

Applications of North-South Slopes in Kenya

Jackson Langat, Gideon Obare, Lilian Kirimi, Bernard Aduda
Tegemeo Institute - Egerton University, Kenya

For background information see: [N-S Slopes in the Sub-Sahara Regions](#)

The Arid and Semi-Arid Lands (ASALs) in Kenya are spread across 29 counties with varying degrees of aridity (Figure 1). ASALs occupy over 80% of the country's landmass and are home to about 36% of the population, 70% of the national livestock, and 90% of wildlife.¹ The annual rainfall ranges between 150 mm to 550 mm and 550 mm to 850 mm per year in arid and semi-arid areas, respectively. Extreme climatic conditions in the ASALs as signified by elevated temperatures throughout the year and high rates of evapotranspiration (ET) are having devastating effects on the environment and livelihoods of communities with spiraling vulnerabilities.²

It is estimated that around 4.4 million people (27% of the ASAL population) currently face high levels of acute food insecurity and are at crisis or worse, while about 774,000 people are in emergency conditions.³ This represents a 43% increase in population in crisis or worse compared to the same period last year. Compared to the previous analysis period (October-December 2022), the prevalence of the population in crisis or worse is similar – with a reduction of the population in emergency. The severity of food insecurity is, however, expected to worsen again in the next quarter (March to June 2023), with about 5.4 million people projected to face high levels of acute food insecurity, of whom 1.2 million people (7%) will likely be in an emergency phase.

¹ [ASALS – ASALS](#)

² [ASAL Info – ASALS](#)

³ Kenya: Acute Food Insecurity and Malnutrition Snapshot February – May 2023.

https://www.ipcinfo.org/fileadmin/user_upload/ipcinfo/docs/IPC_Kenya_Acute_Food_Insecurity_Malnutrition_2023FebJun_Snapshot.pdf

Urgent action is required to reduce food gaps, protect their livelihoods, and prevent/treat acute malnutrition.

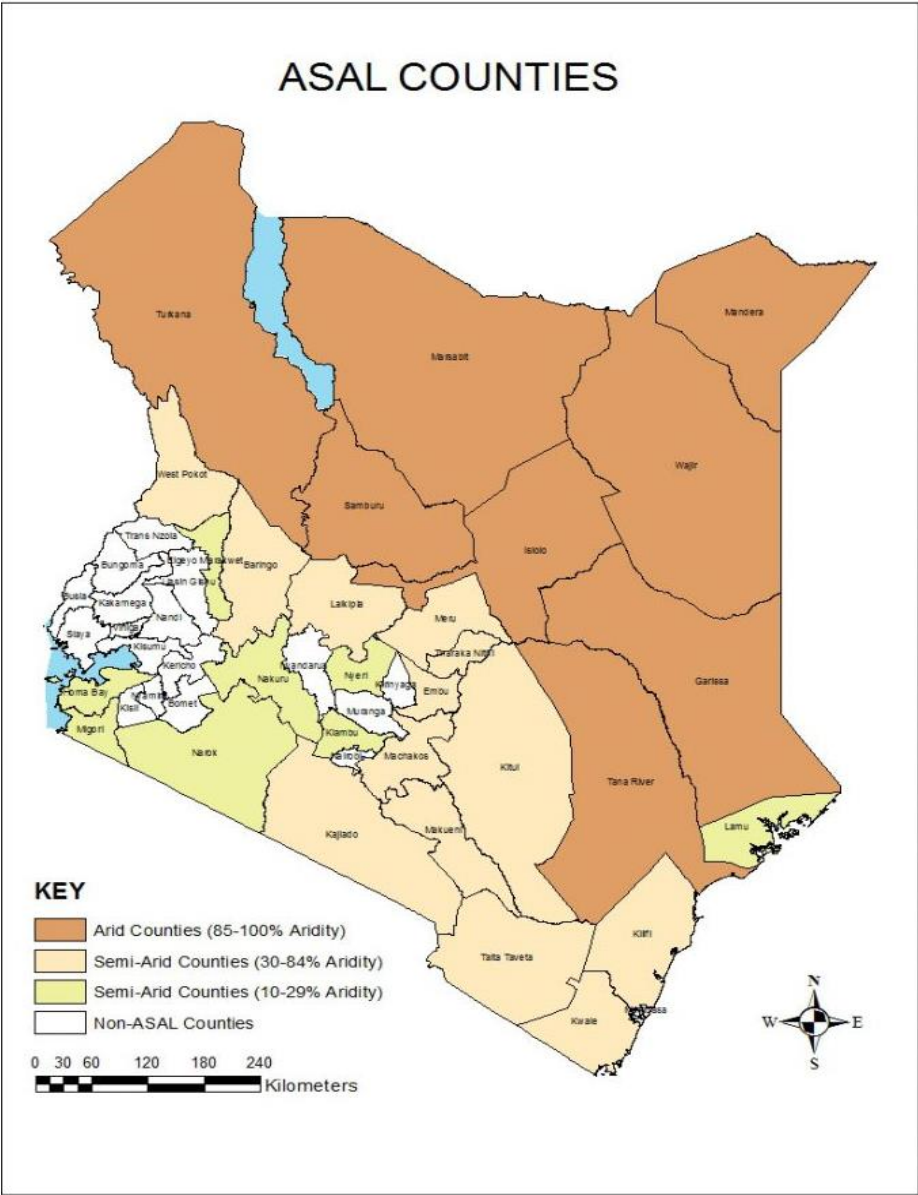


Figure 1: ASAL Counties. Source: Copyright © 2019, Kenya Agricultural & Livestock Research Organization

1. Weather patterns

Kenya’s weather and climate are changing in response to the global warming that is now being experienced worldwide. The minimum temperatures observed over most parts of the country in 2020 were higher than the long-term means, consistent with the global observation that identifies the year as one of the hottest years on record (Figure

2). Temperatures are projected to continue rising by the 2050s (by 1.7°C) and by approximately 3.5°C at the end of the century.⁴ Additionally, the number of hot days and nights will increase, with “hot days” projected to occur on 19%–45% of days by mid-century.

The year 2020 was further characterized by enhanced rainfall during the long-rains season and depressed rainfall in the short-rains season. The general trend in levels of precipitation has an upward pattern, but with a lot of variability over the years (Figure 3). Additionally, precipitation in Kenya is projected to remain highly variable and uncertain, with average rainfall expected to increase by mid-century, particularly during the short rains, which occur between October and December. Extreme rainfall events are also expected to increase in frequency, duration, and intensity.⁵

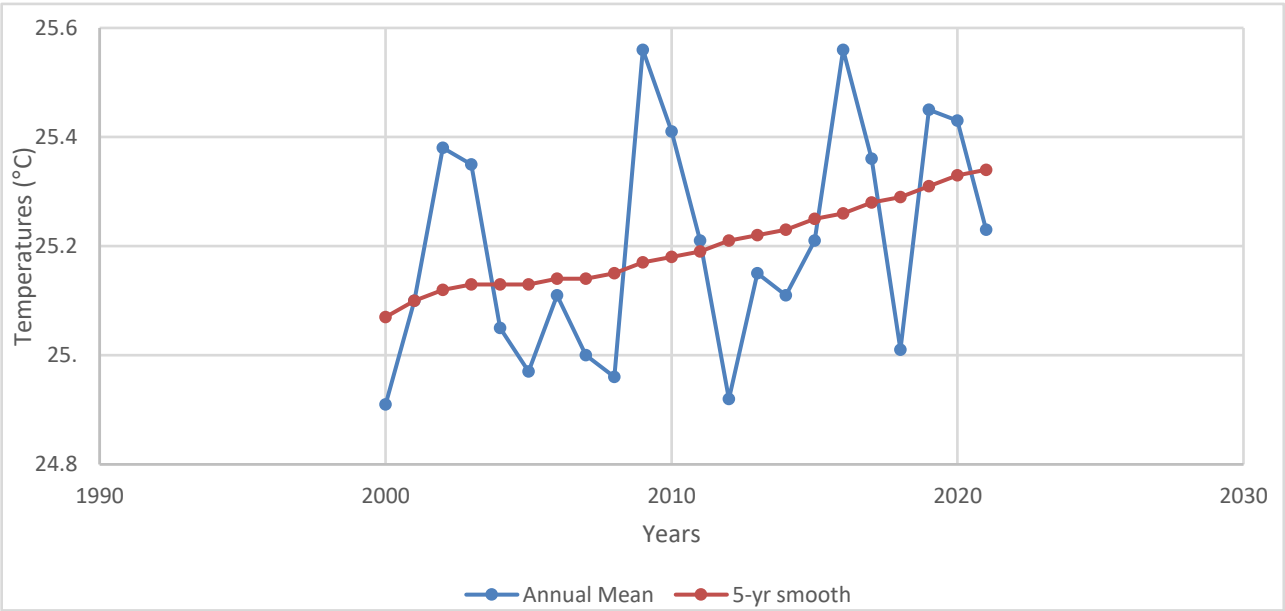


Figure 2: Temperature distribution in Kenya. Source: Climate Change Knowledge Portal © 2021 The World Bank Group.

⁴ Climate Risk Profile: Kenya (2021): The World Bank Group.

⁵ Ibid.

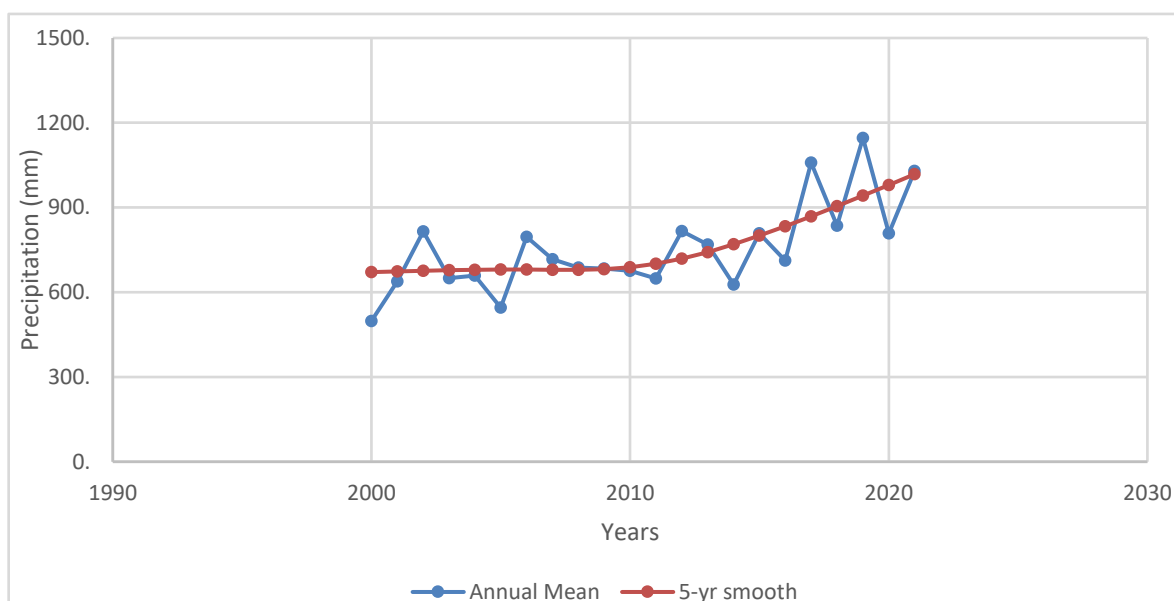


Figure 3: Precipitation distribution in Kenya. Source: Climate Change Knowledge Portal © 2021 The World Bank Group.

2. Potential crops to be cultivated on the new arable land

The production of the major cereals consumed by the majority of Kenyans, i.e., maize, wheat, and rice, is decreasing due to the reduced acreage planted. Thus, their consumption is outpacing food production and widening the deficit gap, necessitating imports. The country will therefore need to import more cereals to meet the needs of the growing population, with around 3.4 million people being severely food insecure and in dire need of more food.

Quantities of Cereals Imports (Metric Tonnes)

Year	Maize	Wheat	Rice
2012	324	1,044	399
2013	93	1,033	409
2014	458	1,225	459
2015	490	1,421	442

2016	148	1,362	507
2017	1,328	1,855	625
2018	530	1,737	599
2019	229	1,999	608
2020	274	1,883	605
2021	486	1,889	630

Source: Various Economic surveys

ASALs present an opportunity to produce select drought-tolerant cereal crops as a means to address the over-dependence on the import market. Appropriate varieties of drought-tolerant crops such as sorghum, millets, pigeonpea, cowpea, and green gram are helping farmers overcome the drought conditions.⁶ Climate-smart crops (sorghum, pearl millet, finger millet, pigeonpea, cowpea, green gram, and groundnut) are the major contributors to national food and nutrition security and have become an income-generating activity for farmers in the ASAL areas, especially Makueni, Kitui, and Taita Taveta counties. These three counties are part of the ASALs 'production that accounts for about 48% of sorghum, 60% of millets, 99% of pigeonpea, 95% of green gram, and 93% of cowpea produced in Kenya.⁷ Among the crops that present high potential for production in the ASALs, sorghum is attracting many farmers because a large industrial market for it exists beyond household consumption, : a major malting company needs sorghum as a raw material for its products. The byproducts from industrial processing of sorghum, among other crops, are rich sources of nutrients for livestock feed formulation.

⁶ Drought-tolerant crops to the rescue in Kenya – ICRISAT

⁷ <https://www.icrisat.org/climate-smart-crops-improve-livelihood-of-farmers-in-south-eastern-kenya/>

3. Sustainability of food production in the ASAL regions

The dynamics of poverty within Kenya are changing and directly influence the country's agricultural sector. Currently, 46% of the Kenya's population live on less than 1 USD a day, 36.5% are food insecure, and 35% of children under five are stunted in growth (chronically malnourished). The country's population has increased significantly (from 11 million in 1970 to 39.5 million in 2011); at the current rate of growth, it will be double in the next 27 years, reaching 81 million in 2039. As a result of this rapid increase, land parcels in the areas of high agricultural potential are decreasing in size, affecting food production. The formation of new arable land by the North-South Slope concept has the potential to alleviate the imminent food insecurity in Kenya.^{8a}

Kenyan farmers, who are used to rain-fed farming systems, are being pushed into drier, more marginal areas where they become increasingly vulnerable to drought and the unpredictability of weather patterns resulting from climate change. The population increase, coupled with the expansion of agriculture into arid lands, has affected the dynamics of pastoralism, where increased competition for natural resources has escalated conflict in some areas. Furthermore, there has been a marked increase in the number of people dropping out of the nomadic livelihood, often moving into settled communities, which rely heavily on food aid.⁸

Climate change, political and economic instability, the effects of the COVID-19 pandemic, and the damage caused by the desert locust infestation have intensified and blatantly exposed the vulnerability of the ASAL populations.⁹ There is thus a dire need for conservation and more protected areas, as reflected in the many policies developed and pieces of legislation put in place in Kenya. These documents include the

⁸ [Kenya at a glance | FAO in Kenya | Food and Agriculture Organization of the United Nations](#)

^{9a} [Growing Crops on North-South Slopes](#), ReSlope Global

⁹ Joint statement by the ASAL Humanitarian Network – AHN. Nairobi, Kenya; October 5, 2020.

Sessional Paper No. 8 of 2012 on The National Policy for the Sustainable Development of Northern Kenya and other Arid Lands, Forest Policy (2014), the Forest Conservation and Management Act (2016), the National Policy on the Environment (Revised 2016), the National Wildlife Conservation and Management Policy (2017), and the Wildlife Conservation and Management Act (2013).

4. Drivers of economic growth and resilience-building

Many constraints have and continue to negatively impact the resilience, food security situation, and socio-economic development of Kenya's ASALs, which constitute over 84% of its land and are exposed to extreme natural events. These events range from drought and locust invasion to flood and have resulted in displaced communities, disrupted social services delivery, and increased social tensions. The effect of droughts includes a food deficit of 20–30%, decline of GDP growth by 3–5%, and adverse effects on the livelihoods of over 80% of the population.¹⁰ Kenya has introduced policies and frameworks to tackle climate change that include updating its Nationally Determined Contribution (NDC) to 32% in 2021 and putting in place mitigation and adaptation measures to achieve the COP26 emission reduction targets. The policies include increasing the share of renewable energy in the electricity generation mix, increasing tree cover to at least 10% of land area, building a low-carbon and efficient transportation system, and increasing the uptake of adaptation technology across all sectors.¹¹

Additionally, several interventions are being implemented by diverse agencies within the ASAL areas. USAID's Partnership for Resilience and Economic Growth (PREG) brings together multiple humanitarian and development partners to work with the Kenya

¹⁰ AfDB, Kenya Economic Outlook. <https://www.afdb.org/en/countries-east-africa-kenya/kenya-economic-outlook>

¹¹ Ibid

National Drought Management Authority (NDMA) and county governments to coordinate resilience and economic growth activities among the vulnerable pastoralist communities in ASAL counties. The PREG¹² model of collaboration is grounded in sequencing, layering, and integrating interventions, which has enabled partners to minimize overlap, promote synergies, and achieve multi-partner collaboration.

5. Human development and response to climate risks

In 2021, Kenya's human development index was 0.575 and ranked 152 of 191 countries published, down from 150 in 2020 (Figure 4). Expanding people's choices to be educated, to live longer and healthy lives, and to enjoy a decent standard of living are the key indicators of human development; they are equally important.

However, the performance of the ASALs as per these indicators is modest with sustainability challenges. Limited access to education and low literacy levels hinders economic development in this area. On average, 38.5% of the Kenyan adult population is illiterate, with a very wide regional disparity. Whereas Nairobi has the highest level of literacy, 87.1 per cent, the northeastern region, which is largely ASAL, has the lowest, at 8.0%.¹³ A high turnover of teachers, together with poor pay and conditions for a largely voluntary staff, hinders access to adult education programs, with only 31% of the adult population being aware of the existence of literacy programs. Other barriers to effective participation in literacy programs include lack of relevant teaching and learning materials; costs of learning materials; lack of centers within reach of most adults; and curricula that are irrelevant to learners' needs.

¹² Partnership for Resilience and Economic Growth in Northern Kenya (PREG) Endline Report. 01 Jun 2022.

¹³ UNESCO (2006). Kenya National Adult Literacy Survey report.

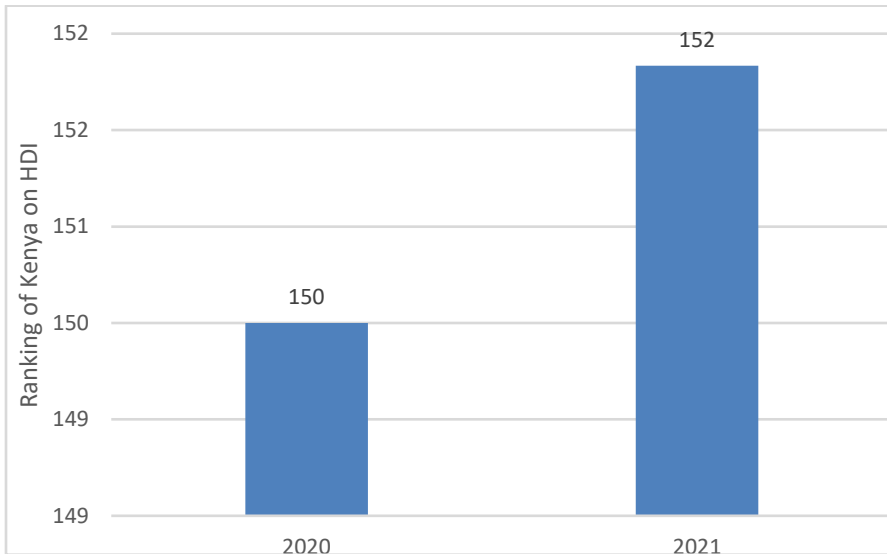


Figure 4: Ranking of Kenya based on HDI. Source: UNDP¹⁴

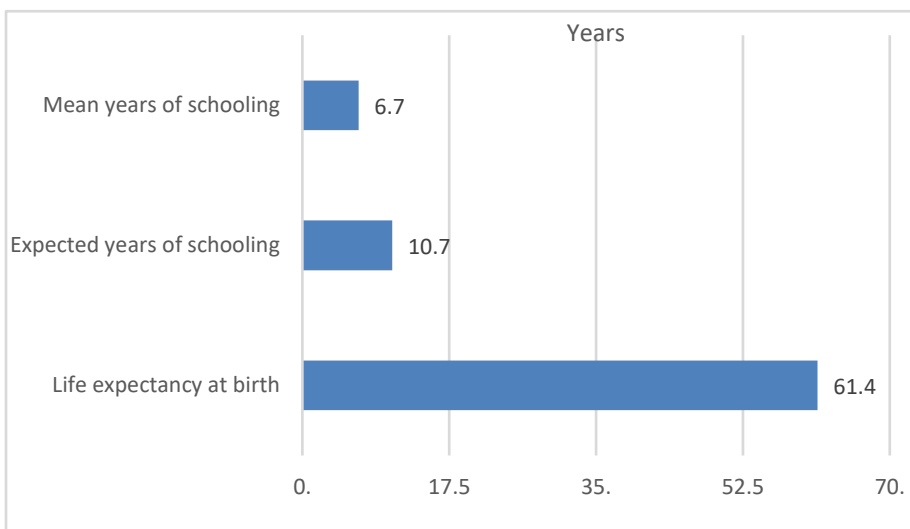


Figure 5: HDI Dimensions and indicators scores. Source UNDP¹⁵

6. Distribution of newly opened arable land to users.

The land tenure system in Kenya identifies freehold, leasehold, communal, and “in trust” as classifications of designating rights to a land resource. The land occupied by wildlife and natural resources is classified as public land; its title is managed and controlled by the government under the respective ministries whose land activities

¹⁴ UNDP. Human Development Insights. Access and explore human development data for 191 countries and territories worldwide. <https://hdr.undp.org/data-center/country-insights#/ranks>

¹⁵ ibid

relate to it. Thus, the new arable land formed by the North-South Slope concept could be accessed as public land controlled by the government or communal land that is managed by the pastoral communities. Another possibility is the formation of a new government-owned enterprise that will cultivate and manage the new arable land.

6. Public perception

A number of lobby groups and development agencies have taken a position in terms of expanding human activities to the marginal areas in the ASAL and even to cultivating the land for agricultural production. There is thus a dire need to engage with the policy makers before planning and interventions. The success of this initial lobbying will, however, be determined by a team that will promote the concept within the local institutions and international aid organizations. The change of government that happened through the 2020 election presents such an unprecedented opportunity: there is a drive for innovation to counter the adverse effects of drought in Kenya. These effects are experienced in a backward economy that is acutely dependent on imports to meet the needs for major food items—mainly cereals. Global shocks, as exemplified by the Russia-Ukraine war and COVID-19, provide more grounds to push for innovation with local production of food items.

The opportunity to enhance food production using the North-South Slope concept lies in improving productivity while most arable land today is already tapped.

The North-South Slope pilot can be assessed on private land in the dry areas close to Egerton so technical support will be readily available from Egerton's team. Once pilot testing and demonstration are done, large scale implementation could be expanded country-wide.

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