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AfricaInteract

Enabling research-to-policy dialogue for adaptation to climate change in Africa

Research and Policies for Climate Change Adaptation in the West Africa Health Sector

SUMMARY



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Acronyms and Abbreviations

COMNAC	Comité National sur les Changements Climatiques, Senegal
ECOWAS	Economic Community of West Africa States
HDSS	Health and Demographic Surveillance Systems
HIV/AIDS	Human immunodeficiency virus / acquired immunodeficiency syndrome
IDSR	Integrated Disease Surveillance and Response
INDEPTH	International Network for Demographic Evaluation of Populations and Health
IPCC	Intergovernmental Panel on Climate Change
LDC	Least Developed Country
LDCF	Least Developed Countries Fund
LF	Lymphatic filariasis
NAPA	National Adaptation Programme of Action
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization

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1. Introduction

Although Africa has contributed least to global greenhouse gas emissions, the continent is highly vulnerable to the impacts of climate change (World Bank 2009). In West Africa, the expectation is for a greater number of extremely dry and wet years in the Sahel region throughout this century, and for more severe droughts (Boko et al. 2007). Climate change may impact on health through distinct mechanisms (Thomson et al. 2004), for example, impact directly through heat stress, or indirectly through: a) its role in determining agricultural output and consequently food security, which directly affects nutritional status; b) its role in the economy, which might affect governance, health systems and hence access to disease prevention and health care; c) its role in determining seasonal and annual demographic processes (e.g. migration) increasing the likelihood of individuals contracting certain infectious diseases such as HIV/AIDS; and d) its impact on the spatial and temporal distribution of climate-related infectious diseases (e.g. malaria, Rift Valley fever and meningococcal meningitis).

West Africa’s socio-economic vulnerability to climate change correlates with poor health conditions in the region. Except for Cape Verde, life expectancy at birth in the West African region falls below the world average, due to high mortality rates among children under 5 (up to 150 per 1,000 live births in some countries). Other climate-sensitive diseases including vector born diseases, meningitis and HIV/AIDS, are prevalent in West Africa and constitute the major disease burden in the region. Climate variability plays a major role in increasing their incidence or in ‘triggering’ periodic epidemics. Evidence abounds that the climate is changing and there is a lot of uncertainty regarding the pace and extent of the changes, and the health impacts in communities. This uncertainty renders policy decision-making more complex and highlights the need for Africa to build its knowledge and analytical base and to strengthen the capacity of national and regional institutions in developing the evidence base needed to address climate change adaptation issues.

With funding from the International Development Research Centre (IDRC), AfricaInteract and CORAF/WECARD commissioned a desk review of research and policies related to climate change adaptation in the health sector in Africa. The goal of the review is to enhance the knowledge base and to support

research-based policy formulation for climate change adaptation in the health sector in sub-Saharan Africa. The review was conducted to seek answers to the following questions:

- What is the role of climate change challenges in the context of the multiple challenges and opportunities facing the health sector in the region?
- What is the current state of knowledge on adaptation to climate change in the health sector in the region?
- What is the current state of knowledge on whether and how research findings are integrated in health sector policies in the region?
- What are the major gaps in research on adaptation to climate change in the health sector?
- What is needed to ensure that research findings are better integrated into health sector policies?
- What is the current state of knowledge about the stakeholders involved with research and policy on adaptation to climate change in the health sector in the region, and how can stakeholder involvement be improved?

This publication is a Summary of the main report published by CORAF/WECARD and Future Agricultures.

2. Overview of the West Africa Health Sector

2.1. Key facts for the health sector in West Africa

Although the health status of the populations of West Africa has improved remarkably over the last 50 years, average life expectancy at birth remains around 50 years compared with 68 years for the rest of the world (WHO 2009). Infectious and parasitic diseases remain the leading causes of high mortality, accounting for more than 42 percent of all deaths. Malaria is the primary cause of morbidity and mortality in West Africa. Over one third of reported malaria cases on the continent occur in West Africa. However, West Africa is less affected by HIV/AIDS than southern and eastern Africa regions.

Other serious tropical diseases include meningitis, cholera and other diarrhoeal diseases, onchocerciasis, trypanosomiasis, dracunculiasis, schistosomiasis, leprosy and yellow fever. Acute respiratory diseases and malnutrition complete the landscape of the main pathologies. Some of these diseases are present in specific geographic environments. For example, onchocerciasis and epidemics of meningitis are particularly prevalent in the Sudano-Sahelian region. Other diseases remain limited to a few countries, such as Lassa fever in Côte d'Ivoire, Guinea and Sierra Leone and Buruli ulcer disease in the coastal countries between Côte d'Ivoire and Ghana (ECOWAS-SWAC 2007).

Weak health systems with insufficient financial resources undermine efforts to reduce the burden of these diseases. Access to sanitation and drinking water are also essential factors. In Africa, only 60 percent of the total population has access to improved drinking water (85

percent of the urban population and 45 percent of the rural population). In West Africa, the rate of access to potable drinking water varies from 50 percent to 80 percent. In Nigeria, Senegal and Ghana, the proportion of the population with access to potable water is 60 percent, 70 percent and 80 percent respectively.

The number of health workers per inhabitant is also very low in West Africa, which records on average, one doctor for each 8,300 inhabitants, compared to one for 435 in the United Kingdom and one for 170 in Cuba (ECOWAS-SWAC 2007). This distribution displays wide intra-regional disparities, with 70 percent of West Africa's doctors found in Nigeria alone, which houses 45 percent of the region's population. The result is a ratio of one doctor to 4,000 inhabitants in Nigeria, and a much more critical situation in countries such as Niger, Liberia and Sierra Leone, each with less than one doctor to 33,300 inhabitants.

2.2 Climate and health interactions in West Africa

There are two main aspects to the interaction between climate and health in West Africa:

Climate change can increase health hazards

Climate change may directly impact on health through extreme high air temperatures that may contribute to deaths from cardiovascular and respiratory disease, particularly among the elderly. The major killers in the region such as diarrheal diseases, malnutrition, vector-borne diseases such as malaria and other infectious disease are also highly climate-sensitive and are expected to worsen as the climate changes. Other less direct impacts on health operate through a number of distinct mechanisms including a) the impact of climate on food security and nutrition; b) impact on the affordability of maintaining nutritional status and accessing health care and preventative tools against disease (e.g. mosquito nets); and c) its role in determining seasonal and annual demographic processes by causing seasonal labour migration, which is common in the Sahel, as well as movement of refugees, increasing the vulnerability of individuals to contracting certain infectious diseases such as HIV/AIDS, malaria and respiratory infections (Findley et al. 2005).

The health impacts are an outcome of a large number of factors such as economic status, access to health services, demographic patterns and environmental changes

Climate change affects the social and environmental determinants of health – clean air, safe drinking water, sufficient food and secure shelter. Rising sea levels and extreme weather events destroy homes, medical facilities and essential paramedical services. Variable rainfall patterns affect the supply of fresh water and lack of safe water can compromise hygiene and increase the risk of diarrheal disease. Floods contaminate freshwater supplies, heighten the risk of water-borne diseases and create breeding grounds for disease-carrying insects such as mosquitoes.

3. Research Related to climate change in the West Africa Health Sector

Scientific evidence has been accumulated on the health consequences of climate change in West Africa. The consequences include the impact of extreme weather events such as heat waves and flooding; the effect on infectious diseases (focusing mainly on vector- and water-borne diseases, food-borne diseases and HIV); the effect of changing levels of air pollutants and allergens; as well as malnutrition and population displacement.

3.1. Extreme weather events and disease

Heat waves: Research in the Sahel of West Africa examined the association between weather patterns and daily mortality using Health Demographic Surveillance System (HDSS) time series in Burkina Faso and in Ghana. These studies found strong associations between higher temperature and higher daily mortality. In Burkina Faso, short-term direct heat effect was particularly strong on the under-five child mortality rate. The rate of cardiovascular death was highest in April during the hot dry season (March–May), and means monthly temperatures were significantly related to mortality in elderly populations (Kynast-Wolf et al. 2010). Independent coherent effects and strong associations between rainfall events and daily mortality were also found, particularly in elderly populations. In Northern Ghana, short-term weather variability was also strongly associated with mortality.

Water-related diseases: Water-related diseases include water-borne (transmitted by ingestion) and water-washed (caused by lack of hygiene) diseases. Since 1970, over 12 cholera epidemic outbreaks have been reported in West Africa, from coastal to Sahelian areas (Constantin de Magny et al. 2012; 2007). Association was found between outbreaks of cholera and local variability of rainfall and the global climate variability quantified by the Indian Oscillation Index.

Malnutrition: Malnutrition is one of the greatest health crises in West Africa. Climate variability and change influence shocks, trends and seasonality observed and predicted in West African countries. These factors have considerable effects on under-nutrition and its causal pathways, and represent sources of stresses in the lives and livelihoods of exposed communities. Most studies on malnutrition and climate change emphasize food security and the projection of malnutrition with climate projections (Akrofi 2012; Lloyd et al. 2011; Ramin and McMichael 2009; Haile 2005). A study examining and projecting climate and health trends in Mali, coupling FEWS NET climate data and DHS health data, suggests links between livelihoods and each measure of malnutrition as well as a link between climate and stunting (Jankowska et al. 2012).

3.2. Vector-borne diseases

In West Africa, malaria, African trypanosomiasis, leishmaniasis, yellow fever, dengue, Rift Valley fever and other non-vector-borne infectious diseases such as cholera and meningitis, have been identified. (Connor et al. 2006, Thomson et al. 2004). The vectors – mosquitoes, ticks and flies are climate sensitive. Climate change is expected to lead to drastic changes in the geographical distribution, seasonal transmission of vector-borne diseases, such as Malaria, Filariasis, Onchocerciasis, and Yellow fever.

Malaria: Assessment of the potential impact of global climate change on the incidence of malaria suggests a widespread increase of risk due to expansion of the areas suitable for malaria transmission (Tanser et al. 2003; Martens et al. 1995). This predicted increase is most pronounced at the borders of endemic malaria areas and at higher altitudes within malarial areas. The incidence of infection is sensitive to climate changes in Sahelian areas where the disease is less endemic (Ermert et al. 2012). The most obvious result of rainfall decline in West Africa is the associated change in malaria prevalence and incidence across the region (Doumbia et al. 2012; Thomson et al. 2004). A greater than 80 percent decline in malaria incidence has been observed in the semi-arid areas of northern Senegal, Mali and Niger from the early 1960s to the mid-1990s. This reduction is presumably associated with a loss of vector breeding sites and a shortening or reduction in intensity of the malaria transmission season as a result of lower vector survivorship. Different cytogenotypes and molecular forms of *Anopheles gambiae* s.s. have been found to be highly climate sensitive (Sogoba et al. 2008; Sogoba et al. 2007). Observations of malaria incidence before and after the droughts which have occurred since the 1970s indicate that in the Sahel (Niayes region, Senegal), endemic malaria decreased drastically after the disappearance of the principal mosquito vector, *Anopheles funestus*, due to the destruction of its larval sites by cultivation (Mouchet et al. 1996)

Animal health and zoonoses: The most common zoonoses in West Africa are Rift Valley fever, African Trypanosomiasis and Leishmaniasis. Evidence of the actual impact of climate change on the transmission of leishmaniasis with field-based data is still weak (Fernandez et al. 2012; Fischer et al. 2010). There is a scarcity of data on the link between climate change and leishmaniasis in West Africa.

3.3 Immune disorders and respiratory diseases

Climate change will cause changes in the levels of air pollutants, the main concern being that higher temperatures are likely to lead to increased levels of ground-level ozone. In the Sahel with reduced rainfall, the concentration of dust particles in the air increases (de Longueville et al. 2013), and explains the recurrent annual epidemics of meningitis in countries like Burkina Faso and Niger (Agier et al. 2013; Yaka et al. 2008).

HIV/AIDS: The links between climate change and HIV/AIDS are still conjectural but they are becoming a subject of increasing concern and study (Ramin and McMichael 2009; Suarez 2008; Gomes 2004). No study has really demonstrated a direct link between HIV/AIDS and climate change. Most of the studies have described scenarios where in practice, individuals will face multiple stresses from climate change (i.e. floods and malaria) concomitant with other non-climate stressors (i.e. HIV/AIDS, globalization, etc.).

Meningococcal meningitis: In West Africa, meningococcal meningitis often occurs as extensive epidemics with thousands of deaths, particularly in the so-called meningitis belt of sub-Saharan Africa. The Sahel bears the greatest epidemic burden of meningococcal meningitis, recording over two-thirds of outbreaks and high attack rates (Molesworth et al. 2002b). Predominance of epidemics and their seasonal occurrence happens during dry, dusty times of year, ceasing with the onset of the rains (Molesworth et al. 2001), suggest that environmental conditions are important, although the mechanisms by which they may work are poorly understood (Cuevas et al. 2007; Thomson et al. 2006b; Molesworth et al. 2002b). The relationship between climate and meningitis has been most widely studied in West Africa, and the evidence indicates that the distribution of the epidemics is compatible with changes in the environment, particularly dust (Agier et al. 2013; de Longueville et al. 2013; Yaka et al. 2008).

4. Health Policies related to Climate Change in the West Africa Health Sector

4.1. Climate change considerations in national government health sector policies and strategies

A review of health considerations within the NAPAs of West African countries based on the principles of the Framework for Public Health Adaptation to Climate Change found that up to 95 percent of NAPAs considered health as one of the sectors on which climate change is considered to have impact (WHO 2011b). However, only 23 percent of these plans are comprehensive in health-vulnerability assessment. For example, many lack baseline epidemiological data for climate sensitive diseases and the health conditions. The diseases most frequently listed in these NAPAs were diarrhea, malaria, respiratory diseases, vector-borne diseases, meningitis and ocular and skin diseases. In West Africa, only Ghana, Nigeria and Senegal are listed among the top 10 recipient countries by amount disbursed.

Senegal: Senegal's government policies and reports reflecting adaptation needs, priorities and planned actions include a National Adaptation Strategy to Climate Change (Adaptation Fund 2010: 13). In addition to a NAPA and its National Communications, Senegal has set up a National Committee on Climate Change (COMNAC) that reports to the Minister of State, to

raise awareness of different groups on climate change, including the private sector, civil society, decision makers and academics.

Ghana: The adaptation document in Ghana is the Initial National Communication on Climate Change to the UNFCCC (Government of Ghana 2011). Climate change (adaptation and mitigation) has been integrated into Ghana's Medium-Term National Development Policy Framework (2010-2013) (Government of Ghana 2010). One commitment within this plan is to ensure integration of climate change impacts into sectoral and district plans.

Nigeria: Nigeria's strategy for addressing the impacts of climate change is captured in the First National Communication on Climate Change. Nigeria has initiated the development of a National Adaptation Policy, Strategy and Plan of Action, which includes human health (Federal Ministry of Environment 2010).

5. Gaps in Climate Change Adaptation Research and Policy in the West Africa Health Sector

In most West African countries, Action Plans have been prepared covering the following baseline risk and capacity assessments; capacity building; integrated environment and health surveillance; awareness raising and social mobilization; public health oriented environmental management; scaling up of existing public health interventions; strengthening of partnerships; and promotion of research.

5.1. Key research gaps on adaptation to climate change

The following research gaps on adaptation to climate change in the West Africa health sector were identified

i. Understanding of how climate change affects climate sensitive diseases in West African countries: Although many studies in West Africa show that climate change affects the environment and transmission patterns of parasitic infections such as malaria, trypanosomiasis and leishmaniasis, or other diseases such as cholera and diarrheal infections, there is little quantitative evidence of the impacts of climate change on health in different countries. More research is needed at national and regional levels to fully understand these impacts, with more rigorous assessments and building of the evidence base for public health adaptation strategies in NAPAs.

ii. Understanding how other societal and environmental changes (e.g. migration, settlement in new areas) affect the changes in health hazards and risks: Comprehensive assessments are required of the risks posed by climate variability and change on population health. The analysis of health considerations within NAPAs indicated that there is very weak, limited and fragmented information and understanding of the vulnerability of countries to climate change. Assessments are needed to establish the baseline situation of existing population vulnerability to climate-sensitive health risks and the degree to which health systems can effectively respond and manage these risks.

iii. Understanding how individuals and societies can respond to changes in hazards: There is a research gap in understanding local and indigenous knowledge coping/adaptation strategies and assessing their value for public health strategies. There is need for research and development of appropriate evidence for the development of early warning and early response systems including climate products and services for use in national policy and decision-making.

iv. Availability of data and information systems for building evidence-based early warning systems: West African countries are implementing the WHO's Integrated Disease Surveillance and Response (IDSR) strategy. However, the IDSR implementation of IDSR is hampered by poor data quality and use of aggregated data, and inadequate resources at the national, district and health facility levels resulting in delayed and incomplete reporting.

Risk factors for vulnerable population groups need to be investigated and research should be undertaken on the mechanisms of their vulnerability and opportunities for increased resilience.

5.2. Key Policy Gaps in climate change adaptation

A glaring policy gap is the failure to give climate change adequate attention with regards to the potential adverse effects it will have, directly and indirectly, on the health of the population. There is need to clearly address issues related to health with regards to climate change adaptation. There is no policy related to required ratios of different categories of health workers in relation to the population. . There is no policy for the required number of health workers in case of health disasters caused by climate change.

6. Stakeholders and Opportunities for Collaboration in Research on Climate Change in the West Africa Health Sector

A Regional Plan of Action for Reducing Vulnerability to Climate Change in West Africa was launched in 2010 by the Economic Community of West African States (ECOWAS) to develop the mechanisms, stakeholders and capacity needed to support governments' and communities' efforts for climate change adaptation.

Major research institutions and networks involved in health and climate change in the region, include Université Cheick Anta Diop in Dakar, Senegal; University of Ghana, Legon; University of Ibadan, Nigeria; Malaria Research and Training Center at University of Bamako, Mali; University of Ouagadougou, Burkina Faso; and Centre de Recherche Médicale et Sanitaire (CERMES) in Niger. In addition to those institutions, the following are important resources for climate and health research and response: (i) The Permanent Interstate Committee for Drought Control in the Sahel or Comité permanent inter-État de lutte contre la sécheresse au Sahel (www.cilss.bf/CILSS), which has two institutions, the AGRHYMET (Agro-Hydro-Meteorological) Regional Centre (<http://www.usbr.gov/pn/agrimet/wxdata.html>) in charge of agriculture, hydrology and meteorology; and the Sahel Institute, specialising in the facilitation of exchange between national systems.

(ii) The West African Health Organization (WAHO) is a specialised health institution that is part of ECOWAS. Its mandate is to help Member States to deliver a high quality of health care for their people.

(iii) The International Network for the Demographic Evaluation of Populations and Their Health (INDEPTH www.indepth-network.org) is a global network of members who conduct longitudinal health and demographic evaluation of populations.

(iv) The Network of Migration Research in Africa (NOMRA) is a collaborative association of researchers and scholars interested in and working on migration, especially international migration, in the region.

(v) Environment and Development Third World or Environnement et développement du Tiers Monde (ENDA-TM) is focused on providing support and sharing knowledge on climate change adaptation.

(vi) Info Climat (INFOCLIM) shares knowledge between stakeholders, with its main emphasis being on building awareness and the dissemination of data.

A higher degree of regional climate change action is occurring through collaboration between stakeholders and participation in shared projects and programs focusing primarily on the following sectors: agriculture, freshwater, fisheries, coastal zones and biodiversity/ecosystem conservation. Scientific and social scientific expertise is required to inform the discussion of potential adaptation options, such as disaster risk reduction (DRR) measures to manage hydro-meteorological risks, or the feasibility and socio-economic implications of changing practices, such as introducing climate variability information into public health interventions (Findley et al. 2005).

7. Conclusions and recommendations

7.1 Conclusions

This review highlights the poorly institutionalised communication of information for evidence-informed policy formulation . There is a general lack of awareness among health policymakers about climate change risks and how these relate to public health priorities.

Countries in West Africa are already suffering from the health impact of climate change. There is a need for health-focused institutions and organizations and other stakeholders to collaborate and bring to the attention of policymakers the serious health risks and impacts of climate change and the need for effective adaptation responses.

7.2 Recommendations

The following recommendations are made:

- i. Introduce comprehensive assessments of the risks posed by climate variability and change on population health and health systems.
- ii. Support research to understand local and indigenous knowledge, coping and adaptation strategies and assess their value for public health.
- iii. Encourage research for the development of early warning and early response systems including climate products and services for use in national policy and decision-making.
- iv. Conduct research on more effective methods for communicating scientific results to stakeholders, including the use of new technologies.
- v. Provide support for investments in routine observation of climate, environmental and health phenomena through HDSS for integration of climate and environmental data.
- vi. Train public health professionals and students to understand and demand appropriate climate and environmental information.
- vii. Strengthen health systems with integrated environment and health surveillance.
- viii. Determine the most appropriate indicators for climate change and develop, test and validate models for these indicators in relation to disease transmission dynamics.
- ix. Establish trans-disciplinary research-for-policy frameworks o improve the management of disease risks and related health threats under climate change conditions.

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