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Farmers Awareness, Knowledge and Risk Perception of Climate Change in Homa Bay County, Kenya

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Abstract:

Climate change has emerged as a complex challenge in the Lake Victoria Basin. This is due to the basin's geographical and climatic conditions, its high dependence on natural resources, limited capacity to adapt to a rapidly changing climate and frequent natural disasters. Limited research has been undertaken on the relation between people's perceptions of climate variability and climate change and their actual and intended practices. This study aimed at finding out Farmers awareness, knowledge and risk perception of climate change in Homa Bay County with a view to guide policy makers in decision making and management of climate change impacts. A quantitative household based cross-sectional survey questionnaire was used to collect information from 384 farmers drawn from the eight sub-counties of Homa Bay County. Target respondents comprised of men and women aged fifteen to seventy-five years old. This study employed multi-stage sampling technique to select each Primary Sampling Unit (PSU). Qualitative data was collected through in-depth interviews conducted to fifteen key informants from government agencies and five from non-state actors and four Focus Group Discussions (FGDs). The study found out that all respondents indicated that they had experienced at least one extreme weather event a year prior to the interview with over half of the respondents (78%) having experienced drought while 74% had experienced heavy rains. About a third of the residents (36%) never received information about extreme events that affected them while about two thirds (62%) of those who received information did so during and after the extreme weather event. The study also established that other issues including HIV and AIDS (64%), education (59%), health 54%, development (52%) corruption (39%) and unemployment (31%) ranked high and were therefore perceived to require immediate attention as opposed to climate change despite its far-reaching effects among the residents. The study recommended that deliberate effort be made to raise awareness on climate change adaptation strategies to enable residents understand the causes and consequences of climate change, enhance preparedness towards the impacts of climate change and adopt sustainable lifestyles.

Keywords: Drought, seasonal shifts, livelihoods, weather information, human actions

1. Introduction

There is a worldwide consensus that global warming is a real, rapidly advancing and widespread threat facing humanity in the 21st century (IPCC, 2007a). The IPCC projects an acceleration and deepening of the impacts of climate change globally with potentially serious implications for the cultures, subsistence economies, health and future of indigenous communities (IPCC, 2007b). Climate change is therefore one of the most urgent environmental issues facing our planet and its inhabitants.

Climate Change has emerged as a major complex challenge in the Lake Victoria Basin region of Kenya, given the basin's geographical and climatic conditions including the high dependence on natural resources and limited capacity to adapt to a rapidly changing climate and frequent natural disasters. Homa Bay County is equally vulnerable to the climatic variability and climate change which are likely to increase the frequency and magnitude of some natural disasters and extreme weather events notably, drought, floods and high food prices which continue to affect the region's most vulnerable groups (GOK, 2010). According to the Homa Bay County Integrated Development Plan (CIDP) 2013-2017, climate change has become too obvious in the County, with the ever-declining stock of fish in Lake Victoria, drying up of water ways and worsening weather conditions, the local populations have not been able to sustain food production at a level commensurate with growth in the population.

These extreme events could be worsened by existing social and economic challenges in the County especially the burden of disease because the County has one of the worst health indicators countrywide. It is noted that without appropriate intervention measures in place, many residents will lose their livelihoods especially in fishing, agriculture, tourism and forestry where it is the major source of employment (Homa Bay CIDP, 2013 - 2017). Given the Lake Victoria Basin's geographical and climatic conditions, high dependence on natural resources, limited capacity to adapt to a rapidly changing climate and frequent natural disasters, climate change has emerged to be a major challenge (World Bank, 2010). According to Kabir *et al.* (2016) knowledge of climate change is necessary in empowering people to adapt appropriately and for communities and households to adjust to the ongoing and future climate change.

However, lack of such knowledge is likely to lead to divergence between actions prescribed by policy-makers and those taken by the public to mitigate against the effects of climate change; suggesting an informational gap on the most effective actions to be taken (Whitemarsh, 2005). Moreover, there is limited research on the relationship between farmer's perceptions of climate variability and climate change and their actual and intended practices, particularly the agriculturally dependent communities as well as the role of experiential influences on perceptions of global risks (Milne *et al.*, 2008; Whitemarsh, 2005).

The challenge therefore is to develop strategies, which would promote sustainable development. It is worth noting that without appropriate planning and intervention measures in place, many residents are likely to lose their dependable livelihoods which employs majority of her people. This study therefore aimed at establishing the existing knowledge on climate change among the farmers and determining risk perceptions towards climate change by farmers in order to respond to climate change impacts in Homa Bay County, Kenya.

2. Materials and Methods

2.1. Study Area

Homa Bay County lies between latitude 0°15' South and 0° 52' South, and between longitudes 34° East and 35° East (Figure 1). The County covers an area of approximately 4,267.1 Km² inclusive of the water surface. The county is located in South Western Kenya along Lake Victoria where it borders Kisumu and Siaya Counties to the North, Kisii and Nyamira Counties to the East, Migori County to the South and Lake Victoria and the Republic of Uganda to the West (CIDP, 2013 - 2017). This study was carried out in all the eight sub-counties of Homa Bay County namely; Ndhwa, Homa Bay Town, Mbita, Suba, Karachuonyo, Rangwe, Kasipul and Kabondo Kasipul; 19 divisions, 116 locations and 226 sub locations. Based on projections from the 2009 Kenya Population and Housing Census, Homa Bay County had an estimated population of 1,038,858 persons consisting of 498,472 males and 540,386 females by the end of the year 2012. The County's Poverty rate for 2009 stood at 49.6% (Wiesmann *et al.*, 2014). The main economic activities in the County include fishing and fish trade, fish processing, Agricultural products: Maize, Millet, Cassava, Sunflower and sand harvesting (KNBS, 2013).

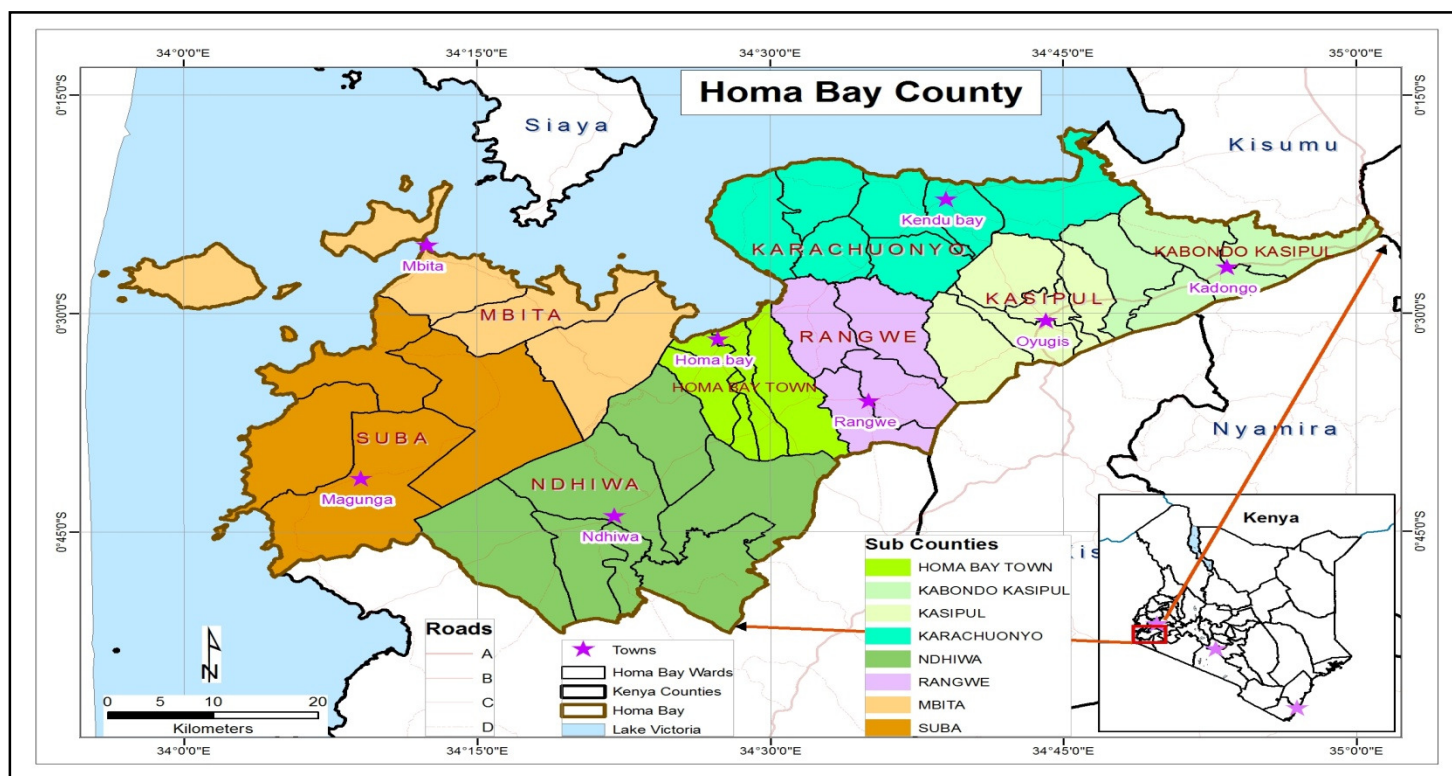


Figure 1: Map of Homa Bay County
Source: Homa Bay CIDP, 2013 - 2017

2.2. Research Design and Sampling Strategy

This study adopted a cross-sectional survey and evaluation research designs. The information required for this study was both qualitative and quantitative and was gathered from male and female farmers in Homa Bay County. The questionnaire was first piloted on a small sample of the population in an area with similar characteristics but not within the study area, in order to establish the reliability of the instrument. Questionnaires were used to gather information about knowledge, farmers public risk perceptions and responses to impacts of climate change in the study area. The respondents were requested and assisted to fill the questionnaire. Demographic characteristics, including gender, age, highest education qualification and income were studied. A face to face interview schedule on the subject of knowledge, public risk perceptions and responses to impacts of climate change were conducted with some of the participants sampled for the study. The interviews were semi-structured, allowing participants to freely express their experiences and attitudes in their own language. Focus group discussions were held in four different areas within the county. The main areas tackled included understanding, perception of causes and consequences, sources of information, adaptation strategies and barriers to taking action on climate change effects.

A sample size of 384 farmers was used in the study. These farmers were selected randomly. Quantitative data analyses were done to establish the means, modes, standard deviations, variance, percentages, and frequencies while inferential analyses were by use of chi-square test and Spearman rank order correlation analysis. Chi-square tests were employed to test levels of association between non-parametric nominal variables. The analysis of the sample was done according to the total sample, major geographic regions, gender, age brackets, level of education, poverty index and occupation categories. For qualitative data, a coding frame was developed through a consultative process with the research assistants based on the research questions, and was further extended through open coding of a selection of the transects. Once the coding process was completed for all transcripts, the researcher identified which themes were most prominent across the transects and selected and grouped together all the quotations relating to each research question, so that they could be compared and analyzed together.

3. Results and Discussions

3.1. Socio-demographic Characteristics of the Respondents

Out of the farmers interviewed 246 (64%) were male while 138 (36%) were female. On land ownership 69% owned land while 31% did not own the land which they were cultivating during the period of study. The results showed that 22.4% had attained primary level of education, 36.7% secondary, and 33.8% tertiary while 7% had no formal schooling respectively.

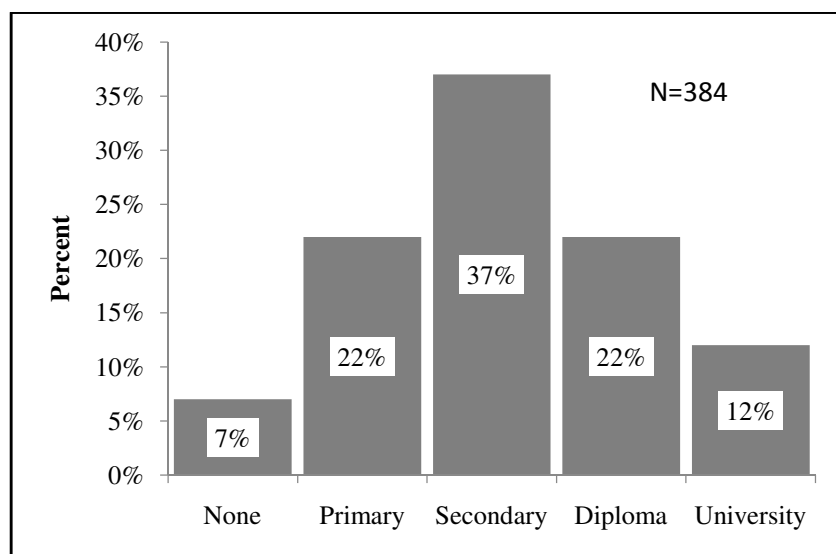


Figure 2: Level of Education for household Heads in Homa Bay County, Kenya

3.2. Existing Knowledge on Climate Change among Farmers in Homa Bay County, Kenya

3.2.1. Awareness and Knowledge of Climate Change in Homa Bay County

In order to determine the awareness levels the respondents (farmers) were asked if they had heard the term climate change on which majority of the respondents 158 (97.5%) indicated that they had heard the term climate change implying very high awareness levels. Even with these high levels, variation in awareness and knowledge of climate change were still abound amongst different sections of the respondents. About nine out of ten of the respondents aged between 20 and 35 were aware of climate change. This high awareness is attributed to the awareness creation for youth who have various ways of accessing information. The levels of awareness decrease as one tends towards the higher ages with only about 50% of those aged 65 and above being aware of climate change. This trend can be attributed to the limited sources of information available to this age group. The level of awareness was also found to be significantly related to the levels of education and income of the respondent both with p-values of ($P < 0.000$). It can be deduced that the higher the

level of education and income of the respondent, the higher the level of awareness. This could be due to the fact those with higher levels of education also have high levels of interaction and therefore are in a better position to have heard of climate change. Higher levels of education also have relationship(s) with higher levels of income and therefore can afford the various channels of communication from where they get information on climate change.

To establish how they got to know the term climate change, the respondents were further probed on their sources of information in which about nine out of ten people had heard of climate change through radio 137 (85%), TV 131 (34%), from newspapers and magazines 23% and weather reports as the main sources of information on extreme weather events (Figure 3).

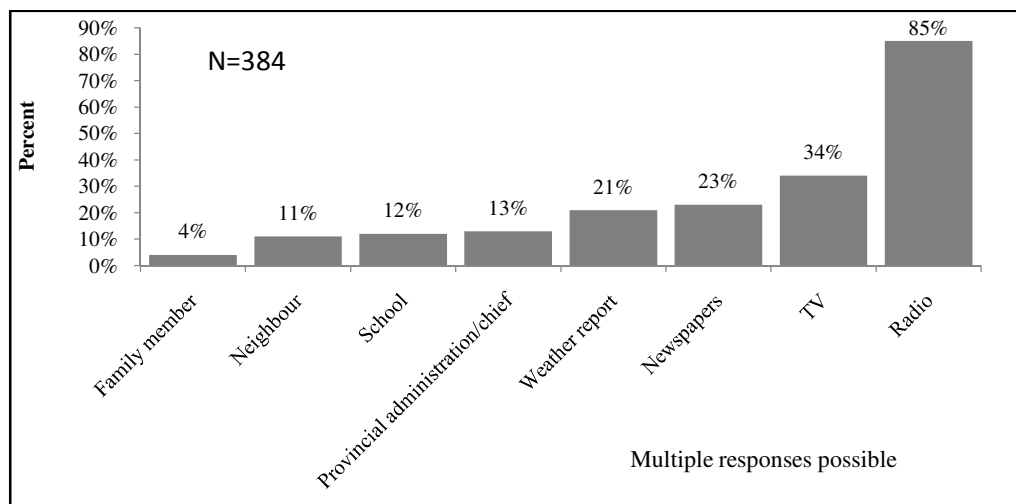


Figure 3: Sources of information on extreme weather events in Homa Bay County

3.2.2. Beliefs about the Causes of Climate Change in Homa Bay County

About nine in ten respondents agree that climate change in Kenya is attributed to deforestation locally, 304 (79%) to human activities, 246 (64%) cutting trees in other countries, 234 (61%) to industrial pollution, while 24% and 19% mentioning use of fossil fuels and emissions from greenhouse gases respectively. Another 8% and 3% of the respondents attributed the causes to punishment from God and generally being consequences of normal actions of God respectively. Further analysis indicated that the respondents were not aware of some of the correct causes of changes in weather patterns for example 312 (81.3%) and 291 (75.8) were not aware that greenhouse gas emissions and use of fossil fuels respectively as causes of changes in weather.

A fundamental element in the way climate risks are interpreted is knowledge of the causes of the risk. Some literature supports a link between having knowledge of the causes of climate change and behavioral intentions (O'Connor *et al.*, 1999). The attribution of causes to the risk is relevant because it can influence the ways in which people act in response. Based on causes, people also make judgments about who is responsible for addressing a problem and this can generate more motivation to take action. A study on Climate change knowledge, perception and concern among 104 corporate elites in Lagos found out that there is acceptance by most people that climate change is a human-caused problem and there was a general awareness of the main causes (BBC, 2004). When prompted, most people could correctly identify destruction of forests, carbon dioxide emissions, emissions from transport, and emissions from power stations as major contributors to climate change (Whitmarsh, 2005).

When the respondents were further asked whether their individual actions contribute to climate change, 32 (20%) responded to the contrary while 130 (80%) responded positively that their individual actions contribute to climate change. Further probing with those who said that their actions had contributed to climate change on how their actions contribute to causing climate change, majority 293 (76.3%) said through cutting wood for cooking followed by 215 (56%) indicated using chemicals, 161 (42%) through burning waste, 130 (34%) using machines, using vehicles 96 (25%) while the least was cooking which recorded 51 (13.3%) as in Figure 4. This corresponds to the fact that 97.5% of households in Homa Bay County use solid bio-fuels for cooking and is the thirteenth ranked County while it takes number one at 94.6% in usage of paraffin countrywide (Wiesman, 2014).

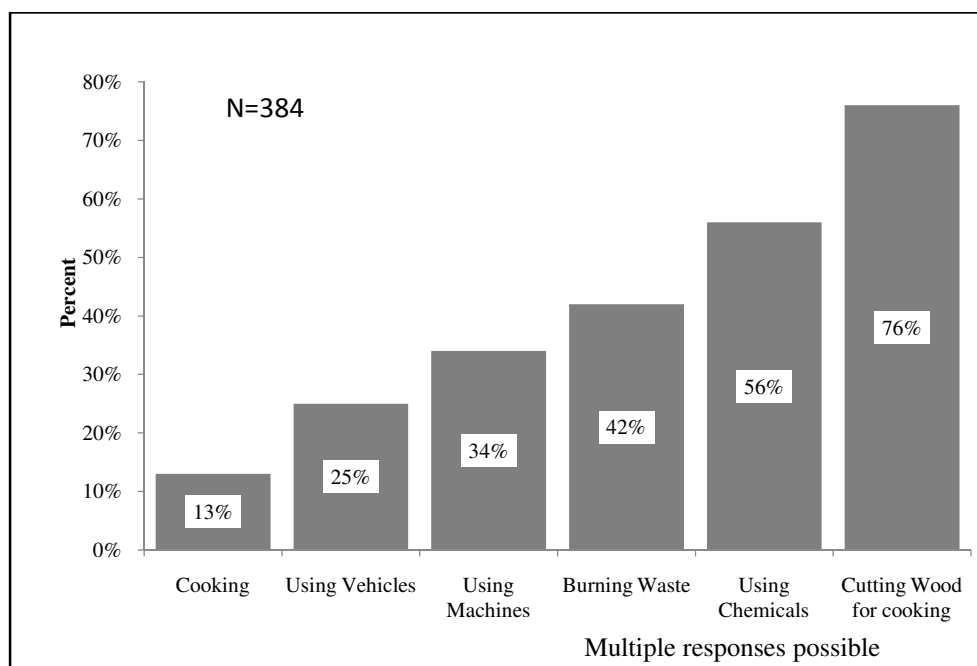


Figure 4: Human actions contributing to climate change in Homa Bay County

Results from most key informants indicated that climate change in Homa Bay County is caused through among others, excessive cutting of trees for timber, use of inefficient cooking stoves and poor farming technologies. Others linked the causes to siltation of the water bodies and carbon emission from incomplete combustion from motor vehicles and homes using kerosene and its location along the equator. One of the respondents said that, climate change in Homa Bay is a result of the poor approaches to improving our environment. This is because the initiative of one tree cut being replaced by five trees ratio system is not in place totally Homa Bay is a good water catchment area but the environment has completely been abandoned.

When key informants were asked whether Kenyans have contributed to climate change and if so how, majority of the interviewees said Kenyans in general have contributed to climate change through excessive tree cutting, using ineffective cooking methods that consume a lot of wood, slow adoption to mitigation and adaptation technologies and one respondent reported that the kind of destruction of forests and water towers experienced within the country is quite alarming. Studies have also indicated that not only are the impacts of climate change perceived as distant and irrelevant but even the causes are also divorced from personal actions and there is some doubt about whether climate change is caused by human activities (Lorraine, 2005). DEFRA (2002) found out that 13% of the English public do not believe that climate change is as a result of human activities, and a further 16% say they do not know (Bibbings, 2004a). General lack of certainty about the causes of climate change is also reflected in the difficulty people have in connecting what is happening locally with the global level, thereby understanding how the daily choices in their own lives might be linked to climate change (Lorraine, 2005).

3.3. Effects of Climate Change in Homa Bay County

Out of the respondents who had heard of climate change, 92% said that climate change is already affecting Homa Bay County as shown in Figure 5. The analysis of chi-square test revealed that there was a significant relationship ($p < 0.000$) between climate change already affecting Homa Bay and the age of the respondents. All respondents aged between 25 to 29 and 45 to 49 indicated that Homa Bay is already feeling the effects of climate change. These are people in the productive age and are therefore affected in one way or the other by the changes in climate being experienced currently. All the employed respondents indicated that climate change is already affecting Homa Bay County and this could be attributed to their level on interaction and access to information. A study on Climate change knowledge, perception and concern among 104 corporate elites in Lagos found that majority of the respondents (89%) believed that climate change was really happening with only 9% indicating not being sure whether climate change is happening or not (Adeniyi, 2011).

Levels of knowledge also vary significantly within this wide spread awareness, for instance more than 99% of the surveyed population in the UK had heard of climate change, 85% said they knew only a little or a fair amount, with only 10% saying they knew a lot about climate change (Whitmarsh *et al.*, 2011). A similar research conducted among Australian and British respondents found out that 73.9% of Australian respondents and 78.3% of British respondents indicated that they personally thought the world's climate was changing while 7.8% and 6.4% Australian and British respondents indicated they did not know whether climate was changing or not (Reser, *et al.*, 2012).

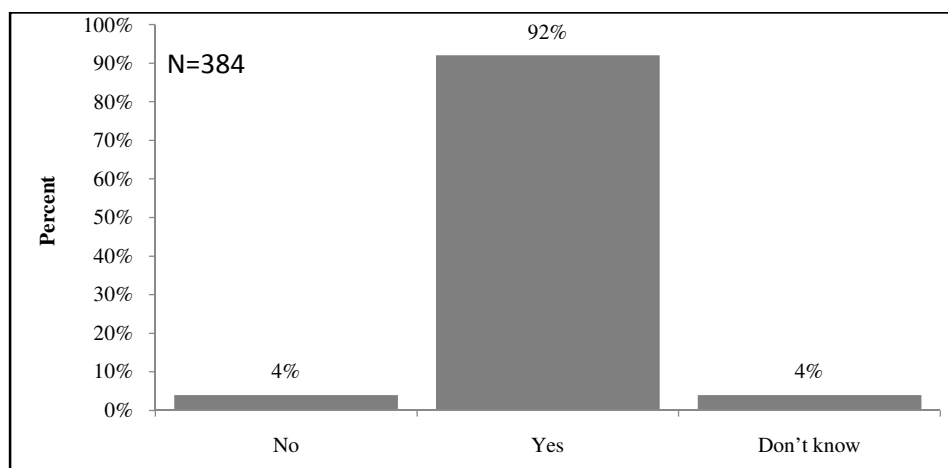


Figure 5: Views on Climate change in Homa Bay County

When the respondents were asked if they thought climate change will affect Homa Bay County in the future, 72% of those who had heard of the term climate change responded affirmatively. The results also reveal that quite a number of Homa Bay residents (28%), fall in the category of those who do not know whether Homa Bay people will feel the impacts of climate change in future. This means that they are uncertain whether the changes they have experienced in their everyday lives will affect them in the future implying that the respondents do not understand that climate change refers to a long-term phenomenon.

When asked about the effects of climate changes, the respondents who had heard of climate change and thought that Homa Bay is currently experiencing or will experience effects of climate change, more than half the respondents mentioned poverty (82%), drought (78%), increase in diseases (76%) decreased agricultural production (69%), forest shortage (66%), increase in temperature (65%), irregular rainfall (63%), water shortages (62%) and less money (51%). About five out of ten people mentioned health effects (48%), sickness and death of animals (48%) increasing natural disasters (44%) and becoming harder to farm (43%).

The respondents were asked what consequences the changes in weather have on their lives and that of their families' majority of the respondents indicated that the changes had made it hard for them to cultivate (70.8%), increased the disease burden (70.6%), led to reduction in agricultural production (70%), reduced water availability (65%), and made it difficult to work (50%). On the effects of climate change, majority of the key informants indicated that rainfall patterns have changed; drought has become more prevalent and prolonged with floods too being very severe and intensive. Some of the farmers revealed that when they were young, their parents could easily predict the onset of rains but currently this has become very difficult. The study established that there are shifts in seasons and the indigenous indicators of rainfall onset have become uncertain. It is evident that climate change has increased the occurrences of prolonged droughts leading to drying of rivers and severe crop failure that results to hunger and malnutrition.

Non-state actors have pointed out that effects on livelihoods especially for those that depend primarily on natural weather conditions are affected in terms food insecurity, poor health and poverty at household level due to decreased agricultural productivity and also challenges to social and economic development as key drivers of the economy for instance agriculture, energy, livestock, tourism, forestry and fisheries are climate sensitive. Many residents of Homa Bay indicate that many diseases including diarrhea, cholera and malaria have increased and will continue to increase in future. This situation is expected to worsen in areas clean drinking water and good sanitary conditions.

3.4. Perception about Changing Weather and Environment in Homa Bay County

Majority of the respondents indicated that there is a general change in weather and the environmental conditions that have led to a shift in seasons where rains start and end at different times than they used to (93%), rains have become less predictable (91%) and less in quantity (82%) and that droughts have become more frequent (78%). All the respondents indicated that they have experienced at least one extreme weather event in their area in the year prior to the interview. Further analysis showed that over half of the respondents had experienced drought (78%), heavy rains (74%), pests (71%) and very high temperatures (51%) respectively. About three out of ten (28%) had experienced flooding with (21%), (10%), (10%), (7%), and (5%) experiencing cold weather, wild fires, thunder, storms, and landslides respectively. When asked about the events with the most serious impact on their lives, about seven out of ten respondents 67% indicated drought followed by pests on agricultural production 17%, very heavy rains 8% and floods 5%.

Weather Condition	Number	Percentage	Rank
Seasons start and end at different times than they used to before (Unpredictable)	150	92.6	1
Rains have become less predictable	147	90.7	2
Rains have become less	133	82.1	3
Droughts become more frequent	126	77.8	4
Droughts more intense	99	61.1	5
Rains less intense	89	54.9	6

Table 1: Weather characteristics in Homa Bay County

Generally, therefore, the farmers have experienced changes in weather and the environment by indicating that extreme weather events have become more frequent and intense than they used to be in the past. Out of all the 162 respondents who reported experiencing at least one extreme event in the previous year and also received information, 36 (22%) received information about the event before, 88 (54%) during the event, 12 (8%) received information after the event had occurred while 26 (16%) were not aware when they received the information. About two thirds of the farmers received information on or after the extreme event which has negative impacts on the already worsening food insecurity in the County. Farmers need timely information to be able to plan their planting calendar and also prepare for the adverse events.

Chi square test revealed that there existed a strong relationship between receiving information about the extreme events and Household heads ($p < 0.000$); level of education ($p < 0.003$) and occupation ($p < 0.000$). Those with higher educational levels and the various occupations were more likely to have received information about the extreme events and this could be attributed to their access to various ways of receiving information including TV, radio, newspapers among others and also due to their concern for the environment. Most farmers were likely to have received information due to the prospects of planning their farming activities.

It is always important to be able to understand the ways in which peoples understanding of the changing weather and environment relates to their key concerns. The respondents were asked to rate issues of high priority (Table 1). High on the priority list of concerns to Homa Bay County farmers are HIV and AIDS (70%) and education (52%). Climate change (19.1%) was ranked sixth but of much concern is deforestation which ranked eighth while it is a bigger environmental issue in the county. The results support the notion that, the majority of people usually express a greater concern for problems which appear to possess an immediate effect on their lives such as hazardous waste or pesticides use as opposed to long term problems that may affect future generations such as climate change or population growth (Reser, *et al.*, 2012).

Items	Number	Percentage	Rank
HIV/AIDS	113	69.8	1
Education	84	51.9	2
Corruption	77	47.5	3
Health	76	46.9	4
Unemployment	55	34	5
Climate change	31	19.1	6
Drought	29	17.9	7
Deforestation	14	8.6	8

Table 2: Ranking of issues according to priority in Homa Bay County

In the current research, more than half the respondents felt that HIV and AIDS, education, health and development were more pressing and currently affecting them than climate change and deforestation. On the other hand, the exposure most people have on climate change has been impersonal and most people only have virtual experience through documentaries and news media in what may seem like a remote area of the world (Bhusal, 2009). However, coupled with the populations wait and see attitude, people do not understand the importance of changing environmentally destructive behaviours even when experts provide detailed and clear risks caused by climate change. These findings therefore indicate that widespread reported concerns about climate change should not be taken at face value. When examined in the context of other personal, social and environmental concerns, climate change is not amongst the most pressing issues for the general public. This therefore indicates that there is need to examine the relative importance of climate change, and the influences on concerns, in order to provide a more meaningful and contextual picture of public concern.

4. Conclusions and Recommendations

4.1. Conclusions

Despite being aware of climate change and its effects, access to information on weather and climate among farmers in Homa Bay County is not sufficient and timely. This could be very detrimental to the levels of food security situation in the County specifically and the Country in generally. However, coupled with the populations wait and see attitude, people do not understand the importance of changing environmentally destructive behaviors even when experts provide detailed and clear risks caused by climate change. The study revealed that Homa Bay residents are uncertain whether the changes in climate they experience in their everyday lives will affect them in the future, implying that they do not understand that climate change refers to a long-term phenomenon. Local adaptation strategies employed in Homa Bay County were effective but not sufficient and therefore not sustainable. Although they have used local strategies to adapt to these changes, the magnitude of future hazards may limit their capacity.

4.2. Recommendations

The research recommends establishment of an early warning system and a team in each ward and village to ensure increased community access to national and local weather information and to support people to prepare for disasters such as droughts and floods. The study also recommends increasing peoples' perception and concern that climate change is a long-term phenomenon. This can be done through radio call-in programs for rural populations in both national and vernacular stations that bring together those with relevant expertise to share their experiences and develop solutions to commonly expressed climate change concerns. Finally, the study

recommends development of policy guidelines on the development of new drought-resistant varieties, weather forecasts, provision of financial services, improvement of rural transport infrastructure, investments in public healthcare and public welfare programs, policies to enhance good governance and coordination of development partners' activities.

5. References

- i. Adeniyi, A. (2012). Climate change knowledge, perception and concern among corporate elites in Lagos. Vantage Publishers. Lagos, Nigeria.
- ii. BBC (2004). Poll for Climate Change Special. www.bbc.co.uk: BBC. Date retrieved-7/10/2014
- iii. Bibbings, J. (2004). Climate Concern: Attitudes to climate change and wind farms in Wales. Cardiff: Welsh Consumer Council and Friends of the Earth Cymru.
- iv. DEFRA (Department for Environment Food and Rural Affairs) (2003). Digest of Environmental Statistics. London: HMSO.
- v. GoK (2010). National Climate Change Response Strategy. Ministry of Environment and Mineral Resources. Nairobi, Kenya.
- vi. Homa Bay County Government. (2013). First County Integrated Plan- 2013-2017.
- vii. IPCC, (2007a): Summary for Policymakers. In: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 7-22.
- viii. IPCC. (2007b). Climate change 2007: synthesis report. Cambridge University Press, Cambridge, UK.
- ix. Kabir, M.I., Rahman, B., Smith, W., Lusha, M.A., Azim, S. and Milton, A.H. (2016). Knowledge and perception about climate change and human health: findings from a baseline survey among vulnerable communities in Bangladesh. *BioMed Central*, **16**:266. Accessed 20/06/2016
- x. KNBS (2009). Population and Housing Census, Bungoma County projections. Nairobi, Kenya: Government Printers.
- xi. Milne, M., Stenekes, N., & Russell, J. (2008). Climate Risk and Adaptation. In B. o. R. Sciences (Ed.). Canberra: Commonwealth of Australia.
- xii. O'Connor, R., Bord, R. and Fisher, A. (1999). Risk perceptions, general environmental beliefs, and willingness to address climate change. *Risk Analysis*, **19** (3):461-71
- xiii. Reser, J. P., Bradley, G. L., Glendon, A. I., Ellul, M. C., and Callaghan, R. (2012). Public Risk Perceptions, Understandings, and Responses to Climate Change and Natural Disasters in Australia and Great Britain., Gold Coast, Australia: National Climate Change Adaptation Research Facility.
- xiv. Wiesmann, U., Samoei, P., Trechsel, L., Engesser, M. (2015). A socio-economic atlas for informed decision-making. In: Ehrensperger A, Ott C, Wiesmann U, editors. Eastern and Southern Africa Partnership Programme: Highlights from 15 Years of Joint Action for Sustainable Development. Bern, Switzerland: Centre for Development and Environment (CDE), University of Bern, with Bern Open Publishing (BOP), pp. 95–98. <http://doi.org/10.7892/boris.72023>.
- xv. World Bank. (2010). Development in a Changing Climate: Concept note. Washington, DC: World Bank.
- xvi. Whitmarsh, L., et al. (2011), Public engagement with carbon and climate change: To what extent is the public 'carbon capable'? *Global Environmental Change*, **21** (1), 56-65
- xvii. Whitmarsh, L.E. (2005). A Study of Public Understanding and Response to Climate Change in the South of England. PhD Thesis, University of Bath. (unp.)