REPORT

CLIMATE CHANGE, DROUGHT DYNAMICS & THEIR IMPLICATIONS: THE CASE OF NAROK COUNTY

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1. Introduction to Narok County

Narok is one of the 21 Counties categorized as Arid and Semi-Arid (ASALs) in Kenya. The county lies in the Great Rift Valley, home to a few major rivers, arid and rugged landscapes, and volcanic landforms with areas of prominent geothermal activities. The County covers an area of 17,933.1 Km2. with a population of 1,157,873 (KNBS, 2019).

Narok County is endowed with diverse natural resources and a rich Maasai culture. The County's main economic activities include pastoralism, crop farming, conservation and tourism enterprise and trade, spread across the three broad agro-ecological zone, namely Mau highlands, Mara grassland and the Transmara Midlands.

The highland areas of Mau escarpments spurn 3,300 km2 and rise to an attitude of 3,100m above sea level provides fertile ground for farming. Mau Complex is also the source of major rivers like Mara and Ewaso Nyiro with Mara River being the single major river that passes through Maasai Mara Game Reserve ultimately draining into Lake Victoria. The famous Maasai Mara Game Reserve - one of the most popular tourism destinations in Kenya - is in the lowlands area of the county. The Transmara midlands cover an estimated area of 3,400km2, while the Mara grassland spurn about 10,000km2

Figure 1: Location of Narok County

The county has an estimated 724Km2 of gazetted forest, 930Km2 of non-gazetted forest and 480 Km2 of county council trust forest. The total area under forest cover represents 11.9 per cent of the total county surface area. The vegetative cover of these forests is mainly natural trees in the highland areas and shrubs and grasslands in the lowlands.

In addition, Maasai Mara game reserve covers approximately 1,510Km2. Of this area 1,000km2 is in Narok South sub-county while 510km2 of game reserve is in Transmara West sub-county and is famously referred to as the Mara triangle.

The county has several water catchments, Mau Forest being the biggest catchment. There are also a number of streams which originate from Mau Forest while those in lowlands like Osupuko division are from springs.

Wood fuel and charcoal are the main sources of energy for domestic use. About 83 per cent of households in the county use firewood as the main cooking fuel while approximately 13 per cent use charcoal.

The 2,134 Km2 hectares of forest has great potential for carbon trading. The county government will develop initiatives to promote forest conservation with a view to tap the potential for carbon trading.

The dominant vegetation in the county includes forest land in the Mau area and grasslands and shrubs in the lowland areas. The lowlands areas are suitable for livestock rearing, while the highlands support rain-fed agriculture. A major threat to the vegetation cover is the destruction caused by human activities including grazing, charcoal burning, extraction of wood fuel and cutting down of trees without replacement resulting in adverse ecological effects.

Land tenure arrangement and associated ecological conditions in the County play a significant role in influencing trends and consequential impacts of droughts, including adaption and mitigation efforts by residents of the County. This is especially so, given the reality that livelihoods production systems in the County are predominantly agricultural (crop-farming, livestock keeping and pastoralism) and nature-based tourism (wildlife conservation) related. These sectors are highly sensitive to changes in precipitation and temperature levels.

Land tenure dynamics such as whether land is collectively/communally or individually/privately owned; extent of subdivision (size of land with respect to choice of productive use), fenced or free-range, sold to buyers with different visions of land use than indigenous pastoral, clarity and security of ownership including whether customary or legal title deed or vulnerability triggered through land grabs; land use management strategies adopted - are all essential considerations in the link between vulnerability to impact of drought and resilience potentials among landowners.

2. Livelihoods and Economic activity dynamics & its links to Food Security Potentials & Vulnerabilities

The Narok County policy aspirations in the agricultural sector is to secure the food security situation through enhanced agricultural growth and productivity enabled through responsive land use policies, resource allocation (of a min.10% of County budget) and better supply chain management.

Livelihood production systems in the County are highly climate sensitive, as they heavily rely on rainfall reliability, patterns, and intensity. The dominant livelihood practices are pastoralism, agro-pastoralism, mixed farming, and conservation-tourism enterprises. The agricultural sector contributes about 89% of the total household incomes and is key to the economic growth and development of the county in provision of food, employment, and raw materials for the industrial sector.

a) Crop farming

The High to Medium Potential Land (HMPL) with adequate and reliable rainfall is dominated by commercial small, medium and large scale predominantly rain fed agriculture. An estimated 5,821 km2 of land is under agriculture comprising 60% small-scale (1-30 acres); and 40% medium (30-100 acres) and large-scale farms (above 100 acres) which are either labour or capital intensive (NCDP, 2013).

Overall, approximately, 200,000 hectares of land in high and medium potential areas is put under various crops annually (NCDP, 2013). The crops grown by most smallholder farmers include maize, beans, sugarcane and horticultural crops (potatoes, cabbage, kales, carrots, tomatoes, French beans, onions, garden peas and indigenous vegetables, tree tomatoes, avocadoes, water melons, bananas etc), tea, coffee, pyrethrum and pastures (Boma Rhodes,

Napier grass, brachiaria grass) etc. Wheat and barley are mainly grown by medium and large-scale farmers.

On average the county produces about 200,000MT of maize and 135,000 MT of wheat each year. However, production of these crops has been fluctuating because of erratic rains and emergence of the devastating Maize Lethal Necrosis Disease (MLND). In view of the diverse agro-ecological zones; enormous but unexploited potential exist for up-scaling production of the above listed crops and introduction of new ones. These crops are mainly under rainfed production system and few irrigation schemes.

Challenges experienced in the subsector, includes decline in agricultural extension services due to the low funding levels of the Agricultural Sector - For most smallholder producers, agricultural extension services is an important means for accessing knowledge, technologies, innovations and agricultural information; minimal access to credit services; in-transparent and long marketing chains; land tenure insecurity; conflicting policies and legislations; inadequate and low quality farm inputs.[1] A huge potential for value addition exist as most crops and livestock products are sold raw with very minimal value addition.[2]

Factors constraining optimization of agricultural production include land subdivision, poor land use systems/change in land use patterns and lack of a land use master plan. The County has 156 group ranches. In the recent past, the number has been decreasing because of increased demarcation and privatization. The County is yet to develop its County Spatial plan – a 10-year master plan on how the counties envisions sustainable utilization of its physical space. This is a mandatory requirement by law.

In addition, environmental related challenges inter alia climate change and associated calamities such as droughts and floods, environmental degradation (deforestation and forest degradation), overexploitation of natural resources, poor/weak soil and water conservation practices resulting in heavy soil erosion and excessive surface runoff ultimately translating to reduced land productivity. The Coronavirus pandemic and its associated constraints has compounded the issue of livelihoods production, market activities and food security.

The issue of food security is also compounded by the reality that main storage facilities in the county are individual on-farm granaries with minimal public storage capacities available at the National Cereals and Produce Board (NCPB) silos.

b) Livestock sector

Livestock rearing in Narok County is one of the main economic livelihood activities that majority of the households especially in the rural areas largely depend on. The sub-sector supports food security, provides employment and is a significantly important source of income for Communities in the entire County. Pastoralism employs about 90% of the ASAL workforce with 95% of ASAL household income coming from this sub-sector. More than 80% of the beef consumed in Kenya is produced by pastoralists, either domestically or in neighboring countries.

The county boasts of a huge livestock population with desirable adaptation genes, coupled with the rich indigenous livestock management skills and knowledge. The types of livestock kept in the County comprise of cattle, sheep and goats, poultry, and bees. Productivity of different

[1] land, labour, seeds, fertilizer, pesticides, farm machinery services, animal feeds, breeding animals, artificial insemination services, veterinary services and building materials

[2] Conference Paper: Experiences and Strategies in Enhancing Small Holder Agricultural Productivity in Narok County; by Chris Nkukuu, 10th – 13th March 202

livestock enterprises is gradually growing commercially as most farmers are employing both extensive and semi-intensive modes of production.[3]

Livestock rearing is a major economic activity in the county - pre-dominantly pastoralism. The activity is concentrated in the lowland/ASALs areas. Zebu is the main breed of cow reared in the county. The population of major livestock species is approximately 1. 4 million Cattle; 1.2 million sheep and 0.8 million goats; 68,789 donkeys; 670,898 poultry, 299 pigs, 5,643 rabbits and 8 camels.[4]

Because of increase in human population and competition from other agricultural enterprises (mainly crop farming) local communities are increasingly diversifying into keeping high quality livestock breeds. Thus Boran, Sahiwal, exotic dairy breeds and their crosses are progressively becoming popular (Narok County 2019).

Milk, meat, hide and skin, wool, mutton and eggs form the main products from these animals. The vibrancy and sustainable production within the sector is hinged on the robustness of the requisite livestock inputs and support services. Critical livestock inputs include water, pasture, fodder, feed supplements, fertilizers, germplasm, vaccines, and drugs. Essential Services on the other hand include animal health, animal breeding, research and extension, and animal identification services.

Cross-cutting challenges within the Agricultural sector include, adverse climatic conditions inter alia recurrent drought and floods which leads to crop failure and livestock losses; underfunding (below 10%) & inadequate feed and water availability, high costs and low quality inputs & lack of agricultural County-specific regulations and policies; low adoption of modern farm technologies and innovations and inadequate capacity to control crops and livestock pests and diseases (Queleaquelea birds, Malignant Cattery Fever (MCG), Foot and Mouth Disease (FMD), East Cost Fever (ECF).

The community and county government are practicing and promoting a range of climate change coping mechanisms/strategies. To begin with, common value addition activities being practiced in the sector include milk cooling, hides and skins treatment, cereals storage and milling, and sugar milling in Trans Mara West Sub County. Some of the strategies employed are formation of producer and marketing groups to do milk bulking and market access, accessing commercial feeds[5], production and conservation of improved pastures coupled with conservation of wheat and barley straws, pastoral mobility (including via Trucks and Rail), piloting of Crop insurance program.[6]

Access to pasture/fodder, browse and water is critical in sustainable livestock production in the County geared towards enhanced food security for the County's residents. Several sustainable land development and management practices were employed. Soil and Water conservation measures - Roof catchments, infiltration ditches, diversion ditches, water holes and pans were also used by farmers in the Sub Counties for both livestock and crop production.

[3] Narok County, Department Of Agriculture, Livestock And Fisheries Annual Report 2018/2019
[4] County Integrated Development Plan (Cidp) 2013-2017 - Economic Transformation for a Shared Prosperit
[5] dairy meal, poultry feeds, fish feeds, molasses and minerals
[6] through the Kenya Agricultural Insurance Program (KAIP), in 2018

Agro-forestry[7] was also promoted as a land use system to reduce and check degradation, improve soil fertility and overall land productivity (border tree planting, trees interspersed in cropland, trees in soil conservation structure, woodlots, live fences).

In addition, diverse soil fertility management practices such as application of fertilizers and manures, crop rotations, incorporation of crop residues, rotational grazing and Conservation agriculture were employed by farmers.

c) Conservation and Tourism Enterprises:

Narok County is also home to huge wildlife population.[8] Conservation and eco-tourism related activities within the County is the second largest economic activity as it offers employment opportunities and other indirect benefits. While the Maasai Mara Game Reserve (MMGR) is only 1,510 Sq. km, the Maasai Mara ecosystem spurns an area of 6,650 km² with the adjoining community ranches (including Maji moto) contributing the significant area of about 4,500 sq. Kms. Today, conservancies in Masai Mara cover about 1,405km² of pristine wildlife territory, 105km² less than the Maasai Mara National Reserve.[9]

These ranches of critical importance to the conservation agenda and the tourism enterprise are owned and managed by pastoral Maasai communities. This land is not only a vital dispersal area for all the wildlife species for which the Maasai Mara is famous, but the local Maasai culture is an attraction in and of itself. The annual spectacle and breathtaking migration (of over 1.2 million migrating Wildebeests, zebras, and T. Gazelles) against the backdrop of the rich Maasai culture has led to the nomination of the reserve as one of the New 7 wonders of the World,

In recent years, this area is under increasing pressure to sub-divide land into private/individual and small parcels of land. Human-Wildlife Conflicts (HWC) on food, pasture and water due to forests and game reserves encroachment leading to a shrinking wildlife range and habitat, is intensifying. While privatization of landholdings isn't fully realized within the ranches, in pockets where it has succeeded, fencing of individual plots is increasingly constraining the movement of wildlife.

[7] Trees planted - grevillea, eucalyptus, cypress and acacia and variety of medicinal trees
[8] Ibid
[9] https://www.basecampexplorer.com/foundation/project/maasai-mara-wildlife-conservancies-association-mmwca/

3. Climatic Conditions: Trends in Drought Incidences and Impacts, Narok County

Extreme weather conditions are likely to become more frequent and more severe because of climate change. Overall, projected changes in ASALs indicate an increase in temperature, more variability in rainfall and extreme whether events such as droughts and floods. The projected increase in temperature due to global warming will intern reduce the availability of forage for grazing animals (World Bank 2013), ultimately triggering changes in the livestock sector in terms of herd structure, composition, breeds, (PRISE Project 3). Climate change impacts will also intensify outbreaks of diseases including notifiable and zoonotic diseases, and resource conflicts.

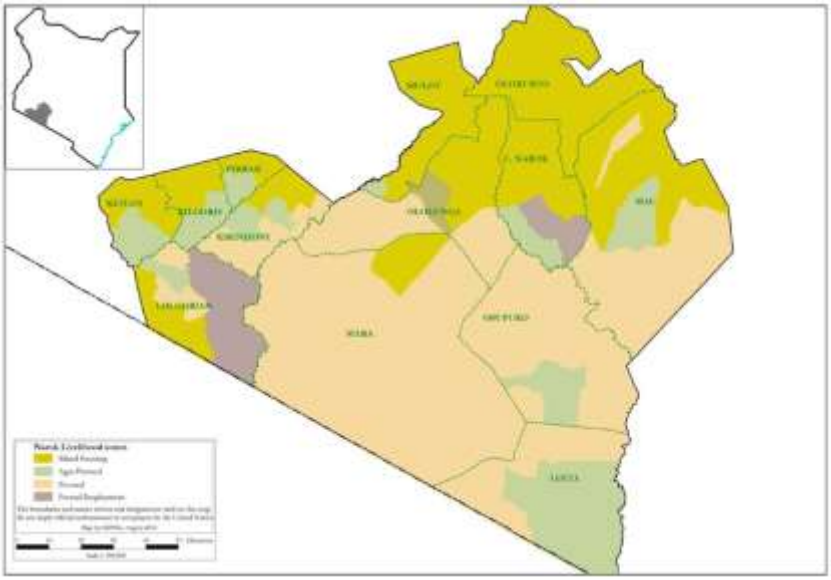

Figure 2: Map of Narok County & its Livelihoods Zones

All 21 ASALs counties showed increase in temperature in the last 50 years with 5 Counties,[10] including Narok (1.75°C) surpassing the 1.5°C increase.[11] Narok County has experienced adverse climatic conditions including recurrent drought and floods which leads to crop failure and livestock losses.

The County has witnessed an intensification of environmental variability and climate change associated impacts, characterised by adverse changes in weather pattern leading to reduced crop and livestock productivity, exacerbated food insecurity and ultimate entrenchment of poverty. Some of the climatic changes are linked to destruction of the Mau Forest Complex (MFC) which serves as the main water catchment for rivers flowing into and through the county. Encroachment of forests and riverbanks for farming, charcoal burning, poor farming methods are some of the observed local drivers of forest and environmental degradation in the county.

Poverty levels, particularly within low-income poor families has risen due to inability to produce sufficient food for domestic use. The segment of population mostly affected by poverty include the women, youth, disabled, the sick especially HIV/AIDS affected persons, minority, and marginalized groups such as the Ogiek and vulnerable groups such as orphaned children.

Climate change has affected the County's bi-modal rainfall pattern. It is becoming increasingly difficult to predict the onset of the short and the long rains. This has affected farmers timing regarding land preparation, hence affecting agricultural productivity.

The widespread changes in extreme temperatures have had negative effects in livelihoods activities in the county. Climate change also influences water availability. It is estimated that the county has about 1,436 ground water sources. These include dams, rivers (including Mara and

[10] Turkana (1.8oC), West Pokot, Elgeyo Marakwet (1.91oC), Baringo (1.8oC), Laikipia (1.59oC)

[11] Projected climate change and potential impacts on livestock sector. Mohammed Y Said1,2, Joseph Muhwanga1, Claire Bedelian3, Liz Carabine4, Simon Nderitu5, Stephen Moiko1, Joanes Atela6 and Robina Abuya1.. Presentation - PRISE National Workshop, 11th April 2018, Crown Plaza, Nairobi, Kenya

Ewaso Nyiro as major rivers) shallow wells, protected springs, water pans, boreholes, and un-protected springs. Hot weather conditions during the day have led to serious decline in the amount of water available for livestock, wildlife, and domestic use. For example, water levels in rivers like Mara which is vital for wildlife survival in Maasai Mara Game Reserve, has often declined drastically.

The average distance people travel in search of water is approximately 3Km in wet seasons. The distance increases to 10 Km during the dry seasons. The most affected are the people living in rural areas where only 5,661 households had access to piped water. In the whole county only an estimated seven per cent of households were benefitting from piped water (Narok County CIDP, 2013/17).

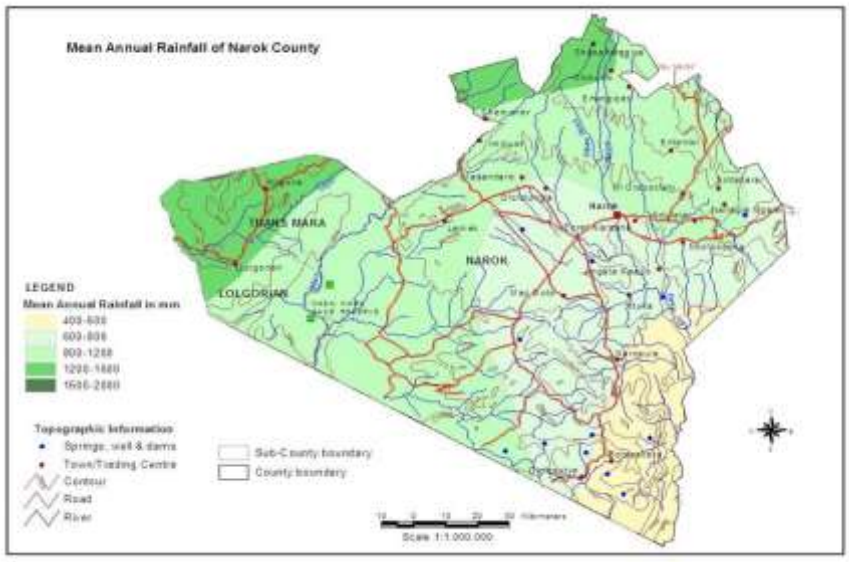

Figure 3: Mean Annual Rainfall Narok

Major agro-ecological zones influencing agricultural, food security and other economic activities include humid, sub-humid, semi- humid, Semi-Arid and Arid. Rainfalls amounts are influenced by the passage of inter tropical convergence zones giving rise to bi-modal rainfall pattern within the county. The rainfall distribution pattern is bimodal with the long rains falling from March to May and short rains received between September and November.

The average annual rainfall ranges from 500 to 1800 mm per annum. during the dry and wet season respectively. The lower zones of the county are relatively dry and rainfall is unreliable.[12] The arid parts of the ASALs receive between 125 and 500 mm of rainfall annually, while the semi-arid regions receive between 400 and 1250mm. Two-thirds of the county is classified as semi-arid (Narok DEAP 2009-2013). Temperatures range from 20^{0}C (January- March) to 10^{0}C (June-September) with an average of 18^{0}C.

The March to June season receives high intensity rainfalls that support growth of vegetation which provides fodder for livestock and wildlife. This climatic characteristic has been influencing the migration of wildebeest into Kenya from Serengeti in June in search of vegetative food and return migration to Serengeti in November after the vegetation diminishes. The seasons are also important to farmers in planning for planting and harvesting.

[12] ibid

4. Transformation of land tenure arrangements:

It is evident from the foregoing that land tenure arrangements and land-use options are at the heart of landowners' ability to cope with intensified trends in climate variability. The question of evolution of property rights (to land) is critical because the way in which land rights are assigned ultimately influences the social, economic, and political development of society. Land as the primary base of resources is crucial because it serves not only economic, cultural and symbolic functions, but, equally, access to it means livelihood and survival to most rural communities.

Historically, Narok County is occupied by the indigenous Maasai people, who are, to large extent nomadic pastoralists, holding land communally and managing large herds of livestock as individual /family holdings. Ownership and access to land to support livelihoods production system within the County has evolved from boundless communal pastoral landholdings under customary tenure, colonial administrative districts with Maasai territorial sections (iloshon) control, delineated group ranches, fragmented privately/individually owned land parcels to tiny commercial plots within the sprawling urban centres.

From the colonial encounter to-date, the Maasai pastoralists' community has consistently lost land through colonization, nationalization, privatization, and subsequent sales living the community increasingly landless, livelihoods production potentials constrained, and effective political representation diminished.

The evolution of land rights in the county has remained highly contested. The origins of many conflicts in the County can be traced to disputes over land ownership, rights, access, use and control. The conflicts are fueled by unsettled historical land related claims and injustices, contested land registration privatization processes within former group ranches and Trustlands, policy and institutional failures which cumulatively contribute to rising landlessness and inequities in the sharing and distribution of benefits accruing from land and associated natural resources.[13]

Consequently, sections of the community are left feeling excluded, marginalized and disenfranchised; a scenario that has made the County one of the conflicts hot-spot areas in the Country on matters land. This situation has often provided fodder for political mobilization during electioneering period, disrupted livelihoods production activities, ultimately compromising peaceful co-existence and food security within the County.

The County's Integrated Development Plan (CIDP) for the period 2018-2022, reflects the priorities set out in Kenya's Vision 2030, the Medium-Term Plan (MTPIII) for the period 2018-2022, the Jubilee Manifesto, the Sustainable Development Goals, the AU Agenda 2063 and other policy documents and national commitments. CIDP II has internalized President Kenyatta's Four Pillar Agenda for the second term that is anchored on enhancing and accelerating food security, manufacturing, affordable health care and affordable housing. Land tenure security is the foundation for sustainable production in all sectors of the economy.

Evidently, the unresolved historical land injustices, privatization and individuation of pastoral landholdings, the incessant inconclusive legal tussles arising from the group ranches subdivision processes, the growing landlessness as consequence of land sales and influx of migrant

[13] Land Tenure, Land Use, Environmental Degradation and Conflict Resolution: a PASIR Analysis for the Narok District, Kenya. Anantha K. Duraiappah, Gerrishon Ikiara, Mutsembi Manundu, Wilfred Nyangena and Rueben Sinange. Working Paper No 33, August 2000, International

communities, the intensification of enclosure on the rangelands through fencing of individual land plots have cumulatively exacerbated weakened pastoralists reliance in the context of Climate change and food security.

Decreases in productive land sizes with livestock populations remaining high, compared to land carrying capacity at the current production systems has intensified incidences of pasture and fodder insufficiency, due to decline in pastoral grazing range. This in turn has impacted how communities respond and adapt to changes in climate.

5. Drought trends and Incidences in Narok County

Droughts continue to persist with devastating impacts on the economy, energy and infrastructure, health, land use, society, and water resources sectors in the country. Kenya's economy heavily relies on rain-fed agriculture supporting 80% of food supplies and employment of at least 75 % of the populations (World Bank, 2012).[14] The latest report by global climate risk index 2020 (Eckstein et al., 2020), further paints a worrying situation, with Kenya being classified as the 7th most affected and vulnerable country globally to the occurrence of extreme events.

Drought is an extended period, during which, freshwater availability and accessibility for human and ecosystem's needs at a given time and place is below normal, due to unfavourable spatial and temporal distribution of rainfall, temperature, soil moisture and wind characteristics. The unfavourable weather conditions lead to scarcity of freshwater sources, high temperature and strong winds. While a common phenomenon of climate variability, drought occurrence is often a devastating and complex natural hazard - resulting in considerable environmental, social, and economic damage as well as in worsening food security.

Climate change studies further indicate a trend towards increasing climate variability in the African continent, most likely resulting in more frequent drought event.[15] Drought is therefore associated with at least six variables - rainfall deficit and its persistence, soil moisture deficit and its persistence, and temperature excess and its persistence.

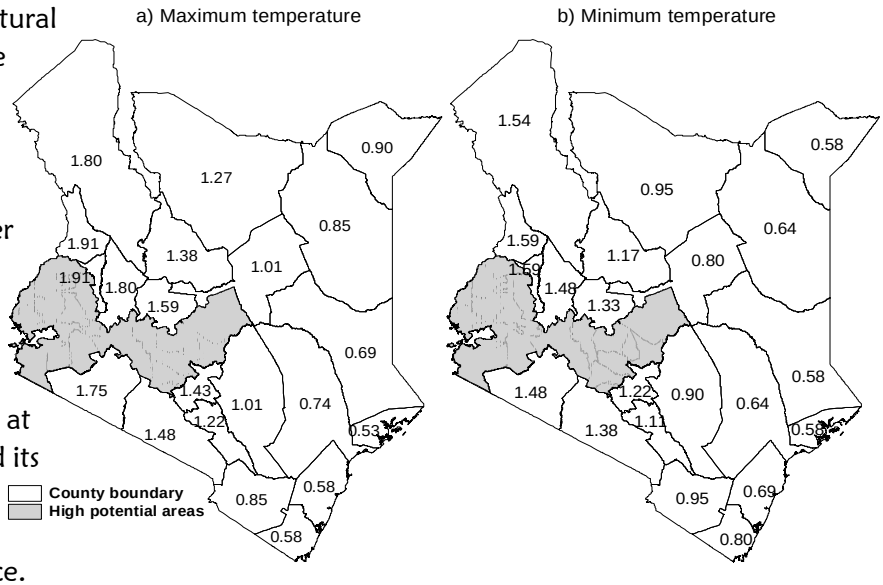

Figure 4 Said et al., 2017 PRISE report: Temperatures changes in the Kenya arid and semi-arid lands between 1960 and 2013

Recent history of drought Incidences in Kenya include (1980–2011) – 1980 (widespread),

[14] G. Tan, B. Ayugi, H. Ngoma, et al., Projections of future meteorological drought events under representative concentration pathways (RCPs) of CMIP5 over Kenya, East Africa, Atmospheric Research (2020), https://doi.org/10.1016/j.atmosres.2020.105112

[15] Monitoring Drought with the Combined Drought Index in Kenya; Zoltan Balint, Francis Mutua, Peris Muchiri and Christian T. Omuto

1983/1984 (Central, Rift Valley, eastern and northeastern) 1987, (Eastern and central Provinces), 1991/1992 (Northeastern, Rift Valley, eastern and coast provinces 1993/1994 (Northern, central and eastern provinces 1995/1996 (Widespread), 1997 (Northern parts of Kenya) 1999/2000 (Countrywide except West and Coast provinces) 2004 (Widespread), 2005 (widespread) and 2010/2011 (Northern parts of Kenya). [16]

Empirical evidence indicates rising surface temperatures, more intense rainfall, and more frequent droughts in Kenya's arid and semi-arid lands home to pastoralism. Since 1993 to-date, Kenya has declared at least seven national disasters because of drought.

a) The 2021/2022 Drought

The Climate Outlook for the October-November-December (OND) 2021 "Short Rains" season indicated that most parts of the country were likely to experience depressed rainfall. Most Global climate and weather forecasting models predicted La Nina condition was likely to develop over the OND season.[17] According to Kenya Metrological Department (KMD), the rainfall forecast for December 2021 indicated that; several parts of the ASALs were likely to experience below average rainfall and warmer than average temperatures. [18]

By December 2021, vegetation condition index in most of the ASAL counties (including Narok) was either severe or extreme deficit considerably below that of December 2020 attributed to late onset and poor performance of rainfall in the month of November 2021. By January 2022 the pasture and browse condition were on worsening trend because of poor performance of previous long and short rains season experienced across ASAL Counties.

By Mid-January 2022 body condition of most livestock was below normal and (on a declining trend) in comparison to similar periods during a normal year due to poor performance of the 2021 long and short rains season that resulted to poor regeneration of pasture and browse.

Milk production status was also below average as compared to a normal year, due to the persistent dry period being experienced. In majority of the ASAL counties, cattle prices were on a declining trend as compared to the previous month mainly because the state of cattle body condition was poor. There was also glut of animals offered for sale by pastoralists. In order to meet family expenses for example purchase of food for the households, payment of school fees, respond to the pressures exerted by COVID19 etc. A Steer that would have sold for Kshs. 80,000 in the market, was going for about Kshs, 25,000 by January 2022.

[16] Ibid

[17] Kenya Meteorological Department. Weather Outlook For The October-November-December 2021 ShortRains Season And Review Of The June-September Pe

[18] National Drought Management Authority National Drought Early Warning Bulletin, January 2022

Livestock mortalities due to drought was reported in the Southern rangelands of the County including Osupuko, Loita and Mara divisions. Adaptation strategies undertaken by pastoralists ranged from migration, purchase of commercial feeds (hay, lucerne, diary feeds silage), harvesting/purchase of crop residues among others. Migration in search of pasture and water saw pastoralist travel further than ever witnessed before. For example, Animals were transported by Trucks and rail from Narok to Emali, Kajiado - about 300kms away. These coping strategies were only accessible to relatively well-up livestock owners. The less endowed experienced untold losses as livestock succumbed to the biting drought, ultimately entrenching poverty.

Figure 5: Aftermath of Drought: Common sites in pastoral Areas

Narok is one of the counties that reported high livestock mortality as result of starvation and diseases. On the other hand, prices of food crops skyrocketed. For example, Maize prices increased as compared to the previous month due to depletion of stocks. In addition, distances walked by people and livestock in search of water increased tremendously.

As consequence, negative trend in malnutrition were also reported attributed to the continued reduction in milk consumption, decline in terms of trade and fewer number of integrated health outreaches delivering essential nutrition services as result of Covid-19 pandemic.

6. Discussion and Recommendation:

With a rapidly growing population at the rate of 4.7, half the population living below the poverty line, an equivalent of six per cent of population accessing electricity, with 78% deliveries outside of health facilities and far apart ill-equipped health facilities, with not less than 50% of population being less than 35years old coupled with high rates of unemployment – Narok County is facing rather difficult times ahead (as per 2019 census).

These challenges are compounded by repeated incidences of drought, which ultimately have a negative bearing on efforts towards realization of a range of sustainable development goals, including sustainable consumption and production patterns (SDG#12), combating climate change and its effects (SDG#13), promoting peaceful coexistence, justice and strong institutions (SDG#16.[19]

[19] Presentation: The Big Four Agenda Conference: Narok County: Fast-tracking the sustainable implementation of the big 4 agenda in ASAL Counties. 10th – 13th March 2020); Keekorok Lodge-Maasai Mara National Reserve. By Dr Salaton Tome - Leveraging Livestock Production And Wildlife Conservation: Rediscoverng The Forgotten

Analysis of climate change vulnerability must go beyond exposure and sensitivity to climate impacts. While climate change is indiscriminate in impacts; pre-existing fragility compound impacts within certain peoples' groups, livelihoods systems, landscapes - other environmental, economic, and political factors for example pressures arising from agricultural settlement, urbanization, conflict over grazing lands and water, and land fragmentation degradation come to bear.

Climate change drivers and impacts are gendered. Adaptive capacity is shaped by gender dynamics. Climate change is a driver of changes in gender roles and relations. – women face additional social, cultural, and political constraints to resource access and adaptive decision-making - Lack decision-making power, responsible for care of the sick, and the young; eat last in times of drought and have lower earning power to mention but a few.

Vulnerability in Arid and Semi-Arid Lands (ASALs) counties is exacerbated by high Gender Inequality Indices, in the areas of reproductive health, empowerment, and the labour market. Improving equity in gender issues and reducing gender disparities will benefit all sectors and thus contribute to sustainable economic growth, poverty reduction and social injustices. In addition, vulnerable groups such as children living in poor households, the disabled and the youth are more likely to experience poverty.

Efforts towards enhancement of resilience and adaptive capacities of indigenous peoples and local communities are critical in exploring potential solutions to the recurrent challenge of drought occasioned by climate change dynamics. The overall goal should be to increase adaptive capacity to ultimately reduces vulnerability.

To do so, County and national government, Non-State Actors need to first appreciate and understand the differentiated nature of climate change impacts. That climate change exhibits differentiated impacts with respect to - divers livelihoods, ecosystems/ecological zones Rural-urban settings, cultural and gender dynamics.

Once this fact is acknowledged and understood, the next logical step is moving away from macro level broadly aggregated data & generalized approaches to locale and livelihoods micro-level disaggregated data. Evidence based decision making is foundational. Informed, adaptive and forward-looking decision-making is central to adaptive capacity. Essentially, moving from reactive approaches to anticipatory and pre-emptive ones, as reactive approaches are expensive and with in-optimal outcomes. These should then inform resource allocations, strategies, and actions. In the context of pastoralism, consider both short and long-term interventions

Kenya has been grappling with the persistent problem of unbalanced regional development since 1963 (when it acquired independence) to-date. The reality of historical marginalization of indigenous forests peoples and pastoral regions (often occupying ASALs) is a constitutionally a accepted reality in Kenya (CoK Art. 260).

These communities have been condemned to the periphery of national development for decades. I particularly, the Sessional Paper No. 10 of 1965 for example established a flawed and inequitable foundation for equity and inclusiveness in development practice in the Country. The Sessional paper directed investment resources in areas of "high economic potential" areas (premised on rainfed agriculture) in order to attain rapid economic growth and redistribute the proceeds to "medium potential" and "low potential areas".

The situation of indigenous forest and pastoral communities has worsened with annexation of vast chunks of their ancestral lands for conservation as protected areas and forest reserves, without bother consent nor compensation.

Through various policies and interventions, the government has tried to reverse the discriminative effects of colonial policies that had created wide disparities and imbalances between regions

Over time, marginalized communities have endured the pains of historical and contemporary injustices, lack of recognition and identity, discrimination of citizenship rights, unequal employment opportunities, lack of inclusiveness in decision making and leadership and high levels of poverty, among others. In a nutshell, the ethnic minorities and marginalized populations have been largely relegated to the margin or periphery of socio-economic development.

a) Long-Term Strategies

- Access to climate information is critical for adaptive management of livelihoods - investing in Early warning systems in collaboration with Indigenous knowledge holders on weather forecasting, is essential in exploring pre-emptive strategies and actions

- Access to relevant and timely climate change and weather-related information is essential in efforts aimed at strengthening adaptation action targeted at Disaster Risk Adaptation. Strategies such as forage growing/hay production, forage bulking/pasture banking, pasture improvement, range reseeding and enhanced access to and improving water harvesting and storage capacity will be better utilized in efforts to reduce vulnerabilities, enhance resiliency, and ensure optimal livelihoods outcomes.

- Strengthening efforts towards livelihoods diversification, beyond climate/weather sensitive production systems are equally necessary. Having multiple options for securing food and income provides people with alternatives when one strategy fails livelihoods practices such as beekeeping for honey production, beadwork, eco-cultural tourism have for example proven viable in pastoral rangelands.

- Climate proofing infrastructure and providing safety nets against impact of climate change, including drought incidences from the get-go as - opposed to rehabilitation and reconstruction - is desirable. Such efforts would include robust, scaled-up and sustained livestock insurance schemes, and timely off-take, strengthened and sustained markets and value addition among others.

- Support improvement of water harvesting skills/technologies and storage capacity including supporting expansion of area under irrigation

Availability of and Access to Data on marginalized communities

- Sustainable Development Goals (SDGs) aspire to Leave No One Behind in its aspirations to ensure all human beings fulfill their potential in dignity and equality

and in a healthy environment. Kenya National Bureau of Statistics (KNBS), has the responsibility to generate official data, including Statistical abstracts and household survey for national and county government

- To address the gap on availability of data specific to Indigenous/marginalized communities with respect to drought impacts and food security, KNBS should develop indicators and generate disaggregated data on gender, marginalized groups and facilitate its dissemination to relevant social actors
- Counties should establish clear robust structures and protocols for research, data generation and management to generate baseline data, assess status and trends on drought and impacts on foods security, including on indigenous peoples and women

b) Short-term strategies

- Sufficient budgeting and better timing of emergency response measures such as declaration of drought disasters, compensatory payments, food reliefs,

- Ensuring robust and sustainably managed Counties Food and safety nets, including provision of food assistance, and scaling up of cash transfers targeting households which are food insecure because of the prevailing drought stress and encouraging voluntary destocking among pastoralists

- Robust, and effective malnutrition monitoring response mechanisms including Provision of food to subsidize school fees in public boarding secondary schools; Provisions for severe acute malnutrition - Ready to Use Therapeutic Food (RUTF) and supplies for moderate acute malnutrition - Ready to Use Supplementary Food (RUSF).

- Address drought induced water stress through water trucking, water treatment drugs and purchase of water boozers