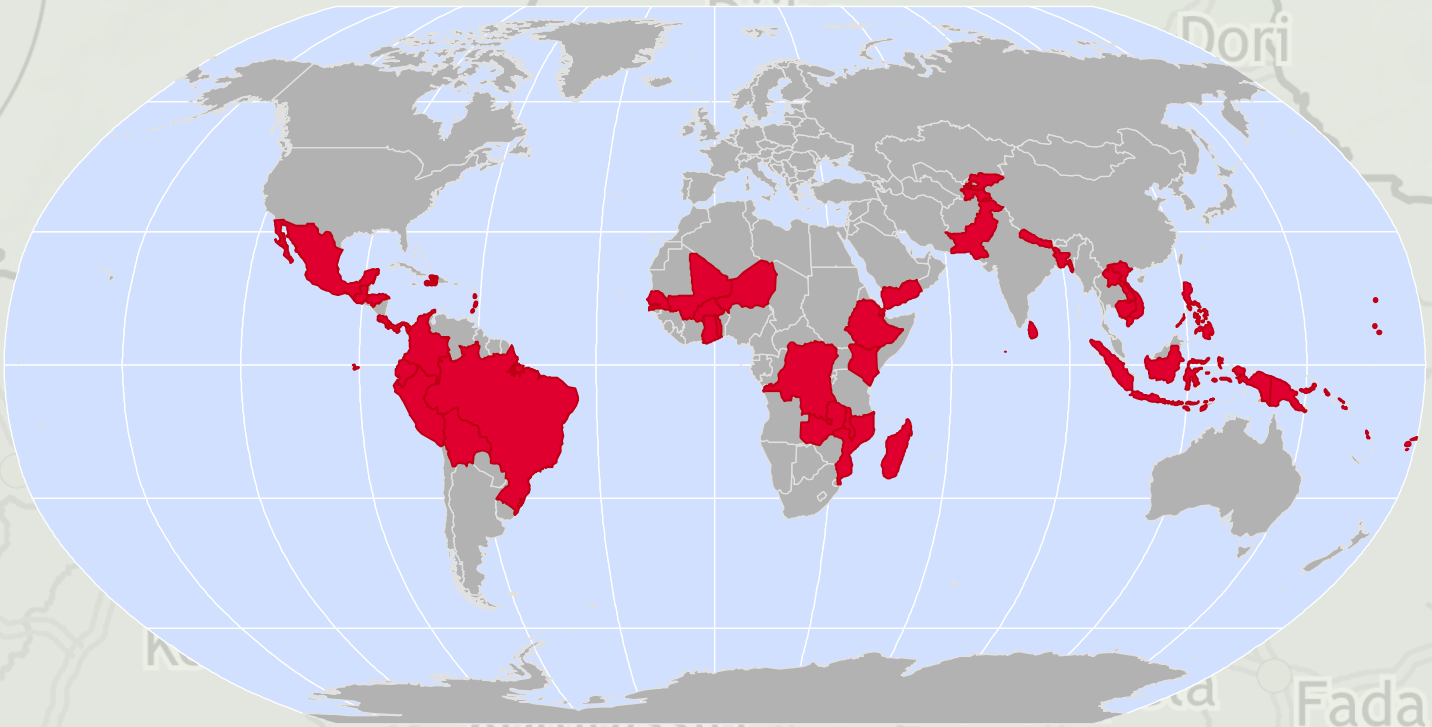
[30] Please refer to the Burkina Faso DRM/CC country note for identification of additional gaps.

- A more efficient meteorological network is needed to provide better ground measurements and validation for climate models.
- A mechanism to support the integration of data from relevant research institutions to address current and future climate change risks is required in order to systematically monitor changes and risks.
- Food aid statistics in Burkina Faso display the need for a robust food security early warning system to allow for early and preventative action in cases of chronic food insecurity. In the food security and nutrition sector, information is critical for both emergency interventions and long-term assistance. Quality information, delivered in a relevant timeframe and with gender specifics, is necessary in order to respond adequately to targeted groups. Such a system requires the collection and integration of data for vulnerable districts in the following areas:
    - Food/Market Access
    - Agricultural Production Monitoring and Harvest Forecasts
    - Vulnerable Groups
    - Food and Nutrition

Research Gaps

- Impact studies are required, particularly on agricultural productivity with projected changes in climate. For example, initial studies on the impacts of climate change on cotton production suggested yield increases in the northern regions. However, additional feasibility studies are required to support any projected change in production yields, particularly with regards to water availability.
- There is a need to improve existing impact studies to investigate how a sustained drop in rainfall will affect groundwater levels, environmental degradation, and biodiversity. Changes in climate, land use, and population pressure have already increased erosion and siltation, but the impacts are yet to be fully understood.
- Robust farming techniques for a changing climate need to be identified, such as drought-tolerant and culturally acceptable cereals.
- A comprehensive assessment of river flows and water management structures can help to identify locations for the creation of water-retention ponds.

This Country Profile ***(http://countryadaptationprofiles.gfdrr.org)*** *is part of a series of 49 priority country briefs developed by the Global Facility for Disaster Reduction and Recovery (GFDRR) and the Global Support Program of the Climate Investment Funds (CIF). The profile synthesizes most relevant data and information for Disaster Risk Reduction and Adaptation to Climate Change and is designed as a quick reference source for development practitioners to better integrate climate resilience in development planning and operations. Sources on climate and climate-related information are linked through the country profile's online dashboard, which is periodically updated to reflect the most recent publicly available climate analysis.*



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