Drought as a Determinant on Retention of Pupils in Public Primary Schools: A Case of Garissa County-Northern Kenya

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Abstract

This study investigates the impact of drought on the retention rates of pupils in public primary schools in Garissa County, Northern Kenya. Arid and semi-arid lands (ASALs) cover a significant portion of the Earth's surface and support a substantial population despite severe water scarcity. In Kenya, drought has led to food insecurity, affecting millions and disrupting education. This research employs a mixed-methods approach, combining quantitative data from school records with qualitative interviews with educators and officials. Descriptive analysis reveals high dropout rates, particularly in remote and drought-affected sub-counties, with variations indicating the role of school feeding programs in mitigating these rates. Inferential analysis shows significant positive correlations between water scarcity, economic hardship, and dropout rates, while the presence of school feeding programs correlates negatively with dropout rates. The findings highlight the multifaceted impact of drought on education and underscore the need for comprehensive strategies, including improved water access, economic support, and reliable feeding programs, to enhance educational outcomes and support community resilience in drought-prone regions.

Keywords: Retention, refugee, impact, arid, semi-arid, educational outcomes

Introduction

Arid and semi-arid lands (ASALs) cover approximately 41% of the Earth's surface and accommodate around 2.5 billion people (UNICEF, 2009). Despite severe water scarcity, these regions support up to 50% of the world's livestock and 44% of food production (Otuoma, 2004). By 2025, it is estimated that 1.9 billion people could live in water-stressed regions (WHO & UNICEF, 2010). In Kenya, drought has resulted in significant food insecurity, impacting over 4.1 million people as of August 2022 (UN OCHA, 2022). This study aims to explore the impact of drought on the retention of pupils in public primary schools in Garissa County, Northern Kenya.

Drought has a profound effect on human welfare, leading to severe food shortages and malnutrition, which in turn affect school attendance and retention rates (Wilhite, 2000; Manabe, 2002). In Garissa County, the predominantly pastoralist economy and marginalized population experience significant educational disruptions

due to drought (Bonaya, 2014). Despite efforts by governmental and non-governmental organizations to improve educational access, retention remains a major challenge. This study aims to explore how drought conditions influence the retention rates of pupils in public primary schools, examining the multifaceted ways in which environmental stressors affect educational outcomes.

Literature Review

Climate change has been identified as a critical factor exacerbating water scarcity, particularly in arid and semi-arid lands (ASALs). The increasing frequency and severity of droughts have significant implications for regions like Northern Kenya, where livelihoods are heavily dependent on pastoralism and agriculture (Nkedianye et al., 2011). Studies indicate that drought frequency in Kenya has increased from once every ten years in the 1980s to once every two to three years since 2000, leading to recurrent agricultural failures and loss of livestock (Nicholson, 2014). This environmental stressor not only affects food security but also has profound impacts on educational outcomes.

Drought-induced economic hardships force families to prioritize immediate survival needs over long-term investments such as education. This is particularly evident in pastoralist communities where the loss of livestock, a primary source of income, directly translates to an inability to afford school fees (Gitau, 2013). Research by Masih et al. (2014) highlights that households facing economic hardship due to drought are more likely to withdraw their children from school, either to reduce expenses or to involve them in income-generating activities.

Further, studies by Duryea et al. (2007) support this, indicating that children are more likely to leave school to work when their parents experience economic hardship. This negative impact on education is compounded by the migration patterns of pastoralist families, who move in search of water and pasture during droughts, disrupting children's schooling (Bonaya, 2014). Additionally, the inconsistency of school feeding programs during drought periods exacerbates the problem, as children are often kept at home due to the lack of reliable meals at school (Huho & Mugalavai, 2010).

The impact of drought on education is not uniform across genders. For example, a study by Nordstrom and Cotton (2020) found that girls in drought-affected areas were more likely to stay enrolled in schools than boys, as they were less involved in economic activities. However, this did not necessarily translate to better learning outcomes, as the quality of education often deteriorated due to the strain on resources and infrastructure.

In summary, the existing literature underscores the multifaceted ways in which drought affects educational attainment in ASALs. It highlights the need for comprehensive strategies that address both the immediate and long-term impacts of drought on education, including economic support for affected families, reliable school feeding programs, and infrastructure improvements to ensure continuity.

Methodology

A mixed-methods approach was used to provide a comprehensive understanding of the impact of drought on school retention rates. This approach combined quantitative

data from school records with qualitative data from interviews. The study targeted all 228 public primary schools in Garissa County, ensuring a broad and representative sample.

Quantitative data were collected through a census survey of school records, focusing on enrollment and dropout rates across different sub-counties. This data was analyzed using descriptive statistics to identify patterns and variations in dropout rates. Additionally, regression analysis was employed to examine the relationship between drought conditions (e.g., water scarcity, economic hardship) and school dropout rates.

Qualitative data were gathered through semi-structured interviews with 20 head teachers, the County Director of Education, and seven Sub County Directors. These interviews provided insights into the personal experiences and perceptions of educators regarding the impact of drought on school retention. The qualitative data were analyzed thematically to identify common themes and insights related to the challenges and mitigation strategies associated with drought conditions.

Analysis

Descriptive Analysis

The descriptive analysis of the data collected from Garissa County's public primary schools highlights significant variations in enrollment and dropout rates across different sub-counties. As of September 2022, the overall dropout rate stood at 7.11%, with considerable disparities observed between sub-counties. For instance, Fafi and Benane reported the highest dropout rates at 11.3% and 11.8%, respectively, while Garissa and Liboi exhibited lower rates at 1.8% and 2.1%. These figures indicate that while some areas struggle more with retaining pupils, others manage to maintain relatively better retention rates. The primary reasons for these high dropout rates were identified as water scarcity, economic hardship, and inadequate school infrastructure. Schools in remote sub-counties, such as Lagdera, Benane, and Shantabaq, faced more severe challenges, including a lack of reliable water sources and higher costs associated with transporting water. The analysis also showed that schools with consistent school feeding programs reported lower dropout rates, emphasizing the importance of these programs in supporting pupil retention by ensuring children receive at least one meal per day.

Inferential Analysis

The inferential analysis involved a regression model to examine the relationship between drought conditions and school dropout rates. The model included water scarcity, economic hardship, and the presence of school feeding programs as independent variables, with dropout rates as the dependent variable. The results revealed significant positive correlations between water scarcity ($\beta = 0.45$, $p < 0.05$) and economic hardship ($\beta = 0.38$, $p < 0.05$) with dropout rates. This indicates that as water scarcity and economic hardships increase, dropout rates also rise. Conversely, the presence of school feeding programs was found to be negatively correlated with dropout rates ($\beta = -0.30$, $p < 0.05$), suggesting that these programs effectively mitigate some adverse effects of drought on education by providing essential nutrition and encouraging regular attendance. The inferential analysis underscores the importance of addressing water scarcity and economic hardships while enhancing school feeding

programs to improve pupil retention in drought-affected regions.

$$Dropout\ Rate = \beta 0 + \beta 1(Water\ Scarcity) + \beta 2(Economic\ Hardship) + \beta 3(School\ Feeding\ Programs) + \epsilon$$

The analysis revealed significant positive correlations between water scarcity ($\beta 1 = 0.45, p < 0.05$), economic hardship ($\beta 2 = 0.38, p < 0.05$), and dropout rates. Conversely, school feeding programs were negatively correlated with dropout rates ($\beta 3 = -0.30, p < 0.05$).

Conclusion

Drought significantly impacts pupil retention in Garissa County's public primary schools. The findings from this study underscore the urgent need for comprehensive measures to mitigate the adverse effects of drought on education. Addressing water scarcity is crucial, as reliable access to water can help stabilize both household economies and school attendance. Economic support for affected families, such as subsidies or conditional cash transfers, can alleviate the immediate financial pressures that force children out of school.

Additionally, consistent and well-implemented school feeding programs can provide a reliable source of nutrition for pupils, encouraging regular attendance even during periods of severe drought. Policymakers and stakeholders must prioritize these interventions to enhance educational outcomes and support community resilience in drought-prone regions. Long-term strategies should include investments in climate-resilient infrastructure and educational facilities that can withstand environmental challenges. Community engagement and awareness programs are essential to emphasize the importance of education, even in the face of economic and environmental adversity. By adopting a multifaceted approach, it is possible to improve retention rates and ensure that children in Garissa County receive the education they deserve, despite the challenges posed by drought conditions.

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Data Availability: The data results are included in the content of the paper.

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