

Fuzzy Comprehensive Assessment of Drought Vulnerability in Turkana Rangeland, Kenya.

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Abstract: This paper explores the vulnerability context in Turkana rangeland. It establishes the origin of the people living in Turkana before they settled in the rangeland and provides a general environmental and demographic background. It is argued that to properly understand how Turkana people respond to food crises, it is imperative to appreciate that given the hostile nature of the Turkana environment, there are factors that are responsible for their vulnerability. The paper is based on key informant and household interviews. This is complemented by local level information gathered from other sources such as informal interviews, observation, and case histories, as well as from a review of several Turkana studies. This knowledge may enable us to gain satisfactory insight into the challenges facing Turkana people in attempting to secure a reliable and sustained livelihood, and how their livelihood responses can best be strengthened. It also becomes easier to draw comparisons with how the Turkana pastoral production systems function during 'drought and famine stress' threat period. The paper is based on extensive review of secondary literature on Turkana rangeland.

Key words: Vulnerability, famine, environment and demography

I. INTRODUCTION

Most ethnographic studies of nomadic people in East Africa emphasize the importance of environmental conditions and usually have an introductory chapter with a description (sometimes extensive) of the local and even regional environments (Asad 1970; Gulliver 1955). Gulliver (1955) also pointed out that any study of the people living Turkana rangeland to a certain extent is an ecological study, in that their culture centres around the management and care of livestock, and must take advantage of all available resources. Gulliver states as follows:

In the Turkana district, there is such a notably harsh and difficult environment that its effect on social life is all-pervasive, inescapable both for the people themselves and for the observer of their lives and activities. For a proper understanding of any facet of Turkana socio-economic organization it is necessary to begin with an appreciation of the environmental limitations rigorously imposed on all social activities (Gulliver 1955: 16).

II. GENERAL DESCRIPTION OF THE TURKANA RANGELAND

Turkana is an arid and desiccated area. It lies just north of the equator, within the Great Rift Valley, the world's most formidable geological fault, a great scar that runs north-south for 3000

kilometres through Eastern and Central Africa. It is one of the largest county in Kenya and covers 77,000 km² which is approximately 12 per cent of Kenya's land mass. This area includes 6,000 km² occupied by Lake Turkana (Republic of Kenya 2002). It shares international boundaries with Uganda to the west, and Sudan and Ethiopia to the north. The area is also bordered by highland regions occupied by other peoples. To the west, atop the escarpment in northeastern Uganda, live the Karamajong, Jie, and Dodos. In the mountains at the northern end of the escarpment are pockets of hunting and gathering people known as the Ika, who are Kuliak-speakers (Lamphear 1992). To the north across the mountainous frontiers of the Sudan and Ethiopia are Toposa and Nyangatom who speak languages akin to that of the Turkana, as well as

Cushitic speaking, Dassanetch. In the south are the Kalenjin speaking, and Pokot. East of the Pokot and in the areas beyond the southeastern tip of Lake Turkana, are the Maa speaking Sampur (currently called Samburu) who live in close pastoral association with the Cushitic speaking, camel rearing Rendile (Lamphear 1992).

Currently, Turkana rangeland is divided into 17 administrative divisions, 58 locations, 158 sub-locations and 3 constituencies (Republic of Kenya 2002). The constituencies are Turkana North, which covers seven divisions (Lokitaung, Kaaling, Kibish, Kakuma, Lapur, Oropoi, and Lokichogio), Turkana Central which covers five divisions (Central, Kerio, Kalokol, Turkwel, and Loima), and Turkana South which covers five divisions (Lokichar, Lomelo, Lokorio, Katilu, and Kainuk).

The county is geographically isolated from the rest of Kenya by rough terrain. From the escarpment of the Rift Valley, Turkana appears a vast stretch of dry plain. The plains which form the main topography of the

Turkana County are below 600 metres, making the area the lowest anywhere in the East African hinterland (Lamphear 1992). Informants noted that the plain is very important to the Turkana people, as they regard themselves as people of the plains who make use of the mountains unwillingly, and only by necessity. When a Turkana person is asked where he lives, he usually gives the name of the plain where he lived during the wet season. Therefore, Turkana people call the plains 'homeland' (akwap).

In the centre of Turkana are the plains, and around it to the south are isolated barren landscapes of extinct volcanic mountain ranges. In the north and northeastern part of the district, these ranges include: Lokwanamoru Range, Lorioneteom Range, Pelekech Hills, Mogilla Range, Loima and Songot, Moroto, Lotikipi and Puch Prasir Plateau. In the south: Kamorok, Kailongkol, and Laiteruk mountain ranges can also be found. McCabe and Ellis (1987) measured the average elevation of the plains at 600 to 650 meters, and the altitude of the mountain ranges from 1500 to 1800 meters above sea level (Republic of Kenya 2002). The ranges are particularly important as key elements within the annual cycle of the Turkana pastoralists, especially as a dry season grazing area.

The Turkana know their environment intimately. Although there are no western style signs to mark locations, each place, hill, and dry river bed has a name, and the names are widely known by the people who live in the area. According to informants, men have a broader geographical knowledge than women because they tend to have more experiences away from the camps, for instance, herding animals, and visiting distant friends to exchange livestock. However, men, women, and children are all very well oriented in their social environment.

III. BRIEF HISTORICAL BACKGROUND OF PEOPLE LIVING IN TURKANA RANGELAND

The Lake Turkana basin has a long history of human occupation and is still a haven for archaeologists looking for evidence of early humanity. Trapped and fossilized in the silts of Lake Turkana are the remains of the earliest human ancestors – Australopithecus, Homo habilis, and Homo erectus. The following summary of Turkana history is brief; more lengthy descriptions and references may be found in Ehret (1971), Gulliver (1951), Lamphear (1976) and Ong'any (1981).

The critical question being asked here is: Who are the Turkana people? According to oral traditions, the 'original' Turkana was the eastern vanguard of the 'Ateker,' groups of the eastern Nilotic linguistic family known as the central para-nilotes, which replaces the incorrect and misleading term 'Nilo-hamitic' (Lamphear 1976, 1992). Traditionally, tribal groups which share close linguistic ties with the Turkana are the Karamojong, Jie, Dodoth, Iteso, Ngangatom, and Toposa (Lamphear 1992). According to Lamphear (1992), these tribal groups were Turkana neighbours and inhabited the Korten-Magos hills in the present day Karamoja district of Uganda at the beginning of the 18th century. During this time, they adopted a strong pastoral outlook and kept thoracic hump zebu cattle that permit long distance patterns of transhumance (Lamphear 1992). The massive migration of these groups to Korten-Magos hills led to serious ecological pressures, exacerbated by one or more serious droughts, and internecine feuds over pastoral resources (Lamphear 1992). The Ateker group broke into segments that were to form distinct linguistic groups such as the Karamajong, Dodos, and Toposa. Moving southwards from the Korten-Magos hills down to the Apale River and to the northwest of the Korten-Magos hills were elements of the Jie and the Turkana (Lamphear 1976). The Turkana later separated from their brethren, the Jie (now in Uganda), and expanded their territory in all directions, displacing the Toposa, the Dongiro (Nyangatom), and the Merille (referred to as Dassanech) in the north, the Dodoth (Dodos) and Karamajong in the west; the Pokot in the south and the Samburu in the southeast (Lamphear 1992). Displacement by the Turkana occurred over an extended period of time by exerting pressure on key opponents. In this milieu of change, some defeated groups were assimilated, while some were forced out, themselves exacting pressure on their neighbours and so on (Oba 1992).

Turkana traditions depict military activities during this period of expansion as small-scale raids and skirmishes rather than coordinated military campaigns (Gulliver 1955). They captured large numbers of animals including Boran Zebu cattle, and also many camels. Although they had acquired camels earlier from the raids in Loima Hills region, Lamphear (1988) reports that extensive camel husbandry by Turkana people began at this time. The final expansion reached south as far as Lake Baringo, with raiding parties marauding up the eastern shore of Lake Turkana, although the Turkana did not occupy this region. This conquest of other tribes by the Turkana people was made possible by the fact that the Turkana were isolated from the rinderpest disaster of the 1880s, and were therefore in a comparatively stronger economic and military position than their neighbours, whose livestock was decimated by the epidemic (Gulliver 1955).

The larger Nilotic grouping migrated southward from the Nile region and includes the Kenya Luo. Other paraniotic peoples also called plain Nilotes, include the 'Maasai' and the 'Kalenjin' culture groups which settled in and around the Rift Valley (Ehret 1974).

Linguists think that Eastern Cushitic languages (e.g. older roots of Somali, Boran, Rendile or Galla) were spoken in northwestern Kenya before the para-nilotes took over (Lynch and Robbins 1979; Soper 1985). It has been documented that in the 17th and 18th centuries, the Karamajong-Teso group rapidly expanded and migrated close to their present locations (Ehret 1974). Lamphear (1976, 1988) reports that the Turkana's major expansion to and 'conquest' of their current territory took place in the 1850s. The people's own origin myth refers to an eastward migration down from the Jie territory in Uganda, where relatives sought after an old woman who ventured to gather wild fruits and a lost bull (Lamphear 1988).

From the 1850s onwards, due to unfavourable climatic conditions in the Turkana rangeland leading to variable fodder and water supply, poor security, and because of the unique requirements of each stock species, Turkana pastoralists developed a flexible social system and a pastoral system well augmented with agriculture, hunting, gathering, and fishing (Lamphear 1992).⁶⁷ Turkana people also had competitive raiding relationships with the surrounding pastoralist tribes, except for a short period of cessation during British domination (Gulliver 1951). By the 1890s before the first arrival of the British military presence, Turkana people had gained control of virtually all territory which was ever to be regarded as Turkana. The encounters between Europeans and local Turkana were mostly hostile initially, and increased the Turkana's distrust of outsiders. Although the Turkana generally had no major political leaders, Lamphear (1992) documents how a few powerful diviners rose to war leadership in resistance against the British. The diviners led a major uprising from 1916 against the colonial powers, but its suppression seriously disrupted the Turkana peoples' social security system (Lamphear 1976).

The Turkana rangeland has remained remote since Kenya became independent as a nation in 1963. The development of this arid part of Kenya has not been a priority of the Kenya government until the decade of the 1980s (Republic of Kenya 1992). However, the paving of a road through Turkana to Sudan has accelerated changes, and the administrative centre Lodwar is now a bustling frontier town of over 20,000 people (Republic of Kenya 2002). A mix of 'modernizing' influences, both beneficial and detrimental, has diffused spatially along the road corridor: Kenyans from 'upcountry' coming north to operate businesses, the number of available goods, and public education have all been strong influences. Interestingly, most Turkana people still follow their traditional beliefs and customs. They could be seen keeping cattle, camels, donkeys, and goats, wearing traditional clothing, and inhabiting huts near the towns.

IV. ECOLOGICAL CLASSIFICATION

According to the ecosystem adopted by the survey of Kenya (Pratt and Gwynne 1966; Republic of Kenya 1992), land in the Turkana District covers six agro-climatic zones (III-VIII) of which 'arid' and 'very arid' eco-climatic zones VI and VII respectively, cover the major part of the county. These agro-climatic zones have been classified according to annual rainfall and evaporation patterns. Moisture indices are calculated not only from rainfall and evaporation, but also include measures of radiation, temperature, saturation deficit, and wind speed. According to this classification, an index of -60 is the minimum possible and is equivalent to no rainfall, or 'true desert'. Zone VII (moisture index -57 to -60) is not found in East Africa (Pratt and Gwynne 1977).

The arid zone V (moisture index of -42 to -51) is characterized by wooded and thorn-bushed grassland. The very Arid Zone VI (moisture index of -51 to -57) is dwarf shrub grassland with acacia trees mostly confined to water courses and depressions. Lava outcrops and gravel flats are common in many parts of Turkana. The east central region is nearly a desert; even the shoreline of Lake Turkana has little vegetation. Turkana is adjacent, and ecologically similar, to a stretch of 'drought pulsed ecosystems' in southern Sudan, Ethiopia and Somalia, and is similar to the Sahel region bordering the Sahara Desert and the West African savannas (Ellis 1984). Most of these areas are inhabited by subsistence pastoralists, who, like the Turkana, have a wide range of survival strategies for land which is too arid for crop growth.

V. TEMPERATURE

The low-lying plains in Turkana are hot and dry, and temperatures are high, but fairly uniform throughout the year, with an average daily range of about 24 degrees to 38 degrees centigrade and are seldom lower even at night. Ground absorption and radiation can increase temperatures over lava flats to at least 67 degrees centigrade (Coe 1972). During the day, the extremely high temperatures are accompanied by strong easterly winds sweeping across the largely barren countryside, carrying large quantities of sand.

VI. RAINFALL

In the Turkana rangeland, climate variability, caused by uncertain rainfall patterns, is one of the most unstable factors that affect pastoral production systems (Ellis 1994). Long-term data from various stations show that rainfall in Turkana is not only sparse, but is spatially and temporally erratic. Rain tends to fall intermittently, but it can occur any time. Ideally rain starts in March or April and usually extends on through August and September with most precipitation concentrated in April and July. Precipitation is somewhat

correlated with elevation, with higher amounts in the northern and western parts of the district, decreasing eastward to Lake Turkana. Government records show annual averages of 150 millimeters to 300 millimeters for central and southern Turkana. Mean annual rainfall is 159 millimetres in Lodwar, the district headquarters (EcoSystems Ltd 1985).

Rain often comes in sharp storms in Turkana, and because of minimal grass cover and baked soils, runoff can produce flash floods. Groundwater recharge may be helped by floods flowing to the eastern, drier parts of the district. Recharge is highest where the ground cover is sandy gravel and fractured rock.

The Turkana people describe the two major seasons as dry (*akamu*) and wet (*akiporo*). According to Gulliver (1955), these two terms, in keeping with realities, are used in an extremely elastic manner. More precisely, *Akiporo* refers to the times when the rains have been sufficient to produce new and fairly well-established vegetation. *Akamu* means no rain or sporadic rain that does not produce new growth (Gulliver 1955).⁷⁵ The ideal pattern is reflected in the names of Turkana months. At the beginning of the rainy season is *Titima* ('when Grass is growing'), followed by *Eliel* ('Spreading' – when homesteads move with their herds across the country to utilize the new grass), *Lochoto* ('Mud'), and *Losuban* ('The Time of Marriages'). The advent of the dry season is marked by *Lopoo* ('When Dry Berries are Gathered'), followed by *Lorara* ('When Leaves Fall'), *Lomak* ('When Trees are Bare'), and by sinister periods of *Lolongo* ('Hunger') and *Lokwang* ('The White Time' – when clouds of white dust envelop the land) (Lamphear 1992: 7-8). During the time I arrived in Turkana for my fieldwork, two weeks after strong rainstorms, several people told me that they were still 'waiting for the rains to come' to go visit their friends. When I asked about the rains that had already come, they replied that those were not the real rains which bring grass. I had to concur with Gulliver when he reported that "Turkana say, with truth, that only about one year in four or five has a 'good wet season', with rainfall well above the average paucity" (Gulliver 1955: 23).

The predominant low mean annual rainfall, coupled with extremely high variability, indicates a drought - stressed ecosystem. Seasonal dry periods vary between six and nine months. Long-term data series suggests one to three-year droughts have occurred, accumulating to approximately times during the past 80 years, with an average of one drought every six to seven years (Turkana Drought Contingency Planning Unit 1992).

Demographic considerations

The demographic structure of a given community is quite important in understanding livelihood strategies of that particular society. The effect of characteristics such as household size and composition on adaptive options at household disposal has been documented widely in literature

(Adams 1992; Toulmin 1986). In this paper, knowledge of population dynamics is essential to understanding Turkana human ecology. According to the 1999 population and housing census, Turkana county had a population of 450,860 persons. This population was projected to increase to 497,779 persons in 2002 and to 606,774 persons in 2008. The population has been increasing dramatically, and this rapid growth rate is estimated at 3.3 per cent per year (Republic of Kenya 2002:17). In absolute terms, the population of the county is estimated to increase by about 22 per cent between 2002 and 2008 (Republic of Kenya 2002). The population density varies from persons per Km² to the northern part of the Turkana county to one person per km² to the south frontier of the district (Republic of Kenya 2002).

The observation I would make here is that the population in Turkana is increasing fairly rapidly and is therefore exerting a lot of pressure on the available scarce facilities and resources such as food, water, pasture, vegetation, education, employment, and health. This is manifested by the persistent drought, famine, malnutrition, unemployment, poverty, and the inability of the district residents to access basic services such as health and education. Furthermore, high population has led to increased competition with pastoral neighbours for pasture and water, leading to violent armed attacks between Turkana and their neighbours the Pokot pastoralists (Daily Nation 15th May 2007: 13).

VII. FACTORS ASSERTING PRESSURE ON THE TURKANA LIVELIHOOD SYSTEM.

7.1 Drought and famine occurrence.

Periodically, the Turkana livelihood system has experienced a lot of pressure leading to widespread food shortages. Swift (1985) and the Turkana Drought Contingency Unit (1992) extensively traced famine and rainfall patterns in Turkana, and reported that, on average, a county-wide disaster involving human starvation occurs once every 10 years. Although memories of food shortages may not be accurate, Table 1 indicates an increasing vulnerability and frequency of famine occurrences (Swift 1985; the Turkana Drought Contingency Unit 1992). A discussion with key informants in the surveyed villages in Turkana revealed that food shortages in Turkana were predominantly the result of drought. The respondents' comments concurred with an earlier model designed by Songreah engineers. As part of their consultancy to examine the Turkwel Gorge Multipurpose project and downstream effects in Kenya, Songreah engineers developed a model to explain

“Factors influencing migration to and from settlements” in Turkana (Norconsult 1990: 87). They found that the major push factor is drought. I find the model helpful for this study, and have reproduced it here in Figure 1.

Therefore, while analyzing occurrences of food shortages in the Turkana county, it is worth noting that the local people name the famine periods as they experience or perceive them. Each prolonged famine period has a specific name. Table 1 indicates the years in which famine has occurred since the early 1920s, and includes the Turkana name given to each period and local people’s perception. Respondents stressed that the famine years listed in Table 1 represent acute cases only since those were the ones they could remember. As shown in Table 1, it is clear that throughout the history of the Turkana, drought occurrences have in most cases been followed by famines.

Table 1: major historical droughts and famines, names and descriptions among Turkana

Year	Local Turkana name	Local perceptions
1925	Ekwakoit	Bad hunger.
1930	Abrikae.	Drought and bad hunger.
1942	Lolewo.	Bad animal disease.
1943	Ekuwan loyang	Drought and famine.
1947	Ataa nachoke	Animal disease and famine.
1949	Ngilowi	Animal disease.
1952	Lotira	Animal disease, drought and famine.
1953-1954	Lokulit	Bad years, famine continued.
1960	Namotor	Drought and famine. All people were starving
1966	Etop	Serious but short drought.
1971	Lolewo	Cholera epidemic, many deaths.
1979-1981	Loukoi (CCPP), Lopiar, Atanayanaye	Animal disease (CCPP, anthrax), security problems, famine.
1984	Kilejok, Kidirik	Minimal rain, animal raiding.
1990-1992	Lopiar	Skins everywhere, many livestock deaths.
1997	Etop	Serious but short drought.
2005-2006	Kumando	Drought and bad hunger. Drought which terminated everything.

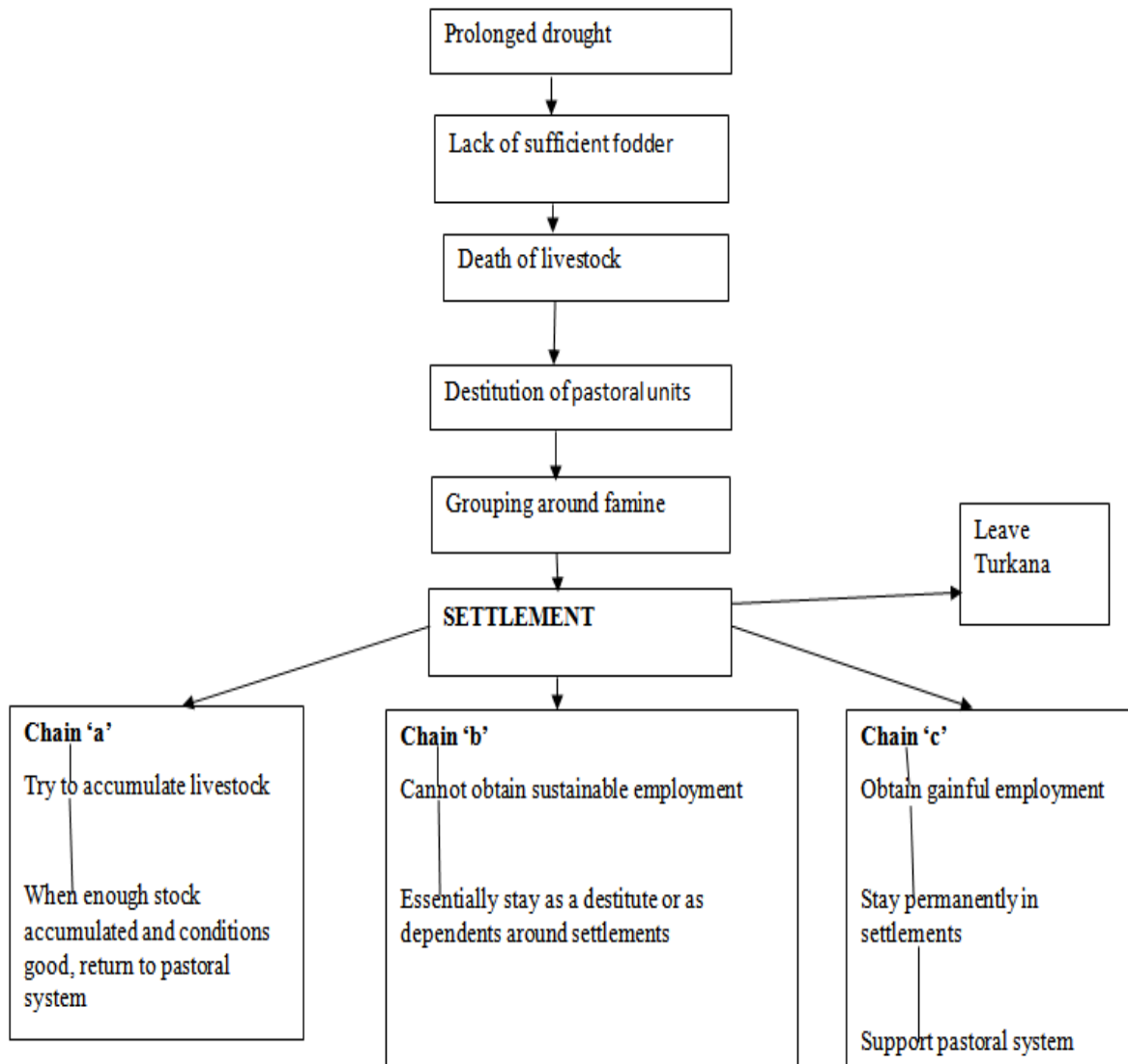
Source: Swift (1985); Turkana Drought Contingency Unit (1992); and Field data (2007).

7.2. Phases of drought and effects in Turkana.

It is now arguable that drought conditions in the Turkana area are becoming the norm while non-drought years are the exception (Leville and Crosskey 2006). But, in order to understand drought impacts in Turkana, one fundamental question needs to be answered: “How are Turkana pastoralist livelihoods affected by drought?” According to Swift (1985) and the Turkana Drought Contingency Unit (1992), drought conditions in Turkana have had serious implications in the past. The impact has mainly been on the herders’ economy and their social lives. Both Figures 1 and 2 provide an overview of the socio-economic implications of drought related stress in the Turkana county.

According to Swift (1985), Norconsult (1990), Turkana Drought Contingency Unit (1992), and field respondents, the most direct effect of a shortage in rainfall on Turkana pastoralists’ livelihoods is the drying up of water sources and declining forage resources for livestock, as shown in both Figures 1 and 2. Livestock, which are the most important asset for Turkana pastoralists, are directly dependent on access to forage and water resources. Therefore, when forage supply is depleted, nutritional condition of livestock deteriorates, affecting their health, for example, their fertility and live weights. As seen in Figures 1 and 2, animal death rates increase, and, due to this, there are many skins on the market, and prices fall. Pastoral households increasingly try to sell or barter part of their animals, but market prices decline rapidly as there are few buyers. Cereals are not easily available since, in case of the nation-wide drought, the farm sector is affected by low production whereby cereal prices escalate, especially in the absence of price control. Alternative sources such as hunting and gathering, sale of firewood, and alternative income through casual employment could be sought. Movements become uneven, and households may break up to reduce the demand for food, though this may also lead to conflict with other herders.

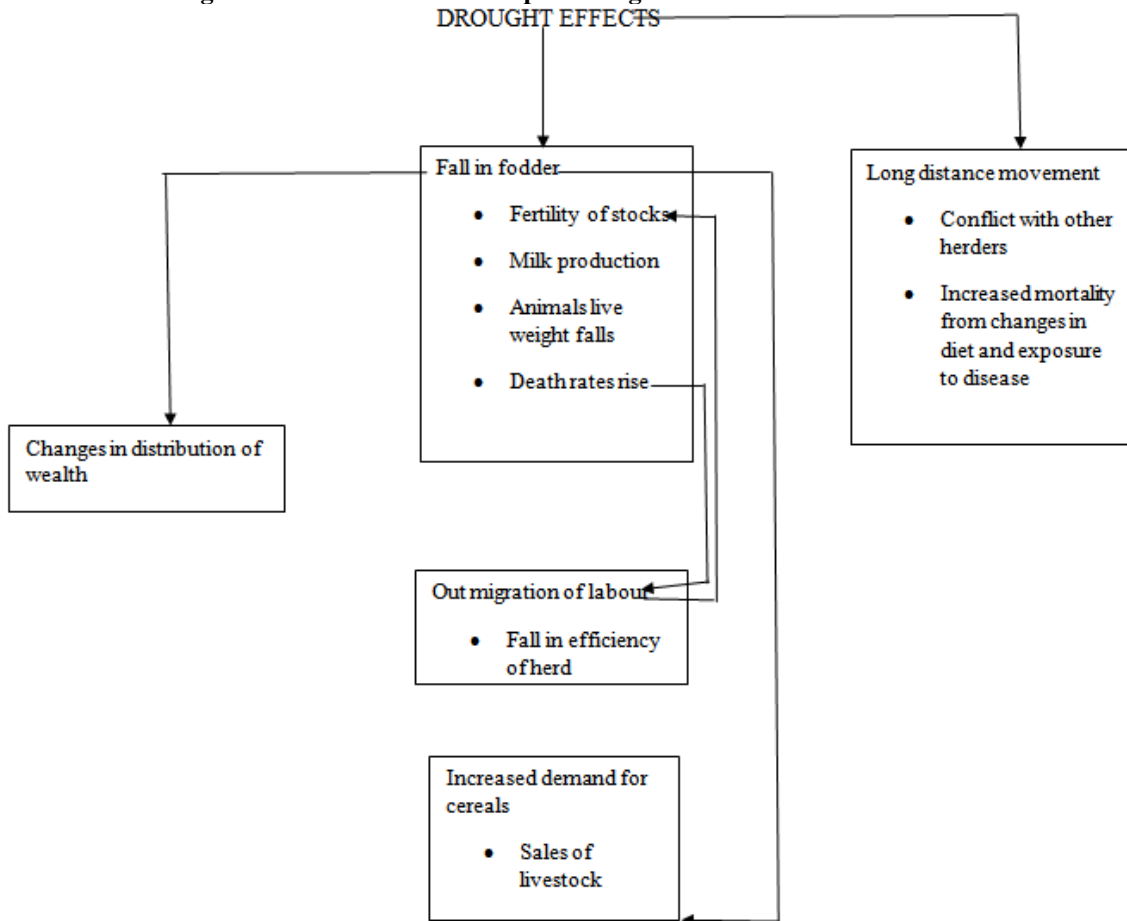
Figure 1: factors influencing migration to and from settlements in Turkana



Source: Norconsult 1990:6.

As shown in Figure 1, those herders who end up in settlements could either look for employment to support the pastoral system, or try to accumulate livestock, and, when enough stock is accumulated and the conditions are good, return to a pastoral system, or essentially stay as destitute or dependents around settlements.

Figure 2: Events in the build up to drought related stress in Turkana



Source: Swift (1985) and Turkana Drought Contingency Unit (1992).

Figure 2 further shows that during drought periods, changes in the distribution of wealth become notable. The rich, with many assets, are in a fortunate and better position, and may even exploit the situation for their benefit, as they can acquire more assets (e.g. livestock) at relatively low prices. The poor become poorer, as they need to sell whatever they have in order to purchase cereals (Swift 1985; Turkana Drought Contingency Unit (1992). Toulmin (1986) observes that several case studies about the impact of drought on pastoral communities in Sub-Saharan Africa show a similar pattern to that of the Turkana, shown in Figures 1 and 2.

VIII. CONCLUSION

This paper has given specific information on the environmental context in which Turkana people make a living such as the agro-climatic zones, rainfall patterns, and demographic patterns in Turkana rangeland. This is critical since livelihoods of people living in the rangeland and their social relations configurations are affected to a large extent by the environment. It is argued that the environment in which Turkana households live, provides opportunities and limitations that influence their decision making. However, the predicament in which they find themselves in is as a result of accumulated impacts of various internal and external factors that substantially weaken their asset base. The findings further suggest that drought per se does not necessarily lead to famine: death from starvation and hunger related diseases. Other intervening variables like the socio-economic environment are crucial.

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