

Research Application Summary

An overview to climate change in North Africa: Implication for Africa

Muna Elhag, M.¹ & Hussein Sulieman, M.²

¹University of Gezira, Faculty of Agricultural Sciences, Wad Medani, Sudan

²University of Gadarif, Faculty of Agricultural and Environmental Sciences, Remote Sensing Unit

Corresponding author: elhagmuna@yahoo.com

Abstract

North Africa is one of the worlds most water-scarce and dry region with a high dependency on climate-sensitive agriculture and a large share of its population and economic activity in flood-prone urban coastal zones. Therefore, climate change and variability may result in increased damage to natural resources and strategic economic sectors in the region. Agriculture is still one of the most important sectors of the economies of region, both for feeding the population and for export. Climate change is predicted to reduce water availability and quality, creating the potential for severe water shortages in both cities and rural areas. For the North Africa region, climate change is not a completely new phenomenon. Throughout the ages, societies of the region have been under pressure to adapt to water scarcity and heat. However, the scale of impacts that are expected from climate change is likely to be beyond the coping range of many communities and countries, and will require additional adaptation efforts.

Key words: Climate change, coastal regions, drylands, global emissions, North Africa

Résumé

L'Afrique du Nord est l'un des mondes les plus pauvres en eau et la région sèche avec une forte dépendance une agriculture sensible au climat. La grande partie de sa population et son activité économique partagent des inondables zones urbaines côtières. Par conséquent, le changement climatique et la variabilité peuvent entraîner une augmentation des dégâts aux ressources naturelles et à des secteurs économiques stratégiques dans la région. L'agriculture est encore l'un des secteurs les plus importants de l'économie de la région, à la fois pour nourrir la population et pour l'exportation. Le changement climatique est prédit pour réduire la disponibilité en eau et la qualité, la création de la potentialité pour des pénuries aggravées d'eau dans les villes et les zones rurales. Pour la région d'Afrique du Nord, le changement climatique n'est pas un phénomène entièrement nouveau. Au fil des siècles, les sociétés de la région ont subi des pressions pour s'adapter à la pénurie d'eau et à la

chaleur. Toutefois, l'ampleur des impacts qui sont attendus du changement climatique sont susceptibles d'être au-delà de la fourchette d'adaptation des communautés et de pays, et exigeront des efforts d'adaptation supplémentaires.

Mots clés: Changement climatique, les régions côtières, les terres arides, les émissions mondiales, l'Afrique du Nord

Background

Climate change and climate variability has been, and continues to be, the principal source of fluctuations in global food and production in the arid and semi-arid tropical countries of the developing world. Africa is highly vulnerable to the various manifestations of climate change especially for water resources, food security, natural resources, vector and water-borne diseases. Also, coastal zones are vulnerable to sea level rise and exacerbation of desertification. Although Africa contributes relatively little to global emissions, it is considered to be the most vulnerable region in the world in terms of climate change. This is due to some of its physical and socio-economic characteristics. The historical climate record for Africa shows warming of approximately 0.7°C over most of the continent during the 20th century and a decrease in rainfall over large areas of the Sahel, and increase in rainfall in east central Africa. Climate change scenarios for Africa, based on results from several general circulation models indicate future warming across Africa ranging from 0.2°C per decade (low scenario) to more than 0.5°C per decade (high scenario) (Hulme, 2001).

Climate change in North Africa. North Africa climate change is an especially urgent issue, particularly since it is a region that experiences increasingly frequent droughts and a threat of water supply shortage. Climate change is seriously affecting North African countries. Water shortages, deforestation and desertification have led to rounds of droughts and floods, making the region one of the most vulnerable areas in the world. The region is one of the world's most water-scarce and dry regions; with a high dependency on climate-sensitive agriculture and a large share of its population and economic activity in flood-prone urban coastal zones. Therefore, changes in temperature and precipitation patterns may result in damage to strategic economic sectors such as tourism or others with growth potential such as high-value-added agriculture.

Under intermediate warming scenarios, most models project that by 2050 North Africa will experience decreases during the

growing season that exceed one standard deviation of natural variability, rainfall is predicted to increase in December-February and decrease in June-August. With a more rapid global warming scenario, large areas of Africa would experience changes in December-February or June-August rainfall that significantly exceed natural variability (Agoumi, 2003).

North Africa countries are paying a heavy price for climate change. Low-lying coastal areas in Tunisia, Libya and Egypt are particular at risk. For them, the social, economic and ecological impact is expected to be higher than the rest of the world. Climate model projections available for North Africa indicate a clear increase in temperature over the next 20 years that is expected to continue throughout the 21st century, probably at a rate higher than the estimated global average. Model simulations also suggest a drying trend in the region, particularly along the Mediterranean coast, driven by large decreases expected in summertime precipitation. Because coastal areas historically receive by far the largest amount of rainfall in North Africa, future decreases will likely have a significant and noticeable impact. Precipitation trends in the interior semiarid and arid regions of North Africa are more difficult to predict due to the very small amount of natural precipitation that characterizes these areas. Climate change will induce some variations in precipitation patterns, but the trend is not clear, as some models predict slight increases and others predict slight decreases in annual precipitation amounts. Rising sea level could affect 19 port cities in North Africa (IPPC, 2001).

Impact of Climate Change in North Africa

Climate change also poses many challenges to the region's cities which represent centres for economic, social, cultural and political activities. Agriculture is still one of the most important sectors of the economies of region, both for feeding the population and for export. The number of people employed in agriculture varies by country: about 50% in Morocco, 40% in Egypt, 25% in Algeria and probably even fewer in Libya which imports close to 75% of its food. Climate change will reduce water availability and quality, creating the potential for severe water shortages in both cities and rural areas. Expanded use of Nile River water use by Sudan and other upstream African countries in response to climatic stress would seriously threaten Egypt. By 2030, three-quarters of Egyptians will have inadequate access to fresh water (NIC, 2009). Climatic stress will add to the already substantial migration from rural areas into cities,

Adaptations to Climate Change

and Europe. Cities will face deteriorating living conditions, high unemployment, and frequent civil unrest.

Adaptation is widely recognized as a vital component of any policy response to climate change. Studies show that without adaptation, climate change is generally detrimental to vulnerable societies; but with adaptation, vulnerability can largely be reduced. The degree to which a system is affected by climate change depends on its adaptive capacity (Gbetibouo, 2009). Adaptive capacity is the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damage, to take advantage of opportunities, or to cope with the consequences (IPCC, 2001). Therefore, in order for North Africa to take full action of the above climate change challenges, there will be need for a critical regional strategic adaptation plan that takes, at the same time, into account the solitude of each individual country or sub-region (e.g. Nile Delta, Mediterranean region, Greater Meghreb). Such plan seeks to enhance capabilities of countries in the region for responding to climate change by building scientific and technical capacity, advancing scientific knowledge, networking and linking scientific and policy makers. Indeed, the region is not isolated from the other parts of its continent. Therefore, a wide cooperation approach, especially with sub-Saharan countries, is crucial for the success of any adaptation plan for the region.

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