

**FLOOD DISASTER RISK REDUCTION STRATEGIES AND  
PARTICIPATION RATES OF PUPILS IN PRIMARY SCHOOLS IN  
TANA DELTA SUB COUNTY, TANA RIVER COUNTY KENYA.**

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**A Research Project Submitted in Partial Fulfillment of the Requirements for the  
Award of the Degree of Master of Education in Education in Emergencies  
University of Nairobi**

**2020**

**DECLARATION**

This research project is my original work and has not been presented for award of a degree in any other university.

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## **DEDICATION**

This research project is dedicated to my beloved wife Mary and my daughter Gracious for their unending love and moral support during the production of this report.

## **ACKNOWLEDGEMENT**

I am grateful to the almighty God for his love, provision, protection and mercy he gave me during the research project. Special thanks to University of Nairobi, Department of Educational Administration and Planning under the stewardship of Prof. Jeremiah M. Kalai for providing me with an enabling environment, which helped me to successfully complete my coursework. The concepts acquired were used to carry out the study. Thanks to my supervisors Dr. Rosemary Imonje and Dr. Jeremiah M. Kalai who have gladly shared their expertise and experience and provided me with constant guidance during the working time. I highly appreciate all the help and support given. I wish to thank the head teachers, teachers and pupils who participated in this study. Additional thanks to my parents Mr. and Mrs. Ephantus Murigi for their encouragement and financial support during the study.

## **TABLE OF CONTENT**

Declaration .....	ii
Dedication .....	iii
Acknowledgement .....	iv
Table of Content .....	v
List of Tables .....	x
List of Figures .....	xii
Abbreviations and Acronyms .....	xiii
Abstract .....	xiii

### **CHAPTER ONE**

#### **INTRODUCTION**

1.1 Background of the Study .....	1
1.2 Statement of the Problem .....	6
1.3 Purpose of the Study .....	7
1.4 Research Objectives .....	7
1.5 Research Questions .....	8
1.6 Significance of the Study .....	8
1.7 Limitations of the Study .....	9
1.8 Delimitations of the Study .....	10
1.9 Basic Assumptions of the Study .....	10
1.10 Definition of Significant Terms .....	10
1.11 Organization of the Study .....	12

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

2.1 Introduction.....	13
2.2 Indigenous Knowledge on Flooding by the School Community and Participation Rates of Pupils.....	13
2.3 Teacher Flood – Disaster Risk Reduction Trainings and Participation Rates of Pupils.....	15
2.4 Integration of Disaster Risk Reduction Content into School Curriculum and Participation Rates of Pupils .....	16
2.5 External Collaboration through School Board of Management, on Flood Emergency Mitigation and Participation Rates of Pupils.....	17
2.6 Summary of Reviewed Literature.....	18
2.7 Theoretical Framework.....	19
2.8 Conceptual Framework.....	20

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

3.1 Introduction.....	22
3.2 Research Design.....	22
3.3 Target Population.....	23
3.4 Sample Size and Sampling Procedure .....	23
3.5 Research Instruments .....	24
3.6 Instrument Validity .....	25
3.7 Instrument Reliability .....	25
3.8 Data Collection Procedures.....	26
3.9 Data Analysis Techniques.....	26
3.10 Ethical Considerations .....	27

## CHAPTER FOUR

### ANALYSIS AND PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction.....	29
4.1.1 Response Rate.....	29
4.2 Demographic Characteristics .....	30
4.2.1 Gender of Respondents .....	30
4.2.2 Respondents Period of Membership .....	31
4.2.3 Respondents Level of Education .....	32
4.3 Flood Disaster Risk Management on Participation in the School .....	32
4.3.1 Flood Emergencies in the Past Five Years .....	33
4.3.2 Level of Safety of Physical Infrastructure during Floods in the Schools .....	33
4.3.3 Early Warning Systems Alerts on Impending Floods.....	34
4.3.4 Effects of Flood Disasters on Learning in the Schools.....	35
4.3.5 Policies that Guide Implementation of Flood Safety .....	36
4.3.6 Safety Measures of Infrastructure during Emergencies.....	37
4.3.7 Resources Available for Implementing Flood Disaster in the Schools .....	38
4.3.8 Resources as Hindrances to Formulation of Flood Disaster Reduction Strategies.....	39
4.3.9 Traditional Knowledge on Flood Forecasting .....	39
4.4 Teacher Training On Flood DRR on Participation Rates of Pupils in Primary Schools .....	40
4.4.1 Activities that Address Flood Disaster Risk Reduction.....	41
4.4.2 Specific Teachers Assigned to Disseminate Information of Flood Disaster Reduction .....	42
4.4.3 Instructional Materials to Support Instructions on Flood Disaster Reduction....	42

4.5 Types of External Collaborations the BOM Have Sourced to Mitigate Flood Emergencies .....	43
4.5.1 Involvement of other Partners in Mitigation of Floods .....	44
4.5.2 Board Members Assigned to Contact Organizations for Collaborations.....	44
4.5.3 BOM Participation in Disaster Risk Reduction .....	45
4.5.4 BOM Rate of Participation in Flood Disaster Risk Reduction .....	46
4.6 Role of Pupils in Implementing Flood Disaster Safety Standards.....	46
4.7 Role of Indigenous Knowledge on Flood Disaster Risk Reduction .....	47
4.7.1 Enquires from Teachers and School Management on Flood Prediction.....	48
4.8 Demographic Characteristics of the Respondents and Flood Disaster Risk.....	49
Management on Participation in the School.....	49
4.8.1 Gender of the Respondents .....	49
4.8.2 Period of Membership of the Respondents .....	49
4.8.3 Education Level of the Respondents.....	50

## **CHAPTER FIVE**

### **DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS**

5.1 Introduction.....	51
5.2 Discussion of Findings.....	51
5.2.1 Level of Indigenous Knowledge on Flooding that Affects Participation Rates of Pupils in Primary Schools .....	51
5.2.2 Type of Teacher Training On Flood DRR that Affects Participation Rates of Pupils in Primary Schools.....	52
5.2.3 Level of Integration of Disaster Risk Reduction Content in the Curriculum that Affects Participation Rates of Pupils in Primary Schools .....	53

5.2.4 Types of External Collaborations the Boards of Management Have Sourced to Mitigate Flood Emergencies that Affect Participation Rates of Pupils in Primary Schools.....	54
5.3 Conclusions.....	55
5.4 Recommendations.....	57
5.5 Areas of Further Study.....	58
<b>REFERENCES.....</b>	<b>59</b>

## **APPENDICES**

Appendix I: Introductory Letter.....	72
Appendix II: Questionnaire For School Board Of Management.....	73
Appendix III: Questionnaire For School Head-Teachers .....	78
Appendix IV: Questionnaire For Teachers.....	84
Appendix V: Questionnaire For Pupils.....	89
Appendix VI: Interview Schedule For Village Elders.....	91
Appendix VII: Research Permit.....	92
Appendix VIII: Map Of Tana Delta Sub-County .....	93

## LIST OF TABLES

<b>Table 3.1:</b> Target population.....	23
<b>Table 3.2:</b> Sample size .....	24
<b>Table 3.3:</b> Data analysis technique .....	27
<b>Table 4.1:</b> Response rate .....	29
<b>Table 4.2:</b> Distribution of respondents by their gender .....	30
<b>Table 4.3:</b> Respondents period of membership.....	31
<b>Table 4.4:</b> Distribution of respondents by their level of education.....	32
<b>Table 4.5:</b> Flood emergencies in the past five years .....	33
<b>Table 4.6:</b> Level of safety of physical infrastructure during floods in the schools.....	33
<b>Table 4.7:</b> Early Warning Systems Alerts on Impending Floods .....	34
<b>Table 4.8:</b> Effects of flood disasters on learning in the schools .....	35
<b>Table 4.9:</b> Policies that guide implementation of flood safety .....	36
<b>Table 4.10:</b> Safety measures of infrastructure during emergencies .....	37
<b>Table 4.11:</b> Resources available for implementing flood disaster in the schools .....	38
<b>Table 4.12:</b> Resources as hindrances to formulation of flood disaster reduction strategies.....	39
<b>Table 4.13:</b> Teacher training on flood DRR .....	41
<b>Table 4.14:</b> Activities that address flood disaster risk reduction .....	41
<b>Table 4.15:</b> Specific teachers assigned to disseminate information of flood disaster reduction.....	42
<b>Table 4.16:</b> Instructional materials to support instructions on flood disaster reduction.....	42
<b>Table 4.17:</b> Involvement of other partners in mitigation of floods.....	44
<b>Table 4.18:</b> Board members assigned to contact organizations for collaborations.....	44

<b>Table 4.19:</b> BOM participation in disaster risk reduction.....	45
<b>Table 4.20:</b> BOM rate of participation in flood disaster risk reduction.....	46
<b>Table 4.21:</b> Role of pupils in implementing flood disaster safety standards .....	46
<b>Table 4.22:</b> Role of indigenous knowledge on flood disaster risk reduction.....	48
<b>Table 4.23:</b> Enquires from teachers and school management on flood prediction .....	48
<b>Table 4.24:</b> Gender of the respondents .....	49
<b>Table 4.25:</b> Period of membership of the respondents.....	49
<b>Table 4.26:</b> Education level of the respondents .....	50

## LIST OF FIGURES

<b>Figure 2.1:</b> Relationships between flood disaster risk reduction strategies and participation rates of pupils .....	21
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## **ABBREVIATIONS AND ACRONYMS**

<b>BOM</b>	Board of Management
<b>DRR</b>	Disaster Risk Reduction
<b>EWS</b>	Early Warning Systems
<b>KICD</b>	Kenya Institute of Curriculum Development
<b>MDG</b>	Millennium Development Goals
<b>MOEST</b>	Ministry of Education Science and Technology
<b>NGO</b>	Non-Government Organization
<b>UNCRC</b>	United Nations Convention on the Rights of the Child
<b>UNDP</b>	United Nations Development Programme
<b>UNEP</b>	United Nations Environmental Programme
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>UNICEF</b>	United Nations Children’s Fund
<b>UN-WFP</b>	United Nations World Food Program
<b>UPE</b>	Universal Primary Education

## ABSTRACT

This study aimed at investigating the relationship between flood disaster risk reduction strategies and participation rates of pupils in public primary schools in Tana Delta sub County of Tana River County. Four objectives thus guided the study; to examine the level of indigenous knowledge by village elders on flooding, determine the type of teacher training on flood disaster risk reduction, establish the level of integration of disaster Risk Reduction content in the curriculum and determine the types of external collaborations the boards of managements have sourced to mitigate flood emergences in schools. The target population consisted 12 schools in the flood prone areas of Tana Delta. The sample size for the study consisted of 72 members of the school boards of management, 12 head teachers, 29 teachers, 1152 pupils and 12 village elders. Data was collected using self-administered questionnaires for pupils, teachers, head teachers and members of school boards. Interview schedules were used for village elders. Descriptive statistics were used to analyze quantitative data while qualitative data was analyzed thematically according to the objectives. Data was collected using five sets of questionnaires for the BOM, the head teachers, teacher, pupils and village elders was analyzed using descriptive statistics and presented in frequencies and percentages in form of tables with the help of statistical package for social sciences (SPSS) computer software. According to the study, there exists established good level of indigenous knowledge on flooding however lack of good rapport between school managements and the village elders to enable dissemination of indigenous knowledge on flooding affected policy making on the same, hence negatively affected participation in schools. On teacher training, a majority of teachers indicated that they had not received any training on flood disaster management. Head teachers however indicated that there were child-led clubs in the schools that participated in flood disaster safety activities. The Education Ministry through the Kenya Institute of Curriculum Development (KICD) had also integrated disaster risk reduction into the national curriculum. The study revealed however that there were no sufficient instructional material to implement disaster risk reduction in schools. While school Boards had involved external stakeholders like local NGOs and companies for flood disaster management activities and even constructed shelters in place, compliance with building codes and regulations for flood prone environments was still wanting. The study concluded that indigenous knowledge, teacher training on flood disaster risk reduction, integration of flood disaster risk reduction in the school curriculum and external collaborations, all which are components of flood disaster risk reduction strategies have an influence on pupils participation in education. Finally, the study has provided the stakeholders in education with recommendations of flood disaster risk Reduction strategies that can enhance participation of pupils in primary schools. The study recommends training of all school stakeholders on flood disaster risk reduction in order to improve their capacity to effectively implement flood disaster risk reduction. In addition, the study recommends mainstreaming available indigenous knowledge into flood management policies by the schools.

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Background of the Study**

Globally food disaster have post serious challenges on the abilities of community to cope with their resources, in effect increasing the vulnerability of communities by precipitating a vicious cycle of deaths, destruction and poverty (Action Aid, 2011) Pakistan experienced the worst floods in its history in July 2010. The floods affected 84 districts out of 121 districts in Pakistan, and more than 20 million people – one-tenth of Pakistan’s population – devastating villages from the Himalayas to the Arabian Sea. More than 1,700 men, women and children lost their lives, and at least 1.8 million homes were damaged or destroyed (UINS DR, 2010). The education institutions have consequently been affected by the flooding disasters affecting the rate of participation in schools. A practical example is in Fiji were in the year 2012 floods caused damages in the education sector estimated at Fijian Dollars (FJD) 889,332.

The infrastructure damaged included classrooms, teachers’ quarters, boarding facilities, equipment, text and library books and furniture, United Nations Office of the coordination of Humanitarian Affairs (UN-OCHA, 2012). Africa is undergoing a period of rapid transformation in its economy, social structures and environment. Change, especially transformative change, brings both growth and vulnerability. Building communities that are resilient to disaster is the challenge facing Africa today. A report presented by UNICEF (2015) to the Humanitarian country team indicated that either 1.15 million people were affected by floods in Malawi of which 336,000 people were displaced and are in camps (106,226) or others hosted within the communities (22,828).

In Kenya, many parts of the country experience unexpectedly heavy rain falling mid-April which continues through the end of May and from September to November( the short rains) the areas that are most prone to flood disaster are the Lake Victoria basin, Budalangi in western Kenya, along the Nzoia river with the flood waters arising from the Cherangani Hills and the Kano plain floods along the Nyando river with the flood waters arising from the Nandi Hills, Tana Floods along the downstream areas along the river with flood waters originating from the Abardares and Mt.Kenya catchment. During the month of December 2012, the country experienced floods and landslides in various parts of the country. In Nyando, several schools also reported low pupils turn out with high absenteeism as many pupils stayed at home since the roads and pathways were cut off and some of the schools flooded or marooned with water (Kenya Read Cross, 2012).

According to Medicines sans Frontiers (2013), weeks of flooding in April 2013 left thousands people in Kenya's Tana River delta region in urgent need of food, shelter, clean drinking water and medical services. The Ministry of Education Disaster Report (2013), states four schools in Tana River north district, were washed away by floods after Tana River broke its banks. The schools; Singwaya, Hirimani, Bilbil and huruma primary schools were marooned by floods after Tana river broke its banks following heavy rains that were experienced in the Kenya highlands. The four primary schools served 1804 pupils. The Ministry of Education (MOE, 2012) estimated that a significant 100,000 (36 percent) of floods-affected population in the recent foods of 2012 were school- going children. Stakeholders in the humanitarian and development sector are concerned by these trends.

Addressing the United Nations General Assembly, Ban Ki-moon (2013) pointed out that member states should continue the implementation of the Hyogo framework for action and in particular collect data on losses and damages, strengthen the resilience of schools and hospitals and ensure that any new critical infrastructure is disaster resilient. Kenya being a member state of the United Nations therefore has a great obligation on this recommendation. Disaster Risk Reduction (DRR) forms the pillar of disaster preparedness, that is, it forms the action plan to be implemented before, during and after disasters. The Hyogo declaration (2005) states that strengthening community level capacities to reduce disaster risk at the local level is especially needed, considering that appropriate disaster reduction measures at that level enable the communities and individuals to reduce significantly their vulnerability to hazards. Disaster risk reduction has also been viewed globally as a key safety in schools (Action Aid, 2011).

In the United Nations General Assembly 64<sup>th</sup> session (2010) resolution on education in emergencies, which recognizes that ensuring the right to education in emergencies requires specifically designed, flexible and inclusive approaches consistent with protection needs and Disaster Risk Reduction considerations. Women and men living in disaster-prone areas over a number of generations have accumulated knowledge of their consequences of disasters. These techniques are referred to as “indigenous knowledge”, cumulative body of knowledge, know-how, practices and representations maintained and developed by peoples with extended histories of interaction with the natural environment (USAID, 2012). Nyakundi (2010) found out (482 or 83%) of the respondents were aware of local ways of knowing whether it would flood or not and (465 or 80%) of these respondents acknowledge the use of the traditional knowledge to predict the flooding risk. These results demonstrate that local strategies are considered as a trusted source of information and of importance to this community.

However, the limited intervention for disaster risk reduction has consisted mainly of conventional methods such as structural techniques and the provision of relief. These are well reported and understood. What have been largely ignored are the local perceptions, experiences and historical processes that have been used to mitigate floods by the community (Nyakundi, 2010). The people living there have been settled for many hundreds of years and share a uniform linguistic and cultural background, making it easier for deep local knowledge and coping strategic to emerge and be transmitted from generation to generation. Despite these affirmations, most school communities have not given indigenous knowledge an official platform during food emergencies.

According to INEE (2010), schools affected by disasters often had disproportionately fewer teachers, who also lacked requisite pedagogical skills for handling skills- based subjects, such as DRR. Therefore, education institutions need to develop the capacity of staff and students to be better prepared, withstand, and respond to disasters (UNESCO, 2011). According to Barakat and Hardman (2012), training teachers on skills for adapting basic instructional manuals and visual aid into child- friendly resources can significantly improve the dissemination of information on DRR and mitigate the high staff turnover common in flood- affected areas.

Curriculum is the most significant aspect in teaching and learning. Integrating DRR into the school curriculum links mitigation efforts with long-term development efforts, thereby ensuring that children are safe, education services continue to be provided, and educational developments are secure during emergencies (Trans, 2011). Therefore, curriculum and its teachers are powerful tools for building a culture of resilience. They have an important role to play in transmitting knowledge for disaster and conflict risk reduction.

Therefore, the education system has a responsibility to ensure that it does not act as a vehicle for domination. It also has a role to play supporting teachers and learners to internalize safe practices in case of disaster UNESCO, (2011). In the study of Odhiambo (2014), findings revealed that flood DRR had not been fully integrated into the curriculum of a majority of schools. According to Tran, (2011) integrating DRR into the school curriculum links mitigation efforts with long-term development efforts, thereby ensuring that children are safe, education services continue to be provided, and educational developments are secure during emergencies. The integration of flood disaster safety standards into the Kenyan school curriculum has, however, often with challenges that an already over- loads regular curriculum poses.

External collaborations have an integral part in disaster mitigation policy formulations proper infrastructure and contingency planning. As policies will directly or indirectly affect multiple individuals or groups, the planning process must be participatory. A wide range of stakeholder must be consulted and should agree with the main strategies set forward in the plan. IIEP, (2011). In the year 2003, the Kenyan Government introduced free primary education (FPE) in order to enhance participation by learners and consequently realize the internal goal of Universal Primary Education (UPE). The Kenya government through MOEST and its partner organizations formulated the safety standards guidelines for schools in Kenya. This is a blueprint meant to help mitigate disasters in school. However, most schools in flood zone line Tana delta have not been able to implement the safety standards and consequently participation of pupils. Based on this background, this study intended to investigate effects of floods disaster risk reduction strategies on participation rates of pupil's primary schools Tana Delta, Tana River County.

## **1.2 Statement of the Problem**

The Government of Kenya with funding from the World Bank initiated hydropower and irrigation projects between the years 1983 to 1992 throughout River Tana being measures to control flooding downstream. These include the Kiambere Dam and the Bura irrigation scheme. However, the projects have never been able to meet the mandate of water control due to corruption and due to protests by the indigenous of Tana Delta, because reduced supply of water for farming and for the animals of the neighboring pastoralist communities especially during the dry spell (Ahmad, Kazmi & Pervez, 2011).

This was made even worse when the government initiated the Tana River primate Reserve project which displaced the locals and prohibited them from accessing the fertile river basins and also water (Horta, 2010) This has made effort of controlling the Tana Waters complicated and currently unsuccessful. Flooding during the rainy season therefore continue to displace people and interrupt learning. In an education field report, 24 schools were affected by floods in Tana River County, contributing to a large number of pupils missing more than 30% of the 2013 academic year.

Learning was disrupted by lack of access to some schools because of floods. 2013 Enrolment in Tana Delta District dropped by 23% to 16,651 (7,716 girls and 8,925 boys) from 21,584 (10,351 girls and 11,233 boys) in 2012 UNICEF (2013). In section 39 of the Basic Education Act (2013) of the Kenyan constitution, the government through the cabinet secretary of education has the responsibility of ensuring that children belonging to marginalized, vulnerable or disadvantaged groups are not discriminated against and prevented from pursuing and completing basic education.

The government also has the duty to ensure compulsory admission, attendance and completion of basic education by every pupil. However, pupils in 36 primary schools remain vulnerable to the ravages of frequent flood disasters in Tana delta sub-county, which negatively affects participation of pupils in the area and consequently realization of universal primary education goal by Kenya. No study on flood emergency in Tana Delta has been documented. This study therefore intended to fill this gap by investigating effects of flood disaster risk reduction strategies on participation rates of pupils in primary schools in Tana Delta sub county, Tana River County.

### **1.3 Purpose of the Study**

The purpose of this study was to investigate effects of flood Disaster Risk Reduction strategies on participation rates of pupils in primary schools in Tana delta sub county, Tana River County, Kenya.

### **1.4 Research Objectives**

This study was guided by the following objectives:

- i. To examine the level of indigenous knowledge by village elders on flooding that affects participation rates of pupils in primary schools.
- ii. To determine the effects of teacher training on Disaster Risk Reduction on pupil's participation rates in Tana Delta Sub-County.
- iii. To establish the level of integration of disaster risk reduction content in the curriculum that affects participation rates of pupils in primary schools.
- iv. To determine the effects of external collaborations on pupil's participation rates in Tana Delta Sub-County.

## **1.5 Research Questions**

In order to achieve the objectives set, the study sought to answer the following questions:

- i. How does level of knowledge on flooding affect participation rates of pupils in primary schools?
- ii. What effect does teacher training on flood disaster risk reduction have on participation rates of pupils?
- iii. What effects does integration of disaster risk reduction content, in the school curriculum have on participation rates of pupils?
- iv. What effect does the external collaboration for flood emergency mitigation, sourced by the school management, have on participation rates of pupils?

## **1.6 Significance of the Study**

The main beneficiaries might be the pupils in the flood prone areas, as their studies will never be significantly interrupted by floods.

The findings of the study might also provide the ministry of education and its local partners with valuable insight into the strategies that affect participation in primary schools, thereby providing basis for effectively addressing future challenges of flooding in schools. The findings of the study might be significant in that it may provide the Ministry of Education and its local partners with valuable insight into the factors that influence implementation of flood disaster safety standards, thereby providing basis for effectively addressing future challenges facing implementation of flood disaster safety standards in schools. The school managers by large will also benefit by knowing strategies for flood preparation consequently improve quality which is affected by among other aspects, participation rates of learners.

The study may further encourage head teachers, teachers, pupils and SMCs to perceive DRR as relevant and urgent enough in schools in Kenya to be intrinsically tied to implementation of the school curriculum. Further, the findings of the study might add to the growing pool of knowledge on flood safety in schools that could be crucial in catalyzing future explorations by researchers who might wish to further delve into the existing knowledge and incorporate other aspects not included in it.

### **1.7 Limitations of the Study**

Respondents had limitations with filling in the questionnaires due to variations in interpreting questionnaire items. This brought forth unintended or incorrect responses that might have compromised the outcome of the study. The researcher however used research assistants with competence in the use of local languages to interpret every question upon request to minimize wrong interpretation.

The researcher, in addition, was not able to control the attitudes of the researcher, in addition, was not able to control the attitudes of the respondents, which might have given socially acceptable but not honest answers in order not to offend the purpose of data collection by the researcher so as minimize on challenge of attitude.

## **1.8 Delimitations of the Study**

This study intended to explore effect DRR strategies have on participation rates in primary schools in Tana delta, Tana River County. The study focused on primary schools that are affected by perennial floods. The researcher acknowledges that climate change is a contributor to the unpredictable and unusual weather patterns. This study however delved into flood disaster into disaster risk reduction only.

## **1.9 Basic Assumptions of the Study**

The study was carried out on the assumption that:

- i. All the respondents shall be ready to co- operate and answer the questions asked honestly.
- ii. The process of data collection for the study will not be adversely affected by annual floods themselves.
- iii. The recommendations of the study shall be MOEST and its partners to mitigate the impacts of flood disasters in primary schools

## **1.10 Definition of Significant Terms**

**Climate Change:** Refers to the change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to cultural climate variability observed over comparable time periods.

**Contingency Planning:** Refers to the management process that analyses specific potential events or emerging situation that might threaten society or the environment and establishes arrangements in advance to enable timely, effective and appropriate response to such events and situations.

<b>Disaster:</b>	Refers to a serious flood incident that disrupts the normal functioning of a primary school, causing widespread human, material, or environmental loss which exceeds the ability of the affected population to cope with using their own resources.
<b>Dropout:</b>	Refers to a child's leaving school after having been enrolled.
<b>Early Warning Practices:</b>	Refer to those actions that people in the community who minimize loss of life and assets in anticipation of disaster.
<b>Emergency:</b>	Refers to disaster which causes a serious disaster which causes a serious disruption of the functioning of the society causing widespread human, material and environmental losses which exceed the ability of the affected society to cope with using only its resources.
<b>External Collaboration:</b>	Refers to support from neighboring organizations both governmental, like the interior and coordination ministry and nongovernmental like the companies and INGOs, who acknowledge that they have a social responsibility.
<b>Flood Disaster Risk Reduction:</b>	Refers to the concept and practice of reducing flood risks through systematic efforts to analyze and manage the casual factors of flood disasters.
<b>Indigenous Knowledge:</b>	Refers to the information base for a society, which facilitates communication and decision- making.
<b>Participation:</b>	Refers to the rates of enrolment, retention and completion of pupils in a school.
<b>Repetition:</b>	Refers to the requirement that a child repeat one or more grade
<b>Stakeholders:</b>	Refer to the members of school board of management.

**Strategy:** Refers to plan, method or series of maneuvers to obtain the goal of flood disaster risk reduction.

**Vulnerability:** Refers to the characteristic and circumstance of pupils and their teachers that result in them being susceptible to harm, loss or distress arising from flood incidents.

### **1.11 Organization of the Study**

The study is organized into five chapters: chapter one is the introduction. It includes background and statement of the study, limitations, delimitations, assumption of the study, definition of the operational terms and organization of the study, chapter two focuses on review of related literature which includes; indigenous knowledge on flood mitigation by school communities, institutional flood DRR trainings, integration of DRR into school's curriculum, external collaborations on flood emergency mitigation by the school management, summary of reviewed literature, theoretical framework and conceptual framework.

Chapter three deals with research methodology of the study, wherein the methodology that was used in carrying out the study is outlined. It includes the research design, target population, sample size and sampling procedures, research instruments, instrument reliability, data collection procedures and data analysis techniques. Chapter four of the study contains details on data collection, data organization, analysis and presentation, while chapter five focuses on summary of the findings, conclusions and recommendations for further studies.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

#### **2.1 Introduction**

This chapter reviewed literature as an account of the knowledge and ideas that have been established by accredited scholars and experts in the field of study. It was guided by the objectives of study and is presented in sub themes namely; indigenous knowledge on flooding by school communities, institutional flood DRR trainings, integration of DRR into school curriculum and external collaborations on flood emergency mitigation by the school management. It also included a summary of reviewed literature, theoretical and conceptual framework.

#### **2.2 Indigenous Knowledge on Flooding by the School Community and Participation Rates of Pupils**

Globally, there is increasing acknowledgement of the relevance of indigenous knowledge as an invaluable and underused knowledge reservoir, which presents developing countries, particularly Africa, with a powerful asset in environmental conservation and disaster management (Kamara, 2014). Kiplang'at and Rotich (2008) posited that it “encompasses the skills, experiences and insights of people, applied to maintain or improve their live hood. Indigenous knowledge is developed and adapted continuously to gradually changing environments and passed down from generation to generation and closely interwoven with people’s cultural values.” Furthermore, traditional indigenous knowledge is developed and adapted cautiously to gradually changing environments and passed down from generation and closely interwoven with people cultural values .”

Furthermore, traditional indigenous knowledge of storm routes and winds patterns enables people to design their disaster management long in advance by constructing types of shelter, wind break structures, walls and homestead fences appropriately. Lack of these considerations has serious consequences on participation of learner. UNICEF (2009) established a total of 45.5 million children who make 16.5% of the world population were out of school of these 21.8 million were boys while 23.7 million were girls (Okoum 2012). Similar application and use of indigenous knowledge for disaster management is also prevalent in Swaziland. Floods can be predicted from the height of birds nest near rivers. Though some communities in the Niger Delta have used indigenous knowledge to forecast floods with some degree of accuracy, it has not been integrated with scientific method for improved risk analysis and contingency planning and post disaster management (Horta, 2010).

The potential of the indigenous floods prediction mechanism can be enhanced by scientific knowledge such as well-annotated flood risk maps. Simple weather stations and flood gauges at the banks of the floodable rivers, which could be understood and applied by the local indigenous population. A proper blending of the indigenous predictive techniques combined with simplified scientific procedure would help communities mitigate flood disaster and adapt to environment changes (Sayers et al., 2013) However, in his study of Bangladesh floods Hussein (2011) reported that the practices documented, often interwoven with cultural values, are designed or adapted to achieve specific objectives or serve precise purposes. Identical reproduction of these practices in another community or cultural setting may not be possible. Nevertheless, Nyakundi, (2010) asserts that traditional flood knowledge (TFK) does exist and the strategies in such knowledge are a trusted source of information and important to the community which indicated some ability of the locals to be resilient.

### **2.3 Teacher Flood – Disaster Risk Reduction Trainings and Participation Rates of Pupils**

During the Pakistan floods in the year 2010, there were 309,000 children, whose schools had been damaged. In addition, there were 306,000 children, including 135,000 girls whose schools had been converted into shelters (INEE, 2010). In a similar case, the flood response rapid assessment Khartoum state (2014), out the 841 teachers in the 97 schools that had been trained on cue subjects, only 39 had been trained on education in emergencies (EiE) and 27 on psychosocial support. It recommended the education sector to strengthen the relationship between the education and protection clusters around issues related to child-friendly spaces, youth engagement, and reporting and monitoring of violations, and include DRR training components in teacher training.

Similarly in his research, Odhiambo, (2014) found out that most schools lacked specific trained teachers with the requisite pedagogical skills for adapting instructional materials and disseminating information on flood DRR to pupils and fellow teachers.

Schools and governments can however offer training through experts and case studies a capacity building initiative on disaster risk reduction and school safety by Assam state in India was a path breaking, innovative and first of its kind in south Asia. Teachers prepared and submitted the school disaster management plan which included risk assessment, mitigation measures, roles and responsibilities of stakeholders as well as response mechanisms to follow during emergencies (Assam state disaster management authority, 2014).

## **2.4 Integration of Disaster Risk Reduction Content into School Curriculum and Participation Rates of Pupils**

According to Baraka & Hardeman(2012), training teachers on skills for adapting basic instructional manuals and visual aid into child-friendly recourses and significantly improve the dissemination of information on DRR and mitigate the high staff turnover common in flood-affected areas. High staff turnover has a negative impact on participation of pupils. The curriculum and its teachers are powerful tools for building a culture of resilience. They have important role to play in transmitting knowledge for disaster and conflict risk reduction. Therefore, the education system has a responsibility to ensure that it is does not act as a vehicle for domination. It also has a role to play in supporting teachers and learners to internalize safe practices in case of disaster, (IIEP, 2011).

Disaster risk reduction should be systematically treated across the curriculum and through the grade levels. Treatment must be beyond the basic science of hazards and safety measures to consider prevention, mitigation, vulnerability and resilience building, (UNICEF, 2012). Lesotho offers an example of a nation in the process of completely re-configuring its curriculum away from a traditional based academic model to one primarily built on skills development. This is opening up opportunities for integration of DRR into the curriculum. In largely parallel way, Malawi has gone down the path of organizing its curriculum according to skills that most likely will help embed climate change and DRR related learning more thoroughly (UNESCO, 2012).

## **2.5 External Collaboration through School Board of Management, on Flood Emergency Mitigation and Participation Rates of Pupils**

The general assembly (2013) resolved to stress the need to foster better understanding and knowledge of the causes of disasters, as well as to build resilience and strengthen coping capacities, in particular in developing countries, though interlaid, the exchange of best practices, technology transfer, as mutually agreed, and technical knowledge, educational and training programmes for disaster risk reduction, access to relevant data and information, the strengthening of institutional arrangements, the promotion of community participation, recognizing that women play a vital role in disaster risk reduction, ownership through community-based disaster risk management approaches and a people-centered ,holistic approach, in order to build an inclusive society.

Although most school are used to executing activities alone, Wisner,(2006) reports that methods of participatory vulnerability assessment, capacity assessment and hazard mapping have been used with broader communities surrounding schools and other institutions of education and research. Government can effectively reach out to communities and protect them by focusing on schools in DRR initiatives to achieve to achieve greater resilience of disasters. In her recommendations, Kwamboka (2013) stated that the government should sensitize the communities in the area of disaster risk reduction through activities such as digging of trenches around the school compounds to minimize flooding.

Similarly, Otiende (2009) attributes the low implementation of flood mitigation efforts in communities in western Kenya to low capacities to play an active role in flood mitigation programmes. School stakeholders therefore need to undergo sensitization training in ways in which they can actively participate in flood mitigation programmes meant to benefit them.

## **2.6 Summary of Reviewed Literature**

This section explored literature related to the study. The chapter is divided into indigenous knowledge on flooding by school communities, teacher flood DRR trainings, integration of DRR concepts into school curriculum and external collaborations on flood emergency mitigation by the B.O.M, summary of literature review and theoretical framework showing the interactive relationships. In reviewing the literature on effects of flood disaster risk reduction strategies on participation of pupils, it was clear that disaster risk reduction is crucial for enhancing participation of pupils during a flood emergency. The reviewed literature underscored the central place of indigenous knowledge on flooding, teacher flood DRR trainings, integration of DRR concepts into school curriculum and external collaborations on flood emergency mitigation by the school management.

That heavy loss of life and property in public primary schools has persisted in parts of the country points to a low level of implementation of flood disaster safety standards in schools in Kenya (Nabeta, 2012). The resultant clamor in local media reports about the devastating impacts of flood disasters on schools raised the researcher's interest in examining the flood Disaster Risk Reduction strategies on participation rates of pupils in primary schools in Tana delta sub county, Tana River County, Kenya. While studies have focused on gaps in training of stakeholders in fire disaster preparedness in schools (Kikuvi 2011), no study has focused on the flood Disaster Risk Reduction strategies on participation rates of pupils in primary schools in Tana delta sub county, Tana River County, Kenya, despite concerns for the safety of pupils of tender ages in primary schools, and this study was intended to fill this gap.

## **2.7 Theoretical Framework**

The study was based on Bronfenbrenner's Ecological System Theory proposed by Urie Bronfenbrenner in 1990. The theory saw child development within the context of the system of relationships that form the child's environment, each layer of relationship having an effect on the child's development (Berk, 2000). It defines child's own as a primary environment influencing the child's development. The direct interaction between factors in the child is maturing biology, his immediate environment, community environment and the societal and cultural landscape affects the child's development. Changes or conflict on any one layer will ripple throughout other layers. To study a child's development then, one must not only look at the child and the immediate environment, as it interacts with the larger environment. According to the theory, the direct bi-directional relationships and interaction that the child has with his immediate surroundings have the strongest influence his development.

However, the child does not function directly with the larger social system, although it impacts the child's development by interacting with some structures with which he interacts. Flood disaster risk reduction strategies are part of community-wide effort, occurring at different levels of the community, and aimed at enhancing school safety. Effective flood DRR strategies can be understood in the context of a complex system of relationships between factors in a pupil's environment that affect the level of the participation in education. The direct interaction between child-led flood DRR activities in the school curriculum will establish strong bi-directional effect on the child's flood disaster mitigation.

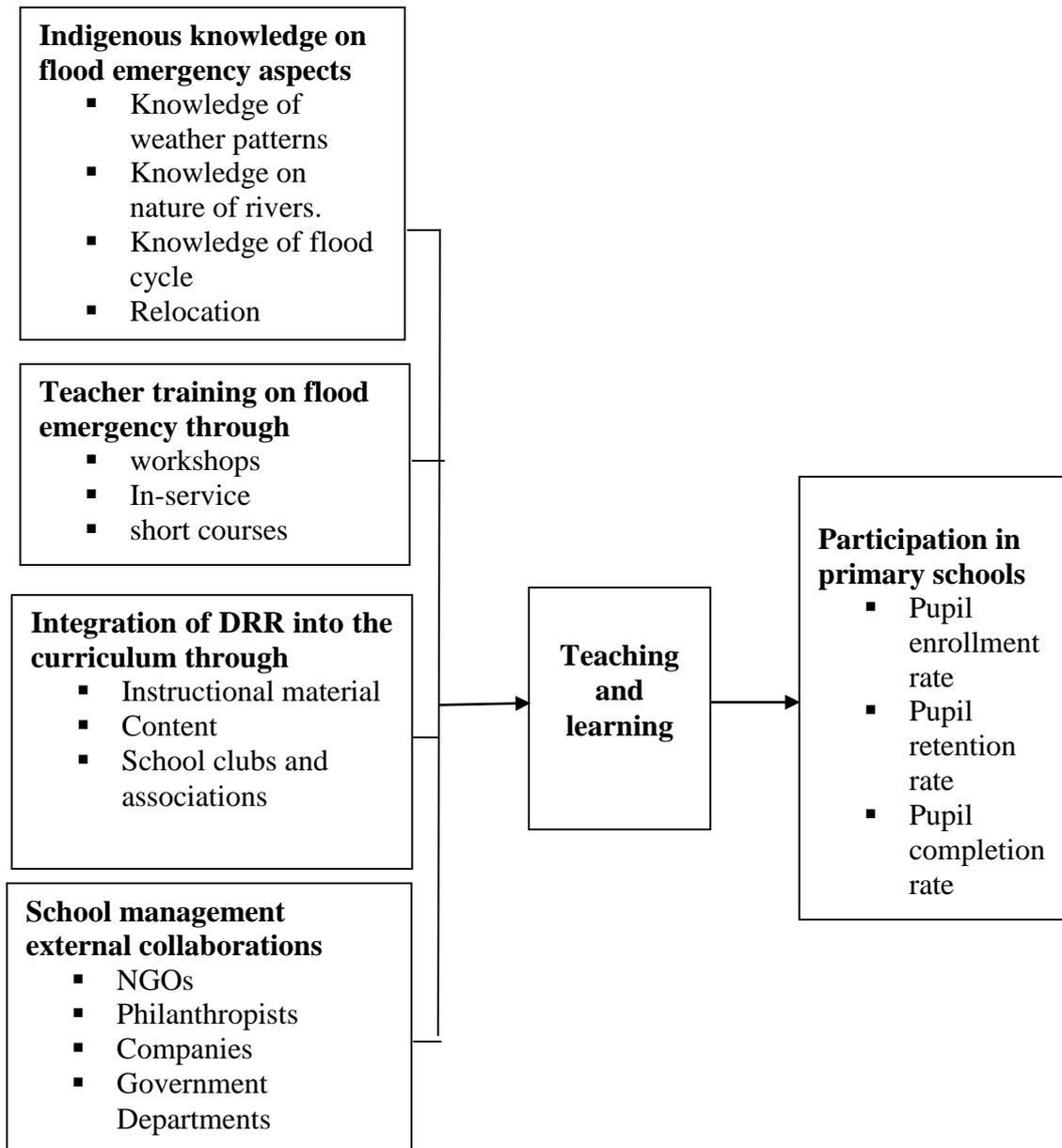
While the child will not interact directly with global developments in principals on disaster reduction and national policy changes on disaster risk reduction in school, such changes will have a cascading impact on structures with which the child interacts, for example the level of school resources allocation for implementing flood disaster strategies. Bronfenbrenner's ecological system theory is suitable in examining the interaction between indigenous knowledge on flooding by school communities, teacher flood DRR trainings, integration of DRR concepts into school curriculum and external collaborations on flood emergency mitigation by the school management as they affect participation rates of pupils in schools.

## **2.8 Conceptual Framework**

Conceptual framework gives an idea of the variables to be covered by the study, (Best & Khan, 2011). The conceptual framework relates independent variables to dependent variables. In figure 1.1, the framework considered variables that are of great effect to participation rates by pupils, which are indigenous knowledge on flood emergency, teacher flood DRR training, integration of DRR concepts into the curriculum, and the external collaborations by the school board of management to mitigate flood emergencies, which form the independent variables.

The participation rates in this study were student completion rates, student enrolment rate, repetition rates and dropout rate. The output is influenced by how the inputs interact through the teaching and learning process. Kombo (2004), points out that if the interaction is healthy, then the output (enrolment and completion rates) should be good.

**Figure 2.1: Relationships between Flood Disaster Risk Reduction Strategies and Participation Rates of Pupils**



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter entails the methods used to collect the data necessary to answer the research. The chapter is organized into the following sub-sections: research design, target population, sample size and sampling procedures, research instruments validity, instrument reliability, and data collection procedures and data collection procedures and data and analysis techniques.

#### **3.2 Research Design**

This study employed a descriptive survey design. Orodho (2009) defines survey as a method of collecting information by interviewing or administering a questionnaire to a sample of individual. He further states that the survey study gather data at a particular point in time with the intention of describing the nature of the existing conditions can be compared and determining the relationship that exist between specific events.

Using this design the researcher sought to find answers to questions by analyzing the variables that relate to the flood disaster risk reduction strategies effect on participation of pupils in primary schools in Tana delta. This study fits within the framework of descriptive survey design because the researcher collected data and reported the way things are without manipulating any variables.

### 3.3 Target Population

The study was conducted in flood prone areas of Tana delta Sub County which was composed of three educational zones namely; Garsen North, Garsen central and Garsen south. According to the Tana delta education office data (2016), the sub county had a total of 63 primary schools. There were 41447 students, 709 teachers, 63 head teachers and 378 members of the B.O.M, who are community stakeholders and management of public primary schools in Kenya. This was the target population of the study.

**Table 3.1: Target population**

<b>Target population</b>	<b>Total Number</b>
Students	41,447
Teachers	709
Head teachers	63
Members of the B.O.M	378
Village elders	63
<b>Total</b>	<b>42, 660</b>

### 3.4 Sample Size and Sampling Procedure

A multi-stage sampling technique was used in this study. According to Orodho (2005), good representative sample should constitute at least 20 percent of the entire population where population is small. However, Kothari (2004), added that a bigger sample better represents a population. In this study 12 schools were selected from the 36 flood affected primary schools in flood-prone Tana delta which comprised 30 percent of the total number of schools through simple random sampling so as to give every subject an equal chance to be selected. Purposive sampling will be used to include all the 12 head-teachers of the sampled schools and the village elders of the villages hosting the sampled schools.

Next 29 teachers, 19 BOM members and 1152 students who consisted 10 percent was selected through simple random sampling was again used to select all pupils in Grades 5-8, since there was a high probability that they had been members of their schools for sufficiently long, at least 4 years, to be able to effectively respond to questionnaire items that was presented to them. All the 12 village elders were sampled for the study.

**Table 3.2: Sample size**

<b>Target population</b>	<b>Total Number</b>	<b>Sample size</b>
Students	41,447	1152
Teachers	709	29
Head teachers	63	12
Members of the B.O.M	378	19
Village elders	63	12
<b>Total</b>	<b>42, 597</b>	<b>1,224</b>

### **3.5 Research Instruments**

The study used questionnaires as the main instrument to gather relevant data for each sub-group of respondents. The questionnaire had two main sections, both consisting of open-ended and closed- ended items. Items in section B sought the opinion of the respondent on ways in which school on flood DRR as basis for safety in their school, training of flood DRR, extent to which flood DRR had been integrated into the school curriculum, ways in which the school stakeholders participated in flood impact mitigation in schools instructions to guide respondents were provided in both sections. According to Kothari (2004), questionnaires can be used to collect dependable and reliable data since the respondents are given adequate time to give well thought out answers in their own words.

### **3.6 Instrument Validity**

Validity is defined as the degree to which a test measures what it supposed to measure (Borg and Gall, 1993). Content validity is the degree to which the empirical measures or several measures of the concepts, accurately measure the concept. He further argues that content validity is a non-statistical method used to validate the content employed in the questionnaire. The researcher prepared the instrument in close consultation with the supervisors in order to ensure that items in the questionnaire covered all areas under investigation. Best and Khan (2002) observed that, content validity of the research instrument could be enhanced through expert judgment. Specialists in the content measured by the instrument are asked to judge the appropriateness of the instrument researcher's supervisor experts/specialists helped to assess the validity of the instrument.

### **3.7 Instrument Reliability**

According to Mugenda and Mugenda (2003), reliability of an instrument is the degree of consistency with which it measures a variable. It is conceived with estimates of the degree to which a research instrument yield consistent results or data after repeated trials. The reliability of a standardized test is usually expressed as a correlation coefficient, which measures the strength of association between variables. The researcher employed the test and retest techniques in order to improve reliability whereby the questionnaires was admitted twice to head teachers, students and teachers. After the first administration the researcher revisited the schools after two weeks for the second administration. Instrument reliability co-efficient of 0.7 or more implied a high degree of reliability of the instrument. The study employed the person product moment correlation.

### **3.8 Data Collection Procedures**

The researcher sought written permission from the national commission for science, technology and innovation (NACOSTI), the Tana River county director of education and the school head – teachers to enable him conduct research in the selected schools. He created sufficient rapport with the respondent, inform them of their freedom to make informed choice and allow for possible adjustment to the data collection schedule where need will arise. Five sets of questionnaire were then be self-administered concurrently in the 12 sampled schools, with the help of two assistants, to the unit of analysis who were; the school board of management, school head teachers, teachers and pupils. The respondents then filled in their opinions on the items of the questionnaires, which was then collected by the researcher. Interview schedules were used for village elders.

### **3.9 Data Analysis Techniques**

Data analysis is the process of systematically applying statistical and logical techniques to describe and illustrate, condense and recap, and evaluate data. It involves uncovering underlying structures, extracting important variables, detecting any anomalies and testing any underlying assumptions. The data was analyzed both qualitatively and quantitatively. Qualitative data was analyzed thematically as per a study objective that is, putting it into major topics or subjects. Quantitative data was analyzed using descriptive statistics, which entailed the use of mean, mode, percentage, and standard deviation, which helped to determine the proportions, average scores and variance for each set of scores in the sample.

**Table 3.3: Data analysis technique**

<b>Variables</b>	<b>Indicators</b>	<b>Mode of Analysis</b>	<b>Statistical analysis of variables (ANOVA)</b>
Knowledge on flood emergency aspects	– High – Medium – Low	Descriptive (cross-tabulation)	T-Test
Teacher training on flood emergency	– Trained – Not trained	Inferential	T-Test differences
Integration of DRR into the curriculum	– High level – Medium level – Low level	Descriptive Inferential	ANOVA
School management external collaborations	– Many collaborators – Few collaborators – None	Descriptive Inferential	Cross-tabulation ANOVA

### **3.10 Ethical Considerations**

The researcher observed ethical considerations throughout the study. The researcher sought written permission from the relevant authorities, first from the National Commission for Science, Technology and Innovation (NASCOSTI), then from the County Director of Education, Tana River County, both of whom issued the authorization to conduct research.

During the actual data collection, the researcher informed the all respondents of their freedom of choice of participation in the study. The researcher further informed the respondents that their identity and opinions on issues under study would be kept confidential, and that any information gathered from them will be used for the purpose of the study only. Having thus ascertained the respondent's informed consent, the researcher will proceed to administer the research instruments

## CHAPTER FOUR

### ANALYSIS AND PRESENTATION OF RESEARCH FINDINGS

#### 4.1 Introduction

This chapter presents the findings of the study, as set out in the research methodology. It outlines the study findings in line with the research objectives using descriptive statistics. The results are presented on the effects of flood disk reduction strategies on participation rates of pupils in primary schools in Tana delta Sub County, Tana River county Kenya.

##### 4.1.1 Response Rate

The response rate for pupils, teachers, head teachers, village elders and members of the B.O.M is presented in Table 4.1.

**Table 4.1: Response rate**

Response	Head teachers		Teachers		BOM		Pupils		Village elders	
	F	%	F	%	F	%	F	%	F	%
Responded	12	100	25	86	14	76	795	69	9	75
Not responded	0	-	4	14	5	24	357	31	3	25
<b>Total</b>	<b>12</b>	<b>100</b>	<b>29</b>	<b>100</b>	<b>19</b>	<b>100</b>	<b>1152</b>	<b>100</b>	<b>12</b>	<b>100</b>

This implies that based on this assertion, the response rate of 100 percent from the head teachers, 86 percent from the teachers, 76 percent from the BOM, 69 percent from the students and 75 percent from the village elders was very good.

Mugenda and Mugenda (2013), specified that a survey response rate of 50 percent is adequate for analysis and reporting; a rate of 60 percent is good and a response rate of 70 percent and over is excellent for analysis and reporting. The recorded high response rate can be attributed to the data collection procedures, where the researcher pre-notified the potential participants of the intended survey, utilized a self-administered questionnaire where the respondents completed and these were picked shortly after and made follow up calls to the schools for queries as well as prompt the respondents to fill the questionnaires.

## 4.2 Demographic Characteristics

This section presents the demographics of respondents.

### 4.2.1 Gender of Respondents

Gender of the respondents was evaluated and presented as below.

**Table 4.2: Distribution of Respondents by their Gender**

Gender	Head teachers		Teachers		BOM		Pupils		Village elders	
	F	%	F	%	F	%	F	%	F	%
Male	8	66	13	52	12	86	432	54	8	88
Female	4	34	12	48	2	14	363	46	1	12
<b>Total</b>	<b>12</b>	<b>100</b>	<b>25</b>	<b>100</b>	<b>14</b>	<b>100</b>	<b>795</b>	<b>100</b>	<b>9</b>	<b>100</b>

Table 4.2 above shows gender imbalance in all areas of education stake holding where women are the minority in Tana delta.

The ecological system theory looks at a child’s development from the individual level where the child is oriented to being male or female by the natural biological factor. This is further developed at school in the micro system stage. It is at this point female children would need adult females in the school system to develop properly and have abilities to protect themselves even during an emergency. The girls in Tana delta lack this structure.

#### 4.2.2 Respondents Period of Membership

Table 4.3 shows respondents’ period of membership.

**Table 4.3: Respondents Period of Membership**

	Head teachers		Teachers		BOM		Pupils		Village elders	
Below 1 year	1	8	2	8	1	7	-	-	-	-
1-3 Years	2	17	3	12	1	7	-	-	1	11
4-6 Years	2	17	5	20	4	29	248	31	1	11
6-10 Years	4	33	9	36	5	36	298	37	5	56
Over 10 years	3	25	6	24	3	21	249	32	2	22
<b>Total</b>	<b>12</b>	<b>100</b>	<b>25</b>	<b>100</b>	<b>14</b>	<b>100</b>	<b>795</b>	<b>100</b>	<b>9</b>	<b>100</b>

The findings show that the respondents had served their respective positions long enough and therefore their responses could be relied upon in generating more information. It also implies that the teachers, head teachers and BOM had served in their respective schools long enough to have some substantive history and relevant trainings like the flood mitigation training and to know about the integration of disaster risk reduction integration in the school. The findings also show that the village elders were very suitable in providing account of previous flooding phenomena. The government senior administrators and NGOs also use them in emergency contexts.

### 4.2.3 Respondents Level of Education

Respondent's level of education is presented in Table 4.4 below;

**Table 4.4: Distribution of Respondents by their Level of Education**

Level of Education	Head Teachers		Teachers	
	F	%	F	%
Degree	7	58	4	16
Diploma	4	33	12	48
Kenya Advanced Certificate of Education	1	8	6	24
KCPE	-	-	-	-
Kenya Certificate of Education	-	-	3	12
<b>Total</b>	<b>12</b>	<b>100</b>	<b>25</b>	<b>100</b>

As per Table 4.4, 58 percent of the head teachers who were the majority had a degree while 48 percent of the teachers who were the majority had a diploma as their highest level of academic and professional qualification. This shows that the teaching staff was trainable and educated enough to adapt to current worldwide trends on disaster management. Both the teachers and head teachers had undertaken a Diploma in education management course where they covered the Disasters management as a course unit.

### 4.3 Flood Disaster Risk Management on Participation in the School

This section presents findings on respondents' level of indigenous knowledge on flooding and its effects on the participation rates of pupils in primary schools.

### 4.3.1 Flood Emergencies in the Past Five Years

**Table 4.5: Flood Emergencies in the Past Five Years**

	Head Teachers		Teachers		BOM	
	F	%	F	%	F	%
Yes	10	83	21	84	11	79
No	2	17	4	16	3	21
<b>Total</b>	<b>12</b>	<b>100</b>	<b>25</b>	<b>100</b>	<b>14</b>	<b>100</b>

Table 4.5 shows that majority of the head teachers (83 percent), teachers (84 percent) and BOM (79 percent) indicated that their school had been affected by flood emergencies in the past five years. This therefore implied that there was a serious problem of flooding in the area that affected the schools' curriculum.

It justified collection of data in from respondents in these schools and consequently an analysis needed to be done to try to bring a solution through research.

### 4.3.2 Level of Safety of Physical Infrastructure during Floods in the Schools

**Table 4.6: Level of Safety of Physical Infrastructure during Floods in the Schools**

	Head Teachers				Teachers				BOM									
	Safe		Unsafe		Safe		Unsafe		Safe		Unsafe							
	F	%	F	%	F	%	F	%	F	%	F	%						
Roads and bridges	1	8	4	33	7	58	6	24	9	36	10	40	2	14	3	21	9	64
Drainage systems	1	8	2	17	9	75	2	8	8	32	15	60	1	7	3	21	12	86
Buildings	10	83	1	8	1	8	17	68	5	20	3	12	13	93	1	7	-	-
Play fields	2	17	8	66	2	17	4	16	13	52	8	32	4	29	8	57	2	14
Water and sanitation	1	8	1	8	10	83	2	8	4	16	19	76	1	7	10	7	3	21

The above information indicates that physical infrastructure by majority of those interviewed showed on average was safe. Majority as highly unsafe considered roads and bridges. This explains why most schools in the flood prone areas had a small number of enrolments. The drainage systems were considered highly unsafe by majority of the respondents this posed a major health hazard during floods with a specific threat of water borne diseases. Buildings were considered relatively safe by majority of the respondents evidently that is why most were able to with stand the heavy annual floods. There were however a few unreliable buildings as was shown by the responses.

The respondents indicated that play fields were safe during flood emergencies. Water and sanitation was an issue and majority indicated that it was highly unsafe. This called for the school board of management to collaborate with external organs to source funding or material for construction of proper and sufficient sanitation facilities like pit latrines, urinals, septic tanks, water tanks and enough water taps.

#### 4.3.3 Early Warning Systems Alerts on Impending Floods

**Table 4.7: Early Warning Systems Alerts on Impending Floods**

	Head Teachers		Teachers		BOM	
	F	%	F	%	F	%
Yes	2	83	4	16	2	14
No	10	17	21	84	12	86
<b>Total</b>	<b>12</b>	<b>100</b>	<b>25</b>	<b>100</b>	<b>14</b>	<b>100</b>

Majority of the respondents (83 percent), (84 percent) and (86 percent) indicated that they did not receive early warning system alerts on impending floods from sources other than own observation. For the respondents who indicated that they received early warning alerts received the information from media disseminated, the metrological department of Kenya and the Kenya Red Cross. This shows lack of external collaboration by schools with other bodies like local NGOs and local MOEST office to develop locally recognized and documented Early Warning mechanisms.

#### 4.3.4 Effects of Flood Disasters on Learning in the Schools

The study sought to investigate whether flood disasters affected learning in the schools.

**Table 4.8: Effects of Flood Disasters on Learning in the Schools**

	Head Teachers		Teachers		BOM	
	F	%	F	%	F	%
Yes	12	100	19	76	13	93
No	-	-	6	24	1	7
<b>Total</b>	<b>12</b>	<b>100</b>	<b>25</b>	<b>100</b>	<b>14</b>	<b>100</b>

Table 4.8 illustrates that all the head teachers (100 percent), 93 percent of the BOM and 76 percent of the teachers who were the majority indicated that flood disasters affected learning in their schools in the recent past. They all indicated that they were forced to send pupils home and to report when the floods had reduced. They also indicated that floods had damaged their learning materials and means of transport was disrupted during that period.

### 4.3.5 Policies that Guide Implementation of Flood Safety

**Table 4.9: Policies that Guide Implementation of Flood Safety**

	Head Teachers		Teachers		BOM	
	F	%	F	%	F	%
Yes	4	33	7	28	2	8
No	8	67	18	72	12	92
<b>Total</b>	<b>12</b>	<b>100</b>	<b>25</b>	<b>100</b>	<b>14</b>	<b>100</b>

The study sought to find out whether there were policies that guided implementation of flood safety in the schools. Majority of the head teachers (67 percent), teachers (72 percent) and BOM (92 percent) indicated that they did not have any policies that guided the implementation of flood safety in the schools. The politics, which arc the schools, are old and only indicate that they should move to higher grounds or they should communicate with parents when things get out of hand. This calls for mainstreaming of policies by integrating the nation to the primary school curriculum.

### 4.3.6 Safety Measures of Infrastructure during Emergencies

**Table 4.10: Safety Measures of Infrastructure during Emergencies**

	H. Teachers		Teachers				BOM					
	Yes		No		Yes		No		Yes		No	
	F	%	F	%	F	%	F	%	F	%	F	%
Buildings and other physical infrastructure have been reinforced and retrofitted	7	58	5	42	6	24	19	76	9	64	5	36
Flood safety drills are regularly held	9	75	3	25	9	36	16	64	8	57	6	43
Evacuation map is displayed on all buildings	2	17	10	83	3	12	22	88	10	71	4	29
First Aid kits & emergency supplies are stock-piled and prepositioned	8	67	4	33	8	32	17	68	8	57	6	43
First Aid and emergency response teams have been formed and trained	6	50	6	50	5	20	20	80	11	79	3	21
School records, guides, textbooks and work-books are secure and safeguarded	10	83	2	17	10	40	15	60	9	64	5	36

According to the findings in Table 4.10 above, majority of the head teachers indicated that buildings and other physical infrastructures had been reinforced and retrofitted while majority of the BOM and teachers indicated that they had not been reinforced. Majority of the respondents indicated that flood safety drills were not regularly held. Majority of the respondents indicated that they had no evacuation maps displayed.

According to the study on first Aid kits and emergency supplies prepositioning, majority indicated that they had them in place. Majority said that they did not have first Aid and emergency response teams formed and trained. This justified the need for training on flood disaster mitigation by teachers. The study however established that majority indeed had their school records, guides, textbooks and workbooks secure and safeguarded.

#### 4.3.7 Resources Available for Implementing Flood Disaster in the Schools

**Table 4.11: Resources Available for implementing Flood Disaster in the schools**

	Head Teachers		BOM	
	F	%	F	%
Yes	10	83	13	93
No	2	17	1	7
<b>Total</b>	<b>12</b>	<b>100</b>	<b>14</b>	<b>100</b>

As per the findings in Table 4.11, 93 percent of the BOM and 83 percent of the head teachers who were the majority indicated that there were no resources available for implementing flood disaster safety measures in the schools. Most cited failure by the national government in providing financial resources. This shows lack of proper collaborative approach by the board of management external source, which are the alternative provision of resources for example through corporate social responsibility.

### 4.3.8 Resources as Hindrances to Formulation of Flood Disaster Reduction Strategies

**Table 4.12: Resources as Hindrances to Formulation of Flood Disaster Reduction Strategies**

	Head Teachers		BOM	
	F	%	F	%
Yes	9	75	8	57
No	3	25	6	43
<b>Total</b>	<b>12</b>	<b>100</b>	<b>14</b>	<b>100</b>

Findings from Table 4.12 show that 75 percent of the head teachers and 57 percent of the BOM who were the majority indicated that resources greatly constituted as major hindrances to the formulation of flood disaster risk reduction strategies in the schools.

### 4.3.9 Traditional Knowledge on Flood Forecasting

Findings of the study revealed that a high proportion of villagers at Tana Delta Sub County, Tana River County Kenya had knowledge of traditional flood forecasting and warning. They observed changes in weather pattern and river levels as the main source of traditional flood information from elderly residents, relatives and friends, respectively. When and when not to expect rains helped to reach conclusions on the probability of flooding and the subsequent course of action on the part of local community. This involved predicting probability of future flood events by watching for changes in the rain pattern. Heavy rain in the area accompanied by strong winds signaled the approach of heavy rains.

Knowledge of flood cycles was the least common traditional early warning indicator mentioned by the elderly respondents residing in the area. Until very recently, multiyear cycles of drought and rain were regarded as a strong indication of the weather that might be expected in a given year. These were products of centuries of observations handed down through oral tradition. The most commonly cited indicator for floods by the elders was the cycle of 5 years. During each of these cycles, floods were observed in these communities. These cycles represented longer-term weather patterns in the region as observed over past centuries. The elders were requested to evaluate the effectiveness of their current coping strategies. Results from the study indicate that their responses were very effective.

#### **4.4 Teacher Training On Flood DRR on Participation Rates of Pupils in Primary Schools**

Baraka & Hardeman (2012) indicated that training teachers on skills for adapting basic instructional manuals and visual aid into child-friendly recourses and significantly improve the dissemination of information on DRR and mitigate the high staff turnover common in flood-affected areas. An investigation done by Nderitu (2009) on implementation of safety standards in schools indicated that head teachers were not trained on disaster management nor was the school community. Effort should be made to educate and train staff and students in emergency procedures, otherwise in the event a disaster strikes, a period of panic and uncertainty may crop up before any action is taken. Panic is also likely to grip the inexperienced, untrained and ill-equipped personnel. This may lead to no action being taken on rescue operations as the people may not be resilient. The study therefore sought to establish the type of teacher training on flood DRR that affects participation rates of pupils in primary schools in Tana delta sub county, Tana River County, Kenya.

**Table 4.13: Teacher Training On Flood DRR**

	<b>Teachers</b>	
	<b>F</b>	<b>%</b>
Yes	4	16
No	21	84
<b>Total</b>	<b>25</b>	<b>100</b>

Table 4.13 shows that 84 percent of the respondents who were the majority indicated that they had not received any training on flood disaster risk management. 16 percent indicated that they had received in-service and short courses that had been facilitated by MOEST.

#### **4.4.1 Activities that Address Flood Disaster Risk Reduction**

**Table 4.14: Activities That Address Flood Disaster Risk Reduction**

	<b>Head Teachers</b>		<b>Teachers</b>		<b>Pupils</b>	
	<b>F</b>	<b>%</b>	<b>F</b>	<b>%</b>	<b>F</b>	<b>%</b>
Yes	3	25	6	24	172	22
No	9	75	19	76	623	78
<b>Total</b>	<b>12</b>	<b>100</b>	<b>25</b>	<b>100</b>	<b>795</b>	<b>100</b>

The above table indicates that 75 percent of the head teachers, 76 percent of the teachers and 78 percent of the pupils who were the indicated that the activities in their schools did not address disaster risk reduction. This shows there is need for training the teachers on flood mitigation who in turn will train the pupils on Disaster Risk Reduction activities by including the course in the school's curriculum.

#### 4.4.2 Specific Teachers Assigned to Disseminate Information of Flood Disaster Reduction

**Table 4.15: Specific Teachers Assigned to disseminate Information of Flood Disaster Reduction**

	Head Teachers		Teachers	
	F	%	F	%
Yes	3	25	7	28
No	9	75	18	72
<b>Total</b>	<b>12</b>	<b>100</b>	<b>25</b>	<b>100</b>

According to the findings in Table 4.15 above shows, that majority of both head teachers (75 percent) and the teachers (72 percent) indicated that there were no specific teachers assigned to disseminate information on flood disaster reduction in their schools. This was because the teachers did not have reliable knowledge on flood emergency due to lack of teacher training on the same.

#### 4.4.3 Instructional Materials to Support Instructions on Flood Disaster Reduction

**Table 4.16: Instructional Materials to Support Instructions on Flood Disaster Reduction**

	Head Teachers		Teachers		Pupils	
	F	%	F	%	F	%
Yes	2	17	3	12	74	9
No	10	83	22	88	721	91
<b>Total</b>	<b>12</b>	<b>100</b>	<b>25</b>	<b>100</b>	<b>795</b>	<b>100</b>

As per the findings in Table 4.16 above, majority of the head teachers (83 percent), teachers (88 percent) and pupils (91 percent) indicated that there were no instructional materials available to support learning on flood Disaster risk Reduction in their schools. This was a call to the school's BOM and head teachers to ensure that instructional materials were provided to the school to ensure that appropriate information on flood safety was delivered to all the school's staff and pupils.

#### **4.5 Types of External Collaborations the BOM Have Sourced to Mitigate Flood Emergencies**

Wisner (2006) reported that methods of participatory vulnerability assessment, capacity assessment and hazard mapping have been used with broader communities surrounding schools and other institutions of education and research. Similarly, Otiende (2009) attributes the low implementation of flood mitigation efforts in communities in western Kenya to low capacities to play an active role in flood mitigation programmes.

School stakeholders therefore need to undergo sensitization training in ways in which they can actively participate in flood mitigation programmes meant to benefit them. The current study therefore sought to determine the types of external collaborations the boards of management have sourced to mitigate flood emergencies that affect participation rates of pupils in primary schools in Tana delta sub county, Tana River County, Kenya.

#### 4.5.1 Involvement of other Partners in Mitigation of Floods

**Table 4.17: Involvement of other Partners in mitigation of Floods**

	<b>BOM</b>	
	<b>F</b>	<b>%</b>
Yes	9	64
No	5	36
<b>Total</b>	<b>14</b>	<b>100</b>

The study found that 64 percent of the BOM that were majority indicated that they sought the involvement of other partners such as Red Cross, USAID and World Vision that are not stakeholders of the school in planning, policy formulation and mitigating of flooding. This positive indicator informs the school management boards of an alternative platform for assistance in flood Disaster Risk Reduction in their schools.

#### 4.5.2 Board Members Assigned to Contact Organizations for Collaborations

**Table 4.18: Board Members Assigned to Contact Organizations for Collaborations**

	<b>BOM</b>	
	<b>F</b>	<b>%</b>
Yes	11	79
No	3	21
<b>Total</b>	<b>14</b>	<b>100</b>

Majority of the respondents 79 percent indicated that there were specific board members assigned to contact neighboring organizations for collaborations. They indicated that they used voice calls and one on one talks to contact neighboring organizations for collaborations. The response from the neighboring organizations was poor according to the respondents.

#### 4.5.3 BOM Participation in Disaster Risk Reduction

**Table 4.19: BOM Participation in Disaster Risk Reduction**

	Head Teachers		BOM	
	F	%	F	%
Yes	8	67	13	93
No	4	33	1	7
<b>Total</b>	<b>12</b>	<b>100</b>	<b>14</b>	<b>100</b>

According to the findings in Table 4.19, 93 percent of the BOM and 67 percent of the head teachers who were the majority indicated that the BOM participated in disaster risk reduction activities in school.

#### 4.5.4 BOM Rate of Participation in Flood Disaster Risk Reduction

**Table 4.20: BOM Rate of Participation in Flood Disaster Risk Reduction**

	Head Teachers								BOM													
	Seldom				Often				Quite.				Often				Quite.					
	Rarely		Rarely		Rarely		Rarely		Seldom		Seldom		Seldom		Often		Often		Quite.		Quite.	
	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%
Community advocacy																						
activities	-	-	3	25	7	58	2	17	1	7	2	14	8	57	3	21						
Resources mobilization	-	-	4	33	5	42	3	25	4	29	3	21	6	43	1	7						
School emergency team																						
activities	-	-	2	17	9	75	1	8	2	14	5	36	7	50	7	50						

The study found that majority of the head teachers and BOM indicated that the BOM often participated in community advocacy activities, resources mobilization and school emergency team activities as flood disaster risk reduction activities in their schools.

#### 4.6 Role of Pupils in Implementing Flood Disaster Safety Standards

**Table 4.21: Role of Pupils in Implementing Flood Disaster Safety Standards**

	Head teachers	
	F	%
Yes	7	58
No	5	42
<b>Total</b>	<b>12</b>	<b>100</b>

Findings in Table 4.21 above shows that 58 percent of the head teachers who were the majority indicated that there were child-led clubs in the school that participated in flood disaster safety activities. The activities the pupils were involved in the child-led clubs included; facilitating in flood safety awareness activities, helping mobilize funds for safety activities, participating in development of instructional materials on flood DRR, dissemination of flood DRR information and participation in flood emergency team activities.

#### **4.7 Role of Indigenous Knowledge on Flood Disaster Risk Reduction**

Globally, there is increasing acknowledgement of the relevance of indigenous knowledge as an invaluable and underused knowledge reservoir, which presents developing countries, particularly Africa, with a powerful asset in environmental conservation and disaster management (Kamara, 2014). Similar application and use of indigenous knowledge for disaster management is also prevalent in Swaziland.

Floods can be predicted from the height of birds nest near rivers. Though some communities in the Niger Delta have used indigenous knowledge to forecast floods with some degree of accuracy, it has not been integrated with scientific method for improved risk analysis and contingency planning and post disaster management. The current study therefore sought to examine the level of indigenous knowledge on flooding that affects participation rates of pupils in primary schools in Tana delta sub county, Tana River County, Kenya. The village elders provided the response.

**Table 4.22: Role of Indigenous Knowledge on Flood Disaster Risk Reduction**

	Village Elders	
	F	%
Yes	9	100
No	-	-
<b>Total</b>	<b>9</b>	<b>100</b>

All the village elders (100 percent) indicated that there were traditional ways in which they had been predicting the onset of floods. They indicated that behavior of humans; plants and animals, knowledge of weather patterns, knowledge on nature of river and knowledge of flood cycle were the ways they previously used to predict the onset of floods.

#### 4.7.1 Enquires from Teachers and School Management on Flood Prediction

**Table 4.23: Enquires from Teachers and School Management on Flood Prediction**

	Village Elders	
	F	%
Yes	6	67
No	3	33
<b>Total</b>	<b>9</b>	<b>100</b>

Table 4.23 illustrates that 67 percent of the village elders who were the majority indicated that they had gotten enquiries from teachers and the school management on flood prediction. This shows that the village elders played an important role in providing predictions and in providing possible solutions on how floods risks can be reduced in the Tana Delta Sub-County, Tana River County.

## 4.8 Demographic Characteristics of the Respondents and Flood Disaster Risk Management on Participation in the School

The gender, period of membership and education level of the respondents were reviewed against flood disaster risk management on participation in the school.

### 4.8.1 Gender of the Respondents

**Table 4.24: Gender of the Respondents**

		Head teachers	Teachers	BOM	Pupils	Total
Gender	Male	66	52	86	54	258
	Female	34	48	14	46	142

The study sought to establish whether gender of the respondents influenced flood disaster risk management. From the table above, male were represented by 86%, while female were represented by 48%. The results indicated that gender of the respondents influenced flood disaster risk management on participation in the school.

### 4.8.2 Period of Membership of the Respondents

**Table 4.25: Period of Membership of the Respondents**

		Head teachers	Teachers	BOM	Pupils	Total
Period of membership	Below 1 year	8	8	7	-	23
	1-3 Years	17	12	7	-	36
	4-6 Years	17	20	29	31	97
	6-10 Years	33	36	36	37	142
	Over 10 years	25	24	21	32	102

The study further sought to establish whether period of membership influenced flood disaster risk management among the respondents. From the table above, those aged below 1 year were represented by 23%, those aged between 1 and 3 years were represented by 36% while those aged between 4 and 6 years were represented by 97%. However, those above 6 years scored over 100%. The results indicated that majority of the respondents with a membership period of over 6 years had proper flood disaster risk management on participation in the school.

### 4.8.3 Education Level of the Respondents

**Table 4.26: Education Level of the Respondents**

	Head teacher	Teacher	Total
Degree	58	16	74
Diploma	33	48	81
Kenya Advanced Certificate of Education			
KCPE	8	24	32
Kenya Certificate of Education	-	-	-
<b>Total</b>	<b>12.0</b>	<b>25</b>	<b>37.0</b>

On education level of the respondents, the study indicated that, 81% of the respondents with Flood Disaster Risk Management had diploma as their highest level of education, 74% had degrees level of education while 32% had Kenya Advanced Certificate of Education. Further, 12% had Kenya Certificate of Secondary Education. This therefore shows that irrespective of level of education majority of the respondents had low flood disaster risk management.

## **CHAPTER FIVE**

### **DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

The objectives of the study were to examine the level of indigenous knowledge on flooding that affects participation rates of pupils in primary schools, to determine the type of teacher training on flood DRR that affects participation rates of pupils in primary schools, to establish the level of integration of disaster risk reduction content in the curriculum that affects participation rates of pupils in primary schools and to determine types of external collaborations the boards of management have sourced to mitigate flood emergencies that affect participation rates of pupils in primary schools. A total of 12 head teachers, 25 teachers, 14 BOM, 795 pupils and 9 village elders were surveyed, and the findings presented in Chapter Four. This chapter presents discussions of the findings.

#### **5.2 Discussion of Findings**

##### **5.2.1 Level of Indigenous Knowledge on Flooding that Affects Participation Rates of Pupils in Primary Schools**

The study found out that the respondents schools had been affected by flood emergencies in the past five years, they indicated that they did not receive early warning system alerts on impending floods from sources other than own observation, they indicated that flood disasters affected learning in their schools in the recent past, they also indicated that they didn't have any policies that guided the implementation of flood safety in the schools.

They further indicated that there were no resources available for implementing flood disaster safety measures in the schools and they indicated that resources greatly constituted as major hindrances to the formulation of flood disaster risk reduction strategies in the schools. This is concurrent with Kamara (2014) who states that globally, there is increasing acknowledgement of the relevance of indigenous knowledge as an invaluable and underused knowledge reservoir, which presents developing countries, particularly Africa, with a powerful asset in environmental conservation and natural disaster management. Indigenous knowledge is developed and adapted continuously to gradually changing environments and passed down from generation to generation and closely interwoven with people's cultural values." Furthermore, traditional indigenous knowledge is developed and adapted cautiously to gradually changing environments and passed down from generation and closely interwoven with people cultural values." furthermore, traditional indigenous knowledge of storm routes and winds patterns enables people to design their disaster management long in advance by constructing types of shelter, wind break structures, walls and homestead fences appropriately (Kiplang'at and Rotich, 2008).

### **5.2.2 Type of Teacher Training On Flood DRR that Affects Participation Rates of Pupils in Primary Schools**

The study found that majority of the teachers indicated that they had not received any training on flood disaster risk management. The head teachers, teachers and the pupils also indicated that the activities in their schools did not address disaster risk reduction, both teachers and head teachers indicated that there were no specific teachers assigned to disseminate information on flood disaster reduction in their schools and they also indicated that there were no instructional materials available to support learning on flood Disaster risk Reduction in their schools.

These findings were in line with Odhiambo, (2014) who found that most schools lacked specific trained teachers with the requisite pedagogical skills for adapting instructional materials and disseminating information on flood DRR to pupils and fellow teachers. Schools and governments can however offer training through experts and case studies a capacity building initiative on disaster risk reduction and school safety by Assam state in India was a path breaking, innovative and first of its kind in south Asia. Teachers prepared and submitted the school disaster management plan which included risk assessment, mitigation measures, roles and responsibilities of stakeholders as well as response mechanisms to follow during emergencies (Assam state disaster management authority, 2014).

### **5.2.3 Level of Integration of Disaster Risk Reduction Content in the Curriculum that Affects Participation Rates of Pupils in Primary Schools**

The study also found that the head teachers who were the majority indicated that there were child-led clubs in the school that participated in flood disaster safety activities. All the village elders indicated that there were traditional ways in which they had been predicting the onset of floods. They indicated that behavior of humans, plants and animals, knowledge of weather patterns, knowledge on nature of river and knowledge of flood cycle were the ways they previously used to predict the onset of floods and that the village elders who were the majority indicated that they had gotten enquiries from teachers and the school management on flood prediction. This is supported by Baraka and Hardeman (2012) who noted that training teachers on skills for adapting basic instructional manuals and visual aid into child-friendly recourses and significantly improve the dissemination of information on DRR and mitigate the high staff turnover common in flood-affected areas.

High staff turnover has a negative impact on participation of pupils. The curriculum and its teachers are powerful tools for building a culture of resilience. They have important role to play in transmitting knowledge for disaster and conflict risk reduction. Therefore, the education system has a responsibility to ensure that it does not act as a vehicle for domination. It also has a role to play in supporting teachers and learners to internalize safe practices in case of disaster, (IIEP, 2011).

#### **5.2.4 Types of External Collaborations the Boards of Management Have Sourced to Mitigate Flood Emergencies that Affect Participation Rates of Pupils in Primary Schools**

The study further found that the BOM indicated that they sought the involvement of other partners such as Red Cross, USAID and World Vision that are not stakeholders of the school in planning, policy formulation and mitigating of flooding, they also indicated that there were specific board members assigned to contact neighboring organizations for collaborations, the BOM and head teachers also indicated that BOM participated in disaster risk reduction activities in school and the head teachers and BOM indicated that the BOM often participated in community advocacy activities, resources mobilization and school emergency team activities as flood disaster risk reduction activities in their schools.

These findings support a study by the general assembly (2013) which evaluated that resolved to stress the need to foster better understanding and knowledge of the causes of disasters, as well as to build resilience and strengthen coping capacities, in particular in developing countries, though interlaid, the exchange of best practices, technology transfer, as mutually agreed, and technical knowledge, educational and training programmes for disaster risk reduction, access to relevant data and information, the

strengthening of institutional arrangements, the promotion of community participation, recognizing that women play a vital role in disaster risk reduction, ownership through community-based disaster risk management approaches and a people-centered ,holistic approach, in order to build an inclusive society.

### **5.3 Conclusions**

The findings of this study support the value of DRR knowledge in school students. Although line agencies (i.e., the organizations working in DRR sector) that DRR concept and disaster education are already incorporated in the school curricula and the students receive DRR knowledge through awareness campaigns, trainings, meetings, and so on, the real scenario is different. The level of knowledge has been explored on five key DRR issues of the school students, the study found that the achievements are not very encouraging. The students still seem to be confused about disaster adaptation and risk perception. Only one satisfactory result was obtained in the status of disaster knowledge of the students. A greater number of students think that disaster knowledge is very important, but only a few students were found to have comprehended the importance of disaster knowledge.

Although the levels of knowledge of both male and female students on DRR issues are not much different, the male students are more confused about disaster adaptation procedure than the female students. The sources of disaster information to male and female students distinctly differ from each other. A higher number of female students seem to have been using a television as the major source of disaster information, whereas the male students depend more on the FM radio.

Regardless of the age group, no students seem to have been reading newspapers and surfing Internet as the sources of disaster information. Lack of availability of newspaper and limited access to the Internet facility in few selected districts might also have been causing this limitation in the source of disaster information. The conclusion to be made from the study shows that there is lack of availability done in regards to risk reduction on the same. Thus, it is essential for the National Education Policy and the curriculum revision cycle to plan ahead, so necessary steps need to be taken to introduce disaster risk reduction concepts to the curriculum development board before or during the actual revision phase, This will provide enough time for the concerned agencies to develop a relevant curriculum related to disasters, train the teachers and also pilot test the curriculum so that any necessary revision could be carried out before the curriculum is actually adopted to teaching nationwide.

Another key issue is that any change in curriculum has budgetary implications. Change in the curriculum results in increase in teaching time and increase in corresponding costs of teaching and printing of textbooks. An ideal plan would provide the curriculum revision board with sufficient time to place revisions in forthcoming education sector plan, so that budgetary arrangements are put to place to cater for the increase in teaching costs necessitated due to the revision of curriculum.

#### **5.4 Recommendations**

- i. The potential of the indigenous floods prediction mechanism can be enhanced by scientific knowledge such as well-annotated flood risk maps. Simple weather stations and flood gauges at the banks of the floodable rivers, which could be understood and applied by the local indigenous population. A proper blending of the indigenous predictive techniques combined with simplified scientific procedure would help communities mitigate flood disaster and adapt to environment changes.
- ii. Schools and governments should offer training through experts and case studies a capacity building initiative on disaster risk reduction and school safety. Teachers should prepare and submit the school disaster management plan which includes risk assessment, mitigation measures, roles and responsibilities of stakeholders as well as response mechanisms to follow during emergencies.
- iii. Disaster risk reduction should be systematically treated across the curriculum and through the grade levels. Treatment must be beyond the basic science of hazards and safety measures to consider prevention, mitigation, vulnerability and resilience building.
- iv. The schools Board of Management needs to promote links between the sub-national contingency plans and school preparedness plans. Ensure functional imkap.e.1, and communications between sub-national early warning mechanism and schools/communities. Develop sub-national procedures and past evacuation, including specification of safe assembly areas.

### **5.5 Areas of Further Study**

There is need to study other counties that have been affected by the same disaster in order to draw conclusions on the experiences in the areas. Other studies may also be conducted in secondary schools as this study focused on primary schools.

Further studies may also need to be conducted other data collection tools like focus group discussion and interview guides. This may provide in-depth contextual data that could further deepen understanding of the effects of flood risk reduction strategies on participation rates of pupils/students.

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## **APPENDICES**

### **APPENDIX I**

#### **INTRODUCTORY LETTER**

**Dear Sir/ Madam,**

**RE: DATA COLLECTION**

I am a Master of Education in Education in Emergencies student in the University of Nairobi conducting research on Flood disaster risk reduction strategies and participation rates of pupils in primary schools in Tana Delta Sub County, Tana River County Kenya. Your school has been selected to participate in this study. I hereby humbly request you to respond to all the items in the questionnaire provided to the best of your knowledge. The questionnaire is meant for the research only and the identity of the respondents will be treated with utmost confidentiality.

Thank you.

**Yours faithfully,**

**George Mburu.**

## APPENDIX II

### QUESTIONNAIRE FOR SCHOOL BOARD OF MANAGEMENT

**INSTRUCTION:** The purpose of this questionnaire is to gather information on Flood Disaster Risk Reduction Strategies effect on Participation in Primary Schools Tana Delta Sub County, Tana River County. Kindly respond to each question by ticking (✓). The appropriate response or by giving your own opinion as honestly as possible. Your answers will only be used for the purpose of this study. Do not write your name anywhere in this questionnaire.

#### SECTION A: Background information

Please indicate your gender:

Female [ ]

Male [ ]

How long have you been a member of the Board of Management in this school?

Below 1 year [ ]

1-3 years [ ]

4-6 years [ ]

**SECTION B:** This section seeks your opinion on flood disaster risk reduction strategies effect on participation in your school

**PART I:** Extent to which school policies and plans prioritize flood Disaster Risk Reduction strategies

(a) Has your school been affected by flood emergencies in the past five years?

Yes [ ]

No [ ]

(b) How would you rate the level of safety of physical infrastructure in your school during flood emergencies?



First Aid and emergency response teams have been formed  
and trained [ ]

School records, guides, textbooks and work-books secure and  
Safeguarded [ ]

7.(a) Are resources available for implementing flood disaster safety measures  
in your school?

Yes [ ]

No [ ]

(b) If yes, which are the main sources of funding to: flood disaster safety  
programmes in your school?

8. (a) In your opinion, did resources constitute a major hindrance to the formulation  
of flood disaster risk reduction strategies in your school?

Yes [ ]

No [ ]

(b) If yes, kindly indicate the extent to which resource constituted a major  
challenge to formulation of flood disaster risk reduction strategies in your  
school:

Very greatly [ ]

Greatly [ ]

Slightly [ ]

Very slightly [ ]

**PART 2: Types of external collaborations sourced to mitigate flooding in the school**

9. (a) Do you engage other partners, that are not stakeholders of the school, in planning, policy formulation and mitigation of flooding?

Yes [ ]

No [ ]

(b) If yes, please indicate examples of organizations you have collaborated with?.....

10.(a) Are there specific board members assigned to contact neighbouring organizations for collaborations?

Yes [ ]

No [ ]

(b) If yes, what modes of communication do they use to engage those organizations?

SMS [ ]

Email [ ]

Voice calls [ ]

One on one [ ]

Others (Elaborate).....

11. What has been the rate of response of these organizations?

Very good[ ]

Good [ ]

Poor [ ]

Very poor[ ]

**PART 3: Extent to which School Board of Management participate: in formulation flood disaster risk reduction strategies in school.**

12(a) Have the BOM participated in disaster risk reduction activities in school?

Yes

No

(b) In your opinion, on what extent has the BOM participated in flood disaster risk reduction activities your school?

	Really	Seldom	Often	Quite Often
Community advocacy activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Resources mobilization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School emergency team activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others (Elaborate) .....				

**THANK YOU FOR YOUR COOPERATION**



**Part 2: Please fill in the following details on .your school**

4. How many pupils are enrolled in your school?  
Girls..... Boys.....
5. How many teachers are in your school?  
Females..... Males.....

**SECTION B:** This section seeks your opinion on flood disaster risk reduction strategies effect on participation rates in your school

**PART 1: Extent to which school policies and plans prioritise flood Disaster Risk Reduction strategies to improve on participation?**

6.(a) Has your school been affected by flood emergencies in the past five years?

Yes [ ]

No [ ]

(b) How would you rate the level of safety of physical infrastructure in your school during flood emergencies?

Physical infrastructure	Highly safe	Safe	Unsafe	Highly unsafe
Roads & Bridges	[ ]	[ ]	[ ]	[ ]
Drainage systems	[ ]	[ ]	[ ]	[ ]
Buildings	[ ]	[ ]	[ ]	[ ]
Playfields	[ ]	[ ]	[ ]	[ ]
Water and Sanitation	[ ]	[ ]	[ ]	[ ]
Other (Specify) .....				

7.(a) Do you receive Early Warning Systems alerts on impending floods:corn other than your own observation?

Yes [ ]

No [ ]

(b) If yes, what is the most common means by which the EWS alerts were received.....

8.(a) Have flood disasters affected learning in your school in the past?

Yes [ ]

No [ ]

(b) If yes, how was learning affected?

9.(a) Are there policies and plans that guide the implementation of flood disaster safety in your school?

Yes [ ]

No [ ]

b) If yes, which policy guidelines are available in your school?

.....

(c) Have the following measures have been taken to ensure safety of physical infrastructure during emergencies?

Buildings and other physical infrastructure have been reinforced

and retrofit and safety drills are regularly held [ ]

Evacuation map is displayed on all buildings [ ]

First Aid kits & emergency supplies are stockpiled

and prepositioned [ ]

First Aid and emergency response team have been formed

and trained [ ]

School records, guides, textbooks and work-books secure

and safeguarded [ ]

10. (a) Are resources available for implementing flood disaster safety measure your school?

Yes [ ]

No [ ]

(b) If yes, which are the main sources of funding for flood disaster risk reduction programme in your school?

11.(a) In your opinion, did resources constitute a major hindrance to the formulation of flood disaster risk strategies in your school?

Yes [ ]

No [ ]

(b) If yes, kindly indicate the extent to which resource constituted a major challenge to formulation of flood disaster risk reduction strategies in your school:

Very greatly [ ]

Greatly [ ]

Slightly [ ]

Very slightly [ ]

**PART 2: Extent to which Flood Disaster Risk Reduction Strategies are part of the school curriculum**

12.(a) Do activities in your school address flood disaster risk reduction?

Yes [ ]

No [ ]

(b) Please indicate how have flood safety activities been included in your school curriculum? .....

13(a) Are there specific teachers assigned to disseminate information on flood, disaster reduction in your school?

Yes

No

(b) If yes, have teachers been trained to disseminate information on flood Disaster Risk Reduction?

Yes

No

(a) Are instructional materials available to support instruction on flood Disaster Risk Reduction in your school?

Yes

No

(b) If yes, have teachers been trained to disseminate information on flood Disaster Risk Reduction?

Yes

No

14.(a) Are instructional materials available to support instruction on flood Disaster Risk Reduction in your School?

Yes

No

(b) If yes, to what extent do you agree that the instructional materials available in your school are appropriate for delivering information on flood safety?

	Greatly	Barely	Not at all
Materials address local context of flood disasters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are adapted to specific levels of the pupils	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Language of the catchment has been used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pupils were involved in developing materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**PART 3: Extent to which School Board of Management participates in formulating flood disaster risk reduction strategies in school.**

- (a) Have the BOM participated in disaster risk reduction activities in school?
- Yes
- No
- (b) In your opinion, to what extent has the BOM participated in flood disaster risk reduction activities your school.
- Rarely Seldom Often Quite often
- Community advocacy activities
- Resources mobilization
- School emergency team activities
- Others (Elaborate).....

**PART 4: The role of pupils in implementing flood disaster safety standards**

- (a) Are there child-led clubs in your school that participated in flood disaster safety activities?
- Yes
- No
- (b) In which flood disaster safety activities did pupils participate most?
- Facilitated in flood safety awareness activities
- Helped mobilize funds for safety activities
- Participated in developing instructional materials on flood DRR
- Disseminated flood DRR information



**SECTION B:** This section seeks your opinion on flood disaster risk reduction strategies effect on participation rates of pupils in your school

**PART 1: Extent to which school policies and plans prioritize Disaster Risk**

**Reduction strategies to improve participation**

(a) Has your school been affected by flood emergencies in the past five years?

Yes

No

(b) How would you rate the level of safety of physical infrastructure in your school during flood emergencies?

Physical infrastructure	Highly safe	Unsafe	Highly unsafe
-------------------------	-------------	--------	---------------

Roads & Bridges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----------------	--------------------------	--------------------------	--------------------------

Drainage systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
------------------	--------------------------	--------------------------	--------------------------

Buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
-----------	--------------------------	--------------------------	--------------------------

Playfields	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
------------	--------------------------	--------------------------	--------------------------

Water and Sanitation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
----------------------	--------------------------	--------------------------	--------------------------

Other (Specify) .....

5. (a) Do you receive Early Warning Systems z leas on impending floods from sources other than your own observation?

Yes

No

(b) If yes, what is the most common means by which the EWS alerts were received?.....

6.(a) Have flood disasters affected learning in your school in the recent past?

Yes [ ]

No [ ]

(b) If yes, how was learning affected?

7.(a). Are there policies that guide implementation of flood safety in your school?

Yes [ ]

No [ ]

If yes, which policy guidelines are available in your school?

Have the following measures have been taken to ensure safety of

physical infrastructure during emergencies? [ ]

Buildings and other physical infrastructure reinforced and retrofitted [ ]

Flood safety drills are regularly held [ ]

Evacuation map is displayed on all buildings [ ]

First Aid kits & emergency supplies are stock-piled and propositioned [ ]

First Aid and emergency response teams have been formed and trained [ ]

School records, guides, textbooks and work-books secure and safeguarded [ ]

**PART 2: Extent to which Flood Disaster Risk Reduction is part of the school curricular**

8.(a) Do activities in your school address flood disaster risk reduction?

Yes [ ]

No [ ]

(b) If yes, please indicate how has flood Disaster Risk Reduction strategies been included the curriculum of your school?

.....

9.(a) Are there specific teachers assigned to disseminate information on flood disaster risk reduction in your school?

Yes [ ]

No [ ]

(b) If yes, have teachers been trained to disseminate information on flood Disaster Risk Reduction?

Yes [ ]

No [ ]

10.(a) Are instructional materials available to support instruction on flood risk reduction in your school?

Yes [ ]

No [ ]

(b) If yes, to what extent do you agree that the instructional materials available your school are appropriate for delivering information on flood safety?

Materials address local context of flood disasters	Greatly	Barely	Not at
Are adapted to specific levels of the pupils	[ ]	[ ]	[ ]
Language of the catchment has been used	[ ]	[ ]	[ ]
Pupils were involved in developing materials			

**PART 3: The types of training teachers have on flood Disaster Risk Redaction?**

11. (a) Have teacher received any training on flood disaster risk reduction?

Yes [ ]

No [ ]

(b) If yes, to what type of training?

In-service [ ]

Short course [ ]

Workshop [ ]

Others specify .....

12. Who facilitated the training?

MoEST [ ]

NGO [ ]

School [ ]

Others (specify).....

**THANK YOU FOR YOUR COOPERATION**

## APPENDIX V

### QUESTIONNAIRE FOR PUPILS

**INSTRUCTION:** The purpose of this questionnaire is to gather information on I Disaster Risk Reduction Strategies effect on Participation rates of pupils Tana Sub County, Tana River County. Kindly respond to each question by ticking; appropriate response or by giving your own opinion as honestly as possible answers will only be used for the purpose of this study. Do not **write** your anywhere in this questionnaire.

#### **SECTION A: Background information**

I. Please indicate your gender:

Female

Male

How long have you been a pupil in your school?

5-6 years

7-8 years

**Over 8 years**

#### **SECTION B: *Extent to which is Flood disaster risk reduction is part of the school curriculum***

(a) Do activities in your school address flood disaster safety?

Yes

No

(b) If yes, please indicate how have flood disaster risk reduction activities have been included in your school curriculum?

(a) Are instructional materials available to support learning on flood Disaster Risk Reduction in your school?

Yes [ ]

No

5(b) If yes, to what extent do you agree that the instructional materials available in your school are appropriate for delivering information on flood safety?

Greatly Barely Not at

Materials address local context of flood disasters [ ] [ ] [ ]

Are adapted to specific levels of the pupils [ ] [ ] [ ]

Language of the catchment has been used

Were involved in developing materials

**THANK YOU FOR YOUR COOPERATION**

**APPENDIX VI**

**INTERVIEW SCHEDULE FOR VILLAGE ELDERS**

The purpose of this interview schedule is to investigate Flood disaster risk reduction strategies and participation rates of pupils in primary schools in Tana Delta Sub County, Tana River County Kenya. I would like to ask you some questions about your background, your knowledge about floods and your interactions with teachers and school management.

**SECTION A: Background information**

1. How long have you lived in Tana Delta?
2. How long have you been the village elder?

**SECTION B: Experiences**

1. (a) Are there traditional ways in which you have been predicting the onset of floods?
- (b) If yes, which among the following have previously been used to predict?  
Behaviour of animals and plants [ ]  
Knowledge of weather patterns [ ]  
Knowledge of nature of rivers [ ]  
Knowledge of flood cycle [ ]  
Others (Elaborate).....
2. Have you ever got any enquires from teachers and school management on flood prediction?

**THANK YOU FOR YOUR COOPERATION**

**APPENDIX VII**  
**RESEARCH PERMIT**

THIS IS TO CERTIFY THAT:  
MR. GEORGE MBURA MURUGI  
OF UNIVERSITY OF NAIROBI, 01000  
IMPELOMBA, HAS BEEN PERMITTED TO  
CONDUCT RESEARCH IN TANA RIVER COUNTY

on the topic: **EFFECTS OF FLOOD  
DISASTER RISK REDUCTION STRATEGIES  
ON PARTICIPATION RATES OF PEOPLE IN  
PRIMARY SCHOOLS IN TANA DELTA SUB  
COUNTY, TANA RIVER COUNTY, KENYA.**

For the period ending:  
13th June 2017

Form No. T.NACO/ST/15/00442/11459  
Date of Issue: 16th June 2016  
Fee Received: KSh 1000



*George Mbura Murugi*  
Director General  
National Commission for Science,  
Technology & Innovation

**CONDITIONS**

1. You must report to the County Administrator and the County Education Officer of the area before conducting your research. Failure to do this may lead to the cancellation of your permit.
2. Government property will not be used without written prior approval.
3. No individuals should be used unless it has been approved.
4. If you wish to change any condition of this permit, you must first get the approval from the relevant Government Department.
5. You are required to submit a report from the County Education Officer to the County Administrator.
6. The Government of Kenya reserves the right to modify the conditions of this permit according to circumstances without notice.

  
REPUBLIC OF KENYA  
  
National Commission for Science,  
Technology and Innovation  
**RESEARCH ADVANCE  
PERMIT**  
Date: 16/06/2016  
Signature: \_\_\_\_\_

### APPENDIX VIII: MAP OF TANA DELTA SUB-COUNTY

