

**The KENYA INSTITUTE for PUBLIC
POLICY RESEARCH and ANALYSIS**

Effects of Droughts and Floods on Schooling in Prone Areas of Kenya

Rose Ngara-Muraya

DP/299/2023

**THE KENYA INSTITUTE FOR PUBLIC POLICY
RESEARCH AND ANALYSIS (KIPPRA)**

Effects of Droughts and Floods on Schooling in Prone Areas of Kenya

Rose Ngara-Muraya

Kenya Institute for Public Policy
Research and Analysis

*KIPPRA Discussion Paper No. 299
2023*

KIPPRA in Brief

The Kenya Institute for Public Policy Research and Analysis (KIPPRA) is an autonomous institute whose primary mission is to conduct public policy research leading to policy advice. KIPPRA's mission is to produce consistently high-quality analysis of key issues of public policy and to contribute to the achievement of national long-term development objectives by positively influencing the decision-making process. These goals are met through effective dissemination of recommendations resulting from analysis and by training policy analysts in the public sector. KIPPRA therefore produces a body of well-researched and documented information on public policy, and in the process assists in formulating long-term strategic perspectives. KIPPRA serves as a centralized source from which the Government and the private sector may obtain information and advice on public policy issues.

Published 2023

© Kenya Institute for Public Policy Research and Analysis

Bishops Garden Towers, Bishops Road

PO Box 56445-00200 Nairobi, Kenya

tel: +254 20 2719933/4; fax: +254 20 2719951

email: admin@kippra.or.ke

website: <http://www.kippra.org>

ISBN 978 9914 738 24 7

The Discussion Paper Series disseminates results and reflections from ongoing research activities of the Institute's programmes. The papers are internally refereed and are disseminated to inform and invoke debate on policy issues. Opinions expressed in the papers are entirely those of the authors and do not necessarily reflect the views of the Institute.

Abstract

Droughts and floods affect schooling in prone areas through increased food insecurity, water scarcity, poor health, insecurity, damaged infrastructure, and limited access to schools. Although various measures have been implemented to mitigate the risks and effects of drought and floods on schooling, the challenge persists. Based on a primary survey of household for school attendance information, key informant interviews for measures being taken and secondary data and information for trends on school enrolment and dropout, this paper discusses the effects of droughts and floods on schooling, measures taken to address them, challenges, and emerging issues. The findings revealed that despite some preventive, preparedness, response, and recovery measures being taken by the government and other stakeholders, droughts and floods continue to pose serious threats, affecting learners' health, damage to homes, schools, and other infrastructure. This leads to increased absenteeism and drop out from school, with an average of eight days of schooling missed per year, and wastage at primary school level in prone counties higher than the rest of the country by 10 per cent. The gross enrolment rate for counties prone to droughts and floods prone is lower than the rest of the country by 30 per cent, with less than 60 per cent progression to secondary level. It is important to include need for increased human and financial resources for enhanced preventive, preparedness, response and recovery programmes, increased capacity building, community sensitization and participation in related programmes. There is also a need to design and implement policy frameworks to guide activities and coordination of actors and actions for greater outcomes and reduced risk and effects of droughts and floods on schooling. This will also reduce associated emergencies and suffering among communities and reduce school absenteeism and dropout of learners in prone counties and ultimately improve schooling, education, and human capital development.

Abbreviations and Acronyms

ADPC	Asian Disaster Preparedness Centre
ASEAN	Association of Southeast Asian Nations
ASSI	ASEAN Safe School Initiative
CBC	Competency-Based Curriculum
CSG	County Steering Group
CSR	Community Social Responsibility
CWS	Church World Services
DRR	Disaster Risk Reduction
EiE	Education in Emergency
EPHTI	Ethiopia Public Health Training Initiative
ESARO	Eastern and Southern Africa Regional Office
FEMA	Federal Emergency Management Agency
GPE	Global Partnership for Education
ICODECON	International Conference of Development and Economy
IDRC	International Development Research Centre
IFC	International Financial Corporation
IISD	International Institute for Sustainable Development
IOM	International Organization for Migration
IPCC	Inter-governmental Panel on Climate Change
KCPE	Kenya Certificate of Primary Education
KFS	Kenya Forest Service
KICD	Kenya Institute of Curriculum Development
KNBS	Kenya National Bureau of Statistics
MEAL	Monitoring Evaluation Accountability Learning
NDMA	National Droughts Management Authority
NGO	Non-Governmental Organization
ODL	Open and Distance Learning
PTA	Parents' Teachers' Association
PRISE	Pathways to Resilience in Semi-arid Economies
REGLAP	Regional Learning and Advocacy Programme
TVET	Technical and Vocational Education and Training
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNEP	United Nations Environment Programme
UNESCAP	Economic and Social Commission for Asia and the Pacific
UNISDR	United Nations International Strategy for Disaster Reduction
UNOCHA	United Nations Office for the Coordination of Humanitarian Aid
USAID	United States Agency for International Development
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme
WHO	World Health Organization
WV	World Vision

Table of Contents

Abstract.....	iii
Abbreviations and Acronyms.....	iv
List of Tables.....	vi
List of Figures.....	vi
1. Introduction.....	1
1.1 Background of the Study.....	1
1.2 The Problem	4
1.3 Study Objectives.....	5
1.4 Research Questions	6
2. A Review of Related Literature.....	7
2.1 Effects of Droughts and Floods on Schooling	8
2.1.1 Droughts and Schooling	8
2.1.2 Floods and Schooling	12
2.2 Measures to Reduce Effects of Droughts and Floods on Schooling	14
2.2.1 Preventive Measures	14
3. Methodology	24
3.1 Scope	24
3.2 Research Design	24
3.3 Conceptual Framework	25
3.4 Sample and Data Sources	27
3.5 Limitations	28
4. Results and Analysis	29
4.1 Interruptions to Learning and Absenteeism in the Face of Droughts and Floods	29
4.2 School Enrolment and Progression in the Face of Droughts and Floods.....	39
4.3 Droughts and Floods Events: Prevention, Preparedness, Response, and Recovery	43
5. Challenges of Droughts and Floods and Emerging Issues.....	59
5.1 Resources	59
5.2 Rainwater Harvesting and Flood Control	61
5.3 Traditional Knowledge and Practices	61
5.4 Waste Management, Water Sanitation and Hygiene	61
5.5 Coordination of Response Activities and Actors	62
5.6 Changes in Roles Played by Learners and Infringement of Rights	63
5.7 Food Security and Social Protection	64
5.8 Access to Schools and CSR	64
5.9 Absenteeism and Syllabus Coverage	64
5.10 Capacity and Inaccessibility of Schools	65
5.11 Access to Land, Agricultural Inputs, and Extension Services	66
5.12 Other Challenges - Corruption and Lack of Data.....	66

6.	Summary, Conclusion and Recommendations	68
6.1	Summary	68
6.2	Conclusion	69
6.3	Recommendations.....	70
6.4	Areas for Further Research	72
	References	74
	Annexes	85
	Annex 1: ASAL and Flood Prone Counties Selected for Droughts/Floods Survey...	85
	Annex 2: Incidences of Droughts and Floods in Kenya from 1975 - 2018	85
	Annex 3: Actors in Response and Recovery	87
	Annex 4: Key Informant Interview Guide	90
	Annex 5: Focus Group Discussion	91
	Annex 6: Household Tool - Schooling Information	92

List of Tables

Table 4.1: Absenteeism from school and work due to droughts and floods	32
Table 4.2: Diseases reported as prevalent during droughts	33
Table 4.3: Diseases reported as prevalent during floods	39
Table 4.4: Enrolment in primary school (2007-2010) and progression to secondary school (2015-2018)	40
Table 4.5: Gross enrolment ration for 2014, 2016, 2018 and 2019	44

List of Figures

Figure 1.1: Kenya hazard map - areas prone to droughts, floods and landslides	3
Figure 2.1: Kenya counties and climatic conditions	10
Figure 3 1: Process model - threats of droughts and flood to schooling	27
Figure 4.1: Number of school days missed by sex	29
Figure 4.2: Reason for not being in school	30
Figure 4.3: Period of absence from school and reason for absence	30
Figure 4.4: When learners not in school during the survey were planning to return to school	31
Figure 4.5: Effects of floods	35
Figure 4.6: Solid waste filling storm drains	36
Figure 4.7: Prevalent diseases during droughts and floods	38

1. Introduction

1.1 Background of the Study

Significant parts of the world are prone to high variability in precipitation that culminates into drought when too low, and flooding when too heavy, seriously affecting social functioning of communities including learners and schooling (Tamiru and Belaschew, 2017). Droughts and floods are conditions that significantly affect humans, especially their environment, settlements, mental and physical health, social economic status, and occupational functioning (UNISDR, 2005; UNISDR, 2015). The sectors most seriously affected by droughts and floods include agriculture, livestock, water, health, education, housing, and infrastructure, among others (Ruto, Ongwenyi and Mugo, 2009; Government of Kenya, 2010a). All these directly or indirectly affect schooling, with related prolonged interruptions and social economic disruptions leading to increased levels of illiteracy and semi-illiteracy (IPCC, 2012; Bhatasara, 2015; United Nations Children's Fund - UNICEF, 2015, Global Partnership for Education - GPE, 2018). This paper analyses the effects of droughts and floods on schooling in prone areas of Kenya.

Drought, unlike the permanent phenomenon of aridity, is a temporary but extended dry period that sets in gradually over a relatively wide geographical area, lasting from three months to one year or more, and culminating into extreme soil moisture depletion and drying up of water sources (UNISDR, 2005; UNISDR, 2015). Resultant effects may be devastating, permeating through economies for an extended period (Wilhite, Sivakumar and Pulwarty, 2014). Droughts are often accompanied by strong winds that blow away roofs of homes and schools, create dust storms, uprooting trees and augmenting spread of fires that damages grazing fields and forests, *inter alia* (United Nations Development Programme - UNDP), n.d.; Kisurulia, Katiambo and Lutomia, 2013; Owuor, 2015). The short-term effects include loss of soil moisture and hydrological drought that trigger inadequacy of water for domestic and industrial use, including hydropower production, loss of crops and animals, food insecurity and health challenges, crowned by malfunctioning of the affected society (IPCC, 2012; MoiYoi, 2013; Kisurulia et al., 2013). Schooling is one of the key activities that malfunctions following drought episodes as learners are forced out of school to look for food and water or migrate with parents in search of pasture (Ndichu, 2013).

Droughts affect agricultural yield and livestock, which gives rise to food insecurity, causing absenteeism from school due to hunger, poor health, need to look for food and water, and nomadism *inter alia* (Belaschew et al., 2011; Randal and Gray, 2016). An Ethiopia study (Tamiru and Belaschew, 2017) revealed that children from food secure households are 57 per cent less likely to be absent from school compared with their food insecure counterparts, which was consistent with outcomes of similar studies in low-income countries.

Floods occur when water bodies burst their banks, submerging normally dry land and can last for days or even weeks. Flash floods occur suddenly as run-off following very heavy rainfall/storm, dykes and dam burst, causing enormous

damage. Flash floods sweep everything, including boulders, trees, homes, people, animals, property, and infrastructure such as schools, health facilities, roads, bridges, power plants and communication lines, among others, interrupting normal operations including schooling (Owuor, 2015; World Bank, 2015). Widespread floods inundate everything including homes, health facilities, and schools, among other facilities, causing temporary inaccessibility or destroying them completely. People get displaced and exposed to weather elements, affecting the normal functionality of the impacted communities. For example, when roads become impassable to both vehicular traffic and pedestrians following flood damages, community members cannot get to their destinations safely or in a timely manner. Learners cannot easily access schools or learn effectively in flooded or damaged school infrastructure (International Federation of Red Cross and Red Crescent Societies - IFRC, 2018). Children get afflicted by flood-related diseases such as malaria, diarrhoea, cholera, among others, forcing them to stay away from school (Okaka and Odhiambo, 2018). In addition, loss of homes and livelihood forces people, including learners into displacement areas/camps. Coupled with injuries and loss of parents and/or siblings in flood accidents or from diseases that emanate, the affected learners get exposed to intense short, medium and long-term mental trauma and disruption of schooling (Baez, Fuente and Santos, 2009). Some floods are cyclical, occurring every year or after every number of years, for example those associated with the El-Nino phenomenon (Opere, 2013).

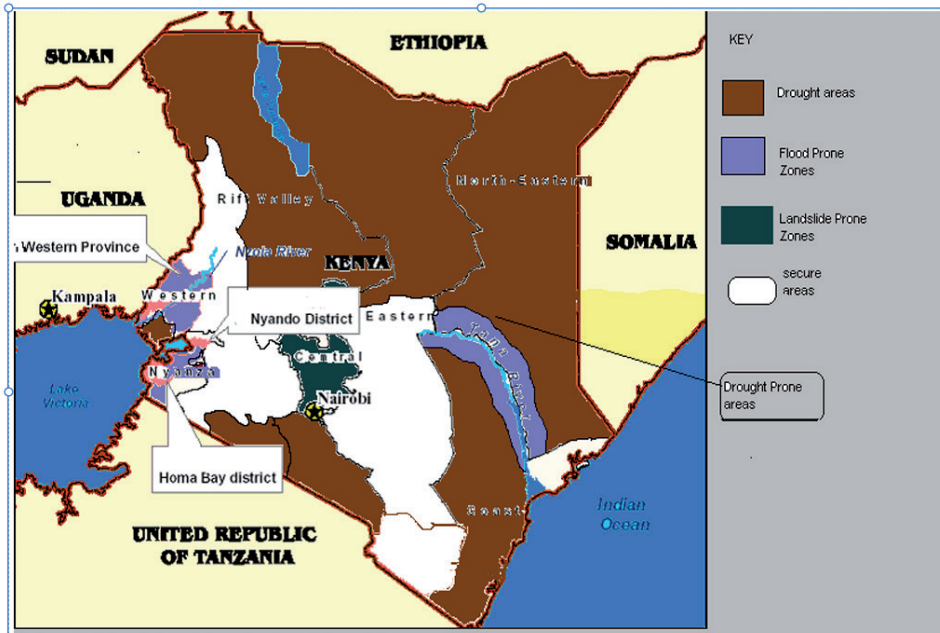
Flooding seriously and repeatedly affects countries across Eurasia, including England, France, Germany, Italy, Ireland, Poland, Sweden, Romania, Bangladesh, Cambodia, China, India, Japan, Korean peninsula, Philippines, and Vietnam, among others. The Atlantic coastline, especially on the northern frontier, is exposed to increasing danger of rising sea level and serious flooding either from storms, melting glaciers and strong winds that raise the tide, hurricanes, cyclone/typhoons, and monsoon (Marcos and Woodworth, 2017). According to the Association of Southeast Asian Nations - ASAEN (2016), the region experiences floods of devastating magnitude.

The Horn of Africa, Central, Eastern and Southern Africa experience frequent and sometimes long seasons of drought followed by severe floods (Spear et al., 2018). For example, a harsh drought was experienced in this region in 2016 and 2017, followed by devastating floods in countries such as Mozambique, Malawi, Kenya, Ethiopia, and Somalia in 2018 (FAO, UNICEF and WFP, 2019). Cyclone Idai hit Mozambique and Eastern Zimbabwe in March of 2019, causing great damage to homes, schools, and other infrastructure. Some schools were used as evacuation camps and those evacuated brought their livestock that further destroyed school infrastructure (Munsaka and Mutasa, 2000).

Many parts of Kenya experience spells of droughts and/or flooding nearly on an annual basis. This is especially the case in the arid and semi-arid lands (ASALs) that account for over 80 per cent of the country as depicted in Figure 1.1, and houses about 38 per cent (about 18 million) of Kenya's population – of approximately 48 million people – (Ruto, Ongwenyi and Mugo, 2009; Sharifi, 2013; Government of Kenya, 2014; UNDP, n. d., Abuya et al., 2019). Annex Table 2 summarizes droughts and flood experiences in the country, the most affected

areas and magnitude of exposure. An overview of the last 13 years shows that in 2008, the country experienced flooding, losing at least 24 lives, with Budalangi, Rift Valley, Kitale, Makueni, Mwala/Kibwezi being the most affected areas. In 2009, the country experienced a widespread drought, with pastoralists losing 70 to 90 per cent of their livestock. In 2010, the country had floods that mostly affected Budalangi, Mt Elgon, Samburu, Tana River and Turkana, killing at least 73 people. In 2011, a drought affecting mostly Marsabit, Turkana, Samburu and Nairobi had over 4.3 million people in dire need of food relief. The year 2012 started with floods that affected the lake region, killing at least 84 people and displacing over 30,000 people. This was followed by a widespread drought that affected 3.75 million people. The year 2013 had localized floods that affected Tana River, while in 2014 Nairobi and Narok were affected. Widespread floods in 2015 and localized floods in 2016 caused deaths of 26 people from a collapsed building in Nairobi and 1,000 people displaced in Nairobi and Turkana counties. The year 2017 had a widespread drought that exposed 3.9 million people to food insecurity while 2018 had serious floods that killed at least 186 people, injured 100, affected 800,000 and displaced 300,000 people (Government of Kenya, 2009; Elliott and Fowler, 2012; Venton et al., 2012; Huho, Mashara and Musyimi, 2016; Floodlist, 2018; UNICEF, 2018).

Figure 1.1: Kenya hazard map - areas prone to droughts, floods and landslides



Data source: UNDP, n.d (Note: though old and done when Kenya had provinces as administrative regions, the map is useful in depicting parts of the country affected by droughts floods and landslides)

Droughts and floods affect schooling directly and indirectly, yet education is the foundation of human capital development, which cannot be optimally achieved if schooling is regularly interrupted (Baez, Fuente and Santos, 2009). By reducing frequency and severity of drought and floods through effectively preventing and preparing for them and taking measures that reduce their impacts on schooling, ripple effects on education and other sectors of the economy can be achieved (Intergovernmental Panel on Climate Change - IPCC, 2012; Abdi, 2010; Sharifi, 2013, Government of Kenya, 2014).

The Government of Kenya is cognizant of the social, economic, and environmental effects of droughts and floods. In its development blueprint – the Kenya Vision 2030 and particularly the social pillar – the government indicates the reality of problems associated with natural calamities of droughts and floods and their effects on various sectors, including education, and the need to guarantee improved education for human capital development to achieve the Kenya Vision (Government of Kenya, 2007). Achievement of the Vision is constrained when a substantial segment of learners (about 40%) living in the arid and semi-arid lands (ASALs), the flood prone areas, is kept out of school due to droughts and floods (Akello, 2014; Government of Kenya, 2018a). The Medium-Term Plans (MTP I, II and III) highlight the plight of vulnerable groups and vulnerable areas and are cognizant of needed action to reduce suffering (Government of Kenya, 2008; 2013a; 2018a). The Constitution of Kenya (2010) reiterates the human rights to education. According to Article 53 (1) (b), “every child has a right to free and compulsory basic education”, and hence schools and related essential facilities should always be available without disruption by weather and climatic calamities (Government of Kenya, 2010a).

In the event of exposure to the hazards of droughts and floods, there are measures that can be taken to reduce suffering, improve schooling and consequently human capital development. The starting point is to put in place preventive measures, those that reduce occurrence of these calamities through environmental monitoring for disaster management. Monitoring and putting in place early warning systems for awareness creation prevents or reduces injuries from the events while minimizing the interference their occurrence elicits on schooling. Once the events have occurred, response and recovery measures and coordination of the activities reduces the severity of their impact on lives and livelihoods, including schooling (UNISDR, 2005; Ndichu, 2013).

1.2 The Problem

Droughts and floods are common phenomenon that affects many parts of Kenya as shown in Figure 1.1 and 2.1. Droughts present serious and devastating effects especially in the ASALs of Kenya, leading to exposure to famine, diseases and loss of lives and livelihoods, directly or indirectly affecting schooling.

Drought sets in gradually with failed rains, then dries up food crops and pasture. This gradual onset provides early warning that a drought is eminent and will affect sectors and communities including schooling. Floods occur rapidly, although off-

season rains can cause unexpected floods, and seasonal rains and their flooding characteristics are often known and expected. Yet, they still cause loss of life and devastating damage in the prone areas of Kenya along the banks of major rivers such as Nyando, Yala, Nzoiya, Tana and Sabaki. The floods disrupt schooling, since schools and homes get flooded, paths and bridges broken such that learners cannot access schools, and learning materials are damaged.

Learners get exposed to the risks and effects of droughts and floods in the form of disrupted learning programmes, high school absenteeism, low enrolment, retention, and progression. For example, in Mandera and Wajir counties, three out of 10 boys and two out of ten girls are enrolled in school, and 30 per cent of them drop out of school before completion of primary school education (GPE, 2018). This is triggered by food insecurity, poor nutrition, child labour, destruction of schools and other infrastructure, diseases, injuries, loss of life and associated trauma and displacement of populations (Few et al., 2015; Owuor, 2015). Such disruption in learning reduces the ability to take advantage of opportunities associated with academic prowess, and promotes inequality in human capital development (Ndichu, 2013; Ayub, 2018; Gibbs et al., 2019; GPE, 2020).

Despite numerous experiences of droughts and floods as shown in Annex Table 2, Kenya is often caught unprepared. When appropriate and timely actions are not taken, related emergencies are unavoidable. Reactive rather than proactive tendencies to the disasters, ad hoc and uncoordinated disaster response activities bring forth social, economic, and environmental effects that have a bearing on schooling (Owuor, 2015; Development Initiative - DI, 2017).

Moreover, the state of preparedness of the governments to respond to drought and flood emergencies is wanting, with the Education in Emergency (EiE) policy not backed by an adequate budget allocation to sustain it, thus increasing dependency on donor agencies to respond to disasters (Government of Kenya, 2017). It becomes paramount to examine the effects of droughts and floods on schooling, required action in terms of prevention, preparedness, response, recovery, and coordination with respect to droughts and floods occurrences and effects on schooling, challenges and policies needed to reduce these effects.

1.3 Study Objectives

The broad objective of this study was to articulate the effects of droughts and floods on schooling in prone areas of Kenya.

The specific objectives of the study were to:

- (i) Estimate the effects of droughts and floods on schooling in prone areas of Kenya;
- (ii) Identify gaps in measures being undertaken at community and school level to address the effects of droughts and floods on schooling;
- (iii) Establish challenges and emerging issues that steer the effects of droughts and floods on schooling;

- (iv) Propose policy measures towards reduction of the effects of droughts and floods on schooling.

1.4 Research Questions

These objectives will be achieved by responding to the following questions:

- (i) To what extent do droughts and floods affect schooling in prone areas of Kenya?
- (ii) What are the gaps in measures being employed at community and school level to address the effects of droughts and floods on schooling?
- (iii) What are the challenges and emerging issues that steer the effects of droughts and floods on schooling?
- (iv) What policy measures can Kenya put in place to reduce the effects of droughts and floods on schooling?

2. A Review of Related Literature

Natural hazards such as storms, landslides, tornados/cyclones/typhoons, earthquakes, tsunamis, volcanic eruptions, droughts, and floods occur across the world, and their interaction with vulnerable communities gives rise to disasters and related emergencies (UNDP, n.d.; IPCC, 2012). Focusing on droughts and floods, social-economic activities including schooling are affected when these events occur. For example, the Association of Southeast Asian Nations (ASAEN), details the devastating magnitudes of natural hazards and how they have had to give special attention to school safety, due to the effects the events and particularly concomitant floods have on schools and schooling (ASAEN, 2016). Most of Asia, countries along the Pacific Ocean coast, Caribbean Islands along the Gulf of Mexico, and Southern United States of America (USA) and the eastern coast of Southern Africa suffer floods emanating from rising sea levels, storms, hurricanes, tornados, cyclones, typhoons, monsoon, and tsunamis, with devastating effects on communities including learners (FEMA, 2004; UNESCAP, 2020; IFRC, 2018). Parts of Europe especially the northern, western, and southern coastal areas get flooded due to rising sea levels from melting glaciers and icesheets, storms, and cyclones that inundate homes and institutions of learning, among other facilities (IOM, 2009). Southern Australia and Western USA experience devastating droughts. These, according to IOM (2009) and IPCC (2012), are meteorological droughts, soil moisture/agricultural droughts, ecological droughts, hydrological droughts, and socio-economic droughts that create a conducive environment for deadly effects, taking lives of people and animals, consuming forests, grasslands, farms, homes, schools, and other amenities. They also inflict environmental drawbacks, food insecurity, health and social problems to community members including learners, such that schooling is consequently suspended for prolonged periods (FEMA, 2004; Abram et al., 2021).

Following drought and flood disasters, time and resources are refocused from important but not life supporting ventures such as schooling to other life supporting activities and ventures such as searching for water and food in addition to rebuilding damaged shelters, significantly affecting schooling (GPE, 2020; UNESCAP, 2020). Taking preventive and precautionary measures has been shown to reduce frequency and intensity of droughts and floods in the short, medium, and long-term, which entails moving away from crisis to risk management (UNESCO, 2016; Wilhite, Sivakumar and Pulwarty, 2014). Building the adaptation and improving response to climate change through interventions that reduce its causes reduces attendant impacts on the environment, such as frequency and severity of droughts and floods. Managed human settlement and land use in fragile lands and catchment areas, and managed developments especially those that interfere with ecosystems or block waterways form part of that process (Few et al., 2015; Ebi and Hess, 2020). Based on previous experiences and a desire to improve the situation, an analysis is required of the exigency of droughts and floods, those at risk and degree of vulnerability (Fews et al., 2015). This calls for an understanding of the most applicable interventions, associated impact if interventions are made, and likely outcomes without intervention (IPCC, 2012).

2.1 Effects of Droughts and Floods on Schooling

Effects of droughts and floods on schooling encompass what happens following the events. Such effects can be reduced through actions taken before, during and soon after the events. This means preventing, preparing, and responding and coordinating actions for effectiveness and efficiency (UNISDR, 2005; 2015).

2.1.1 Droughts and schooling

Drought exposes communities to a multiplicity of problems, disrupting lives and livelihoods, which directly or indirectly affects schooling. Being a prolonged dry spell (metrological drought), water sources dry up (hydrological drought) while flora and fauna is also damaged (soil moisture/agricultural drought). Death of livestock and crop failure are associated with drought, yet animals are the main source of food and income (milk, meat, blood, fat and hide) for pastoral communities (Chege, Kimiywe and Ndungu, 2015; Nyariki and Amwata, 2019). Learners migrate alongside families in nomadism, often trekking long distances in search of food, water, and pasture for livestock. Experiences of severe food insecurity, hunger, starvation, poverty, and especially reduction in ration served to children; culminating to malnutrition, wasting, and stunting, affects learning abilities, school attendance, performance, and progression (United Nations Environment Programme - UNEP and Government of Kenya, 2006; UNCCD, 2016; Ray, Fares and Risch, 2018).

UNCCD notes that during the 2015/16 drought, “Over 20 million people were facing food insecurity in Eastern Africa. Water shortages triggered water-borne and vector-borne diseases Droughts were causing children to drop out of school to fetch water from long distances cut cultivatable areas, reduced pastures prompting livestock migration and increased conflicts among farmers and malnutrition.” (UNCCD, 2016: 3).

Baez et al. (2009) observed that nutrition of expectant and lactating mothers, infants and under five children is very important for child growth, mental capacity, and literacy. Evidence shows that children born during drought are 36 per cent more likely to be malnourished given their mothers are unlikely to be feeding well during pregnancy and when lactating. Children exposed to poor nutrition at the age of one to two years are more likely to get stunted, have delayed school entry, have hampered performance, and have higher probability of non-completion (Baez et al., 2009; Cooper et al., 2019).

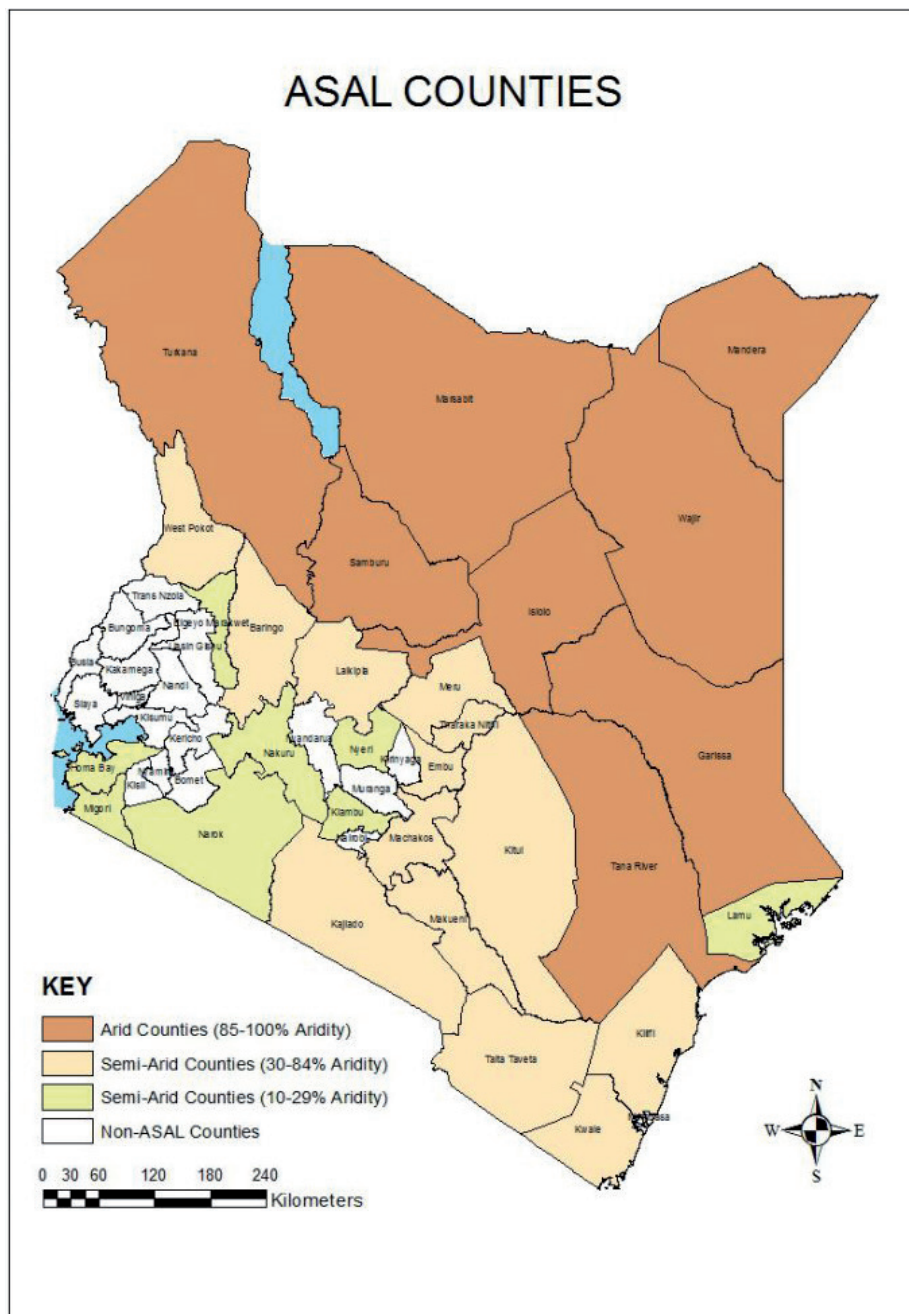
During drought – due to associated water scarcity – the water collection points are far off, and boreholes are less productive, giving rise to long queues for the dwindling commodity (Levison, DeGraff and Dungumaro, 2018; Osman, 2018). Children are allocated water collection duties in school, mostly for cooking and cleaning, taking between three hours to a whole day of learning time (Osman, 2018). Additionally, lethargic, hunger-stricken and dehydrated children cannot adequately concentrate in school, and their teachers’ effectiveness is also reduced since they too face hunger (Ayabei, 2016).

Over 80 per cent of Kenya's landmass is arid or semi-arid (Figure 2.1), most of this being in northern and southern and eastern parts of the country (Birch, 2018). Some of the counties that are most affected include Baringo, Busia, Garissa, Homa Bay, Isiolo, Kajiado, Kitui, Marsabit, Mandera, Narok, Samburu, Siaya, Tana River, Turkana, Wajir and West Pokot, among others – Annex Table 1 has the list of drought and flood prone counties. These areas are often susceptible to droughts, exposing schooling to related risks of drought, including high-speed winds that blow off roofs, sand/dust; storms in addition to food and water shortages that devastate livelihoods and local economies (Birch, 2018). The Famine Early Warning Systems Network (FEWS NET) Kenya price bulletin for December 2017 (at the climax of a severe drought) shows trends in prices of foodstuff (maize and beans), cattle and goats. The five-year average, previous year (2016) and current (2017) prices concur on food inflation and decline in animal prices. While the 2017 food prices were above those of 2016 and the five-year average for Turkana, Isiolo, Garissa, and Kitui counties, prices of goats and cattle were way below the previous year and five-year average in the listed drought prone counties, indicating food inflation and decline in prices of livestock due to drought triggered emaciation.

Poor school attendance, retention, progression, and completion are closely linked to the aridness and frequent droughts, with chances of learners staying in school being less than 50 per cent, and chances of progressing to secondary schools and to university even less (Regional Learning and Advocacy Programme - REGLAP, 2012; Speranza, 2010). Gross Enrolment Rate (GER) for most ASAL counties falls below the national average especially for secondary education as shown in Annex Table 3 (Government of Kenya, 2019).

¹<https://nation.africa/kenya/counties/baringo/rain-storm-destroys-five-classrooms-963366>

Figure 2.1: Kenya counties and climatic conditions



Source: Birch (2018)

Baez et al. (2009) and Brown (2012) observed that drought often leads to change of roles, with children dropping out of school to help in the search for water and pasture. Girls are mostly assigned water fetching and other domestic chores while boys take up livestock herding. Additionally, due to financial constraints that reduce ability to meet basic school-related needs, children are withdrawn from school, with saved resources from school-related expenses used to boost sustenance, and some help by working for pay to buy food. When children drop out of school during drought, they face exposure to multiple challenges, including neglect, child labour, abuse, female genital mutilation, trafficking, sexual exploitation, and child marriages, with the girlchild at a greater risk (Church World Services (CWS), 2008; Ndichu, 2013; Bhatasara, 2015; Brown, 2012). If a school-going child is forced by circumstances to work for up to six hours per day, their schooling attainment is reduced by up to a year (Baez et al., 2009; Brown, 2012). In other cases, children especially girls are withdrawn to be married off so that the family can obtain livestock as dowry, to replace animals that die during drought, and to get resources to cater for the rest of the family members due to poverty, and/or to reduce the number of people that need to be cared for in the family (Jones et al., 2014; Hodgkinson, 2016; Ayub, 2018).

“Before the drought, many children were going to school, but have now mostly dropped out. As of March 2017, approximately 180,000 children dropped out of school due to the drought, most of them girls (as they are responsible for domestic chores such as fetching water” (Dometita, 2017: 26).

UNICEF (2019) opines that due to drought-related water shortages, there is poor hygiene and sanitation as hands, food/vegetables, and utensils are not well cleaned, which is linked to health problems. Other factors for absenteeism from school during drought include migration of families – either in search of pasture for livestock or to cities/towns in search of alternative employment – or being too weak to attend school due to hunger (IPPC, 2012). Baez et al. (2009) and Brown (2012) observed that temporary withdrawal from school due to drought has a 70 per cent chance of becoming permanent school dropout, with majority dropping out of school temporarily to care for aging or sickly and hunger-weakened parents, grandparents and/or younger siblings. Extreme drought and related hunger and starvation lead to ill health or even death of parents/guardians, leaving the children traumatized and unable to continue with school for a while (Baez et al., 2009).

Animals dying and crops withering because of drought lead to increased poverty. Animals are a source of wealth among pastoralists in most arid and semi-arid areas and total loss of livestock can transform wealthy households into poverty (Mandera County, 2013; Government of Kenya, 2014), which leads to trauma in parents/guardians, poor school enrolment for children, high school dropout rate, and poor school progression.

Since drought causes environmental degradation and loss of vegetation cover and desertification, both water reserves and grazing/browsing grounds shrink, which becomes a source of conflict between communities and between humans

and wild animals (Abdi, 2010; Ndichu, 2013; Food Security Information Network - FSIN, 2021). For example, according to Mwangi (n.d.) the Turkana, Pokot, and Samburu in Baragoi and Samburu, Borana, Rendile and Gabbra communities in Samburu and Marsabit counties often fight over water and pasture. So do the Pokomos and Orma communities in Tana River where farming brings in another angle to conflict, as Orma pastoralists graze in Pokomo farmland citing inability to access the river to water animals since farmers have taken ownership of the land along the river. Mwangi also notes that pastoralists from North Eastern counties come down to Kitui and Kilifi counties during drought, giving rise to further conflicts over pasture, water, and farmlands. Besides cultural practices of stealing animals to marry or show tribal power, criminal banditry and cattle rustling, these communities also raid to restock after drought devastates their animals (Mwangi, nd). The conflicts and related insecurity interfere with schooling, at times forcing children to stay at home for prolonged periods (Asaka, 2012; Mander County, 2013; Government of Kenya, 2014;). “Four primary schools (Twambui, Malalani, Ililuni and Koi) and one secondary school (Malalani Mixed) had to be closed after pupils and students deserted the institutions for fear of attacks by the armed pastoralists” (Mwangi, nd: 7). Although historically known to quell conflicts more expeditiously, traditional conflict resolution mechanisms are not as effective anymore due to the limitation exerted by Article 159(3) of the Constitution of Kenya, and this exacerbates the conflicts, forcing the government to intervene on many occasions to quell bloody conflicts (Kariuki, n.d).

The government has initiated bursary, grants and scholarship programmes, free primary education, and subsidized secondary education to help maintain in school learners who are likely to drop out due to fees constraint especially in areas usually affected by drought (Government of Kenya, 2014). Food relief and the school feeding programme help in suppressing food insecurity and to keep learners in school, with some households sending underage children to school so that they can be fed during drought, saving the households up to 9 per cent of food expenditure (Langinger, 2011; Venton et al., 2012; Mander County, 2013; Government of Kenya, 2014).

2.1.2 Floods and Schooling

Floods and storms wreak havoc or submerge schools as spelt out in a detailed account of incidences of 2010 floods across Kenya by the International Federation of Red Cross and Red Crescent Societies (IFRC, 2010), showing how floods partially or totally render schools inaccessible and/or unusable while taking lives of learners coming to or from school. This is confirmed in a study on flooding on the plains of River Nyando, indicating how roads that lead to schools get flooded and impassable for some time, bridges are swept off and/or deep gullies cut through the roads/paths thus separating learners from their schools (Akello, 2014). In the cases where schools are across rivers, learners normally walk across dry riverbeds, hop across stones, use temporary log bridges, simple rafts or canoes to or from school. As observed by Manda (2013), in Garissa County, Tana River becomes violently swollen when it rains upstream, and only motorized boats can cross,

yet these are elusive and expensive, which inhibits learners from reaching school until the rains subside. This is a common phenomenon, made worse if rivers swell during the day when learners are in school, with some drowning when attempting to cross the swollen rivers to get home (Manda, 2013; IFRC, 2010). Schools also get flooded, leaving some structures damaged, and access roads/paths/bridges destroyed, yet repairing or rebuilding such schools and/or access roads can take many months or years (Ambuchi, 2011). With school facilities and access routes damaged, many learners cannot reach schools and learning is inhibited. School attendance becomes poor, performance goes down and the rate of dropping out of school increases (Nyakundi et al., 2010; Mander County, 2013; Opere, 2013; Akello, 2014).

Flood related health problems afflict learners in prone areas, increasing school absenteeism and even dropout (Stanke et al., 2013; Okaka and Odhiambo, 2018). Maoulidi (2010) and Kanoti, Olago, Opiyo and Nyamai (2019) noted that in low-income urban neighbourhoods and most rural areas, pit latrines are commonly used and those in flood prone areas fill up with water, bringing the sludge to the surface. In areas with rampant open defecation, floods expose communities to food and water contamination and related diseases such as dysentery, cholera, typhoid salmonellosis, and diarrhoea, among others (Stanke et al., 2013). Okaka and Odhiambo (2018) observed that stagnant water and vegetation overgrowth arising from excessive rain and floodwater increases vectors such as mosquitoes, leading to prevalence of malaria, dengue fever, yellow fever, Rift Valley Fever, among others, all affecting community members including learners and thus affecting school attendance.

Moreover, floods damage crops and contaminate food with aflatoxins, which leads to food poisoning and even death (Alakonya and Monda, 2013). In areas where floodwater lingers, crops and vegetation die due to water logging and plant diseases (Opere, 2013; Palapala and Nyamolo, 2016), leading to insufficient food and hence food intake especially for children, and hence undernutrition, malnutrition and related conditions such as marasmus, kwashiorkor, stunting and wasting (Cooper et al., 2019; Belesova et al., 2019; Osei and Lambon-Quayefio 2021; FSIN, 2021). These health conditions delay children's onset of schooling and retards learning ability (Omosa, 2005; Chotard et al., 2010; Mason et al., 2010; Friel et al., 2014; Gitu, 2016; Pathways to Resilience in Semi-arid Economies - PRISE, 2016).

A study by Tapsell et al. (2002) established existence of an intricate correlation between stress and mental health, leading to "adjustment disorder, acute-stress disorder, and post-traumatic stress disorder" (Tapsell et al., 2002: 6). They opined that the intensity and duration of suffering vary by, among others, age, gender, and occupation, and that such stress affects behaviour, learning, and school attendance. Sena and Kifle (2006), Baez, Fuente and Santos, (2009), World Health Organization - WHO (2012), Sana and Khattak (2014) and Fontalba-Navas et al. (2017) concur that following floods, loss of lives from drowning and related diseases, damage to homes, schools and other infrastructure becomes traumatic to all, including learners, leading to post traumatic stress disorders (PTSD), with all round effects including schooling.

2.2 Measures to Reduce Effects of Droughts and Floods on Schooling

Raikes et al. (2019) observed that droughts and floods pose major challenges to the community and to schooling. They also noted that while floods are given relatively more risk management attention, drought receives more crisis management, and although it may not be entirely possible to eliminate related risks of the events, efforts can be made to reduce them through preventive and preparedness measures. When preventive and preparedness measures are not adequately taken, the effects of droughts and floods on communities and schooling are sometimes catastrophic, raising the need for emergency response and recovery measures (Knutson et al., 1998). However, timely response and recovery actions and appropriate coordination of all activities prevents the effects of the events from being catastrophic.

2.2.1 Preventive measures

According to the Oxford dictionary, to prevent something means stopping it from happening. Sena and Kifle (2006) opined that prevention measures are based on a vulnerability assessment and capacity of those at risk to handle likely outcomes from the threat. In the context of droughts and floods and the risks they pose on schooling, preventive measures are at two levels: preventing the frequency or severity of the events and preventing the likely impact on members of the community, including learners. Budhakooncharoen (2003), IFRC (2011) and Belesova et al. (2019) have analyzed measures that can be taken continuously to reduce the frequency, intensity and recurrence of droughts and floods, such as proper planning and investment in environmental and water conservation, while measures to avert the events from becoming a disaster include early warning and evacuation.

Droughts

According to Sivakumar et al. (2014), one may not prevent droughts, but it is possible to prevent it from becoming a disaster; that is, avert human suffering. Environmental and water conservation, monitoring early warning and planning for response are some of the measures taken to reduce the effects of droughts on all aspects of community life, including schooling (IFRC, 2011). A study by Owuor (2015) revealed that droughts in Kenya occur due to inadequate water reservoirs; deforestation from tree cutting for settlements, agriculture, charcoal burning, and forest fires; catchment areas mismanagement that give rise to soil erosion due to poor agricultural and soil conservation practices that then causes siltation and capacity reduction in water reservoirs; and inadequate water and drought management policies.

Knutson, Hayes and Phillips (1998) and Spear et al. (2018) noted that if governments took proactive rather than reactive action by moving from crisis to risk management, serious and costly impacts of drought, such as environmental degradation that perpetuates other droughts, loss of livelihood, severe hunger and starvation, displacement and diseases would be avoided. This is because drought, just like desertification, is a gradual/slow occurrence event that lingers for long, and is never a surprise occurrence (Raikes et al., 2019). Environmental conservation activities such as tree planting and employing appropriate agricultural and range management practices while ensuring optimum land productivity are key in reducing desertification and its footprints such as droughts, and the effects they have on schooling (Tengnas, 1994; Bidwell and Woods, 2017).

Additionally, studies in Ethiopia (Wubetu, 2016), India (Singh et al., 2019), and Kenya (Aroka, 2010; Nyamieri, 2013) indicate that rainwater harvesting is a pathway to reduced hunger and starvation. The water is used for irrigation to improve food security while domestic use reduces time spent on fetching water, saving time for other productive activities including schooling, especially for girls. It also reduces the need for change of roles associated with droughts, such as withdrawal from school to dedicate the time to search for water and food, herding and working for pay (Brown, 2012; Wubetu, 2016). In Sub-Saharan Africa (SSA), improved access to safe drinking water frees up to 90 per cent of the time women and girls spend fetching water, and increases girls' school attendance by up to 15 per cent if a water point is within a 15 minutes' walk (Wilbur et al., 2015).

In recognition of the right to education accorded by the Constitution of Kenya (2010) in Articles 43(1) and 53(1), movement pattern of pastoralists is studied, and arrangements made such as creating space and capacity in schools located in the drought period destination zones. This enables learners to continue attending school when families migrate, thus preventing withdrawal from school due to drought (Government of Kenya, 2014). However, this becomes difficult to implement when migration movement extends beyond national borders to Tanzania, Uganda, and Ethiopia among other neighbouring countries, where Kenyan learners are unlikely to be accepted in schools (Krätli and Dyer, 2009). Increasing number of mobile schools, boarding schools, non-formal education (NFE) programmes and improving the quality and reach of radio lessons have been proposed as effective measures to prevent school dropout due to nomadism in drought-prone areas (Birch et al., 2010).

Various forms of integrated learning with mobility of nomadic families are possible, these being "family learning, open and distance learning (ODL), and core curriculum" (Krätli and Dyer, 2009: 1). Krätli and Dyer (2009) opines that mobile schools and distant schooling attached to permanent schools have been adopted to reduce long periods of absenteeism, poor progression and permanent withdrawal from school, and that success is limited due to inadequate infrastructure and human capacity. They observed that groups within a community have different migration patterns, which makes maintenance of class composition difficult in the mobile schools, such that learners in different levels are combined into one class with only one teacher to attend to all of them in a group of families migrating together. Distance learning is also an alternative through radio lessons, which is

no longer as widely used due to the widespread privatization of airwaves (Krätli and Dyer, 2009), limited access and poor connectivity, inconsistency of lessons, and learners' poor attention if there is no teacher available for guidance (Alam and Tiwari, 2020). Low-cost boarding schools have been increased and/or expanded in drought-prone areas, such that migrating families can leave behind school-going children to continue with learning (Government of Kenya, 2014). However, complexities arise with boarding schools when children close school for holidays, but their parents have shifted in search of water and pasture (Ruto, Ongwenyi and Mugo, 2009; Abdi, 2010; Sharifi, 2013; Government of Kenya, 2014). Moreover, there is an aspect of family learning which is lost when children are separated from their families (Krätli and Dyer, 2009).

Other measures to reduce or prevent the effects of drought on schooling for a positive effect on attendance are school feeding programmes as confirmed in a Kitui study (Mwendwa and Gori, 2019). Noting that children drop out of school to join parents in search for food and water, school feeding programmes lead to increased enrolment and retention especially during drought in the prone counties where even underage children are enrolled to benefit from the programmes (FSIN, 2021).

Sporadic fire outbreaks during droughts, normally started by herders to burn old grass for tick eradication and to create new biodiversity (Nyongesa and Vacik, 2018) put homes and schools at risk of destruction, displacement of the affected and closure of schools (IFRC, 2018; FAO, 2021). To prevent such fires, much as there is recommended burning (Bidwell and Woods, 2017), gaps referred to as firebreaks, firewalls, fireroads, firelines or fuel breaks (cut out in vegetation to help put off fires or reduce its ferocity) are essential around homes and institutions/facilities such as schools, which are at risk (Owuor, 2015, Ndichu, 2013).

Floods

Globally, major causes of floods are monsoon rains, typhoons, cyclones, tornados, higher than normal tides, tsunamis, melting ice sheets and glaciers (IFRC, 2018; WMO, 2021). A study by Bradshaw et al., (2007) revealed that a 10 per cent increase in deforestation leads to between four (4) and 28 per cent increase in frequency and severity of flooding. With depleted vegetation cover, storms/heavy rains give rise to soil erosion and concomitant siltation in water reservoirs, leading to broken dams, riverbanks, levees/dykes, and especially when they are not well constructed and/or maintained (Opere, 2004; Coleman, Kaktins and Wojnob, 2016).

Strong winds often come during heavy rains, blowing away and destroying roofs of homes and classrooms as it happened to Kadutura Primary School in Laikipia North and homes near the school. Figure 2.1 shows examples of incidences of floods and windstorms destroying schools and related infrastructure.

² <https://www.youtube.com/watch?v=JhdSDjHFYas>.

Figure 2.1: Photos showing incidences of floods



(a) Mary's St Shibuye Girls Primary Schools roof of classrooms blown off by wind (Photo by Duncan Ocholla/Standard)



(b) Liter Girls High School bus swept by floods (Photo by PD/Jimmy Gitaka)



(c) Flooded Kibarwa Primary School in Nyando Plains (Photo/PD/Viola Kosome)

More examples are given from newspaper articles and TV news showing how classrooms in various schools were damaged by strong winds, for example, Kokorwonin³ and Kipkutuny Primary Schools in Baringo,⁴ Chewara Primary School in Tiaty,⁵ and Tendwet Primary School in Kuresoi South.⁶ In some cases, learners are injured when the storms happen during the day as learning is ongoing. For example, the incidence that happened at St Mary Pakwach Girls' Primary School.⁷ Some of the key preventive measures that can help to reduce vulnerability

3. <https://nation.africa/kenya/counties/baringo/rain-storm-destroys-five-classrooms-963366>

4. <https://www.youtube.com/watch?v=JhdSDjHFYas>

5. <https://www.standardmedia.co.ke/education/article/2001267012/learning-disrupted-after-wind-blows-off-roofs-in-school>

6. <https://hivisasa.com/posts/pupils-cheat-death-as-wind-blow-off-the-roof-of-their-classrooms>

7. <https://www.westnileweb.com/news-a-analysis/pakwach/five-pupils-injured-as-heavy-wind-blows-off-classroom-roof>

and exposure, increase resilience, and guarantee continuity of learning once a strong wave of disaster has subsided include appropriate positioning of schools in relative vantage points, ensuring structures are strong enough to withstand strong winds, rains, and other calamities (UNISDR, 2012).

To prevent flooding from dam breaks, construction of several small dams along

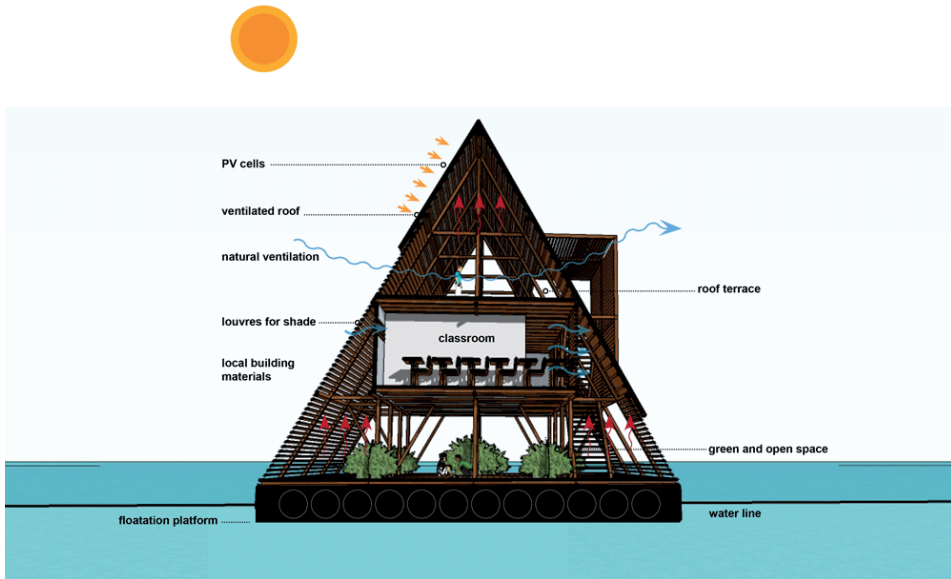


Figure 2.2: Examples of flood resilient structures



(a) Concept diagram of Makoko Floating School in Lagos Lagoon in Nigeria⁸

(b) Elevated houses in Mozambique⁹

8. <https://theconversation.com/many-african-countries-are-flooding-risking-decades-of-development-if-they-do-not-adapt-106581>

9. <https://www.sheltercluster.org/sites/default/files/docs/Learning%20how%20to%20live%20with%20Floods.pdf>

a river line besides building strong dam walls provides better security and safety compared to a large dam because the water force in large dams is more dangerous (Stephens, 2010; Gujja and Perrin, 1999). Constructing settlements, schools and other infrastructure in floodplains, areas that should be reserved for vegetation to absorb flood waters and prevent flooding, exposes inhabitants and learners to flood-related calamities (UNICEF, 2009; REGLAP, 2012) and could be avoided. Forests and green lands are good at trapping rainwater, which is useful for prevention of soil erosion, conserving soil moisture and retarding desertification (IPCC, 2019). Adoption of ecosystem-based approaches to flood risk reduction done through appropriate agricultural practices, range management, use of renewable energy, water management, proper placement of structures and infrastructural engineering practices, reduce flooding risks and increases resilience (Ried and Orindi, 2018). This encompasses changing people's mindsets to participate in reducing flooding, associated runoff, and soil erosion, through afforestation/ reforestation (Kamble, Walia and Thakare, 2013; Todorova, 2016). When floods occur due to rising water levels along shores of lakes, seas, and oceans such that previously dry land becomes submerged in water, trees/forest cover in such areas die from water logging (Basak, Basak and Rahman, 2015). People living in such areas, including learners, get displaced, but some adapt to living on water, which means construction of floating homes and schools (Feuerhake, Muianga, Nhampule and Ferreiro, 2010). Figure 2.2 (a) and (b) shows examples of flood resilient structures in Nigeria and Mozambique.

Flood risk education manuals have been designed to put in place preventive measures and deal with flood disasters, either globally or in specific regions. Netherlands, for example, has designed a manual for a specific flood-prone region in the northern parts of the country (Bosschaart, Schee and Kuiper, 2016). A guide of designs that improve school safety in the United States of America against natural hazards such as floods, wind, wildfires, earthquakes among other hazards was developed, comprehensively describing the methods and processes of making schools safer when exposed to these hazards (Federal Emergency Management Agency (FEMA), 2004). International Finance Corporation (IFC) also developed a guide to be used for physical safety of students and staff; minimize interruption to schooling; and instilling a general culture of safety in the face of disasters (IFC, 2010). Southeast Asian countries formed ASAEN, a corroborative framework to manage the disasters, with one arm being ASAEN Safe School Initiative (ASSI) programme. In partnership with Plan International, Save the Children, Mercy Malaysia, and World Vision, ASSI aimed at making schools safer using a comprehensive school safety framework that includes resource mobilization, education, and sensitization on disaster management and training in survival skills including swimming (ASAEN, 2016). The Red Cross has developed a guide to be used for training school going children and adults on how to secure themselves, identify location of safe spaces and safest route home in case of floods (IFRC, 2018). The manual is designed for use across the globe and the "National Societies in Australia, Hong Kong, Mexico, Peru, the United States of America, and the United Kingdom have adapted and are implementing it" (IFRC, 2018: 17) to reduce the effects floods and other events such as droughts have on communities and especially on schooling.

Preparedness Measures

Preparedness for drought and floods is the action taken to protect society, economy, and the environment from the devastating impacts the events can exert. It entails gathering required resources and capacity before the onset of the event (Sena and Kifle, 2006). Droughts are known to set in gradually, yet they are observed to attract more crisis management actions that majorly involve response, recovery, and reconstruction, while floods, whose onset is rapid and with devastating damage draws more risk management action that mainly include planning, prevention, and preparedness (Wilhite, Sivakumar and Pulwarty, 2014; Knutson et al., 1998; Raikes et al., 2019).

UNICEF, Plan International and Save the Children (1996) suggested that mainstreaming disaster risk reduction into all programmes including school curriculum and all social economic activities can majorly promote preparedness and increase resilience to droughts and floods. This includes early warning of a likely event based on projected weather and conditions upstream; putting in place child friendly facilities that essentially ensure children are not at risk; drainage clearing to prevent flooding, associated deaths, and infrastructure destruction; improved healthcare programmes due to likely disease outbreaks; and safe drinking water, food, and other necessities on standby. UNICEF (2009), Raikes et al. (2019) recommend having a budget for reconstruction of damaged school infrastructure, including latrines, classrooms, playfields, furniture, books and other learning materials, in addition to construction of resistant facilities as preparedness measures, noting that what is ideal for one event may be disastrous for another. Through regional learning and advocacy programmes, teachers require training to teach children how to avoid injuries and general exposure to risks associated with droughts and floods (REGLAP, 2012). Coupled with community participation in risk reduction and resilience building, swimming lessons to prevent drowning are key for preparedness (ASAEN, 2016).

The practice of integrating disaster management and risk reduction with learning in school curriculum is possible and has been proven to save lives (Asian Disaster Preparedness Centre (ADPC), 2007; Mamogale, 2011; INSIRD, nd). Learners are trained to identify a looming emergency or disaster, what to do or not do to prevent escalation of the hazard to an emergency, avoiding being caught in an injurious situation during drought or floods – for example, not crossing swollen rivers or unstable foot bridges during floods, and not starting fires during dry and windy seasons. Sena and Kifle (2006) and ASAEN, 2016) opines that education prepares people for exposure to droughts and floods, and that preparedness reduces exposure to risks posed by the events on schooling. Risk management actions such as disseminating information about their likely occurrence through education facilitates planning and how to deal with the possible outcomes. Given that education and preparedness have been identified as fundamental in reducing vulnerability to droughts and floods among other calamities, it is of essence to establish the extent of this education in the affected areas, deepening/widening the scope, implementation of what has been learned and assessment of its effectiveness (INSIRD, nd). The primary recipients of such education are learners, who then become a good conduit to pass key well-structured safety messages to

their parents, peers, and community members using word of mouth, art, drama, and music (such as disaster songs), poetry, posters, dance, and theatre (ADPC, 2007). In some countries, safety is taught as a stand-alone subject or within Geography, among other subjects.

Additional preparedness measures for floods in schools include building shelves high up on walls above likely flood water levels; roof catchment water harvesting to reduce ground runoff and avail water for use during the dry months; school-based tree planting that not only teaches the children importance of environmental management but also traps water thus reducing flow of flood water hence preventing/reducing soil erosion (Achoka and Maiyo, 2008; Nyakundi et al., 2010; Feuerhake et al., 2010). These trees also break the wind, thus protecting school structures (Tengnas, 1994). Planning and preparedness to deal with threat of wild raging fires in schools requires firefighting and evacuation skills (Niekerk, 2011). Affected learners are likely to miss school for some time during emergency situations, making it crucial to design ways of covering missed lessons as a preparedness measure (UNICEF, 2009).

A study on flooding in the Nyando River Valley established that there exists traditional knowledge and methods of predicting when floods are likely to happen, and that knowledge is widely used (Nyakundi et al., 2010). This traditional knowledge comprises human and animal behaviour before the event, weather patterns, nature of the river, and food cycle. However, the study also revealed that some of the most reliable droughts and floods risk reduction knowledge and strategies known to communities that suffer droughts and floods regularly are not put into practice due to some degree of ignorance, poverty, and eroded cultural practices (Nyakundi et al., 2010).

Response Measures

The nature of an event and its likely effect on schooling determines the required response measures, which must be efficiently and effectively executed guided by a disaster response plan.

Droughts

Response to drought includes provision of water and food to schools and communities suffering hunger and starvation. The school feeding programmes have substantially reduced hunger-driven school dropout and have been a great drought response measure, in some cases leading to increased school enrolment (Ibrahim, 2017). Provision of water in schools and neighbouring households not only reduces the need for learners to miss school to go fetching water but also incidence of diseases associated with poor water and sanitation that causes absenteeism (Komarulzaman, Jong and Smits, 2019). Though not common in Kenya, other response measures include rescuing learners from schools under the threat of wild raging fires, which demands fire fighting and evacuation skills (Niekerk, 2011).

Floods

Response action to effects of floods mainly include: rescuing those at risk of

drowning; provision of temporary shelter to families displaced by floods including learners; provision of food and water to the affected; treatment for the injured in flood accidents or infected following contamination of food and water; construction of temporary schools as regular schools are submerged and/or damaged by floods; provision of boats to help learners cross swollen rivers to and from school; provision of books, uniforms and other learning materials following floods that damage/sweep such materials away; and assisting with funerals for learners and community members that drown, *inter alia* (Niekerk, 2011; Mudavanhu, 2014; UNICEF, Plan and Save the Children, 1996).

Recovery Measures

Drought

UNICEF (2009) and National Academies of Sciences, Engineering, and Medicine (2017) concur that urgent actions are needed to help communities recover from droughts, and these are relevant for schooling since all those attending school are an integral and highly vulnerable part of the community. They note that recovery from effects of drought include regaining health following devastation from lack of food and water, as well as illnesses that affect the weakened community members including learners. Recovery happens faster when community members are involved in the intervention processes. Additionally, providing safe areas for learners during devastations is a key part of recovery and hence learners need to recover learning time lost during absence from school due to droughts. They also need to recover from trauma related to the drought experiences that range from hunger and associated death of family members and close associates.

Floods

Following floods, damaged schools are rehabilitated/reconstructed, in some cases with the participation of the learners, who in the process learn the technical models of flood proof construction when technical assistance is available. This promotes sustainability while building their capacity to deal with associated losses. It also enlightens them on what to expect and how to minimize the effects of floods on their health, school attendance, and their educational progress. Other than provision of temporary shelters, there is less likelihood for homes (where learners live) to be given similar attention in reconstruction, mostly due to the likely huge need, high cost and in some cases unclear land ownership (UNHabitat, 2019). Following a disaster such as floods, an environment audit of homes, school and even play areas is necessary to ascertain the required rehabilitation for effective safety and recovery (Mudavanhu, 2014; UNHabitat, 2019).

As UNICEF (2009) and UNHabitat (2019) note, after the initial response period following droughts and floods, a longer recovery period ensues, during which learners that lose homes, parents, siblings, and friends need to undergo counselling to recover from associated trauma. Teachers can be trained to offer counselling services to learners exposed to traumatic experiences arising from the events (UNICEF, 2009; UNDP, 2020).

Literature reviewed herein spells out the effects of drought and floods and how they directly or indirectly affect schooling in Kenya. In many cases, the literature highlights how to deal with some of the risks and effects of the events. Despite availability of this information, the effect of droughts and floods are still being experienced in Kenya. This prompted the need to explore how droughts and floods affect school absenteeism, enrollment, retention, and progression in prone areas of Kenya, gap in required actions to reduce these effects, challenges encountered, and emerging issues and to propose policies to reduce the risks and effects of the events on schooling in Kenya.

3. Methodology

This paper focuses on the effects of droughts and floods on schooling in drought and flood-prone areas in Kenya. In addressing the set objectives, literature review, primary data from a survey by Kenya Institute for Public Policy Research and Analysis (KIPPRA) undertaken in February - March 2018, and secondary information from the Ministry of Education and Kenya National Bureau of Statistics were used.

3.1 Scope

A significant part of Kenya is arid or semi-arid and experiences increasingly frequent and severe droughts and floods. Areas prone to droughts and floods form the focus of this study, covering 27 counties (Annex Table 1). Droughts occur nearly every year in some of these counties, often followed by floods especially in the downstream of major rivers such as Tana/Garana, Athi/Sabaki, Nyando, Yala, Nzoia, Mara and Perkerra, among others. Heavy rainstorms cause floods and landslides, with some parts of Kenya such as hilly areas of central Kenya, Nandi Hills, Mt Elgon and parts of Northwestern Kenya including West Pokot (slopes of Mt Elgon) experiencing landslides that carry whole villages, killing and maiming people and devastating homes, roads, and other infrastructure such as schools, hence affecting schooling in a multiplicity of ways.

3.2 Research Design

To meet the objectives of this study, qualitative research method was majorly employed with key informant interviews (KII) conducted using an interview guide (Annex 5) on key players in dealing with droughts and floods across the selected counties. The KIIs were conducted on National Droughts Management Authority (NDMA) officers, national and county government officers at the county level including county commissioners, directors of education, health, environment, agriculture and livestock. Other stakeholders including international development agencies, civil society, private companies and officers in-charge of a few health facilities and schools were interviewed on the role they play in reducing risks and suffering associated with droughts and floods. Civil society actors with a presence in the counties and actively involved in responding to droughts and floods were mainly The Red Cross, St Johns Ambulance, World Vision, Oxfam, ActionAid, Care Kenya, and Plan International, among a few others. Private firms interviewed were mostly banks and insurance companies chiefly to ascertain their role as key players in financing and mitigating risks associated with droughts and floods. The information sought to show measures taken to prevent and prepare for droughts and floods to reduce their frequency and severity, response to and recovery from the effects of the events, and coordination mechanism in place for all stakeholders and their activities. Focus group discussions (FGDs) were also held using an FGD guide (Annex 5), mostly on county steering group (CSG) members. Discussions focused on their actions to reduce likely occurrence and effects of droughts and

floods on communities and schooling, and response to ensuing emergencies following the events.

Quantitative data was collected from households using a structured questionnaire (Annex 6) for demographics information and information regarding experiences during droughts and floods, how they affect schooling among other social-economic aspects such as health, food security, infrastructure, the environment, and livelihoods.

Secondary information from other related studies and databases complemented the primary survey data, especially to show enrolment and retention and educational wastage in schools in drought and flood-prone counties relative to other counties. This additional information was gathered to strengthen the survey findings, with key reference made to education data on primary school retention relative to occurrence of drought and flood events.

While survey data provided school absenteeism and dropout associated with droughts and floods hindrances as reported by households, statistical abstracts provided school enrolment data in Grade 1 and progression to Form 1, with a comparison done between droughts and floods prone counties relative to other counties to assess wasting in primary schools. Key informant interviews with Ministry of Education, NDMA and other key players and FGD with CSG provided challenges and emerging issues encountered in attempting to reduce risks and effects associated with droughts and floods on schooling in the prone counties.

Data analysis was done alongside thematic areas of prevention and preparedness for likely occurrence of droughts and floods, response, and recovery and coordination of activities following the occurrence of the events. The findings are presented in the paper along the same thematic areas. Policy recommendations were based on outcomes of the study and the secondary data analysis.

3.3 Conceptual Framework

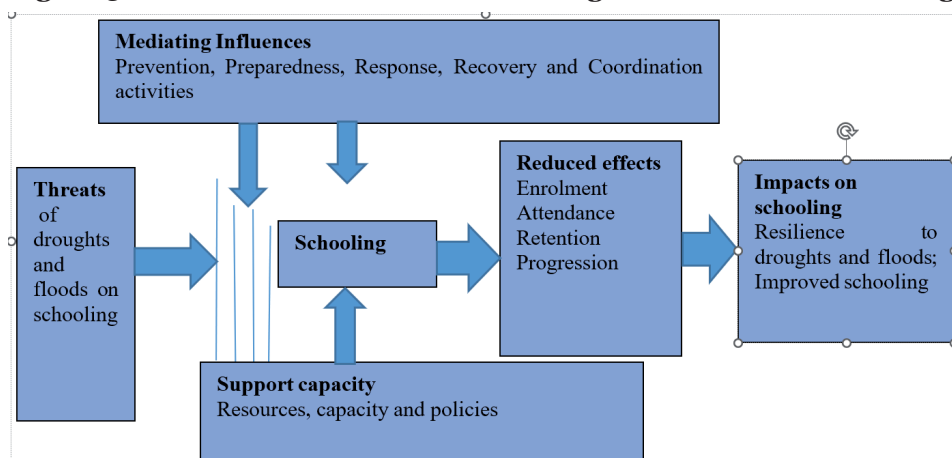
The conceptual framework in Figure 3.1 shows exposure of schooling to the threats of droughts and floods and the nature of likely effects associated with the occurrence of these events on schooling. It also shows the mediating actions and support capacity that influence the outcomes and likely impacts. The conceptualization borrows and builds on Tapsell et al. (2002) theory that shows the threats faced by a population. Mediating factors and support capacity thwart the threats to promote and strengthen populations' ability to withstand and recover from related outcomes. This strengthens resilience to threats of droughts and floods.

Droughts and floods have the potential to affect schooling. Schooling effects are proxied by poor enrolment, attendance (absenteeism), and progression. Using information from a household survey, an assessment was done on school attendance (absenteeism), seeking the number of days learners missed school in the last one year and the reason for absence. The key relationships sought was how absenteeism was linked chiefly to: hunger; search for food and water during

drought; migration of family in nomadism (searching for water and pasture); insecurity (arising from conflicts over water and pasture), rustling (to restock following loss of livestock to drought); and changing roles (where learners abandon school to look for food, water and pasture or to take care of younger siblings, the weak and the elderly); working to supplement parents' income (following loss of livelihood from droughts or floods); and infrastructure damage following floods (damaging access routes thus making schools inaccessible or school infrastructure damaged making schools unusable). Secondary data obtained from various publications by the Kenya National Bureau of Statistics and Ministry of Education was used to analyze enrolment and progression.

Communities, including learners, become highly vulnerable following droughts or flood experiences that disrupts their lives. Coping with the situation and resumption of normalcy and functionality depends on external interventions to a large extent. The range of needed actions are mediating influences while others provide support capacity at community and school level, that thwart the threats and ensure learners continue with schooling. The actions are encompassed in prevention, preparedness, response, and recovery activities that either reduce frequency of events and the severity of their impact, saving lives, and reducing misery and schooling interruptions.

- (i) Preventive measures are made at two levels before droughts and floods affect schooling: preventing the frequency and severity of occurrence of the events through mitigation actions that scatter the risks, and preventing the effects of the events through actions that protect schooling, such as building stronger raised buildings, planting windbreakers, strategic location for schools – on high grounds away from floodplains, building strong and resilient foot bridges that rise above the highest water levels.
- (ii) Preparedness for the events and for the likely effects on schooling follows preventive measures, and entails ensuring that no one is caught off-guard by the occurrence of the events. It encompasses early warnings, stockpiling foodstuff, water, and livestock feed; reinforcing dikes; and evacuating learners to higher ground.
- (iii) Response to droughts and floods events is needed when the event has taken place and has affected schooling. The objective is to relief suffering, and it entails evacuating marooned learners; providing food and water; electing temporary homes and schools.
- (iv) Recovery from the events and their effects details how the affected schools and learners are helped to go back to the pre-event status or better through rebuilding homes and schools and other infrastructure, recovering learning time lost, and restocking animals.
- (v) Coordination focuses on how all these actions are conducted, and the guiding frameworks for efficiency and effectiveness.

Figure 3 1: Process model - threats of droughts and flood to schooling

Source: Author's conceptualization (Built on Tapsell et al., 2002 Process Model)

The support capacity determines how the actions listed above are implemented and how the risks and effects are reduced. The support system includes actors that take mediating actions and how they do so. In addition to national and county governments, the actors cut across development partners, UN agencies and civil society, the private sector and the community. The resources include what is required to take these actions and how they are put together. The actors are involved in supporting actions before the event (prevention and preparedness), during the event (response) and after the event (recovery), to thwart the threats and alleviate suffering from the effects. Their activities and resource management must be well coordinated to yield substantial outcomes and impacts. There must, therefore, be some frameworks, principles, and policies to guide the process.

3.4 Sample and Data Sources

The KIPPRA Droughts and Floods Survey 2018 was conducted in February - March 2018 (just before the onset of the April rains) on a sample comprising 1,370 households and spread across 27 droughts and flood-prone counties (Wajir County was supposed to be part of the survey as the 28th but could not be covered due to insecurity). The clusters, households and the firms were scientifically selected with the assistance of Kenya National Bureau of Statistics (KNBS) using their sample frame following a request by KIPPRA. The main secondary source of data was KNBS publications, such as the statistical abstracts and economic surveys and the Ministry of Education publications.

3.5 Limitations

The KIPPRA Droughts and Floods Survey 2018 was to be conducted on a sample comprising 1,500 households contained in 150 clusters across 28 counties, with 10 households in each cluster. However, due to insecurity, Wajir County was not covered, thus reducing the counties to 27. A single building urban cluster in Kilifi County and a few households across the region were non-responsive.

Due to the nature of the survey, specific data to show the magnitude to which droughts and floods led to poor enrolment, progression and retention was not collected. The discussions in this paper are based on a comparison between ASAL counties and the rest of the country using secondary data. No mapping was done to assess the numbers and exact location of schools affected by the events or differences in effects across the counties. A specific survey on schooling is, therefore, recommended for this kind of data collection and analysis for even better recommendations policy interventions.

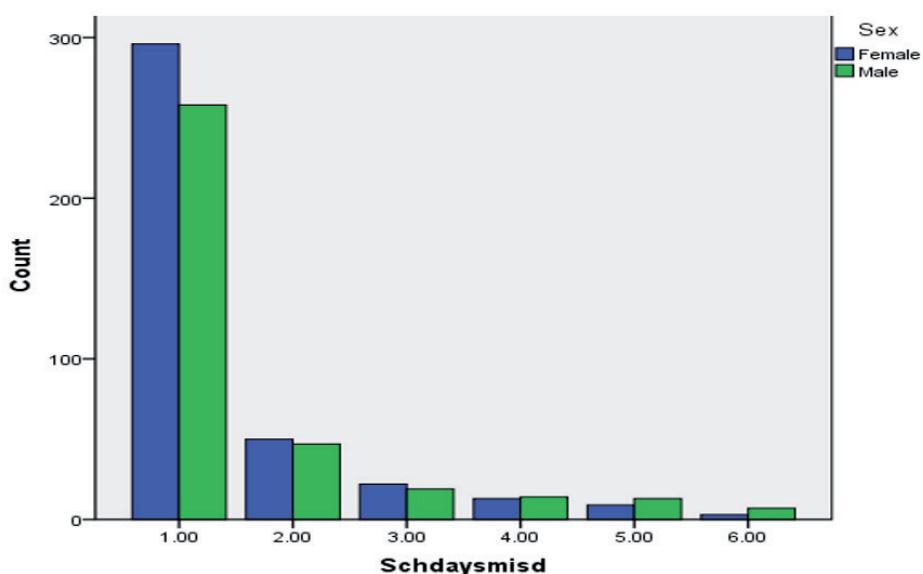
4. Results and Analysis

Droughts and floods affect schooling directly or indirectly through various sectors, including agriculture and livestock, water, health and nutrition, infrastructure, transport and trade, security, and the environment. When sectors are affected, learners miss school for days while others permanently drop out of school due to related challenges such as health, economic losses, and waned interest. The outcomes of the household survey, key informant interviews and focus group discussions with stakeholders including national and county government officers/ members of CSG yielded findings as presented in the following sections.

4.1 Interruptions to Learning and Absenteeism in the Face of Droughts and Floods

The study revealed that some of the drought and flood-prone counties suffer prolonged periods of drought, followed by devastating floods. Majority of the learners missed school for less than seven days, followed by eight (8) - 14 days (Figure 4.1). Very few learners missed more than 30 days of schooling.

Figure 4.1: Number of school days missed by sex

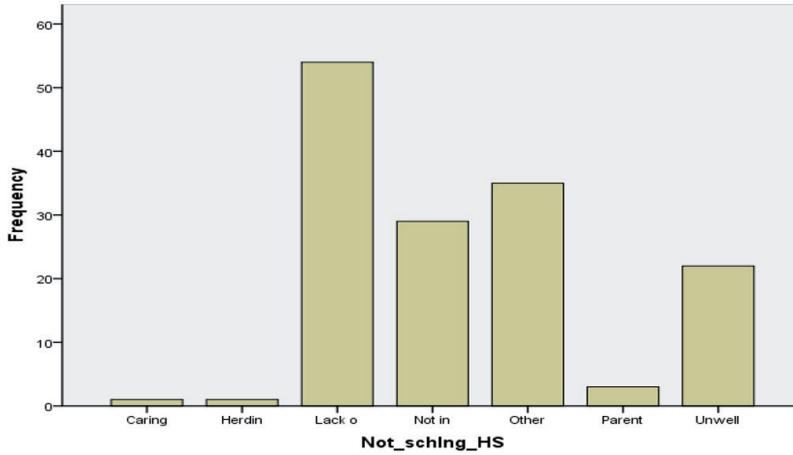


1.00 = 1-7days; 2.00 = 8-14 days, 3.00 = 15-21 days, 4.00 = 22-30 days, 5.00 = 31-90 days and 6.00 = over 90 days.

Data source: KIPPRA 2018 Survey Data

Most of the learners not in school during the survey were absent for the reasons detailed in Figures 4.2.

Figure 4.2: Reason for not being in school

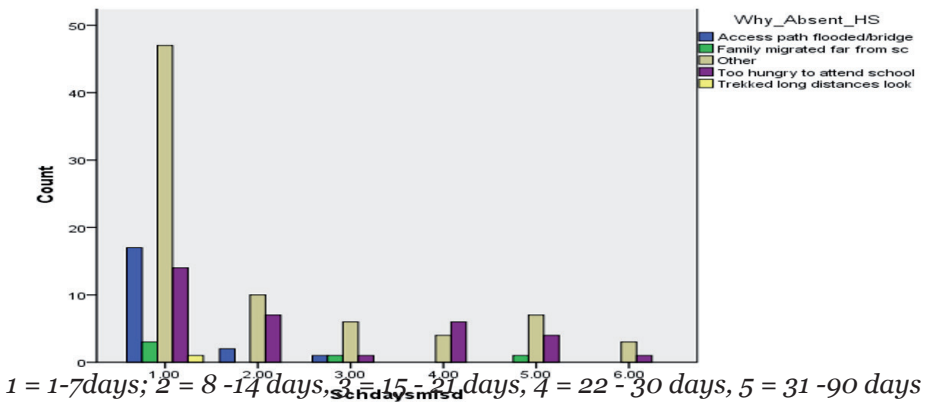


Caring = caring for the younger sibling; Herding = Herding animals; Lack o = lack of school fees; Not in = Not interested; Parent = Parent not interested; Other = additional reasons for missing school

Data source: KIPPRA 2018 Survey Data

As shown in Figure 4.2, lack of school fees, learners not being interested in school and being unwell were the main reasons why they missed school, with ‘other’ being some of the reasons given in Figure 4.3.

Figure 4.3: Period of absence from school and reason for absence



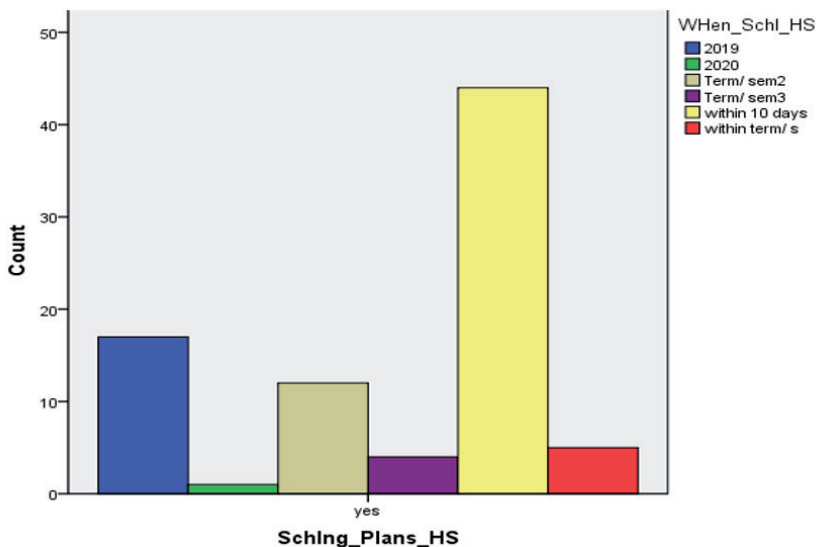
Data source: KIPPRA 2018 Survey Data

Learners who were absent from school for one week or less indicated they were absent because they were too hungry to attend school (Figure 4.3). The most prevalent reasons indicated as ‘other’ in Figure 4.3 are those reasons given in Figure 4.2. Additional reasons for missing school included: family migrating far

away from school and trekking for long distances to look for water and food. All these were associated with the 2017 and early 2018 drought.

Majority of the learners that were not in school during the survey, but were intending to go back, gave intent to resume within 10 days or within the term (first term), others planned to resume in second term (that was set to begin in May 2018), indicating absence from school throughout February and March 2018 followed by April school holidays (Figure 4.4). A few learners planned to return to school in the third term (that was set to begin in September 2018). Many learners did not plan to return to school until 2019, with a few indicating they will return in 2020. If one is absent from school for a term or two, continuity becomes an issue. When that turns into a year or two for those who indicated they would return in 2019 and 2020, chances of returning were slimmer.

Figure 4.4: When learners not in school during the survey were planning to return to school



Data source: KIPPRA 2018 Survey Data

Learners lose an average of eight days (Table 4.1) due to ill-health associated with droughts and floods. Those in the labour force missed an average of 25 days in a year from work due to the effects of droughts and floods. When parents in the labour force are predisposed, there are primary and secondary implications to learners. Not earning anything for family upkeep, especially for casual workers, affects the family economically. This negatively affects schooling in a multiplicity of ways, such as hunger due to parents' inability to buy food and not being able to meet school-related expenses (such as fees, uniforms, sanitary towels, and books among other needs). This causes further absenteeism indirectly linked to parent/guardian's health.

Tables 4.1: Absenteeism from school and work due to droughts and floods

Variable	Observations	Mean	Standard Deviation	Min	Max
School days missed per year	1,029	8.2	26.7	0	365
Workdays missed per year	900	25.2	208.5	0	365

Data source: KIPPRA 2018 Survey Data

Droughts and absenteeism

ASAL counties face drought repeatedly, exposing people including learners to extreme conditions that culminate to hunger, ill health, wasting, and stunting, causing poor school attendance and interrupted learning. Additionally, given that drought devastates crops and livestock that parents make a livelihood from, it renders them unable to pay fees and meet subsistence expenses. It therefore leads to food insecurity from agricultural and livestock devastation.

In Kajiado County, school-going children were malnourished, with some of them unable to join Form One by February 2018 (during data collection). Some families reportedly lacked food and could only afford one meal a day if any. In Nairobi County and other urban areas, drought was confirmed to lead to water scarcity and rationing. Food shortage affects primary school learners more, with many of them having only one meal at school. Schools under feeding programmes receive underage children sent to school so that they can eat, making such schools overpopulated while schools without a feeding programme lose learners. In West Pokot, only 36 out of 126 schools had a school feeding programme in 2017, mainly in North Pokot Sub-county. Schools in western parts of West Pokot County (Riwo, Sigor, Masol, Turkwel) did not have a school feeding programme because the area is assumed not to need a feeding programme. However, during prolonged droughts, most schools in the county get affected, and some are forced to close thus paralyzing learning.

Drought also lead to serious water shortages for drinking and cleaning as rivers, wells and even boreholes and other reservoirs (pans, ponds, and dams) dwindle. Learners are forced to abandon school to look for water, while those on school water fetching duty, especially in school with a feeding programme, spend up to a whole day looking for water, to be used for cooking. The water shortage leads to poor hygiene practices. Hands are inadequately/ineffectively washed or not washed at all, food is not well cleaned before cooking/eating, and utensils are not well cleaned. Besides high evaporation, open/stagnant water pools on riverbeds, water pans and ponds are shared with wild and domestic animals, causing high pathogen contents, yet it is not boiled or treated before consumption, which is a threat to human health. The consumption of contaminated water was blamed for prevalence of diseases such as cholera, rotavirus, cryptosporidiosis, dysentery, and increase in intestinal worms. Drought is also associated with too much dust

that affects asthmatic people while also causing flu and pneumonia. Table 4.2 shows diseases that were reported as arising during drought that led to health-related absenteeism from school.

Tables 4.2: Diseases reported as prevalent during droughts

Category	Disease prevalent during drought
Water borne	Diarrhoea, cholera, rotavirus, cryptosporidiosis, dysentery, intestinal worms
Vector borne	Chikungunya
Food borne/ shortage	Toxicity, for example, aflatoxin; chemical contamination, diarrhoea, starvation, under-nutrition, malnutrition, kwashiorkor, marasmus
Air (dust, dirt)	Viral and bacterial pneumonia, flu, asthma, bronchitis, eye infections, for example, trachoma, conjunctivitis, jiggers, skin infection – scabies
Temperatures	Hyperthermia
Trauma	PTSD (mental illness and worsening of chronic diseases)

Data source: KIPPRA 2018 Droughts and Floods Survey

Noting that drought gives rise to conflict, there is significant movement when it strikes. Shortage of food, water, and pasture forces pastoralists to migrate in nomadism. Drought was also said to be a push factor for rural-urban migration. Some learners migrated alongside community members, abandoning school. Children left behind to attend school also took the responsibility of taking care of their younger siblings, the weak and the aged and the few animals left behind. Often, such a responsibility can be overwhelming, forcing many learners to abandon school. Boys drop out mostly from Grade Six and Seven at primary school level or Form One and two for those in secondary school, with some joining tuk tuk/ boda boda business or picking miraa (in upper eastern) to earn an income. Girls drop out to take care of their younger siblings, undertake household chores, fetch water and firewood, although the boy child may survive and return to school later when the situation improves. However, it is more difficult for the girls to go back to school since some get coerced into prostitution, get pregnant or are married off, making them to permanently drop out of school. This outcome has been echoed by Adaawen et al. (2019) and the UN Migration Agency (International Organization for Migration (IOM), 2016).

In other cases, the whole family migrated, affecting school accessibility such that children especially those in day primary schools were withdrawn from their regular schools. Some had access to mobile schools while others lost access to education, with a high likelihood of increased dropout especially for the girl child. Although some mobile makeshift schools were created in some of the destination places, they only had one teacher available who combined learners across different school levels in one class and taught them most subjects. In some cases, some learners were asked to report in the morning and others in the afternoon to make it easy for the teacher to handle them.

In nomadism, pastoralists move with animals to neighbouring counties or countries such as Tanzania (from Taita Taveta, Kajiado and Narok), Uganda (from West Pokot) and Ethiopia (from Turkana and Marsabit). In some cases, the newcomers are not welcome, and conflict arises. Farming communities do not take kindly herders who destroy their crops. Such conflicts lead to displacement and/or damage, hence poor access to schools for children in conflicting communities. For example, pastoralists from Garissa and Tana River camped in the northern parts of Kilifi bordering Kitui during the 2017 drought, birthing conflicts that led to the closure of some schools in the conflict zones. During clashes in Isiolo between Borana, Somali and Turkana communities, schools and homes were burnt down. Kagir Primary School in Baringo was closed following an attack during the 2017 drought while Kawop and other schools in Baragoi, Samburu County, were closed following repeated clashes. Several schools in Tot Division of Elgeyo Marakwet relocated to the escarpment following cattle rustling raids by West Pokot and Baringo raiders, while in other parts of the county, schools maintained two locations, one in the valley and another on the hills. During conflicts, the community stayed on the hills from where they could see the enemy from a distance, and back to the valley during times of peace. Having two locations for one school made infrastructure development expensive for the relatively poor communities, with those parents not able to contribute to infrastructure development forced to withdraw their children from school.

The Early Childhood Development Education (ECDE) children were found to be affected by drought due to poor diet, were exposed to poor hygiene standards and hence poor health. Cases of child abandonment during droughts were reported to the provincial administration. Parents failed to prioritize education for young children, with the perception that they could start school later when resources are available, thus prioritizing family subsistence and survival. This led to a reduction in the number of learners enrolled into the ECDE programmes and a delay in starting schooling, culminating to long-term stigma in later stages and eventual dropout. Children get most affected as government resources meant for their programmes are easily reallocated/redirected to emergency response, yet strict commitment to children education, nutrition and health is required even in the face of drought. During drought, children get exposed to low Global Acute Malnutrition (GAM)¹⁰ levels, causing related health problems that force them to miss school, some for intermittent periods of up to 30 days in a term.

Floods and Absenteeism

Counties usually affected by floods include Busia, Bungoma and Kakamega counties in Western Region; Kisumu, Homa Bay and Siaya counties in Nyanza Region; Mombasa, Kwale, Kilifi, Tana River and Taita Taveta counties in Coast Region; Garissa, Mandera, and Wajir counties in North Eastern Region; Isiolo, Marsabit, Kitui, Machakos, and Makueni counties in Eastern Region; Samburu, Turkana, West Pokot, Kajiado, Narok, Trans Nzoia, Elgeyo Marakwet, and Nandi

¹⁰ GAM is a measure of acute nutrition in children aged 6 to 59 months. According to the UNHCR standards, GAM of 10 percent or less in a population has low or medium public health concern. If more, the severity is considered of high public concern and immediate actions must be taken.

in Rift Valley Region; and Nairobi County in Nairobi Region. Some of these areas flood more than others, with hilly parts suffering ranging flash floods and landslides while lowland flat areas suffer widespread floods.

Figure 4.5: Effects of floods



(a) Tana River County learners on canoes crossing Tana River, which is dangerous during floods (b) Flooded houses in Mwanja Tana Delta¹¹

Floods affect schooling in a multiplicity of ways. Following heavy rains especially upstream, parts of Tana River such as Bura, Garole, Tana Delta get widespread floods. Similarly, Busia (Budalangi), Kisumu (Nyando and Yala basins), Homa Bay (basins of Awach Tende, Maugo, Miriu, Kuja and Oyombe rivers) among other river basins get flooded. During such floods, bridges and roads are swept off, health facilities, schools, and homes are damaged, rendering many people including learners displaced and/or homeless while books and other learning materials get damaged by the floods. Schools fail to reopen because they become unusable/inaccessible for prolonged periods. Some schools are located across rivers that swell during rains. Subsequently, learners use boats, canoes, and simple rafts to cross the rivers to access school (Figure 4.5a). Crossing such rivers comes with a measure of risk as learners drown when attempting to cross the swollen rivers to or from school.

Following the advice by the county administration before the floods, families move to higher grounds away from the flood zones, in some cases taking the learners farther from their schools. It becomes less attractive for the learners to take the risk and trek the extra distance to school and especially through flooded plains. In other cases, schools are used as displacement camps, thus halting learning.

¹¹ <https://www.the-star.co.ke/counties/coast/2019-12-24-locals-in-distress-as-floods-submerge-villages-in-the-tana-delta/>

In some cases, schools get too damaged by floods, needing long periods of time and substantial resources to rebuild. In other cases, the floods linger for long especially in schools near rivers and lakes with rising water levels that swallow up the school grounds, homes, and farms (for example, in Baringo, Busia, Kisumu and Siaya counties). Where possible, learners are redistributed to other schools, with cases of withdrawal due to related stress and trauma. Some schools close for two to three weeks in a term during floods, making it difficult for learners to catch up with the syllabus on reopening. During floods, transportation of final primary and secondary examinations becomes difficult, requiring airlifting of the materials, hence delaying the examination if equipment to airlift are not readily available. These flood-related concerns contribute to prolonged absenteeism.

Waste materials in urban areas block drainages (Figure 4.6), leading to blockage consequently causing floods that submerge homes, schools, hospitals, and other infrastructure. Resultant urban traffic jams attract hiked fares that force many, including learners, to walk long distances for hours, wading in water and rain. Subsequent fatigue and ill-health affects learners' attentiveness and school attendance. Life is threatened as some get swept into open storm drains and manholes.

Figure 4.6: Solid waste filling storm drains



Source: Photos taken in Kisauni during the KIPPRA 2018 survey

Parents, especially casual labourers and *jua kali* workers, are unable to earn a living during severe flooding, which affects daily earnings, promotes inability to meet family subsistence and school-related expenses, which leads to absenteeism and/or dropout from school.

In addition, flood-related accidents happen, affecting people including learners, with cases of drowning in still or fast-moving flood water, landslides, falling trees, collapsed buildings/homes, bridges, among other infrastructure causing injuries and curtailing schooling. Health is affected through water borne diseases that become rampant and widespread especially in slums that have poor sanitation. Young children love to play in waters, including flood water and are most at risk. They play in sewers contaminated water (especially in urban areas, coastal areas, and places with high water tables where pit latrines fill up and spill out waste with flood water), exposing the children to diseases (such as cholera, bilharzia and

intestinal worms, among others), and consequently keeping them out of school. For example, in Nairobi County, floods damage homes, with cases of drowning in the informal settlements such as Huruma, Karoreni, Mathare, Mukuru, among other areas. In Mombasa County, periphery wall to Padya hospital that borders Mbaraki School collapsed following heavy rains, killing at least six people. Primary schools, including Star of the Sea, Maji Safi, Jambi la Wageni, Kwachura, Migandini and Utange, among others, became stricken and inaccessible during floods, forcing learners to stay away for two to three weeks during the rainy seasons. Classrooms collapse and toilets sink when it floods, leaving learners exposed and without crucial facilities in many parts of the prone areas, forcing premature schools' closure and interrupted learning.

The issue of sanitation has serious health effects during floods. In areas where people use bushes as the toilet, floods sweep human waste into rivers, pans, ponds, and other water reservoirs, contaminating drinking water with pathogens and other bacterium such as *E. coli* that cause severe and sometimes bloody diarrhoea, cholera and typhi, *inter alia*. Table 4.3. shows the diseases that occur during floods. Vectors such as mosquitoes proliferate, leading to malaria infestation alongside other vector borne diseases such as yellow and dengue fever. The resultant dampness also leads to increased asthma, flu and pneumonia incidences. The diseases affect learners, causing health-related school absenteeism.

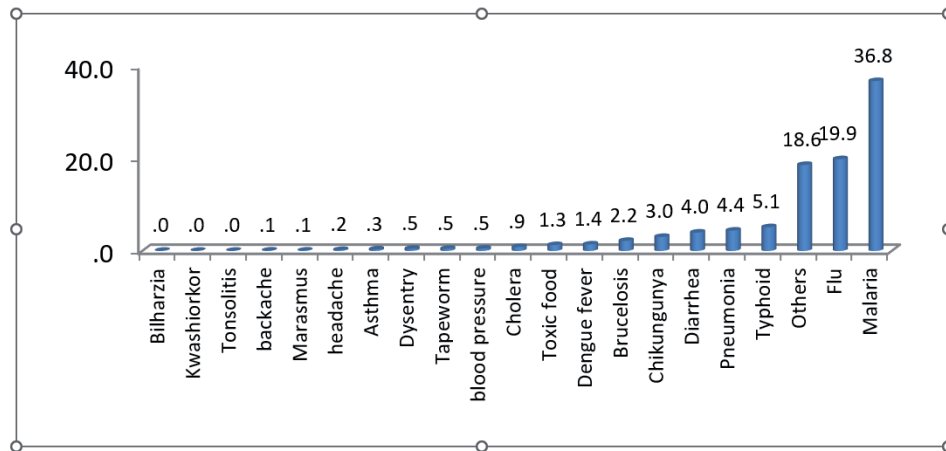
Tables 4.3: Diseases reported as prevalent during floods

Category	Disease prevalent during drought
Water borne	Diarrhoea, cholera, rotavirus, Cryptosporidiosis, dysentery, intestinal worms, typhoid, amoeba, bilharzia
Vector borne	Malaria, dengue fever, yellow fever
Food borne/shortage	Toxicity, for example, aflatoxin; chemical contamination, diarrhoea
Air (cold, mold)	Viral and bacterial pneumonia, meningitis, measles, flu, asthma, bronchitis
Temperatures	Hyperthermia
Trauma	PTSD (mental illness and worsening of chronic diseases)

Data source: KIPPRA 2018 Droughts and Floods Survey

Thirty-seven (37) per cent of household members suffered malaria (Figure 4.7), which is associated mostly with floods while nearly 26 per cent suffered flu, pneumonia and asthma associated with dampness and cold weather during the wet season. Learners' health is affected alongside other community members, which increases their absenteeism in school.

Figure 4.7: Prevalent diseases during droughts and floods



Data source: KIPPRA 2018 Droughts and Floods Survey

4.2 School Enrolment and Progression in the Face of Droughts and Floods

Progression

As an indicator of progression, we used number of learners that enrolled into primary school in 2007, 2008, 2009 and 2010 against those that enrolled into secondary school in 2015, 2016, 2017 and 2018 (that is, after eight years of primary school education)¹² instead of the usual transition from primary to secondary school data given every year). We then compared droughts and flood-prone counties with the others to assess whether droughts and flood-related concerns contributed to poor retention and progression to secondary school in the drought and flood-prone areas.

The analysis was done with the assumption that there was no inter-county movement of learners, such that learners who were enrolled in primary school in a particular county progressed to secondary school within the same county. Learners who enrolled in class one in 2007 completed primary school (Class Eight) in 2014 and joined secondary school (Form 1) in 2015, while those that joined class one in 2010 completed class eight in 2017 and joined Form 1 in 2018 (Table 4.4). Though short, this four-year span was adequate to show the desired trend.

The number of learners who progressed from Class 1 to Form 1 is shown in percentages in the last four columns of Table 4.4. On average, only about 28.5 per cent of learners who enrolled into Class 1 between 2007 and 2010 progressed

¹²The comparison could not be done for other years because the county data obtained from statistical abstracts is only available from 2013 to 2019 publications and runs back to 2007 only for class 1 enrolment. from 2013 to 2019 publications and runs back to 2007 only for class 1 enrolment.

to Form 1 (secondary school) in the droughts and flood-prone counties compared to 38.7 per cent in other counties. This is an indication of a much higher dropout (educational wastage) within primary school level in the prone counties, pulling down the national average to about 31 per cent. This essentially means there is educational wastage of 69 per cent within primary school level nationally, 71.5 per cent in the droughts and flood-prone counties and 61.3 per cent in the others. The causes of such wastage are many and varied, with direct and indirect effects of droughts and floods and their implications on schooling being key for such a big difference.

During 2007 to 2018, droughts and floods were experienced in the country. The country experienced widespread droughts in 2007, 2008, 2009, 2011, 2012 and 2017, and floods in 2008, 2010, 2013, 2014 and 2015 (localized) and 2018 (widespread). Although a more detailed study will be needed to extract the proportion of educational wastage directly and indirectly credited to the droughts and to floods, drought was particularly likely to be the most significant reason for learners dropping out of school given its prolonged nature, and ability to devastate agriculture and livestock, which are the mainstay of majority of Kenyans and hence a threat to food security for livelihoods, both of which are essential to sustain learners in school. Embu County recorded the lowest progression of between 13.7 and 14.5 per cent during the reviewed period. As observed from Table 4.4, of the 314,819 learners enrolled in class one in 2007, only 43,249 joined form 1 in 2015 (upholding the assumption of no inter-county movement).

Other counties such as Marsabit, Tana River, Narok and Kwale had progression of below 20 per cent, with Kilifi and Isiolo just surpassing this mark. Most of the other drought and flood-prone counties had a below national average progression rate of between 20 and 30 per cent. Mandera had just above average progression, though oscillating widely, while Wajir started off well but declined steadily. Tharaka Nithi and Garissa show the best progression among the drought and flood-prone counties, though Garissa figures have a declining trend. Meru County had the highest progression of 88 to 95 per cent. The majority of drought and flood-prone counties portray a high dropout rate, which fortifies the call to protect schooling and the education sector from the impacts of droughts and floods. Ayub (2018) established in a study in Baringo County boys' completion rate of 77.3 per cent and 55.6 per cent for girls; girls' dropout rate from school in the ASAL counties is higher due to economic, social-cultural, and environmental factors credited to the harsh climatic conditions.

Enrolment

Table 4.5 indicates the gross enrolment rate (GER) in pre-primary, primary and secondary schools for select years for which data was available. It shows that, on average, there was a lower GER in ASAL and flood-prone counties compared to other counties. For nearly all the years, less than 60 per cent of learners proceeded to secondary school in the ASAL and flood-prone counties on average, compared to nearly 90 per cent of learners in the rest of the country. Counties such as Garissa, Mandera, Marsabit, Samburu, Tana River, Turkana, Wajir and West Pokot had the lowest rates, with Wajir recording the lowest rate of below 20 per cent. It is

Tables 4.4: Enrolment in primary school (2007-2010) and progression to secondary school (2015-2018)

County	Class 1 enrolment- Primary					Form 1 enrolment - Secondary					Progression (%)				
	2007	2008	2009	2010		2007	2008	2009	2010		2007/ 15	2008/ 16	2009/ 17	2010/ 18	
Bomet	116,868	117,204	118,714	122,456		61,354	66,458	69,072	74,020		52.5	56.7	58.2	60.4	
Bungoma	400,407	419,312	433,528	460,825		117,190	127,469	132,482	141,465		29.3	30.4	30.6	30.7	
Kakamega	472,891	495,218	507,169	528,560		126,747	134,842	140,145	145,562		26.8	27.2	27.6	27.5	
Kericho	276,721	277,517	291,914	293,851		59,908	62,865	65,337	67,413		21.6	22.7	22.4	22.9	
Kiambu	291,765	299,354	304,744	316,030		121,151	126,061	131,018	132,628		41.5	42.1	43	42	
Kirinyaga	103,006	105,685	122,992	124,823		43,708	45,099	46,873	47,548		42.4	42.7	38.1	38.1	
Kisii	273,111	285,714	319,820	346,015		118,594	119,123	123,808	124,817		43.4	41.7	38.7	36.1	
Lamu	22,633	23,178	22,337	24,815		5,954	6,005	6,241	6,602		26.3	25.9	27.9	26.6	
Meru	105,537	109,681	109,150	109,150		92,897	97,153	100,974	103,591		88	88.6	92.5	94.9	
Migori	240,366	251,457	274,072	291,215		70,125	75,405	78,370	83,070		29.2	30	28.6	28.5	
Murang'a	198,356	203,515	239,992	243,947		103,250	106,273	110,452	112,380		52.1	52.2	46	46.1	
Nakuru	358,556	359,588	385,637	397,147		120,374	128,864	133,932	141,011		33.6	35.8	34.7	35.5	
Nandi	222,671	223,311	235,135	247,658		55,629	60,319	62,691	66,608		25	27	26.7	26.9	
Nyamira	145,012	151,704	151,183	165,165		53,021	52,040	54,087	56,808		36.6	34.3	35.8	34.4	
Nyandarua	149,204	153,085	158,450	160,494		54,312	57,008	59,250	61,148		36.4	37.2	37.4	38.1	
County	Class 1 enrolment- Primary					Form 1 enrolment - Secondary					Progression (%)				
	2007	2008	2009	2010		2007	2008	2009	2010		2007/ 15	2008/ 16	2009/ 17	2010/ 18	
Nyeri	145,906	149,701	149,383	153,585		68,646	69,603	72,340	75,252		47	46.5	48.4	49	
Trans	229,408	230,069	234,374	242,965		61,243	69,275	71,999	75,992		26.7	30.1	30.7	31.3	
Nzoia															
Uasin Gishu*	184,954	185,486	196,989	201,574		59,831	67,314	69,961	72,903		32.3	36.3	35.5	39.3	

Vihiga	180,112	188,616	188,879	190,473	56,157	60,895	63,290	66,844	31.2	32.3	33.5	35.1
Average									38.0	39.0	38.8	39.1
Baringo	142,127	142,536	145,451	151,177	37,155	38,560	40,076	40,829	26.1	27.1	27.6	27
Busia	220,102	230,494	235,551	241,279	47,580	51,273	53,289	56,957	21.6	22.2	22.6	23.6
Elgeyo Marakwet	110,399	110,716	117,372	131,195	30,264	32,940	34,235	34,904	27.4	29.8	29.2	26.6
Embu	314,819	327,184	337,016	344,991	43,249	46,427	48,253	50,047	13.7	14.2	14.3	14.5
Garissa	30,001	35,067	44,698	52,661	16,328	19,357	20,118	21,377	54.4	55.2	45	40.6
Homa Bay	283,162	296,229	299,765	340,012	80,431	84,321	87,637	90,308	28.4	28.5	29.2	26.6
Isiolo	24,004	24,947	25,812	25,978	4,460	5,370	5,581	5,788	18.6	21.5	21.6	22.3
Kajiado	90,810	91,072	100,144	115,056	28,535	29,354	30,508	31,611	31.4	32.2	30.5	27.5
Kilifi	266,488	272,910	275,126	280,401	51,765	54,904	57,063	59,848	19.4	20.1	20.7	21.3
Kisumu	240,538	251,638	260,311	313,386	71,000	75,929	78,915	81,680	29.5	30.2	30.3	26.1
Kitui	328,528	341,432	344,242	347,613	80,417	84,577	87,903	90,777	24.5	24.8	25.5	26.1
Kwale	157,454	161,249	168,115	169,427	27,547	28,825	29,959	30,780	17.5	17.9	17.8	18.2

County	Class 1 enrolment- Primary				Form 1 enrolment - Secondary				Progression (%)				
	2007	2008	2009	2010	2007	2008	2009	2010	2007/ 15	2008/ 16	2009/ 17	2010/ 18	
Lalikipia	85,424	85,670	99,966	101,023	30,955	32,422	33,697	34,568	36.2	37.8	33.7	34.2	
Machakos	287,241	298,524	299,942	302,942	101,529	104,987	109,116	111,223	35.3	35.2	36.4	36.7	
Makueni	293,803	305,343	305,275	305,235	96,190	102,579	106,613	110,413	32.7	33.6	34.9	36.2	
Mandera	10,148	46,929	54,417	56,303	13,923	15,841	16,464	17,744	34.7	33.8	30.3	31.5	

Marsabit	40,331	41,915	47,221	48,052	6,438	7,433	7,725	8,114	16	17.7	16.4	16.9
Mombasa	81,333	83,293	101,411	105,987	31,111	33,427	34,742	36,976	38.3	40.1	34.3	34.9
Nairobi	319,000	320,102	345,939	347,024	74,878	86,057	89,441	96,137	23.5	26.9	25.9	27.7
Narok	175,409	175,914	177,531	185,518	29,594	32,142	33,406	35,694	16.9	18.3	18.8	19.2
Samburu	32,783	32,877	36,815	45,484	6,815	8,031	8,347	8,752	20.8	24.4	22.7	19.2
Siaya	259,545	271,522	271,628	285,107	73,547	76,481	79,489	82,892	28.3	28.2	29.3	29.1
Taita Taveta	74,616	76,414	77,161	83,965	21,897	22,255	23,130	23,168	29.3	29.1	30	27.6
Tana River	40,832	41,816	45,648	52,975	6,467	6,777	7,044	7,357	15.8	16.2	15.4	13.9
Tharaka-Nithi	86,366	89,759	96,530	100,843	41,254	44,228	45,967	47,268	47.8	49.3	47.6	46.9
Turkana	53,471	53,625	60,839	64,456	20,780	24,994	25,977	26,748	38.9	46.6	42.7	41.5
Wajir	28,481	33,291	39,057	43,028	11,786	12,937	13,446	14,403	41.4	38.9	34.4	33.5
West Pokot	105,452	105,755	108,262	119,345	22,995	29,189	30,337	30,677	21.8	27.6	28	25.7
Average									28.2	29.6	28.4	27.7
Total/National	8,330,151	8,577,618	8,965,707	9,381,211	2,558,981	2,656,374	2,760,839	2,942,705	30.7	31.0	30.8	31.4

Data source: KNBS, 2013 and 2018 *Data on Uasin Gichu varied in different statistical abstracts

good to note that grade repetition and inclusion of under-age learners due to early school entry or over-aged due to late entry result to the over 100 per cent GER. It could also mean that the county is a destination from out of county for learners. Further analysis of this data is needed to establish which between the four possibilities is more prevalent across the country to identify and segregate within GER proportion from out of county enrolment (and source counties), repetition, early and late entrants. Then it will be possible to compare the droughts/floods prone and non-prone counties along all these facets.

4.3 Droughts and Floods Events: Prevention, Preparedness, Response, and Recovery

Prevention and preparedness reduce the likely effects of droughts and floods while response and recovery reduce misery following the events. Coordination mechanisms increase efficiency. Buffering capacity is enhanced as a preventive measure but if the events lead to a change in the community functionality due to damage and/or displacement, some response mechanisms are employed, such as giving relief food and water distribution. When the event turns into a disaster, the government declares a state of emergency and calls for international support to deal with the outcome of the disaster. Recovery measures include creation of camps where the affected people can be provided with food, water, temporary shelter, clothes, bedding, and increased emergency services to prevent further exposure. Preventive, response, and recovery interventions are meant to bring the affected back to pre-event status or better.

Although droughts and floods negatively impact all members of the community in affected areas, different age-groups are affected differently depending on their regular occupation. The events impede the ability of learners in pre-primary, primary and secondary schools to continue with schooling. In many cases, the actions taken for the community impact the learners but specific actions for learners are also required. Besides rescue and evacuation activities, learners often need materials to support them to continue learning, bursaries for the affected, enhanced school feeding programmes, mobile and temporary schools among other measures. Social protection is often a long-term recovery measure, which is often pegged to enrolment and continued school attendance for school going children.

Prevention and Preparedness

Environmental conservation is a key preventive measure for droughts and floods frequency and severity. According to the directors of environment in the drought prone counties, drought devastates the vegetation, leading to loss of animals and hence livelihood for pastoralists. Charcoal burning and sand harvesting are employed as coping mechanisms, further devastating the environment. Floods follow to find bare soil and soil erosion ensues, causing environmental degradation that perpetuates increased frequency and severity of droughts and floods. Since environmental conservation reverses deforestation phenomenon, reducing the frequency and severity of droughts and floods, the battle could be won through

Tables 4-5: Gross enrolment ratio for 2014, 2016, 2018 and 2019

County	2014			2016			2018			2019		
	Pre-pri- mary	Primary	Secondary	Pre-pri- mary	Primary	Sec- ondary	Pre-pri- mary	Pri- mary	Sec- ondary	Pre-pri- mary	Primary	Secondary
Bomet	87.4	116.6	66.3	83	118.2	82	87.4	116.6	66.3	131.43	113.21	85.76
Bungoma	82.8	117.2	66.3	86	123.1	78.4	101.5	113.2	66	123.78	119.23	79.38
Kakamega	66.7	120.1	64.3	65.4	121.1	72.3	89.4	119	63.1	146.98	122.34	77.78
Kericho	84.7	118.8	70.1	82.8	115.7	78.8	90.4	117.9	67.6	131.88	113.06	86.03
Kiambu	71.2	106.3	86.4	65	102.8	91.1	92.9	109.2	75.3	75.01	92.29	82.43
Kirinyaga	84.9	120.2	106.1	75.2	110.2	112.7	82	110	85.1	105.37	113.78	106.67
Kisii	100.8	110.5	92.1	100.9	109.1	96.7	98.6	99.2	81.5	138.75	103.41	99.45
Lamu	104.3	115.7	57.2	97.9	113.3	56.3	51.4	94.6	69.3	119.31	108.25	56.7
Meru	69.6	110.2	70.2	74.3	105.5	76.2	91.8	113.5	65.7	107.5	106.78	80.68
Migori	93.2	113.7	56.4	92.3	114	65.6	144.7	110.6	60.3	127.37	110.86	75.07
Murang'a	49.7	115.6	128.8	59.4	117	139.1	66.4	112.5	76.4	107.45	110.63	132.73
Nakuru	67.3	112.5	68.8	58.6	112.4	78.4	94.4	107.2	66.2	102.18	109.7	84.68
Nandi	89.8	121.8	63.2	96	123.7	75.3	117.6	121.2	64	141.53	118.61	82.11
Nyamira	87.8	105.2	80.8	94.7	102.9	84.2	118.9	108.7	83.5	164.24	115.92	89.3
Nyandarua	54.5	109.5	84.3	51.8	103	94.6				118.31	109.91	99.1
Nyeri	78.2	119	132.4	73	107.3	132.9	94.4	107.2	66.2	79.38	102.44	125.39
Trans Nzoia	52.7	112.3	52.9	66	120.5	71.7				92.7	116.92	80.6
Uasin Gishu	60.8	92.9	46.2	77.6	101.5	70.4	103.7	114.5	76.3	101.78	99.85	62.52

County	2014			2016			2018			2019		
	Pre-primary	Primary	Secondary	Pre-primary	Primary	Secondary	Pre-primary	Primary	Secondary	Pre-primary	Primary	Secondary
Vihiga	73.8	118	96	64.5	116.5	109.8				159.15	125.7	104.99
Average	76.9	113.5	78.4	77.1	112.5	87.7	95.3	110.9	70.8	119.7	111.2	89.0
Baringo	86.5	99.3	53.9	93.2	102.6	57.7	102	115.8	60.2	140.79	100.37	65.04
Busia	79.6	120.5	49.1	83.3	115.2	59.3	114.8	116.7	53.7	188.11	116.4	62.43
Elgeyo Marakwet	89.1	116.6	72.5	93	114.7	78.1	97.6	122.6	65.6	140.4	118.71	87.03
Embu	50.8	115.1	92.5	61.1	118.2	102.2	94.4	107.2	66.2	96.29	120.69	104.59
Garissa	69.4	71.4	19.3	59.9	72.7	24.7	94.4	107.2	70.3	38.83	35.23	23.54
Homa Bay	106.6	116.2	69.2	109.9	115.5	76.2	115.1	107	58.2	173.8	111.58	83.63
Isiolo	107.7	100.3	28.5	102.9	99.2	33.3	94.4	107.2	70.3	125.27	54.89	23.72
Kajiado	69.4	90.9	32.4	67.4	92.7	37.5	94.4	107.2	70.3	89.55	86.62	45.31
Kilifi	81.2	109.3	37.8	93.9	106.6	43	127.1	105.9	44.3	106.5	106.79	55.96
Kisumu	69.7	111.2	68.2	71.5	111.8	75.5	111.9	109	67.3	137.16	113.5	80.28
Kitui	87.2	120.6	68.3	77.6	116.8	75.8	78.4	104	70.3	124.12	131.24	73.9
Kwale	83.7	107.5	35.5	106.1	108.5	38.6	78.4	104	70.3	118.81	99.22	40.53
Laikipia	79.9	112.9	75.7	79.9	110.7	82.1	89	94.2	69.3	103.04	93.97	80.26
Machakos	53	116.9	94.4	50.8	111.6	101.6	78.4	104	70.3	138.54	111.66	93.09
Makueni	55.2	116.8	103.3	53.9	111.2	114.4	78.4	104	70.3	112.49	127.94	105.45
Mandera	20.7	29.2	9.4	18.7	32.6	11.2	78.4	104	70.3	41.64	39.88	23.09

County	2014			2016			2018			2019		
	Pre-pri- mary	Pri- mary	Second- ary	Pre-pri- mary	Primary	Second- ary	Pre-pri- mary	Primary	Second- ary	Pre-pri- mary	Primary	Secondary
Marsabit	51.5	79.5	15.8	53.2	76.4	22.2	94.4	107.2	66.2	68.99	54.79	17.86
Mombasa	66.8	77.6	34.7	75.8	77.5	41				48.74	79.08	46.17
Nairobi	76.2	84	28.6	82.7	87.2	34.2		84	28.6	39.22	63.57	36.62
Narok	70.4	101.8	24.5	79.6	107.8	29.1	94.4	107.2	66.2	58.57	97.63	37.55
Samburu	113	73.7	20	93.2	78.1	27.4	96.4	75.3	32.1	188.83	69.62	37.55
Siaya	73.5	117	75.1	84.2	119.3	87.1	114.4	110.7	56	190.7	114.99	87.85
Taita Taveta	80.2	119	81.3	99.1	112.7	84.8		136.2	108.6	88.5	108.39	84.89
Tana River	70.1	77.2	20.5	91.8	81.1	23.4	94.4	107.2	70.3	116.29	74.4	30.18
Tharaka Nithi	73.3	118	114.6	74.2	116	124.5	94.4	107.2	66.2	139.29	135.09	132.75
Turkana	97.6	77.4	12.1	100.8	81.3	20.9	81.4	70.4	32.9	184.03	70.52	21.18
Wajir	25.6	35.2	12.8	27.6	38.1	15.3	78.4	104	70.3	36.57	34.93	19.5
West Pokot	98.9	109.4	25.3	120.6	133	44.1	96.3	103.7	53.9	160.43	119.16	63.22
Average	74.5	97.3	49.1	78.8	98.2	55.9	94.9	104.9	62.9	114.1	92.5	59.4
National average	76.9	113.5	78.4	77.1	112.5	87.7	95.3	110.9	70.8	119.7	111.2	89.0
Difference	2.4	16.2	29.3	-1.7	14.3	31.8	0.4	6	7.9	5.6	18.7	29.6

Data source: Various basic education statistical booklets

Tables 4-5: Gross enrolment ratio for 2014, 2016, 2018 and 2019

County	2014				2016			2018			2019	
	Pre-pri- mary	Primary	Second- ary	Pre-pri- mary	Primary	Second- ary	Pre-pri- mary	Primary	Second- ary	Pre-pri- mary	Primary	Secondary
Bomet	87.4	116.6	66.3	83	118.2	82	87.4	116.6	66.3	131.43	113.21	85.76
Bungoma	82.8	117.2	66.3	86	123.1	78.4	101.5	113.2	66	123.78	119.23	79.38
Kakamega	66.7	120.1	64.3	65.4	121.1	72.3	89.4	119	63.1	146.98	122.34	77.78
Kericho	84.7	118.8	70.1	82.8	115.7	78.8	90.4	117.9	67.6	131.88	113.06	86.03
Kiambu	71.2	106.3	86.4	65	102.8	91.1	92.9	109.2	75.3	75.01	92.29	82.43
Kirinyaga	84.9	120.2	106.1	75.2	110.2	112.7	82	110	85.1	105.37	113.78	106.67
Kisii	100.8	110.5	92.1	100.9	109.1	96.7	98.6	99.2	81.5	138.75	103.41	99.45

adequate effort by the national government through Kenya Forest Services, county governments, the community-led reforestation initiatives and other stakeholders.

These efforts include protection of forests and catchment areas; increasing forest cover; replacement of cut trees; employing appropriate farming methods; not tilling riparian and sensitive ecosystem zones such as swamps; not overstocking, managed charcoal burning; not burning grasslands just before rains among others. Training and sensitizing communities on how to do benching/contour farming and planting appropriate trees, plants or crops effectively conserves the environment, improves food security, nutrition, and health. This reverses the negative effects droughts and floods have on communities and schooling. The role of community members in environmental conservation was found to be major, requiring literacy promotion to enlighten them on conservation and safety measures. For increased forest cover, Kenya Forest Services (KFS) that has a presence in counties and has been promoting public and private forests, working closely with tree nursery operators is undertaking various projects in Baringo (Sabatia Forest project), Isiolo (Kina project), Kajiado (Ngong Hills project), Machakos (Tala and Iveti projects), Makueni (Kenze Hill project), Narok (Mau Forest) are some of the examples KFS is setting in counties. Also, World Vision and other non-governmental organizations (NGOs) also provide community members with training on environmental conservation in places they have a presence. For example, training on reduction of soil erosion by planting and growing trees (seedlings sometimes provided); not tilling but plant appropriated grass along river lines; destocking/reducing herds; plant appropriate foods crops (seeds sometimes provided). Action Against Hunger and World Vision offer tree seedlings for afforestation/reforestation, and water tanks for schools to promote rainwater harvesting. Other interventions include unblocking drains in flood-prone urban areas.

Rainwater harvesting, done at the national and county government, community, and domestic levels, is an ideal and key measure in preventing severe effects of droughts and floods. National and county governments undertake large projects such as construction of dams, dykes and large water pans while the community maintains the dykes, water pans and ponds besides building some at their level, sometimes with assistance from development partners. At the household level, families harvest water into tanks, small ponds and Zai pits for domestic consumption and irrigation. However, most ASAL households have thatched rooftops and cannot harvest water, lack resources to acquire water tanks (harvesting facilities) or guidance on appropriate farming techniques. They therefore do not take these preventive measures, yet, if all households were able to reduce risks through rainwater harvesting, the eventual effect would be reduced episodes of droughts and floods.

The stakeholders also help build sand and earth dams, water pans and ponds, provide dam liners and water tanks, train how to make Zai pits for community and household rainwater harvesting and for increased food yield. Moreover, rainwater conservation saves children from making long trips to look for water. Schools that install water tanks and those that built water pans to harvest rainwater use it for cleaning, watering plants and for food preparation, saving children from

missing classes to fetch water for these uses. However, even for the schools with the reservoirs, the water runs out during prolonged severe drought, calling for increased capacity of reservoirs and materials to cover open pans to reduce evaporation.

Rainwater conservation has multiple benefits that positively impact schooling. Water is conserved in dams for hydroelectric power generation, which illuminate homes and schools. Once a dam is built, it changes the ecosystem of the surrounding areas, promoting growth of forests and other vegetation, food included. Besides reversing desertification, the forests, trees, and vegetation cover reduce soil erosion, helping retain soil fertility and moisture, thus improving the environment. The dam water is used for irrigation, especially downstream, especially in the region served by both Tana and Athi rivers. This increases land productivity and food production in the dam area, all with direct benefits on learners' nutrition and health, thus reducing absenteeism due to hunger and malnutrition. Projects such as Ahero, Hola, Bura and Galana Kalalu have controlled flooding, increased food production, food security, farmers' and traders' income and general standard of living, which has reduced the effects of floods and droughts on schooling. However, deeper investigation is required to separate the extent of this effect on schooling, since both Garissa and Tana River counties recorded a declining trend in school progression (Table 4.3), showing there are other factors that contribute to low progression besides droughts and floods.

The National Water Harvesting and Storage Authority (NWHSA) has been spearheading many water boreholes, small, medium, and large sized dams/ water pans¹³ for rainwater harvesting and flood control across the country and especially in the ASALs, availing water for households, schools and for irrigation. This has impacted food security and water availability, with direct and indirect effects in retaining learners in school. Some of the projects the Authority has developed include Narok, Nyando, R. Kuja and Awach flood control projects; Olopito Elmasharian flood control check dam; Sabwani flood control dyke along River Koitobos in Trans Nzoia County; Siyoi Muruny' Dam in West Pokot County; Kiserian dam in Kajiado County; rehabilitation of Maruba dam in Machakos County; Chemususu Dam in Baringo County; Pesi Dam in Nyandarua County; Napuu Water Supply Project in Turkana County; Kwoyo and Ochunyno water projects in Homa Bay County; drilling of boreholes¹⁴ (in Kitengela Boarding in Kajiado County; Perkerra in Baringo County; Kenyerere, Sere, Riogoro, and Gesore Primary School in Nyamira County; Mungetho Dispensary in Nakuru County; Lwaho in Kakamega County; Lochar Ekeny in Turkana County) among others. The authority also does tree planting campaigns; for example, Lambwe Forest in Homa Bay County) and community sensitization in owning projects to ensure they are well maintained.

Early warning and sensitization messages about impending droughts or floods are key preparedness measures. When parents are made aware about impending floods, they ensure safety by keeping their children at home while some move to

¹³ https://www.waterauthority.go.ke/index.php?option=com_content&view=article&id=43&Itemid=414.

¹⁴ https://www.waterauthority.go.ke/index.php?option=com_content&view=article&id=44&Itemid=413.

higher grounds if their homes are located in areas likely to be affected by floods. The information is most useful with respect to floods, which are sudden unlike droughts that happen gradually. Increased use of social media, especially parents' WhatsApp groups is an effective communication channel to pass information/early warning of impending floods. In Mombasa, for example, sensitization is conducted in schools on how to prevent flooding and how learners should handle themselves in school during floods. The sensitization is done by teachers, staff from relevant county departments and other stakeholders; for example, Aga Khan Foundation that uses its own resources to offer teachers' training.

Although the objective is to prevent and reverse negative/harmful effects of droughts and floods on schooling, such environmental conservation interventions not only reduce frequency and severity of droughts and floods and their harmful effects on schooling, but also improves health, food, and nutrition security. However, given that the prone counties are still experiencing severe droughts or floods and are often in need of food relief and evacuation, these efforts require enhancement to promote wider embracement and coverage. Some communities reserve some grazing areas for the dry season, with a rotational programme and community by-laws that govern grazing there. Community elders take strict disciplinary actions (fines and/or animal seizure) against anyone breaking the by-laws. This delays migration, thus keeping learners in their regular schools for as long as possible before the need arises to move further away in search of pasture.

Public works engineers described how infrastructure gets damaged during heavy rains, and noted that the coastal region requires different roads, drains, and bridges construction technology with more compressing compared to inland roads due to sandy soils that easily slump. Some example of infrastructure cited during the study as damaged by floods include: roads and bridges such as Mai Mahiu - Narok road, Sigiri bridge (Busia), Mbogolo bridge (on the Kilifi-Mombasa road); powerlines (Kisumu high voltage powerline and life wires falling in flood waters in Mombasa); airports/airstrips (Kisumu airport, Amboseli, Maasai Mara and Nanyuki airstrips) - no planes could land or takeoff when flooded; drains in major urban areas (Nairobi, Mombasa, Kisumu, among others) blocked due to poor solid waste disposal.

Flooding causes infrastructure damage, collapsed walls, fallen trees, submerged houses, and traffic gridlocks. Infrastructure damage affects transport and trade, produce does not reach the market/consumers, and perishable fresh produce rots away, all leading to food inflation and shortages. Housing is affected as temporary structures dissipate or get swept away by raging waters while others collapse over sinking soils during floods (for example, the buildings that collapsed in Huruma, Nairobi).¹⁴ When neighbourhoods flood, the strong people in the affected area manage to move away. However, some children, the aged, pregnant women and people with disability get trapped. With damaged infrastructure and homes, learners are affected through injuries; lose school uniforms, books, and other materials; are displaced from home; and are unable to access school,

¹⁴ <https://floodlist.com/africa/kenya-floods-building-collapses-huruma-nairobi#:~:text=Huruma%20Building%20Collapse,120%20rooms%20in%20the%20building>.

¹⁵ https://www.waterauthority.go.ke/index.php?option=com_content&view=article&id=44&Itemid=413.

which interferes with schooling. Injurious outcomes and effects on learners can be prevented and prepared for through varied measures, including environmental conservation; proper drainage, planning and construction technology; information and early warnings; and planned movement from flood plains before the rains.

In West Pokot County, the 2017 drought was severe, plunging the county into an emergency, with the global acute malnutrition (GAM) reaching 20.4 per cent, which is alarming by UNHCR standard. Floods that occur mainly in November erode the soil, creating huge gorges and destroying the environment, chiefly due to human activities that deplete vegetation cover. Road transportation is challenged; for example, the Marich Bridge along Kitale - Lodwar road was swept away severally, hindering accessibility to those areas. Trade is disrupted as infrastructure is destroyed, consequently affecting the movement of goods and people within and outside the county. Livelihood and settlement are disrupted leading to other problems, including high rate of school absenteeism and dropout. Communities are given agricultural input but are not taught how to conserve the soil or how to harvest water for irrigation. Conservation activities are not adequately implemented due to the gap in devolution of the functions of the Kenya Forest Services, which widens the preventive and preparedness gap.

Response

Once droughts and floods events have occurred, response interventions improve schooling. Primary school learners are the most affected by droughts and floods and hence form the principal targets in response strategies. Water and food shortage are the key challenges during drought. Reported responses included trucking water to schools, and school feeding programmes. It was noted that even under-age children are taken to school during drought so that they can benefit from the school feeding programmes; schools not under the feeding programme lose learners while those under the programme gain more learners. Other response measures include building temporary homes and schools in the places people are displaced from by floods, and providing the affected people with food, utensils, clothes, beddings, and other necessities. Although some of the activities are not specific to learners, they form key beneficiaries alongside other community members. Besides the county and national governments that fund, participate and coordinate some of the response activities, a sample of response actors and activities by county is given in Annex 3.

Looking at actions taken in a few counties, Nairobi County has a reliable early warning system given from the meteorology department. At the sub-county level, disaster committees mobilize resources to help the affected people, with all departments co-opted into the committees alongside ward administrators and stakeholders that include public administration, Red Cross and NEMA, among others. The meteorology department sends messages/information to the disaster committees that relay the information to its members accordingly. People in flood affected areas are then evacuated to schools or churches in high areas, in some cases forcefully, until floods subside. Among the areas where people are evacuated from include riverbanks, Soweto, Ruai, Utawala and Kamulu/Joska.

Mombasa County Inspectorate Department takes families of affected learners and community members to safer grounds, for example, in social halls such as Mikindani Social Hall. The victims are given food and some supplies such as mattresses and blankets, that they take home when the situation normalizes. The county also offers lunch during Kenya Certificate of Primary Education (KCPE) to all 97 public schools. The County department of education has introduced a milk programme, which ensures all Mombasa public schools' learners in pre-primary and lower primary (grade 1-3) get 200ml packet of milk every school day (they reach beyond their mandate since primary school learners are outside the mandate of the department). The current County Integrated Development Plan (CIDP) has budgeted for a healthy snack, which is cost effective, and research is ongoing on the best snack.

In Kajiado County, there used to be food for the school feeding programme from the World Food Programme (WFP) for the whole county. However, this became unmanageable at some point. The programme was restricted to semi-arid areas such as Magadi, parts of Loitoktok, Kajiado Central and Uwazo (Ngong Hills). The homegrown food programme previously under WFP in partnership with the government (now fully taken over by the government) gives money to schools to manage and buy food locally. Stakeholders and partners including World Vision and New Life contribute food to be supplied to selected schools in prone areas. This is similar to the homegrown feeding programme that focuses on selected and most affected ECDE and primary schools. In some parts of the county, roads infrastructure is a challenge leading to inaccessibility for delivery of relief food, and schools lack water to cook the given food. The weather in some places is sometimes too hot, reaching 42 degrees Celsius, making it too strenuous for learners to fetch water for the school feeding programme.

Although West Pokot County government has constructed water pans in Pokot Central and North, they dry out during a prolonged dry spell since they do not store much water and evaporation is usually excessive, forcing the county government to truck water. In partnership with World Vision, the County government has drilled boreholes especially in Pokot North and West sub-counties. The Ministry of Agriculture distributes drought tolerant seeds to farmers while the County government supplies hay to communities in North Pokot (this was done twice in 2017). The County government does large scale cost-free immunization and treatment of livestock since 2017 and buys livestock from farmers through an animal offtake programme, sells some of the animals to Kenya Meat Commission NASUKUTA processing plant and distributes some as relief in the hunger-stricken areas, saving the pastoralists from complete loss of animals to drought while at the same time feeding them. The National government identifies the need for food aid and targets special groups such as people living with HIV and AIDS, schools and areas that are hunger stricken, vulnerable groups with relief food every month. Children are moved to neighbouring schools to continue with schooling during conflicts. Home-grown food school feeding programme continues in selected schools, with stakeholders giving grants to purchase food locally, thus cushioning learners and their parents.

The actors include the Red Cross, World Vision, Mercy Corps, and Action Against Hunger (ACF), among others. Red Cross is an active member of the CSG and supports its logistics including convening CSG meetings. They have an integrated outreach emergency response plan comprising cash transfer, provision of basic foodstuff and non-food supplies. They map out affected areas and mobilize communities for medical and food relief alongside mass screening to identify the most severely affected sites. World Vision provides water tanks, constructs shelters, digs latrines and boreholes, spearheads drainage clearing and garbage collection, donates clothes, sanitary towels and money to the vulnerable. These programmes have been effective in reducing suffering following droughts and floods in West Pokot County.

Recovery

The study revealed direct recovery measures that reduce the effects of droughts and floods on schooling, which included school repairs/improvements/reconstruction, construction of boarding schools, provision of school fees bursaries and improved mobile schools. Construction of low-cost boarding schools to enhance retention of learners in school even when the parents move with animals during drought is effective but not widespread. Agricultural extension services, sensitization, and provision of seeds and drilling boreholes have indirect impact on schooling through water and food security. Health programmes that prevent and/or eradicate droughts and floods related diseases that prevent learners from attending school also impact on schooling. Other recovery measures include rebuilding public facilities such as roads and bridges to ensure learners can access their schools. Unfortunately, families receive little assistance to rebuild their flood damaged homes, yet this would ensure learners have a habitable home to operate from following the events. In West Pokot County, for example, shortage of resources to undertake recovery initiatives, political interference, and poor terrain in the interior parts are a hindrance to recovery measures. SIKOM Peace Network for Development has been helping with resources to respond and prepare contingency plans; however, it lacks skilled personnel.

Education departments in some counties indicated they are implementing programmes that build learner's capacity to comprehend disasters, including causes, short-term effects, and long-term impact, prevention and preparedness measures and recovery processes. With such capacity, learners will have the ability to participate in disaster risk reduction (DRR) programmes including response and recovery programmes. This will ensure reduced effects on them, their families, and peers in school, making it easy to revert to the pre-disaster status faster. In Mombasa County, for example, children are trained to dispose milk packets appropriately after consuming milk in school, which is good for waste disposal and prevention of floods arising from blocked drains. It is also important in preventing environmental degradation and its repercussions on climate change.

Coordination Mechanism

The success of prevention, preparedness, response, and recovery interventions is highly dependent on how the activities are coordinated. Using resources

provided by the government and other stakeholders through the education in emergency (EiE) programme, parents' teachers' associations (PTA) and board of management (BoM) coordinate learners' affairs in schools. At the county level, there is collaboration between various departments and provincial administration in a forum where they discuss relevant roles for all. County steering groups (CSG), chaired by county commissioners, help schools during floods or droughts by bringing stakeholders together to find common solutions. The Ministry of Education has supervisors right from the school level to national level through whom all issues are communicated and directions sought. County directors of education are the county supervisors, below them are sub-county supervisors, zonal officers at the ward level, then school principals and BoM. A school head can contact a county director directly or through the various supervisors in case of an emergency. Sub-county offices are reached first for fast solutions. This structure is effective and timely since it is not too bureaucratic.

During flood disasters, children are transferred to other safer schools or to safer grounds, especially those in boarding schools, while day scholars are also sent to other nearby schools. Schools also liaise with parents to ensure safety for the learners. For example, in a school for the handicapped in Mombasa County, opening is delayed if floods are pre-empted, and parents are called to pick up their children if floods occur when school is in session.

Counties have ECDE officers in every sub-county who visit schools together with Ministry of Education officers to not only assess teaching and encourage teachers, but also meet teachers and parents to discuss the disaster risk management mechanism in place. In Mombasa County, the ECDE directorate liaises with stakeholders, coordinators, other directors, and the national government for quality assurance, ensuring children are in school and well provided, especially with milk. The county milk committee identifies suppliers, who are given tender to supply directly to schools while the school milk superintendent receives the milk and manages its distribution to the learners.

The Kilifi CSG coordinates county activities, including response to drought. Stakeholders channel assistance through responsible agencies. For relief food, the interior ministry plays the key distribution role since it has structures in place up to the local level. The County Commissioner is the principal administrator who supervises relief committees. Livestock offtake is done by the veterinary department while health outreach is done through the Ministry of Health nutrition staff. Cash transfer is done through service providers; that is, banks and Safaricom. Water trucking is done by the department of water in liaison with private truck owners and technical working groups as sub-committees of CSG. CSG does contingency planning and although finances are not adequate, they prevent loss of human life. The role of identifying beneficiaries and implementing planned programmes is played by NDMA. Through participatory practices and community involvement in funding, planning, coordination, monitoring and evaluation, the mechanism is very effective.

In West Pokot, the CSG forum comprising government line ministries, CBOs and NGOs are coordinated by NDMA. They meet on a quarterly basis to discuss, plan,

and monitor droughts and flood-related matters, main actors, and key roles. The forum also discusses accountability measures and receives monthly returns on food security. The actors include World Vision (sets up water pans and boreholes); Mercy Corps (digs water pans, boreholes and educates communities on improved livelihood); Action Against Hunger (ACF) (supports emergency relief food); and Red Cross (evacuates communities during floods/landslides); Emergency and Disaster Management Response Directorate (plans and monitors disasters, reports and recommends actions such as rehabilitation of damaged roads, bridges and school buildings; County Nutrition Technical Forum under Ministry of Health comprising health stakeholders – the Red Cross, ACF, UNICEF, WHO and SIKOM – investigates health and nutrition issues. They meet monthly except when NDMA indicates the country is in an emergency, requiring weekly response meetings. Interventions are rolled out and emergencies are monitored. The county has not achieved 100 per cent coordination since stakeholders' interest dominates, blocking service delivery to the communities.

Coordination - Education in Emergency (EiE)

Education in emergency (EiE) programme under the Directorate of Field Coordination and Co-Curricular Activities, Ministry of Education, has a desk office that deals with emergency related issues including droughts and floods in relation to education. Liaison is done with field officers at the county and sub-county levels to give and get information, making it possible for the information to flow from all corners on a need basis. The directorate works closely with NDMA and participates in short rains and long rains assessments, effects, and impacts. They then report to the government through NDMA on how droughts and floods affect education and advise on mitigation.

The programme has developed frameworks including a draft policy to guide 'interventions, coordination and oversight' and an information booklet to communicate with all players including World Vision, Save the Children, and UNICEF, among others, on what the government plans to do. They also develop annual work plans. These frameworks are developed in consultation with stakeholders to help address EiE-related matters and needed actions.

Education in emergency cluster working group was formed under the Directorate Field Coordination and Co-Curricular Activities, Ministry of Education. It comprises actors in EiE that meet monthly for coordination of EiE interventions. Donors voluntarily attend in large numbers to help address gaps the Ministry of Education is unable to address, while also reporting on activities and extent of coverage. This reduces overlaps for prudent use of resources.

Information on floods effects is collected by field officers using questionnaires, which are analyzed by the desk officer. As floods get worse, a team monitors flood hot spots to assess direct effects on schools. Although floods and strong winds damage school infrastructure, the department does not have a budget to assist in recovery, other than a small budget for minor emergencies. An emergency fund vote head for dealing with floods and wind damage is applied for by those affected.

Although it takes time to process, it is fast-tracked through the various stages of approval. As funds are awaited, the directorate works with UNICEF to pre-position teaching/learning materials and temporary safe learning spaces for those displaced to camps. Psychosocial support for traumatized learners is provided by teachers who are trained in guidance and counselling with assistance from UNICEF and Save the Children Fund. Trainers are identified and trained twice a year in cluster of county workshops, done depending on funding.

On droughts, the directorate works with NDMA to conduct annual food security assessment in 23 ASAL counties. This is a multi-sectoral process by Kenya Food Security Steering Group that involves all key ministries – education, health, livestock, agriculture, meteorological departments; non-governmental agencies including UNICEF, Actions Against Hunger, Save the Children, WFP and Food and Agricultural Organization (FAO); among others. The exercise is supposed to come up with food and nutrition insecurity report and the affected population. They develop reports on the impact and performance of all actors on education access, participation, and retention. The reports are released in February – after October - December short rains and August – after the March - May long rains. This assessment helps in decision making regarding required interventions such as school feeding programmes by WFP for specific counties (Turkana, Marsabit, Mandera, Wajir, Baringo, Garissa) while the other ASAL counties are covered by the Ministry of Education under the school feeding programme section for basic primary schools.

The national and county governments, United Nations and other stakeholders assist keep learners in school through the school feeding programme. The programme has four categories: one is the regular school feeding programme, which is largely done by WFP in Baringo, Garissa, Mandera, Marsabit, Turkana, and Wajir pastoralist counties and all learners in these counties are covered. In this programme, WFP purposes to promote local agricultural production through a food in-kind programme where schools are given cash to buy food grown by parents/guardians, with some taking food commodities to school in place of fees. The second is the home-grown school feeding programme done by the Ministry of Education and covers all other counties not under WFP. Only 10 per cent of the schools are covered in this programme. The Ministry provides food through cash transfer based on capitation of Ksh 10 per child per day for Githeri (maize and beans meal) and uji (porridge). Since ECDE is under county governments and most counties do not have a feeding programme, under-age children from very poor families go to the primary schools to be fed. The third is expanded school meals programme, which is usually an emergency feeding programme for places suffering severe drought. Money from the contingency fund is availed to cover even the 90 per cent of schools not in the above mentioned two feeding programmes. It is, however, a ‘one-off’ exercise when there is an emergency. The fourth is community school meals programme organized by the communities where other programmes are not in place. The community donates food or cash to their schools. In some cases, a cook is employed, or community members cook in turns.

Under EiE programme are several school types to help deal with nomadism due to drought. Mobile schools, also referred to as school-in-a-box, are a coping strategy in which a school unit has a teacher, instruction materials and a donkey to carry the materials. The unit is attached to a fixed school for management, and it is moved to different places where nomadic communities settle. Mobile schools are flexible in terms of time. Money is provided for each mobile school through the school managing it. Another type of school under EiE is a special school model in Marakwet that responds to conflicts and has two schools in one: a school on top of the hill and another at the bottom. The top of the hill school is used during times of conflict. The school is secure due to wide vision and learners can take cover. During peace, they use the school in the lower part of the hill where most of the agricultural activities are practiced. Low-cost boarding schools is another strategy that takes care of localizing learners and providing resources, including water and food to ensure children do not move with their parents. Promotion of peace building and conflict resolutions by ensuring that leaders are more involved and accountable will reduce conflicts and improve schooling.

Much as the EiE programme is highly useful, resources are always limited and there is usually a mismatch between time of need (term dates) and when funds are dispatched (financial cycle), which creates a problem because schools do not always have carryover food resources. The same problem applies to mobile schools and other government emergency programmes, leading to cases of desperation. Targeting is also a big problem since food security assessment and classification needed at county, sub-county, and ward level to demonstrate the most food insecure areas is not efficiently done. Since the home-grown school feeding programme does not follow such assessments, some food insecure schools fail to get food relief while schools not in need receive the relief.

The directorate lacks funds for monitoring and reporting, training psychologists and emergency response. They depend on UNICEF and other stakeholders for most of the resources. Substantial effort is invested in convincing the donors that assistance is needed. There is a need for the government to take this programme seriously and give resources for operations and revamp existing budget lines.

Education work group international standard was actualized after 2008 post-election violence (PEV) and became education working group. This is an open forum where partners come and leave at their own will. A very good coordination mechanism is required to keep the group together and develop a work plan that each partner identifies with. Developing the work plan together with the partners helps to include the activities that each will be implementing in line with their mandate, which also guarantees ownership. For EiE's capacity, it is noted that specialization is required, and that implementation process has gaps.

UNICEF identifies, appoints, and trains persons to act as EiE focal point in the now 29 drought and flood prone counties including Migori, Busia, Siaya and Homa Bay and Nyamira for landslides, with a plan to cover other counties in due course. The initial 29 focal points were trained for a week and expected to cascade the new knowledge to the sub-county level as done at the national level. This starts with partner mapping following the 5W (who does what, where, when, and for

whom). The mapped group then convenes a meeting to discuss how synergy can be created in EiE for best outcomes. Garissa, Kisumu, Kwale, Kilifi and Tana River counties were the first to form working groups. The education officers, under the county directors of education, are motivated and encouraged to employ personal initiative in coordinating the EiE focal point working groups, keeping it robust.

Success of the EiE programme is hinged on getting a dedicated budget right from the national to county level. At the school level, there is limited capacity and awareness on disaster risk reduction (DRR), needing capacity enhancement and DRR mainstreaming in the school curriculum. This had been initiated for lower primary school by the Government of Kenya and UNICEF; materials were developed by the Kenya Institute of Curriculum Development (KICD) and distributed to lower primary school (class one to three). However, the commitment for firm implementation is wanting.

5. Challenges of Droughts and Floods and Emerging Issues

5.1 Resources

Counties indicated that they experience resource constraint to deal with droughts and floods due to inadequate resource allocation and delayed disbursement, which has direct and indirect effects on schooling. Significant resources are needed to deal with the effects of droughts and floods; for example, response and recovery, which involves, among other activities, evacuation of school children marooned by floods, provision of water to schools during drought, and provision of food for school feeding programmes. Generally, resources used for emergency response are reallocated from other budgetary items. For example, in re-building schools destroyed by floods/rising water levels in water bodies such as lakes Baringo, Naivasha, and Victoria, among others, some county governments are forced to reallocate scarce resources from other allocations since such events are unplanned and not budgeted for. They also experience delays in receiving money from the national government, making it difficult to take timely actions to reduce risks, prevent and respond to flood emergencies.

Counties indicated that they have no specific budget allocated for coordinating drought and floods activities, yet this is essential to handle related activities and emergencies efficiently and effectively. Resources needed to coordinate information dissemination on a looming disaster such as a storm or flood, warning on risks and how to act to avoid injuries, sensitize and build capacity of communities in disaster risk management (DRM), and mainstreaming disaster risk reduction into programmes are inadequate.

The resources are needed before droughts become severe and floods devastating. The wide gap between the need to deal with droughts and floods in prone counties and available resources calls for enhanced budgetary allocations for disaster risk reduction, emergency response and recovery activities. It also makes sustained investment in preventive and preparedness programmes key to reduce the need for response and recovery expenditure and the risk community members and especially learners get exposed to.

Some schools in flood prone areas were found to be in dire need of improvement to prevent floods related damages. In such schools, raising school buildings above flood level or relocating schools away from flood plains to strategic locations on highest grounds possible, digging trenches around schools to channel floods water away towards the valleys were posed as possible solutions. Although these can reduce the risk of schools getting submerged during floods, resources are not available for implementation.

The county governments also indicated that they have limited rescue equipment required especially during floods. Lack of simple equipment such as power saws for cutting trees that get uprooted during storms result to blocked access routes to schools and other essential facilities such as hospitals. Standby rescue helicopters and/or boats and other necessary equipment should be accessible within flood

prone areas for immediate action to rescue trapped/drowning learners and other community members exposed to related risk. Another risk associated with floods is live electrical wires getting into flood waters and putting people in the vicinity including learners at risk of electrocution. Although Kenya Power and Lighting require to always be on high alert to disconnect powerlines posing such risks, experiences of delayed action were reported in Mombasa. One major hindrance is lack of a clear communication and alert issuing system. Another is inadequate number of rescue volunteers enrolled and adequately motivated to send alerts and SOS calls of such calamities and what action to take to ensure learners stay safe.

Although a whole sector is now devoted to disaster risk management in the MTP III, National DRM policy has been approved by the Cabinet, and over 18 counties have developed legislative proposals and legal frameworks for DRM and setting aside two per cent of the county budget to the same. However, the resources are still inadequate. Furthermore, County Integrated Development Plans (CIDP) are including disaster risk management and reduction with a budget line, which is a good indication that DRM and DRR are now mainstreamed at national and county levels. However, this must be backed up with adequate resources to match the need especially in drought and floods prone counties.

The resource crunch is likely to decline with the establishment of a Ksh 2 billion National Drought Emergency Fund (NDEF) following the Public Finance Management (National Drought Emergency Fund) Regulations, 2018 Cabinet approval. The fund, which will be financed through the National Assembly annual appropriations, is an indicator of serious commitment by the Government of Kenya to manage drought risk rather than crisis. Since the fund forms a common basket for contributions by the private sector, donor support, global climate change and disaster risk financing facilities, it is a platform for better resource management and coordination for efficiency and effectiveness in disaster risk management. With this Fund, NDMA can now use part of the fund to put in place infrastructure that will deal with droughts, such as water pans and boreholes, among others, and prepare for drought, unlike before when they went seeking for funds to respond after the drought becomes an emergency. Additionally, the World Bank has put Kenya and other needy countries into the Catastrophe Deferred Drawdown Option (Cat DDO) Programme that enables the country access better financing to be able to respond faster to disasters, especially those that are climate-related. Among the actors in response activities following droughts and floods are financial institutions, including banks and insurance companies. Banks lend to schools to buy water tanks and food, awaiting release for allocated funds from the exchequer especially for food. Insurance companies develop packages such as insurance for some farming activities that promote food security, thus promoting nutrition, which in turn influences school attendance, retention, and academic prowess. Such programmes, however, are not far reaching, yet if expanded and made accessible especially to unreached areas and schools, it would promote droughts and floods preventive and preparedness measures and improve recovery.

5.2 Rainwater Harvesting and Flood Control

The National government together with partners such as World Agroforestry Centre (ICRAF), World Food Programme (WFP), and private sector partners launched the Kenya chapter of the Billion Dollar Alliance for Rainwater Harvesting in April 2017. This is a continent-wide, multi-actor alliance expected to upscale farm pond technology to enhance farming in the drylands, agribusiness and related income generation while promoting food security and controlling floods. The targeted one million ponds will increase water storage within farms for increased and reliable supply of clean water at the domestic level. This programme follows enactment of the Water Act 2016 which, in addition to the National Water Harvesting and Storage Authority and Water Tribunal, will guide the establishment of the Water Resources Authority, Basin Water Resources Committee, Water Services Regulatory Board, Water Works Development Agencies, and Water Sector Trust Fund. However, some challenges have been encountered that include poor coordination of development partners, unsustainable grant-based community service, inadequate financing mechanisms and adoption of agribusiness approaches, *inter alia*.

5.3 Traditional Knowledge and Practices

Some of the most reliable traditional droughts and floods risk reduction knowledge and practices, though known to some community members, are not heeded to, or practiced. Such knowledge includes how to identify a looming emergency or disaster through animal and insect behaviour change, such as movement and population; what to do and/ or not do to prevent escalation of a hazard to an emergency; avoiding being caught in an injurious situation during drought or floods, for example, not crossing swollen rivers or unstable foot bridges during rainy seasons upstream; and not starting fires during dry and windy seasons, *inter alia*. To overcome this ignorance, documentation and dissemination of such knowledge, sensitization on its importance and appropriate use on reducing risks and effects of droughts and floods can save communities from impacts of related disasters while protecting schooling. Such information, if integrated with disaster risk reduction in education and sensitization, becomes crucial for early warning and awareness creation, leading to timely and appropriate action. Learners can be made to comprehend such information for their safety, and used to pass messages to reach their parents, peers, and community members. This can be achieved through word of mouth, art, drama, and music (such as disaster songs), poetry, posters, dance, theatre among others, which also guarantees passing the knowledge onto upcoming generation.

5.4 Waste Management, Water Sanitation and Hygiene

Waste mismanagement is a challenge in many places and a need was identified for capacity building and awareness creation on appropriate disposal of trash especially in urban areas where such waste blocks drainages thus aggravating flooding. For

example, when schools are provided with milk in Mombasa, packaging disposal has been a challenge resulting in littering. Plastic water bottles and other solid waste were observed in Kisauni, an area that faces serious flooding. Sensitization of parents and learners to stop littering coupled with enforcement of laws and regulations concerning waste disposal and preservation of the environment can save Kenya's urban areas (especially Nairobi, Mombasa, and Kisumu) from severe flooding. Community members need to be empowered to force those littering to collect their waste, with greater use of CCTV cameras in notorious areas to identify culprits. Now that the competency-based curriculum (CBC) demands learner involvement in community work, they can be encouraged to participate in clearing the environment within and outside their schools, an opportunity to train them on trash disposal without littering. This will be useful not only now but even when they become adults in reducing the problem of littering in the county.

Poor Water, Sanitation and Hygiene (WASH) practices lead to serious health problems causing school absenteeism. Although Plan International, UNICEF, Afya Pwani and departments of health offer a course for school principals, teachers, and parents, that lay emphasis on washing hands after visiting the toilet and how to promote WASH clubs in schools; and the Lottery Club of Bahari helps to build or rebuild toilets, classrooms and remove floodwater from flooded schools; the hygiene and sanitation problem persists across drought and flood-prone counties with WASH health-related absenteeism from school as an indicator.

5.5 Coordination of Response Activities and Actors

Every sub-county reports to the county commissioner on food security situation, showing how food aid is distributed and the current need. However, there is poor and wanting accountability and coordination of response activities such as relief food and water distribution following droughts and floods, which also affects learners when relief food becomes inadequate.

Following events of droughts, floods and other calamities, actors are reported to be more involved in response and recovery activities in line with their mandates, ignoring the fact that preventive and preparedness measures would reduce the need for response and recovery. Preparedness and preventive actions such as garbage collection and drainage clearing in urban areas before rains to prevent flooding is a county governments' responsibility, which is not efficiently done and hence garbage heaps across many urban estates, which could be reduced through county spearheaded clean-up days. There is paramount need for reawakening of actors including donors and local private companies on the need to be involved in preventive and preparedness activities in addition to response and recovery, to minimize droughts and floods risks and effects on communities and schooling through intervention activities and support with resources.

On the same note, actors together with county governments, take minimal action before emergencies happen, and lack contingency plans to deal with the events before and after. As a result, the response is not timely, with water, food and other supplies declared too little too late. The county governments rarely allocate

resources to droughts and floods until the communities are in dire need, which shows poor government support and preparedness. The result is uncoordinated and poorly planned response and recovery activities with minimal uncoordinated preventive and preparedness measures. For example, the Ministry of Sports, Heritage, and Culture owns the social halls where people are evacuated to especially during floods emergencies and must give clearance for the halls to be used, making people get stranded for some time due to poor and uncoordinated bureaucratic processes. Although stakeholders in some counties work together under the coordination of the CSG, each facilitating themselves with their own resources, some act remotely without consultation with each other or the county government. Others have resources restricted to their target activities/planned interventions and are not flexible.

5.6 Changes in Roles Played by Learners and Infringement of Rights

Some learners, especially in the ASALs drop out of school during drought to assist with domestic chores such as fetching water and food, or to work and supplement household incomes. Their role changes from learning to other domestic activities or income generation. Others, especially girls, get pregnant or get married, thus changing from learners to mothers or wives. This change of roles is necessitated by the difficult circumstances imposed by drought and related hardships.

Although all people including children have a right to food, nutrition, health and education, these rights are infringed during droughts in prone areas. Attempts by the government to support school feeding programmes and other expenses during drought to keep learners in school are hampered by limited resources. Schools considered not in hunger prone areas fail to get into the government sponsored school feeding programme, yet during severe drought they get affected, forcing them to close, thus denying children the right to education. Since poverty levels are high in these areas, parents are rendered unable to sustain feeding their children alongside other school-related expenses and are forced to keep them out of school. This raises the need for increased resource allocation to the government supported school feeding programme and bringing marginal schools into the programme during drought to ensure there is no rights infringement to education and to keep learners in school.

Within drought prone areas, water is a huge challenge. Learners on water fetching duty spend many hours fetching water to sustain the school feeding programme and cleaning the school facilities. Some schools own water trucks and/or water tanks but others have none of these. County governments in drought-prone areas ferry water to schools, with some households in the school neighbourhood benefiting from the same. Mombasa cement has also been trucking water to schools and communities in water scarce coastal areas as part of their community social responsibility (CSR), while World Vision and other NGOs donate water tanks to schools. However, these efforts are insufficient in the face of widespread need across the ASALs, requiring more actors' participation.

5.7 Food Security and Social Protection

The Bill of Rights places food security mandate with the government. Although county governments wish to play a bigger role through their CIDPs, their institutional and financial capacity is low, leading to poor emergency responses. This affects even social protection, such that the Ksh 2,300 offered to those affected by drought is inadequate, with some counties unable to meet even 50 per cent of this amount. This social support will require enhancement and guarantee given its role in ensuring there is food and other needs for households and learners to reduce absenteeism especially during droughts. The government will also need to build partnerships for preventive and preparedness activities alongside response and recovery for increased resilience and to aid in bouncing back to life before the disaster better.

5.8 Access to Schools and CSR

Schools in the ASALs are sometimes located across seasonal rivers and lack improved access roads and bridges for guaranteed access whatever the weather. Learners face the risk of being marooned or drowned by storm water or missing school altogether during the rainy season. Some schools are in floodplains, making them susceptible to storm damage. Although firms such as Base Titanium in Kwale County build schools and health facilities, dig boreholes and construct dams to serve schools and neighbouring communities as part of CSR, and Mombasa Cement trucks water to needy areas in the coast while also running an elaborate feeding programme for needy children in parts of Kilifi, the need is greater across drought and flood-prone areas. Such projects reduce hunger, distance travelled, avails water for improved hygiene and health and access to schools, thus reducing absenteeism and schooling in general. The need is greater across the prone counties, and more stakeholders will need encouragement to participate in building more schools and providing some basic needs.

5.9 Absenteeism and Syllabus Coverage

The ASALs are home to relatively poor populations, who are also more vulnerable to climate extremes of droughts and floods since the slightest experience drains household resources forcing learners out of school to look for food and water. Closely linked to poverty are cases of spillover of resources meant to help with recovery of the affected and improve schooling. For example, when families affected by floods are given mattresses, some sell them as indicated by the Red Cross. Others who are not victims come to the distribution venues to get the handouts, denying the real victims. The department of education indicated that milk issued to children in Mombasa, though meant to nourish the children in pre-primary and grade one to three, finds its way home for sharing with family. They also noted resistance by grade three learners to proceed to grade four where no milk is offered, thus affecting progression.

Due to the missed school time during droughts and floods, syllabuses are not covered. Although teachers can offer remedial teaching to ensure good performance despite a disaster, they need to be motivated directly and indirectly through encouragement. However, resources are often inadequate, and it is difficult to monitor whether this is achieved across all affected schools or not.

Damage to schools was said to have occurred due to floods and strong windstorms. It emerged that structures can be strengthened and/or shielded from these calamities by constructing drainages, raising classrooms above usual flood water level, draining schools off flood water, and planting wind breaker line of trees among other actions. Although ensuring structures are strong enough to withstand strong winds, floods and other calamities reduces their vulnerability and guarantees continuity of learning, schools do not often have direct control of these interventions that require funds, yet stakeholders/purse holders do not always respond as rapidly or effectively as need requires.

5.10 Capacity and Inaccessibility of Schools

During floods, poor rural roads make some areas inaccessible, such that response is delayed. For example, in Mombasa, the milk does not reach some schools in a timely manner, such that UHC (long life) milk is used. This is delivered in batches to last two to three weeks for regularity and continuity of program. Capacity gaps are experienced in terms of record managers, with deputy head teachers often called upon to receive the supply and keep records while ECD teachers distribute to the learners. This takes them away from their key mandate of school management/teaching. Schools also lack milk storage space, making it difficult to store the two to three weeks supply.

Poor coordination between counties and national governments, long distances and poor infrastructure makes it difficult to reach the neediest community members, calling for serious infrastructure development to ensure those in need can be reached during emergency. In many cases, such developments have a political angle since politicians focus on areas that support them, and hence poor targeting based on political space. Political goodwill was lacking as politicians' focus was reactive since they visited the affected areas once the event – drought or flood – had become an emergency. This means ending drought emergency (EDE) standards are not met or are compromised, which substantially affects schooling. Although NDMA only coordinates counties to undertake activities related to drought or floods management and is apolitical, with an objective to ensure standards are met in dealing with emergency situations, the interference and lack of interest by political leadership leads to delays. The National Government Constituency Development Fund (NG-CDF), previously Constituency Development Fund (CDF), has been of substantial help in development of projects including schools, water projects and infrastructure such as roads and bridges and reconstructing what has been damaged by floods.

Some of the expansive ASAL counties have identified food production as a niche. This follows sub-division of land in the agriculturally productive areas into

uneconomical sizes, densely populated and built up, leading to a reduction in food production in the food basket areas. Food production in the ASAL counties is happening in substantially large irrigation schemes especially along the Tana River basin, for example, Bura, Hola, and Ahero along river Nyando. Such game changer projects, for example, dam construction and irrigation schemes are capital intensive and not many donors are willing to fund them. Most funding agencies preferred funding projects with a two to three year-implementation span since their project implementation lifespans are normally short. Yet, some of these capital-intensive projects do not reach a self-sustainability level within those two to three years and cannot survive without support for a few more years. Additionally, some areas have limited agricultural extension officers to guide on increased production and identification of the appropriate crops. Inadequate storage facilities for both grain and fodder for livestock has been observed to render the increased yield useless as it goes to waste in the farms. These are major challenges that impact on food security and consequently schooling. This calls for proper planning, not only in investing in irrigation schemes but also how the produce will be harvested, transported, stored, and processed, to be of use in promoting food security locally, regionally, nationally, and internationally, and most importantly to improve learners' well-being, promote school attendance, retention, progression, and performance.

5.11 Access to Land, Agricultural Inputs, and Extension Services

To reduce hunger and the effects this has on learners, there is need for increased food production to impact health and nutrition, reducing the negative effects drought has on yield, hunger, and income that lead to poor health and school absenteeism. Change in food production requires wide consultation and partnership between the government, civil society, donors, and the local communities. However, up to 40 per cent of what is grown is lost during harvesting, in storage and in marketing. There is also limited access to farm inputs such as seeds, fertilizers, insecticides, and advice by farmers due to cost, lack of resources and post-harvest losses. Further, there is also poor access to land by the energetic youth who could use it more innovatively in agribusiness. Parents as landowners are not willing to cede titles to the younger generation to invest for fear the youth will sell the land and waste the proceeds.

5.12 Other Challenges - Corruption and Lack of Data

In some flood-prone counties, people cultivate and build structures such as houses on riparian areas, building structures not meeting minimum technical specifications, build walls and structures that block storm waterways among other ills due to corrupt practices. When structures are erected on riparian land and waterways either illegally or with full clearance to build, flood damage to those structures, houses and other infrastructure occurs. Examples given of such structures in Nairobi included T-Mall and nearby structures and Grogan market; Kisauni and Likoni neighbourhoods in Mombasa and structures along Nyando

River in Kisumu City. The resultant floods and infrastructure damage affects learners, endangers their lives or make it impossible for them to reach home or school.¹⁶ Demolition of illegally constructed structure reduces the risks and discourages illegal conduct.¹⁷

Destination camps during floods are not always clearly defined. People are usually told to move to higher ground without specificity, and their animals are not factored in, in terms of space and feed. Pastoralists are inseparable from their animals and, therefore, they stay put and get caught by floods if they cannot find space for their animals or go with the animals to the camp, making the conditions rather difficult. Drought displacement camps for ease of feeding and provision of water and medical services are non-existent.

Lack of statistics on effects of droughts and floods on schooling presents a challenge for policies and planning. Monthly data on schools affected and attendance records would help in assessing the extent of damage, absenteeism and dropout associated with each of the events. The monthly data can then be analyzed to assess specific effects of droughts and floods on schooling.

¹⁶ <https://www.standardmedia.co.ke/ktnnews/ktn-prime/video/2000092817/makini-school-bus-stuck-for-8-hours-submerged-in-floods-in-south-c>; <https://www.kenyans.co.ke/news/11-pupils-rescued-after-being-trapped-hours-floods>.

¹⁷ <https://www.standardmedia.co.ke/entertainment/local-news/2001291120/photos-southend-mall-opposite-t-mall-demolished>.

6. Summary, Conclusion and Recommendations

6.1 Summary

Droughts and floods are becoming increasingly frequent and severe, with implications on schooling. The key channels through which these events affect schooling include health status, school accessibility with damaged infrastructure, migration of families in nomadism triggered by lack of water, pasture and food, conflicts over water, pasture and violent rustling, and displacement by floods, *inter alia*. All these lead to school absenteeism or abandonment, culminating in poor retention, progression, and performance.

During drought, people and animals in prone counties get exposed to starvation, becoming emaciated, with some starving to death. Hungry learners have little energy to reach school or concentrate on learning. Some drop out of school to look for food and water for family members and animals, explaining the high dropout rate of over 38 per cent in ASAL counties. Further, with floods, vector, water, food, and air borne diseases afflict learners (alongside other community members) aggravating school absenteeism. Some schools get inundated and damaged in flood waters, making them unusable. In other cases, the learners cannot reach school due to swollen rivers and damaged infrastructure (paths or roads and bridges).

Several efforts are being made to mitigate the risks and effects of drought and floods. The efforts include preventive and preparedness measures such as environmental conservation, information dissemination and early warning mechanisms at the community level, that reduce the risk of damage the events can unleash. At the school level, similar preventive and preparedness measures are employed in addition to raised classrooms and bookshelves, digging trenches to drain water, and equipping learners with information on what to do or not do during events such as floods, for example, not to cross swollen rivers and to stay at home or move to high grounds with their parents when floods are eminent. School feeding programmes, bore holes and water reservoirs are used to retain learners in school while reducing time spent fetching water.

Other efforts include response and recovery measures employed after droughts and floods events have already occurred. These measures are meant to ameliorate the effects of the events. Such efforts include rescuing marooned people, provision of relief food and water and animal feed, medical camps, basic provisions such as bedding and toiletries, *inter alia*. At the school level, damaged classrooms and other school infrastructure are rebuilt, learners are provided with learning materials to replace those damaged by floods, are provided with temporary schools in displacement camps or mobile schools for those shifting in nomadism, and enrolled in low-cost boarding schools where better care and facilities can be provided to overcome droughts and floods effects, offer better quality education, and retain learners in school.

There is a coordination mechanism at the county level under the County Steering Group that brings together key stakeholders including government departments, donor agencies, NGOs, CBOs, and private companies involved mostly in response

activities. They discuss response measures and share tasks, with each player allocated roles in line with their mandate and resources.

That said, there are challenges and emerging issues. Challenges encountered include inadequate resources for preventive, preparedness, response, and recovery measures to reduce severity of droughts and floods and their effects, untimely and ad hoc response action, poor WASH practices, and poor coordination mechanism.

6.2 Conclusion

Substantial resources are required at the household, school, county, and national level to reduce the risks and effects of droughts and floods on schooling. At household level, preventive measures include rainwater harvesting, tree planting and proper farming techniques for clean and readily available water, yield enhancement and environmental conservation. Resources are required for acquiring water tanks, digging water pans, pods and zae pits to trap water for animals, irrigation, domestic and school use. Practicing proper farming techniques and keeping ideal livestock numbers prevents soil erosion and environmental degradation, which are known to increase frequency and severity of droughts and flood episodes.

Preventive, preparedness, response, and recovery measures and coordination of all activities are essential to reduce the risks and effects of droughts and floods. Consequently, deliberate action is necessary at all levels from national and county governments to community, household and individual, to reduce the risks and effects of droughts and floods. Taking measures and actions improves the environment, livelihood, health, general standard of life and schooling.

Preventive measures before the events checks frequency of occurrence and severity of events, and is done through policies, strategies and actions that scatter the risks, thus protecting learners and their schools using stronger school structures, windbreakers, appropriate choice of school locations, flood water channeling, raised and strong foot bridges and warnings to stay away from raging water paths, *inter alia*. At the government and community level, preventive actions include water harvesting in flood control dams, reinforcing dykes and environmental conservation. Preparedness for floods comprises early warnings, information, and capacity building on how to stay safe, moving to higher grounds, stockpiling foodstuff, medical supplies, water, fuel, and other necessities including livestock feed at possible evacuation camps, *inter alia*. Preparedness for drought include planning to move and direction to migrate to for water and pasture, stockpiling foodstuff and livestock feed, which includes reserving dry periods pasture, digging boreholes, and water pans, establishing mobile schools and low-cost boarding schools for learners.

Response to event occurrence requires relief food, water, medical supplies, temporary shelter and schools and provision of essential materials and utilities for both domestic use and for learning. It also encompasses evacuating marooned people including learners. Recovery from the effects of these events entails helping the affected to go back to the pre-event status or better through rebuilding

homes, schools, and other infrastructure, recovering learning time lost, restocking animals, among others. Coordination focuses on how all these actions are conducted following a guiding framework for efficiency and effectiveness.

The capacity support determines how the actions before the event (prevention and preparedness), during the event (response) and after the event (recovery), are implemented to help reduce the risks, thwart the threats and alleviate suffering among the affected. The support system actors that take mediating actions, offer resources, and technical capacity include national and county governments, development partners (UN agencies, civil society, and private institutions). The resources include what is required to take preventive, preparedness, response, recovery, and coordination actions. The activities and resource management must be well coordinated to yield substantial outcomes and impacts. There must, therefore, be some frameworks, principles, and policies to guide the process for efficiency and effectiveness. When all these activities are implemented, learners are protected from the risks of droughts and floods and cushioned from the effects, which improves schooling to promote attendance, retention, progression, completion, and performance in prone areas.

6.3 Recommendations

The recommendations are structured along the measures in focus; pre-event measures of prevention and preparedness are addressed together, followed by post event measures of response and recovery and then coordination mechanisms.

Prevention and Preparedness

1. Enhance national and county resource allocation (financial, material, human and technical) for disaster risk reduction to shift counties from crisis management, done when resources are reallocated to deal with emergencies of droughts and floods, to risk management in which case resources are earmarked and invested in preventive and preparedness activities.
2. Avail resources to enhance rainwater harvesting efforts. Build more reservoirs (dams, water pans and ponds) and build capacity for domestic and community water harvesting through education and sensitization at all levels for increased water supply for irrigation, domestic and school use. Also, drill more boreholes in schools and make them accessible to local communities to reduce dependence on trucked water. Reinforce and construct dykes to control and or prevent floods.
3. Adopt ecosystem-based approaches to flood risks reduction in schools in low-lying lands and equip them as displacement camps, to guarantee safety for learners and local communities during floods. This is ideal in coastal areas susceptible to flooding, villages and islands in Baringo, along river lines and floodplains such as Yala, Budalangi, Nyando and Tana River, *inter alia*.
4. Mainstream disaster risk reduction into all programmes particularly school curriculum and all social economic activities to promote preventive and preparedness to droughts and floods through integration of droughts/floods

- disaster risk reduction in the education system. Train learners to plant and nurture trees in school for sustainable environmental conservation.
5. Improve access to information, early warning, and awareness creation and timely and appropriate action. Enhance WASH sensitization programmes using public barazas and teachers to ensure reduced water related health problems. Enhance documentation and dissemination of traditional knowledge in sensing droughts and floods.
 6. Conduct a school location audit to establish those in floodplains and storm water areas, and plan to relocate them to safer grounds; plan for reconstruction and strengthening of schools with weak structures for resilience to wind and floods.
 7. With particular emphasis to urban areas where drains get clogged; prioritize solid waste management and sensitization on waste disposal by creating regular county cleanup days especially just before rainy season to reduce flooding, enhance discipline in waste disposal, environmental conservation and improved health that impacts school attendance.
 8. Enhance utilization of information provided by actors such as weather pattern changes; appropriate crops and rangeland management; storage and marketing strategies for increased food security through food production and storage, management of livestock for reduced animal losses for improved livelihood and direct and indirect impacts on schooling.
 9. Enforce strict adherence to set building by-laws and serious punishment of rogue officers including loss of jobs and prosecution to prevent corruption when processing/issuing building permit and monitoring construction works.

Response and Recovery

1. Increase resource allocation for expanded school feeding program and include marginal schools into the program during drought. Provide breakfast, a snack or lunch in school to promote enrollment, attendance, and retention to emulate success outcome in Mombasa County following provision of milk in schools.
2. Enhance capacity of those involved in sensitization and information dissemination and response and recovery activities, including resource capacity for rescuing affected learners for better DRR and reduced impact of droughts and floods on schooling.
3. Enhance partnership between Children Departments and ECDE to ensure children rights are observed and children welfare is adequately addressed for reduced infringement in the face of droughts and floods.
4. Discourage parents from withdrawing their children from school in drought-prone areas by pegging household social assistance programmes to children being kept in school. Build parents' capacity to generate income to counter economic effects of droughts and floods and empower them through agricultural land planning and management and businesses and financial management courses, internal and external market interventions, and value addition of farm produce.
5. Increase the number of ECDE schools to ensure that pre-school learners do not cross seasonal rivers in flood prone regions and build community schools

in areas of need to reduce distances travelled by learners.

6. Encourage teachers, including those in ECDE, to keep monthly statistical returns to show school attendance of children by sex, ages, grade in both public and private facilities.
7. Encourage private firms to donate books, uniforms, and other needed materials to those affected by droughts and floods especially in low-income urban neighbourhoods and poor rural communities in prone counties as part of CSR.
8. Create animal holding grounds in displacement camps and provide animals feeds alongside human relief food and water.

Coordination

1. Utilize resources efficiently and effectively by getting stakeholders to plan together, sharing responsibilities as disaster reduction and management actors according to respective mandates, mapping out hotspots and creating a coordination command system with accountability and transparency processes for dealing with drought, floods and other calamities that affect communities and especially schooling.
2. Recruit casuals to support emergency activities and remove or modify protocols and bureaucracies that cause delays, for example ensure direct access to social halls and other facilities where people are evacuated to during emergencies.
3. Create an alert link via mobile phones to relevant units at Kenya Power and Lighting Company for electrocution risks during floods, and for requests to owners of fire engines and other rescue equipment such as helicopters and boats to rescue drowning learners and other members of the community.

6.4 Areas for Further Research

There is need for a nationwide in-depth study to assess the magnitude of droughts and floods impacts by county to assist with specifically directed resource allocation to deal with the droughts and floods effects on schooling. This will deal with the problem at each level from preventive, preparedness, response, recovery, and coordination.

Gathering statistics on effects of droughts and floods on learning, performance, concentration due to hunger, psychological distress and related absenteeism or dropout regularly is also paramount. This can be achieved through monthly returns showing the number of learners by sex, age, and grade, absenteeism, and reasons of absence. Data on status of school buildings, other infrastructure, and materials before and after floods and any other relevant information will also be useful in monitoring the effects of droughts and floods.

Given that education and sensitization for preparedness are fundamental in reducing community and learner's vulnerability to droughts and floods among other calamities, it is of essence to establish the extent of needed education support in the prone areas, how lessons learnt are used, and effectiveness of the lessons in reducing vulnerability. There is need to establish the learner's awareness of disaster risks, particularly those associated with droughts and floods, and to

establish the extent of integration of DRR into the school curriculum. A mapping of schools in floodplains, historical episodes of flooding that affect the schools, human and material losses suffered and best solutions from perspectives of both schools and households will also be useful.

Further analysis of school enrolment data is needed to establish what specific factors influence gross enrolment rate, to help compare the droughts/floods prone and non-prone counties along the proportion from out of county enrolment (and source counties), repetition, early and late entrants for each education level. This will help in identifying which schools to promote as net recipients of enrolers from prone areas for capacity enhancement. It will also help draw a pattern and or trend, which can be related with effects of climate change.

References

- Abdi, I.A. (2010), Education for All (EFA): Reaching nomadic communities in Wajir, Kenya - Challenges and opportunities. University of Birmingham, United Kingdom.
- Abram N. J. et al. (2021), "Connections of climate change and variability to large and extreme forest fires in Southeast Australia". *Journal of Communications Earth and Environment*. <https://doi.org/10.1038/s43247-020-00065-8>.
- Abuya, R. et al., (2019), Contextualizing pathways to resilience in Kenya's ASALs under the Big Four Agenda. Kenya Market Trust. Nairobi.
- Achoka J.S.K. and Maiyo J. (2008), "Horrible disasters in Western Kenya – Impact on Education and National Development". *Educational Research and Review*, 3 (3): 154-161.
- Adaawen, S., Rademacher-Schulz, C., Schraven, B. and Segadloa N. (2019), Drought, migration, and conflict in Sub-Saharan Africa: What are the links and policy options?
- ADPC (2007), Integrating disaster risk reduction into school curriculum.
- Akanwa A.O. and Ikechebelu N.J. (2019), The developing world's contribution to global warming and the resulting consequences of climate change in these regions: A Nigerian Case Study. DOI: 10.5772/intechopen.85052.
- Akello, S. (2014), Effects of floods on students access to secondary education in Nyando District, Kisumu County, Kenya. University of Nairobi.
- Alakonya, A.E. and Monda, E. O. (2013), A new approach in aflatoxin management in Africa: Targeting Aflatoxin/Sterigmatocyst in Biosynthesis in *Aspergillus* Species by RNA Silencing Technique.
- Alam A. and Tiwari P. (2020), *Putting the 'learning' back in remote learning issue*. UNICEF: New York.
- Ambuchi, J.J. (2011), Flood disaster preparedness and management in schools: Case study of Budalang'i area in Busia County. University of Nairobi.
- Anni, A. H., Cohen, S., Praskiewicz, S. (2020), "Sensitivity of urban flood simulations to stormwater infrastructure and soil infiltration". *Journal of Hydrology*, 588: <https://doi.org/10.1016/j.jhydrol.2020.125028>.
- Aroka N. (2010), Rainwater harvesting in rural Kenya: Reliability in a variable and changing climate. Stockholm University, Stockholm.
- Asaka, J. (2012). "Water and land conflict in Kenya in the wake of climate change. New security beat". The blog of the Environmental Change and Security Programme. <https://www.newsecuritybeat.org/2012/09/water-land-conflict-kenya-wake-climate-change/>.
- ASEAN (2016), School disaster risks management guidelines for Southeast Asia.

-
- Ayabei, C.J. (2016), Influence of food provision on pupils' participation in primary education in public and private schools in Mogotio Sub-County, Kenya.
- Ayub M.J. (2018), "Factors contributing to low completion rates of girls in primary schools in Mogotio Sub-county, Baringo County, Kenya". *International Journal of Scientific Research and Innovative Technology*, 5(1).
- Baez, J., Fuente, A. and Santos, I., (2009), Do natural disasters affect human capital? An assessment based on existing empirical evidence. IZA, Bonn. IZA DP No. 5164.
- Basak, S.R., Basak, A.C. and Rahman, M.A. (2015), "Impacts of floods on forest trees and their coping strategies in Bangladesh". *Weather and Climate Extremes*, 7:
- Belachew T., Hadley C., Lindstrom D., Gebremariam A., Lachat C. and Kolsteren P. (2011), "Food insecurity, school absenteeism and educational attainment of adolescents in Jimma Zone Southwest Ethiopia: A longitudinal study". *Nutrition Journal*, 10:29. <http://www.nutritionj.com/content/10/1/29>.
- Belesova K., Agabiirwe C.N., Zou M., Phalkey R., Wilkinson P. (2019), "Drought exposure as a risk factor for child undernutrition in low and middle-income countries: A systematic review and assessment of empirical evidence". *Environment International*, 131 (2019) 104973.
- Bhatasara, S. (2015), Understanding climate variability and livelihoods adaptation in rural Zimbabwe: A case of Charewa, Mutoko. Thesis, Rhodes University.
- Bidwell T.G. and Woods B., (2017), Management strategies for rangeland and introduced pastures. Oklahoma State University, Oklahoma City.
- Birch I. Cavanna S. Abkula D. and Hujale D., (2010), Towards education for nomads: Community perspectives in Kenya. International Institute for Environment and Development. London.
- Birch, I. (2018), Economic growth in the arid and semi-arid lands of Kenya. DFID Helpdesk, K4D.
- Bosschaart, A., Schee J. and Kuiper, W. (2016), "Designing a flood-risk education programme in the Netherlands". *The Journal of Environmental Education*, 47(4): 271-286. DOI:10.1080/00958964.2015.1130013.
- Bradshaw C., Sodhi N., Peh K. and Brook B., (2007), "Global evidence that deforestation amplifies flood risk and severity in the developing world". *Global Change Biology*, 13: 2379-2395.
- Brown, G. (2012), Child labour and educational disadvantage – Breaking the link, building opportunity: A review. The Office of the UN Special Envoy for Global Education, London. <https://gordonandsarahbrown.com/wp-content/uploads/2012/12/Child-Labour-US-English.pdf>.
- Budhakoontharoen S. (2003), "Floods and droughts: Sustainable prevention and management". *Transactions on Ecology and the Environment*, 64.

- Chege P.M., Kimiywe J.O. and Ndungu Z.W.(2015), "Influence of culture on dietary practices of children under five years among Maasai pastoralists in Kajiado, Kenya". *International Journal of Behavioral Nutrition and Physical Activity*. 12:131 DOI 10.1186/s12966-015-0284-3.
- Chotard, S., Mason, J.B., Oliphant, N.P., Mebrahtu, S., and Hailey, P., (2010), Fluctuations in wasting in vulnerable child populations in the Greater Horn of Africa. <http://journals.sagepub.com/doi/abs/10.1177/15648265100313S302>.
- Church World Services - CWS) (2008), Safety standard manual for schools in Kenya. Nairobi: Ministry of Education.
- Coleman N.M., Kaktins U. and Wojnobs S. (2016), "Dam-breach hydrology of the Johnstown flood of 1889: Challenging the findings of the 1891 investigation report". *Heliyon*, 2(6): e00120.doi: 10.1016/j.heliyon.2016.e00120.
- Cooper, M.W., Brown M.E., Hochrainer-Stigler S., Pflug G., McCallum I., Fritz S., Silva, J. and Zvoleff, A. (2019), "Mapping the effects of drought on child stunting". *PNAS*, 116 (35): 17219-17224; <https://doi.org/10.1073/pnas.1905228116>.
- Development Initiative (2017), Assessment of Kenya's preparedness to disasters caused by natural hazards: Floods, drought and disease outbreak. DI, Bristol.
- Dometita, M. L. M. (2017), Beneath the dryland Kenya drought gender analysis. Oxford: Oxfam.
- Ebi, K.L. and Hess J.J. (2020), "Health risks due to climate change: Inequity in causes and consequences". *Health Affairs*, 39 (12).
- Elliott, H. and Fowler, B. (2012), Markets and poverty in Northern Kenya: Towards a financial graduation model. Nairobi: Financial Sector Deepening Kenya.
- FAO, UNICEF and WFP (2019), A joint call for action before a major regional humanitarian crisis. Joint Position Paper.
- Federal Emergency Management Agency (2004), Design guide for improving school safety in earthquakes, floods, and high winds. FEMA, Washington DC.
- Feuerhake E., Muianga M., Nhampule E. and Ferreiro F. (2010), Learning how to live with floods. UNhabitat and Republic of Mozambique, Maputo.
- Few, R., Satyal, P., McGahey, D., Leavy, J., Budds, J., Assen, M., Camfield, L., Loubser, D., Adnew, M., and Bewket, W. (2015), Vulnerability and adaptation to climate change in semi-arid areas in East Africa. ASSAR Working Paper, ASSAR PMU, South Africa, 111.
- Fontalba-Navas, A., Lucas-Borja, M. E., Gil-Aguilar, V., Arrebola, J. P., Pena-Andreu, J. M., and Perez, J. (2017), "Incidence and risk factors for post-traumatic stress disorder in a population affected by a severe flood". *Public*

- Health*, 144:96-102.
- Food Security Information Network - FSIN and Global Network Against Food Crises (2021), *Global Report on Food Crises 2021*. Rome.
- Friel, S., Berry, H., Dinh, H., O'Brien L., and Walls. H. L. (2014), The impact of drought on the association between food security and mental health in a nationally representative Australian sample. <https://bmcpublihealth.biomedcentral.com/track/pdf/10.1186/1471-2458-14-1102>.
- Gibbs (2019), "Delayed disaster impacts on academic performance of primary school children". *Child Development*, 90 (4): 1402–1412. <https://srcd.onlinelibrary.wiley.com/doi/epdf/10.1111/cdev.13200>.
- Gitu, K. (2006), *Agricultural development and food security in Sub-Saharan Africa (SSA): Building a case for more public support: The case of Kenya*. Nairobi: FAO.
- Global Partnership for Education - GPE (2018), "Prolonged drought in East Africa forces millions of children out of school". *Education for All Blog*. <https://www.globalpartnership.org/blog/prolonged-drought-east-africa-forces-millions-children-out-school>.
- Global Partnership for Education - GPE (2020), *2020 Results Report*. GPE, Washington DC.
- Government of Kenya (2007), *Kenya Vision 2030: A globally competitive and prosperous Kenya*. Nairobi: Ministry of State for Planning, National Development and Vision 2030.
- Government of Kenya (2008), *Kenya Vision 2030 - First Medium Term Plan (2008-2012)*. Nairobi: Ministry of State for Planning, National Development and Vision 2030.
- Government of Kenya (2009), *Draft National Policy for Disaster Management in Kenya*. Nairobi: Ministry of State for Special Programmes. <http://www.ifrc.org/docs/idrl/765EN.pdf>.
- Government of Kenya (2010a). *Constitution of Kenya 2010*. Nairobi: Government Printer.
- Government of Kenya (2010b), *National Climate Change Response Strategy: Executive Brief*. Nairobi: Ministry of Environment and Mineral Resources.
- Government of Kenya (2013a), *Kenya Vision 2030 – Second Medium Term Plan (2008-2012)*. Nairobi: Ministry of State for Planning, National Development and Vision 2030.
- Government of Kenya (2013b), *Sector Plan for Drought Risk Management and Ending Drought Emergencies Second Medium-Term Plan 2013–2017*.
- Government of Kenya (2014), *Education for All: The 2015 National Review*. Nairobi: Ministry of Education, Science and Technology.

- Government of Kenya (2016), Social protection, culture and recreation sector report. Nairobi: Government Printer.
- Government of Kenya (2017), Education Sector Disaster Management Policy. Nairobi: Ministry of Education.
- Government of Kenya (2018a), Kenya Vision 2030 - Third Medium Term Plan (2008-2012). Nairobi: Ministry of State for Planning, National Development and Vision 2030.
- Government of Kenya (2018b), National Education Sector Strategic Plan 2018-2022. Nairobi: Ministry of Education.
- Government of Kenya (2019), Basic Education Statistical Booklet. Nairobi: Ministry of Education.
- Government of Kenya (2021), The National Disaster Risk Management Bill, 2021. NBills No. 28. Kenya Gazette Supplement No. 104.
- Gujja, B. and Perrin, M. (1999), A place for dams in the 21st Century? Washington DC: WWF.
- Hodgkinson, K. (2016), Understanding and addressing child marriage: A scoping study of available academic and programmatic literature for the HER CHOICE Alliance.
- Huho, J.M., Mashara, J.N. and Musyimi, P.K. (2016), "Profiling disasters in Kenya and their causes". *Academic Research International*, 7(1). https://www.researchgate.net/publication/293414597_Profiling_Disasters_in_Kenya_and_Their_Causes.
- Ibrahim, H.B.A. (2017), "The role of school feeding programme supported by DAL company in students' enrolment and drop-out". *Advances in Social Sciences Research Journal*, 4 (2). DoI:10.14738/assrj.42.2517.
- Intergovernmental Panel on Climate Change - IPCC (2012), Managing the risks of extreme events and disasters to advance climate change adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, and New York, NY, USA. 582.
- Intergovernmental Panel on Climate Change - IPCC (2019), Summary for policy makers". In: Climate Change and Land: an IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems.
- International Federation of Red Cross and Red Crescent Societies - IFRC (2010), Kenya floods: Preliminary emergency appeal n°MDRKE012. GLIDE n° FL-2010-000047-KEN. IFRC, Nairobi.
- International Federation of Red Cross and Red Crescent Societies - IFRC (2011), "Drought in the Horn of Africa: Preventing the next disaster". Geneva: International Federation of Red Cross and Red Crescent Societies.

- International Federation of Red Cross and Red Crescent Societies - IFRC (2018), Public awareness and public education for disaster risk reduction: Action-oriented key messages for households and schools. Geneva: IFRC.
- International Financial Corporation (2010), Disaster and emergency preparedness: Guidance for schools. Washington DC: IFC.
- International Organization for Migration - IOM (2016), The climate change – Human trafficking nexus. Geneva: IOM.
- International Organization of Migration - IOM (2009), Compendium of IOM activities in migration, climate change and the environment. Geneva: IOM.
- Jones, N., Tefera, B., Stephenson, J., Gupta, T., Perezniето, P., Emire, G., Gebre, B., and Gezhagne, K. (2014), Early marriage and education: The complex role of social norms in shaping Ethiopian adolescent girls' lives. London: ODI.
- Kamble, R.K., Walia, A. and Thakare, M.G. (2013), "Ecosystem approach to flood disaster risk reduction". *International Journal of Environment*, 2(1).
- Kanoti J. R., Olago D., Opiyo N. and Nyamai C. (2019), An overview of groundwater and sanitation challenges in Kisumu City, Kenya". *International Journal of Innovative Research and Development*, DOI No.: 10.24940/ijird/2019/v8/i4/143592-347932-1-SM.
- Kariuki F. (n.d.), Conflict resolution by elders in Africa: Successes, challenges and opportunities. <http://kmco.co.ke/wp-content/uploads/2018/08/Conflict-Resolution-by-Elders-successes-challenges-and-opportunities-1.pdf>.
- Kisurulia S., Katiambo D., Lutomia G.A. (2013), "An investigation into the state of disaster and safety preparedness in schools in Kenya". *International Journal of Science and Research*, 2319-7064.
- KNBS (2013), Statistical Abstract 2013. Nairobi: Government Printer.
- KNBS (2018), Statistical Abstract 2013. Nairobi: Government Printer.
- Knutson, C., Hayes, M. and Phillips, T. (1998), How to reduce drought risks. Preparedness and Mitigation Working Group. Western Drought Coordination Council.
- Komarulzaman, A., Jong E. and Smits, J., (2019), "Effects of water and health on primary school enrolment and absenteeism in Indonesia". *Journal of Water and Health*, 17(4): 633-646.
- Krätli, S. and Dyer, C. (2009), Mobile pastoralists and education: Strategic options. London: International Institute for Environment and Development.
- Langinger, N. (2011), "School feeding programmes in Kenya: Transitioning to a homegrown approach". *Stanford Journal of International Relations*. <https://www.dlci-hoa.org/assets/upload/education-documents/20200804020405893.pdf>.

- Levison, D., DeGraff, D.S. and Dungumaro, E.W. (2018), "Implications of environmental chores for schooling: Children's time fetching water and firewood in Tanzania". *European Journal of Development Research*, 30, 217-234. <https://doi.org/10.1057/s41287-017-0079-2>.
- Mamogale, H.M. (2011), Assessing disaster preparedness of learners and educators in Soshanguve North Schools. University of The Free State.
- Mandera County (2013), First County Integrated Development Plan 2013-2017. Mandera County.
- Maoulidi M. (2010), Water and sanitation needs assessment for Kisumu City, Kenya. MCI Social Sector Working Paper Series N° 12/2010.
- Marcos, M. and Woodworth, P.L. (2017), "Spatiotemporal changes in extreme sea levels along the coasts of the North Atlantic and the Gulf of Mexico". *Journal of Geographical Research*, 10.1002/2017JCO13065.
- Mason, J.B., Chotard, S., Cercone, E., Dieterich, M., Oliphant, N. P., Mebrahtu, S., and Hailey, P. (2010), "Identifying priorities for emergency intervention from child wasting and mortality estimates in vulnerable areas of the Horn of Africa". *The Sage Journals*, <https://journals.sagepub.com/doi/10.1177/15648265100313S303>.
- Mbogo, E., Inganga, F. and Maina, J.M. (n.d.), Drought conditions and management strategies in Kenya.
- Monda, A.K. (2013), Factors influencing pupils' access to primary school education in flood prone areas of Ijara District, Garissa County, Kenya.
- Mudavanhu, C. (2014), The impact of flood disasters on child education in Muzarabani District, Zimbabwe.
- Munsaka, E. and Mutasa S. (2000), Flooding and its impact on education. DOI: 10.5772/intechopen.94368. <https://www.intechopen.com/online-first/flooding-and-its-impact-on-education>.
- Mwangi, M. (nd), Cooperation and conflicts over access and use of natural resources in the arid and semi-arid lands (ASALs) of Kenya.
- Mwendwa, E.M. and Gori J.M. (2019), Relationship between school feeding programmes and the pupils' school attendance in public primary schools in Kitui County, Kenya". *International Journal for Innovation Education and Research*, 7(10).
- National Academies of Sciences, Engineering, and Medicine (2017), Strengthening the disaster resilience of the academic biomedical research community: Protecting the nation's investment. Washington DC: The National Academies Press. doi:<https://doi.org/10.17226/24827>.
- Ndichu, G.D. (2013), Impact of drought on primary schools learning in Laikipia West District of Laikipia County, Kenya.

- Niekerk, D. (2011), Introduction to disaster risk reduction. United States Agency for International Development - USAID, Washington DC.
- Nyakundi, H., Mogere, S., Mwanzo, I. and Yitambe, A. (2010), Community Perception and Response to Flood Risk in Nyando District, Western Kenya.
- Nyamieri A.B. (2013), Community perception on rainwater harvesting systems for enhancing food security in dry lands of Kenya: A case study of Uvati and Kawala Sub-Location in Mwingi District, Kenya.
- Nyariki, D.M. and Amwata, D.A. (2019), "The value of pastoralism in Kenya: Application of total economic value approach". *Pastoralism: Research, Policy and Practice*. <https://doi.org/10.1186/s13570-019-0144-x>.
- Nyongesa K.W. and Vacik H. (2018), Fire management in Mount Kenya: A case study of Gathiuru Forest Station. MPDI.
- Okaka, F.O. and Odhiambo, B.D.O. (2018), "Relationship between flooding and outbreak of infectious diseases in Kenya: A review of the literature". *Journal of Environmental and Public Health*. <http://downloads.hindawi.com/journals/jep/2018/5452938.pdf>.
- Omosa, E.K. (2005), The impact of water conflicts on pastoral livelihoods: The case of Wajir District in Kenya. Nairobi: International Institute for Sustainable Development (IISD).
- Opere A. (2004), The impact of natural disasters due to environmental change, on the livelihood of the Lake Victoria Basin. Nairobi: Department of Meteorology, University of Nairobi.
- Opere, A. (2013), "Floods in Kenya". In: *Developments in Earth Surface Processes*. Elsevier B.V.
- Osei R. D. and Lambon-Quayefio M.P. (2021), "Effects of long-term malnutrition on education outcomes in Ghana: Evidence from a panel study". *The European Journal of Development Research*.
- Osman, I. (2018), The effects of drought on primary education in Eastern Uganda. The Research and Evidence Facility (REF). 23(02). <https://blogs.soas.ac.uk/ref-hornresearch/2018/02/23/guest-blog-the-effects-of-drought-on-primary-education-in-eastern-uganda/>.
- Owuor, P. (2015), "The disaster profile of Kenya". *Emergency and Disaster Reports*, 2(3): 1-45.
- Palapala V. and Nyamolo M. (2016), "Effect of water logging on selected morphological characteristics in maize". *Journal of Agricultural Science and Food Technology*, 2 (6): 80-92.
- PRISE (2016), Kenya: Country Situation Assessment. Nairobi: PRISE.
- Raikes, J., Smith, T.F., Jacobson, C. and Baldwin, C. (2019), "Pre-disaster Planning and Preparedness for Floods and Droughts: A systematic review". *International Journal of Disaster Risk Reduction*, 38: 101207.

- Randell, H. and Gray C. (2016), "Climate variability and educational attainment: Evidence from rural Ethiopia". *Glob Environmental Change*, 41: 111-123, DOI:10.1016/j.gloenvcha. 2016.09.006.
- Ray, R.L., Fares, A. and Risch, E. (2018), "Effects of drought on crop production and cropping areas in Texas". *Agricultural and Environmental Letters*.
- Regional Consultative Committee on Disaster Risk Management- RCC (2007), Integrating Disaster Risk Reduction in School Curriculum. RCC, klong luang.
- REGLAP (2012), Key statistics on the drylands of Kenya, Uganda and Ethiopia. ReliefWeb/OCHA.
- Reid, H. and Orindi V. (2018), Ecosystem-based approaches to adaptation: Strengthening the evidence and informing policy. IIED. <http://pubs.iied.org/17620IIED>.
- Ruto, S. J., Ongwenyi, Z. N. and Mugo, J.K., (2009), Educational marginalization in Northern Kenya. Education for All Global Monitoring Report 2010.
- Sana, R. and Khattak, S.R. (2014), "Prevalence of post-traumatic stress disorder in flood affected population of Banda Sheikh Ismail, District Nowshera". *JPMI* 28 (1) http://applications.emro.who.int/imemrf/J_Postgrad_Med_Inst/J_Postgrad_Med_Inst_2014_28_1_27_32.pdf.
- Sena, L. and Kifle, W.M. (2006), "Disaster prevention and preparedness: Lecture notes for health science students - Ethiopia Public Health Training Initiative (EPHTI) and USAID.
- Sharifi, S. (2013), Education of nomad children in the north and east of Afghanistan: Models, challenges and opportunities. Karlstad University, Karlstad.
- Singh D., Choudhary, M.K., Meena, M.L., and Kumar C. (2019), "Rainwater harvesting for food and livelihood security: A case study from Pali, India". *Open Agriculture*, 4: 767-777.
- Sivakumar V.K.M., Stefanski R., Bazza M., Zelaya S, Wilhite D. and Magalhaes A. R. (2014), "High level meeting on National Drought Policy: Summary and major outcomes". *Weather and Climate Extremes*.
- Spear, D., Haimbili, E., Baudoin, M., Hegga, S., Zaroug, M., Okeyo, A., Angula, M., (2018), Vulnerability and adaptation to climate change in semi-arid areas in Southern Africa. IDRC, Ottawa.
- Speranza, C.I. (2010), Resilient adaptation to climate change in African agriculture. Bonn: German Development Institute.
- Stanke, C., Kerac, M., Prudhomme, C., Medlock, J., and Murray, V. (2013), "Health effects of drought: A systematic review of the evidence". *PLOS Currents Disasters*. Edition 1. doi: 10.1371/currents.dis.7a2cee9e980f91ad7697b57obcc4b004.

-
- Tamiru D. and Belachew T. (2017), "The association of food insecurity and school absenteeism: Systematic review". *Agriculture and Food Security*, 6:5 DOI 10.1186/s40066-016-0083-3.
- Tapsell S.M., Penning-Rowsell E.C., Tunstall S.M. and Wilson T.L. (2002), "Vulnerability to flooding: Health and social dimensions". *The Royal Society*, 10.1098/rsta.2002.1013.
- Tengnas, B. (1994), *Agroforestry extension manual for Kenya*. Nairobi: International Centre for Research in Agroforestry.
- Todorova, K. (2016), *Ecosystem-based approach for flood risk reduction in Bulgaria*. International Conference of Development and Economy Conference (ICODECON) Paper, Thessaloniki.
- UNCCD (2016), *The ripple effect: A fresh approach to reducing drought impacts and building resilience*. UNCCD, Bonn.
- UNEP and Government of Kenya (2006), *Kenya drought: Impacts in agriculture, livestock and wildlife*. UNON, Nairobi. <https://wedocs.unep.org/handle/20.500.11822/29651>.
- UNESCAP and UNISDR (2012), *Reducing vulnerability and exposure to disasters. The Asia-Pacific Disaster Report 2012*. Bangkok, United Nations.
- UNESCO (2016), *Drought risk management: A strategic approach*. Paris: UNESCO.
- UN-Habitat (2019), *Supporting safer housing reconstruction after disasters: Planning and implementing technical assistance at large scale*. Nairobi: UN-Habitat.
- UNICEF (2009), *Manual: Child friendly schools*. New York: UNICEF.
- UNICEF (2015), *A study of education and resilience in arid and semi-arid lands*. UNICEF, Eastern and Southern Africa Regional Office (ESARO).
- UNICEF, Plan International and Save the Children (1996), *Disaster risk reduction in education in emergencies: A guidance note for education clusters and sector coordination groups*.
- UNISDR (2005), *The Hyogo Framework of Action 2005-2015*. Geneva: UNISDR.
- UNISDR (2009), *Drought risk reduction framework and practices: Contributing to the implementation of the Hyogo Framework for Action*. Geneva: UNISDR.
- UNISDR (2015), *The Sendai Framework for Disaster Risk Reduction 2015-2030*. Geneva: UNISDR.
- Venton, C.C., Fitzgibbon, C., Shitarek, T., Coulter, L. and Dooley, O. (2012), *The economics of early response and disaster resilience: Lessons from Kenya and Ethiopia*. http://www.fao.org/fileadmin/user_upload/drought/docs/Econ-Ear-Rec-Res-Full-Report%20.pdf.

- WHO (2012), Public health risk assessment and interventions: Flooding disaster in Nigeria. Geneva: WHO.
- Wilbur, J., Lamb, J., Willenborg, H. and Sridharan, A. (2015), Water for women. Every woman counts. Every second counts.
- Wilhite, A.D., Sivakumar, V.K.M. and Pulwarty, R. (2014), "Managing drought risk in a changing climate: The role of national drought policy. *Journal on Weather and Climate Extremes*, 3: 4-13.
- World Bank (2015), *Disaster risk management in the transport sector: A review of concepts and international case studies*. Washington, DC: World Bank.
- World Meteorological Organization - WMO (2021), State of the Global Climate 2020. Geneva: MWO.
- Wubetu A. (2016), "The role of rainwater harvesting for food security in Ethiopia: A review". *Journal of Biology, Agriculture and Healthcare* (Online), 6(13).

Annexes

Annex 1: ASAL and flood-prone counties selected for droughts/floods survey

S. No.	Code	County	S. No.	Code	County
1	101	Nairobi	15	502	Wajir ¹
2	301	Mombasa	16	503	Mandera
3	302	Kwale	17	601	Siaya
4	303	Kilifi	18	602	Kisumu
5	304	Tana River	19	604	Homa Bay
6	306	Taita Taveta	20	701	Turkana
7	401	Marsabit	21	702	West Pokot
8	402	Isiolo	22	703	Samburu
9	404	Tharaka Nithi	23	705	Baringo
10	405	Embu	24	707	Elgeyo Marakwet
11	406	Kitui	25	709	Laikipia
12	407	Machakos	26	711	Narok
13	408	Makueni	27	712	Kajiado
14	501	Garissa	28	804	Busia

Annex 2: Incidences of droughts and floods in Kenya from 1975 - 2018

Year	Type	Where	Effects
1975	Drought	Widespread	16,000 people affected
1977	Drought	Widespread	20,000 people affected
1980	Drought	Widespread	40,000 people affected
1982	Floods	Nyanza	4,000 people affected
1983/84	Drought	Widespread	200,000 people affected
1985	Floods	Nyanza/Western	10,000 people affected

¹ Omitted from study due to insecurity during the survey period.

1991/92	Drought	ASAL regions of Northeastern, Rift Valley, Eastern and Coast	1.5 million people affected
Year	Type	Where	Effects
1995/96	Drought	Widespread	1.41 million people affected
1997/98	Floods	Widespread (El Nino)	1.5 million people affected, epidemic of Rift Valley Fever
1999/2000	Drought	Widespread	4.4 million people affected
2002/3	Floods	Nyanza, Busia, and Tana River Basin	150,000 people affected
2002	Landslides	Meru Central, Murang'a, Nandi	2,000 people affected
2004	Landslides	Nyeri/Othaya Kihuri	Five (5) people dead
2004/2005	Drought	Widespread	Three million people affected and in need of relief aid for eight months to March 2005; 2.5 million people close to starvation; 30-40 per cent loss of livestock in Northern Kenya and 70 per cent loss in a few pastoral communities; declared a national disaster
2006	Floods	Widespread	7 deaths, 6,500 people displaced
2006	Drought	Widespread	40 human lives lost and about 40 per cent cattle, 27 per cent sheep and 17 per cent goats lost
2007/8	Drought	Widespread	4.4 million people affected, 2.6 million people at risk of starvation, up to 70% loss of livestock in some pastoral communities: 3.5 million in need of food by September
2008	Floods	Budalangi, Rift Valley, Kitale, Makueni, Mwala/Kibwezi	24 people killed; 2396 affected
2009	Drought	Widespread	70-90 per cent loss of livestock by Maasai pastoralists
2010	Floods	Budalangi, Mt Elgon, Samburu, T/river, Turkana	73 killed, 14,585 people affected, 3000 people buried and property destroyed

Year	Type	Where	Effects
2011	Drought	Marsabit, Nairobi, Turkana, Samburu	4.3 million people were in dire need of food
2012	Floods	Nyanza/Western	84 people killed, 30,000 displaced and about 280,000 people affected countrywide
2012	Drought	Widespread	3.75 million people in dire of food by July 2012
2013	Floods	Tana River County	82,000 people displaced
2014	Floods	Narok Town, Nairobi City	Property and infrastructure destroyed
2015	Floods	Widespread	15 people killed, thousands displaced
2016	Floods	Nairobi, Turkana counties	26 people dead from collapsed building in Nairobi, 1,000 people in Turkana County left homeless
2017	Drought	Widespread	3.4 million people were left severely food insecure; 3.9 million people in need
2018	Floods	Widespread	186 people killed, 100 injured, 800,000 affected, 300,000 displaced

Sources: Government of Kenya (2009); Elliott and Fowler (2012); Venton et al. (2012); Huho, Mashara and Musyimi (2016); Floodlist (2018); UNICEF (2018)

Annex 3: Actors in response and recovery

	Actor	Activities	Coverage
1	Action Against Hunger	Nutrition, water and sanitation	Isiolo, Kakamega, Tana River, West Pokot, Trans Nzoia, Busia, Bungoma Nairobi
2	Action Aide	HIV/AIDS, Food security, Education	National
3	ADRA	Food security, education, health	National
4	ACID	Maize development programme, building smallholder capacity	National
5	AMREF	Healthcare, HIV/AIDS	National
6	Care	HIV/AIDS, emergency and relief operations, smallholder commercializing activities	National

7	CARITAS	Poverty reduction; conflict resolution; gender disparity; response to disasters and emergencies; emerging needs	National
8	Catholic Relief Services	HIV/AIDS, food security, strengthening civil society, governance, education	National
9	COOPI	Water, healthcare, education, food security, slum upgrading	Nairobi, Northern Kenya
10	Christian Children's Fund	HIV/AIDS, health and sanitation, education, childhood development, sustainable livelihood development, emergency response	National
11	Concern worldwide	Health, education, emergency response	Nairobi, Marsabit
12	Christian Aid	HIV/AIDS, climate	National
13	EPAG - Kenya	Food Security, drought Mitigation, research, capacity building, advocacy (HIV/AIDS, FGM, youth and women empowerment, gender equity, livestock marketing)	Mandera, Wajir
14	Family Health International	HIV/AIDS, health services	National
15	Handicap International	Disability, health and disease prevention, income generating activities	Nairobi, Garissa
16	Islamic Relief	Food security, WASH, health, education, micro-finance, Environment, conflict resolution	Nairobi, Mandera, Wajir, Garissa
17	Pastoralist Against Hunger	Food security	Mandera
18	Northern Aid	Food security; water, sanitation and health (WASH); peace and conflict management, and emergency response	Northern Kenya

19	Plan International	Children rights: marriage, labour, trafficking, FGM, violence against children	Nairobi, Machakos, Kajiado, Tharaka Nithi, Busia, Kisumu, Homabay, Mombasa, Siaya, Kilifi, Taita Taveta, Kwale, Marsabit
20	Oxfam	Education, human rights, peace building, sustainable livelihoods, food security	Nairobi, and Northern Kenya
21	Red Cross	Famine, health (blood donor services, first aid training), education related humanitarian needs, disaster, and emergency response	National
22	Safe the Children	HIV/AIDS, water and sanitation, education, food security	National
23	SIKOM Peace Network Development	Conflict management and promotion of peace	West Pokot and Turkana
24	Solidarities International	Water and food security, health, emergencies	Marsabit
25	St John Ambulance	First aid and ambulance services	National
26	Green Belt Movement	Capacity building, environmental conservation	National
27	Trocaire	Emergency response, human rights, education, sustainable livelihoods	Kitui, Laikipia, Mbeere, Meru, Nyeri, Tana River, Tharaka and Turkana
28	Terra Nuova	Natural resources management and conservation, urban youth	Nairobi, pastoral semi-arid regions
29	VSF - Suisse	Livelihoods, food security through camel development	Nairobi, Mandera, Isiolo
30	World Vision	Health and nutrition, education and child protection, WASH, and food and security, livelihood and resilience, disaster management	35 out of 47 counties (Including all droughts and floods counties)

Annex 4: Key Informant Interview Guide

Name of respondent:

Designation:

Name of institution:

County:

Sub-county:

Date of interview:

Name of Interviewer(s):

1. What is the general status of drought/floods in your county in the last ten years? (occurrence and severity)
2. In your opinion, what sectors are most affected by droughts/floods? (for example, security, health, agriculture, education, livestock, trade etc.)
3. How do droughts/floods affect this county/sectors/communities/people? (economic, social and environmental impacts).

Strategies

4. Tell me about the drought/flood management practices that are used in the sector/county (planning for drought/floods, responding to drought/floods; and recovery from droughts/floods disaster).
 - a. In your opinion, how effective are the current practices in addressing the underlying causes and effects/impacts associated with drought/flood? (planning for drought/floods, responding to drought/floods; and recovery from droughts/floods disaster); (measures of effectiveness: adequacy, timeliness, cost effectiveness and targeting-is it going to the right people?)
 - b. What are the main challenges in implementing the above practices?

Coordination and Governance

5. What are the main coordination mechanisms for addressing drought/flood emergencies in your county? (at national, county and sub-county levels). (Who are the actors and what are their roles and responsibilities? Is there an information sharing mechanism? What is the reporting structure?)
 - a. How effective is this mechanism? (In terms of broad-based participation, achievements, capacity to respond).
 - b. How adequate are available resources to address droughts/floods?
 - c. What measures of accountability have been put in place to support the coordination and management of drought/floods?
6. In your opinion, what do you think should be done to better enhance resilience to drought/floods? (When taking recommendations take note of; how to categorize planning, response and recovery; include the person responsible for implementation).

Probing questions (health facilities and schools)

1. What illnesses prevail in the region during a) drought b) floods? What was the impact?
2. How many lives were lost in the region in 2017 due to a) drought b) floods? What was the impact?
3. Does this school get flooded during heavy rains? How does this affect learning/school attendance? What was the impact?
4. How did the 2017 drought affect learning/school attendance? Impact

Annex 5: Focus Group Discussion

1. Introduction
 - a. Introduction of the KIPPRA team and FGD participants
 - b. Objectives of the survey and FGD
 - c. Rules of undertaking the FGD
2. Status of drought/floods in your locality
 - a. List all drought/flood events that have occurred in your area in the last 10 years.
 - b. What is your opinion on the duration and severity of drought/floods events over the period?
 - c. How does the last drought/flood compare with previous events in the last 10 years?
3. How did the last incident of drought/flood affect the community's livelihoods?
 - a. Impact on health, schooling and labour,
 - b. Impact on availability of water and pasture; and production of crops, livestock, fisheries,
 - c. Impact on savings and incomes,
 - d. Impact on roads, bridges, storage facilities, transport,
 - e. Impact on social networks, conflicts, mutual trust, family.

Drought/flood management strategies

1. Before the event
 - a. Which stakeholders were involved in preparing communities to reduce the risks of the last drought/floods event?
 - b. What activities were they involved in?
 - c. How effective were the above activities in preparing the community for the drought/flood event?
2. During the event
 - a. What action did the community take to reduce the effects of the drought/flood event?

- b. What challenges did the community experience in coping with drought/floods?
 - c. Which stakeholders were involved in supporting communities cope with drought/floods?
 - d. What are your views on the support provided by these stakeholders?
3. After the event
- a. After the drought/flood event, what measures did the community take to support the recovery process?
 - b. What challenges were experienced during the recovery process?
 - c. What measures have been put in place to ensure the community does not suffer future losses from drought/floods?
 - d. What factors hinder implementation of the above measures?
 - e. What do communities need to reduce the risks associated with drought/floods?

Annex 6: Household Tool - Schooling Information

5.2.1	List household members ID whose occupation in last 12 months is student from Q2.1.
5.2.2	Is he/she in school currently? (1) Yes; (2) No (If Yes, skip to 5.2.7
5.2.3	If no in 5.2.2 why? (1)Not interested; (2) Parents not interested; (3) Lack of fees; (4) Herding; (5) Farming; (6) Gathering food; (7) Fetching water; (8) Unwell; (9) Caring for a sick relative; (10) Other (specify)
5.2.4	If no to 5.2.2, any plans to return to school in the future? 1=Yes 2=No 3=Not sure
5.2.5	If yes in 5.2.4, when? (1) Within 10 days; (2) Within term 1; (3.) Term 2; (4) Term 3; (5) 2019
5.2.6	If no in 5.2.4, Why? (multiple possible) (1) Family migrated far from school in search of pasture/water; (2) School closed due to damage by strong winds/flood; (3) Too hungry to attend school; (4) Access path flooded/bridge washed away; (5) Too sickly; (6) Insecurity in the area; (7) Other (specify)
5.2.7	Was he/she absent from school in the last event of drought/floods? 1=Yes 2=No
5.2.8	If yes in 5.2.7, for how many days was he/she absent?
5.2.9	If yes in 5.2.7, why was he/she absent? (1) Family migrated far from school in search of pasture/water; (2) School damaged by strong winds/floods; (3) Trekged long distances looking for water/pasture during drought; (5) Too hungry to attend school; (6) Access path flooded/bridge washed away; (7) Insecurity; (8) Other (specify)

5.2.10	Measures being taken to ensure schooling is not interrupted during the drought (floods) period? (1) Lunch offered; (2) Boarding facilities; (3) Bursary; (4) Infrastructure improved; (5) Culture change; (6) Other (specify)
5.2.11	Who implements the measures in 5.2.10? (1) Family; (2) School; (3) Church; (4) County government; (5) National government; (6) NGO/CBO; (7) Other (specify)

ISBN 978 9914 738 24 7

**Kenya Institute for Public Policy Research and Analysis
Bishops Garden Towers, Bishops Road
PO Box 56445, Nairobi, Kenya
tel: +254 20 2719933/4, 2714714/5, 2721654, 2721110
fax: +254 20 2719951
email: admin@kippra.or.ke
website: <http://www.kippra.org>**