

**EFFECT OF SAND HARVESTING ON PUPILS' LEARNING IN PUBLIC
PRIMARY SCHOOLS IN KENYAWA DIVISION, KAJIADO COUNTY, KENYA**

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**A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF
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UNIVERSITY**

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DECLARATION

I declare that this document and the research it describes are my original work and that they have not been presented in any other university for academic work

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This research was conducted under our supervision and is submitted with our approval as
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Signed: _____ **Date:** _____

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DEDICATION

I dedicate this thesis to God who is the author and finisher of our faith, my beloved wife Sylvia Kisipan and our two daughters, Jerusha Simayiai and Patience Nashilu. I also dedicate it to my mother and father, my sisters and brothers who without their understanding, encouragement, inspiration and love, the completion of this work would not have been possible.

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ABSTRACT

Despite the national and county governments' effort to control sand harvesting through issuance of guidelines and occasional banning of harvesting, the practice has persisted. Pupils at primary school are among the harvesters who motivated by the ready cash, are depleting the resource with far reaching ramifications. The purpose of the study was to investigate how sand harvesting has affected pupils' learning in public primary schools in Kenyawa division, Kajiado East sub-county, Kajiado County. The study objectives were to establish the effect of sand harvesting on pupils' school attendance, to examine the effect of sand harvesting on pupils' academic performance and to assess the effect of sand harvesting on pupils' physical learning environment in Kenyawa division. The study was premised on the classical liberal theory of equal opportunity as advanced by Horace Mann. The study adopted ex-post-facto research design. The study targeted 50 head teachers, 304 teachers and 1496 class seven and eight pupils. Fifteen head teachers, 30 teachers and 150 pupils were sampled for the study. Data collection instruments included class teachers' questionnaire, pupils' questionnaire and head teachers' interview schedule. Pilot testing was done in the neighbouring Mashuuru division. Content validity of data collection instruments was ascertained through pilot testing and by availing the instruments to two University supervisors. Reliability of the instruments which had mainly qualitative items was ascertained by ensuring the instruments' credibility, dependability, transferability and confirmability. The study found that about 30% of pupils in public schools in Kenyawa division are immersed in sand harvesting. The practice takes part mostly at night and weekends. The practice has led to pupils' chronic absenteeism, truancy and low concentration in school. Overall, the mean attendance of the pupils not involved in sand harvesting was found to be significantly higher ($t = -10.8$, $df = 153$, $p < 0.05$) than those involved. The mean mark of all sampled pupils (regardless of gender) not involved in sand harvesting was found to be significantly higher ($t = 10.6$, $df = 153$, $p < 0.05$) than those involved. Uncontrolled sand harvesting has led to wanton environmental degradation, such air pollution and noise pollution. It was also found that, the noise levels in six schools' environment were significantly greater than the safe threshold of 85 dBA ($p < 0.05$). The study recommends that, a concerted effort by all stakeholders to ensure more children in upper classes are in boarding schools in order to reduce the possibility of joining the sand harvesting business.

LIST OF ABBREVIATION AND ACRONYMS

EFA	Education for All
FAWE	Forum for African Women Educationalists
FPE	Free Primary Education
ILO	International Labour Organization
IPEC	International Programme on the Elimination of Child labour
KCPE	Kenya Certificate of Primary Education
MOE	Ministry of Education
MOEST	Ministry of Education Science and Technology
NEMA	National Environment Management Authority
NGO	Non-Governmental Organization
NSHG	National Sand Harvesting Guidelines
TIQET	Totally Integrated Quality Education and Training
UFPE	Universal Free Primary Education
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
WFCL	Worst Forms of Child Labour

OPERATIONAL DEFINITION OF TERMS

The following terms are operationalized for use on the study:

Academic Performance: refers to the mean mark attained termly in all subjects

Attendance – refers to the actual presence of a pupil in school during school days

Attendance Percentage – The number of days a pupil has attended school over the total number of days pupils were expected to be in school in accordance with Ministry of Education.

Child Labour: refers to the employment of children in any work that deprives children of their childhood, interferes with their ability to attend regular school, and that is mentally, physically, socially or morally dangerous and harmful. In this study pupils' sand harvesting is considered as child labour

Cohort: refers to a group of pupils entering a particular level of education at the same time, same grade or stage between initial and final grade.

Drop out: refers to those students who leave school before the completion cycle in which they enrolled.

Retention: refers to the ability of pupil to start a course and complete it

Pupils' Learning: refers to pupils' knowledge and skills acquisition through activities within and outside the classroom in a school environment. In this study, it is conceptualized in terms of attendance, academic performance and teaching environment

Pupils' School Participation: refers to pupils' school attendance and participation in Class learning activities, extra curriculum activities, administration and any other activity in the school curriculum

Sand harvesting: refers to the removal, extraction, harvesting or scooping of sand from its source

School Completion: refers to completing a prescribed course of study for a given level of education. It is done by tracking a cohort of students who enroll at a certain point up to the time they exit the system of education having undergone the complete cycle.

Truancy - unexcused chronic absence from school

CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Introduction

Chapter one covers the background of the study, statement of the problem, the purpose of the study, the objectives of the study, research questions, the study hypotheses, significance of the study, scope, delimitations, limitations and assumptions of the study. The chapter closes with a description of the study theoretical framework and conceptual framework.

1.2 Background of the Study

The United Nations Education, Social and Cultural Organization (UNESCO) (2014) observes that education is a basic human right recognized since adoption of the Universal Declaration of Human Rights in 1948. In protection of this fundamental right, several international and national bodies have also enacted laws and legislations geared to enhance children participation, retention and completion of basic education. However, the enacted legislations and laws notwithstanding, learners' participation, retention and completion of basic education has remained a challenge in many countries. In a similar observation, Rena (2009) posit that the increase of the number of pupils enrolled in schools since the adopted Education for All (EFA) and Free Primary Education (FPE) in many countries is normally at variance with the number of pupils who attend classes on daily basis.

The International Labour Organization (2012), attributes the prevalence of the poor participation in education to mainly child labour. The academic achievement of children who combine work and school often suffers and more so there is a strong tendency for these children to drop out of school and enter into full-time employment. Child labour refers to the employment of children in any work that deprives children of their childhood,

interferes with their ability to attend regular school, and that is mentally, physically, socially or morally dangerous and harmful (ILO, 2012).

In most countries, child labour is considered as work undertaken by children in the age group of 5-17 that prevents them from attending school and inhibits their general growth and development (Mutiso, 2012). Cunningham and Viazzo (2015) aver that child labour has existed to varying extents, through most of history. They observed that many children aged 5–14 from poorer families still worked in United States of America, Europe, and in various colonies of European powers during 19th and 20th centuries. These children mainly worked in factories, agriculture, home-based assembly operations and mining. Some worked night shifts lasting 12 hours. However, the incidences of child labour fell with the rise of household income, availability of schools and passage of child labour laws.

Statistics by United Nations International Childrens Education Fund (UNICEF) show that one in four children in the world's poorest countries, around are engaged in child labour. The highest number (29 percent) living in sub-saharan Africa (UNICEF, 2013). Worldwide agriculture is the largest employer of child labour. UNICEF statistics further show that the vast majority of child labour is found in rural settings and informal urban economy. In these areas children are predominantly employed by their parents, rather than factories. Poverty and lack of schools are considered as the primary cause of child labour.

Pupils' participation in sand harvesting to the extent of not only compromising their health but also interfering with their school participation qualifies to be a form of child labour. The National Environment Management Authority (NEMA) (NEMA, 2007) defines sand as sedimentary material finer than gravel and coarser than silt with grains between 0.06mm and 2mm in diameter and includes stones, coral, earth and turf but does not include silica

sand. Globally, the demand for sand and gravel continues to increase due to rapid urbanisation and the need for sand based products. For instance, the global trade value of stone, sand and gravel imports for the year 2010 was estimated to be \$40.3 billion with China, Singapore, Italy, Germany and the Netherlands being the highest importers, respectively (United Nations Commodity Trade Statistics Database, 2010).

Kavilu (2016) observes that in Kenya, the booming construction industry especially in Nairobi city and its environs, has put unprecedented demand of sand and concrete. This has prompted the sand dealers to exert pressure on sand producing areas of Machakos, Kitui, Makueni and Kajiado to increase their supplies. Subsequently, people from these semi-arid counties have embraced the sand trade as a source of quick money where in some cases all family members are enlisted. Studies by Mutiso and Orodho (2014), Muendo (2015) and Gitonga (2017) showed that pupils were highly involved in sand harvesting activities leading to extreme exhaustion and lack of concentration in school activities. It was further noted that sand harvesting took place early in the morning before school, during school hours, evening, at night and over the weekends.

The effects of uncontrolled rapid sand harvesting has been the subject of focus by media, researchers, and county and national government governments. This has been due to the environmental degradation, child labour and the occasional bloody conflict between the community conservationists and sand merchants. A comment by Kavilu (2018) on a certain media exemplifies the growing concern:

...This God-given treasure that floods large and small river beds in the lower eastern Kenya region today enriches only a few. The fabled white gold is leaving in its wake rich deposits of drugs that destroy the lives of youngsters who ought to

be in school. The little money that trickles down after rich middlemen have pocketed their share goes back to the nabobs who peddle drugs to the impressionable youths, turning them into zombies and cheap hirelings for crime. Delinquency blossoms. Because they are not strong enough to load sand onto lorries to put money into their pockets, women resort to using their bodies and flood the area with unwanted babies fathered by the drug-soaked lads. The incidence of HIV/AIDS is up due to careless sex. It is a vicious cycle as the white gold breeds poverty rather than wealth for the locals, under the very nose of the authorities.

Kenyawa division is one of the regions undergoing heavy sand harvesting in river bends, river banks and on land. However, Kenyawa division sand harvesting activities have been less publicized. Incidentally, the neighboring Kasikeu Division of Kilome Sub County, about nine kilometres off Sultan Hamud on the Nairobi/Mombasa highway, has been much publicized following a bloody confrontation in December 2012 pitting sand harvesters against folks defending the commodity on Mwangini river (Ombuor, 2015). Additionally, while several studies on effects of sand harvesting on environment and pupils' education have been conducted in Machakos, Kitui and Makueni counties (Mutiso & Orodho, 2014; Muendo, 2015; Gitonga, 2017), there is a dearth of studies on sand harvesting in Kajiado County and more so in Kenyawa Division.

According to Kajiado County school census report of 2016, Kenyawa division was singled out as having many public primary schools posting erratic and dismal KCPE performance, declining enrollment and retention rates (MOEST, 2016). Additionally, the report noted the relatively high cases of pupils' chronic absenteeism and health related issues. This created the impetus for the current study. The report further showed that Kenyawa education zone recorded a mean mark of 256.5 in 2011, 258.4 in 2012, which dropped to

255.9 in 2013, then to 234.23 in 2014 and dropped drastically to 225.3 in 2015. Enrolment rates have also been recording significant decline as seen in Table 1.1.

Table 1.1: Primary School Enrollment, Retention for Boys and Girls

Class	2012	2013	2014	2015	2016
1	1770	1780	1789	1640	1637
2	1700	1725	1780	1754	1715
3	1600	1700	1780	1600	1617
4	1250	1279	1740	1830	1804
5	1200	1645	1620	1590	1634
6	890	845	950	1399	1403
7	1356	1350	840	900	800
8	950	912	880	802	790

Source: MOEST, 2016

From Table 1.1, it can be deduced that enrollment of children at lower level is high and declines as one progresses to higher levels in the academic ladder. For instance, the table shows that in the year 2014, 1620 pupils were enrolled in class 5, in 2015, the number of pupils of same cohort who were in class six were 1399 representing a decline of 14 percent, in the year 2016 the same cohort in class seven shows the number has decreased further to 800. This implies that within a three year period, enrollment of the cohort had declined by 46 percent thus signifying higher wastage rates. Therefore, a critical analysis of the table 1 shows that the challenges of educational participation, retention and completion exist in Kenyawa division public primary schools.

1.3 Statement of the Problem

Education serves as the means to bring about the desired change in society, to develop a generation of virtuous individuals and to contribute to the development of the society (Kimani & Kombo, 2010). In cognizance, the Kenyan government has enacted several legislations and laws to ensure every child receives quality basic education. For instance, the constitution of Kenya 2010 (Republic of Kenya, 2010) stipulates that every child has the right to free and compulsory education and in addition, every child has the right to be protected from abuse, neglect, harmful cultural practices, all forms of violence, inhuman treatment and punishment and hazardous or exploitive labour.

However, despite the government effort, pupils' participation, enrollment, retention and performance in Kenyawa division, Kajiado County has been on a downward trend. Kenyawa is one of the regions in Kenya experiencing intensive sand harvesting. Owing to the fact that the past studies done in other sand harvesting regions in Kenya found existence of rampant child labour and degradation of the environment albeit the existence of the NEMA (2007) National Sand Harvesting Guidelines, the researcher embarked on investigation of the effects of sand harvesting on pupils education.

1.4 Purpose of the Study

The purpose of the study was to investigate the effect of Sand harvesting on pupils' learning in public primary schools in Kenyawa division, Kajiado East sub-county, Kajiado County, Kenya.

1.5 Objectives of the Study

The study will be guided by the following objectives:

- i. To establish the effect of sand harvesting on pupils' school attendance in school in public primary schools in Kenyawa division, Kajiado County, Kenya.
- ii. To examine the effect of sand harvesting on pupils' academic performance in public primary schools in Kenyawa division, Kajiado County, Kenya.
- iii. To assess the effect of sand harvesting on pupils' physical learning environment in, Kenyawa division, Kajiado County Kenya.

1.6 Study Questions

- i. What is the effect of sand harvesting on pupils' participation in school in public primary schools in Kenyawa division?
- ii. What is the effect of sand harvesting on pupils' academic performance in public primary schools in Kenyawa division?
- iii. What is the effect of sand harvesting on pupils' physical learning environment in public primary schools in Kenyawa division, Kajiado County?

1.7 Significance of the Study

Oso and Onen (2009) aver that significance of the study refers to the relevance of the study in terms of academic contributions and practical use that might be made of the findings. It shows how the research benefits or impacts others in part or whole. It also highlights the contributions of the research to other researchers, practitioners and policy makers.

The study findings are expected to be of use to teachers, head teachers, school board members, parents, Quality Assurance Standards Officers (QASOs), Teachers' Service

Commission (TSC), Ministry of Education Science and Technology (MOEST), NEMA, Nongovernmental Organizations (NGOs) and other researchers in the same field. The study findings on the extent to which pupils are involved in sand harvesting in terms of frequency and times of the activity will be a wakeup call to teachers and head teachers and who may use the report to appeal for construction of more boarding facilities to contain the prevalence. Additionally, this information would be an appraisal of the effectiveness of the different policies and guidelines as formulated by both NEMA and county government of Kajiado to guide the sand harvesting sector. For instance NEMA (2007) National Sand Harvesting Guidelines, prohibits persons of under 18 years of age to get involved in sand harvesting, restricts harvesting hours to 6am to 6pm and prohibits sand harvesting, extraction or scooping from river banks.

The study findings on the part played by the house hold involvement in sand harvesting as the main economic activity on learners school chronic absenteeism would provide insight to MOE, TSC and other concerned government bodies on the prevailing low participation, retention and completion rates despite a relatively high enrollment rate. The study findings on the state of learning physical environment and the implications to all the learners and teachers may be instrumental to not only to NEMA but also to various NGOs dealing with environment and child education. The findings may guide them in putting in place measures to promote conducive learning environment. The study finding may also be of valuable use to other researchers venturing in child labour in sand harvesting and its implication in education.

1.8 Scope of the Study

The scope of the study is the geographical area within which the study will be operating (Marylin & Goes, 2013). The study was conducted in Kenyawa division, Kajiado East Sub

County, Kajiado County. Kenyawa division has a high concentration of schools in areas where sand harvesting is done and is probably the most affected by sand harvesting process and other retention hindering activities.

1.9 Delimitations of the Study

The delimitations of the study are the boundaries set by the researcher by conscious exclusionary and inclusionary decisions in regard to the subject of interest (Simon & Goes, 2014). Delimitations are within the researcher's control. Though there are many factors that may affect pupils' education in Kenyawa division, the current study was delimited to the effects of sand harvesting on pupils' education. Sand harvesting was the main economic activity in the region affecting almost all homes directly or indirectly. Specifically, the study looked into sand harvesting and pupils' school attendance, academic performance and learning physical environment.

1.10 Limitations of the Study

Limitations refer to potential weaknesses in the study that are not within control of the researcher (Kombo & Tromp, 2006). This study made inquiries into matters that were sensitive to teachers, head teachers and learners. Some learners new about the NEMA (2007) guidelines on sand harvesting that prohibited activities at night and that those under 18 years old should not take part in sand harvesting. Besides the NEMA caveats, pupils knew that most head teachers, teachers and provincial administrators were against pupils working at night and during school time in order to excel in their scholarship. It was therefore, tricky for the pupils to give the details about their sand harvesting activities. However, the researcher in the company of the sampled pupils' class teachers talked to the sampled pupils on at least two occasions and assured them of the nature of intended

research and that the furnished information will be treated with utmost confidentiality. Similarly, head teachers were also found to hesitate in commenting about child labour in their schools catchment areas. Though, their information on child labour was of incriminating nature, their anonymity was assured. Further, some head teachers declined to be audio taped during the face to face interviews, thus prompting the researcher to hand write the information. Subsequently, the researcher could not note some of the information.

1.11 Assumptions of the Study

Assumptions in a study are things that are somewhat out of researcher's control, but if they disappear the study would become irrelevant (Simon, 2011). Leedy and Ormrod (2010) posited, "Assumptions are so basic that, without them, the research problem itself could not exist" (p. 62). It was assumed that the class teachers had a close interaction with the pupils and their parents so as to know each student family economic base and other challenges pertinent to pupil's education. Further, the study assumed that both teachers and head teachers had a general view of sand harvesting, the positive and negative effects and that they have travelled around to have noted the change in river flow, riparian region and the anthropogenic around the wetlands. In doing so, they were expected to give informed responses to the study questions. The study also assumed that all pupils in Kenyawa public primary schools had equal to exploit their talents in academics and other areas.

1.12 Theoretical Framework

The theoretical framework accounts for or explains phenomena and tries to clarify why things are the way they are based on theories (Kombo & Tromp, 2006). They further explicate that theoretical framework enables the researcher to conceptualize the topic in its entirety as an outgrowth of the larger society. Thus, the researcher is enabled to

acknowledge the problem from a wider objective perspective and not from a narrow personalized self-interest and prejudiced stance.

The study was premised on the classical liberal theory of equal opportunity as advanced by Horace Mann (Coombs, 1988). According to the classical liberal theory of equal opportunity, each person is born with a given amount of capacity which to a large extent is inherited and cannot be substantially changed. Mann felt that a common school would be the “great equalizer” and advocated for a school and education system where participation would be determined on the basis of individual merits and not socio-economic background, gender, geographical barriers and policies (Coombs, 1988). Thus, governments should strive to improve their citizens’ social economic status so as to reduce incidences of child labour which denies them the chance to exploit their in born capacity.

This theory was found relevant for this study because by reducing the factors that inhibit pupils’ school participation and performance such as sand harvesting, the conducive conditions can be created to implement the vision of equal opportunity where all children have access to the kind and amount of education suitable for their inherited capacity.

1.13 Conceptual Framework

Gregory, Lumpkin and Marley (2005) regards a conceptual framework as a tool that assists the researcher to elaborate knowledge and perception of the condition under examination. They further contend that when evidently expressed, a conceptual framework has a potential value as a tool to assist a researcher to make meaning of successive findings. It forms part of the scrutinized plan for negotiation and it is reviewed and improved as a result of investigation.

Figure 1.1 shows the study conceptual frame work. The conceptual framework depicts the interrelatedness of independent variable (sand harvesting) and the dependent variables (pupils’ school participation, pupils’ academic performance and pupils learning physical environment).

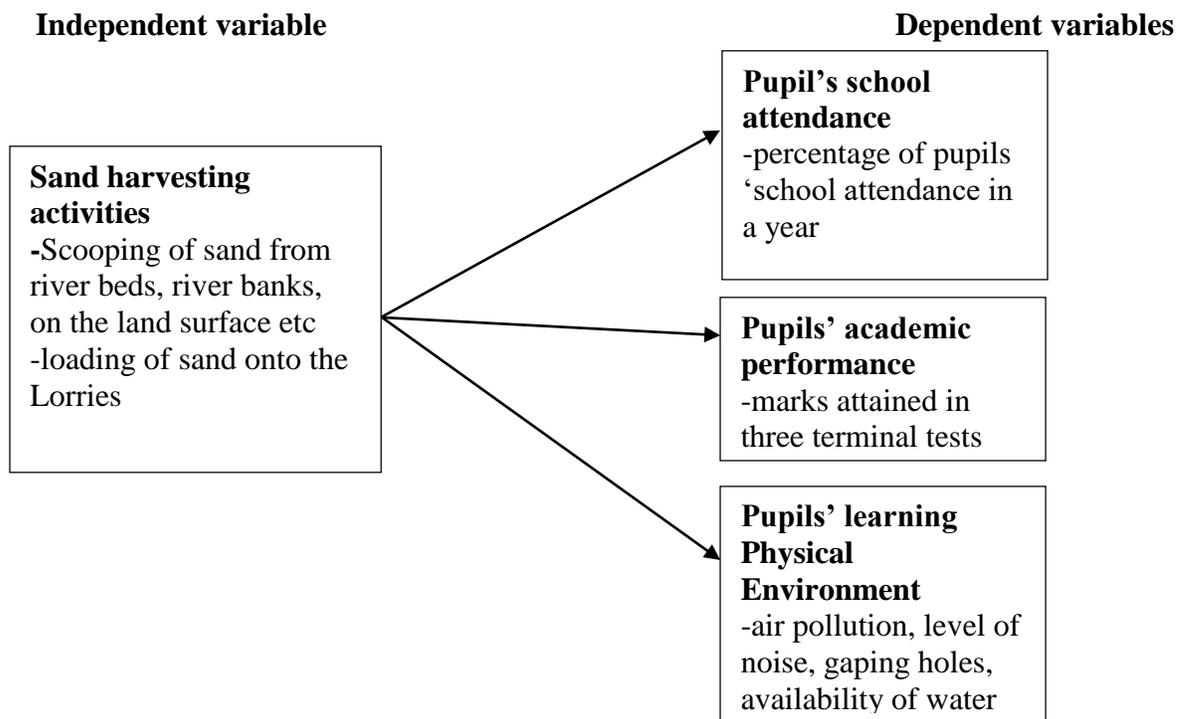


Figure 1.1: Conceptual Framework Showing the Envisaged Interplay between Sand Harvesting and Pupils’ Learning

As shown in Figure 1.1, sand harvesting was conceptualized to have an effect on pupils’ education in terms of participation in school, pupils’ academic performance and pupils’ learning physical environment in Kenyawa division. Participation of pupils’ in sand harvesting whether as family work or commercial was considered as form of child labour particularly when it interfered with school attendance, concentration in school work and when the participants were under 18 years of age.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the review of the relevant literature in view of the research problem. The chapter was organized in accordance to the study objectives. The review was undertaken in order to eliminate duplication of what has been done and provide a clear understanding of existing knowledge base in the problem area. The literature review was based on authoritative, recent, and original sources such as journals, books, UN agencies publications, MOEST and other government bodies' policies, thesis and dissertations. Specifically, the chapter reviews literature on global and regional sand harvesting implications on environment, education and the community social economic development. However, the literature review commences with a treatise of the concept of child labour. The chapter closes with the summary of the reviewed literature and research gaps.

2.2 Concept of Child Labour

Isah (2013) observes that over time, there has not been a universally accepted definition of child labour and therefore there are many definitions. Child labour is a complex phenomenon and has been found to take place along a continuum in that at one end of the continuum, child labour is beneficial, promoting or enhancing a child's physical, mental, spiritual, moral or social development without interfering with schooling. At the other end of the continuum, child labour is palpably destructive or exploitative. This implies that a broad definition of child labour should include the beneficial aspect while the narrow definition includes negative aspects only. Moyi (2012) is of the view that by defining child labour as economic activity researchers fails to capture the large number of children

contributing to the upkeep of the household at the expense of school and social development.

The International Labour Organization (ILO) (2002) defines child labourers as children between 5-11 years of age who are economically active; work in an economic activity for 14 or more hours per week, and children between 12-17 years of age engaged in hazardous work. The definition by the ILO is derived from two conventions, Convention 138 on the Minimum Age for Admission to Employment and Work, which sets the minimum working age at 15 years and Convention 182 on the Worst Forms of Child Labour, which focuses on the worst forms of child labour. UNICEF (2013) on its part has a broader definition of child labour. It defines child labour as work that exceeds 1 h of economic labour or 28 h of domestic labour for children, 5 –11 years or 14 h of economic labour or 28 h of domestic labour for children, 12 – 14 years, and 43 h of economic labour for children, 15 – 17 years. This definition expands the ILO definition but also has limitations. It assumes that 28 h of domestic chores per week do not interfere with school attendance.

From the two definitions of child labor, duties assigned to children as part of upbringing, constitutes child labour, even though there is a thin difference between the duties assigned by parents and child exploitation. Children exploitation can be defined as a situation where a child assumes the role of an adult, thus offering the services as does an adult in exchange of payment (ILO/IPEC, 2001). Ordinarily they are working under conditions designed for adults, which leads to damage on their growth as their bodies are not mature enough to withstand such condition.

The most common explanation for the child labour is poverty. The poverty hypothesis assumes child labour is inevitable in poor households; they cannot survive without

children's income contribution. These households are vulnerable to income shocks and cannot afford to keep children in school and in other non-work activities. Admassie (2012) asserts that poverty is the main, if not the most important factor compelling parents to deploy their children into work obligations. Fallon and Tzannatos (2008) concurs that child labour is a consequence of persistent poverty and that child labour decreases as the income and resources of households increase. Indeed child labour perpetuates poverty across generations since parents who were child workers have a higher probability of sending their children to work (Emerson and deSouza, 2000). This vulnerability forces them to send children to work to reduce the potential impact of loss of family income due to poor crop yields, job losses, the death of a bread winner to mention a few. Therefore, school and other non-work activities are viewed as luxury activities, only consumed when incomes rise sufficiently to cover household costs (Jensen & Nielsen, 2007). However, the poverty argument has been questioned since a study done in Ghana and Pakistan by Bhalotra and Heady (2003) found that household's with greater land holdings tend to make their children work more and yet large land holdings would mean greater wealth and therefore poverty does not lead to more child labour.

The poor quality of the educational system and the low salaries and poor working conditions of the teachers (Kim, 2011) are also noted as other socio-economic factors that can drive the family to force their children to work. Other aspects that is not strictly economic, such as the educational level of parents, the number of people that live in the home, the birth order of each child or the existence of polygamy (Omokhodion & Ochendu, 2009), also act as either causal or predisposing elements for incorporating children into the workforce. Moreover, Mukherjee and Das (2008) note that among those parents with greater educational levels, there is a lower frequency of their children engaging in manual

labor. This finding is probably due to their awareness of the negative effects of child labor on the child's development. Pedraza and Ribero (2006) found that when the head of the family was the mother, the children and teenagers were exclusively dedicated to studying, unlike those cases in which the head of the family was the father. They conclude that an exchange between the decision to working or study apparently exists among children. That is, there is a change, in varying degrees, among youth from the educational context to that of labor, as there can be cases where both activities are carried out simultaneously.

Manda et al., (2013) in concluding therefore is of the view that whether or not a child works depends not only on the income of the household in which they reside but also their status within the household. A child's age, gender, birth order, and relationship to the head of household also affect this decision. This is because older children are more likely to work because they are more physically developed, can obtain higher wages, and face higher schooling costs.

Child labor generates negative effects that hinder the child's cognitive, emotional and social development (Amar et al., 2008). Many of these child laborers are in a critical period of their psychosocial development during which key aspects of their personality and social behavior, such as self-esteem and self-concept, are being molded and defined. In a school set-up, the relationship with peers, and the family environment are all factors that can affect the formation of these key personality concepts (Omokhodion et al., 2006). Similarly, child labor makes adequate child and youth inclusion in the educational system difficult because the time of work takes away from the time allocated to studies and that the attention to academic activities is reduced, due to the fatigue produced by the labor (Sabia, 2009). In particular sand harvesting as a form of child labor affects the children school enrollment,

transition of primary to secondary schools, student completion rates and the students' academic performance.

The International Programme on the Elimination of Child labour (IPEC) an agency of ILO (ILO-IPEC, 2017) provided some global estimates on child labour (2012-2016). Some of these statistics include: Worldwide 218 million children between 5 and 17 years are in employment. Among them, 152 million are victims of child labour; almost half of them, 73 million, work in hazardous child labour. In absolute terms, almost half of child labour (72.1 million) is to be found in Africa; 62.1 million in the Asia and the Pacific; 10.7 million in the Americas; 1.2 million in the Arab States and 5.5 million in Europe and Central Asia. In terms of prevalence, 1 in 5 children in Africa (19.6%) are in child labour, whilst prevalence in other regions is between 3% and 7%: 2.9% in the Arab States (1 in 35 children); 4.1% in Europe and Central Asia (1 in 25); 5.3% in the Americas (1 in 19) and 7.4% in Asia and the Pacific region (1 in 14). Boys constitute 58% of all children in child labour and 62% of all children in hazardous work. Boys appear to face a greater risk of child labour than girls, but this may also be a reflection of an under-reporting of girls' work, particularly in domestic child labour. Child labour is concentrated primarily in agriculture (71%), which includes fishing, forestry, livestock herding and aquaculture, and comprises both subsistence and commercial farming; 17% in Services; and 12% in the Industrial sector, including mining.

Another research by Anadolu Agency (AA) (2013) indicated that about 48 million children are engaged in child labour in Sub-Saharan Africa. Further, the global estimate by AA (2013) shows that sub-Saharan African countries are lagging behind in terms of eliminating child labour issues. Thus there is a need for more research studies in regard to child labour in Sub-Saharan Africa with a view to minimizing the prevalence of child labour.

2.3 Sand Harvesting and Pupils' School Attendance

Mensah (1997) cited in Salifu (2016) describes sand mining or harvesting as the practice of extracting sand mainly through an open pit or as the removal, extraction, harvesting or scooping of sand from the site. Sand and gravel constitute the largest volumes of all materials that are mined in various parts of the world. Steinberger, Krausmann and Eisenmenger (2010) observe that, of the 59 billion tonnes per year global estimate of all materials mined, gravel and sand make up the largest portion ranging between 68 and 85 percent. Since time immemorial, sand and gravel have been exploited to aid in the construction industry. Due to rapid urbanization in most parts of the world, the demand for sand and gravel continues to increase. However, as noted by the United Nations Environment Programme (UNEP) (2014), while sand has the ability to replenish itself, the extraction rates in most sites are far greater than their renewal increasing the possibilities of complete depletion.

Sand harvesting has been providing a live hood for many people all over the world. United Nation department of social and economic affairs (2003) cited in Muendo (2015) estimated that in Africa alone, 20 million people depend on sand harvesting activities for subsistence and placed the figure by then at 100 million people worldwide who depend on sand harvesting for survival. ILO (1999) estimated that there were about 30 countries worldwide which depended on the sector for their livelihood.

Owing to the fact that some form of sand harvesting do not require initial heavy investment, in some instances one only needs a bucket with which to scoop the material, many families have adopted the practice as the main live hood (Muendo, 2015). This implies that all members of the family must contribute either in scooping, gathering or loading into the

transporting vehicle. In Ghana, Mensah (2002) noted that sand harvesting was causing child labour of children aged 14 yrs as they assisted their mothers in sand harvesting.

Pupils' School Participation entails the pupils' school attendance and participation in Class learning activities, extra curriculum activities, administration and any other activity in the school curriculum. The relationship between school participation and child labour is generally perceived to be negative. Child work interferes with schooling because balancing the demands of work and education places physical and psycho-social strain on children and often leads to low school participation, poor academic performance and dropping out (Alpha & Karim, 2016). Pupils involved in work such as sand loading expends a lot of physical energy, such that learners lack the energy required for school attendance or effective study. As a result of fatigue and a lack of leisure activities to support physical, social and emotional development, the child will experience very little mental stimulation and will end up neglecting his or her studies (Binder & Scrogin, 1999). For instance, a study by Akabayashi & Psacharopoulos (1999) found that a child's reading and mathematics ability decreased with additional hours of work, whereas they increased with additional hours of school attendance and study. Similarly, Ray & Lancaster (2003) investigated the effect of work on the school attendance and performance of children in the 12-14 year age group in seven countries, particularly in terms of the relationship between hours of work and school attendance and performance. They concluded that hours spent at work had a negative impact on education variables, with the marginal impact weakening at the higher levels of work hours.

Dyer (2012) notes that in the most of the cases, child labor makes adequate child and youth inclusion in the educational system difficult because the time taken by work takes away the time allocated for studies and that the attention to academic activities is reduced, due

to the fatigue produced by the labor. He further lament that the time taken by the child labor practice in the children schooling time has not been adequately considered in the literature, the impact of labor on variables related to education have barely been taken into account.

Rosati and Rossi (2013) are of the view that in the literature, the amount of time that the child devotes to labor or the moment of the day or week in which s/he is dedicated to labor and the impact of labor on variables related to education will affect school enrollment. They gave an example that if a child is engaged only during the weekend, then chances are high that the child will be going to school during the week days as opposed to a child that works during the weekdays. For Sabia (2009) attending school and working are decisions that are usually considered simultaneous as a family and therefore the number of hours the child devotes to work is one of the fundamental variables for evaluating the child's wellbeing.

Buonomo (2011) opine, however, that school attendance is an indicator that does not sufficiently explain the impact of child labor, as it does not take into account the quality of the child's experience in school. In an earlier study, Jensen and Nielsen (2007) found that among child laborers in Zambia, only 2 percent of the minor participants mentioned labor as the reason for abandoning studies. Consequently, it is necessary to consider other variables associated with schooling to adequately evaluate the impact that child labor can have on those variables, such as the aforementioned years of schooling or age-academic grade ratio. Sabia (2009) conclude that though a relationship between child labor and school enrollment may exist, especially other factors such as gender, income level or number of members in the family are considered, these factors only provide an indirect measure of the educational consequences of the child's involvement in labor activities.

The first influence of sand harvesting on transition and retention is the problem of school dropout before achieving the desired goal in progression to the other level. Most of the school age going students discontinued their studies to engage in economic activities that provide short-term financial gains. Many children search for employment due to economic reasons and also the cost of schooling (Dube, 2011). Costs associated with education: simple school levies, reference books, uniforms and others, are additional burden for a needy family and they may pull a child out of school. Education may also not be prioritized, particularly if there is little evidence that education leads to employment. As most child laborers come from low earning backgrounds where they are denied access to education and have few alternative safe employment options, their ability to break the cycle is limited.

Nomadic pastoralism among parents in ASAL areas in search of greener pastures and the nature of sand harvesting, has been shown to be both positively and negatively associated with pupils' school participation. Migratory experiences of family members and relatives can minimize school attachment and the absence of a family member can increase the labor burden at home (Meza & Carla Pederzini, 2008). In addition, the migration of family members can create a "culture of migration" where kids devalue schooling with anticipation of migrating themselves. Conversely, migration may have positive effects on reducing dependency on sand harvesting income. Thus, families are able to diversify their sources of income, while children benefit from mobile schools.

Fry (2008) is of the view that as children age, the costs of attending school increase for the child and the family. Children become more capable of contributing household labour or entering the formal labour market. The likelihood of dropout increases as the curriculum becomes more difficult and pupils feel they earn their living without the struggle at school. Thus, dropout rates are expected to increase as children age.

Watson (2008) conducted a study on the impact of child labour on the educational achievement of 12 year old children in Vietnam. The aim of the study was to establish whether child labour had an important effect on the total hours of extra classes attended per week and whether there was a work schooling trade-off. Secondly, the study examined whether child labour had a negative impact on the educational attainment of the children by making them perform poorly in school due to fatigue. Using regression methods, the study found that labour work was not significantly impacting on enrolment and school participation and that there was little trade-off between classroom hours and work. Therefore, it was not surprising that child labour was not negatively impacting on educational attainment. It was concluded that children who engage in moderate levels of child labour are inclined to benefit from the work experience. Also, moderate amount of work in safe conditions can enhance development of useful skills and sense of responsibility among children. Further, the child may value their education more if they have to work to in order to cater for their school fees and other personal costs.

ILO (2009) identifies three fundamental dimensions of child labor that negatively affect the minor's educational experience. On one hand, the conditions in which the labor is carried out, taking into account the worse forms of child labor, the quality of the labor performed and the subjection to situations that involve a physical or psychological risk to the minor, result in a clear negative impact on their general development and, specifically, on their academic performance in the educational context. Rosati and Rossi (2003) suggests that it is not the type of activity performed but the conditions under which the activity is performed that are important, even if taking into account that certain types of labor can entail worse working conditions. In addition, as mentioned by Rosati and Rossi (2003) and Akabayashi and Psacharopoulos (1999), the intensity of child labor, measured by the time

dedicated to the work, is an important variable when considering its impact on academic performance.

The third significant variable for the model was the presence of work in the morning. It is in this case that the competition between the working day and the school day is more probable. Several authors have noted that the moment of the day in which the work is performed can have a differential impact on the working minor (Sabia, 2009). Performing labor activities in the morning, a time during which school activities are usually scheduled in the majority of the contexts, produces an immediate effect on the minor's absence from school when it coincides with school hours and therefore affects the indicators included in the academic performance factor. It is worth highlighting that the presence of labor in the afternoon or at night was not significant variables for the final model. In this sense, the majority of the intensive labor is carried out in the morning schedule, and in those cases (of less frequency) in which the labor is performed in the afternoon or at night, in addition to not affecting school attendance, this labor usually involves housework or specific assistances in other jobs.

Watson (2008) study findings were contrary to Dyer (2012) who had noted that child labour affected school participation. The finding was however, in support of several other studies (Buonono, 2011; Rosati & Rossi, 2013; Sabia, 2009) whose findings are deviating from a long held general consensus that global returns from the elimination of child labour would be enormous, albeit lack of adequate empirical support. However, Watson study, was done in Vietnam which according to World Bank (2014) is has attained middle income economy and as such its demographic variables are different from most of the Sub Sahara Countries.

Lesanayo (2014) conducted a study on the impact of child labour on pupils' enrolment, retention and KCPE performance in selected primary school in Kilifi County. The study found that most of the pupils were engaged in mostly unpaid family related work such as grazing, building houses, fishing, fetching water, household chores, cutting stones in the quarry, feeding chicken, fetching fire wood, hawking, washing clothes, weeding, cooking and tilling the land. In order to accomplish these tasks some of the pupils had to miss school resulting lack of continuity, lack of interest in school work and stagnation in one class. Most of the respondents (pupils and head teachers) indicated that most pupils were out of school to supplement the family income. As noted by Admassie (2012) poverty is the main if not the most important factor compelling parents to deploy their children into work obligations in most of the developing countries.

Muendo (2015) carried out a study on the socio-economic effects of sand harvesting in river Thwake, Kathiani division, Machakos County, Kenya. The study employed descriptive research design and involved 121 stakeholders in sand harvesting industry such as drivers, sand loaders, administration officers, teacher, and other community members. The objectives were to determine how sand harvesting activities have contributed to job creation; to find out the extent to which sand harvesting activities have improved living conditions among the people living in Kathiani Division; to determine whether sand harvesting activities have affected education among the children; and to determine how sand harvesting activities have affected accessibility of better health services among people living in Kathiani Division. Among other findings, most of the respondents indicated that, the proceeds from sand harvesting did not enable them to take their children to better schools, they were not able to afford text books and other learning materials for their children. The respondents further indicated that children who took part in sand harvesting

did poorly in school. The study also sought to establish whether sand harvesting contributed to use of drugs. Over 80% of respondents affirmed that drugs abuse amongst the youth including school children was on the increase after interacting with the labourers in sand industry. Thus, overall Muendo (2015), depicted a situation where sand harvesting in Kathiani had no substantial benefits to people in the region.

Muendo (2015) study was however, not exhaustive in gathering the pertinent information in regard to sand harvesting since it employed only one questionnaire for all respondents and which was almost 100% structured. Thus, the likert type responses of degree of agreement to statements and some yes/no type of responses could not generate the in depth overview about the variables in the study. In particular the study did not delve into the details of why, how and the extent to which child labour is entrenched in the sand harvesting sector. The current study embarked on establishing detailed information in regard to child labour in sand harvesting and its implications in education.

2.4 Sand Harvesting and Pupils' Academic Performance

Alfa and Karim (2016) posit that child labor activities and low school performance are the key issues affecting many African rural societies, as these two issues deter their future academic endeavors. According to ILO-IPEC (2017), children's participation in agricultural activities and other types of labour coupled with limited access to quality education do lead them to uncertain future.

The most visible element that is affected by child labor is the child academic performance. Researches in developing countries have found that the majority of child and youth laborers do not regularly attend school and the absence cause negative effect on their performance (Heady, 2006). However, in certain cases, a negative relationship between the number of

hours worked and the hours of school attendance has been found (Boozer & Suri, 2011). For example, Buonomo (2011) found that children who work below the median predicted by the proposed statistical model (up to two hours daily) demonstrated better schooling results (measured years in school, age-grade ratio, completion of elementary education, completion of at least one year of secondary education) than those children who only attended school. This finding indicates that while there is clear evidence of the negative impact of labor on the minor's education, a minimal devotion to labor does not seem to have a significant effect on the education of children and youth (Ray & Lancaster, 2013).

In reality, other characteristics such as performance in different subjects or failure of academic courses are related to academic performance and the intensity of the work affects the performance of children. In fact, in certain cases, it is shown that working minors also usually attend school (Admassie, 2012), suggesting that variables associated with academic performance are those that show us the impact of child labor on the minor's education (Buonomo, 2011). Furthermore, it is possible to take into account specific subjects or specific fields of the educational development that are differentially affected by child labor and its associated variables, for instance, mathematics and language (Orazem & Gunnarsson, 2004). However, the majority of these cases are based on the results of standardized tests that evaluate these fields, rather than on obtaining direct or indirect data on the performance of the child laborer in the educational center.

All in all, child labor seems to have a clear negative effect on academic performance. However, such an effect is far from homogeneous, and it cannot simply be associated with the presence or absence of child labor in the individual children. Such variables as the number of hours worked or the type of work are associated with the intensity of such effects and with schooling factors beyond just attendance. Therefore, it is pertinent to study the

effects that different variables of child labor have on various aspects of the minor's education in an attempt to clarify the real reach that such work has on the development of the minor and on his/her academic success and educational experience.

Bezerra, Kassouf and Arends-Kuenning (2009) conducted a study in Brazil aimed at establishing the impact of child labor and school quality on academic achievement of students in the 4th and 8th grades. The dependent variable was a standardized, multiple-choice exams designed to measure students' abilities and capacities in Portuguese (with a focus on reading comprehension) and Mathematics. In order to analyze the effect of child labor on student school achievement test scores, two estimation methods; the ordinary least squares (OLS) and two-stage least squares regression methods were used. The analysis took into consideration several factors and situations which are common in urban settings. The number of hours worked and the work conditions such as; student only works, studies and works only at home, studies and works only outside the home, or studies and works in both locations. This was necessary because the hours of work and work conditions determined the amount of time the students can spend on school activities. The researchers did control for the endogeneity of child labor using instrumental variable techniques, where the instrumental variable is the average wage for unskilled male labor in Brazil. The study found that child labor causes a loss in students' school achievement. Children who did not work had better school performance than students who worked. Further, the study found that up to two hours of work per day did not have a statistically significant effect on school performance, but student's achievement decreased on additional hours. Just like Vietnam, Brazil Gross Domestic Product (GDP) is far ahead of many Sub Saharan countries and has been experiencing an impressive decline in child labor (Bezerra et al., 2009). Additionally,

the study considered child work based in urban centres and which may be quite different from the strenuous sand harvesting activities.

Alfa and Karim (2016) study focused on the effect of child labor and performance on child relationship in rural areas of Niger State in Nigeria. The researchers developed an analytical model based on the theories of Basu and Van (1998), and Fan (2011). Empirical data were obtained from socio-economic survey with a sample size of 845 primary school pupils ranging from 10 to 14 years of age from 435 households in Suleja local government rural districts. Using logit analysis, it was found that non-biological children engaged in more hours of work than the biological child. Further, children from the households that earn income below subsistence level work more hours, with negative impact on performance than those from households that earn income above subsistence.

Salifu (2016) conducted a study on implications of sand mining on the environment and livelihoods in Brong Ahafo region in Ghana. Two hundred respondents were chosen using the systematic, convenience and purposive sampling techniques. Data from the respondents were collected using field observations, questionnaires and interviews. The study found that, largely people got into sand mining due to unemployment. It was also found that very high profits and regular income from the sales of sand had raised the living standards of people to some extent. Some people built permanent houses and paid for their sons and daughters in higher education. Further, sand mining in Brong Ahafo region in Ghana was found to have negative effects on due to environmental degradation. The study findings were mainly contrary to Muendo (2015) study which depicted a situation where sand harvesting in Kathiani had no substantial benefits to people in the region.

However, Salifu (2016) study gave the issue of child labour in sand harvesting a wide berth. Being the chief economic activity in a rural area and a lucrative one as described in the study, child labour was bound to be enlisted. The current study, in addition to exploring on the livelihood activities and the environmental conditions in relationship to children education, it dwelt on the involvement of minors in the sand harvesting sector.

Legeve and Poipoi (2012) did a study on the influence of child labour on academic achievement of primary school pupils in Suba and Homa-Bay Districts, Kenya. Employing a causal comparative research design and a sample of 171 boys and 162 girls, a t-test of independence showed that pupils who were involved in child labour had a significantly lower academic achievement mean score than those not involved in fishing activities. The findings of the study revealed that there was significant difference in the academic achievement of pupils who were involved and those who were not involved in fishing activities. Further, the academic achievement of boys involved was significantly higher than that of girls involved in fishing activities. This leads to the conclusion that fishing activities have an effect on academic achievement, and that the effect is moderated by gender. However, fishing dynamics are slightly different from sand harvesting and thus a study to investigate regarding child labour and academic performance was embarked on.

A study done in Kenya by Mutiso and Orodho (2014) aimed at investigating the impact of sand harvesting on education of pupils in public primary schools in Kathiani Division, Machakos County. The study employed survey research design, and using stratified sampling technique selected 10 headteachers, 10 class teachers, 80 pupils, 2 local administration officers and 2 education officers to take part in the study. Data was collected by use of questionnaires and interview schedule. The findings found that pupils were highly involved in sand harvesting activities that took place early in the morning before school,

during school hours, evening, at night and over the weekends, leading to extreme exhaustion of pupils and lack of concentration in school activities. The study concluded that sand harvesting impacted negatively on pupils' education in terms of participation, academic performance and indiscipline. Although Mutiso and Orodho (2014) study was comprehensive, it did not investigate the effect of environment on pupils' education.

2.5 Sand Harvesting and Physical Learning Environment

Sand as a resource is of great socio-economic value. Sand is used to provide bulk, strength, and other properties to construction materials like asphalt and concrete. It is used mainly as a concrete constituent in the building and construction industry, as a source of silica for making sodium silicate, as an abrasive (sand paper, sand blast), used in foundries for molding and parting (Aquaknow, 2012). Thus, its uses being inevitable, the importance of sand in the global development cannot be gainsaid.

Globally, sand deposits are actively harvested on every continent except Antarctica (Naveen, 2012). In Australia sand harvesting is carried out in Kurnell peninsula while in the United States sand harvesting has been carried out in Florida, California, Georgia, Monterey bay area, New Jersey and Virginia. The demand for sand is growing around the world, particularly in the middle income and developing countries such as China, India, Malaysia and Kenya where the rapid economic development causes strong growth of construction industry.

Thus sand mining is a major source of employment for many people around the globe (Asha, 2011). Apart from sand dealers and sand harvesters the sector employs many other people such as drivers who operate heavy-duty trucks that convey the sand to their

customers, labourers who dig and load the sand into the trucks and traders who sell food and water to the people who gather around the sites (Peprah, 2013).

While the proceeds from the sand harvesting lead to promotion of learners' education through the payment of school fees, building of schools and generally supporting the livelihood of many families, unrestricted harvesting can cause enormous damage to the environment. The environment degradation ranging from drying up of rivers, roads damage, loss of farm lands, and pollution of air can directly or indirectly affect pupils' education. For instance, in most rural areas in Africa drying of a river jeopardizes the whole family main stay; children will miss school in search of water; others will drive the family livestock in search of watering holes and even the whole family may relocate.

Globally, the basic sources of sand for human activities are terrestrial deposits. These are made up of sand from the channels of rivers and residual soil deposits on agricultural lands. Aromolaran (2012) and Hedge (2011) observe that sand mining lead to the destruction of vegetation, agricultural and non-agricultural lands. Every year several hectares of fertile land along rivers are destroyed through sand mining. Sand harvesting has created gullies on agricultural lands and forest reserves in several places (Tariro, 2013). The scooping of sand from the ground destroys the vegetation cover and the soils which become unproductive for farming. The extraction of sand from river beds creates gullies on the floors of the rivers. Peckenham, Thornton and Whalen (2009) explicates that, deep pits on the river beds cause the lowering of the groundwater table; consequently, wells in such places become dry. Additionally, the lowering of water table from the activities of alluvial sand mining affects the smooth flow of streams thereby negatively impacting on riparian wetlands. Sand mining diminishes water clarity and quality due to high turbidity levels,

reduction of dissolved oxygen and high temperatures in such water bodies (Reid, 2006). Poor water quality becomes a risk to crop production and hence food insecurity.

Sand mining through an open pit on land or quarrying has other negative impacts such as noise pollution, air pollution, damage to biodiversity and habitat destruction (Salifu, 2016). Dust from quarry sites are known to be responsible for vegetation injury and crop yield loss and thus become a threat to the survival of plants. Guach (2001) cited in Mutiso (2012) maintained that dust from mining sites is a major source of air pollution, its severity depending on local microclimate conditions, the concentration of dust particles in the ambient air, the size of the dust particles and their chemistry. The air pollution is responsible for various respiratory and eye problems. Further, it blocks and damages plants internal structures, is abrasive to leaves and cuticles, thwarting the normal growth. Crop failure aggravates family's financial situation prompting the older children to search for work to supplement the family earnings (Salifu, 2016).

Kardous, Themann, Morata and Lotz (2016) explicates that one way that noise can permanently damage a person's hearing is by a single brief exposure to a high noise level, such as a grenade, a gun or a firecracker going off near the ear. Kardous et al., further note that, hearing damage can also occur gradually at much lower levels of noise, if there is enough exposure over time. It is therefore, essential to limit one's exposure to moderately high noise levels as well, and give ears a chance to recover after any period of noise exposure. For instance, at 91 decibels, ears can tolerate up to two hours of exposure, at 100 decibels, damage can occur with 15 minutes of exposure, at 112 decibels, damage can occur with only one minute of exposure while at 140 decibels, immediate nerve damage can occur (<https://www.noisehelp.com/noise-dose.html>). Generally, the accepted standard to minimize hearing risk is based on an exposure to 85 dBA for a maximum limit of eight

hours per day. However, such an exposure should be followed by at least ten hours of recovery time at 70 dBA or lower (at which the risk of harm to healthy ears is negligible) (Fink, 2016).

Areas where Sand and building stone mining is practiced in Kajiado County and other regions in Kenya suffer from noise that emanates from often overloaded trucks and explosives used in preparation of open cast mining pits (Tariro, 2013). In 2009, through the Legal Notice No. 61, the government embarked on regulating and managing the environment noise and excessive vibration pollution (Republic of Kenya, 2009). The enacted regulations prescribe the maximum permissible noise levels from a facility or activity to which a person may be exposed to; provide for the control of noise; and provide for mitigating measures for the reduction of noise. The maximum permissible noise levels are based on the various zones as outlined in the regulations. These regulations prohibit production of any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. Further, any person who is likely to be involved in activities that emit noise or excessive vibrations beyond the permissible levels must obtain a license or a permit respectively from the authority. Although several studies such as Mutiso (2012), Salifu (2016) and Tariro (2013) identified high level of noise as one of the factors detrimental to pupils learning in sand harvesting zones, none of the studies used empirical data to support their findings. The current study, aimed at collecting data on noise levels in different school compounds with a view of ascertaining their effect on pupils' learning.

In Kenya sand harvesting is not well anchored in law and a few dealers continue unabated to enrich themselves at the expense of environment. Gitonga (2017) notes that the law on sand mining in Kenya is basically insufficient. For instance, the Mining Act of 1940 did

not define building sand as a mineral and therefore its extraction was not regulated. The Kenya Mining Act 2016 came as a revision of the 1940 Act. Incidentally, the new Act has also omitted building sand as one of the key mineral that deserve regulation. The Act gives more attention to precious metals such as gold, silver and copper. There has been several attempts by the affected counties to regulate sand harvesting, however, bribery and corruption among the law enforcement agencies and sand dealers has ensured continuous safe passage of the harvested sand. In addition the sand dealers have enlisted machete wielding gangs to protect them from protesting local community, conservationists and some law enforcement officers.

Nonetheless, the NEMA National Sand Harvesting Guidelines, 2007 (NEMA, 2007) brought some sanity to the volatile sector. The NEMA (2007) guidelines give emphasis on environmental impact assessment before embarking on sand harvesting. The guidelines also describe the work of several committees to manage the sector, sets the minimum age for the prospective harvesters, sets the working hours, describes the management of sand harvesting sites, explains the rehabilitation of sand harvesting site procedures, describes the necessary permits for sand transportation and delineates procedures to be followed in the events of disputes in the sector. It is however, noteworthy that the guidelines are not regulations and lacks the element of compliance. Several Counties such as Machakos have enacted some legislations geared to control the sand harvesting sector but as noted by Gitonga (2017) and Ombuor (2015), the legislations are yet to bring notable change. Kavilu (2018) observes that so long as there are no other income generating activities in these semi-arid lands, uncontrolled sand harvesting is bound to continue oblivious regardless of time and harvesters' age set guidelines.

Uncontrolled sand harvesting and flouting of mining regulations with serious implications are not confined to Kenya only. Khan and Sugie (2015) investigated the social impact of sand mining on local society in a village in Tangail district, rural Bangladesh. Among other things the study established that there was flagrant flouting of Laws and the rules on sediments extraction and that local influential residents illegally privatized sand harvesting and sold it for factory construction. Further, residents in the village have been protesting of their damaged roads by heavy tracks and the risk of their houses being washed away due to eroded river banks to no avail. Wealthy and influential sand merchants were found to collude with the influential local leaders to continue with uncontrolled sand harvesting. However, Khan and Sugie (2015) study did not investigate the effect of sand harvesting on children education.

Salifu (2016) examined the effects of sand mining on the environment and livelihoods of people in some selected communities in Brong Ahafo Region, Ghana. The study used a sample of 185 respondents from seven communities and an additional 15 key informants from various institutions and agencies in the Brong Ahafo Region. The decision to sample respondents from these communities was informed from fact that sand mining was the main activity and had existed for a longer period than other regions in Ghana. The study found that sand harvesting provided employment to people in several tasks such as being diggers of sand, loaders of sand, drivers of tipper trucks, operators of excavators, food vendors and tally clerks. Sand miners were found to enjoy higher and regular income than most farmers. Most significantly, some of the proceeds from sand mining was used in the repairing and construction of roads for their work. Thus, means of transportation for the people in the sand mining fringe communities has improved.

However, on the other hand, sand harvesting was found to have caused loss of arable land, loss of biodiversity, destruction of water bodies, deforestation and the creation of gullies on farmlands. The negative effects on the environment was a challenge to the whole community as farming dwindled and water resources diminished.

Gitonga (2017) sought to analyze the factors leading to increased sand harvesting in Machakos County with a view of regulating the harvesting activities and ensuring sustainability. The sampling frame comprised of 81 respondents drawn equitably from three spatial clusters of Kathiani, Mwala and Machakos town constituencies where sand harvesting was prevalent. The study established that the sand demand for the booming construction industry, low or no yields from farms and high poverty levels created impetus for the increased sand harvesting in Machakos County. The study also found that sand harvesting had caused loss of arable land and vegetation, degradation of river banks and drying of rivers and wells. Sand harvesting was found to have brought about high rate of alcoholism and drug abuse, unwanted pregnancies and sexually transmitted diseases. Further, the study found that school dropout was on increase due to the attractiveness of sand harvesting quick money. However, Gitonga (2017) did not investigate the link between environment and learners education. Apart from gathering information on the condition of environment after sand harvesting in Kenyawa division, the current study investigated the effects of sand harvesting on learners physical learning environment.

2.6 Summary of Literature Review and Research Gaps

The literature reviewed has revealed the effect of the different forms of child labour on the different aspects of a child schooling journey. The studies have described the different forms of child labour including those engaged in domestic works, mining and agricultural

industries, and even those engaged in household chores without necessarily attaching financial gains. The child labour problem was found to be more pronounced in Sub-Saharan Africa and this has been linked to such factors as economic stagnation, poverty, war, famine, orphan hood, and the rapid spread of HIV/AIDS. This has led to many children to seek for alternative ways of supporting their families economically at an early age, though at an expense of their schooling. However, there was paucity of studies linking child labour in sand harvesting and progress in child education. Studies by Alfa and Karim (2016), Anumaka (2012), Bah (2016), Bezerra et al., (2009), Chinyoka and Naidu (2014), Isah (2013), Lesanayo (2014), Ligeve (2012), Okpechi (2014) and Watson (2008) focussed in child labour in different sectors such as agriculture, fishing, and house hold chores and learners academic achievement but none specifically considered child labour in sand harvesting.

Other studies by Gitonga (2017), Khan and Sugie (2015), Muendo (2015), Mutiso and Ordho (2014) and Salifu (2016) focussed or touched on sand harvesting and pupils academic performance and school attendance. However, while most did a thorough treatise on effects of sand harvesting on environment, the effects and implications of environmental degradation on pupils' education directly or indirectly was hardly tackled. Moreover, none of all the studies reviewed was done in Kajiado County and none used empirical data to ascertain the effect of noise pupils learning. The undertaking of the current study was spurred by the identified lacunas.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter covers the research design, research site, target population, sample size, sampling procedures, data collection methods, data processing and analysis, instrument validity, piloting, instrument reliability, legal and ethical considerations.

3.2 Research Design

Creswell (2012) defines a research design as the scheme, outline or plan that is used to generate answers to research problem. It constitutes the blue print for the collection of measurement and analysis of data (Kothari, 2008). This study adopted an ex-post-facto research design of causal comparative type. Creswell (2014) states that ex-post facto is a systematic inquiry in which the researcher does not have direct control of independent and dependent variables because their manifestation has already occurred or they are inherently not manipulated. It is a kind of backwards or past events study in which the researcher looks at events after they have taken place and tries to offer an explanation, hence the name 'retrospective research' or ex post facto (after the facts) research. The causal comparative method (ex post facto) is often used instead of the experimental method to test the cause and effect relationship where experimental manipulation or intervention is not possible. Thus, it is considered a quasi-experimental in which the subjects are not randomly assigned but are grouped based on a particular characteristic or trait.

Through the ex post facto design of causal comparative type, the researcher's goal is to determine whether the independent variable affected the outcome, or dependent variable, by comparing two or more groups of individuals. In the current study, the effect of sand harvesting was deduced by comparing the characteristics of pupils who had indulged in

sand harvesting and those who had not. For instance, a lower academic performance by the group involved in sand harvesting could be associated with the activity. Creswell (2012), however, cautions that, the researcher must remember that demonstrating a relationship between 2 variables (even a very strong relationship) does not “prove” that one variable actually causes the other to change in a causal-comparative study.

3.3 Research Site

The importance of research site is to identify where the actual site and data will be collected (Kombo & Tromp, 2006). The location of the study was Kenyawa Division, Kajiado East Sub- County, Kajiado County Kenya. Kenyawa division was selected because it has the highest number of schools in an area where sand harvesting is most intensive in Kajiado County (MOEST, 2017). Additionally, most of the public primary schools have been performing dismally in KCPE.

3.4 Target Population

Babbie (2014) considers population as all individuals or items with the characteristics that a researcher wishes to study. According to Kajiado County schools census report 2017 (MOEST, 2017), there are 50 public primary schools in Kenyawa division with 304 teachers excluding head teachers and 1,496 pupils in class seven and eight. Therefore, the target population comprised of 304 teachers, 50 head teachers and 1,496 pupils in class seven and eight in the 50 public primary schools in Kenyawa division, Kajiado East Sub-County, Kenya. Table 3.1 depicts the distribution of the target population.

Table 3.1: Target Population

Respondent	Population
Head teachers	50
Teachers	304
Class 7 and 8 pupils	1496
TOTAL	1850

Head teachers were targeted owing to the fact they are in charge of both human and material resources management in the school. They are expected to ensure all pupils are making progress in their scholarship by addressing the hindrances encountered by both teachers and pupils. Since most of the pupils found engaging in sand harvesting are in classes seven and eight, the study targeted all the pupils in classes seven and eight in Kenyawa Division. These pupils had the pertinent information required in this study. The study also targeted teachers in charge of classes seven and eight due to the fact that they normally have the details regarding absenteeism, school attendance and participation, academic progress and performance in examinations and the general welfare of the pupils. Subsequently, the class teachers were the best placed to give information about the pupils' engagement in sand harvesting and other pertinent information to the current study.

3.5 Sample Size and Sampling Procedures

According to Babbie (2014) sampling is a process of study where a representative of the whole population is picked in a structured manner that will ensure the finding represents the behavior of the whole population. Thus, a sample is a subset of the entire population representing the characteristics of the population. Gay, Mills & Airasian (2009) maintain

that 10% to 30% of the population is sufficient for reliable findings. Therefore, 30% of the 50 head teachers were selected for the study. Further, 10% of the targeted 304 teachers were randomly selected for the study. Similarly, 10% of pupils were selected from the targeted 1497 pupils. Table 3.2 depicts the study sample frame.

Table 3.2: Sample Frame

Respondent	Population	Sample	Percentage
Head teachers	50	15	30%
Teachers	304	30	10%
Class 7 and 8	1496	150	10%
TOTAL	1850	195	10.5%

The sampled 15 head teachers were selected through simple random sampling. From each participating school, class teachers for class seven and eight were purposely selected. In case of schools with more than one stream, simple random sampling was applied to pick one class teacher. Further, using simple random sampling five pupils were selected from each class (class seven and eight). Thus, from each selected school, two teachers, the head teacher and 10 pupils took part in the study. As evident from Table 3.2, the study involved 195 respondents.

3.6 Data Collection Procedures

The study employed three data collection instruments: Class Teachers' Questionnaire (CTQ), Head Teachers' Interview Schedule (HIS), Pupils Questionnaire (PQ) and Measurement of Noise in the School Environment Inventory (MNSEI). The use of several research instruments or source triangulation is the surest way of minimizing threat to both

internal and external validity (Creswell, 2012). Further, Orodho (2012) opine that triangulation gives a more detailed and balanced picture of the situation.

3.6.1 Class Teachers' Questionnaire (CTQ)

Kothari (2008) explicates that questionnaires are usually free from the interview bias as the answers are in respondent own words. Respondents also have adequate time to give well thought out answers. Questionnaires also save time and information can be collected from a very large sample. The class teachers' questionnaire was semi-structured in which respondents were allowed to express their views in their own words in the open questions while closed questions captured factual responses.

CTQ was divided into sections A, B, and C (refer to Appendix II). Section A aimed at gathering general information of respondents' such as gender and the duration they have worked in Kenyawa Division. Section B was set to gather information on sand harvesting and pupils' school participation, section C sought to capture information on sand harvesting and pupils' academic performance while section D gathered information on sand harvesting and pupils' physical environment.

3.6.2 Pupils' Questionnaire (PQ)

Pupils' questionnaire was semi-structured and aimed at capturing factual information as well as narrative in regard to sand harvesting and its effects on the learners' education. It was divided into two sections. Section A sought the learner's demographic information such as the gender, class, and age bracket. Section B aimed at gathering information on sand harvesting and learner's progress in education (refer to Appendix IV). The questionnaire gathered information in regard to the extent pupils were engaged in sand harvesting, the frequency and times of engagement, their parents' occupation, how they

spent the money earned from sand industry, the effects of sand harvesting and their academic performance.

3.6.3 Head Teachers Interview Schedule (HTIS)

Orodho (2012) considers interview as a method of collecting information in the form of oral-verbal responses and answers regarding oral-verbal questions. The advantage of the interview method is that it allows an in-depth response from the respondent and enables the interviewer to probe the respondents. Scheaffer, Mendenhall III, Ott & Gerow (2011) proffer that interview method of collecting data is often seen as superior than other instruments in that it creates rapport between the respondent and the researcher.

The head teachers' interview schedule was constructed in such a way that it gathered information in accordance to the study's three objectives. Each question could lead to some probing questions on the same subject. However, the head teachers were free to furnish any other information deemed important but related to the study.

3.6.4 Measurement of Noise in the School Environment Inventory (MNSEI)

The Measurement of Noise in the School Environment Inventory (Appendix VI) was a one page document that was used to record daily noise readings in the school environment. The measurements of noise (unwanted sound) level captured by use of Integrated Sound Level Meter (ISLM). The ISLM consists of a microphone, electronic circuits and a readout display. The microphone detects the small air pressure variations associated with sound and changes them into electrical signals. These signals are then processed by the electronic circuitry of the instrument. The readout displays the sound level in decibels (dB). The ISLM takes the sound pressure level at one instant measurement in a particular location. It also gives an average value after the set time say 8 hours.

The noise measurement inventory (MNSEI) consisted of four columns which contained: day of the week and date, minimum reading, maximum reading and the equivalent sound level in dB (A). The maximum values mostly corresponded to the sound emanating from grenade explosions as sand and ballast harvesters prepared open cast land mining pits. The minimum readings mostly corresponded to a lull when the noisy sand carriers were not in motion and pupils were in class. The daily records were done by one of the participating class teacher for a duration of two consecutive weeks in the sampled schools.

3.7 Pilot Testing

Creswell (2012) reiterates that, it is vital for a researcher to test tools before using them to ensure their validity, reliability and practicability. Therefore, piloting was done in order to ascertain the credibility of the tools by testing clarity of language, time taken to respond, procedure of administering, length and layout of tools. Piloting involved two head teachers and 10 teachers in charge of class seven and eight from five public primary schools in the neighboring Mashuuru Division. Mashuuru Division has similar issues of sand harvesting as Kenyawa and was thus, found appropriate for pilot study. The participants were encouraged to comment and make suggestions which were later used to improve various items.

3.8 Validity of Data Collection Instruments

Validity of an instrument is the degree to which the instrument measures what it purports to measure (Orodho, 2012). It is also referred as the correctness, meaningfulness of inferences and soundness of outcomes of conclusion, which are based on the research findings (Babbie, 2014; Kothari, 2008). The researcher sought the expert opinion on content and construct validity. The data collection instruments were availed to two

University supervisors assigned to the researcher for review. Comments solicited from them were used to enhance the data collection instruments before commencing data collection. The results from the piloting together with the comments from the supervisors were incorporated in the final instrument revisions to ensure its validity.

3.9 Reliability of Data Collection Instruments

Reliability refers to the consistency that an instrument demonstrates when applied repeatedly under similar conditions (Orodho, 2012). Since the data collected by the instruments employed in the current study was largely qualitative, appropriate techniques for ensuring reliability were applied. Cohen, Manion and Morrison (2007) and Creswell (2014) maintain that the reliability of research instruments in qualitative data focuses on the researcher trustworthiness for being the instrument itself. In addition, for qualitative data, both validity and reliability of research instruments are treated together. Cohen et al., explicate that the trustworthiness of a researcher involves credibility, transferability, dependability and confirmability.

Fraenkel, Wallen & Hyun (2012) regard credibility (internal validity) as the extent to which the study shows true value and has meaning to the people who provided the information and the people who might use the report. Further, it establishes the confidence of the findings hence the internal validity and applicability. Kamindo (2008) observes that credibility is also achieved by the demonstrating that indeed research was carried out by giving a detailed account or description of the research process. This can be achieved by use of concepts from the literature, excerpts from field notes, and quotes from interviews and thus enhancing the credibility and authenticity of a study. This study endeavoured to

give detailed account of research process including verbatim quotes from various head teachers, in situ excerpts and extensive use of concepts from literature.

Fraenkel et al., (2012) regard transferability (external validity) or applicability as to whether the results of the study can be transferred to other contexts and settings. As noted by Creswell (2012) transferability of research findings is mainly affected by factors related to the research procedures. Thus, to ensure transferability, procedures followed should be described in details, in what Lincoln and Guba (1985) cited in Kanindo (2008) referred to as 'thick description' and which according to Miles and Huberman (1994) would offer an 'audit trail' for anybody wishing to trace how the study was carried out or transfer or generalize results. In particular, this study has succinctly delineated the methodology approach and design followed by sampling procedures and though it was conducted in one division in Kajiado County, it can be considered to portray what is happening in other divisions where sand harvesting is practiced in Kenya.

3.10 Data Analysis Techniques

Data analysis procedures as explained by Creswell (2014), describes how the raw data from the data collection instruments will be organized, reduced, analysed and displayed. The study used both the quantitative and qualitative techniques in data analysis. Quantitative data from the completed questionnaires were first coded and uploaded into SPSS software version 22 for analyses. Both descriptive and inferential statistics were used to analyse the collected data. Descriptive statistics such as graphs, tables, percentages, and means, standard deviations were generated geared to help in making conclusions in the study. An independent samples t-test was done to determine whether the mean school attendance by the sand harvesting group of pupils was significantly different from the group that did not

practice sand harvesting. Similarly, a t-test of two independent samples was done to ascertain whether there was a significant difference between the mean performance of pupils involved in sand harvesting and those that were not. Finally, a one sample t-test was done to ascertain whether the mean equivalent noise level in various schools environment was significantly greater than the safe standard level of 85 dBA.

Analysis of the interview data started as soon as each session ended. The interviews that were audio-recorded were also transcribed as soon as the interview ended. Similarly, notes taken during the interviews were checked for gaps immediately in order to record all that could be remembered and had not been written down. Identification labels were given according to the respondent such as (HI) for the first head teacher interviewee. Qualitative data generated from questionnaires and interview schedule was put into themes for easier interpretation. However, verbatim quotations were also used in order to maintain the message as given.

3.11 Ethical and Legal Consideration

Ethical and legal consideration is a key part in research since it helps to ensure that no one suffers harm or undesirable consequences as a result of the research activities. Due to the normally sensitive relationships between the researcher and the respondents, reasonable safeguards were built during the field work study that is based on appropriate ethical requirements and measures. The researcher got a letter of introduction from African Nazarene University. The letter assisted the researcher secure a research permit from National Council of Science, Technology and Innovation (NACOSTI). Further, a research permission letter was secured from the Kajiado County Director of Education to visit the sampled schools for data collection. In order to avoid suspicion and scepticism the

researcher assured the respondents utmost confidentiality and that the information provided would be used for academic purposes only. Furthermore, while collecting data the researcher acknowledged all the sources of information collected from textbooks and other research materials.

CHAPTER FOUR

RESULTS AND ANALYSIS

4.1 Introduction

This chapter presents the results and analysis of the data collected in this study. The study objectives were: to assess the impact of sand harvesting on pupils' school attendance, to examine the effect of sand harvesting on pupils' academic performance, and to establish the effect of sand harvesting on pupils' physical learning environment on pupils' education in public primary schools in, Kenyawa division, Kajiado county, Kenya. The study employed semi-structured teachers' questionnaire, semi-structured pupils' questionnaire and the head teachers' interview schedule to collect the data. Both quantitative and qualitative data was analyzed as per the research objectives.

4.2 Response Rate

The study sampled 30 class teachers, 15 head teachers and 150 pupils. However, while all the sampled teachers and pupils filled the questionnaires, 5 head teachers were not available for interview. Thus, the response rates for class teachers, pupils and head teachers were 100%, 100% and 67% respectively. Babbie (2014) postulates that a response rate of more than 70 per cent is considered sufficient for a study.

4.3 Demographic Information

The study found it necessary to analyze the demographic information of respondents, which formed the basis under which some of the interpretations were made. The demographic information sought included: gender, age bracket, and teachers' duration of service in the locale under study.

4.3.1 Pupils Characteristics

Tables 4.1 and 4.2 shows the various pupils characteristics

Table 4.1: Gender Distribution of Pupils

Class	Gender					
	Male		Female		Total	
	f	%	f	%	f	%
7	48	64.0	27	36.0	75	50.0
8	47	62.7	28	37.3	75	50.0
Total	95	63.3	55	36.7	150	100.0

As evident from Table 4.1, most of the pupils sampled were male constituting 63.3 %. Since five pupils were selected from each class in each of the 30 sampled schools through simple random sampling, it implied that there were more boys than girls in classes seven and eight.

Table 4.2: Pupils Age Bracket

Age Bracket in years	Gender					
	Male		Female		Total	
	f	%	f	%	f	%
≤13	26	63.4	15	36.6	41	27.3
14-15	44	62.0	27	38.0	71	47.3
>15	25	65.8	13	34.2	38	25.4
Total	95	63.3	55	36.7	150	100.0

Table 4.2 shows that most of the pupils (47.3%) were in the age bracket of 14 to 15 years, which is within the recommended age. However, the 38 pupils constituting 25.3%, were over 15 years implying that they were over age to be in a primary school level. Over age students are more likely to get distracted from school work.

4.3.2 Teachers Characteristics

The study sought to establish the gender distribution of teachers and their duration of service in their current schools. The result is captured in Tables 4.3 and 4.4.

Table 4.3: Gender Distribution of Teachers

Category	Gender					
	Male		Female		Total	
	f	%	f	%	f	%
Teachers	18	60.0	12	40.0	30	100.0
Head Teachers	8	80.0	2	20.0	10	100.0
Total	26	63.3	55	36.7	40	100.0

It was evident from Table 4.3 that there were slightly more male class teachers (60%) than female teachers (40%) that took part in the study. On the other hand, majority of head teachers were male (80%) depicting an obvious gender disparity in their appointments.

Table 4.4: Teachers' Duration of Service in the Present school

Duration in Years	Category			
	Teachers		Head Teachers	
	f	%	f	%
0-2	0	0.0	0	0.0
3-5	7	23.3	1	10.0
6-8	11	36.7	2	20.0
>8	12	40.0	7	70.0
Total	30	100.0	10	100.0

Table 4.4 shows that most of the teachers constituting 76.7% had worked for a duration of six years and above in Kenyawa Division. This implied that they were conversant with the issues regarding the sand harvesting being one of the major occupation in the region. Similarly, majority of the sampled head teachers (70%) had worked for a duration of over

eight years, and hence would provide pertinent information in regard to how sand harvesting has impacted on pupils' education.

4.4 Effect of Sand Harvesting on Pupils' School Attendance

The first objective of the study was to assess the effect of sand harvesting on pupils' school attendance in public primary schools in Kenyawa Division, Kajiado East Sub County, Kajiado County. In order to accomplish this objective, the study collected and analyzed data from teachers, pupils and head teachers.

4.4.1 Most Prevalent Factors Influencing Pupils Low School Attendance

The first item in this section required teachers to list the factors that influence the upper primary pupils (class six to eight) absenteeism or drop from school starting with most prevalent. Since the reasons for low school participation for girls may be different from those for boys, teachers were required to list them separately. Table 4.5 displays the most frequently listed factors that influence pupils' absenteeism and drop out leading to low school participation.

Table 4.5: The Most Prevalent Factors Influencing Pupils Absenteeism

Rank	Boys	f	%	Girls	f	%
1	Sand Harvesting	24	80	Early marriages/early pregnancy	25	83.3
2	Herding	18	60	Farm labour such as Tomatoes harvesting	20	66.7
3	Transport business (Boda Boda)	15	50	Distance/terrain of home to school	19	63.3
4	Over age	14	46.7	Domestic chores	19	63.3
5	Drought/poverty	10	33.3	Drought/poverty	17	56.7

As evident from Table 4.5, most of the teachers (80%) indicated that boys' absenteeism and drop out from school was mainly due to engagement in sand harvesting. On the other hand most girls drop out due to early marriages and early pregnancy. Further, boys fail to participate in school due to herding, engagement in transport business using motorbikes commonly known as 'Boda Boda', overage and due to drought/poverty in descending order. Drought and poverty may sometimes be considered as the overarching genesis to pupils engaging in income generating activities. Herding or pastoralism, an age old occupation of Maasai community who dominate Kenyawa Division has mainly been a preserve of men and but during drought more labour force is required due to the long distances covered in search of water and fresh pasture. In such situations, boys are used to look after the weakest livestock near their homestead while girls gather firewood and cook for the family. In regard to girls, farm labour such as tomatoes harvesting, domestic chores and distance, and rough terrain to and from school were factors frequently mentioned as great hindrances to girls' participation in education.

When head teachers were requested to comment about child labour among the community in their schools catchment region, most were not forthright that there existed child labour in different forms and contexts. Most had the notion that child labour happened only when a child is engaged in income earning activity outside their homes. However, through the interview probing questions, it was established that child labour within the homestead was extensively used during weekends, after school hours and early in the morning in activities directly or indirectly related to sand harvesting. Boys and girls were engaged in several house hold chores as their parents were exhausted from sand harvesting activities and thus depriving them the valuable time of reading and writing their school assignments.

The study further required the head teachers to outline how they influence parents and other stake holders in ensuring that sand harvesting and other children engagements do not infringe on their rights in accordance to the Kenya Basic Education Act (2013) and Children Act (2001). Most of the head teachers explained that they would guide and counsel the parents on the importance of adhering to the stipulations of the act. Such an approach to the deeply entrenched way of life cannot be eliminated by guidance and counseling but rather legal oriented action.

4.4.2 Frequency of Pupils Involvement in Sand Harvesting

In order to establish the extent pupils were involved in sand harvesting in Kenyawa Division several questions were put to teachers as well as pupil respondents. The question ‘do you get involved in sand harvesting? Was meant to establish the number of pupils who engaged in sand harvesting among the 150 pupils who were sampled. Figure 4.1 depicts the pupils’ response.

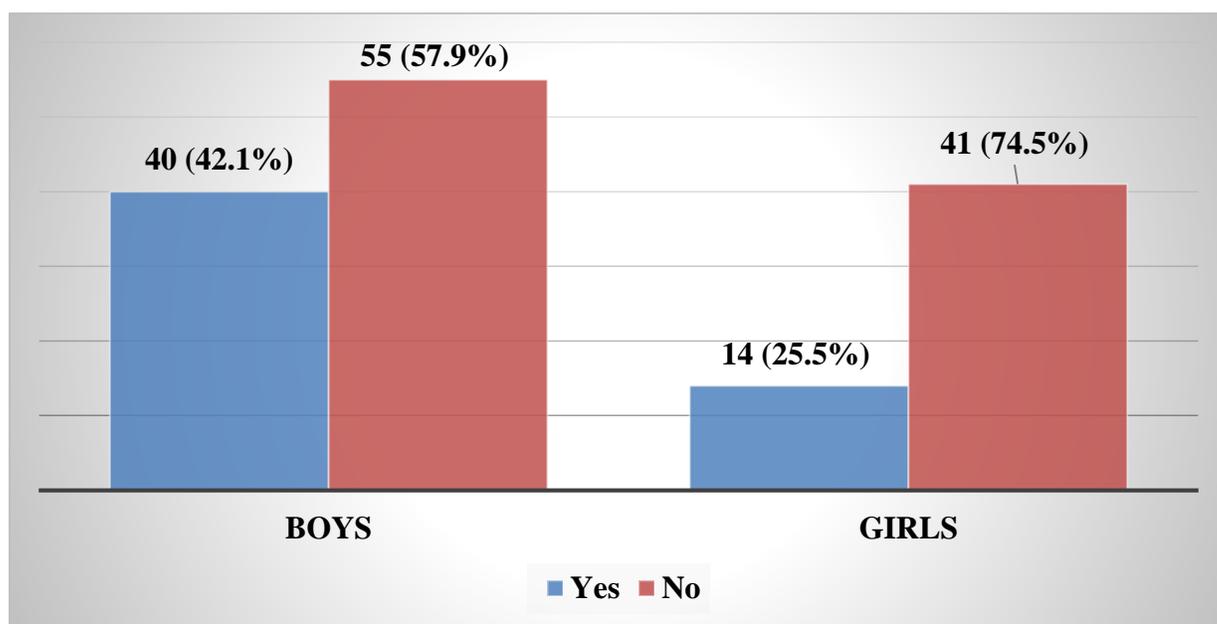


Figure 4.1: Pupils’ Response on their Involvement in Sand Harvesting

Figure 4.1 shows that 40 boys constituting 42.1% of all boys indicated that they are involved in sand harvesting, only 14 (25.5%) girls were involved. On the other hand 57.9% of boys and 74.5% of girls indicated that they were not involved. It is however, instructive to note that though a large section of the students were not directly taking part in sand harvesting, some might have been indirectly involved through their parents and other siblings.

Further, the study sought to establish the frequency of pupils' sand harvesting in a week. Most of the pupils involved in harvesting and loading indicated that they accomplished the work during weekends and any day at night as the work became available. This implied that the occupation could prove detrimental to pupils' commitment to school work and concentration during class time.

Pupils' involved in sand harvesting were consequently required to indicate what they did with the money earned. The pupils' response were as varied as their different needs. Their responses included: buying food stuffs for their families, clothes and other personal items, paying school levies, buying phones, keeping pocket money to buy snacks at school and others. It was thus evident that most of these pupils were not focused to acquire a long lasting asset using the sand harvesting money. Nonetheless, a few students indicated that they bought livestock and motorbikes. A few also indicated that they used the money for self-entertainment such as buying 'Miraa' (Khat), bhang, alcohol and cigarettes. Abuse of substance and alcoholism can lead to pupils' chronic absenteeism from school, low participation in class and eventually dropping out from school.

4.4.3 Parents/Guardian Occupation

The study sought to establish the sampled pupils' parents/guardian occupation with a view of establishing the possible influence of parents' occupation and pupils' participation in school. Figure 4.2 depicts the distribution of parents/guardians occupation.

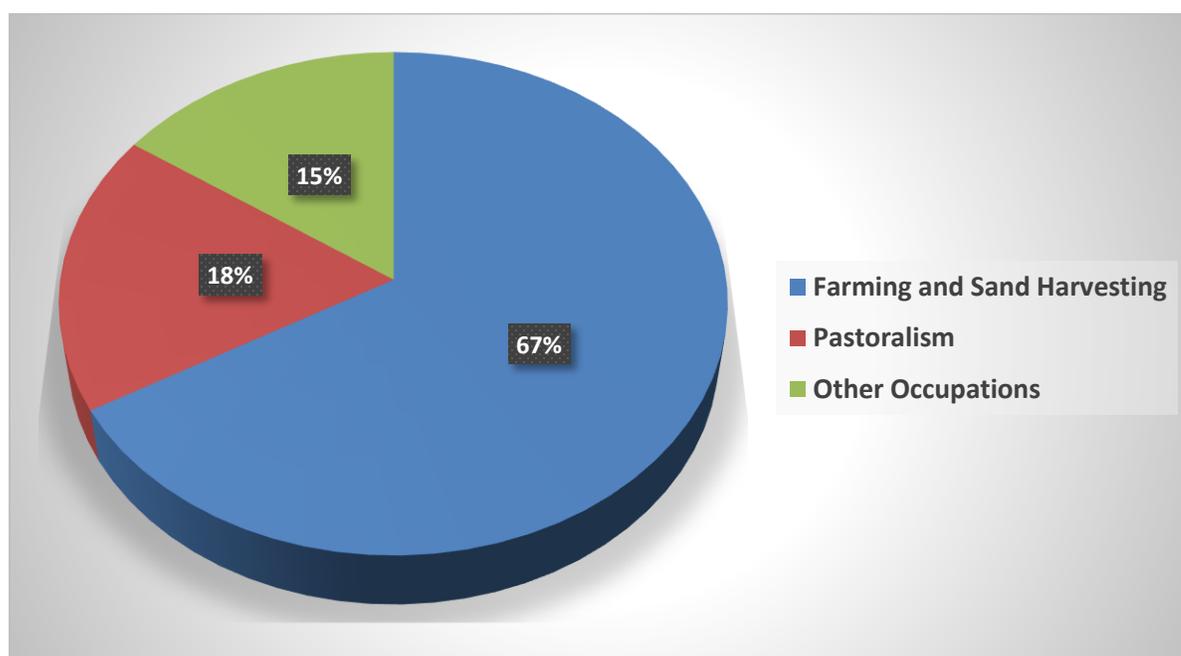


Figure 4.2: Pupils' response in regard to their Parents/Guardian Occupation

As evident from Figure 4.2, most of the parents constituting 67% eked their living from farming and sand harvesting, 18% of parents practiced pastoralists while 15% were in other occupations. Thus, it is obvious that most of the pupils would be inclined to assist their parents in their major occupation either directly or indirectly. For instance, as indicated from the interviewed head teachers, older siblings are expected to gather firewood, prepare meals, look after meals, and look after their younger siblings when their parents were busy in farming and sand harvesting. All pupils were however, emphatic that their parents do not encourage them in sand harvesting. The response from teachers in regard the most

prevalent parents' occupation, concurred with the students' response that most parents were in farming and sand harvesting.

4.4.4 Class Teachers' Awareness of the Pupils Involvement in Sand Harvesting

The study sought to establish how teachers came to know that certain pupils are involved in sand harvesting. The response to this open ended question was varied. Some of the responses included: sleeping in class; truancy; absenteeism; poor performance; restlessness; gathering information from other labourers parents, other students and area leaders; indiscipline, low concentration in class, possessing things that other students do not have such as mobile phones, several pairs of shoes and others, found on site working or near the sand harvesting areas.

The researcher noted that most of the identified pupil behavior was negatively affecting their expected school participation. Most of the pupils had chronic absenteeism, had low concentration in class and indiscipline issues leading constant disciplinary measures in form of punishments and suspensions. In order to ascertain the proportion of students involved in sand harvesting in classes seven and eight, the class teachers were requested to estimate their number in percentage according to gender. Teachers were required to rate the sand harvesting activity as 'occasional', 'serious' and 'not involved'. Occasional sand harvesting was defined as a case where a pupil gets occasionally engaged in sand harvesting over the weekend. Serious sand harvesting was defined as a case where a pupil is seriously engaged in sand harvesting for commercial gains and where harvesting can take place in any day of the week. The finding showed that almost all the teacher respondents indicated that about 30% and below of boys were involved in occasional sand harvesting while none of the girls were involved. The finding was however, inconsistent

with the pupils' response where 25.5% girls were indicated that they are involved in sand harvesting as captured in Figure 4.1. This implied that the class teachers were not fully aware of what some of their students were involved in sand harvesting.

In a related question, both teachers and head teachers were requested to comment about child labour among their school catchment area community. The response was varied and the following themes were prominent: children are used in herding cattle, looking after their siblings at home, there were minimal or rare cases of child labour and that children were engaged in house hold chores such as fetching water and preparing food for the adults engaged in other activities. However there were also many respondents who left the question blank showing that they either had no ready answer or due to the fact that the question had some incriminating aspect. Use of child labour during and even after school hours, denied children time to accomplish school work and often leads to truancy, absenteeism and finally school dropout.

The head teachers were further probed on how they influence and advice parents and other stake holders to uphold pupils' rights as envisaged in the Kenya Constitution 2010, and Basic Education Act 2013 that education is free and compulsory (Republic of Kenya, 2010, 2013). Most of the head teachers indicated that they often make efforts to sensitize parents and BOM members during the parents meeting, AGM and PTA meetings. However, a few head teachers indicated that they sometimes enlisted the help of government administration officers in order to rein on some parents to bring their children to school. The following comments from the interviewed head teachers exemplifies the challenges encountered on this issue:

I think the use of child labour is rampant in this area, but it is executed in a way that you may not specifically associate the perpetrators with it...parents collude with their children to feign illness. Children are left at home to take care of other siblings, do house hold chores and fetch water and fire wood and to take care of the exhausted parents from other engagements such as sand harvesting. Since some homesteads are isolated, there is no possibility of knowing what is preventing these pupils from attending school. (Head teacher 5).

Another head teacher commented, thus:

Through close interaction with some pupils, I come to know that some are so much engaged in activities which may affect their participation in school...some pupils assist their parents to gather sand in river bends at night, other join their parents and move to search for better pasture for their cattle and others are left at home when parents are engaged elsewhere...it is really frustrating for teachers who struggle to assist such pupils who lack continuity in the subject content. (Head teacher 2)

4.4.5 Ways in which Sand Harvesting has enhanced Pupils School Participation

The study sought opinion of both teachers and head teachers on the ways in which sand harvesting might have enhanced pupils' participation in school. Most of the teachers and head teachers indicated that most parents' preoccupation in sand harvesting thwarted the age old traditional practice of nomadic pastoralism. The practice of nomadic pastoralism made the whole family to move with their livestock in search of better pasture and water. This meant that children had to miss school for as long as the family was away. The frequent cases of over age children at a given level is attributed to mainly nomadic pastoralism. Thus, teachers considered sand harvesting to have reduced the incidences of

nomadic pastoralism, and thereby enabling more pupils to attend school and take part in school activities without interruption.

The efforts of some parents to successfully cater for their families' upkeep, building a decent permanent house, investing in real estate and educating children were some of the positive outcomes of sand harvesting that were mentioned by teachers. However, most of the head teachers were quick to caution that the damage arising from uncontrolled sand harvesting outweighs by far the benefits accrued.

4.4.6 Pupils' School Attendance

The study sought to establish the pupils' attendance for the three terms under consideration. The attendance percentage was calculated as the number of days a student was present over the number of days the school was in session. Further, the mean attendance percentage was computed for those who participated and not participated in sand harvesting. The mean attendance percentage was also segregated according to gender. Subsequently, a t-test at 95% confidence level was conducted to ascertain whether there was a significant differences in attendance percentage in the different categories. Table 4.6 shows the summary of the analysed data.

Table 4.6: Pupils Mean Attendance Percentage for three Terms

Category	Involvement in sand harvesting	N	Mean Attendance (%)	Standard deviation	t value	Sig. value (2 tailed)
Boys	Involved	40	82.6	7.2	-8.5	0.017
	Not Involved	55	90.4	3.8		
Girls	Involved	14	88.2	8.3	-4.85	0.224
	Not Involved	41	93.0	4.3		
Overall	Involved	54	84.3	6.7	-10.8	0.026
	Not Involved	96	91.4	4.2		

It was evident from Table 4.6 that boys who indicated that they were taking part in sand harvesting had a lower mean attendance percentage of 82.6 while their counterparts had a higher mean of 90.4. The observed difference was also found to be significant ($t = -8.5$, $df = 93$, $p < 0.05$). Similarly, girls who were not involved in sand harvesting had a slightly higher attendance percentage of 93.0 than those who indicated that they took part who had an attendance percentage of 88.2. The difference was found to be insignificant at 95% confidence level ($t = -4.85$, $df = 53$, $p > 0.05$). Overall, the mean attendance percentage of all sampled pupils (regardless of gender) not involved in sand harvesting was found to be significantly higher ($t = -10.8$, $df = 153$, $p < 0.05$) than those involved. Thus, through causal comparative, the study deduced statistically that sand harvesting did affect pupils' school attendance.

4.5 Effect of Sand Harvesting on Pupils' Performance

The second objective of the study was to examine the effect of sand harvesting on pupils' academic performance. In order to achieve the objective, information from pupils'

questionnaire, teachers' questionnaire and head teachers' interview schedule was analyzed. Most of the head teachers disclosed that pupils mostly directly involved in sand harvesting were from class six to eight. The age of these pupils ranged mostly from as low as 12 to over 15 years. According to head teachers, some of the pupils were 'strong young men' who were in high demand as loaders in the labour intensive sand harvesting industry.

4.5.1 Problems most Prevalent to Pupils' who Practiced Sand Harvesting

Teachers and head teachers were requested to list down the problems most prevalent to pupil's' involved in sand harvesting and which can impact negatively on their academic performance. The most frequent problems mentioned were as depicted in Figure 4.3.

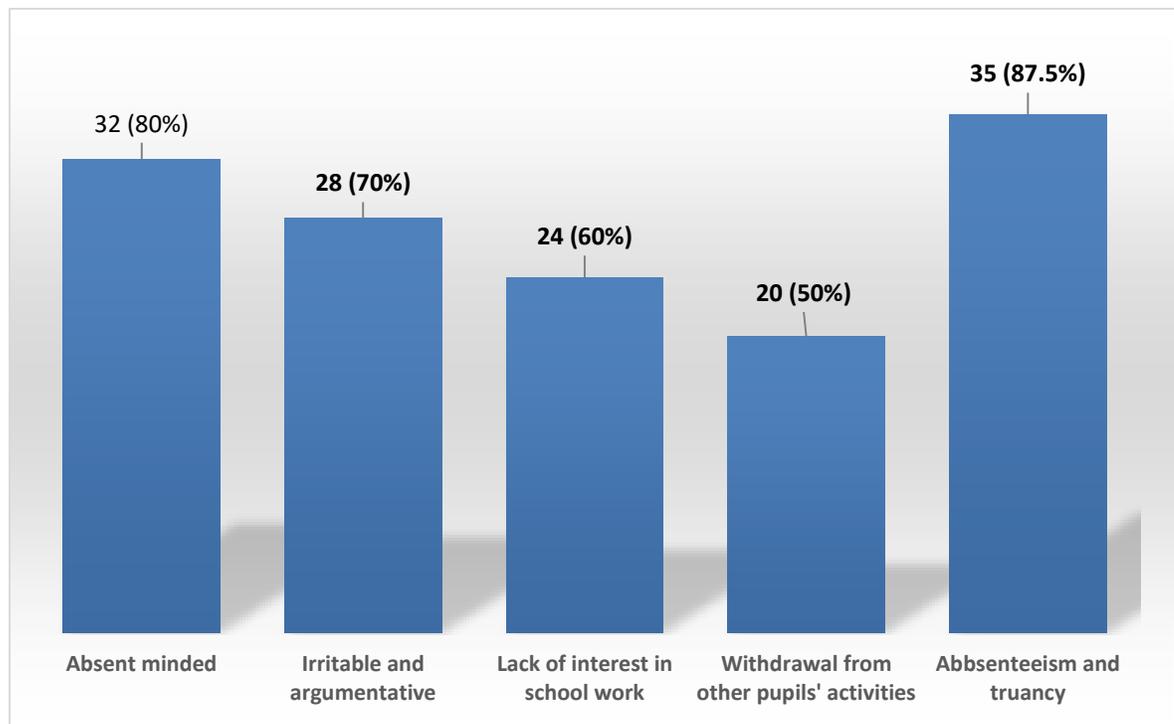


Figure 4.3: Teachers and Head teachers' response on the most Prevalent problems with Pupils Involved in Sand Harvesting

Figure 4.3 indicates that a high percentage (87.5%) of teachers and head teachers found absenteeism and truancy to be the most prevalent issue affecting pupils who take part in

sand harvesting. This implies that such pupils cannot lack continuity in their school work and are likely to encounter serious problems especially in subjects such as mathematics. Similarly, a large section of teachers and head teachers (80%) affirmed that pupils involved in sand harvesting had signs of being absent minded in class. Some head teachers went further and explained that some pupils' indulged in hard drugs which led to absent mindedness. Further, 70% of teachers and head teachers indicated that the learners involved in sand harvesting were irritable and argumentative leading to so much friction with other learners and teachers. The behavior according to head teachers, was due to hard labour and sleep deprivation.

In a rejoinder question in regard to the academic performance of these pupils, almost all teachers and head teachers were unanimous that, the performance was appalling. However, teachers cited of some pupils who were keen in their studies but were forced to practice sand harvesting in order to provide for their poverty stricken families. In such situations, they still performed well but short of their potential. The next question required the teachers and head teachers to indicate their opinion on the extent to which parents endorsed their daughters and sons participation in sand harvesting at the expense of academic performance. Table 4.7 depicts their responses.

Table 4.7: The Extent to which Parents endorsed their Children in Sand Harvesting

Category/Extent	Teachers		Head teachers	
	No.	%	No.	%
To a very great extent	5	16.7	0	0
To a great extent	8	26.7	5	30
To some extent	17	56.6	5	50
Total	30	100.0	10	

As evident from Table 4.7, most of the teachers (56.7%) and 50% of the head teachers were of the opinion that parents to some extent endorsed their children into sand harvesting. Most of the head teachers indicated that sand harvesting was considered a quick way of making money and thus parents enlisted the assistance of their children in order to provide for the family. It follows that, once the children are initiated into the sand harvesting by their parents, they also find it an easier way to earn their own money. Having been initiated into money economy, children are now exposed to so many other luring habits that impact negatively to their academic performance.

4.5.2 Factors Linked to Sand Harvesting that affect Pupils' Academic Performance

The study sought to establish other factors that might have been brought about by the practice of sand harvesting and which impacted on learners' academic performance in Kenyawa Division, Kajiado County. The most frequent factors as indicated by teachers and head teachers are shown in Figure 4.4.

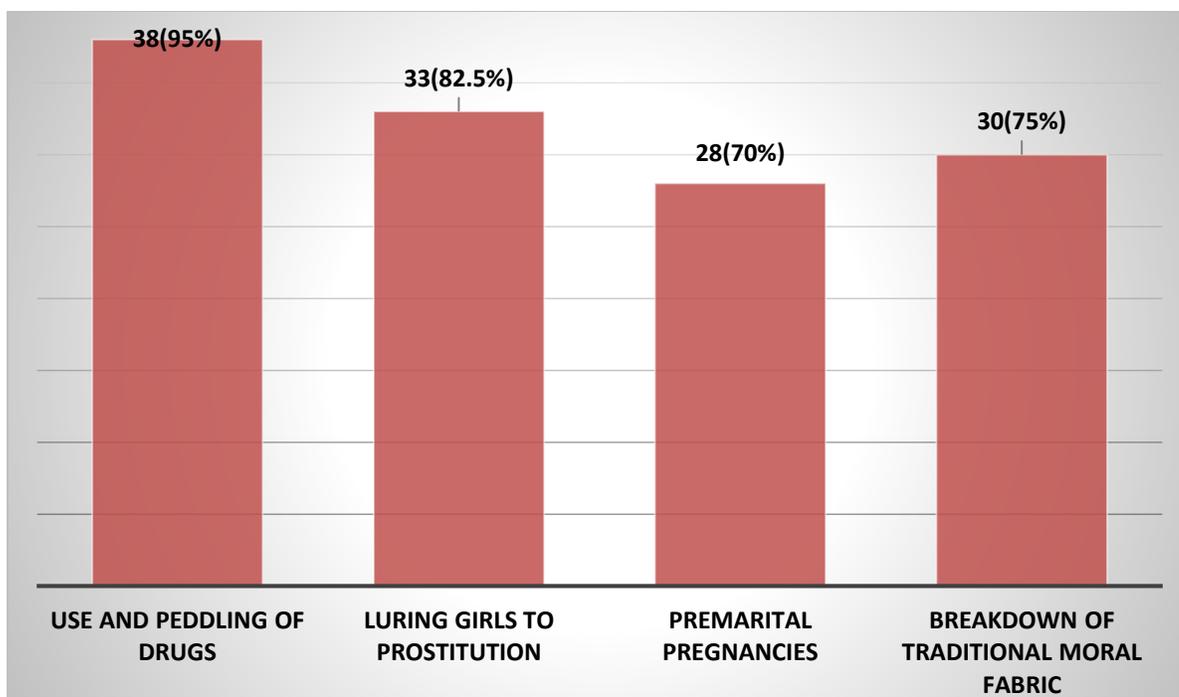


Figure 4.4: Factors Linked to Sand Harvesting that affect Pupils' Academic Performance

Figure 4.4 shows that there were four major issues that arose indirectly from pupils' involvement in sand harvesting. Almost all teachers and head teachers (95%) indicated that some of the pupils involved in sand harvesting indulge in use of hard drugs and peddling. One of the head teacher interviewed commented, thus:

Drugs traffickers have created a fallacy among the sand miners and loaders that they must use some energy inducing drugs in order to execute their hard work well...this has preyed well on our youth...they have graduated from one drug to another...some are now addicted and they permanently appear disoriented in class.
(Head teacher 3)

Another head teacher also lamented:

Use of hard drugs by pupils' who interact with sand harvesting community is on increase in my school...they are also introducing other pupils who are not in sand harvesting. This has complicated maintenance of discipline in the school. Some of these boys seem not to care anymore...they can even fight on a minor provocation...they have mobile phones and money...it's tough to contain them.

(Head teacher 10)

The comments from the two head teachers signifies the frustration and dilemma encountered they manage their schools. The proliferation of illegal drugs among the sand harvesters is beyond their mandate and yet they have to manage pupils who are abusing the drugs at will. Both head teachers and class teachers also indicated their frustrations in that they could not project with certainty improvement in pupils' academic performance due to the unpredictable nature of the pupils. In a question where head teachers were asked to comment on the extent to which they were satisfied with the school KCPE results for the last five years, 80% indicated that they were not satisfied. One of the head teacher commented:

The performance of the school over the last five is unpredictable as the graph is up and down with large margins. No matter how much you teach, the type of the pupils you have in class eight in a particular year will highly determine the results...and note that the previously docile pupils can change and become rogue within a term compromising all the strides made towards enhancing their performance. (Head teacher 8)

Apart from the use of hard drugs, 33 teachers and head teachers' respondents constituting 82.5% indicated that availability of money among the sand harvesters has led to some girls

being lured into prostitution. Girls are enticed by not only their young peers but also some older men in the sand industry. According to most teachers, most girls come from cash strapped families and they find hard to turn away items such as mobile phones and pocket money they get from men in sand industry. This results to prostitution, premarital pregnancies and early unplanned marriages. As noted by one of the head teacher, the progression and performance of girls to class eight is highly unpredictable in Kenya Division:

A girl might be performing very well academically...exuding a promising future and a role model to other younger girls.... But the next moment the same girl has disappeared from school never to come back. In most of such cases, girls just elope with one of the young men who has acquired some money from sand harvesting and purporting to be rich and able to cater for the girl. (Head teacher 2)

The general breakdown of the society moral fabric was also highly mentioned as one of the effects arising indirectly from the practice of sand harvesting. Most teachers decried the breakdown of the Maasai community well preserved moral conduct and respect protocol in terms of age, gender, and other significant considerations. As noted by teachers, the sand industry has attracted people from different ethnic backgrounds and which has diluted the previously well observed societal norms. Thus the respect and obedience to teachers has eroded, implying that teachers' instructions in regard to academic work is ignored and this results to dismal academic performance.

4.5.3 Pupils Mean Academic Performance for Three Terms-2017

The study sought to establish the mean academic performance of the sampled pupils in the past three terms. The questionnaires filled by the pupils were coded such that each

respondent termly mean marks were obtained from the class teachers' mark book. The performance was segregated according to gender and whether one was involved in sand harvesting or not. Subsequently, a t-test at 95% confidence level was conducted to ascertain whether there was a significant differences in academic performances in the different categories. Table 4.8 shows the summary of the analyzed data.

Table 4.8: Pupils Mean performance for three Terms

Category	Involvement in sand harvesting	N	Mean marks	Standard deviation	t value	Sig. value (2 tailed)
Boys	Involved	40	243.7	5.2	34.5	0.004
	Not Involved	55	278.2	4.8		
Girls	Involved	14	250.9	4.2	27.85	0.017
	Not Involved	41	257.5	6.1		
Overall	Involved	54	251.8	5.6	10.6	0.024
	Not Involved	96	260.2	7.3		

It was evident from Table 4.8 that boys who indicated that they were taking part in sand harvesting had a lower mean mark of 243.7 while their counterparts had a higher mean of 278.2 out of the maximum 500 marks. The observed difference was also found to be significant ($t = 34.5$, $df = 93$, $p < 0.05$). Similarly, girls who were not involved in sand harvesting performed slightly better with a mean of 257.5 against those who indicated that they took part who had 250.9 marks. The difference though small was found to be significant at 95% confidence level ($t = 27.85$, $df = 53$, $p < 0.05$). Overall, the mean mark of all sampled pupils (regardless of gender) not involved in sand harvesting was found to be significantly higher ($t = 10.6$, $df = 153$, $p < 0.05$) than those involved. Thus apart from individual class teacher observation that pupils who indulged in sand harvesting child

labour performed dismally, it was also ascertained statistically that a significant difference existed.

4.6 Effect of Sand Harvesting on Pupils' Physical Learning Environment

The third objective of the study was to establish the effect of sand harvesting on pupils' physical learning environment in primary schools in Kenyawa Division, Kajiado East Sub County, Kajiado County. In order to accomplish the objective, data was collected from pupils, teachers and head teachers. All the categories of respondents were required to explain how the sand harvesting has affected the physical environment in their schools catchment areas. Information gathered from the various categories of respondents converged on the following effects: drying of rivers due to lowering of water table after scooping out the sand, destruction of vegetation along the riparian land leading to soil erosion and flooding, gaping holes around the sand harvesting areas, damage of roads by overloaded sand carrying lorries, air pollution (air saturated with sand particles), respiratory diseases to air pollution, and noise pollution (day and night movement of lorries).

The issue of drying rivers, wells and boreholes was especially emotive to all categories of respondents. Some head teachers could remember with nostalgia the days when rivers were full of clean water and wells were never dry. A head teacher lamented:

Our women and children spend so much time nowadays searching for water, it is normally dry the better part of the year. Most of the rivers were permanently flowing but the onset of intensive sand harvesting everything changed...animals are thirsty, people are thirsty...its dusty everywhere and everyone is coughing...(Head teacher 1)

Class teachers were also concerned with, the prevalent of eyes and respiratory diseases that keep pupils and teachers out of school for long. Due to these sicknesses, pupils stay at home or go to seek medical attention prompting teachers to teach different composition of pupils in different days. Consequently, pupils lack continuity in the learned material resulting to dismal performance in examinations, lack of interest and finally drop out.

All categories of respondents indicated that the noise that emanates from the overloaded heavy trucks is a great nuisance as teachers are forced to cut short their teaching and let the noise to subside. This disorganizes their time management leading to lack of syllabus coverage. Roads damage by the heavy trucks also impacts on the pupils' education. Teachers get to school late while quality assurance officers avoid visiting schools as expected due to impassable roads. Lack of quality assurance and standards check, may compromise the pupils scholarship resulting to low learning levels.

Overall most of the head teachers observed that though the sand harvesting had uplifted a number of families economically, the damage it has brought to the physical environment has far reaching ramifications. In particular, all categories of respondents, singled out the enduring noise from the sand carrying trucks and the deafening sound from exploding grenades during sand and other associated minerals extraction as a major nuisance and health hazard. The magnitude of the hazards arising from sound pollution was as described by one of the head teachers, thus:

Sometimes, the noise made by the sand carriers makes teaching impossible.... pupils cannot hear the teacher... you try to shout to no avail...when several of loaded lorries are moving close to the school, even the earth trembles and pupils lose concentration. The noise is often accompanied with dust and the entire environment becomes uncondutive to learning. In such circumstances, teachers

resort to use of unplanned teaching techniques such as writing questions on the board... (Head teacher 8).

Lamenting in regard to the same issue, another head teacher lamented:

The frequent sudden grenade explosions in this area will finally make some of us deaf...we should at least be prepared that the sand excavators will carry out such an operation...some sick children suffer the most...others lose concentration in class after such an event. I think they do infringe on our rights and NEMA should intervene soonest possible. Furthermore, several buildings in the school have now developed huge and dangerous cracks as a result of the loud sounds and constant vibrations. (Head teacher 9).

The generally accepted standard to minimize hearing risk is based on an exposure to 85 dba for a maximum limit of eight hours per day, followed by at least ten hours of recovery time at 70 dBA or lower (at which the risk of harm to healthy ears is negligible). Further, noise levels above 140 dB are not considered safe for any period of time, however brief and for children, the World Health Organization (WHO) recommends no exposure above 120 dB.

In order to ascertain the effect of noise emanating from sand harvesting activities in Kenyawa division, the study used the Measurement of Noise in the School Environment Inventory (MNSEI) to collect data from the sampled schools. The Integrated Sound Level Meter was used for a duration of two consecutive weeks. For schools within 2KM radius, data was taken from the centrally positioned school to avoid unnecessary duplication. The readings from the noise meter were taken daily for two consecutive weeks by one of the class teachers taking part in the study. The data represented the noise variation from 8am to 4pm, the time when most of the pupils were in class. Thus, data from 16 schools were

gathered and subsequently analyzed to ascertain whether they were significantly greater than the recommended safe threshold of 85dBA for 8 hours. Table 4.9 depicts the results.

Table 4.9: Summary of Integrated Sound Level Meter Readings

School	Minimum sound level (dBA)	Maximum sound level (dBA)	Equivalent sound level (mean value) dBA	Standard safe sound level (dBA)	t value	p value sig. value (one tailed)	Comment
A	60	122	92	85	0.23	0.009	Significant
B	72	90	86	85	1.24	0.104	Not significant
C	40	88	80	85	-0.78	0.32	Not significant
D	80	120	88	85	1.17	0.029	Significant
E	63	91	87	85	0.18	0.35	Not significant
F	42	80	75	85	-0.28	0.42	Not significant
G	57	118	84	85	-0.78	0.52	Not significant
H	63	122	90	85	0.68	0.002	Significant
I	58	94	80	85	-0.92	0.214	Not significant
J	60	96	87	85	0.43	0.011	Significant
K	70	103	88	85	0.12	0.008	Significant
L	55	90	82	85	-0.18	0.91	Not significant
M	31	87	75	85	-0.27	0.17	Not significant
N	64	89	70	85	-0.19	0.18	Not significant
O	61	121	91	85	0.34	0.027	Significant
P	68	94	79	85	-0.63	0.38	Not significant

$\alpha = 0.05$

It was evident from Table 4.9, that the equivalent noise levels in six schools' environment were significantly greater than the safe threshold of 85 dBA ($p < 0.05$). This meant that some pupils were at risk of developing hearing problems. Additionally, at high noise level disrupted teaching and learning which could lead to poor syllabus coverage and dismal

academic performance. The interviewed head teachers attributed the high levels of noise to mainly sand carrying trucks the roads next to schools. The school environment also occasionally experienced sharp sudden noise as grenades were used to prepare open cast mines. However, the study findings also showed that, though all schools in Kenyawa division were prone to noise pollution, the equivalent noise levels in most of the schools were not greater than the safe threshold of 85 dBA.

CHAPTER FIVE

DISCUSSION, SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the discussion of the findings as per research objectives, summary of the findings, and conclusions derived from the findings and discussion. The chapter closes with the recommendations as per the objectives and suggestions of areas of further study. The purpose of the study was to investigate the effect of Sand harvesting on pupils' education in public primary schools in Kenyawa division, Kajiado East sub-county, Kajiado County, Kenya. The study objectives were to assess the effect of sand harvesting on pupils' school attendance, to examine the effect of sand harvesting on pupils' academic performance and to establish the effect of sand harvesting on pupils' physical learning environment in, Kenyawa division, Kajiado County Kenya.

5.2 Discussion of the Findings

This section discusses the results and analysis as per the three study objectives.

5.2.1 Effect of Sand Harvesting on Pupils' School Attendance

In reference to Table 4.5, teachers rated sand harvesting as the top cause of boys failure to turn up in school, to be attentive in school and dropout from school in Kenyawa division. On the other hand, sand harvesting was not among the five top most reasons for girls' low attendance and participation in school. The finding was similar to Mutiso and Orodho (2014) who found that boys were more involved compared to their female counterparts in sand harvesting in public primary schools in Kathiani Division, Machakos County. The implication of this finding is that boys' school participation is the most affected and are also more likely to indulge in drugs and alcoholism as they interact with other older miners.

Most of the teachers' indicated that early marriages and pregnancies are the leading cause to low participation in education. This finding concurs with several other studies such as Denge (2016) and Sipitiet (2017) which investigated the participation in education among communities in Arid and Semi-Arid Lands (ASAL). However, Muendo (2015) linked primary school girls pregnancies to sand harvesters who lure girls using the quick money earned in the trade. Therefore, though girls hardly get directly involved in trade harvesting, some of them get lifelong effects. Most teachers also rated farm labour such as tomatoes harvesting as the second most frequent cause of low girls participation. In addition, low girls participation was also linked to house hold chores. The finding that girl child labour was rampant though not involved in sand harvesting, was congruent to Lesanayo (2014) and Okpechi (2014) who found that girls were mostly engaged in family labour in agriculture and house hold chores.

Other factors that influenced boys' low participation in school included herding, transport business (bodaboda) and over age. Cognate to the study, Sipitiet (2017) found that some families in Kajiado are still practicing nomadic pastoralism in which all the members of the family relocate in search of better pastures for their livestock. However, as noted by some the interviewed head teachers, sand harvesting has led to permanent settlements thereby reducing cases of pupils' relocation due to nomadic pastoralism. Teachers were of the opinion that poverty contributed to low school participation of both boys and girls. This finding concurred with most of the studies reviewed in the current study (Adu-Gymfi, 2014; Alfa & Karim 2016; chinyoka and Naidu, 2014; Gitonga, 2017; Ligeve, 2012). Adu-Gymfi (2014) opine that prevalence of poverty, prompted the parents to encourage their children to skip the school and instead assist them in supplementing the family income especially when the parents are aged or sickling. The study established that students who

came to school regularly performed tremendously while the absenteeism students perform poorly.

Referring to Figure 4.1, 40 (42.1%) boys indicated that they were involved in sand harvesting while 55% were not. Though the degree of involvement was varied from one individual to another, the percentage of the boys involved was higher than what the head teacher and teachers' indication. This finding was in congruent to Adu-Gyamfi (2014) who found that the percentage of boys who professed to take part in mining during school hours was far much higher than what their teachers knew. The finding was however, contrary to Gitonga (2017) that primary school pupils were rarely involved in strenuous work such as sand harvesting and mining in general. The high percentage of boys involved implied that boys were prone to this type of child labour and class teachers in collaboration with other subject teachers to ensure they monitor the pupils participating in each lesson throughout the day. Failure to monitor the attendance of each lesson, it would be possible that the register indicates full attendance if done in the morning while as the day progresses the lessons attendance is quite different.

Girls' response on whether they take part in sand harvesting indicated that majority (74.5%) were not taking part in sand harvesting. Nevertheless, 14 of them constituting 25.5% affirmed that they took part in sand harvesting. The finding was contrary to teachers and head teachers responses who indicated that girls hardly take part in the sand business. The finding that only a few girls took part in sand mining was contrary to child mining where Adu-gyamfi (2014) both boys and girls were equally active participants.

In regard to how pupils' spent the money earned from sand harvesting business, most of the pupils indicated that they bought food stuffs for their families, clothes and other

personal items, paying school levies, buying phones, keeping pocket money to buy snacks at school and others. A few students indicated that in addition to catering for their personal items such as clothes and phones, they also used in alcohol, miraa (khat) and other drugs. The finding was similar to Muendo (2017) and Mutiso and Orodho (2014) who found that alcoholism, abuse of substance and alcohol and immorality was on increase among the sand harvesters and other traders surrounding the sand industry. The indulgence by the young people was also noted by some head teacher. One of the head teacher commented, thus;

The quick cash earned for loading trucks with sand has attracted many youths into the area, bring with it adverse effects of rising cases of drugs and substance abuse. The loaders, once they are paid for their services retreat into cheap liquor dens where they spend all the day's earnings. Many of them have left their families destitute and languishing in poverty.

Another head teacher commented:

Disintegration of the family unit is imminent in this area. Most of the loaders spend whole nights at the river and later go to bars to drink. The local shopping centre that had one bar in the past has an additional five at the moment targeting the loaders' cash.

Similarly, in a neighboring sand harvesting region of Kaskeu division, Ombuor (2015) observed that woman were not strong enough to load sand onto lorries and instead engaged in prostitution flooding Kasikeu division of Kilome County with unwanted babies fathered by the drug-soaked lads. Therefore it was evident that most of the pupils involved in sand harvesting were in a vicious cycle of working for the little quick money, spend in mainly leisure and go back to working for more.

The study also sought to establish the parents/guardian occupation with a view of establishing the possible influence of parents' occupation and pupils' participation in school. In reference to figure 4.2, most of the parents (67%) practiced farming and sand harvesting as their main livelihood, 18% of parents practiced pastoralists while 15% were in other occupations. This implied that child labour in Kenyawa division was bound to be inclined to farming and sand harvesting. This finding was a notable departure from Sipitiet (2017) who indicated that the major occupation among the maasai community in Kajiado County was pastoralism. However, the finding corroborated Gitonga (2017), Muendo (2015) and Mutiso (2012) whose findings indicated that the quick money from sand harvesting, made most of the people neglect and abandon other occupations whose accrued benefits were not immediate.

According to head teachers most of the pupils' engaged in sand harvesting are aware that they are acting against the NEMA (2007) guidelines which put the minimum age at 18 years. Head teachers' on their part, disseminate information against use of child labour in sand harvesting. Therefore, pupils' engaging in sand harvesting, do it discreetly such that most of the fellow pupils' and teachers are not aware. In order to monitor and offer corrective advice and measures in appropriate time, class teachers should be keen to identify not only pupils who are just beginning but also those already immersed in the practice. In this regard the study sought to establish how teachers came to know that certain pupils are involved in sand harvesting. The response to this open ended question was varied. Some of the responses included: sleeping in class; truancy; absenteeism; poor performance; restlessness; gathering information from other labourers, parents, other students and area leaders; indiscipline, low concentration in class, possessing things that other students do not have such as mobile phones, several pairs of shoes and others, found

on site working or near the sand harvesting areas. It is however, noteworthy that while all the possession of certain expensive items would be a crucial indicator of child labour in sand industry, physiological and psychosocial factors such as low concentration, getting irritable, sleeping in class and disorientation, and withdrawal remains the major telltale indicators.

These findings were in congruent to Binder and Scrogin (1999) study which established that Work which demands extensive physical energy, sucks the child's energy required for school attendance or effective study. Consequently the accumulated fatigue and lack of leisure activities to support physical, social and emotional development, the child is bound to experience very little mental stimulation and end up neglecting his or her studies. In a similar finding, Akabayashi and Psacharopoulos (1999), found that a child's reading and mathematics ability increased with additional hours of school attendance and study whereas a decrease was registered with additional hours of work.

The study sought opinion of both teachers and head teachers on the ways in which sand harvesting might have enhanced pupils' participation in school. Most of teachers were of the opinion that due to many families preoccupation with sand harvesting, nomadic pastoralism has reduced. Hence the number of children who missed schools during relocation of families in search of better pasture for the livestock has significantly reduced thereby enabling more pupils to attend school and take part in school activities without interruption. Additionally, it was noted that some families have drastically changed their social economic status from poverty status line to middle income level as a result of sand harvesting income.

5.2.2 Effect of Sand Harvesting on Pupils' Academic Performance

Referring to Figure 4.3, teachers and head teachers indicated that the most prevalent problems identified with pupils involved in Sand Harvesting and which affected their academic performance were: being absent minded, irritable and argumentative, apathy towards school work, withdrawal from other pupils' activities, absenteeism and truancy. The finding was similar to Lesanayo (2014) and Ligeve and Poipoi (2012) who found that children worked for excessively long hours without adequate nutrition and health care. Further, they found that during the work process the child may learn deviant behaviours such as stealing, lack of respect to older people, lying, use of vulgar language especially when working with careless adults who treat children like adults.

Figure 4.3 indicates that a high percentage (87.5%) of teachers and head teachers found absenteeism and truancy to be the most prevalent issue affecting pupils who take part in sand harvesting. This implies that such pupils lack continuity in their school work and are likely to encounter serious problems especially in subjects such as mathematics. Similarly, a large section of teachers and head teachers (80%) affirmed that pupils involved in sand harvesting had signs of being absent minded in class. Chronic absenteeism and lack of concentration in class resulted to drop in academic performance. Cognate to the study, Bezerra et al., (2009) we found that child labor causes a loss in students' school achievement in Brazil. Further, children who were not engage in work to supplement the family income but did study during their free hour's registered better school performance than students who work. However, it was noteworthy that up to two hours of work per day did not have a statistically significant effect on school performance, but additional hours decreased student's achievement.

In reference to Table 4.6, most of the teachers (56.7%) and 50% of the head teachers felt that to some extent, parents endorsed their children into sand harvesting. Most of the head teachers indicated that sand harvesting was considered a quick way of making money and thus parents enlisted the assistance of their children in order to provide for the family. The finding was similar to Igeve and Poipoi (2012) who found that primary school children accompanied their parents in fishing business in Suba and Homa-Bay Districts. Thus most children are initiated by their parents working as a family, but later as they gain experience they get engaged on their own.

The study sought to establish other factors that might have been brought about by the practice of sand harvesting and which impacted on learners' academic performance in Kenyawa Division, Kajiado County. Referring to figure 4.4, use and peddling of drugs, luring girls to prostitution, pre-marital pregnancies and breakdown of traditional moral fabric were some of the major factors brought about by the practice of sand harvesting and which impact indirectly on pupils' academic performance. The finding was consistent with several studies (Gitonga, 2017; Lesanayo, 2014; Muendo, 2015; Mutiso, 2012) which found that as people gathered in search of the quick money commodity, several social evils emerge and which affect both boys and girls resulting to dismal academic performance.

In reference to Table 4.7, it was evident that pupils who indulged in sand harvesting child labour performed significantly lower than their counterparts. Boys who indicated that they were taking part in sand harvesting had a lower mean mark of 243.7 while their counterparts had a higher mean of 278.2 out of the maximum 500 marks. The observed difference was also found to be significant ($t = 34.5$, $df = 93$, $p < 0.05$). Similarly, girls who were not involved in sand harvesting performed slightly better with a mean of 257.5 against those who indicated that they took part who had 250.9 marks. The difference

though small was found to be significant at 95% confidence level ($t = 27.85$, $df = 53$, $p < 0.05$). Overall, the mean mark of all sampled pupils (regardless of gender) not involved in sand harvesting was found to be significantly higher ($t = 10.6$, $df = 153$, $p < 0.05$) than those involved. Thus apart from individual class teacher observation that pupils who indulged in sand harvesting child labour performed dismally, it was also ascertained statistically that a significant difference existed. This finding corroborated Bezerra et al., (2009) and Ligeve and Poipoi (2012) who statistically demonstrated that child labour led to lower school performance.

5.2.3 Effect of Sand Harvesting on Pupils' Physical Learning Environment

Referring to section 4.6, pupils, teachers and head teachers indicated that the most obvious environment damage resulting from sand harvesting activities were: drying of rivers due to lowering of water table after scooping out the sand, destruction of vegetation along the riparian land leading to soil erosion and flooding, gaping holes around the sand harvesting areas, damage of roads by overloaded sand carrying lorries, air pollution (air saturated with sand particles), respiratory diseases to air pollution, and noise pollution (day and night movement of lorries). There are several studies which have cited similar findings all over the world (Gitonga, 2017; Khan & Sugie, 2015; Mensah, 2002; Mutiso, 2012; Salifu, 2016). For instance, Mensah (2002) observed that coastal sand harvesting in Ghana led to loss of land (19.2 %), destruction of beach (18.2%), destruction of road 16.5 percent and conflict (13.5%), loss of vegetation (12.2%), destruction of property (11.8%) and use of child labour (8.4%).

Drying up of rivers and wells due to scooping of sand from riverbanks and river beds in Kenyawa division was found to have far reaching ramifications to pupils education. People

are forced to travel for longer distances in search of the vital commodity. In doing so, children labour is highly used. Other children spend time driving their livestock to distant places in search of water. As noted by Mutiso and Orodho (2014), drying up of wells and rivers escalates the levels of poverty as livestock die, food scarcity sets in and pupils' education suffers.

All categories of respondents in the current study found air pollution due to sand harvesting in Kenyawa division. As fleets of sand transport lorries traversed the region, the light and smooth top soil is blown by strong winds that characterize most of Kajiado county, turning the environment into a sea of small soil and sand particles. The particles as explained by head teachers are lethal to eyesight and a recipe to spread of numerous eye diseases. In addition, pupils and teachers are often affected by respiratory diseases prompting them to miss school. Guach (2001) cited in Mutiso (2014) reported that dust from mining sites is a major source of air pollution, although the severity will depend on factors like the local microclimate conditions, the concentration of dust particles in the ambient air, the size of the dust particles and their chemistry. The air pollution is a health hazard especially to those with respiratory problems. Dust has also been found to have physical effects on the surrounding plants, such as blocking and damaging their internal structures and abrasion of leaves and cuticles, as well as chemical effects which may affect long-term survival.

As noted by some of the interviewed head teachers, families located in regions where sand get depleted undergo income shock, and pupils from such families get affected academically. Children who have been enjoying modern amenities get a rude shock when the source of money is no more. Kavilu (2018) avers that with the depletion of sand on river beds, harvesters become desperate and target farmland and after depleting everything become desperados. The rapid depletion of one of the most world needed commodity has

started becoming a crucial environmental issue. Kavilu further notes that Singapore, has already run out of sand and in 2016, it imported 35 million tonnes. In panic, the neighbours have banned or restricted sand exports over environmental concerns.

5.3 Summary of the Findings

The aim of this study was to investigate the effect of Sand harvesting on pupils' education in public primary schools in Kenyawa division, Kajiado County. This section presents a summary of the study findings.

The study has found that child labour in sand harvesting in Kenyawa division has led to low school attendance and participation. Teachers have observed that pupils who actively take part in sand harvesting have chronic absenteeism, truancy, low concentration in class and are more likely miss classes due to indiscipline cases. Boys were found to be more involved in sand harvesting and hence and lower school participation and more involved in drugs abuse. Though, there were some girls taking part in sand harvesting most of the teachers were not aware. However, teachers observed that sand harvesting has made more families to have permanent settlement, thus, reducing the practice of nomadic pastoralism which took many children away from school. Additionally, the proceeds from sand harvesting enabled the parents to provide the essential items required by their children at school such as uniforms, books, pens, lunch, levies and transport. By doing so more pupils had regular school attendance.

In regard to pupils academic performance, it was found that pupils who took part in sand harvesting attained lower marks than those who did not take part. Though physically in class, most of the students who got involved in sand harvesting often slept in class due to overnight exhaustion, while others lacked concentration as they planned to take part after

school. Some parents were found to be encouraging their children to join them in sand harvesting, however, a few pupils excelled in their studies with the hope of pursuing secondary education as the parents were able to pay from the sand harvesting proceeds.

Kenyawa division physical environment was found to be deteriorating on daily basis as uncontrolled sand harvesting continued. Despite the existence of NEMA (2007) sand harvesting guidelines and Kajiado County occasional ban and control of the sand sector, sand harvesting has continued unabated. In the midst of hard economic conditions occasioned by drought and crop failure, and drying rivers and wells, the drive to earn quick money is greatly elevated. People bribe their way through the law enforcement officers. Sand is indiscriminately scooped from river beds and banks destroying the riparian land, enlarging the width of rivers and depriving the river water retaining capacity. As sand trucks move around, roads are damaged and sand is blown all over exposing residents to eye and respiratory complications. Environmental degradation, has had far reaching ramifications on pupils' education. Thus, the continued practice of sand harvesting, quick money, environmental degradation, and prevalence of poverty, child labour in order to support the parents, poor performance and school dropout becomes a vicious cycle.

5.4 Conclusions of the Study

From the study findings and discussions the following conclusions were made:

About 30% of pupils in public schools in Kenyawa division are immersed in sand harvesting child labour. The practice takes part mostly at night and weekends. The practice has led to pupils' chronic absenteeism, truancy and low concentration in school. Further, the practice has indirectly affected other students especially girls who get lured by the

people in the trade and end up in early marriages and unwanted pregnancies. Subsequently, schools are performing dismally in KCPE.

Due to close interaction between the children and grownups during sand harvesting, pupils have acquired undesirable behaviours such as use of drugs, stealing and immoral behaviours resulting to low academic performance. Uncontrolled sand harvesting has been wreaking havoc in Kenyawa division environment as river banks, beds and arable land get damaged, road gets damaged, air gets polluted, and riparian land becomes barren.

5.5 Recommendations of the Study

In the light of the findings and conclusions of the study, the following recommendations were deemed important for the enhancing pupils' education in Kenyawa division, in terms of school attendance, academic performance and environmental conservation and sustainability.

1. All education stake holders in primary education in Kenyawa division such as the Kenyan government, County government, NGOs, parents and teachers should combine synergy and pool resources to enable as many children as possible in the upper primary to join boarding schools. This will keep many children away from sand harvesting child labour, improve school participation and enhance academic performance
2. In addition to NEMA (2007) sand harvesting guidelines, more legislations should be enacted and above all the national and county governments should corroborate and enforce the set regulations. At the same time residents should be assisted to start other income generating activities as they rehabilitate the damaged environment. This will ensure families can support and provide their child with essentials in school.

3. Licenses to sand dealers should be issued on condition that, one will rehabilitate a section of the damaged areas and maintain good practices in sand harvesting.

5.6 Suggestions for Further Research

The researcher recommends that further research studies on;

In order to have in depth information on drive, benefits, frustrations, and hidden curriculum acquired by the pupils engaged in sand harvesting, an anthropological study should be carried out. This would require the concerned researcher to live in homes of the child taking part in sand harvesting and closely follow and interact with the pupils.

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APPENDICES

APPENDIX 1: LETTER OF TRANSMITTAL

Dear Respondent,

I am a Post-Graduate Student in the Africa Nazarene University, pursuing a master's degree in Education. I am currently carrying out a research on: **EFFECT OF SAND HARVESTING ON PUPILS' EDUCATION IN PUBLIC PRIMARY SCHOOLS OF KENYAWA DIVISION, KAJIADO COUNTY**, as part of the course requirement. For this reason, therefore, your school has been sampled for the study and you have been selected as a respondent.

Kindly answer the questions as candidly as possible. There is no right or wrong answer. Do not write your name on the questionnaire. The results of this study will be used for academic purposes only.

Yours Faithfully,

BENSON KISPAN

0723484421

APPENDIX II: CONSENT FORM (PHOTOGRAPHS)

My name is **Benson Kispan**, a post graduate student at Africa Nazarene University. I am pursuing a master's degree in Education and as a part of the course requirement am conducting a research titled: **EFFECT OF SAND HARVESTING ON PUPILS' LEARNING IN PUBLIC PRIMARY SCHOOLS OF KENYAWA DIVISION, KAJIADO COUNTY**. In order to enhance my findings and accomplish the objectives of this study, I require some photographs in regard to sand harvesting. I am therefore requesting you to consent the taking of your photograph and subsequent use in my research work. However, your name and the exact location of the activity will remain anonymous. Further, the results of this study will be used for academic purposes only. Thank you.

I _____, on behalf of the members in the group photograph, has consented the use of the photograph in the aforementioned academic research. I have also received a copy of the consent form for my records.

Date: _____

Signature: _____

Researcher's signature: _____

Cell Phone: 0723484421

Email: benkispan@gmail.com

APPENDIX III: CLASS TEACHERS' QUESTIONNAIRE (CTQ)

Please answer the following questions as accurately as possible by ticking [\surd] appropriately.

SECTION A: Background Information

1. What is your gender?

- a) Male () b) Female ()

2. How long have you worked/ stayed in the present educational zone?

- a) 0- 2 years () b) 3-5 years ()
 c) 6-7 years () d) over 10 years ()

SECTION B: Sand Harvesting and Pupils' School Participation

3. List the factors that cause upper class (class 5 to 8) pupils' absenteeism and drop out in your school. Start with the most prevalent

Order	Boys (starting with the most prevalent)	Girls (starting with the most prevalent)
1		
2		
3		
4		
5		
6		
7		

8. As a class teacher, how do you know pupils who are involved in sand harvesting?

9. Estimate the percentage number of pupils in your class who are involved in sand harvesting

Number of Pupils	Boys			Girls		
	Occasional	Serious	Not involved	Occasional	Serious	Not involved
Below 30%						
31-50%						
51-60%						
61-70%						
Above 70%						

KEY:

Occasional Sand Harvesting: This is the case where a student gets occasionally engaged in sand harvesting over the Weekend

Serious Sand Harvesting: This is a case where a student is seriously engaged in sand harvesting for commercial gains and where harvesting can take place in any day of the week.

10. How do most of the school parents generate their income?

11. Comment about the use of **child labour** in sand harvesting your locality

12. In what ways has sand harvesting improved pupils' school participation?

SECTION C: Sand Harvesting and Pupils Academic Performance

13. What are some of the problems have you noted prevalent to pupils who practice sand harvesting in class?

14. Comment on the academic performance of the pupils engaged in sand harvesting in your class

15. To what extent do you think parents endorse their daughters and sons participation in sand harvesting at the expense of their academic performance?

- a) To a very great extent
- b) To a great extent
- c) To some extent
- d) None at all

16. Mention other factors linked to sand harvesting and which affects pupils' academic performance

SECTION D: Sand Harvesting and Pupils' Learning Physical Environment

17. How has sand harvesting affected the environment in your school catchment area?

18. How have these changes in environment affected pupils' Learning?

APPENDIX IV: HEAD TEACHERS' INTERVIEW SCHEDULE (HTIS)

1. How long have you worked/ stayed in the zone?
2. What are the factors that cause upper class (class 5to 8) pupils' absenteeism and drop out in your school. Start with the most prevalent for each gender.
3. As a Head teacher, how do you know pupils who are involved in sand harvesting?
4. Comment about child labour among your school catchment area community
5. According to Kenya Basic Education Act (2013), basic education is free and compulsory, how do you influence the parents and other stakeholders to ensure that sand harvesting and other engagements do not infringe on this particular pupils' right?
6. How has sand harvesting enhanced pupil participation in school?
7. In which classes are students most involved in sand harvesting?
8. How is sand harvesting affecting pupils' performance in your school?
9. Kindly indicate the KCPE mean mark in your school for the past five years

Year	2012	2013	2014	2015	2016
Performance mean score					

10. To what extent are you satisfied with your school KCPE result over the past five years? Explain:
11. To what extent do you think parents endorse their daughters and sons participation in sand harvesting at the expense of their academic performance?
12. Mention other factors linked to sand harvesting and which affects pupils' academic performance
13. How has sand harvesting affected the environment in your school catchment area?
14. How have these changes in environment affected pupils' Learning?
15. In your own opinion what measures can be taken by the following education stake holders to curb the negative effects of sand harvesting on pupils' education. Parents, Teachers, Head teachers, Government Administrators and Others?

Thank you for your cooperation

APPENDIX V: PUPILS' QUESTIONNAIRE (PQ)

Introduction

This questionnaire seeks to gather information to be used in a study of the effect of sand harvesting on pupils' education in public primary schools of Kenyawa Division, Kajiado County, Kenya. Your honest response will be used for the purpose of this study and will be treated with utmost confidentiality. Do not indicate your name anywhere in this questionnaire.

Instructions: You are kindly requested to honestly respond to the questionnaire items by putting a tick (✓) in the spaces provided or by writing an explanation as required.

SECTION A: BACKGROUND INFORMATION

1).What is your gender

Male ()

Female ()

2.) Indicate your Class

Class 7 ()

Class 8 ()

3.) What is your age bracket?

12years and below ()

13-15 years ()

Over 15years ()

4. School attendance: Please consult your class teacher and fill the following table

Total number of school days since January this year	Number of days you have been present in school since January this year	% Attendance

SECTION B: SAND HARVESTING AND PUPIL’S EDUCATION

4. Do you get involved in sand harvesting?

NO []

YES []

5. If yes, how many times per week? _____

6. Specifically, when do you do your sand harvesting during school term (you can tick more than one choice)

- a) Weekends
- b) Any time sand lorries come
- c) Evening after school
- d) At night
- e) Morning before school
- f) Day time hours

7. What do you do with the money earned?

8. What is your Parents/Guardian Occupation?

9. Do your Parents/Guardian encourage you in sand harvesting? _____

10. In what ways do you think sand harvesting affects your academic performance?

11. How does sand harvesting affect physical environment in your region?

12. How have these changes in environment affected your education?

13. Briefly give suggestions on what should be done to minimize the negative effects of sand harvesting on pupils' education.

Thank you for your cooperation

**APPENDIX VI: MEASUREMENT OF NOISE IN THE SCHOOL
ENVIRONMENT INVENTORY (MNSEI)**

Name of the School: _____

<u>Week 1</u>	Date	Minimum sound level dB(A)	Maximum sound level dB(A)	Equivalent sound level dB(A)
Day				
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
<u>Week 2</u>				
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				

NB: dB (A) means decibels of noise, measured with an A-weighted filter.

dB(A) are decibel scale readings that have been adjusted to attempt to take into account the varying sensitivity of the human ear to different frequencies of sound.

**APPENDIX VII: LIST OF PUBLIC PRIMARY SCHOOLS IN KENYAWA
DIVISION, KAJIADO COUNTY**

S/N	School	S/N	School
1.	Imaroro	16.	Oldarpoi
2.	Eselenkei	17.	Emarti
3.	Kiloh	18.	Ilkimunyak
4.	Parsinti	19.	Imatoi
5.	Nkatu	20.	Lesonkoyo
6.	Kibini	21.	Isara
7.	Ilkishumu	22.	Ilmukutani
8.	Ole Narau	23.	Paranai
9.	Elangata Nanyokie	24.	FPFK Lesoit
10.	Mashuuru	25.	Esoit Sambu
11.	Ollontepes	26.	Samuli
12.	Olmeleki	27.	Noopeuti
13.	Ilkiremisho	28.	Esarumoto
14.	Ilkidemi	29.	Ilmejooli
15.	Edikir	30.	Osarai

APPENDIX VIII: SAND HARVESTING ON A RIVER BEND

Source: Researcher

APPENDIX IX: SAND HARVESTING ON RIVER BANK



Source: Researcher

APPENDIX X: A SAND QUARRY



APPENDIX XI: LETTER OF INTRODUCTION FROM ANU

AFRICA NAZARENE
UNIVERSITY

2nd February, 2018

RE: TO WHOM IT MAY CONCERN

Benson Kisipan (14S01DMED001) is a bonafide student at Africa Nazarene University. He/She has finished his/her course work and has defended his/her thesis proposal *entitled "Effects of Sand Harvesting on Pupils Education in Public Primary Schools of Kenyawa Division, Kajiado County, Kenya."*

Any assistance accorded to his/her to facilitate data collection and finish his/her thesis is highly welcomed.

Prof. Zablon Nthamburi
REGISTRAR

**APPENDIX XII: RESEARCH AUTHORIZATION FROM KAJIADO COUNTY
COMMISSIONER**

THE REPUBLIC OF KENYA



THE PRESIDENCY

Telegrams: "DISTRICTER", Kajiado
Telephone: 0203570295
Fax: 0202064416
E-mail: kajiadocc2012@yahoo.com
Kajiadocc2012@gmail.com
When replying please quote

MINISTRY OF INTERIOR
AND COORDINATION
OF
NATIONAL GOVERNMENT

OFFICE OF THE COUNTY
COMMISSIONER
KAJIADO COUNTY
P.O BOX 1-01100
KAJIADO

Ref. KJD/CC/ADM/45VOL.1/ (70)

6th March, 2018

Benson Sayianka Kisipan,
Africa Nazarene University,
P.O BOX 53067 - 00200,
NAIROBI

RE: RESEARCH AUTHORIZATION: BENSON SAYIANKA KISIPAN

Following the request made on your behalf by National Commission for Science, Technology and Innovation Ref. No. NACOSTI/P/18/21034/21408 dated 2nd March, 2018, you are authorized to undertake your research on "Effect of sand harvesting of pupils education in public primary school in Kenyewa Division, Kajiado County," for a period ending 2nd March, 2019.

You are advised to carry your research in line with laid down research ethics.


JACK MBISO
FOR: COUNTY COMMISSIONER
KAJIADO COUNTY.

CC:
Deputy County Commissioner
MASHURU SUB - COUNTY.

The County Director of Education
KAJIADO COUNTY.

**APPENDIX XIII: RESEARCH AUTHORIZATION FROM COUNTY DIRECTOR
OF EDUCATION**

**MINISTRY OF EDUCATION
STATE DEPARTMENT OF EARLY LEARNING AND BASIC EDUCATION**

email: kajiadocde@gmail.com
When replying please quote



COUNTY DIRECTOR OF EDUCATION
KAJIADO COUNTY
P.O. BOX 33-01100
KAJIADO

Ref: KJD/C/R.3/VOL.I/26

7th March, 2018

Benson Sayianka Kisipan
African Nazarene University
P.O. Box 530067-00200
NAIROBI

RE: RESEARCH AUTHORIZATION: BENSON SAYIANKA KISIPAN

The letter from National Commission for Science, Technology and Innovation Ref. NACOSTI/P/18/21034/21408 dated 2nd March, 2018 refers.

This is to confirm to you that, you have been authorized to conduct your research on **'Effect of sand harvesting of pupils education in public primary schools in Kenyewa Division, Kajiado County'** for a period ending **2nd March, 2019.**

It is expected that you adhere to research ethics in doing your study.

**JOB O. KAIKAI
FOR: COUNTY DIRECTOR OF EDUCATION
KAJIADO COUNTY**



APPENDIX XIV: RESEARCH AUTHORIZATION FROM NACOSTI



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349, 3310571, 2219420
Fax: +254-20-318245, 318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. **NACOSTI/P/18/21034/21408**

Date: **2nd March, 2018**

Benson Sayianka Kisipan
Africa Nazarene University
P.O. Box 53067-00200
NAIROBI.

RE: RESEARCH AUTHORIZATION

following your application for authority to carry out research on *“Effect of sand harvesting of pupils education in public primary school in Kenyewa Division , Kajiado County,”* I am pleased to inform you that you have been authorized to undertake research in **Kajiado County** for the period ending **2nd March, 2019.**

You are advised to report to **the County Commissioner and the County Director of Education, Kajiado County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.


GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Kajiado County.

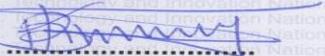
The County Director of Education
Kajiado County.

APPENDIX XV: RESEARCH PERMIT FROM NACOSTI

THIS IS TO CERTIFY THAT:
MR. BENSON SAYIANKA KISIPAN
of AFRICA NAZARENE UNIVERSITY,
0-1100 KAJIADO, has been permitted to
conduct research in Kajiado County

on the topic: EFFECT OF SAND
HARVESTING OF PUPILS EDUCATION IN
PUBLIC PRIMARY SCHOOL IN KENYEA
DIVISION , KAJIADO COUNTY

for the period ending:
2nd March, 2019


Applicant's
Signature

Permit No : NACOSTI/P/18/21034/21408
Date Of Issue : 2nd March, 2018
Fee Received :Ksh 1000



J.P. Kalema
Director General
National Commission for Science,
Technology & Innovation

CONDITIONS

1. The License is valid for the proposed research, research site specified period.
2. Both the Licence and any rights thereunder are non-transferable.
3. Upon request of the Commission, the Licensee shall submit a progress report.
4. The Licensee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.
5. Excavation, filming and collection of specimens are subject to further permissions from relevant Government agencies.
6. This Licence does not give authority to transfer research materials.
7. The Licensee shall submit two (2) hard copies and upload a soft copy of their final report.
8. The Commission reserves the right to modify the conditions of this Licence including its cancellation without prior notice.



REPUBLIC OF KENYA



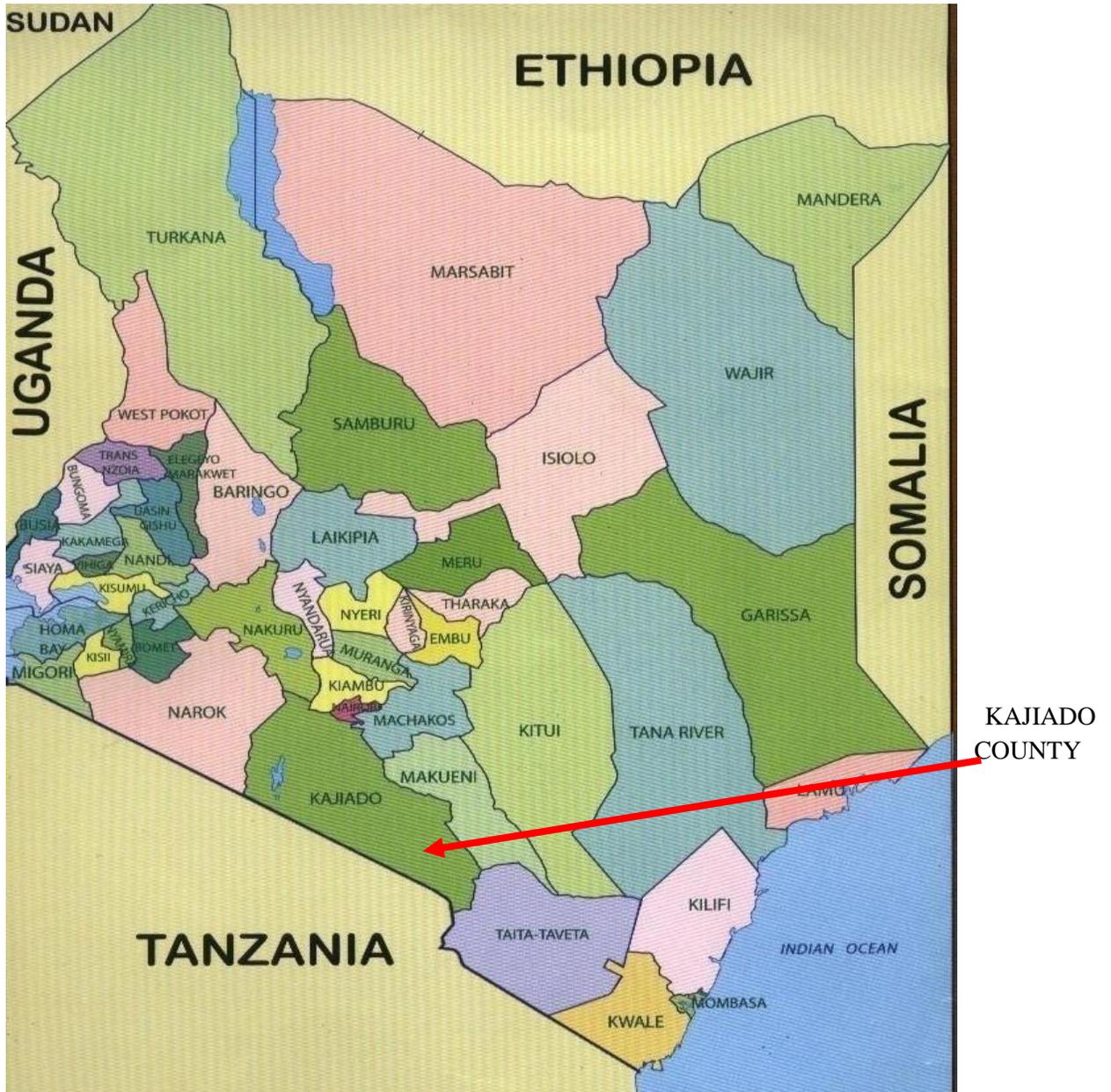
National Commission for Science,
Technology and Innovation

RESEARCH CLEARANCE
PERMIT

Serial No.A 17765

CONDITIONS: see back page

APPENDIX XVI: MAP OF KENYA SHOWING LOCATION OF KAJIADO COUNTY



APPENDIX XVII: MAP OF KAJIADO COUNTY SHOWING KAJIADO EAST SUB COUNTY



APPENDIX XVIII: MAP OF KAJIADO EAST SUB COUNTY SHOWING KENYAWA DIVISION

