Qualitative Analysis of Age and Climate Change Reports from Zambia

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Independent Research, MATH 293

June 15, 2020

Introduction:

Climate change has certainly been a controversial topic of debate in recent years. According to the scientific database, *Access Science*, climate change is “any change in global temperatures and precipitation over time due to natural variability or to human activity.” Biomes would get hotter and rain patterns would be disturbed. There could be an increase total amount of rainfall or a total drought for years unlike before due to climate change.

Although effects have been seen all around the world, African countries have been anticipated to have it the worst. The agricultural sector of countries, specifically Zambia, have had a major impact from climate change. Zambia is a landlocked country in Southern Africa seated mostly on top of a high plateau. Due to the flat terrain, 31.7% of the land is used for agriculture, making it a significant sector of the Zambian economy (Central Intelligence Agency, 2020). Current research indicates that gross domestic product will decrease continuously now and during the oncoming years. The socioeconomic statuses and potential poverty in the foreseeable future has become a concern (Thurlow, Zhu, & Diao, 2012). Recent analyses further support these ideas as drought and floods due to climate change have caused massive crop failure and drastically curbed the output of hydropower dams for copper production. According to the International Monetary Fund as stated by Bloomberg, Zambia’s debt will reach 92% of its own GDP (Hill &

Mitimingi, 2019). The drastic effects of climate change have only started to surface and could surely become worse in the near future. With these severe changes affecting multiple sectors of Zambia's economy, many of its citizens have had to react to its long-lasting impacts. A study in 2015 examined migration and population movement of Zambians in an effort to discover ways Zambians tried to adapt to the rapidly changing climate. A clear connection has not been discovered due to lack of other empirical studies to support it, but it does suggest migration as one of the "common adapting strategies" for farmers. Because of insufficient water and other necessary resources, farming became an unviable occupation for Zambians, resulting in their migration to somewhere with more stable jobs (Simatele & Simatele, 2015). Climate change is an ongoing crisis that nations must respond to and prepare for in the future. Zambia is just one of the African countries affected greatly by climate change today.

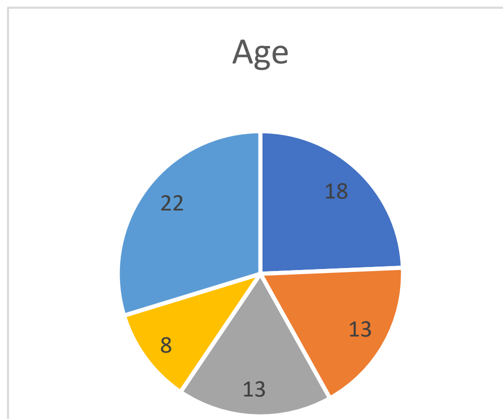
Plenty of research needs to be conducted in order to establish connections between certain variables and the changes, impacts, and responses of climate change. Otherwise, responses may be inaccurate or biased compared to the true reports. This study provides an insight on how valid the responses are when age is examined. Potential reasons for any invalidity can be explored after analysis. If there is no bias, then reports may be considered valid.

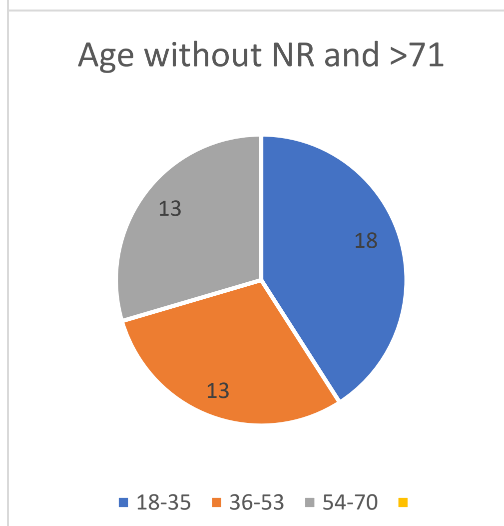
Methodology:

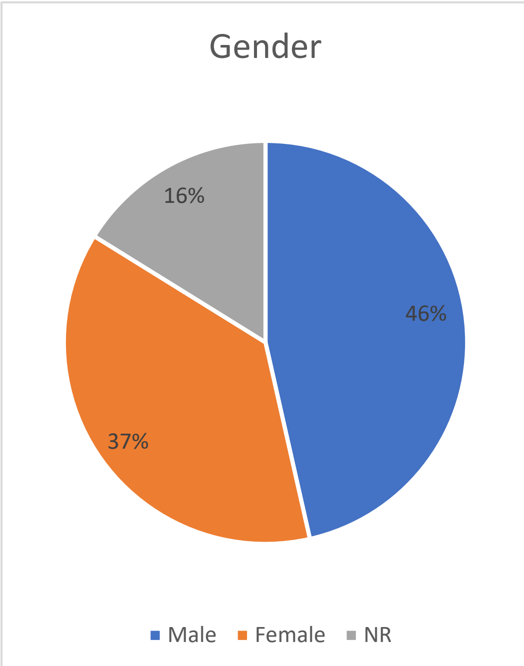
The World Wildlife Fund (WWF) collected most of the data from people in Zambia. WWF Zambia did so in the Western region of Zambia. Another unspecified organization also collected data in regions like Central, Eastern, and Northwestern Zambia. They collected this data on the following dates: June 11 to 18 in 2018, April 8 to 9, July 23, June 11 to 18, and

September 7 to 11 in 2017. The data collected consisted of interviews with free-response questions. Examples of questions asked to the interviewees are "What are some of the biggest changes you have observed over [the past years]?" and "How have the changes in weather you mentioned impacted the [community]?" Many questions shown in the provided WWF data were cut off but could be finished through inference. Interviewees were given the opportunity to only answer the questions they wanted, leaving some areas blank for responses. 92 responses were gathered in total and 74 of the 93 were valid enough for analysis.

Of the responses, 76% (56/74) of the interviewees were farmers. This, of course, is understandable due to the prevalence of agriculture in Zambia. 7% of the other interviewees has miscellaneous roles in their community, including gardeners (2), Businessman (1), Resident (1), Single parent (1), and Elderly (1). The other 16% were not reported by the interviewer. Either the interviewer did not ask for the role or interviewee did not want to share it. For gender, 46% of the collected responses were male. 37% were female, and the other 16% were Not Reported (NR) where the data was missing or absent. If the NR were taken out, then a more even split is seen between the genders at 55% male and 45% female. A majority of the data (80%) was retrieved from Western Zambia. 7% was from Central Zambia. 5% was from Northwestern Zambia. And the other 8% were made up

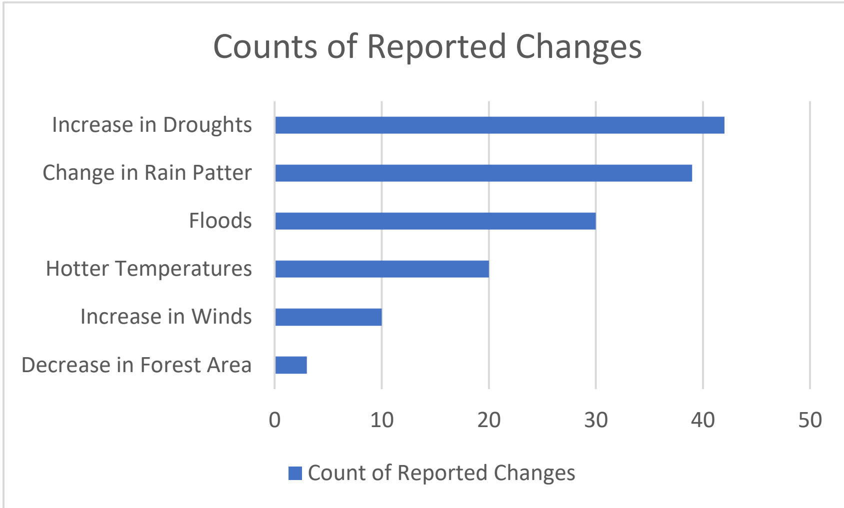


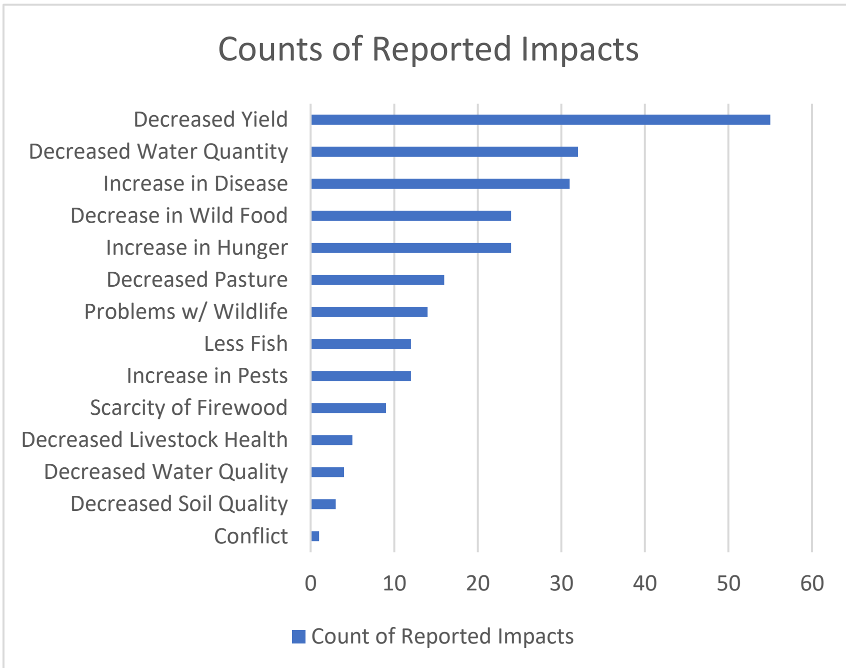




of select responses of one or two each from Northern Zambia, Luapula, and Eastern Zambia. The variable that will be looked at much closer with climate change reports will be age. Interviewees were grouped in separate age groups: 18-35, 36-53, 54-70, >71, and Not Reported (NR). Those 18-35 comprised about 24% of the responses. Those 36-53 made up 18% of the responses. The 54-70 age group also made up another 18% of the responses. The >71 age group covered only 11% of the responses. The NR group made up 30% of the responses which is staggeringly large and will affect data analysis. Without it, the age group percentages are as follows: 18-35 (35%), 34-53 (25%), 54-70 (25%), and >71 (15%). Although it reduces the sample size greatly, the data analysis will be much more accurate in determining values like Chi-Square.

The interviews were then examined and coded to provide a general sense of how prevalent certain reports were. An original coding method was used for the reported changes. “rainpat” was used for changes in rain patterns which include longer dry seasons and shorter wet seasons and irregular and unpredictable precipitation. “hot” coded for heat waves and hot spells experienced by the Zambians. “drought” meant that within recent years, drought was





experienced. "flood" indicated an immense increase in rainfall with a result of flooding. "winds" was used for stronger and more extreme winds. Each of these codes were then used as a variable. A codebook provided by the WWF was used to summarize and emphasize the general impacts of climate change. As there were many Impact codes with some not having much of a count, many were lumped together to create a more general variable. The variable "Decreased Food Production" contained the codes of "yield", "pests", "livestock health", "wild food", "less fish", "pasture", "dec soil quality", and "hunger". These codes all indicate some sort of decreased ability to produce food, whether through agriculture, foraging, or livestock, hence the general variable of "Decreased Food Production". Another generalized variable was "Decreased Water Viability". This included the two codes of "water qual" and "water quan" as they indicated either a decreased quality or quantity of water. They were clumped together to give the overall message that water was not as viable as before. "Increase in Disease" remained as a variable with only one code, "disease". It did not fit in with the other variables as disease is a more unique impact. Diseases included malaria, HIV/AIDS, diarrhea, and respiratory diseases reported by the interviewees. The variable "Overall Conflicts" encompassed both "conflict" and "problem wildlife" as they reported an increase in some type of conflict with either humans or animals. After the responses were coded for the reported changes, impacts, and responses, the data were entered into a contingency table and into the statistics software, IBM SPSS Statistics. Other codes can be found in the Appendix section found later in this paper. From there, data analysis could proceed through multiple Chi-Square tests.

The conditions of a Pearson Chi-Square test require that the data is categorical and that it meets the expected count of 5 for each cell. The data was transformed in a way to make it suitable for Pearson Chi-Square testing. This type of testing was preferred over Fisher's Exact Test as Pearson Chi-Square is much more accurate and reliable. The alpha value indicating statistically significant evidence for this test will be 0.05. If the result is above 0.05, then the null hypothesis is accepted, and the alternate hypothesis is rejected. Any discrepancies between this set of data and others are just by chance. If it were below the value of 0.05, then the data is considered statistically significant and evidence of the alternate hypothesis. From that point forward, tests of significance would determine the strength of the associations.

The hypotheses for the Chi-Square Testing are as follows:

H_0 = There is no association between age and the reports of climate change.

H_1 = There is an association between age and the reports of climate change.

A similar and more descriptive data set was provided later on in the analysis process which filled in more missing data in regards to age. A couple more responses were also added, making the total sample size to be 79. Due to time constraints, this data set was used to reinforce the already set conclusions of the original analysis.

During the actual data analysis however, some problems were encountered in regards to cell count and minimum expected counts. These issues were typically found in the >71 age group and were omitted as a result. The NR group was also excluded as they detract from the accuracy of the testing as can be seen in the results. Analysis including and excluding those groups were conducted and compared.

Results:

Figure 1: Change in Rain Patterns with NR and >71

Crosstab

			Age					
			NR	18-35	36-53	54-70	>71	Total
Change in Rain Patterns	NR	Count	15	8	6	4	2	35
		Expected Count	10.4	8.5	6.1	6.1	3.8	35.0
		% of Total	20.3%	10.8%	8.1%	5.4%	2.7%	47.3%
	Reported	Count	7	10	7	9	6	39
		Expected Count	11.6	9.5	6.9	6.9	4.2	39.0
		% of Total	9.5%	13.5%	9.5%	12.2%	8.1%	52.7%
Total		Count	22	18	13	13	8	74
		Expected Count	22.0	18.0	13.0	13.0	8.0	74.0
		% of Total	29.7%	24.3%	17.6%	17.6%	10.8%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.935[a]	4	.139
Likelihood Ratio	7.127	4	.129
Linear-by-Linear Association	6.015	1	.014
N of Valid Cases	74		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 3.78.

Changes in Rain Patterns (shorter rain seasons and longer dry seasons) were compared against age with the >71 and NR groups included.

Figure 2: Change in Rain Patterns without NR and >71

Crosstab

			Age			
			18-35	36-53	54-70	Total
Change in Rain Patterns	NR	Count	8	6	4	18
		Expected Count	7.4	5.3	5.3	18.0
		% of Total	18.2%	13.6%	9.1%	40.9%
	Reported	Count	10	7	9	26
		Expected Count	10.6	7.7	7.7	26.0
		% of Total	22.7%	15.9%	20.5%	59.1%
Total		Count	18	13	13	44
		Expected Count	18.0	13.0	13.0	44.0
		% of Total	40.9%	29.5%	29.5%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.794[a]	2	.672
Likelihood Ratio	.811	2	.667
Linear-by-Linear Association	.508	1	.476
N of Valid Cases	44		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.32.

Reported changes in rain patterns were compared against age without the NR and >71 age groups.

Figure 3: Decreased Water Viability and Age with NR and >71

Decreased Water Viability * Age Crosstabulation

			Age					
			NR	18-35	36-53	54-70	>71	Total
Decreased Water Viability	NR	Count	17	10	6	8	4	45
		Expected Count	13.4	10.9	7.9	7.9	4.9	45.0
		% of Total	23.0%	13.5%	8.1%	10.8%	5.4%	60.8%
	Reported	Count	5	8	7	5	4	29
		Expected Count	8.6	7.1	5.1	5.1	3.1	29.0
		% of Total	6.8%	10.8%	9.5%	6.8%	5.4%	39.2%
Total		Count	22	18	13	13	8	74
		Expected Count	22.0	18.0	13.0	13.0	8.0	74.0
		% of Total	29.7%	24.3%	17.6%	17.6%	10.8%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.277[a]	4	.370
Likelihood Ratio	4.428	4	.351
Linear-by-Linear Association	1.911	1	.167
N of Valid Cases	74		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 3.14.

Decreased Water Viability (lower water quality and/or quantity) and Age are compared together across all age groups including NR and >71.

Figure 4: Decreased Water Viability and Age without NR and >71

Crosstab

			Age 18-35	Age 36-53	Age 54-70	Total
Decreased Water Viability	NR	Count	10	6	8	24
		Expected Count	9.8	7.1	7.1	24.0
		% of Total	22.7%	13.6%	18.2%	54.5%
	Reported	Count	8	7	5	20
		Expected Count	8.2	5.9	5.9	20.0
		% of Total	18.2%	15.9%	11.4%	45.5%
Total		Count	18	13	13	44
		Expected Count	18.0	13.0	13.0	44.0
		% of Total	40.9%	29.5%	29.5%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.633[a]	2	.729
Likelihood Ratio	.634	2	.728
Linear-by-Linear Association	.069	1	.794
N of Valid Cases	44		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.91.

This crosstabulation and Chi-Square test depicts the amount of reports for Decreased Water Viability across the age groups without NR and >71.

<u>Second Data Set Charts (without NR and >71):</u>

Figure 5: Changes in Rain Patterns and Age

Crosstab

			Age			Total
			18-35	36-53	54-70	
Change in Rain Patterns	NR	Count	9	6	6	21
		Expected Count	7.9	7.1	5.9	21.0
		% within Change in Rain Patterns	42.9%	28.6%	28.6%	100.0%
	Reported	Count	11	12	9	32
		Expected Count	12.1	10.9	9.1	32.0
		% within Change in Rain Patterns	34.4%	37.5%	28.1%	100.0%
Total		Count	20	18	15	53
		Expected Count	20.0	18.0	15.0	53.0
		% within Change in Rain Patterns	37.7%	34.0%	28.3%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.540[a]	2	.763
Likelihood Ratio	.543	2	.762
Linear-by-Linear Association	.123	1	.725
N of Valid Cases	53		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.94.

Reported changes in rain patterns tested against age using data from the second data set.

Figure 6: Drought and Age

Crosstab

			Age			
			18-35	36-53	54-70	Total
Drought	NR	Count	10	6	6	22
		Expected Count	8.3	7.5	6.2	22.0
		% within Drought	45.5%	27.3%	27.3%	100.0%
	Reported	Count	10	12	9	31
		Expected Count	11.7	10.5	8.8	31.0
		% within Drought	32.3%	38.7%	29.0%	100.0%
Total		Count	20	18	15	53
		Expected Count	20.0	18.0	15.0	53.0
		% within Drought	37.7%	34.0%	28.3%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.104[a]	2	.576
Likelihood Ratio	1.107	2	.575
Linear-by-Linear Association	.433	1	.510
N of Valid Cases	53		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.23.

The chart displays the second data set's reports of drought against the age of the interviewee.

Figure 7: Increase in Disease and Age

Crosstab

			Age			
			18-35	36-53	54-70	Total
Increase in Disease	NR	Count	13	10	6	29
		Expected Count	10.9	9.8	8.2	29.0
		% within Increase in Disease	44.8%	34.5%	20.7%	100.0%
	Reported	Count	7	8	9	24
		Expected Count	9.1	8.2	6.8	24.0
		% within Increase in Disease	29.2%	33.3%	37.5%	100.0%
Total		Count	20	18	15	53
		Expected Count	20.0	18.0	15.0	53.0
		% within Increase in Disease	37.7%	34.0%	28.3%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.170[a]	2	.338
Likelihood Ratio	2.182	2	.336
Linear-by-Linear Association	2.085	1	.149
N of Valid Cases	53		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.79.

Reports of diseases such as HIV/AIDS, malaria, and other respiratory diseases are compared against age.

<u>Conclusion</u>:

As can be seen by both groups of Chi-Square testing (with and without NR and >71), there is no association between age and reported changes. The Chi-Square values for Change in Rain Patterns and Age, and Decreased Water Viability and Age respectively, are 0.672 and 0.729. These two values are well above the alpha value of 0.05. This means that the null hypothesis is accepted. The data is not statistically significant for an association between the two variables and they are both independent of one another. The second data set's value for Change in Rain Patterns and Age of 0.763 supports it even further. The second data set also gave enough information for Age to be tested against reports of Drought and Increases in Disease. They also had values above 0.05 at 0.576 and 0.338, respectively. Since all of these values are above 0.05, age has minimal influence on the reports of changes and impacts of climate change in Zambia. They will report changes and impacts as they see it and will not have a bias for or against climate change. Any discrepancies between data sets would be because of chance. There has been a stigma in recent years that climate change is either a hoax or an overblown problem made up by the younger generation. On the other hand, intuition may lead one to believe that the older generation who have lived in Zambia longer would report much more drastic changes and impacts. This data depicts the absence of either biases in Zambia which has been affected greatly by climate change so far.

The two groups of Chi-Square testing indicate the same conclusion, but the group without the NR and >71 age groups result in a much stronger answer. For Change in Rain Patterns and Age, the group with NR and >71 yielded a 0.139 Chi-Square value. Decreased Water Viability and Age yielded a 0.370 Chi-Square value. These are much weaker values compared to 0.672

and 0.729. Also, the >71 age group only had 8 interviews, preventing it from meeting the Chi-Square test's conditions of having at least an expected count of 5. The NR age group detracted from the other age groups as it was unknown what age group it fit into. It was removed to deter any inaccuracy in the tests that could lead to a misleading solution. These problems highlight the limitations of the data for statistical analysis. Much higher sample sizes are recommended for future research. They would lead to more accurate conclusions without discrepancies from insufficient cell counts. Also, in the future, certain characteristics like age, occupation, and gender should be required to be answered to prevent any holes in the data. The data is more manageable that way and more essential information is given to be analyzed.

As the WWF had provided the codebook and raw data for analysis, reports on impacts of biodiversity and reported responses to the changes and impacts of climate change would naturally be examined too. However, the original data set provided did not have sufficient evidence to delve into those impacts on biodiversity or reported responses for proper analysis. The second data set had more descriptive data in regards to biodiversity, but it would not influence the counts enough to meet Pearson Chi-Square testing. It would not be implausible, however, to believe that age and reports on biodiversity or responses have no relation too. Since evidence demonstrates the lack of association between age and reported changes and impacts, a lack of association between age and reported impacts on biodiversity would make sense. The same goes for reported responses too.

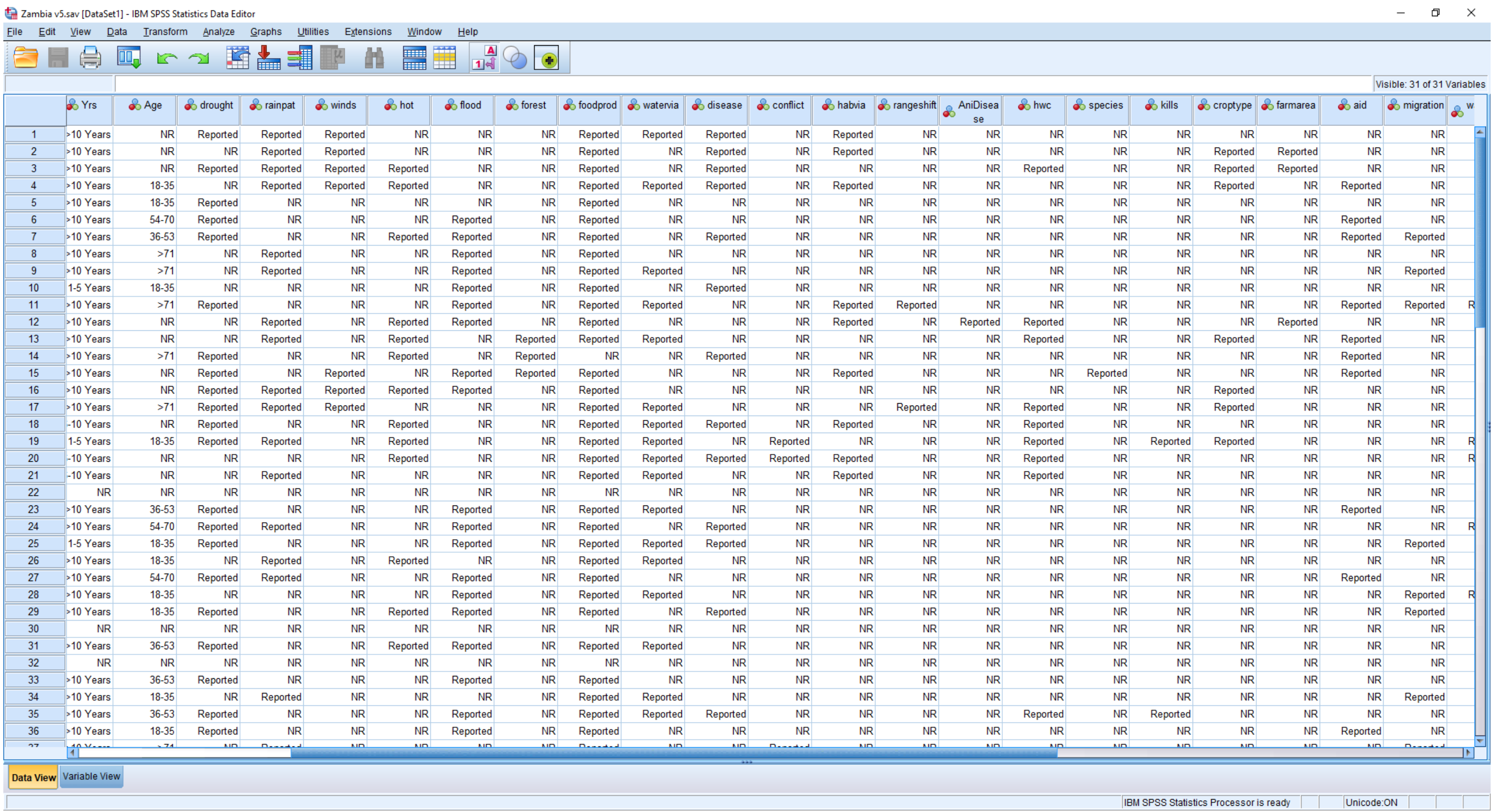
In the future, research could be done on many of the variables. For example, the Increase in Disease variable includes diseases like HIV/AIDS, malaria, and diarrhea. Some of the interviewees attributed malaria to the wind and the HIV due to increased prostitution. To think that an increase in HIV/AIDS is a result of climate change initially seems far-fetched. But the resulting poverty of farmers and their families could potentially push women into sex work out of necessity. Further research into previously unforeseen consequences of climate change could be a good topic.

This independent research report has taken me through experiences I would not have had in a standard class. In a standard statistics class, I would be working with classic textbook data that can easily be analyzed using tests. They could be solved using the same steps that any other problem would need. The data from the WWF was no classic textbook data. I had to sift through the data, code it, recode it, and work with the SPSS software to get results I would have had in 15 minutes for a textbook data problem. This has given me so much more appreciation for those who do research and has exposed me to the real practices done during research. It has taught me how to push through the tedious parts and be able to use collected data to make a meaningful conclusion. I honestly did not know what to expect at first, but with time and effort, I was able to work with the data and manipulate it into a way that was usable and ready for testing. I have learned more through these experiences in skills and practices that are definitely not included in a standard statistics class.

Appendix

The appendix provides insight on how the data was handled and analyzed with Chi Square testing. Screenshots of IBM SPSS software are displayed below:

a. SPSS- Data View



Zambia v5.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Graphs Utilities Extensions Window Help

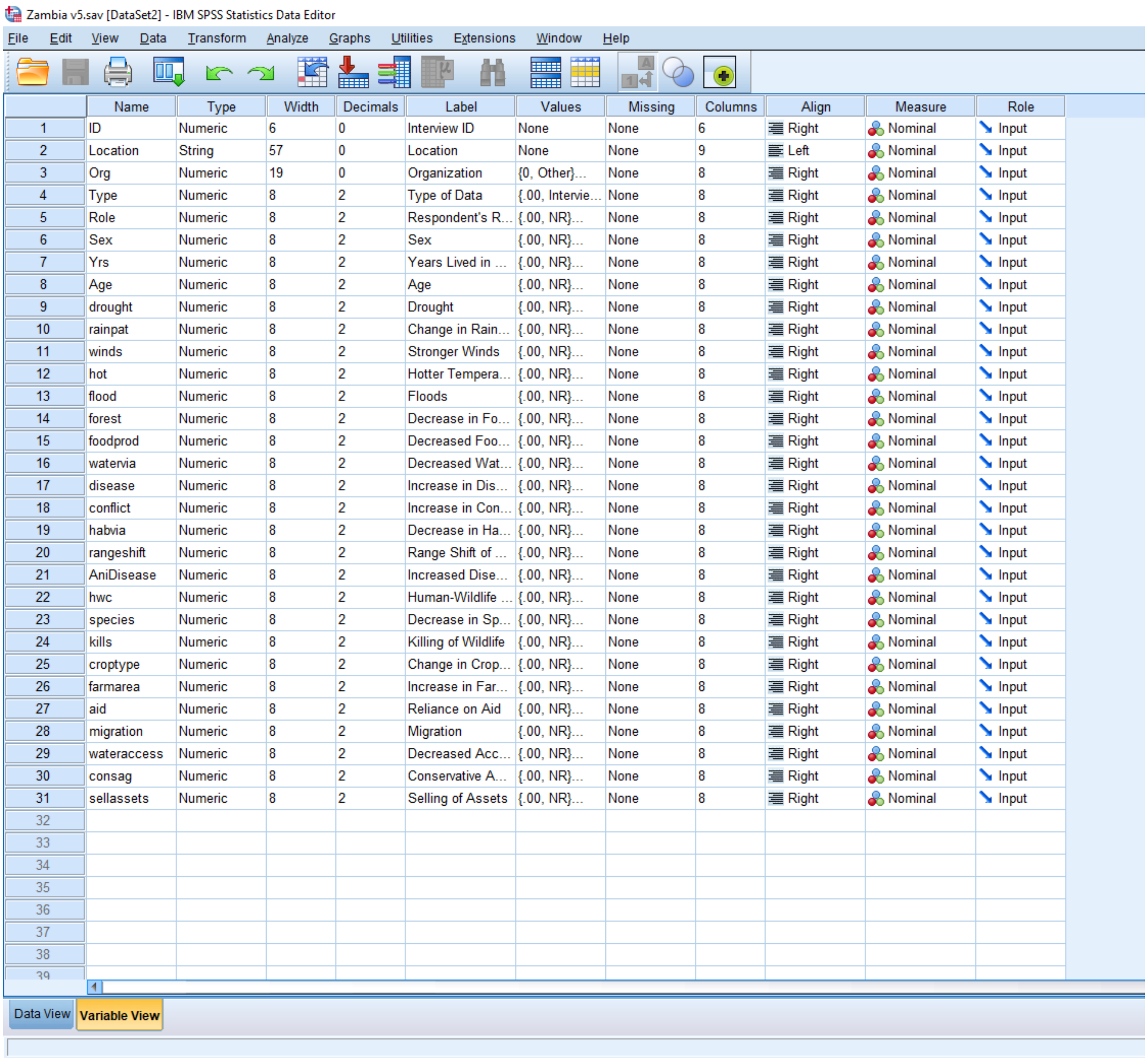
Visible: 31 of 31 Variables

	Yrs	Age	drought	rainpat	winds	hot	flood	forest	foodprod	watervia	disease	conflict	habvia	rangeshift	AniDisease	hwc	species	kills	croptype	farmarea	aid	migration	w
1	>10 Years	NR	Reported	Reported	Reported	NR	NR	NR	Reported	Reported	Reported	NR	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	
2	>10 Years	NR	NR	Reported	Reported	NR	NR	NR	Reported	NR	Reported	NR	Reported	NR	NR	NR	NR	NR	Reported	Reported	NR	NR	
3	>10 Years	NR	Reported	Reported	Reported	Reported	NR	NR	Reported	NR	Reported	NR	NR	NR	NR	Reported	NR	NR	Reported	Reported	NR	NR	
4	>10 Years	18-35	NR	Reported	Reported	Reported	NR	NR	Reported	Reported	Reported	NR	Reported	NR	NR	NR	NR	NR	Reported	NR	Reported	NR	
5	>10 Years	18-35	Reported	NR	NR	NR	NR	NR	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
6	>10 Years	54-70	Reported	NR	NR	NR	Reported	NR	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	Reported	NR	
7	>10 Years	36-53	Reported	NR	NR	Reported	Reported	NR	Reported	NR	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	Reported	Reported	
8	>10 Years	>71	NR	Reported	NR	NR	Reported	NR	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
9	>10 Years	>71	NR	Reported	NR	NR	Reported	NR	Reported	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	Reported	
10	1-5 Years	18-35	NR	NR	NR	NR	Reported	NR	Reported	NR	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
11	>10 Years	>71	Reported	NR	NR	NR	Reported	NR	Reported	Reported	NR	NR	Reported	Reported	NR	NR	NR	NR	NR	NR	Reported	Reported	R
12	>10 Years	NR	NR	Reported	NR	Reported	Reported	NR	Reported	NR	NR	NR	Reported	NR	Reported	Reported	NR	NR	NR	Reported	NR	NR	
13	>10 Years	NR	NR	Reported	NR	Reported	NR	Reported	Reported	Reported	NR	NR	NR	NR	NR	Reported	NR	NR	Reported	NR	Reported	NR	
14	>10 Years	>71	Reported	NR	NR	Reported	NR	Reported	NR	NR	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	Reported	NR	
15	>10 Years	NR	Reported	NR	Reported	NR	Reported	Reported	Reported	NR	NR	NR	Reported	NR	NR	NR	Reported	NR	NR	NR	Reported	NR	
16	>10 Years	NR	Reported	Reported	Reported	Reported	Reported	NR	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	Reported	NR	NR	NR	
17	>10 Years	>71	Reported	Reported	Reported	NR	NR	NR	Reported	Reported	NR	NR	NR	Reported	NR	Reported	NR	NR	Reported	NR	NR	NR	
18	-10 Years	NR	Reported	NR	NR	Reported	NR	NR	Reported	Reported	Reported	NR	Reported	NR	NR	Reported	NR	NR	NR	NR	NR	NR	
19	1-5 Years	18-35	Reported	Reported	NR	Reported	NR	NR	Reported	Reported	NR	Reported	NR	NR	NR	Reported	NR	Reported	Reported	NR	NR	NR	R
20	-10 Years	NR	NR	NR	NR	Reported	NR	NR	Reported	Reported	Reported	Reported	Reported	NR	NR	Reported	NR	NR	NR	NR	NR	NR	R
21	-10 Years	NR	NR	Reported	NR	NR	NR	NR	Reported	Reported	NR	NR	Reported	NR	NR	Reported	NR	NR	NR	NR	NR	NR	
22	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
23	>10 Years	36-53	Reported	NR	NR	NR	Reported	NR	Reported	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	Reported	NR	
24	>10 Years	54-70	Reported	Reported	NR	NR	Reported	NR	Reported	NR	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	R
25	1-5 Years	18-35	Reported	NR	NR	NR	Reported	NR	Reported	Reported	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	Reported	
26	>10 Years	18-35	NR	Reported	NR	Reported	NR	NR	Reported	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
27	>10 Years	54-70	Reported	Reported	NR	NR	Reported	NR	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	Reported	NR	
28	>10 Years	18-35	NR	NR	NR	NR	Reported	NR	Reported	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	Reported	R
29	>10 Years	18-35	Reported	NR	NR	Reported	Reported	NR	Reported	NR	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	Reported	
30	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
31	>10 Years	36-53	Reported	NR	NR	Reported	Reported	NR	Reported	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
32	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
33	>10 Years	36-53	Reported	NR	NR	NR	Reported	NR	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
34	>10 Years	18-35	NR	Reported	NR	NR	NR	NR	Reported	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	Reported	
35	>10 Years	36-53	Reported	NR	NR	NR	Reported	NR	Reported	Reported	Reported	NR	NR	NR	NR	Reported	NR	Reported	NR	NR	NR	NR	
36	>10 Years	18-35	Reported	NR	NR	NR	Reported	NR	Reported	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	Reported	NR	

Data View Variable View

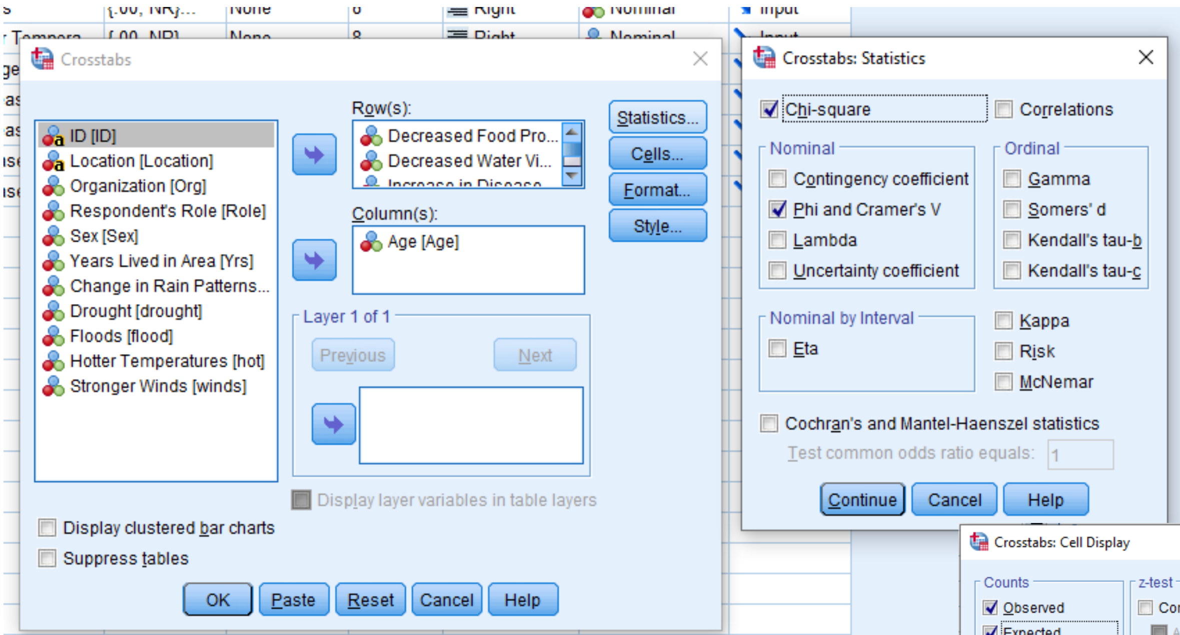
IBM SPSS Statistics Processor is ready Unicode:ON

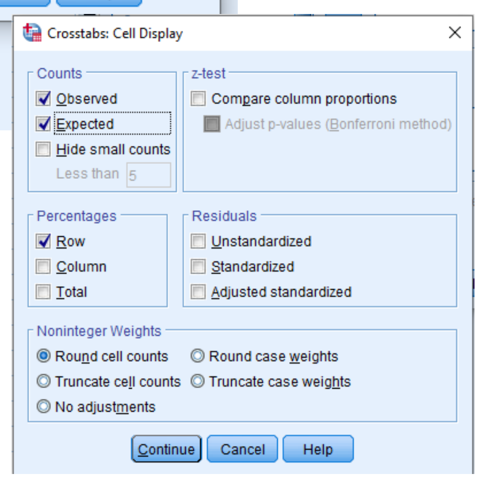
b. SPSS- Variable View



	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	ID	Numeric	6	0	Interview ID	None	None	6	Right	Nominal	Input
2	Location	String	57	0	Location	None	None	9	Left	Nominal	Input
3	Org	Numeric	19	0	Organization	{0, Other}...	None	8	Right	Nominal	Input
4	Type	Numeric	8	2	Type of Data	{.00, Intervie...	None	8	Right	Nominal	Input
5	Role	Numeric	8	2	Respondent's R...	{.00, NR}...	None	8	Right	Nominal	Input
6	Sex	Numeric	8	2	Sex	{.00, NR}...	None	8	Right	Nominal	Input
7	Yrs	Numeric	8	2	Years Lived in ...	{.00, NR}...	None	8	Right	Nominal	Input
8	Age	Numeric	8	2	Age	{.00, NR}...	None	8	Right	Nominal	Input
9	drought	Numeric	8	2	Drought	{.00, NR}...	None	8	Right	Nominal	Input
10	rainpat	Numeric	8	2	Change in Rain...	{.00, NR}...	None	8	Right	Nominal	Input
11	winds	Numeric	8	2	Stronger Winds	{.00, NR}...	None	8	Right	Nominal	Input
12	hot	Numeric	8	2	Hotter Tempera...	{.00, NR}...	None	8	Right	Nominal	Input
13	flood	Numeric	8	2	Floods	{.00, NR}...	None	8	Right	Nominal	Input
14	forest	Numeric	8	2	Decrease in Fo...	{.00, NR}...	None	8	Right	Nominal	Input
15	foodprod	Numeric	8	2	Decreased Foo...	{.00, NR}...	None	8	Right	Nominal	Input
16	watervia	Numeric	8	2	Decreased Wat...	{.00, NR}...	None	8	Right	Nominal	Input
17	disease	Numeric	8	2	Increase in Dis...	{.00, NR}...	None	8	Right	Nominal	Input
18	conflict	Numeric	8	2	Increase in Con...	{.00, NR}...	None	8	Right	Nominal	Input
19	habvia	Numeric	8	2	Decrease in Ha...	{.00, NR}...	None	8	Right	Nominal	Input
20	rangeshift	Numeric	8	2	Range Shift of ...	{.00, NR}...	None	8	Right	Nominal	Input
21	AniDisease	Numeric	8	2	Increased Dise...	{.00, NR}...	None	8	Right	Nominal	Input
22	hwc	Numeric	8	2	Human-Wildlife ...	{.00, NR}...	None	8	Right	Nominal	Input
23	species	Numeric	8	2	Decrease in Sp...	{.00, NR}...	None	8	Right	Nominal	Input
24	kills	Numeric	8	2	Killing of Wildlife	{.00, NR}...	None	8	Right	Nominal	Input
25	croptype	Numeric	8	2	Change in Crop...	{.00, NR}...	None	8	Right	Nominal	Input
26	farmarea	Numeric	8	2	Increase in Far...	{.00, NR}...	None	8	Right	Nominal	Input
27	aid	Numeric	8	2	Reliance on Aid	{.00, NR}...	None	8	Right	Nominal	Input
28	migration	Numeric	8	2	Migration	{.00, NR}...	None	8	Right	Nominal	Input
29	wateraccess	Numeric	8	2	Decreased Acc...	{.00, NR}...	None	8	Right	Nominal	Input
30	consag	Numeric	8	2	Conservative A...	{.00, NR}...	None	8	Right	Nominal	Input
31	sellassets	Numeric	8	2	Selling of Assets	{.00, NR}...	None	8	Right	Nominal	Input
32											
33											
34											
35											
36											
37											
38											
39											

c. SPSS- Configuration of Crosstabulation- percentages are optional





d. Glossary of Codes

Reported Changes:

drought- increase in droughts

rainpat- changes in rain patterns

winds- increase in presence and strength of winds

hot- increased occurrences of hot spells

flood- increased rainfall to the point of flooding

forest- decrease in forest area

Reported Impacts (as provided by the WWF):

yield – decline or loss of crop yields

pests – new or increased numbers of pests

livestock health– includes death of livestock, disease, weight loss and decline in production of milk and # of offspring

soil – declining soil quality

water quant – decreased availability of freshwater

water qual – decreased quality or contamination of freshwater

firewood - scarcity or loss of firewood access

wild food -loss or reduction of wild plants/animals used for consumption

wild med – Loss or reduction of wild plants/animals used for medicinal purposes

less fish –includes instances where fish swim to lower depths/further out from shore to escape heat, making them more difficult to catch

pasture – scarcity of pasture for livestock grazing

conflict - use when there are disputes over resources made more scarce by changing climate (most likely water scarcity due to drought). Can also include theft of food due to low yields).

education - this is somewhat of an impact and a response, but seems more appropriate in the impacts section. When families discontinue sending children to school either because they can’t afford school fees, or need additional help maintaining a livelihood.

disease – increased diseases in humans

property damage – damage to property, equipment, infrastructure, etc. caused by floods/storms for example

problem wildlife – use this code if changes in weather/climate are causing wildlife to increasingly enter farms/settlements to search for water, prey on livestock, or eat/damage crops

hunger- if hunger, famine or poor nutrition are mentioned as an impact.

Reported Impacts on Biodiversity (WWF):

hwc – human wildlife conflict. Any interaction between humans and wildlife that results in negative impacts on human social, economic or cultural life, on the conservation of wildlife populations, or on the environment.

habitat loss – caused by instances of deforestation and other land clearing/conversion activities

habitat degradation – caused by human encroachment, increased human activity and extraction of resources in natural areas, including reserves and parks

fragmentation – (of habitat) includes instances where movement is restricted. For example, with the Kenya report, fencing was impacting migration routes and generally preventing wildlife mobility. Construction of dams and roads can also be an example of this.

kills- death of animals due to hunting/poaching, or defensive or retaliatory killing of problem wildlife

overuse –example of this would be intensive fishing or overexploitation of a specific type of plant or animal.

range shift - if wildlife move into an area they previously did not occupy or out of an area they previously occupied (does not include more frequent intrusion into human settlements). Ex: bird species moves to higher elevation

disease – increase in or emergence of new diseases affecting wild species.

mort.drought -mortality/decline in abundance caused by drought

mort.heat -mortality/decline in abundance caused by heat.

mort.flood -mortality/decline in abundance caused by floods.

phen.change - use when an respondent notes a change in when a certain life cycle event takes place. Ex: “Wild flowers bloomed later in the year than usual.”

invasive - if respondent notes an increase in plant/animal species that

species decline – if people note a general decline in population or disappearance of a species in the area but it’s not clear what the cause is

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