Qualitative Data Analysis of Narok County, Kenya

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Independent Research Math 293

May 16, 2020

Abstract:

A study was conducted predominantly in the area surrounding the Maasai Mara National reserve within Narok County Kenya that included 45 interviews of local residents. These interviews provided qualitative data and showed high reports of decreased water availability, wild animal conflicts, and natural habitat encroachment to name a few. Moderate correlations were found using chi-square statistical analysis between some significant variables.

County Overview:

Narok County lies just below the equator and is located in the south western portion of Kenya, sharing a border with Tanzania to the south. It is almost 18 thousand km^2, about 3.1% of the area of Kenya, with a population of almost 1.2 million, about 2.2% of Kenya (KNBS, 2019). It is split into six sub counties which include Narok North, South, East, and West and also Trans Mara East and West. Considering the elevation is over 1500 meters above sea level county-wide, the climate is more temperate compared to the rest of Kenya.

Some important geographic features in or close to the county include the Mau Forest Complex, Lake Victoria, The Great Rift Valley, and The Maasai Mara National Reserve. The Mau is predominately north of the county but overlaps into Narok North sub-county. It is

considered to be one of the largest “water towers” in Africa located in the Kenyan Highlands. The countless rivers and streams that stem from the Mau Forest flow throughout Kenya. This Forest is an integral part of Kenya’s ecosystem due to the water availability it provides to the country, Narok county included. Over the years, the Forest has been slowly encroached upon by settlers. This is because the land is very fertile and provides a highly demanded resource, wood. The Kenyan government is continuing to undergo the eviction of these people from these areas in an attempt to preserve it. (UNEP, 2014)

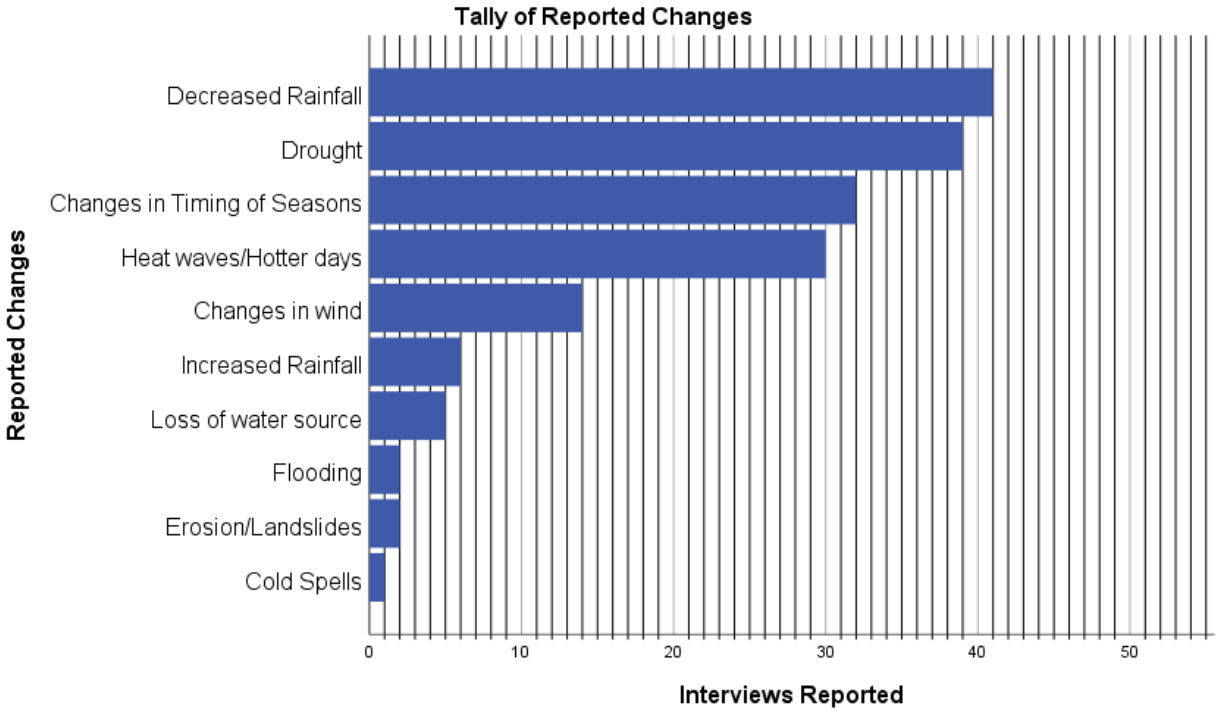
Here are some interesting statistics that will provide some preliminary insight about the county. According to Kenya’s National Bureau of Statistics as of 2019, in Narok County 74.7% of house roofs are made of iron sheets and 14.6% of grasses and twigs. 60.7% of the walls are made of mud/ cow dung. 41.3% of households rely on streams and rivers as their main source of water. 59.8 % of people use pit latrines and 28.2% do it in the open bush. 70.3% of solid waste is burnt. 71.7% of households use firewood as a main source of fuel for cooking and 17.7% use charcoal. (KNBS, 2019) These statistics show that Narok county’s residents have limited access to sturdy building materials, insufficient waste disposal methods, and a heavy reliance on non-renewable resources such as firewood and charcoal.

The majority of the county relies upon agriculture and pastoralism as a source of income as well as tourism, mining, and trading. Looking further into the economy of Narok, their main crops are maize, beans, tomatoes, and potatoes, and tea. Kenya is the third largest tea producer in the world and it is grown in higher elevations with consistent rainfall, e.g. the Mau Forest which overlaps into Narok County. Due to the high use of firewood and charcoal to dry out tea leaves in production, it is a very carbon heavy process.(UNEP 2014)

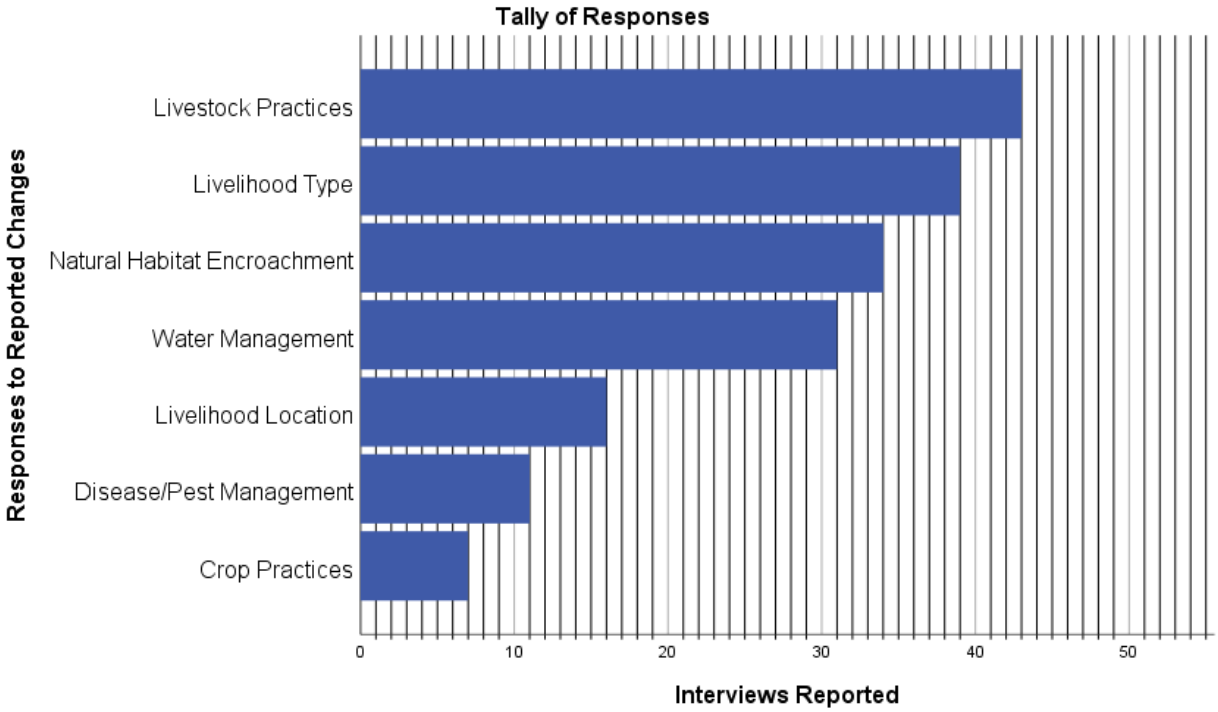
Data:

The data consists of 45 interviews conducted to random individuals in Narok County, Kenya. The interviewee was asked multiple questions about weather, environmental issues, and community issues pertaining to climate change. The interviews were mostly conducted in areas surrounding the Maasai-Mara National Reserve. They were conducted in 2016 with the majority being in early August and early December.

In order to analyze the data, 36 variables were created in SPSS software including gender, interview date, age, and 33 others. All of these are categorical variables. 16 of these variables and sub-variables are categorized based on whether these particular issues were mentioned in the interview description or supplementary questions such as “Wild Animal Conflicts”, with 5 sub-variables, or “Water Availability Issues”, with 7 sub-variables. These variables were created manually. Another 17 variables were rigidly defined by whether they were recorded in the columns of “Reported Changes in the Weather/Climate” or “Responses to Changes”. Because the reported changes and the responses to those changes are both independent from the interpretation of the data analyst, the frequencies of the reported variables can show some significance in the problems the county is facing. These frequencies are shown on the following page.



The first four variables clearly indicate that the individuals living near the Maasai Mara Reserve have seen a definitive change in their rain patterns. The seasons in Kenya are defined by when the rains occur so this can cause decreased overall rainfall, drought, hotter days, and the loss of a water source. When increased rainfall is reported, it is assumed to mean the occasional high intensity burst of rain that can cause flooding and erosion but, it is not known for sure what this means.



The responses to these changes indicate that the people are in the process of adapting their livelihoods to compensate for the climate. Narok county is a mostly pastoralist county which explains the need to adapt livestock practices and manage diseases/pests among them. Due to an increasing need to search for water and pasture, livestock keepers often graze their cattle in areas designated for wild animals. It is also worth mentioning that the high demand for firewood has driven people to travel farther in search of it. Consequently, deforestation is commonplace.

In order to further explore correlations between these variables, the Chi-Square test was run. The Chi-Square test provides two conclusions:

H_0: There is no significance association among the variables

H_1: There is a significance association among the variables

A couple conditions must be satisfied to accept H_1. Firstly, the "Asymptomatic significance", or p-value, must be less than 0.05 and less than the chi-square value, or test value, to ensure a

confidence level of 95%. Next, the number of cells with an expected count of less than 5 must be 0. If both conditions are satisfied, then H_1 is accepted. Finally, to determine the level of significance, the values of Phi are used. The table below shows the different values of Phi.

0 – 0.1	0.1 – 0.3	0.3 – 0.5	0.5<…
Little if any association	Low association	Moderate Association	High Association

Although many tests were run, few were able to satisfy H_1. The following examples had both an acceptable asymptomatic significance and no cells had an expected count of less than 5.

Wild Animal Conflicts * Springs/Rivers/Streams Drying Up

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.007[a]	1	.025		
Continuity Correction[b]	3.667	1	.056		
Likelihood Ratio	5.107	1	.024		
Fisher's Exact Test				.051	.027
Linear-by-Linear Association	4.895	1	.027		
N of Valid Cases	45				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.53.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.334	.025
	Cramer's V	.334	.025
N of Valid Cases		45	

The test value of 5.007 is greater than a p-value of 0.025. The p-value is also less than 0.05. This allows us to use phi to determine the association. The value of phi shows that there is a moderate association between Wild Animal Conflicts and the drying up of water sources.

Wild Animal Conflicts * Drought / Less Rain

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.472[a]	1	.019		
Continuity Correction[b]	4.148	1	.042		
Likelihood Ratio	5.636	1	.018		
Fisher's Exact Test				.034	.020
Linear-by-Linear Association	5.350	1	.021		
N of Valid Cases	45				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.87.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.349	.019
	Cramer's V	.349	.019
N of Valid Cases		45	

The same conditions are satisfied for this correlation as well, with a test value of 5.472 and a p-value of 0.019. Because the two sub-variables of “Drought/Less rain” and “Springs/ Rivers/ Streams Drying up” are similar in nature, it compounds the conclusion that this data implies. Said conclusion being that wild animal conflicts increase if there is less water. It is a sensible conclusion considering that increased competition for water would lead wild animals,

livestock, or humans to search for it farther and farther away which increases the chances of confrontation.

Another chi-square test was run comparing the two main interview dates (excluding two outliers) and a variable describing the reporting of either a smaller number of/decreased health of livestock specifically because of less water. This is a sub-variable of Water Availability Issues and is only marked positive if it is reported that general livestock well-being is worsening due to less water.

Interview Date * Less # of/Decreased Health of Livestock due to less water

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.376[a]	1	.036		
Continuity Correction[b]	3.143	1	.076		
Likelihood Ratio	4.389	1	.036		
Fisher's Exact Test				.057	.038
Linear-by-Linear Association	4.274	1	.039		
N of Valid Cases	43				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.72.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.319	.036
	Cramer's V	.319	.036
N of Valid Cases		43	

Again, the criteria are met with a test value of 4.376 and a p-value of 0.036. A phi of 0.319 shows a moderate correlation as well. To explain this link between the two variables, it is possible that the timings of the two rain seasons are the cause. During the 2016 long rain season,

rains ended late in the third dekad (10 days) of June.(NDMA, 2016) During the 2016 short rain season, the county experienced a late onset of the rains in the first dekad of November and ended early in the second dekad of December. (NDMA, 2017) In terms of the interview dates, early august lies in the middle of a dry season and early December lies toward the end of the short rain season. Since the rains relate to the amount of pasture and the livestock graze on the pasture, this could explain why a greater percentage of people in August reported decreased health of livestock than in December.

Conclusions:

It is apparent from the reported changes and interview answers that Narok County has faced a decrease in water availability, increase in wild animal conflicts, hotter, more unpredictable weather, and worsened livestock health in the years leading up to 2016. The Chi-square tests show a moderate correlation between wild animal conflicts vs. drought, interview date vs. livestock health, and wild animal conflicts vs. drying up of water sources. There has been more natural habitat encroachment and individuals have had to adapt their livelihoods due to climate changes. These issues will continue to worsen if adequate measures are not taken to prevent the destruction of the Mau forest, better manage water resources, or find alternative sources of energy.

References

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