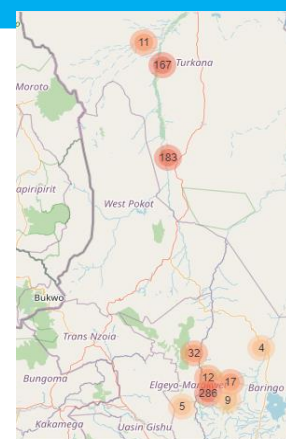
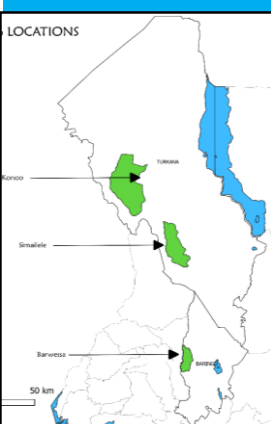


RURAL LIVELIHOODS ADAPTATION TO CLIMATE CHANGE
PROGRAMME (RLACC) – KENYA COMPONENT



**BASELINE STUDY
CHARACTERIZATION AND MAPPING BIOPHYSICAL AND
SOCIO-ECONOMIC FEATURES OF PROJECT AREAS**



FINAL REPORT

By
JOHANNES ORODI DOVENS ODHIAMBO

TABLE OF CONTENTS

LIST OF TABLES.....	iv
LIST OF FIGURES.....	v
ABBREVIATIONS AND ACRONYMS	vi
EXECUTIVE SUMMARY.....	vii
1. INTRODUCTION.....	1
1.1 Overview of RLACC–Kenya Project.....	1
1.1.1 Project goal.....	1
1.1.2 Project Components.....	1
1.1.3 Description of RLACC Project Area.....	3
1.1.4 Roads & Communication.....	6
1.1.5 Industries.....	9
1.2 Agriculture and Livestock Production.....	9
1.2.1 Crop farming.....	9
1.2.2 Livestock Production.....	10
1.3 Land Ownership and Use.....	11
1.3.1 Biophysical parameters.....	12
1.3.2 Climate Change	15
1.4 Rationale for the baseline survey.....	16
2. Methodology	17
2.1 Approach.....	17
2.1.1 Sampling methods and size.....	19
2.1.2 Enumerators’ Training.....	19
2.1.3 Data collection.....	20
2.1.4 GIS mapping.....	23
2.2 Data analysis.....	24
3 Survey Results.....	24
2.3 Socioeconomic and farm characteristics.....	25
2.3.1 Population trend.....	26
2.3.2 Household size, gender, age and education	26
2.3.3 Primary occupation of household heads	27
2.4 Water resources and management	28
2.4.1 Access to water resources for households and livestock	28
2.4.2 Changes in natural resources	29
2.4.3 Natural resources in the environment	29
2.4.4 Adaptation measures for environmental degradation	30
2.5 Climate change challenges, adaptation and coping strategies	30
2.5.1 Climate change episodes and household coping strategies and response capacity.....	30
2.5.2 Climate change adaptation strategies.....	32
4. SUMMARY OF KEY FINDINGS CONCLUSION AND RECOMMENDATIONS.....	34
REFERENCES	37
ANNEXES	37
Annex 1: RLACC Baseline indicator levels at county project sites levels.....	37
Annex 2: Household Questionnaire for Baseline Survey	44
1 Annex 3: FGD Participants and Key Informants.....	2
2 Annex 4: Geo-Referenced Maps of FGD Points	3

LIST OF TABLES

Table 1: Population of Livestock in Turkana County in Recent Years	6
Table 2: Road network in Baringo	8
Table 3: Production Statistics in Turkana County.....	9
Table 4: Production statistics in Turkana project sub counties 2019	9
Table 5: Production statistics in Baringo project sub county 2019.....	10
Table 6: Area cropped, production and values for various crops 2015 - 2017.....	10
Table 7: Households and engagement in livestock enterprises in project sub-counties.....	11
Table 8: Sources of water in project sub counties	14
Table 9: Respondents' age structure	25
Table 10: The gender of the respondents	26
Table 11: Marital status of respondents.....	26
Table 12: Main source of livelihood	27
Table 13: Main income source.....	27
Table 14: Main source of water.....	28
Table 15: Sufficiency of water in the main source for the livestock.....	28
Table 16: Types of climate shocks experienced	31
Table 17: Coping strategies with climate shocks.....	31
Table 18: Capacity of households to cope with climate change shocks (%).....	32
Table 19: Household members adapting use of climate change technologies	33
Table 20: Household members trained on adaptation strategies	33

LIST OF FIGURES

Figure 1: RLACC – Kenya Project Areas.	4
Figure 2: A flooded drift on a road in Turkana	7
Figure 3: Turkana County Project Areas Road and Market Accessibility.....	8
Figure 4: Baringo County Project Area Road and Market Accessibility.....	8
Figure 5: Turkana and Project areas (a) Temperature and (b) Rainfall	12
Figure 6: Turkana (a) Irrigation and (b) Boreholes	13
Figure 7: Turkana (Soils) and (Agro-ecological zones)	13
Figure 8 : Baringo (a) Temperature and (b) Rainfall	14
Figure 9: Irrigation at Barwessa	15
Figure 10: Barwessa Soils Map.....	15
Figure 11: The Baseline Survey Protocol.....	17
Figure 12: RLACC Project Study	18
Figure 13: Konoo, Loima, survey responses household points.....	21
Figure 14: Turkana South Simailele Project area survey response	22
Figure 15: Baringo North, Barwessa Project Area Survey Responses.....	23
Figure 16: Respondents’ age structure.....	25
Figure 17: Respondents’ population characteristic	26
Figure 18: Changes witnessed by respondents over the recent years	29
Figure 19: Tree resource use in the project areas.....	30

ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
AI	Artificial Insemination
ASAL	Arid and Semi-Arid Lands
CIDP	County Integrated Development Plan
DRSLP	Drought Resilience and Sustainable Livelihoods Program
ECF	East Coast Fever
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
HHH	Headed Household
IWUA	Irrigation Water Users Association
KES	Kenya Shillings
KPHC	Kenya Population and Housing Census
KWFT	Kenya Women's Finance Trust
KWS	Kenya Wildlife Society
LMA	Livestock Marketing Association
MAHFP	Months of Adequate Household Food Provisioning
MOALF	Ministry of Agriculture Livestock and Fisheries
NDMA	National Drought Management Authority
NEMA	National Environmental Management Authority
RLACC	Rural Livelihood Adaptation to Climate Change
RVWSB	Rift Valley Water Services Board
SACCO	Savings and Credit Cooperative Society
SFP	School Feeding Program
SPSS	Statistical Package for Social Scientists
WUA	Water Users Association

EXECUTIVE SUMMARY

The baseline survey for the Rural Livelihoods Adaptation to Climate Change Program (RLACC) under the Drought Resilience and Sustainable Livelihoods Programme in the Horn of Africa (DRSLP) - Kenya Project is herein presented. RLACC is an initiative of the Government of Kenya through funding from the African Development Bank (AfDB) specifically Global Environmental Facility (GEF). It is being implemented in Kenya and targets communities living in Barwessa (Baringo North), Simailele (Turkana South) and Konoo (Loima Sub-County) as part of a global initiative covering the Horn of Africa. The project seeks to improve resilience to climate change of pastoral and agro-pastoral communities and also increasing the adaptive capacity of their livelihoods. As such, this study was conducted in close consultations with the project staff and representatives of key stakeholders at both the National, County and target ward levels within Turkana and Baringo Counties.

RLACC - Kenya Project is designed The overall goal of the programme is to improve resilience to climate change of pastoral and agro-pastoral communities in targeted areas in Kenya, and increase the adaptive capacity of their livelihoods. The project consists of three components: knowledge management and mainstreaming; sustainable pastoral and agro-pastoral livelihoods and program activities coordination, monitoring and evaluation. n.

The study was intended to carry out a detailed Baseline Survey in the intervention sites for Turkana and Baringo counties as well as set benchmarks for all the appropriate indicators at the start of the project by looking at several parameters. It was conducted during July-December 2021. Both primary and secondary data were collected and analyzed. A total of 726 sampled households from 3 Wards were interviewed, representing 96% response out of the targeted 760 households. A total of 8 focus group discussions out of the targeted 10 FGDs and key informant interviews were held to capture broader communal views on climate change. This report provides a description of households targeted indicating that their main source of livelihood was pastoralism and mixed farming.

The study concluded that for equity and success of the designed intervention measures, planning should take into account the patriarchal nature of the community. Interventions should focus mostly on livestock production and pasture management as well water harvesting for pasture production, domestic and livestock water supply. Additionally, small livestock are the preferred species because of their adaptability to climate change and drought episodes.

1. INTRODUCTION

1.1 Overview of RLACC–Kenya Project

The Rural Livelihoods' Adaptation to Climate Change (RLACC) – Kenya, is a complement project to the Drought Resilience and Sustainable Livelihoods Program (DRSLP – Phase I), designed to support the additional dimensions of climate change resilience. The RLACC Programme cover two arid and semi-arid counties of Baringo and Turkana where the Drought Resilience and Sustainable Livelihoods in the Horn of Africa (DRSLP) – Kenya project is being implemented.

This baseline study that characterized and mapped the biophysical and socio-economic features of Barwessa in Baringo County and Simailele and Loima in Turkana County to inform the baseline conditions to guide project actions and as benchmarks needed for final project evaluation. The study focused on the project's main beneficiaries who include agro-pastoral communities residing in targeted semi-arid areas that are particularly vulnerable to climate change.

The Project activities are designed to address the various impacts of climate change on rural livelihoods, by financing adaptation measures and associated services based on both the traditional knowledge and know-how of pastoral and agro-pastoral communities, and also proven improved sustainable technologies and practices. In addition to the direct benefits, there are also intangible benefits associated with the project that will lead to environmental regeneration, capacity building and institutional support. The beneficiaries are targeted to participate through trainings, workshops, development of community-based plans, and engagement in improved livelihood practices. The use of cash for work mechanisms and other social transfer mechanisms will also be explored during implementation, to further strengthen the income basis of the resource-poor beneficiaries.

1.1.1 Project goal

The overall goal of the programme is to improve resilience to climate change of pastoral and agro-pastoral communities in targeted areas in Kenya, and increase the adaptive capacity of their livelihoods.

1.1.2 Project Components

The project consists of three components:

- i. Knowledge management and mainstreaming
- ii. Sustainable pastoral and agro-pastoral livelihoods
- iii. Program activities coordination, monitoring and evaluation.

Component I: *Increased resilience of pastoral and agro-pastoral communities to climate change in the target areas.*

The first component of the project seeks to integrate the adaptation to climate change of pastoral and agro-pastoral communities in the target areas into their development planning. This will be promoted through raising awareness of local stakeholders by sharing information on climate change and training government officials at national, regional and local levels on the management of climate risks and planning resilience. This first component aims to build a common understanding of climate change among the local stakeholders and to integrate the lessons learned from local knowledge and previous projects regarding development planning. Overall, this first component creates the enabling environment for the establishment of a participatory integrated management of watersheds that is specifically put in place in component II.

The baseline study focused on benchmarking the existing knowledge, (both indigenous and common practice) of beneficiary communities on climate change and query and adaptation knowledge and observe the practices in place to inform development of responsive training plan and curriculum

Component II: *Investment in sustainable measures to increase the resilience to climate variability and change of the pastoral and agro-pastoral communities in the target areas.*

The measures prioritized in the second component build on the activities conducted in Component I and seek to set up an integrated watershed management. This was to be achieved by providing grants to local communities to fund micro-adaptation projects in the fields of water and grazing resources, livestock and income-earning activities (targeting irrigation technologies, resilient equipment and infrastructure, natural resources management systems).

The integrated watershed management (IWM) is aimed at ensuring a holistic approach to the management of natural resources through identification of alternative subsistence strategies and conducting participatory reforestation activities that involves the local communities and NGOs and that integrates local knowledge. This component also includes social monetary transfers to increase the resilience of different types of households. The social monetary transfers are included in the Project Funding Document (PFD). These are direct cash transfers to the poorest and most vulnerable households. These lack productive assets and are not economically active, so they cannot benefit from either micro-loans or cash-for-public works. These households are typically composed of old or disabled people. The objective is that they have access to minimum cash to be more resilient to climate change. This mechanism is similar to the transfers that

non-active and poor households get in developing countries through public safety net systems.

The baseline survey aimed at capturing information on existing climate change adaptation technologies, measures and practices and delved on establishing how measures are applied. It also attempted to infer the level of vulnerability and exposure of households to climate change risks where adaptation measures have not been applied

Component III: Monitoring, evaluation and project management.

The third component seeks to support the other two components by developing in local language the required information products and coordinating, monitoring and evaluating the activities of the project.

The baseline survey made inferences to the log frame to distil the project outcome and output indicators as a basis for framing indicator aligned survey

1.1.3 Description of RLACC Project Area

The individual consultancy commissioned by RLACC for undertaking the baseline study on characterization and mapping biophysical and socio-economic features of project areas focused on two areas of Simailele and Loima in Turkana County and Barwessa in Baringo County. The baseline information was needed to inform structure the roll out of adaptation measures as part of the Rural Livelihoods Adaptation to Climate Change Program (RLACC) initiative and to provide benchmark data for end of project evaluation. The baseline study was undertaken over a period of six months due to the logistical complications that arose restricting travel and direct community engagement due to the stringent protocol measures in place resulting from the COVID-19 pandemic. The study focused on four key areas assigned in the terms of reference (T.O.R) that focused on;

- i. Evaluating the impacts of climate change to the biophysical features for the three project sites in Turkana and Baringo Counties.
- ii. Investigating the influence of climate change on socio-economic features of the three project sites
- iii. Identifying the climate risk vulnerabilities and adaptive capacities for the biophysical and the socio-economic features in the target areas
- iv. Exploring the climate change impacts in agro pastoral and pastoral livelihoods in relation to the bio physical and socio-economic features in targeted areas/sites.
- v. Reviewing the logical framework for the implementation of climate change adaptation measures for improved pastoral and agro pastoral livelihoods

The study will focus on the two sites of Simailele and Loima in Turkana County and one at Barwessa in Baringo County as illustrated in the maps in Figure 1 below.

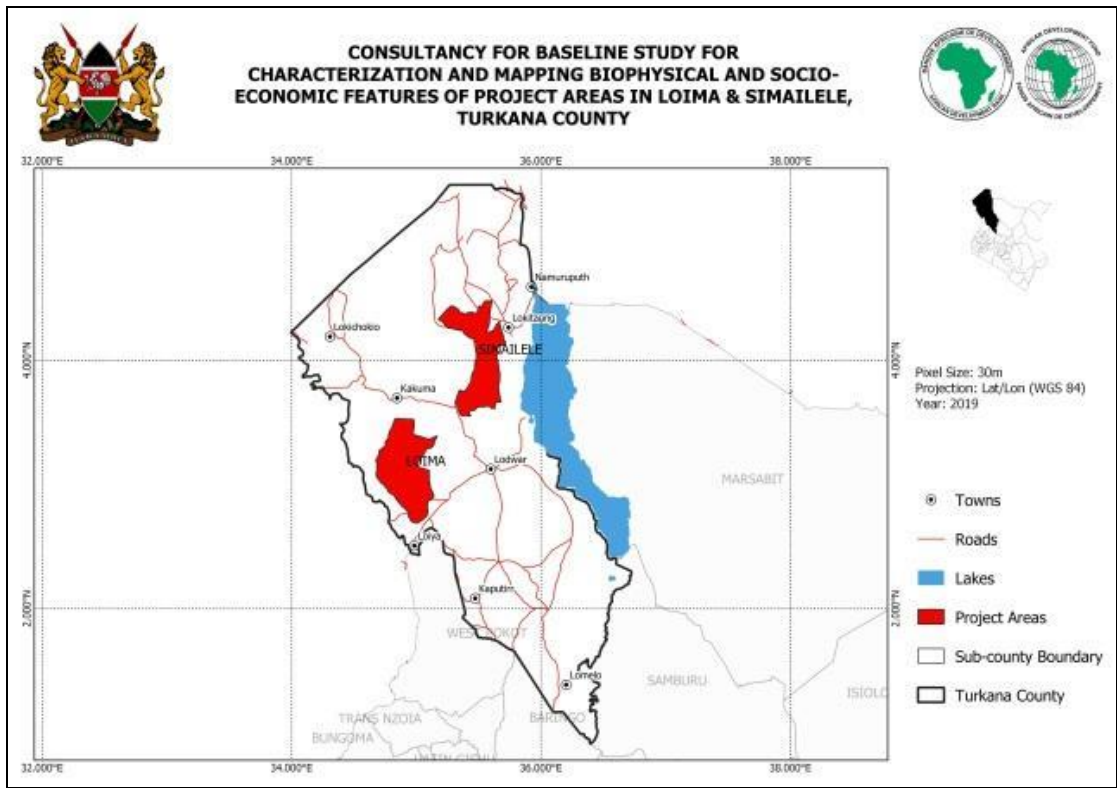
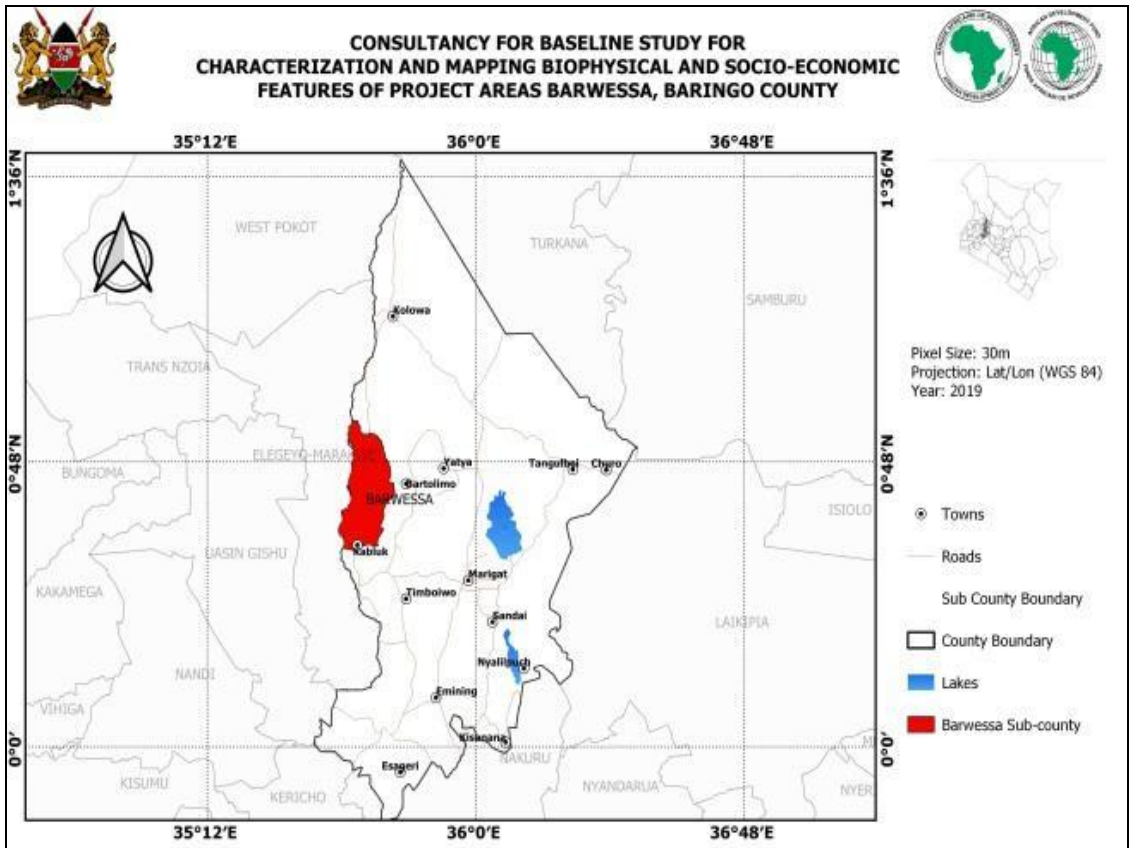


Figure 1: RLACC – Kenya Project Areas.

The RLACC target areas are described as dry and semi-arid, with pastoralism being the primary source of income for the majority of the people. The ASALs are characterized by ecological restrictions that favor nomadic pastoralism and limit settled agriculture. The impediments that limit full development of the ASALs include naturally variable rainfall patterns, frequent droughts, insecurity, and lack of foundational infrastructure, low human capital, increased poverty, and the fragility of biophysical and socio-economic parameters. Currently several farmers in the project region practice combined rain fed and irrigation farming as an adaptation to the hot and dry weather episodes.

The main economic activities in the two RLACC counties in general and in the specific project target areas is agro-pastoralism with subsistence crop production and livestock keeping as the predominant ventures.

In Turkana County the backbone of economy is Livestock production with over 80 percent of the inhabitants relying on livestock for their livelihoods. Nomadic pastoralism is more prominent in the county and defines the lifestyle of most of the county's inhabitants. The County has significant numbers of livestock when compared to the other ASAL counties. Livestock in Turkana include goats and sheep, cows, camels, donkeys and poultry (mainly chicken) and pigs (Table 1). Most of the breeds are indigenous. Products from livestock include milk, beef, mutton, donkey meat (known locally as epong), hides and skins, bones, hooves, eggs and poultry meat. A negative impact on the environment due to overgrazing caused by overstocking¹ is evident in Turkana and this requires corrective action.

Turkana County is home to 926,976 people (2019 National Census), which consists of 478,087 male, 448,868 female and 21 inter-sex. The County has 164,519 households with an average household size of 5.6 and an average population density of 14 persons per Sq. Km. Rapid population growth has resulted in Turkana County having an extremely youthful population. The 2019 current census showed that more than half the County's population is below the age of 19. This youth dominated population profile indicates the need for urgent investments in education, nutrition, water and health. Further, as a result of its geographic location, the population of Turkana County is affected by the periodic influx of refugees from the neighbouring countries. Population growth, the expansion of the youth population and the impact of recurrent droughts upon pastoralist communities, have resulted in rapid levels of urbanisation.

¹ Isiolo County Integrated Development Plan (2013-2017)

Table 1: Population of Livestock in Turkana County in Recent Years

Sub County	Households	Sub County Household livestock holding size					Sub county Livestock population				
		Goats	Sheep	Cattle	Camel	Donkey	Goats	Sheep	Cattle	Camel	Donkey
Central	21,357	48	13	1	2	2	1,025,121	277,637	21,357	42,713	42713
Loima	30,263	18	7				544,737	211,842			
South	19,650	87	33	5	8	3	1,709,571	648,458		157,202	58951
North	17,815	45	11	5			801,686	195,968	89076	98,251	
West	34,129	4	5	1		2	136,515	170,644	34,129		
East	15,853	29	10	1	1	1	459,732	158,528	15,853	15,853	15853
	139,067						4,677,362	1,663,077	160,415	314,019	117,517
Moderated Total Livestock Population Turkana County							2,619,323	931,323	89,832	175,851	65,809

Source: Watson and Binsbergen, 2018

The economic situation is the same for Baringo County where the traditional *zebu* kept for meat production is the main breed in Tiaty, Baringo South and parts of Baringo North Sub-Counties, while in Baringo Central and Eldama-Ravine Sub-Counties improved dairy cows mainly Ayrshire and Friesian are the predominant breeds. The main livestock products are: Milk, beef, mutton and camel meat. There are no registered group or company ranches, however different communities have their own grazing areas. This contributes to resource-based conflicts especially during drought when communities compete for grazing fields. The county covers 11,015.3 km² of which 165 km² is surface water. Its landscape lies at an altitude that rises from 700m at Kerio Valley and Lobo Plains on the west and east respectively to 3,000m Tugen Hills are on the north south. The county has 65,280.4 ha of gazetted forests.

1.1.4 Roads & Communication

Turkana County Road network is inadequately developed. The county has a total road network of 5,496.2 km of which 488.5 km are bitumen, and 5,007.7 km earth surface. The challenges faced on the roads sub-sector include seasonal rivers that cut through roads (Figure 2) and poor soils that increase the cost of road construction and maintenance. As a result, a number of roads are rendered impassable during the rainy seasons. Overall only a small segment of the project area is accessible to the market centres and also to major roads.



Figure 2: A flooded drift on a road in Turkana

Turkana County has five Post Offices namely Lodwar, Kalokol, Kakuma, Lokichoggio and Lokitaung. There are three mobile telephony operators in the county: Safaricom, which has larger network coverage, Airtel and Orange. The mobile network coverage in the county is 25 per cent. Those who own phones are 10.6% of the population in Loima and 18.3% in Simailele areas while those who use e platform for shopping and marketing are 0.3% and 1.8% for those areas respectively. This is further constrained by a high level of illiteracy with 79.9% and 68.8% of the population in Loima and Simailele respectively recorded as being uneducated.

Baringo County does not have a well-developed road network with a total 2,912.55km of road that are mainly earth and mixed type (Table 2). These roads are usually impassable during the rainy season.² Most areas of Barwessa is inaccessible and this affects agricultural commercialization (Figure 4). The County has mobile telephone coverage in various parts of the county in varying degrees. Koibatek Sub County has the highest mobile phone coverage in the county with 65.3 per cent, while East Pokot has the lowest mobile phone coverage of 16.8 per cent. Generally the county has an average mobile coverage of 45 per cent. Those who own phones are 36.6% (KNBS, 2019 Census) while those who use phones for trading or purchasing goods are only 1.4%. However the population has a high cohort who are actively engaged in learning at 49.6%, with 22.2% reported to have completed learning to some level with only 13.5% recorded as having no formal education (KNBS 2019 Census).

² Turkana County Integrated Development Plan (2018- 2022)

Table 2: Road network in Baringo

Road classes	D	E	G	R	U
Km	339.22	1810	20.85	185.11	557.37
Total km	2,912.55				

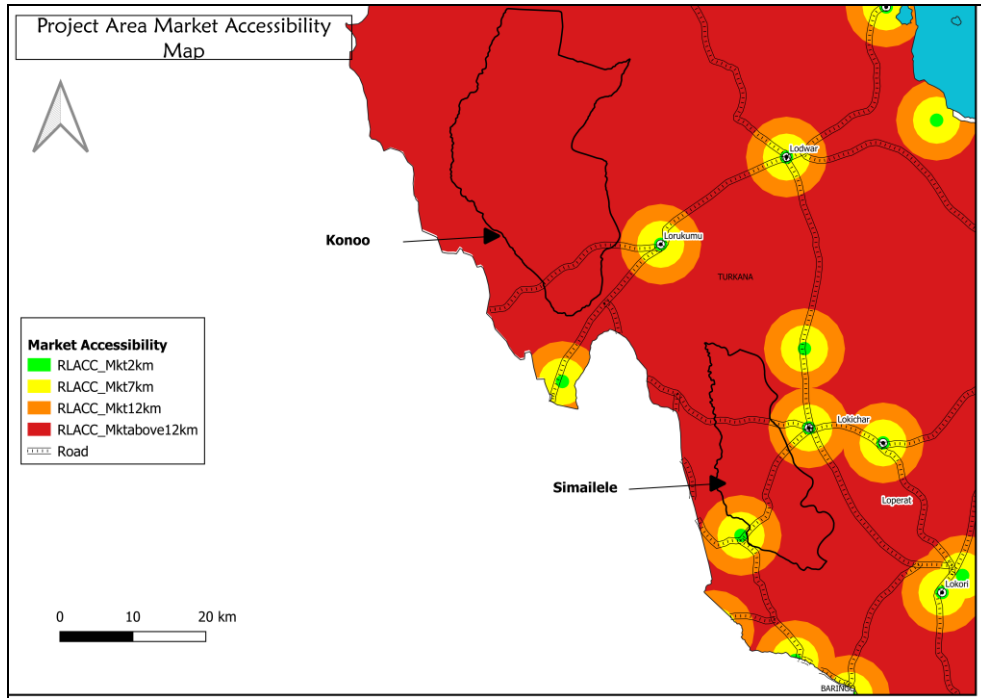


Figure 3: Turkana County Project Areas Road and Market Accessibility

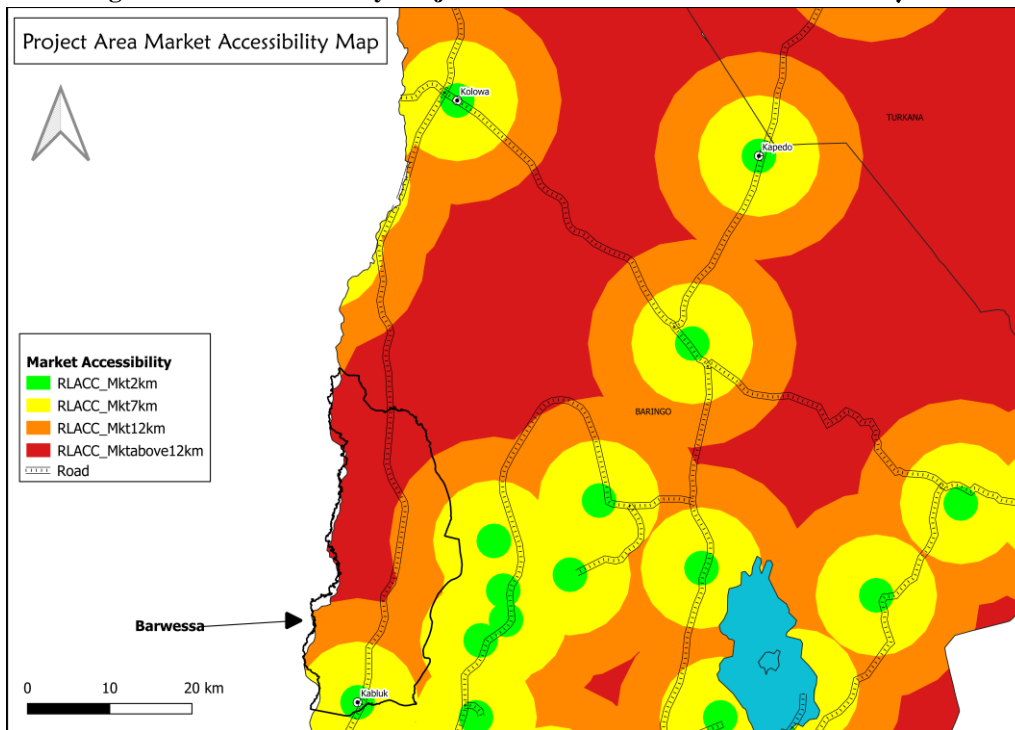


Figure 4: Baringo County Project Area Road and Market Accessibility

1.1.5 Industries

There are no major industries within the targeted project areas. The Turkana County and Baringo County have no manufacturing or agro-processing industries despite their potential for livestock products. Industrial development in the county is still low. However, there is huge mining potential that can attract industrial development.

1.2 Agriculture and Livestock Production

1.2.1 Crop farming

In Turkana County, crop production is mainly rain fed and under irrigation. This is practiced by agro-pastoralists mostly growing maize, beans, green grams, sorghum, millet, mangoes, paw paws, water melon and vegetables. The production of these crops is largely at subsistence level. The table below depicts the current production systems in the county Table 2.

Table 3: Production Statistics in Turkana County

Sub-county	Number of crops	Area (ha) 2 seasons	Quantity (MT)	Value (KES)	Total Agric. Area (ha)	Subsistence Area (ha)	Commercial HH Area (ha)	HH
Turkana North	14	261.17	205.516	11,591,230	48,423	4,401	3370	53
Turkana West	7	1,249.22	398.59	12,471,750	18,920	14,054	6,282	90
Turkana Central	17	653.5	366	20,957,050	21,445	16,675	7,850	651
Loima	20	713.36	848.3	74,570,500	19,676	16,024	6,611	37
Turkana South	22	2,870.57	1641.8	225,691,900	18,727	13,385	7,170	195
Turkana East	14	1496.8	510.1	44,334,750	297,432	293,948	7,769	415
TOTAL		7,244.62	3,970.306	389,617,180				

Source: Ministry of Agriculture, Turkana County (2021) and KBS Census 2019

In the project areas of Loima and Turkana South, the households engaged in agriculture as recorded during the 2019 Census survey were 19,438 and 24,552 respectively. The involvement of households per sub sector are provided Table 2 below. The community is predominantly pastoral with some 20% of them engaged in crop production. The main crop enterprises reported during the 2019 census in the project areas were maize (1,732 ha), sorghum (2,167 ha), green grams (414 ha), watermelon (325) and kales (201 ha)

Table 4: Production statistics in Turkana project sub counties 2019

	Households	Farming	Crops	Livestock	Aquaculture	Fisheries	Irrigation
Loima	19,438	9,743	2,584	9,157	63	91	1,072
Turkana South	24,552	10,257	2,979	8,703	39	63	1,196

In Baringo County the crops grown include maize, finger millet, sorghum, beans, cow peas, green grams, garden peas, Irish potatoes and sweet potatoes. Beans and maize cover the largest acreage in the county while Irish potatoes and garden peas cover the

lowest acreage. Maize and beans are mainly grown in the highlands while finger millet and sorghum are grown in the lowlands (Table 4). In Barwessa, which is a ward in Baringo North, of the 18,409 households involved in farming, some 15,300 households grow maize, 3,927 grow sorghum, 10,260 beans, 5,250 bananas, 10,639 millet and 4,096 kales. Overall, the Baringo North households' engagement per sub sector are provided Table 3 below. The statistics show that the community are predominantly agro-pastoralists.

Table 5: Production statistics in Baringo project sub county 2019

	Households	Farming	Crops	Livestock	Aquaculture	Fisheries	Irrigation
Baringo North	23,500	18,409	16,685	13,946	24	109	377

Table 6: Area cropped, production and values for various crops 2015 - 2017

Crop S/No.	Year 2015			Year 2016			Year 2017		
	Area (Ha)	Yield (Ton)	Value (KES)	Area (Ha)	Yield (Ton)	Value (KES)	Area (Ha)	Yield (Ton)	Value (KES)
Cereals									
Maize	38,301	87,802	2,370,655,350	34,318	76,754	2,558,475,000	34,667	555,565	18,518,893,652
Sorghum	1,274	942	6,401,000	1,159	522	2,349,000	530	7,470	33,615,000
Finger Millet	2,704	2,254	120,062,700	3,437	1,451	13,055,985	4565	34,625	311,553,053
Legumes									
Beans	21,527	19,278	1,067,468,200	20,120	20,948	169,679,853	17,972	92,826	751,895,266
Cow Pea	605	699	51,719,000	454	53	481,140	487	1425	12,936,311
Green Grams	579	499	45,451,200	513	78	706,320	723	1421	12,867,701
Roots And Tubers									
Irish Potato	3,549	58,089	880,253,000	1,564	2,765	12,163,888	1798.6	3179.75	13,988,471
Sweet Potatoes	397	4,522	92,122,000	185	35	69,040	185	2063	4,069,414
Cassava	353	3,585	76,500,000	44	7	34,650	44	1100	5,445,000
Nuts And Oils									
Ground- nuts	1,080	1,386	74,136,000	507	558	7,973,537	637.5	12,750	182,191,033
Macadamia	299	687	82,459,200	350	1,400	98,000,000	594.5	583.13	40,819,100
Coffee							1811	5406	74,650,000
Cotton							160	120	3,600,000

Source: Dept. of agriculture development, Baringo County

1.2.2 Livestock Production

The livestock sub-sector is the backbone of Turkana County and is traditionally the single most important source of food and income. The sub-sector is a source of livelihood for 70 per cent of the county population. Most pastoralists use the free-range system with migrations determined by availability of water and pasture. The free-range system is mostly on communal land challenged by climate change and high levels of insecurity. The livestock mainly kept are goats, sheep, camel, and indigenous cows. The sheep and

goats are the most important livestock species kept by most households in the project areas (Table 6). The livestock sector in the county experience various challenges across the entire value chain from production through marketing to consumption.

There is no structured market for the livestock system with the value chain experiencing low productivity and inefficient market chains as a result of high number of agents that apply high net margins to cover the high costs of transaction and processing. Feed availability is a great challenge in the county and this reduces livestock productivity and output. Feed conservation is not common in most of the county. The reasons for not conserving feeds include lack of skills and lack of storage facilities. There is need to identify and conserve feed species in the natural pastures and to build the capacity of pastoralists to improve feed conservation and utilization strategies for enhanced feed availability and livestock productivity in Turkana County and Simailele and Loima areas in particular. Some of the valued feed plant species in the natural pastures that can be exploited include *Acacia tortilis* and *Prosopis juliflora*

Livestock production in Baringo County and Barwessa area in particular faces similar challenges to those present in Simailele and Loima. The main livestock in the area include the East African Zebu Cattle that are found in the lowlands areas. Exotic cattle are found in the highlands of Baringo Central and Koibatek Sub-Counties. The preferred value chains in Barwessa include beekeeping and honey production, hides and skins, indigenous chicken, goats, sheep and zebu cattle rearing (Table 6). To improve on income and livelihood diversification, it is necessary to support programmes on value addition in among others honey, meats, fish, hides and skins, poultry, dairy, rabbit and pasture/hay storage, while prioritizing programmes on diversification to emerging livestock, including ostriches, guinea fowls, doves, crocodiles, camels and termites.

Table 7: Households and engagement in livestock enterprises in project sub-counties

<i>Sub-county</i>	<i>Exotic Dairy</i>	<i>Exotic Beef</i>	<i>Cattle</i>	<i>Sheep</i>	<i>Goats</i>	<i>Camel</i>	<i>Donkeys</i>	<i>Pigs</i>	<i>Chicken</i>	<i>Beehives</i>
<i>Loima</i>	91	39	976	5,896	8,666	2,616	1,565	17	1,055	53
<i>Turkana South</i>	68	20	902	6,178	8,059	2,447	1,203	5	907	65
<i>Baringo North</i>	2,069	399	7,176	5,279	8,558	12	59	6	9,681	3,365

1.3 Land Ownership and Use

The mean holding size for Loima and Simailele that mirrors that of the greater Turkana County is two acres of arable land per household. This land is however communally owned and the figure represents the average holding size if it were to be shared. Currently, the land is held in trust for the community by the County Government of Turkana. Since land in the county is owned communally, there are no incidences of

landlessness. In the project areas, people are free to graze and settle in any area of their choice.

Barwessa area of Baringo County can be in the lowlands that is mainly a semi-arid to arid climatic zone. The area is characterized by shallow stony sandy soils with rock outcrops, volcanic ash and lava boulders. This zone is essentially a rangeland and apart from scattered isolated pockets of dry land subsistence agriculture and small-scale irrigation the major socio-economic activities centre on livestock and bee keeping.

1.3.1 Biophysical parameters

The RLACC project areas experiences high rainfall variability and economic water scarcity occasioned by low investments in water storage and distribution leading to perennial water access problems. The areas have low rainfall and high temperature regimes (Figure 5 and Figure 8) leading to high evapotranspiration.

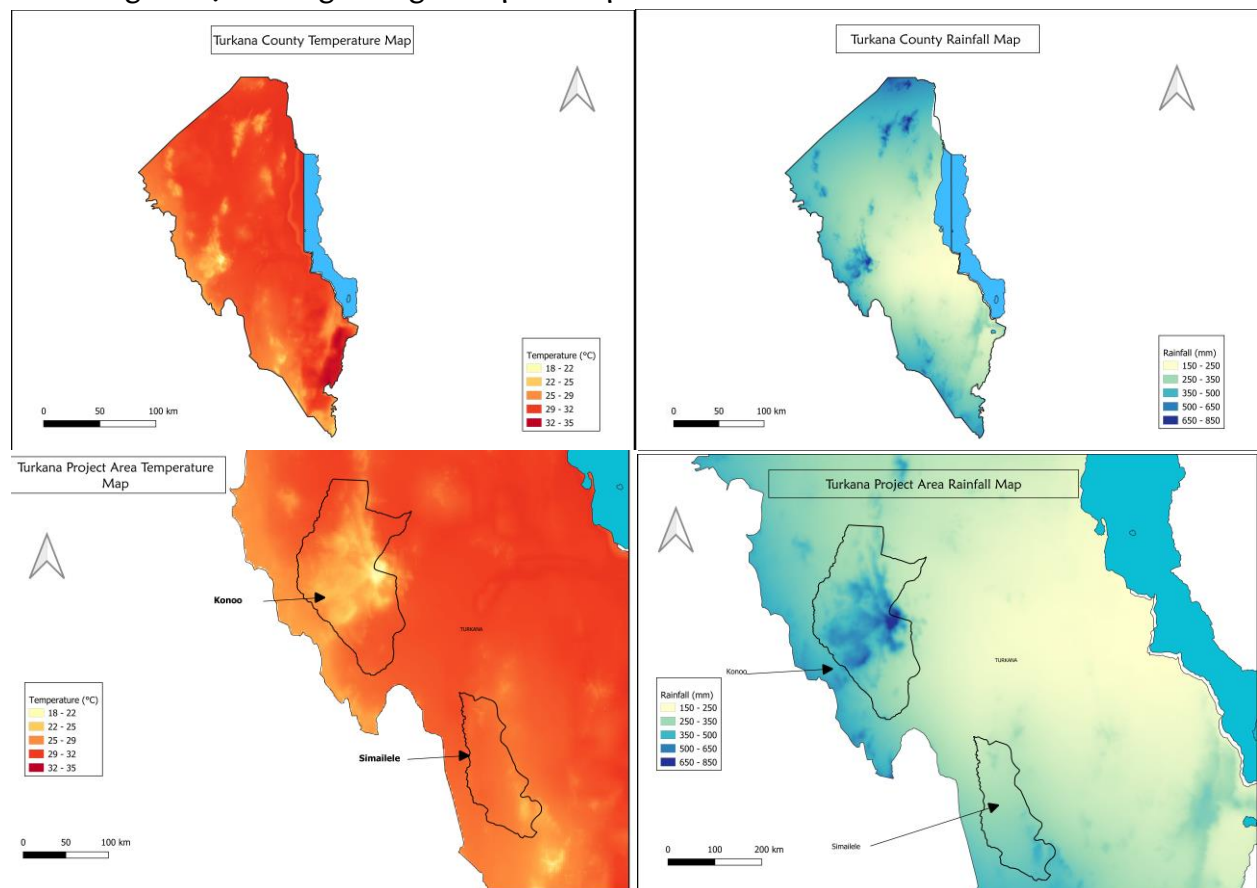


Figure 5: Turkana and Project areas (a) Temperature and (b) Rainfall

Rainfall contributes some 24 km³ of fresh water that falls in Turkana County per year. This translates to an endowment of 24,000 m³ per capita per year, the highest in the country. The project areas in Turkana therefore experience both physical and economic water scarcity interchangeably during and between seasons as a result of low investment

in water harvesting and storage infrastructure. Some efforts have been made to harness rain water with some irrigation and borehole infrastructure in place to reduce losses emanating from evaporation and seepage in both project areas (Figure 6). The boreholes are not well distributed spatially over the project area but are concentrated in areas with higher distribution of human population. The focus of the boreholes is to supply water for domestic use as opposed to livestock. They are present mostly in urban centres and near road network. Most boreholes in Turkana are equipped with hand pumps ‘Duba’ even though others are equipped with diesel piston pumps, submersible pumps (connected with solar) and wind pumps.

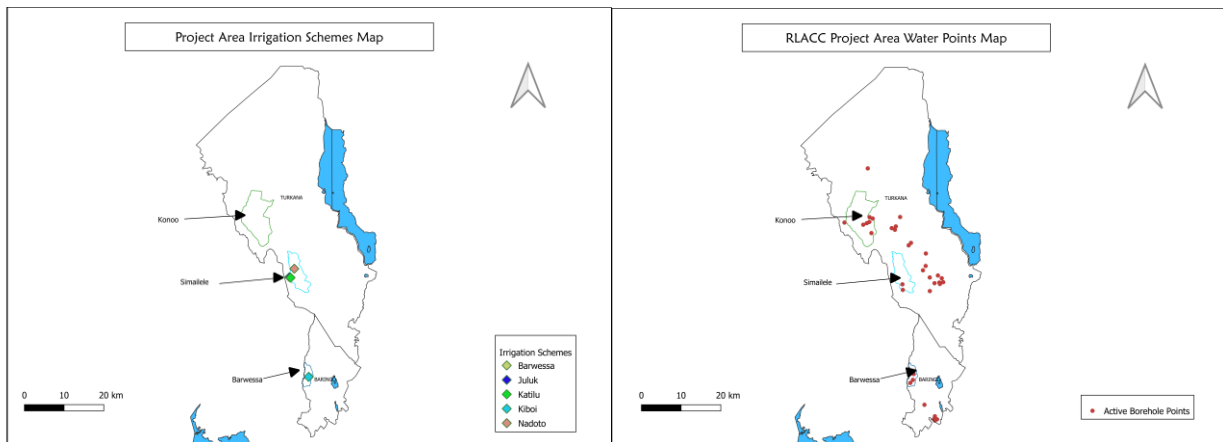


Figure 6: Turkana (a) Irrigation and (b) Boreholes

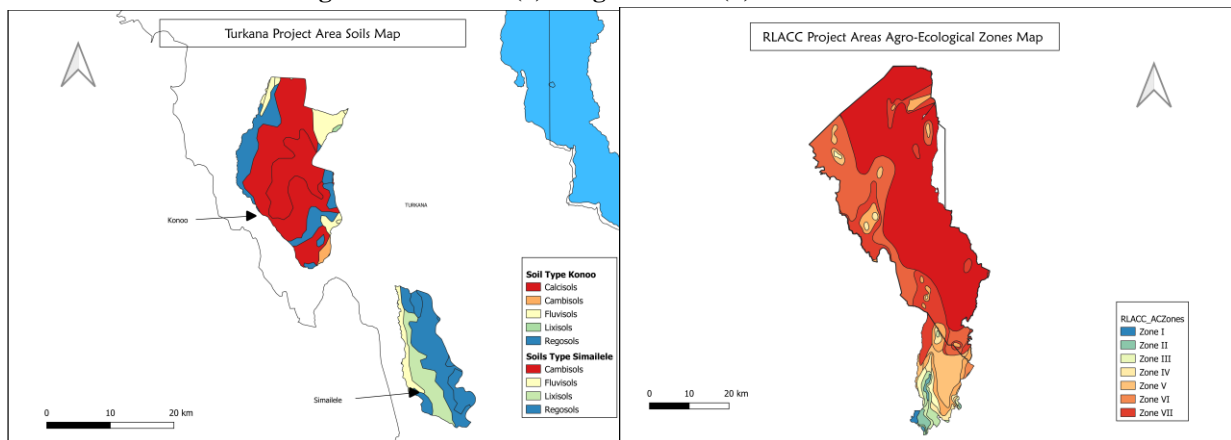


Figure 7: Turkana (Soils) and (Agro-ecological zones)

The discovery of two vast water resources (aquifers) in Napuu and Lotikipi Basins with some 250 billion cubic meters of water provided some hope but it requires innovative harnessing processes to make it economically viable for exploitation. Such exploitation would provide water which if well utilized could supply the drought-hit region and country at large with water for 70 years.

The Barwessa area in Baringo also experiences scarcity in water supply for domestic and agricultural production while efforts have been made on some low investment on irrigation. The sources of water for the community is mainly from a seasonal stream, boreholes (Figure 6) public standing pipes and earth dams (KNBS 2019 Census) indicating low investment in water storage and supplies in the project areas.

Table 8: Sources of water in project sub counties

Sub county	Pond	Dam	Stream	Spring	Well	Borehole	Piped	Rainwater	Public standpipe
Loima	0.3	2.2	41.7	1.6	4.3	18.3	2.0	0.4	25.1
Turkana S	0.6	13.4	31.2	2.4	14.2	21.1	2.1	3.3	8.9
Baringo N	1.6	8.1	68.7	3.3	0.7	7.0	2.4	0.1	1.4

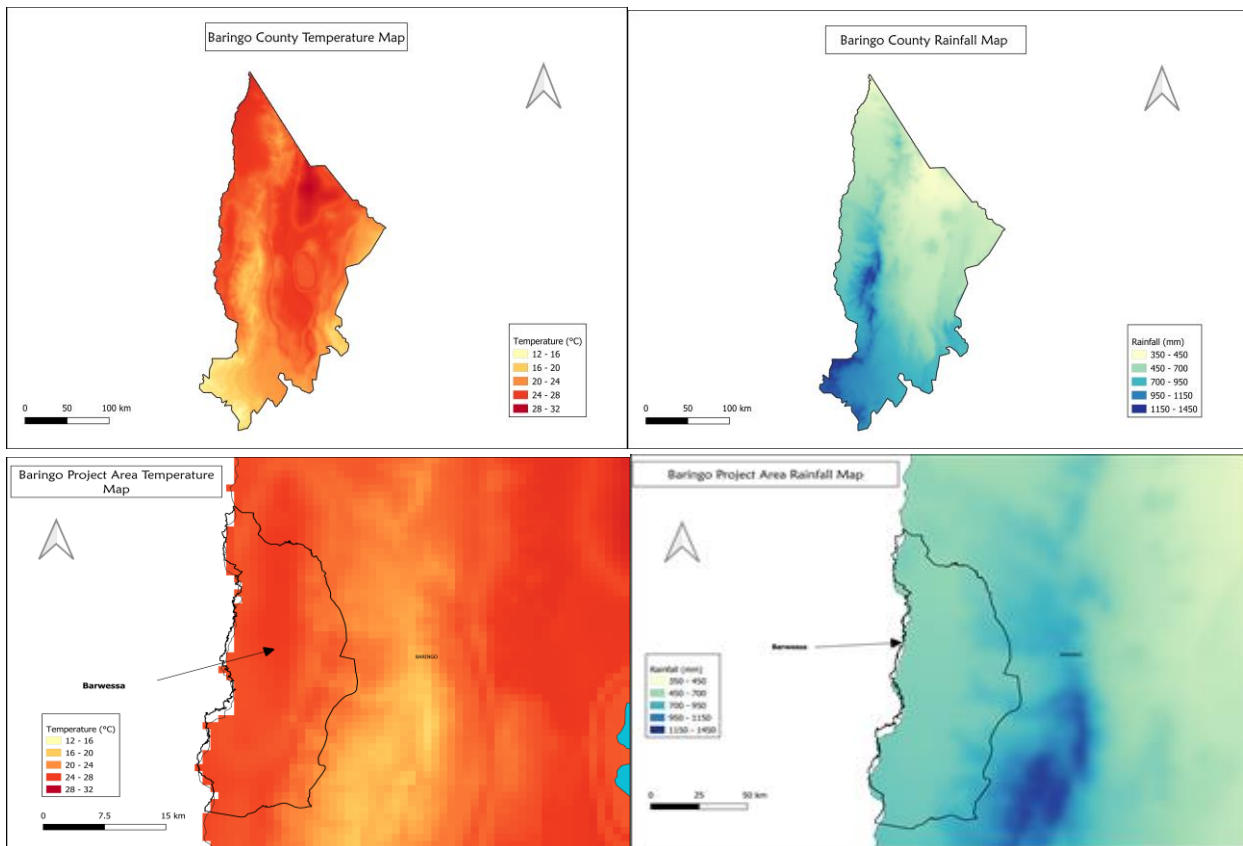


Figure 8 : Baringo (a) Temperature and (b) Rainfall

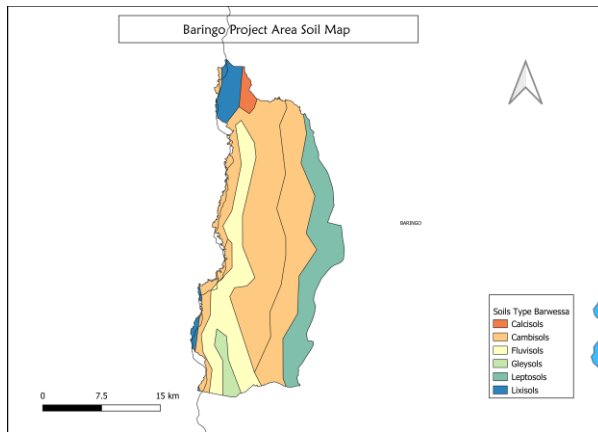


Figure 10: Barwessa Soils Map



Figure 9: Irrigation at Barwessa

1.3.2 Climate Change

The RLACC project areas suffer from the effects of climate change in varying proportions. Droughts and floods are a common occurrence in the three areas. In the past, before 1970s, a major drought was expected every 10 years. But because of factors such as global warming and other climatic changes, these are now more frequent. Major droughts now occur after every 5-7 years. This means that ASAL livelihood systems may not adequately recover to withstand the next drought. As a result, any small shock such as a prolonged dry spell has a much bigger impact on people's livelihood strategies than in the past. This situation is made worse by insecurity, rising poverty and declining asset levels (natural, human, social, financial and physical assets). Furthermore, the areas' fragile eco-systems require very careful intervention approaches to prevent environmental degradation and desertification.

The project areas in Turkana and Baringo Counties have also experienced continued drought. The effects of climate change in the areas include cyclic spells of drought; high infant mortality rates due to poor nutrition and low sanitation, increased resource-based conflicts, increased morbidity, and increased school drop-out rates, and increased vulnerability to floods and loss of biodiversity. The main challenges to both agriculture and livestock production in the three areas includes:

- Low literacy rates among the youth and the adult population that inhibits the learning processes for most cohorts of the population
- Low climate change literacy and investment in adaptation measures and practices leading to climate change associated shocks and disasters
- Very unreliable and poorly distributed rains without proper protocols to foster rainwater harvesting to reduce impacts of dry spells and drought
- High temperatures and heat waves that accentuate evapotranspiration and reduce the viability of keeping livestock and growing crops

- High poverty levels that affect capacity of the populace to invest technologies and mechanisms for effective disaster management.
- Low technology adoption rate and insecurity and resource related conflicts
- Few frontline extension staff and low support for extension services
- Poor road infrastructure especially during rainy seasons
- Land tenure system that is mainly trust based and does not support investment since the land cannot be used as collateral to access credit
- Underdeveloped value chains with poor livestock marketing, poor animal health services and inadequate livestock movement control systems

1.4 Rationale for the baseline survey

An important aspect of the RLACC project is that it is driven by an approach, which aims to support targeted needs of arid and semi-arid lands' communities in the areas noted above. Therefore the situation analysis and baseline survey results including further impact studies will inform the stakeholders on how to put the acquired knowledge into practical use for better results-oriented achievements and sustained benefit flows. A review of the project focus areas showed that there were inadequate baselines for setting targets and evaluating progress in RLACC.

2. Methodology

2.1 Approach

The approach used to execute the assignment included desk study of literature on the project, government and development agencies websites and the internet to mine secondary data, mapping on GIS platform to produce resource maps and primary data collection and analysis. The primary data collection component involved development of survey and reporting tools, field data collection and mapping, survey progress tracking, data cleaning analysis and reporting and stakeholder validation of the findings in a workshop followed by the final report submission and closure (Figure).

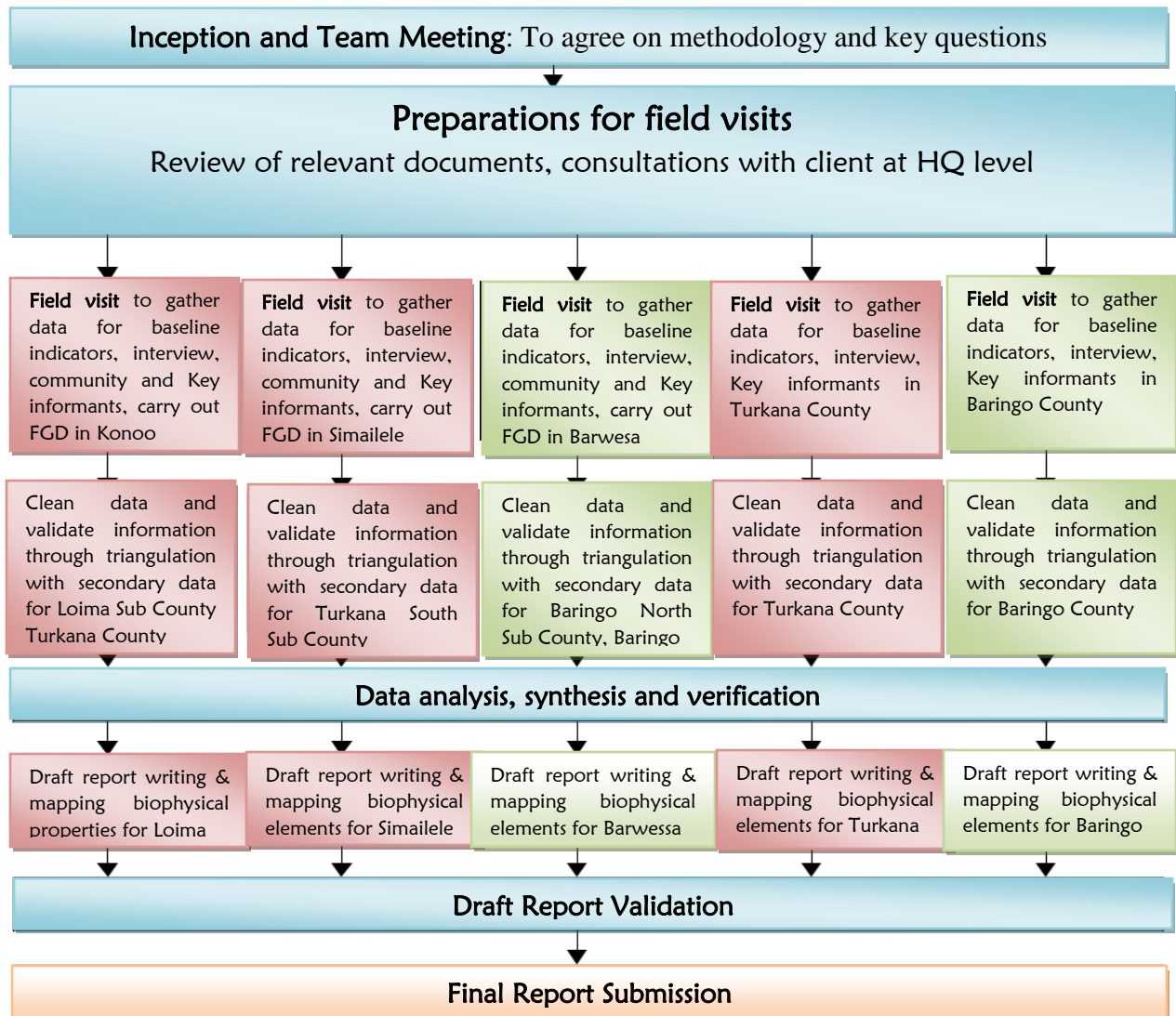


Figure 11: The Baseline Survey Protocol

The scope of work covered office, field and mapping of Konoo area in Loima, Simailele area in Turkana South and Barwesa Ward in Baringo North (Figure 1 and Figure 12). The biophysical and socioeconomic characteristics of the project areas are reviewed and elaborated in Chapter 1.

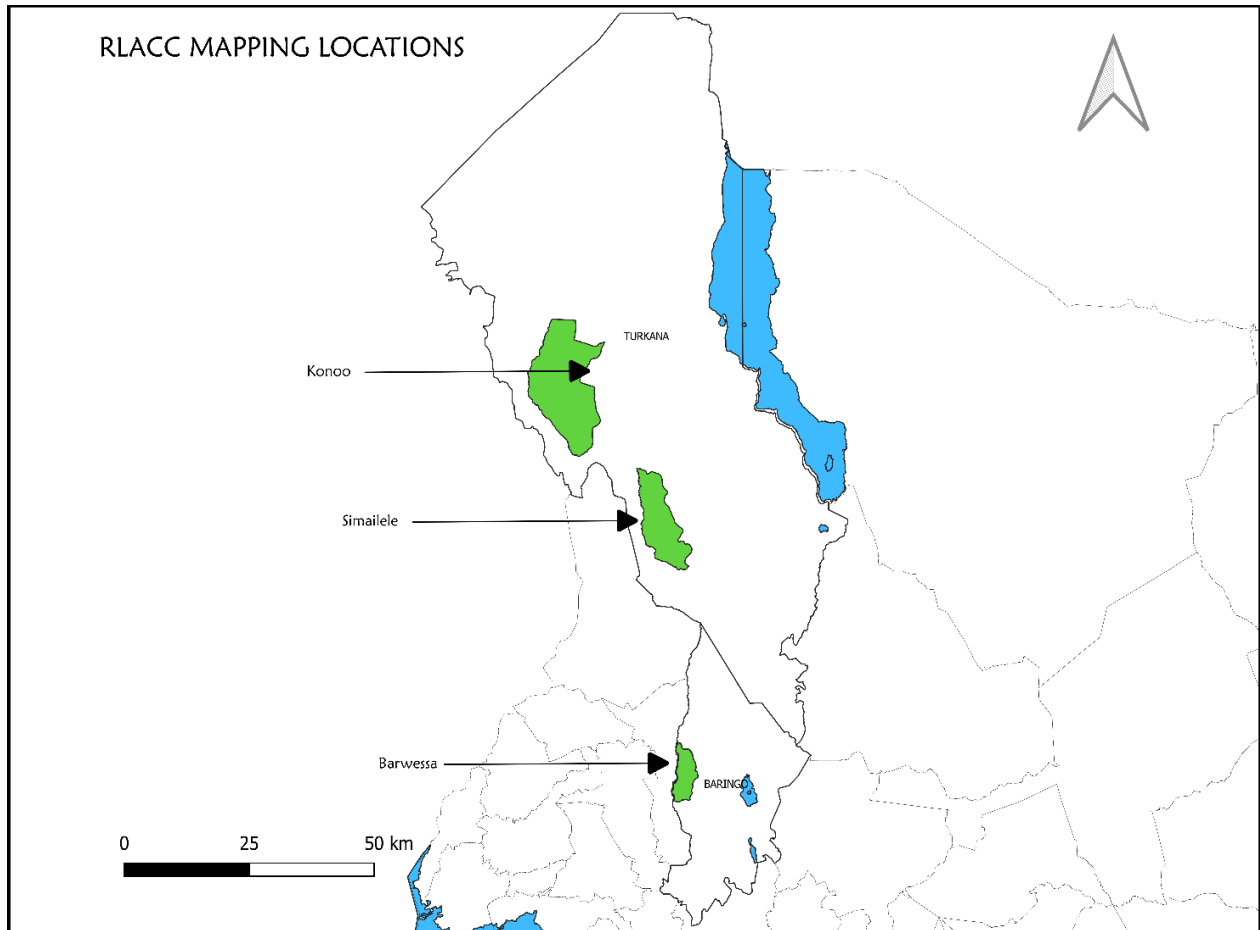


Figure 12: RLACC Project Study

The mapping of biophysical parameters was done using GIS and remote sensing techniques. This was reinforced with ground-truth data collected through observation and interviews. Experiential knowledge and secondary data was used to triangulate the information generated. The biophysical parameters of focus in this study was limited to soil types, spatial distribution of average annual rainfall and average temperature, developed water resources and the pastoral and crop resources in the project areas. These are presented in spatial, qualitative and quantitative form in the narrative, tables, graphs and maps.

2.1.1 Sampling methods and size

Single Random Sampling (SRS) method was used during the survey. Five to six households per village or settlement were randomly selected for the survey, depending on the population figures established from the local leadership and reference to the census figures for the year 2019 (KNBS 2019). Selection was random, with the consultants selecting the 5th, 9th, 11th and 15th household in the targeted village. Consideration was made based on local knowledge to establish and ensure that the distance between households gave an even spatial distribution from one another in order to avoid clustering of households too close to one another. No gender influence was factored into the study since the availability of the respondent to interview depended on the time of day. The gender roles and duties determined the time of day a household member was likely found at home.

The sample size was determined using the Raosoft calculator with 5% margin of error, 95% confidence level. The sample size was calculated as 377 each for Baringo and Turkana Counties. The sampling frame selected was based on the number of villages in the project area. In Barwessa four to six samples were drawn from each of the 40 villages while in Turkana with larger settlements, the lowest and highest sample sizes per village was 4 and 6 spread across 20 villages in the two project areas.

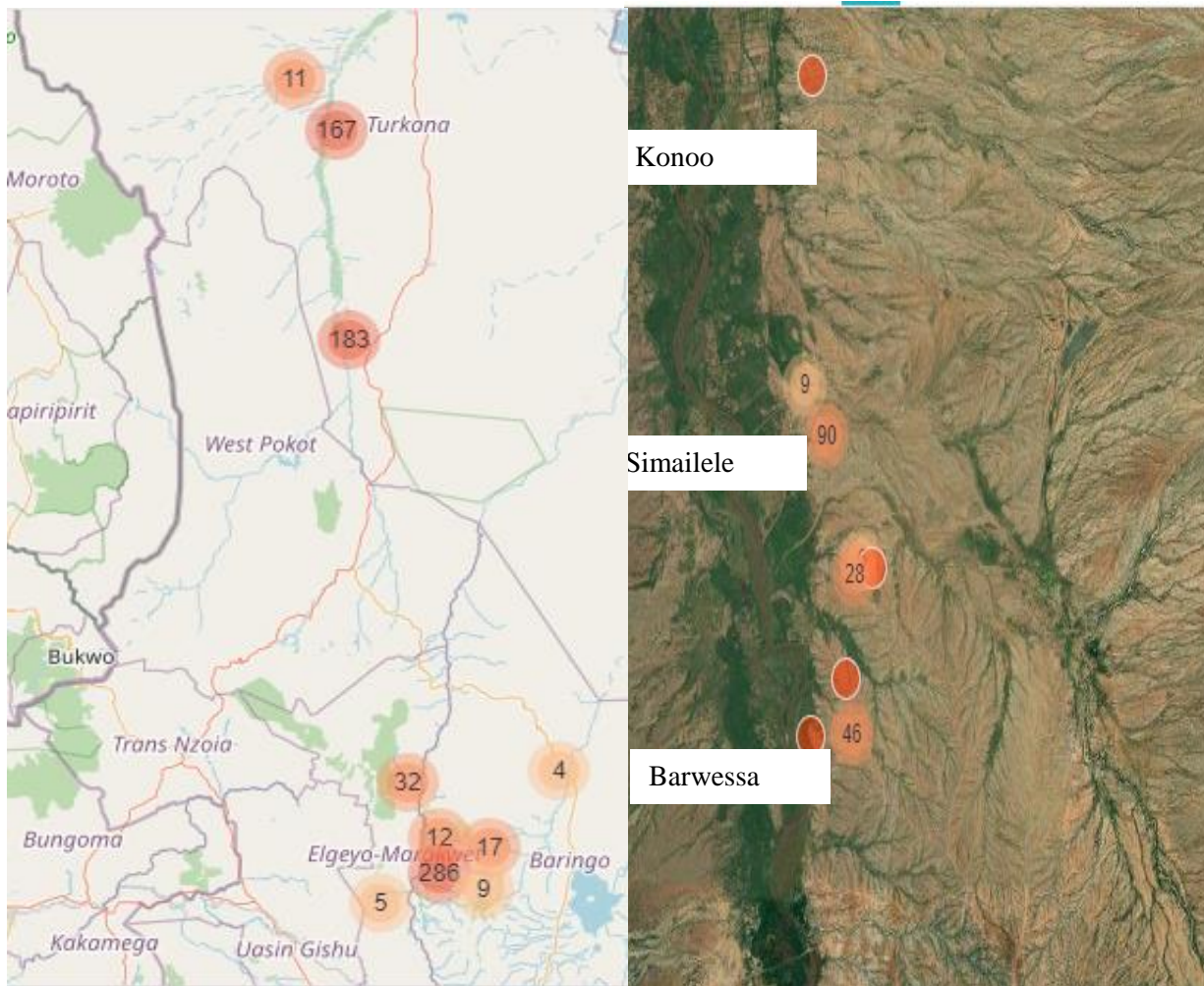
A questionnaire (Annex 1) with pre-set questions was uploaded on KoBoToolbox and the questions administered to sampled respondents drawn from the villages. A total of 726 respondents were interviewed and their data captured and keyed onto hand held smartphone gadgets. Representatives of key stakeholders were also identified and interviewed as key informants. Semi-structured questions (annex 2) were drafted and used to guide the interviews with key informants. The interview questions included key questions that allow for the inclusion of additional thoughts provided by the interviewed partners and the inspiration that came with innovative and improved ideas. The information collected from households and key informants were triangulated through Focus Group Discussions (FGD). Two FGDs were conducted in each sub county.

2.1.2 Enumerators' Training

Ten enumerators (led by two supervisors) with suitable qualifications and experience in quality data collection were identified and recruited through a consultative process. They were trained and facilitated to undertake the survey. The enumerators were indigenous people drawn from the project areas to leverage on their understanding of geographical area and understanding of the nuances of the communities.

2.1.3 Data collection

Data collection from the field was conducted over a period of 14 days. The Team Leader (Dr. Orodi) will provide clarification and instruction to the enumeration team on concepts, definitions and to resolve difficulties in carrying out the field work. The enumerators were guided by Village Officers to reach the respondents. Among other factors, the survey focused on collection of data that captured among others; conditions and development in the program target regions including the following assets: water pans, boreholes, shallow wells, subsurface dams, irrigation schemes and their acreage, crop types/yields; road access, fodder banks, holding grounds and quarantine stations, demonstration plots, livestock sales, livestock mortality rates and household incomes. Others were veterinary laboratories, schools & enrolment levels, water management through WUAs and IWUAs. Also included was the human capacity in terms knowledge and skills on livestock production and animal health, peace building and conflict



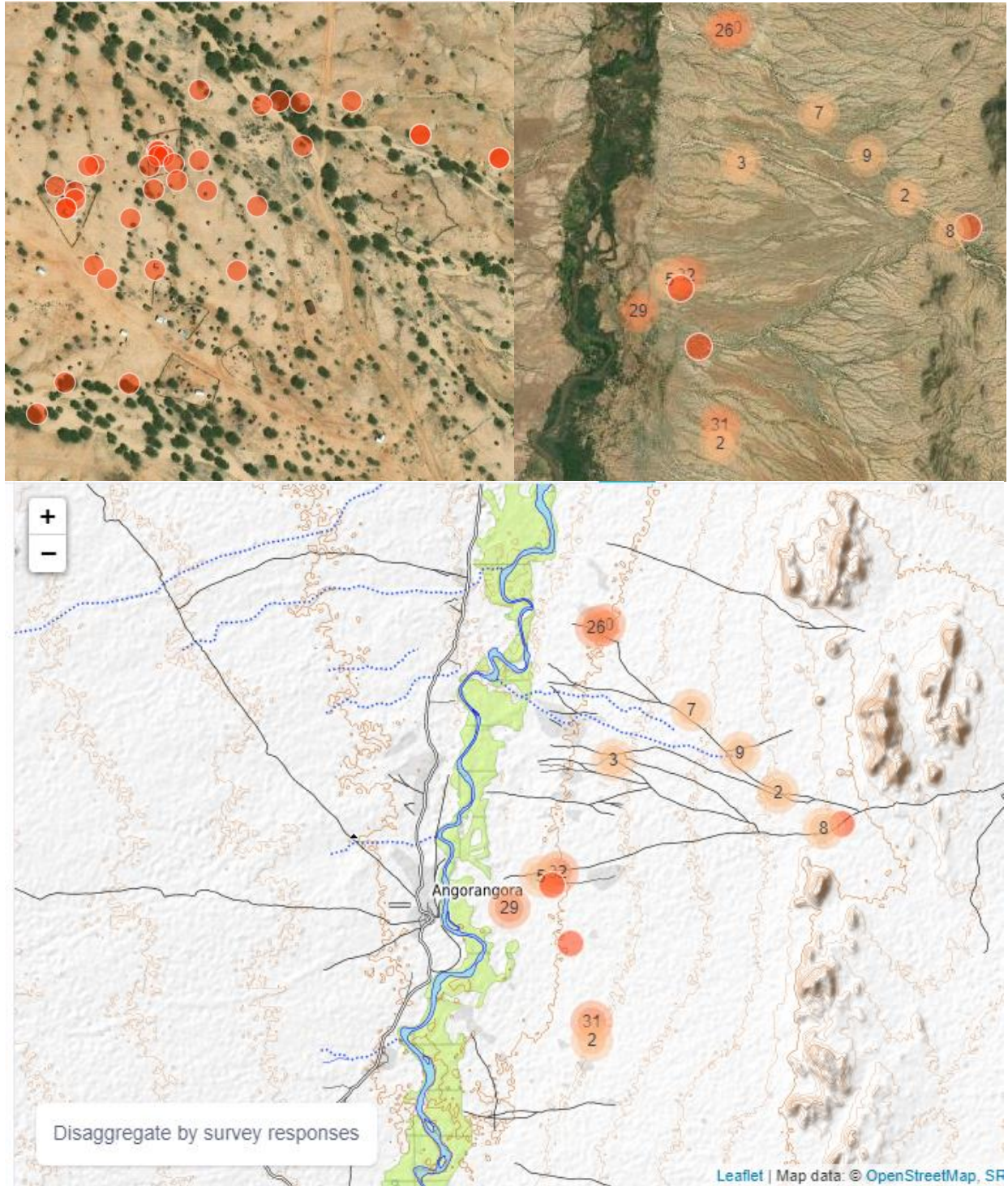


Figure 13: Konoo, Loima, survey responses household points

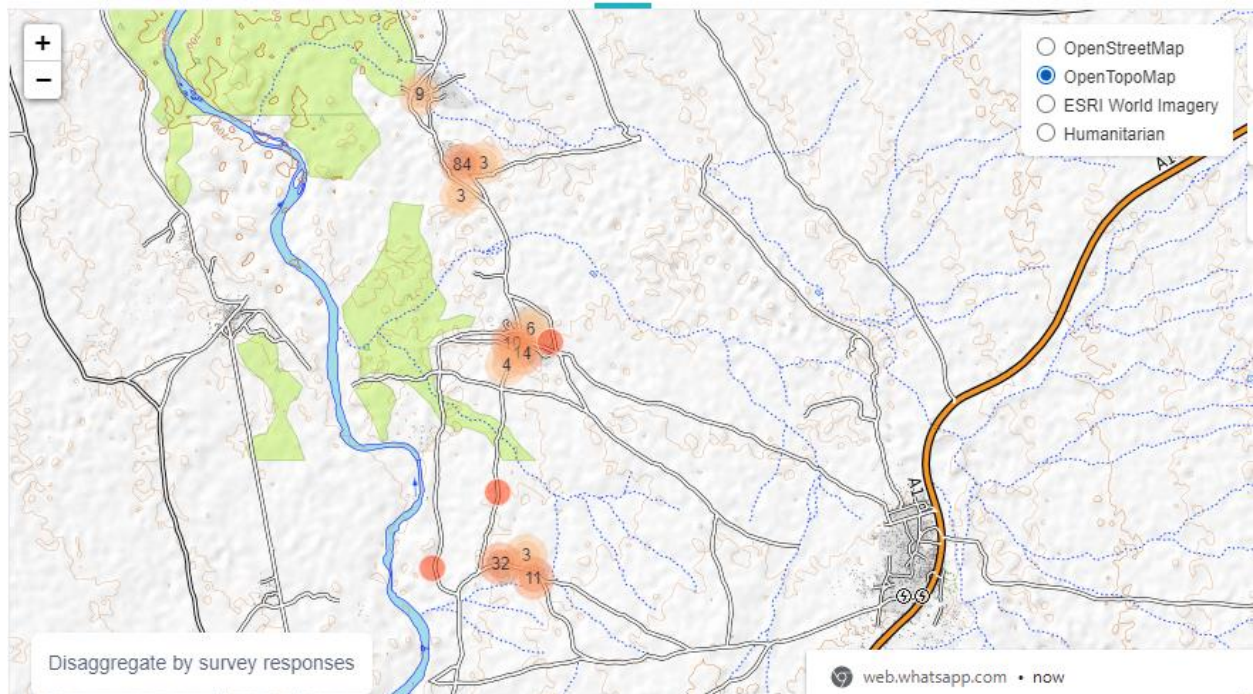
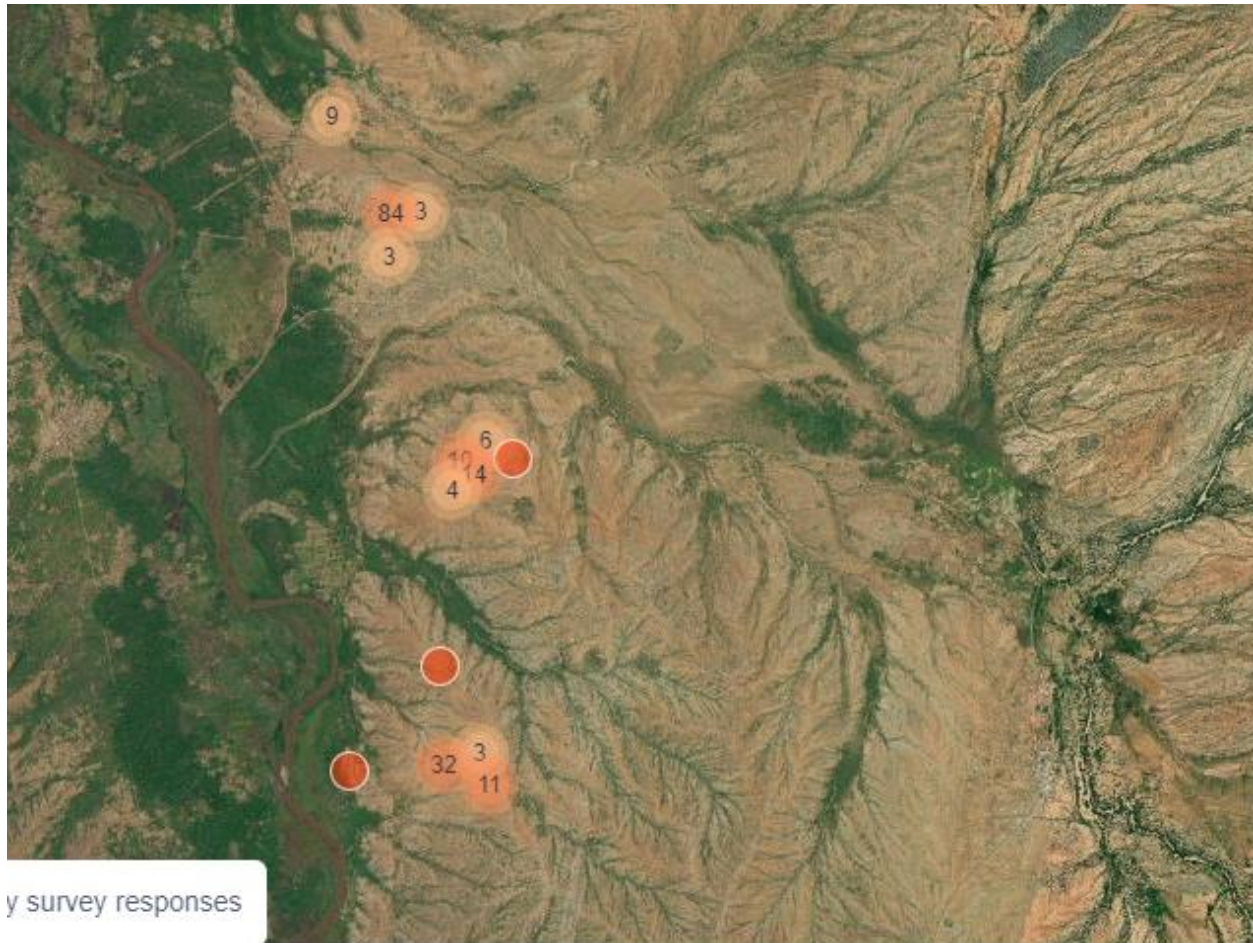


Figure 14: Turkana South Simailele Project area survey response

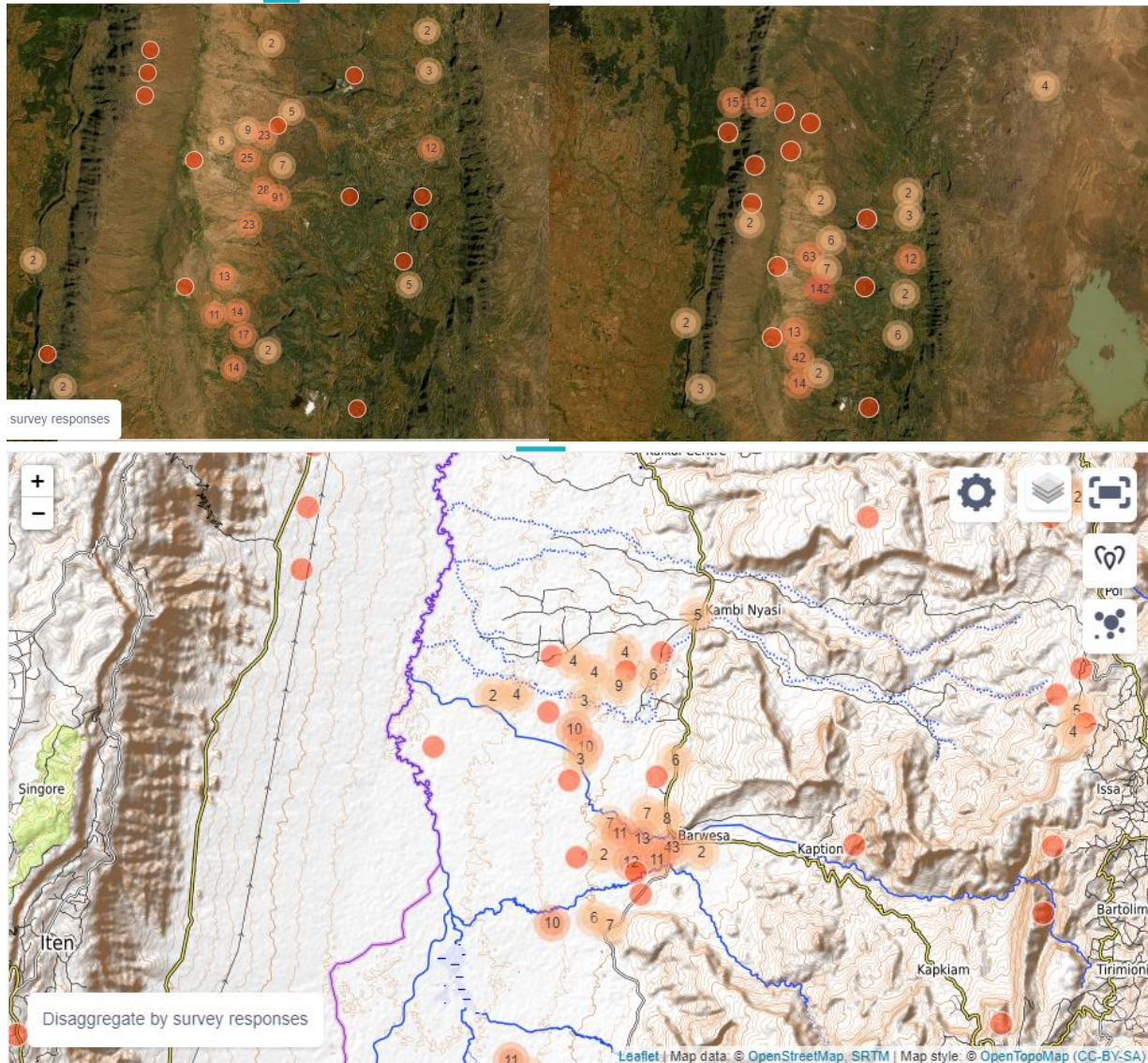


Figure 15: Baringo North, Barwessa Project Area Survey Responses

2.1.4 GIS mapping

The principal information that will be needed in resource mapping include; water, land, biomass, human, infrastructure, temperature, solar, wind rainfall, pastoral and crop resources. The GIS analysis work involved the following steps:

- Acquisition of the best available public domain spatial datasets of Baringo and Turkana;
- Digitization and capture of the imageries and maps in appropriate formats;
- Desktop classification of all imageries relating to forest cover, grassland resources and water resources;

- GIS manipulations and analysis that include overlays and conversion of coverage, data format conversions, digital Ortho-photography, post-processing and projections and data reconciliations;
- RS manipulations, that include geo-referencing, calibration, image processing and analysis, feature extraction; and production of land-cover/land-use maps of project areas from satellite images;
- Generation and updating the GIS metadata, which allows estimations to be made; and
- Design, production of maps and other graphic products using the GIS and other computer software programs

2.2 Data analysis

The data captured by the survey tool was cleaned to remove inconsistencies and downloaded into an excel spreadsheet. The data was analyzed using excel analytics and presented as mean values and trends captured in graphs and tables. The information gained was then described to provide the climate adaptation context. This was aligned to inform the indicators for monitoring the relevance, effectiveness and efficiency of project actions.

3 Survey Results

The results of analyses based on the sample survey data are presented in three sections covering: *socio-economic parameters mainly demographics, education and human capacities and the existing livelihood systems, technical issues related to climate change, community perception on climate change and adaptation and a review of existing measures as gained from literature.*

The results focus on the general socioeconomic conditions in the community and the status of the main resources pointing the current levels of key indicators linked to RLACC results framework summarized in *Annex 3*. In this report, households were the primary units of comparative analysis while data was collected at village levels across the project areas in the two counties. What is presented are results on household characteristics; production, marketing and human capacity in terms of skills, knowledge and practices and the challenges faced especially those associated with climate change. The other results include the levels of household income; food security; collective action; access to various vital livelihood related services; water resources and management. A reflection on the key institutions and processes adopted for conflict resolutions and the capacities available for handling conflicts; the challenges of climate change and the responsive coping and adaptation strategies applied; a review of factors that drive community actions and population growth and factors that drive governance and management of water resources and livestock infrastructure.

2.3 Socioeconomic and farm characteristics

The study interviewed 741 respondents of which 726 provided valid information. The respondents comprised of 38% (284) youth aged 18-35, 46% (340) persons aged 35-60 and 14% (107) elderly people of over 60 years of age (Table 9) .

Table 9: Respondents' age structure

	Frequency	Percent	Valid Percent	Cumulative Percent
	14	1.2	1.2	1.2
1	1	.1	.1	1.3
Valid 18-35	284	38.3	38.3	39.7
35-60	340	45.9	45.9	85.6
above 60	107	14.4	14.4	100.0
Total	741	100.0	100.0	

The age structure of the respondents was as presented in figure 3. Since the study's unit of analysis was the household, the interviewed respondents provided the required household information that was analyzed to obtain the results presented in the subsequent sections below.

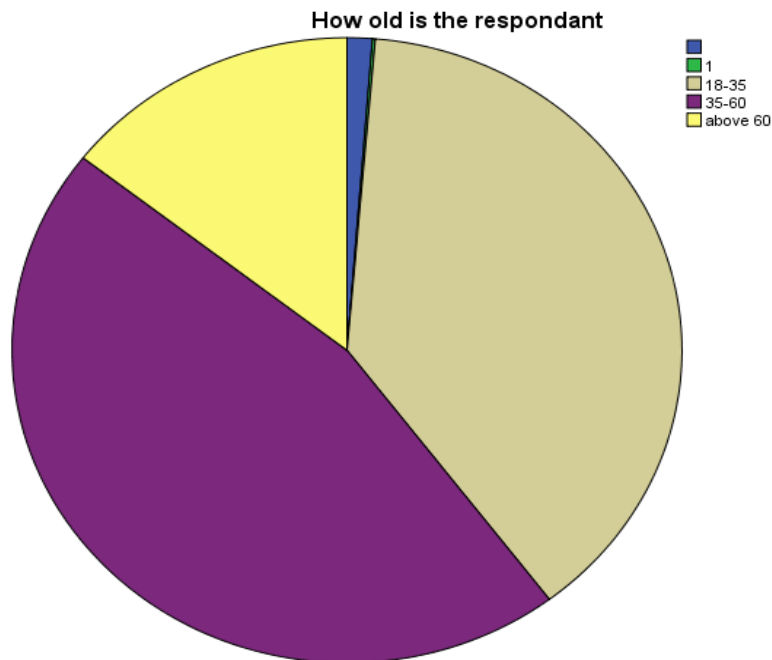


Figure 16: Respondents' age structure

2.3.1 Population trend

The analysis on the population trend from the captured data indicated that a major percentage of the respondents (91.3%) perceived an increase in the populations of their localities over the last 10-20 years. (6.1%) perceived a decline in the local population whereas 2.9% saw a stable population projection over their localities. The major cause of increasing population was attributed to births at 76% and in-migration at 17.5%.

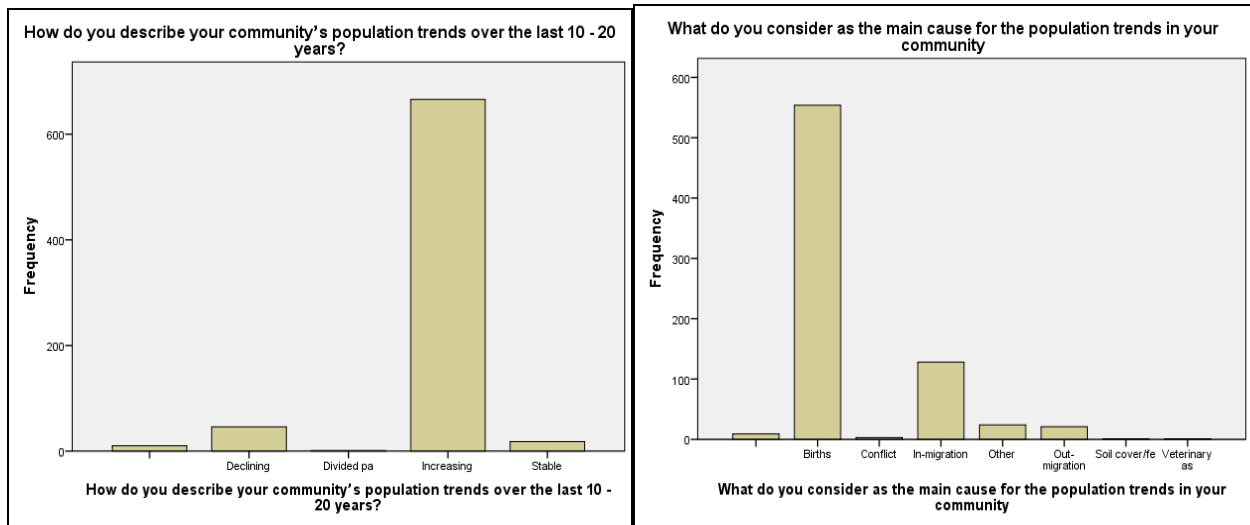


Figure 17: Respondents' population characteristic

2.3.2 Household size, gender, age and education

Table 10: The gender of the respondents

What is respondent's gender?				
	Frequency	%	Valid %	Cumulative %
Invalid	8	1.1	1.1	1.1
	1	.1	.1	1.2
Female	362	48.9	48.9	50.1
Male	370	50.8	50.8	100.0
Total	741	100	100	

The finding reveals that 51% of the households in the study area are male-headed while 49% are female-headed (Table 10). This further confirms the results on household type as reflected in the 2019 Census data and confirms the patriarchal nature of households in the study area.

Table 11: Marital status of respondents

Status	Frequency	%	Valid %	Cumulative %
	8	1.1	1.1	1.1
Divorced	9	1.2	1.2	2.3
Married	604	81.5	81.5	83.8
Single	86	11.6	11.6	95.5
Widowed	34	4.6	4.6	100.0
Total	741	100	100	

Only a small proportion of the households are female-headed (Table 11). A typical household in the study area had an average of 6 household members, with the mean household size of 6 for Baringo and 7 for Turkana. These are slightly higher than the county average of 5.6 persons/household profiled during the 2019 Census.

2.3.3 Primary occupation of household heads

According to the analysis results, the predominant primary occupation of the households in the study area was livestock production with about 76% of households engaging in it.

Table 12: Main source of livelihood

		Which of the following best describes your main source of income?			
		Frequency	%	Valid %	Cumulative %
Valid	Invalid	8	1.1	1.1	1.1
		1	.1	.1	1.2
	Livestock Keeping	563	76.0	76.0	77.2
	Other	76	10.3	10.3	87.4
	Remittances from relatives	20	2.7	2.7	90.1
	Salaried Employment	3	.4	.4	90.6
	Trading	70	9.4	9.4	100
	Total	741	100	100	

Disaggregated by the economic activity, a higher proportion of households were having livestock as their main occupation at (76%), trading at 9.4%, remittance at 3% compared to other sources of income at 10.7% (Figure 13). Disaggregated by counties a higher proportion of households considered crop farming as an alternative occupation in Baringo County corroborating the findings of the 2019 Census ()Table 12.

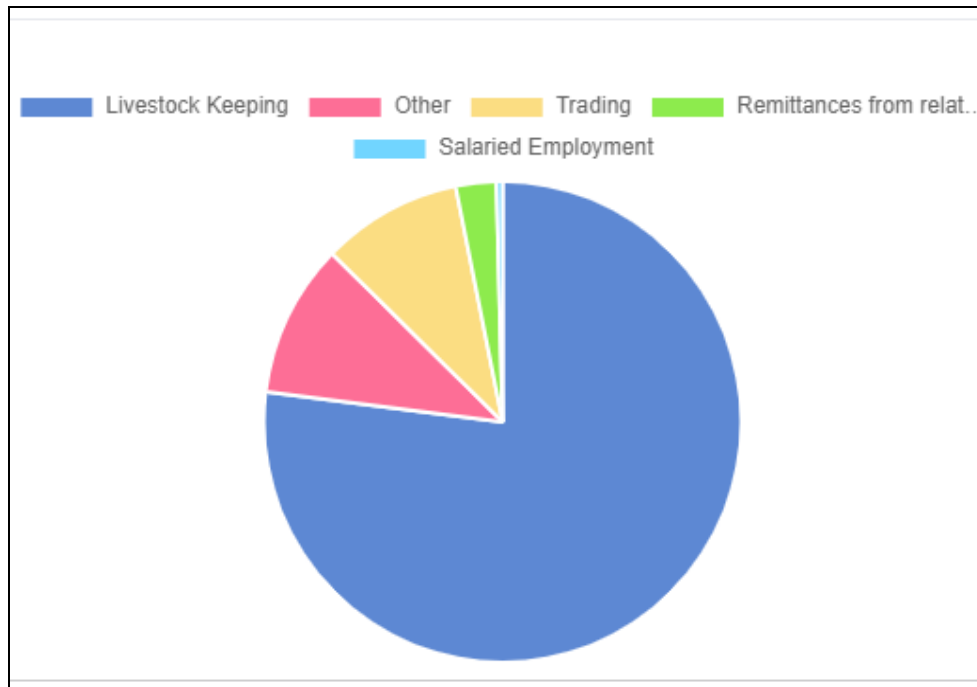


Table 13: Main income source

2.4 Water resources and management

2.4.1 Access to water resources for households and livestock

The analysis results indicates the major sources of water for households and livestock as; rivers and streams (46.6%), sub-surface dams (16.9%), borehole (12.7%), shallow wells (6.1%). Minor sources of water include; water pans (2.4%), rainwater and other sources (3.2%). These values corroborate those obtained during the 2019 Census (Table 9). The significance of this is that more focus needed to be put in harnessing water from the rivers sources and increase investment in rain water harvesting

Table 14: Main source of water

Which of the following best describes your main source of water?					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	River, streams	345	46.6	46.6	45.2
	Lake, pond	1	0.2	0.2	0.1
	Sub-surface dam	125	16.9	16.9	16.7
	Borehole	94	12.7	12.7	11.4
	Shallow well	45	6.1	6.1	5.8
	Water pan	18	2.4	2.4	2.6
	Others	24	3.2	3.2	3.2
Total	741	100	100		

The second most important sources of water for the livestock among the households was borehole (25.7%) and sub-surface dam (25.6%) as well as river and stream source (23.4%) as shown in Table 15.

Table 15: Sufficiency of water in the main source for the livestock

Which of the following best describes your water sufficiency?					
	Frequency	Percent	Valid Percent	Cumulative %	
Valid	River, streams	173	23.4	23.4	46.8
	Lake, pond	1	0.2	0.2	0.4
	Sub-surface dam	190	25.6	25.6	51.2
	Borehole	190	25.7	25.7	51.4
	Shallow well	20	2.7	2.7	5.4
	Water pan	121	16.3	16.3	32.6
	Others	9	1.2	1.2	2.4
Total	741	100	100		

2.4.2 Changes in natural resources

From the analyzed respondent data, 89% of the respondents both in Turkana and Baringo affirm to witness changes in climatic aspects such as rainfall, drought and flood patterns whereas 9% were not aware of any changes in the climatic phenomena. The most significant environmental changes witnessed included increased pasture scarcity by 84% of the respondents, increased soil erosion by 52% and increased water run off by 30% of the respondents. These statistics show the need for increased rain water harvesting to reduce soil erosion and apply the same water for improved pasture production to improve its availability. The data also showed a correlation between the persons who witnessed changes in climatic and environmental aspects with the scale of their occurrence with 87.6% of respondent indicating that these changes occurred at medium scale, with 34.5% responding that the changes were large scale in nature. The community members also correlated the climatic changes to the changing trends in the availability of natural resources and degradation of the environment (Figure 18).

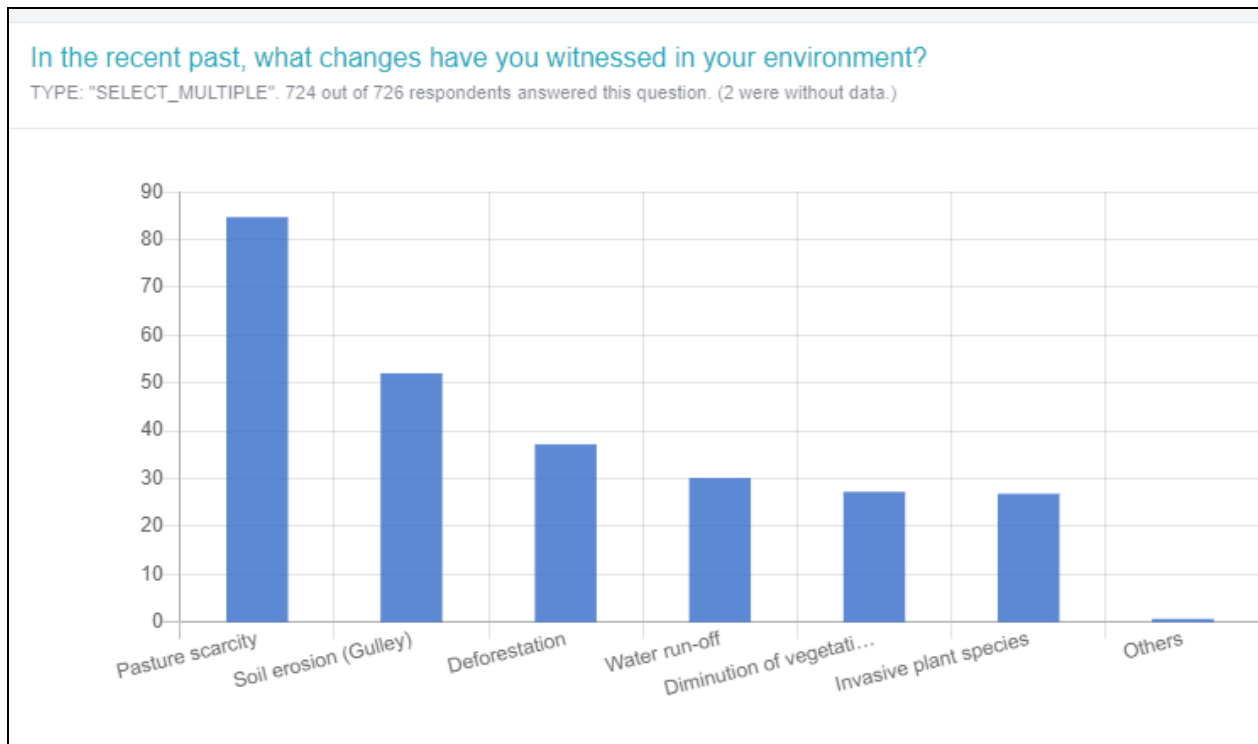


Figure 18: Changes witnessed by respondents over the recent years

2.4.3 Natural resources in the environment

The study results show dependence on tree resources to supply fuelwood, charcoal for cooking, timber for building and resins and wild fruits for human food (Figure 19).

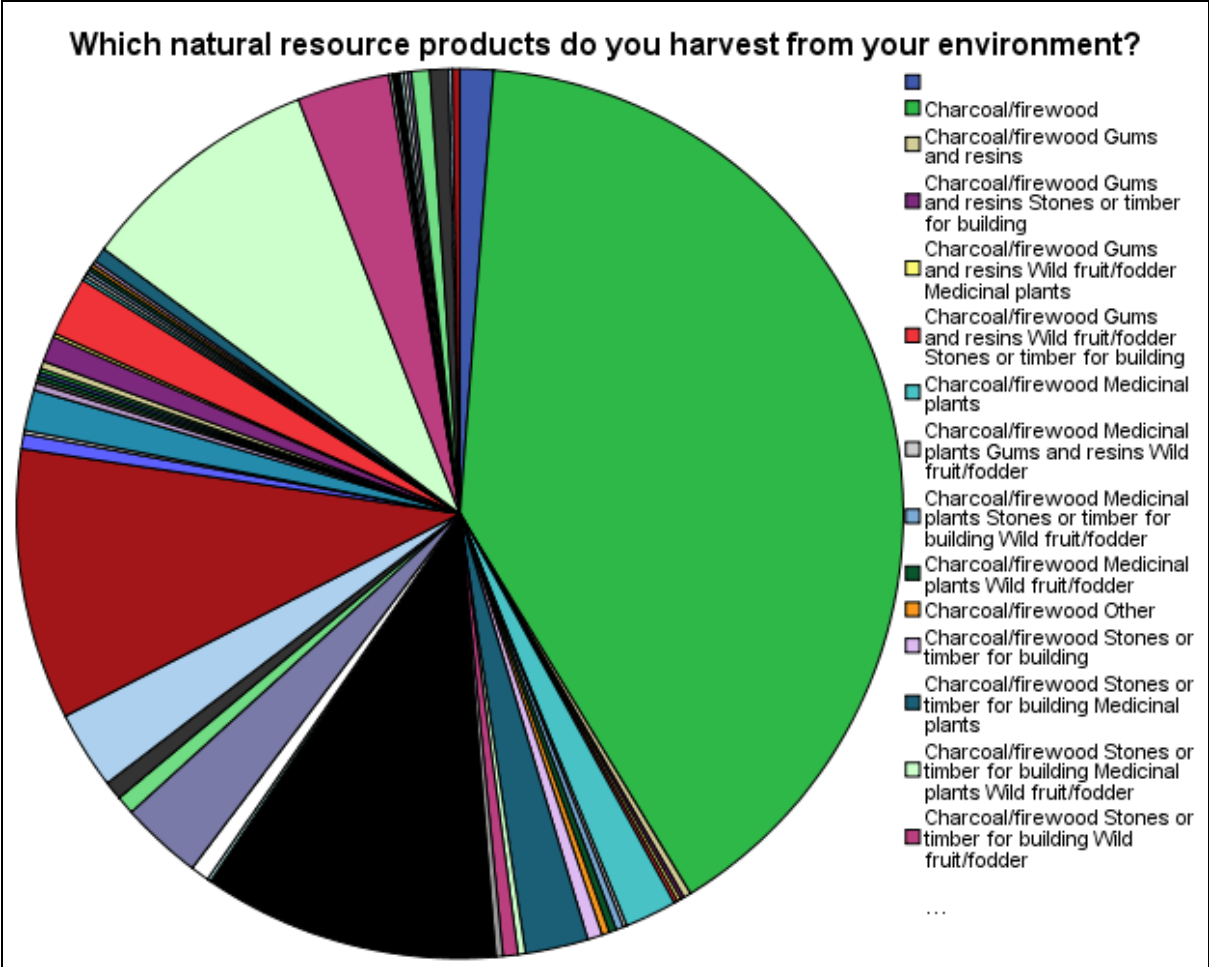


Figure 19: Tree resource use in the project areas.

2.4.4 Adaptation measures for environmental degradation

From analysis of data captured from the sample households, about 32% of households proposed tree planting as the most practiced adaptation measures to climate change. Other measures included, fencing and pasture enclosures (18%), adoption of climate resilient crop varieties (10.3%), ban on charcoal (15.8%), rain water harvesting (10.6%), livestock offtake (16%) and Soil conservation (15.4%). However the scale of adaptation currently was very low with only 3% of households demonstrating use of these technologies and practices. However by pointing at their feasibility, it demonstrated rudimentary understanding of the practices giving room for training and out scaling of the practices in the area in order to create impact.

2.5 Climate change challenges, adaptation and coping strategies

2.5.1 Climate change episodes and household coping strategies and response capacity

The main types of climate change episodes experienced by the respondents were major increase in temperature (42%), rainfall (9%) and drought (60%) while those that indicated minor increases were; for temperature (28%), rainfall (10.7%) and drought

10%. The shocks associated with these changes included increased water and pasture scarcity, upsurge of human parasites (40.55) and animal diseases (60.15) and increased soil erosion and landslides (5.5%) in Barwessa and in Turkana South and Loima respectively.

Table 16: Types of climate shocks experienced

Types of climate shocks experienced	% Per county		
	Barwessa	Turkana South	Loima
Crop pests and diseases	47.2	43.3	30.3
Livestock parasites and diseases	60.1	55	67.8
Livestock mortality	30.2	62.5	68
Crop loss	54.0	70	78
Water scarcity	33.5	30	45.9
Pasture scarcity	60.1	54.8	64.8
Human parasitic diseases	40.5	42.7	42.7
Landslides	5.5	17.6	27.6

The households named the following coping strategies to mitigate on the shocks:

Table 17: Coping strategies with climate shocks

Adaptation Strategy	Proportion of households (%) using different strategies		
	Barwessa	Turkana South	Loima
Nomadism	60.7		
Sold/Slaughter livestock to access food	15.1		
Destocking to reduce risk	18.0		
Purchased food	19.3		
Borrowed food	11.5		
Use traditional support systems	2.3		
Used existing savings	1.3		
Rain water harvesting	3.0		
Pasture management	4.0		
Used previously stored food	10.2		
Food rationing	1.3		
Enlist in food for work program	37.7		
Enlist in cash for work program	8.6		
Received food aid	15.1		
Get off-farm employment	3.4		
Used alternative foods from wild	2.5		
Borrowed from formal or informal source	1.3		

The capacity of the households to cope with climate shocks measured in terms of ability to invest in adaptation measures showed that in Baringo, some inadequate for only 61.9% of the sampled population had inadequate capacity while 23.9% of the respondents adequate to highly adequate capacity (Table 18). This low capacity justifies the need to invest in technologies that support households to cope with the shocks of climate change.

Table 18: Capacity of households to cope with climate change shocks (%)

Major climate shock experienced	Capacity to respond	Barwessa	Turkana S	Loima
Crop pests and diseases	Highly adequate	55	19.2	20.1
	Adequate	8	1.5	2
	Inadequate	8	10.1	9.8
Livestock pests and diseases	Highly adequate	33	24.6	23.5
	Adequate	20	8.2	8.8
	Inadequate	1.6	15.7	15.7
Human parasites and diseases	Highly adequate	24	27.1	28
	Adequate	12	4.8	4.4.
	Inadequate	4	8.7	6.5
Landslides	Highly adequate	2	1.1	1.3
	Adequate	0.5	0	1
	Inadequate	0.5	0	0
Overall	Highly adequate	33.8	18.2	18.6
	Adequate	9.7	3.2	3.4
	Inadequate	4.4	8.9	8.3

2.5.2 Climate change adaptation strategies

The data collected indicate that climate change adaptation among the households varied by project area and by type of measure applied. The proportion of households that adopted soil and water conservation was 6% in Barwessa followed by Turkana South (2%) and Loima (2%) with other values presented in Table 19. The values show very low adaptation measures applied by communities in the project areas with the values mirroring those documented in the Census 2019 data.

Data on level of skills and knowledge on climate change adaptation based on the respondents perceptions reflect low capacities across the project areas on all the adaptation technologies as presented in Table 20.

Table 19: Household members adapting use of climate change technologies

Adaptation strategies and practices in use	% of household members adapting per county		
	Barwessa	Turkana S	Loima
Soil and Water Conservation	6	2	2
Adopting Irrigation	1	1	1
Tree Planting	37	9	9
Water Harvesting	4	3	3
Change crop varieties	4	1	1
Change livestock breeds	3	1	1
Feed Conservation & diversification	5	1	1
Diversification of enterprises	1	1	1
Mixed Cropping	2	2	2
Value addition	0.5	1	1
Communal seed banks	0.5	2	2
Food storage facilities	3.8	2	2
Buy Insurance	0.9	0	0
Lease land	0	0	0
Employment	2.3	1.3	1.3
Overall	4.7	1.82	1.82

Table 20: Household members trained on adaptation strategies

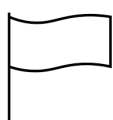
Adaptation strategies trained on	household members trained (%) per county		
	Barwessa	Turkana South	Loima
Soil and Water Conservation	13.5	11.5	11.4
Adopting Irrigation	9.1	8.9	7.6
Tree Planting	11.6	10.6	10.6
Water Harvesting	8.8	3.6	2.6
Change crop varieties	12.6	11.2	8.2
Change livestock breeds	13.5	9.6	5.6
Feed Conservation and diversification	7.1	4.5	4.0
Diversification of enterprises	5	3.2	4.2
Mixed Cropping	8.3	3.2	5.5
Value addition	5.2	1.2	2

Communal seed banks	2.8	1.4	2.8
Food storage facilities	7.1	3.3	7.2
Buy Insurance	2.2	1.1	0.4
Employment	5.2	4.2	1.0

4. SUMMARY OF KEY FINDINGS CONCLUSION AND RECOMMENDATIONS

The overall context of the communities in the project locations is largely patriarchal. Out of the 726 interviewed household heads, in the study area is male headed and managed were 51%. About 49% of households were, female headed and managed while 1% were child headed/under 18 years.

The results however show a patriarchal dominance in decision making towards utilization of biophysical and socio-economic resources within the project sites. 96% of interviewed persons confirmed that men mainly make decisions on resource usage whereas 1.8% of women have a stake on the decision making.



Therefore planning should take into account the patriarchal nature of the community and align interventions targeted to reach both the dominant male cohort while focusing to include women and youth.

Analysis on the decisions made by women indicates a limitation to decision on matters water at 58%, household welfare 34%, grazing 7% and migration 4%. Men therefore hold authority on decision making towards resource exploitation and utilization as well as livelihood activities.



Planning that involves resource allocation should align access, use and control issues to existing social roles to gain acceptance with the communities

The predominant primary occupation of the households in the study area was livestock production with about 77% of households engaging in it. Elsewhere, crop farming ranked second at 10.3%, 9% of the respondents practice trading, 2.8% depending on remittances from relatives and 0.4% indicated as employed and salaried. Disaggregated by counties a higher proportion of households considered crop farming as a main occupation in Baringo compared to Turkana.

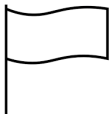


Interventions that are planned should address the greatest challenges that affect the livestock based livelihoods. Focus should be put to address scarcity of pasture, water scarcity, crop and livestock diseases and pest to minimize the climate change

risks and shocks

The predominant land use in the two counties include livestock keeping at 62% and farming at 34%. The land use correlates to the predominant livelihoods in the project sites as highlighted above.

The main livestock water sources for the sampled households were rivers/streams (46.6%), shallow wells (16.9%) and boreholes (12.7%). The proportion of households considering rivers and streams as the main source was higher in Baringo compared to Turkana County.



The project areas have rivers and streams that form the greatest source of water for domestic and livestock use. Simplified water abstraction and distribution systems that rely on renewable energy should be exploited to increase irrigated for pasture and food production, domestic and livestock water supply

The study findings show that a majority of the sampled households were aware of rangelands management practices. About 55% of the households were aware of practices relating to rangeland management such as destocking of livestock, pasture reseeding, rotational and conservation grazing, building of gabions, planting of trees, storing of pasture and cereals stalks, conservation of water catchments among many others.

In regards to climatic changes within the project sites, temperature, rainfall and drought were noted to be the parameters with great variations. 42% indicated a temperature increase, 15% noted an increase in drought whereas 8% mentioned a noted increase in rainfall.

The main types of climate shocks experienced by the households was drought (72.9%) with the proportion being higher in Turkana compared to Baringo. On coping strategies to climate shocks, most households (47.4%) said they increase use/frequency of crop and livestock pest and disease control with the proportion being higher in Baringo (66.5%), than Turkana (35.8%) county.

The analysis of livelihood resources further highlights an increase in vegetation cover within the study area at 21% as reported by communities. 9.8% reported an increase in invasive species, 6.9% noted an increase in river flow and 6.5% indicated increased soil cover hence improved soil fertility.

Evaluation of existence of any local committee that coordinates climate change related issues denotes a non-existence at 59% and existence at 39%. 21% confirmed presence of clear roles and responsibilities for the committee, and effective partnerships outside the committee to address adaptation for the existing local committee. 5% denied existence of roles and responsibilities for the committees.

In regards to training on climate change preparedness and planning, 78% of community members lack training on climate change preparedness and planning where as 21% confirmed receiving training with a major proportion persons trained being men.



Develop a capacity building framework to guide training on climate change and development of community action plans to generated actionable responses to climate change episodes in the area

REFERENCES

- Baringo County Integrated Development Plan 2018-2022
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- Government of Kenya, Agricultural Sector Development Strategy 2010–2020 (ASDS)
- Government of Kenya, Agricultural Sector Transformation and Growth Strategy
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- Kenya National Bureau of Statistics, 2019 Census
- Turkana County Integrated Development Plan 2018-2022

ANNEXES

Annex 1: RLACC Baseline indicator levels at county project sites levels

	Indicators	Baseline data needed (unless otherwise stated. data are relevant statistics for the sample used in the respective surveys)	Level of indicator
1	Population affected by droughts, intermittent floods and land degradation	Current level of household population affected by drought, intermittent floods, land degradation	Drought Overall mean reporting = 72.9% Intermittent floods Overall mean reporting = 18%

	Indicators	Baseline data needed (unless otherwise stated. data are relevant statistics for the sample used in the respective surveys)	Level of indicator
			Land degradation Overall mean reporting = 26.4%
	Population of livestock affected by drought	Current number/proportion of livestock population affected by drought (Disaggregated by livestock type)	Cattle = 5% Goat = 8% Sheep = 8% Poultry = 15% Camel = 1% Donkey = 1%
	Reduce child underweight	Current number of children population who are underweight	Overall =
	Reduced poverty and Enhanced food security	-current monthly household income	Overall households = < 1500KES
		Current months of Adequate Household Food Provisioning (MAHFP)	Food security Overall households = 8
		-current number of livestock owned by type	Cattle Overall mean = 20 number Goats Overall mean = 52 number Sheep Overall mean = 32 number Poultry Overall mean = 13 number Camel Overall mean = 9 number

	Indicators	Baseline data needed (unless otherwise stated. data are relevant statistics for the sample used in the respective surveys)	Level of indicator
			Donkey Overall mean = 11 number
		--current number of live livestock marketed by type	Cattle Overall mean = 3 number Goats Overall mean = 11 number Sheep Overall mean = 10 number Poultry Overall mean = 5 number Camel Overall mean = 2 number Donkey Overall mean = 2 number
		-current mean live weight of each livestock by type	Cattle Young = 111.9 Kg Mature = 222.5 Kg Goat Young = 15.5 Kg Mature = 34.25 Kg Sheep Young = 13.75 Kg Mature = 32 Kg Camel Young = 155 Kg Mature = 411 Kg Donkey Young = 110 Kg Mature = 190Kg

	Indicators	Baseline data needed (unless otherwise stated. data are relevant statistics for the sample used in the respective surveys)	Level of indicator
		-current mean dry weight of each livestock by type	Cattle Young = 63.5 Kg Mature = 123 Kg Goat Young = 6.4 Kg Mature = 20 Kg Sheep Young = 7.5 Kg Mature = 17.4 Kg Camel Young = 99 Kg Mature = 242 Kg Donkey Young = 53.5 Kg Mature = 98Kg
		-current marketing farm-gate price for live livestock by type	Cattle Overall mean reporting = 20,166KES Goats Overall mean reporting = 2,935KES Sheep Overall mean reporting = 2,553KES Poultry Overall mean reporting = 410KES Camel Overall mean reporting = 33,274KES Donkey Overall mean reporting = 4,909KES
		-Current productivity for major food crops	Maize Overall mean for the year = 720kg/acre Beans Overall mean for the year = 260kg/acre Millet Overall mean for the year = 183.25kg/acre Onions

	Indicators	Baseline data needed (unless otherwise stated. data are relevant statistics for the sample used in the respective surveys)	Level of indicator
			Overall mean for the year = 800kg/acre Sorghum Overall mean for the year = 180kg/acre
		-current proportion of households marketing major food crop outputs	Overall mean reporting = 8.6%
		-Current quantity of major food crops outputs marketed	Maize Overall mean for the year = 441kg Beans Overall mean for the year = 178kg Millet Overall mean for the year = 331kg Onions Overall mean for the year = 800kg Sorghum Overall mean for the year = 83kg
		Access to market information	Overall mean reporting = 21%
		Access to agricultural credit	Overall mean reporting = 3.2%
		Access to agricultural extension services	Overall mean reporting = 29.9%
		Access to formal saving services	Overall mean reporting = 25%

	Indicators	Baseline data needed (unless otherwise stated. data are relevant statistics for the sample used in the respective surveys)	Level of indicator
	Increased number of people and livestock accessing water	Nearest livestock watering points in Km	Overall mean reporting = 4.7km
		Membership to water user association	Overall mean reporting = 9.5%
	<i>Improved quality and availability of pasture</i>	- Current % of households using feed conservation and communal seed banks	Feed conservation Overall mean reporting = 12.1% Communal seed banks Overall mean reporting = 4.5%
	<i>Developed and improved rural feeder roads</i>	Current proportion having access to all weather road	Overall mean reporting = 38.2%
	<i>Improved market and input access</i>	Current proportion having access to input and output market	Input market Overall mean reporting = 10.9% Output market Overall mean reporting = 22.6%
	<i>Improved animal health services</i>	Current proportion having access to veterinary, AI and dipping services	Veterinary services Overall mean reporting = 43.7% AI services Overall mean reporting = 3.3% Dipping services Overall mean reporting = 17.8%

	Indicators	Baseline data needed (unless otherwise stated. data are relevant statistics for the sample used in the respective surveys)	Level of indicator
	Climate change and adaptation	- Current % of HH reporting noticing changes in environment: Overall.	Overall mean reporting = 81%
		Current % households experiencing climate shocks: Overall	Overall mean reporting = 32.7%
		- Current % of households accessing climate related information	Overall HH accessing climate related information = 80.6%;
		- Current % of households responding to climate shocks and :Overall vulnerability	Overall mean = 28.5%. HH Capacity to respond: Overall: High= 15.9% Neutral= 4.4% Low= 8.9%

Annex 2: Household Questionnaire for Baseline Survey

Baseline Questionnaire for Household/Rural Level Introduction and consent by main respondent

The household-level questionnaire

Welcome to [NRM Baseline Questionnaire for Household/Rural Level Introduction and consent by main respondent](#)

Consent Statement : Good morning/afternoon. My name is, and I am working for the RLACC project which is cooperating with the Drought Resilience and Sustainable Livelihoods Program - DRSLP in your area. The project works on improving the resilience of pastoral and Agro-pastoral communities to climate change. We are surveying some hundred households now to get an idea of your current livelihood. We would like to ask you some questions that should take no more than 30 minutes of your time. We would like to share some of this information widely in order that more people understand how soil, water and land resources are managed and how to improve this.

Please state the area and code of the baseline survey

- Barwesa 01
- Loima 02
- Simailele 03

Please state the county in which you performed the interview

Please state the ward in which you performed the interview

Please state the ward in which you performed the interview

Please state the village in which you performed the interview

Enumerators name

Please indicate the date and time of the interview

yyyy-mm-dd

hh:mm

What is your supervisors name?

GENERAL INFORMATION

Ideal respondent: household head and/or spouse. Most of these questions can be completed without having to question the respondent directly. Be sensitive about the way you gather this information.

What is the complete name of the respondent?

What is the phone number of the respondent?

How old is the respondent

- 18-35
- 35-60
- above 60

What is respondent's gender?

- Female
- Male

What is respondent's marital status?

- Married
- Single
- Widowed
- Divorced

DEMOGRAPHIC AND SOCIO-ECONOMIC DATA

How do you describe your community's population trends over the last 10 - 20 years?

- Declining
- Stable
- Increasing

What do you consider as the main cause for the population trends in your community

- Births
- In-migration
- Out-migration
- Conflict
- Other

Specify Other

Have you witnessed any changes in natural resources/environment within your lifetime?

Yes No

Please rank any livelihood changes witnessed as well

- Small
- Medium
- Large

Do you believe the changes in the livelihoods within your community have any relationship to natural resource/environmental trends?

- Yes
- No

What adaptation measures exist within your community towards climate change?

SOURCES OF LIVELIHOODS AND RESOURCE USE

Which of the following best describes your main source of income?

- Livestock Keeping
- Trading
- Salaried Employment
- Remittances from relatives
- Other

Specify Other

Which natural resource products do you harvest from your environment?

Charcoal/firewood

Wild fruit/fodder

Gums and resins

Stones or timber for building

Medicinal plants

Other

Specify Other

Have they been increasing, decreasing or remaining constant?

indicate which natural resource product has increased,decreased or remained constant

The distance for getting the natural resource products

near

Far

Very Far

What source of energy does your household use for cooking?

Firewood

Charcoal

LPG

Others

Specify Other

If you use firewood or charcoal, what do you do?

But it

Collect it

Both

Do you have problems getting firewood for your cooking?

Yes

No

If you collect the firewood, how has the distance involved in collecting changed?

Increased

Decreased

Stayed the same

If you collect the firewood, how has the time involved in collecting changed?

Increased

Decreased

Stayed the same

LAND-USE AND LAND-USE CHANGE(S)

What is the predominant land-use in your area?

Livestock keeping

Farming

Others

Specify Other

In the recent past, what changes have you witnessed in your environment?

- Pasture scarcity
- Invasive plant species
Deforestation
- Soil erosion (Gulley)
- Diminution of vegetation/grass species
Water run-off
- Others

Specify Other

What do you think was the cause of these changes?

- Population pressure
- Reduced human migration
Overgrazing
- Natural processes (climate change)
Charcoal burning
- Government regulations/laws
Conflict
- Poor resource governance
Other

Specify Other

Please rank the intensity of this change/degradation

Small

Medium

Large

To cope with above degradation, what changes have you made in the way you have been managing your land or livestock or biophysical and social economic resources??

C: Natural Resource Conflicts

Outline the conflicts of interest between varying resource users within your community/area

Water

Pasture

Land

Extractive resources access

Others

Specify Other

Are these conflicts managed in any way?

Yes

No

Not Sure

If yes, state how?

What aspects of resource conflict management need to be improved?

D: Gender and Biophysical and Social Economic Resources

Who mainly makes decisions on Biophysical and Social Economic Resources?

Women

Men

youths Others

Specify Other

What kind of decisions are normally made by women

Migration

Grazing

Water

Others

Specify Other

E: Rangeland resource status and management practices

Are you aware of any management practices for rangeland resources

Yes No

What are the predominant traditional rangeland management practices in this area?

What are some of the most important Biophysical and Social Economic Resources measures that your community undertakes in managing their environment and resources?

Specify Other

Has the village/ward experienced any of the following climate-related changes over the past years?

Please tick the most relevant box

No changes in temperature experienced

Minor increase in temperature experienced

Major increase in temperature experienced with effects on livelihoods and sectors

Minor increase in rainfall experienced

Major increase in rainfall experienced with effects on livelihoods and sectors

No changes in drought episodes experienced

Minor changes in frequency and severity of drought episodes experienced

Major changes in frequency and severity of drought episodes experienced with effects on livelihoods and sectors

Temperature

Rainfall

Droughts

Has the village/ward experienced any of the following changes over the past years?

Please tick

No changes in vegetation cover Minor increase in vegetation cover Major

increase in vegetation cover Minor decrease in vegetation cover Major

decrease in vegetation cover No changes in soil cover/fertility

Slight decrease in soil cover

/fertility

Major decrease

in soil cover/ fertility

Minor increase in soil cover/ fertility Major increase in soil cover/ fertility No

changes in river flow

Slight decrease in river flow

Major decrease in river flow

Minor increase in river flow Major increase in river flow

No changes in

occurrence of invasive plant species

Slight decrease

in occurrence of invasive plant species

Vegetation cover
species

Soil cover/fertility

River flow

Invasive

Major decrease
in occurrence of invasive
plant species

Minor increase
in occurrence of invasive plant species

Major increase
in occurrence of invasive plant species

In the village/ward, is there any local committee that coordinates climate change related issues?

Yes

No

If yes, Does the committee/department have access to and does it make use of climate information in decision- making?

No

Partially

Yes

If yes, Are climate change risks as well as appropriate adaptation strategies and measures integrated into village/ward development plans?

No

Partially

Yes

If yes, Are there clear roles and responsibilities the committee, and effective partnerships outside the committee to address adaptation?

No

Partially Yes

Has any village committee member/government officials in the village/ward been trained on climate change preparedness and planning?

Yes

No

If yes, Number of people trained

If yes, Number of committees

If yes, percentage of women trained

If yes, percentage of men trained

What are the climate change related adaptation options practiced locally in the village/ward?

Are you aware of RLACC or DRSLP project in your village/ward?

Yes No

What are the RLACC or DRSLP intervention practices implemented in your village/ward?

- Pasture development
Catchment conservation
- Crop diversification/inter-cropping (includes shift to non-traditional crops like sorghum)
Integrated crop-livestock management
- Avoided deforestation
- Reforestation / afforestation(tree seedling distribution)
Fruit seedling distribution
- Rainwater harvesting
- Irrigation Systems (gravity flow)
Water pans construction
- Terracing and contour bands
Zero grazing
- Marram road construction
Borehole development
- Alternative income generation (apiculture, fish farming, high value crops, non/off farm labor)
Drought resistant crop varieties
- Construction hay sheds
Construction sales yards
- Livestock breed improvement (cattle, sheep, goat)
Other...specify

Other Specify

Location/Village under practice of the interventions by RLACC or DRSLP
current

Level of impact from the interventions
what type of intervention and its level of impact

Rated Importance/ direct impact to person to climate change adaptation

GPS location

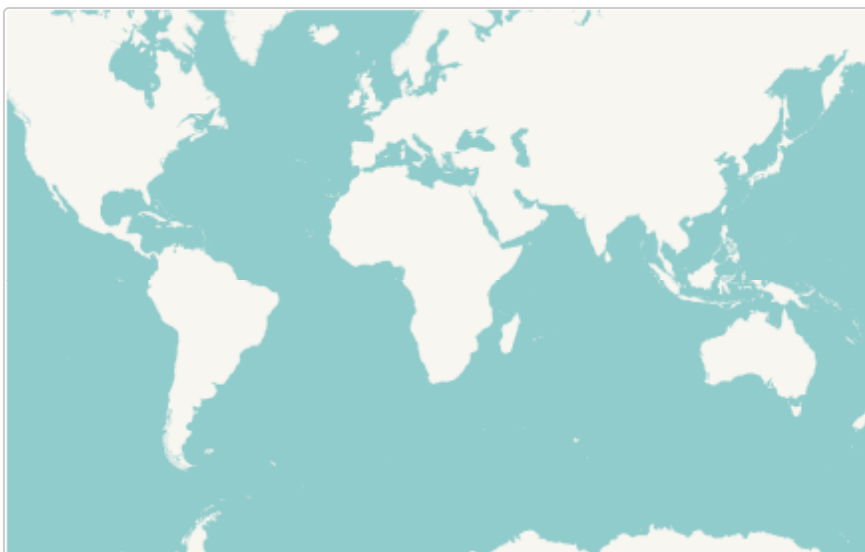
Please capture the coordinates of your location. Position yourself in an open space not obstructed by buildings or trees and wait for the accuracy to reduce to about 5 metres

latitude (x.y °)

longitude (x.y °)

altitude (m)

accuracy (m)



Thank you for taking the time to answer our questions

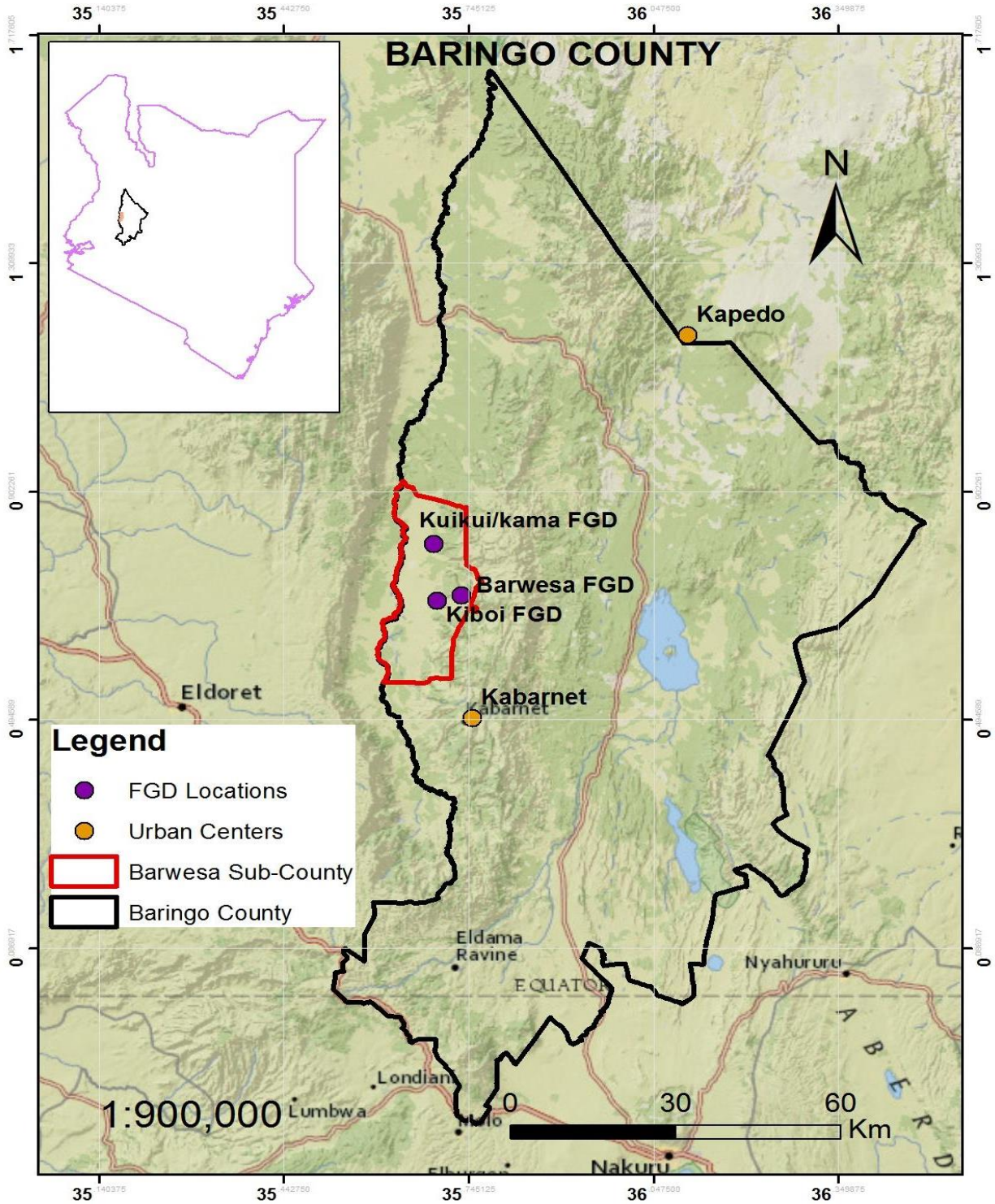
1 Annex 3: FGD Participants and Key Informants

BARINGO COUNTY

TURKANA COUNTY

2 Annex 4: Geo-Referenced Maps of FGD Points

BARINGO COUNTY



TURKANA COUNTY

