



A STUDY ON IMPACT OF CLIMATE CHANGE ON THE FOOD AND NUTRITION SECURITY IN CHILDREN OF SMALL SCALE FARMER HOUSEHOLDS OF MIGORI AREA

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Abstract

The aim of this study was to find out the effect of climate change on the current food and nutrition security status of children below 5 years. Migori was the choice for the study due to the recent prevalence of malnutrition and food shortages. The design of the study was a cross sectional survey of food and nutrition security performed by anthropometry and administering of questionnaires. The study targeted 50 children aged 6-59 months since they are more vulnerable and serve as a proxy to nutritional status. Statistical software's SPSS version 16.0 and MS Office Excel 2003 was used to analyze the findings. From the results, stunted children were 14%, and girls were at greater risk of all 3 grades of malnutrition (wasting, underweight and stunting) than boys. It was perceived that incorporating the findings into the ongoing county climate change programmes will significantly reduce malnutrition and deprivation due to climate change.

Key Words: Climate change, grades of malnutrition, younger children, older children.

Introduction

Climate change directly results from human activities that change the composition of the global atmosphere (ICIMOD, 2008). According to IASC and ISDR (2008), "climate related stresses and shocks already figure prominently in the lives of many of the world's people, particularly the poor". The manifestations of these devastations include storms, floods and droughts. Often, these events result into terrible experience for the affected individuals like loss of livelihoods and life. Additionally, climate shocks wear down long term opportunities for human development, undermining productivity and eroding human capabilities (FAO, 2008). No single climate shock can be attributed to climate change; however climate change is ratcheting up the risks and vulnerabilities affecting the poor. It further adds stress on already overstretched coping mechanisms and traps people on downwards spiral of deprivation (CPP, 2007). Impacts of these devastations lead to persistence vicious cycle of poverty which culminates to malnutrition and deficiency diseases.

Climate change affects agriculture and food production around the world due to the effects of high temperatures, elevated CO₂ level, extreme events, modified pests and weeds, and modified transpiration and precipitation regimes (FAO, 2008). Low latitude regions coupled with the above factors increase the risk of decreased crop yields. In contrast high latitude areas are likely to experience crop yield increases. Kenya is one of the countries seriously affected by the climate changes leading to recurrent droughts, partly due to deforestation and poor land management practices. Since Kenya lies in the low latitudes, it has suffered decreased crop and animals yields. These problems are evident in Migori area due to increased food shortages following recurrent and persistence droughts in the last 2 years. This has contributed to poor nutrition and unacceptable dietary practices in the Migori culture.

Therefore, understanding the potential impact of climate change on agriculture in Migori was critical for two reasons. First, due to low level of technology and capital, and second, due to high dependency on agriculture as the major source of livelihoods (Chhetri and Shrestha, 2004). Furthermore, when climate changes adversely affect agricultural production, a large number of people are at increased risk of losing their livelihoods. This culminates into household food insecurity and malnutrition (UNICEF, 2008). Hence, the purpose of this study was to find out the effects of climate change on the current food and nutrition security status of children below 5 years. This was first done by, finding out the current food and nutrition security status in Migori area, and second, establishing the household's climate change and food security adaptation practices. In the study, it was postulated that the prevalence of household food insecurity was solely due to climate change. It was also hypothesized that climate change causes food shortages leading to nutrition deterioration and poor nutritional status amongst children.

Methods

Study Area and Design

Migori area was purposively chosen as the study site. This is because; Migori is one of the areas in the pilot project by the World Bank receiving cash transfers as emergency response to effects of climate change. The study was designed as a cross sectional survey which investigated households food and nutrition status in the midst of the climate change. The study aimed at collecting information from respondents on their current food nutrition status and adaptation

practices. Children aged 6 to 59 months were chosen because they are more vulnerable and serve as a proxy to nutritional status.

The sample size for this study was set according to the expected outcome; climate change causes food shortages leading to nutrition deterioration and poor nutritional status amongst children. 50 mothers with children below 60 months were identified and requested to participate in the study. Following the consent of these mothers, 50 children were included in the study. 64% of the children were boys. The mean age of the respondents was 3 years with the youngest and oldest being 6 months and 59 months respectively.

Sampling Design and Procedure

All small scale farmer households with mothers having children below 5 years living in Migori area were requested to participate in filling the questionnaires. Their children's anthropometric measurement was also taken. However, mothers with children below 6 months were not included in the study. Names obtained from the chief's office were randomly entered in an excel sheet, where a computer generated program was used to develop 50 household list.

Data Collection

The data was collected by means of semi structured questionnaires (Household Food Insecurity Assess Questionnaire-HFIAQ and coping strategy questionnaires-CSQ), interviews and anthropometric measurements directed to mothers and children respectively at their households. The data collected included; weight, length/height age and information on past and present food security situation as well as data on coping strategy. The interviews were conducted to enhance content validity. Literature review and expert judgment were also performed to enhance content validity. On the other hand, Cronbach alpha coefficient of the completed questionnaires (HFIAQ and CSQ) was 0.951 and 0.946 respectively. This was considered high based on the 0.96 coefficient for both questionnaires; thus, they were highly reliable.

Anthropometry of the children was measured as outlined. Weight was taken by use of beam scales and stadiometer which were accurate up to 10kg. Children below 10Kg were seated, and those above 10Kg stood on beam scale and stadiometer scale respectively and weight then taken. Together with weight measuring board, stadiometer was used to obtain length measurements by following standard procedures. The board was placed on a flat and hard surfaced table. Thereafter, children were requested to lie on it, and then their lengths were taken. These measurements were taken in duplicates and the average used for calculating z-scores. All the information concerning a single individual was linked through a unique identification number. The data that was collected in local language was translated to English.

Data Analysis and Presentations

Statistical analysis of anthropometric data was done by hand and also by using computer statistical programs SPSS version 16. Quantitative analysis of data from HFIAS was performed by using analytical computer package SPSS version 16.0 and Microsoft Office Excel 2003, from which univariate variables were obtained and used to identify linear correlation to find out the relationship between effects of climate change on food and nutrition security. Categorical variables of weight for height z-score (WHZ), weight for age z-score (WAZ) and height for age z-score (HAZ) were particularly used to obtain nutrition status prevalence of malnutrition. Acceptability of these data was investigated through qualitative methods and comparison with findings from earlier studies. The analyzed data was presented in charts, table and a graph. These were used to describe the characteristics of the population from the sample under the main four themes, climate change, nutrition status, food security and household food adaptation practices.

Research Ethics

To ensure confidentiality, anonymity of the participants was ensured by disclosing the information but protecting the identity and privacy of the participants. Participation was on the principle of voluntary consent where the respondents willingly participated. Permission of the guardians to children below 5 years was sought based on the principle of the informed consent. The findings were disseminated to the ministry of agriculture and ministry of health for incorporation into the ongoing climate change and malnutrition programmes.

Results and Discussions

Climate change

80% of the households surveyed agreed to the fact that climate change is taking place. A third of the remaining 20% were indifferent, and the rest did not know what climate change is. Those in agreement suggested drought as the main manifestation which leads to water shortages and poor/low agricultural yields. An earlier study by Shrestha et al. (2000) confers the same. In addition, they identified the loss of livelihoods as a major effect of climate change. Additional studies by WSFS/IFPRI (2009) established that crop failures, decline in livestock rearing, and the loss of livelihoods are the likely cause to food insecurity. UNICEF (2008) also outlined climate change as a new underlying cause of malnutrition.

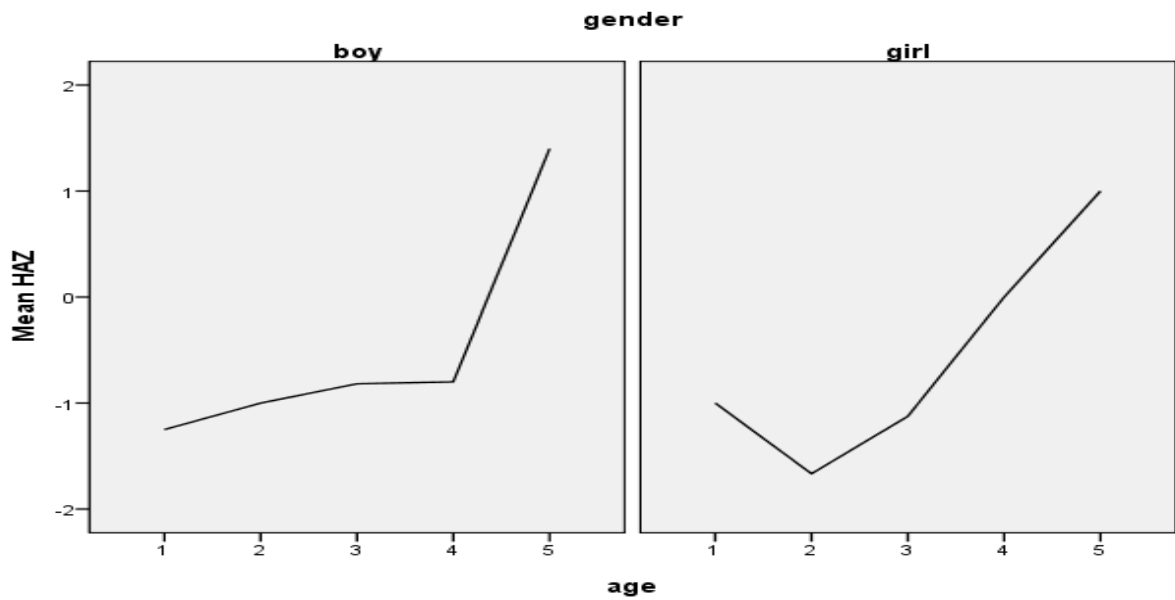
Food security status

38% of the households in this study were moderately food insecure. Severe and mild food insecurity was also dominant at 32% and 26% respectively. Earlier studies by (Aziz et al., 1990) and (Robert, 2004), on food security status in the region looked at the food shortages following poor production and rain failures. These studies also looked at the

poverty levels and the hindrance to purchasing power. However, their findings were positive with over 50% of the households being food secure unlike the current situation at 4%. Food surveillance and early warning systems in the ministry of agriculture in the region showed progressive crop failure and persistent decline in livestock rearing in the past 4 consecutive years. These findings were attributed to global climate change (WHO, 2009). 83% of the food insecure households confirmed inadequate and unreliable rainfall and persistent and recurrent droughts as the major challenges in an attempt to make food available. Some identified declining land productivity and weed complexity as the bottleneck to food production. All the households agreed to rising food prices as the main hindrance to food accessibility. This finding is consistent with the earlier studies done by FAO (2009) which identified rising food prices as one of the response to global climate change.

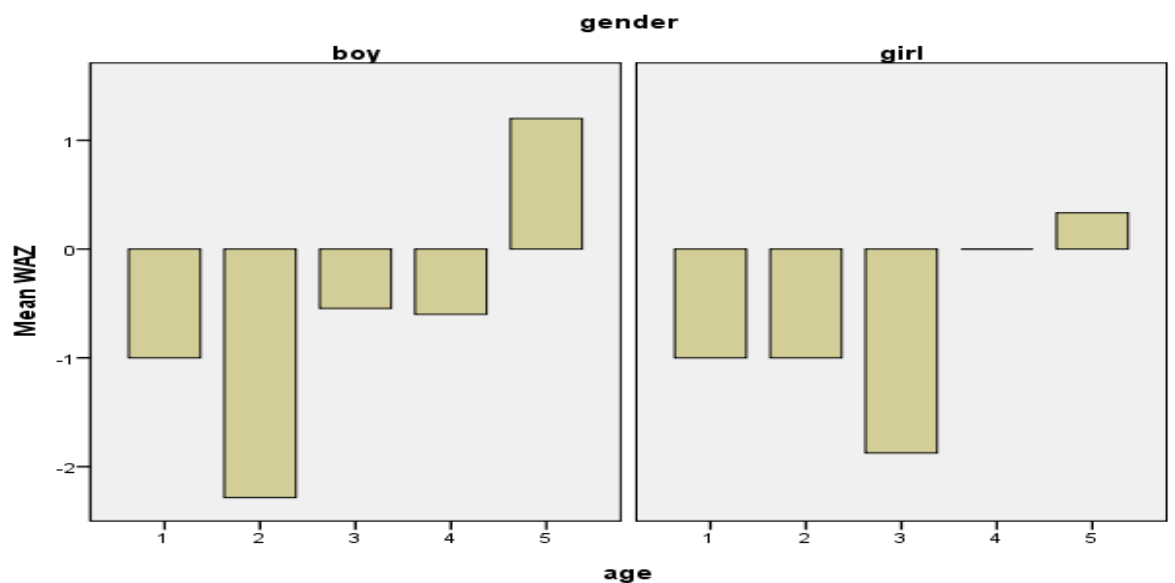
Nutrition status

This was identified by obtaining nutrition indicators WHZ, HAZ and WHZ based on WHO reference standards. These indicators were further used to establish stunting, underweight and risk of wasting since no age category was observed as wasted for both boys and girls. These are represented in figure 1, 2, and 3. Z-score means in older children (3-5 years) were bigger than those in younger children (0-3 years) with the exception in older girls who recorded least WHZ.



1: Height for age line graph

Fig.



2: Bar chart of weight for age z-score

Fig.

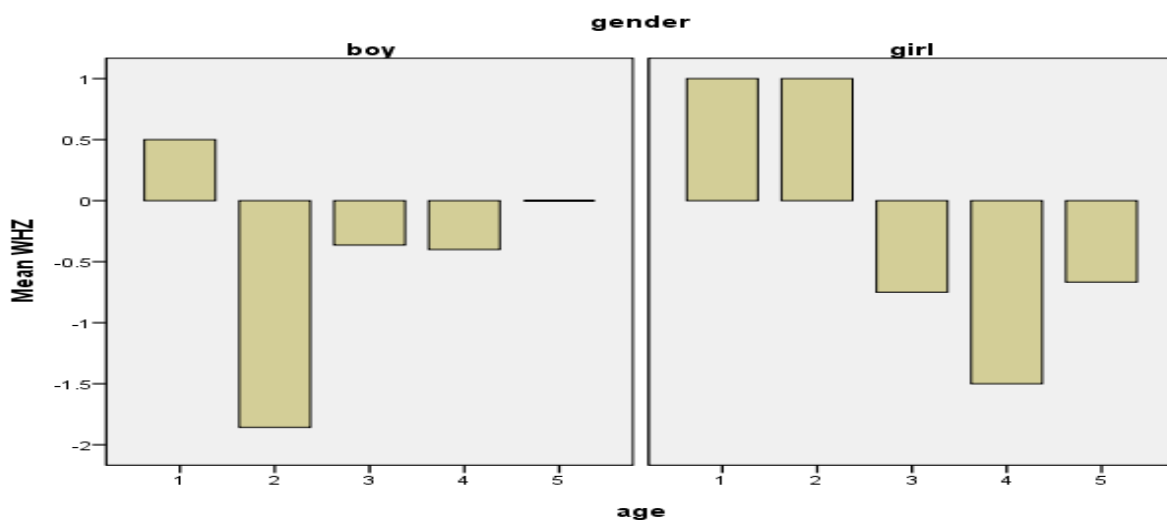


Fig.

3: Bar chart of weight for height z-score

Overall, 7 in 10 children below 5 years were at risk of moderate stunting while 14% were moderately underweight. Risk of stunting was associated with climate change, which led to, wide spread food insecurity in approximately 96% of the household’s sampled. According to Humanity United against Poverty (2008) and FAO (2013), climate change would increase malnutrition levels for children below 2 years to 20% by the year 2050, and lower calorie consumption to levels lower than 2100 Kcal. Migori area with 32% children below the age of two was not an exception, with this group recording the lowest Z-scores for chronic malnutrition (fig. 1 and 2). Worse still, 14% of the underweight children were aged 2 years and younger. Conversely, there was a need to intensify malnutrition, food security and climate change intervention programmes in the region since chronic malnutrition in children after 2 years is irreversible.

Older girls were at greater risk of wasting than stunting and underweight (fig. 3). Wasting was more likely in this age category due to inadequate food intake as a result of food insecurity prevalence in 96% of the households. Younger children below 3 years received complementary foods plus breast milk; hence nutritious mother’s milk provided nutrition needs and shortages which were absent in the compliments. However, unlike younger girls who had high WHZ, boys aged 2 years were at greater risk of wasting. This was partly due to mal-absorption as was explained by the parents.

Underweight was the greatest concern to younger children in all sexes with the boys of 2 years being moderately underweight (fig. 2). For this age group, lower values were due to underlying causes such as insufficient household food insecurity, inadequate maternal and child care as well as inadequate health services and unhealthy environment in some households. These lead to lowered food intake and increased infections, both of which are immediate causes of food insecurity (UNICEF, 2008). At this period mother stores are depleted and since these children could not be sent to live with richer households or work for food, they were left to starve. These children also received extremely minimal care as their mothers engaged in numerous household chores thus granted little care. Some mothers were also at parity and/ or expecting thus could not effectively care for these children.

Though food insecurity was widespread, Migori did not suffer from acute or severe chronic malnutrition cases. This is because most households adopted various community adaptation practices (fig. 4); thus individuals and households were still in position of acquiring meals. According to FAO (2013), coping strategies are among the immediate response in households’ attempt to adaptation to climate change and food shortages. In Migori, there was a linear correlation of -0.199 between stunting and effects of climate change on food security amongst younger children. Thus, absence of chronic malnutrition in older children was a clear indicator of healthy eating in the past years, whereas the higher risk of wasting noted in older girls was due to recent food shortages at a time when they need more food since they grow faster than their counterparts. Wasting is reversible, and this situation was likely to improve following good harvest of maize staple in the months of December and January.

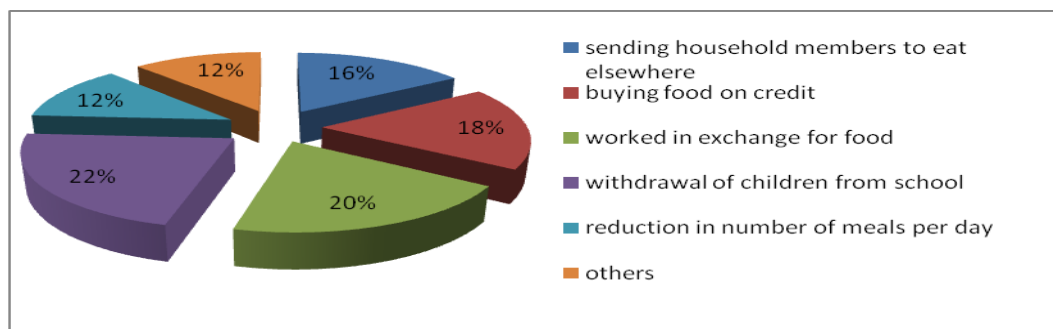


Fig. 4: Pie chart on community adaptation practices

Coping strategies

Withdrawal of children from school was the most prominent coping strategy in Migori. Schooling was terminated for children, either for them to go and work for food and earn income for family or to live with relatives elsewhere while helping them in the daily household chores and thereafter expect food assistance. Moreover, other guardians withdrew children from school due to persistent infections caused by suppressed immunity which results from malnutrition (Aziz et al., 1990). From the study, children in food insecure households where adult family members worked for food were relatively well nourished. In addition, sending children to live with relatives was widespread; however these children were unavailable to participate in the survey.

Conclusion and Recommendation

Climate change is a slow encroachment in the environment which may lead to changes that take a longer time to realize. In most occasions, these changes are manifested in tandem with environment degradation. The latter results to decreased crop and livestock production due to persistent drought, prolonged nutrient loss from the soil, loss of grazing land to wilting and drying out and alteration of planting seasons. Lowered agricultural yield is the main contributing factor to soaring food prices which make it hard for subsistence farmers and the poor to access the food. This component of food insecurity has hit the households of Migori lowering their capacity to make food available. It was on this regard that 96% of the households in the area were either mildly, moderately or severely food insecure. A number of children in these households were at risk of the 3 grades of malnutrition with 14% of them already stunted, due to food insecurity. The most affected age category was 2 years; boys (stunting and wasting) and girls (underweight). However, girls were at a greater risk of all the grades of malnutrition than boys. These findings did not keenly take into consideration other causes of malnutrition, basic, underlying or immediate causes. To fight hunger and risks of various grades of malnutrition, these households adopted 5 major coping strategies. They included in ascending order, withdrawal of children from school, working in exchange for food, buying food on credit, sending household members to eat elsewhere and reduction in the number of meals per day. Hence, from these findings, interventions in Migori area should encourage coping strategies where adult members work for food. Additionally, research should be done to: find out the most suitable adaptation practices that if chosen can reduce the impacts of food insecurity and meet the nutritional needs of children below 5 years, and acceptable food crops that can withstand adverse climatic conditions to guarantee food availability throughout the year.

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